fischer elektronik

to cool to protect to connect

f.cool.e

made in Germany

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Management System
ISO 9001:2015
ISO 14001:2015
ISO 27001:2013
www.tuv.com
ID 0091004274

Heatsinks Cooling aggregates Thermal conductive materials

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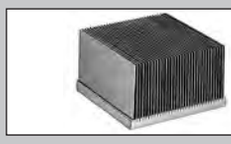
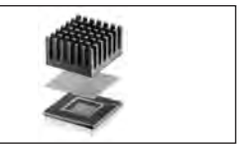
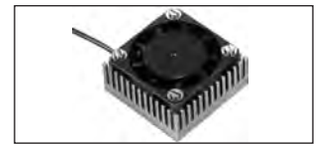
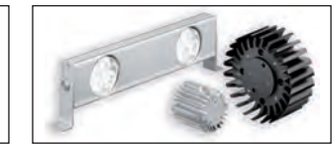
f.cool.e 11 - 2022
500

flucticulus frigus
from the series
flucticulus,
Homage an Hokusai, 2019,

16.000 photos 10 x 15 on cardboard, 60 x 60 cm

from:
Thomas Kellner
www.thomaskellner.com

A	**A 1 – A 172**				
B	**B 1 – B 78**				
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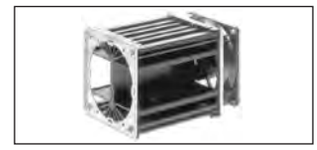
D	**D 1 – D 57**				
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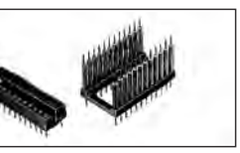
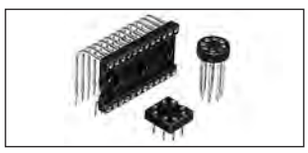
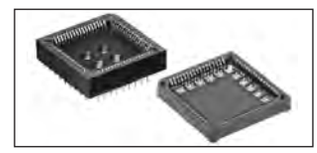
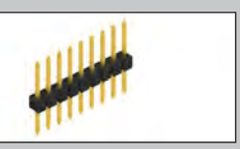
F	**F 1 – F 27**				
G	**G 1 – G 106**				
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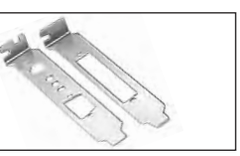
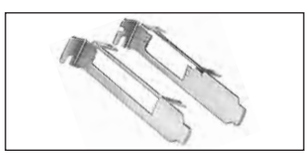
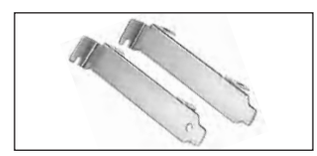
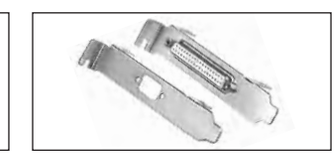
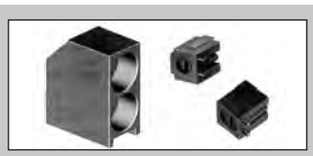
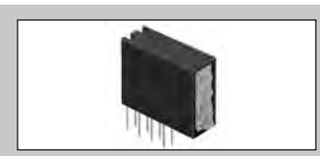
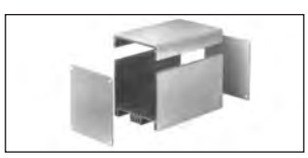
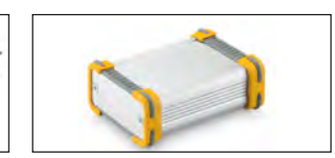
K	**K 1 – K 28**				
L	**L 1 – L 16**				
M	**M 1 – M 82**				
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Extruded profiles: extruded heatsinks, extruded heatsinks for lock-in retaining spring, extruded heatsinks for PCB mounting, fin coolers, fluid coolers, high-performance heatsinks	**A 1 – A 172**	**A**
Heatsinks for processors and LED: heatsinks and fan coolers for universal PGA/BGA, DIL, PLCC, heatsinks for LED, pin heatsinks	**B 1 – B 78**	**B**
Board level heatsinks: finger-shaped heatsinks, heatsinks for transistors in plastic case, attachable heatsinks, small heatsinks, copper heatsinks for D PAK and others	**C 1 – C 36**	**C**
Cooling aggregates: miniature cooling aggregates, heatsink cooling aggregates, high capacity cooling aggregates, multi module cooling aggregates, hollow-fin aggregates, cooling aggregates with axial fan	**D 1 – D 57**	**D**
Thermal interface material and accessories for electronic components: thermally conductive foil made of siliconelastomer, silicone-free thermal conductive foils, GEL thermal conductive foils, aluminium oxide wafers, mica wafers, thermal conductive paste, thermally conductive adhesive, fixing clamp for mounting rail, guide rails, mounting material for heatsinks	**E 1 – E 105**	**E**
Sockets: IC-sockets for DIL, PLCC, sockets for transistors, crystal oscillators and connector-sleeves	**F 1 – F 27**	**F**
PCB connectors and accessories: male and female headers, grid spacing 2.54; 2.50; 2.00 and 1.27 mm, high precision contact strips, direct female connectors, jumpers	**G 1 – G 106**	**G**
IDC connectors: design DIL, shroud-male header, single and double row female headers, lockable connectors, ribbon cable	**H 1 – H 19**	**H**
D-Sub connectors: USB connectors, RJ45 connectors, D-Sub male and female headers, connectors with mounting option, connectors for ribbon cable, mixed layout connectors, SMD connectors, cover, accessories	**I 1 – I 42**	**I**
Brackets: brackets for PC and PCI with or without fixing tab, retainer for ISA versions	**K 1 – K 28**	**K**
Optoelectronics: LED-holders for front panel assembly, LED-holder without LED, LED-holder with mounted LED, light pipes for SMDs	**L 1 – L 16**	**L**
Cases: shell cases, extruded assembled cases, desk consoles, combination cases, tube cases, miniature aluminium cases, cooling cases, LED line modules, design cases, special front panels, accessories for cases	**M 1 – M 82**	**M**
19" Extension systems: basic case (Rack), plug-in chassis, subracks, insert modules, part front panels, rack handles, PCB holder, accessories	**N 1 – N 69**	**N**

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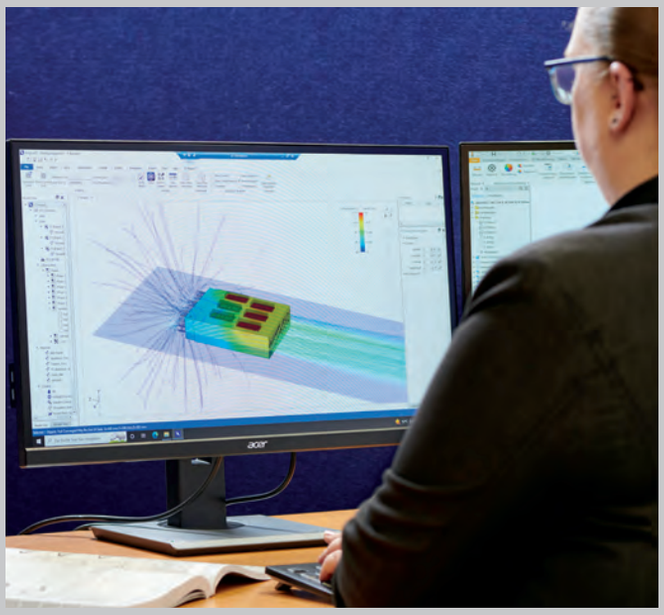
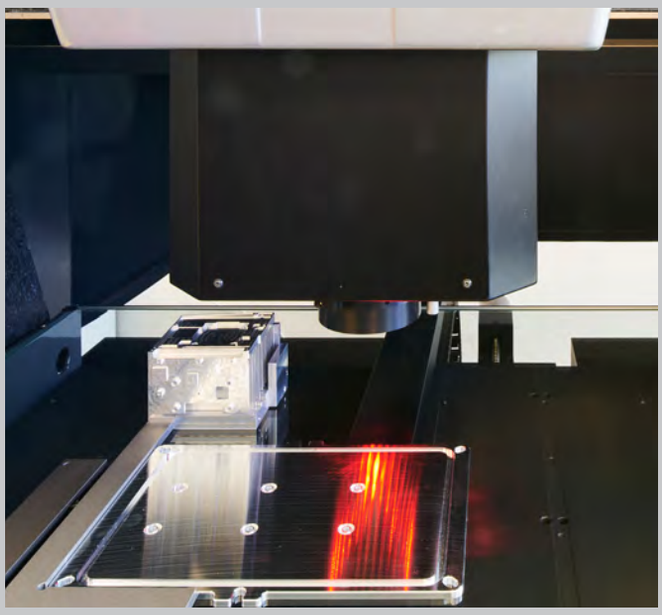
entrance area company

motivated employees

committed field service

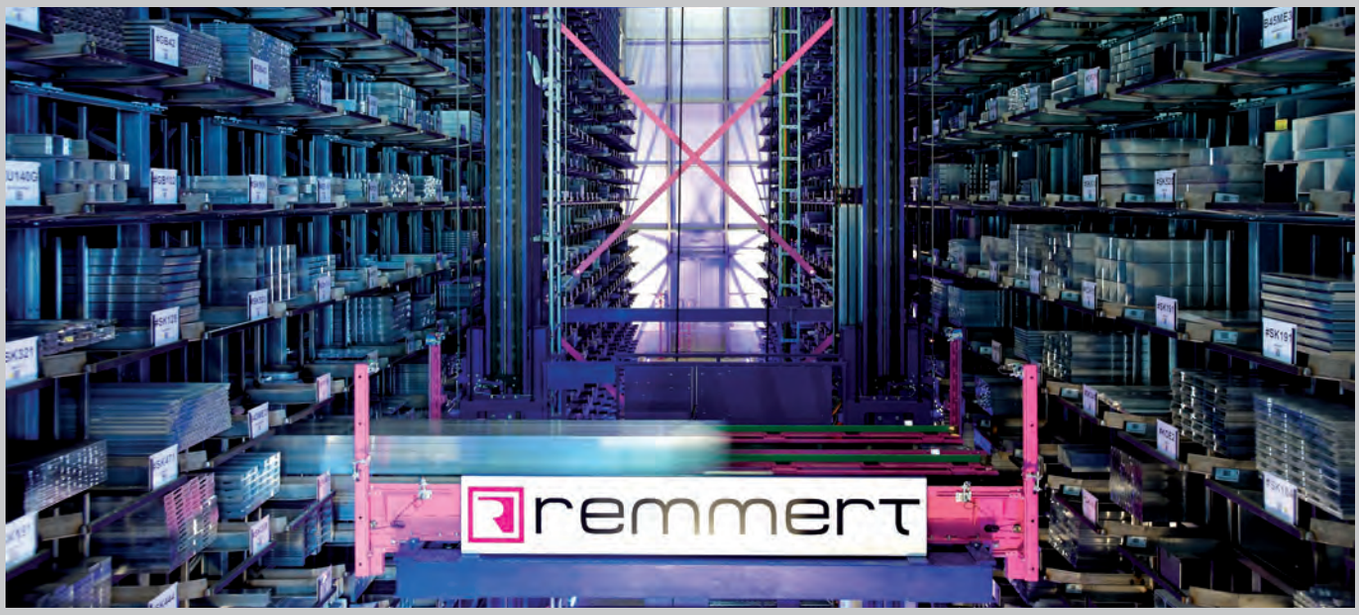


innovative product development

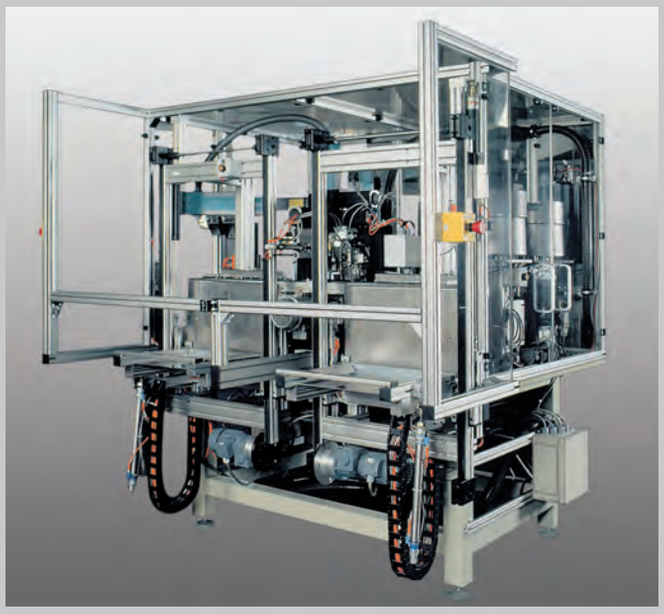


certified quality management

own tool-making department



foresighted storekeeping



efficient special machines

low-burr sawing technology

precise punching department

up-to-date milling technology

Electronica, Fair Munich D

Embedded World, „NürnbergMesse“ D

Light + Building, „Messe Frankfurt“ D

Amper, Brno Exhibition Centre CZ

IPS - International Parts + Supply, MOC Munich D

You can find current exhibition dates at
www.fischerelektronik.de/en/latest-news/exhibition-and-events-congresses

Quality-Management System ISO 9001

We are certified to ISO 9001.
This process-directed quality management system implies a constant focus on satisfying the demands of customers, and this is the major objective of our company.

The implementation and further development of our quality management system demonstrably ensures
- guaranteed customer satisfaction and thus the success of our company,
- compliance with customers' requirements at all times through defined processes,
- early detection and prevention of errors, and
- checking of both process effectiveness and efficiency on a regular basis together with steady improvement.

It is through constant vigilance and the provision of evidence that we deliver flawless products, which fully comply with quality requirements, that we maintain our quality certification.
In order to secure lasting company success and to meet our customers' expectations now and in the future, we define measurable objectives within the framework of our quality system, which are regularly checked and developed.
We are committed to constant measurement and improvement of our performance.

Our quality management system applies to all processes carried out by our company.

Certificate

Standard **ISO 9001:2015**

Certificate Registr. No. **09 100 4274**

Certificate Holder:

Fischer Elektronik GmbH & Co. KG
Nottebohmstr. 28
58511 Lüdenscheid
Germany

Scope: Design/construction, manufacture, assembly and technical advice for heatsinks, sockets, connectors, mounting parts, cases, 19" assembly systems, computer accessories

Proof has been furnished by means of an audit that the requirements of ISO 9001:2015 are met.

Validity: The certificate is valid from 2021-11-01 until 2024-10-31.
First certification 1994

2021-09-09

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

www.tuv.com

Certificate

Standard **ISO 14001:2015**

Certificate Registr. No. **01 104 8209**

Certificate Holder:

Fischer Elektronik GmbH & Co. KG
Nottebohmstr. 28
58511 Lüdenscheid
Germany

Scope: Design/construction, manufacture, assembly and technical advice for heatsinks, sockets, connectors, mounting parts, cases, 19" assembly systems, computer accessories

Proof has been furnished by means of an audit that the requirements of ISO 14001:2015 are met.

Validity: The certificate is valid from 2021-10-09 until 2024-10-08.
First certification 1998

2021-09-09

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

www.tuv.com

Environmental Management System ISO 14001

We consider protection of the environment and saving of natural resources entrepreneurial tasks of high priority.

Aware of this, our company was the first German heat-sink manufacturer to implement, the environmental management system in accordance with ISO 14001 in 1998.

Our entrepreneurial responsibility comprises preventing accidents, safeguarding against occupational diseases, designing workplaces to suit human requirements, developing products which are safe to use, saving resources and avoiding environmental impact to the maximum extent possible.

We already consider environmental compatibility in the product and process development stage. The environmental impact of our activities is documented, assessed and in a continuous improvement process reduced to a minimum.

Implementation and consistent working on and with the environmental management system is a vital process and a constant challenge but finally it will always lead to better results.

Information management norm DIN EN ISO/IEC 27001

Information security is becoming more important. For the success of our business information are essential values. Administrating and protecting those has our top priority.

The information security management system to ISO/IEC 27001 considers three kinds of information: availability, confidentiality and integrity.

This information security management system is the basis for continuous monitoring and optimisation processes.
It also ensures the scrupulous handling with information. A protection against attacks on the corporate network and theft is ensured.

Within the information security management system the risk evaluation such as human misconduct takes place by means of error-possibility-influence-analysis.

Certificate

Standard **ISO/IEC 27001:2013**

Certificate Registr. No. **01 153 101878**

Certificate Holder:

Fischer Elektronik GmbH & Co. KG
Nottebohmstr. 28
58511 Lüdenscheid
Germany

Scope: Design/construction, manufacture, assembly and sales for heatsinks, sockets, connectors, mounting parts, cases, 19" assembly systems, PCB accessory

SoA Version 2.2 dated 14.02.2020

Proof has been furnished by means of an audit that the requirements of ISO/IEC 27001:2013 are met.

Validity: The certificate is valid from 2020-12-23 until 2023-09-30.

2021-01-12

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

www.tuv.com

IAF DAkkS Deutsche Akkreditierungsstelle D-ZM-16031-01-00 TÜVRheinland® Precisely Right.

Europäische Gemeinschaft

AEO-Zertifikat

DE AEOC 101367
(Nummer des Zertifikats)

1. Inhaber des AEO-Zertifikats	2. Erteilende Behörde
Fischer Elektronik GmbH & Co KG EORI-Nummer: DE 2499770 Nr. der amtl. Eintragung: HRA 2836 UST-IDNr(n).: DE 125797501	Hauptzollamt Dortmund Kronenburgallee 7 DE-44139 Dortmund

HAUPTZOLLAMT DORTMUND

Der in Feld 1 genannte Inhaber ist

Zugelassener Wirtschaftsbeteiligter

"AEOC (zollrechtliche Vereinfachungen)"

3. Tag, ab dem das Zertifikat wirksam ist:

16.03.2010

The authorised economic operator AEO-certificate

Since 1st January 2008 companies based in the European Union and involved in customs activities have been able to apply for the status of Authorised Economic Operator (AEO). The status entitles a benefit of safety-relevant custom controls and/or simplification according to custom regulations.

The goal is here to ensure an uninterrupted global supply chain from the producer to the end user. The status of an authorised economic operator is valid in all Member States and is not limited in time.

Our company has the status AEO-C (customs simplification).

The legal requirements of an authorised economic operator are essentially the result of:
Article 5a community custom code (ZK)
Article 14a - 14x community custom code implementing provision (ZK-DVO)

Imprints of heatsinks and housings – your and our repro time is valuable !

Production processes:

digital UV printing
Digital UV printing delivers high resolution printing with sharp contours throughprecise color application with up to 1200 dpi whereby the colors used cover the complete CMYK spectrum as well as white and silver tones. By means of a full-surface white underlay as a primer intensive colours are generated even on dark surfaces. With this printing method it is possible to print color gradients, pictures or photos. UV LEDs being activated immediately after the printing process harden the ink and ensure optimum durability of the ink on rough and smooth surfaces. Plastic materials, lacquered components and anodized or transparent passivated aluminum surfaces can be printed.

Silk screen printing
In a silk screen process the printing colour is printed on the material to be printed with help of a squeegee through a finely woven tissue. On the so-called silk a light-sensitive coating is applied which hardens by UV irradiation. Certain places which should remain translucent are covered by a film before the UV irradiation. The resulting screen is inserted in the silk printing machine and the requested colour is spread over the silk by a flood squeegee. In the next working step the silk frame is lowered over the workpiece to be printed and the colour is pressed on the material to be printed through the open spaces in the silk, the printing motive. The following hardening is processed at room temperature or by means of UV lamps.

Pad printing
The pad printing is an indirect gravure process for printing on different objects in almost any form and material. With a flood squeegee the requested colour is pulled over a cliché and then removed from the cliché with help of a doctor blade so that only a colour film remains in the recesses. The so-called pad absorbs the colour in the following working steps and presses it on the printing material in a rolling movement. The following hardening of the 2k-colours is processed at room temperature or by means of UV lamps. The pad printing allows the printing on different surface structures as well as on convex / concave curved parts due to the deformability of the pad.

Sub-elox printing
The sub-eloxal printing is a special printing process which is only used on aluminium surfaces. The special nature of this printing process is the colour that is printed in an anodised and open-pore aluminium surface. In a first production step the produced article is degreased and pickled in an anodising plant. Hereby the natural oxide layer of the aluminium is removed and a porous surface is produced. After the anodising process the requested motive is applied on the resulted surface by means of digital printing. Beforehand the aluminium workpiece is warmed up to 50°C whereby a fast drying of the applied colour is achieved. After permanent drying of the surface the final product is compressed in a hot water bath. Due to the hot water sealing the open pores are closed and a hard oxide layer is created under which the previously applied colour is enclosed.

The order for the printing has to contain the font, font size and the exact position of the scripture together with a dimensioning by considering countersinks, etc. A requested company logo always has to be sent as a vector file. If those specifications are neglected the printing order possibly has to be rejected or it leads to a lot of additional work which is associated with additional costs.

The fulfilment of the following criteria enables a smooth order processing:

Adobe Illustrator (.ai/.eps)	without continuous-tone image; used fonts converted into paths or supplied
Adobe Acrobat (.pdf)	all fonts enclosed; continuous-tone images colour-separated
InDesign (.indd)	spot colour or scale colours with right resolution (300 dpi colour, black and white 600 dpi); no RGB

This results in additional time requirement and therefore additional costs:

Precise testing of the data on usability by our repro department. Screen formats (.jpg, .gif, .png) and paper patterns, stickers or anything similar are usually not suitable for creating templates in most cases.

Templates which definitively cannot be used:

Imperfect copies such as paper-fax / Microsoft Office files (.doc, .xls, .ppt) can only be used for inspection or for transmitting texts.

Please always add dimensional drawings (.pdf; .dxf) to the parts to be printed.

Please note as a general rule: retouching work extending beyond the standard time will be invoiced additionally at cost price.

Explanations – references – printings

A ... index area:
shows topics/categories

"current"

B ... index area:
shows topics/categories

"following"

D 15 ... page number

SK 495 ... art. no.

please indicate ... additional options

... option for surface finishing

SA = anodisé noir
AL = aluminium nature dégraissé
ME = anodisé nature
TP = passivé transparent sans chrome

→ **A 10** ... link to page

 ... length in [mm]

 ... height in [mm]

 ... hole pattern

 ... symbol of heatsink geometry

R_{th} ... thermal resistance in [K/W]

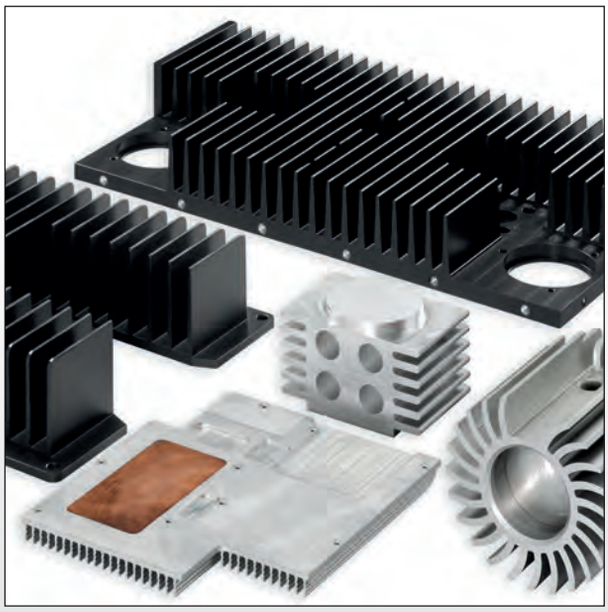
 ... thickness of sheet/plate

v ... air/speed in [m/s]

 ... packing (option) TR = Tape & Reel

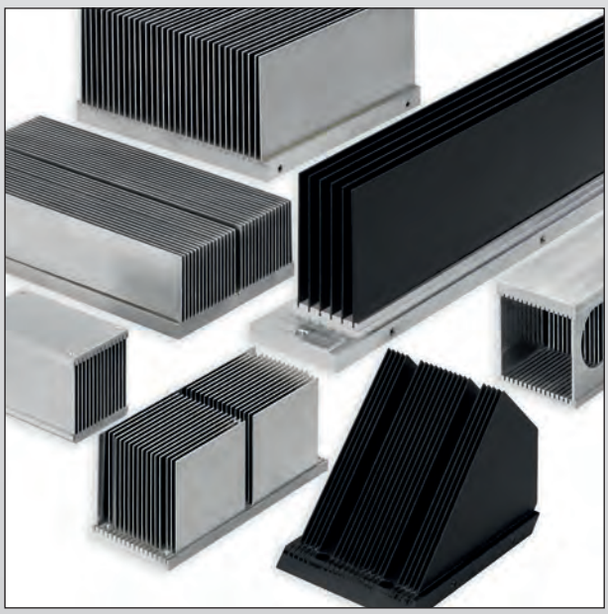
fischer elektronik

Machined heatsinks
Fluid heatsinks
Lamella heatsinks
Extruded heatsink with solder pins



Machined heatsinks
- several hundreds of extrusion profiles available
- future orientated stockkeeping of heatsink profiles in a fully automatic honeycomb warehouse
- precise milling treatments in highest quality
- effective heat spreading by means of heatsinks with grouted copper areas
- designs and modifications according to your demand

Fluid heatsinks
- fluid heatsinks for dissipation of big heat flow volumes
- compact design with internal lamella structure
- thick bottom plates for optimal heat dissipation
- I- and U streamed versions
- water connection or mounting flange for your special application
- customized treatments and solutions



Lamella heatsinks
- compact lamella heatsinks with a big surface
- special design for forced convection
- thermotechnical optimal fitted lamellas
- precise milled flat semiconductor mounting surface
- single and double sided bottom plate made of aluminium or copper
- production according to customer specified demands

Extruded heatsinks with solder pins
- solid pressed in soldering pins and threaded bolts for a direct pcb-mounting
- for horizontal and vertical mounting position
- standard drilling patterns and transistor retaining springs for various semi-conductive elements
- soldering pins with insulation for spacing help
- variations and modifications according to drawing

Technical introduction

1. General points

In order to provide optimum performance of semi-conducting devices it is essential not to exceed the maximum junction temperature indicated by the manufacturer.

Generally this maximum junction temperature can only be maintained without exceeding it by running the device concerned at lower power outputs.

At outputs approaching the maximum ratings semi-conductor devices have to be cooled by so called heatsinks, sometimes called dissipators.

The thermal performance of these heatsinks primarily depends on the thermal conductivity of the material from which they are made, size of surface area and mass.

In addition, surface colour, mounting position,temperature, ambient air velocity and mounting place all have varying influence on the final performance of the heatsink from one application to another..

However, a figure for thermal resistance can be experimentally determined in a reliable manner and used in the equations that follow in part 2.

There are no agreed international standard methods for testing electronic cooling systems or for the determination of the thermal resistance.

Therefore the diagrams and values given in our catalogue have been determined under practical operating conditions and therefore allow the most suitable heatsink from the range to be selected.

We expressly point out that all information and data is given to the best of our knowledge and belief. The user is solely responsible for the proper use of our products and he should check their suitability for the intended application.

Fischer Elektronik do not assume any warranty, whether expressed or implied, for the suitability, function or merchantibility of their products in specific or general applications, and they cannot be held liable for accidental or consequential damage due to non-observance of the above.

Furthermore Fischer Elektronik reserve the right to carry out technical modifications to their products at any time.
All orders are subject to the General Sales Conditions of Fischer Elektronik.

2. The determination of thermal resistance

The thermal resistance is the parameter that is the most important in cooler selection, apart from mechanical considerations.

For determination of the thermal resistance the following equation applies:

Equation 1:

$$R_{thK} = \frac{\vartheta i - \vartheta u}{P} - (R_{thG} + R_{thM}) = \frac{\Delta\vartheta}{P} - R_{thGM}$$

In case of an application where the maximum junction temperature is not exceeded the temperature has to be verified.
When the case temperature has been measured the use of the following equation will enable the maximum junction temperature to be calculated:

Equation 2:

$$\vartheta_i = \vartheta_G + P \times R_{thG}$$

The meaning of the determinants:

ϑ_i = maximum junction temperature in °C of the device as indicated by manufacturer.
As a »safety factor« this should be reduced by 20-30 °C.

ϑ_u = ambient temperature in °C.
The rise in temperature caused by radiant heat of the heatsink should be increased by a margin of 10-30 °C.

$\Delta\vartheta$ = difference between maximum junction temperature and ambient temperature.

ϑ_G = measured temperature of device case (equation 2).

P = maximum power rating of device in [W]

R_{th} = thermal resistance in [K/W]

R_{thG} = internal thermal resistance of semiconductor device (as indicated by manufacturer)

R_{thM} = thermal resistance of mounting surface. For TO 3 cases the following approximate values apply:

1. dry, without insulatar	0.05 - 0.20 K/W
2. with thermal compound/without insulator	0.005 - 0.10 K/W
3. Aluminium oxide wafer with thermal compound	0.20 - 0.60 K/W
4. Mica wafer (0.05 mm thick) with thermal compound	0.40 - 0.90 K/W

R_{thK} = thermal resistance of heatsink, which can be directly taken from the diagrams

R_{thGM} = sum of R_{thG} and R_{thM}. For parallel connections of several transistors the value R_{thGM} can be determined by the following equation:

Equation 3:
$$\frac{1}{R_{thGM\ ges.}} = \frac{1}{R_{thG1} + R_{thM1}} + \frac{1}{R_{thG2} + R_{thM2}} + \cdots + \frac{1}{R_{thGn} + R_{thMn}}$$

The result can be substituted into equation 1.

K = Kelvin, which is the standard measure of temperature differences, measured in °C, therefore 1°C = 1 K.

K/W = Kelvin per watt, the unit of thermal resistance.

Calculation examples:

1. A TO 3 power transistor with 60 watt rating has a maximum junction temperature of 180 °C and an internal resistance of 0.6 K/W at an ambient of 40 °C with aluminium oxide wafers.
What thermal resistance is required for the heatsink?

given:
$P = 60\ W$
$\vartheta_i = 180\ °C - 20\ °C = 160\ °C$ (for safety margin)
$\vartheta_u = 40\ °C$
$R_{thG} = 0.6\ K/W$
$R_{thM} = 0.4\ K/W$ (average value)

find: R_{thK} using equation 1
$$R_{thK} = \frac{\vartheta_i - \vartheta_u}{P} - (R_{thG} + R_{thM}) = \frac{160\ °C - 40\ °C}{60\ W} - (0.6\ K/W + 0.4\ K/W) = \underline{1{,}0\ K/W}$$

2. Same conditions as above but for three devices with equally distributed power ratings.

solution use equation 1 and equation 3
$$\frac{1}{R_{thGM\ ges.}} = \frac{1}{0.6 + 0.4\ K/W} + \frac{1}{0.6 + 0.4\ K/W} + \frac{1}{0.6 + 0.4\ K/W} = \frac{3}{1}\ W/K$$

$$R_{thGM\ ges.} = \frac{1}{3}\ K/W = \underline{0.33\ K/W}$$

substitute into Equation 1 gives:
$$R_{thK} = \frac{160\ °C - 40\ °C}{60\ W} - 0.33\ K/W = \underline{1.67\ K/W}$$

With these values determined, the tabulation on page A 13 - 17 can be used to give a choice of possible heatsink profiles. Then by examination of the drawings and curves the final choice can be made.

3. A transistor with power rating of 50 W and internal thermal resistance of 0.5 K/W has a case temperature of 40 °C.
What is the actual value of junction temperature?

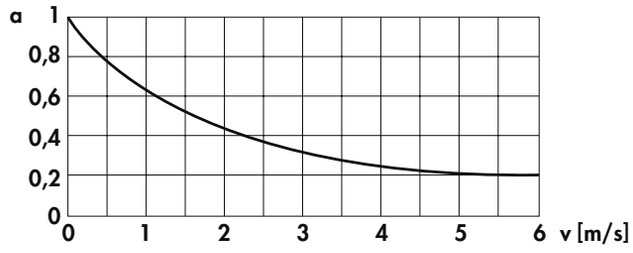
given:
$P = 50\ W$ $R_{thG} = 0.5\ K/W$ $\vartheta_G = 40\ °C$

find: ϑ_i using equation 2

$$\vartheta_i = \vartheta_G + (P \bullet R_{thG}) \qquad \vartheta_i = 40\ °C + (50\ W \bullet 0.5\ K/W) = \underline{65\ °C}$$

Thermal resistances of any profiles with forced convection

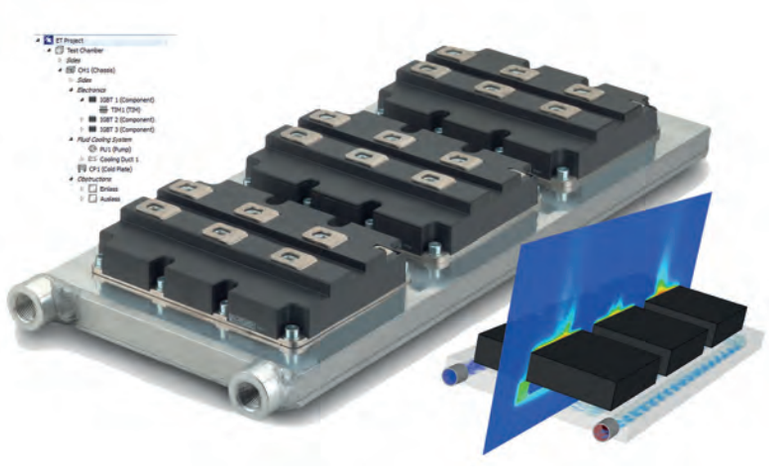
$R_{thKf} \approx a \bullet R_{thK}$
R_{thKf} = thermal resistance with forced convection
R_{thK} = thermal resistance with natural convection
a = factor of proportion



Computer based thermal simulation for optimal cooling concepts

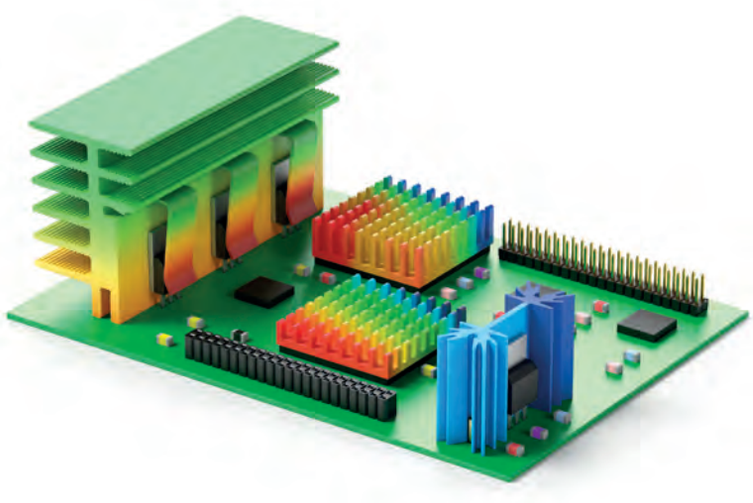
Performance, service life and reliability of electronic semiconductor devices are significantly determined by the thermal load to which the devices are exposed. An exceeding of the maximum operating temperature leads to malfunctions. An exceeding of the permissible junction temperature leads to a destruction of the semiconductor. To make it worse there is an advancing trend in the semiconductor industry for continuous increasing integration- and power densities of electronic devices. For the solution of thermal problems the first question is which kind of heat dissipation has to be considered. For this there are different processes available: by means of free convection (passive) with different heatsink solutions, by means of forced convection (active with help of fans, cooling aggregates) or by means of fluid media (fluid cooling).

However, electronic devices and systems have many different boundary and installation conditions. Therefore the choice of the optimum thermal management is often difficult. There are surely possibilities to find the right heat dissipation concept by using the thermal resistance for calculations or by testing and verifying prototypes directly in the application, but nowadays customer specified mechanical adjustments are requested and demanded more than ever. Small mechanical post-machinings, such as additional integrated threads or drilling can be considered in the calculation with safety reserves in the temperature of the thermal resistance, but extensive modifications demand a repeated inspection of the thermal circumstances.



To facilitate the determination of passive heat dissipation concepts Fischer Elektronik offers a computer based thermal simulation as a kind of service.

Considered factors in the thermal simulation



With help of the computer based thermal simulation the necessary characteristics of the cooling concept can be determined exactly. Based on physical concepts such as mass, energy and impulse the software especially considers the thermal requirements for free or forced convection. Simultaneously the system is aligned to thermal dissipation by means of fluid. Moreover the thermal simulation calculates physical effects such as thermal radiation and turbulences. The emission factor of the different surfaces also plays its role. As a result the simulation software delivers a precise cooling solution for the application and is a big help for the decision-making and interpretation of the electronic design.

Advantages of a computer based simulation

The computer based thermal simulation is already used for the prototype development. Herewith the development cycles of heat dissipation concepts is reduced considerably. Unsuitable concepts can be discarded quickly and without big costs of material. A lot of features and options of the simulation system also reduce the temporary and apparatuses efforts compared to a conventional simulation in the measurement chamber.

We will be happy to advise you in detail about the theme thermal simulation.

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Technical introduction

Remarks:

1. The values indicated in the diagrams apply only for heatsinks with black anodised surface, mounted vertically and natural convection.

Correction factors: natural surface: +10 to 15 % for horizontal mounting: +15 to 20 %

2. Heatsink profiles are extruded to European standard DIN EN 12020 (former DIN 17615).
   For profiles exceeding a circumscribed circle of 350 mm, the tolerances to DIN EN 755 (former DIN 1748) apply.

Important note:
Manufacturers of certain electronic components, especially modules with a large surface area, IGBT etc., specify installation surfaces for heatsinks etc. with an flatness, which is beyond standard tolerances. Such perfect flatness can only be achieved by milling the installation surface. Furthermore, it should be noted that threaded wire inserts may be required in order to reach higher tightening torques in aluminium (e.g. Heli-Coil or similar.). Please observe the semiconductor manufacturers' information.

3. The mentioned heatsink profiles in our catalogue contain so called extrusion marks between the fins for a profile identification. To avoid misuse the operator has to check the size and position for the mechanical treatment or placement of the components.

4. Profile extruded threaded channels are no threads conforming to standards, as they have no thread pitch. The thread pitch is imitated by staggered webs (ribs). The customer is responsible for appropriate use.

5. Machining of our extruded and non extruded profiles conforms to requirements of DIN ISO 2768 m - unless otherwise stated. For all ICK S types DIN ISO 2768c is valid.

6. The lengths of extruded profiles [|⟷|] and the pin layouts [✥] indicate only the standard range. We offer every profile cut to customer's exact length and machining requirement made to drawing or sample. We bore, countersink, mill, saw, grind and cut threads into your heat sink to meet your specific requirements. With our modern machine tools including CNC machining centres, multispindled drills (up to 26 drillings/threads at the same time) and digital milling and stamping tools plus our own "in house" tool room we are able to manufacture competetively priced prototypes as well as batch and mass produced parts with short lead times.

7. The standard material of our heatsinks is warm age-hardened aluminium alloy according to EN AW 6060 – T66 (former AlMgSi05 – F22 acc. to DIN 1748). Our standard surface treatments are raw degreased aluminium (Al) and black anodised (SA). On request, we anodise clear natural (ME) or decorative in any colour that is technically possible.

8. If you cannot find a suitable profile within our range of approx. 400 profiles, 13 small heatsinks and 50 finger shaped heatsinks, we can design and produce to your requirements. Please contact us at the start of your next project so that we can work together, either directly or through our representatives. Remember that we have the ability to find the solution for "your" cooling problem.

9. Note on tolerances

All dimensions given in this cataloque for products, items and machined parts are acc. to DIN ISO 2768 m if not otherwise stated. Not included are items like extruded profiles, diecasts, handles, vibration dumpers etc. for which different standards apply.

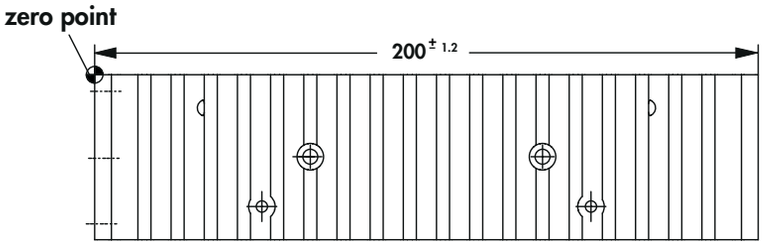
Update - 2023

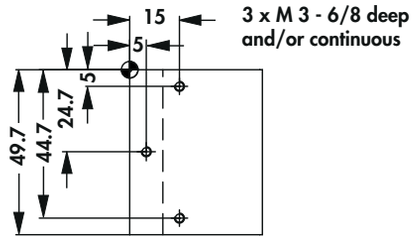
The information given in this catalogue were established and examined carefully.
Nevertheless, mistakes or printing errors, and especially technical modifications and updating and improvement of our products, cannot be excluded. All trade marks are recognised even if they are not specifically identified or mentioned. No identification does not imply that a product or trademark is not registered. No part of this catalogue may be reproduced or distributed without prior written consent of Fischer Elektronik. All data contained in this catalogue, in texts, illustrations, documents and descriptions are subject to copyright and the provisions of DIN ISO 16016. All rights reserved.

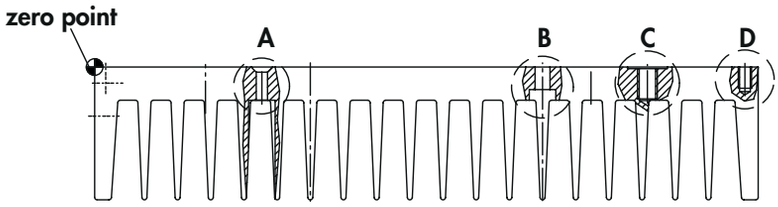
General information

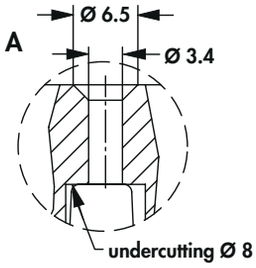
Blind holes are produced after anodising. Through holes are produced before anodising. For completely visual parts additional lacquering or adding additional mounting threads or bolts is recommended.

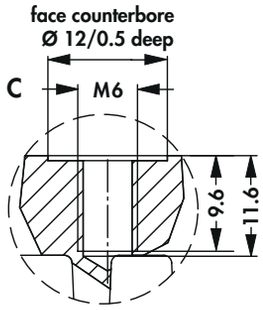
A part of the extruded heatsink profiles is pressed according to DIN EN 12020 (circumscribing circle <350mm). For sections that exceed a circumscribed circle of 350 mm, DIN EN 755 applies. The machining tolerances are specified according to DIN ISO 2768 m.

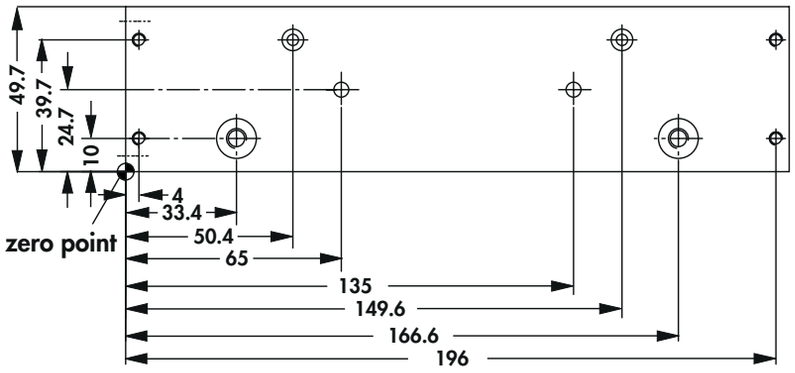


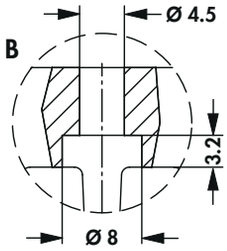


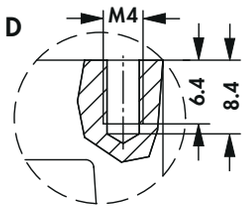












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Technical introduction

Information for dimensioning, shown on SK 47 general:

The deflection can be up to 0.8 mm concave, 0.2 mm convex. If a certain flatness of the bottom surface is required the bottom thickness can be decreased by a maximum of approx. 0.8 mm by means of face-milling. This situation must be taken into consideration with the bore hole depths for blind holes.
Counterbores and bore hole diameters are to be produced according to DIN 74, if not explicitly stated otherwise.
The depth of thread should be calculated as follows.

Example M5:
thread: M5 x 1.6 mm = 8 mm core bore: 8 mm + 2 mm = 10 mm

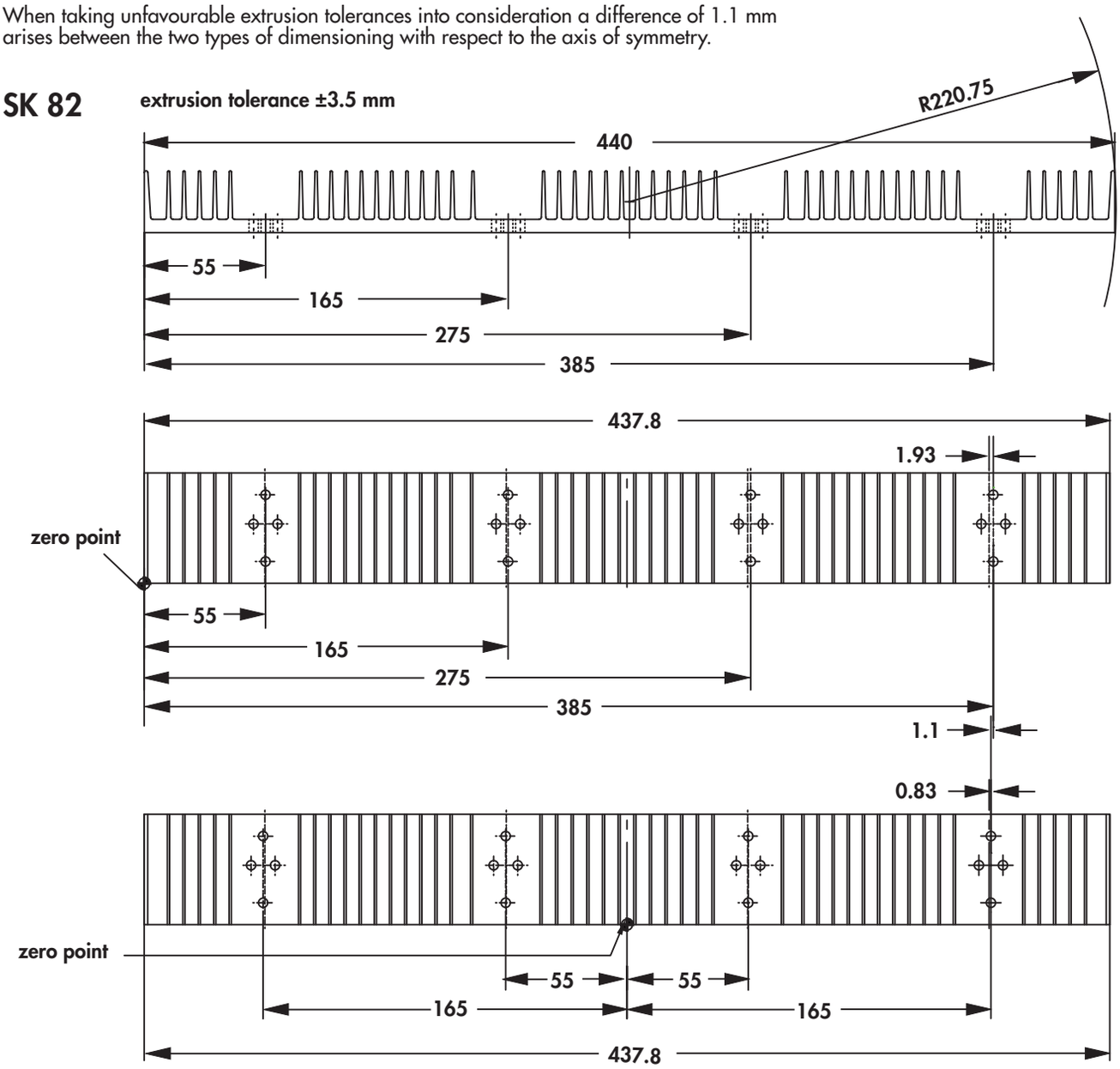
Examples:
cutout A: Through-hole according to DIN 74 A m 3, counterbore bottom side, undercut of the fins.
cutout B: Through hole with break-through of the fins according to DIN 74 H m 4, counterbore on fin side.
cutout C: Thread M6. Depth of thread 1.6 x 6 mm = 9.6 mm, bore depth 9.6 mm + 2 mm = 11.6 mm.
Bore hole on fin base is plunged through. Face counterbore dia. 12 x 0.5 on bottom side.
cutout D: Blind thread M4. Depth of thread 1.6 x 4 mm = 6.4 mm, bore depth 6.4 mm + 2 mm = 8.4 mm.

Extrusion tolerances – production tolerances

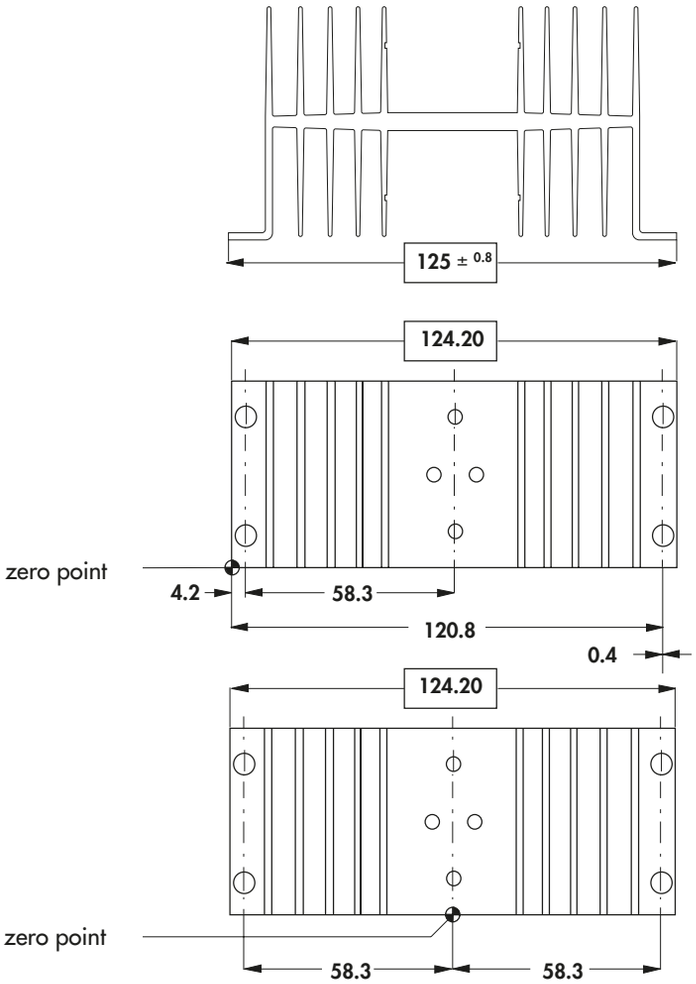
There is often the problem, that the production tolerances cannot be adhered to, due to the extrusion tolerances. The two examples show how the production tolerances can be cut in half by means of suitable dimensioning (here: extension of the zero point from the outer edge to the center of the section).

When taking unfavourable extrusion tolerances into consideration a difference of 1.1 mm arises between the two types of dimensioning with respect to the axis of symmetry.

SK 82 **extrusion tolerance ±3.5 mm**



SK 34



extrusion tolerance ± 0.8 mm

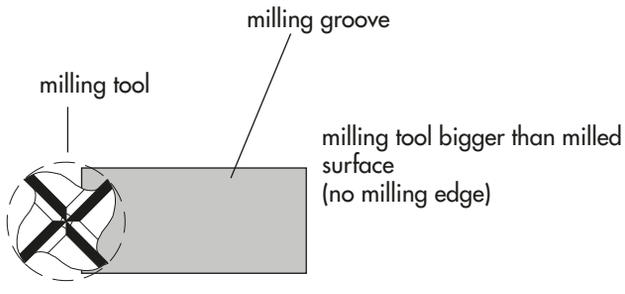
dimensioning set to the outer edges

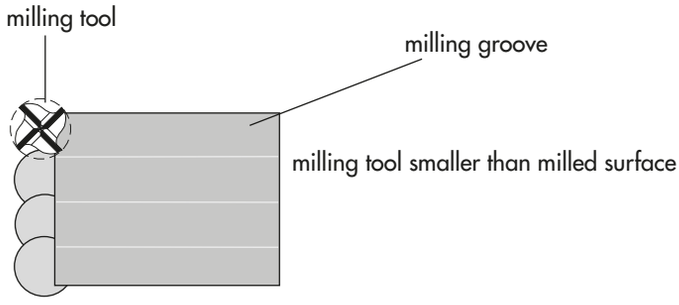
dimensioning set to the center

When taking unfavourable extrusion tolerances into consideration, a difference of 0.4 mm arises between the two types of dimensioning with respect to the axis of symmetry.

Milling

If, when milling heatsinks, cooling aggregates, etc., the milling tool diameter is smaller than the area being milled for production reasons, so called „milling grooves" with steps or edges are produced (see sketch). Even if the roughness depth value for the surface is observed, it is a good idea to specify the area of the component in which no milling edges are allowed.





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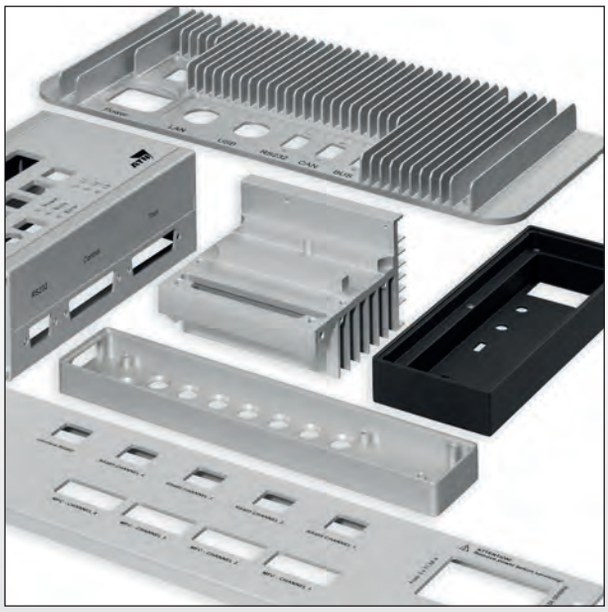
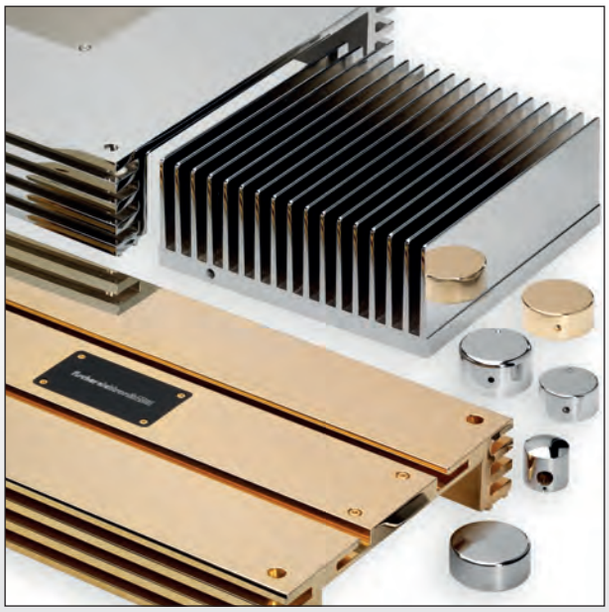
Precision machining and highly decorative surfaces



Decorative aluminium milled parts
- time-optimized, automatic stockkeeping of several hundred extruded profiles for short deliveries
- latest CNC machining centres
- precise millings for highest quality demands
- batch-optimised production processes
- special profiles according to your specific demand

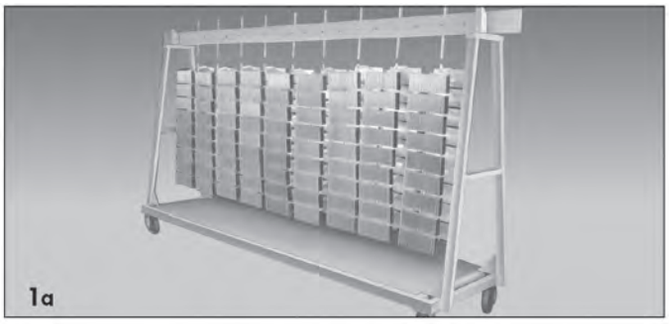


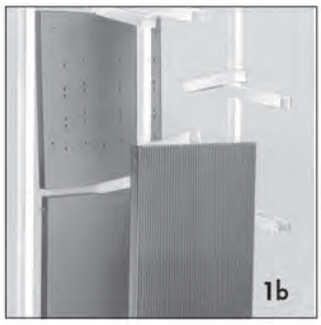
Chromium plating and gold plating
- chromium plating and gold plating of front panels, extruded profiles and construction parts
- qualitative constant and reproducible, high quality surfaces
- various gloss levels by means of different polishing processes
- processing of brass, aluminium and steel

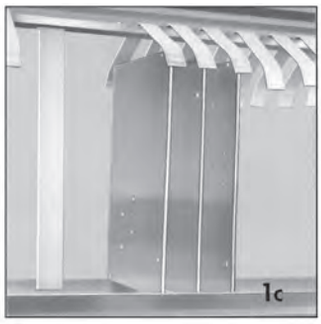
Surface refinements
- corrosion resistant and decorative anodize layers
- lacquerings and durable powder coatings in all current RAL colours
- anti-glare surfaces, Nextel®-Suide Coating
- electrically conductive surfaces, chromate VI free
- prevention of clamp marks by means of special contacting systems

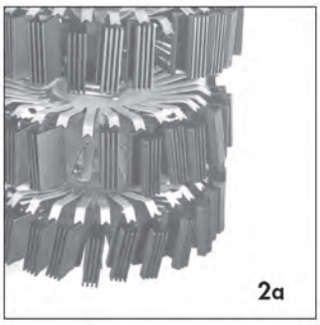
Development and construction
- compentent partner with experience of more than 40 year
- Innovative product development, product-specific support by means of application engineers
- design assistance, feasibility analyses and product optimizations
- construction support and preparation of drawings

Heatsinks for decorative purposes and as visual parts

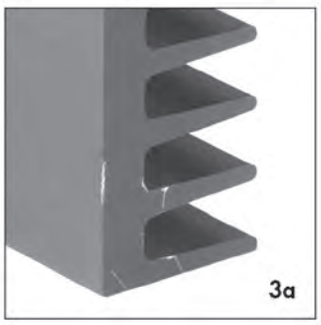

1a

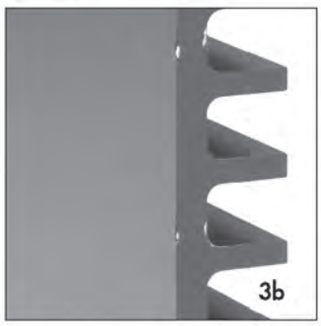

1b


1c


2a


2b


3a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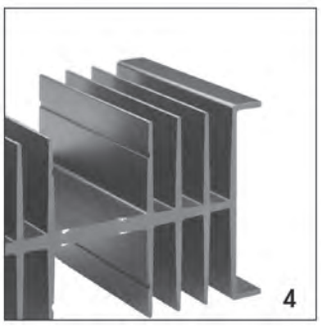
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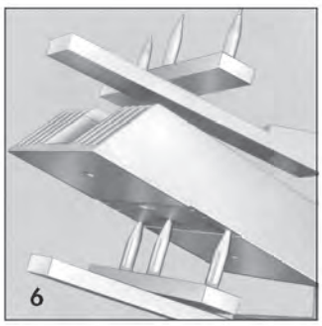
5


6


7

Anodising (also known as ELOXAL: **EL**ectrically **OX**idised **AL**uminium) is used in many cases for decorative surface protection of aluminium. In this process, the aluminium parts to be treated are connected to the positive pole of a direct-current source (anode) in a suitable electrolyte where aluminium, in so doing, forms the negative pole (cathode). The flowing direct current now causes a migration of oxygencontaining ions, with electrically negative charge, to the anode in order to deposit the oxygen. At this point, the aluminium reacts with this oxygen, forming aluminium oxide. A non-porous, electrically insulating, abrasion free, oxide barrier, or „eloxallayer", then develops. The development and therefore thickness of this layer can be controlled by the amount of current flow.

For process handling, secure transportation and electrical connection, the parts to be anodised must be placed on „racks" (figure 1). As excellent electrical contact is necessary and the parts being processed must be mounted on the carrying racks in a totally secure manner a high clamping force is required especially for those large and heavy heatsinks (figure 2). This will mean that „clamp marks" are visible. These are mere bare points in the case of small and light weight heatsinks with black anodising (figure 3) but for heavy parts the clamping pressures and current can cause deformation of the surface (figure 4). Any such deformations on large heatsinks is unavoidable and varies with each part (figure 5).

If heat sinks are used as visual parts, in other words parts whose surface must be blemish-free in appearance, it is suggested that the customer will define specific areas which should have no clamp marks. If, for technical production reasons, it is not possible to place clamps on the remaining points then consideration should be either given to the construction of separate specialpurpose frames which will allow processing (figure 6). Existing or additional threaded holes may possibly also be used for screwing on fixing angles, upon which the clamps may then be placed (figure 7). Furthermore, there is always the possibility to remove the clamp marks by hand finishing, although some slight indentation may still be visible. Alternatively, instead of using the anodising process there are various paint finishes available.

With visual parts and mouldings, both discussion of all technical details and determination of the desired design in cooperation with the manufacturer - even at the initial enquiry stage - are imperative for the smooth completion of orders to the satisfaction of the customer.

Our experts are at your disposal for all technical advice.

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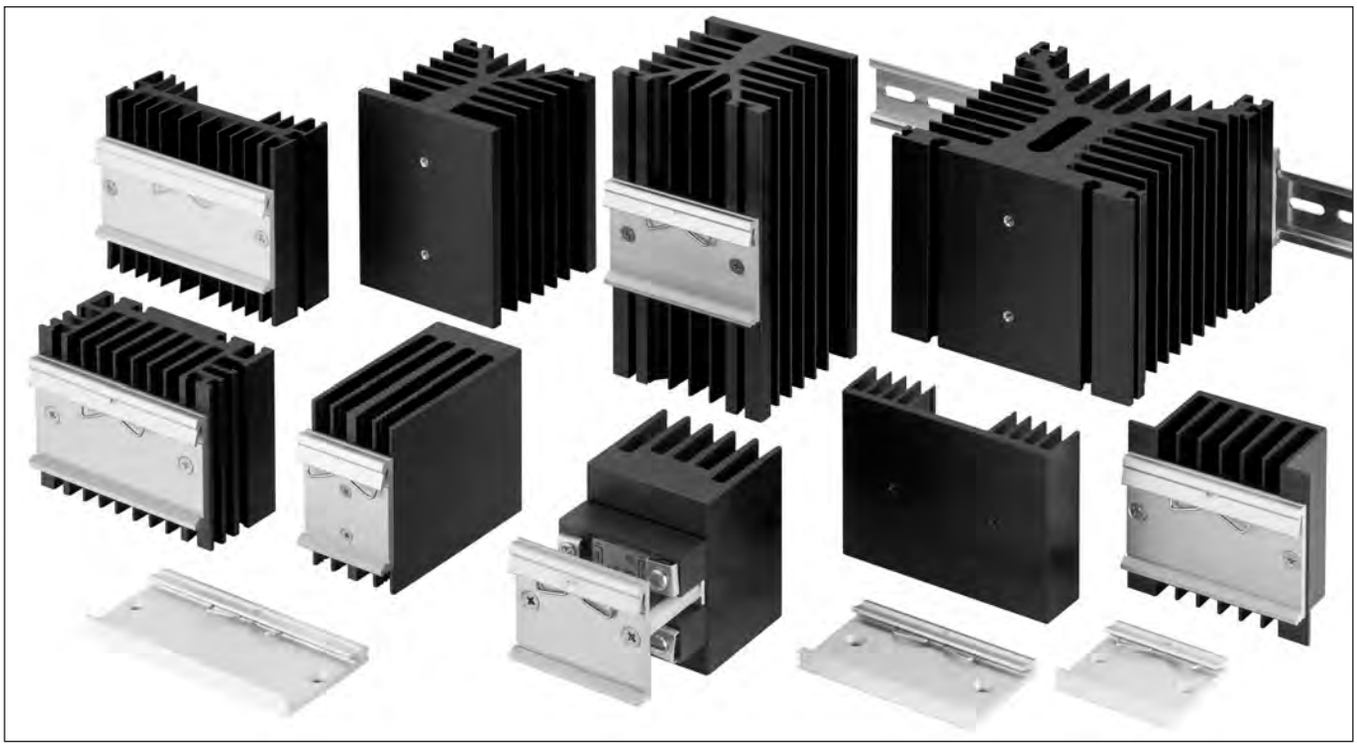
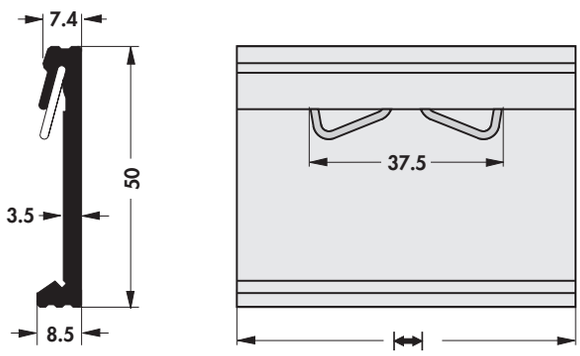
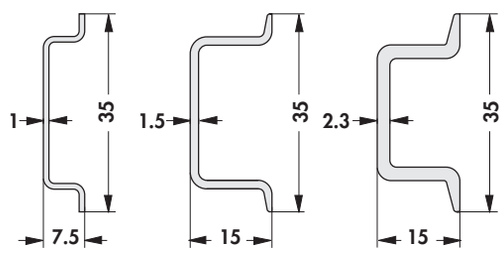
Heatsinks for solid state relays



- universal clip fastening, suitable for all 35 mm mounting rails
  according to DIN EN 50 022, rail thickness from 1 to 2.3 mm
  KL 35 ... ➔ E 75
- fast and simple asssembly of heatsinks by means of snapping them onto the mounting rail
- secure hold due to a stable extruded profile with integral stainless steel spring
- special lengths (≥40 mm) and drillings on request

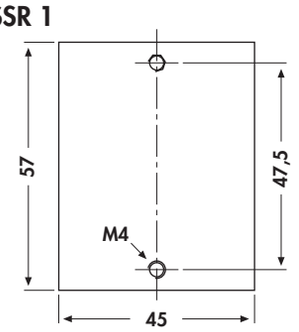
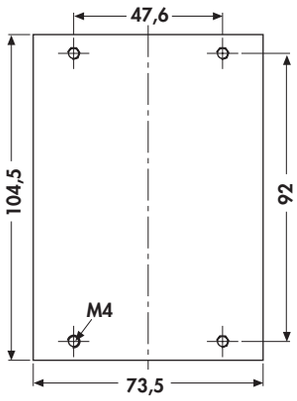
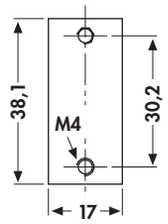
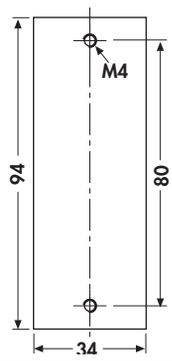




Examples of mounting rail versions suitable for KL 35

surface:	finish clear anodised

Heatsinks for solid state relays

perforations – drilling pattern rotated by 90° as well as further drilling patterns upon request	with KL 35 – fixing of the SSR by means of screws with the help of insert nuts in the heatsink	with KL 35 – fixing of the SSR by means of screws with the help of tapped holes in the heatsink	without KL 35 – fixing of the SSR by means of screws with the help of tapped holes in the heatsink
	art. no.	art. no.	art. no.
SSR 1 	SK 172 75 KL SSR 1	SK 89 75 KL SSR 1 SK 89 100 KL SSR 1 SK 111 75 KL SSR 1 SK 434 75 KL SRR 1 SK 453 75 KL SRR 1 SK 467 75 KL SRR 1 SK 507 75 KL SSR 1	SK 04 75 SSR 1 SK 33 75 SSR 1 SK 455 75 SSR 1 SK 467 75 SRR 1 SK 507 75 SRR 1
SSR 2 		SK 89 100 KL SSR 2 SK 89 150 KL SSR 2 SK 176 150 KL SSR 2 SK 507 150 KL SSR 2	SK 04 150 SSR 2 SK 507 150 SSR 2
SSR 3 	SK 187 75 KL SSR 3	SK 111 75 KL SSR 3	
SSR 4 	SK 172 150 KL SSR 4	SK 455 100 KL SSR 4	SK 455 100 SSR 4 SK 467 100 SSR 4

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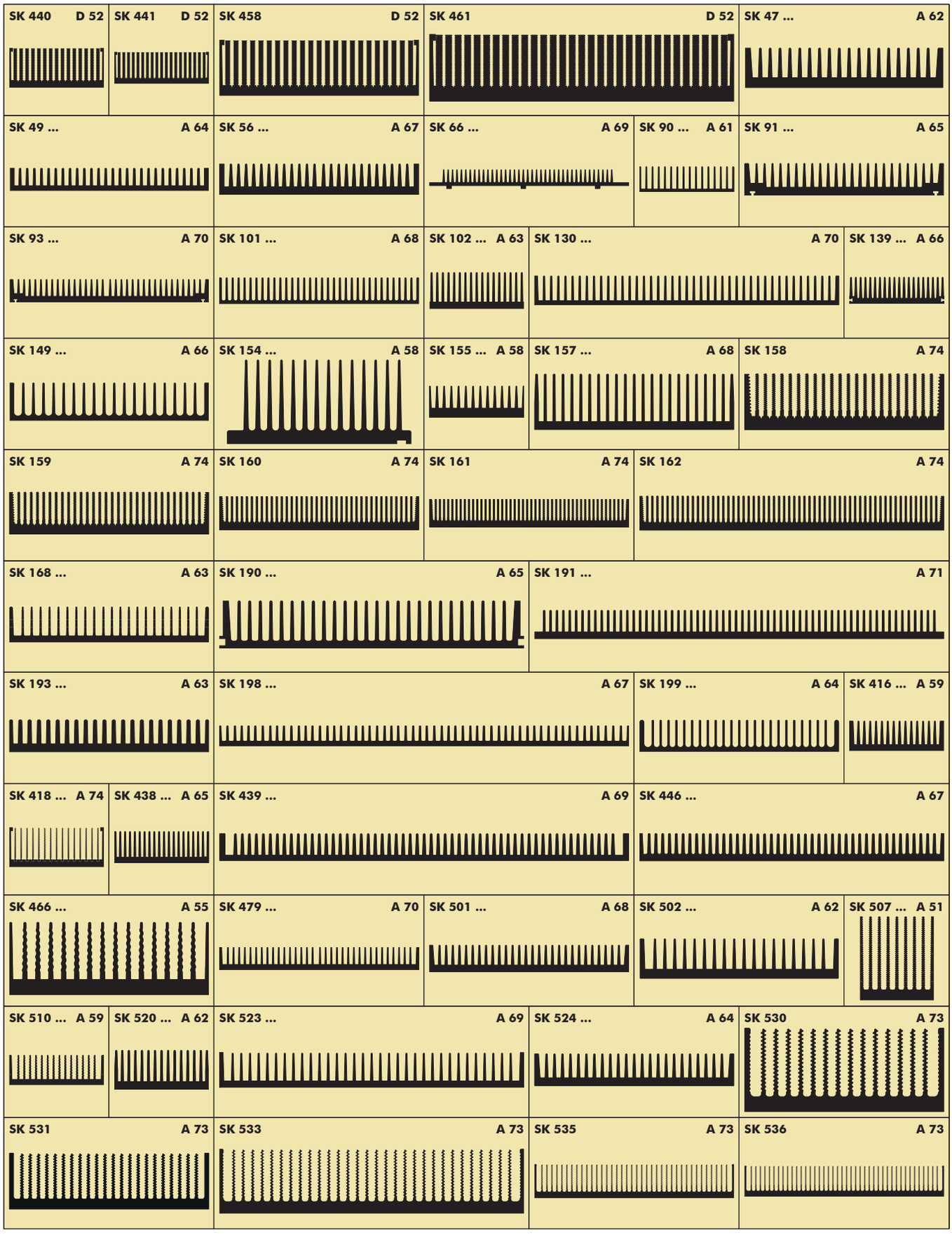
Heatsink-chart



Heatsink-chart classified in categories of thermal resistance at 75 mm length

SK 537 A 73	SK 538 A 73	SK 539 A 73	
SK 540 A 73	SK 553 ... A 56	SK 555 ... A 64	SK 557 ... A 63
SK 568 ... A 68	SK 579 ... A 69	SK 580 ... A 63	SK 588 ... A 57
SK 591 ... A 62	SK 601 ... A 56	SK 613 ... A 55	SK 614 ... A 66
SK 621 ... A 71	SK 622 ... A 65	SK 623 ... A 60	SK 627 ... A 59
SK 650 ... A 70	SK 651 ... A 70	SK 656 ... A 68	SK 657 ... A 37
SK 673 ... A 71	SK 678 ... A 65	SK 685 ... A 69	
SK 689 ... A 67	SK 57 ... A 86	SK 30 ... A 89	SK 53 ... A 95
SK 82 ... A 96	SK 86 ... A 96	SK 15 ... A 98	SK 163 ... A 99
SK 556 ... A 98	SK 83 ... A 100		
SK 108 ... A 101	SK 109 ... A 101	SK 110 ... A 100	SK 435 ... A 102
SK 144 ... A 103	KSK 7 A 78		
KSK 8 A 79	KSK 9 A 79	KSK 10 A 79	KSK 11 A 79

< 1 K/W | 1-1,5 K/W | 1,5-2 K/W | 2-2,5 K/W

2,5-3 K/W | 3-4 K/W | 4-5 K/W | > 5 K/W

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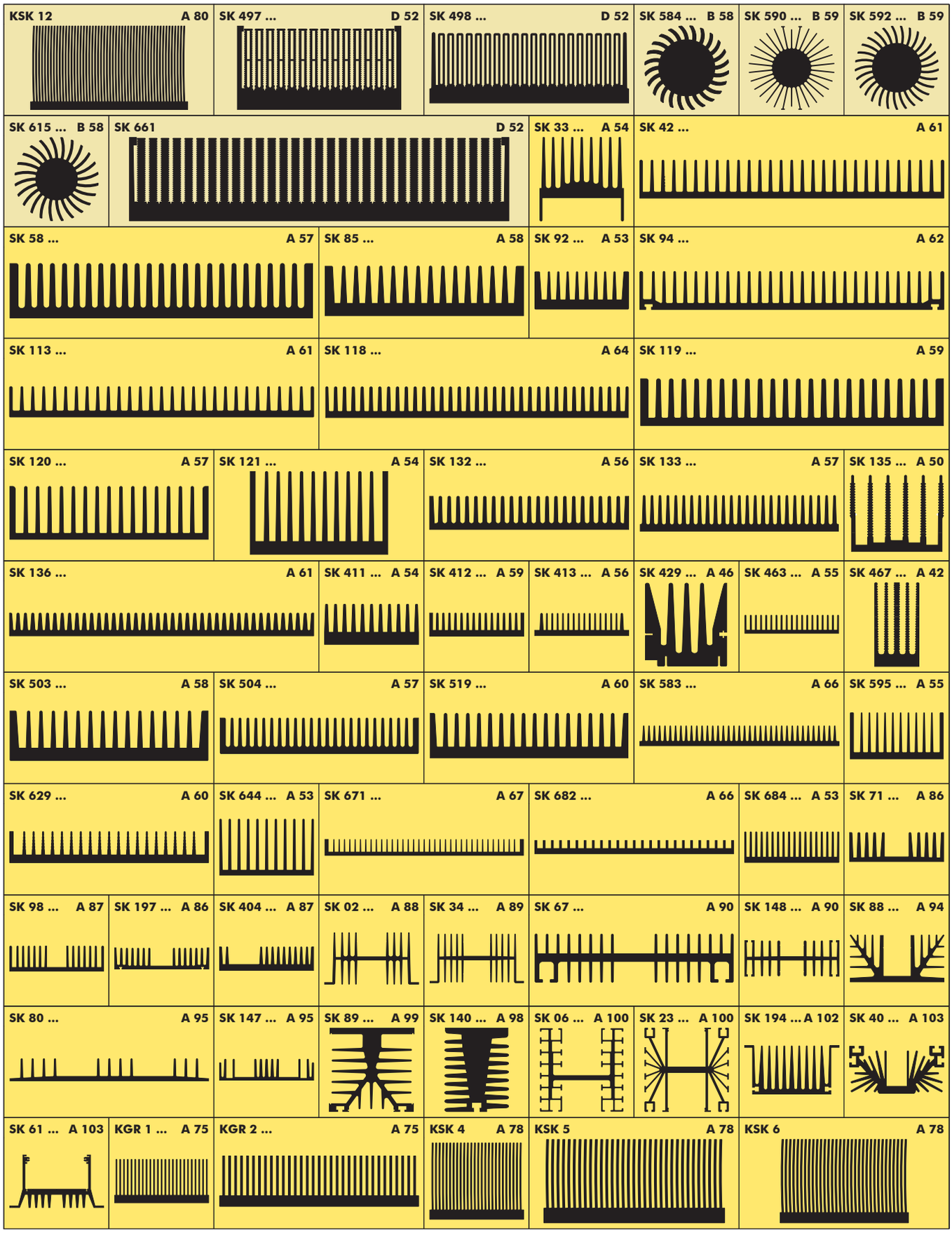
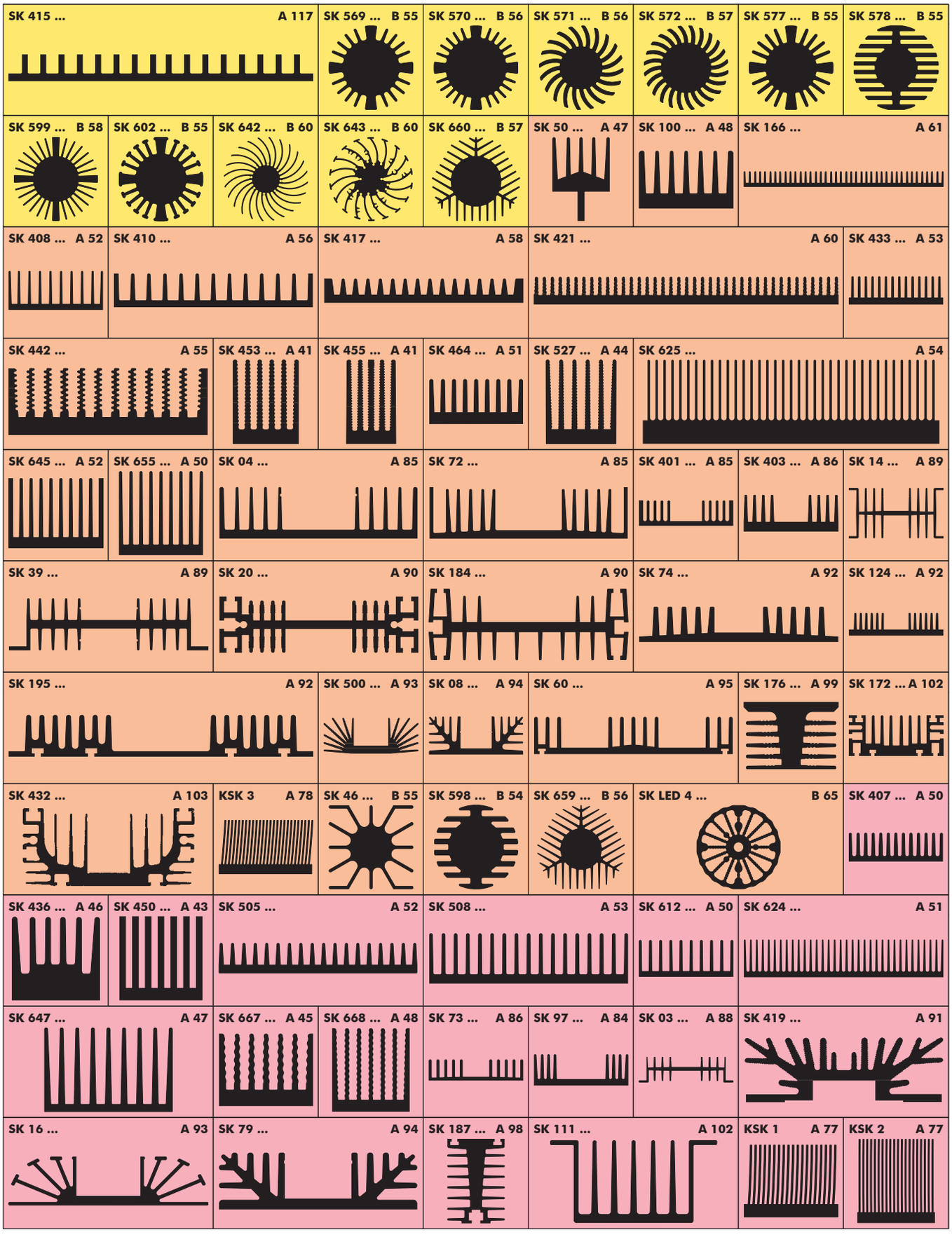
Heatsink-chart



Heatsink-chart classified in categories of thermal resistance at 75 mm length



< 1 K/W | 1-1,5 K/W | 1,5-2 K/W | 2-2,5 K/W

2,5-3 K/W | 3-4 K/W | 4-5 K/W | > 5 K/W

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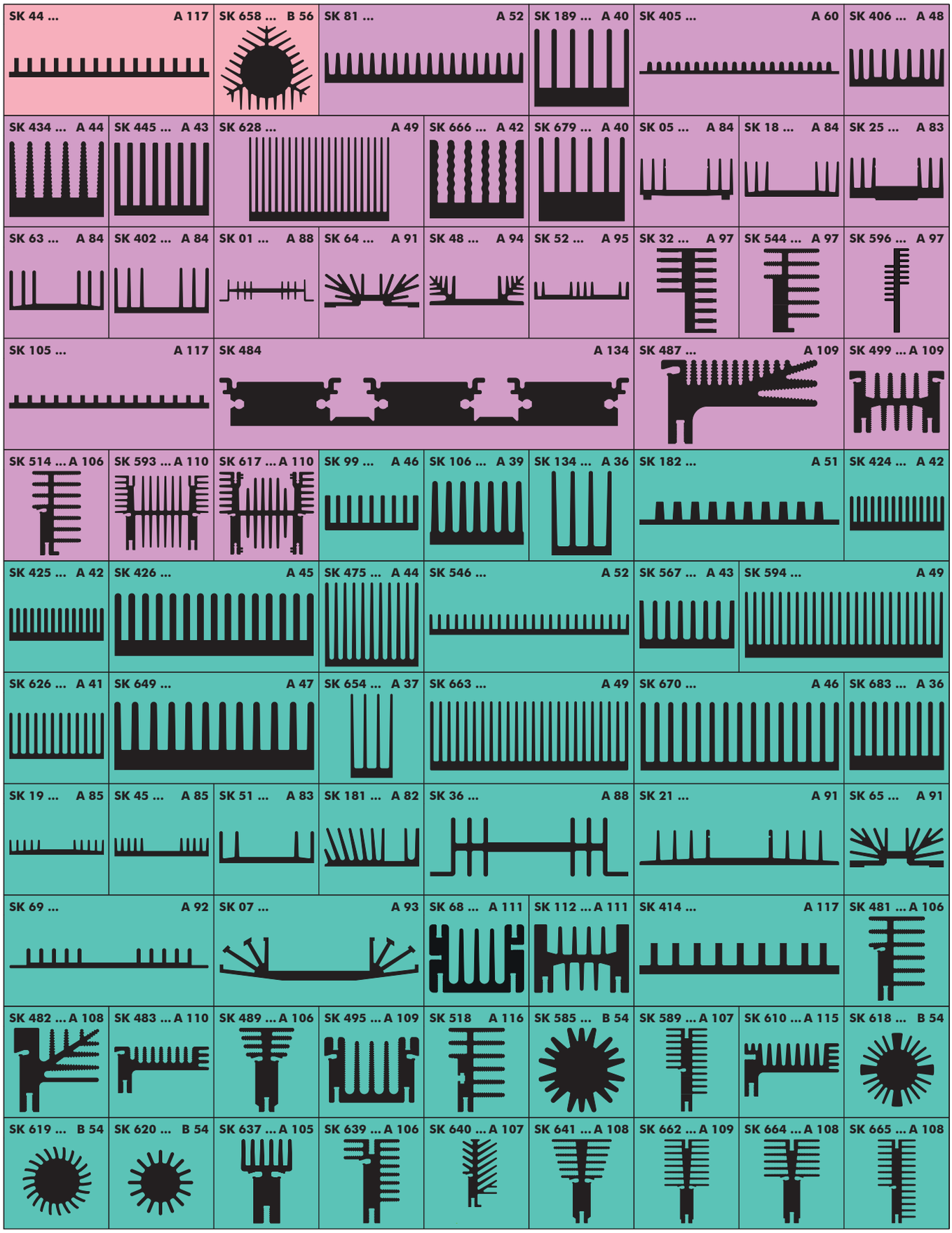
Heatsink-chart



Heatsink-chart classified in categories of thermal resistance at 75 mm length

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Heatsink-chart

SK 669 ... A 107	SK 156 ... A 45	SK 174 ... A 38	SK 179 ... A 38	SK 180 ... A 45	SK 422 ... A 40	SK 444 ... A 48	SK 468 ... A 45
SK 472 ... A 39	SK 566 ... A 32	SK 630 ... A 47	SK 648 ... A 48	SK 485 ... A 47	SK 78 ... A 83	SK 107 ... A 82	SK 122 ... A 82
SK 173 ... A 82	SK 185 ... A 94	SK 96 ... A 113	SK 138 ... A 113	SK 451 ... A 114			
SK 490 ... A 104	SK 573 ... A 105	SK 574 ... A 107	SK 576 ... A 105	SK 611 ... A 115	SK 681 ... A 105	SK 687 ... A 115	SK LED 2 ... B 63
SK LED 3 ... B 63	SK LED 5 ... B 64	SK LED 6 ... B 64	SK LED 7 ... B 64	SK 95 ... A 26			
SK 126 ... A 35	SK 177 ... A 33	SK 178 ... A 35	SK 400 ... A 35	SK 420 ... A 39	SK 423 ... A 40	SK 427 ... A 44	SK 437 ... A 28
SK 447 ... A 32	SK 448 ... A 32	SK 452 ... A 33	SK 454 ... A 30	SK 456 ... A 38	SK 460 ... A 35	SK 469 ... A 27	SK 470 ... A 26	SK 471 ... A 36
SK 473 ... A 31	SK 476 ... A 29	SK 477 ... A 30	SK 478 ... A 27	SK 486 ... A 31	SK 493 ... A 34	SK 496 ... A 25	SK 509 ... A 37	SK 511 ... A 40
SK 513 ... A 39	SK 521 ... A 28	SK 522 ... A 27	SK 545 ... A 49	SK 547 ... A 39	SK 548 ... A 43	SK 549 ... A 36	SK 550 ... A 33
SK 551 ... A 31	SK 552 ... A 27	SK 554 ... A 31	SK 558 ... A 27	SK 559 ... A 31	SK 560 ... A 32	SK 561 ... A 32	SK 562 ... A 37	SK 563 ... A 38
SK 564 ... A 38	SK 565 ... A 26	SK 581 ... A 34	SK 582 ... A 30	SK 586 ... A 25	SK 587 ... A 36	SK 597 ... A 34	SK 616 ... A 25	SK 631 ... A 29

< 1 K/W | 1-1,5 K/W | 1,5-2 K/W | 2-2,5 K/W

2,5-3 K/W | 3-4 K/W | 4-5 K/W | > 5 K/W

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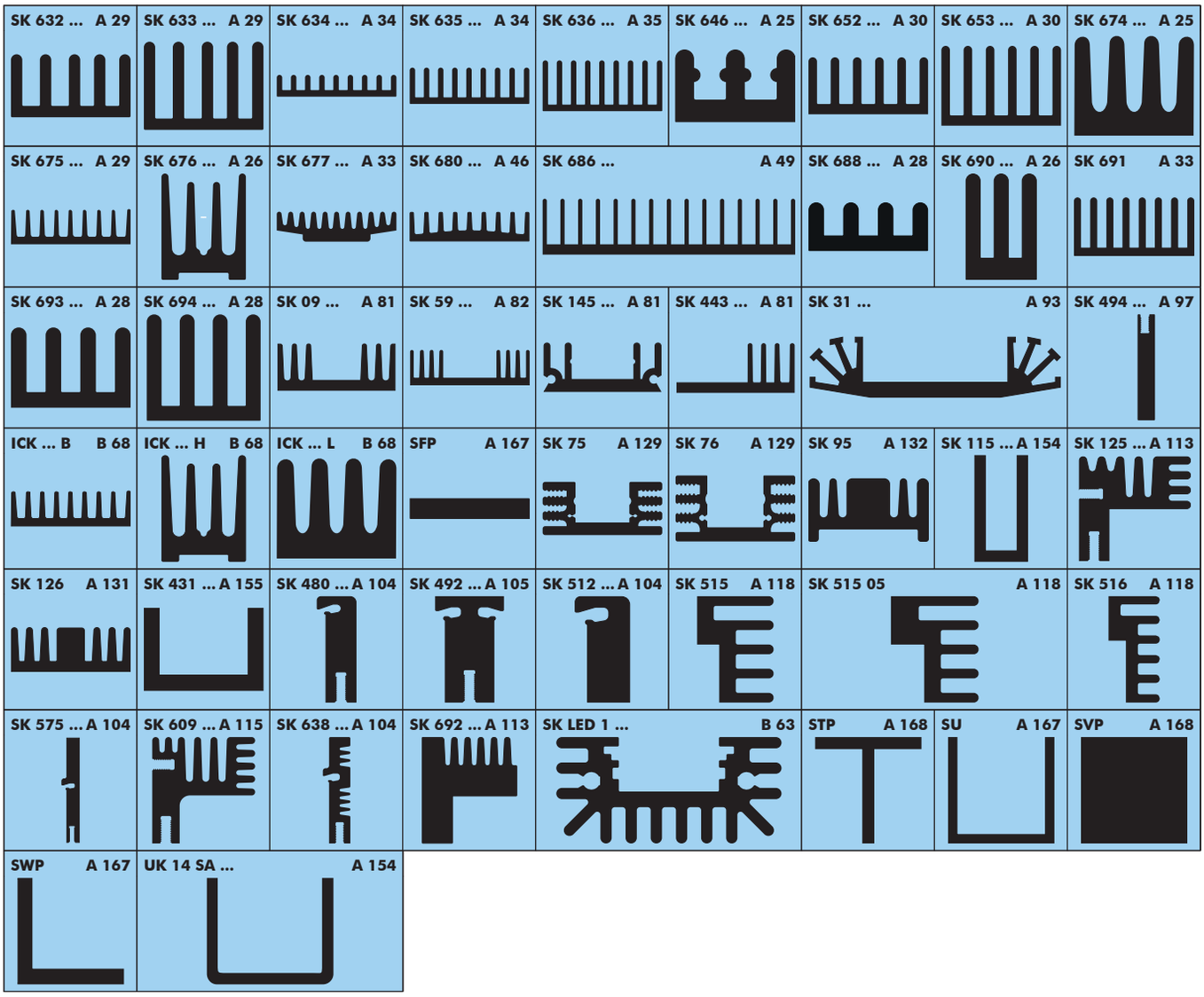
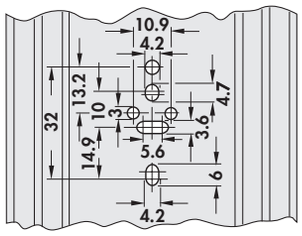
Heatsink-chart



Heatsink-chart classified in categories of thermal resistance at 75 mm length

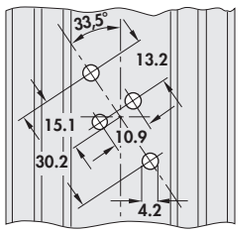
Hole pattern

CB



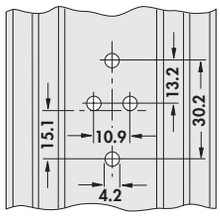
CB = TO 3 + SOT 9 + TO 66 + SOT 32
at |↔| 37.5 mm oblique drilling

TO 3 S



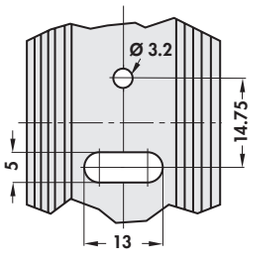
TO 3 oblique drilling for |↔| 37.5 mm

TO 3

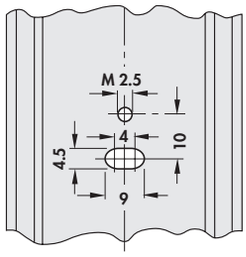


TO 3 exceeding |↔| 50 mm

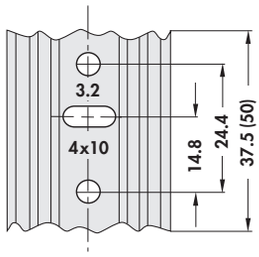
TO 220



SOT 32



K

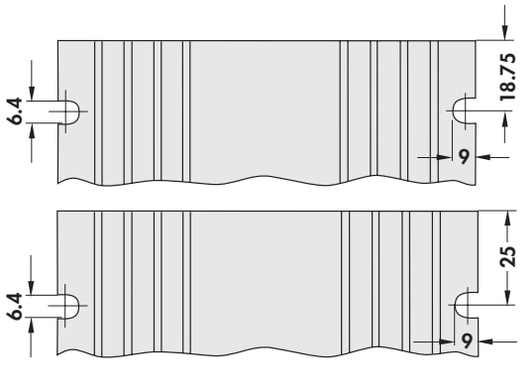


SOT 32 / TO 220 exceeding |↔| 37.5 mm

Standard hole pattern are processed as complete pin layouts, centered on the length of the heatsink.
Other positions of the pin layout on the heatsink, multiple drillings or changes of the drillings are processed according to customer's requirements.

For heatsinks exceeding |↔| 75 mm standard hole pattern can be supplied in multiple design.

Fixing slots



|↔| [mm]	number of fixing slots
37.5	2
75	4

|↔| [mm]	number of fixing slots
50	2
100	4

Heatsinks with the following shape ⊣⊢ and a standard hole pattern have these fixing slots as part of the serial production

Order example

SK 01	50	SA	TO3
profile	length	surface	pin layout

Surface treatment for heatsinks with standard drilling: black anodised **(SA).**

Raw degreased aluminium **(AL)** and clear natural anodise **(ME)** on request.

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Assignment table of transistor heatsinks

	TO 3	TO 66	SOT 9	TO 220	SOT 32
					
extruded heatsink	SK 01 SK 02 SK 03 SK 04 SK 05 SK 07 SK 08 SK 14 SK 16 SK 18 SK 19 SK 20 SK 21 SK 30 SK 31 SK 34 SK 36 SK 39 SK 45 SK 48 SK 51 SK 52 SK 53 SK 60 SK 63 SK 67 SK 69 SK 71 SK 72 SK 73 SK 74 SK 78 SK 79 SK 80 SK 88 SK 97 SK 122 SK 124 SK 147 SK 148 SK 185 SK 195 SK 197 SK 401 SK 402 SK 404	SK 01 SK 02 SK 03 SK 04 SK 05 SK 07 SK 08 SK 14 SK 16 SK 18 SK 19 SK 20 SK 21 SK 30 SK 31 SK 34 SK 36 SK 39 SK 45 SK 48 SK 51 SK 52 SK 53 SK 60 SK 63 SK 69 SK 71 SK 72 SK 73 SK 74 SK 78 SK 79 SK 80 SK 122 SK 147 SK 148 SK 185 SK 195 SK 197 SK 401 SK 402 SK 404	SK 01 SK 02 SK 03 SK 04 SK 05 SK 07 SK 08 SK 14 SK 16 SK 18 SK 19 SK 20 SK 21 SK 30 SK 31 SK 34 SK 36 SK 39 SK 45 SK 48 SK 51 SK 52 SK 53 SK 60 SK 63 SK 69 SK 71 SK 72 SK 73 SK 74 SK 78 SK 79 SK 80 SK 122 SK 147 SK 148 SK 185 SK 195 SK 197 SK 401 SK 402 SK 404	SK 09 SK 59 SK 64 SK 145	SK 01 SK 02 SK 03 SK 04 SK 05 SK 07 SK 08 SK 09 SK 14 SK 16 SK 18 SK 19 SK 20 SK 21 SK 30 SK 31 SK 34 SK 36 SK 39 SK 45 SK 48 SK 51 SK 52 SK 53 SK 60 SK 63 SK 65 SK 69 SK 71 SK 72 SK 73 SK 74 SK 78 SK 79 SK 80 SK 122 SK 147 SK 148 SK 185 SK 195 SK 197 SK 401 SK 402 SK 404

Assignment table transistor heatsinks

	TO 3	TO 66	SOT 9	TO 5	TO 247	TO 3 P
						
extruded heatsink with solder pin					SK 126 SK 145 SK 400 SK 437 SK 448 SK 459 SK 460 SK 600	SK 104 SK 129 SK 400 SK 409 SK 448 SK 456
extruded heatsink	WP 4030				SK 452 SK 484	SK 452 SK 484
set-up/clip-on heatsinks	AKK 127 AKK 191				FK 243 FK 245 FK 271 FK 272 FK 273 FK 274 FK 275 FK 276 FK 277 FK 278 FK 279 FK 280 FK 281 FK 282	
finger-shaped heatsinks	FK 201 FK 202 FK 205 FK 206 FK 207 FK 208 FK 223 FK 234 FK 236 FK 254 1 FK 318 FK 318 1	FK 201 FK 202 FK 205 FK 206 FK 207 FK 208 FK 223 FK 234 FK 236	FK 201 FK 202 FK 205 FK 206 FK 207 FK 208 FK 223 FK 234 FK 236			
small heatsinks				KF 5 KK 1 KK 562 SKK		

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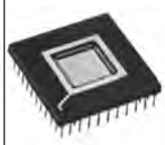
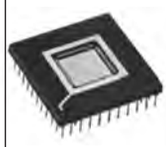
Assignment table transistor heatsinks

	TO 218	TO 220	SOT 32	DIL	PLCC	P-SIP	PGA/BGA
							
U-heatsinks		ICK 35 SK 431 UK 14					assignment table → B 2 - 11
extruded heatsink with solder pin	SK 145 SK 400 SK 437 SK 448 SK 459 SK 460	SK 75 SK 76 SK 104 SK 129 SK 145 SK 185 SK 409 SK 459 SK 460 SK 600	SK 104 SK 129 SK 454 SK 469 SK 470				
extruded heatsinks	SK 126 SK 452 SK 484	SK 95 SK 126 SK 400 SK 437 SK 448 SK 452 SK 454 SK 469 SK 470 SK 484 SK 518	SK 95	ICK...B ICK..H ICK...L	ICK PLCC ICK R		
set-up/clip-on heatsinks	FK 220 FK 224 FK 241 FK 243 FK 245 SK 516	FK 220 FK 224 FK 237 FK 240 FK 242 FK 243 FK 245 FK 248 FK 253 FK 255 FK 257 FK 258 FK 259 FK 260 FK 261 FK 262 FK 263 FK 264 FK 265 FK 266 FK 267 FK 268 FK 269 FK 270 SK 515				FK 224	

Assignment table transistor heatsinks

	TO 218	TO 220	SOT 32	DIL	PLCC	P-SIP	PGA/BGA
							
finger-shaped heatsinks	FK 243 FK 245	FK 205 FK 206 FK 207 FK 208 FK 210 FK 212 FK 214 FK 216 FK 217 FK 218 FK 219 FK 222 FK 225 FK 227 FK 228 FK 229 FK 230 FK 231 FK 232 FK 233 FK 234 FK 235 FK 236 FK 238 FK 247	FK 201 FK 205 FK 206 FK 207 FK 208 FK 209 FK 210 FK 211 FK 212 FK 213 FK 214 FK 215 FK 216 FK 217 FK 218 FK 223 FK 234 FK 235 FK 236 FK 239				assignment table → B 2 - 11
small heatsinks			KK 32 KK 92				

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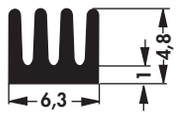
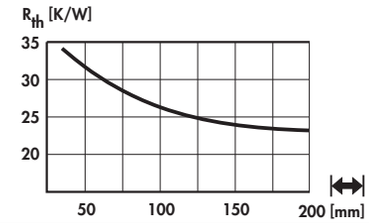
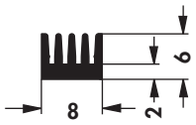
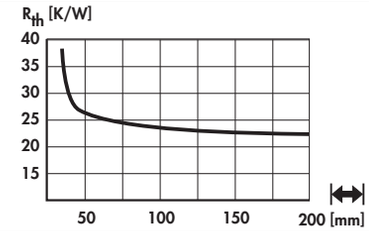
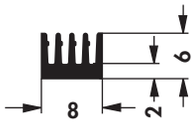
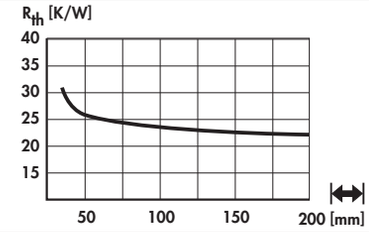
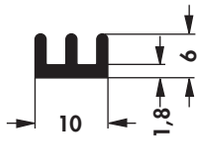
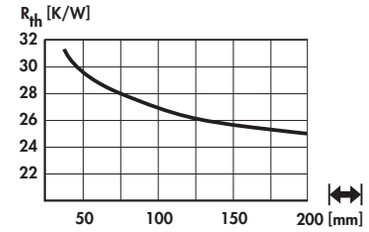
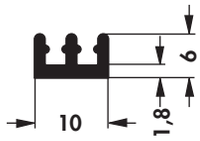
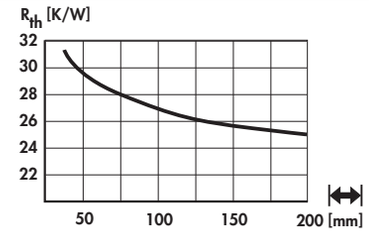
Standard extruded heatsinks

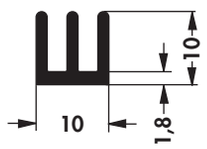
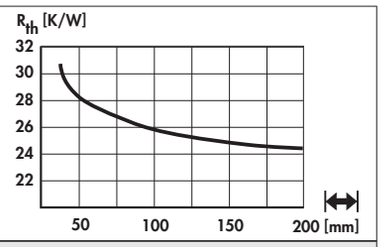
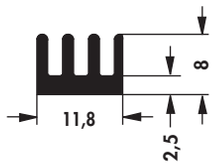
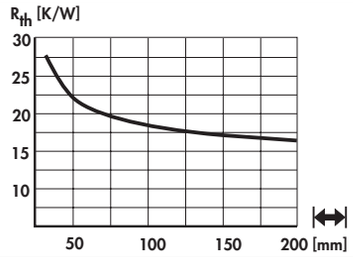
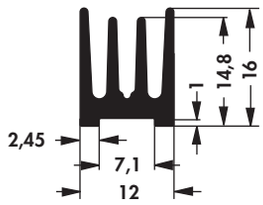
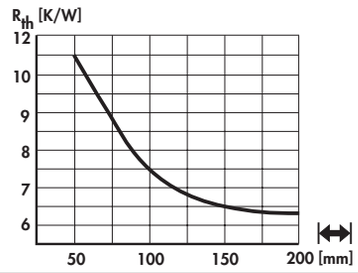
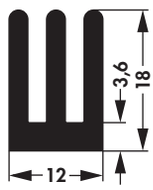
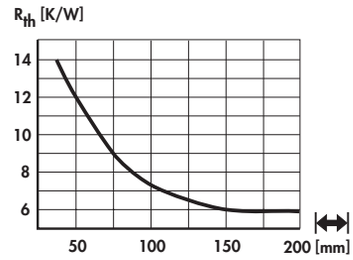
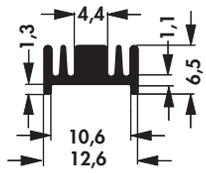
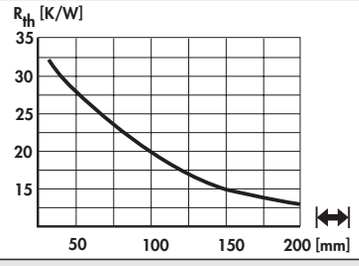
art. no.		
SK 674 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 586 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 616 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 496 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 646 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 565 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 470 ...		
	extruded heatsinks for PCB mounting ➔ A 134	
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	
art. no.		
SK 676 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	
art. no.		
SK 690 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	
art. no.		
SK 95 ...		
please indicate:	**... ↔** **15 25 37.5 1000 mm**	

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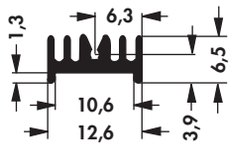
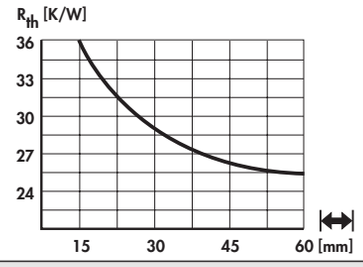
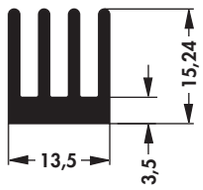
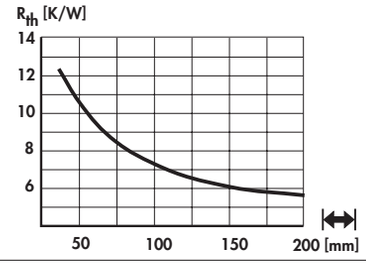
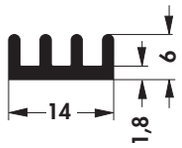
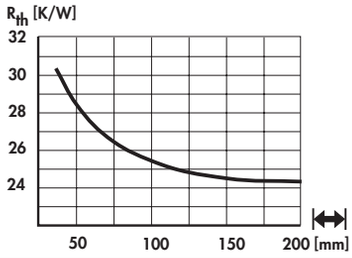
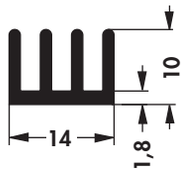
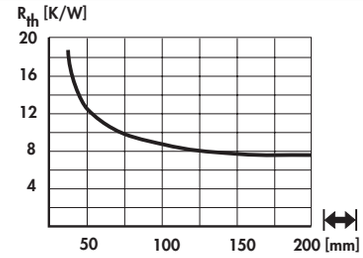
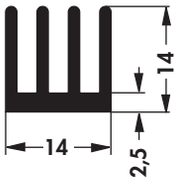
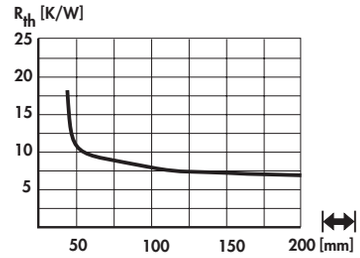
Standard extruded heatsinks

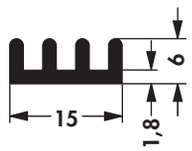
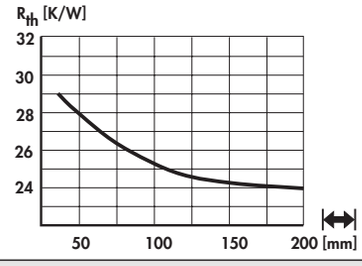
art. no.		
SK 522 ...		
please indicate:	**... ↔** **15 25 37.5 50 1000 mm**	

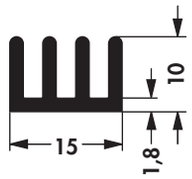
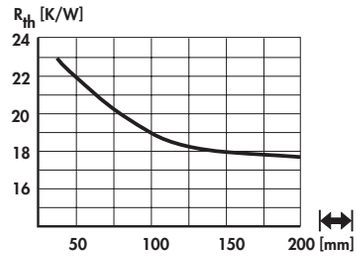
art. no.		
SK 469 ...		
	extruded heatsinks for PCB mounting ➔ A 134	
please indicate:	**... ↔** **25 37.5 75 100 1000 mm**	

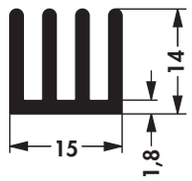
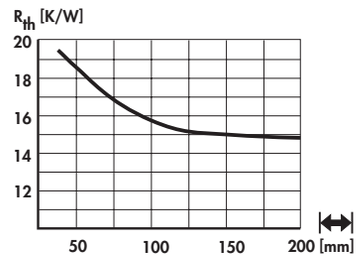
art. no.		
SK 478 ...		
please indicate:	**... ↔** **25 37.5 50 75 1000 mm**	

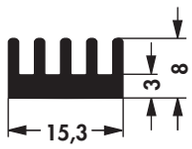
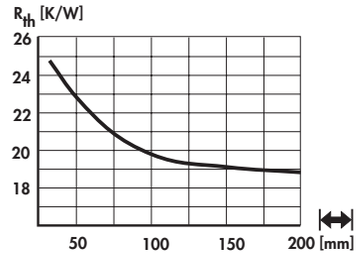
art. no.		
SK 552 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	

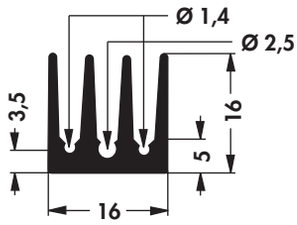
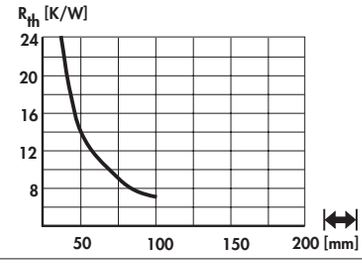
art. no.		
SK 558 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	

art. no.		
SK 688 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	

art. no.		
SK 693 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	

art. no.		
SK 694 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	

art. no.		
SK 521 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	

art. no.		
SK 437 ...	 extruded heatsinks for PCB mounting ➔ A 133	
please indicate:	**... ↔** **100 1000 mm**	

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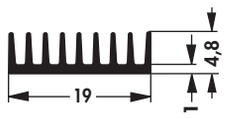
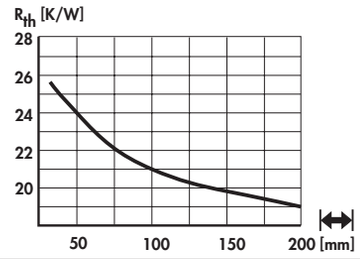
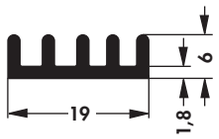
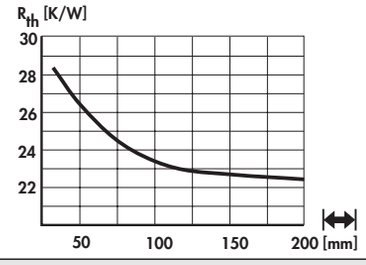
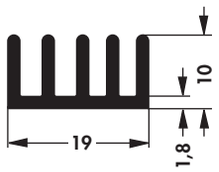
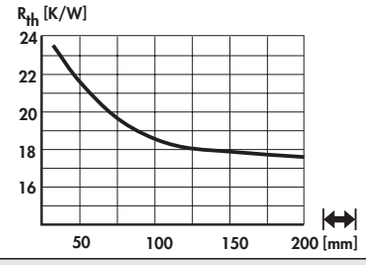
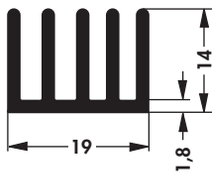
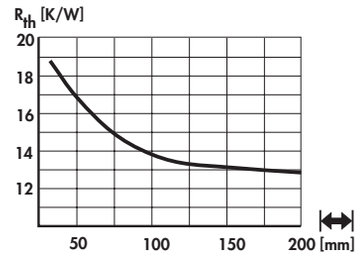
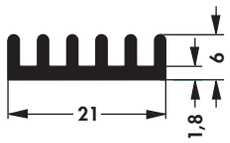
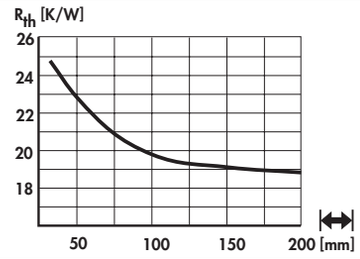
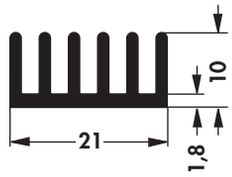
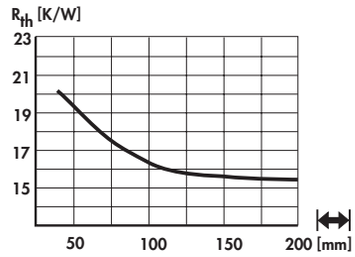
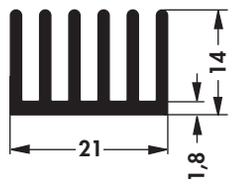
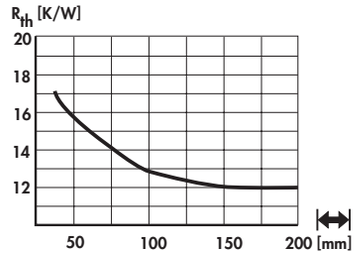
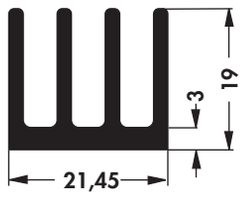
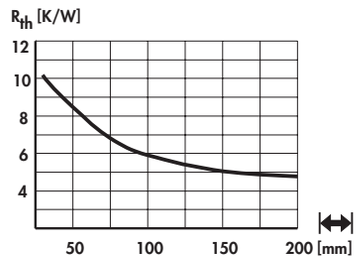
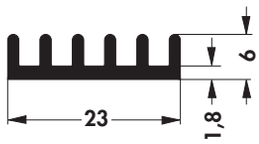
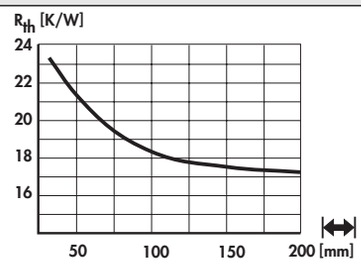
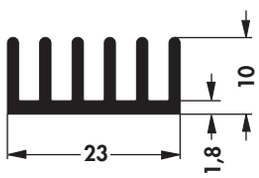
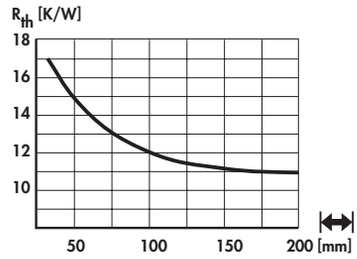
Standard extruded heatsinks

art. no.		
SK 675 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	
art. no.		
SK 631 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	
art. no.		
SK 632 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	
art. no.		
SK 633 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	
art. no.		
SK 476 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 652 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 150 1000 mm**	
art. no.		
SK 653 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 150 1000 mm**	
art. no.		
SK 454 ...	 extruded heatsinks for PCB mounting ➔ A 120	
please indicate:	**... ↔** **25 37.5 50 75 100 150 1000 mm**	
art. no.		
SK 477 ...		
please indicate:	**... ↔** **37.5 50 100 1000 mm**	
art. no.		
SK 582 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

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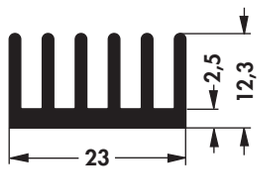
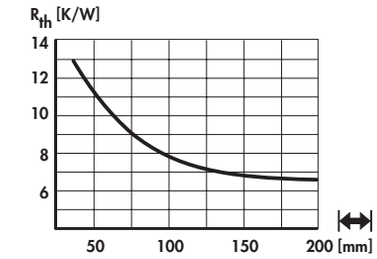
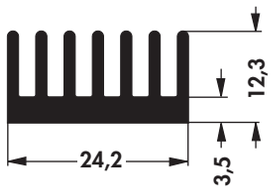
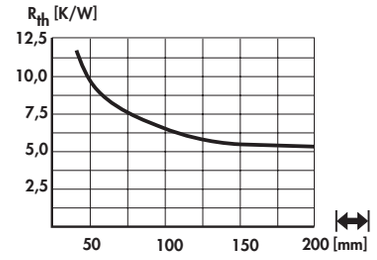
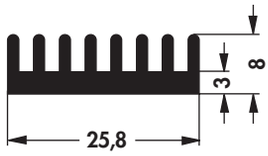
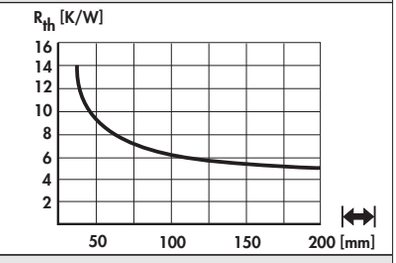
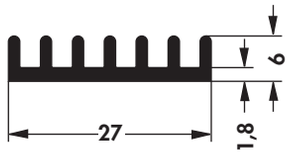
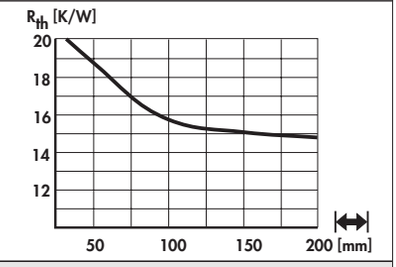
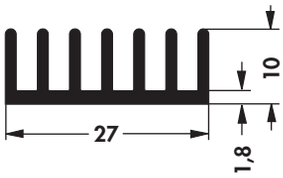
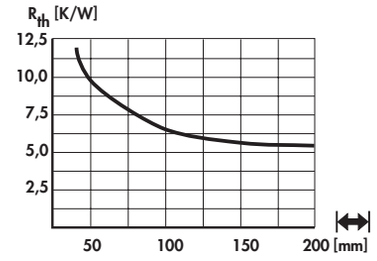
Standard extruded heatsinks

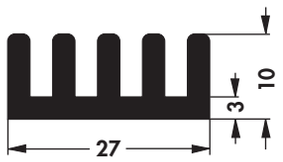
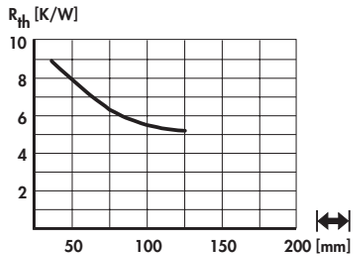
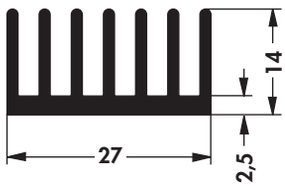
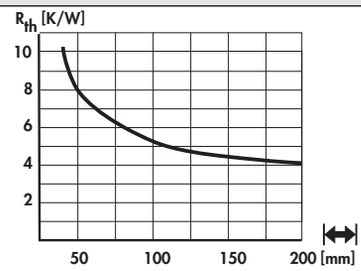
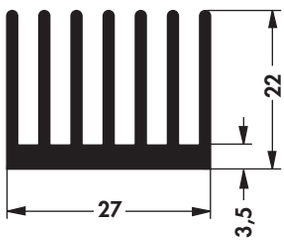
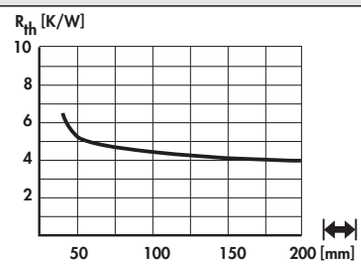
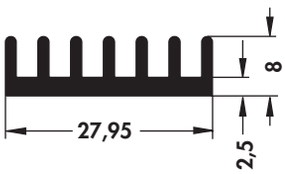
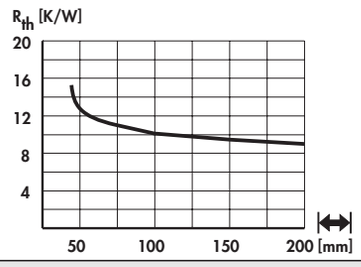
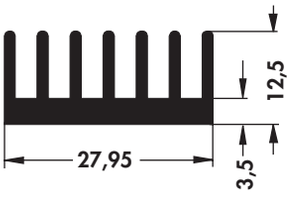
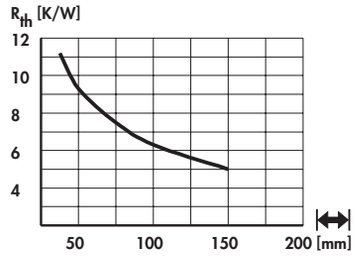
art. no.		
SK 559 ...		
please indicate:	**... ↔** **37.5 75 100 1000 mm**	

art. no.		
SK 551 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 486 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 473 ...		
please indicate:	**... ↔** **37.5 50 75 1000 mm**	

art. no.		
SK 554 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 447 ...		
please indicate:	**... ↔** **37.5 1000 mm**	
art. no.		
SK 560 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 566 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 561 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 448 ...	 extruded heatsinks for PCB mounting ➔ A 135	
please indicate:	**... ↔** **37.5 50 75 mm**	

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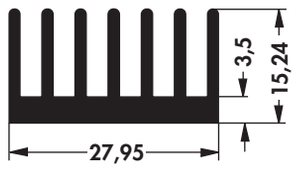
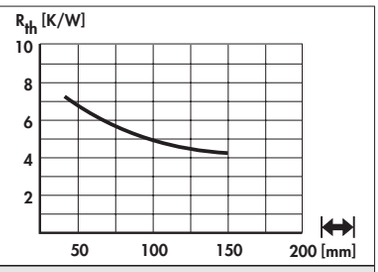
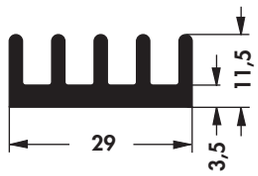
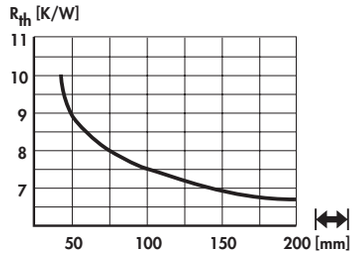
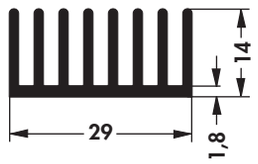
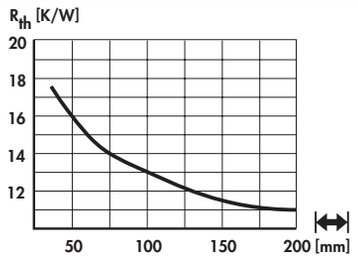
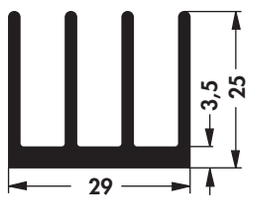
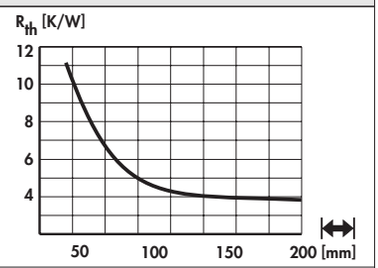
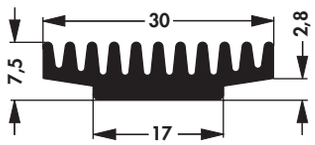
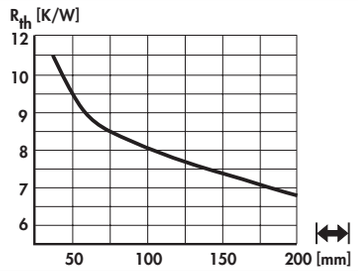
Standard extruded heatsinks

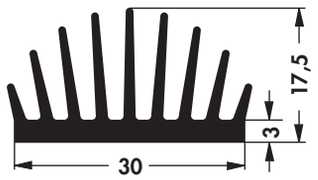
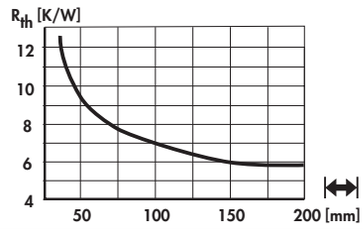
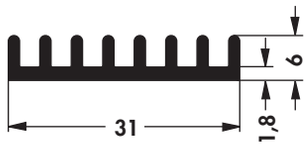
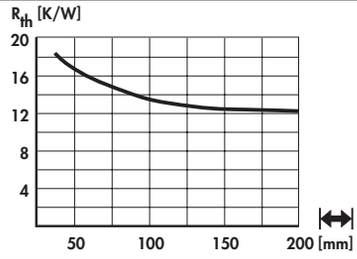
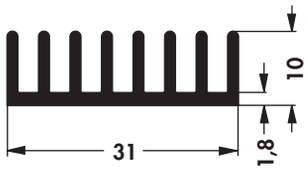
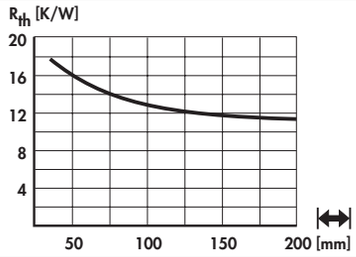
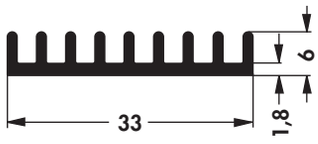
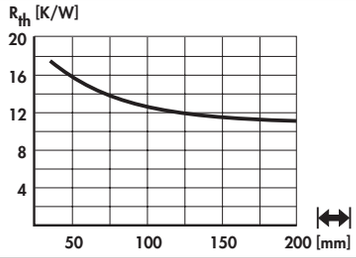
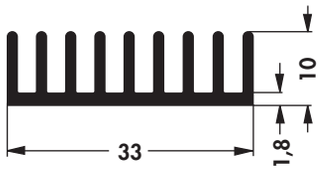
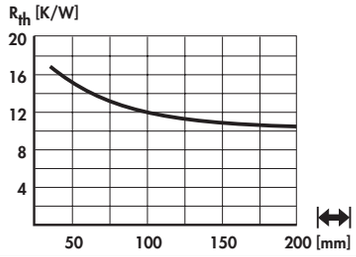
art. no.		
SK 177 ...		
please indicate:	**... ↔** **50 75 100 1000 mm**	

art. no.		
SK 550 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 691 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 452 ...		
	extruded heatsinks for PCB mounting ➔ A 120	
please indicate:	**... ↔** **37.5 100 1000 mm**	

art. no.		
SK 677 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 597 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 493 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 581 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 634 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 635 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

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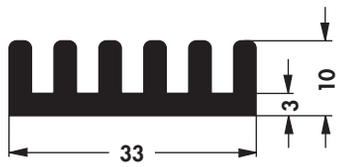
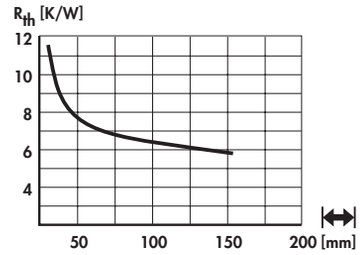
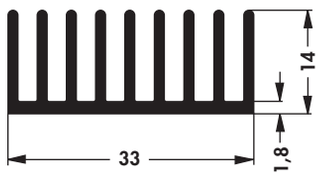
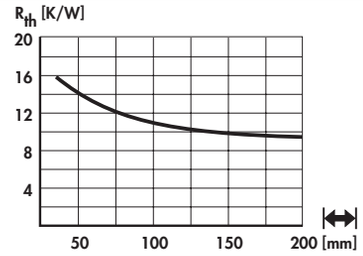
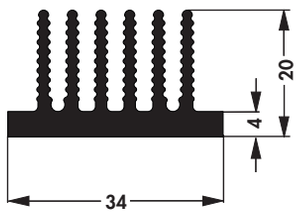
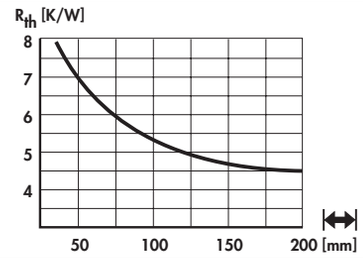
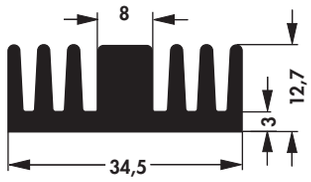
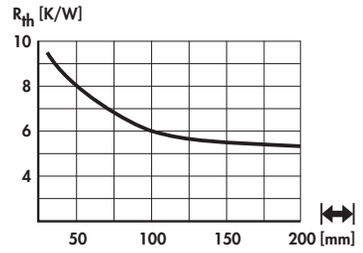
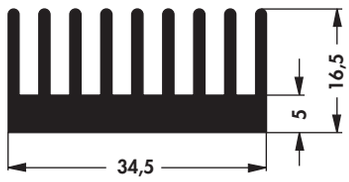
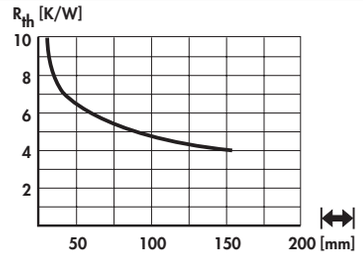
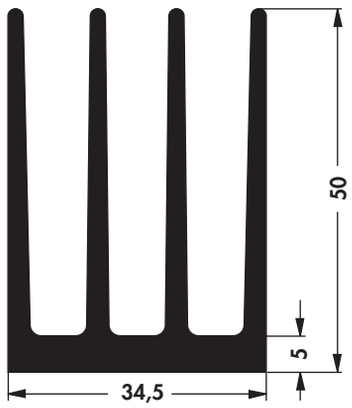
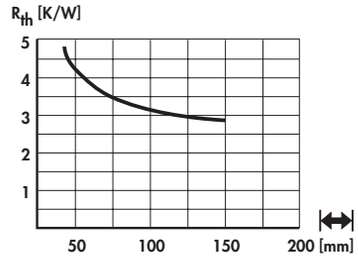
art. no.		
SK 400 ...		
	extruded heatsinks for PCB mounting ➔ A 135	
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

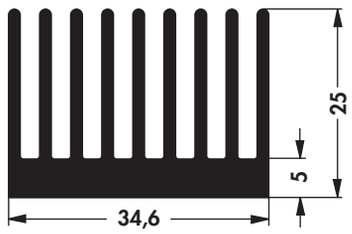
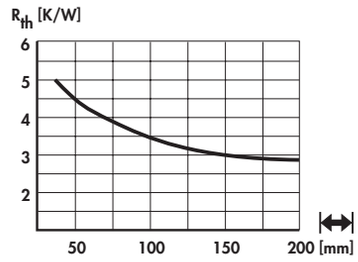
art. no.		
SK 636 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

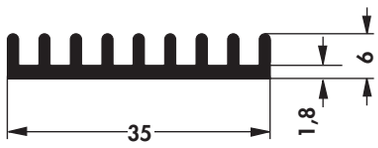
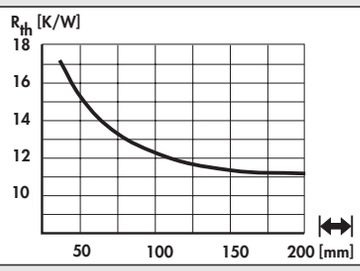
art. no.		
SK 460 ...		
	extruded heatsinks for PCB mounting ➔ A 136	
please indicate:	**... ↔** **25 37.5 50 1000 mm**	

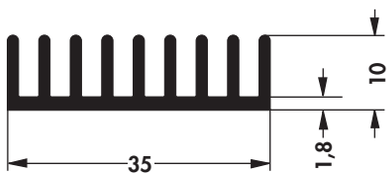
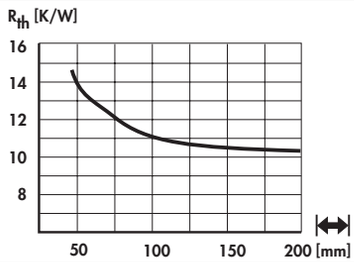
art. no.		
SK 126 ...		
	extruded heatsinks for PCB mounting ➔ A 131	
please indicate:	**... ↔** **25 37.5 1000 mm**	

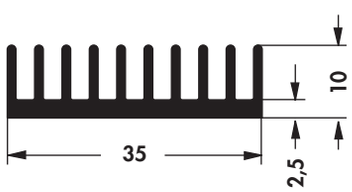
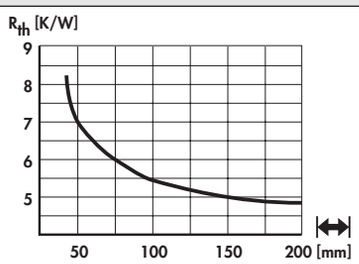
art. no.		
SK 178 ...		
please indicate:	**... ↔** **37.5 75 100 1000 mm**	

art. no.	
SK 134 ...	 
please indicate:	**... ↔** **37.5 50 100 1000 mm**

art. no.	
SK 683 ...	 
please indicate:	**... ↔** **37.5 50 100 1000 mm**

art. no.	
SK 471 ...	 
please indicate:	**... ↔** **37.5 50 75 1000 mm**

art. no.	
SK 587 ...	 
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**

art. no.	
SK 549 ...	 
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**

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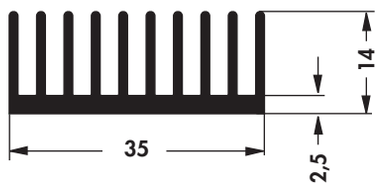
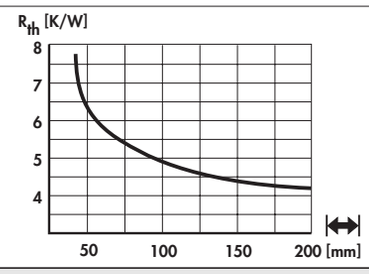
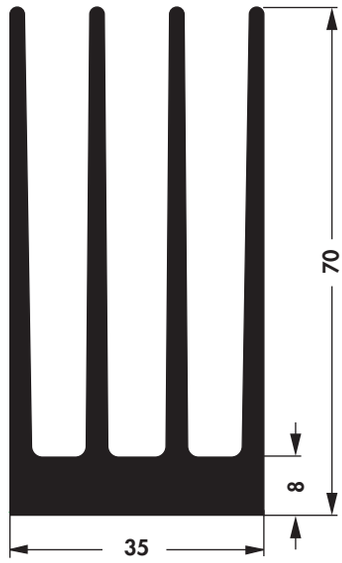
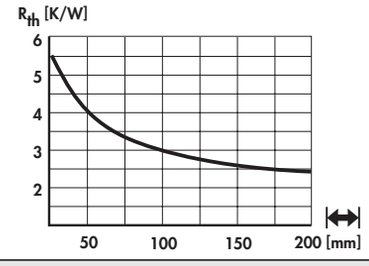
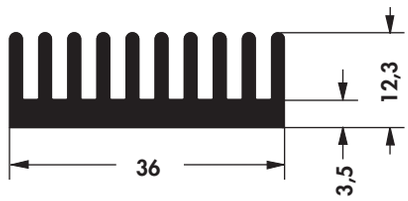
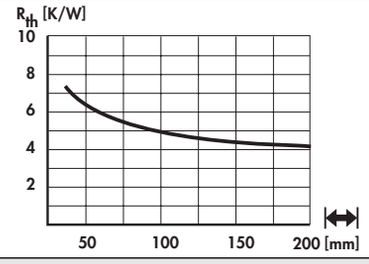
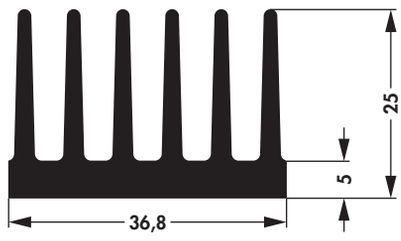
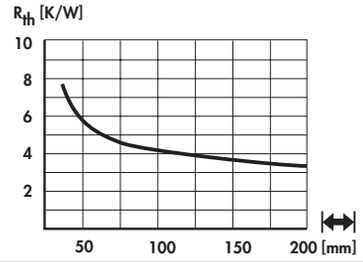
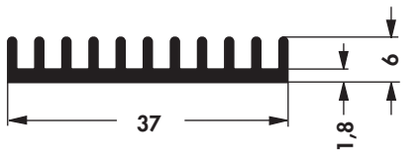
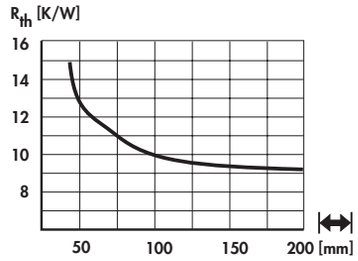
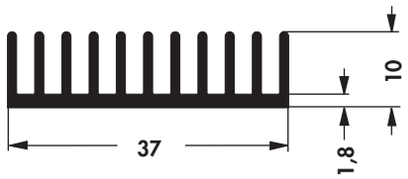
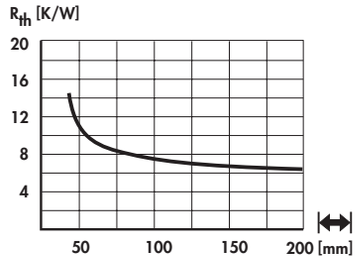
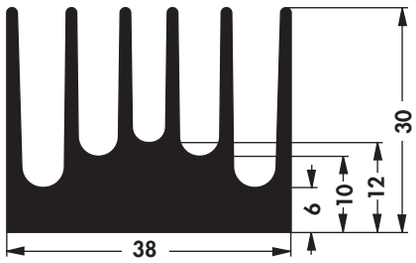
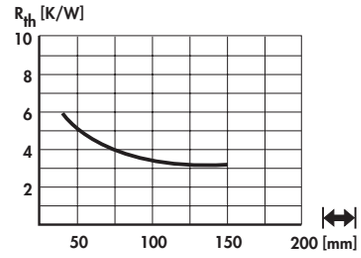
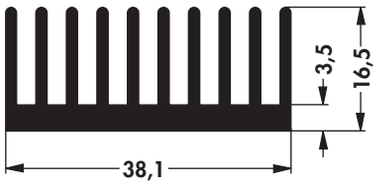
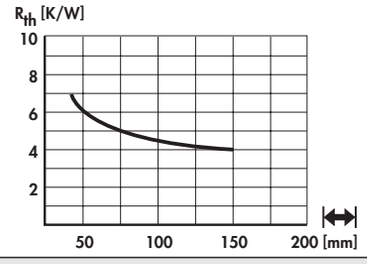
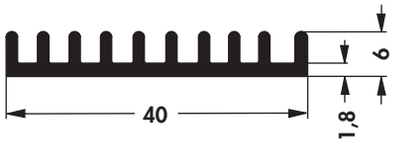
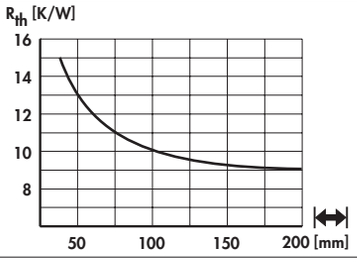
art. no.	
SK 562 ...	 
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**

art. no.	
SK 654 ...	 
please indicate:	**... ↔** **37.5 50 100 150 1000 mm**

art. no.	
SK 509 ...	 
please indicate:	**... ↔** **37.5 50 100 150 1000 mm**

art. no.	
SK 657 ...	 
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**

art. no.		
SK 563 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 564 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 174 ...		
please indicate:	**... ↔** **75 1000 mm**	
art. no.		
SK 179 ...		
please indicate:	**... ↔** **37.5 50 100 1000 mm**	
art. no.		
SK 456 ...		
	extruded heatsinks for PCB mounting ➔ A 135	
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

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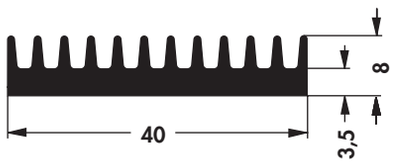
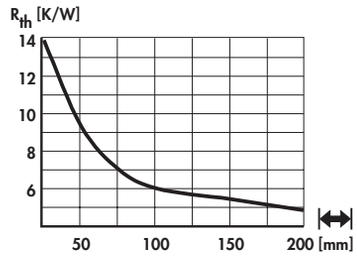
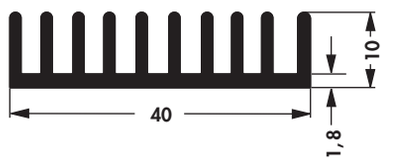
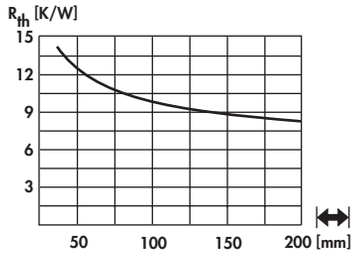
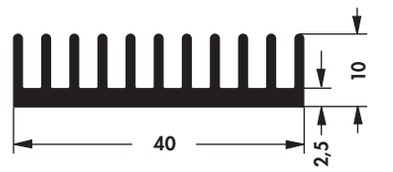
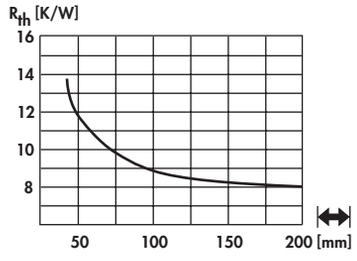
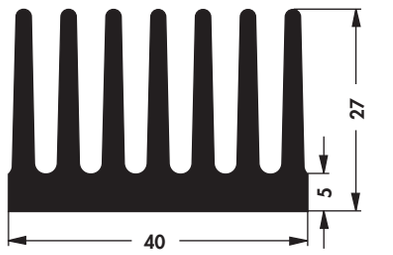
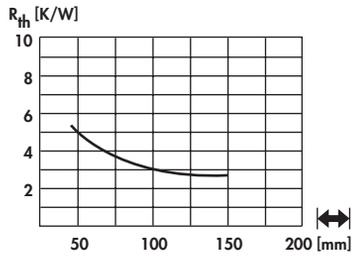
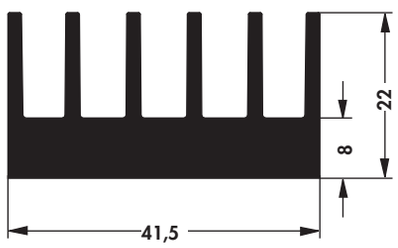
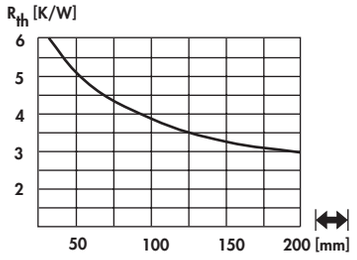
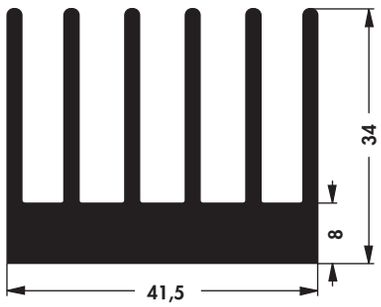
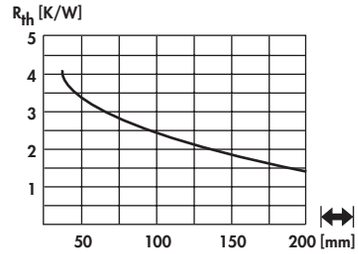
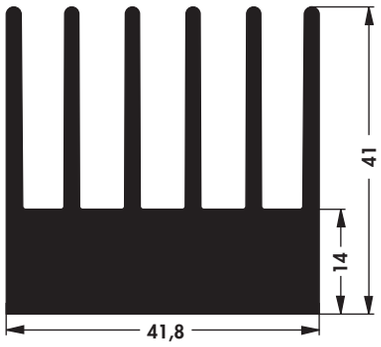
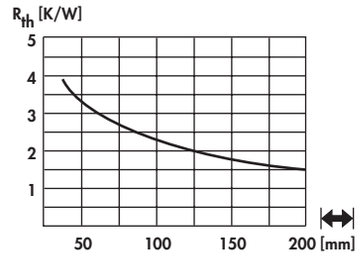
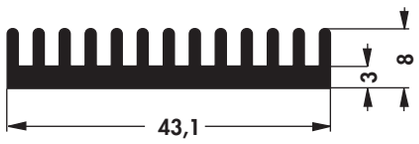
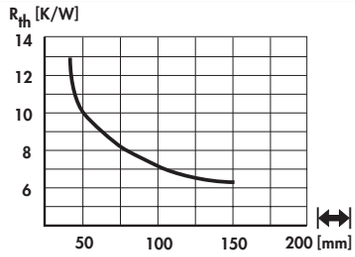
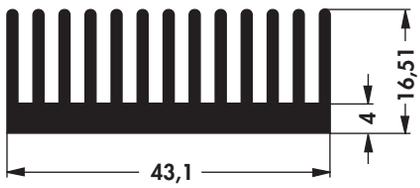
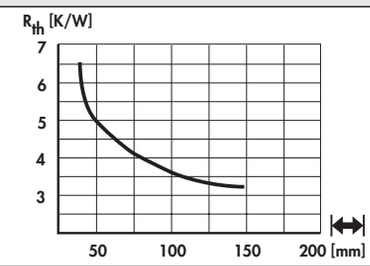
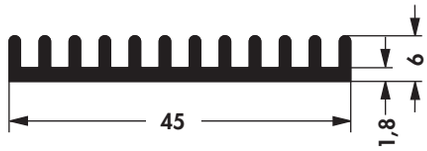
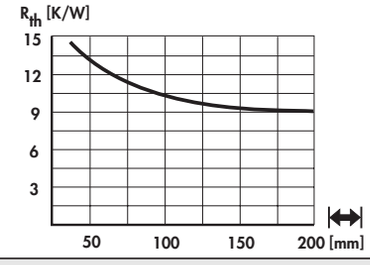
art. no.		
SK 420 ...		
please indicate:	**... ↔** **37.5 75 1000 mm**	
art. no.		
SK 513 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 547 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 106 ...		
please indicate:	**... ↔** **50 75 1000 mm**	
art. no.		
SK 472 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 189 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 679 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 423 ...		
please indicate:	**... ↔** **100 1000 mm**	
art. no.		
SK 422 ...		
please indicate:	**... ↔** **50 1000 mm**	
art. no.		
SK 511 ...		
please indicate:	**... ↔** **50 75 100 1000 mm**	

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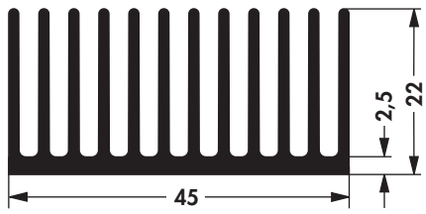
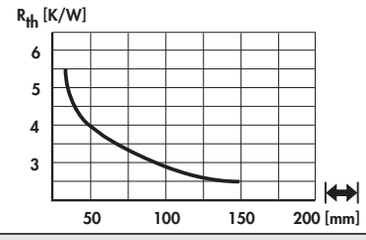
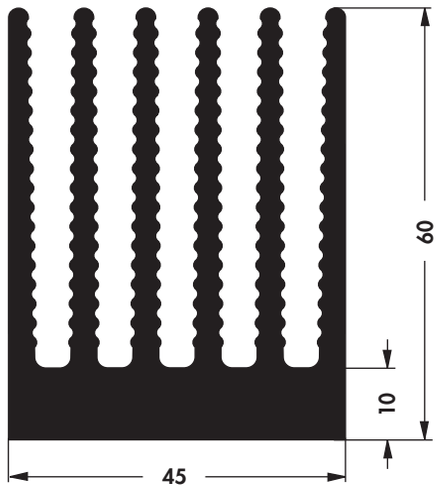
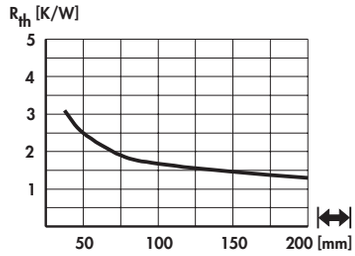
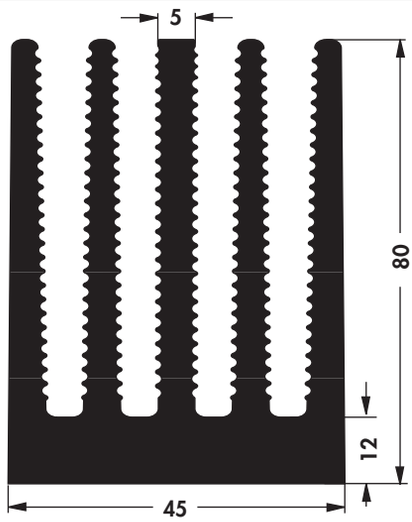
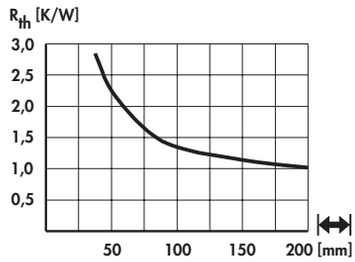
art. no.	
SK 626 ...	 

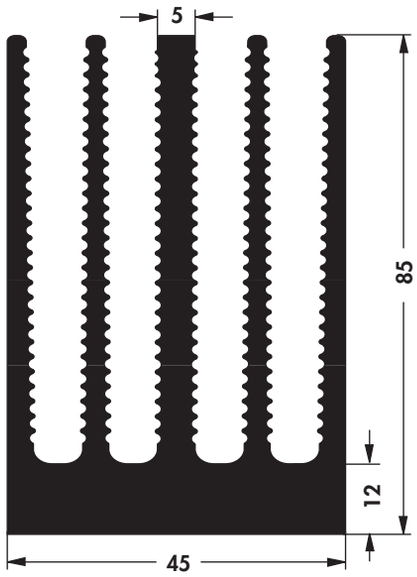
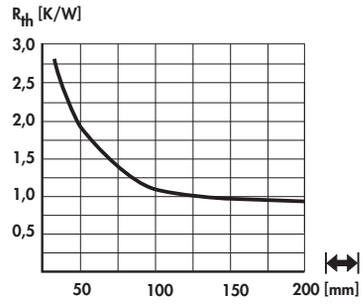
please indicate: ... ↔
50 75 100 1000 mm

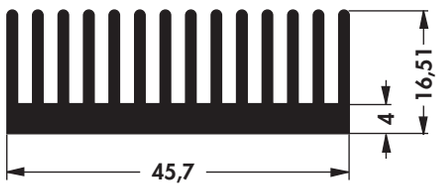
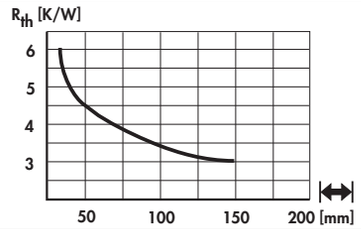
art. no.	
SK 453 ...	 

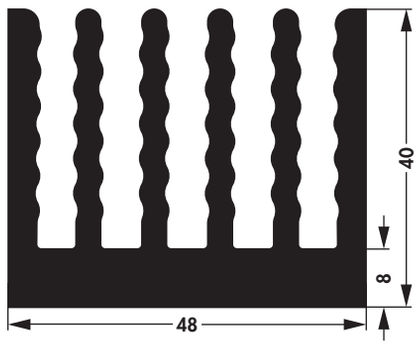
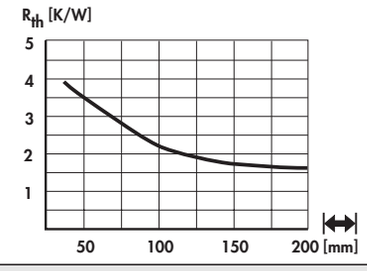
please indicate: ... ↔
37.5 75 mm
... ⌖ **(optional)**
SSR 1

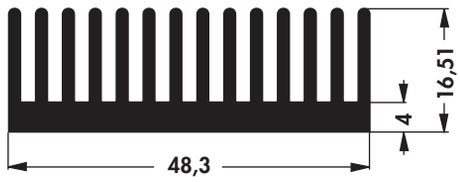
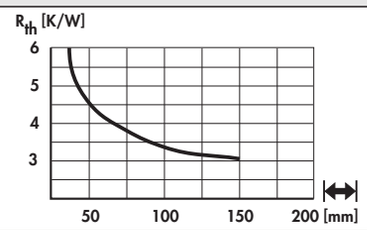
art. no.	
SK 455 ...	 

please indicate: ... ↔
75 mm
... ⌖ **(optional)**
SSR 4

art. no.	
SK 467 ...	 
please indicate:	... ↔ 37.5 50 75 100 1000 mm ... ⌖ (optional) SSR 1; SSR 4

art. no.	
SK 424 ...	 
please indicate:	... ↔ 75 1000 mm

art. no.	
SK 666 ...	 
please indicate:	... ↔ 37.5 50 75 100 150 1000 mm

art. no.	
SK 425 ...	 
please indicate:	... ↔ 75 mm

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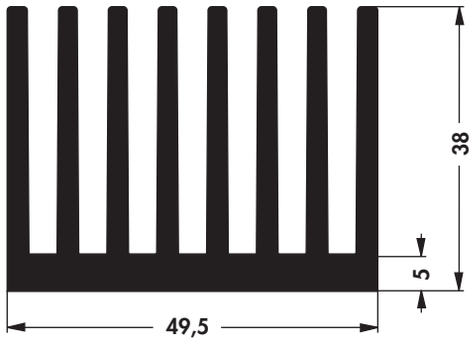
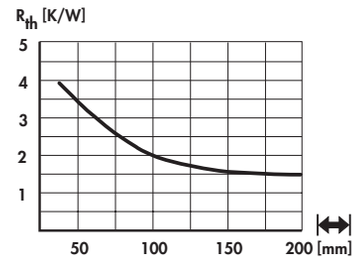
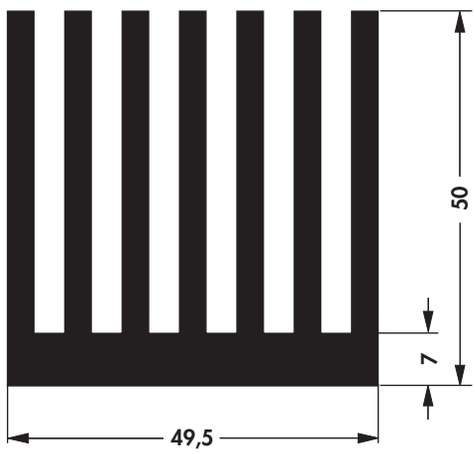
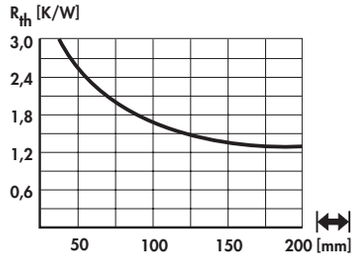
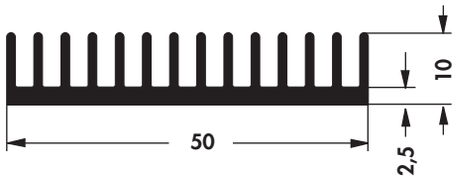
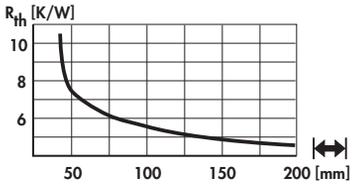
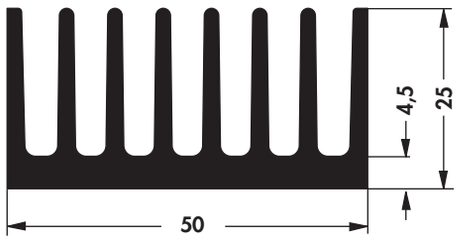
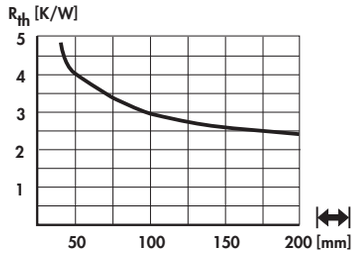
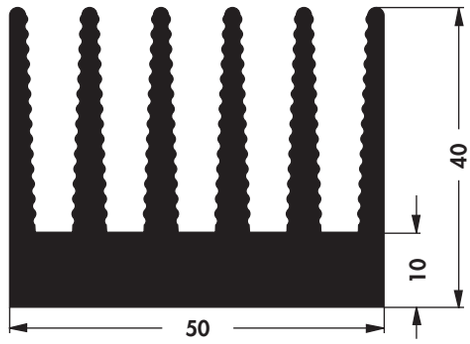
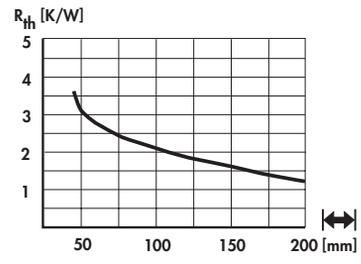
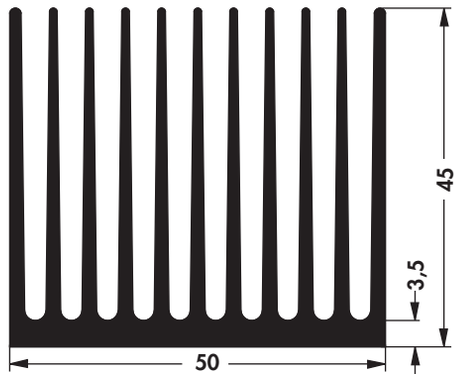
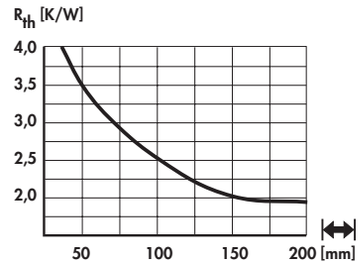
art. no.	
SK 445 ...	 
please indicate:	**... ↔ 100 1000 mm**

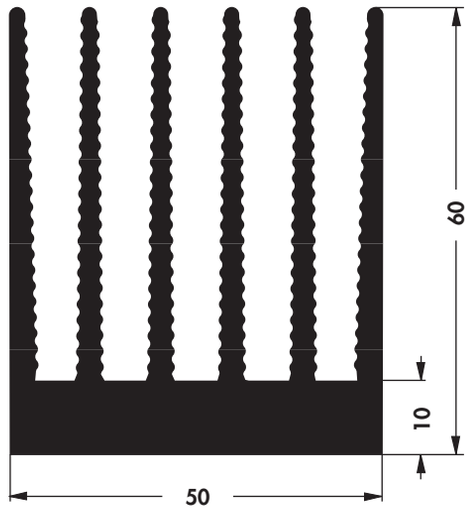
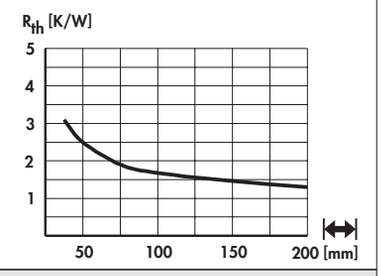
art. no.	
SK 450 ...	 
please indicate:	**... ↔ 75 1000 mm**

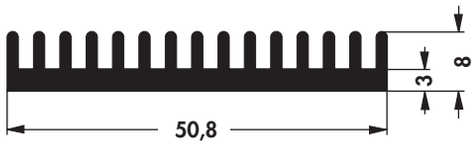
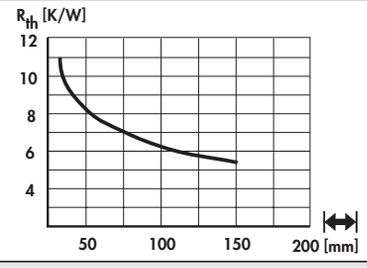
art. no.	
SK 548 ...	 
please indicate:	**... ↔ 37.5 50 75 100 1000 mm**

art. no.	
SK 567 ...	 
please indicate:	**... ↔ 37.5 50 75 100 1000 mm**

art. no.	
SK 434 ...	 
please indicate:	**... ↔** **50 75 100 1000 mm** **... ⌖ (optional)** **SSR 1**

art. no.	
SK 475 ...	 
please indicate:	**... ↔** **37.5 50 100 1000 mm**

art. no.	
SK 527 ...	 
please indicate:	**... ↔** **50 75 100 1000 mm**

art. no.	
SK 427 ...	 
please indicate:	**... ↔** **50 75 1000 mm**

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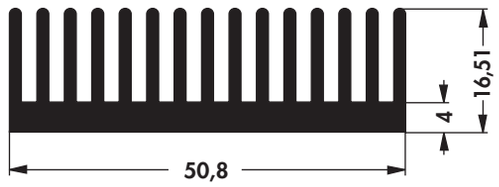
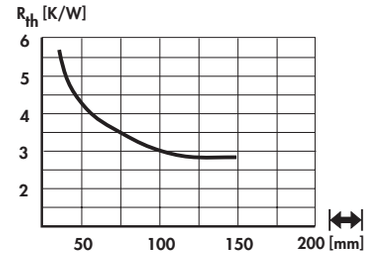
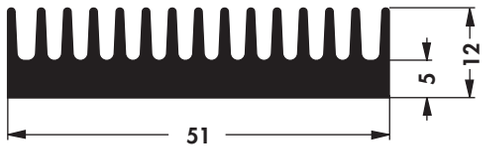
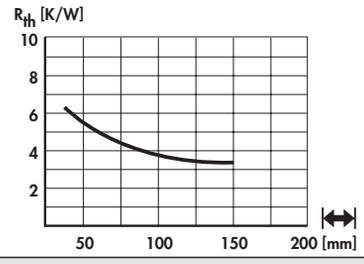
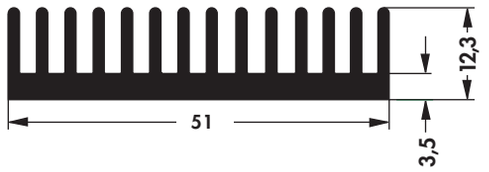
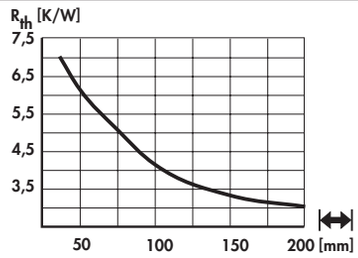
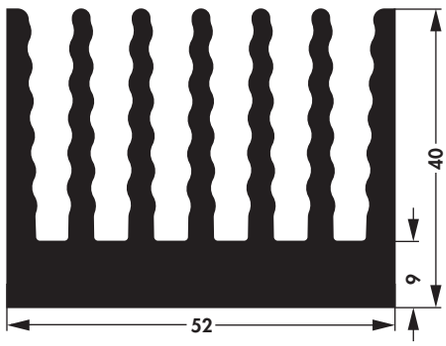
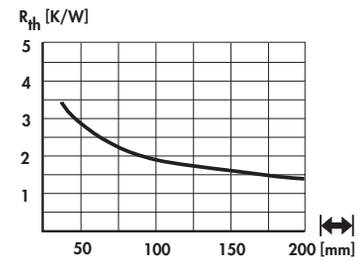
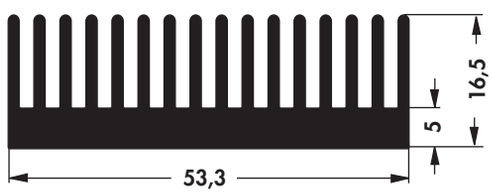
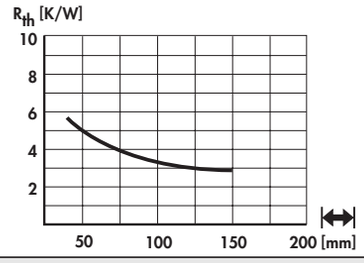
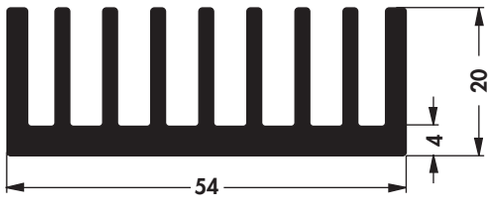
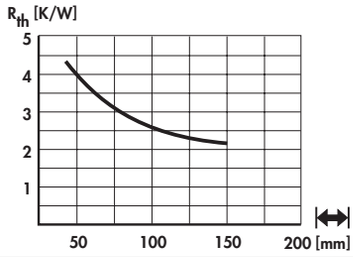
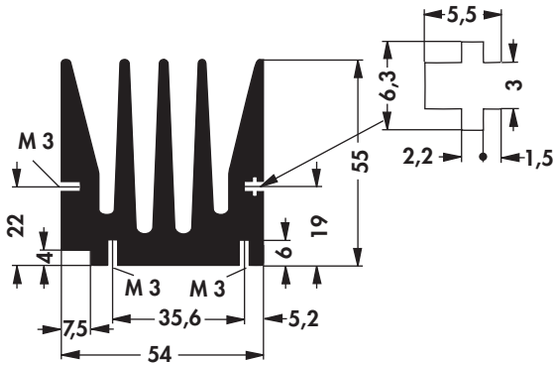
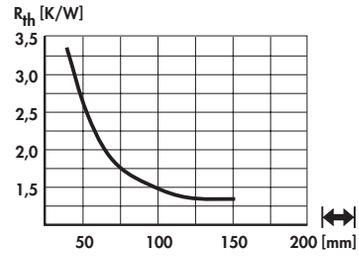
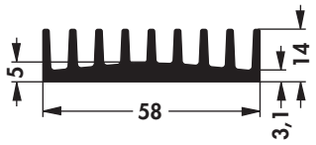
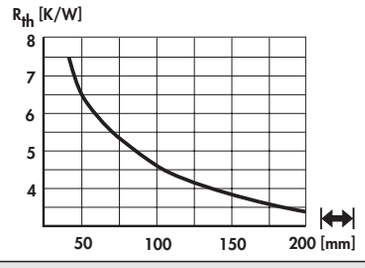
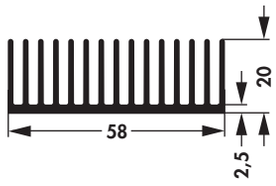
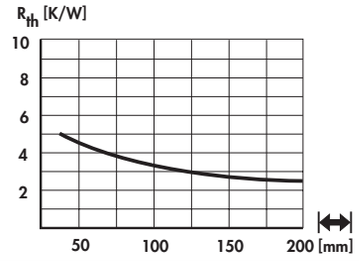
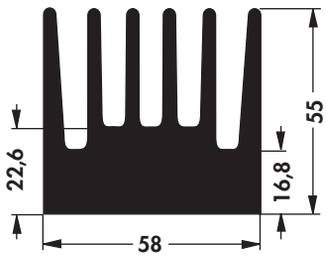
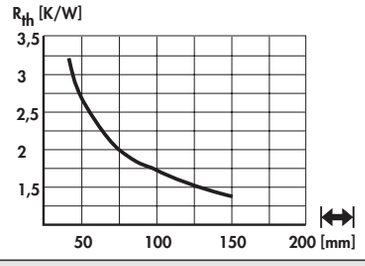
art. no.		
SK 426 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

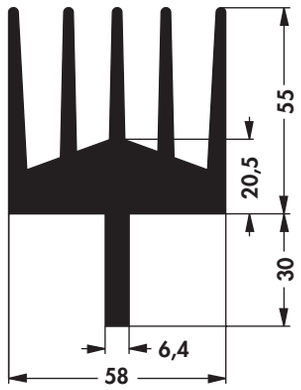
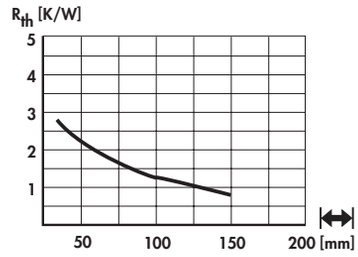
art. no.		
SK 156 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

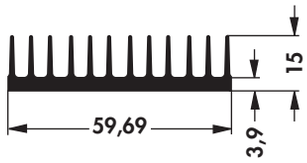
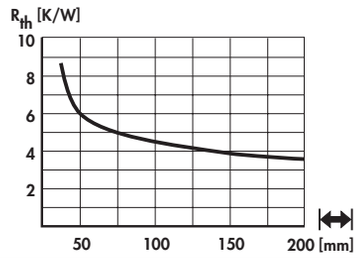
art. no.		
SK 468 ...		
please indicate:	**... ↔** **37.5 75 1000 mm**	

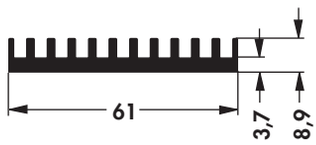
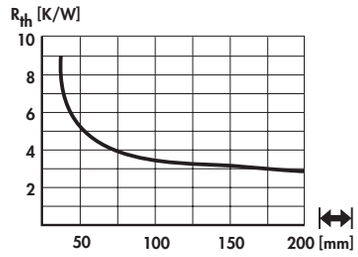
art. no.		
SK 667 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

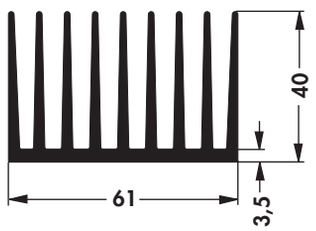
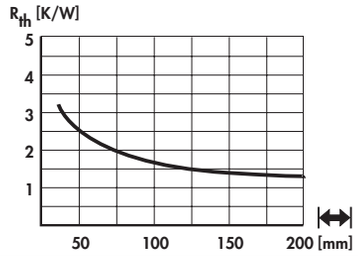
art. no.		
SK 180 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

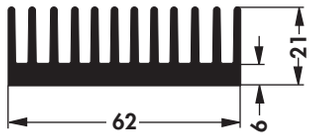
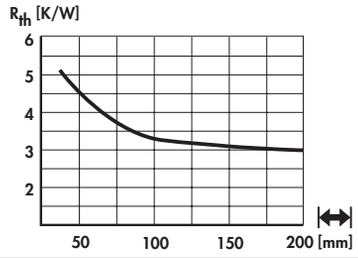
art. no.	
SK 99 ...	 
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**
art. no.	
SK 429 ...	 
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**
art. no.	
SK 680 ...	 
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**
art. no.	
SK 670 ...	 
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**
art. no.	
SK 436 ...	 
please indicate:	**... ↔** **75 1000 mm**

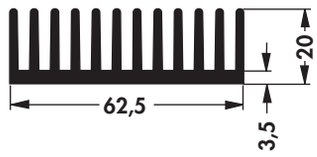
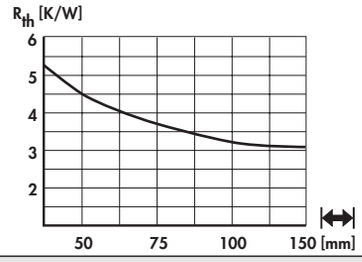
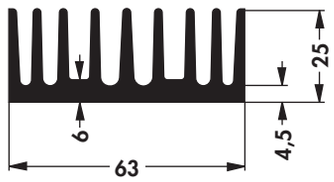
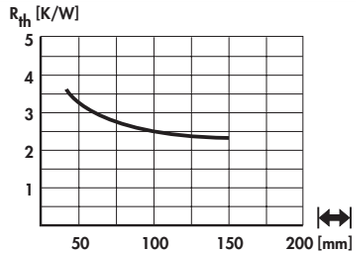
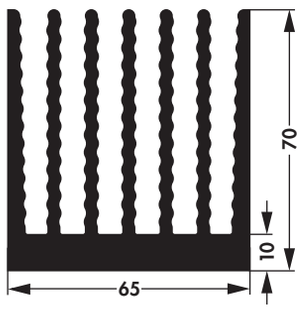
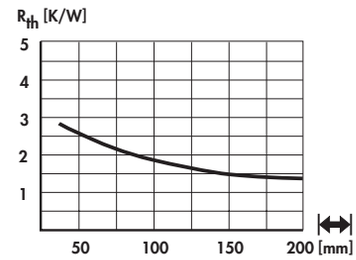
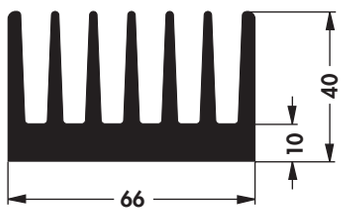
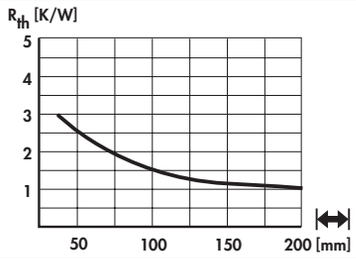
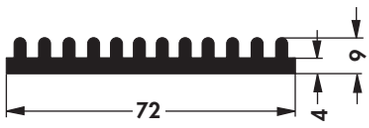
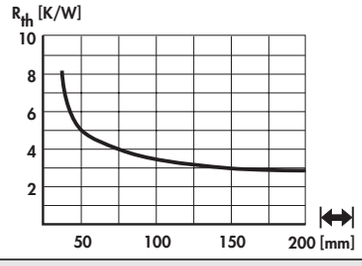
art. no.		
SK 50 ...		
please indicate:	**... ↔** **75 1000 mm**	

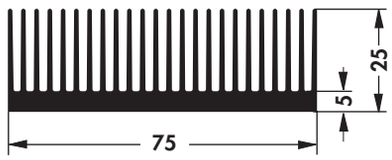
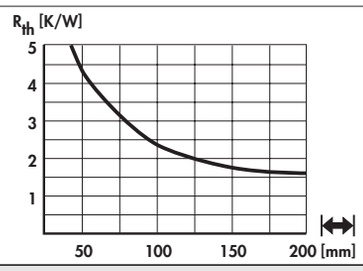
art. no.		
SK 630 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

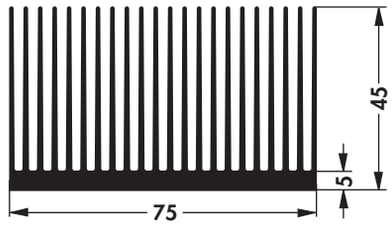
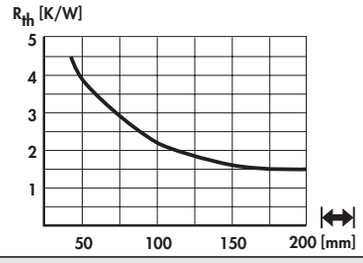
art. no.		
SK 485 ...		
please indicate:	**... ↔** **50 75 100 1000 mm**	

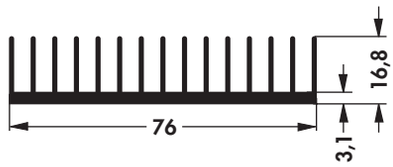
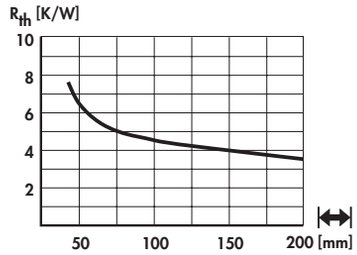
art. no.		
SK 647 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

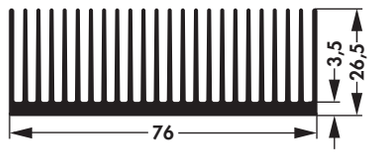
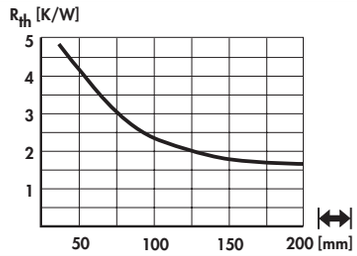
art. no.		
SK 649 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

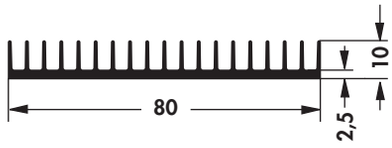
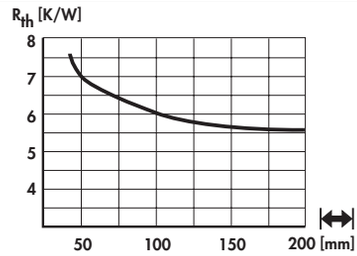
art. no.		
SK 444 ...		
please indicate:	**... ↔** **37.5 50 75 1000 mm**	
art. no.		
SK 406 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 668 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	
art. no.		
SK 100 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	
art. no.		
SK 648 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

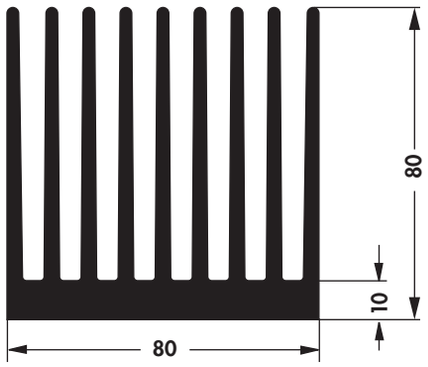
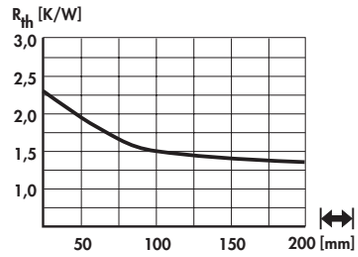
art. no.		
SK 594 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

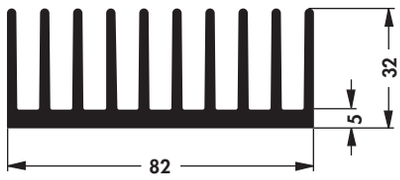
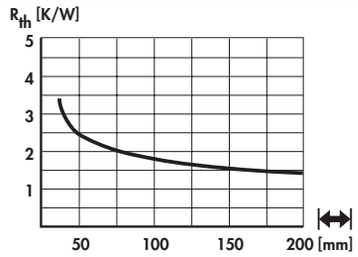
art. no.		
SK 628 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

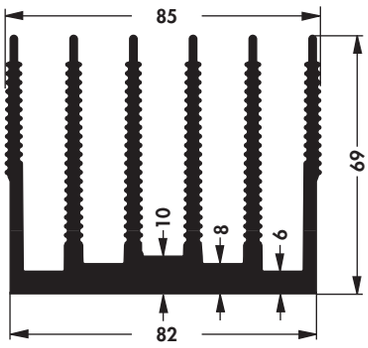
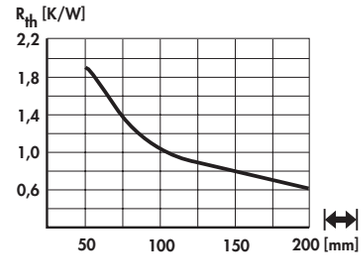
art. no.		
SK 686 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

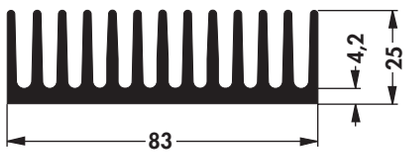
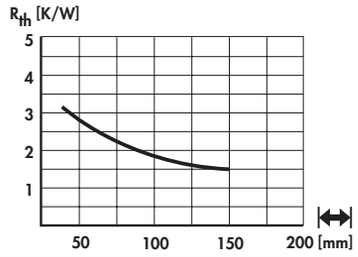
art. no.		
SK 663 ...		
please indicate:	**... ↔** **50 75 100 150 1000 mm**	

art. no.		
SK 545 ...		
please indicate:	**... ↔** **50 75 100 150 1000 mm**	

art. no.	
SK 655 ...	 
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**

art. no.	
SK 612 ...	 
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**

art. no.	
SK 135 ...	 
please indicate:	**... ↔** **50 100 1000 mm**

art. no.	
SK 407 ...	 
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**

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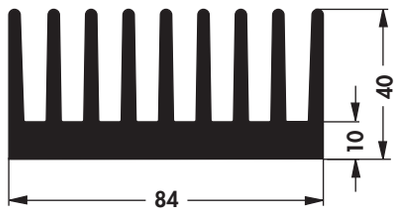
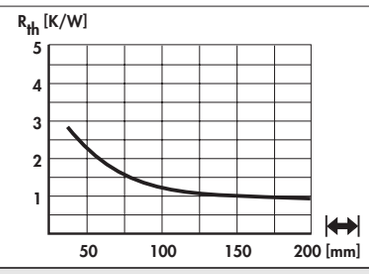
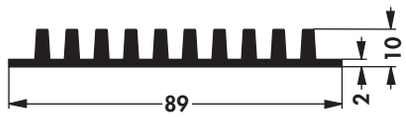
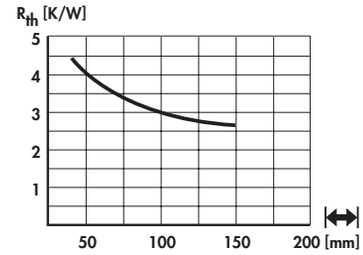
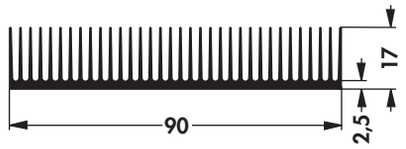
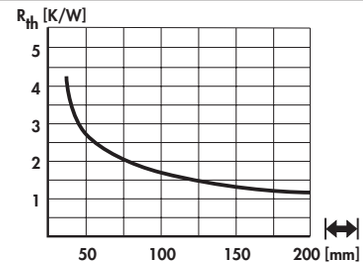
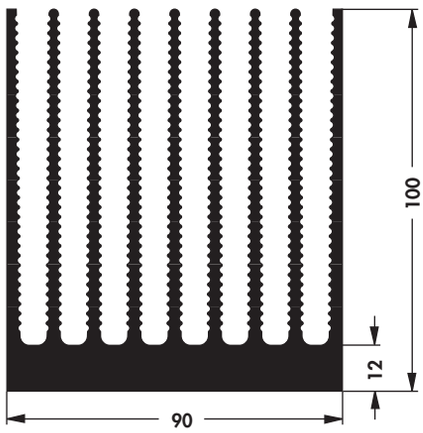
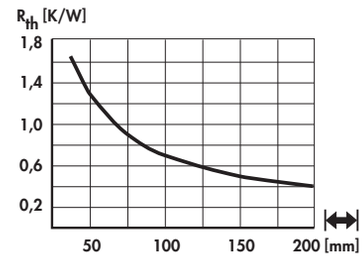
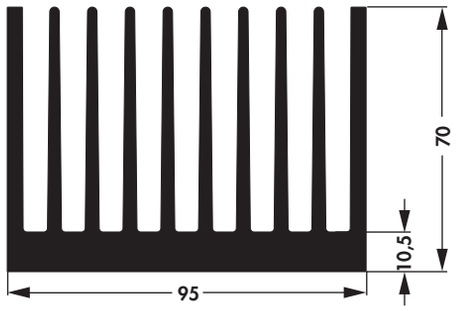
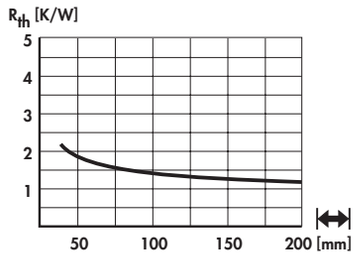
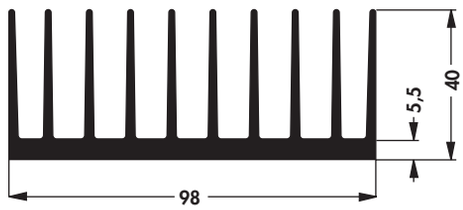
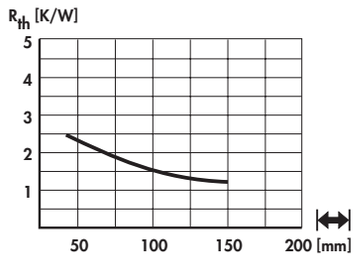
art. no.	
SK 464 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**

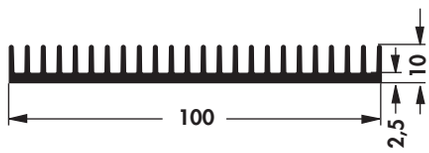
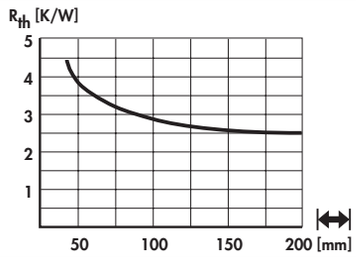
art. no.	
SK 182 ...	 
please indicate:	**... ↔** **37.5 50 75 100 150 200 1000 mm**

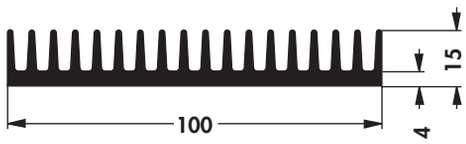
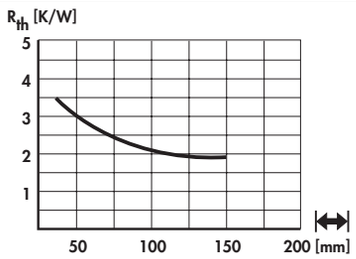
art. no.	
SK 624 ...	 
please indicate:	**... ↔** **37.5 50 75 100 150 200 1000 mm**

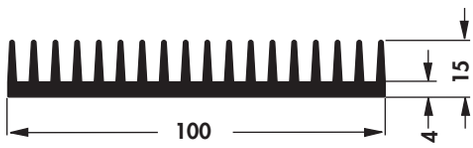
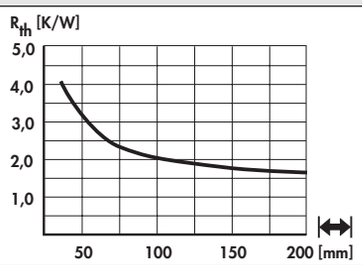
art. no.	
SK 507 ...	 
please indicate:	**... ↔** **37.5 75 100 1000 mm** **... ⋄ (optional)** **SSR 1; SSR 2**

art. no.	
SK 645 ...	 
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**

art. no.	
SK 408 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**

art. no.	
SK 546 ...	 
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**

art. no.	
SK 81 ...	 
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**

art. no.	
SK 505 ...	  weight reduced like SK 81
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**

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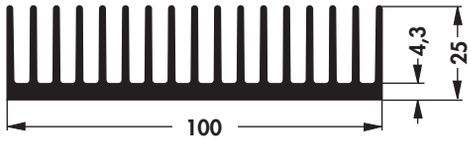
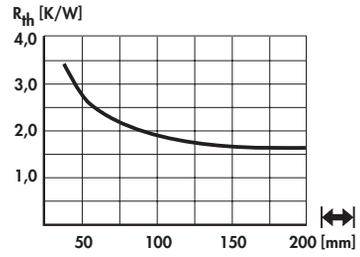
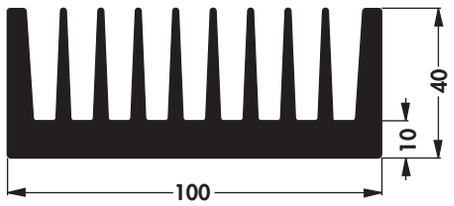
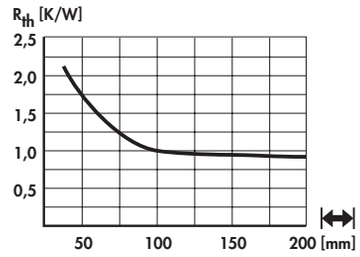
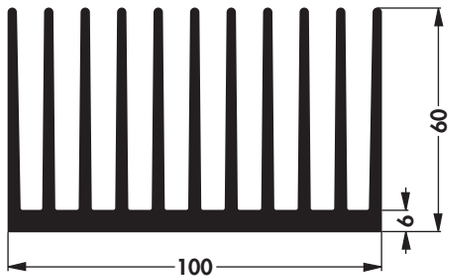
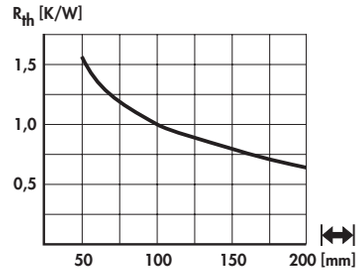
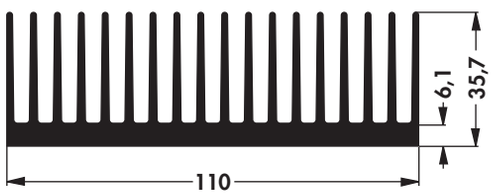
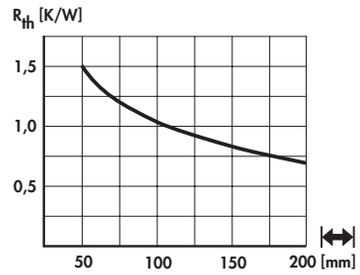
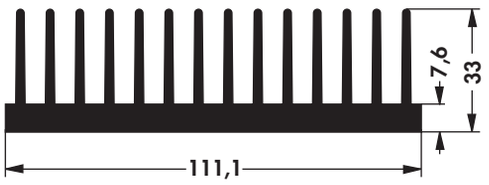
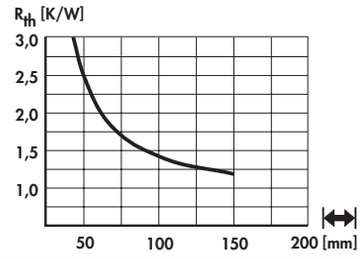
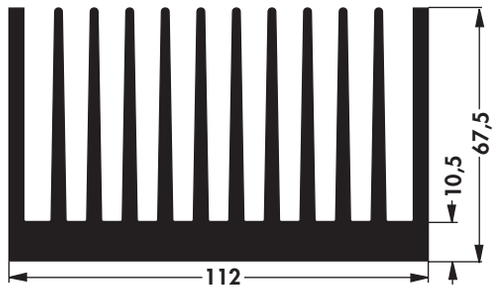
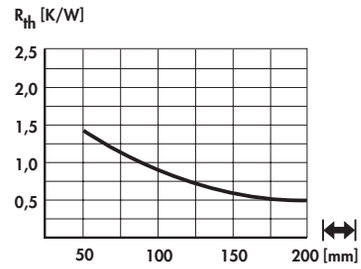
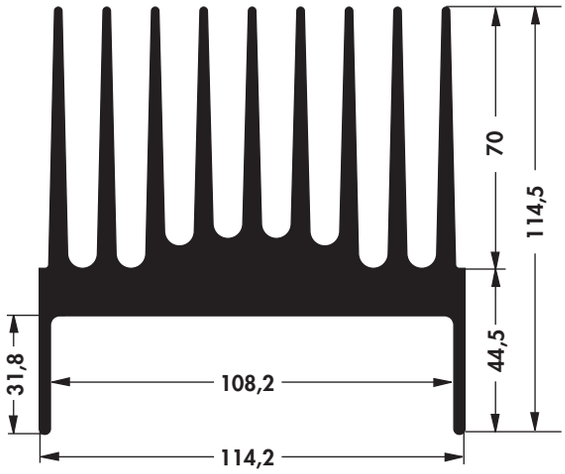
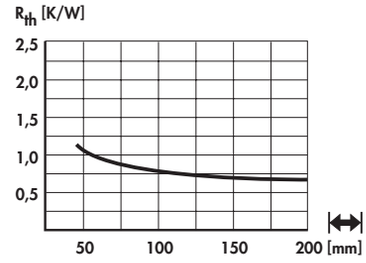
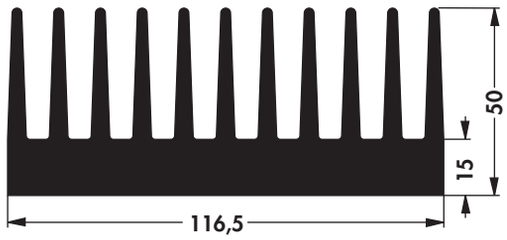
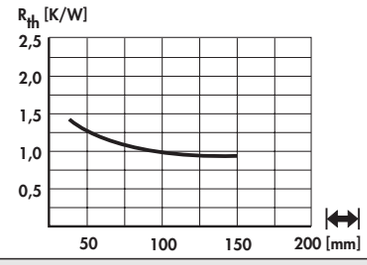
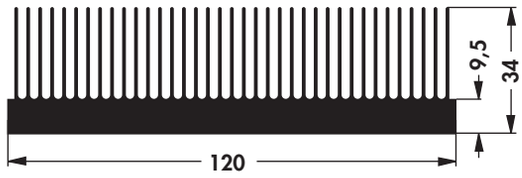
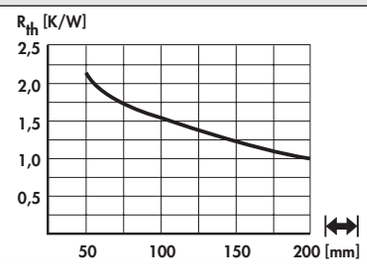
art. no.		
SK 508 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	
art. no.		
SK 92 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	
art. no.		
SK 644 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	
art. no.		
SK 684 ...		
please indicate:	**... ↔** **50 75 100 150 1000 mm**	
art. no.		
SK 433 ...		
please indicate:	**... ↔** **37.5 50 75 1000 mm**	

art. no.	
SK 121 ...	 
please indicate:	**... ↔** **75 100 150 1000 mm**

art. no.	
SK 33 ...	 
please indicate:	**... ↔** **50 75 100 1000 mm** **... ⏀ (optional)** **SSR 1**

art. no.	
SK 411 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**

art. no.	
SK 625 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**

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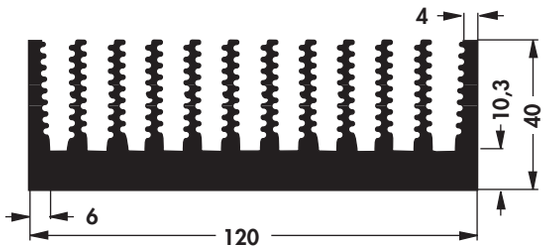
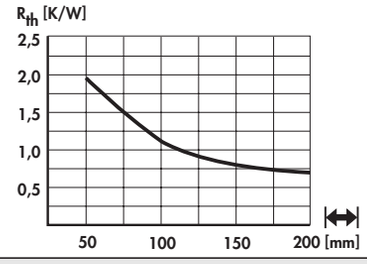
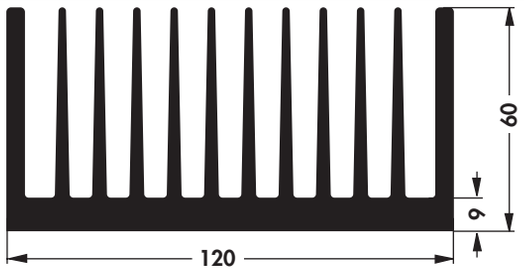
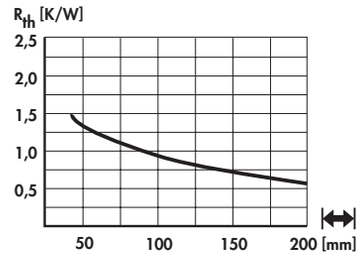
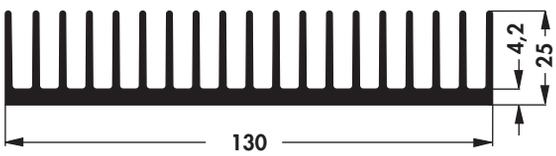
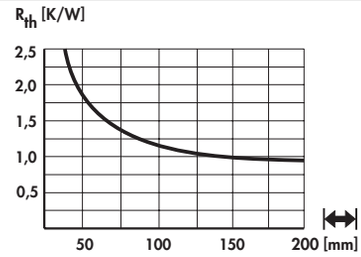
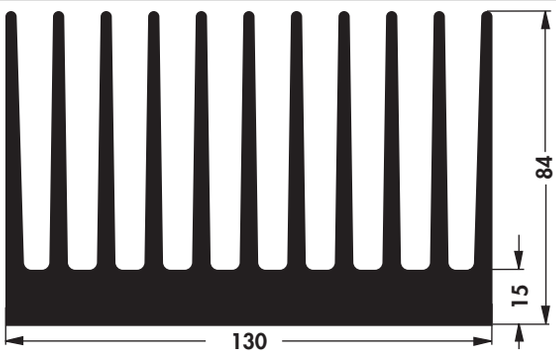
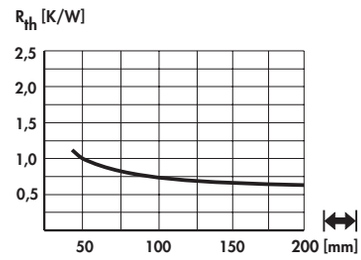
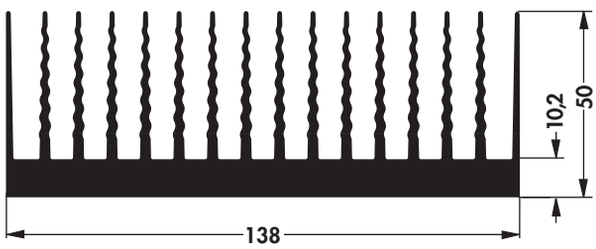
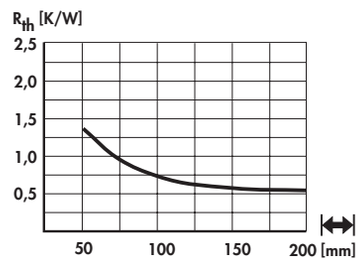
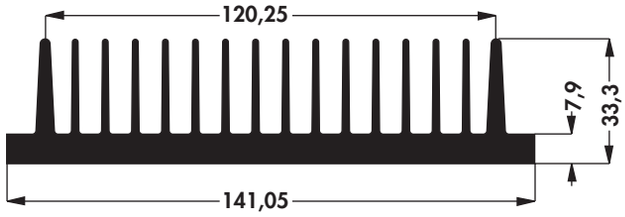
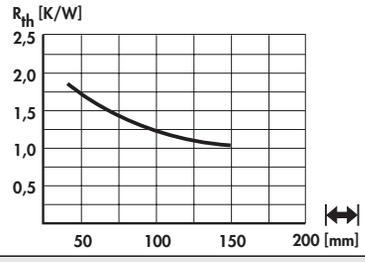
art. no.		
SK 442 ...		
please indicate:	**... ↔** **50 75 100 150 1000 mm**	

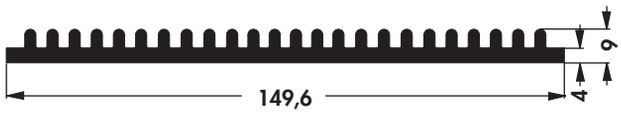
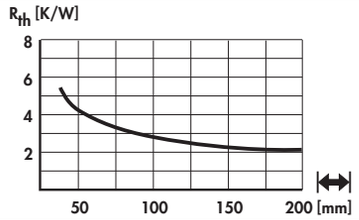
art. no.		
SK 595 ...		
please indicate:	**... ↔** **50 75 100 150 1000 mm**	

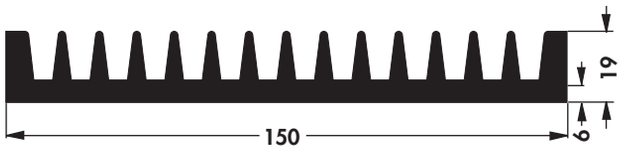
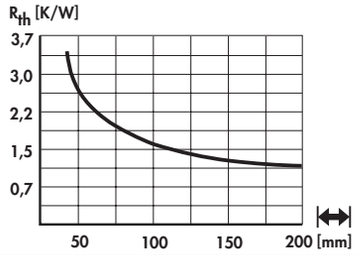
art. no.		
SK 463 ...		
please indicate:	**... ↔** **50 75 100 150 1000 mm**	

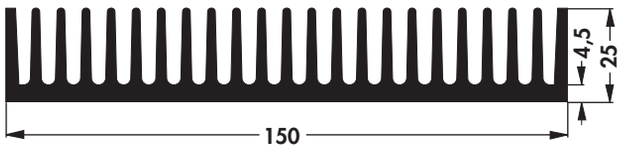
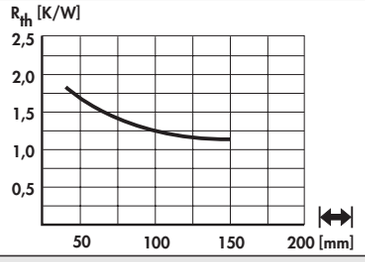
art. no.		
SK 613 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

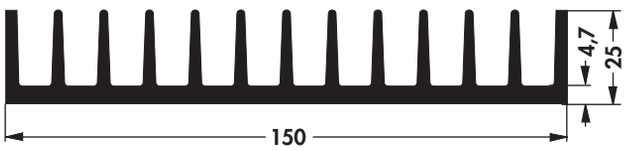
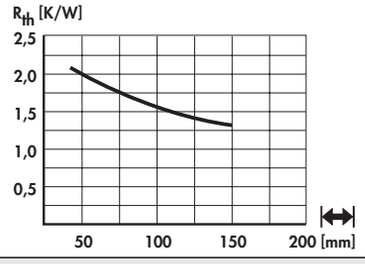
art. no.		
SK 466 ...		
please indicate:	**... ↔** **50 75 100 150 1000 mm**	

art. no.		
SK 413 ...		
please indicate:	**... ↔** **100 1000 mm**	

art. no.		
SK 601 ...		
please indicate:	**... ↔** **50 75 100 150 1000 mm**	

art. no.		
SK 553 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

art. no.		
SK 132 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

art. no.		
SK 410 ...		
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**	

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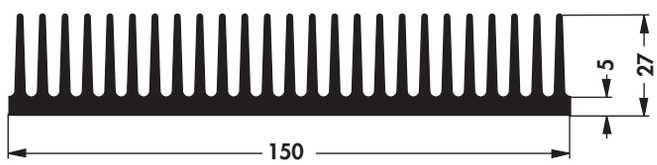
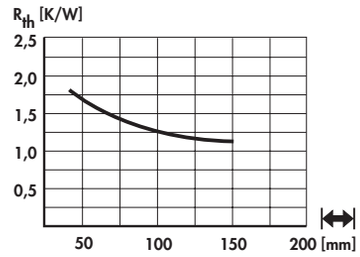
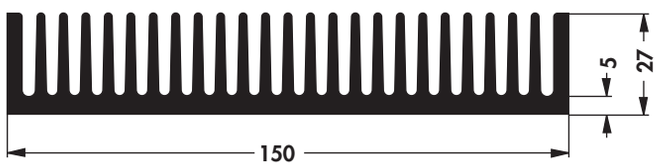
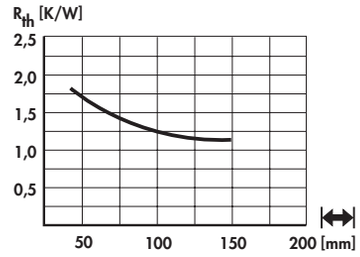
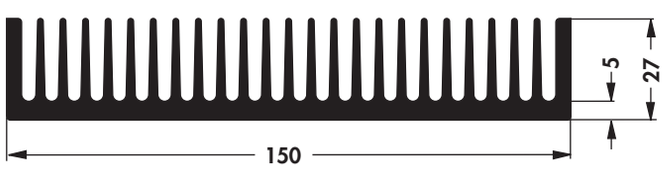
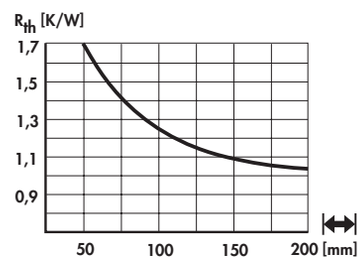
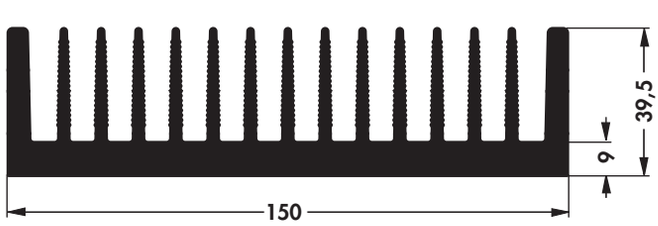
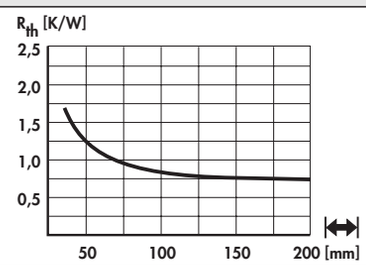
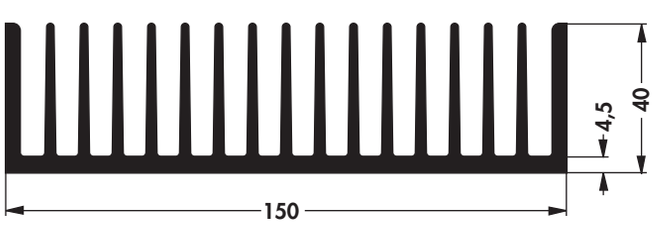
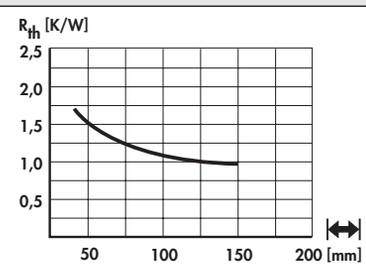
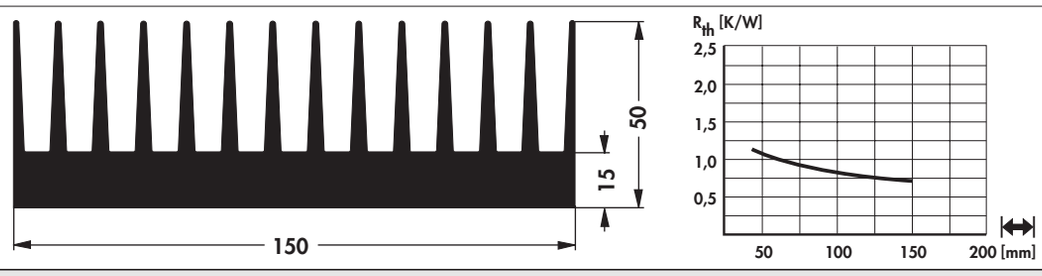
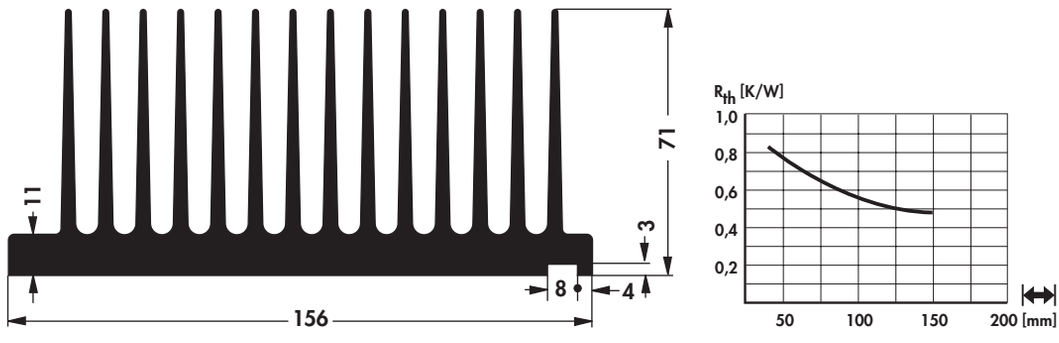
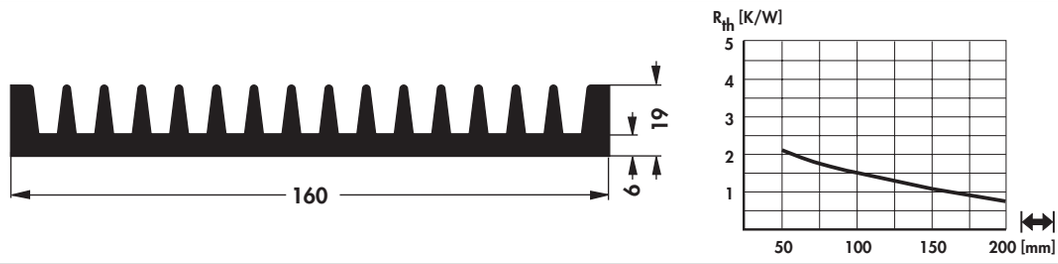
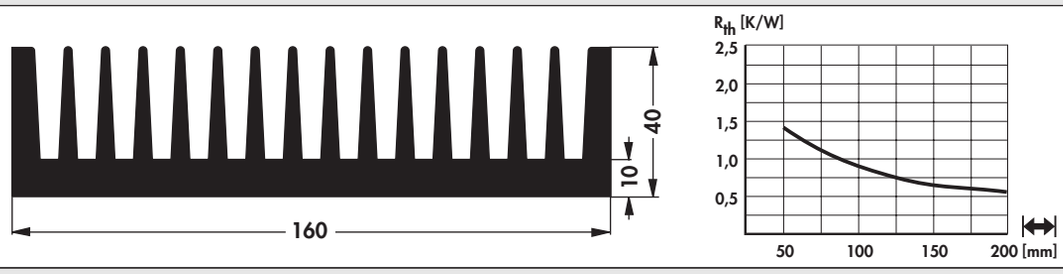
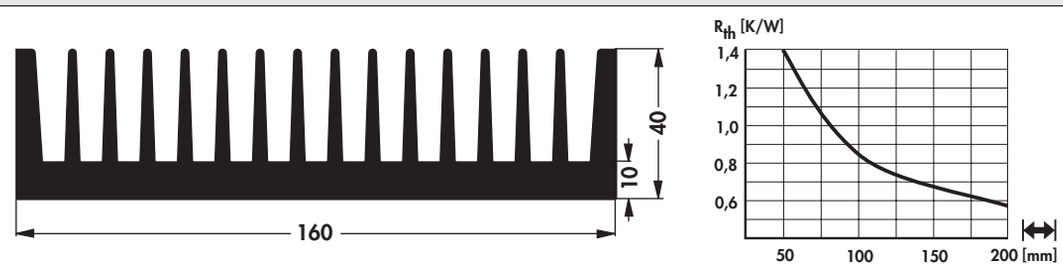
art. no.	
SK 133 ...	 
please indicate:	**... ↔ 50 75 100 1000 mm**

art. no.	
SK 58 ...	 
please indicate:	**... ↔ 50 75 100 150 1000 mm**

art. no.	
SK 504 ...	  weight reduced like SK 58
please indicate:	**... ↔ 37.5 50 75 100 150 1000 mm**

art. no.	
SK 588 ...	 
please indicate:	**... ↔ 50 75 100 150 1000 mm**

art. no.	
SK 120 ...	 
please indicate:	**... ↔ 50 75 100 150 1000 mm**

art. no.	
SK 155 ...	
please indicate:	**... ↔** **50 75 100 150 1000 mm**
art. no.	
SK 154 ...	
please indicate:	**... ↔** **50 75 100 150 mm**
art. no.	
SK 417 ...	
please indicate:	**... ↔** **75 100 150 1000 mm**
art. no.	
SK 85 ...	
please indicate:	**... ↔** **37.5 50 75 100 150 1000 mm**
art. no.	
SK 503 ...	 weight reduced like SK 85
please indicate:	**... ↔** **75 100 1000 mm**

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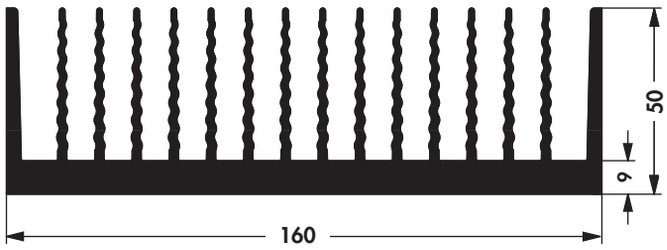
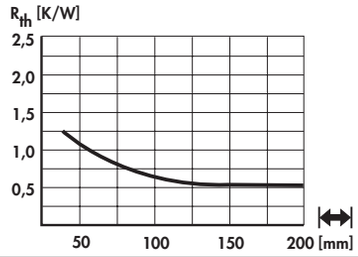
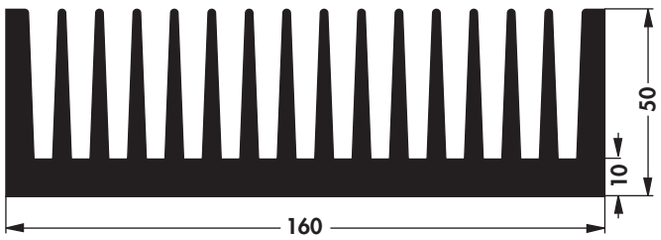
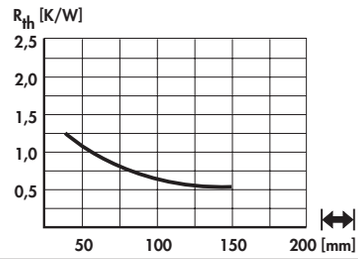
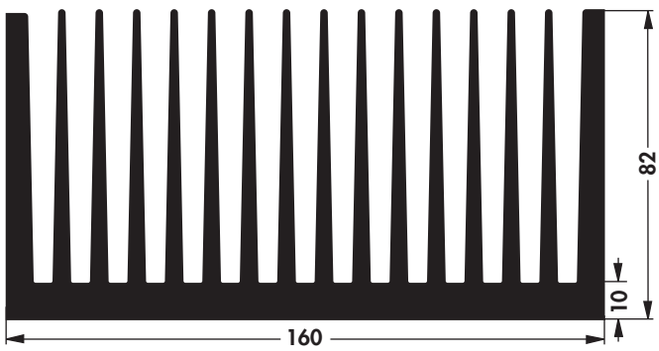
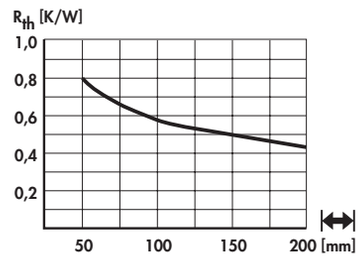
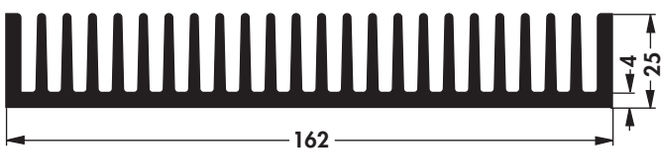
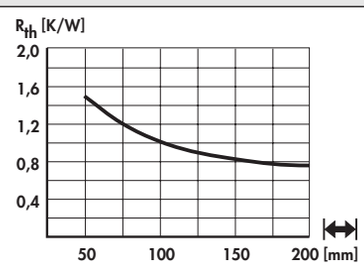
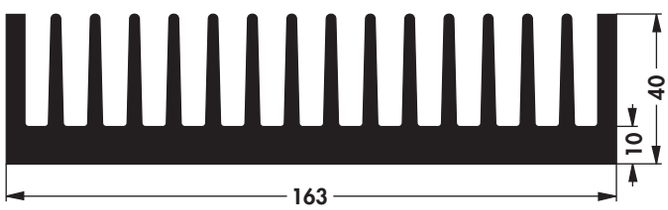
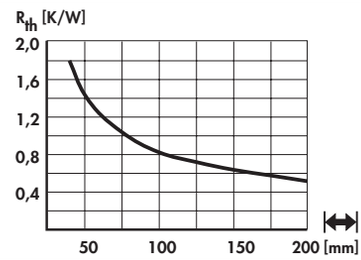
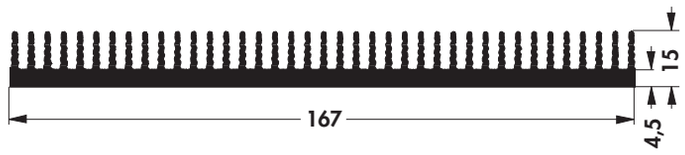
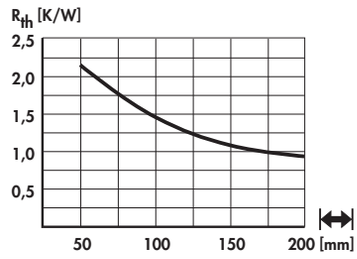
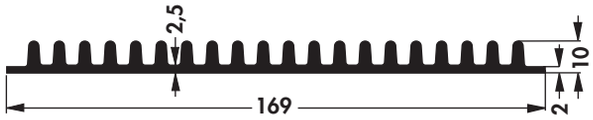
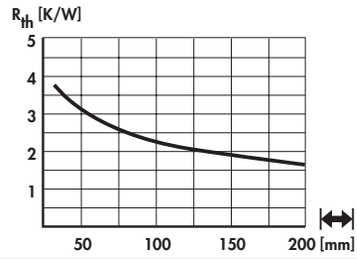
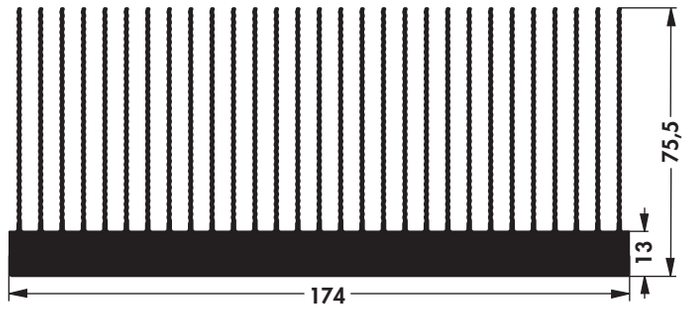
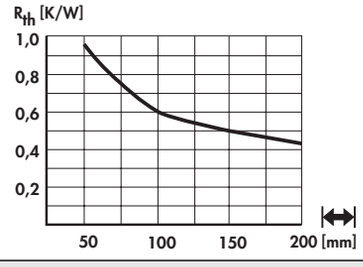
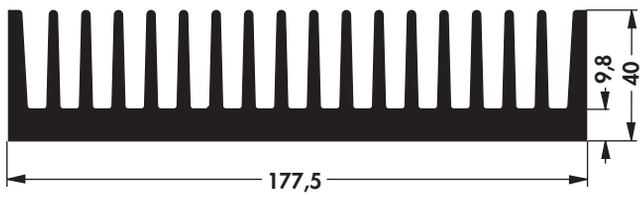
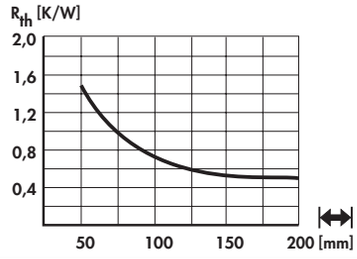
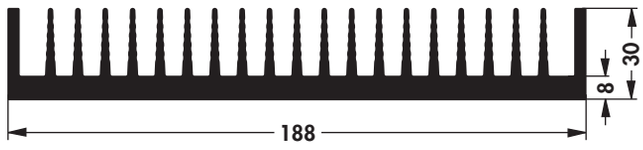
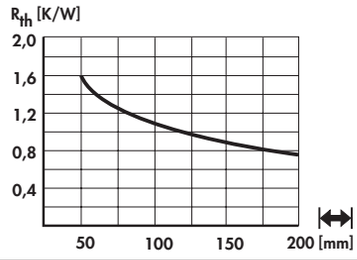
art. no.	
SK 510 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**
art. no.	
SK 416 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**
art. no.	
SK 627 ...	 
please indicate:	**... ↔** **50 75 100 150 200 1000 mm**
art. no.	
SK 119 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**
art. no.	
SK 412 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**

art. no.	
SK 421 ...	 
please indicate:	**... ↔** **50 75 100 150 200 1000 mm**
art. no.	
SK 405 ...	 
please indicate:	**... ↔** **100 1000 mm**
art. no.	
SK 623 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**
art. no.	
SK 519 ...	 
please indicate:	**... ↔** **50 100 1000 mm**
art. no.	
SK 629 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**

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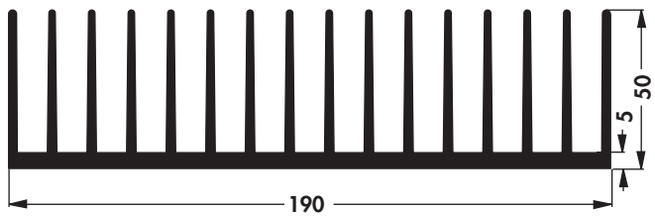
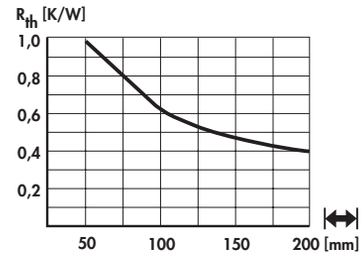
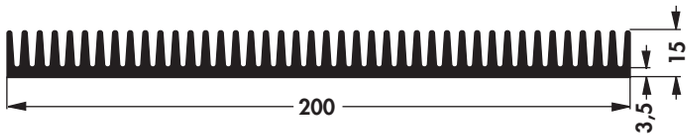
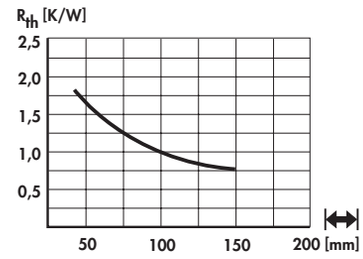
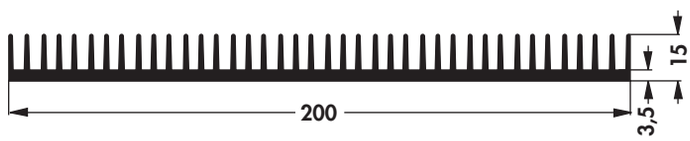
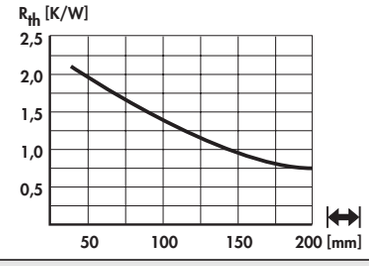
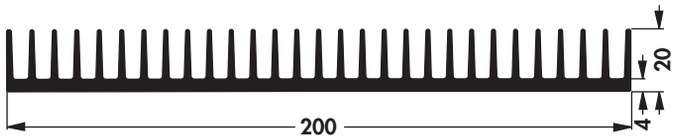
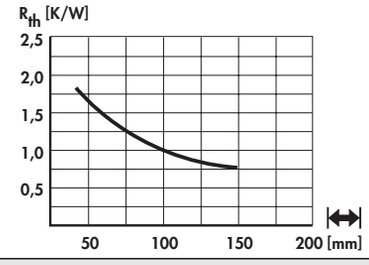
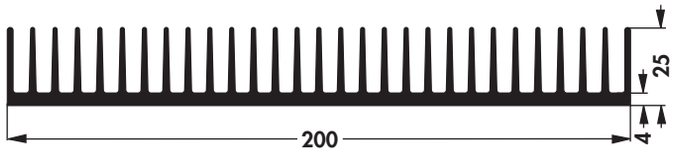
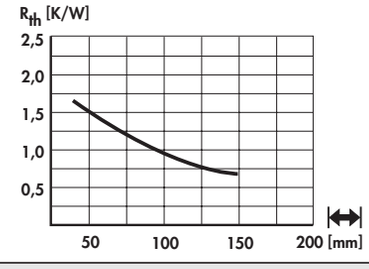
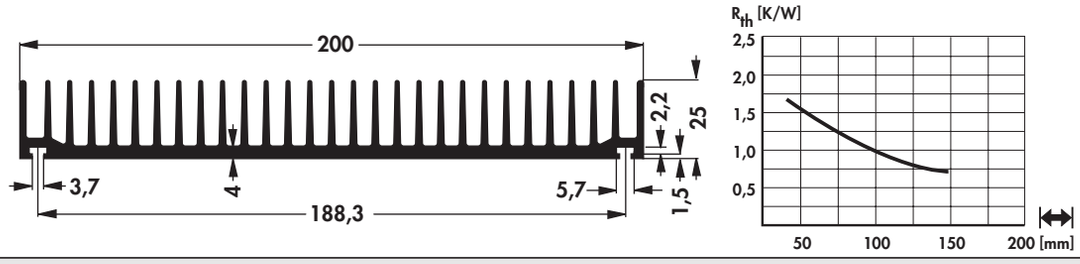
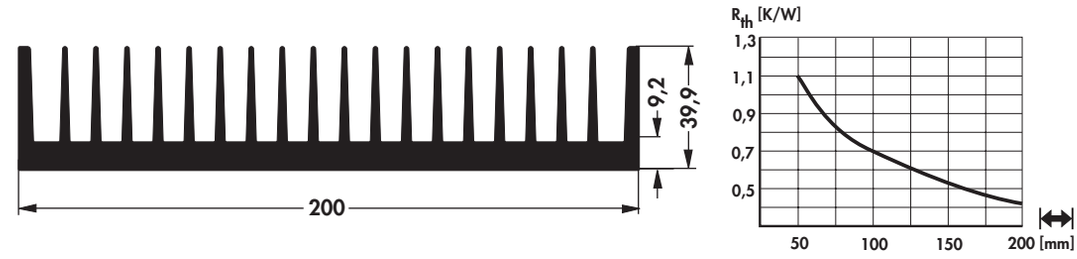
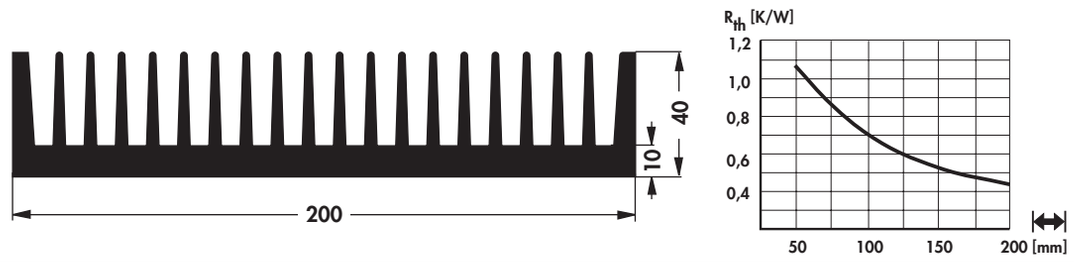
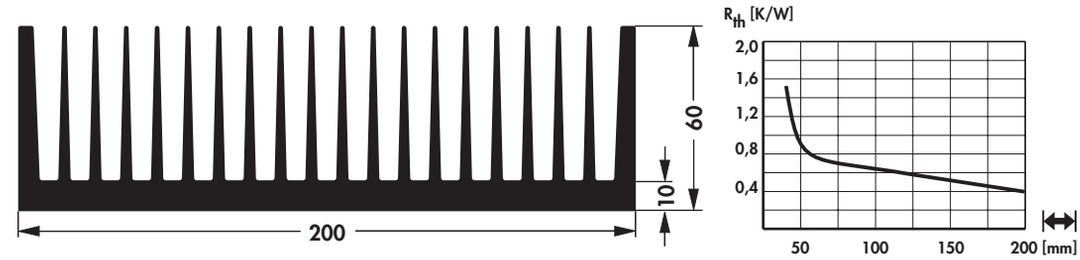
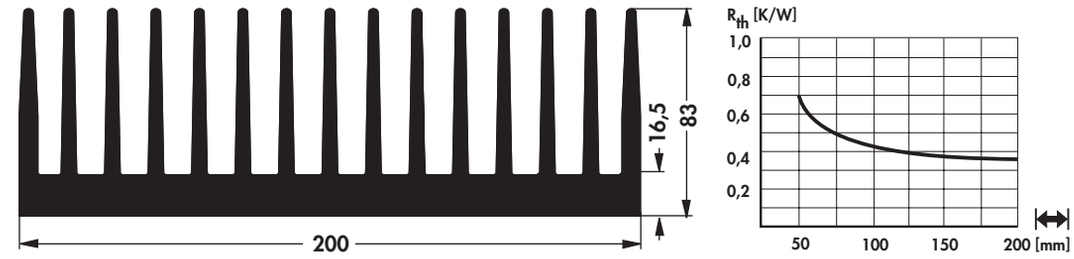
art. no.	
SK 90 ...	 
please indicate:	**... ↔** **50 75 100 1000 mm**
art. no.	
SK 136 ...	 
please indicate:	**... ↔** **75 100 150 1000 mm**
art. no.	
SK 166 ...	 
please indicate:	**... ↔** **1000 mm**
art. no.	
SK 113 ...	 
please indicate:	**... ↔** **50 75 100 150 1000 mm**
art. no.	
SK 42 ...	 
please indicate:	**... ↔** **50 75 100 150 200 1000 mm**

art. no.	
SK 94 ...	
please indicate:	**... ↔ 1000 mm**
art. no.	
SK 502 ...	 weight reduced like SK 47
please indicate:	**... ↔ 37.5 50 75 100 150 1000 mm**
art. no.	
SK 47 ...	
please indicate:	**... ↔ 75 100 150 1000 mm**
art. no.	
SK 591 ...	
please indicate:	**... ↔ 75 100 150 1000 mm**
art. no.	
SK 520 ...	
please indicate:	**... ↔ 75 100 150 1000 mm**

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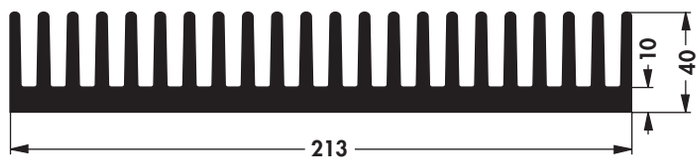
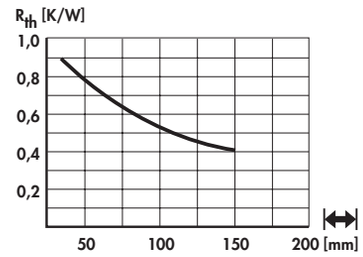
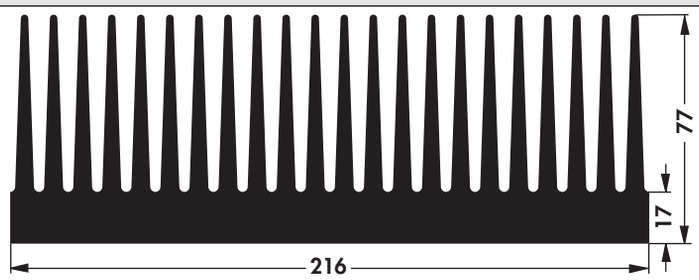
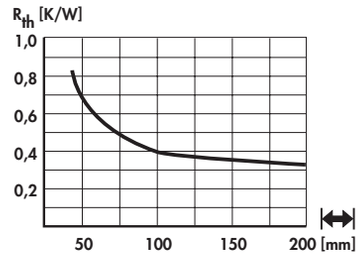
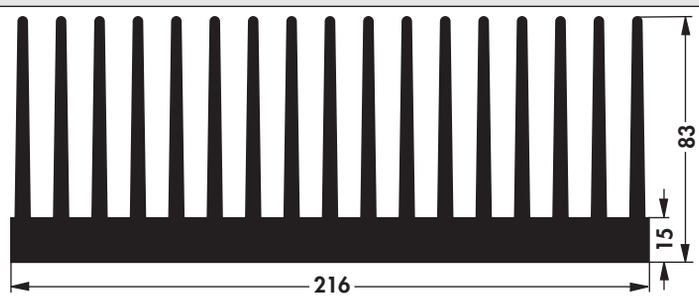
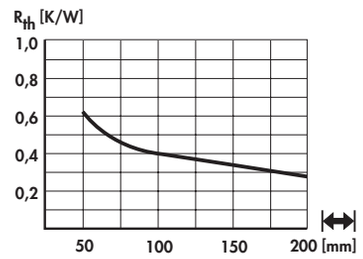
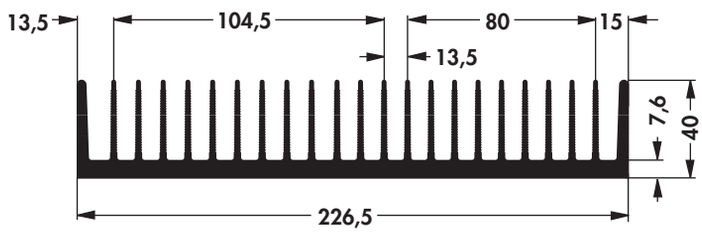
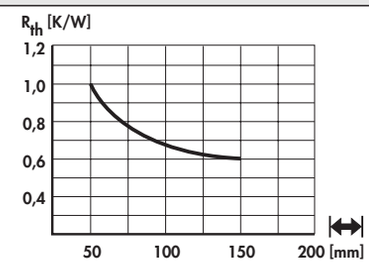
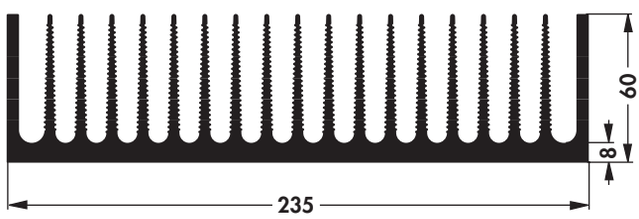
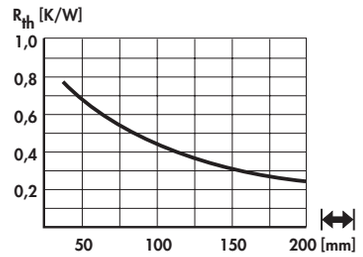
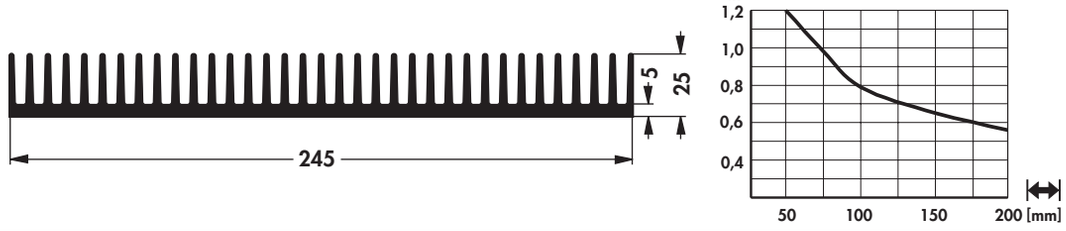
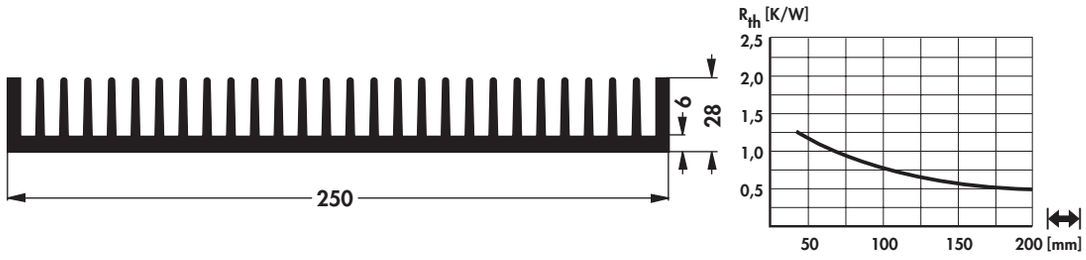
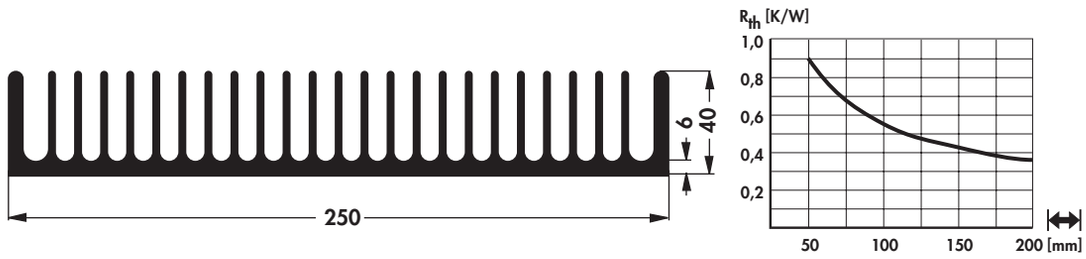
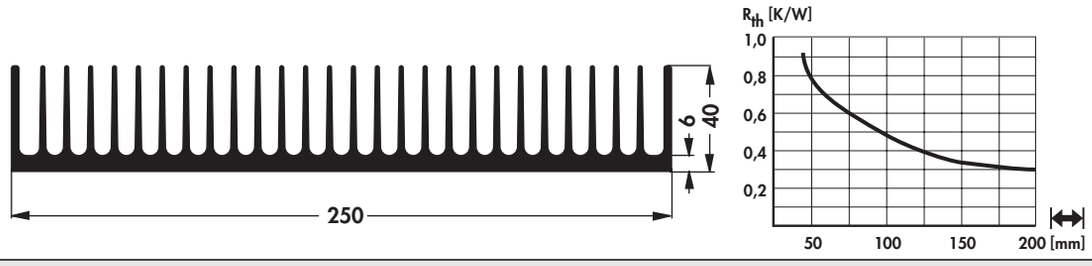
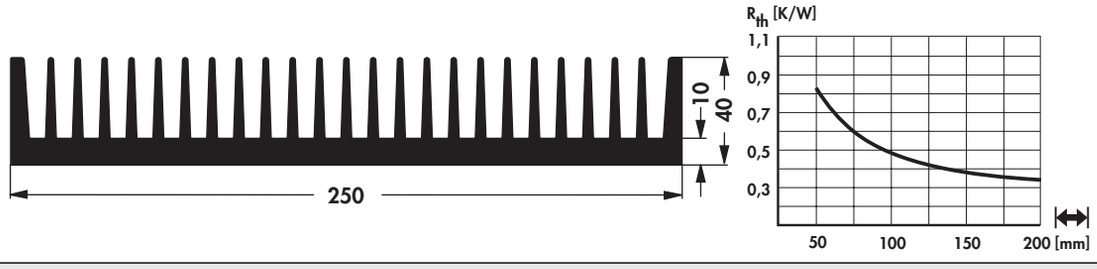
art. no.	
SK 193 ...	 
please indicate:	**... ↔** **100 150 1000 mm**
art. no.	
SK 557 ...	 
please indicate:	**... ↔** **75 100 150 1000 mm**
art. no.	
SK 102 ...	 
please indicate:	**... ↔** **75 100 150 1000 mm**
art. no.	
SK 168 ...	 
please indicate:	**... ↔** **1000 mm**
art. no.	
SK 580 ...	 
please indicate:	**... ↔** **75 100 150 200 1000 mm**

art. no.	
SK 118 ...	
please indicate:	**... ↔ 75 100 150 1000 mm**
art. no.	
SK 49 ...	
please indicate:	**... ↔ 50 75 150 200 1000 mm**
art. no.	
SK 199 ...	
please indicate:	**... ↔ 75 100 1000 mm**
art. no.	
SK 555 ...	
please indicate:	**... ↔ 75 100 150 1000 mm**
art. no.	
SK 524 ...	
please indicate:	**... ↔ 75 100 150 1000 mm**

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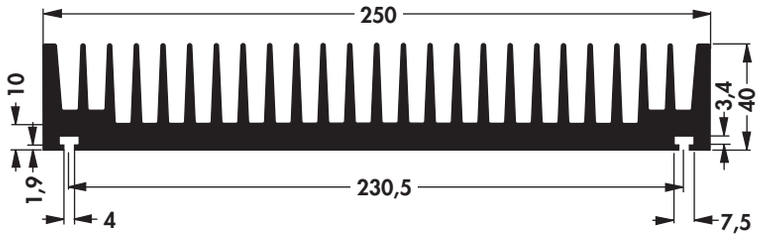
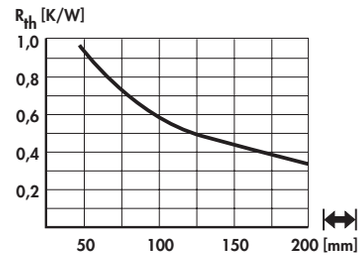
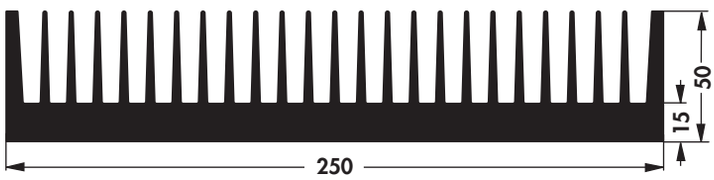
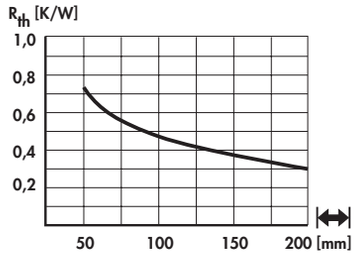
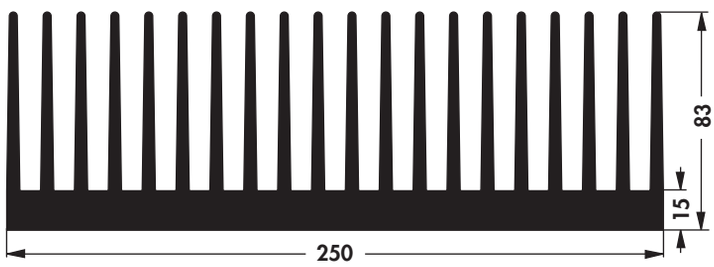
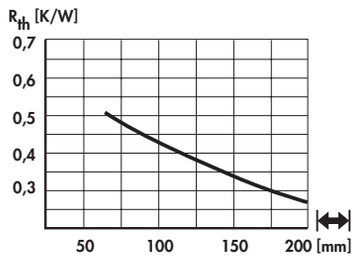
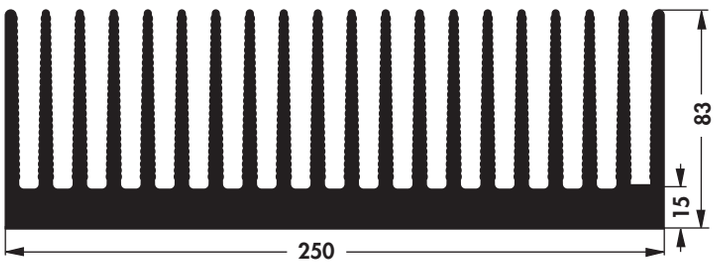
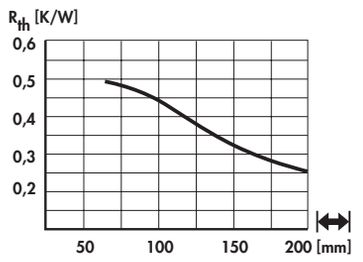
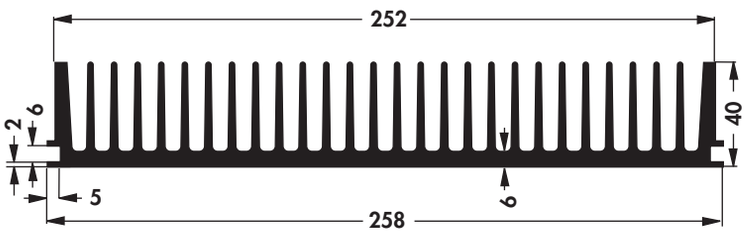
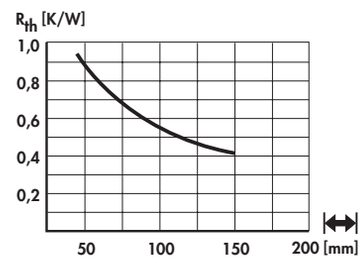
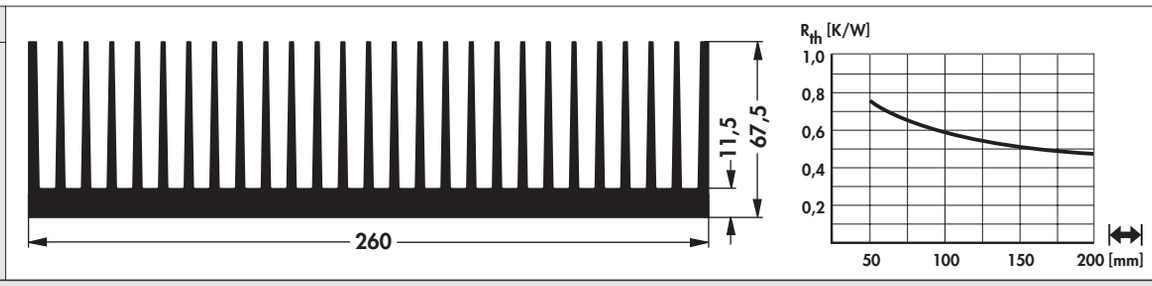
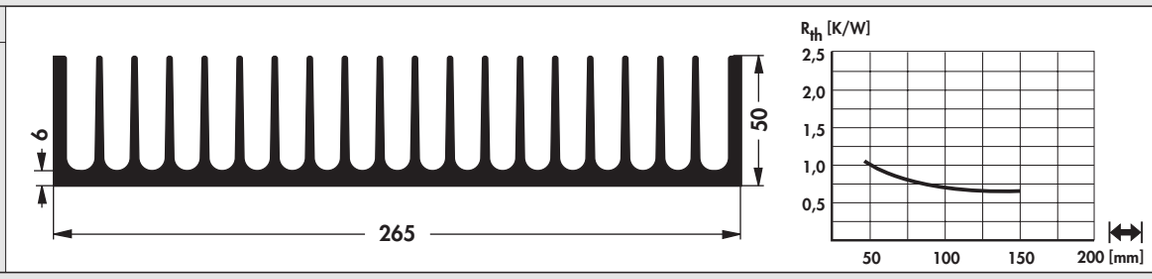
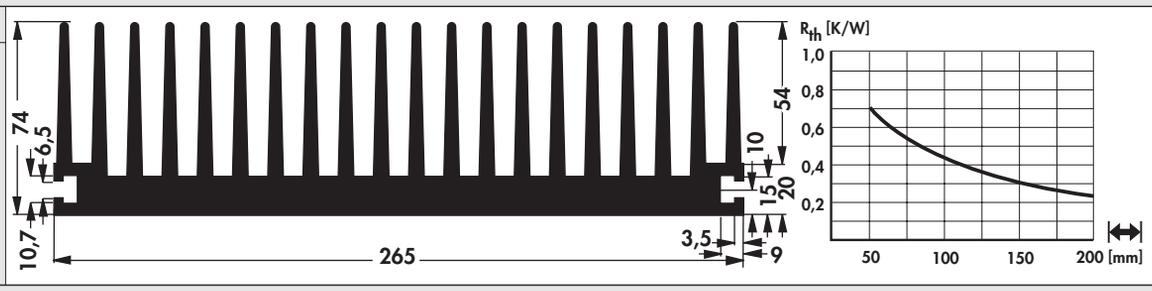
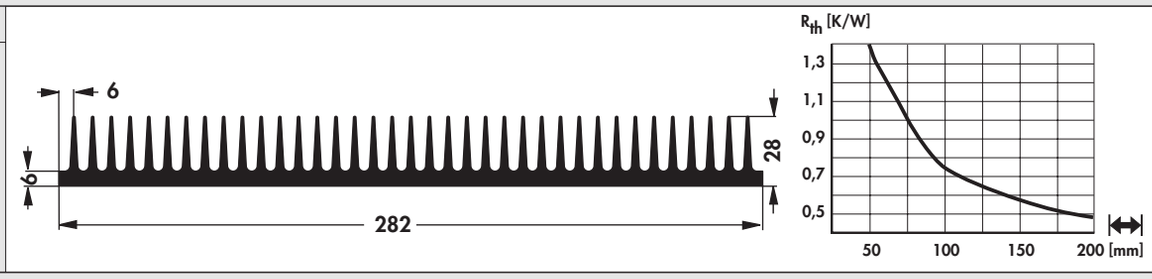
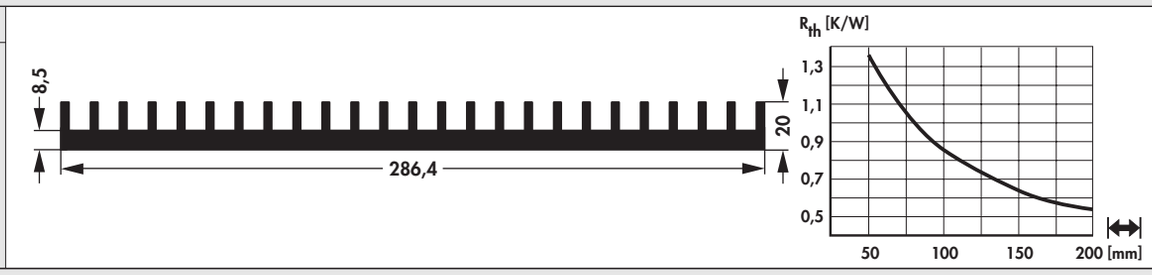
art. no.		
SK 91 ...		
please indicate:	... ↔ 75 100 150 1000 mm	

art. no.		
SK 622 ...		
please indicate:	... ↔ 75 100 150 200 1000 mm	

art. no.		
SK 678 ...		
please indicate:	... ↔ 75 100 150 1000 mm	

art. no.		
SK 438 ...		
please indicate:	... ↔ 75 100 150 1000 mm	

art. no.		
SK 190 ...		
please indicate:	... ↔ 150 1000 mm	

art. no.	
SK 614 ...	
please indicate:	**... ↔ 75 100 150 200 1000 mm**
art. no.	
SK 149 ...	
please indicate:	**... ↔ 200 1000 mm**
art. no.	
SK 139 ...	
please indicate:	**... ↔ 100 150 200 1000 mm**
art. no.	
SK 583 ...	
please indicate:	**... ↔ 100 150 200 1000 mm**
art. no.	
SK 682 ...	
please indicate:	**... ↔ 100 150 200 1000 mm**

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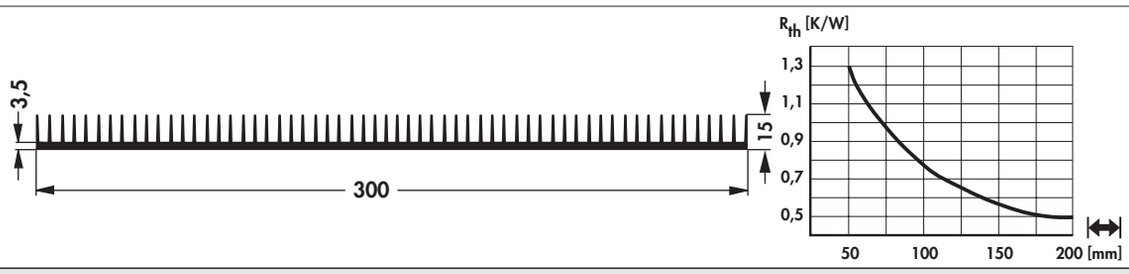
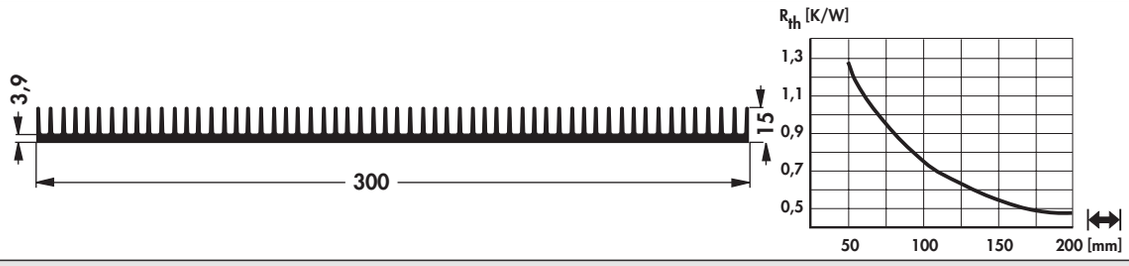
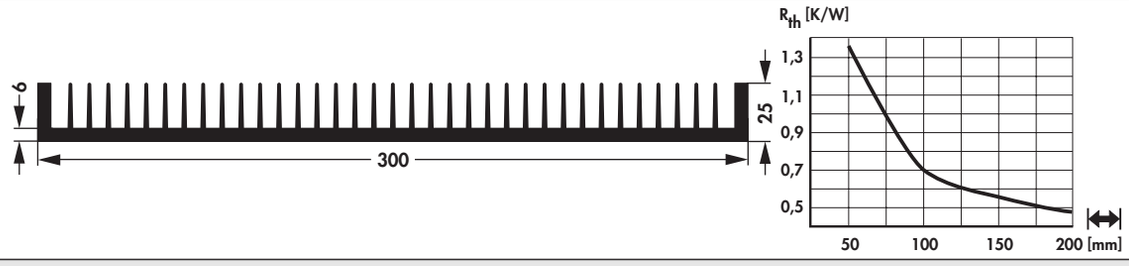
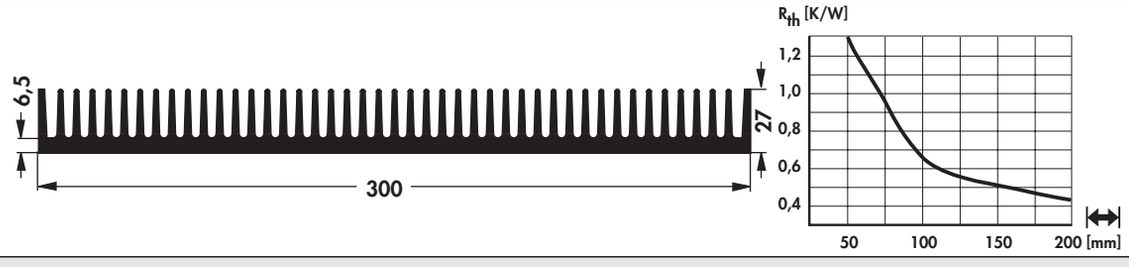
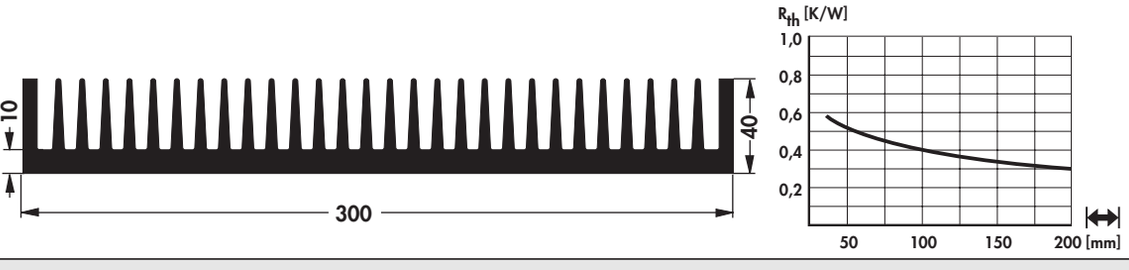
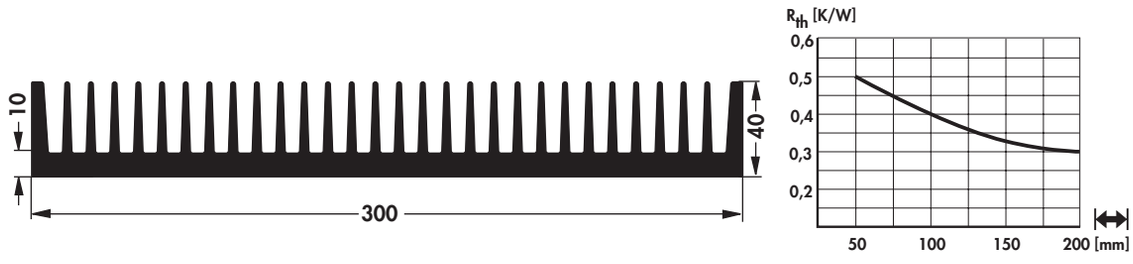
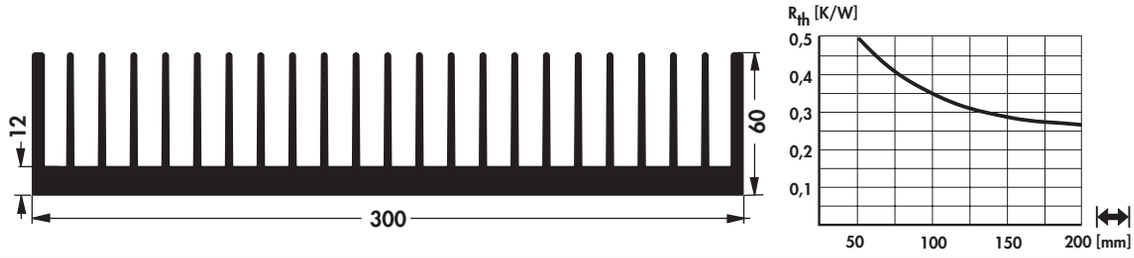
Standard extruded heatsinks

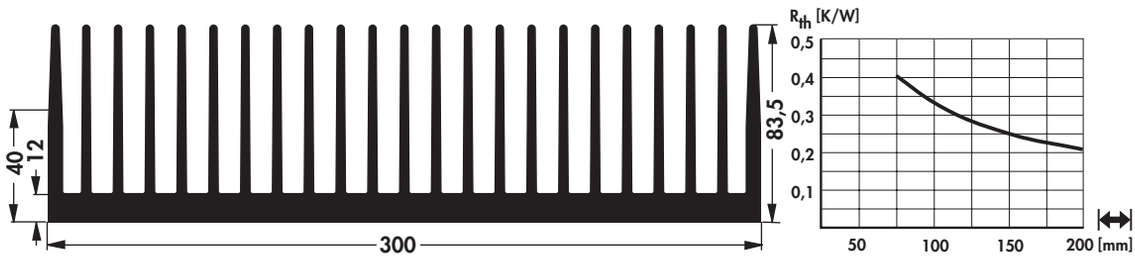
art. no.	
SK 689 ...	
please indicate:	**... ↔** **75 100 150 200 1000 mm**
art. no.	
SK 198 ...	
please indicate:	**... ↔** **100 150 1000 mm**
art. no.	
SK 671 ...	
please indicate:	**... ↔** **50 75 100 150 200 1000 mm**
art. no.	
SK 446 ...	
please indicate:	**... ↔** **75 100 150 1000 mm**
art. no.	
SK 56 ...	
please indicate:	**... ↔** **75 100 150 200 1000 mm**

art. no.	
SK 501 ...	
	weight reduced like SK 56

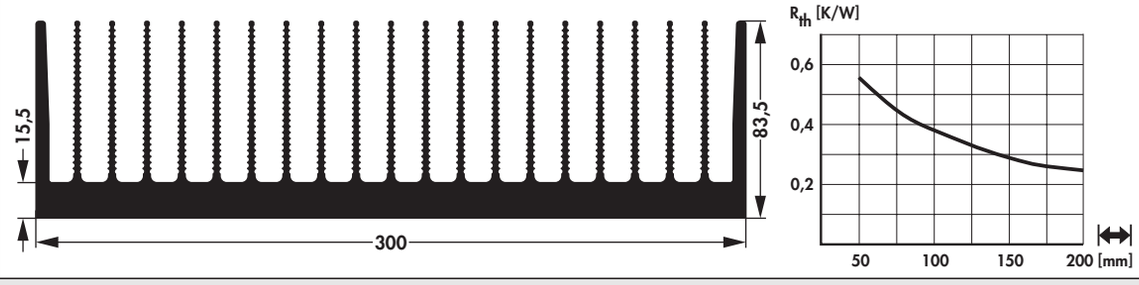
please indicate: **... ↔**
37.5 50 75 100 150 200 1000 mm

art. no.	
SK 568 ...	

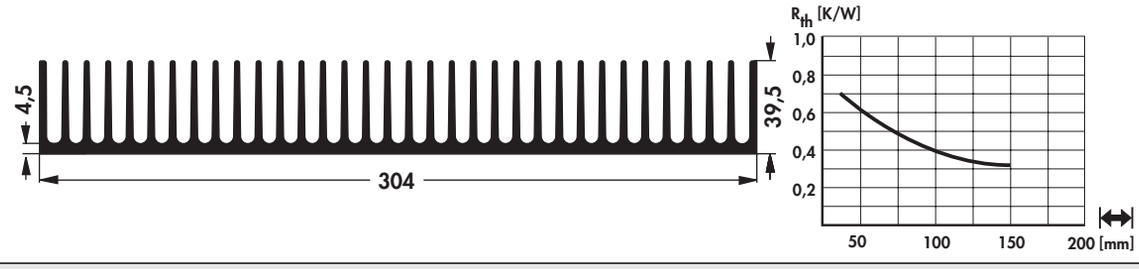
please indicate: **... ↔**
75 100 150 200 1000 mm

art. no.	
SK 157 ...	

please indicate: **... ↔**
100 150 200 1000 mm

art. no.	
SK 656 ...	

please indicate: **... ↔**
100 150 200 1000 mm

art. no.	
SK 101 ...	

please indicate: **... ↔**
75 100 1000 mm

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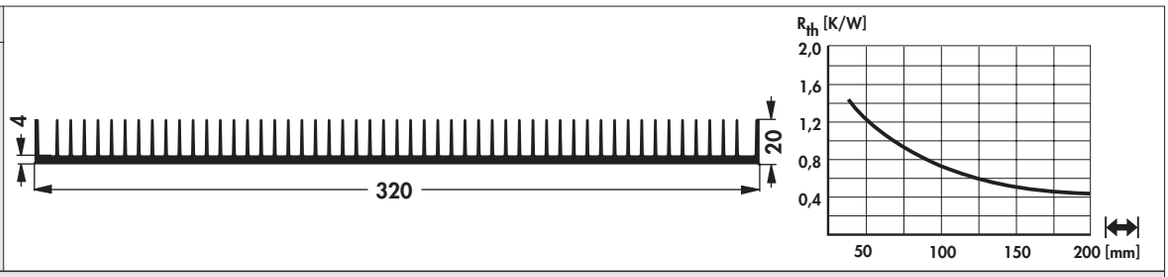
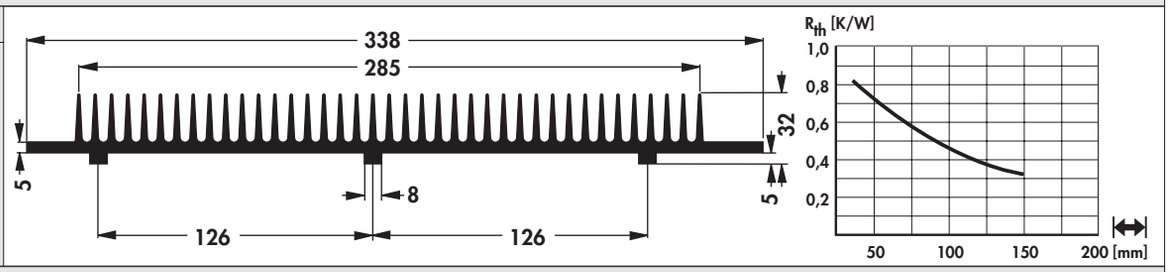
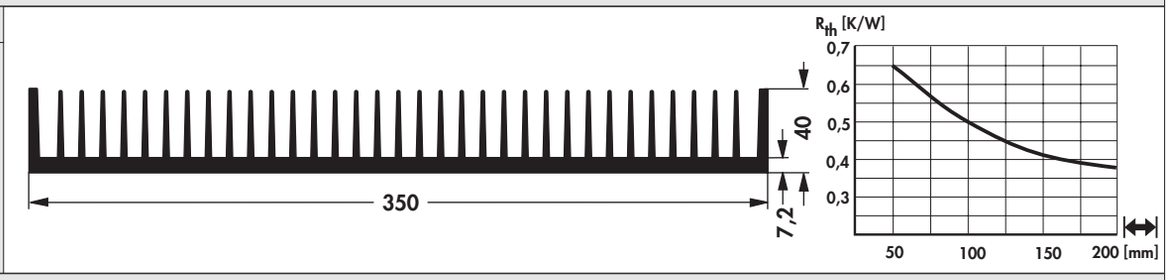
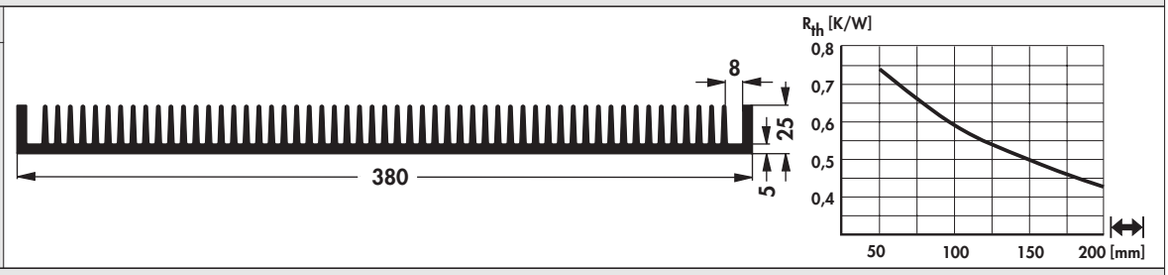
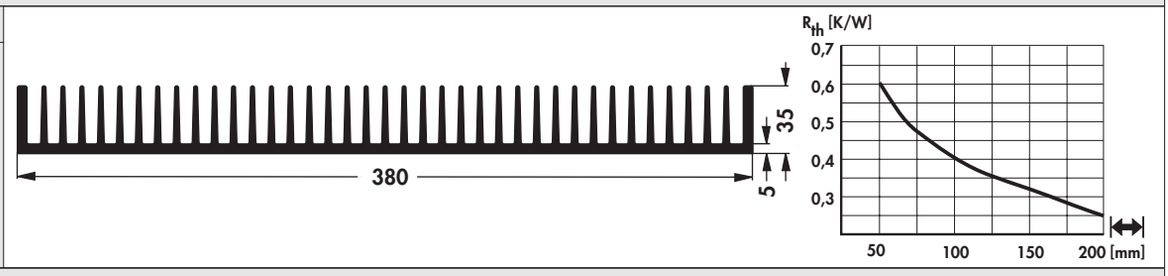
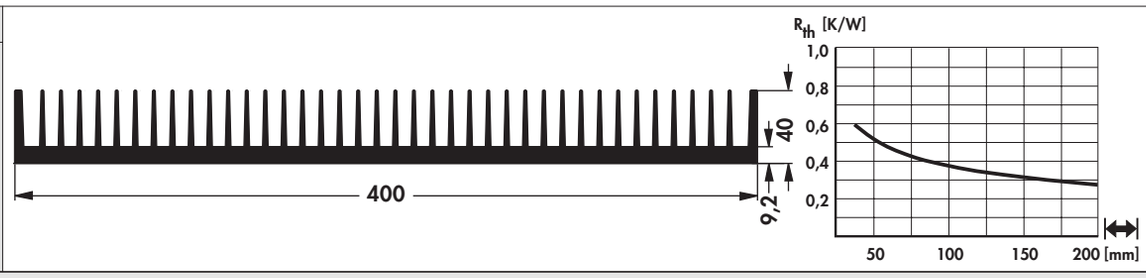
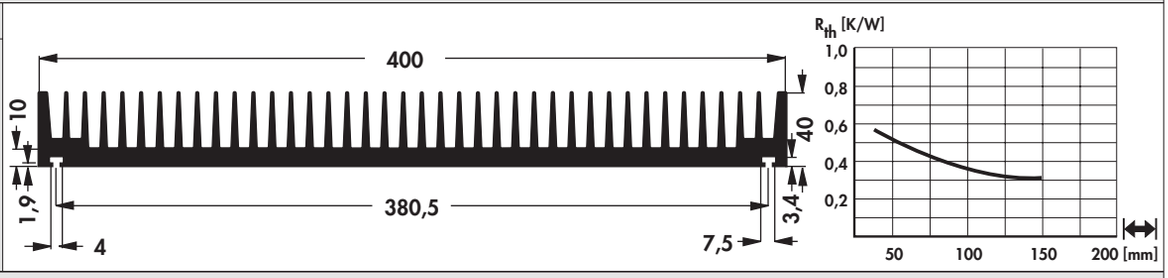
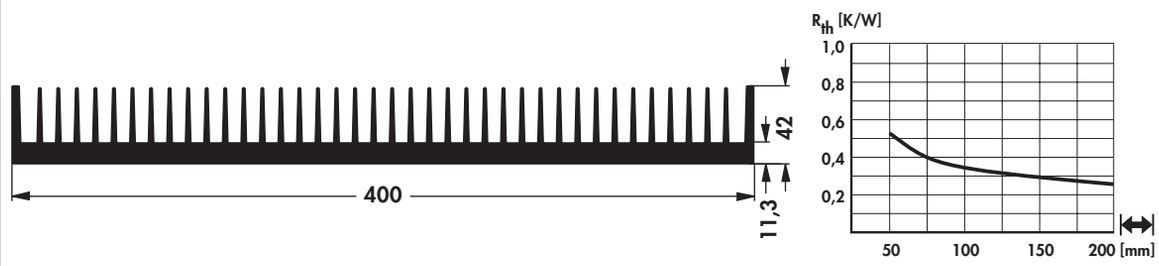
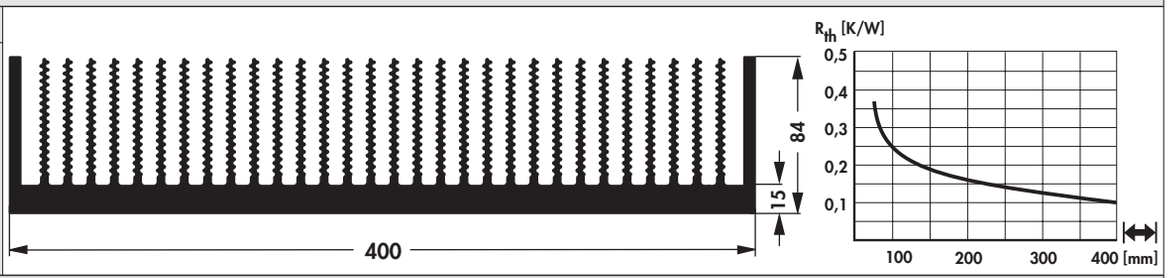
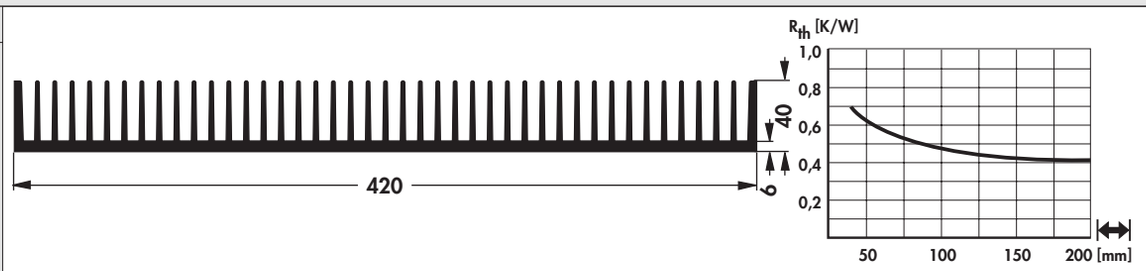
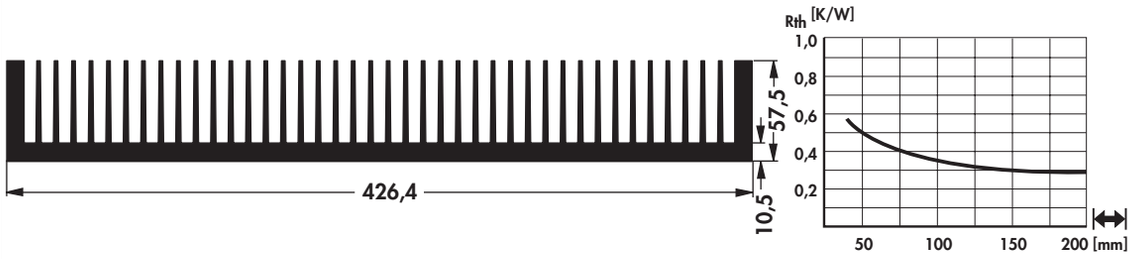
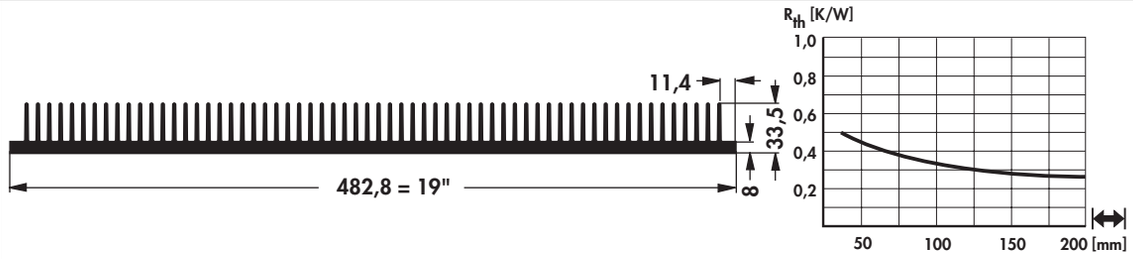
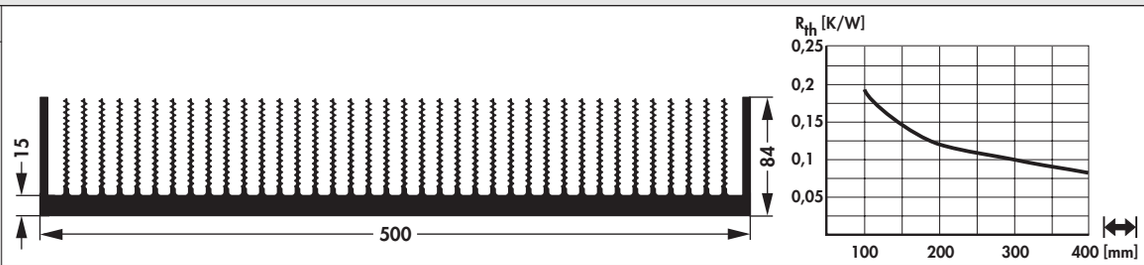
Standard extruded heatsinks

art. no.	
SK 579 ...	
please indicate:	**... ↔ 75 100 150 200 1000 mm**
art. no.	
SK 66 ...	
please indicate:	**... ↔ 75 100 1000 mm**
art. no.	
SK 523 ...	
please indicate:	**... ↔ 100 150 200 1000 mm**
art. no.	
SK 439 ...	
please indicate:	**... ↔ 100 150 1000 mm**
art. no.	
SK 685 ...	
please indicate:	**... ↔ 100 150 200 1000 mm**

art. no.	
SK 479 ...	
please indicate:	**... ↔ 75 100 150 1000 mm**
art. no.	
SK 93 ...	
please indicate:	**... ↔ 75 100 150 1000 mm**
art. no.	
SK 651 ...	
please indicate:	**... ↔ 75 100 150 200 1000 mm**
art. no.	
SK 650 ...	
please indicate:	**... ↔ 150 200 300 400 1000 mm**
art. no.	
SK 130 ...	
please indicate:	**... ↔ 200 1000 mm**

art. no.	
SK 621 ...	
please indicate:	**... ⟷** **75 100 150 200 1000 mm**

art. no.	
SK 191 ...	 suitable heatsink for rear panal in 19" cases
please indicate:	**... ⟷** **75 100 150 200 1000 mm**

art. no.	
SK 673 ...	 minimum order quantity 1500 kg; samples on request
please indicate:	**... ⟷** **150 200 300 400 1000 mm**

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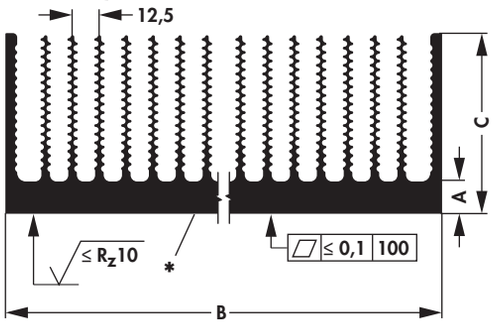
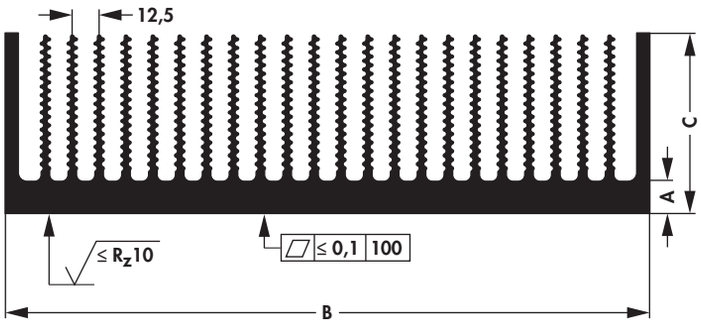
Welded high perfomance heatsinks

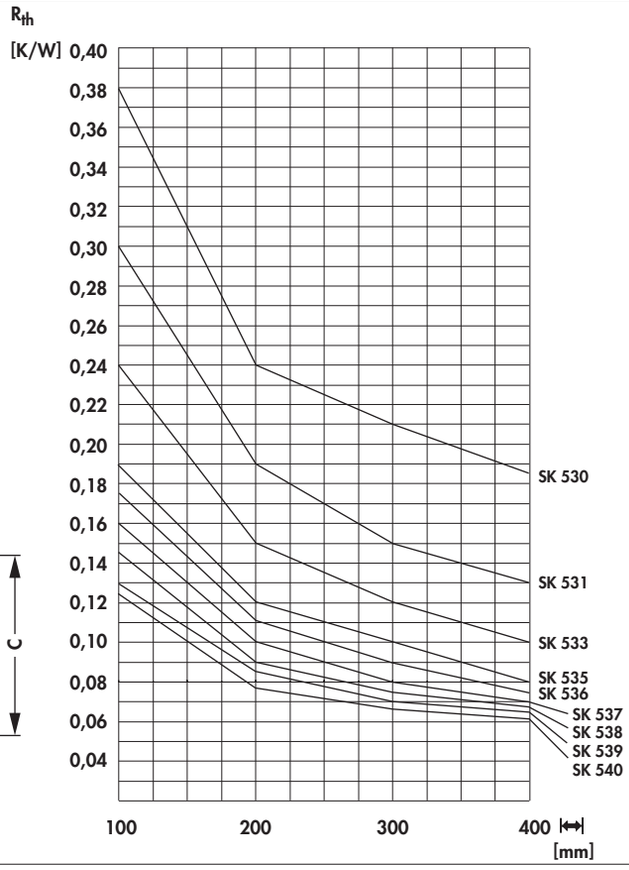
– optimum fin geometry and fin quantity for free convection
– well suited for forced convection
– flat milled base (not SK 530, SK 531)
– * = welded joint (not SK 530, SK 531)
– length according customer´s details
– customer specific versions and machining on request

SK 530; SK 533 - SK 540



SK 531





art. no.	number of fins	dim. [mm] A	B	C
SK 530 ...	14	15 ±0.7	200 ±0.7	84 ±0.7
SK 531 ...	22		300 ±1.0	
SK 533 ...	30	16 +0.0/ -1.5	400 +0.6/ -1.6	84 +0.0/ -1.5
SK 535 ...	38		500 +0.6/ -1.6	
SK 536 ...	42		550 +0.6/ -1.6	
SK 537 ...	46		600 +0.6/ -1.6	
SK 538 ...	50		650 +0.6/ -1.6	
SK 539 ...	54		700 +0.6/ -1.6	
SK 540 ...	58		750 +0.6/ -1.6	

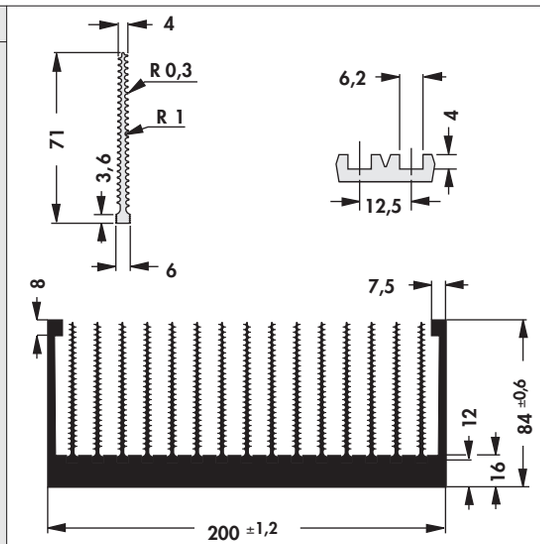
please indicate: **... ↔**
200 300 400 500 600 mm

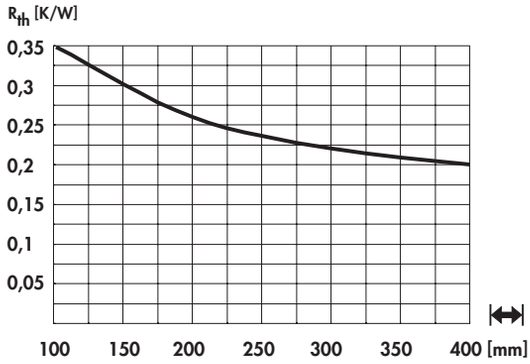
High performance heatsinks with press-in fins

– other length according to customer´s details
– customer specific versions and machining upon request

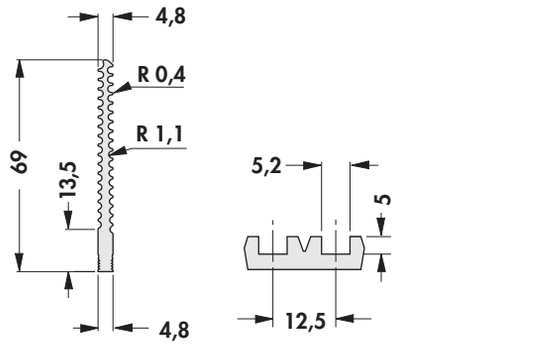
art. no.

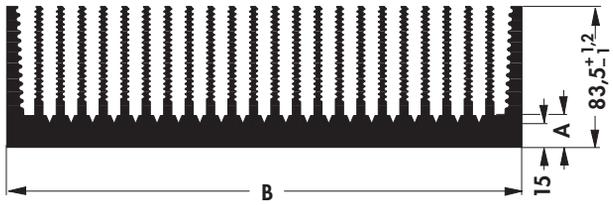
SK 418 ...

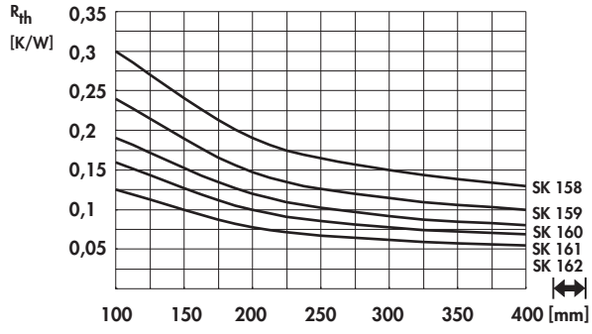


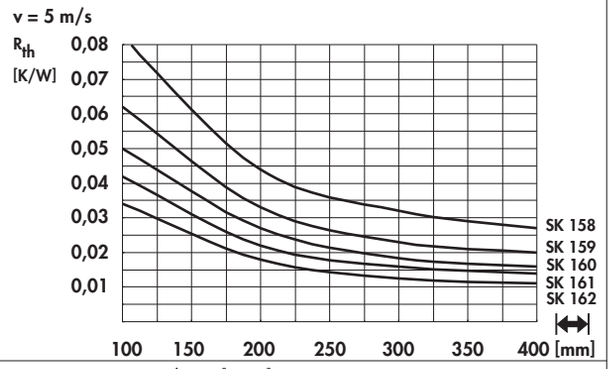


please indicate: **... ↔**
100 150 200 1000 mm









art. no.	number of fins	dim. [mm] A	dim. [mm] B
SK 158 ...	22	20	300 ±2.0
SK 159 ...	30		400 ±2.0
SK 160 ...	38		500 ±2.5
SK 161 ...	46		600 ±3.0
SK 162 ...	58		750 ±4.0

please indicate: **... ↔**
200 300 400 500 600 mm

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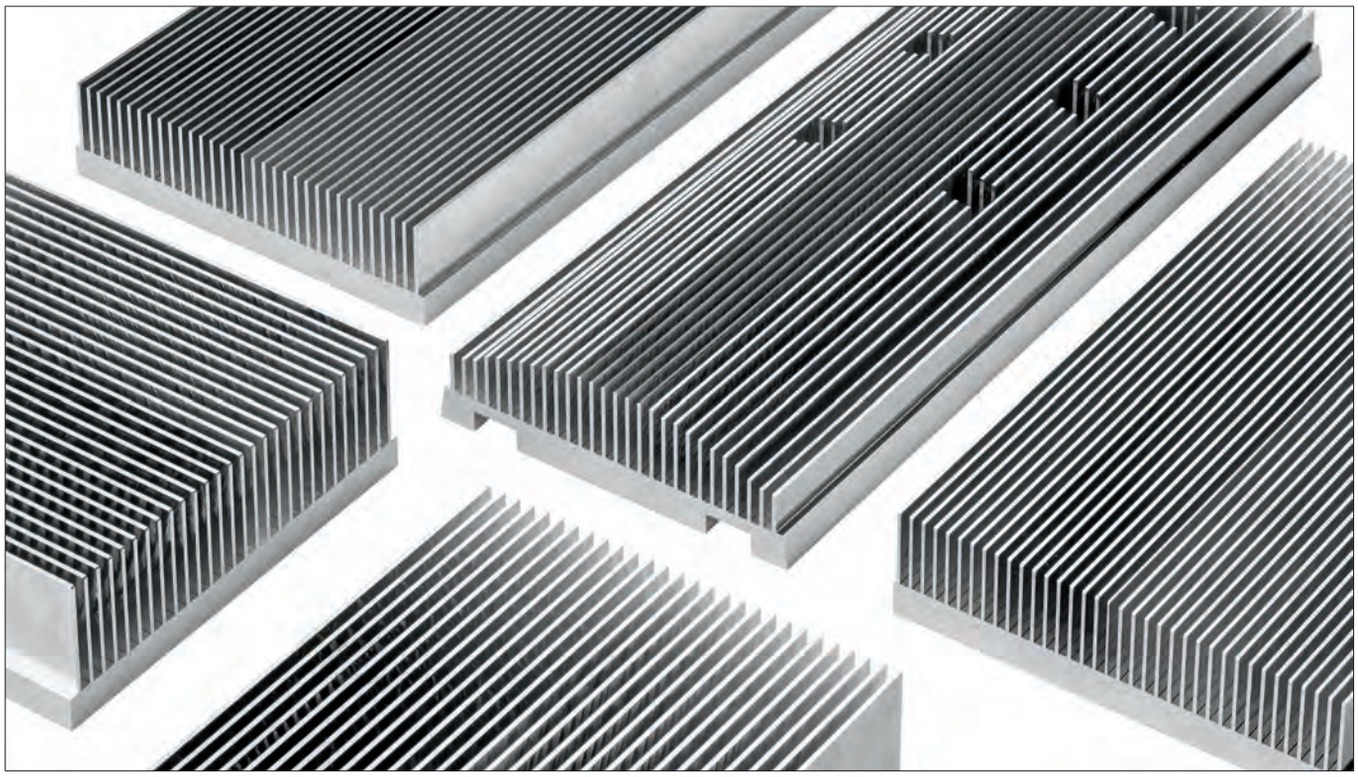
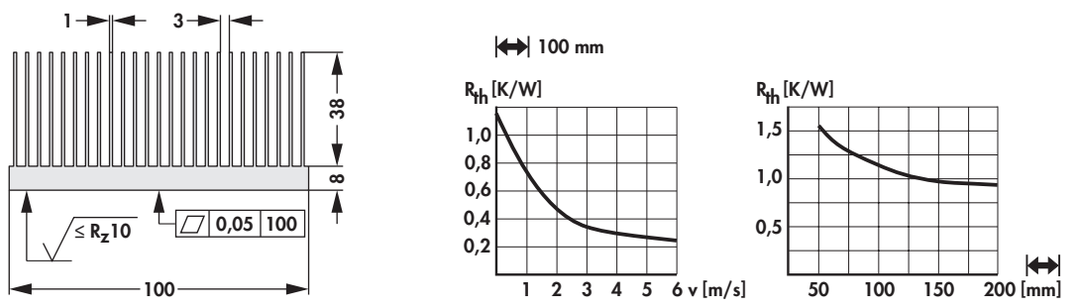
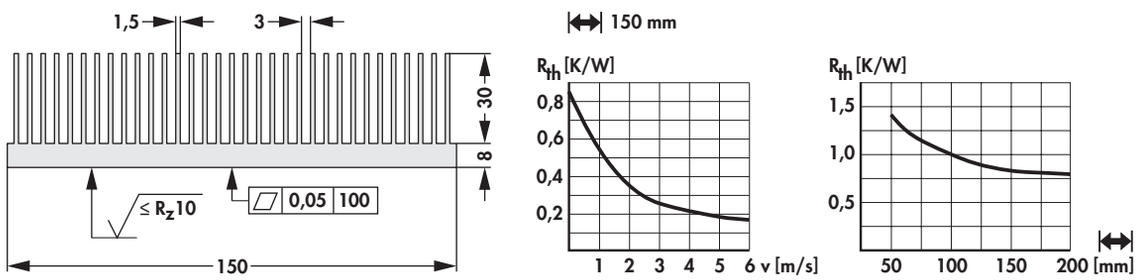
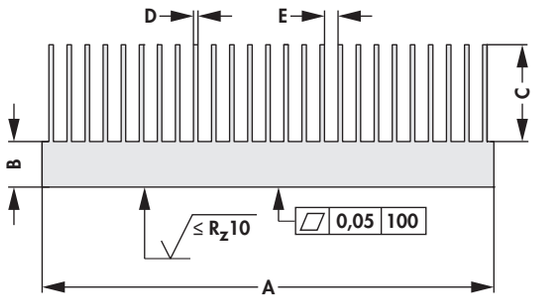
Heatsinks KGR

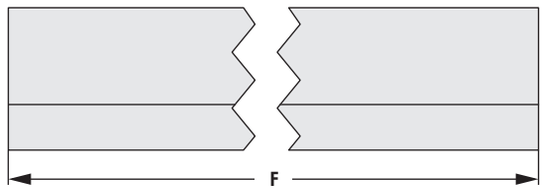


– effective heatsink solutions machined out of solid aluminium material
– precise milled flat surfaces with very low surface roughness
– for free and forced convection
– very small thermal resistance
– designs made of copper material, different sizes, dimensions and special designs upon request

art. no.	
KGR 1 ...	
art. no.	
KGR 2 ...	
please indicate:	**... ↔ 50 75 100 150 200 1000 mm**
material:	aluminium EN AW 6082

KGR





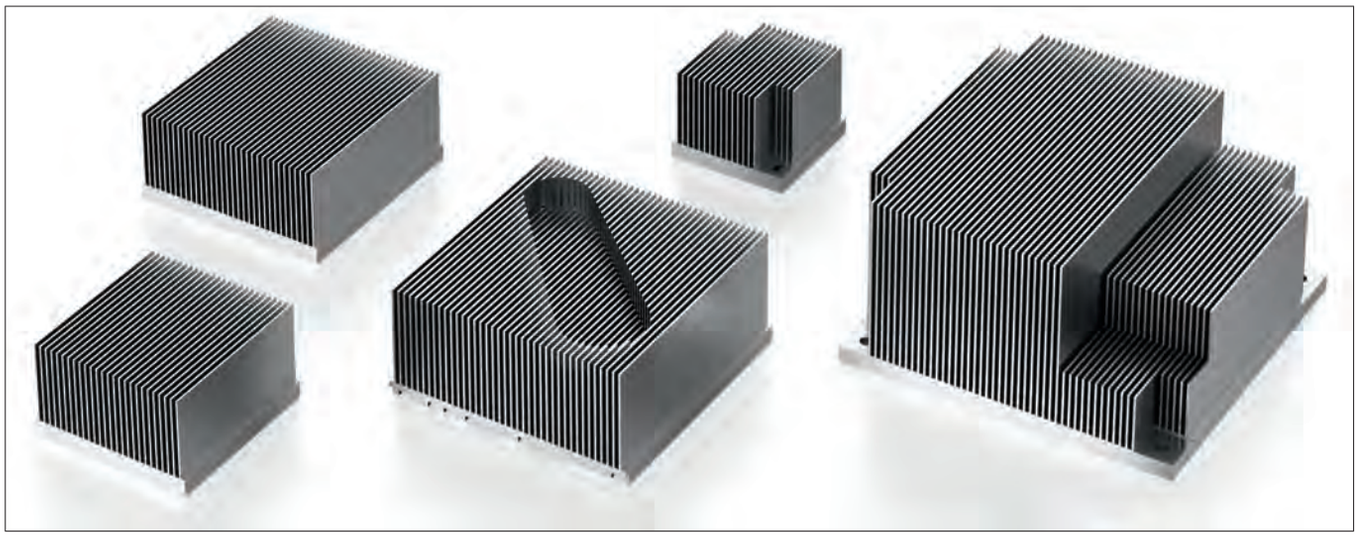
possible dimensions:

dimensions [mm]					
A	B	C	D	E	F
max. 250	min. 4/max. 20	max. 38	min. 0,8	2 / 2.5 / 3 / 4 / 5	max. 1500

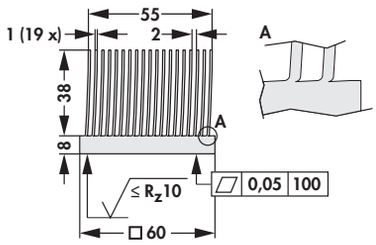
please indicate with your order:

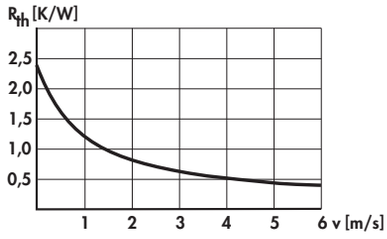
dimensions [mm]					
A	B	C	D	E	F
material:	depending on the dimension: aluminium EN AW 6060 or EN AW 6082, version in copper upon request				

Skiving heatsinks KSK

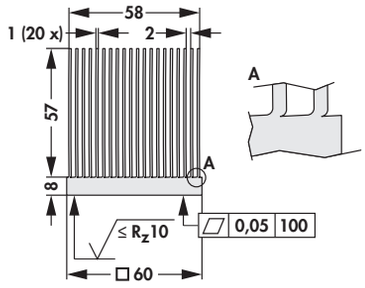


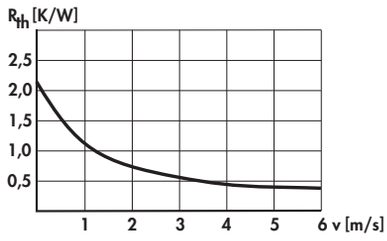
– skiving heatsink with exactly milled flat semiconductor mounting surface and low roughness depths
– particularly suitable for thermoelectric and similar power modules
– optimal heat transfer resistance from the base plate to the individual fins, as the heatsinks are made from one piece of material
– very good heat conducting aluminum material EN AW 1050 A
– extremely compact and high fin density for forced convection
– great design flexibility and fast prototyping
– skived heatsinks made of copper material on request
– heatsink width = length
– additional mechanical processing, other designs and dimensions according to customer-specific requirements



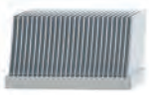


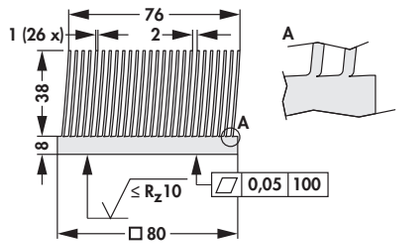
art. no.
KSK 1

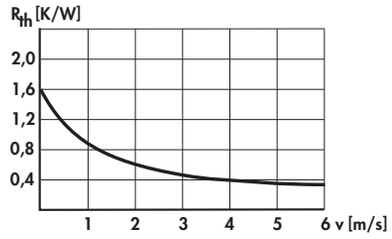




art. no.
KSK 2

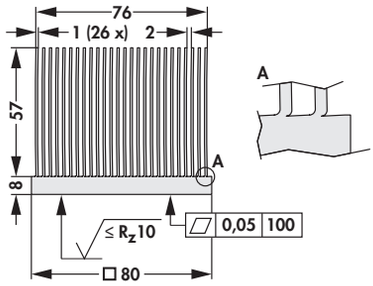


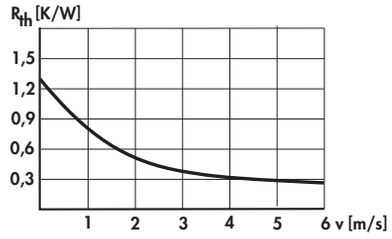




art. no.

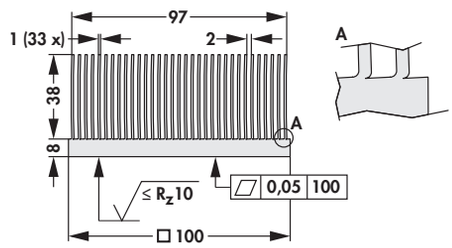
KSK 3

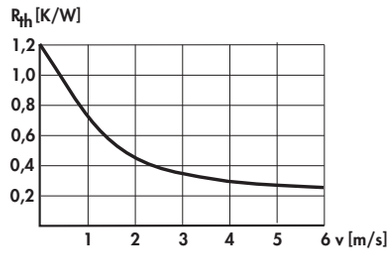




art. no.

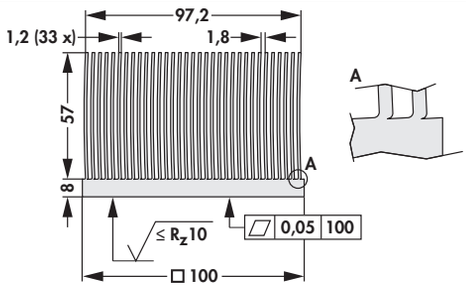
KSK 4

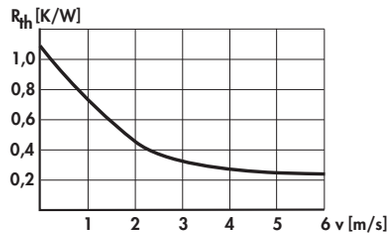




art. no.

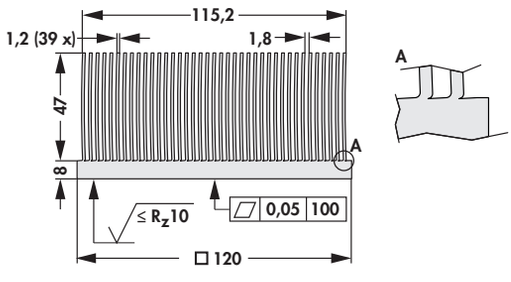
KSK 5

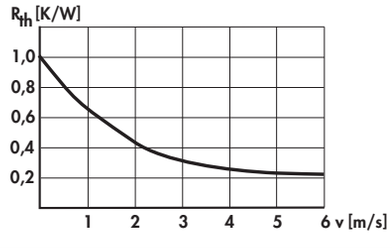




art. no.

KSK 6

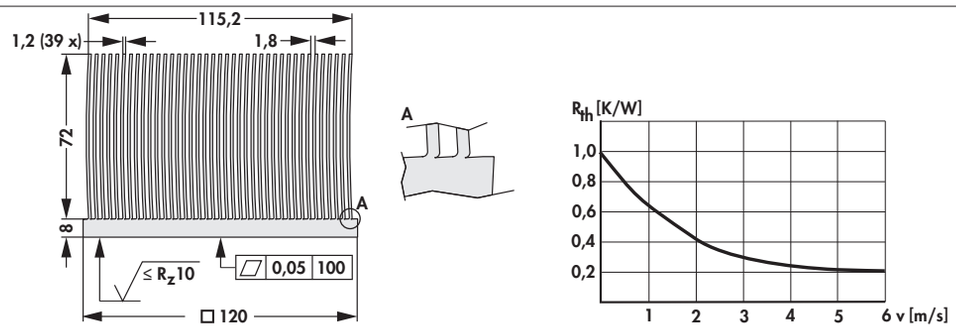




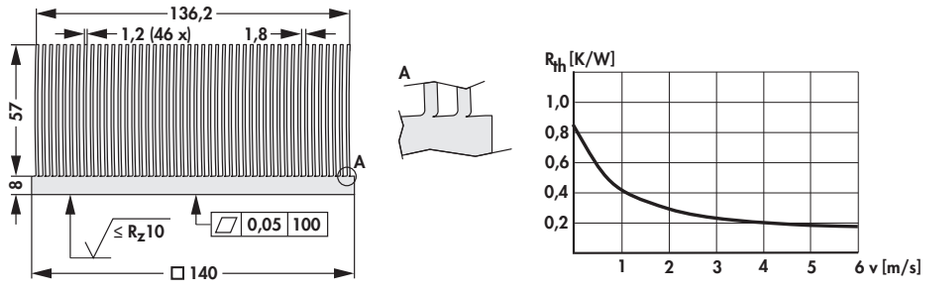
art. no.

KSK 7

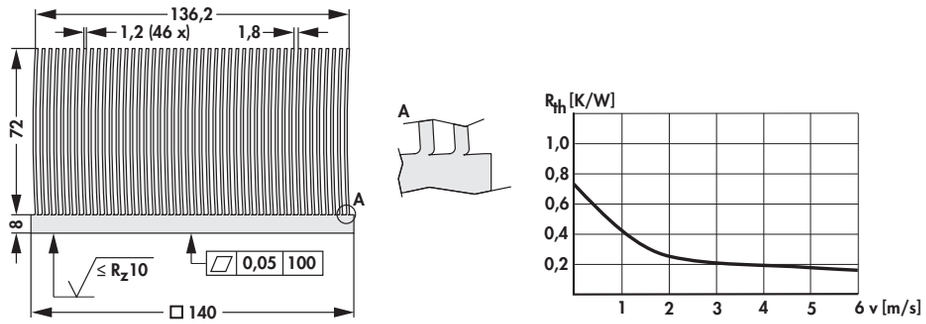
Skiving heatsinks KSK



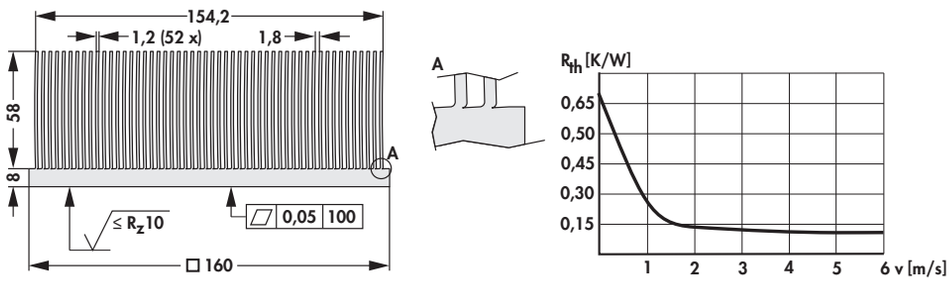
art. no.
KSK 8



art. no.
KSK 9

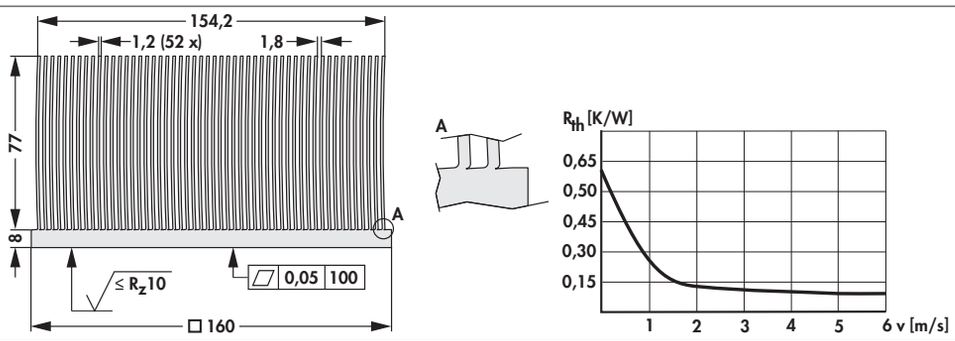


art. no.
KSK 10



art. no.
KSK 11

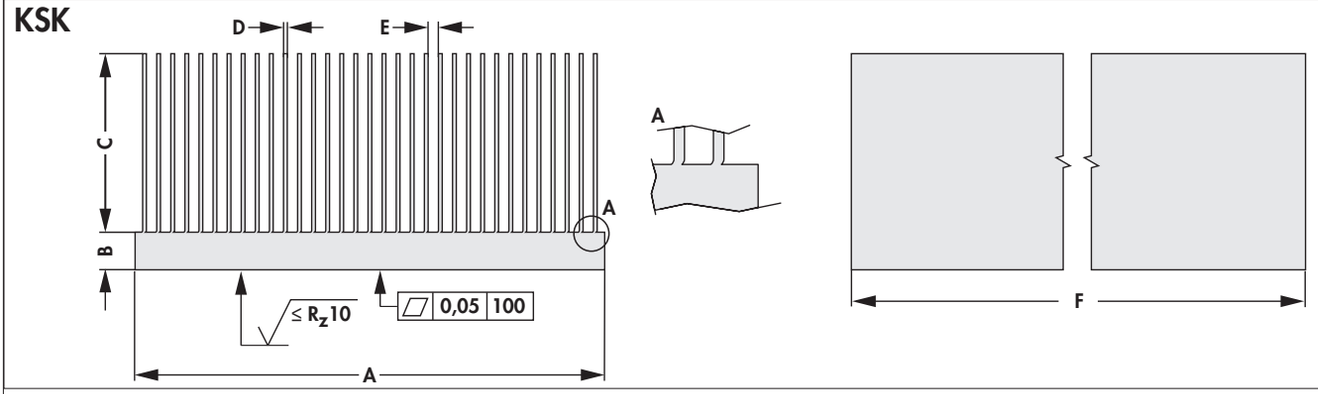
Skiving heatsink KSK



art. no.
KSK 12

For customised heatsinks please specify the dimensions when ordering:

– the dimension E depends on the design and the ratio of fin thickness and fin spacing



possible dimensions:

dimensions [mm]					
A	B	C	D	E	F
max. 1150	8 - 40	max. 120	0.8 - 1.4	0.5 - 10	max. 580

please indicate with your order:

dimensions [mm]					
A	B	C	D	E	F
material:	EN AW 1050 A; other materials on request				

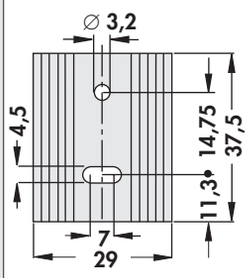
fischer elektronik

Standard extruded heatsinks

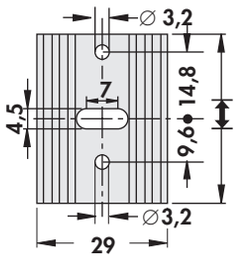
art. no.

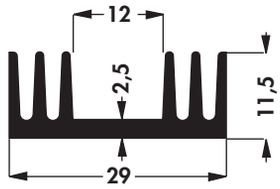
SK 09 ...

SK 09 37,5 TO 220

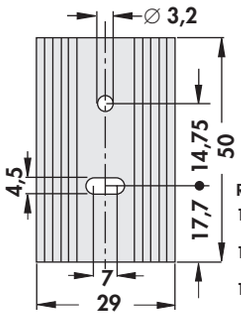


SK 09 37,5 TO 220 1
SK 09 50,0 TO 220 1

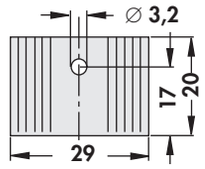


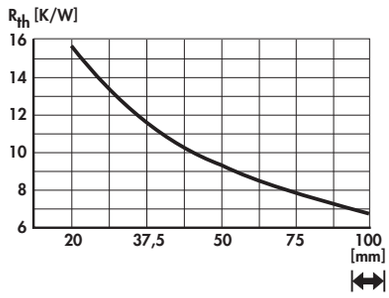


SK 09 50 TO 220



SK 09 20 TO 220





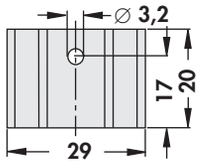
please indicate: ... ↔
20 37.5 50 1000 mm

... ◈ **(optional)**
K; TO 220

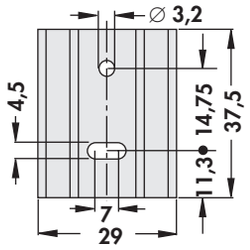
art. no.

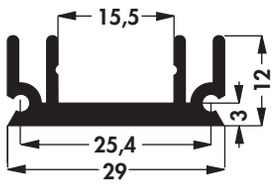
SK 145 ...

SK 145 20 TO 220

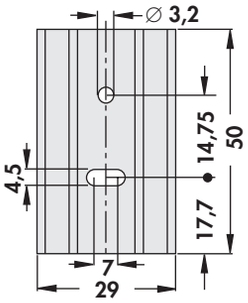


SK 145 37,5 TO 220

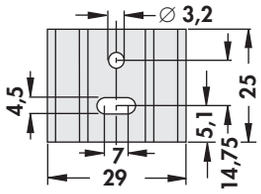


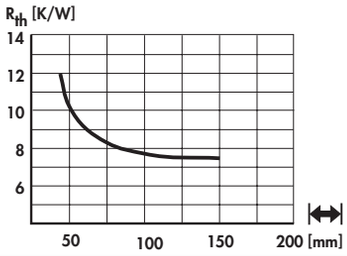


SK 145 50 TO 220



SK 145 25 TO 220



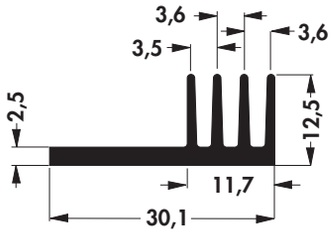


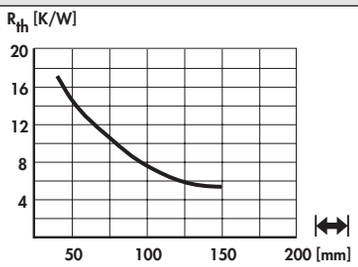
please indicate: ... ↔
20 25 37.5 50 1000 mm

... ◈ **(optional)**
TO 220

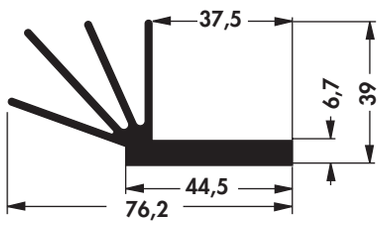
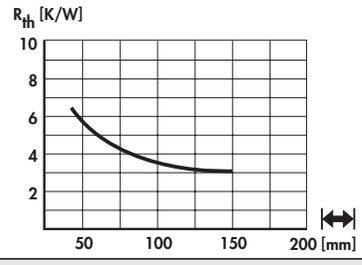
art. no.

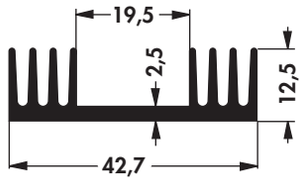
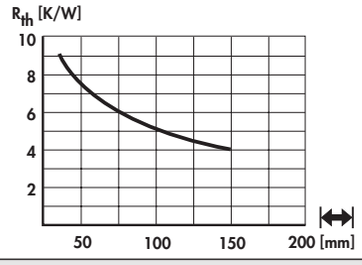
SK 443 ...

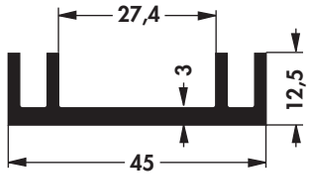
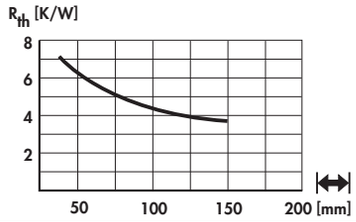


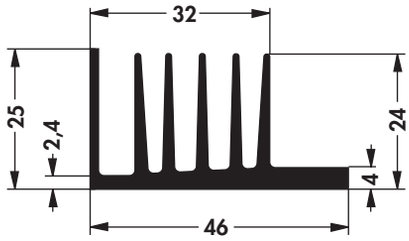
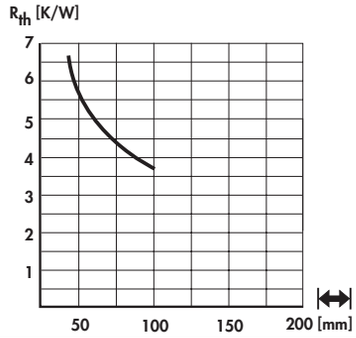


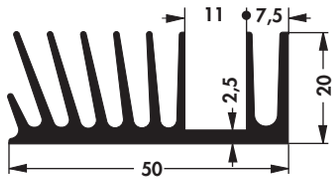
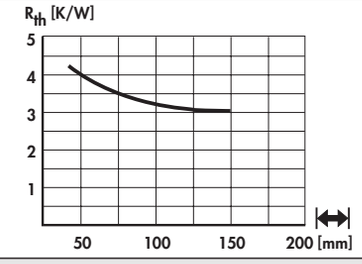
please indicate: ... ↔
37.5 75 100 1000 mm

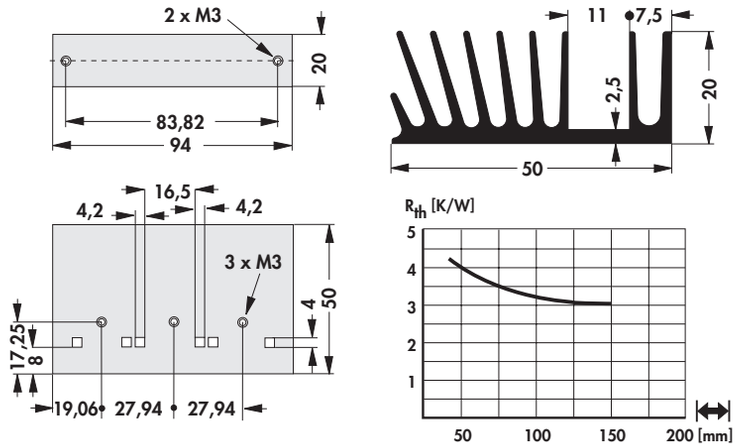
art. no.		
SK 173 ...		
please indicate:	**... ↔** **1000 mm**	

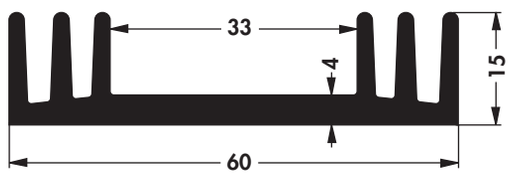
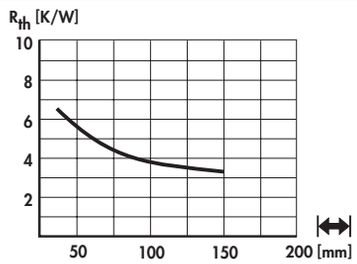
art. no.		
SK 59 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	**... ◈ (optional)** **TO 220**

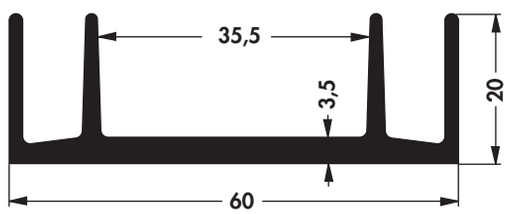
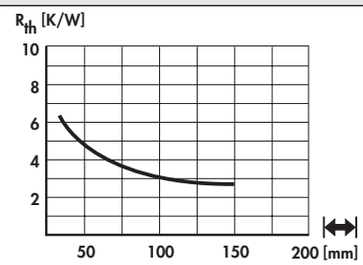
art. no.		
SK 122 ...		
please indicate:	**... ↔** **37.5 50 mm**	**... ◈ (optional)** **TO 3; CB**

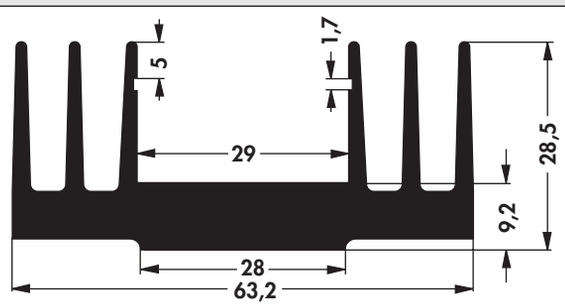
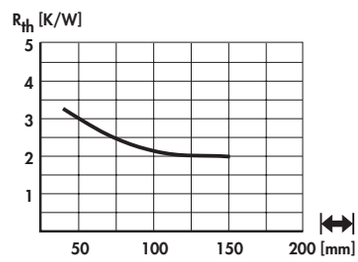
art. no.		
SK 107 ...		
please indicate:	**... ↔** **50 75 100 1000 mm**	

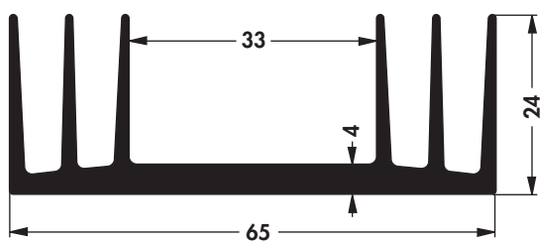
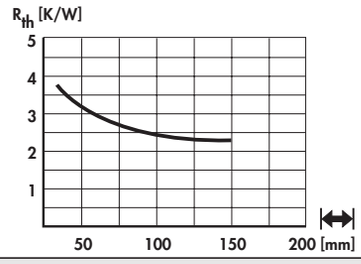
art. no.		
SK 181 ...		
please indicate:	**... ↔** **50 75 100 1000 mm**	

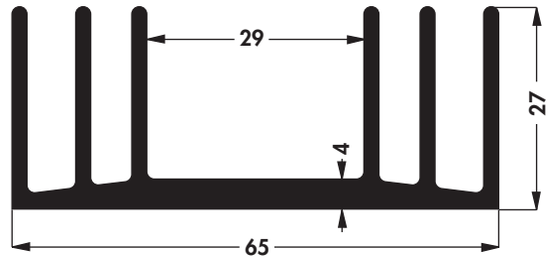
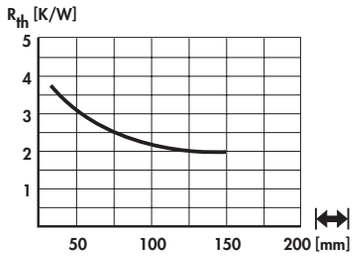
art. no.		
SK 181 94 C 3 x TO 220	 SK 181 94 C 3 x TO 220	
	retaining spring for transistor THF 409 TO 220 ➔ A 142	

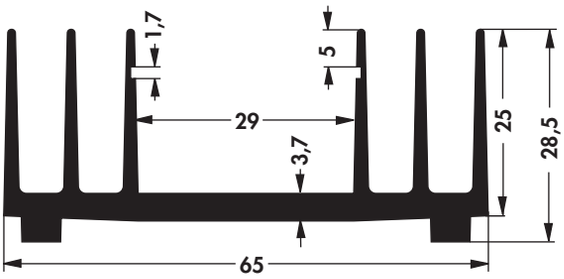
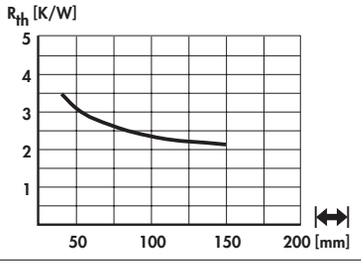
art. no.		
SK 78 ...		
please indicate:	**... ⟷** **37.5 50 75 100 1000 mm**	**... ⌖ (optional)** **TO 3; CB**

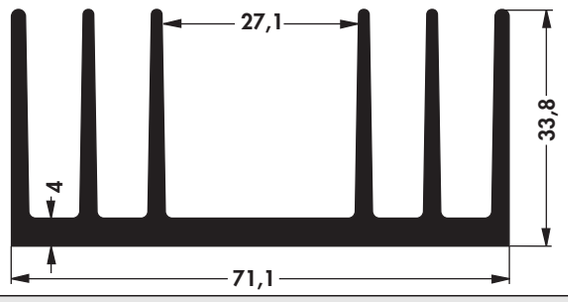
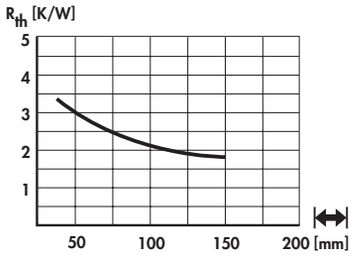
art. no.		
SK 51 ...		
please indicate:	**... ⟷** **37.5 50 75 100 1000 mm**	**... ⌖ (optional)** **TO 3; CB**

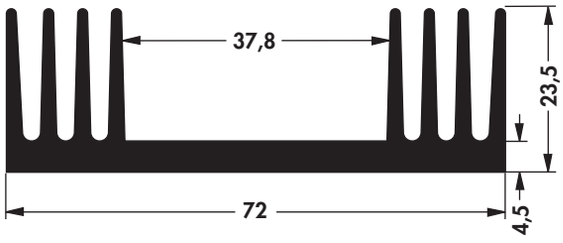
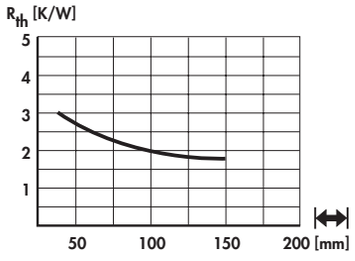
art. no.		
SK 25 ...		
	with slots for cover plates or PCBs	
please indicate:	**... ⟷** **37.5 50 1000 mm**	

art. no.		
SK 18 ...		
please indicate:	**... ↔ 37.5 50 75 1000 mm**	**... ⌖ (optional) TO 3; CB**

art. no.		
SK 63 ...		
please indicate:	**... ↔ 37.5 50 75 100 1000 mm**	**... ⌖ (optional) TO 3; CB**

art. no.		
SK 05 ...		
	with slots for cover plates or PCBs	
please indicate:	**... ↔ 50 75 1000 mm**	**... ⌖ (optional) TO 3; CB**

art. no.		
SK 402 ...		
please indicate:	**... ↔ 100 mm**	**... ⌖ (optional) TO 3; CB**

art. no.		
SK 97 ...		
please indicate:	**... ↔ 37.5 50 75 100 1000 mm**	**... ⌖ (optional) TO 3**

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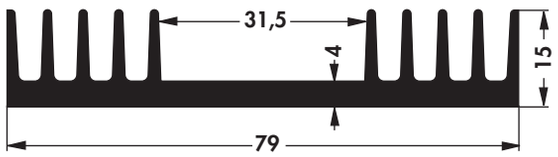
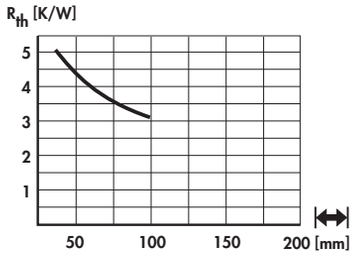
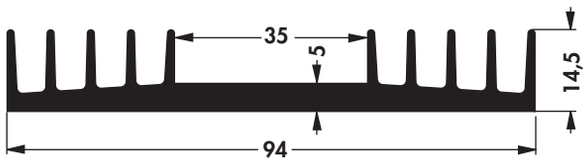
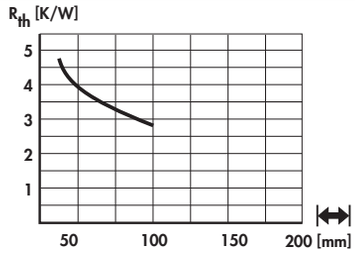
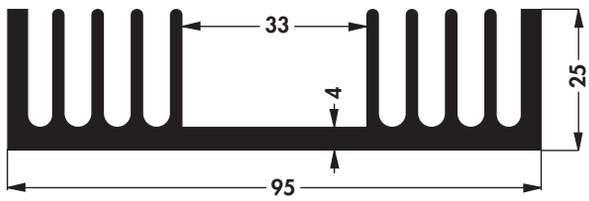
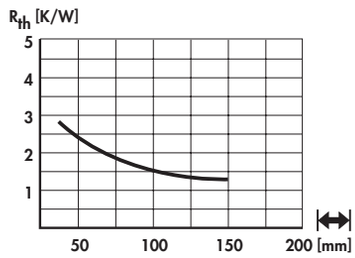
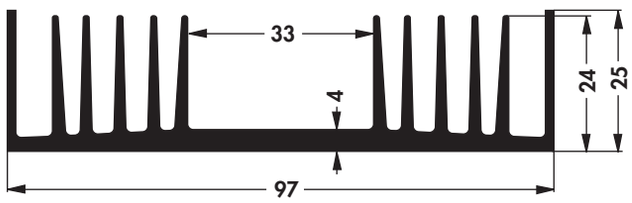
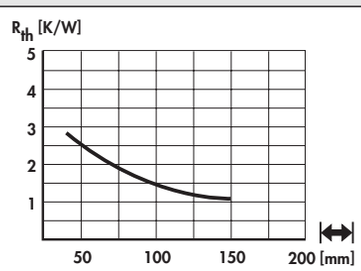
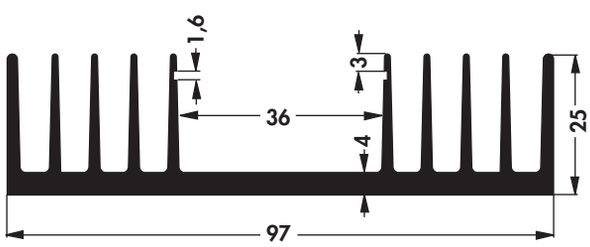
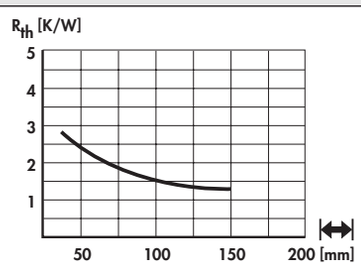
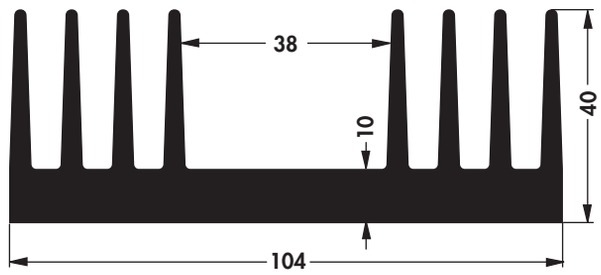
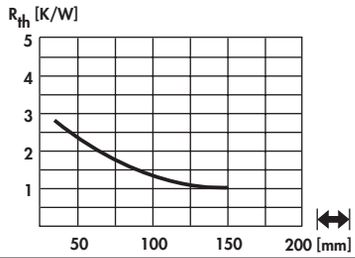
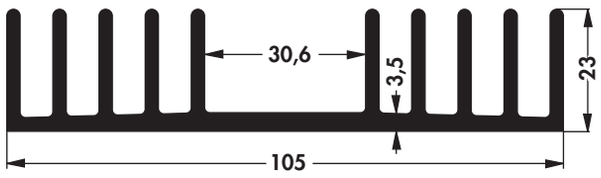
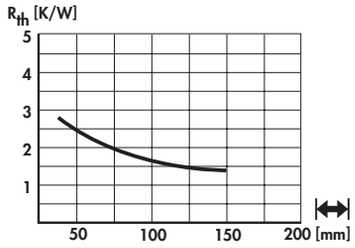
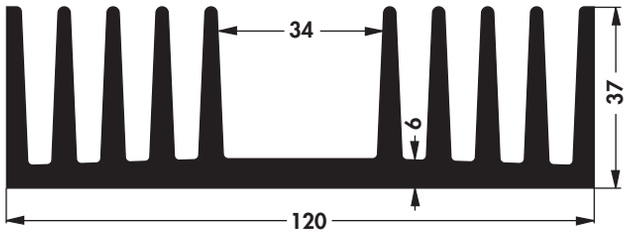
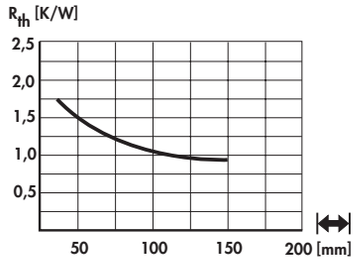
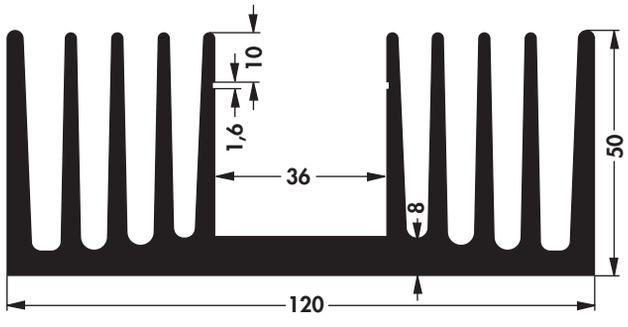
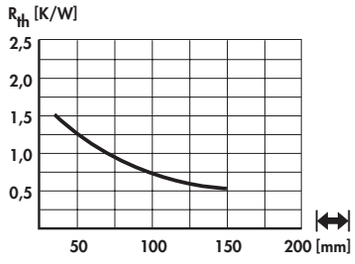
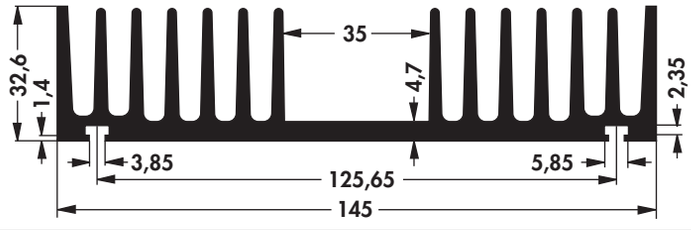
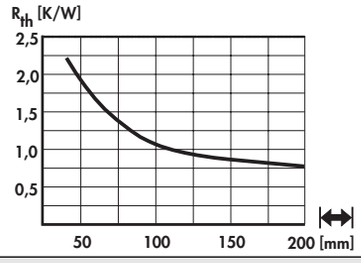
art. no.		
SK 45 ...		
please indicate:	**... ↔ 37.5 50 75 100 1000 mm**	**... ⌖ (optional) TO 3; CB**
art. no.		
SK 19 ...		
please indicate:	**... ↔ 37.5 50 75 100 1000 mm**	**... ⌖ (optional) TO 3; CB**
art. no.		
SK 401 ...		
please indicate:	**... ↔ 100 1000 mm**	**... ⌖ (optional) TO 3; CB**
art. no.		
SK 72 ...		
please indicate:	**... ↔ 37.5 50 75 100 1000 mm**	**... ⌖ (optional) TO 3; CB**
art. no.		
SK 04 ...	 with slots for cover plates or PCBs	
please indicate:	**... ↔ 37.5 50 75 100 1000 mm**	**... ⌖ (optional) SSR 1; SSR 2; TO 3; CB**

art. no.	
SK 403 ...	 
please indicate:	**... ↔ 1000 mm**

art. no.	
SK 73 ...	 
please indicate:	**... ↔ 50 75 1000 mm** **... ⌖ (optional) TO 3; CB**

art. no.	
SK 71 ...	 
please indicate:	**... ↔ 37.5 50 75 100 1000 mm** **... ⌖ (optional) TO 3**

art. no.	
SK 57 ...	 
with slots for cover plates or PCBs	
please indicate:	**... ↔ 37.5 75 100 1000 mm**

art. no.	
SK 197 ...	 
please indicate:	**... ↔ 37.5 1000 mm** **... ⌖ (optional) TO 3; CB**

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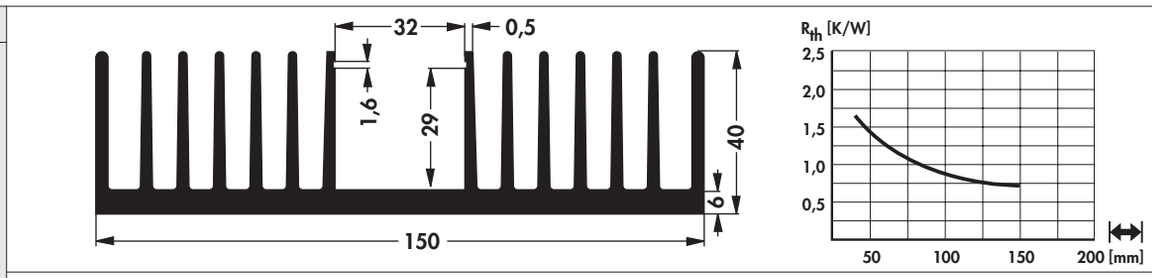
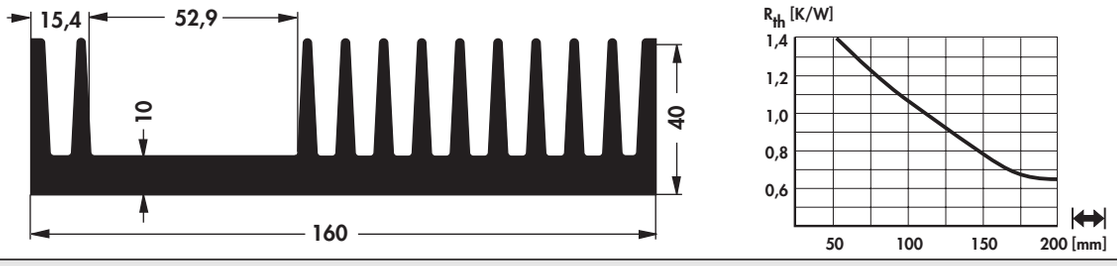
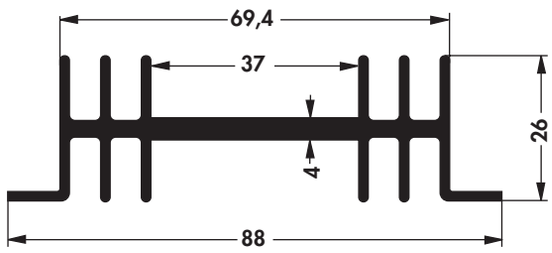
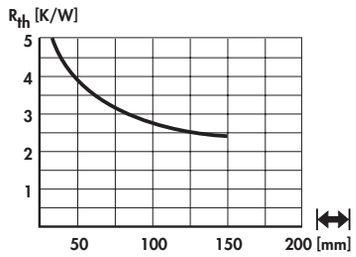
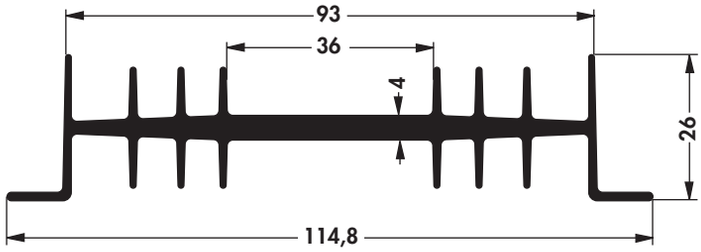
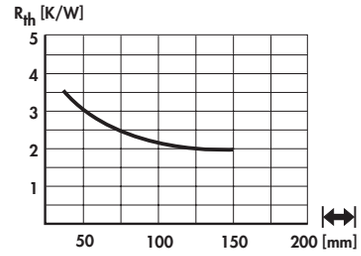
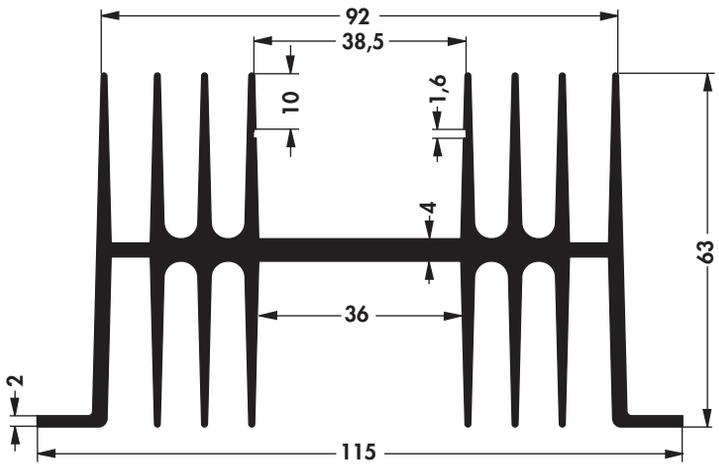
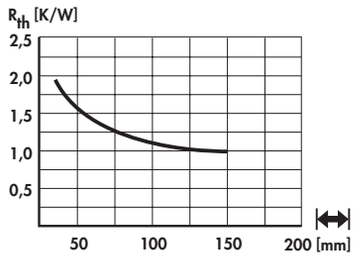
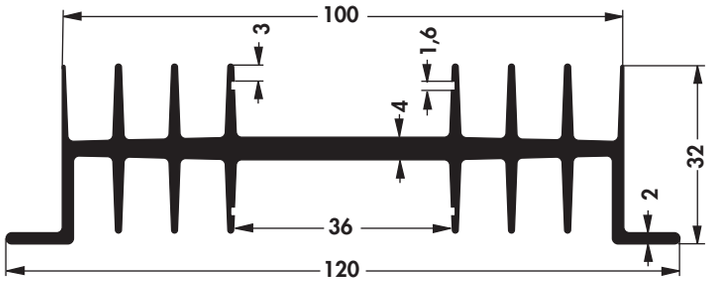
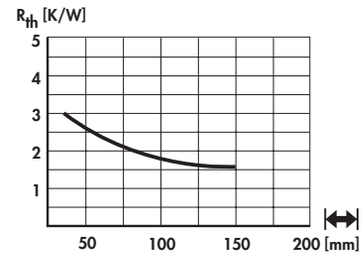
art. no.	
SK 98 ...	with slots for cover plates or PCBs
please indicate:	**... ⟷** **100 150 mm**

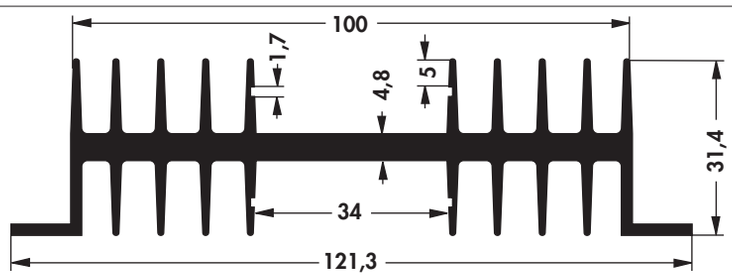
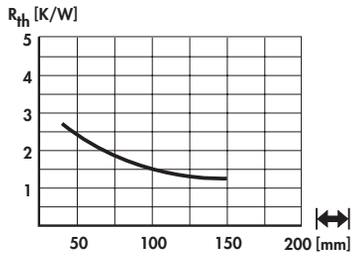
art. no.	
SK 404 ...	
please indicate:	**... ⟷** **50 75 1000 mm** **... ⌖ (optional)** **TO 3; CB**

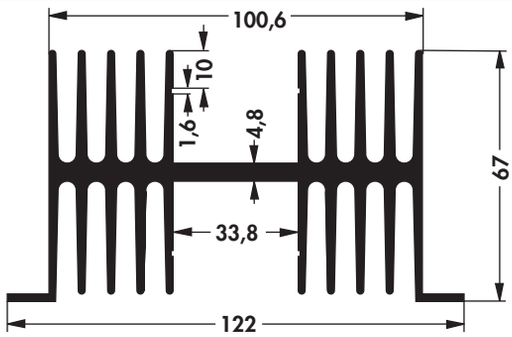
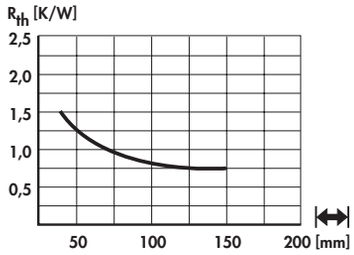
art. no.	
	 
SK 36 ...	mounting parts IS 1, IS 2, IS 3 ➔ E 102
please indicate:	**... ⟷ 50 75 1000 mm** **... ⟐ (optional) TO 3; CB**

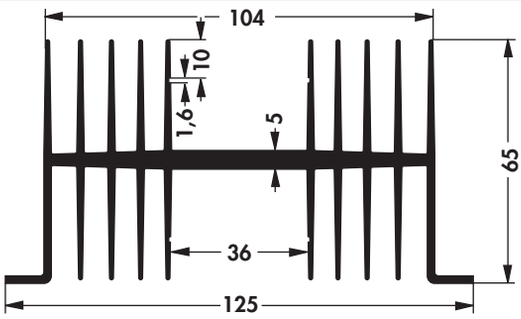
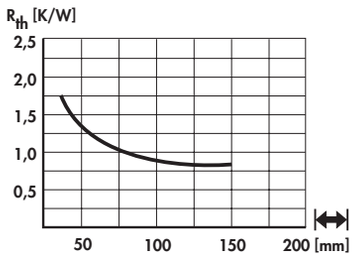
art. no.	
	 
SK 01 ...	mounting parts IS 1, IS 2, IS 3 ➔ E 102
please indicate:	**... ⟷ 37.5 50 75 100 1000 mm** **... ⟐ (optional) TO 3; CB**

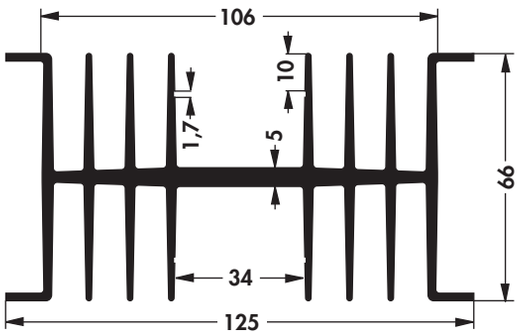
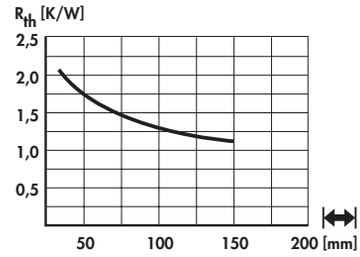
art. no.	
	 
SK 02 ...	with slots for cover plates or PCBs; mounting parts IS 1, IS 2, IS 3 ➔ E 102
please indicate:	**... ⟷ 37.5 50 75 100 1000 mm** **... ⟐ (optional) TO 3; CB**

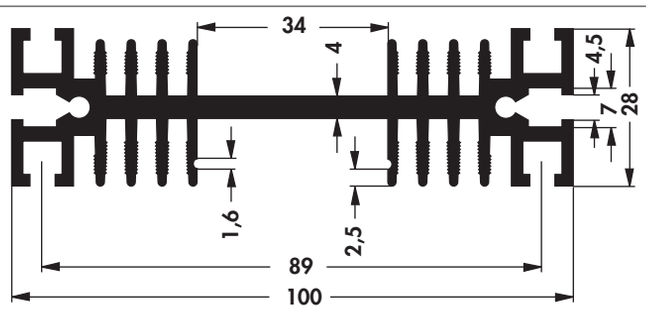
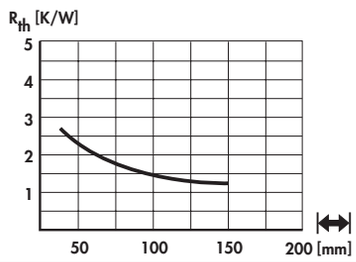
art. no.	
	 
SK 03 ...	with slots for cover plates or PCBs; mounting parts IS 1, IS 2, IS 3 ➔ E 102
please indicate:	**... ⟷ 50 75 100 1000 mm** **... ⟐ (optional) TO 3; CB**

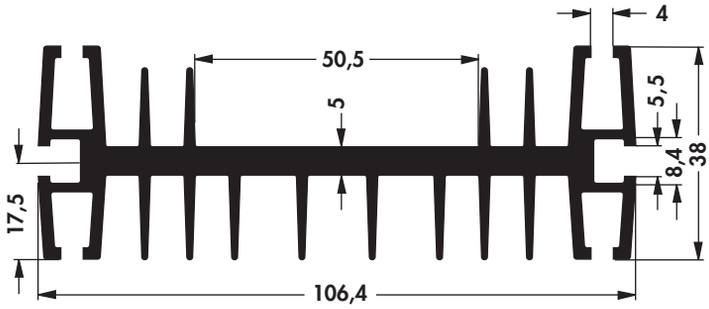
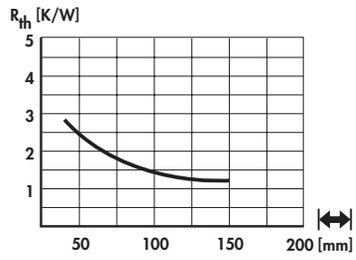
art. no.	
SK 39 ...	 
	with slots for cover plates or PCBs; mounting parts IS 1, IS 2, IS 3 ➔ E 102
please indicate:	**... ↔ 75 100 1000 mm** **... ⟡ (optional) TO 3; CB**

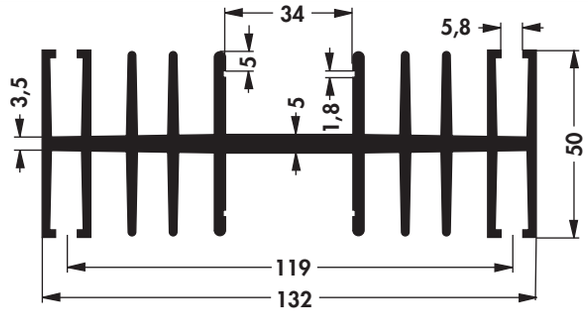
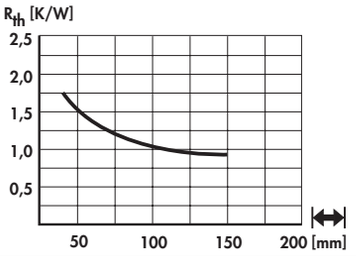
art. no.	
SK 30 ...	 
	with slots for cover plates or PCBs; mounting parts IS 1, IS 2, IS 3 ➔ E 102
please indicate:	**... ↔ 75 100 1000 mm** **... ⟡ (optional) TO 3; CB**

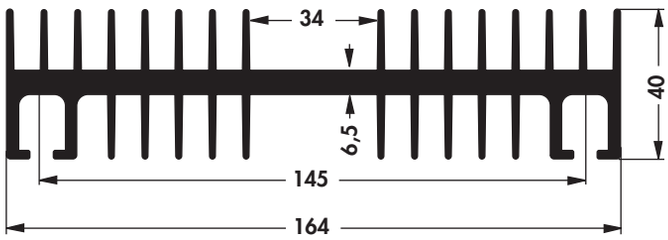
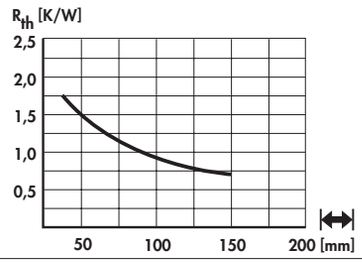
art. no.	
SK 34 ...	 
	with slots for cover plates or PCBs; mounting parts IS 1, IS 2, IS 3 ➔ E 102
please indicate:	**... ↔ 50 75 100 1000 mm** **... ⟡ (optional) TO 3; CB**

art. no.	
SK 14 ...	 
	with slots for cover plates or PCBs; mounting parts IS 1, IS 2, IS 3 ➔ E 102
please indicate:	**... ↔ 50 75 100 mm** **... ⟡ (optional) TO 3; CB**

art. no.	
SK 20 ...	 
	with slots for cover plates or PCBs; mounting parts IS 5, IS 8 ➔ E 102
please indicate:	**... ⟷** **37.5 75 100 1000 mm** **... ⌖ (optional)** **TO 3; CB**

art. no.	
SK 184 ...	 
please indicate:	**... ⟷** **100 1000 mm**

art. no.	
SK 148 ...	 
	with slots for cover plates or PCBs
please indicate:	**... ⟷** **37.5 100 1000 mm** **... ⌖ (optional)** **TO 3; CB**

art. no.	
SK 67 ...	 
	mounting part IS 6 ➔ E 102
please indicate:	**... ⟷** **37.5 50 100 1000 mm** **... ⌖ (optional)** **TO 3**

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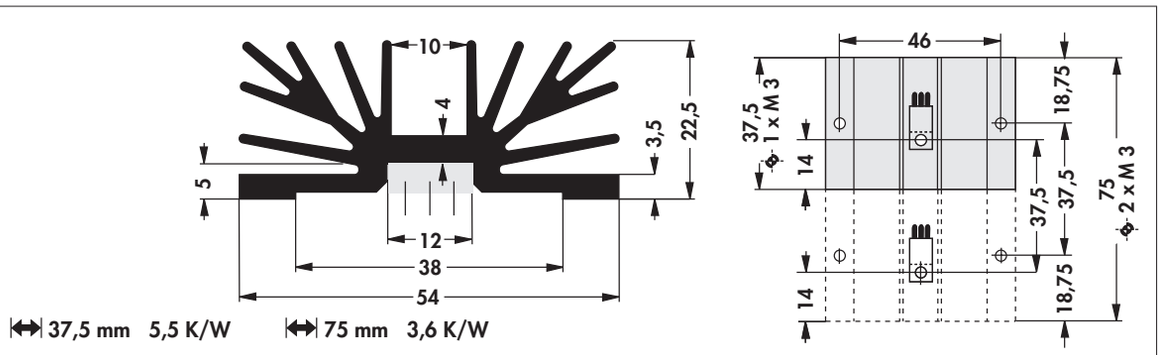
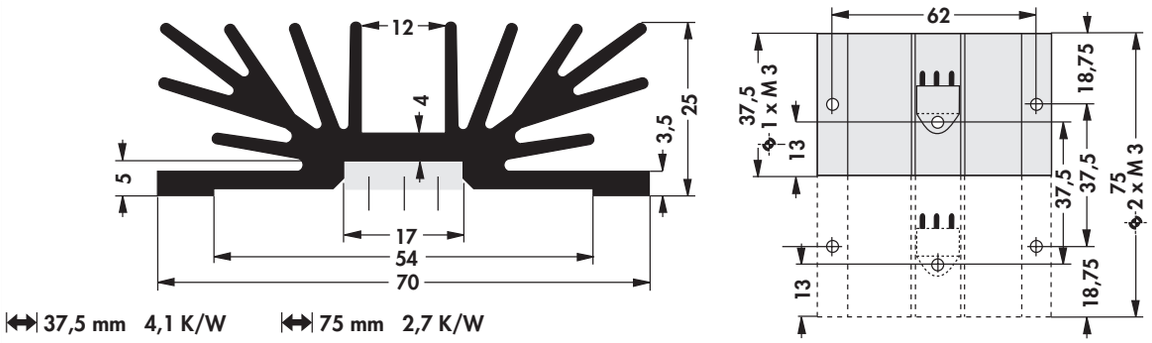
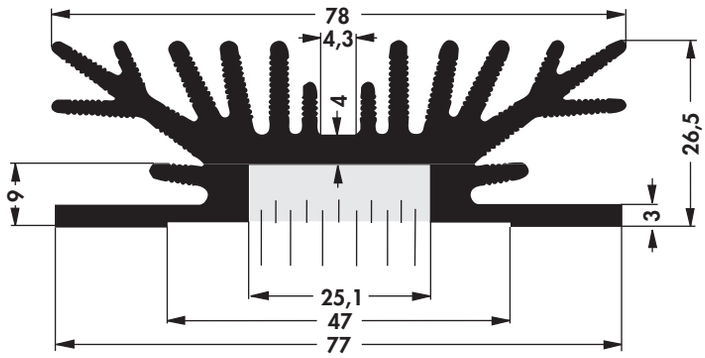
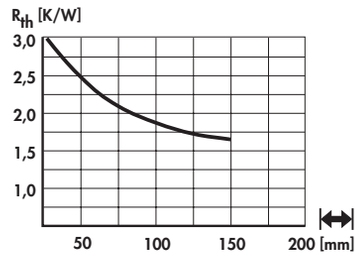
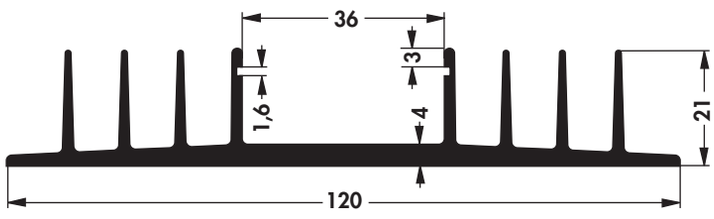
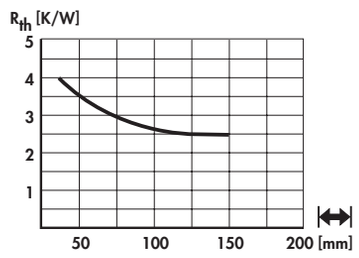
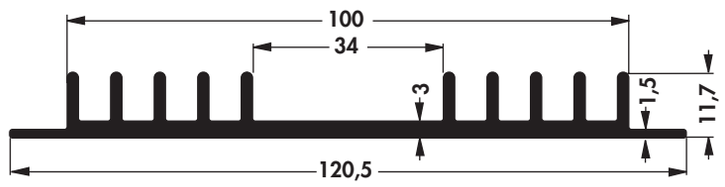
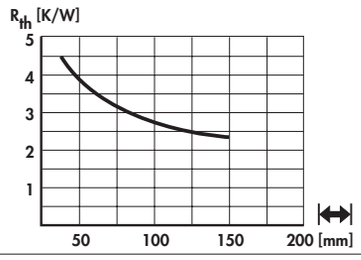
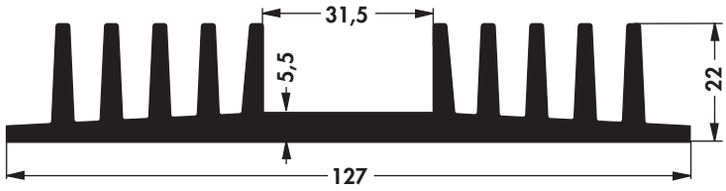
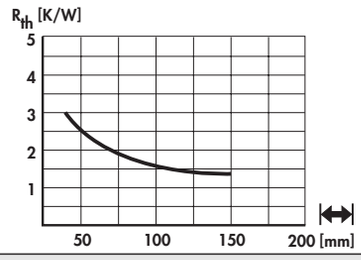
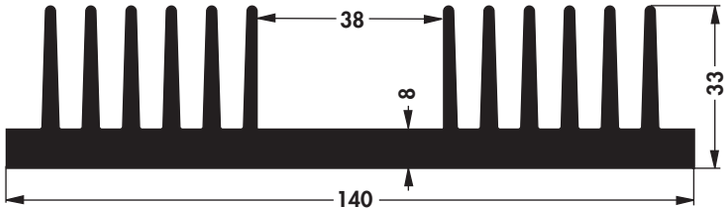
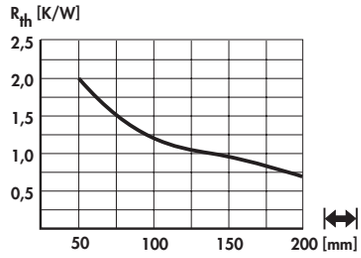
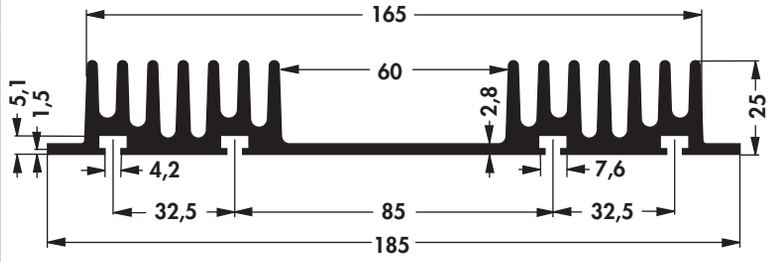
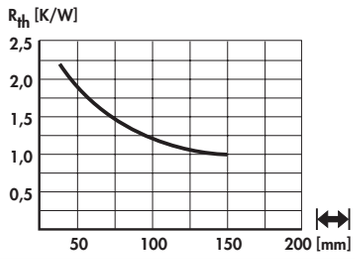
art. no.	
	
	⟷ 37,5 mm 5,5 K/W ⟷ 75 mm 3,6 K/W
SK 65 ...	for cases SOT 32
please indicate:	**... ⟷ 37.5 75 mm** **... ⌖ (optional) 1xM3; 2xM3**

art. no.	
	
	⟷ 37,5 mm 4,1 K/W ⟷ 75 mm 2,7 K/W
SK 64 ...	for cases TO 220, TOP 3
please indicate:	**... ⟷ 37.5 75 mm** **... ⌖ (optional) 1xM3; 2xM3**

art. no.	
	 
SK 419 ...	
please indicate:	**... ⟷ 1000 mm**

art. no.	
	 
SK 21 ...	with slots for cover plates or PCBs; mounting parts IS 1, IS 2, IS 3 ➔ E 102
please indicate:	**... ⟷ 37.5 1000 mm** **... ⌖ (optional) TO 3; CB**

art. no.	
SK 69 ...	 
	mounting parts IS 1, IS 2, IS 3 ➔ E 102
please indicate:	**... ⟷ 50 75 100 1000 mm** **... ⟐ (optional) TO 3; CB**
art. no.	
SK 74 ...	 
please indicate:	**... ⟷ 37.5 100 1000 mm** **... ⟐ (optional) TO 3; CB**
art. no.	
SK 124 ...	 
please indicate:	**... ⟷ 50 100 150 1000 mm** **... ⟐ (optional) TO 3**
art. no.	
SK 195 ...	 
please indicate:	**... ⟷ 75 100 mm** **... ⟐ (optional) TO 3; CB**

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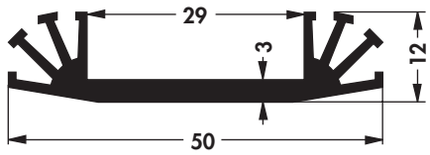
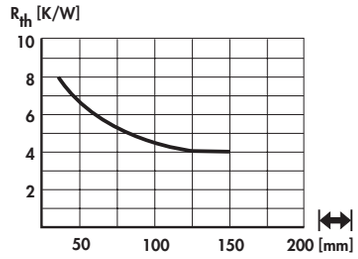
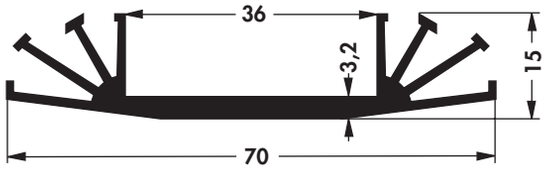
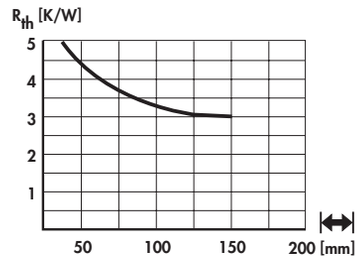
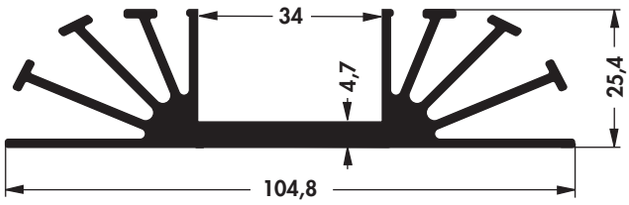
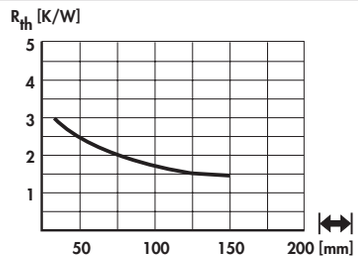
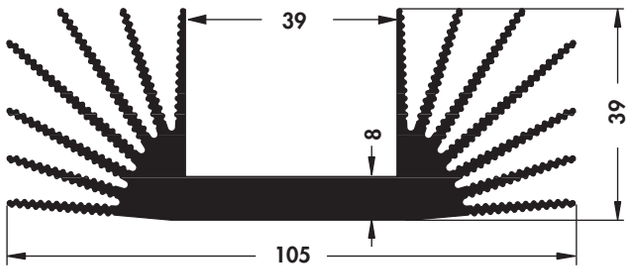
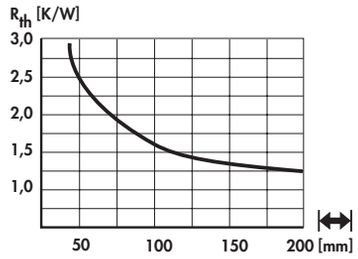
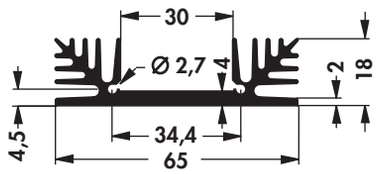
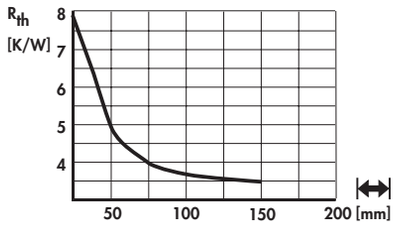
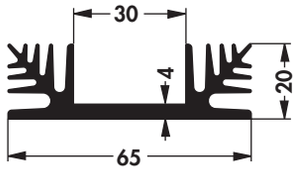
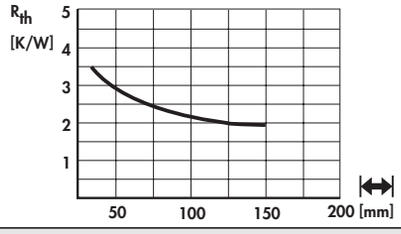
art. no.		
SK 31 ...		
please indicate:	**... ↔ 37.5 50 75 1000 mm**	**... ⌖ (optional) TO 3; CB**

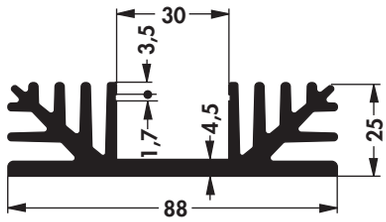
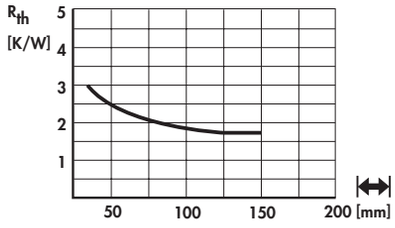
art. no.		
SK 07 ...		
please indicate:	**... ↔ 37.5 50 75 1000 mm**	**... ⌖ (optional) TO 3; CB**

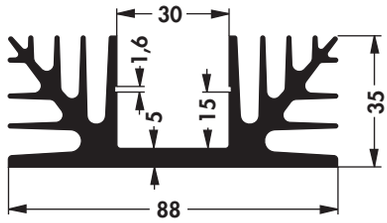
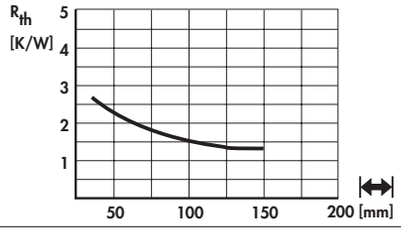
art. no.		
SK 16 ...	 mountingpart IS 3 ➔ E 102	
please indicate:	**... ↔ 75 1000 mm**	**... ⌖ (optional) TO 3; CB**

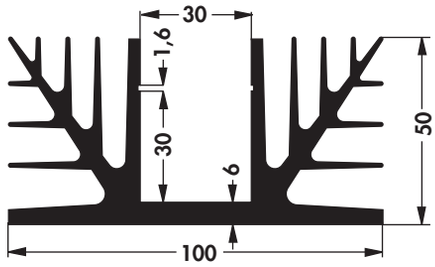
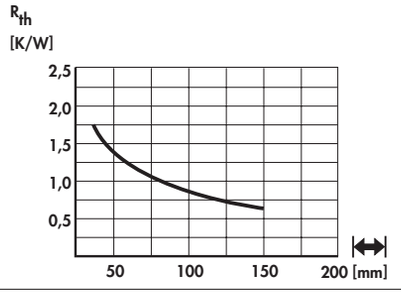
art. no.		
SK 500 ...		
please indicate:	**... ↔ 37.5 50 75 100 1000 mm**	

art. no.		
SK 185 ...		
	extruded heatsink for PCB mounting ➔ A 128	
please indicate:	**... ↔** **37.5 50 1000 mm**	**... ◈ (optional)** **TO 3; CB**

art. no.		
SK 48 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	**... ◈ (optional)** **SSR 3; TO 3; CB**

art. no.		
SK 79 ...		
	with slots for cover plates or PCBs	
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	**... ◈ (optional)** **TO 3; CB**

art. no.		
SK 08 ...		
	with slots for cover plates or PCBs	
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	**... ◈ (optional)** **TO 3; CB**

art. no.		
SK 88 ...		
	with slots for cover plates or PCBs	
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	**... ◈ (optional)** **TO 3**

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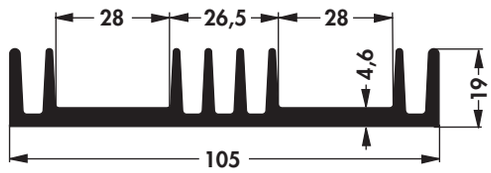
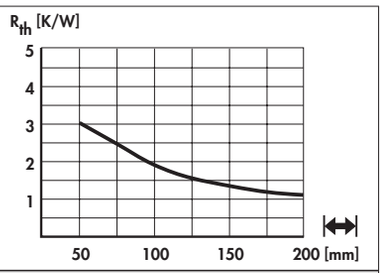
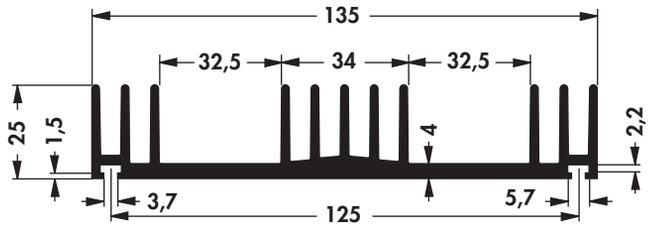
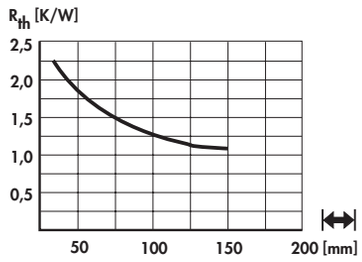
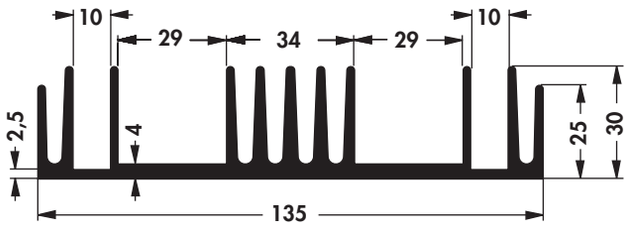
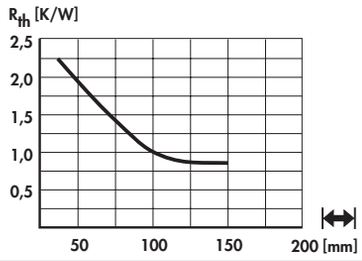
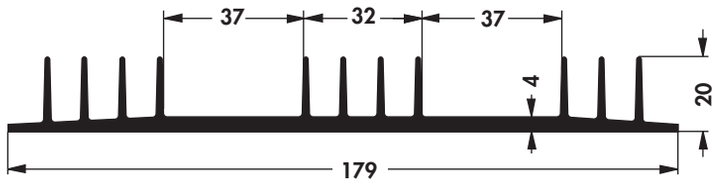
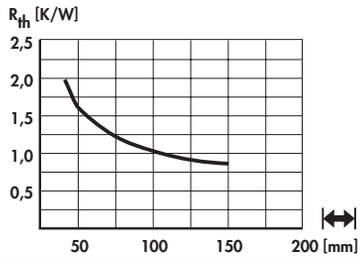
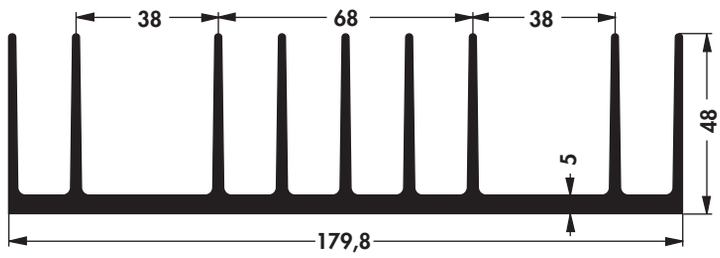
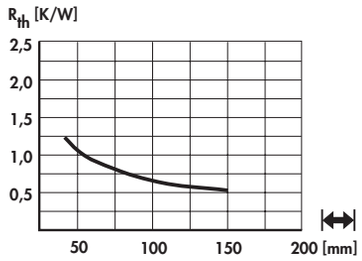
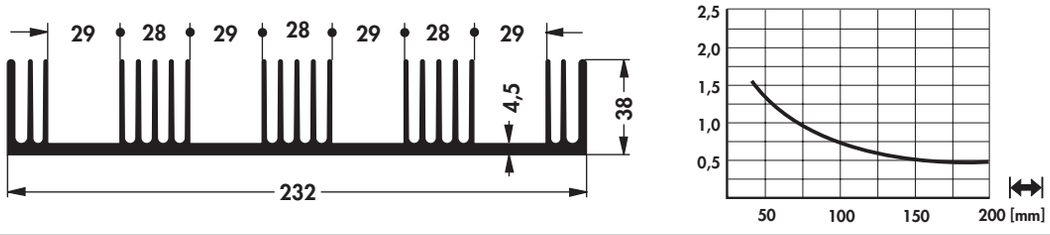
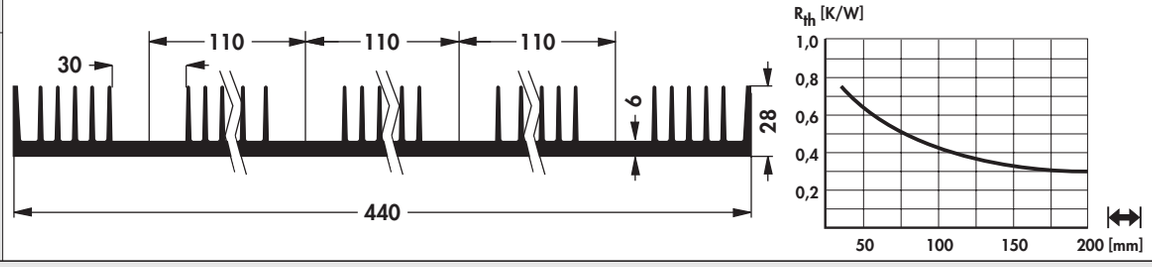
art. no.		
SK 52 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	**... ⌖ (optional)** **2xTO 3; 2xCB**

art. no.		
SK 60 ...		
please indicate:	**... ↔** **50 75 100 1000 mm**	**... ⌖ (optional)** **2xTO 3; 2xCB**

art. no.		
SK 147 ...		
please indicate:	**... ↔** **50 150 1000 mm**	**... ⌖ (optional)** **2xTO 3; 2xCB**

art. no.		
SK 80 ...		
please indicate:	**... ↔** **75 100 1000 mm**	**... ⌖ (optional)** **2xTO 3; 2xCB**

art. no.		
SK 53 ...		
please indicate:	**... ↔** **50 75 100 150 1000 mm**	**... ⌖ (optional)** **2xTO 3; 2xCB**

art. no.	
SK 86 ...	
please indicate:	**... ↔ 100 150 1000 mm**
art. no.	
SK 82 ...	
please indicate:	**... ↔ 100 1000 mm**

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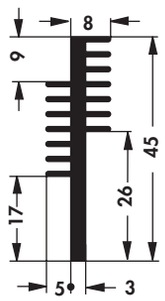
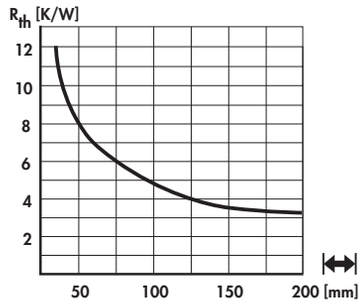
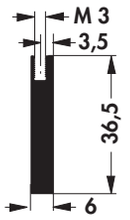
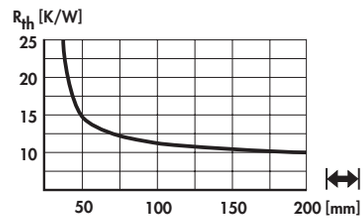
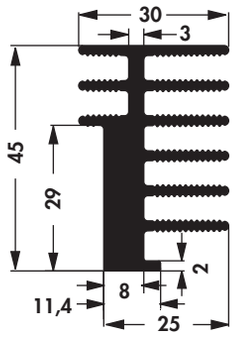
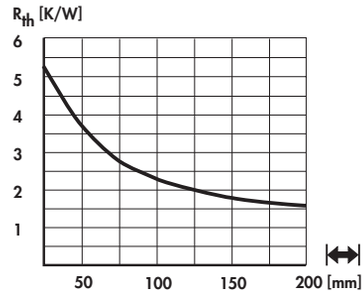
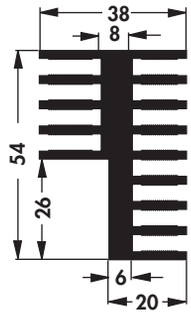
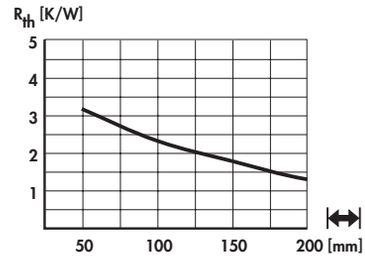
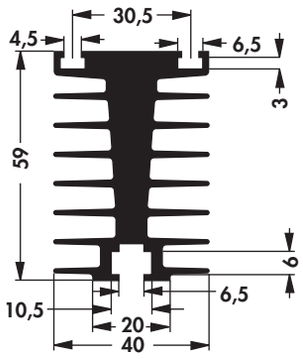
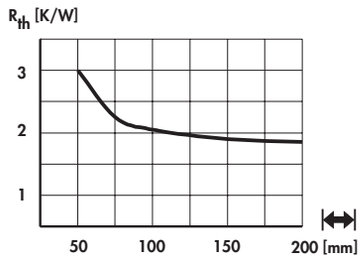
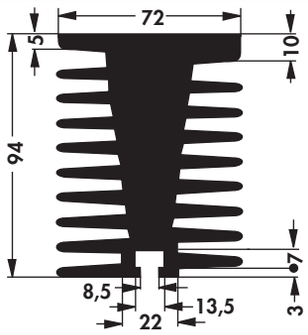
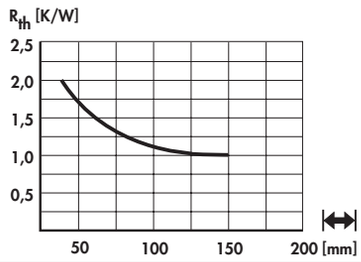
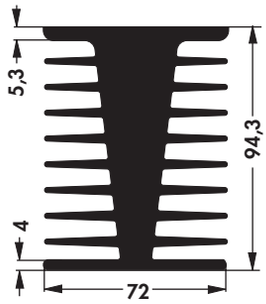
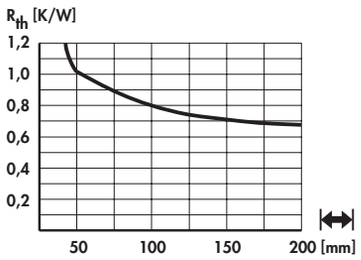
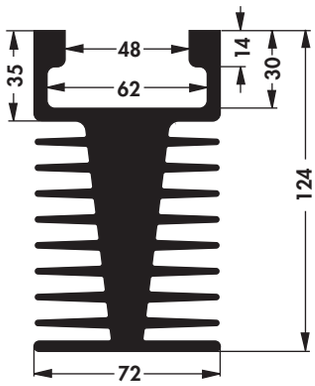
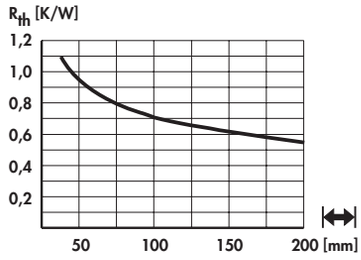
art. no.		
SK 596 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	
art. no.		
SK 494 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	
art. no.		
SK 544 ...		
please indicate:	**... ↔** **50 75 100 1000 mm**	
art. no.		
SK 32 ...		
please indicate:	**... ↔** **37.5 50 75 100 1000 mm**	

art. no.		
SK 187 ...		
please indicate:	**... ↔** **75 1000 mm**	

art. no.		
SK 140 ...		
please indicate:	**... ↔** **1000 mm**	

art. no.		
SK 556 ...		
please indicate:	**... ↔** **75 100 150 1000 mm**	

art. no.		
SK 15 ...		
please indicate:	**... ↔** **75 1000 mm**	

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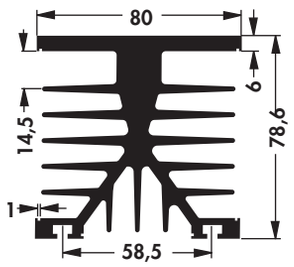
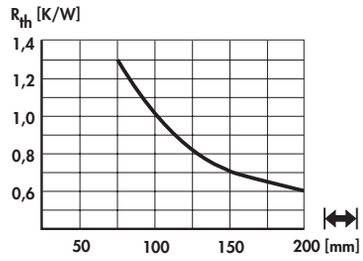
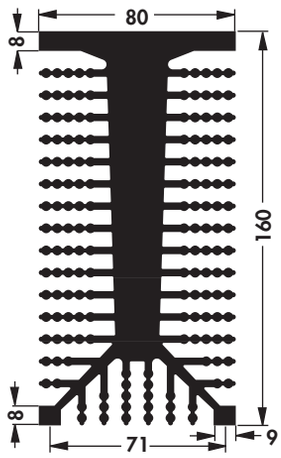
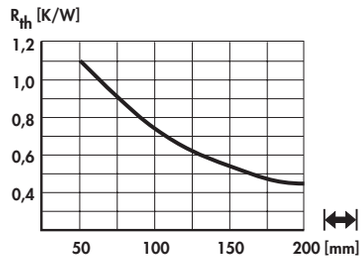
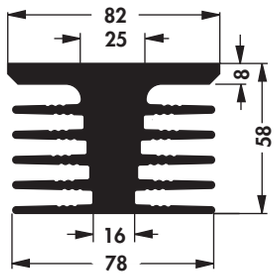
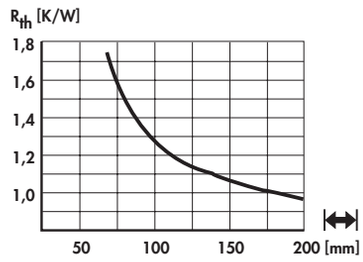
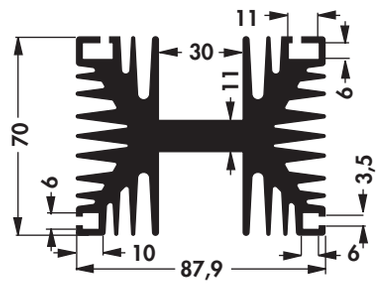
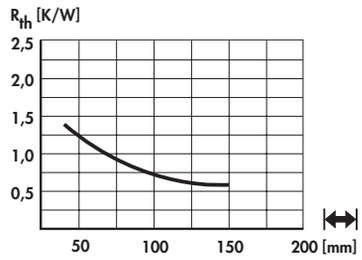
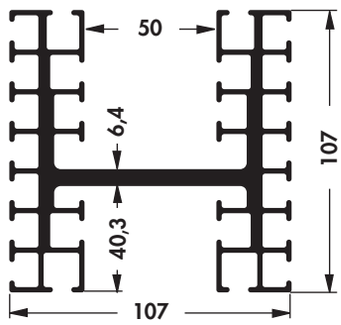
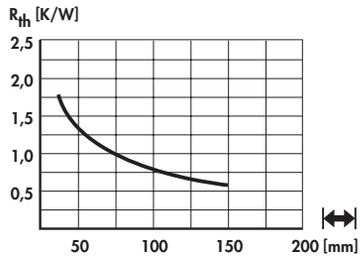
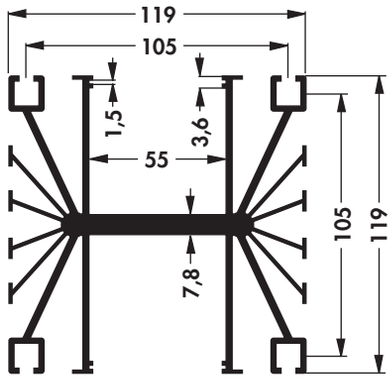
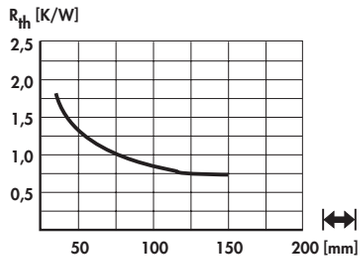
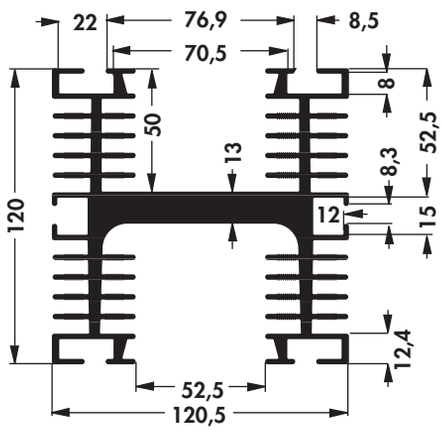
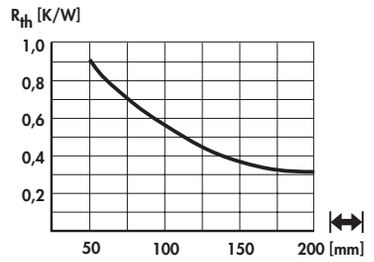
Standard extruded heatsinks

art. no.		
SK 89 ...	 with slots for cover plates or PCBs	
please indicate:	**... ↔** **100 150 1000 mm**	**... ⟲ (optional)** **SSR 1; SSR 2**

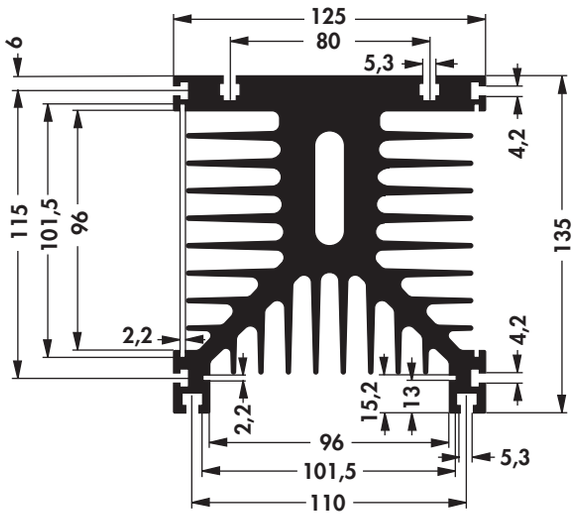
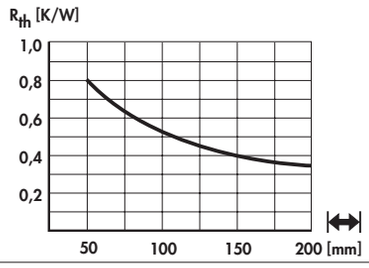
art. no.		
SK 163 ...		
please indicate:	**... ↔** **100 150 1000 mm**	

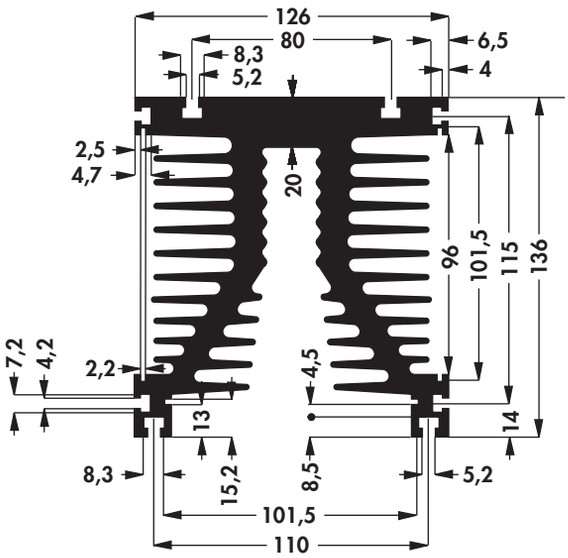
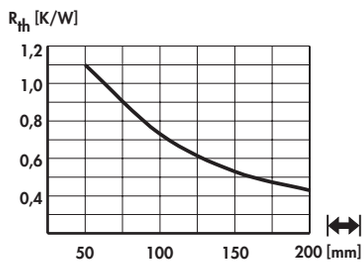
art. no.		
SK 176 ...		
please indicate:	**... ↔** **75 100 150 1000 mm**	**... ⟲ (optional)** **SSR 2**

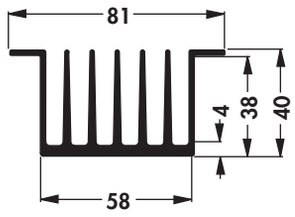
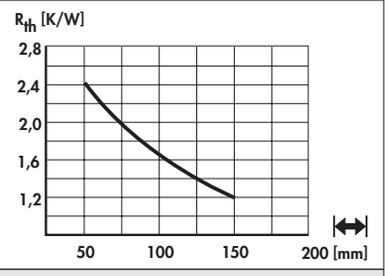
art. no.	
SK 83 ...	 
please indicate:	**... ↔** **100 1000 mm**
art. no.	
SK 06 ...	  mounting part IS 4 ➔ E 102
please indicate:	**... ↔** **75 1000 mm**
art. no.	
SK 23 ...	  with slots for cover plates or PCBs; equipped with fan and endplates = **LA 4** ➔ D 19
please indicate:	**... ↔** **75 mm**
art. no.	
SK 110 ...	 
please indicate:	**... ↔** **150 200 1000 mm**

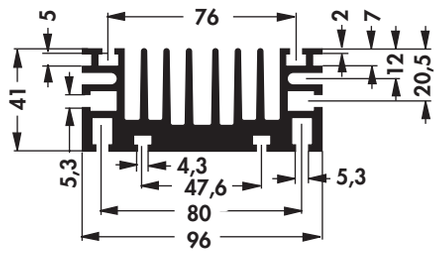
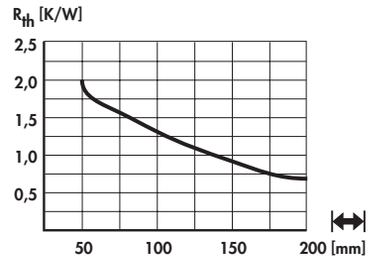
fischer elektronik

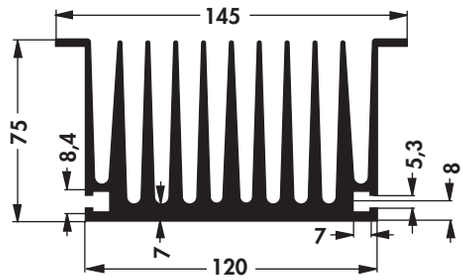
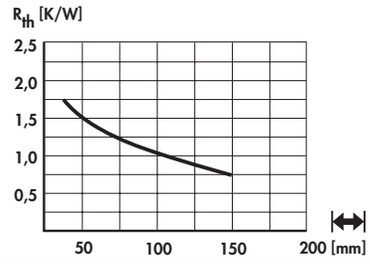
Standard extruded heatsinks

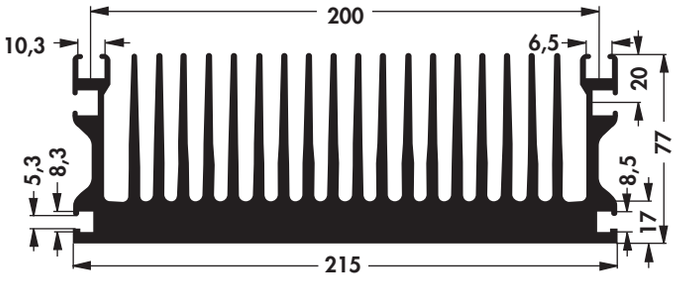
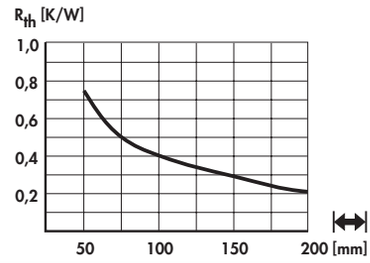
art. no.	
	 
SK 109 ...	with slots for cover plates or PCBs
please indicate:	**... ↔** **100 150 200 1000 mm**

art. no.	
	 
SK 108 ...	with slots for cover plates or PCBs
please indicate:	**... ↔** **100 1000 mm**

art. no.		
SK 111 ...		
please indicate:	**... ↔** **75 100 1000 mm**	**... ◈ (optional)** **SSR 1; SSR 3**

art. no.		
SK 172 ...		
please indicate:	**... ↔** **50 75 100 150 1000 mm**	

art. no.		
SK 194 ...		
please indicate:	**... ↔** **75 1000 mm**	**... ◈ (optional)** **SSR 2**

art. no.		
SK 435 ...		
please indicate:	**... ↔** **150 200 1000 mm**	

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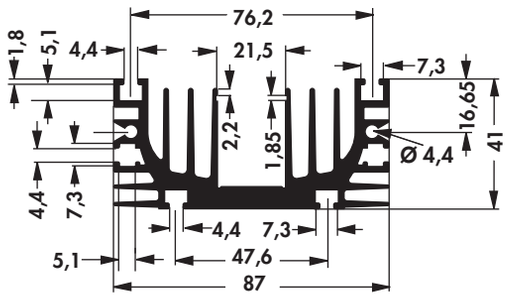
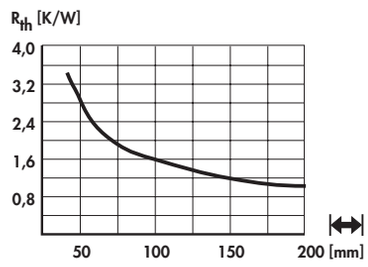
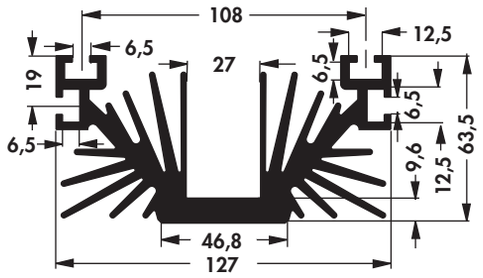
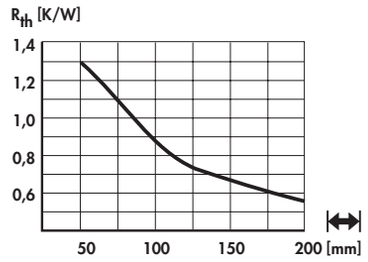
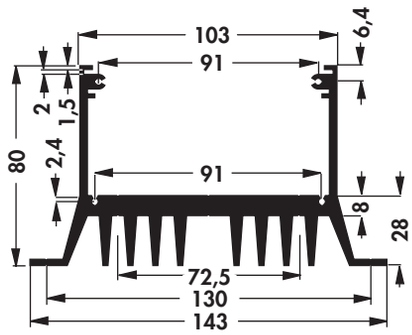
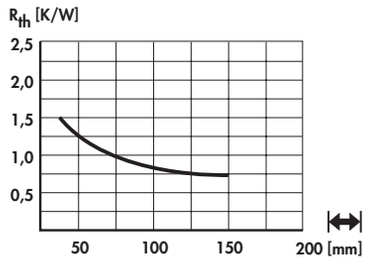
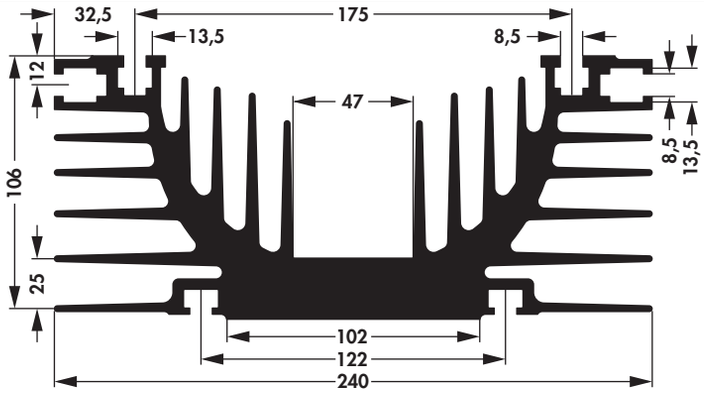
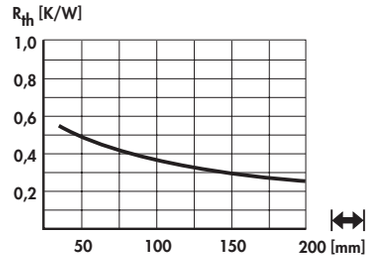
Standard extruded heatsinks

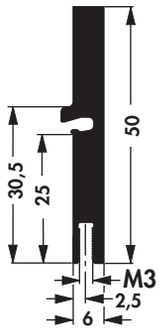
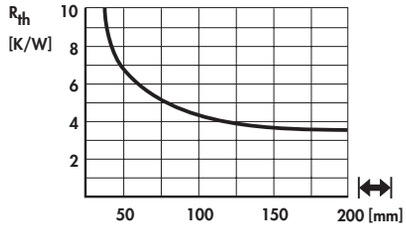
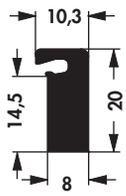
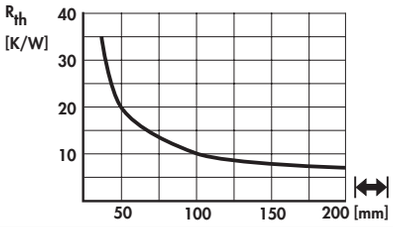
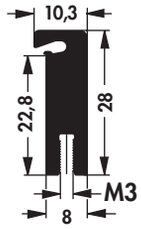
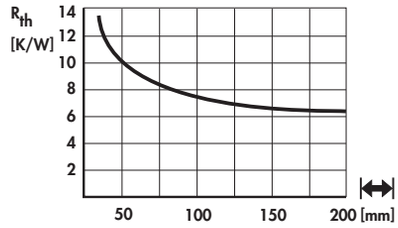
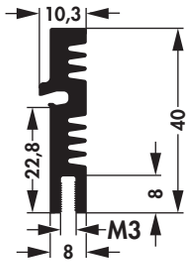
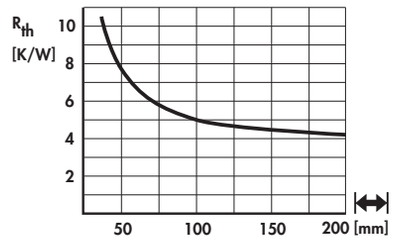
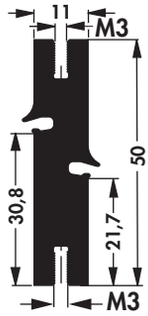
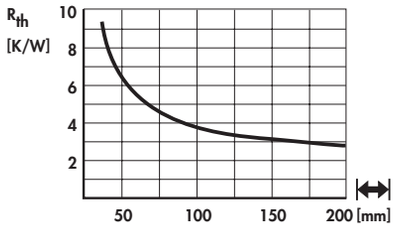
art. no.	
	 
SK 432 ...	with slots for cover plates or PCBs
please indicate:	**... ↔ 100 1000 mm**

art. no.	
	 
SK 40 ...	
please indicate:	**... ↔ 100 1000 mm**

art. no.	
	 
SK 61 ...	with slots for cover plates or PCBs; ➔ **cooling case** ... case catalogue **f.case**
please indicate:	**... ↔ 75 100 150 1000 mm**

art. no.	
	 
SK 144 ...	
please indicate:	**... ↔ 1000 mm**

Extruded heatsinks for lock-in retaining spring

art. no.			
SK 575 ...			
please indicate: ... ↔ **25 37.5 50 75 84 100 1000 mm**			
art. no.			
SK 512 ...			
please indicate: ... ↔ **25 50 100 1000 mm**			
art. no.			
SK 480 ...			
please indicate: ... ↔ **25 37.5 50 75 84 100 1000 mm**			
art. no.			
SK 638 ...			
please indicate: ... ↔ **25 37.5 50 75 84 100 1000 mm**			
art. no.			
SK 490 ...			
please indicate: ... ↔ **37.5 50 75 84 100 1000 mm**			

please note: profile threads ➔ A 5; screw-in solder pin ELS 3 ➔ A 110

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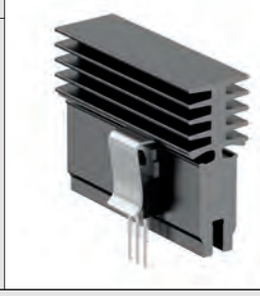
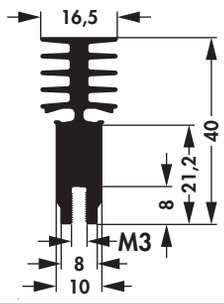
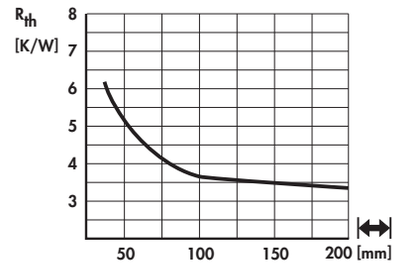
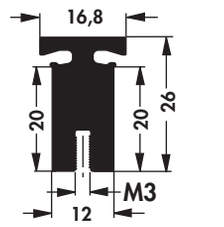
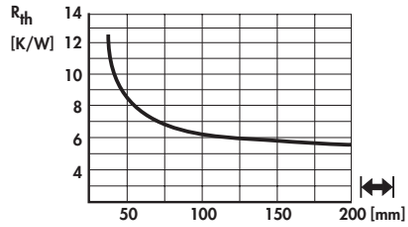
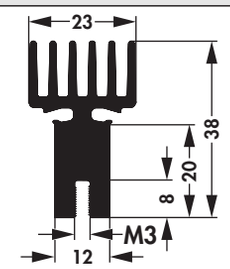
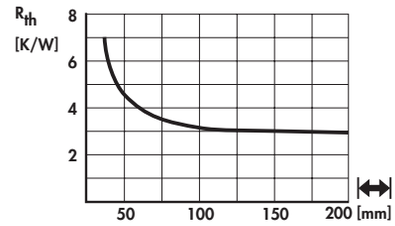
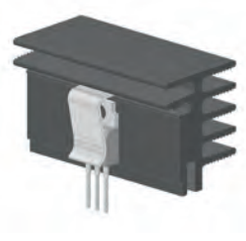
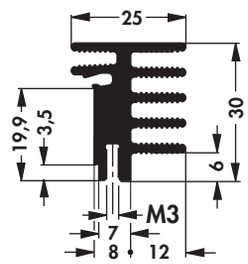
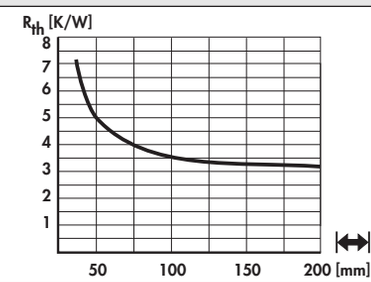
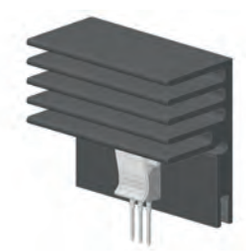
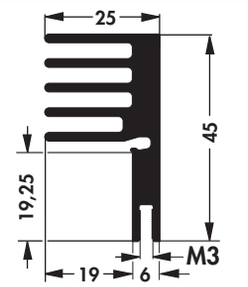
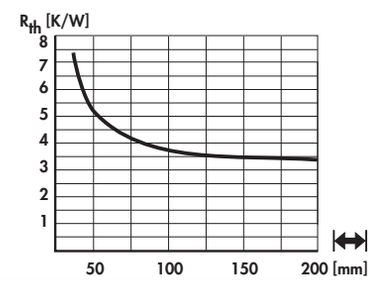
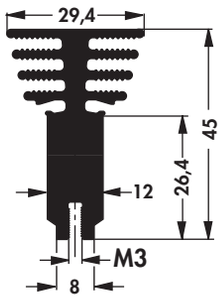
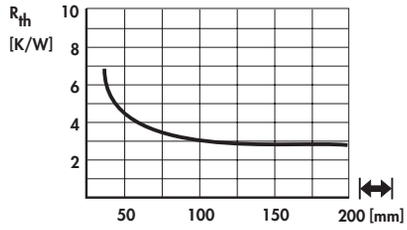
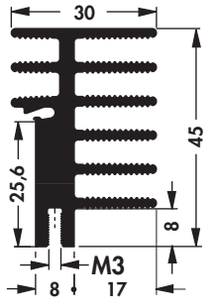
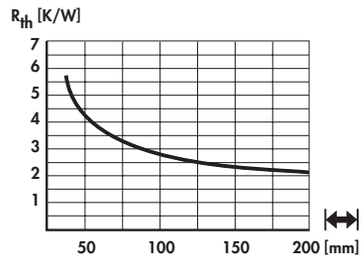
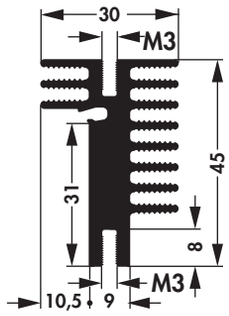
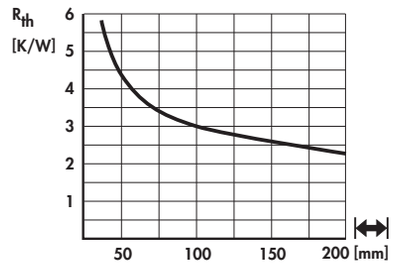
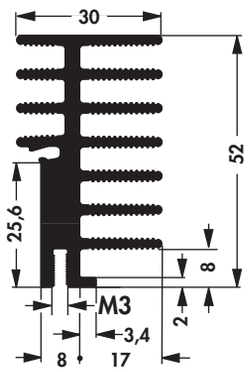
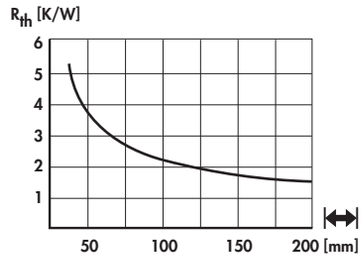
Extruded heatsinks for lock-in retaining spring

art. no.			
SK 681 ...			
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**		
art. no.			
SK 492 ...			
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**		
art. no.			
SK 637 ...			
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**		
art. no.			
SK 573 ...			
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**		
art. no.			
SK 576 ...			
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**		

please note: profile threads ➔ A 5; screw-in solder pin ELS 3 ➔ A 110

Extruded heatsinks for lock-in retaining spring

art. no.			
SK 489 ...			
please indicate: ... ↔ **25 37.5 50 75 84 100 1000 mm**			
art. no.			
SK 481 ...			
please indicate: ... ↔ **25 37.5 50 75 84 100 1000 mm**			
art. no.			
SK 639 ...			
please indicate: ... ↔ **25 37.5 50 75 84 100 1000 mm**			
art. no.			
SK 514 ...			
please indicate: ... ↔ **25 37.5 50 75 100 1000 mm**			

please note: profile threads ➔ A 5; screw-in solder pin ELS 3 ➔ A 110

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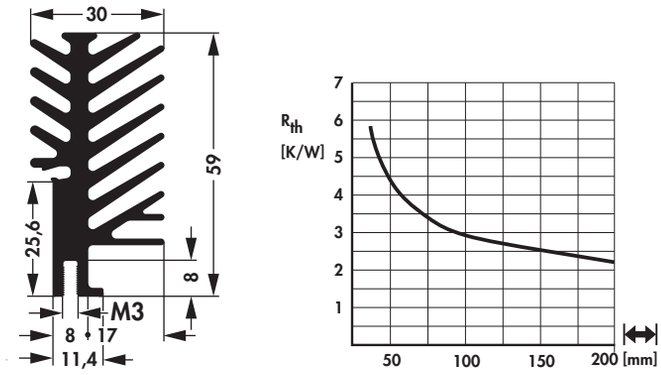
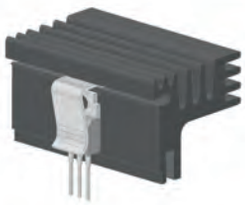
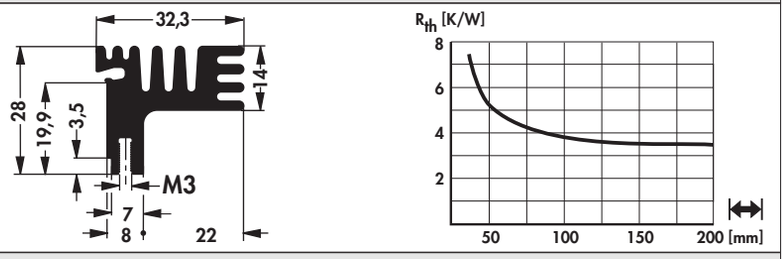
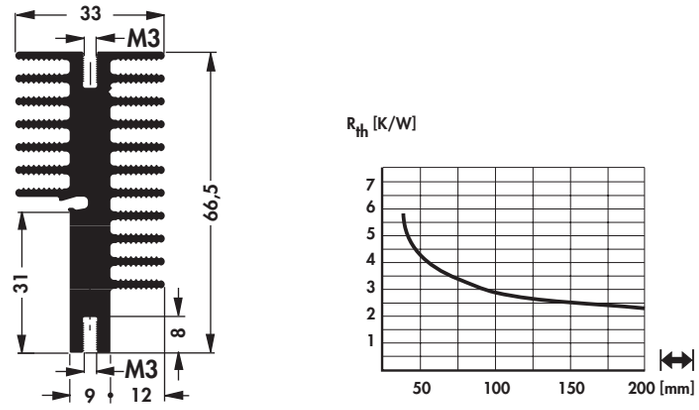
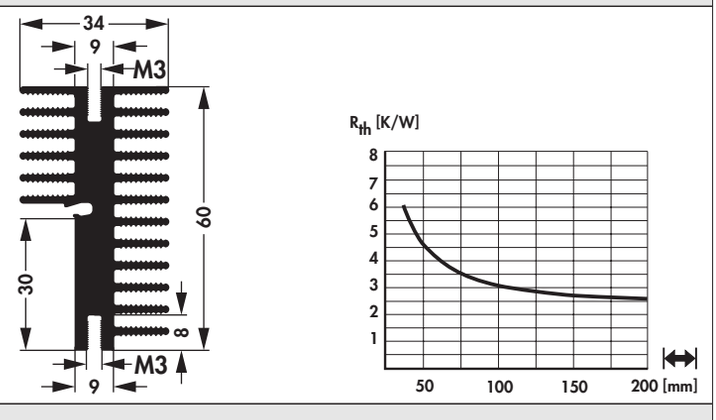
Extruded heatsinks for lock-in retaining spring

art. no.		
SK 640 ...		
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**	

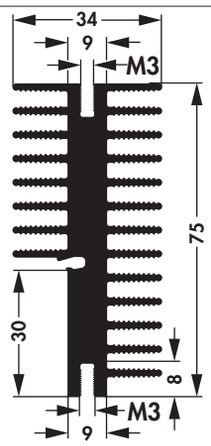
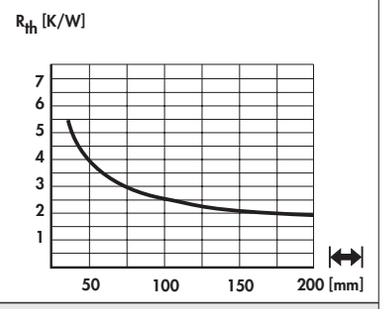
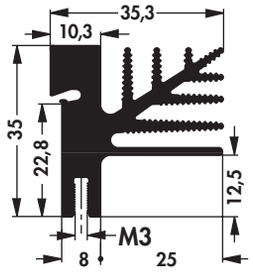
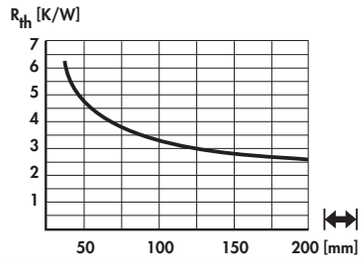
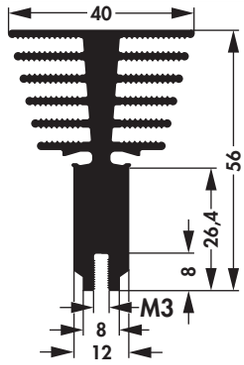
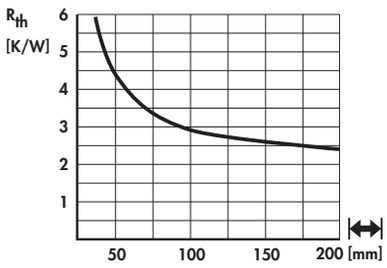
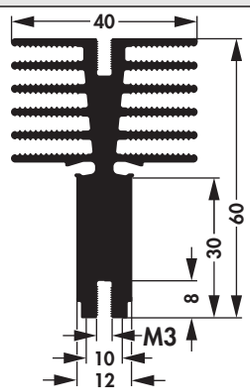
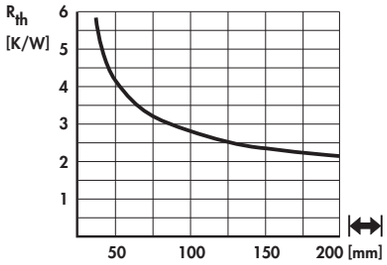
art. no.		
SK 574 ...		
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**	

art. no.		
SK 589 ...		
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**	

art. no.		
SK 669 ...		
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**	

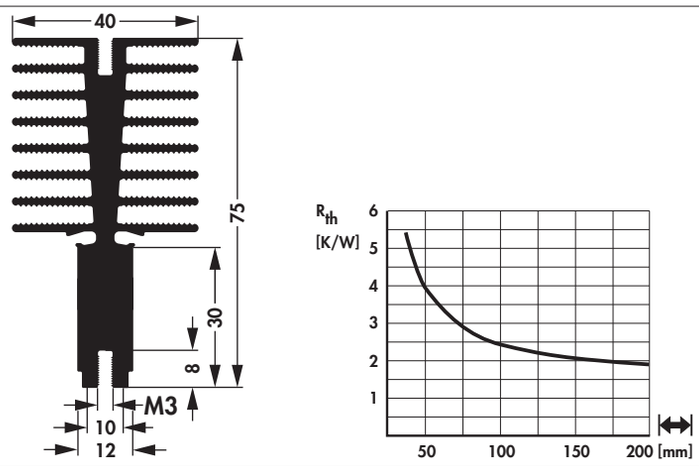
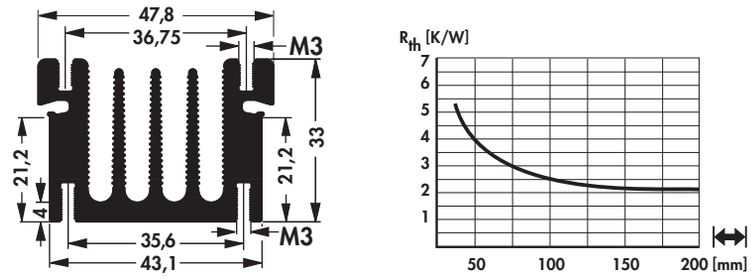
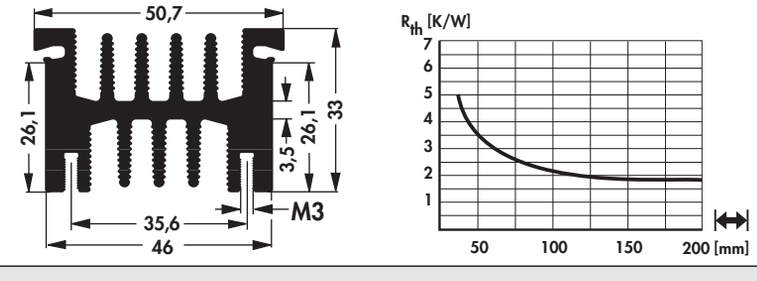
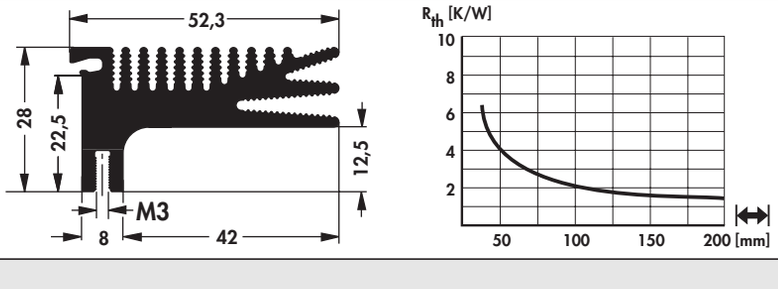
please note: profile threads ➔ A 5; screw-in solder pin ELS 3 ➔ A 110

Extruded heatsinks for lock-in retaining spring

art. no.			
SK 665 ...			
please indicate: ... ↔ **25 37.5 50 75 84 100 1000 mm**			
art. no.			
SK 482 ...			
please indicate: ... ↔ **25 37.5 50 75 84 100 1000 mm**			
art. no.			
SK 641 ...			
please indicate: ... ↔ **25 37.5 50 75 84 100 1000 mm**			
art. no.			
SK 664 ...			
please indicate: ... ↔ **25 37.5 50 75 84 100 1000 mm**			

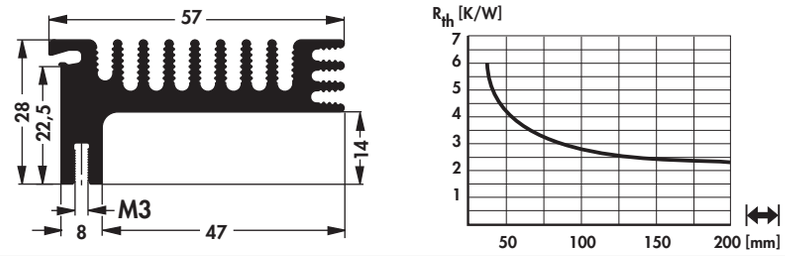
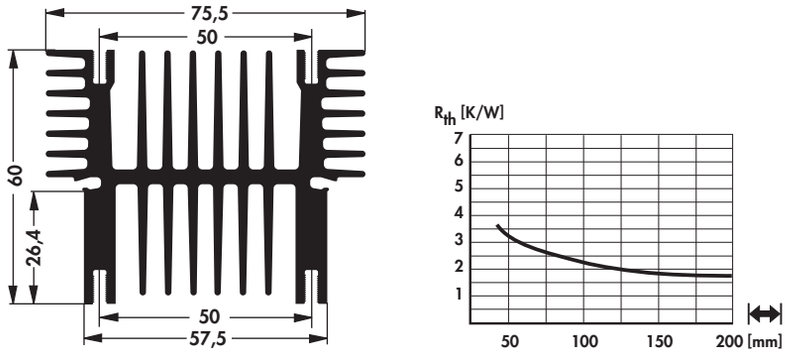
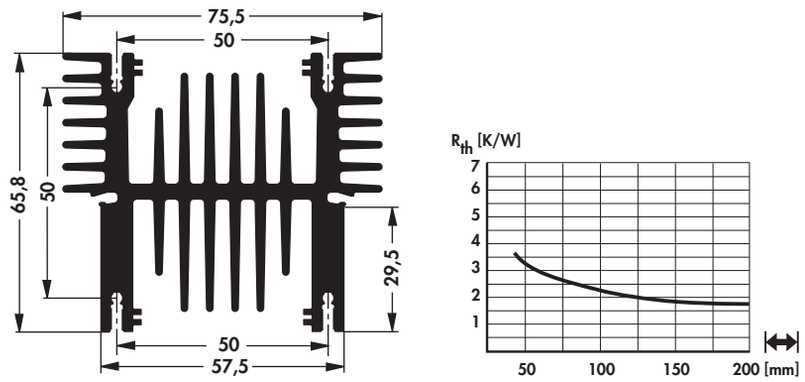
please note: profile threads ➔ A 5; screw-in solder pin ELS 3 ➔ A 110

Extruded heatsinks for lock-in retaining spring

art. no.		
SK 662 ...		
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**	
art. no.		
SK 495 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	
art. no.		
SK 499 ...		
please indicate:	**... ↔** **25 37.5 50 75 100 1000 mm**	
art. no.		
SK 487 ...		
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**	

please note: profile threads ➔ A 5; screw-in solder pin ELS 3 ➔ A 110

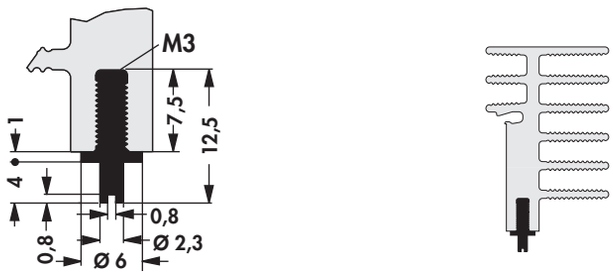
Extruded heatsinks for lock-in retaining spring

art. no.		
SK 483 ...		
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**	
art. no.		
SK 593 ...		
please indicate:	**... ↔** **25 37.5 50 75 84 100 1000 mm**	
art. no.		
SK 617 ...		
please indicate:	**... ↔** **25 37.5 50 75 84 94 100 1000 mm**	

please note: profile threads ➔ A 5; screw-in solder pin ELS 3 ➔ A 110

Screw-in solder pin ELS 3

– screw in solder pin made of brass
– easy mounting
– secure hold
– surface coating suitable for soldering
– suitable for all heatsinks with M3 profile thread
– position in the threaded channel as required
– specific designs upon customer´s request

art. no.		
ELS 3		

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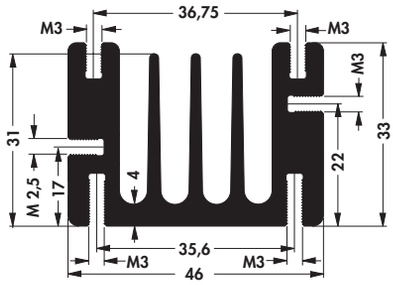
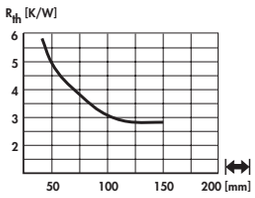
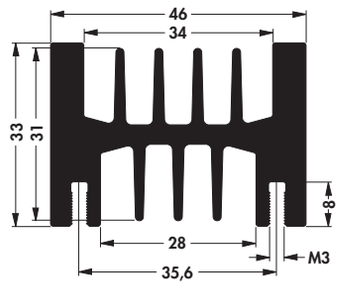
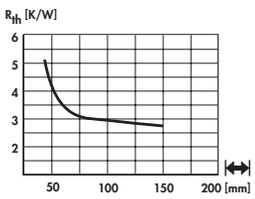
Extruded heatsinks for PCB mounting

Heatsinks for printed circuit boards

– thread channel for M3 screws
– screw-in solder pin M3 **(art. no.: ELS 3 ➔ A 110)**

art. no.		
SK 68 ...		 
please indicate:	**... ⟷** **37.5 50 75 94 100 1000 mm**	

art. no.		
SK 112 ...		 
please indicate:	**... ⟷** **37.5 50 75 94 100 1000 mm**	

please note: profile threads ➔ A 5

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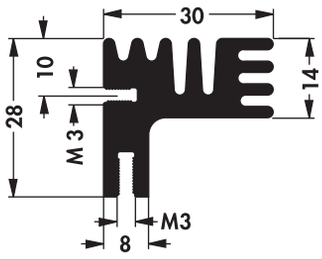
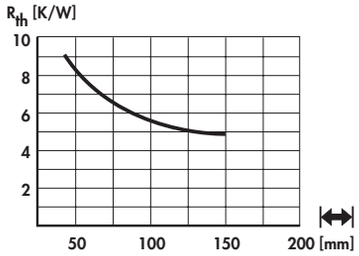
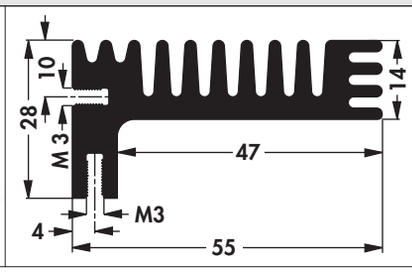
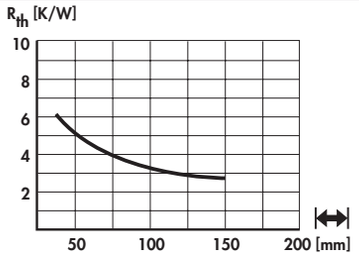
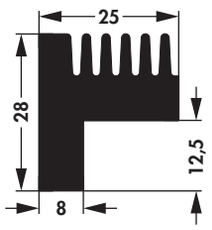
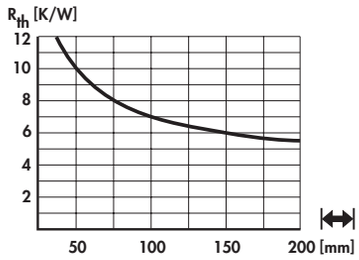
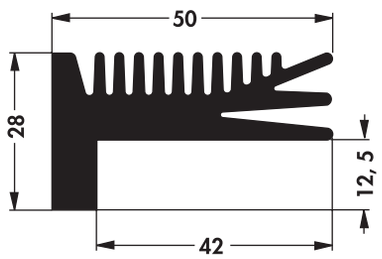
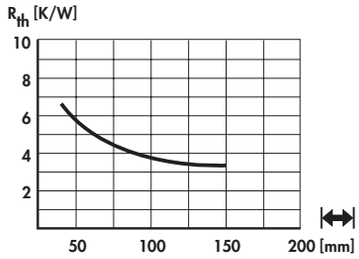
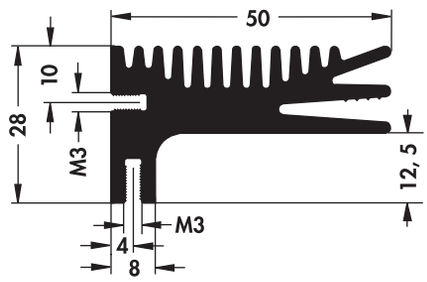
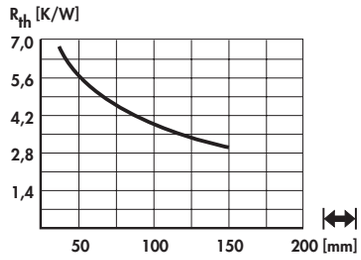
Extruded heatsinks for PCB mounting

Heatsinks for printed circuit boards

– for use on eurocards

art. no.		
SK 125 ...		
	screws M3; screw-in solder pin: **art. no.: ELS 3**	
please indicate:	**... ↔** **50 84 94 100 1000 mm**	
art. no.		
SK 96 ...	 	
	screws M3; screw-in solder pin: **art. no.: ELS 3**	
please indicate:	**... ↔** **50 84 94 1000 mm**	
art. no.		
SK 692 ...		
please indicate:	**... ↔** **50 84 94 100 1000 mm**	
art. no.		
SK 138 ...		
please indicate:	**... ↔** **84 94 1000 mm**	

please note: profile threads ➔ A 5

art. no.	
	 
SK 451 ...	screws M3; screw-in solder pin: **art. no.: ELS 3**
please indicate:	**... ↔** **50 84 94 1000 mm**

please note: profile threads ➔ A 5

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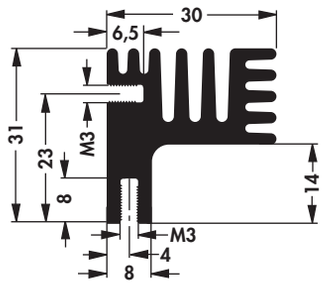
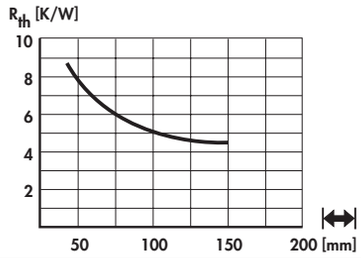
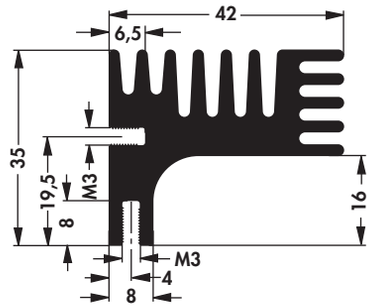
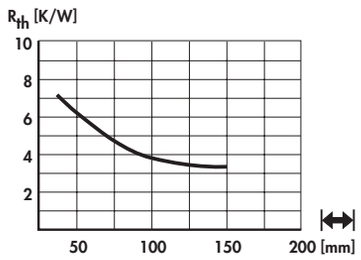
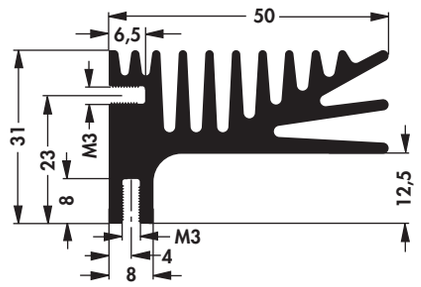
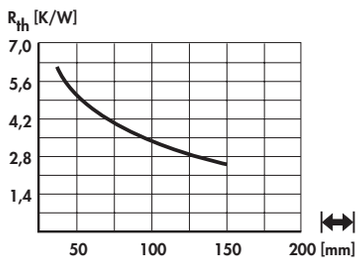
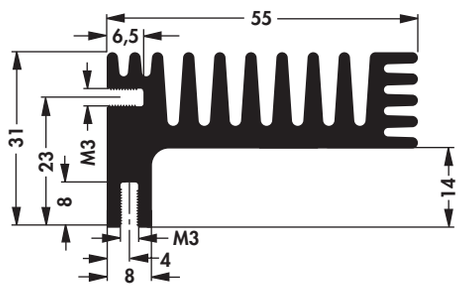
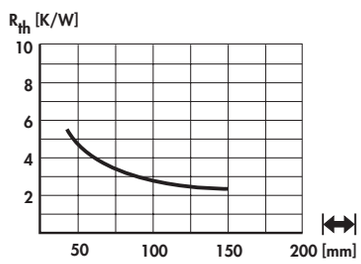
Extruded heatsinks for PCB mounting

PCB heatsink

– for using eurocards
– especially suitable for power transistors
– suitable for TO 218, TO 220, TO 247, TO 264 and SOT 429

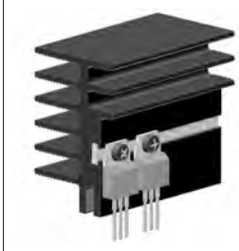
art. no.		
SK 609 ...		
	screws M3; screw-in solder pin: **art. no.: ELS 3**	
please indicate:	**... ↔** **50 84 94 1000 mm**	
art. no.		
SK 687 ...		
	screws M3; screw-in solder pin: **art. no.: ELS 3**	
please indicate:	**... ↔** **50 84 94 100 1000 mm**	
art. no.		
SK 611 ...		
	screws M3; screw-in solder pin: **art. no.: ELS 3**	
please indicate:	**... ↔** **84 94 1000 mm**	
art. no.		
SK 610 ...		
	screws M3; screw-in solder pin: **art. no.: ELS 3**	
please indicate:	**... ↔** **50 84 94 1000 mm**	

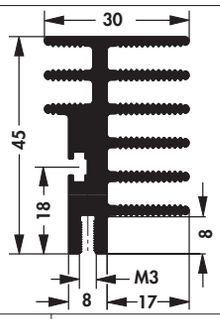
please note: profile pressed threads ➔ A 5

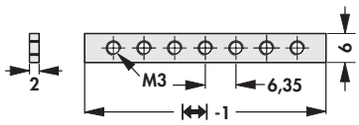
Extruded heatsinks for PCB mounting

Heatsink for PCB with threaded rail

– transistor mounting onto the heatsink using a slide-in rail with M3 thread
– easy positioning using a grid 6.35 mm
– other rail grids upon request
– suitable for TO 220, TO 218, TO 247 and similar
– thread channel for M3 screws
– screw-in solder pin M3 **(art. no.: ELS 3)**
– specific versions upon customer´s request







art. no.	↔ [mm]	R_{th} [K/W]	⌖	version
SK 518 50 GS	50	4.3	TO 220	with threaded rail
SK 518 75 GS	75	3.3		
SK 518 84 GS	84	3.0		
SK 518 50	50	4.3	—	without threaded rail
SK 518 75	75	3.3		
SK 518 84	84	3.0		
surface:			black anodised	

please note: profile threads ➔ A 5

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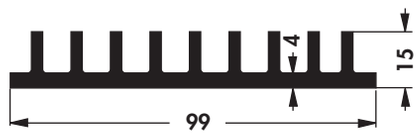
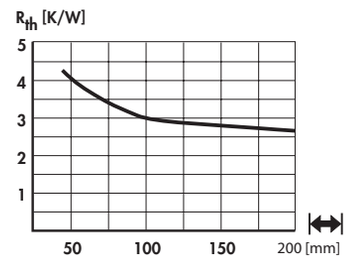
Extruded heatsinks for PCB mounting

Heatsinks for printed circuit boards

– the heatsinks SK 414, SK 105, SK 44 and SK 415 are especially suitable for printed circuit board heatsinks for 19" plug in units

art. no.

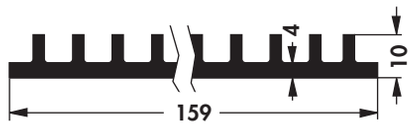


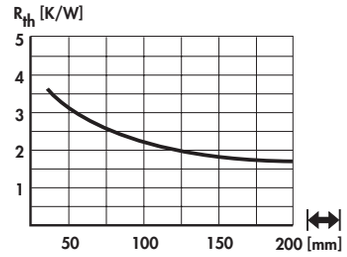


SK 414 ...

please indicate: **... ↔**
100 233.4 1000 mm

art. no.

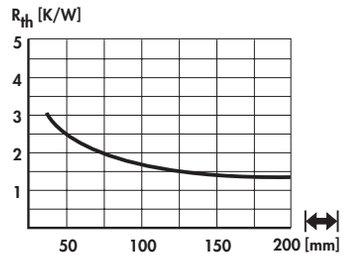




SK 105 ...

please indicate: **... ↔**
37.5 50 75 100 150 200 233.4 1000 mm

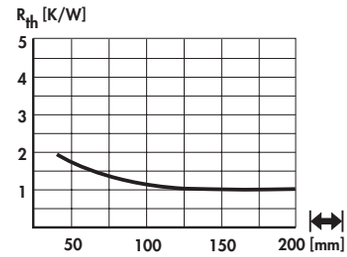
art. no.



SK 44 ...

please indicate: **... ↔**
50 75 100 150 200 233.4 1000 mm

art. no.



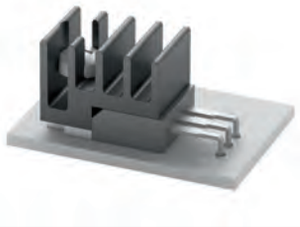
SK 415 ...

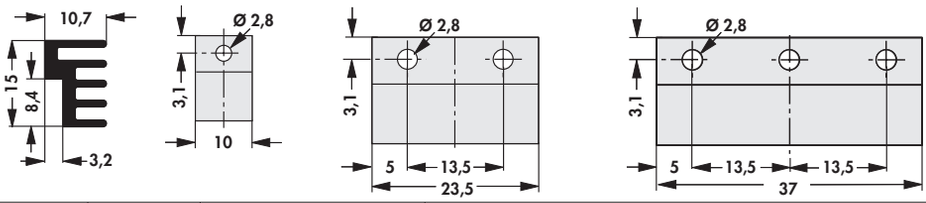
please indicate: **... ↔**
37.5 100 150 1000 mm

Extruded heatsinks for PCB mounting

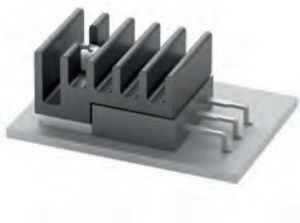
Attachable heatsinks for transistors

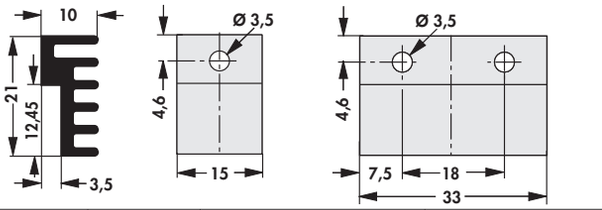
– compact heatsink in transistor dimensions
– for horizontal and vertical transistors
– can be screwed or glued
– specific versions upon customer's request





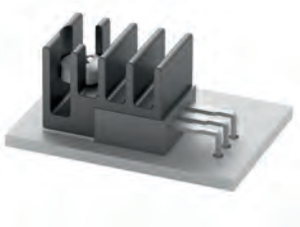
art. no.	↔ [mm]	R_{th} [K/W]	⌖	version
SK 515 10 S TO 220	10.0	30.0	TO 220	for screw fastening M2.5
SK 515 23,5 S 2 x TO 220	23.5	27.5	2xTO 220	
SK 515 37 S 3 x TO 220	37.0	26.1	3xTO 220	
SK 515 10 TO 220	10.0	30.0	—	without screw fastening
SK 515 23,5 TO 220	23.5	27.5		
SK 515 37 TO 220	37.0	26.1		

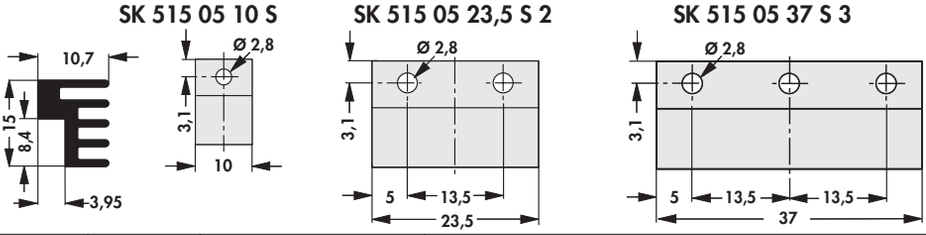




art. no.	↔ [mm]	R_{th} [K/W]	⌖	version
SK 516 15 S TO 218	15	28.4	TO 218	for screw fastening M3
SK 516 33 S 2 x TO 218	33	26.9	2xTO 218	
SK 516 15 TO 218	15	28.4	—	without screw fastening
surface:		black anodised		

Attachable extruded heatsinks for transistors with thin bottom plate (0.5 mm)





art. no.	↔ [mm]	R_{th} [K/W]	⌖	version
SK 515 05 10 S	10.0	30.0	TO 220	for screw fastening M2.5
SK 515 05 23,5 S 2	23.5	27.5	2xTO 220	
SK 515 05 37 S 3	37.0	26.1	3xTO 220	
SK 515 05 10	10.0	30.0	—	without screw fastening
SK 515 05 23,5	23.5	27.5		
SK 515 05 37	37.0	26.1		
surface:		black anodised		

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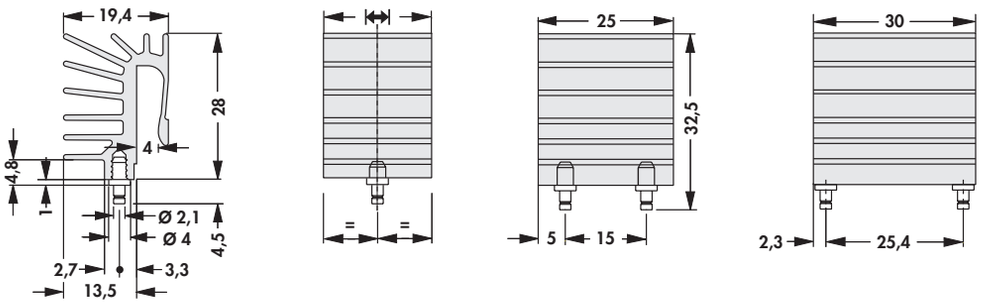
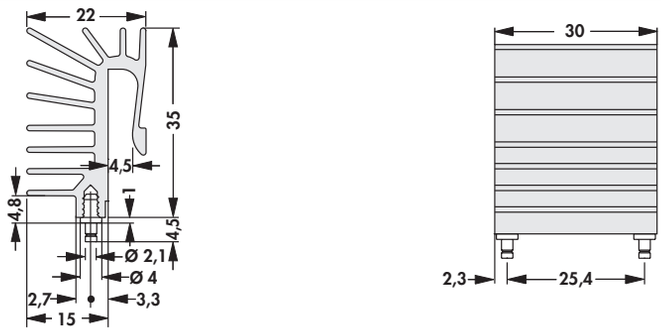
Extruded heatsinks for PCB mounting

Attachable heatsinks for transistors

– extruded heatsink with intergrated spring locking function
– simple assembly by pushing the heatsink onto the transistor
– optimum heat transfer between component and heatsink
– solderable pin for PCB mounting
– specific versions upon customer´s request



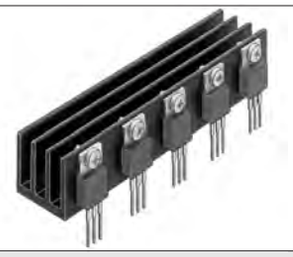
art. no.	for transistor	↔ [mm]	R_{th} [K/W]	spring force [N]	version
SK 525 15	TO 220	15	13.3	54	without solder pins
SK 525 30		30	7.8	100	
SK 525 15 ST		15	13.3	54	with 1 solder pin
SK 525 20 ST		20	10.7	70	
SK 525 25 ST		25	9.0	85	with 2 solder pins
SK 525 30 ST		30	7.8	100	

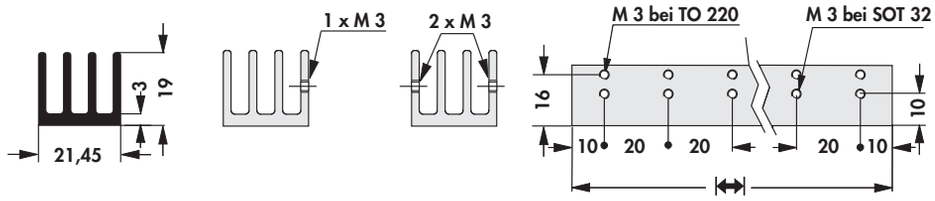


art. no.	for transistor	↔ [mm]	R_{th} [K/W]	spring force [N]	version
SK 526 30 ST	TO 247	30	6.3	100	with 2 solder pins
surface:	black anodised				

Extruded heatsinks for transistors

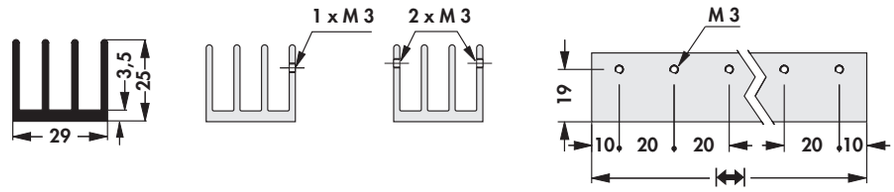
– compact PCB heatsink
– effective heat dissipation for single and double row transistor mounting
– profile **SK 454** ➔ A 30
– profile **SK 452** ➔ A 33
– specific versions upon customer´s request





art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 454 20 1 x M3 ...	20	10.8	SOT 32/ TO 220
SK 454 60 3 x M3 ...	60	7.7	
SK 454 20 2 x M3 ...	20	10.8	
SK 454 40 4 x M3 ...	40	9.4	
SK 454 60 6 x M3 ...	60	7.7	
SK 454 40 2 x M3 TO 220	40	9.4	TO 220
SK 454 80 4 x M3 TO 220	80	6.5	
SK 454 100 5 x M3 TO220	100	5.9	
SK 454 80 8 x M3 TO 220	80	6.5	
SK 454 100 10xM3 TO220	100	5.9	

please indicate: **... ⌖**
SOT 32; TO 220



art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 452 20 1 x M3	20	11.1	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 452 40 2 x M3	40	7.5	
SK 452 60 3 x M3	60	5.9	
SK 452 80 4 x M3	80	4.9	
SK 452 100 5 x M3	100	4.3	
SK 452 20 2 x M3	20	11.1	
SK 452 40 4 x M3	40	7.5	
SK 452 60 6 x M3	60	5.9	
SK 452 80 8 x M3	80	4.9	
SK 452 100 10 x M3	100	4.3	
surface:		black anodised	

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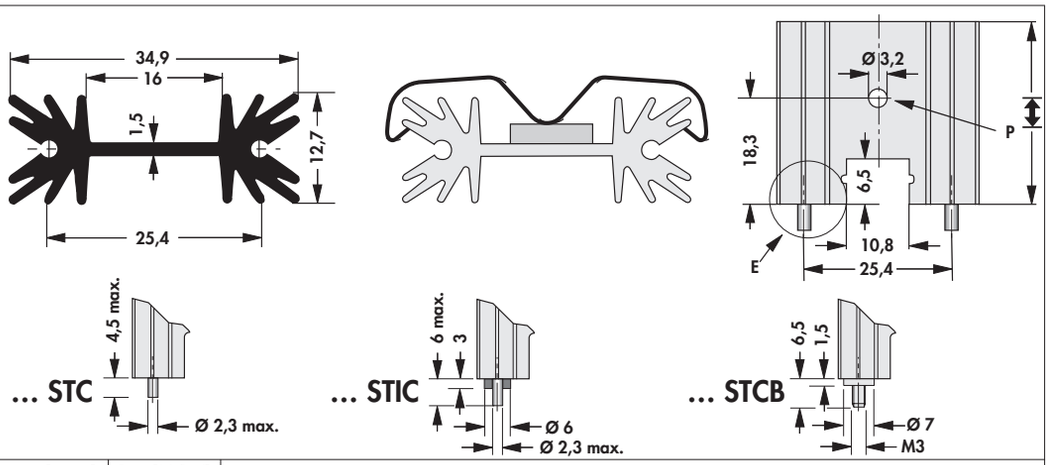
Extruded heatsinks for PCB mounting

– for semiconductor clip-mounting
– special lengths and transistor drillings upon request
– **P** = raised retaining stud, **E** = mounting method

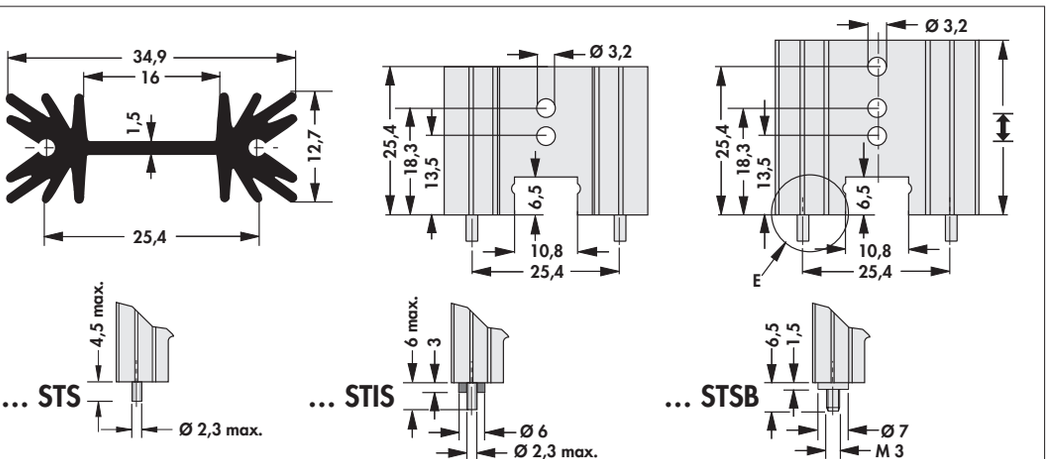


art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 104 25,4 ...	25.4	14	TO 220
SK 104 38,1 ...	38.1	11	
SK 104 50,8 ...	50.8	9	
SK 104 63,5 ...	63.5	8	

please indicate: **... mounting method**
STC = with solder pin
STIC = with solder pin and insulating washer
STCB = with threaded bolt M3, brass

surface: black anodised

– for semiconductor screw-mounting
– special lengths and transistor drillings on request
– **E** = mounting method



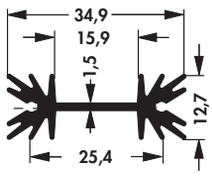
art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 104 25,4 ...	25.4	14	SOT 32/ TO 220/ TO 3 P
SK 104 38,1 ...	38.1	11	
SK 104 50,8 ...	50.8	9	
SK 104 63,5 ...	63.5	8	

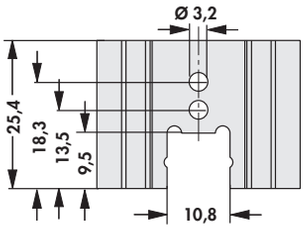
please indicate: **... mounting method**
STS = with solder pin
STIS = with solder pins and insulating washer
STSB = with threaded bolt M3, brass

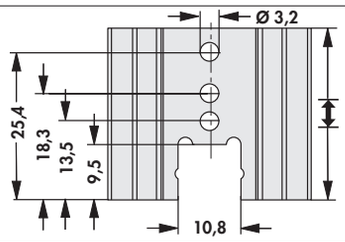
surface: black anodised

Extruded heatsinks for PCB mounting

– horizontal for semiconductor screw-mounting
– special lengths and transistor drillings on request



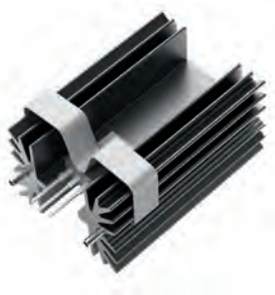


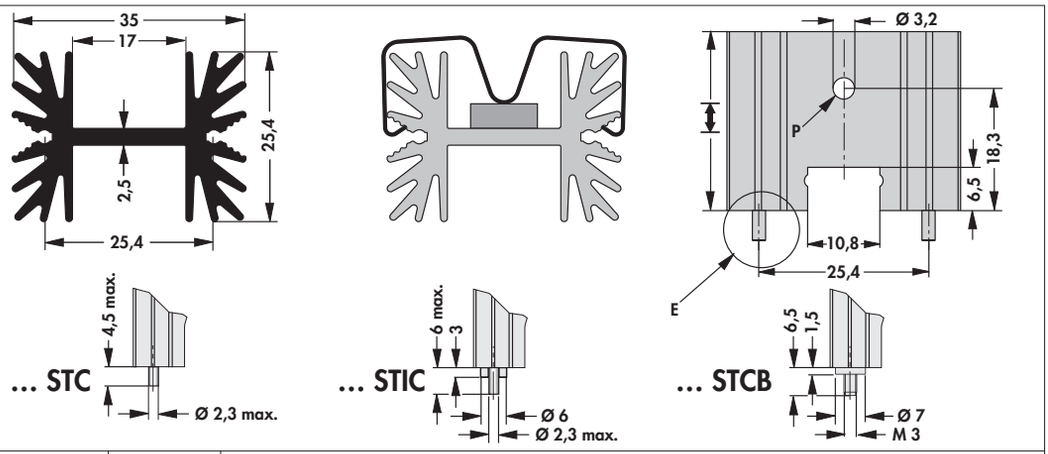


art. no.	↔ [mm]	R_{th} [K/W]	⌖
SK 104 25,4 LS	25.4	14	SOT 32/ TO 220/ TO 3 P
SK 104 38,1 LS	38.1	11	
SK 104 50,8 LS	50.8	9	
surface:			black anodised

Extruded heatsinks for PCB mounting

– for semiconductor clip-mounting
– special lengths and transistor drillings on request
– **P** = raised retaining stud, **E** = mounting method



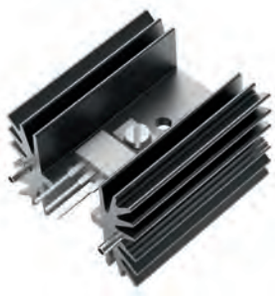


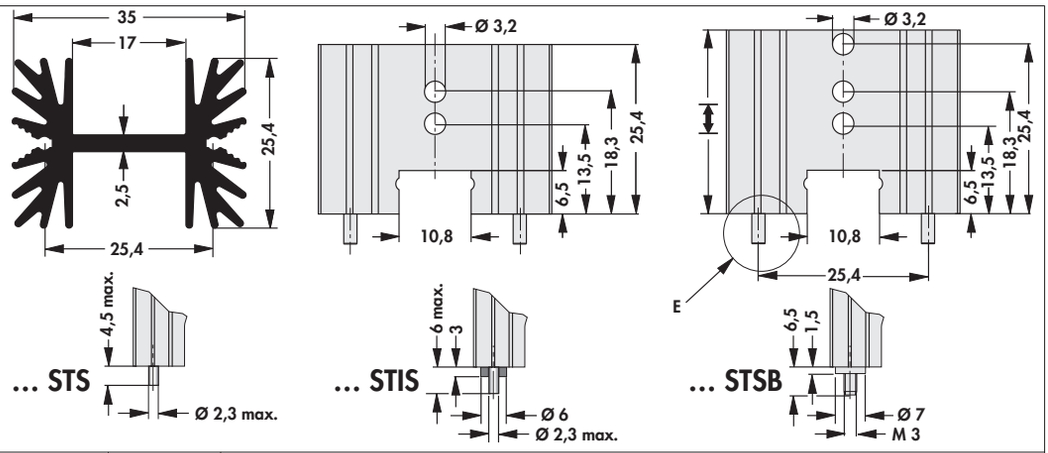
art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 600 25,4 ...	25.4	11.0	TO 218/ TO 220/ TO 247/ TO 3 P
SK 600 38,1 ...	38.1	9.0	
SK 600 50,8 ...	50.8	7.3	
SK 600 63,5 ...	63.5	6.5	

please indicate: **... mounting method**
STC = with solder pin
STIC = with solder pin and insulating washer
STCB = with threaded bolt M3, brass

surface: black anodised

– for semiconductor screw-mounting
– special lengths and transistor drillings on request
– **E** = mounting method





art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 600 25,4 ...	25.4	11.0	TO 218/ TO 220/ TO 247/ TO 3 P
SK 600 38,1 ...	38.1	9.0	
SK 600 50,8 ...	50.8	7.3	
SK 600 63,5 ...	63.5	6.5	

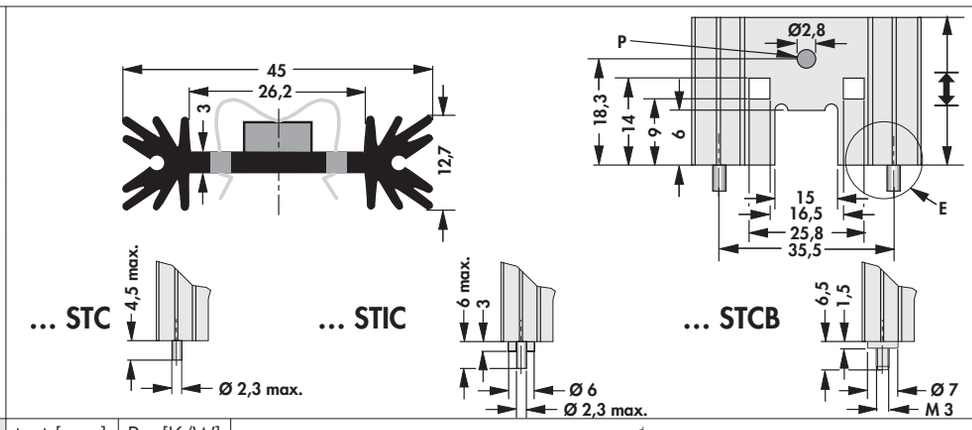
please indicate: **... mounting method**
STS = with solder pin
STIS = with solder pins and insulating washer
STSB = with threaded bolt M3, brass

surface: black anodised

Technical introduction ➔ **A 2 – 8**

Extruded heatsinks for PCB mounting

– for semiconductor clip-mounting
– special lengths and transistor drillings on request
– **P** = raised retaining stud, **E** = mounting method

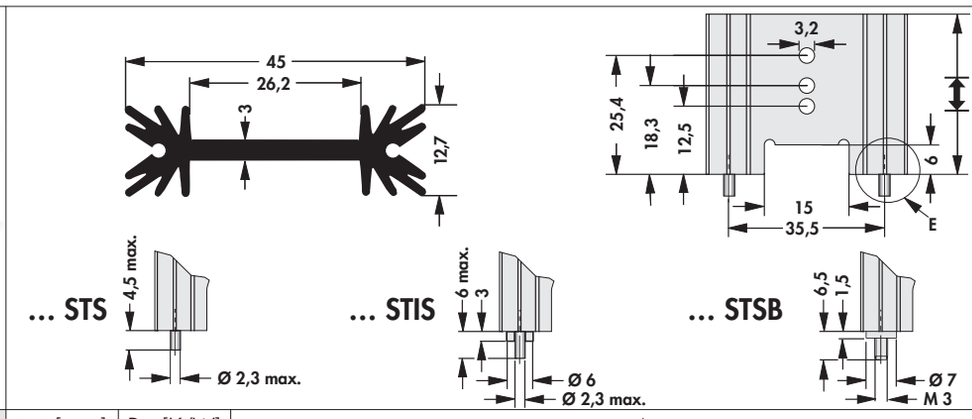


art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 409 25,4 ...	25.4	8.2	TO 220/ TO 3 P
SK 409 38,1 ...	38.1	7.0	
SK 409 50,8 ...	50.8	6.2	
SK 409 63,5 ...	63.5	5.6	

please indicate: **... mounting method**
STC = with solder pin
STIC = with solder pin and insulating washer
STCB = with threaded bolt M3, brass

surface: black anodised

– for semiconductor screw-mounting
– special lengths and transistor drillings on request
– **E** = mounting method



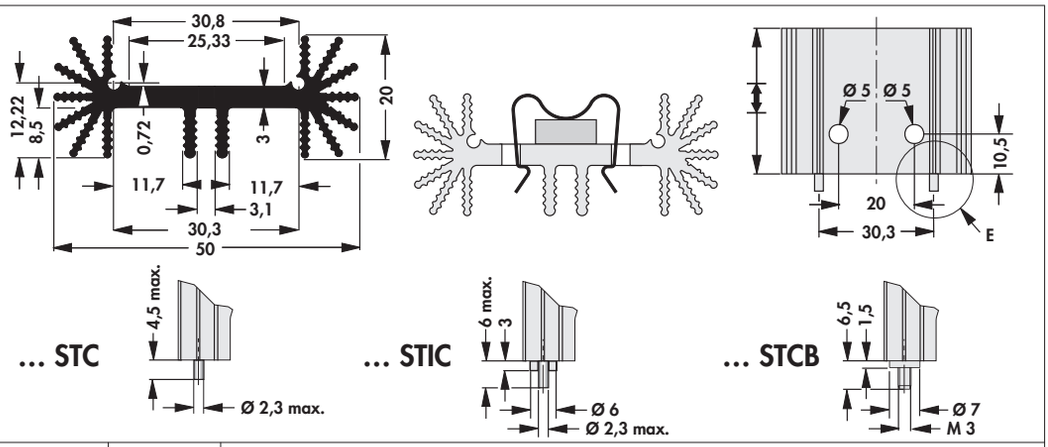
art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 409 25,4 ...	25.4	8.2	TO 220/ TO 3 P
SK 409 38,1 ...	38.1	7.0	
SK 409 50,8 ...	50.8	6.2	
SK 409 63,5 ...	63.5	5.6	

please indicate: **... mounting method**
STS = with solder pin
STIS = with solder pins and insulating washer
STSB = with threaded bolt M3, brass

surface: black anodised

Extruded heatsinks for PCB mounting

– for semiconductor clip-mounting
– special lengths and transistor drillings on request
– **E** = mounting method

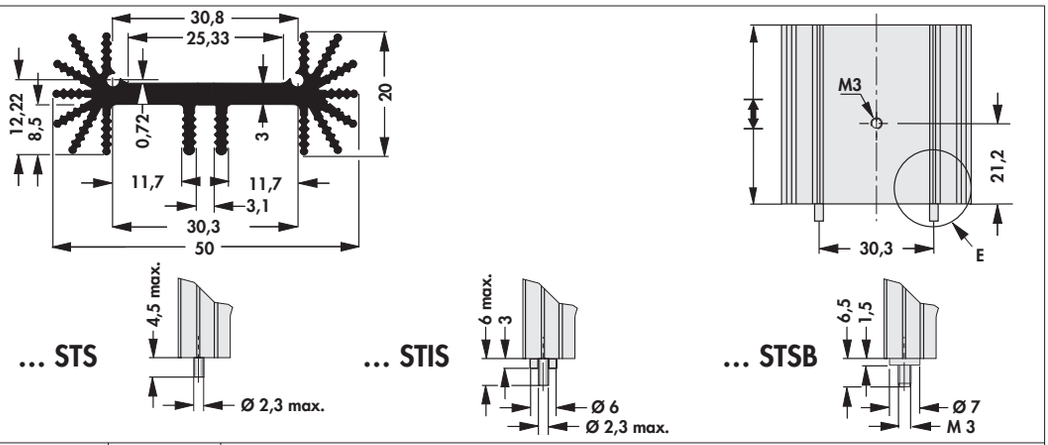


art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 459 25 ...	25.0	7.9	TO 218/ TO 220/ TO 247/ TO 248
SK 459 37,5 ...	37.5	6.3	
SK 459 50 ...	50.0	5.6	

please indicate: **... mounting method**
STC = with solder pin
STIC = with solder pin and insulating washer
STCB = with threaded bolt M3, brass

surface: black anodised

– for semiconductor screw-mounting
– special lengths and transistor drillings on request
– **E** = mounting method



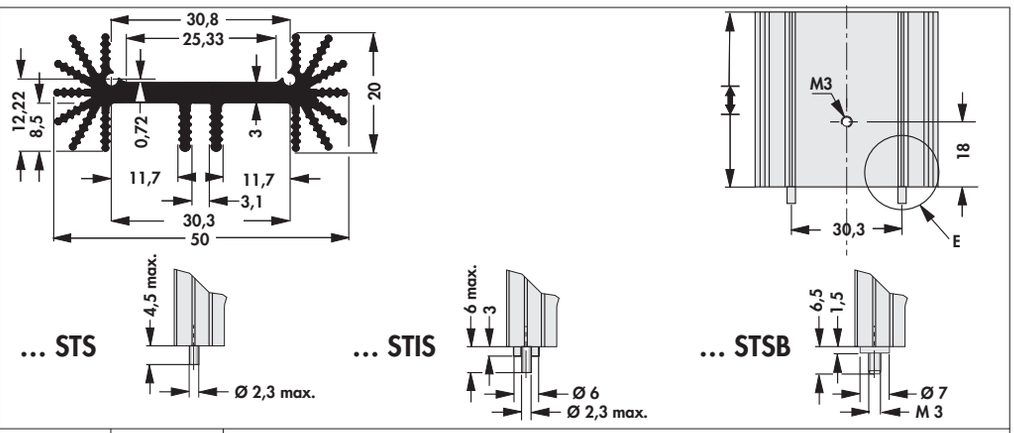
art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 459 25 ...	25.0	7.9	TO 218/ TO 220/ TO 247/ TO 248
SK 459 37,5 ...	37.5	6.3	
SK 459 50 ...	50.0	5.6	

please indicate: **... mounting method**
STS = with solder pin
STIS = with solder pins and insulating washer
STSB = with threaded bolt M3, brass

surface: black anodised

Extruded heatsinks for PCB mounting

– for semiconductor screw-mounting
– special lengths and transistor drillings on request
– **E** = mounting method

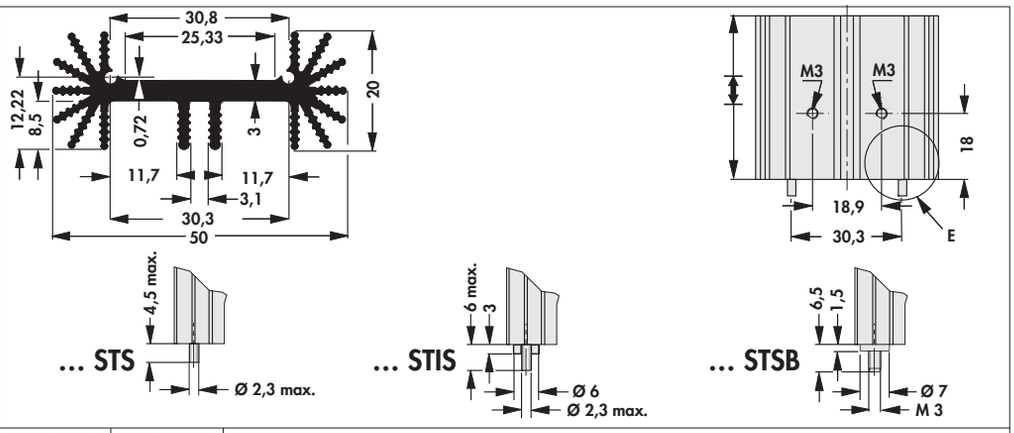


art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 459 25 M ...	25.0	7.9	SIP-Multiwatt
SK 459 37,5 M ...	37.5	6.3	
SK 459 50 M ...	50.0	5.6	

please indicate: **... mounting method**
STS = with solder pin
STIS = with solder pins and insulating washer
STSB = with threaded bolt M3, brass

surface: black anodised

– for semiconductor screw-mounting
– with **combination-hole pattern** for mounting of 2 x TO 220 or 2 x SOT 32
– special lengths and transistor drillings on request
– **E** = mounting method



art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 459 25 2 x TO 220 ...	25.0	7.9	2 x SOT 32/ 2xTO 220
SK 459 37,5 2 x TO 220...	37.5	6.3	
SK 459 50 2 x TO 220 ...	50.0	5.6	

please indicate: **... mounting method**
STS = with solder pin
STIS = with solder pins and insulating washer
STSB = with threaded bolt M3, brass

surface: black anodised

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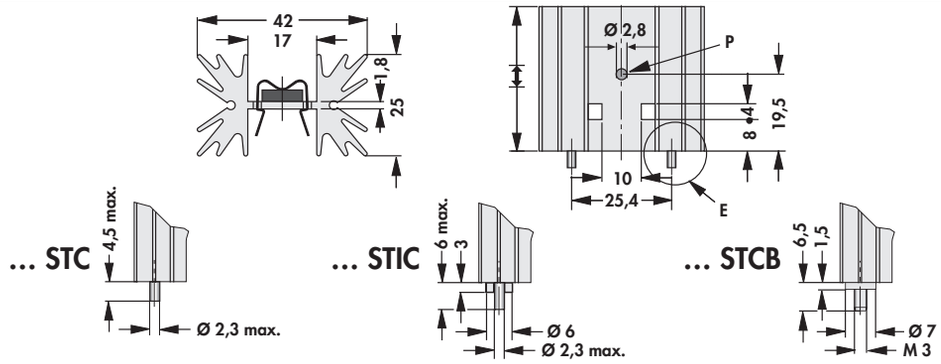
Extruded heatsinks for PCB mounting

– for semiconductor clip-mounting
– special lengths and transistor drillings on request
– **P** = raised retaining stud, **E** = mounting method

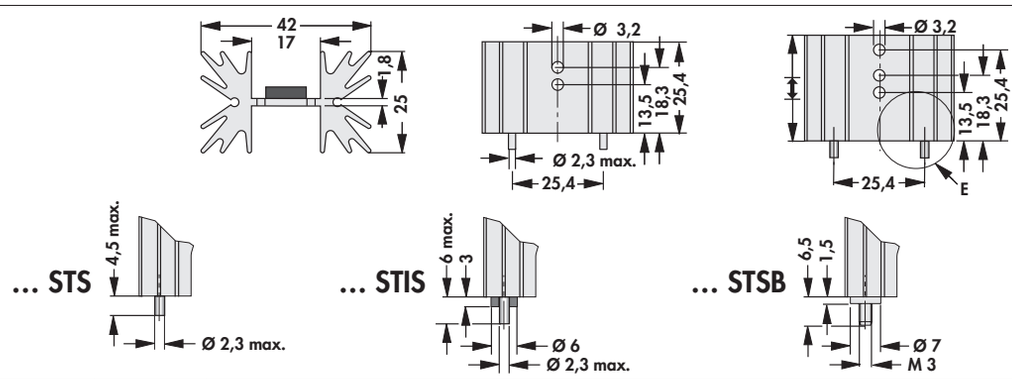


art. no.	↔ [mm]	R_{th} [K/W]	⌖
SK 129 25,4 ...	25.4	7.8	TO 220
SK 129 38,1 ...	38.1	6.5	
SK 129 50,8 ...	50.8	5.3	
SK 129 63,5 ...	63.5	4.5	

please indicate: **... mounting method**
STC = with solder pin
STIC = with solder pin and insulating washer
STCB = with threaded bolt M3, brass

surface:	black anodised

– for semiconductor screw-mounting
– special lengths and transistor drillings on request
– **E** = mounting method



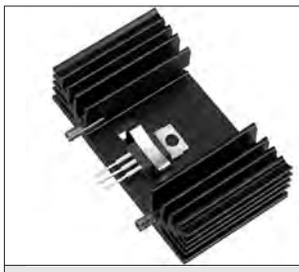
art. no.	↔ [mm]	R_{th} [K/W]	⌖
SK 129 25,4 ...	25.4	7.8	SOT 32/ TO 220/ TO 3 P
SK 129 38,1 ...	38.1	6.5	
SK 129 50,8 ...	50.8	5.3	
SK 129 63,5 ...	63.5	4.5	

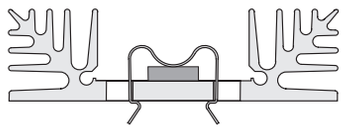
please indicate: **... mounting method**
STS = with solder pin
STIS = with solder pins and insulating washer
STSB = with threaded bolt M3, brass

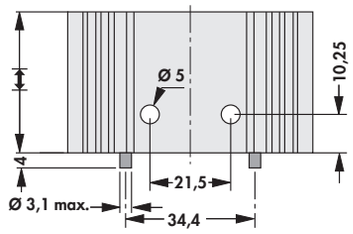
surface:	black anodised

Extruded heatsinks for PCB mounting

– for semiconductor clip-mounting
– profile **SK 185** ➔ A 94
– special lengths and drillings on request
– **L** = solderable pins

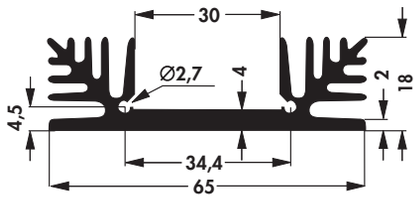


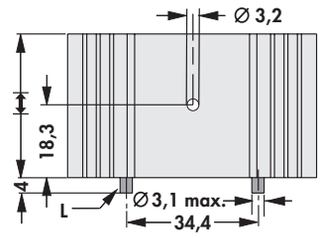




art. no.	↔ [mm]	R_{th} [K/W]	⌖	version
SK 185 25 STC TO 220	25.0	7.9	TO 220	with solder pins
SK 185 37,5 STC TO 220	37.5	6.4		
SK 185 50 STC TO 220	50.0	4.9		
SK 185 50 C TO 220				without solder pins
surface:		black anodised		

– for semiconductor screw-mounting
– profile **SK 185** ➔ A 94
– special lengths and drillings on request
– **L** = solderable pins





art. no.	↔ [mm]	R_{th} [K/W]	⌖	version
SK 185 25 STS TO 220	25.0	7.9	TO 220	with solder pins
SK 185 37,5 STS TO 220	37.5	6.4		
SK 185 50 STS TO 220	50.0	4.9		
SK 185 25 TO 220	25.0	7.9		without solder pins
SK 185 37,5 TO 220	37.5	6.4		
SK 185 50 TO 220	50.0	4.9		
surface:		black anodised		

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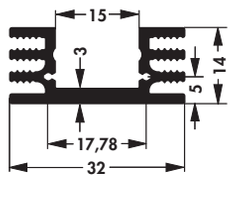
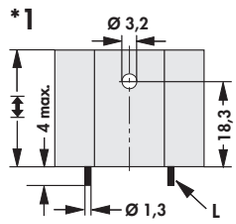
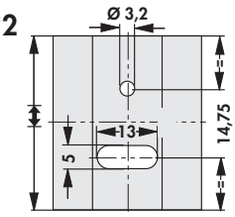
Extruded heatsinks for PCB mounting

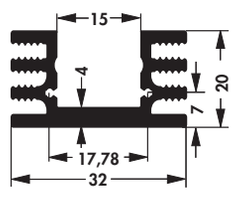
– for semiconductor screw-mounting
– hole pattern is centered to the total length of the heatsink
– special lengths and drillings on request
– ***1** = versions with solder pins; ***2** = versions without solder pins
– **L** = solderable pins

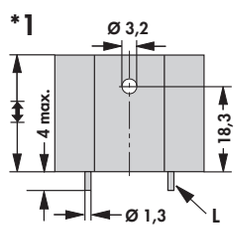


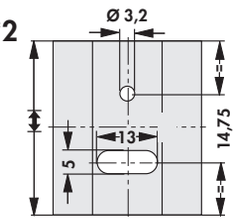




art. no.	↔ [mm]	R_{th} [K/W]	⌖	version
SK 75 25 STS TO 220	25.0	12.5	TO 220/*1	with solder pins
SK 75 37,5 STS TO 220	37.5	10.0		
SK 75 50 STS TO 220	50.0	8.5		
SK 75 25	25.0	12.5	—	without solder pins
SK 75 25 TO 220			TO 220/*2	
SK 75 37,5	37.5	10.0	—	
SK 75 37,5 TO 220			TO 220/*2	
SK 75 50	50.0	8.5	—	
SK 75 50 TO 220			TO 220/*2	
SK 75 75	75.0	7.0	—	
SK 75 1000	1000.0	—		



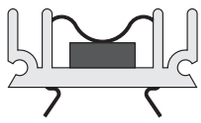


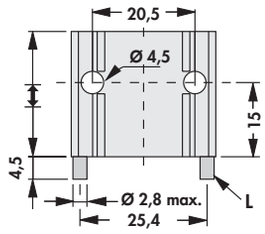


art. no.	↔ [mm]	R_{th} [K/W]	⌖	version
SK 76 25 STS TO 220	25.0	10.0	TO 220/*1	with solder pins
SK 76 37,5 STS TO 220	37.5	8.0		
SK 76 50 STS TO 220	50.0	7.0		
SK 76 25	25.0	10.0	—	without solder pins
SK 76 25 TO 220			TO 220/*2	
SK 76 37,5	37.5	8.0	—	
SK 76 37,5 TO 220			TO 220/*2	
SK 76 50	50.0	7.0	—	
SK 76 50 TO 220			TO 220/*2	
SK 76 75	75.0	5.9	—	
SK 76 1000	1000.0	—		
surface:		black anodised		

Extruded heatsinks for PCB mounting

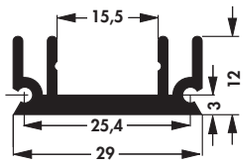
– for semiconductor clip-mounting
– profile **SK 145** ➔ A 81
– special lengths and drillings on request
– **L** = solderable pins

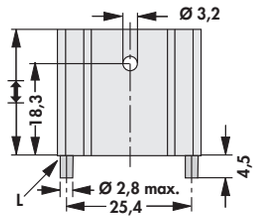




art. no.	⟷ [mm]	R_{th} [K/W]	⌖	version
SK 145 25 STC	25	13.5	TO 218/ TO 220/ TO 247/ TO 248	with solder pins
SK 145 30 STC	30	12.4		
SK 145 50 STC	50	10.0		
surface:		black anodised		

– for semiconductor screw-mounting
– profile **SK 145** ➔ A 81
– special lengths and drillings on request
– **L** = solderable pins



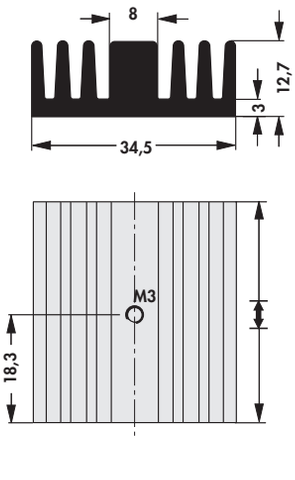


art. no.	⟷ [mm]	R_{th} [K/W]	⌖	version
SK 145 25 STS TO 220	25.0	13.5	TO 218/ TO 220/ TO 247/ TO 248	with solder pins
SK 145 37,5 STS TO 220	37.5	12.0		
SK 145 50 STS TO 220	50.0	10.0		
surface:		black anodised		

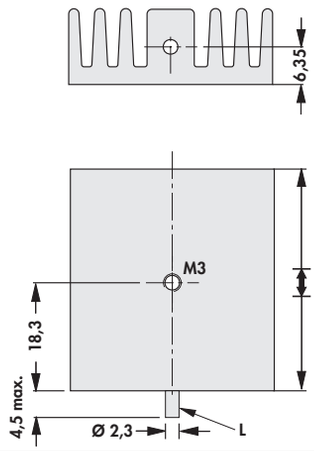
Extruded heatsinks for PCB mounting

– special lengths and drillings on request
– **L** = solderable pins

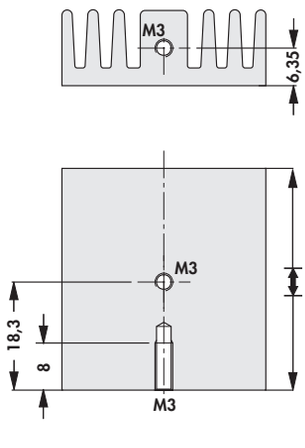
SK 126 25 TO 220
SK 126 37,5 TO 220



SK 126 25 STS TO 220
SK 126 37,5 STS TO 220



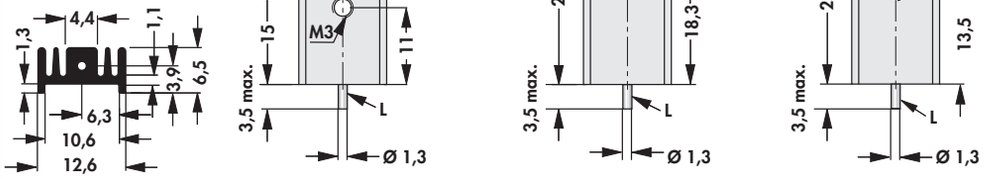
SK 126 25 2 x M 3
SK 126 37,5 2 x M 3



art. no.	↔ [mm]	R_{th} [K/W]	⌖	version
SK 126 25 STS TO 220	25.0	13.0	TO 218/ TO 220/ TO 247/ TO 248	with solder pin and thread M3
SK 126 37,5 STS TO 220	37.5	9.5		
SK 126 25 TO 220	25.0	13.0		without solder pin, with M3 thread
SK 126 25 2 x M3				
SK 126 37,5 TO 220	37.5	9.5		
SK 126 37,5 2 x M3				
SK 126 25	25.0	13.0	—	—
SK 126 37,5	37.5	9.5		
SK 126 1000	1000.0	—		
surface:		black anodised		

Extruded heatsinks for PCB mounting

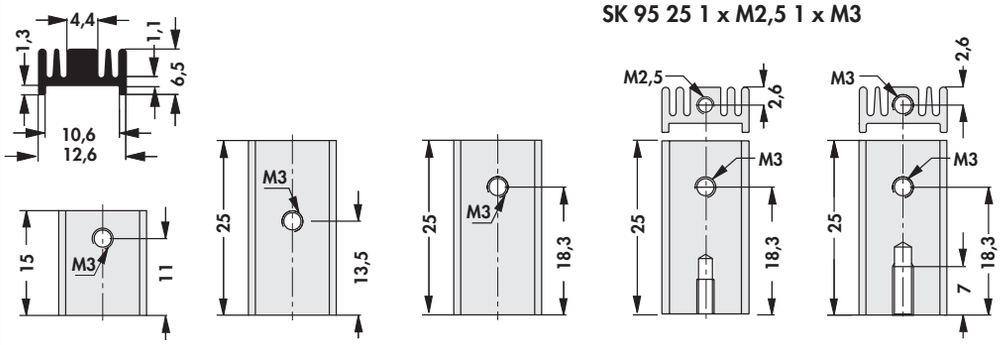
– special lengths and drillings on request
– **L** = solderable pins



SK 95 15 STS SOT 32 S | **SK 95 25 STS TO 220** | **SK 95 25 STS SOT 32**

art. no.	↔ [mm]	R_{th} [K/W]	⌖
SK 95 15 STS SOT 32 S	15	38.5	SOT 32
SK 95 25 STS SOT 32	25	36.0	SOT 32
SK 95 25 STS TO 220	25	36.0	TO 220

SK 95 25 1 x M2,5 1 x M3



SK 95 15 SOT 32 S | **SK 95 25 SOT 32** | **SK 95 25 TO 220** | **SK 95 25 2 x M3**

art. no.	↔ [mm]	R_{th} [K/W]	⌖
SK 95 15 SOT 32 S	15	38.5	SOT 32
SK 95 25 SOT 32	25	36.0	SOT 32
SK 95 25 TO 220	25	36.0	TO 220
SK 95 25 1x M2,5 1x M3	25	36.0	1xM2.5/ 1xM3 (TO 220)
SK 95 25 2 x M3	25	36.0	2xM3 (TO 220)
SK 95 15	15	38.5	—
SK 95 25	25	36.0	—
SK 95 1000	1000	—	—
surface:		black anodised	
type of thread:		not anodised	

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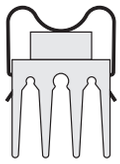
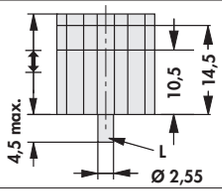
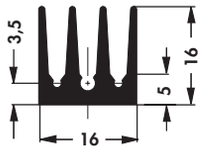
Extruded heatsinks for PCB mounting

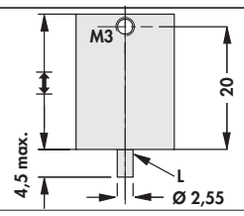
– single solder pin
– profile **SK 437** ➔ A 28
– special lengths and drillings on request
– **L** = solderable pin





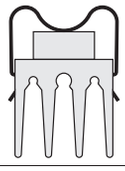
art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 437 25 STC	25	24	TO 218/ TO 220/ TO 247/ TO 248
SK 437 30 STC	30	22	
SK 437 35 STC	35	18	
SK 437 50 STC	50	14	

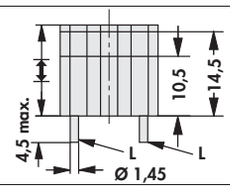




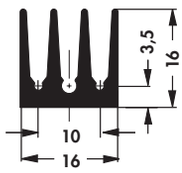
art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 437 25 STS	25	24	TO 218/ TO 220/ TO 247/ TO 248
SK 437 30 STS	30	22	
SK 437 35 STS	35	18	
SK 437 50 STS	50	14	
surface:	black anodised		

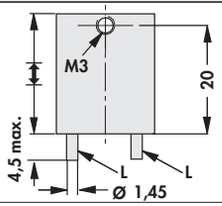
– double solder pin
– profile **SK 437** ➔ A 28
– special lengths and drillings on request
– **L** = solderable pin





art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 437 25 STC 2	25	24	TO 218/ TO 220/ TO 247/ TO 248
SK 437 30 STC 2	30	22	
SK 437 35 STC 2	35	18	

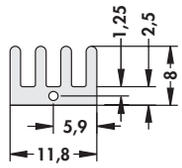


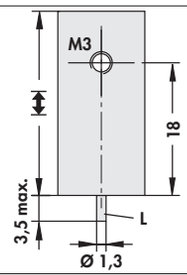


art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 437 25 STS 2	25	24	TO 218/ TO 220/ TO 247/ TO 248
SK 437 30 STS 2	30	22	
SK 437 35 STS 2	35	18	
surface:	black anodised		

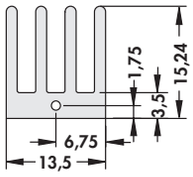
Extruded heatsinks for PCB mounting

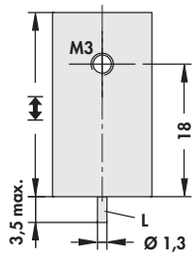
– special versions on customer´s request
– **L** = solderable pin





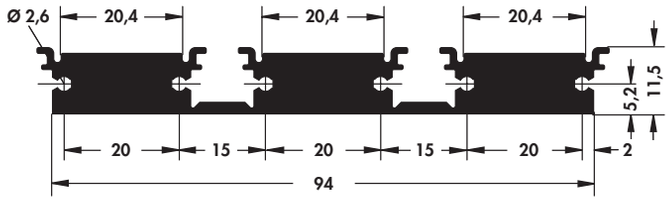
art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 470 25 STS	25	29.0	SOT 32/ TO 220
SK 470 30 STS	30	27.2	
SK 470 35 STS	35	25.6	
SK 470 50 STS	50	23.2	





art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 469 25 STS	25	15.3	SOT 32/ TO 220
SK 469 30 STS	30	14.3	
SK 469 35 STS	35	13.0	
SK 469 50 STS	50	10.6	
surface:		black anodised	

– as mounting- and connecting piece
– for clamp mounting of the transistors
– triple unit can be seperated
– solder pin mounting possible
– special versions on customer´s request



art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 484 25	25.0	6.0	TO 218/ TO 220/ TO 247/ TO 264/ TO 3 P
SK 484 37,5	37.5	4.5	
SK 484 50	50.0	3.7	
SK 484 75	75.0	2.8	

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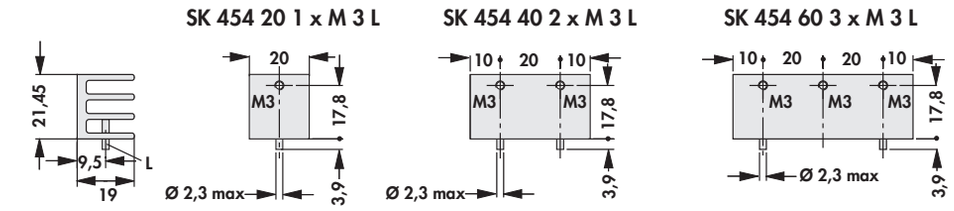
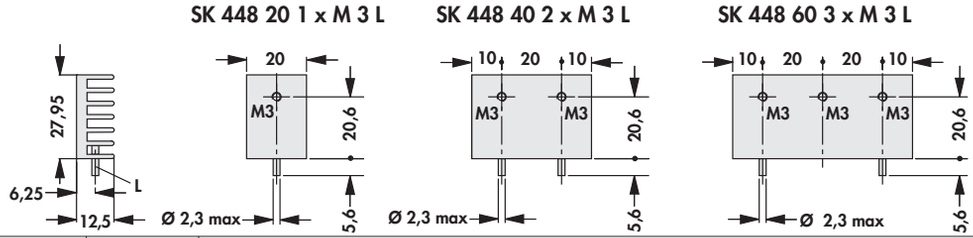
Extruded heatsinks for PCB mounting

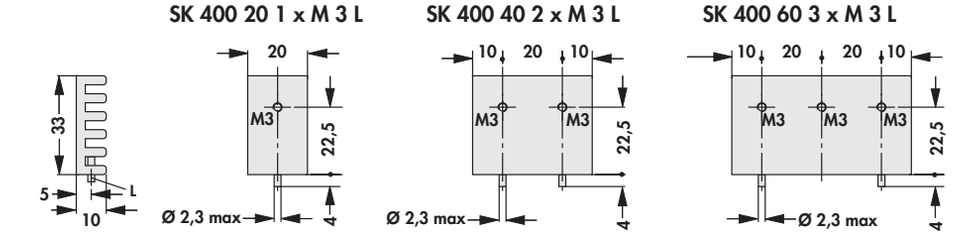
– compact PCB heatsinks
– especially suitable for vertical PCB mounting in housings, racks etc.
– easy solder fixing
– special versions on customer´s request
– **L** = solderable pin



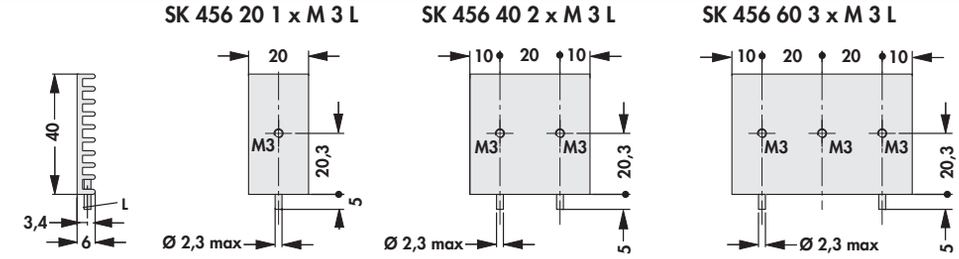
art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 454 20 1 x M3 L	20	10.1	SOT 32/ TO 220
SK 454 40 2 x M3 L	40	8.8	
SK 454 60 3 x M3 L	60	7.5	



art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 448 20 1 x M3 L	20	11.8	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 448 40 2 x M3 L	40	9.8	
SK 448 60 3 x M3 L	60	7.1	



art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 400 20 1 x M3 L	20	11.6	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 400 40 2 x M3 L	40	8.2	
SK 400 60 3 x M3 L	60	7.2	

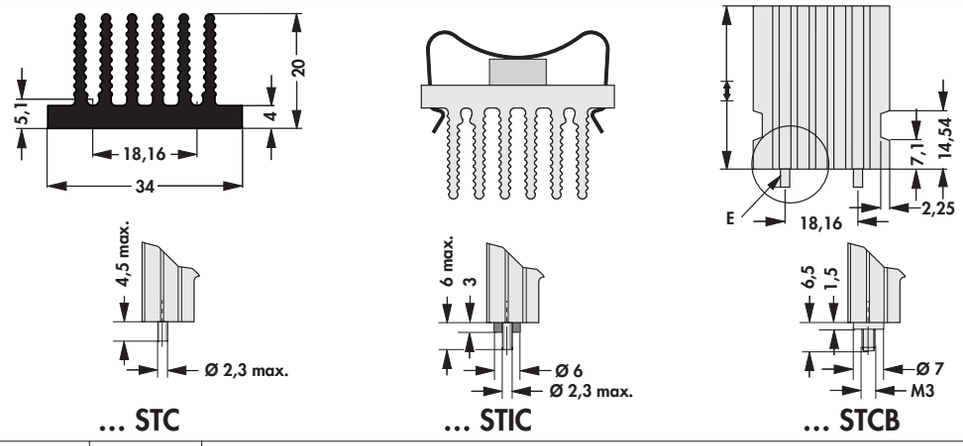


art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 456 20 1 x M3 L	20	13.0	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 456 40 2 x M3 L	40	10.5	
SK 456 60 3 x M3 L	60	8.5	

surface:	black anodised

Extruded heatsinks for PCB mounting

– for semiconductor clip-mounting
– special lengths and transistor drillings on request
– **E** = mounting method

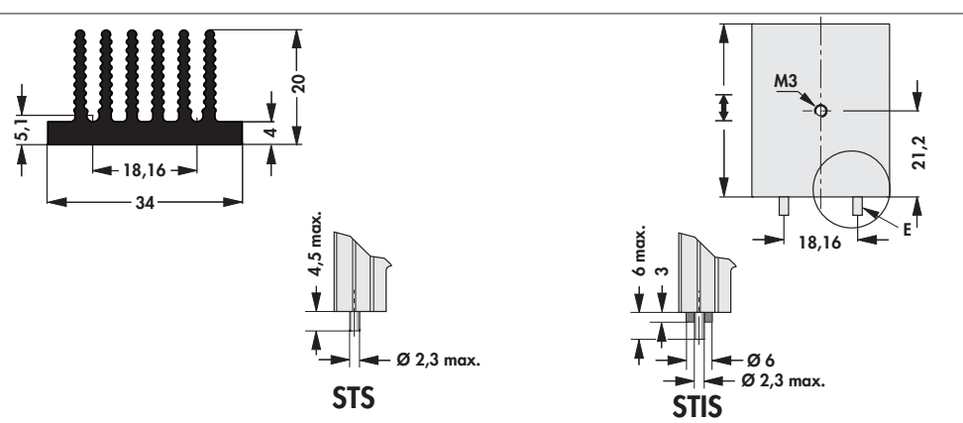


art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 460 25 ...	25.0	9.0	SIP-Multiwatt/ TO 218/ TO 220/ TO 247/ TO 248
SK 460 37,5 ...	37.5	7.9	
SK 460 50 ...	50.0	7.0	

please indicate: **... mounting method**
STC = with solder pin
STIC = with solder pin and insulating washer
STCB = with threaded bolt M3, brass

surface:	black anodised

– for semiconductor screw-mounting
– special lengths and transistor drillings on request
– **E** = mounting method

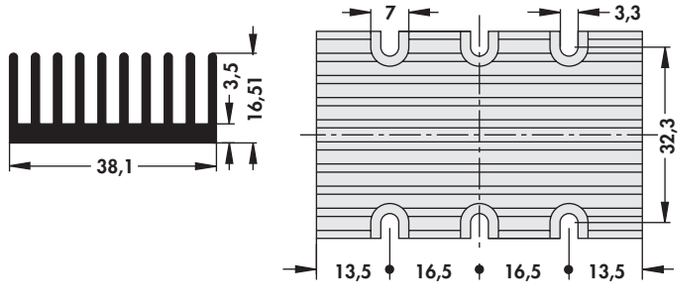
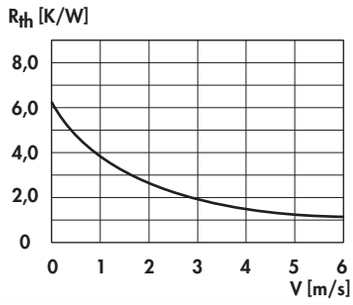
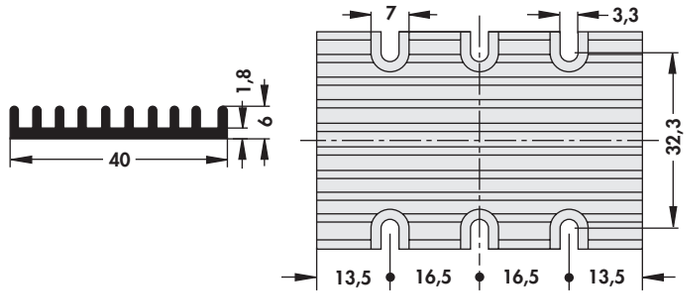
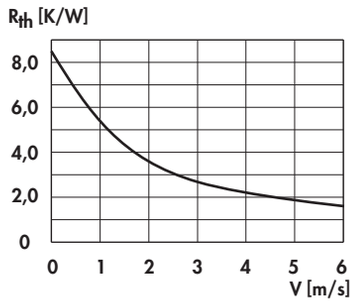
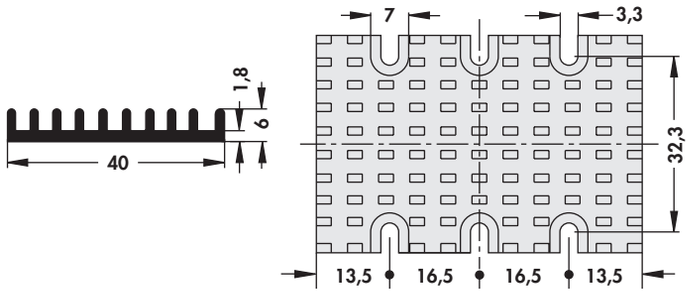
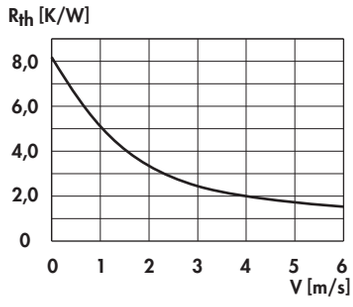
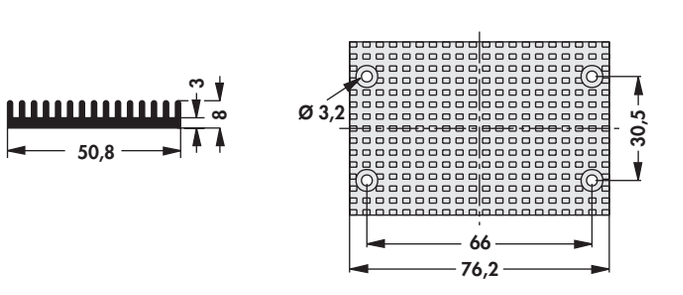
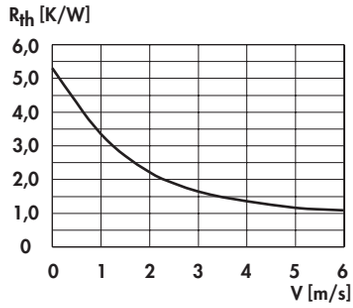
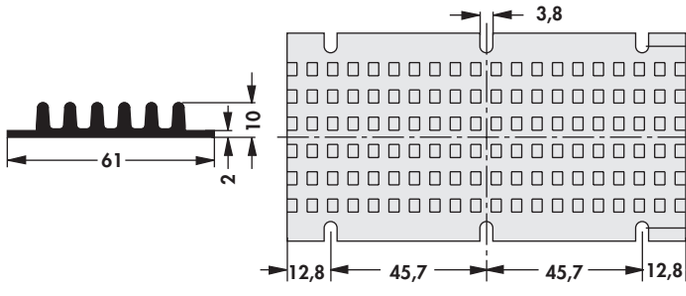
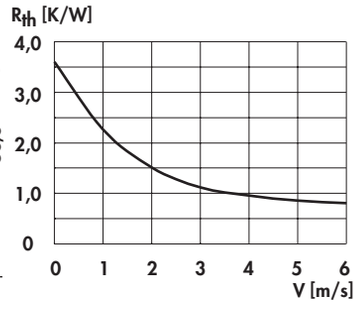


art. no.	⟷ [mm]	R_{th} [K/W]	⌖
SK 460 25 STS	25.0	9.0	SIP-Multiwatt/ TO 218/ TO 220/ TO 247/ TO 248
SK 460 37,5 STS	37.5	7.9	
SK 460 50 STIS	50.0	7.0	

surface:	black anodised

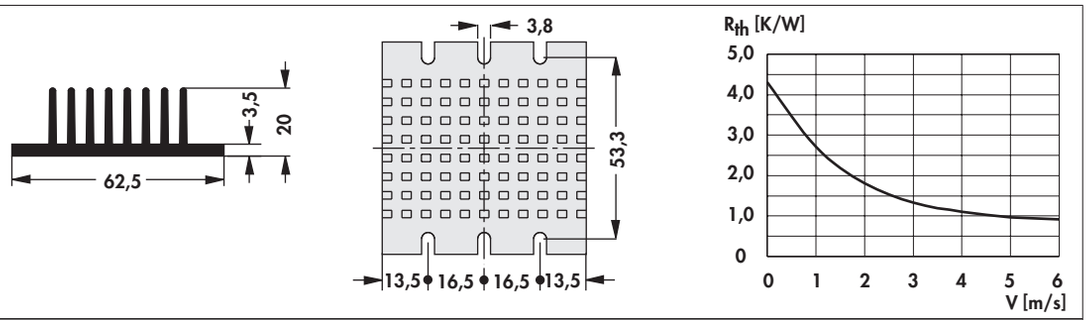
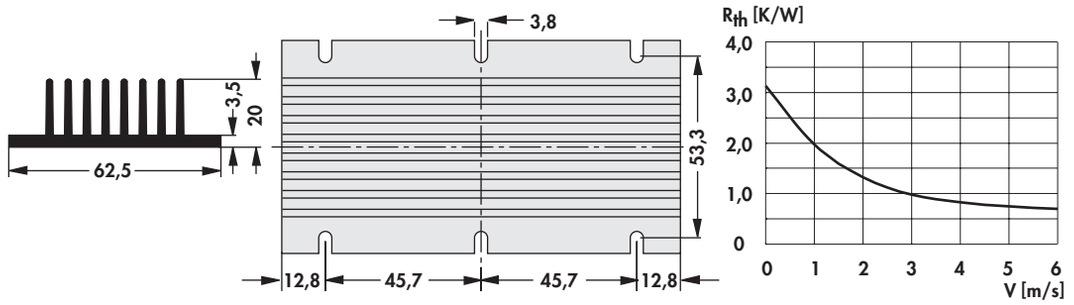
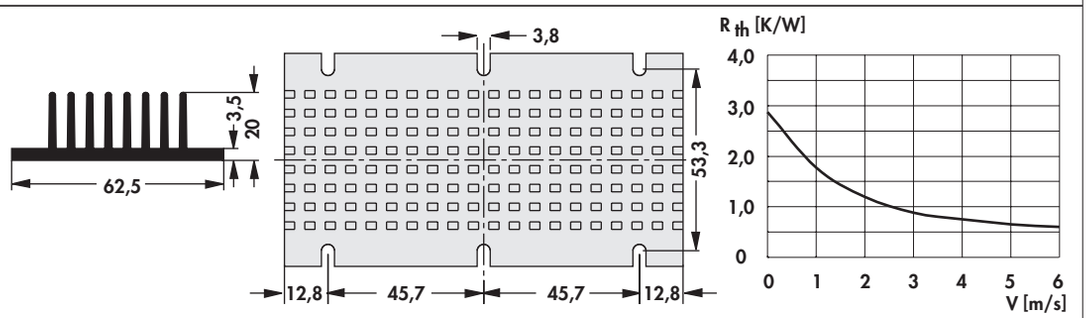
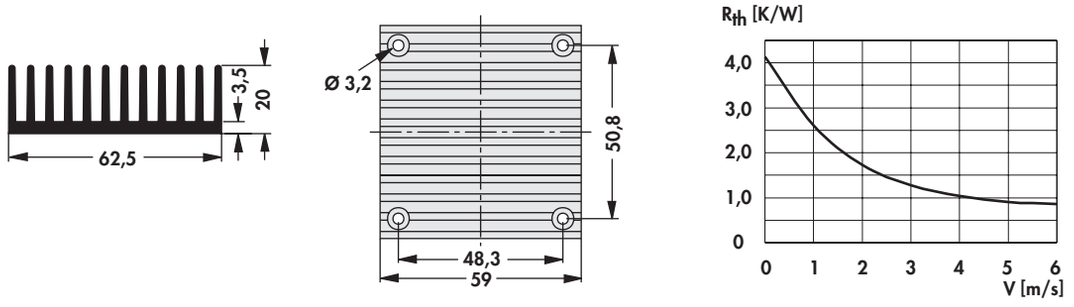
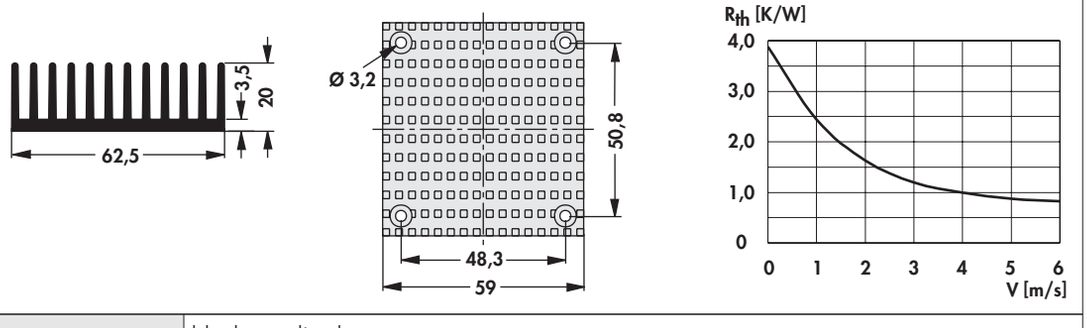
Extruded heatsinks for DC/DC converter

– special versions on customer´s request

art. no.		
SK DC 10 60 SA		
art. no.		
SK DC 8 60 SA		
art. no.		
SK DC 8 1 60 SA		
art. no.		
SK DC 2 1 76 SA		
art. no.		
SK DC 4 1 117 SA		
surface:	black anodised	

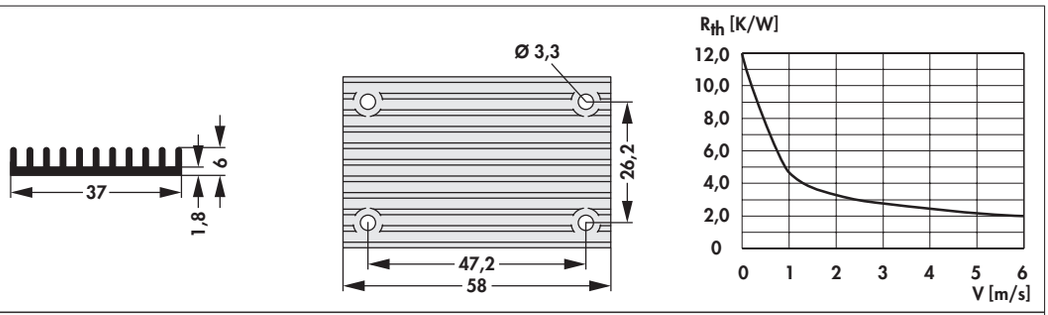
Extruded heatsinks for DC/DC converter

– special versions on customer´s request

art. no.	
SK DC 6 1 60 SA	
art. no.	
SK DC 7 117 SA	
art. no.	
SK DC 7 1 117 SA	
art. no.	
SK DC 5 59 SA	
art. no.	
SK DC 5 1 59 SA	
surface:	black anodised

Extruded heatsinks for DC/DC converter

– **extruded heatsinks for 1/4 brick**
– special versions on customer´s request

art. no.	
SK DC 11 58 06 SA	
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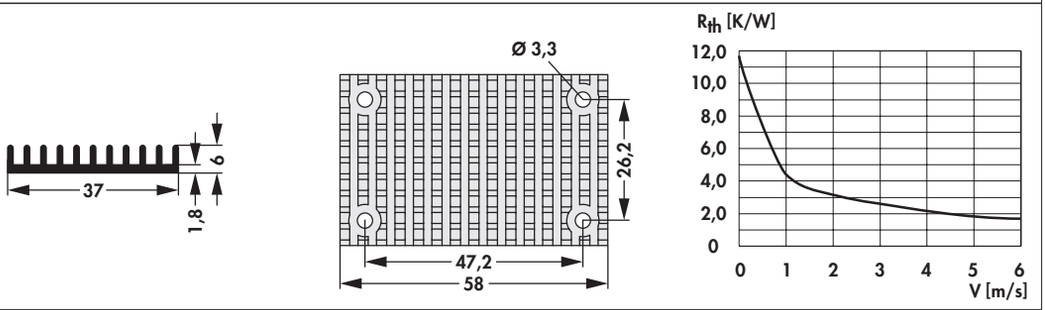
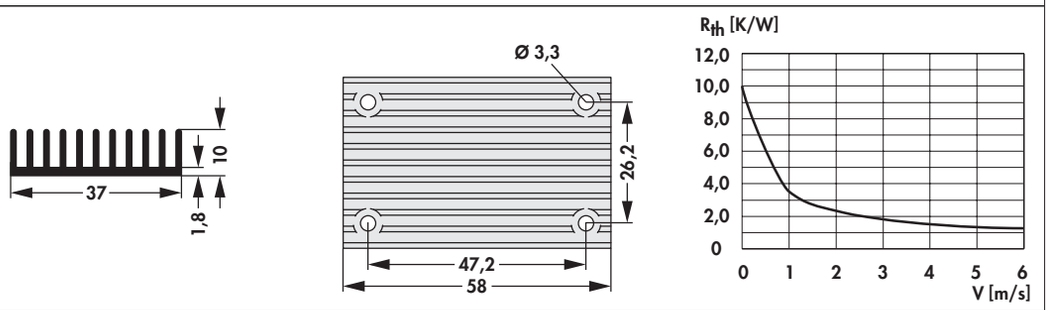
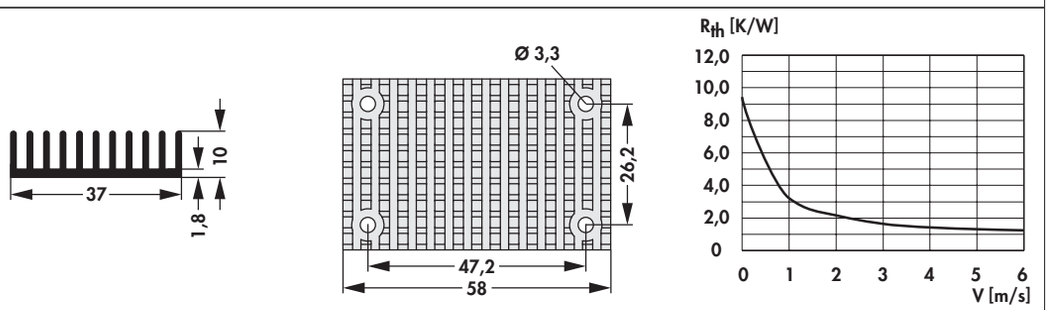
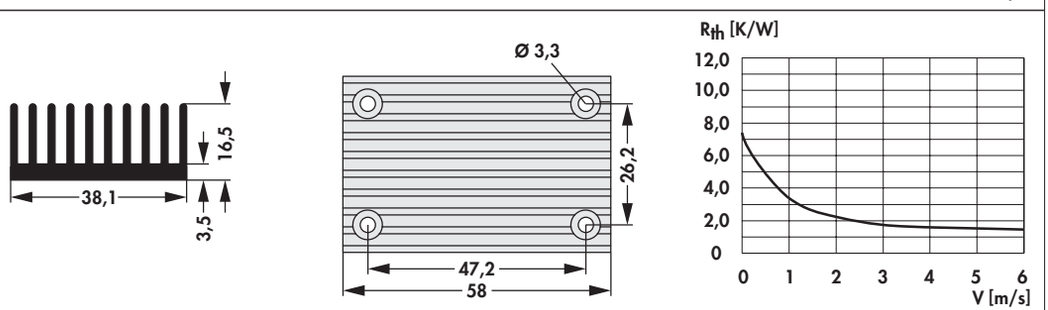
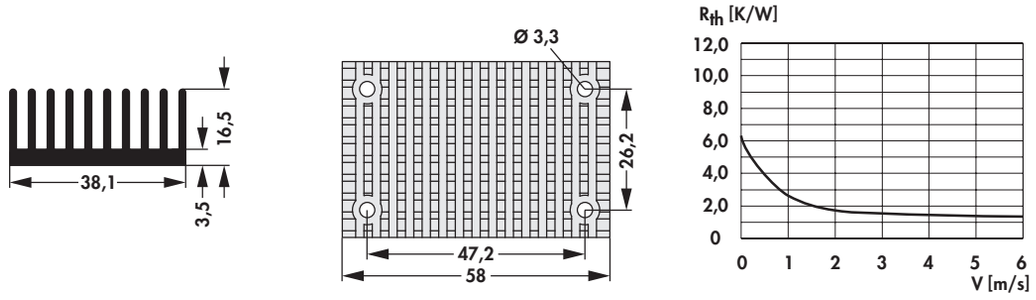
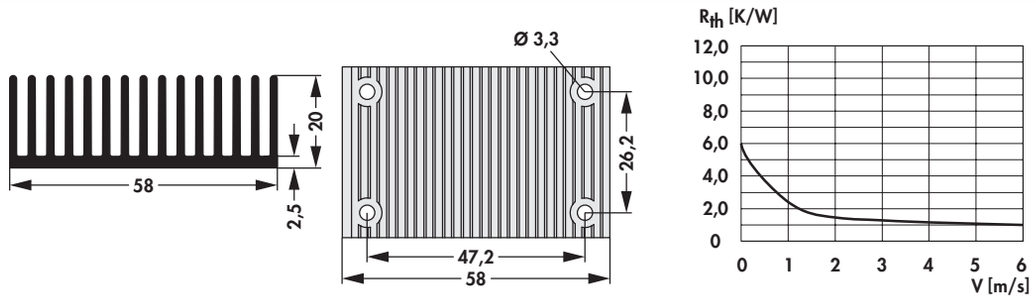
SK DC 11 1 58 06 SA	
art. no.	
SK DC 12 58 10 SA	
art. no.	
SK DC 12 1 58 10 SA	
art. no.	
SK DC 13 58 16,5 SA	
surface:	black anodised

Extruded heatsinks for DC/DC converter

– **extruded heatsinks for 1/4 brick**
– special versions on customer´s request

art. no.	
SK DC 13 1 58 16,5 SA	
art. no.	
SK DC 14 37 20 SA	
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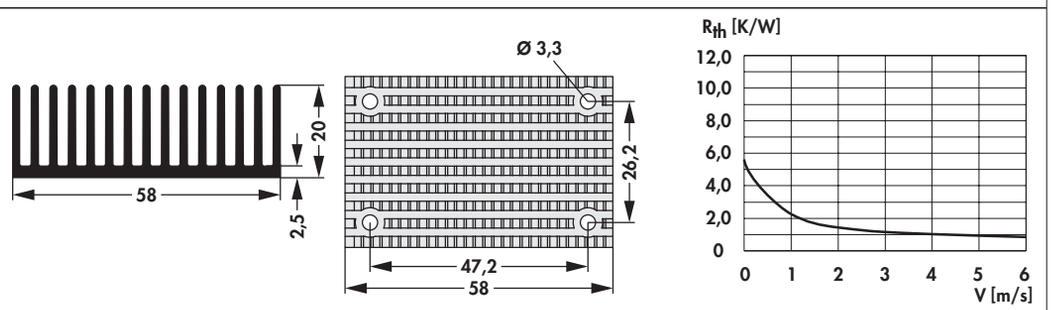
SK DC 14 1 37 20 SA	
surface:	black anodised

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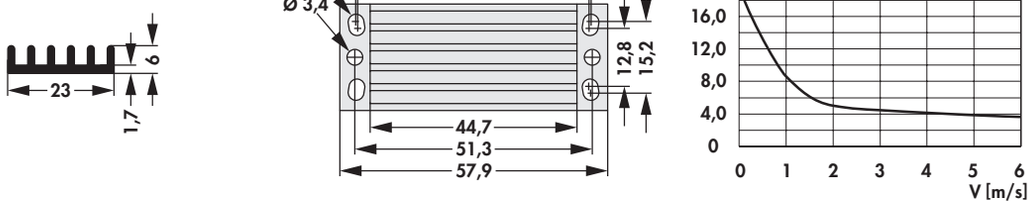
Extruded heatsinks for DC/DC converter

– **extruded heatsinks for 1/8 brick**
– special versions on customer´s request

art. no.	
SK DC 15 58 SA	
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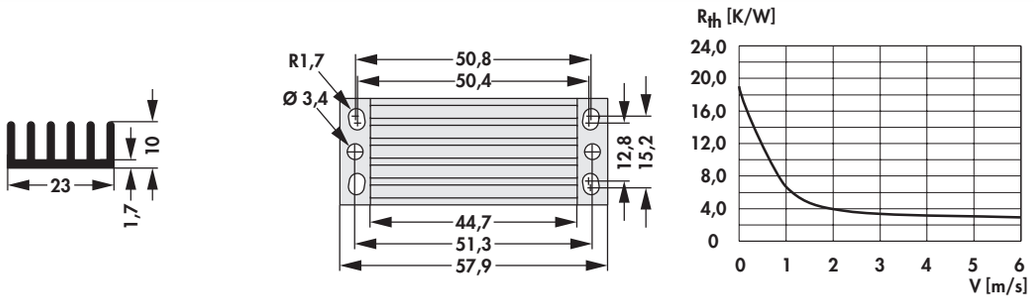
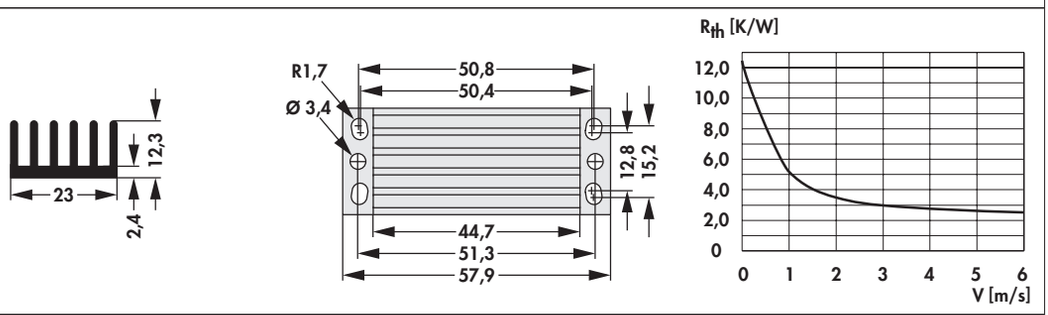
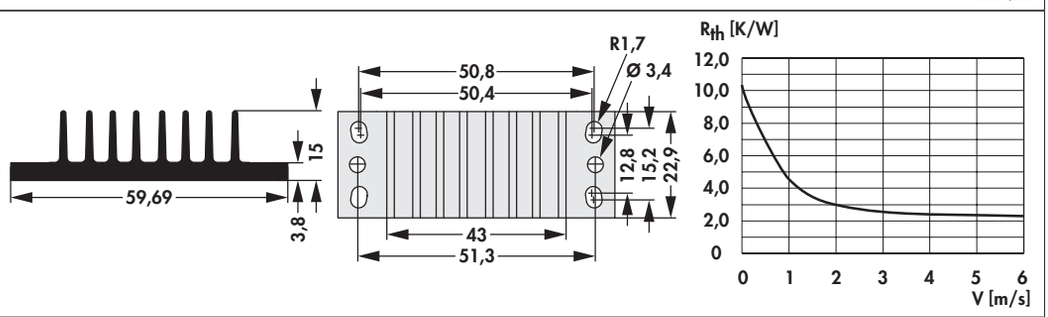
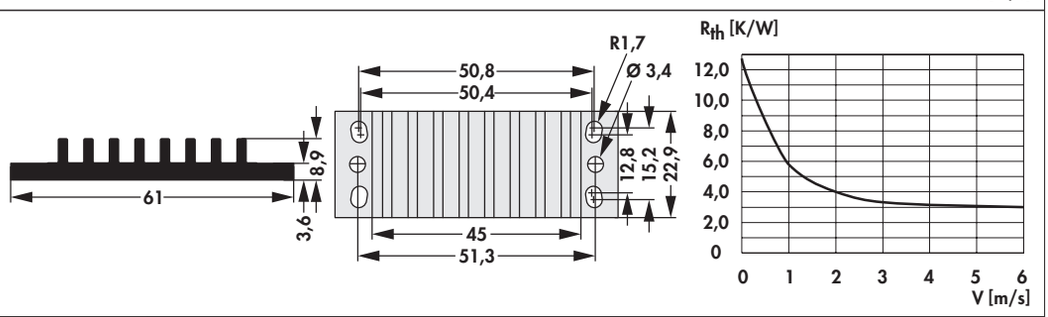
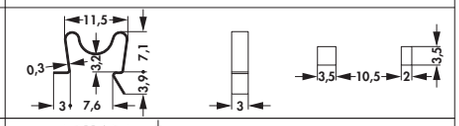
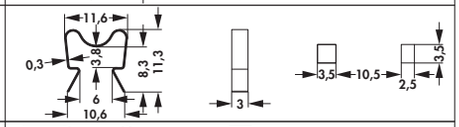
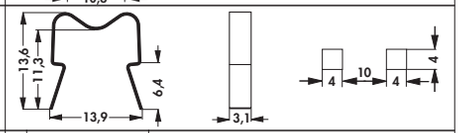
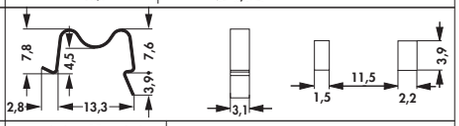
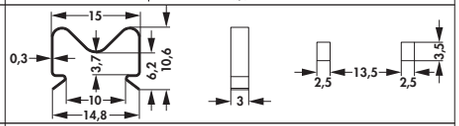
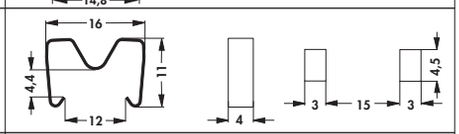
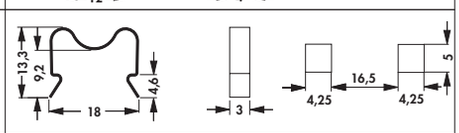
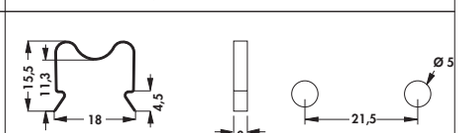
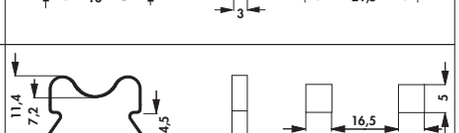
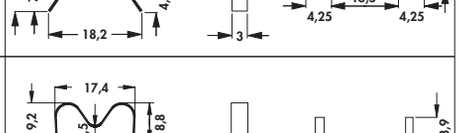
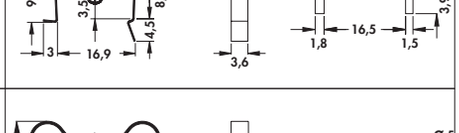
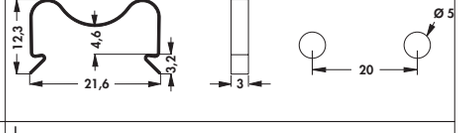
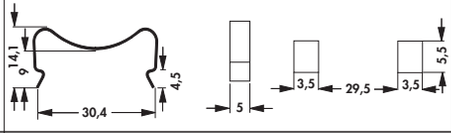
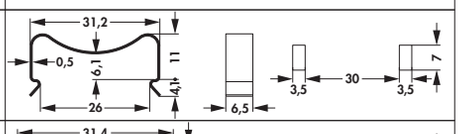
SK DC 16 58 SA	
art. no.	
SK DC 17 58 SA	
art. no.	
SK DC 18 23 SA	
art. no.	
SK DC 19 23 SA	
surface:	black anodised

Retaining springs for transistors

art. no.	for transistor-housing	suitable for heatsinks	plate thickness [mm]	material	
THF 126 11	TO 126	-	2	stainless steel	
THF 126 12	TO 126	-	2	stainless steel	
THF 129 TO 220	TO 220	FK 219/ FK 222/ SK 129	1-2	stainless steel	
THF 220	TO 220	FK 219/ FK 222	1-2	stainless steel	
THF 220 15	TO 220	-	1.5-2.0	stainless steel	
THF 249	TO 220	FK 249	1.0-1.5	spring steel, corrosion protected	
THF 409 TO 220	TO 220/ TO 247/ TO 248/ TO 3 P	SK 409	1.5-3.0	stainless steel	
THF 409 220 2	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P	SK 145/ SK 185/ SK 437	4	stainless steel	
THF 409 SOT 32	TO 126/ SOT 32/ SOT 82	SK 409	2-3	stainless steel	
THF 220 17	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P	-	1.0-1.5	stainless steel	
THF 409 220 1	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P	SK 409/ SK 459	2-3	stainless steel	
THF 247	TO 220/ TO 247/ TO 248/ TO 3 P	SK 484	2	stainless steel	
THF 247 15	TO 247/ TO 248/ TO 3 P	SK 460	4	stainless steel	
THF 247 11	-	-	1.5	stainless steel	

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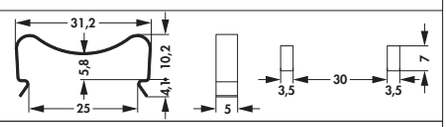
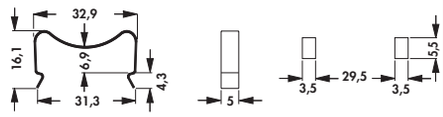
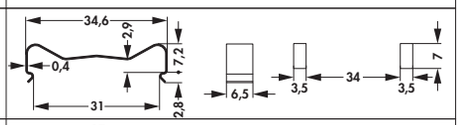
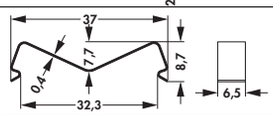
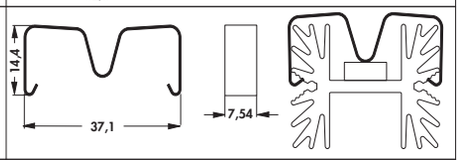
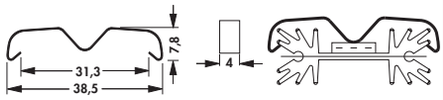
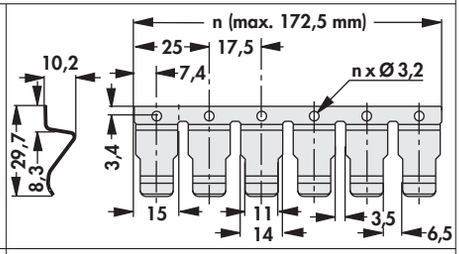
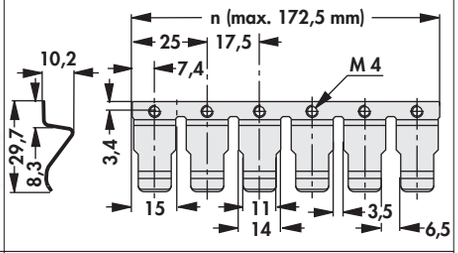
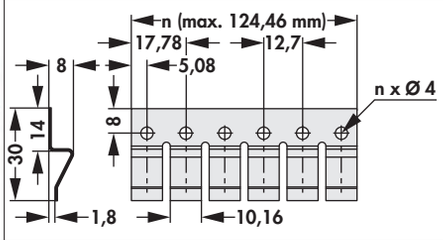
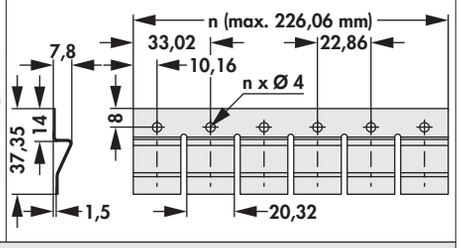
Retaining springs for transistors

art. no.	for transistor-housing	suitable for heatsinks	plate thickness [mm]	material	
THF 247 14	TO 247/ TO 248/ TO 3 P	SK 484	2	stainless steel	
THF 247 4	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P	SK 460	4	stainless steel	
THF 220 35	2 x TO 220	-	1.0-1.5	stainless steel	
THF 126 37	TO 126	-	4	stainless steel	
THF 600	TO 218/ TO 220/ TO 247/ TO 3 P	SK 600	2.5	spring steel, corrosion protected	
THF 104	TO 220/ TO 247/ TO 248/ TO 3 P	SK 104	1-2	stainless steel	

Retaining springs for transistors

– universal **retaining spring** for transistor housings types TO 218, TO 220, TO 247, TO 264, SOT 32 and various SIP Multiwatt etc.
– fast and easy mounting of the transistors
– number of retaining spring elements can be chosen **(n = max. 10)**
– **THFMG** with thread M 4
– specific versions and modifications on customer´s request

art. no.	for transistor-housing	spring force [N]	material		
THFM ...	TO 218/ TO 220/ TO 247/ TO 264/ SOT 32/ SIP Multiwatt	55 ±5	stainless steel		
THFMG ...	TO 218/ TO 220/ TO 247/ TO 264/ SOT 32/ SIP Multiwatt	55 ±5	stainless steel		
THFM 11 ...	TO 220	45 ±5	stainless steel		
THFM 20 ...	TO 247/ TO 264	70 ±5	stainless steel		

please indicate: **... number of retaining-spring elements 1 - 10**

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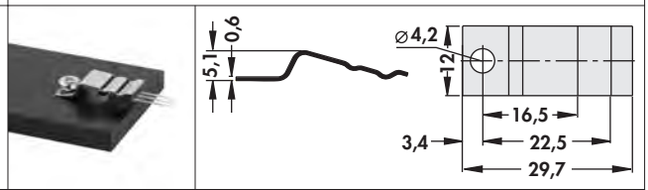
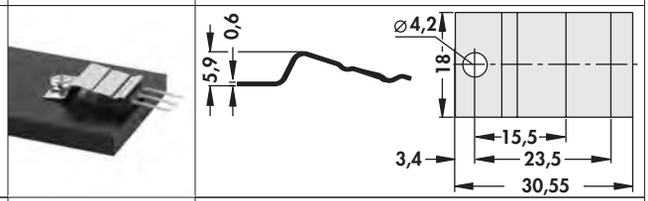
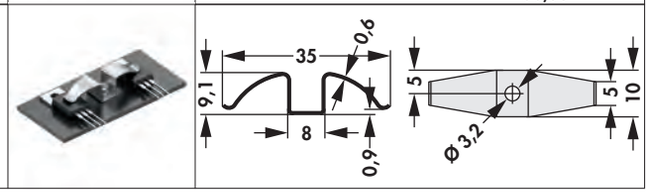
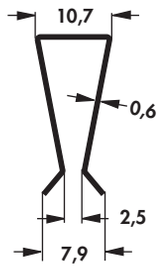
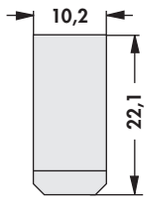
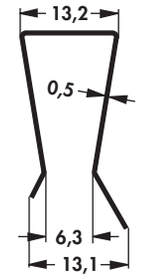
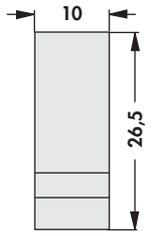
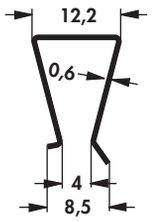
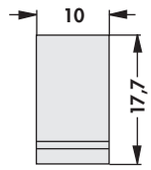
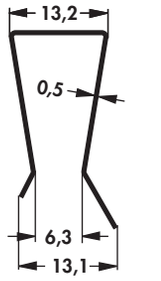
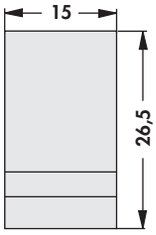
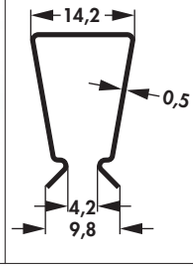
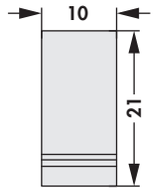
Retaining springs for transistors

art. no.	for transistor-housing	spring force [N]	material	
THFK 220	TO 220	79	spring steel, corrosion protected	
THFK 247	TO 218/ TO 247	119	spring steel, corrosion protected	
THFK 36	TO 218/ TO 220/ TO 247/ TO 3 P	40	stainless steel	

Retaining springs for transistors

– able to slide on the transistor and mounting plate
– easy mounting
– high pressure force and firm grip
– specific versions upon customer´s request

art. no.	for transistor-housing	plate thickness [mm]	holding force [N]	material		
THFA 1	TO 220	2	20	stainless steel		 
THFA 2	TO 220	6.5	20	spring steel, corrosion protected		 
THFA 3	TO 220	5.5	33	spring steel, corrosion protected		 
THFA 4	TO 218/ TO 247	6.5	59	spring steel, corrosion protected		 
THFA 5	TO 220/ TO 3 P	5	13	stainless steel		 

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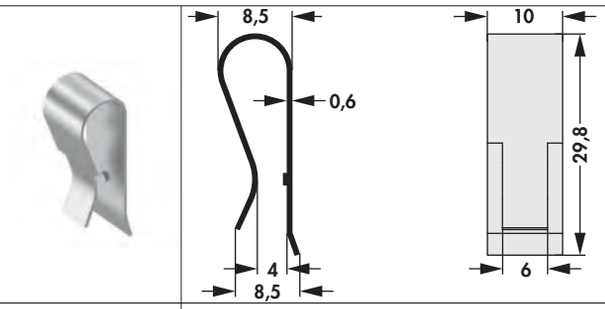
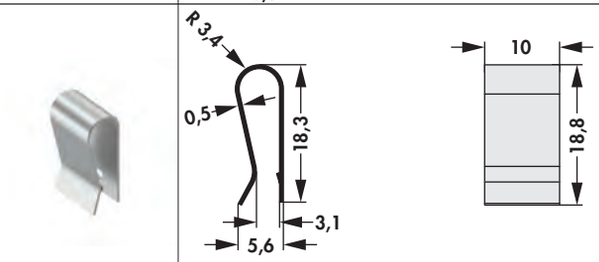
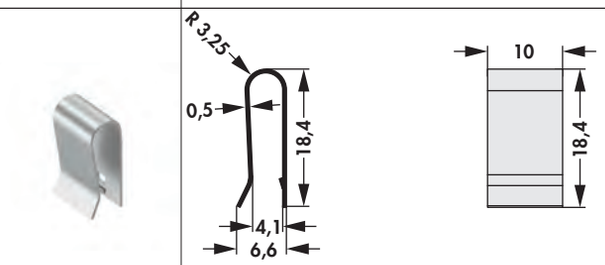
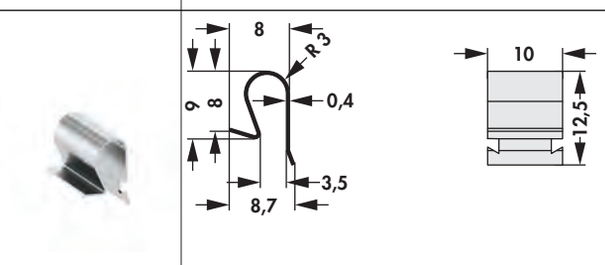
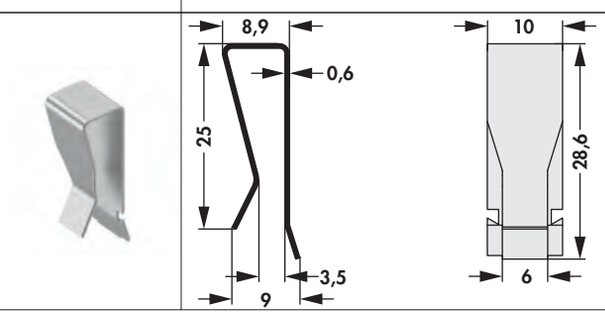
Retaining springs for transistors

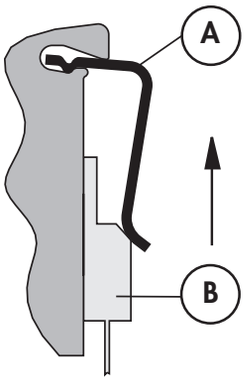
art. no.	for transistor-housing	plate thick-ness [mm]	hold-ing force [N]	material	
THFA 6	TO 220/ TO 3 P	3	28	spring steel, corrosion protected	
THFA 7	TO 220/ TO 3 P	3	50	spring steel, corrosion protected	
THFA 8	TO 220/ TO 3 P	3	55	spring steel, corrosion protected	
THFA 9	TO 220/ TO 3 P	1	20	stainless steel	
THFA 10	TO 220/ TO 3 P	4	32	spring steel, corrosion protected	

Retaining springs for transistors

– universal lock-in retaining spring for types TO 218, TO 220, TO 247, TO 264 and various SIP-Multiwatt etc. transistor housings
– clip fastening also for power transistors without holes, MAX types etc.
– easy assembly and secure hold when using a special groove geometry in heatsinks, housing parts etc.
– optimal heat transfer between component and cooling element
– various spring clip shapes available for fastening the components (see sketch)
– the indicated spring forces **THFU 1-7** refer to a transistor thickness of 4.5 mm (TO 220)
– the range of suitable heat sinks is continuously extended
– versions specifically designed to meet customers requirements on request

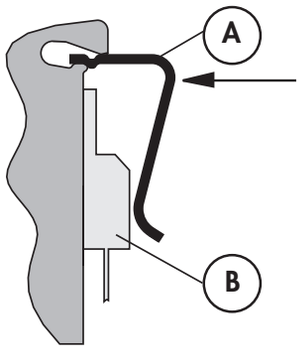
Installation

THFU 1

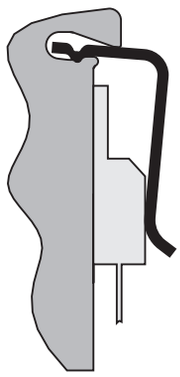


– **insert** the lock-in retaining spring for transistors THFU 1 (A) into the groove of the profile
– **push** transistor (B) below the springinu

THFU 2, THFU 3, THFU 4, THFU 5, THFU 6, THFU 7



– **place** transistor (B) onto the mounting area
– **press** the lock-in retaining spring for transistors THFU 2 - 7 (A) into the groove of the profile (a suitable installation aid will facilitate pressing in)



– Once in place, the spring will keep its position and fix the transistor with a high contact pressure on the installation surface (the spring remains in its position and it can neither be moved in a lengthwise direction nor fall it can out of the groove in a cross direction).

material:	stainless steel
material thickness:	0.8 mm

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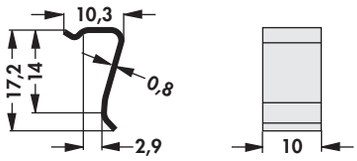
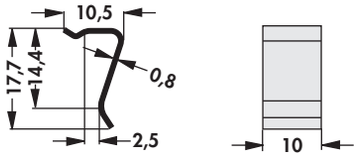
Lock-in retaining spring for transistors

art. no.	for transistor-housing	suitable for heatsinks	spring force [N]	material		
THFU 1	TO 218/ TO 220/ TO 247/ TO 262/ TO 3 P/ SOT 199/ SOT 429	SK 480/ SK 481/ SK 482/ SK 483/ SK 487/ SK 489/ SK 490/ SK 492/ SK 495/ SK 499/ SK 512/ SK 514/ SK 573/ SK 574/ SK 575/ SK 576/ SK 589/ SK 593/ SK 617/ SK 637/ SK 638/ SK 639/ SK 640/ SK 641/ SK 662/ SK 664/ SK 665/ SK 669/ SK 681/ LAM 3 K/ LAM 3 D K/ LAM 4 K/ LAM 4 D K/ LAM 5 K/ LAM 5 D K/ LAM 6 K/ LA 27 K	60 ±5	stainless steel		

Lock-in retaining spring for transistors

art. no.	for transistor-housing	suitable for heatsinks	spring force [N]	material		
THFU 2	TO 218/ TO 220/ TO 247/ TO 262/ TO 3 P/ SOT 199/ SOT 429	SK 480/ SK 481/ SK 482/ SK 483/ SK 487/ SK 489/ SK 490/ SK 492/ SK 495/ SK 499/ SK 512/ SK 514/ SK 573/ SK 574/ SK 575/ SK 576/ SK 589/ SK 593/ SK 617/ SK 637/ SK 638/ SK 639/ SK 640/ SK 641/ SK 662/ SK 664/ SK 665/ SK 669/ SK 681/ LAM 3 K/ LAM 3 D K/ LAM 4 K/ LAM 4 D K/ LAM 5 K/ LAM 5 D K/ LAM 6 K/ LA 27 K	60 ±5	stainless steel		

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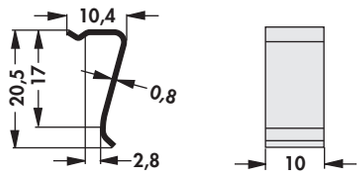
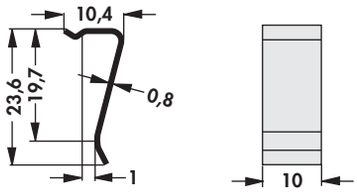
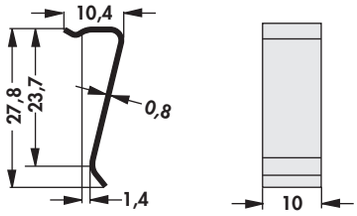
Lock-in retaining spring for transistors

art. no.	for transistor-housing	suitable for heatsinks	spring force [N]	material	
THFU 3	TO 218/ TO 220/ TO 247/ TO 262/ TO 3 P/ SOT 199/ SOT 429	SK 480/ SK 481/ SK 482/ SK 483/ SK 487/ SK 489/ SK 490/ SK 492/ SK 495/ SK 499/ SK 514/ SK 573/ SK 574/ SK 575/ SK 576/ SK 589/ SK 593/ SK 617/ SK 637/ SK 638/ SK 639/ SK 640/ SK 641/ SK 662/ SK 664/ SK 665/ SK 669/ SK 681/ LAM 3 K/ LAM 3 D K/ LAM 4 K/ LAM 4 D K/ LAM 5 K/ LAM 5 D K/ LAM 6 K/ LA 27 K	50 ±5	stainless steel	 

Lock-in retaining spring for transistors

art. no.	for transistor-housing	suitable for heatsinks	spring force [N]	material		
THFU 4	TO 218/ TO 202/ TO 220/ TO 248/ TO 262/ TO 264/ TO 3 P/ SOT 199	SK 480/ SK 481/ SK 482/ SK 483/ SK 487/ SK 489/ SK 490/ SK 495/ SK 499/ SK 514/ SK 575/ SK 589/ SK 593/ SK 617/ SK 638/ SK 639/ SK 640/ SK 641/ SK 662/ SK 664/ SK 665/ SK 669/ SK 681/ LAM 5 K/ LAM 5 D K/ LAM 6 K/ LA 27 K	32 ±5	stainless steel		
THFU 5	TO 218/ TO 202/ TO 220/ TO 247/ TO 248/ TO 262/ TO 264/ TO 3 P/ SOT 199/ SOT 429	SK 490/ SK 589/ SK 617/ SK 639/ SK 662/ SK 664/ SK 665/ SK 669/ LAM 5 K/ LAM 5 D K/ LAM 6 K/ LA 27 K	25 ±5	stainless steel		

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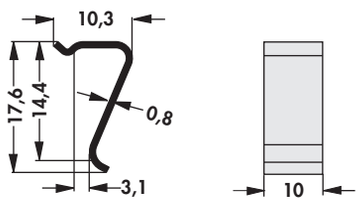
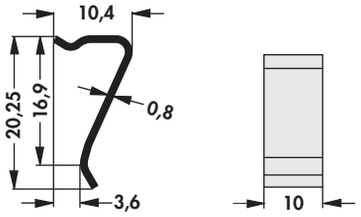
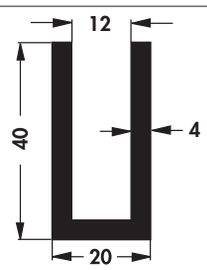
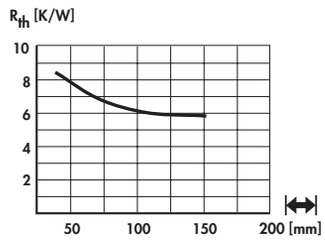
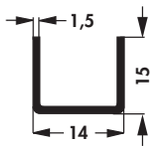
Lock-in retaining spring for transistors

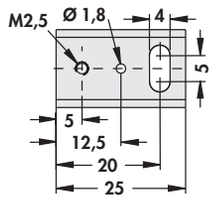
art. no.	for transistor-housing	suitable for heatsinks	spring force [N]	material	
THFU 6	TO 126/ TO 218/ TO 220/ TO 225/ TO 247/ TO 248/ TO 251/ TO 3 P/ SOT 32	SK 480/ SK 481/ SK 482/ SK 483/ SK 487/ SK 489/ SK 490/ SK 492/ SK 495/ SK 499/ SK 512/ SK 514/ SK 573/ SK 574/ SK 575/ SK 576/ SK 589/ SK 593/ SK 617/ SK 637/ SK 638/ SK 639/ SK 640/ SK 641/ SK 662/ SK 664/ SK 665/ SK 669/ SK 681/ LAM 3 K/ LAM 3 D K/ LAM 4 K/ LAM 4 D K/ LAM 5 K/ LAM 5 D K/ LAM 6 K/ LA 27 K	65 ±5	stainless steel	 
THFU 7	eSIP	SK 480/ SK 482/ SK 483/ SK 487/ SK 490/ SK 492/ SK 495/ SK 573/ SK 574/ SK 576/ SK 637/ SK 638/ SK 681/ LAM 3 K/ LAM 3 D K/ LAM 6 K	40 ±5	stainless steel	 

U-Extruded heatsinks

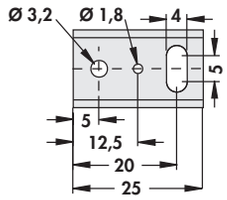
art. no.		
SK 115 ...		
please indicate:	**... ↔** **37.5 50 1000 mm**	



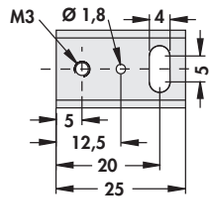
UK 14 SA 220



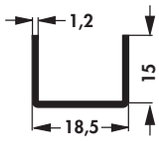
UK 14 SA 220 3,2

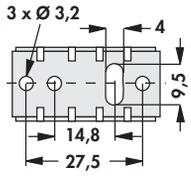


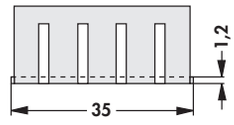
UK 14 SA M3



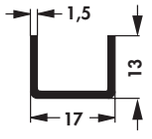
art. no.	R_{th} [K/W]	⌖
UK 14 SA 220	20	TO 220
UK 14 SA 220 3,2		
UK 14 SA M3		



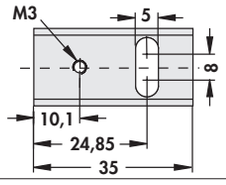




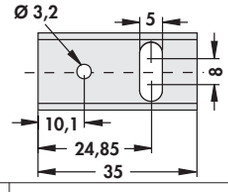
art. no.	R_{th} [K/W]	⌖
ICK 35 SA	15	TO 220



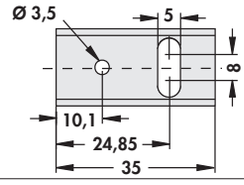
SK 13 35 SA 220



SK 13 35 SA 220 3,2



SK 13 35 SA 220 3,5



art. no.	R_{th} [K/W]	⌖
SK 13 35 SA 220	17	TO 220
SK 13 35 SA 220 3,2		
SK 13 35 SA 220 3,5		

surface:	black anodised

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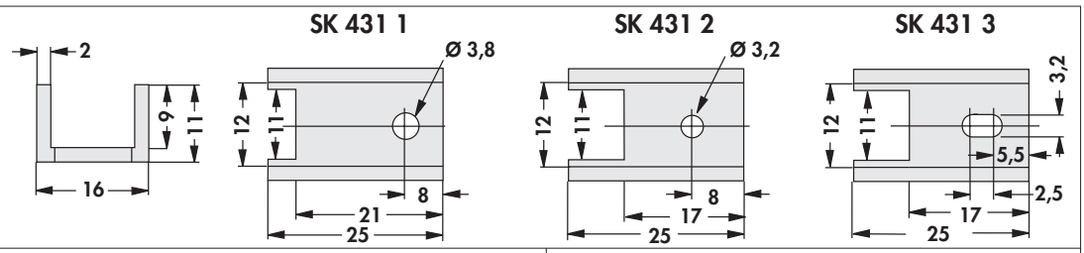
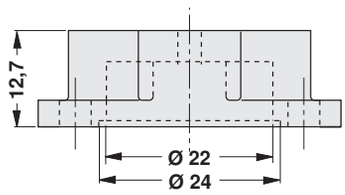
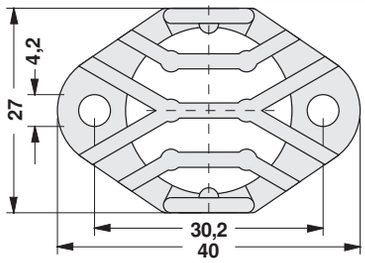
U-Extruded heatsinks



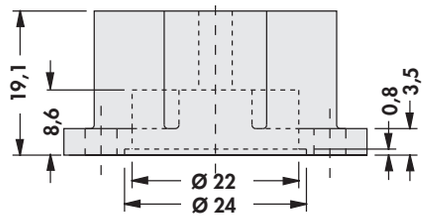
art. no.	R_{th} [K/W]	
SK 431 1	18	TO 220
SK 431 2		
SK 431 3		
surface:	black anodised	

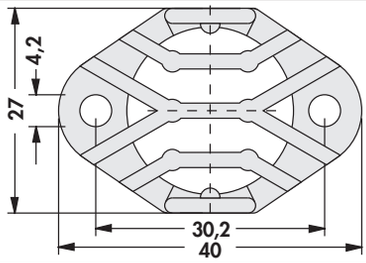
Attachable heatsinks and angle for TO 3





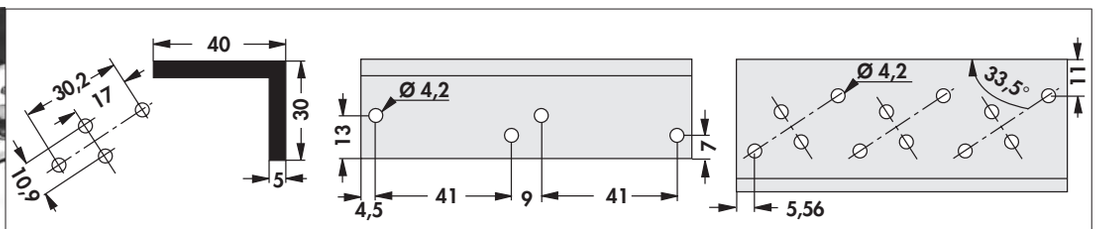
art. no.	↔ [mm]	R_{th} [K/W]
AKK 127	27	14





art. no.	↔ [mm]	R_{th} [K/W]
AKK 191	27	12

surface:	black lacquered
material:	die-casting aluminium



art. no.	↔ [mm]	R_{th} [K/W]	⌖
WP 4030 100 ...	100	3.7	—
WP 4030 100 3 ...			TO 3

please indicate: **... surface**
SA = black anodised
AL = raw degreased aluminium (by the metre raw aluminium)

socket: TF 3 2 ➔ E 103

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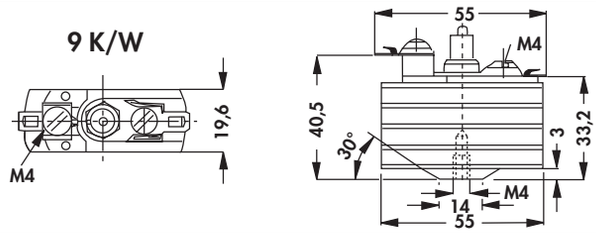
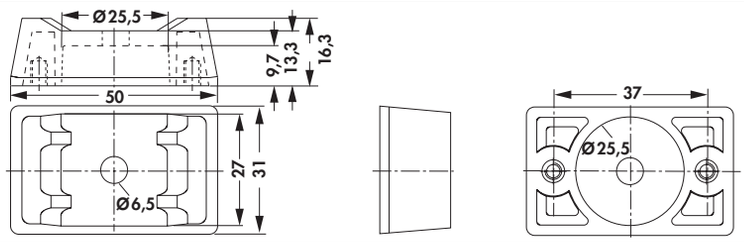
Die-cast heatsinks

Die-cast acc. to german standard DIN 41882

art. no.		
K 9 M 4		
surface:	black lacquered	

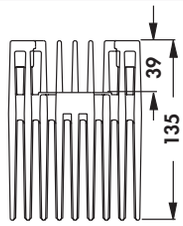
Mounting parts for heatsinks

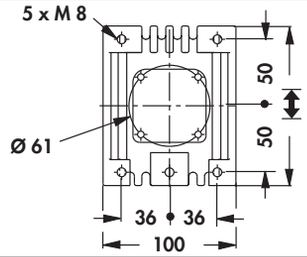
art. no.	
IS 53	

Die-cast heatsinks

– completely milled mounting surface for semiconductors with square bottom plates
– the mounting surface can be equipped with threads for fastening semiconductors with screwed glands (semiconductor thread tapping)
– threads from M 4 to M 32 x 1.5 or 4 x threads for semiconductors with clamping plate mounting are available on request
– strap fastening thread M 8
– delivery without anode strap
– other lengths and drillings on request

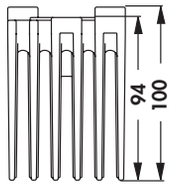
0,55 K/W

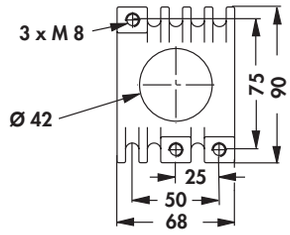




art. no.	⟷ [mm]	R_{th} [K/W]
K 0,55 M 12	120	0.55

1,1 K/W





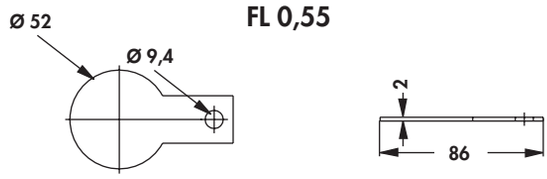
art. no.	⟷ [mm]	R_{th} [K/W]
K 1,1 M 12	90	1.1

surface:	black lacquered

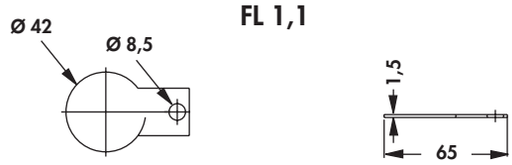
Accessories

– anode end strap made of tin-plated cathode copper

FL 0,55

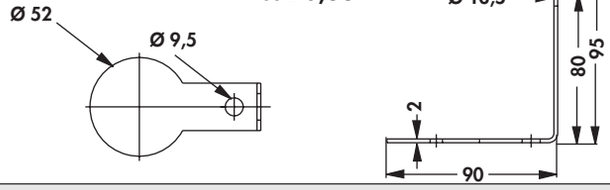


FL 1,1

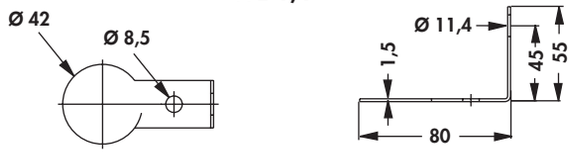


art. no.	art. no.
FL 0,55	**FL 1,1**

WL 0,55



WL 1,1



art. no.	art. no.
WL 0,55	**WL 1,1**

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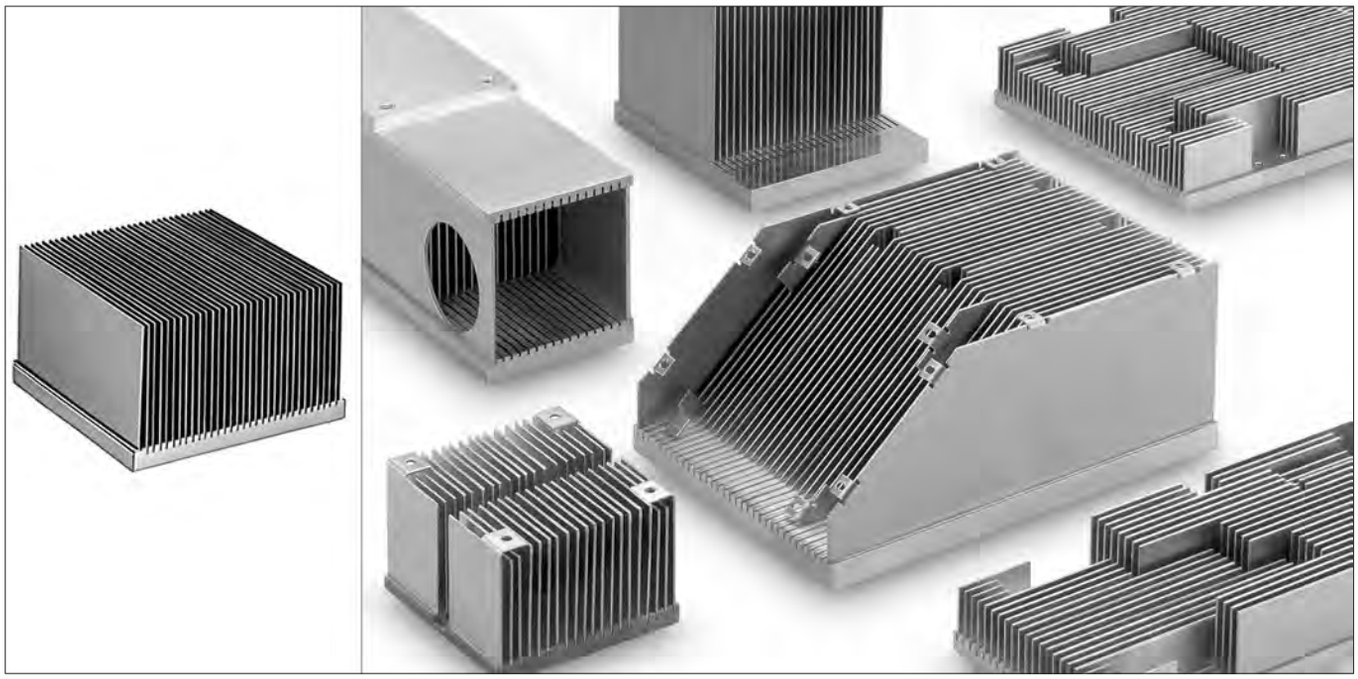
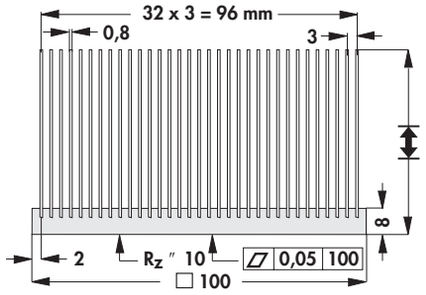
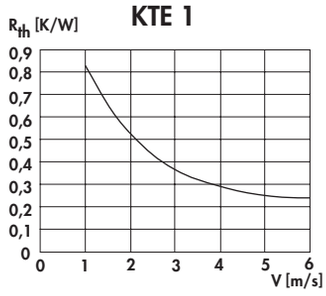
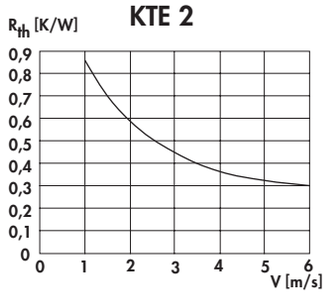
Standard fin coolers for thermoelectrical elements



- fin coolers in special design
- especially suitable for thermoelectric elements (Peltier-elements) and similar power modules
- compact design with reduced volume
- large surface, therefore more efficient than extruded profiles
- particularly low heat resistance with forced air coolingideally fitted thermotechnical and in the basic material pressed in lamellas are additionally mounted with thermal conductive glues to avoid air pockets
- accurately flat milled surfaces
- very low roughness
- machining for module mounting according to drawing
- heat bridges (spacing bridges) on request
- lapped surface on request
- customer specific special design



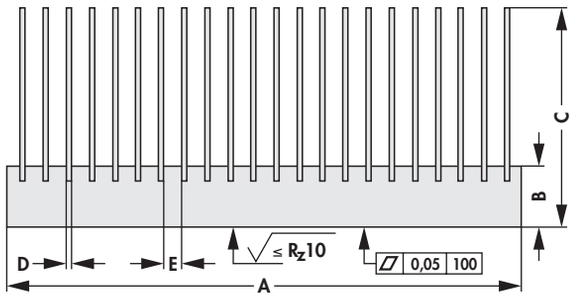


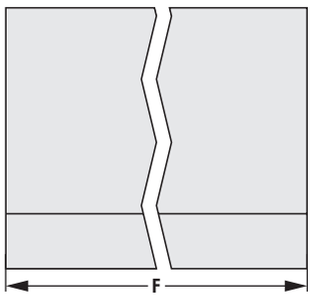


art. no.	↕ [mm]	art. no.	↕ [mm]
KTE 1	58	**KTE 2**	46
material:	aluminium, construction with copper on request		

Fin coolers KTE/KTED custom design

KTE



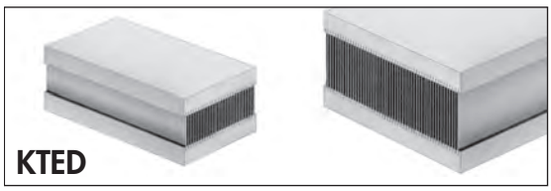


possible dimensions:

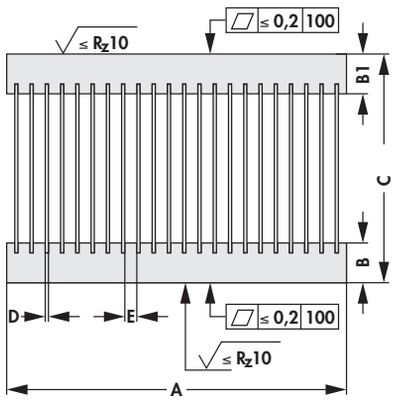
dimensions [mm]					
A	B	C	D	E	F
max. 400	max. 30	max. 150	0.8 / 1 / 1.5 / 2	min. 2	max. 400

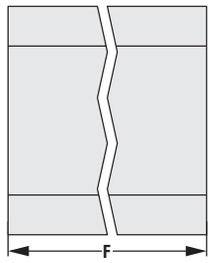
please indicate with your order:

dimensions [mm]					
A	B	C	D	E	F
material:	aluminium, construction with copper upon request				



KTED





- fin coolers in special design
- for forced convection, thus particularly low thermal resistance
- two opposite bottom plates as mounting surfaces for power modules and similar
- mounting surfaces precisely flat milled
- compact design with reduced volume
- ideally fitted thermotechnical and in the basic material pressed in lamellas are additionally mounted with thermal conductive glues to avoid air pockets
- lapped finish on request
- additional machining according to customer's requirements
- fan versions on request
- special constructions to customer's indications

possible dimensions:

dimensions [mm						
A	B	B 1	C	D	E	F
max. 400	max. 30	max. 30	max. 150	0.8 / 1 / 1.5 / 2	min. 2	max. 400

please indicate with your order:

dimensions [mm]						
A	B	B 1	C	D	E	F
max. 400	max. 30	max. 30	max. 150	0.8 / 1 / 1.5 / 2	min. 2	max. 400
material:	aluminium, construction with copper upon request					

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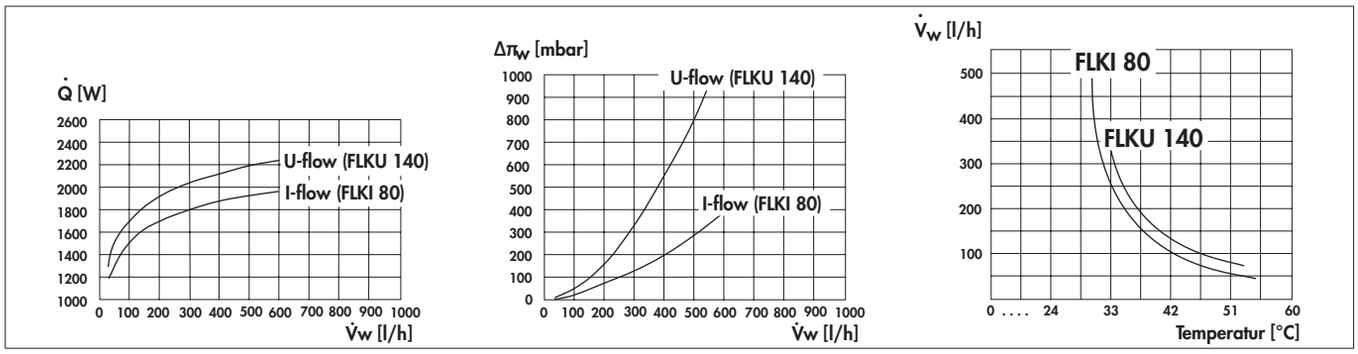
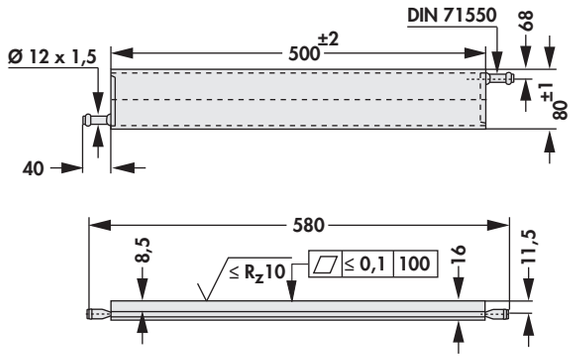
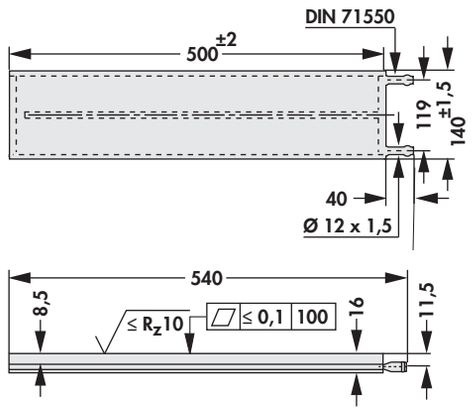
Liquid coolers for power modules

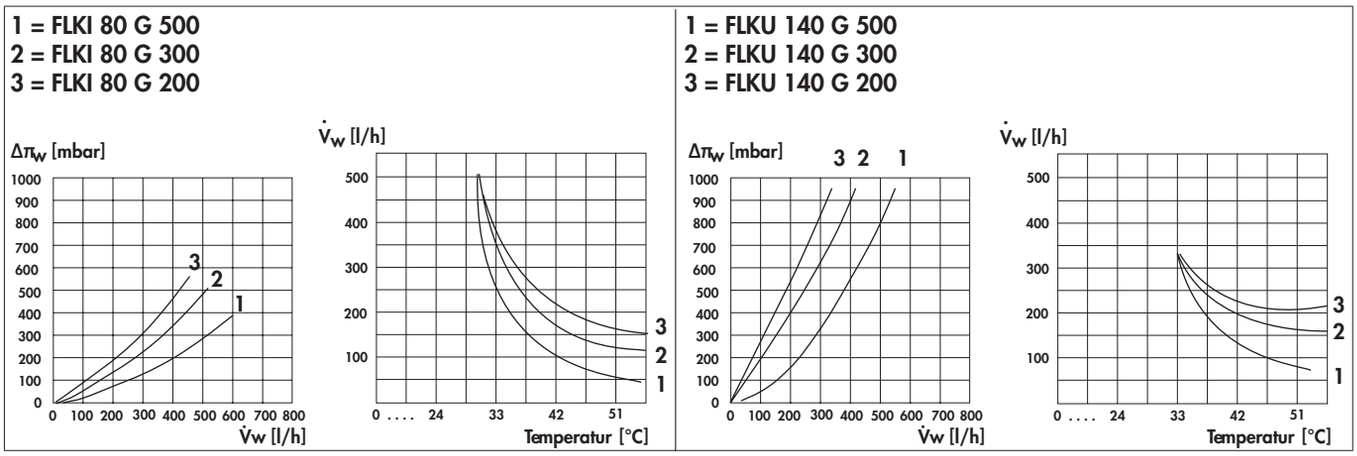


– water-gycol mixture (60/40); inlet temperature approx. 26 °C

Fluid cooler for dissipating large quantities of heat with low space requirement; **effective system to cool power modules**; suitable for water pH 6.5-8.5 with anticorrosives, as well as other fluids (eg. oil, alcohols, etc.); **compact design with internal fin structure for particularly good heat transfer to the fluid**; minimised flow pressure losses (see diagram); **operating pressure up to 2 bar possible**; thick base plate for optimum heat distribution and to secure the heat-emmiting elements; **mounting flange for the cooler according to customer's instructions**; precisely face milled surface of component mounting area with very good flatness and low roughness depth; **dimensionally accurate adjustment to given mounting conditions**; connections using hole ports 12 mm in diameter with reinforcing seam to DIN 71550 or installation flange to customers instuctions; **I- or U-throughflow or multiple throughflow versions**; max. drilling depth in the base plate: 7 mm
To avoid corrosion in the water cooler the cooling fluid has to flow in a closed circuit and it has to contain 40-60 % (preferred is 50 %) anti-corrosive fluids for aluminium, if necessary with anti-freeze. For the choice and approval of the cooling fluid as well as for the possible consequences in the cooling circuit the user is the only liable person. Therefore we exclude any liability for damages caused by the choice or approval of the cooling fluids.

– dimensions and designs using customer's instructions

art. no.		
FLKI 80		
art. no.		
FLKU 140		
material:	EN AW 6060	

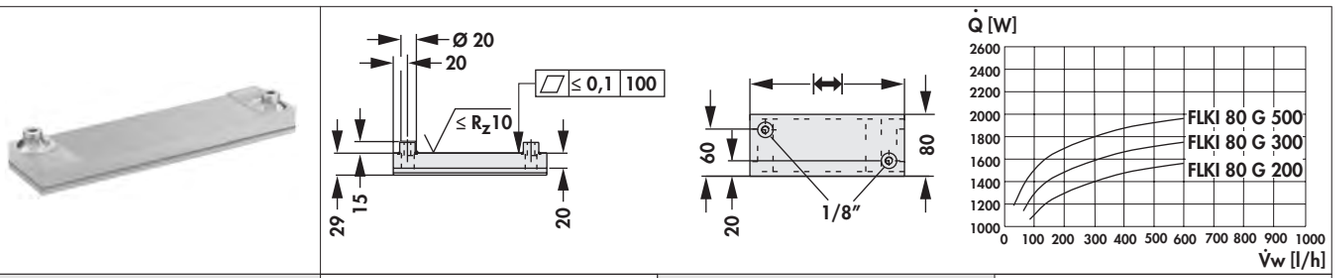


– water-gycol mixture (60/40); inlet temperature approx. 26 °C

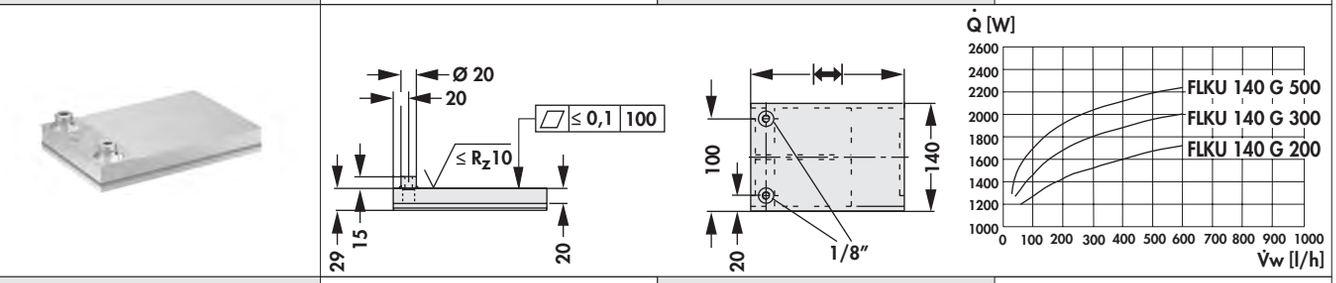
Fluid cooler for dissipating large quantities of heat with low space requirement; **effective system to cool power modules;** suitable for water pH 6.5-8.5 with anticorrosive, as well as other fluids (eg. oil, alcohols, etc.); **compact design with internal fin structure for particularly good heat transfer to the fluid;** minimised flow pressure losses; **operating pressure up to 2 bar possible;** thick base plate for optimum heat distribution and to secure the heat-emitting elements; **mounting flange for the cooler according to customer's instructions;** precisely face milled surface of component mounting area with very good eveness and low roughness depth; **for power modules like IGBT-module, Thyristor-module, SCR diode module, bridge amplifiers and others;** dimensionally accurate adjustment to given mounting conditions; **conncetions with thread muffle 1/8" or mounting flange according to customer's instructions;** I- or U-throughflow or multiple throughflow versions; **max. drilling depth in the base plate: 17 mm**

To avoid corrosion in the water cooler the cooling fluid has to flow in a closed circuit and it has to contain 40-60 % (preferred is 50 %) anti-corrosive fluids for aluminium, if necessary with anti-freeze. For the choice and approval of the cooling fluid as well as for the possible consequences in the cooling circuit the user is the only liable person. Therefore we exclude any liability for damages caused by the choice or approval of the cooling fluids.

– dimensions and designs using customer's instructions



art. no.	↔ [mm]	art. no.	↔ [mm]
FLKI 80 G 200	200	**FLKI 80 G 500**	500
FLKI 80 G 300	300		



art. no.	↔ [mm]	art. no.	↔ [mm]
FLKU 140 G 200	200	**FLKU 140 G 500**	500
FLKU 140 G 300	300		
material:	EN AW 6060		

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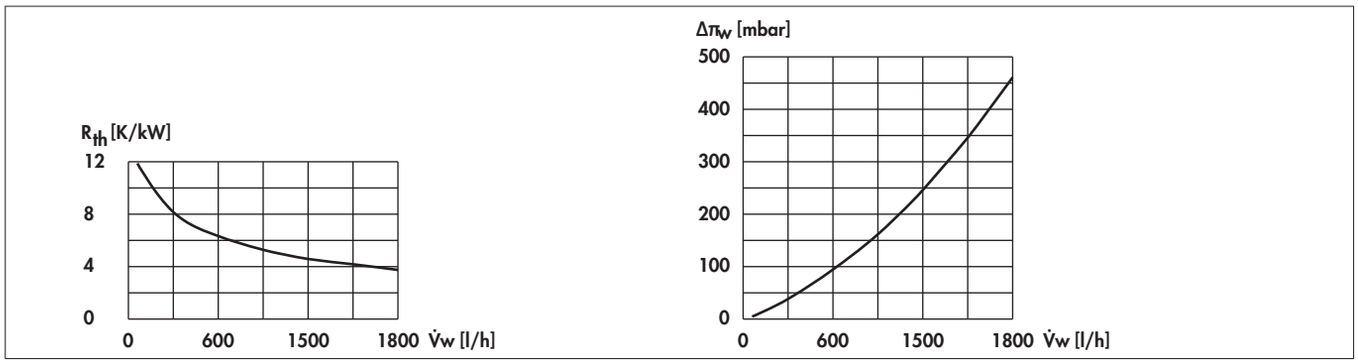
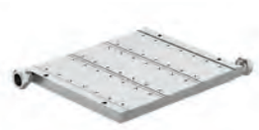
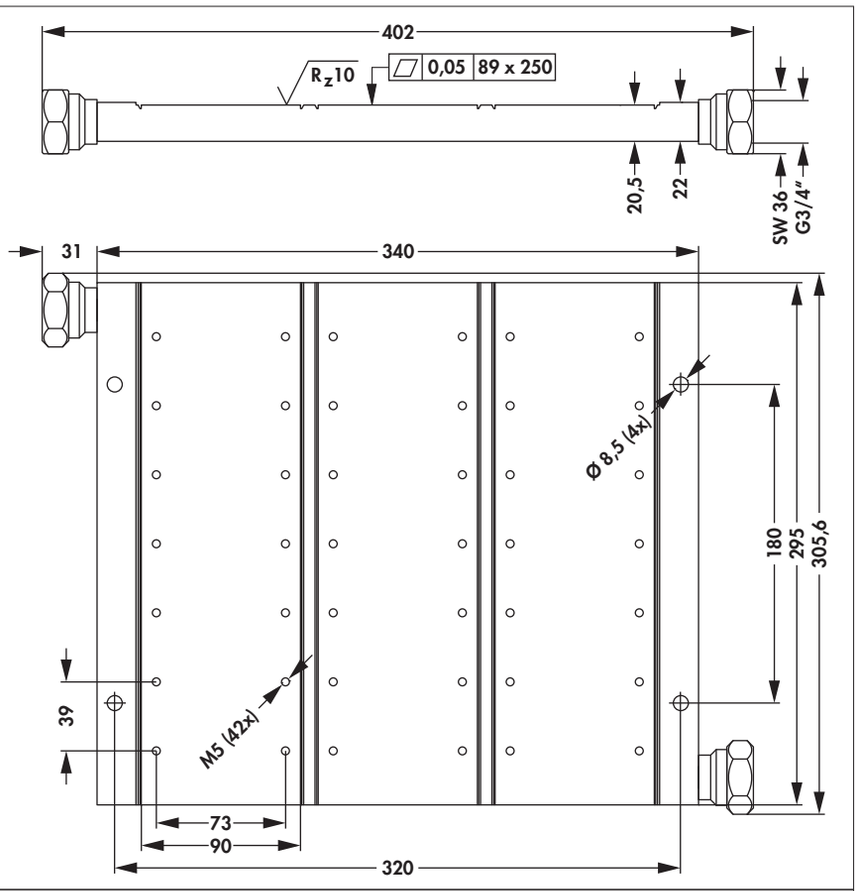
Liquid coolers for power modules

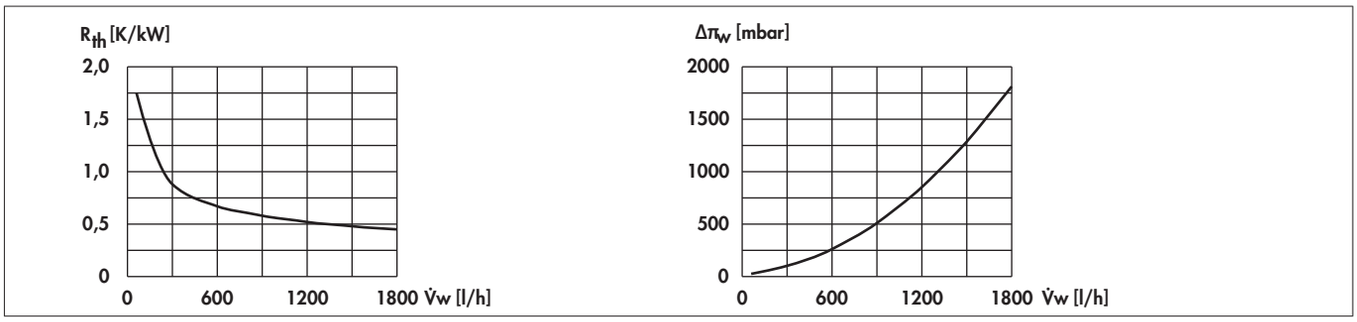


– water glycol mixture (60/40); inlet temperature approx. 26 °C

Liquid coolers of special design for high-power converters PrimePack™3+ module (IGBT 5); **for heat dissipation of maximum 3 modules on one liquid cooler**; suitable for water pH 6,5-8,5 with corrosion protection as well as other fluids (i.e. oils, alcohols, etc.); **particularly good heat transfer to the fluid by means of inner lamellae structure**; operating excess pressure up to 2 bars possible; **thick mounting plate for optimal heat distribution**; mounting of the modules will be done by already installed M5 threads; **threw holes for mounting of the fluid coolers**; precisely milled flat semiconductor mounting surface with very good flatness and low roughness depth; **line connection for water inlet and outlet by means of a G ¾" thread**; special designs and modifications for a specific assembly situation according to customerspecific specifications.

To avoid corrosion in the water cooler the cooling fluid has to flow in a closed circuit and it has to contain 40-60 % (preferred is 50 %) anti-corrosive fluids for aluminium, if necessary with anti-freeze. For the choice and approval of the cooling fluid as well as for the possible consequences in the cooling circuit the user is the only liable person. Therefore we exclude any liability for damages caused by the choice or approval of the cooling fluids.

art. no.		
FLKI 295		
material:	EN AW 6060	

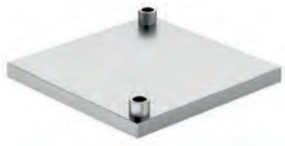
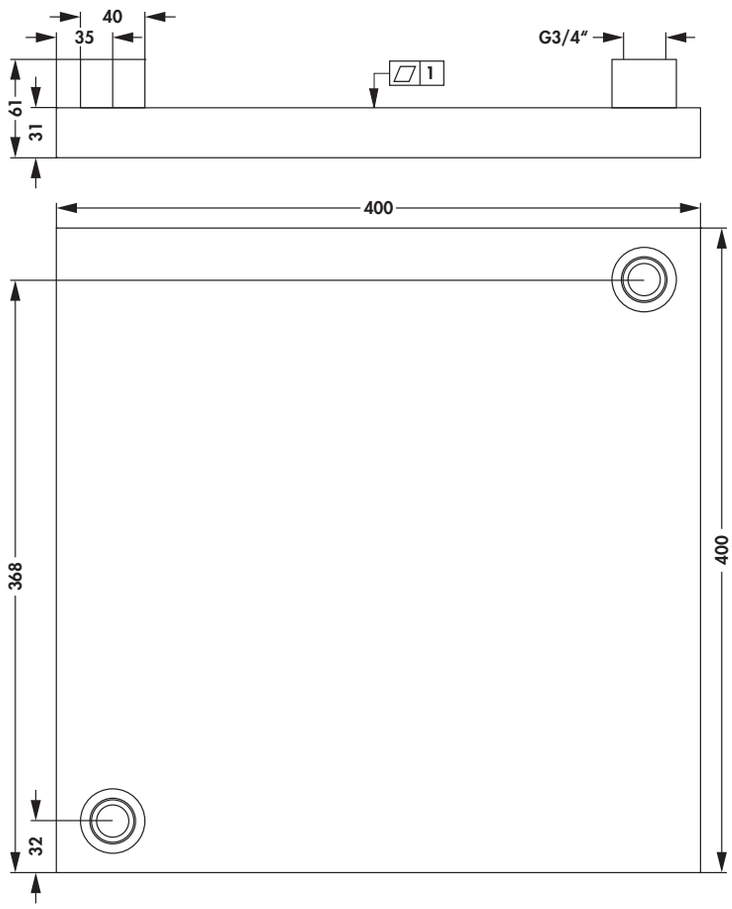


– water glycol mixture (60/40); inlet temperature approx. 26 °C

Fluid cooler for dissipating large quantities of heat with low space requirement; **effective system to cool power modules**; suitable for water pH 6,5-8,5 with anticorrosives, as well as other fluids (eg. oils, alcohols, etc.); **compact design with internal fin structure for particularly good heat transfer to the fluid**; minimised flow pressure losses; **operating excess pressure up to 2 bar possible**; thick base plate for optimum heat distribution and to secure the heat-emitting elements; **mounting flange for the cooler according to customer's instructions**; precisely face milled surface of the component mounting area with very good flatness and low roughness depth; **for power modules such as IGBT-modules, thyristor-modules, SCR diode modules, bridge amplifier and others; dimensional modification at specified installation conditions**; connections via thread G3/4" or mounting flange according to customer's specifications; **drilling depth into the base panel maximum 17 mm.**

To avoid corrosion in the water cooler the cooling fluid has to flow in a closed circuit and it has to contain 40-60 % (preferred is 50 %) anti-corrosive fluids for aluminium, if necessary with anti-freeze. For the choice and approval of the cooling fluid as well as for the possible consequences in the cooling circuit the user is the only liable person. Therefore we exclude any liability for damages caused by the choice or approval of the cooling fluids.

– Dimensioning and realisation in connection with customer's specifications

art. no.		
FLKI 400 G 400		
material:	EN AW 6060	

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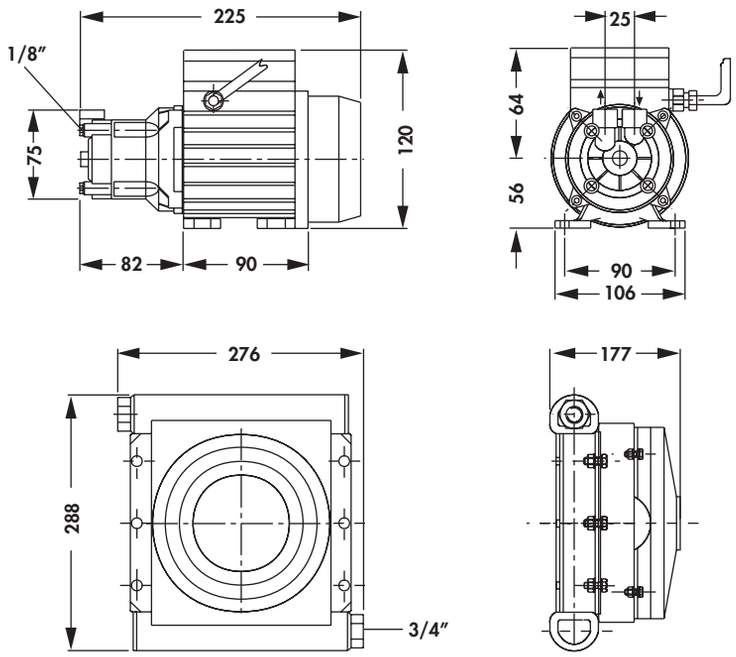
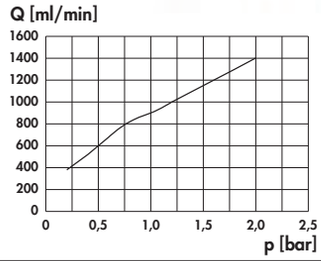
Recooling systems for liquid coolers

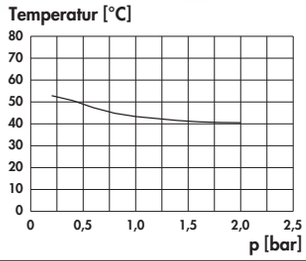
– recooling system for all types of liquid coolers
– cools up to 2,600 watts thermal power loss
– consists of pump and recooler
– pump as normally aspirating, single-stage centrifugal pump with spiral housing in block construction
– recooler with liquid-conducting tube system with air lamella and electrically driven fan motor
– further information free of charge under: **FLK R1-Info**
– notes: anticorrosive agents are required when water is used as coolant (eg. water/glykol - 60/40)
– the hose systems used (NOT in scope of delivery) must be resistant to anticorrosive agents (eg. material EPDM according to DIN 73411, ISO 4081)

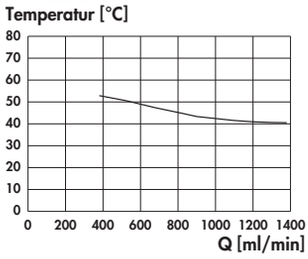
To avoid corrosion in the water cooler the cooling fluid has to flow in a closed circuit and it has to contain 40-60% (preferred is 50%) anti-corrosive fluids for aluminium, if necessary with anti-freeze. For the choice and approval of the cooling fluid as well as for the possible consequences in the cooling circuit the user is the only liable person. Therefore we exclude any liability for damages caused by the choice or approval of the cooling fluids.

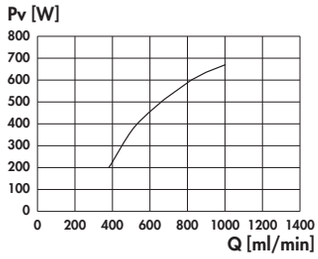
art. no.		
FLKR 1		

thermal cooling capacity:	max. 2.600 W
pump:	single-phase 230 V AC, 120 W
recooler:	single-phase 230 V AC, 120 W/ three-phase 400 V AC, 90 W
type of delivery:	pump and recooler



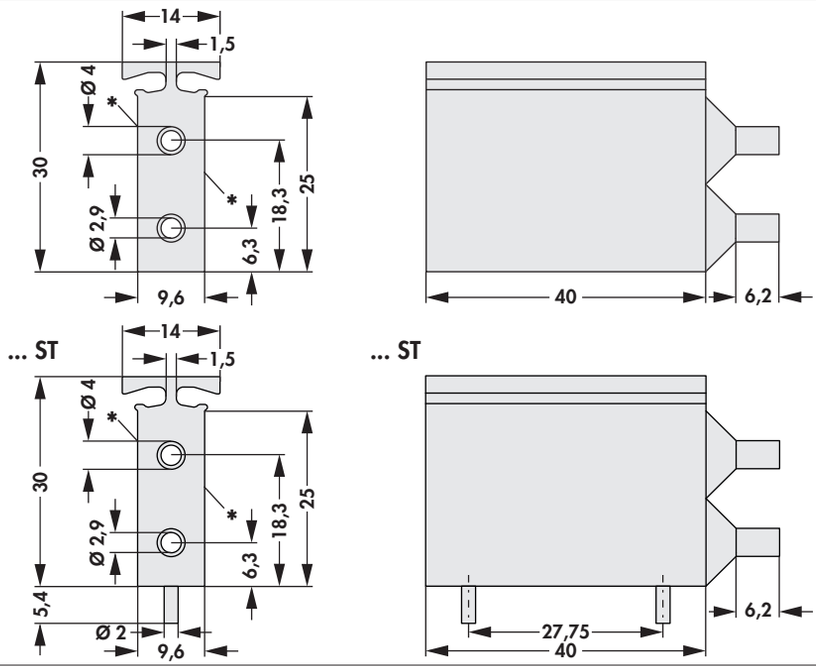






– technical data refer to a water inlet temperature of 23 ° C
– stainless austenitic steel / 1.4404 stainless steel V4A
– water as a cooling medium without corrosion protection inhibitors
– suitable liquid pumps and hose systems on request
– other materials with higher thermal conductivity (nickel) on request
– version with soldering for PCB mounting on request
– customer-specific adaptations and designs

Liquid coolers for circuit board assembly; **produced in 3D printing with an AI-optimized heat exchange structure**; dissipation of large amounts of heat with little space requirement; **particularly suitable for power semiconductors in TO case, SIP Multiwatt and similar**; simple and safe component assembly using lock-in retaining springs for transistors from the THFU series; **separate cooling circuit on each mounting side;** minimized flow pressure losses through optimized heat exchange structure; **finely ground semiconductor mounting surfaces with very good flatness and low surface roughness**; maximum operating pressure up to 3 bar; **max. dissipated power loss with a difference in water temperature (IN = 33 ° C, OUT = 43 ° C) of 670W**; simple connection via plastic hoses from the pneumatics area; **dimensional adjustments to the given installation conditions**

art. no.		
FLKU 10 ...		
		* ground flat
please indicate:	**... mounting method (optional)** **ST = with solder pin**	
material:	stainless steel 1.4404	

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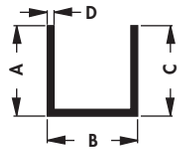
Standard aluminium profiles

– length, drilling and surface finishes to customer's instructions
– other standard profiles on request

U-profiles

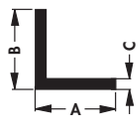


art. no.	A [mm]	B [mm]	C [mm]	D [mm]	art. no.	A [mm]	B [mm]	C [mm]	D [mm]
SU 02	20	40	20	2.5	**SU 16**	30	30	30	2.0
SU 03				2.0	**SU 27**	40	40	40	2.5
SU 05	30	20	30		**SU 29**				4.0
SU 09	20		20	1.5	**SU 32**	30	30	30	3.0
tolerances:	EN 755								
material:	EN AW 6060								

flat profiles

art. no.	A [mm]	B [mm]	art. no.	A [mm]	B [mm]
SFP 005	40	15	**SFP 058**	40	8
SFP 006	30	8	**SFP 060**	80	
SFP 007	40	5	**SFP 067**	30	15
SFP 016	70	15	**SFP 074**	70	10
SFP 028	40	10	**SFP 076**	60	30
SFP 029	30		**SFP 079**	90	100
SFP 037	55		**SFP 090**	120	15
SFP 046	25	5	**SFP 100**	100	
SFP 054	50	10	**SFP 106**	40	20
SFP 057	115	100	**SFP 112**	100	25
tolerances:	EN 755				
material:	EN AW 6060				

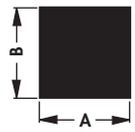
angled profile



art. no.	A [mm]	B [mm]	C [mm]	art. no.	A [mm]	B [mm]	C [mm]
SWP 02	80	80	8	**SWP 29**	15	10	2
SWP 06		40	6	**SWP 36**	75	50	5
SWP 10	30	20	2	**SWP 40**	40	30	
SWP 15	40		4	**SWP 55**		40	
SWP 23	20	15	2	**SWP 57**	60	30	
SWP 25	50	30	5				
tolerances:	EN 755						
material:	EN AW 6060						

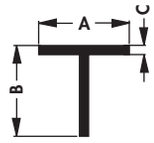
Standard aluminium profiles

quadrangular profile



art. no.	A [mm]	B [mm]	art. no.	A [mm]	B [mm]
SVP 01	8	8	**SVP 12**	50	50
SVP 04	25	25	**SVP 13**	55	55
SVP 10	10	10			
tolerances:	EN 755				
material:	EN AW 6060				

T-profile



art. no.	A [mm]	B [mm]	C [mm]	art. no.	A [mm]	B [mm]	C [mm]
STP 4	60	60	6	**STP 5**	20	20	2
tolerances:	EN 755						
material:	EN AW 6060						

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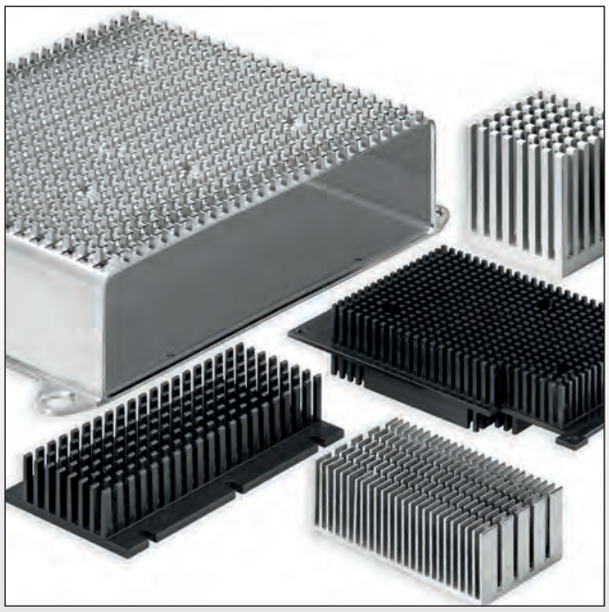
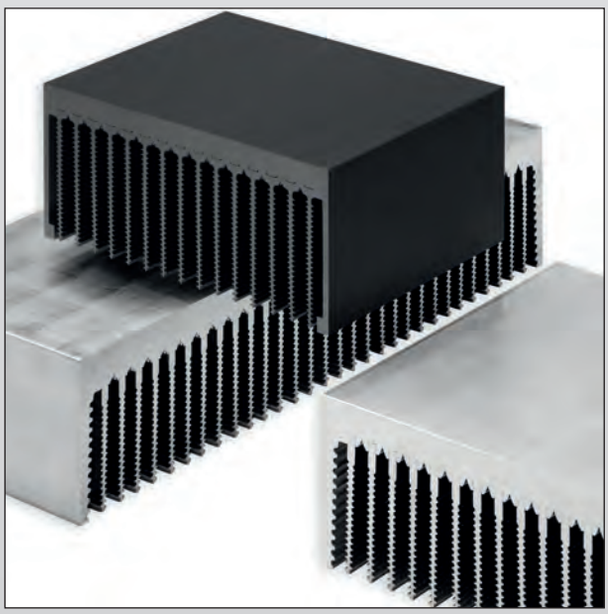
CNC treatments of cooling profiles
Streamlined omnidirectional fin geometrie
Heatsinks with pressed-in fins
Precise milled flat surfaces

Customer specified CNC treatments of cooling profiles
- latest CNC machining centres for highest quality demands
- profile treatments for seizes up to 1600 mm
- future orientated stockkeeping of the aluminium profiles in fully automated honeycomb warehouses
- batch size optimized production flow
- special profiles, modifications and surfaces according to your special demand



Streamlined omnidirectional fin geometrie
- free-standing cooling fingers for forced cooling
- incident flow of the heatsinks by means of fans from all sides (omnidirectional)
- no direction-oriented installation position
- fin spacings according to your demand
- special designs, treatments and versions according to customer's request



Extruded heatsinks with pressed-in fins
- for highest thermal dissipation losses
- channelled fin geometrie for increasing the surface
- thermotechnical optimized connection between fin and bottom plate
- deliverable in widths of 200 up to 750 mm
- customer specific versions and treatments

Precise milled flat surfaces
- very small depth of roughness and unevenness
- individually milled flat semi-conductor mounting surfaces for minimizing the heat-transmission resistances
- millings on the already anodized heatsinks
- protective foil avoid scratching of the high-quality mounting surface
- special designs according to customer's drawing

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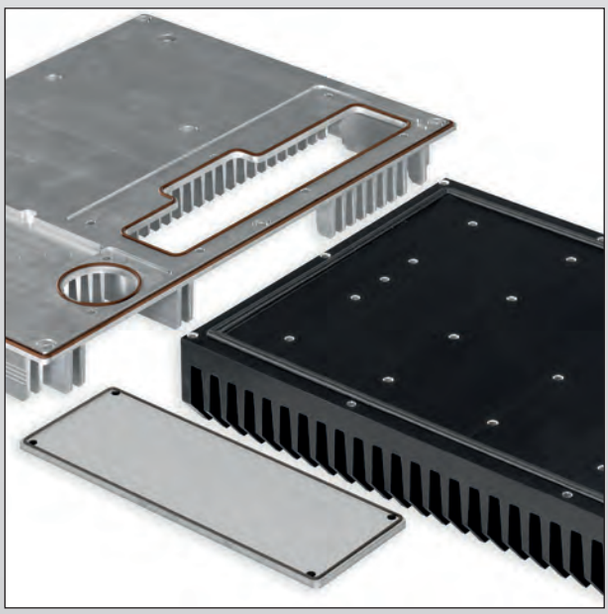
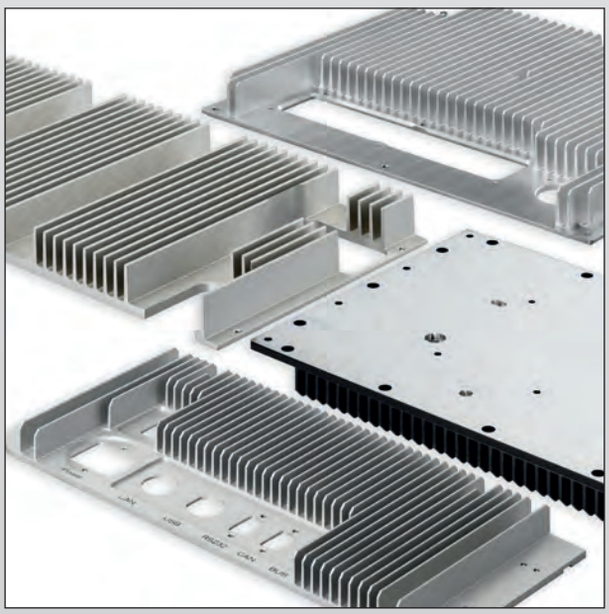
Surface labelling
Additional equipments
Heatsinks with integrated sealing
19" compliant CNC-treatment

Surface labelling
- durable and high quality labeling by means of YAG-laser, silk screen-, pad- and digital printing
- print layout preparation by means of in-house repro department
- precise in contrast, precise engraved fonts and contours by means of CNC-controlled treatment systems
- labeling of aluminium, Plexiglas and plastics

Additional equipments
- fractional semi-conductor mounting surfaces made of copper for heat dissipation
- pressed-in or screwed distance sleeves made of metal and plastics
- threaded bolts with internal and external thread
- support rail mountings made of metal or plastics according to DIN EN 50022



Heatsinks with integrated sealing
- foamed sealing applied on the profile as a permanent element of the heatsink
- also usable for front plates or milled parts
- groove filled or stacked
- permanently elastic and CFC-free
- adaption of the sealing properties to the specific application



19" compliant CNC-treatment
- milled heatsink side or back panels for 19" cases, 19" plug in boxes, subracks and insert modules
- pressing in or welding of threaded bolts
- customer specified modifications, designs
- surfaces and printing upon request

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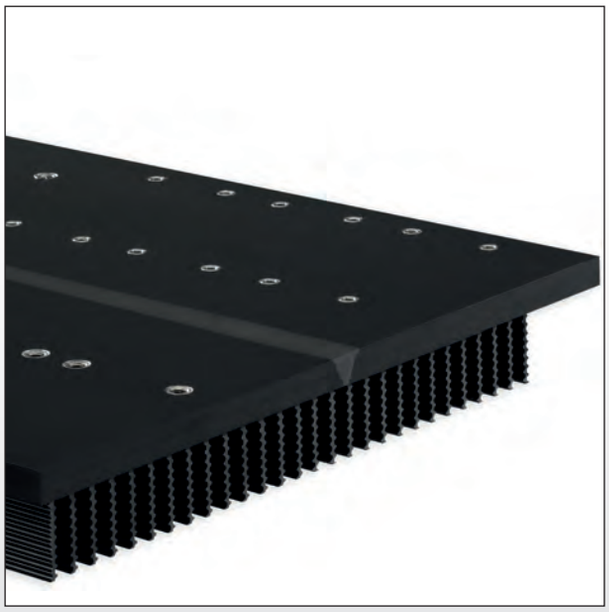
Welded high perfomance heatsinks
Welded heatsinks
Construction- and milled parts
Cases and contour milled parts

Welded high performance heatsinks
- optimal fin geometry with channelled structure for free convection
- production of heatsink widths outside of the press-technical production possibilities
- removing of the welding line by means of precise milled flat surfaces
- individual surface design



Welded heatsinks
- homogeneous connection of the materials by means of special welding methods
- welding on additional mounting levels which are situated diagonally to the pressing direction of the profiles
- production of prototypes
- application-based special designs and treatments according to your demand

Construction- and milled parts made of aluminium according to customer specifications
- precise milled contours and surfaces
- inserting of holes and cut-outs, cutting or milling of threads
- turning in of wire thread inserts for high- and wear-resistant threads
- simple data exchange by means of up to date CAD- / CAM-systems

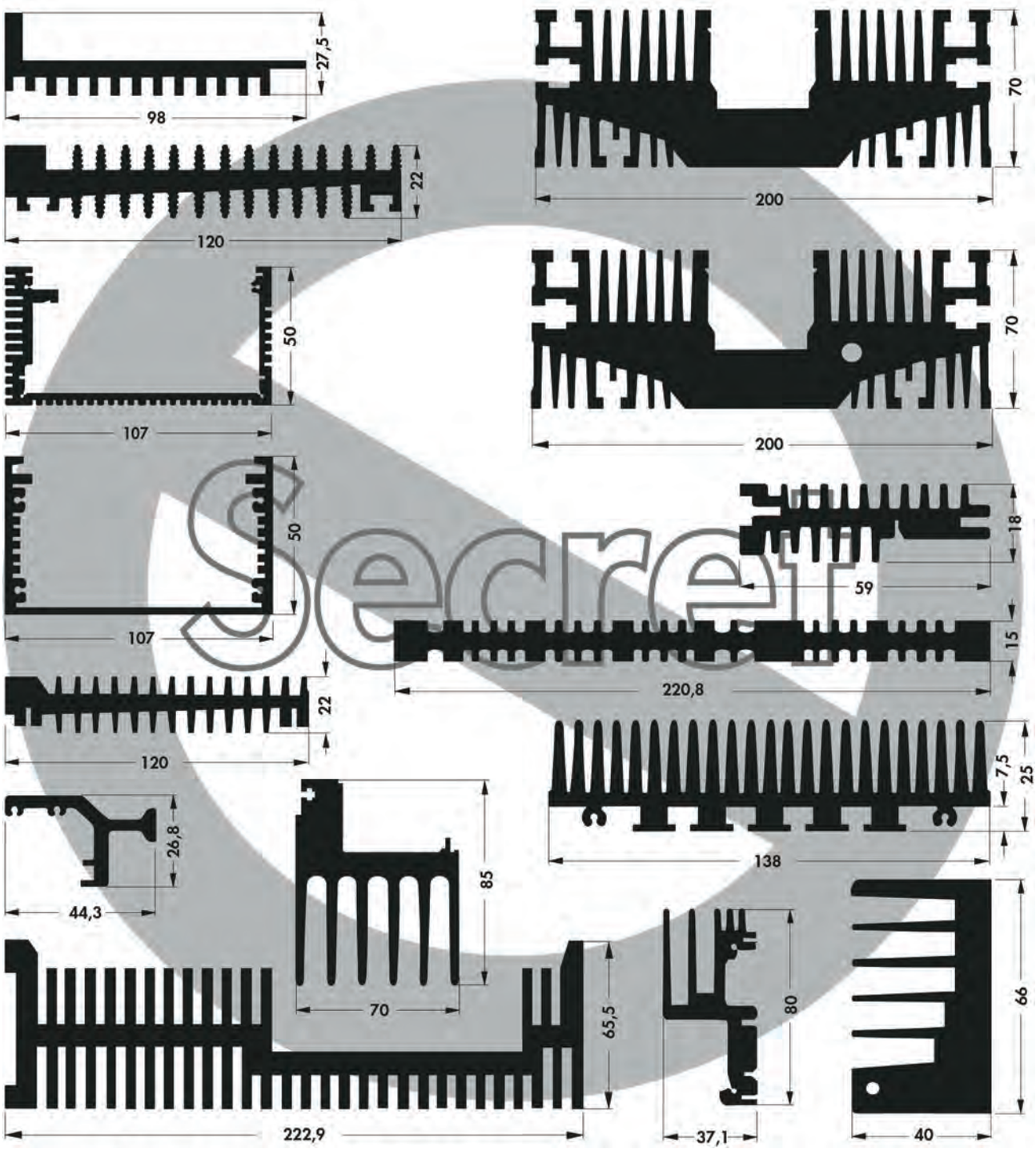
Cases and contour milled parts made of aluminium
- customer specific cases and construction parts
- precise mechanical treatments for highest quality demands
- all requested surface designs
- modifications and versions, special requirements, treatments and designs according to your drawing specification

Special profiles

Whenever you cannot find the ideal solution for your problem from the wide range of standard extrusions on offer or a solution constitutes a compromise between the use of the space available and the weight, as long as the quantity is correct a special section is the answer.

Released from the dimensional restrictions of the standard profiles, special extrusions are tailored to your design requirements, and offer considerable benefits in terms of machining time and use of space.

Furthermore your calculation will be influenced positively by the optimised material use and shorter machining times.
You can determine the combination of the desired thermal properties and the design element yourself, by the use of a special profile.
We are not allowed to publish many of our customer-specific Profiles, because they are subject to „non disclosure agreements".
Therefore we only show some examples for customer profiles in the industry.
All figures are illustrations. Changes reserved.



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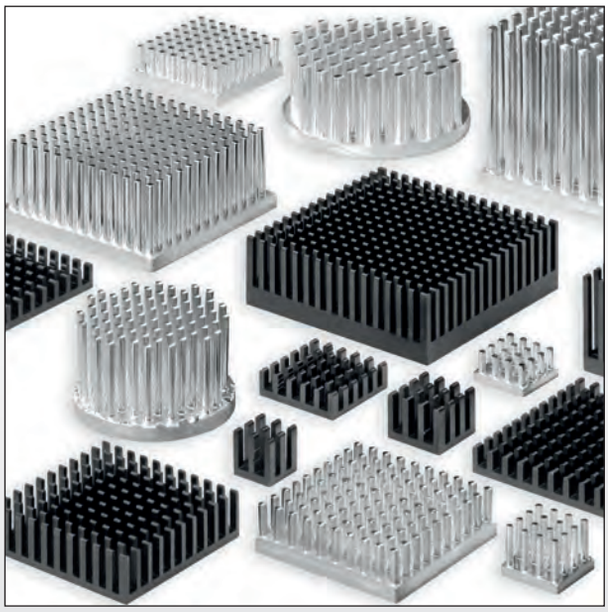
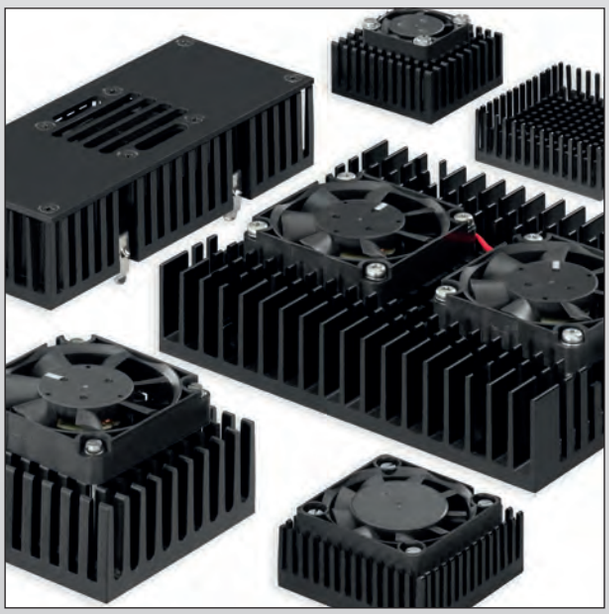
Round and pin heatsinks
Heatsinks for LEDs
Heatsinks for all transistor types
Heatsinks and coolers for processors



Round and pin heatsinks
- streamlined omnidirectional fin geometrie
- excellent thermal conductivity due to special aluminium alloys
- suitable for free and forced convection
- no direction bounded installation position
- flat semiconductor mounting surfaces
- contour also as milled parts according to your demands

Heatsinks for LEDs
- various heatsink geometries adjusted to all current LED-types and light-engines
- star shaped heatsinks for the use as a LED-lamp housing
- LED mounting by means of screws, thermal conductive adhesive foil or thermal conductive glue
- customer specified versions with application based „thermal management“

Heatsinks for all current PL CC, DIL-IC and SMD transistor types
- effective heat dissipation at a low profile and low weight
- direct mounting of the component by means of a double-sided adhesive thermal foil or glue
- solderable versions of the surface
- special packaging such as tape & reel, magazine or tray upon request



Heatsinks and coolers for processors
- passive and active product solutions
- effective heat dissipation due to optimal conception of fan and heatsink
- long lifetime and high operating safety due to high quality fans
- versions for screw, glue and clip mounting
- customer specific solutions and fans

Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK PGA 6 x 6 x 14	B 13	20	6.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 8 x 8 x 12	B 13	14.8	8.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 9 x 9	B 13	14	3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 11 x 11 x 8	B 13	16	7.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 11 x 11	B 13	10.9	4.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 11 x 11 x 12	B 14	12.3	3.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 14 x 14	B 14	10	4.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 14 x 14 x 10	B 14	10.5	11.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 14 x 14 x 14	B 14	9.6	12.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 14 x 14 x 12	B 14	9.8	5.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 15 x 15	B 15	9.4	5.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 16 x 16 x 8	B 15	14	4.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 16 x 16 x 10	B 15	10.5	12.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 16 x 16 x 12	B 15	9.3	6.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 17 x 17	B 15	8.6	6.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 17 x 17 x 8	B 16	13.2	5.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 17 x 17 x 12	B 16	9	6.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 18 x 18	B 16	8.4	7.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 19 x 19	B 16	8.6	7.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 19 x 19 x 12	B 16	9	6.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 20 x 20 x 10	B 17	8.5	15.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 20 x 20 x 8	B 17	12	6.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 20 x 20	B 17	7.6	8.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 20 x 20 K	B 17	7.6	8.3	fixing clamp	socket 7/ socket 370	IDT W2A/ AMD® K6-III/ AMD® K6-2/ MMX/ IDT C6/ Intel® Pentium®
ICK PGA 20 x 20 x 12	B 17	8	8.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 21 x 21	B 18	7	8.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 22 x 22	B 18	6.2	8.9	therm. conductive foil/ therm. cond. adhesive	universal	universal

– very good thermal efficiency
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Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK PGA 25 x 25	B 18	5	11.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 10 x 10	B 19	32	1.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 10 x 10 x 10	B 19	28.5	1.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 11 x 11 x 6	B 19	31	1.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 11 x 11 x 10	B 19	27.5	2.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 11 x 11 x 14	B 20	25.5	2.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 12 x 12 x 18	B 20	24.5	2.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 14 x 14	B 20	30	2.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 14 x 14 x 10	B 20	27.4	2.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 14 x 14 x 14	B 20	25.9	2.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 15 x 15 x 6	B 21	29.5	2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 15 x 15 x 10	B 21	27	2.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 15 x 15 x 14	B 21	25.5	2.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 19 x 19 x 6	B 21	27	2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 19 x 19 x 10	B 21	26	2.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 19 x 19 x 14	B 21	21	2.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 21 x 21	B 22	24.3	2.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 21 x 21 x 10	B 22	23	2.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 21 x 21 x 14	B 22	20	3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 23 x 23	B 22	22.5	2.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 23 x 23 x 10	B 22	21.5	2.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 25 x 25 x 6	B 22	21.25	2.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 25 x 25 x 10	B 23	20	3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 25 x 25 x 14	B 23	17	3.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 27 x 27	B 23	20	3.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 27 x 27 x 10	B 23	18.5	3.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 27 x 27 x 14	B 23	13.5	9.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 27 x 27 x 22	B 24	10.5	9.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 29 x 29 x 6	B 24	19.5	3	therm. conductive foil/ therm. cond. adhesive	universal	universal

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Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK BGA 29 x 29 x 10	B 24	18	3.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 29 x 29 x 14	B 24	17	3.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 31 x 31	B 24	18.6	3.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 31 x 31 x 10	B 25	17	3.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 33 x 33 x 6	B 25	17.5	3.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 33 x 33 x 10	B 25	16.5	3.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 33 x 33 x 14	B 25	15	4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 35 x 35	B 25	16.5	3.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 35 x 35 x 10	B 26	15.7	3.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 37 x 37 x 6	B 26	15.7	9.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 37 x 37 x 10	B 26	14	10.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 40 x 40	B 26	14.6	4.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 40 x 40 x 10	B 26	13.8	4.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 42,5 x 45	B 27	13.6	4.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 10 x 10 x 6,5	B 28	25	2.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 10 x 10 x 10	B 28	23.75	2.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 10 x 10 x 12,5	B 28	22.5	2.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 10 x 10 x 18,5	B 29	21.75	3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 14 x 14 x 6,5	B 29	9	5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 14 x 14 x 10	B 29	8.8	5.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 14 x 14 x 12,5	B 29	8.1	5.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 14 x 14 x 18,5	B 29	7.9	5.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 17 x 17 x 15	B 30	8.36	5.95	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 17 x 17 x 20	B 30	7.89	6.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 18 x 18 x 6,5	B 30	7	7.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 18 x 18 x 10	B 30	6.8	8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 22 x 22 x 6,5	B 30	6.4	13.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 22 x 22 x 10	B 31	5.9	8.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 22 x 22 x 18,5	B 31	5	10	therm. conductive foil/ therm. cond. adhesive	universal	universal

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Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK S 25 x 25 x 6,5	B 31	5.8	12.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 25 x 25 x 12,5	B 31	5.3	14.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 25 x 25 x 18,5	B 31	5.2	14.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 29 x 29 x 10	B 32	5.7	13.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 29 x 29 x 20	B 32	3.7	20.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 29 x 29 x 30	B 32	2.9	21	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 32 x 32 x 10	B 32	5.4	13.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 32 x 32 x 20	B 32	3.7	20.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 36 x 36 x 10	B 33	4.7	16	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 36 x 36 x 15	B 33	3.9	19.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 36 x 36 x 20	B 33	3.2	22	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 36 x 36 x 30	B 33	2.5	23.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 40 x 40 x 7,5	B 33	4.85	15.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 40 x 40 x 10	B 34	4.6	16.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 40 x 40 x 20	B 34	3.5	21.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 40 x 40 x 25	B 34	3.1	23.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 45 x 45 x 10	B 34	4.7	16	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 45 x 45 x 20	B 34	4.4	17	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 50 x 50 x 10	B 35	2.7	20	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 50 x 50 x 20	B 35	2.7	27.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 50 x 50 x 25	B 35	2.4	31.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 50 x 50 x 40	B 35	6.05	13.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 50 x 50 x 50	B 35	4.05	14.32	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 98 x 98 x 30	B 36	2.4	35	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 98 x 98 x 45	B 36	3.5	42	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S D 12 x 12 x 7,5	B 37	48	2.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S D 18 x 12 x 7,5	B 37	9	5.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S D 24 x 18 x 7,5	B 37	8.5	5.85	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S D 98 x 98 x 10	B 37	4.88	10.25	therm. conductive foil/ therm. cond. adhesive	universal	universal

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Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK S R 28,5 x 6,5	B 38	17.3	3.47	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 28,5 x 10	B 38	13.9	4.32	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 28,5 x 12,5	B 38	10.3	5.83	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 28,5 x 18,5	B 39	10.1	5.94	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 32,5 x 10	B 39	11.9	5.04	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 32,5 x 20	B 39	10	6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 32,5 x 30	B 39	8.8	6.82	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 32,5 x 40	B 39	7.6	7.89	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 32,5 x 50	B 40	6.6	9.09	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 36,5 x 20	B 40	7.2	8.33	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 40 x 10	B 40	7.1	8.45	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 40 x 20	B 40	6.05	9.92	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R A 40 x 20	B 40	7.6	7.89	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 40 x 30	B 41	6.1	9.84	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 40 x 50	B 41	4.5	13.33	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 45 x 30	B 41	6	10	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 45 x 45	B 41	4.4	13.64	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 50 x 10	B 41	6	10	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 50 x 20	B 42	7	8.57	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 50 x 30	B 42	6.1	9.84	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 50 x 45	B 42	5.1	11.76	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 54 x 20	B 42	6.1	9.84	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 54 x 30	B 42	5.05	11.88	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 54 x 45	B 43	4.1	14.63	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 70 x 30	B 43	4	15	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 70 x 50	B 43	3.5	17.14	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 85 x 30	B 43	3.7	16.22	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 85 x 45	B 43	3.4	17.65	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 98 x 30	B 44	3.7	16.22	therm. conductive foil/ therm. cond. adhesive	universal	universal

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Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK S R 98 x 50	B 44	2.95	20.34	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 100 x 50	B 44	2.3	26	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 100 x 70	B 44	2	30	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 120 x 50	B 45	1.9	31.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 120 x 70	B 45	1.8	33.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 140 x 50	B 45	1.85	32.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 140 x 70	B 45	1.7	35.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 160 x 70	B 46	1.6	37.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 23,5 x 14	B 47	18.58	6.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 23,5 x 14 G	B 47	19.16	6.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 27 x 10	B 47	17.69	6.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 27 x 10 G	B 47	18.24	6.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 28 x 15	B 47	15.24	7.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 28 x 15 G	B 48	15.72	7.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 29 x 11,5	B 48	17.26	8.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 29 x 11,5 G	B 48	17.8	8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 32 x 14	B 48	15.23	7.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 32 x 14 G	B 48	15.23	7.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 33 x 10	B 48	17.6	6.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 33 x 10 G	B 48	18.15	6.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 33 x 16,5	B 49	13.87	8.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 33 x 16,5 G	B 49	14.3	8.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 35 x 10	B 49	16.9	9.35	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 35 x 10 G	B 49	17.5	9.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 36 x 12	B 49	12.88	10	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 36 x 12 G	B 49	13.28	8.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 40 x 10	B 49	12.28	9.45	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 40 x 10 G	B 50	12.66	9.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 40 x 27	B 50	9.41	12.1	therm. conductive foil/ therm. cond. adhesive	universal	universal

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art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK LED R 40 x 27 G	B 50	9.71	11.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 45,7 x 16,5	B 50	10.46	11.05	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 45,7 x 16,5 G	B 50	10.49	10.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 50 x 10	B 50	10.57	10.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 50 x 10 G	B 51	10.9	10.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 50,8 x 16,5	B 51	10.17	11.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 50,8 x 16,5 G	B 51	10.49	10.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 54 x 20	B 51	9.48	12.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 54 x 20 G	B 51	9.78	11.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 66 x 40	B 52	3.2	21	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 75 x 10	B 52	5.2	12.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 84 x 40	B 52	2.5	14.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 100 x 40	B 52	2	27	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 160 x 40	B 53	1.4	42	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 200 x 40	B 53	1	51	therm. conductive foil/ therm. cond. adhesive	universal	universal
SK LED 1	B 63	15				
SK LED 2	B 63	9				
SK LED 3	B 63	7				
SK LED 5	B 64	12.5				
SK LED 6	B 64	14.2				
SK LED 7	B 64	9.2				
SK LED 4	B 65	2				
ICK PPC 51	B 73	8.1	14	screw fastening		Power PC
ICK PEN 3 XE	B 73	2	31.3	screw fastening	Slot 2	Intel® Pentium® III-Xeon™ Slot II Format
ICK PEN 3 XE 1	B 73	1.8	33.6	screw fastening	Slot 2	Intel® Pentium® III-Xeon™ Slot II Format
ICK EM 22	B 73	4.4	18.1	screw fastening		MQ7 Board
ICK EM 25	B 73	3.9	20.4	screw fastening		Q7 Board
ICK PEN 38 F	B 74	4	15.1	therm. conductive foil	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2
ICK PEN 38 W	B 74	4	15.1	therm. cond. adhesive	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2

– very good thermal efficiency
– aerodynamic imnidirectional fin geometry
– simple mounting by means fo fixing clamp, thermal conductive adhesive film or thermal conductive glue
– customer specified designs, surfaces and modifications upon request

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Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK PEN 45 W	B 74	3.5	21	therm. cond. adhesive	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2
ICK PRO 40 W	B 74	2.7	22	therm. cond. adhesive	socket 8	Intel® Pentium® PRO
ICK PEN 3 FC	B 74	3.5	22	fixing clamp	socket 7/ socket 370	Intel® Pentium® III FC PGA (Mendocino, Cop-permine)

- **very good thermal efficiency**
- **aerodynamic imnidirectional fin geometry**
- **simple mounting by means fo fixing clamp, thermal conductive adhesive film or thermal conductive glue**
- **customer specified designs, surfaces and modifications upon request**

Fan coolers for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
LA LED 40 x 30	B 66	1.4	35	therm. conductive foil/ therm. cond. adhesive	universal	universal
LA LED 50 x 20	B 66	1.25	40	therm. conductive foil/ therm. cond. adhesive	universal	universal
LA LED 50 x 45	B 66	0.9	50	therm. conductive foil/ therm. cond. adhesive	universal	universal
LA ICK 15 x 15 F 05	B 75	2.3	22.2	therm. conductive foil	universal	universal
LA ICK 15 x 15 F 12	B 75	2.3	22.2	therm. conductive foil	universal	universal
LA ICK 17 x 17 F 12	B 75	1.6	35.8	therm. conductive foil	universal	universal
LA ICK 17 x 17 F 12 A	B 75	1.6	35.8	therm. conductive foil	universal	universal
LA ICK 17 x 17 W 05	B 75	1.6	35.8	therm. cond. adhesive	universal	universal
LA ICK 17 x 17 W 12	B 75	1.6	35.8	therm. cond. adhesive	universal	universal
LA ICK 18 x 18 F 12	B 75	1.5	41.7	therm. conductive foil	universal	universal
LA ICK 18 x 18 W 12	B 75	1.5	41.7	therm. cond. adhesive	universal	universal
LA ICK 21 x 21 F 05	B 75	1.4	46.3	therm. conductive foil	universal	universal
LA ICK 21 x 21 F 12	B 75	1.4	46.3	therm. conductive foil	universal	universal
LA ICK 21 x 21 W 05	B 75	1.4	46.3	therm. cond. adhesive	universal	universal
LA ICK 21 x 21 W 12	B 75	1.4	46.3	therm. cond. adhesive	universal	universal
LA ICK PEN 8 F 05	B 76	2.5	23.4	therm. conductive foil	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2
LA ICK PEN 8 F 12	B 76	2.5	23.4	therm. conductive foil	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2
LA ICK PEN 8 W 05	B 76	2.5	23.4	therm. cond. adhesive	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2
LA ICK PEN 8 W 12	B 76	2.5	23.4	therm. cond. adhesive	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2
LA ICK PEN 16 W 12	B 76	1.2	51.1	therm. cond. adhesive	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2

– high-quality industrial design
– compact design with high mechanical stability
– fan with doubled ball bearing axis
– optimal thermotechnical design of fan and heatsink

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Fan coolers for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
LA ICK PEN 16 W 12 A	B 76	1.2	51.1	therm. cond. adhesive	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2
LA ICK PEN 18 W 12	B 76	1.6	38.6	therm. cond. adhesive	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2
LA ICK PEN 38 W 12	B 76	1.1	53.6	therm. cond. adhesive	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2
LA ICK PRO 25 F 12	B 76	0.97	60	therm. conductive foil	socket 8	Intel® Pentium® PRO
LA ICK PEN 2 K 12	B 77	1.2	58		Slot A/ Slot 1	Intel® Pentium® II/ AMD® Athlon®
LA ICK PEN 3 XE	B 77	0.8	61.8	screw fastening	Slot 2	Intel® Pentium® III-Xeon™
LA ICK PEN 4 1 K	B 77	0.6	85	fixing clamp	socket 463/ socket 423	Intel® Pentium® IV

- **high-quality industrial design**
- **compact design with high mechanical stability**
- **fan with doubled ball bearing axis**
- **optimal thermotechnical design of fan and heatsink**

Fan coolers for IC processor

Heatsinks
– excellent thermal efficiency achieved by flow-favourable omnidirectional fin geometry and black anodised surface
– easy mounting using fixing clamp, thermally conductive adhesive foil or thermally conductive glue

Fan coolers
– special high-grade industrial type
– compact design with high mechanical stability
– fan motor axle with double ball bearings ensures high reliability and long product life
– low current consumption and thus low self-heating
– effctive heat dissipation achieved by optimum design of fan motor and heatsink
– fan motors with other operating voltages on request
– fan motors also available with pulse output and alarm device cicuit

Technical introduction
– the thermal resitances and the power dissipation were determined with an ambient temperature of 25 °C and an IC case-temperature of 85 °C
– with higher IC case-temperature, the power to be dissipated increases proportionally

Fixing methods

K = fixing clamp
F = double sided thermally conductive adhesive foil
W = thermally conductive glue
SB= screw fixing

Technical data for fans with pulse output ➔ B 78
– pulse output for control of the alarm device circuit
– puls form is like rectangle with the triple frequency of rotation speed
– with blocked rotor the output signal can be L (0.8 V) or H (Vcc-1V)
– the pulse output must not be connected with GND or Vcc without a mutiplier (>10K)
– to prevent short circuits, do not isolate the used puls output

– double-sided adhesive thermal conductive foil **WLF ...** ➔ E 37

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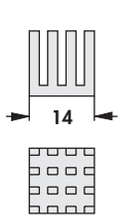
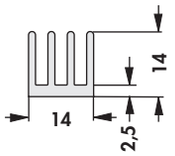
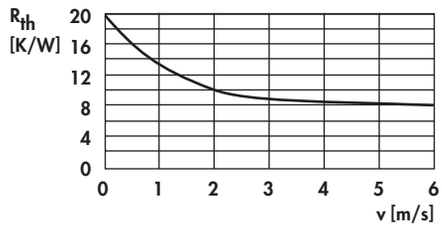
ICK PGA 6 x 6 x 14 WLF ... 14 x 14			
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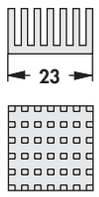
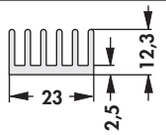
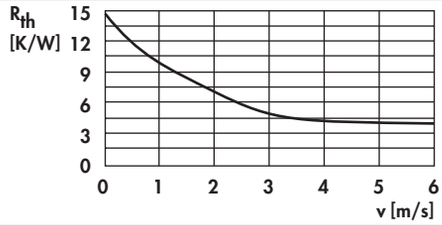
ICK PGA 8 x 8 x 12 WLF ... 23 x 23			
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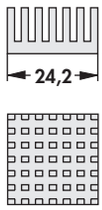
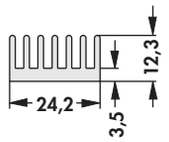
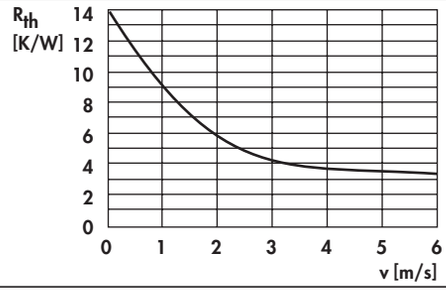
ICK PGA 9 x 9 WLF ... 24 x 24			
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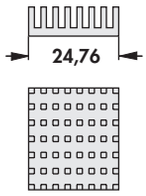
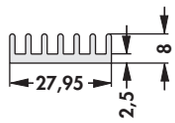
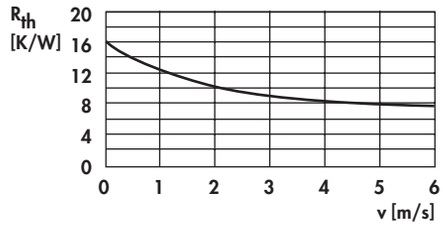
ICK PGA 11 x 11 x 8 WLF ... 24 x 27			
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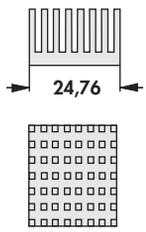
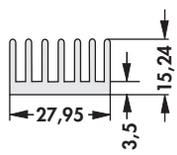
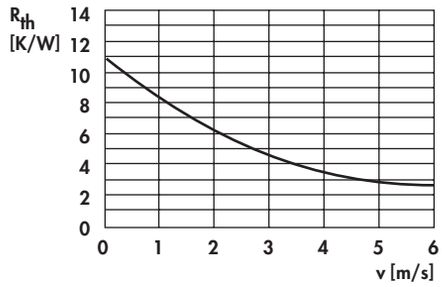
ICK PGA 11 x 11 WLF ... 24 x 27			
surface:	black anodised		

Heatsinks for PGA

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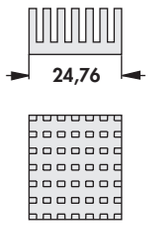
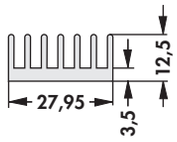
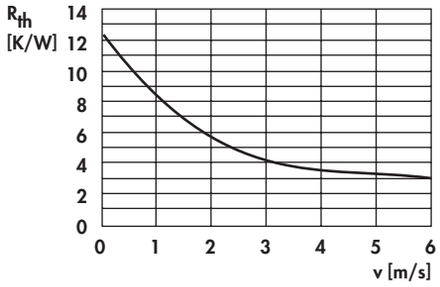
ICK PGA 11 x 11 x 12 WLF ... 24 x 27			
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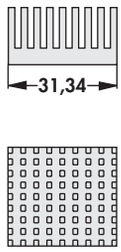
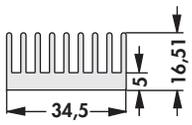
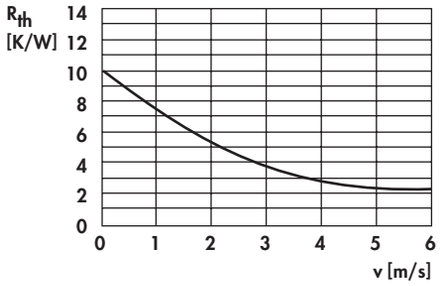
ICK PGA 14 x 14 WLF ... 31 x 34			
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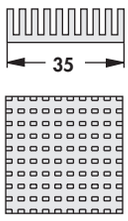
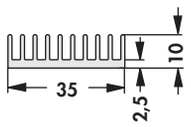
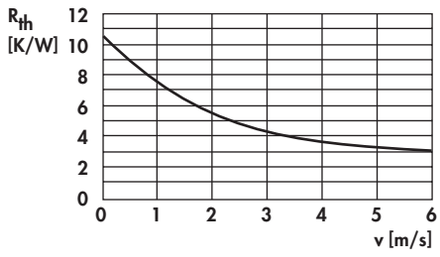
ICK PGA 14 x 14 x 10 WLF ... 35 x 35			
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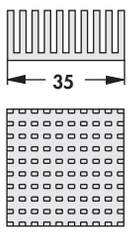
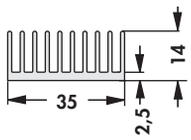
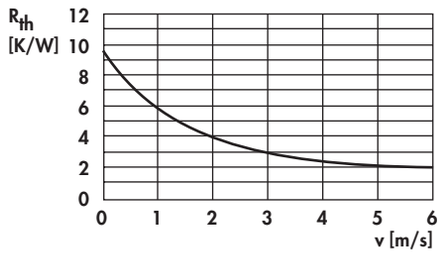
ICK PGA 14 x 14 x 14 WLF ... 35 x 35			
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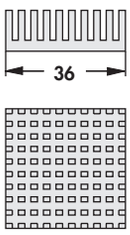
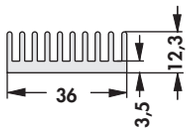
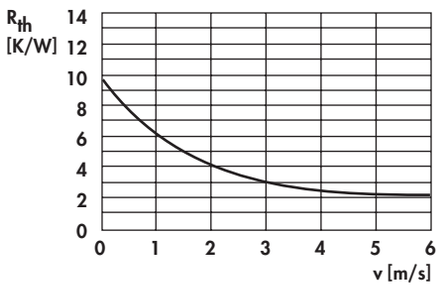
ICK PGA 14 x 14 x 12 WLF ... 36 x 36			
surface:	black anodised		

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Heatsinks for PGA

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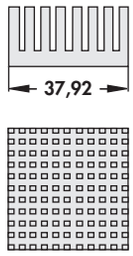
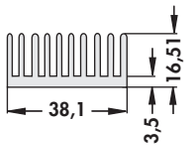
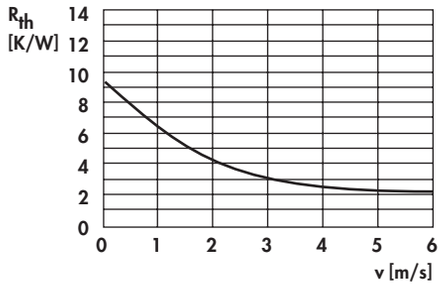
ICK PGA 15 x 15 WLF ... 37 x 37			
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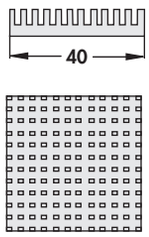
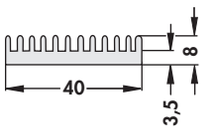
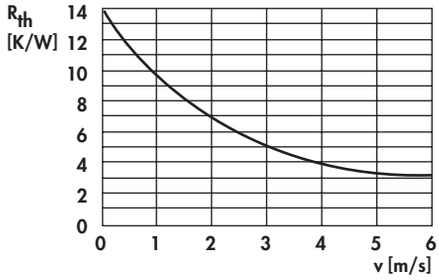
ICK PGA 16 x 16 x 8 WLF ... 40 x 40			
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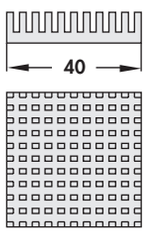
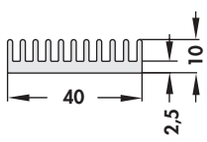
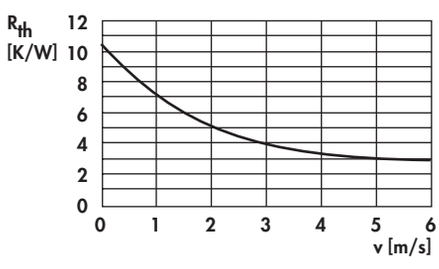
ICK PGA 16 x 16 x 10 WLF ... 40 x 40			
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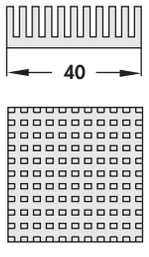
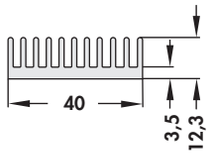
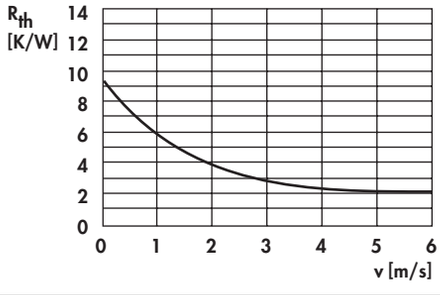
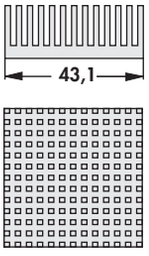
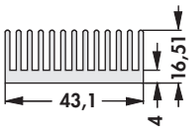
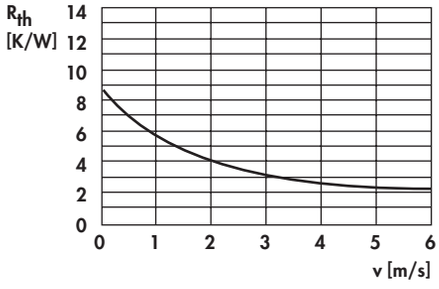
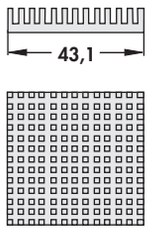
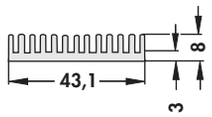
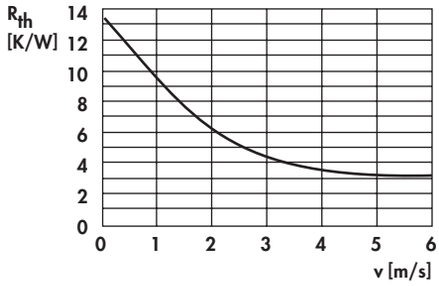
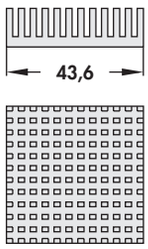
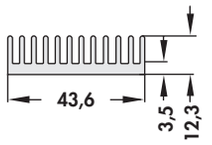
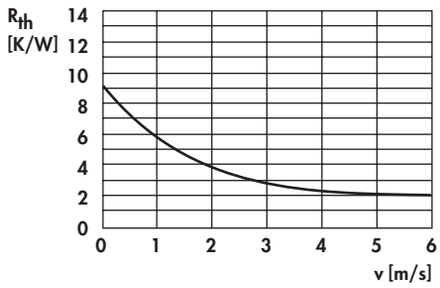
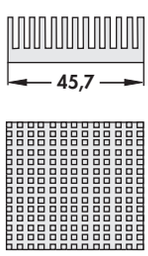
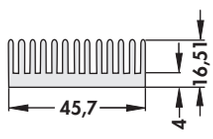
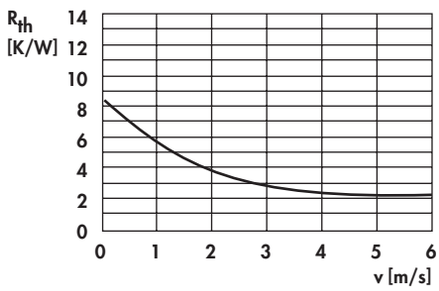
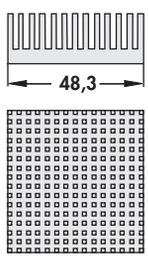
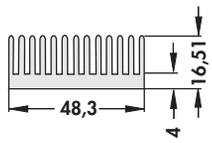
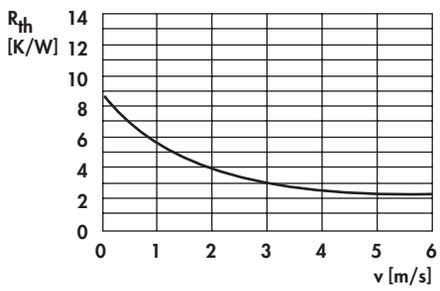
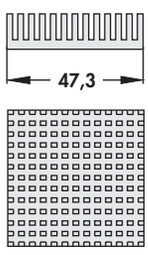
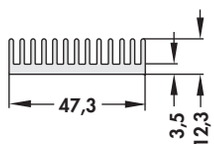
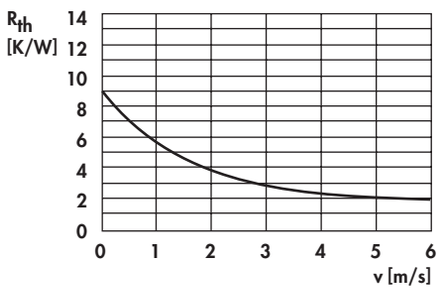
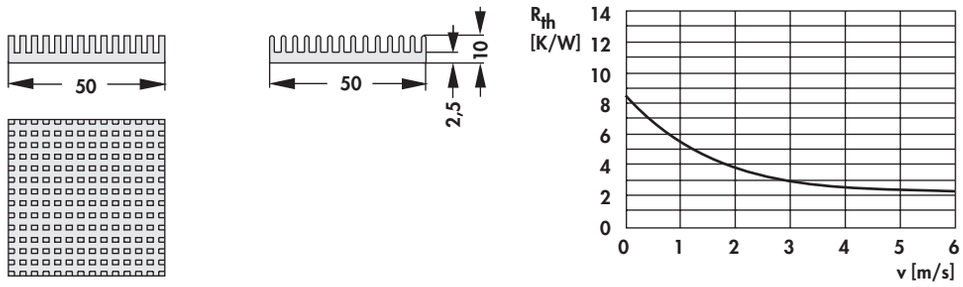
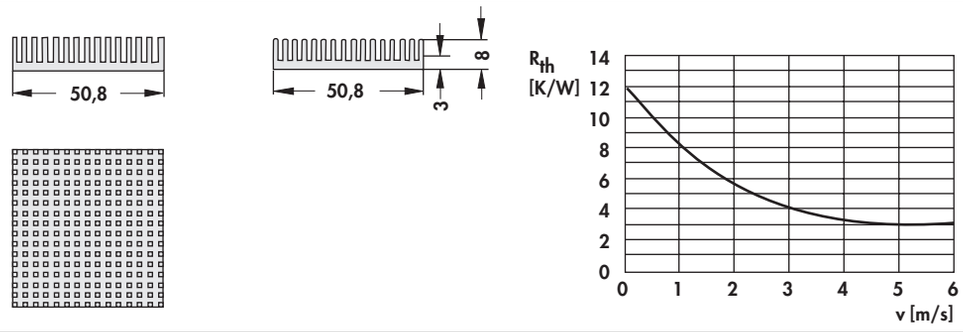
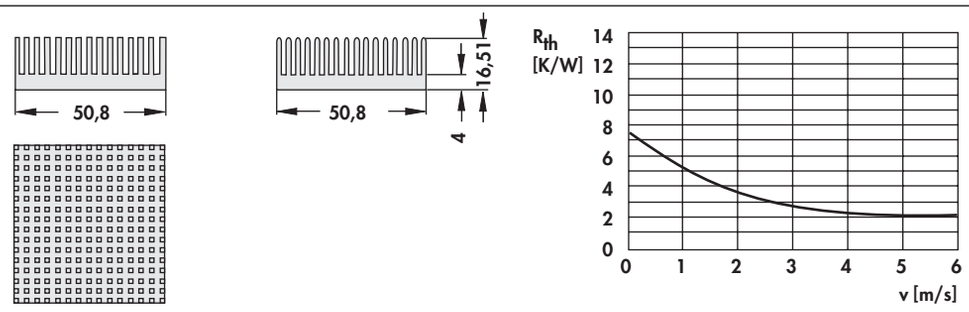
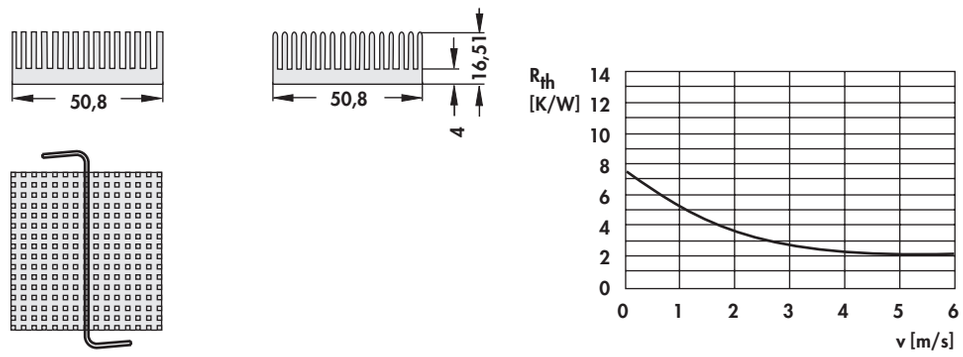
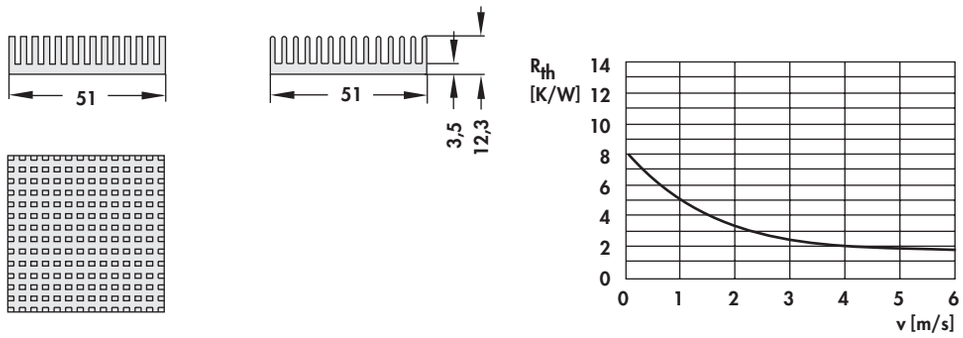
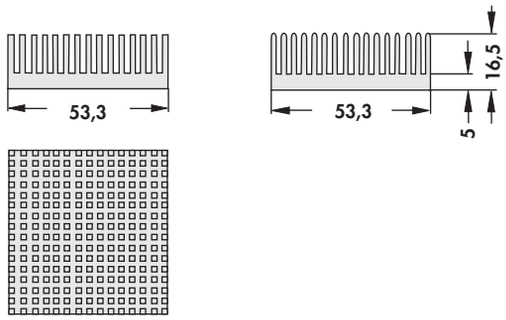
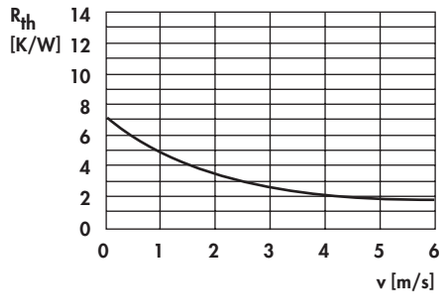
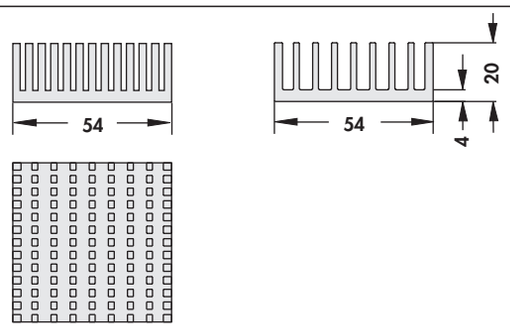
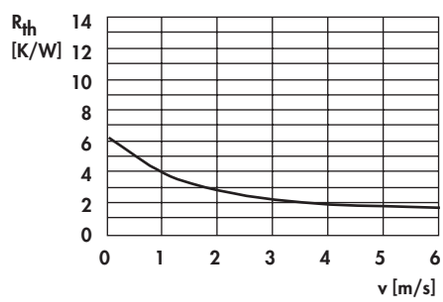
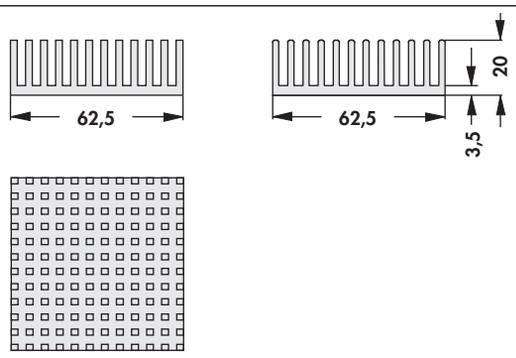
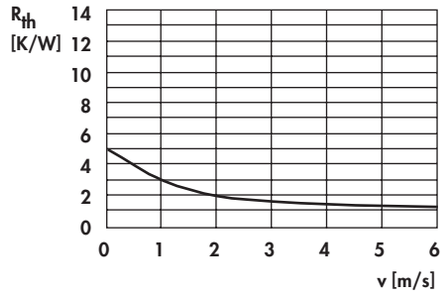
ICK PGA 16 x 16 x 12 WLF ... 40 x 40			
art. no.			
ICK PGA 17 x 17 WLF ... 43 x 43			
surface:	black anodised		

art. no.			
ICK PGA 17 x 17 x 8 WLF ... 43 x 43			
art. no.			
ICK PGA 17 x 17 x 12 WLF ... 43 x 43			
art. no.			
ICK PGA 18 x 18 WLF ... 45 x 45			
art. no.			
ICK PGA 19 x 19 WLF ... 48 x 48			
art. no.			
ICK PGA 19 x 19 x 12 WLF ... 47 x 47			
surface:	black anodised		

Heatsinks for PGA

art. no.	
ICK PGA 20 x 20 x 10 WLF ... 48 x 48	
art. no.	
ICK PGA 20 x 20 x 8 WLF ... 50 x 50	
art. no.	
ICK PGA 20 x 20 WLF ... 50 x 50	
art. no.	
ICK PGA 20 x 20 K WLF ... 50 x 50	
	with fixing clamp for socket 7 and socket 370
art. no.	
ICK PGA 20 x 20 x 12 WLF ... 50 x 50	
surface:	black anodised

Heatsinks for PGA

art. no.		
ICK PGA 21 x 21 WLF ... 53 x 53		
art. no.		
ICK PGA 22 x 22 WLF ... 54 x 54		
art. no.		
ICK PGA 25 x 25 WLF ... 62 x 62		
surface:	black anodised	

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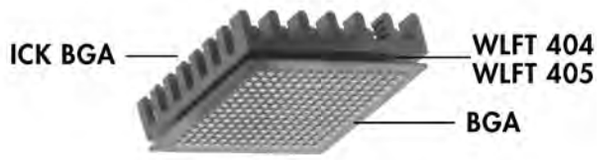
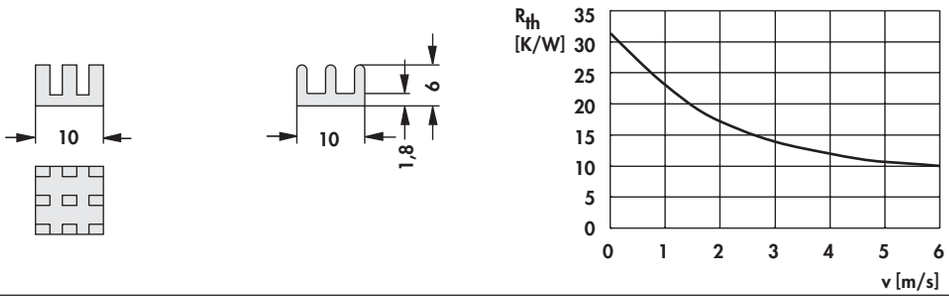
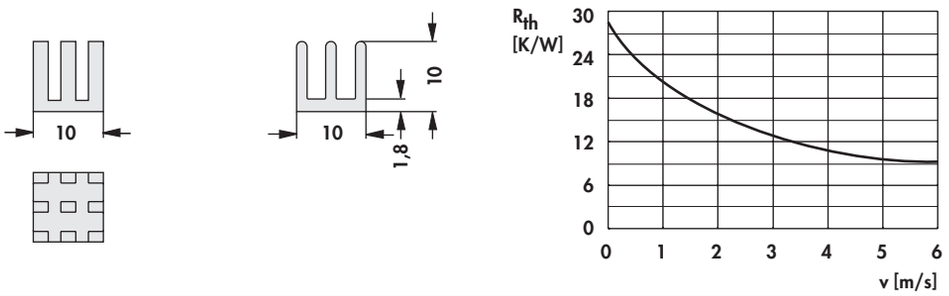
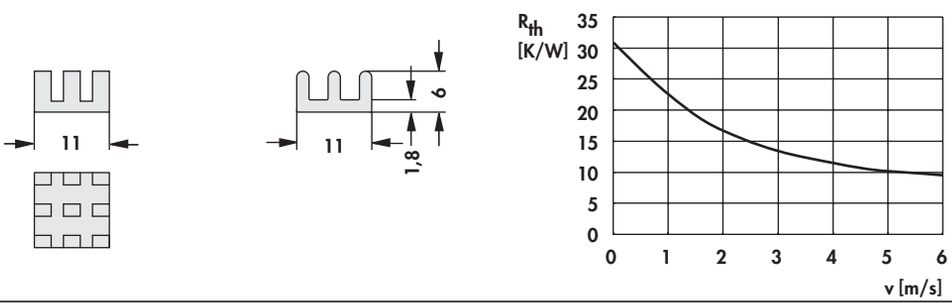
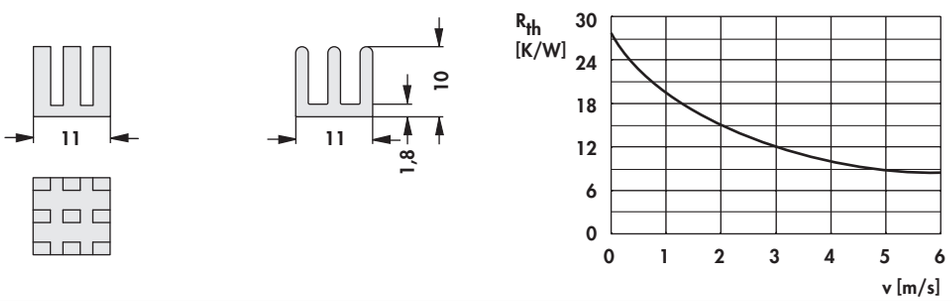
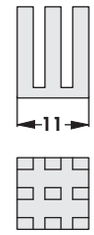
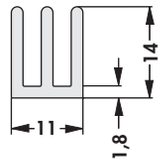
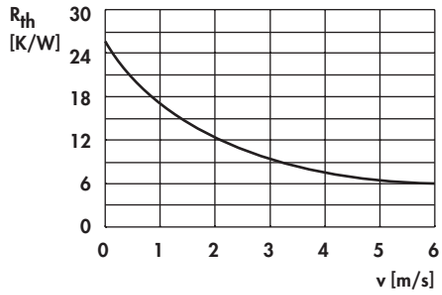
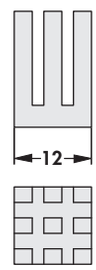
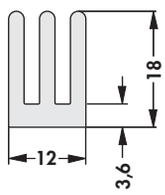
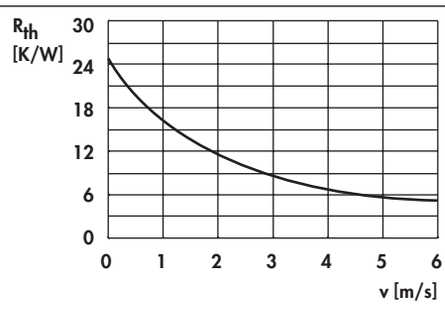
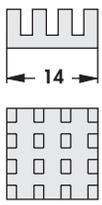
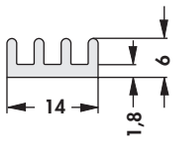
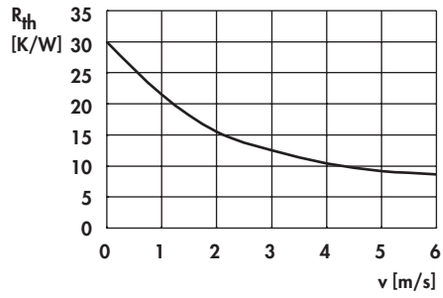
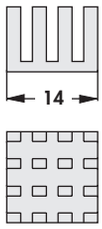
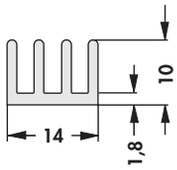
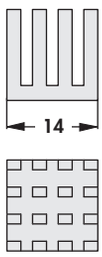
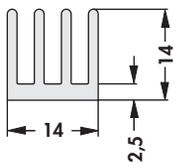
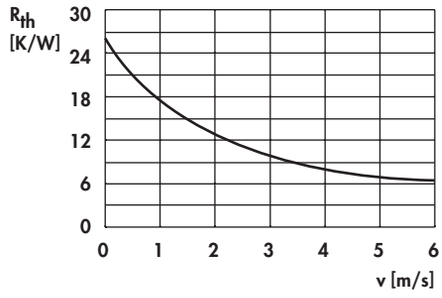
Heatsinks for BGAs



– particularly suited for **B**all **G**rid **A**rrays
– heatsink dimensions match the respective BGA-type
– can be glued directly on the BGA component
– double-sided adhesive thermal conductive foil **WLF ...** ➔ E 37

art. no.	
ICK BGA 10 x 10 WLF ... 10 x 10	
art. no.	
ICK BGA 10 x 10 x 10 WLF ... 10 x 10	
art. no.	
ICK BGA 11 x 11 x 6 WLF ... 11 x 11	
art. no.	
ICK BGA 11 x 11 x 10 WLF ... 11 x 11	
surface:	black anodised

art. no.			
ICK BGA 11 x 11 x 14 WLF ... 11 x 11			
art. no.			
ICK BGA 12 x 12 x 18 WLF ... 12 x 12			
art. no.			
ICK BGA 14 x 14 WLF ... 14 x 14			
art. no.			
ICK BGA 14 x 14 x 10 WLF ... 14 x 14			
art. no.			
ICK BGA 14 x 14 x 14 WLF ... 14 x 14			
surface:	black anodised		

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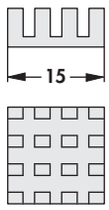
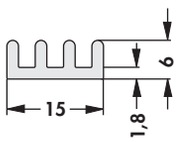
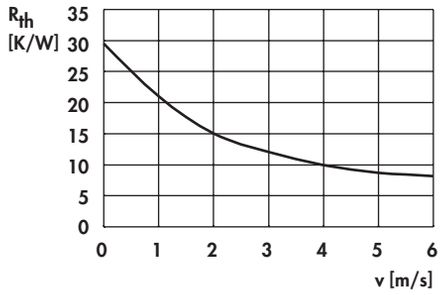
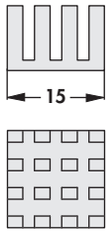
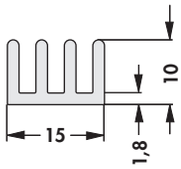
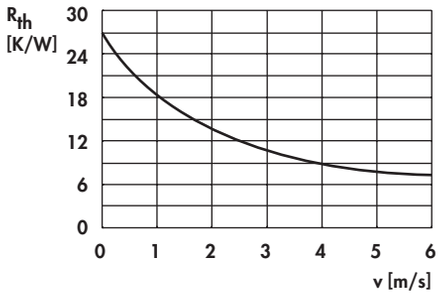
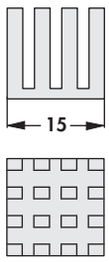
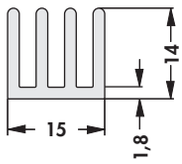
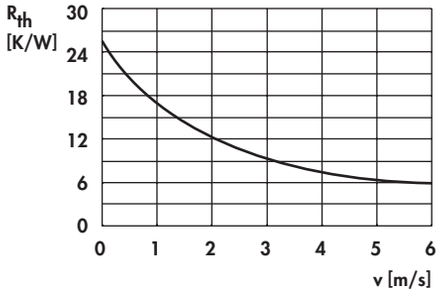
Heatsinks for BGAs

art. no.			
ICK BGA 15 x 15 x 6 WLF ... 15 x 15			
art. no.			
ICK BGA 15 x 15 x 10 WLF ... 15 x 15			
art. no.			
ICK BGA 15 x 15 x 14 WLF ... 15 x 15			
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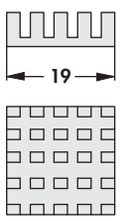
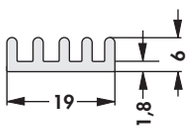
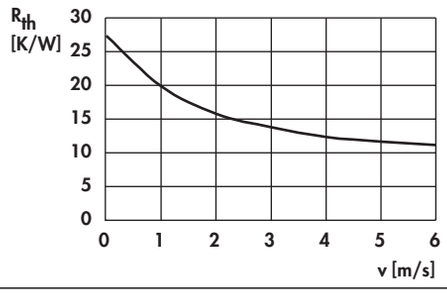
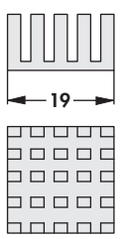
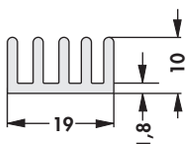
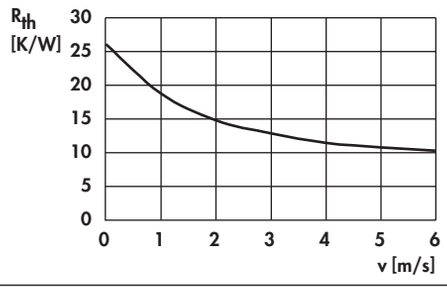
ICK BGA 19 x 19 x 6 WLF ... 19 x 19			
art. no.			
ICK BGA 19 x 19 x 10 WLF ... 19 x 19			
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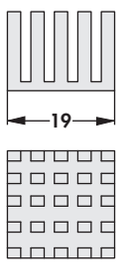
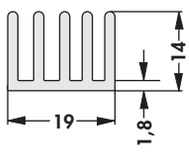
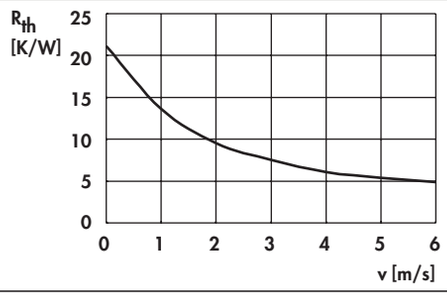
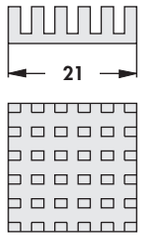
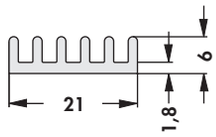
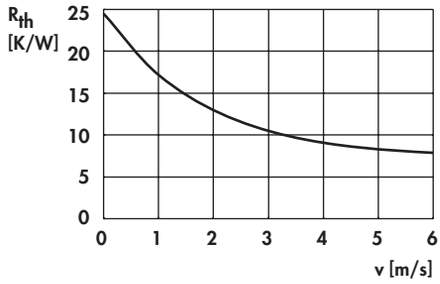
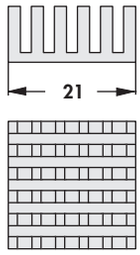
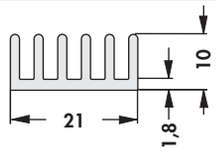
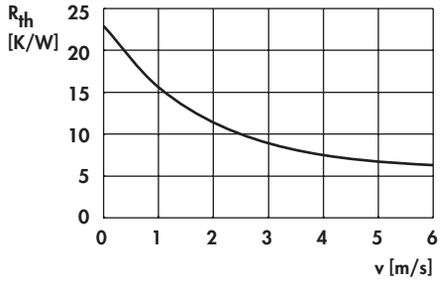
ICK BGA 19 x 19 x 14 WLF ... 19 x 19			
surface:	black anodised		

Technical introduction ➔ A 2 – 8

art. no.			
ICK BGA 21 x 21 WLF ... 21 x 21			
art. no.			
ICK BGA 21 x 21 x 10 WLF ... 21 x 21			
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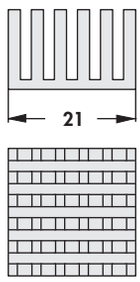
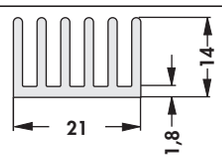
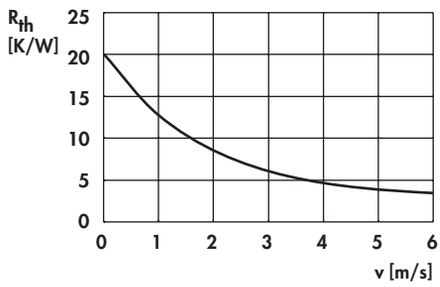
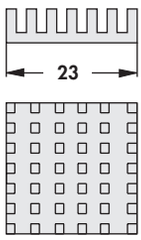
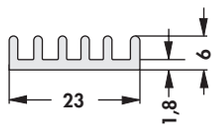
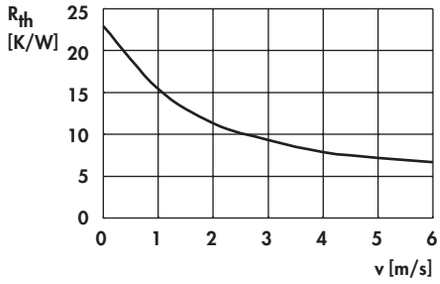
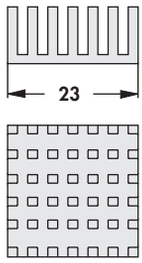
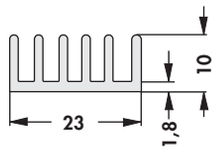
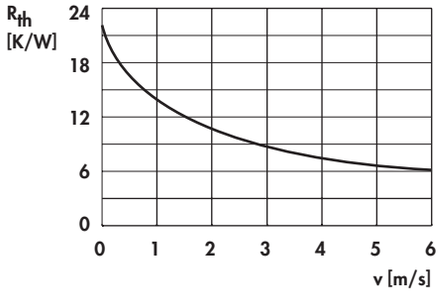
ICK BGA 21 x 21 x 14 WLF ... 21 x 21			
art. no.			
ICK BGA 23 x 23 WLF ... 23 x 23			
art. no.			
ICK BGA 23 x 23 x 10 WLF ... 23 x 23			
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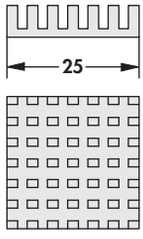
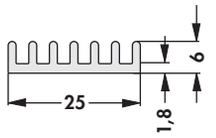
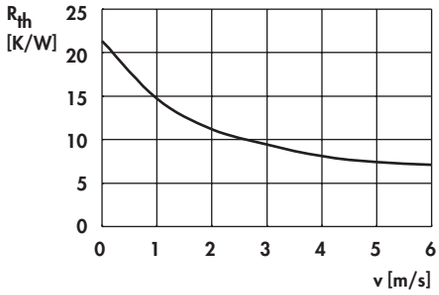
ICK BGA 25 x 25 x 6 WLF ... 25 x 25			
surface:	black anodised		

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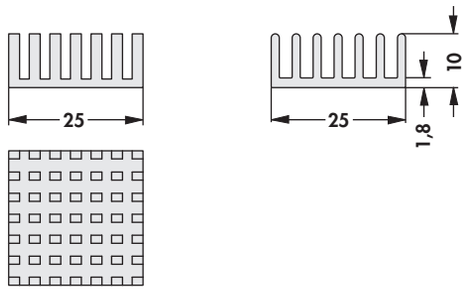
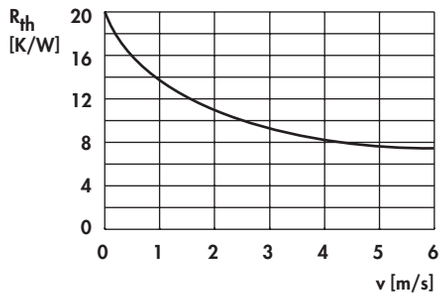
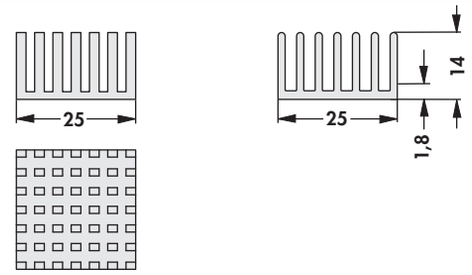
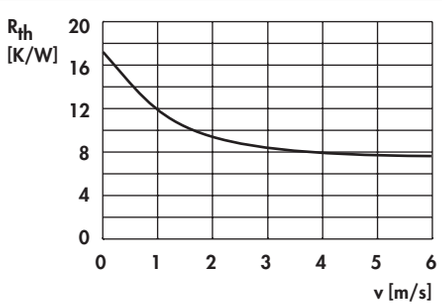
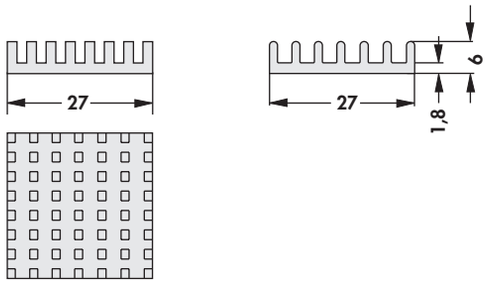
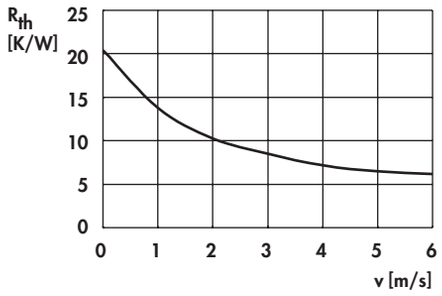
art. no.		
ICK BGA 25 x 25 x 10 WLF ... 25 x 25		
art. no.		
ICK BGA 25 x 25 x 14 WLF ... 25 x 25		
art. no.		
ICK BGA 27 x 27 WLF ... 27 x 27		
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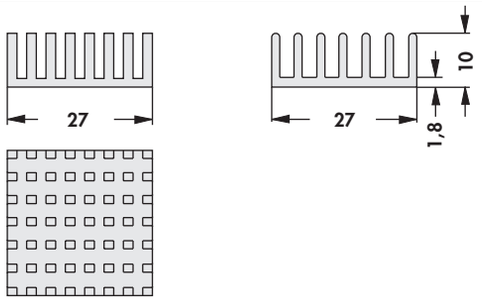
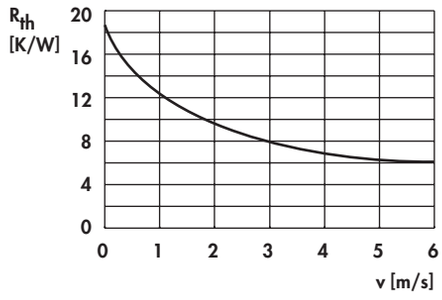
ICK BGA 27 x 27 x 10 WLF ... 27 x 27		
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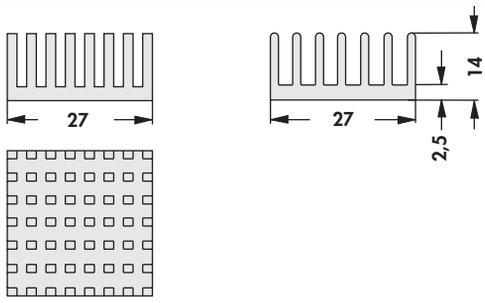
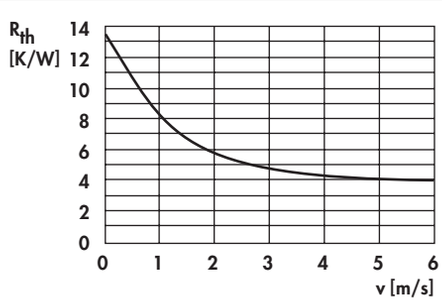
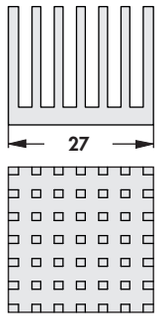
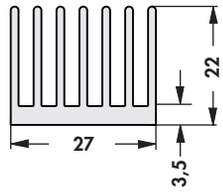
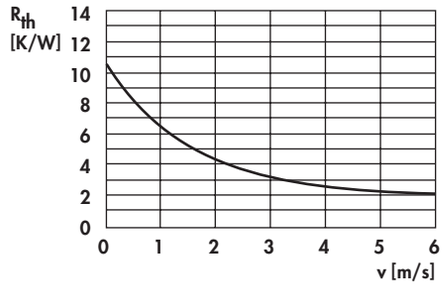
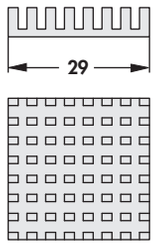
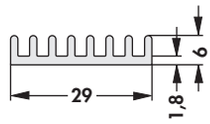
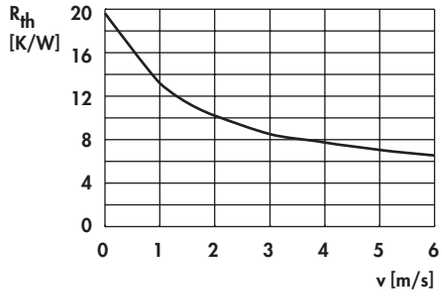
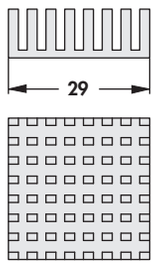
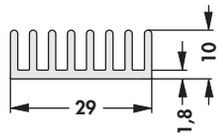
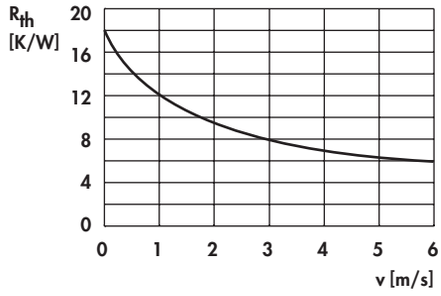
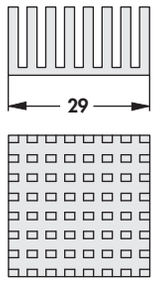
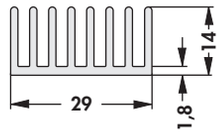
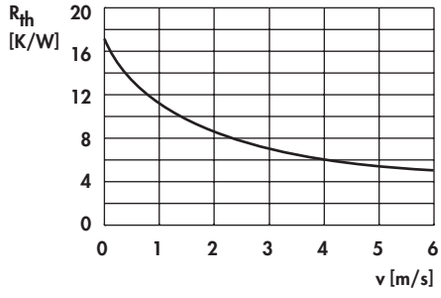
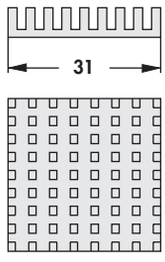
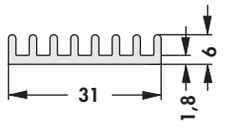
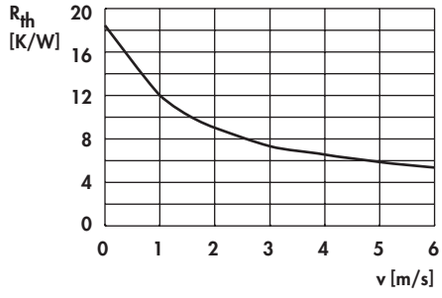
ICK BGA 27 x 27 x 14 WLF ... 27 x 27		
surface:	black anodised	

art. no.			
ICK BGA 27 x 27 x 22 WLF ... 27 x 27			
art. no.			
ICK BGA 29 x 29 x 6 WLF ... 29 x 29			
art. no.			
ICK BGA 29 x 29 x 10 WLF ... 29 x 29			
art. no.			
ICK BGA 29 x 29 x 14 WLF ... 29 x 29			
art. no.			
ICK BGA 31 x 31 WLF ... 31 x 31			
surface:	black anodised		

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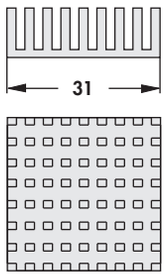
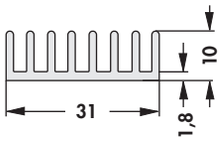
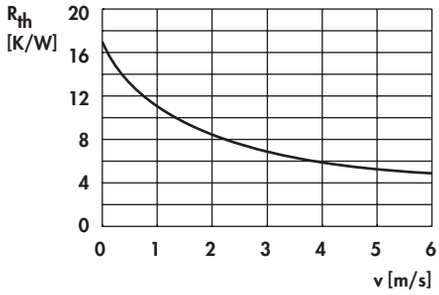
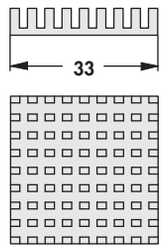
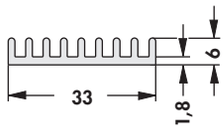
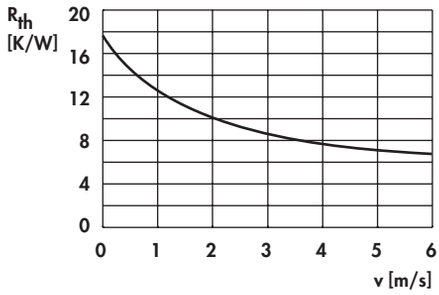
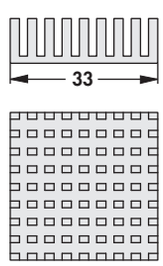
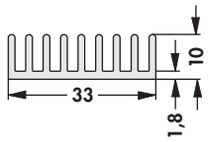
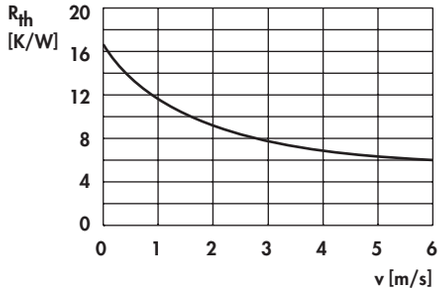
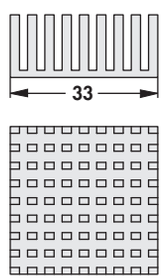
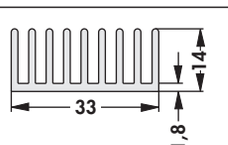
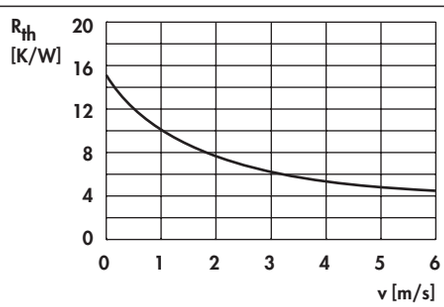
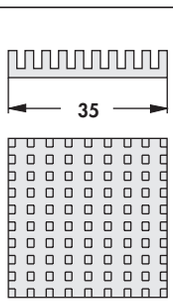
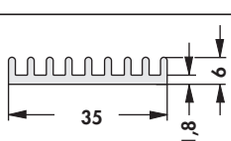
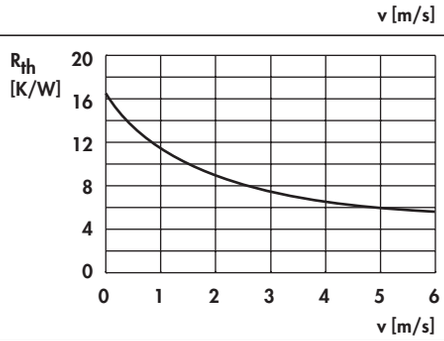
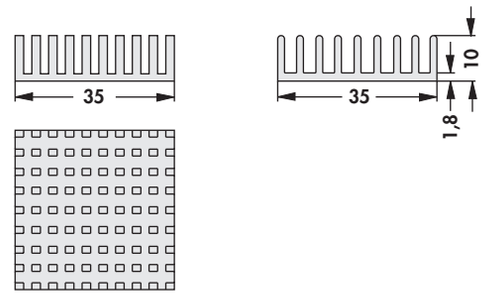
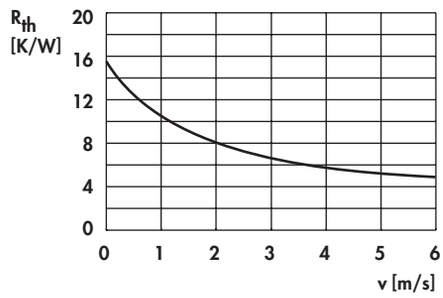
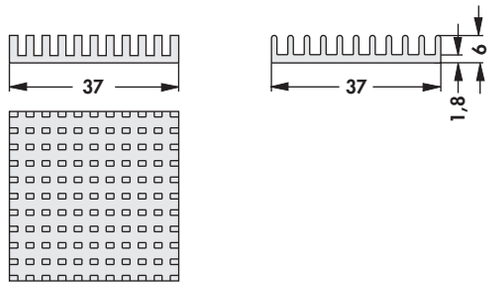
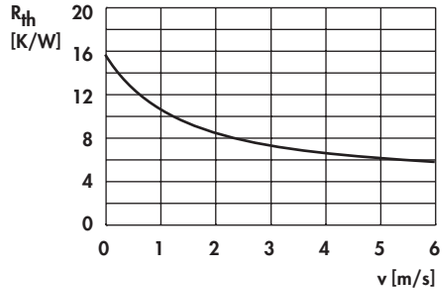
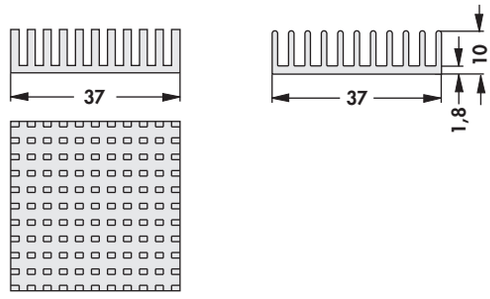
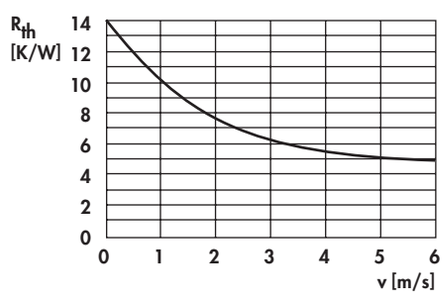
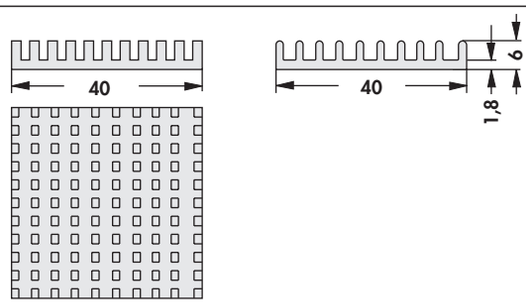
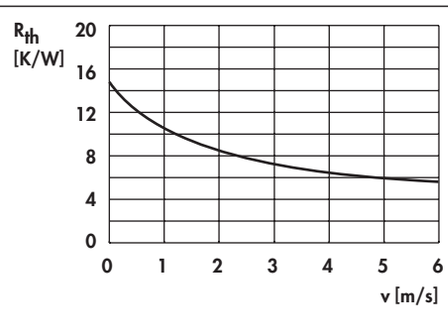
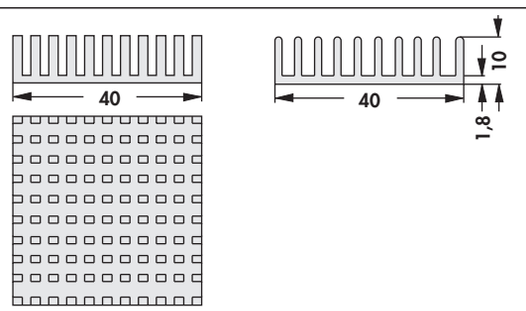
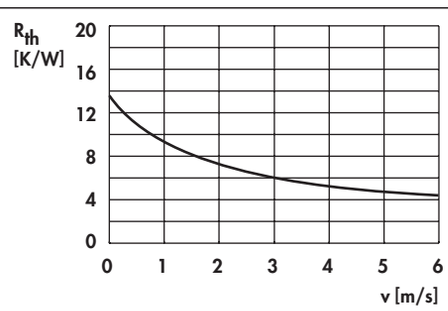
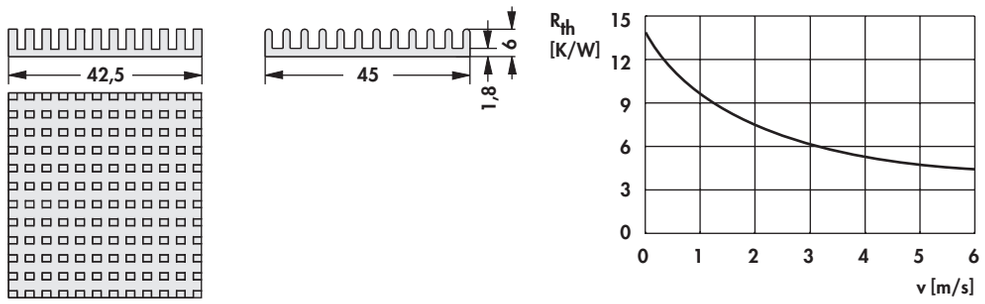
Heatsinks for BGAs

art. no.			
ICK BGA 31 x 31 x 10 WLF ... 31 x 31			
art. no.			
ICK BGA 33 x 33 x 6 WLF ... 33 x 33			
art. no.			
ICK BGA 33 x 33 x 10 WLF ... 33 x 33			
art. no.			
ICK BGA 33 x 33 x 14 WLF ... 33 x 33			
art. no.			
ICK BGA 35 x 35 WLF ... 35 x 35			
surface:	black anodised		

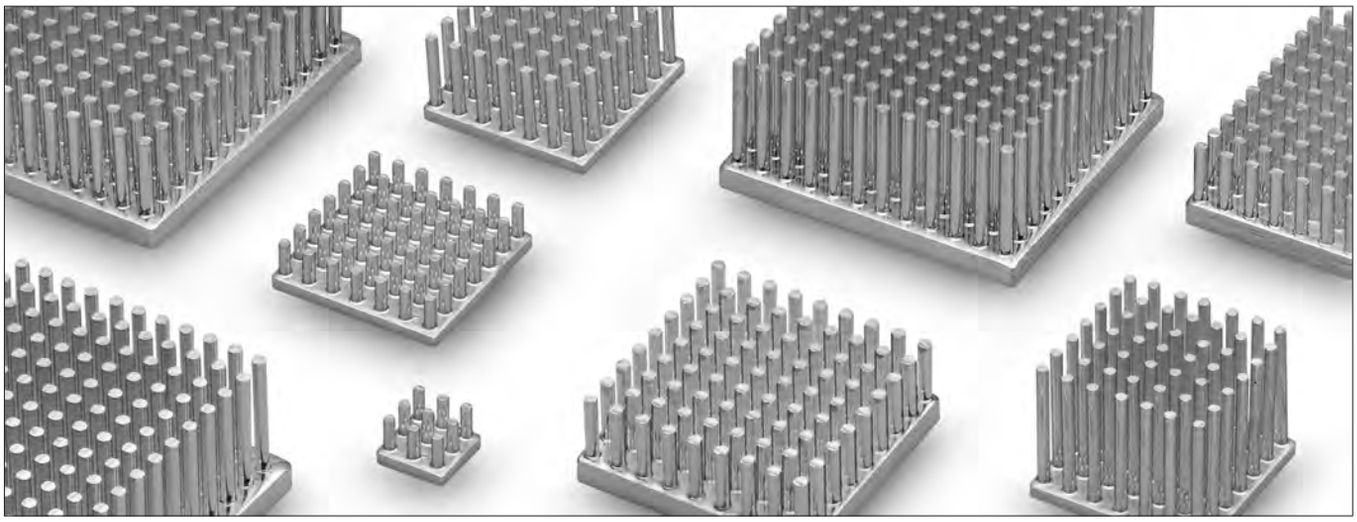
art. no.		
ICK BGA 35 x 35 x 10 WLF ... 35 x 35		
art. no.		
ICK BGA 37 x 37 x 6 WLF ... 37 x 37		
art. no.		
ICK BGA 37 x 37 x 10 WLF ... 37 x 37		
art. no.		
ICK BGA 40 x 40 WLF ... 40 x 40		
art. no.		
ICK BGA 40 x 40 x 10 WLF ... 40 x 40		
surface:	black anodised	

fischer elektronik

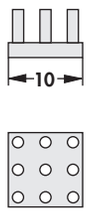
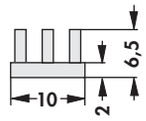
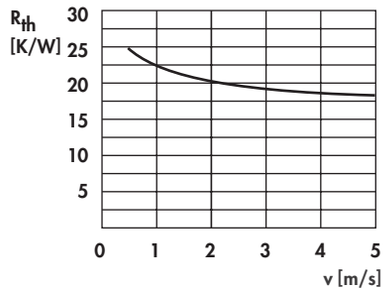
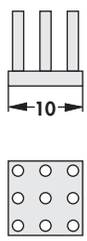
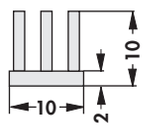
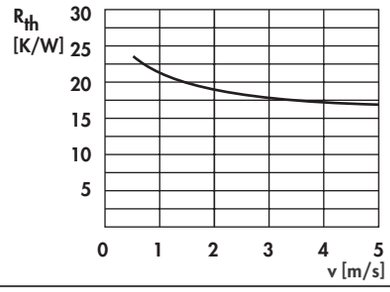
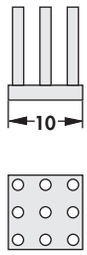
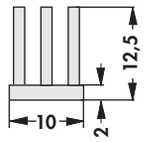
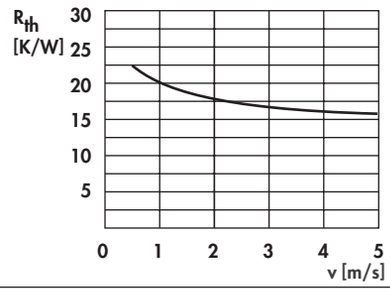
Heatsinks for BGAs

art. no.	
ICK BGA 42,5 x 45 WLF ... 42,5 x 45	
surface:	black anodised

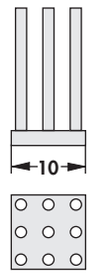
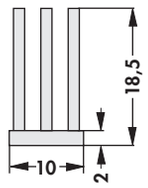
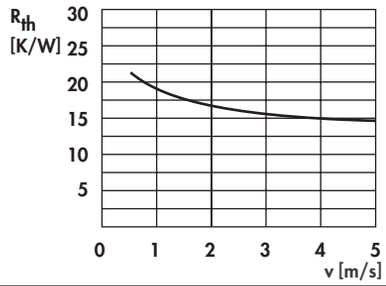
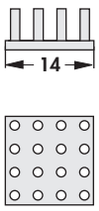
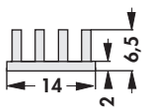
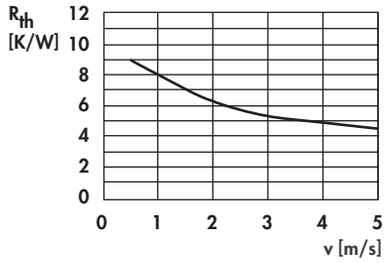
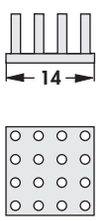
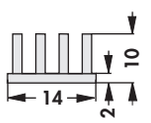
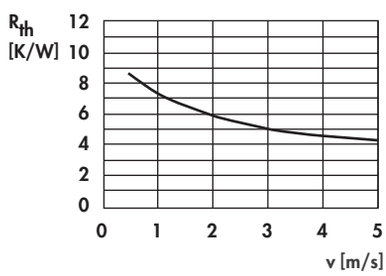
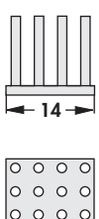
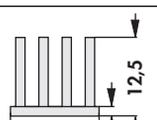
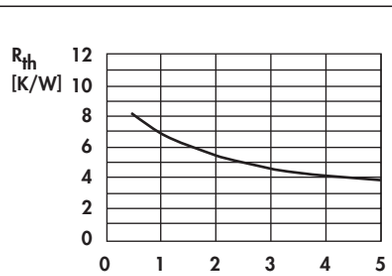
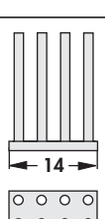
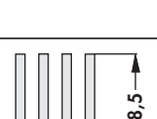
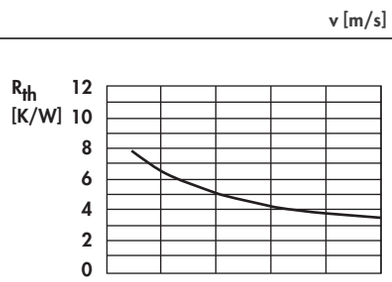
Pin heatsinks rectangle



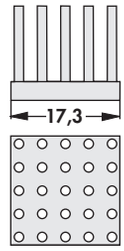
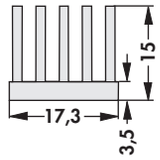
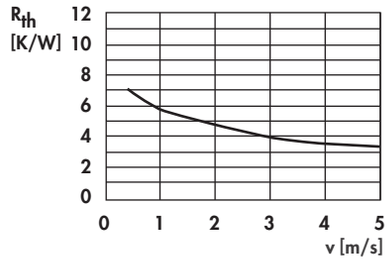
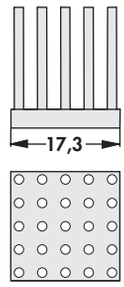
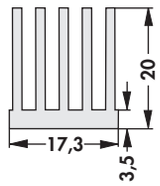
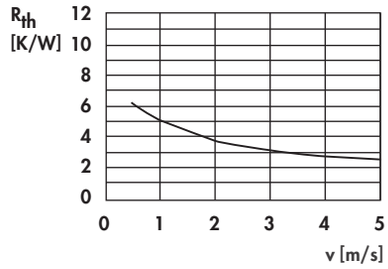
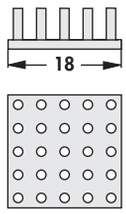
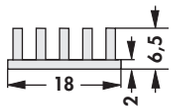
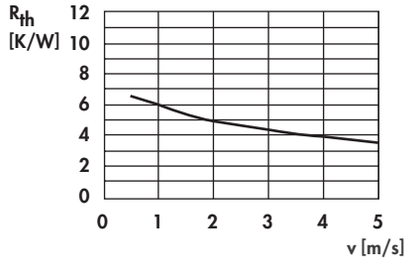
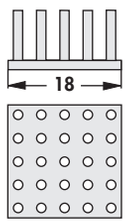
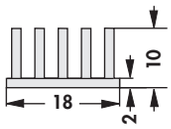
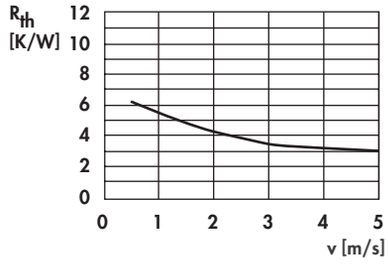
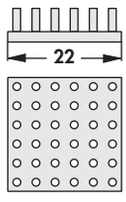
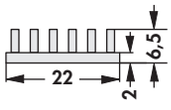
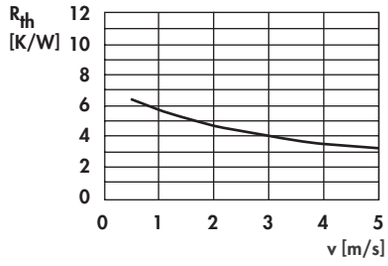
– arrangement and number of pins for optimum air flow
– suitable for forced and free convection
– excellent thermal conductivity by the alloy material (Al99,5; 220 W/mK) and homogeneous arrangement of materials
– constant heat dissipation in the base and the pins in the direction of heat flow
– low weight achieved by optimised geometry
– components fastened using glue, adhesive foil or clamps
– customer-specific modifications and special designs; other pin-lengths and surfaces on request

art. no.			
ICK S 10 x 10 x 6,5 WLF ... 10 x 10 weight: 1g			
art. no.			
ICK S 10 x 10 x 10 WLF ... 10 x 10 weight: 1g			
art. no.			
ICK S 10 x 10 x 12,5 WLF ... 10 x 10 weight: 1.3g			
surface:	Al-natural		

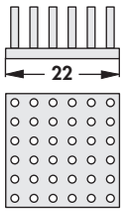
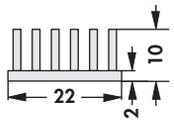
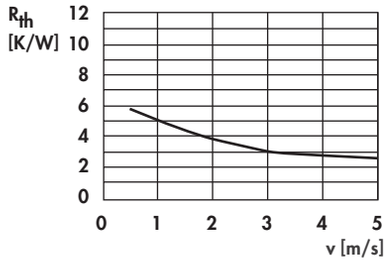
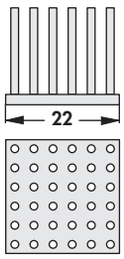
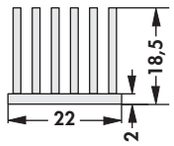
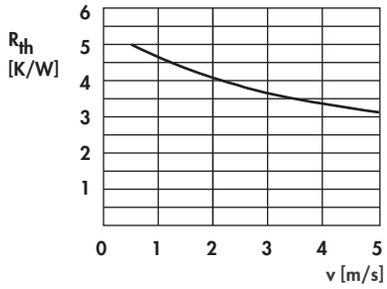
Pin heatsinks

art. no.			
ICK S 10 x 10 x 18,5 WLF ... 10 x 10 weight: 1.3g			
art. no.			
ICK S 14 x 14 x 6,5 WLF ... 14 x 14 weight: 1.5g			
art. no.			
ICK S 14 x 14 x 10 WLF ... 14 x 14 weight: 1.9g			
art. no.			
ICK S 14 x 14 x 12,5 WLF ... 14 x 14 weight: 2g			
art. no.			
ICK S 14 x 14 x 18,5 WLF ... 14 x 14 weight: 2.4g			
surface:	Al-natural		

Pin heatsinks

art. no.			
ICK S 17 x 17 x 15 WLF ... 17 x 17 weight: 4.7g			
art. no.			
ICK S 17 x 17 x 20 WLF ... 17 x 17 weight: 5.6g			
art. no.			
ICK S 18 x 18 x 6,5 WLF ... 18 x 18 weight: 2.5g			
art. no.			
ICK S 18 x 18 x 10 WLF ... 18 x 18 weight: 3.1g			
art. no.			
ICK S 22 x 22 x 6,5 weight: 3.5g			
surface:	Al-natural		

Pin heatsinks

art. no.			
ICK S 22 x 22 x 10 WLF ... 22 x 22 weight: 4g			
art. no.			
ICK S 22 x 22 x 18,5 WLF ... 22 x 22 weight: 5.4g			
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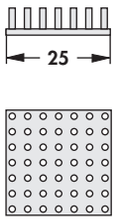
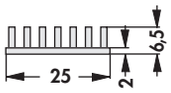
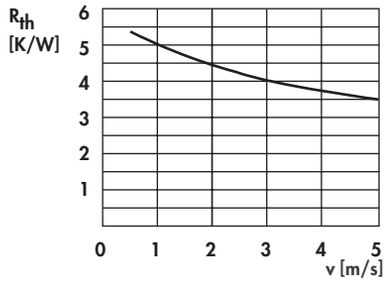
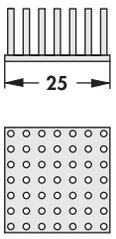
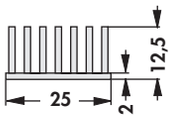
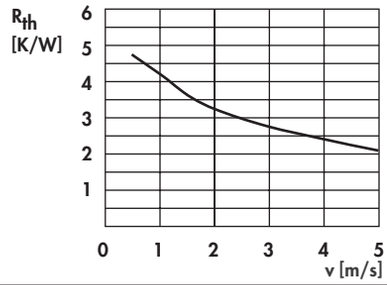
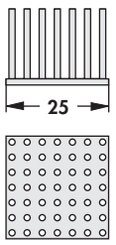
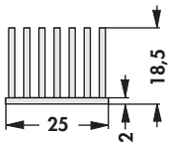
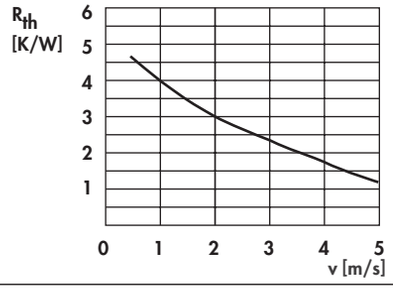
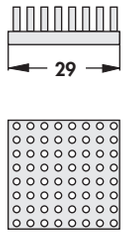
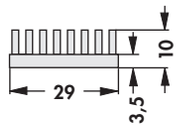
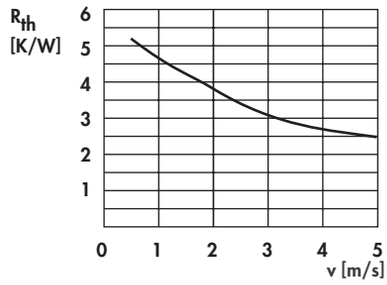
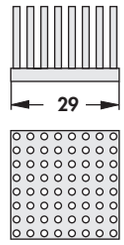
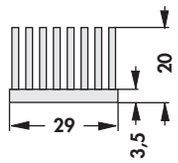
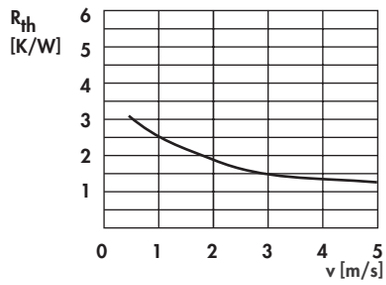
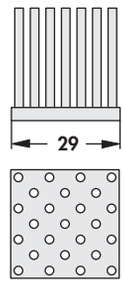
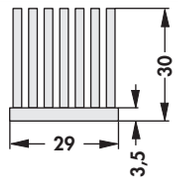
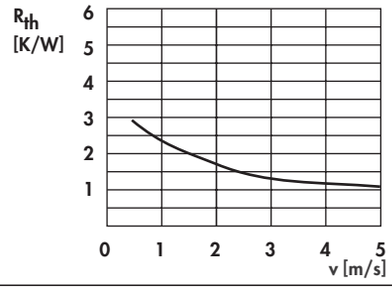
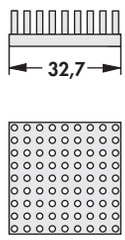
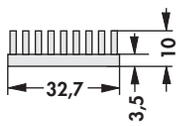
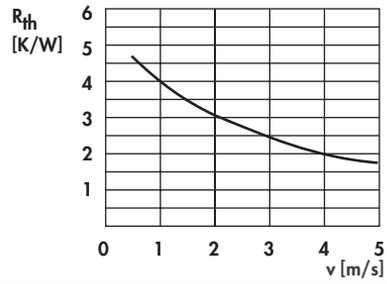
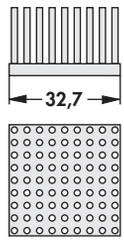
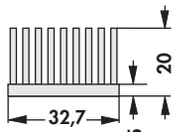
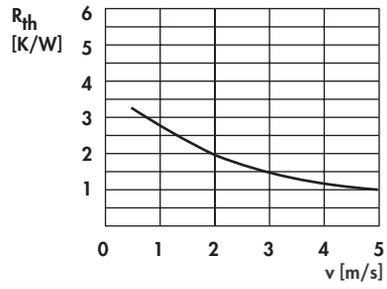
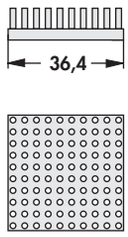
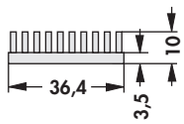
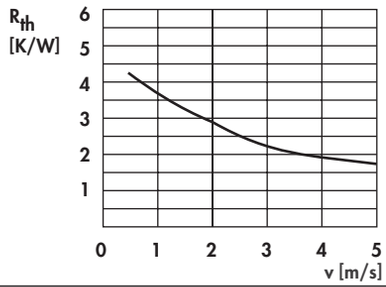
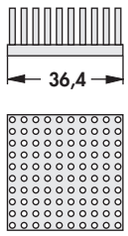
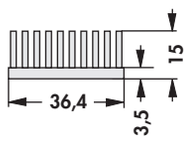
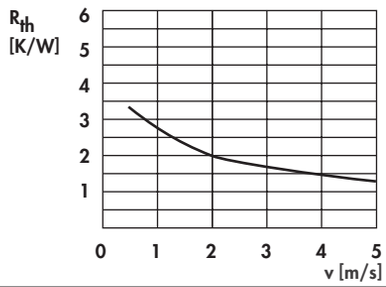
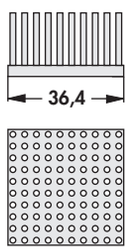
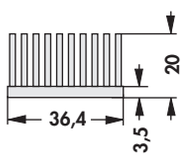
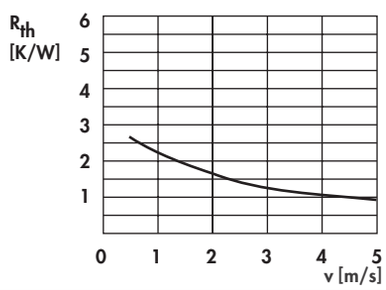
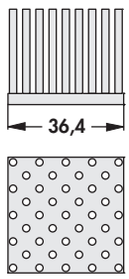
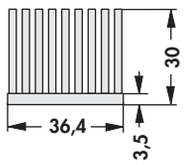
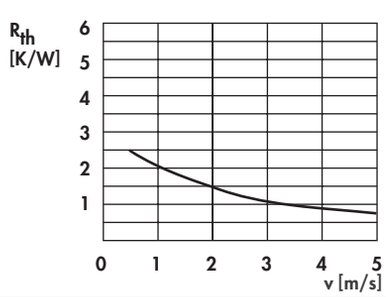
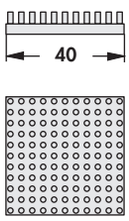
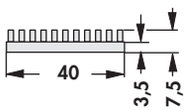
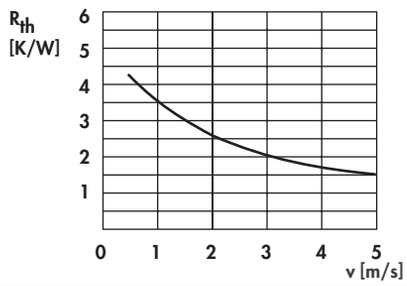
ICK S 25 x 25 x 6,5 WLF ... 25 x 25 weight: 4g			
art. no.			
ICK S 25 x 25 x 12,5 WLF ... 25 x 25 weight: 6g			
art. no.			
ICK S 25 x 25 x 18,5 WLF ... 25 x 25 weight: 7g			
surface:	Al-natural		

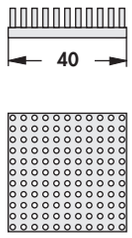
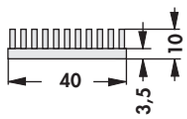
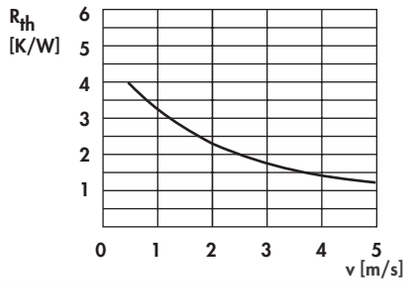
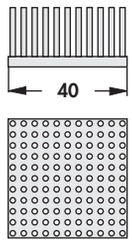
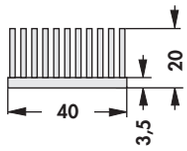
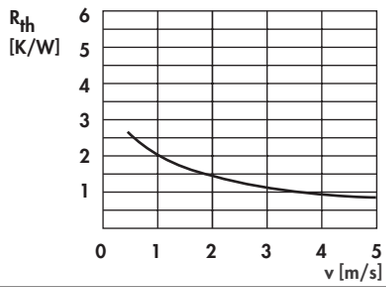
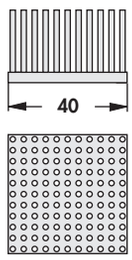
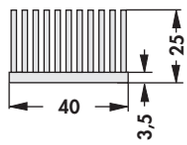
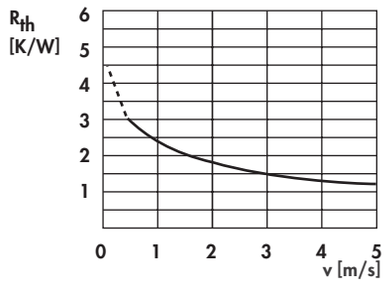
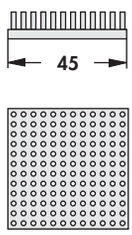
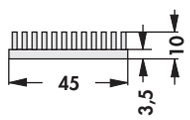
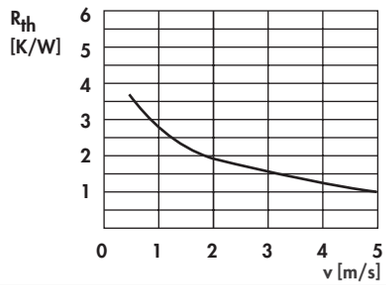
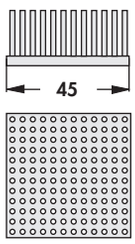
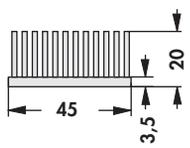
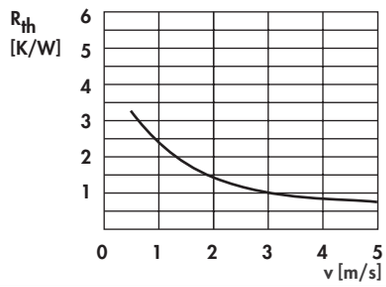
Pin heatsinks

art. no.			
ICK S 29 x 29 x 10 WLF ... 29 x 29 weight: 11g			
art. no.			
ICK S 29 x 29 x 20 WLF ... 29 x 29 weight: 15g			
art. no.			
ICK S 29 x 29 x 30 WLF ... 29 x 29 weight: 15.4g			
art. no.			
ICK S 32 x 32 x 10 WLF ... 32 x 32 weight: 14g			
art. no.			
ICK S 32 x 32 x 20 WLF ... 32 x 32 weight: 19g			
surface:	Al-natural		

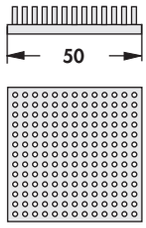
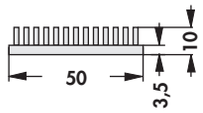
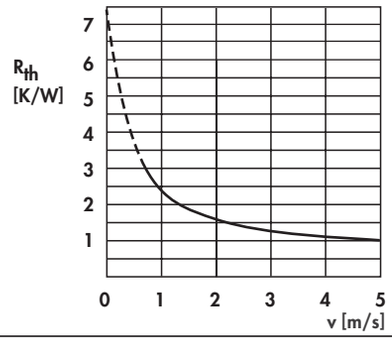
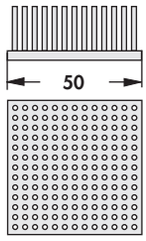
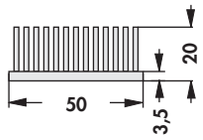
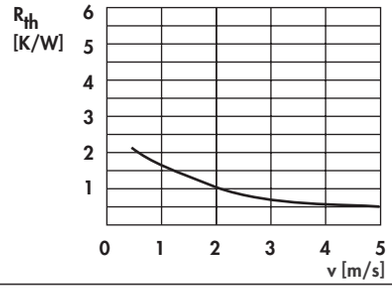
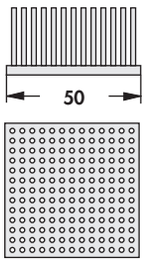
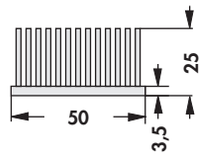
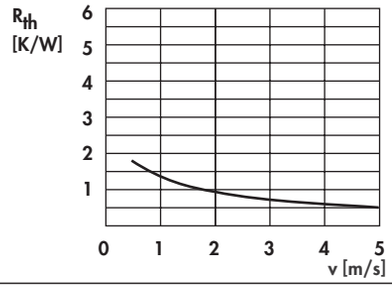
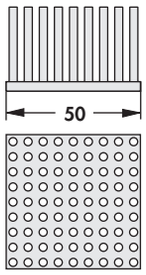
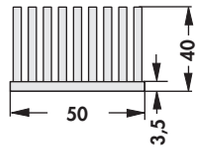
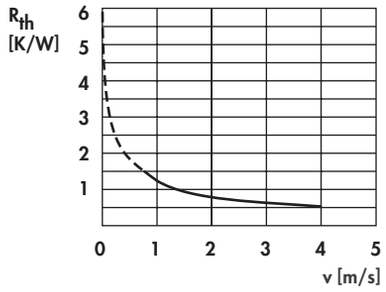
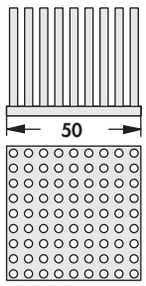
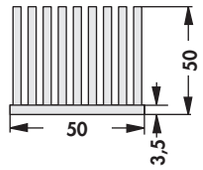
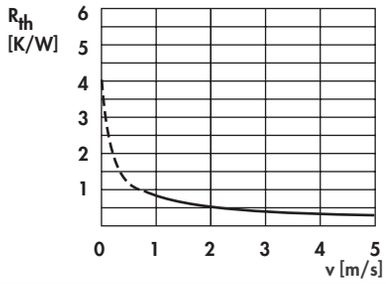
Pin heatsinks

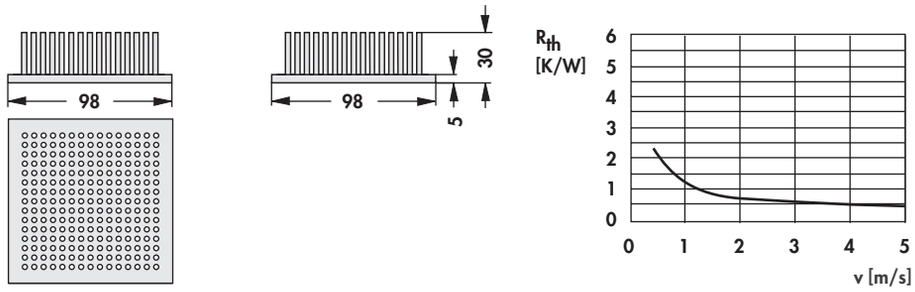
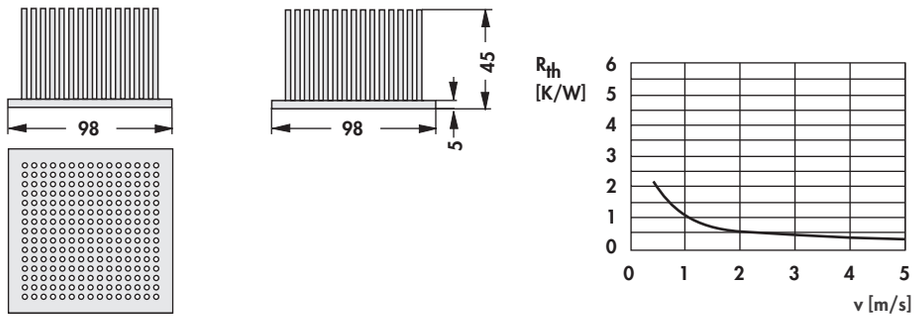
art. no.			
ICK S 36 x 36 x 10 WLF ... 36 x 36 weight: 17g			
art. no.			
ICK S 36 x 36 x 15 WLF ... 36 x 36 weight: 20g			
art. no.			
ICK S 36 x 36 x 20 WLF ... 36 x 36 weight: 24g			
art. no.			
ICK S 36 x 36 x 30 WLF ... 36 x 36 weight: 24.4g			
art. no.			
ICK S 40 x 40 x 7,5 WLF ... 40 x 40 weight: 18g			
surface:	Al-natural		

Pin heatsinks

art. no.			
ICK S 40 x 40 x 10 WLF ... 40 x 40 weight: 21g			
art. no.			
ICK S 40 x 40 x 20 WLF ... 40 x 40 weight: 29g			
art. no.			
ICK S 40 x 40 x 25 WLF ... 40 x 40 weight: 37g			
art. no.			
ICK S 45 x 45 x 10 WLF ... 45 x 45 weight: 26g			
art. no.			
ICK S 45 x 45 x 20 WLF ... 45 x 45 weight: 36g			
surface:	Al-natural		

Pin heatsinks

art. no.			
ICK S 50 x 50 x 10 WLF ... 50 x 50 weight: 31.2g			
art. no.			
ICK S 50 x 50 x 20 WLF ... 50 x 50 weight: 43g			
art. no.			
ICK S 50 x 50 x 25 WLF ... 50 x 50 weight: 49g			
art. no.			
ICK S 50 x 50 x 40 WLF ... 50 x 50 weight: 80.05g			
art. no.			
ICK S 50 x 50 x 50 WLF ... 50 x 50 weight: 95.51g			
surface:	Al-natural		

art. no.	
ICK S 98 x 98 x 30 WLF ... 98 x 98 weight: 237g	
art. no.	
ICK S 98 x 98 x 45 WLF ... 98 x 98 weight: 301.3g	
surface:	Al-natural

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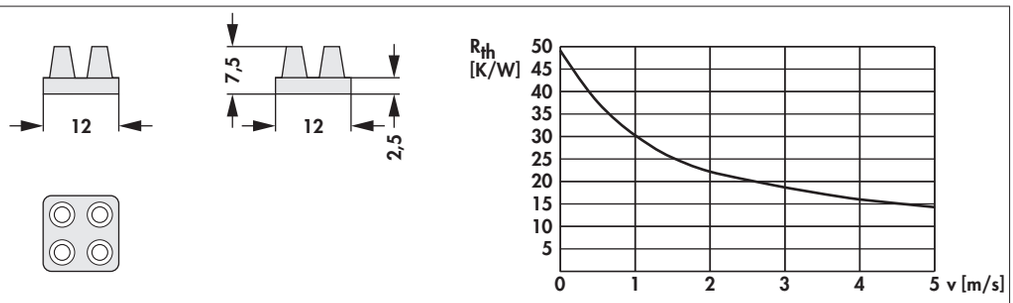
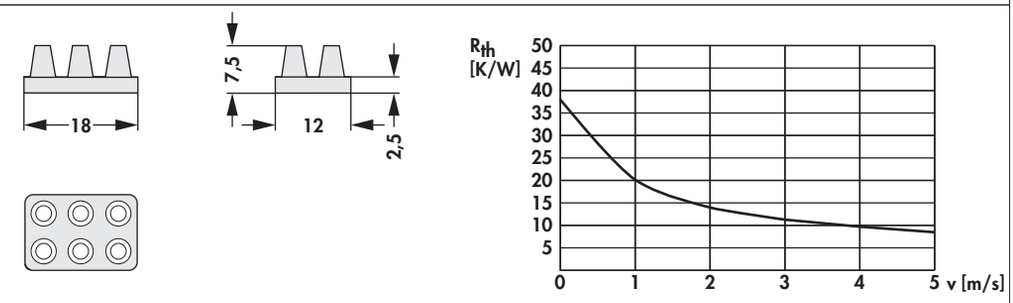
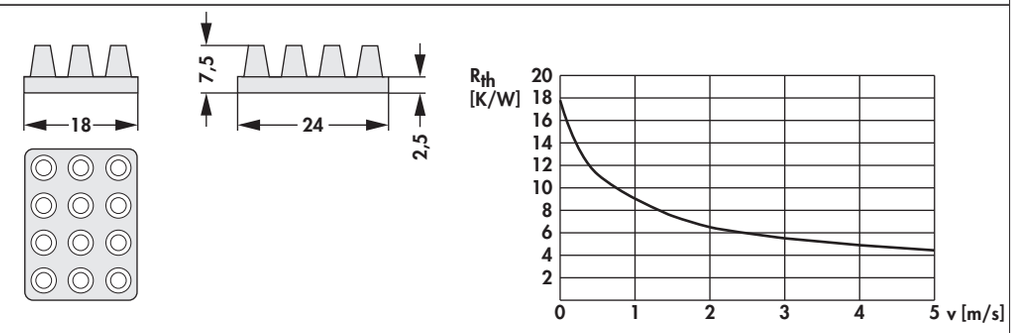
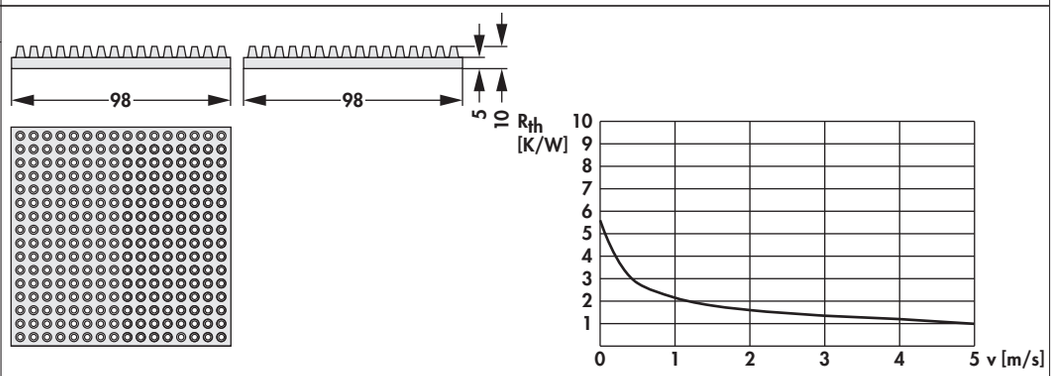
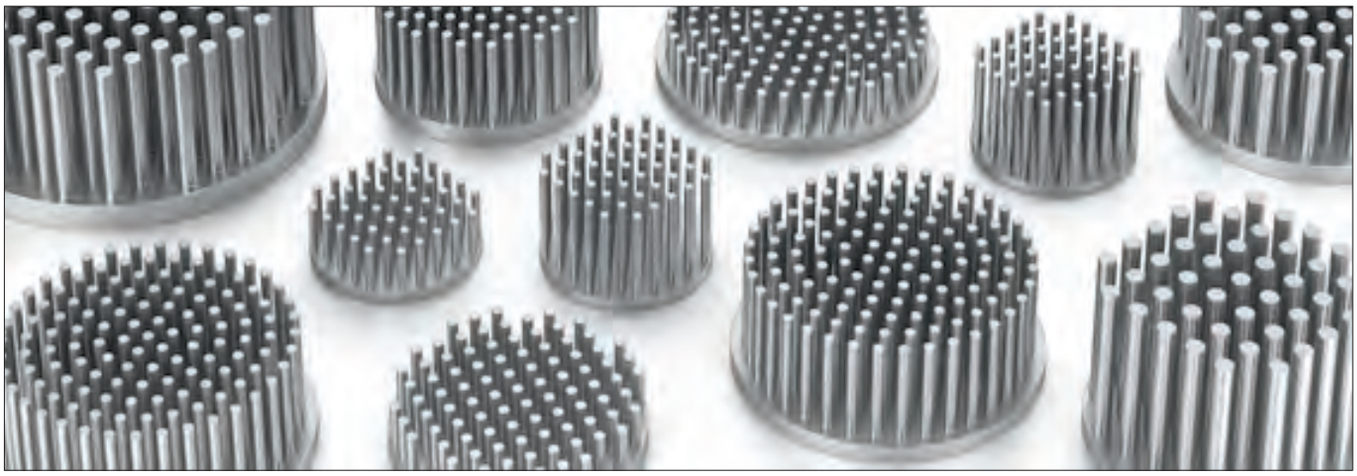
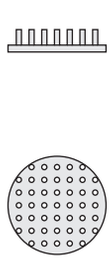
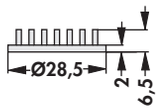
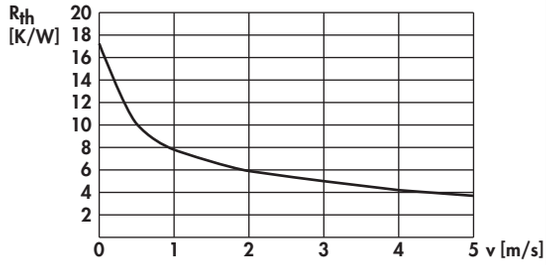
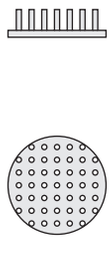
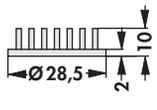
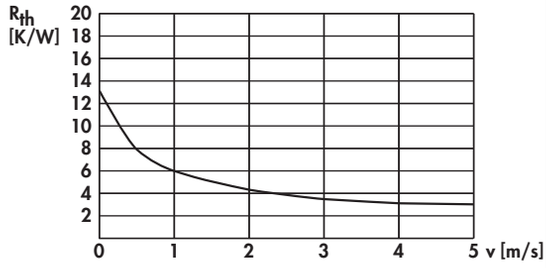
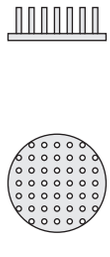
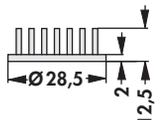
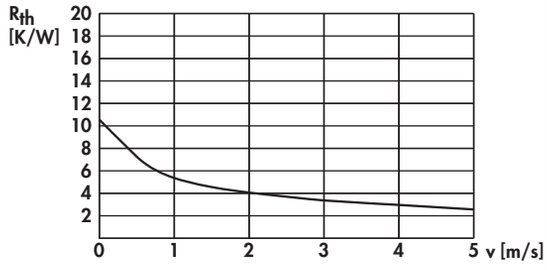
Pin heatsinks Dome

art. no.	
ICK S D 12 x 12 x 7,5 WLF ... 12 x 12 weight: 1.8g	
art. no.	
ICK S D 18 x 12 x 7,5 WLF ... 12 x 18 weight: 2.7g	
art. no.	
ICK S D 24 x 18 x 7,5 WLF ... 18 x 24 weight: 4.4g	
art. no.	
ICK S D 98 x 98 x 10 WLF ... 98 x 98 weight: 154g	
surface:	Al-natural

Pin heatsinks round



– arrangement and number of pins for optimum air flow
– suitable for forced and free convection
– excellent thermal conductivity by the alloy material (Al99,5; 220 W/mK) and homogeneous arrangement of materials
– constant heat dissipation in the base and the pins in the direction of heat flow
– low weight achieved by optimised geometry
– components fastened using glue, adhesive foil or clamps
– customer-specific modifications and special designs
– other pin-lengths and surfaces on request

art. no.			
ICK S R 28,5 x 6,5 WLF ... D 28,5 weight: 4.41g			
art. no.			
ICK S R 28,5 x 10 WLF ... D 28,5 weight: 5.16g			
art. no.			
ICK S R 28,5 x 12,5 WLF ... D 28,5 weight: 5.7g			
surface:	Al-natural		

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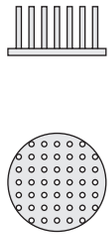
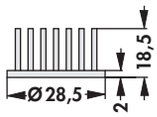
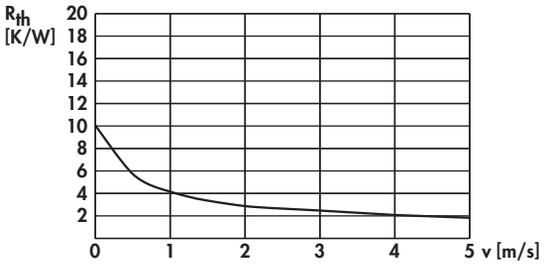
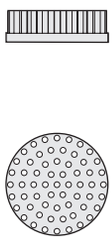
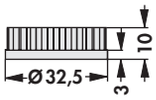
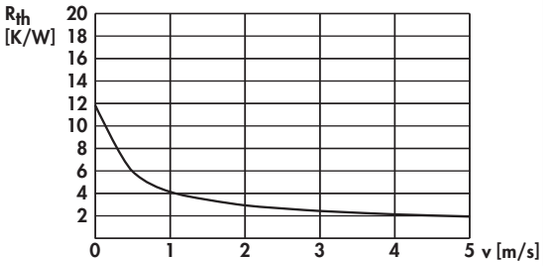
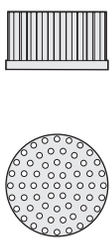
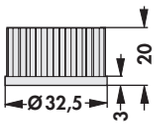
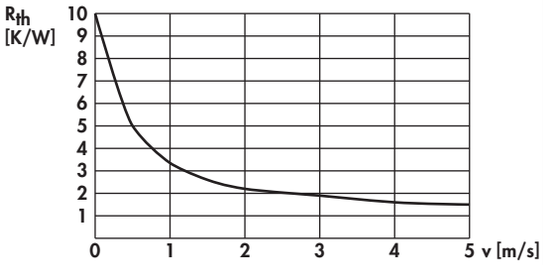
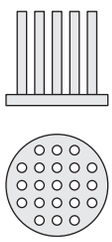
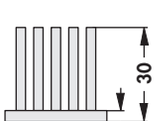
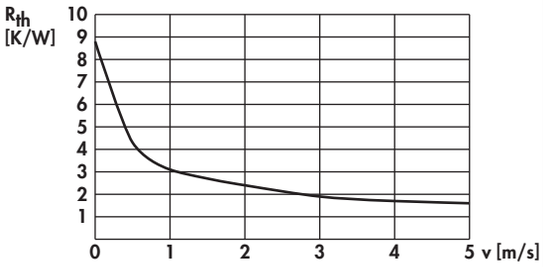
Pin heatsinks

art. no.			
ICK S R 28,5 x 18,5 WLF ... D 28,5 weight: 6.98g			
art. no.			
ICK S R 32,5 x 10 WLF ... D 32 weight: 9.7g			
art. no.			
ICK S R 32,5 x 20 WLF ... D 32 weight: 13.8g			
art. no.			
ICK S R 32,5 x 30 WLF ... D 32 weight: 20.6g			
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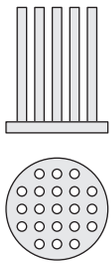
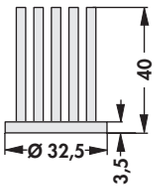
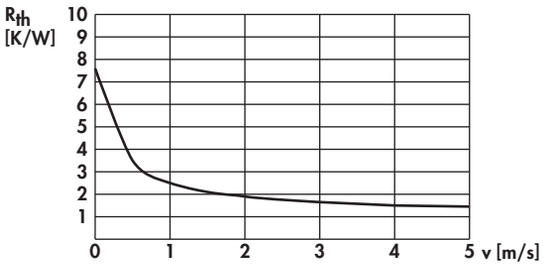
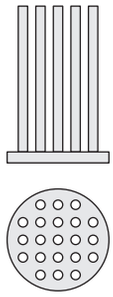
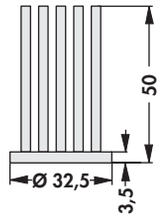
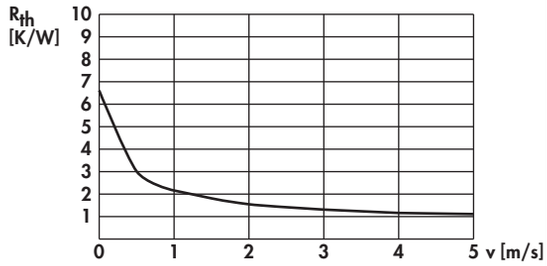
ICK S R 32,5 x 40 WLF ... D 32 weight: 24.61g			
surface:	Al-natural		

Pin heatsinks

art. no.			
ICK S R 32,5 x 50 WLF ... D 32 weight: 28.62g			
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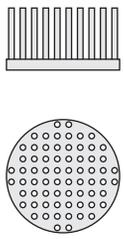
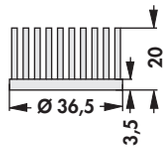
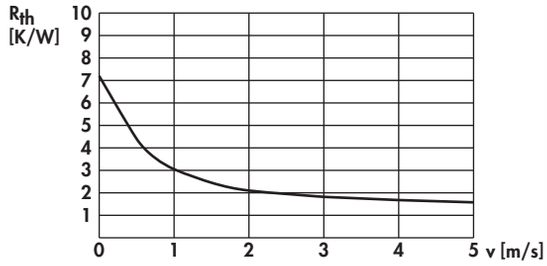
ICK S R 36,5 x 20 WLF ... D 36,5 weight: 17.59g			
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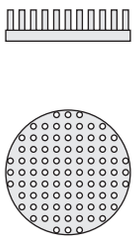
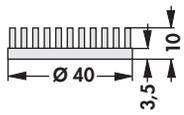
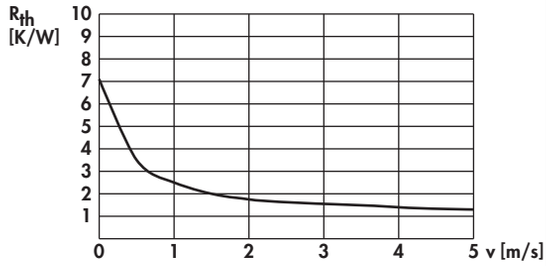
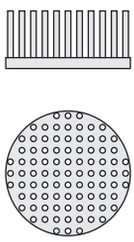
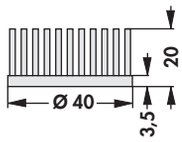
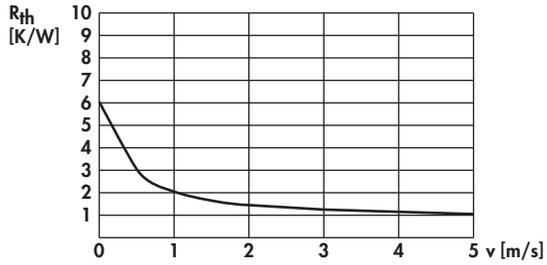
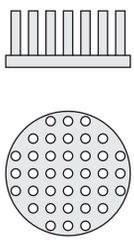
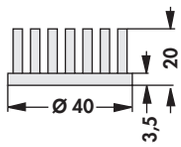
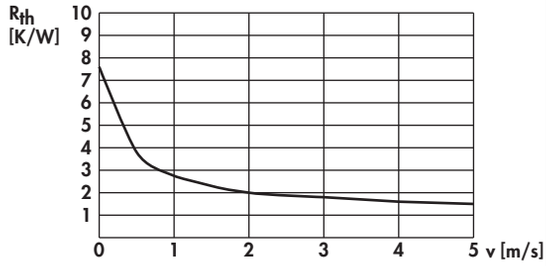
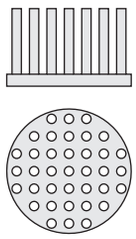
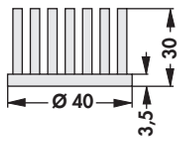
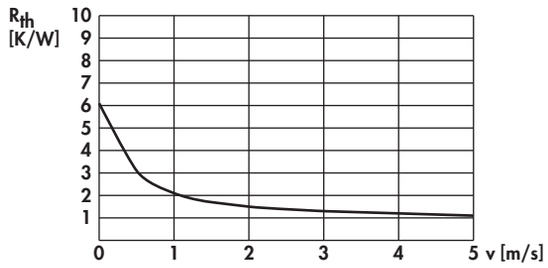
ICK S R 40 x 10 WLF ... D 40 weight: 15.85g			
art. no.			
ICK S R 40 x 20 WLF ... D 40 weight: 21.96g			
art. no.			
ICK S R A 40 x 20 WLF ... D 40 weight: 22.18g			
surface:	Al-natural		

Pin heatsinks

art. no.			
ICK S R 40 x 30 WLF ... D 40 weight: 29.24g			
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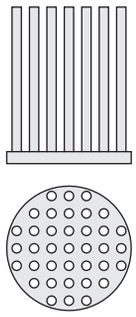
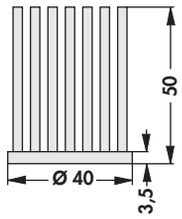
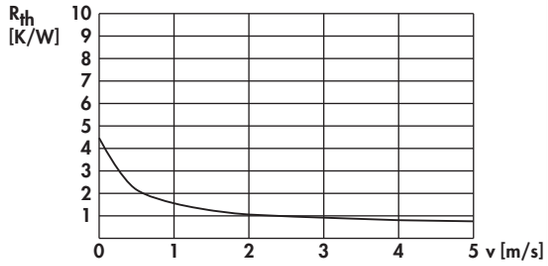
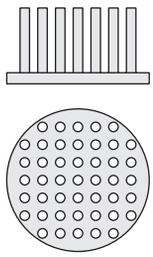
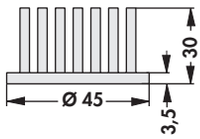
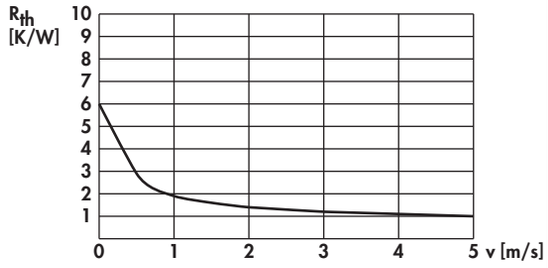
ICK S R 40 x 50 WLF ... D 40 weight: 48g			
art. no.			
ICK S R 45 x 30 WLF ... D 45 weight: 37.78g			
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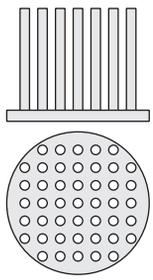
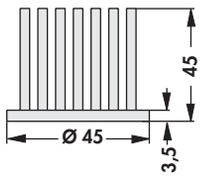
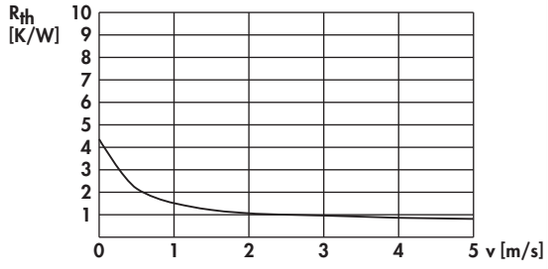
ICK S R 45 x 45 WLF ... D 45 weight: 50.67g			
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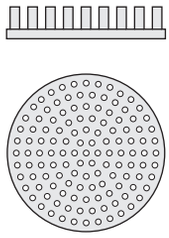
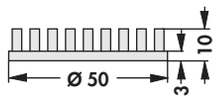
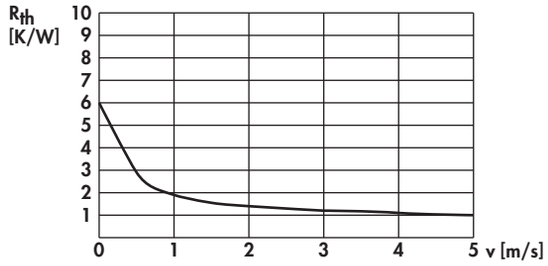
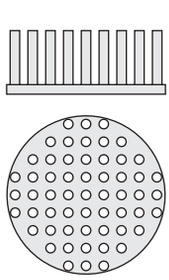
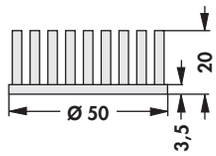
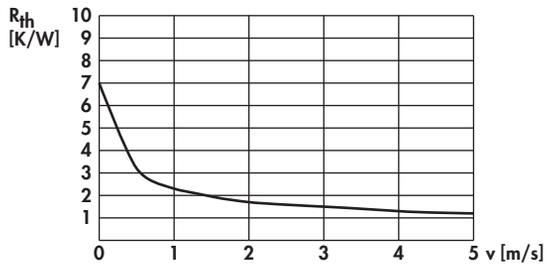
ICK S R 50 x 10 WLF ... D 50 weight: 22g			
surface:	Al-natural		

Pin heatsinks

art. no.			
ICK S R 50 x 20 WLF ... D 50 weight: 34.39g			
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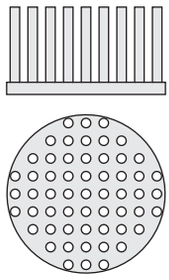
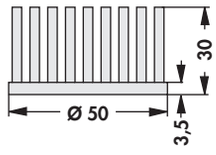
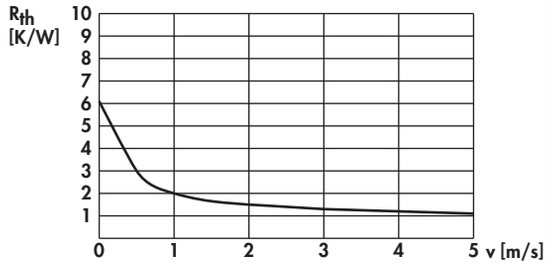
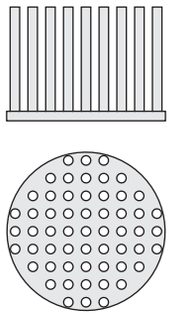
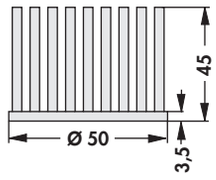
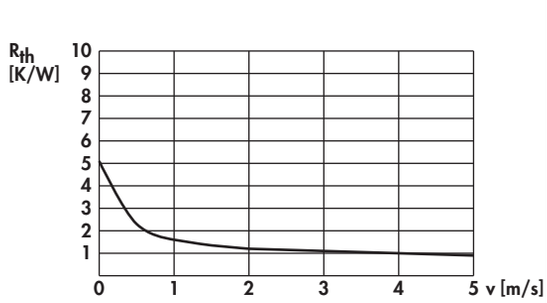
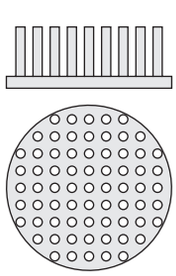
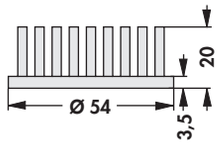
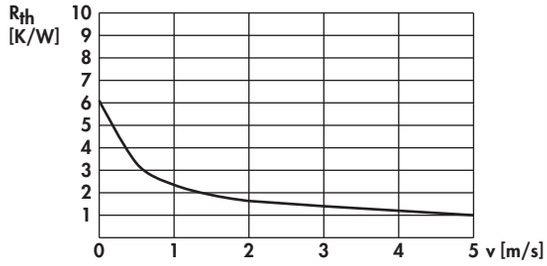
ICK S R 50 x 30 WLF ... D 50 weight: 45.28g			
art. no.			
ICK S R 50 x 45 WLF ... D 50 weight: 61.59g			
art. no.			
ICK S R 54 x 20 WLF ... D 54 weight: 40.94g			
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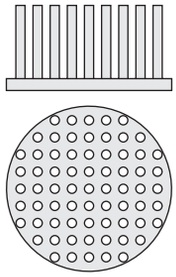
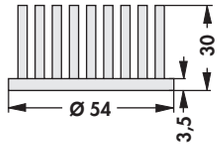
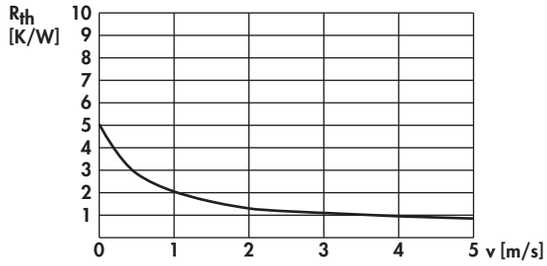
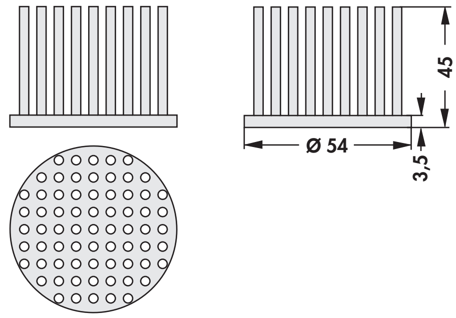
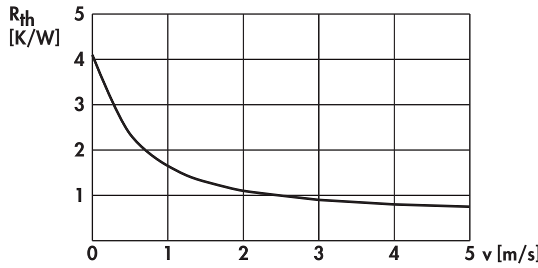
ICK S R 54 x 30 WLF ... D 54 weight: 54.11g			
surface:	Al-natural		

art. no.

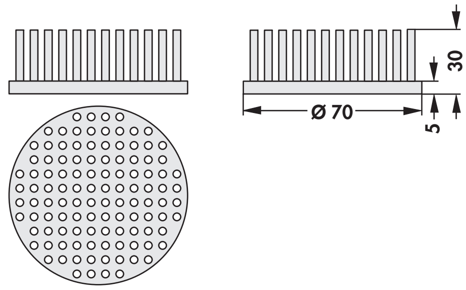
ICK S R 54 x 45
WLF ... D 54
weight: 73.86g

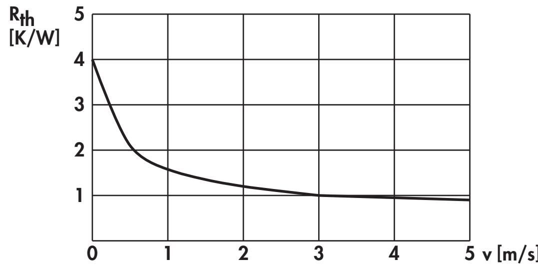




art. no.

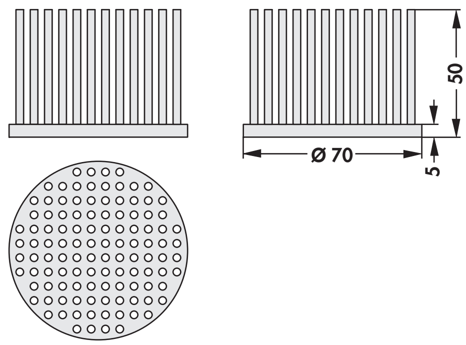
ICK S R 70 x 30
WLF ... D 70
weight: 92.8g

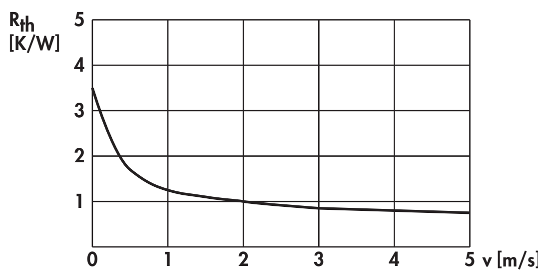




art. no.

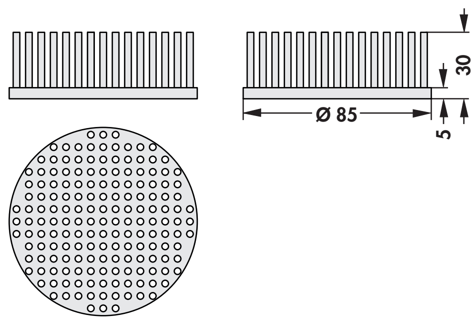
ICK S R 70 x 50
WLF ... D 70
weight: 135.56g

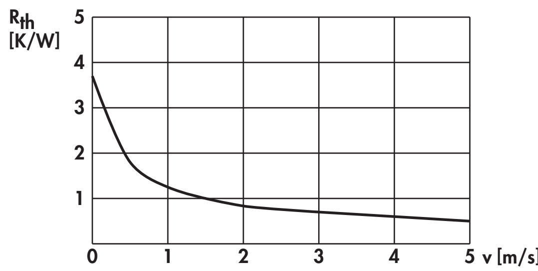




art. no.

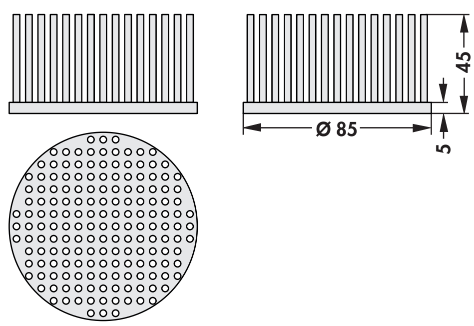
ICK S R 85 x 30
WLF ... D 85
weight: 157g

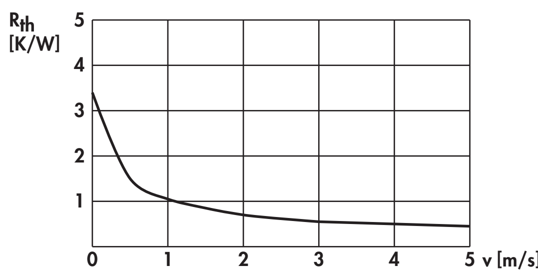




art. no.

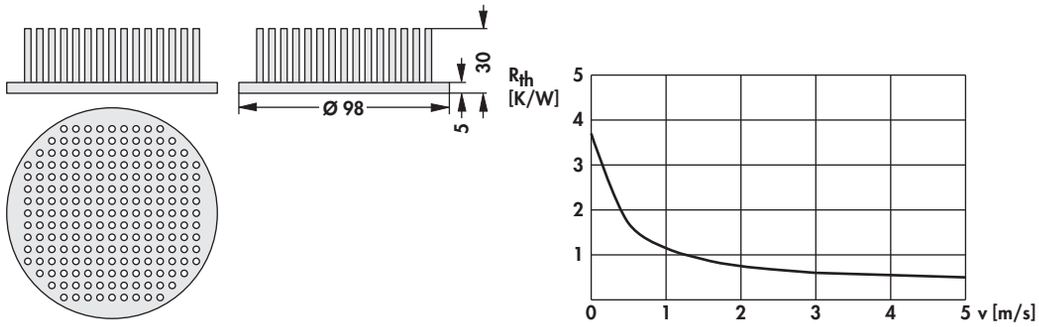
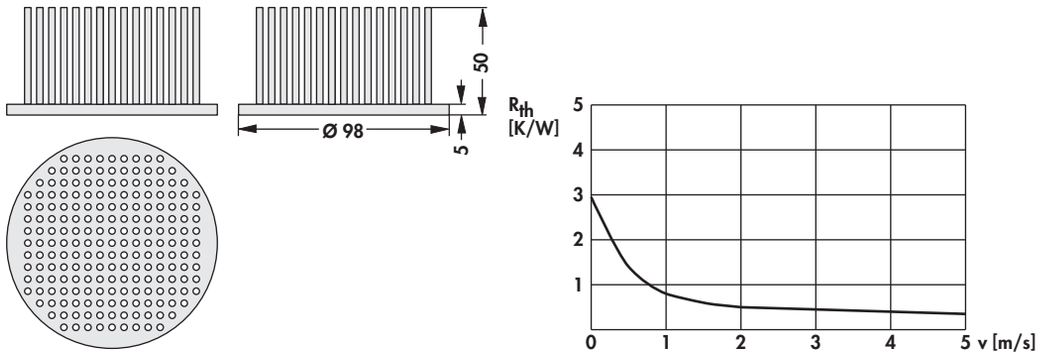
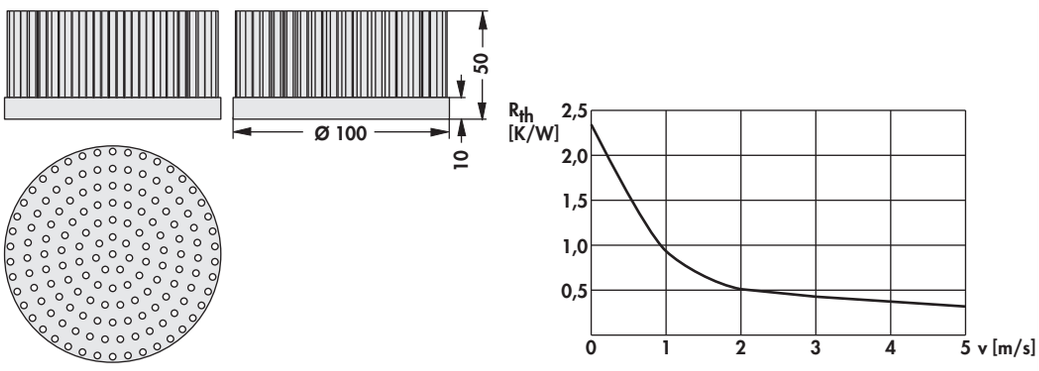
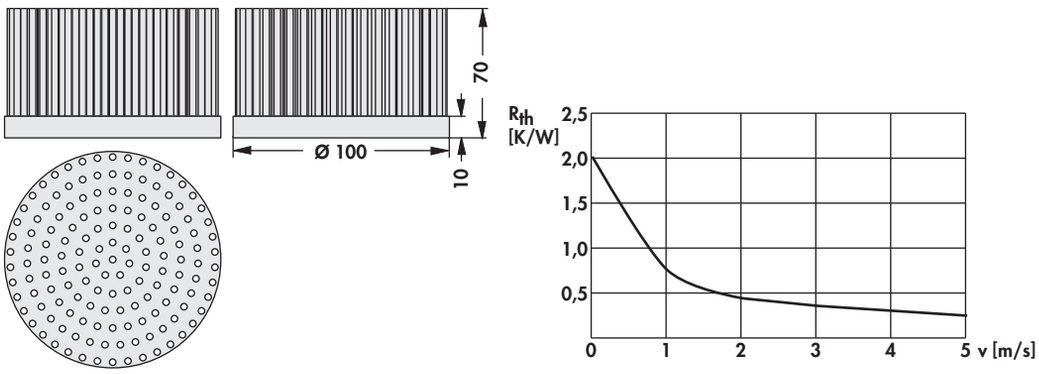
ICK S R 85 x 45
WLF ... D 85
weight: 164g



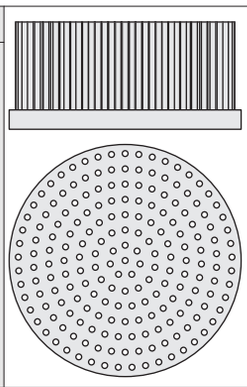
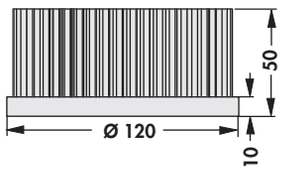
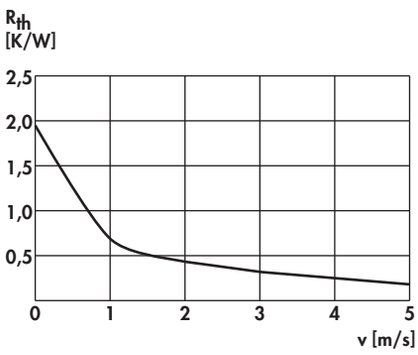
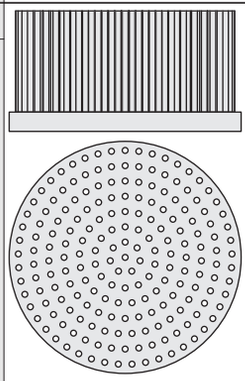
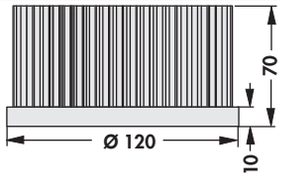
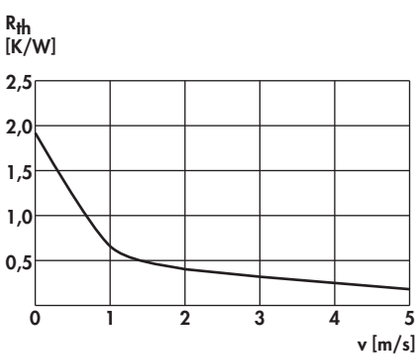
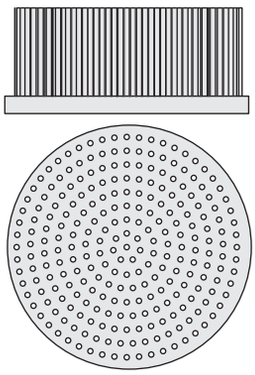
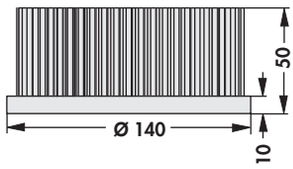
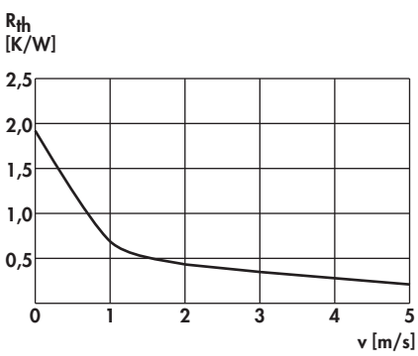
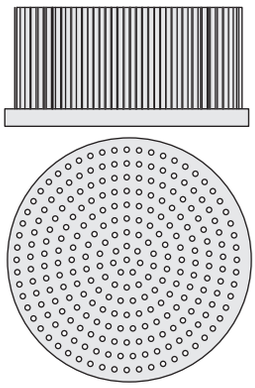
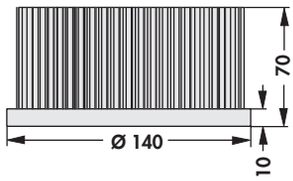
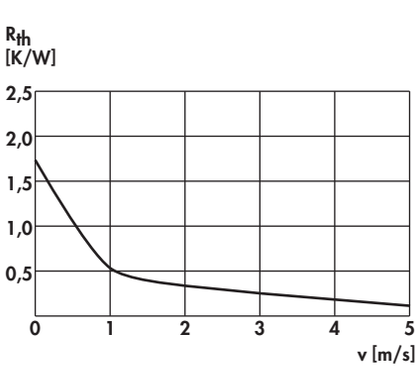


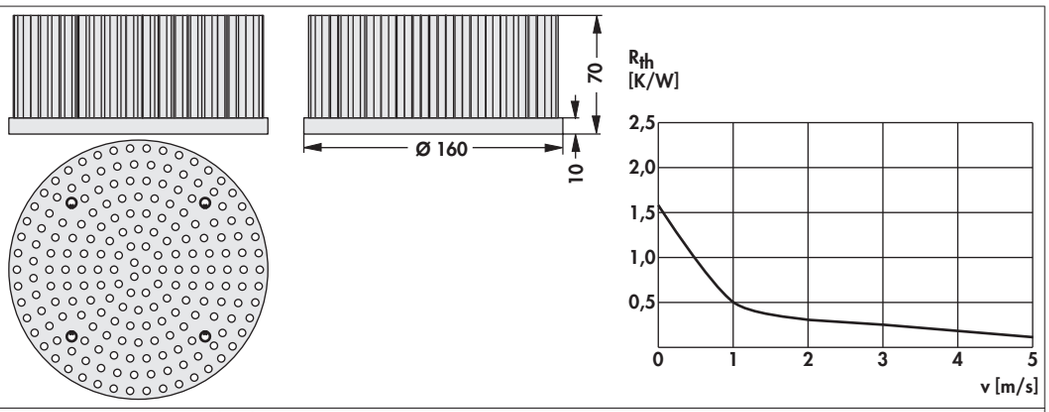
surface:	Al-natural

Technical introduction → A 2 – 8

art. no.	
ICK S R 98 x 30 WLF ... D 98 weight: 117.5g	
art. no.	
ICK S R 98 x 50 WLF ... D 98 weight: 194.23g	
surface:	Al-natural
art. no.	
ICK S R 100 x 50 WLF ... D 100 weight: 320g	
art. no.	
ICK S R 100 x 70 WLF ... D 100 weight: 381.5g	
surface:	black anodised

Pin heatsinks

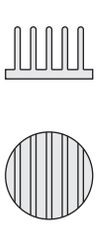
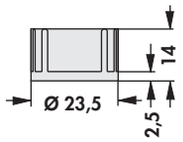
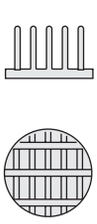
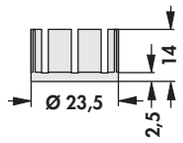
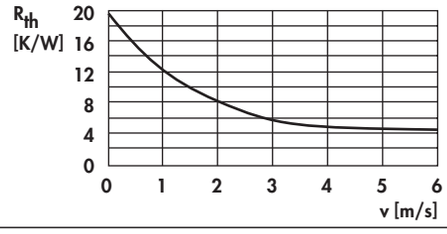
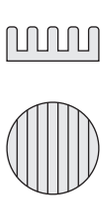
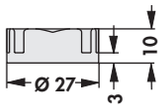
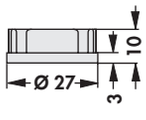
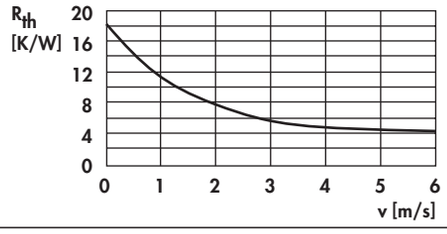
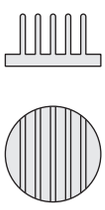
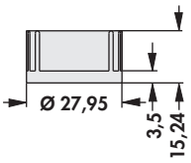
art. no.			
ICK S R 120 x 50 WLF ... D 120 weight: 455.8g			
art. no.			
ICK S R 120 x 70 WLF ... D 120 weight: 530.9g			
art. no.			
ICK S R 140 x 50 WLF ... D 140 weight: 608.8g			
art. no.			
ICK S R 140 x 70 WLF ... D 140 weight: 705.3g			
surface:	black anodised		

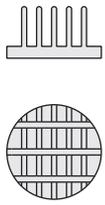
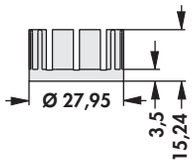
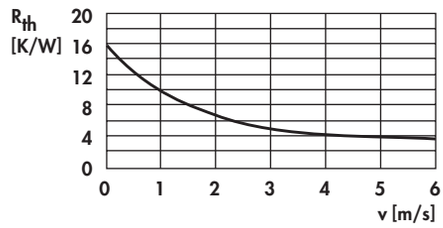
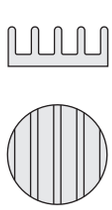
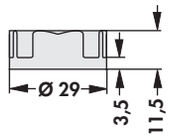
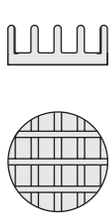
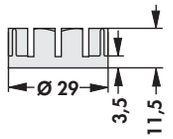
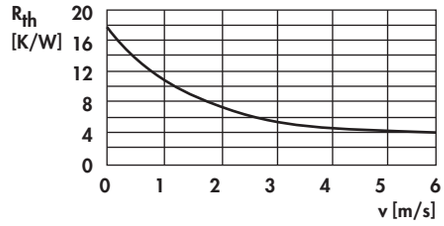
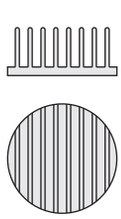
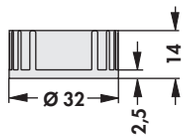
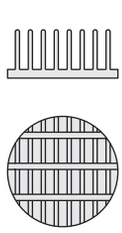
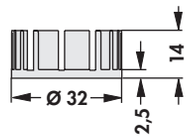
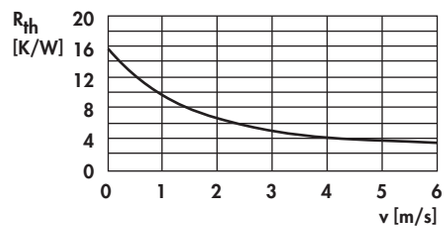
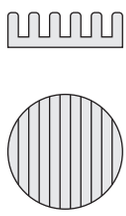
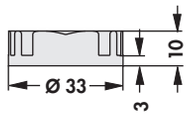
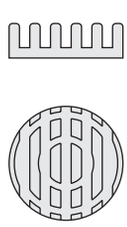
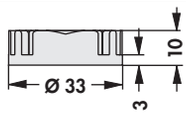
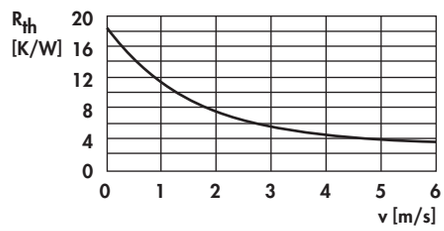
art. no.	
ICK S R 160 x 70 WLF ... D 160 weight: 1,055g	
	Mounting possibility for fans 92 x 92 mm
surface:	black anodised

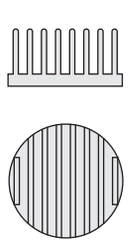
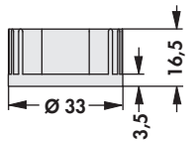
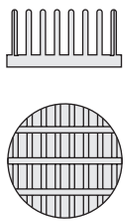
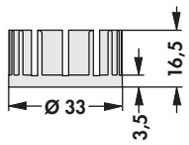
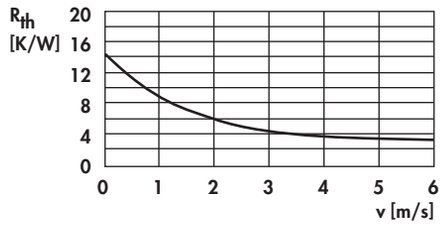
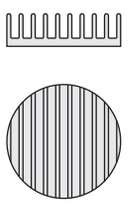
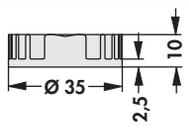
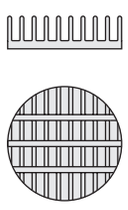
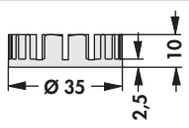
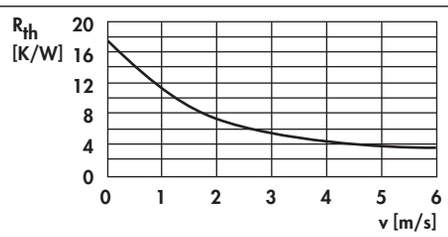
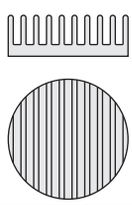
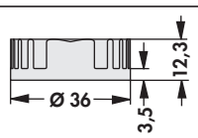
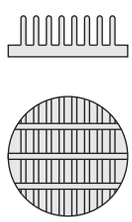
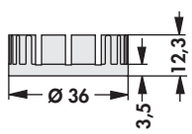
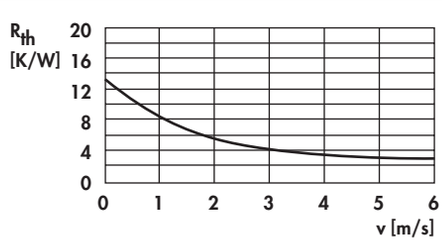
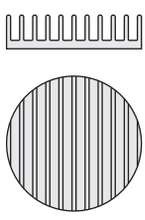
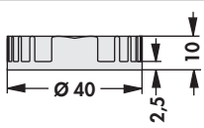
fischer elektronik

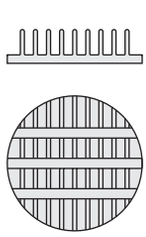
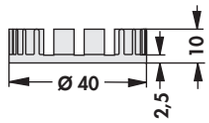
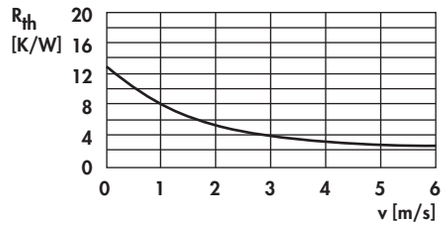
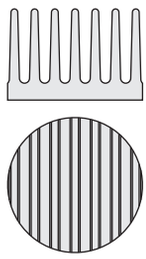
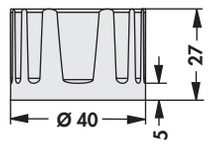
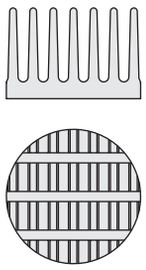
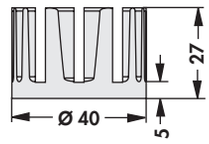
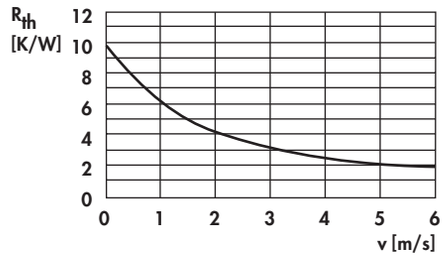
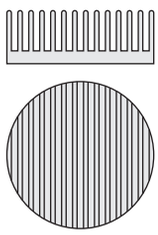
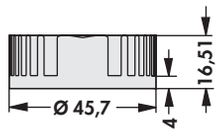
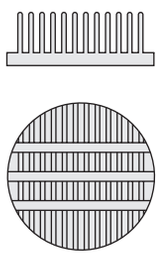
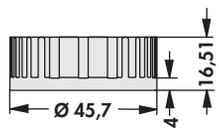
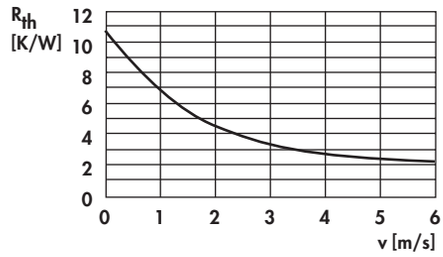
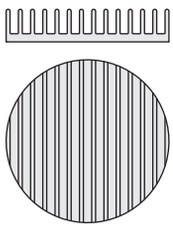
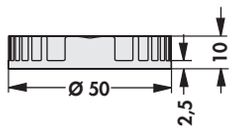
Heatsinks for LEDs

- suitable for free or forced convection
- heat sink dimensions are fitted to the respective LED typ
- simple mounting by using thermally conductive adhesive foil, glue or screw mounting
- specific versions on customer´s request
- double-sided adhesive thermal conductive foil **WLF ...** ➔ E 37
- special design, surfaces and modification to customer specification on request

art. no.			
ICK LED R 23,5 x 14 WLF ... D 23			R_{th} = 18,58 K/W
art. no.			
ICK LED R 23,5 x 14 G WLF ... D 23			
art. no.			
ICK LED R 27 x 10 WLF ... D 27			R_{th} = 17,69 K/W
art. no.			
ICK LED R 27 x 10 G WLF ... D 27			
art. no.			
ICK LED R 28 x 15 WLF ... D 28			R_{th} = 15,24 K/W
surface:	black anodised		

art. no.			
ICK LED R 28 x 15 G WLF ... D 28			
art. no.			
ICK LED R 29 x 11,5 WLF ... D 29			R_{th} = 17,26 K/W
art. no.			
ICK LED R 29 x 11,5 G WLF ... D 29			
art. no.			
ICK LED R 32 x 14 WLF ... D 32			R_{th} = 15,23 K/W
art. no.			
ICK LED R 32 x 14 G WLF ... D 32			
art. no.			
ICK LED R 33 x 10 WLF ... D 33			R_{th} = 17,6 K/W
art. no.			
ICK LED R 33 x 10 G WLF ... D 33			
surface:	black anodised		

art. no.			
ICK LED R 33 x 16,5 WLF ... D 33			R_{th} = 13,87 K/W
art. no.			
ICK LED R 33 x 16,5 G WLF ... D 33			
art. no.			
ICK LED R 35 x 10 WLF ... D 35			R_{th} = 16,9 K/W
art. no.			
ICK LED R 35 x 10 G WLF ... D 35			
art. no.			
ICK LED R 36 x 12 WLF ... D 36			R_{th} = 12,88 K/W
art. no.			
ICK LED R 36 x 12 G WLF ... D 36			
art. no.			
ICK LED R 40 x 10 WLF ... D 40			R_{th} = 12,28 K/W
surface:	black anodised		

art. no.			
ICK LED R 40 x 10 G WLF ... D 40			
art. no.			
ICK LED R 40 x 27 WLF ... D 40			R_{th} = 9,41 K/W
art. no.			
ICK LED R 40 x 27 G WLF ... D 40			
art. no.			
ICK LED R 45,7 x 16,5 WLF ... D 45			R_{th} = 10,46 K/W
art. no.			
ICK LED R 45,7 x 16,5 G WLF ... D 45			
art. no.			
ICK LED R 50 x 10 WLF ... D 50			R_{th} = 10,57 K/W
surface:	black anodised		

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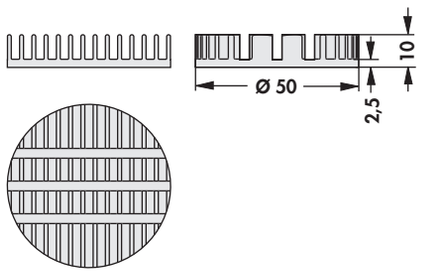
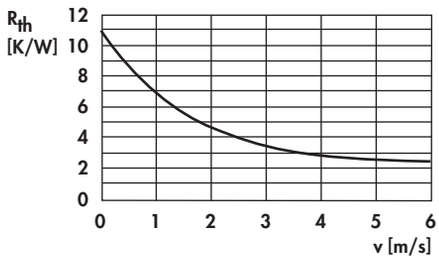
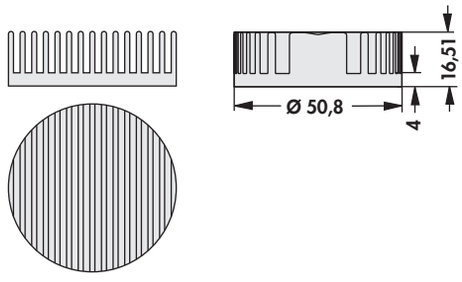
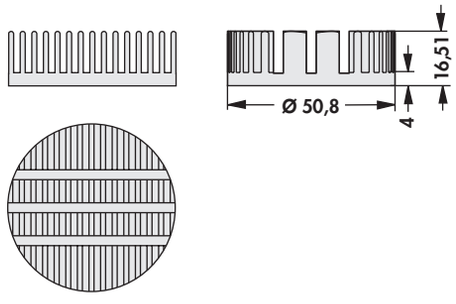
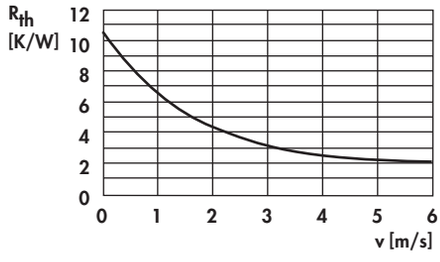
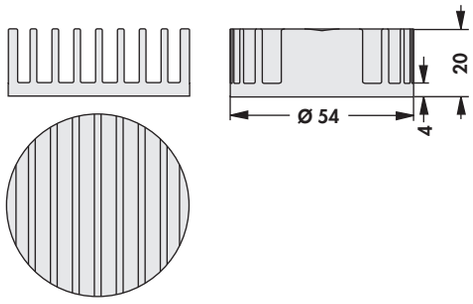
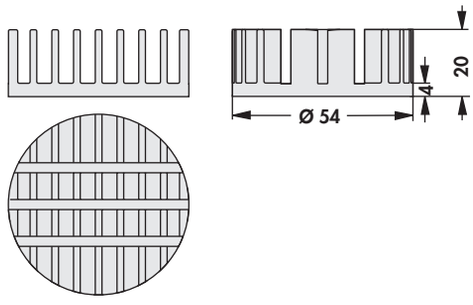
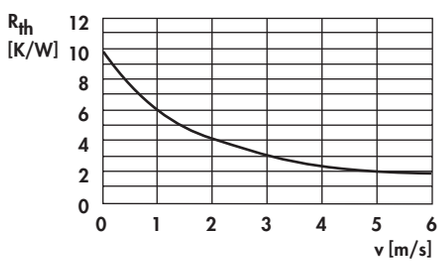
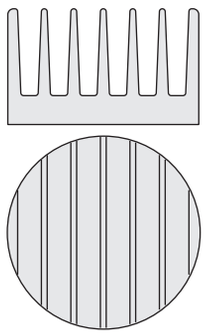
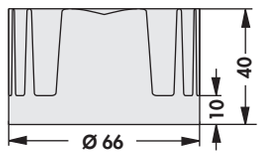
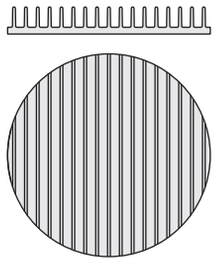
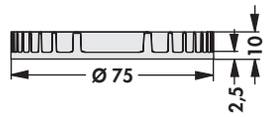
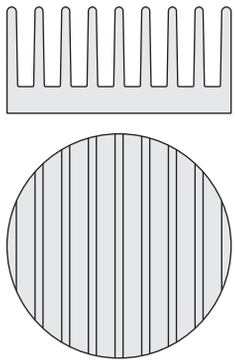
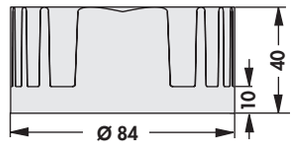
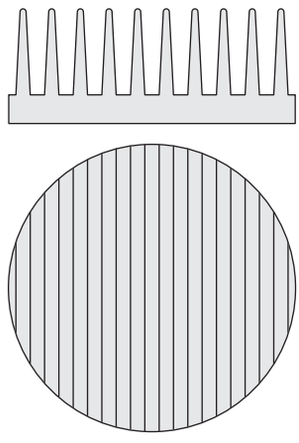
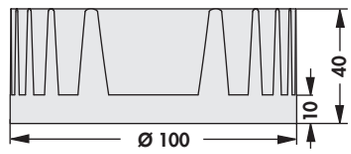
Heatsinks for LEDs

art. no.		
ICK LED R 50 x 10 G WLF ... D 50		
art. no.		
ICK LED R 50,8 x 16,5 WLF ... D 50		R_{th} = 10,17 K/W
art. no.		
ICK LED R 50,8 x 16,5 G WLF ... D 50		
art. no.		
ICK LED R 54 x 20 WLF ... D 54		R_{th} = 9,48 K/W
art. no.		
ICK LED R 54 x 20 G WLF ... D 54		
surface:	black anodised	

art. no.		
ICK LED R 66 x 40 WLF ... D 66		 R_{th} = 3,2 K/W
art. no.		
ICK LED R 75 x 10 WLF ... D 75		 R_{th} = 5,2 K/W
art. no.		
ICK LED R 84 x 40 WLF ... D 84		 R_{th} = 2,5 K/W
art. no.		
ICK LED R 100 x 40 WLF ... D 100		 R_{th} = 2 K/W
surface:	black anodised	

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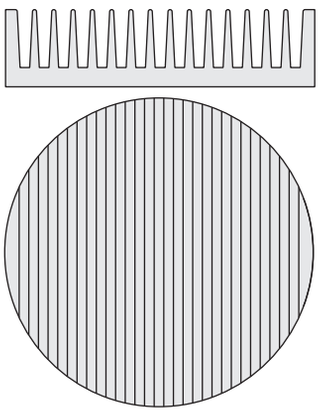
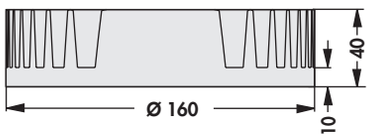
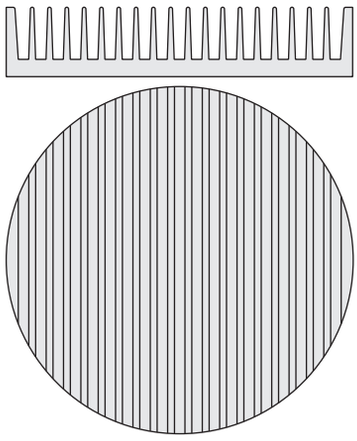
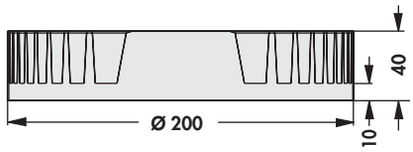
Heatsinks for LEDs

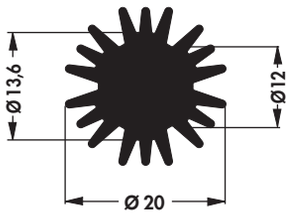
art. no.	
ICK LED R 160 x 40 WLF ... D 160	  R_{th} = 1,4 K/W
art. no.	
ICK LED R 200 x 40 WLF ... D 200	  R_{th} = 1 K/W
surface:	black anodised

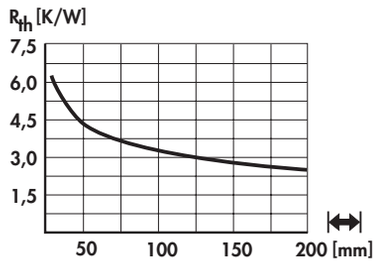
Heatsinks for LEDs

– up from a profile length of 25 mm: optional adapter plate **LA LED 68 ...** ➔ B 67 suitable for LED modules:
Bridgelux Vero, Citizen CitiLED, Cree XLamp, Edison Edilex, GE Infusion, Lustrous Lustron, Megaman Teco, Osram PrevaLED and Soleriq, Philips Fortimo and Luxeon, Prolight Opto, Sharp Mega Zenigata, Toshiba E-Core, Tridonic Stark, Vexica Lumaera, Vossloh Schwabe Luga Shop and Industrial
– special design, surfaces and modification to customer specification on request

art. no.

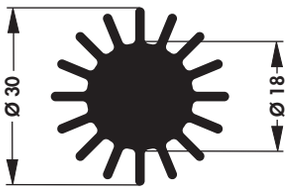
SK 585 ...

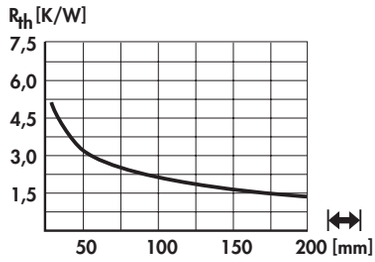




art. no.

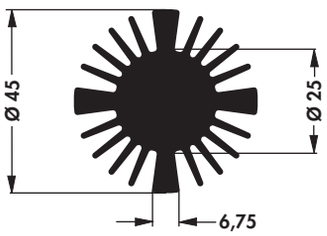
SK 620 ...

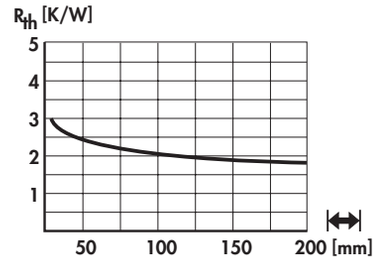




art. no.

SK 618 ...

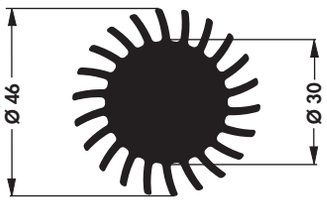


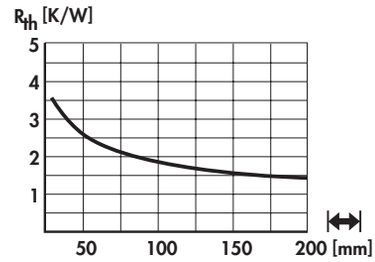


please indicate: **... ⟷**
10 15 20 25 37.5 50 1000 mm

art. no.

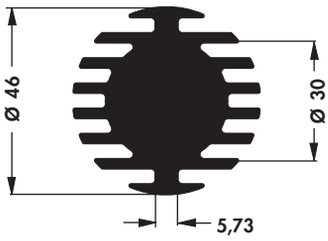
SK 619 ...

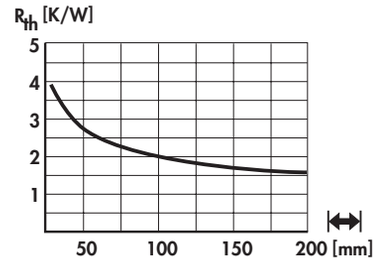




art. no.

SK 598 ...



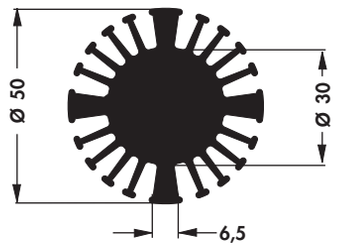
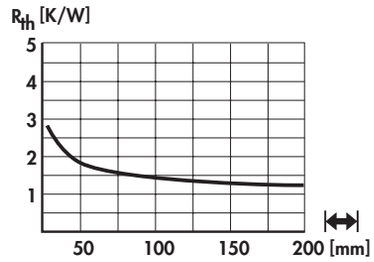
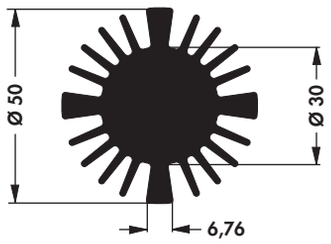
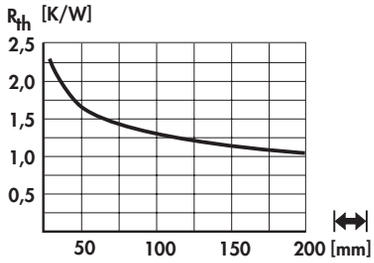
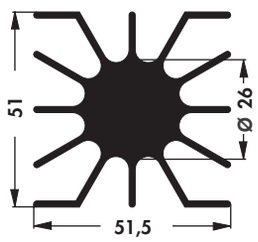
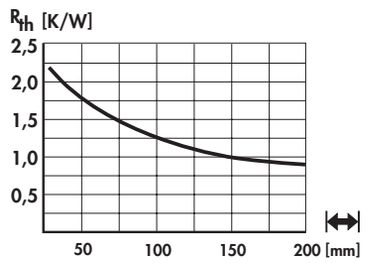
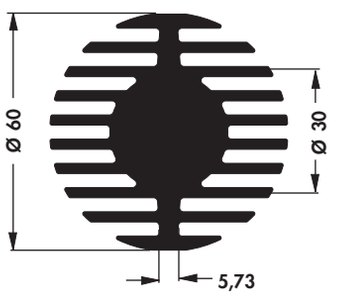
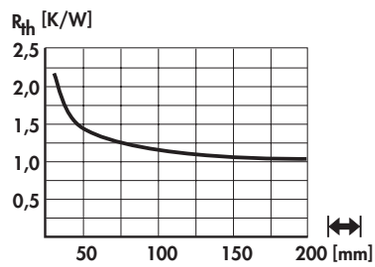
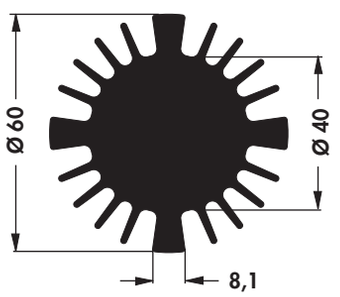
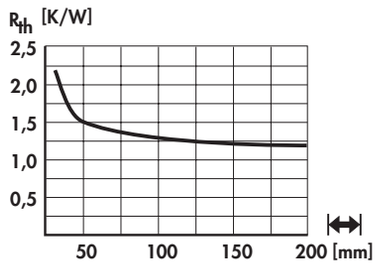


please indicate: **... ⟷**
10 15 20 25 37.5 50 1000 mm

... adapter (optional)
AD = adapter plate (art. no. AD LED 53)

surface:	black anodised

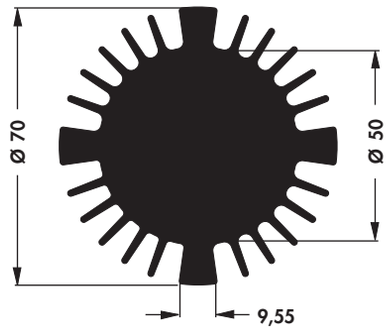
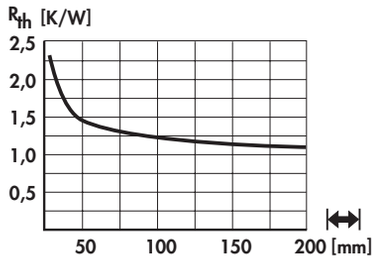
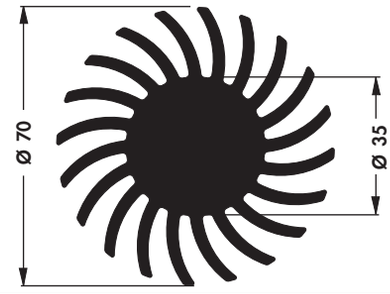
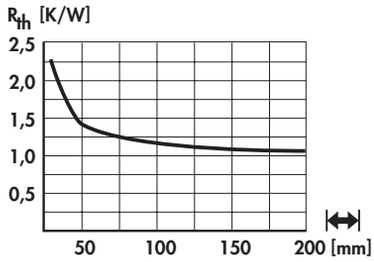
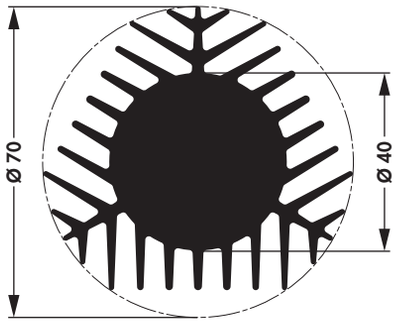
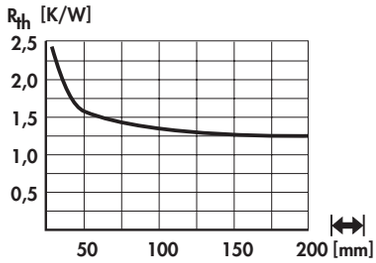
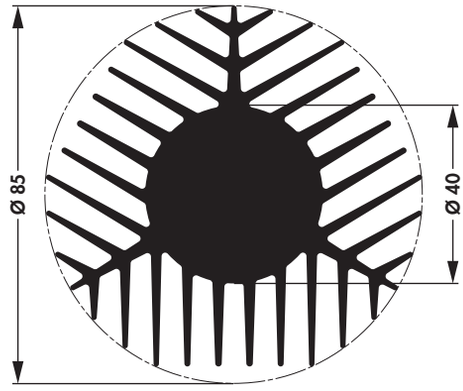
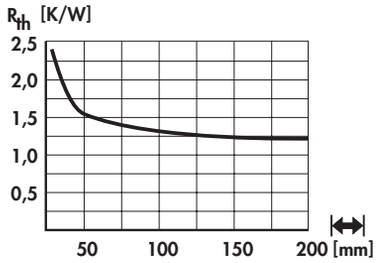
Heatsinks for LEDs

art. no.		
SK 602 ...		
art. no.		
SK 577 ...		
art. no.		
SK 46 ...		
art. no.		
SK 578 ...		
art. no.		
SK 569 ...		

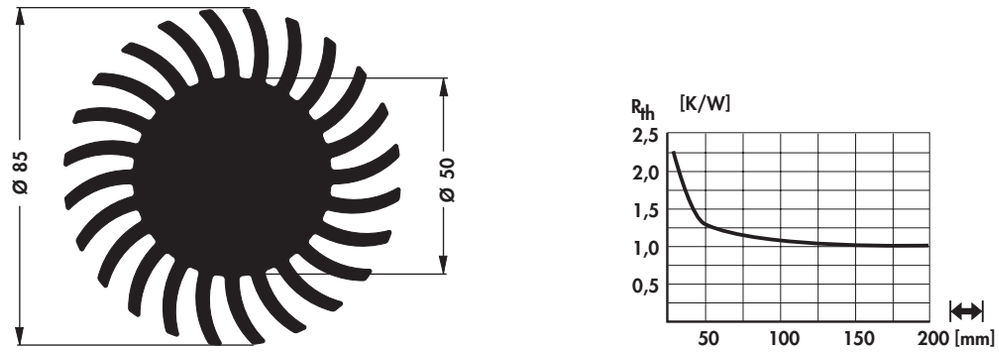
please indicate: **... ↔** **10 15 20 25 37.5 50 1000 mm**

... adapter (optional)
AD = adapter plate (art. no. AD LED 53)

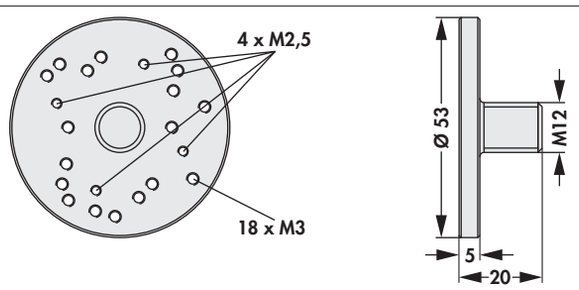
surface:	black anodised

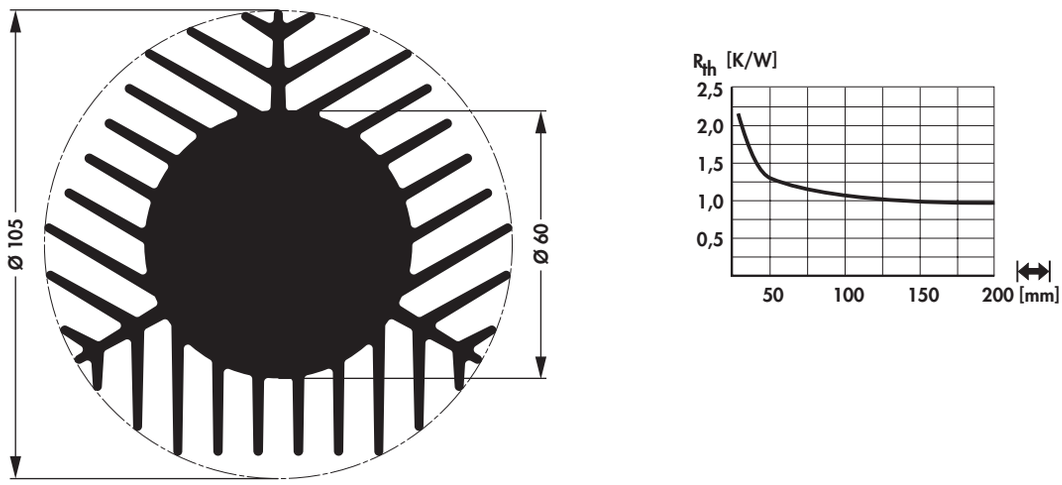
art. no.	
SK 570 ...	 
art. no.	
SK 571 ...	 
please indicate:	**... ↔** **10 15 20 25 37.5 50 1000 mm** **... adapter (optional)** **AD = adapter plate (art. no. AD LED 53)**
art. no.	
SK 658 ...	 
art. no.	
SK 659 ...	 
please indicate:	**... ↔** **10 15 20 25 37.5 50 1000 mm**
surface:	black anodised

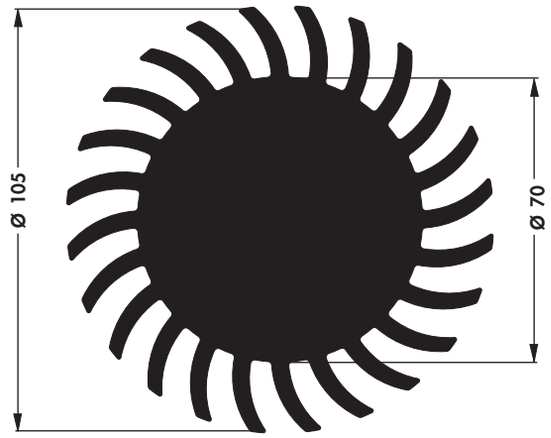
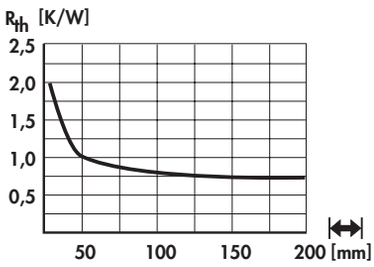
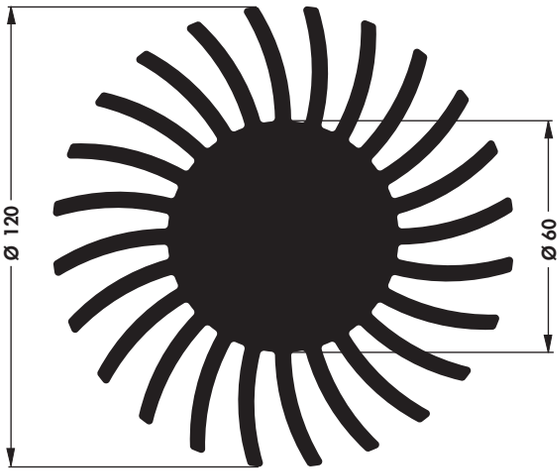
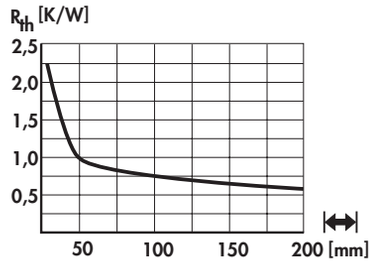
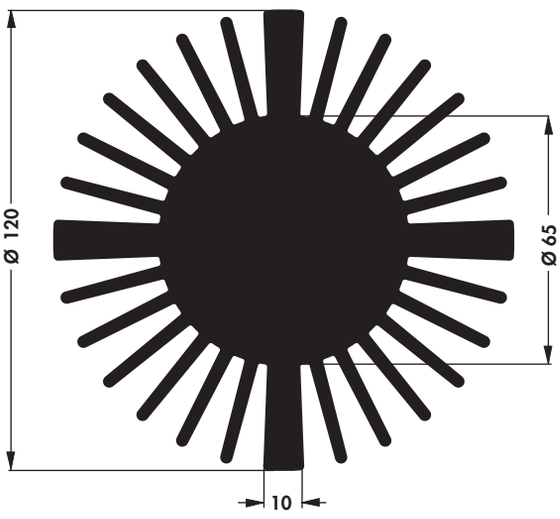
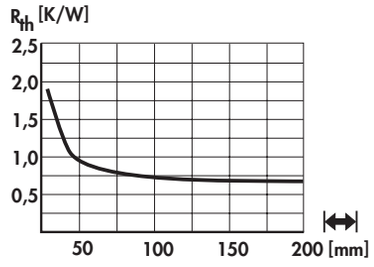
Heatsinks for LEDs

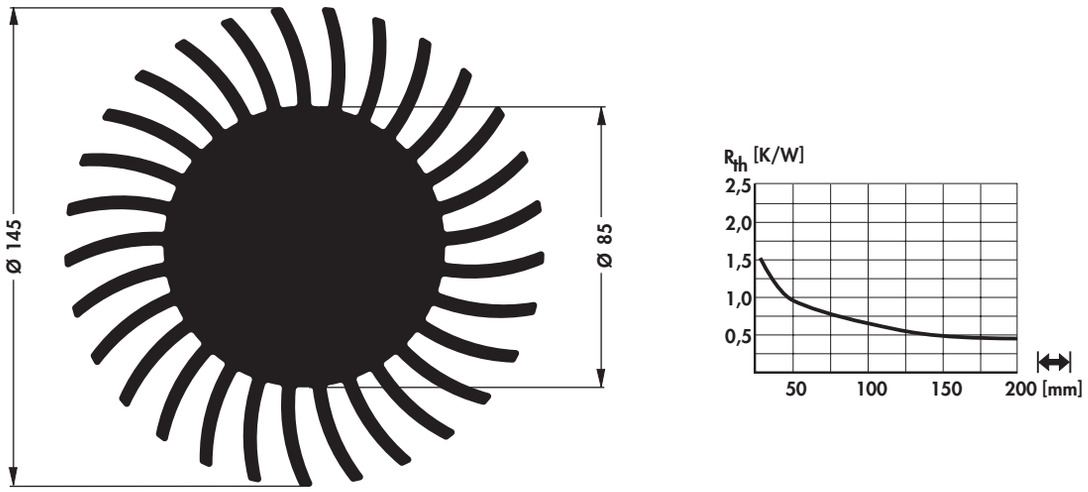
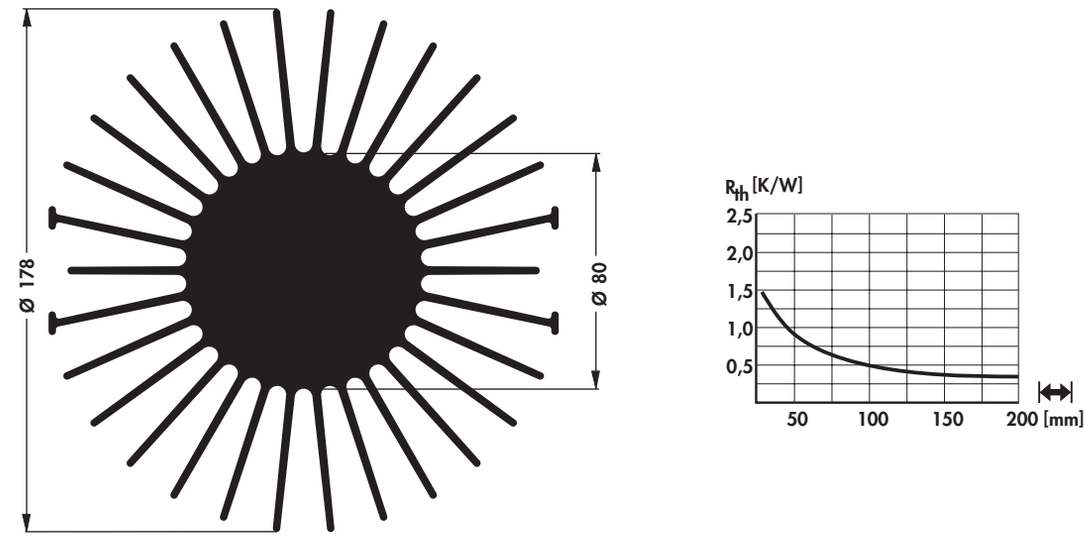
art. no.	
SK 572 ...	
please indicate:	**... ↔ 10 15 20 25 37.5 50 1000 mm** **... adapter (optional) AD = adapter plate (art. no. AD LED 53)**
surface:	black anodised

– adapter plate suitable for LED modules:
Bridgelux Vero, Citizen CitiLED, Cree XLamp, Edison Edilex, GE Infusion, Luga Shop und Industrial, Lustrous Lustron, Megaman Teco,Osram PrevaLED und Soleriq, Philips Fortimo und Luxeon, Prolight Opto, Sharp Mega Zenigata, Toshiba E-Core, Tridonic Stark, Vexica Lumaera, Vossloh Schwabe

art. no.	
AD LED 53	
surface:	black anodised

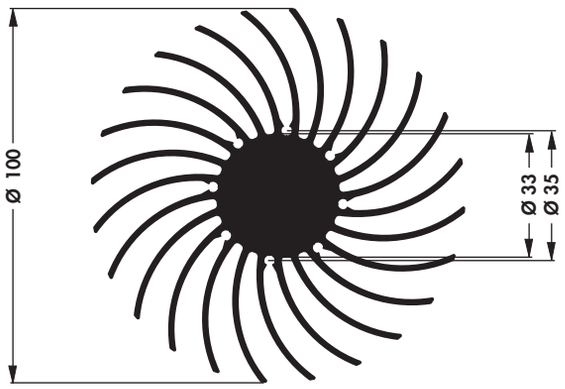
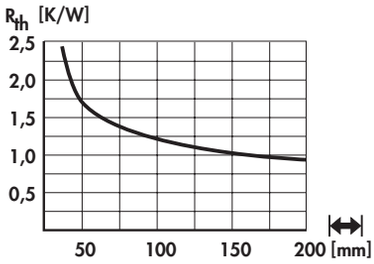
art. no.	
SK 660 ...	
please indicate:	**... ↔ 10 15 20 25 37.5 50 75 100 150 1000 mm**
surface:	black anodised

art. no.	
SK 584 ...	 
art. no.	
SK 615 ...	 
art. no.	
SK 599 ...	 
please indicate:	**... ↔** **10 15 20 25 37.5 50 75 100 150 1000 mm**
surface:	black anodised

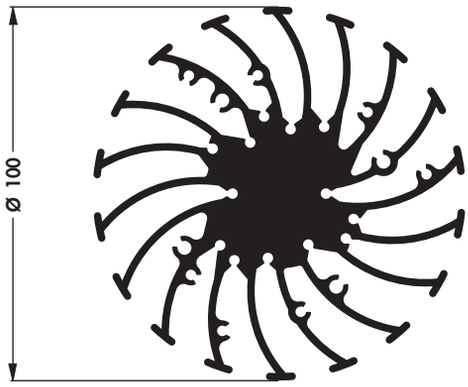
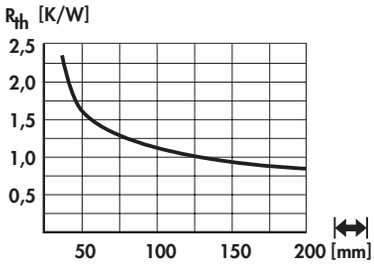
art. no.	
SK 592 ...	
art. no.	
SK 590 ...	
please indicate:	**... ↔ 10 15 20 25 37.5 50 75 100 150 1000 mm**
surface:	black anodised

Heatsinks for LEDs

– suitable for LEDs:
Osram PrevaLED, Philips Lumileds and Luxeon, Prolight Opto, Sharp Mega Zenigata, Vossloh Schwabe Luga Shop and Industrial as well as all further Zhaga compliant LED modules with a mounting hole spacing of 35 mm
– special designs, surfaces and modifications to customer specification on request

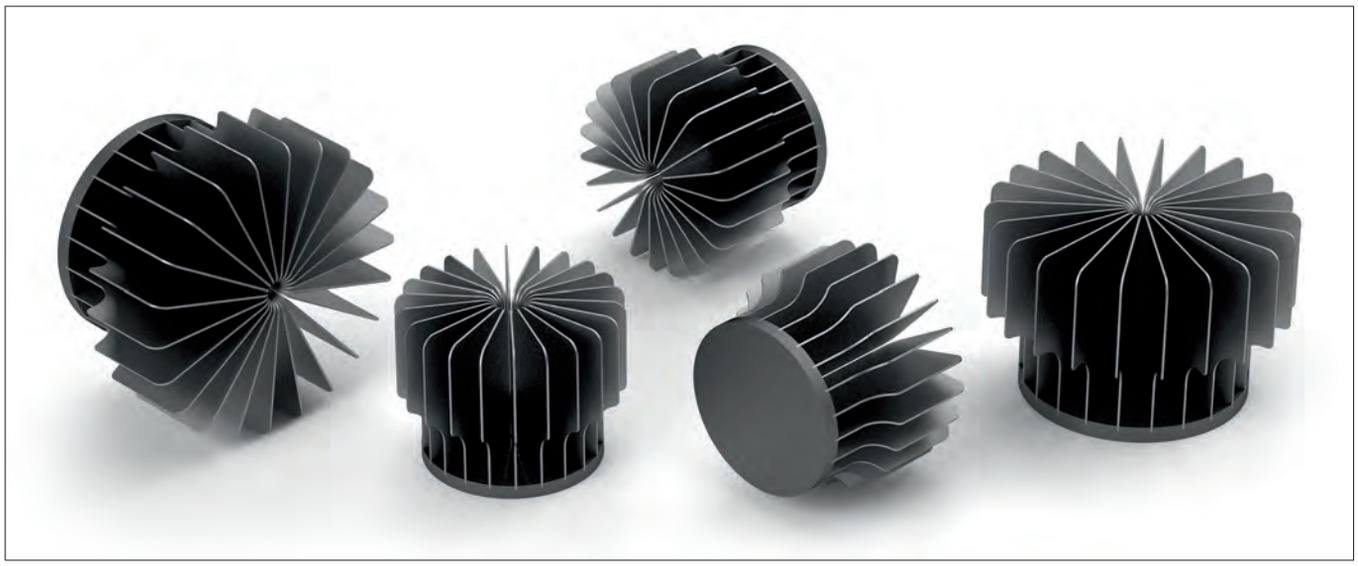
art. no.	
SK 642 ...	 
please indicate: ... ↔ **10 15 20 25 37.5 50 75 100 150 1000 mm**	
surface:	black anodised

– suitable for LEDs:
Bridgelux Vero, Citizen CitiLED, Cree XLamp, Edison Edilex, GE Infusion, Megaman Teco, Osram PrevaLED and Soleriq, Philips Fortimo, Lumileds and Luxeon, Prolight Opto, Sharp Mega Zenigata, Toshiba E-Core, Tridonic Stark, Vexica Lumaera, Vossloh Schwabe Luga Shop and Industrial, Zhaga
– fixing screws for LED modules and holder systems on request
– special designs, surfaces and modifications to customer specification on request

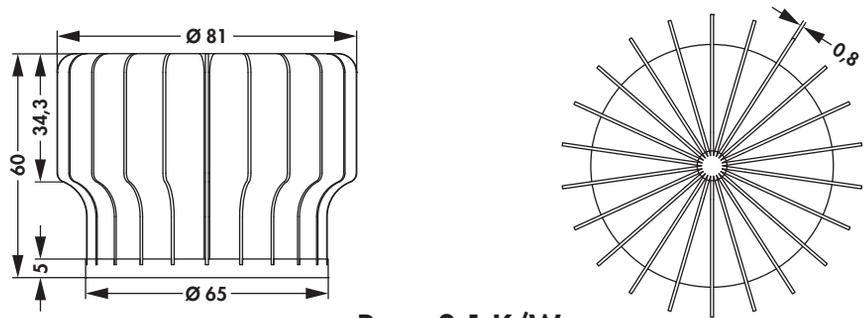
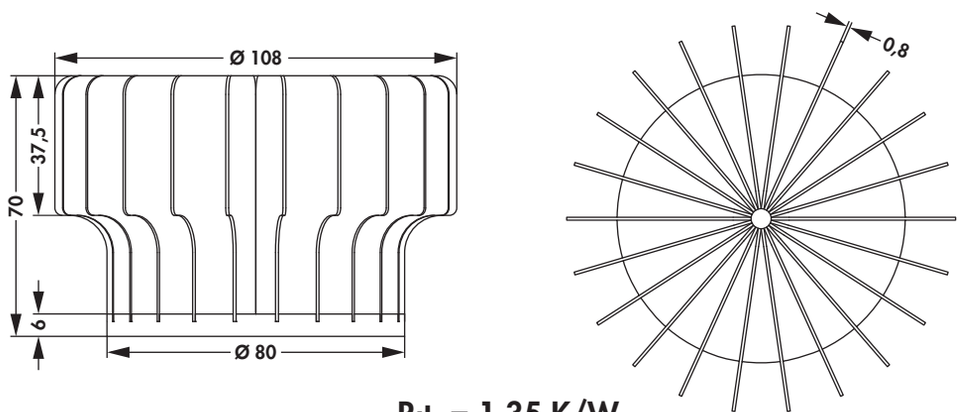
art. no.	
SK 643 ...	 
please indicate: ... ↔ **10 15 20 25 37.5 50 75 100 150 1000 mm**	
surface:	black anodised

fischer elektronik

Heatsinks for LED

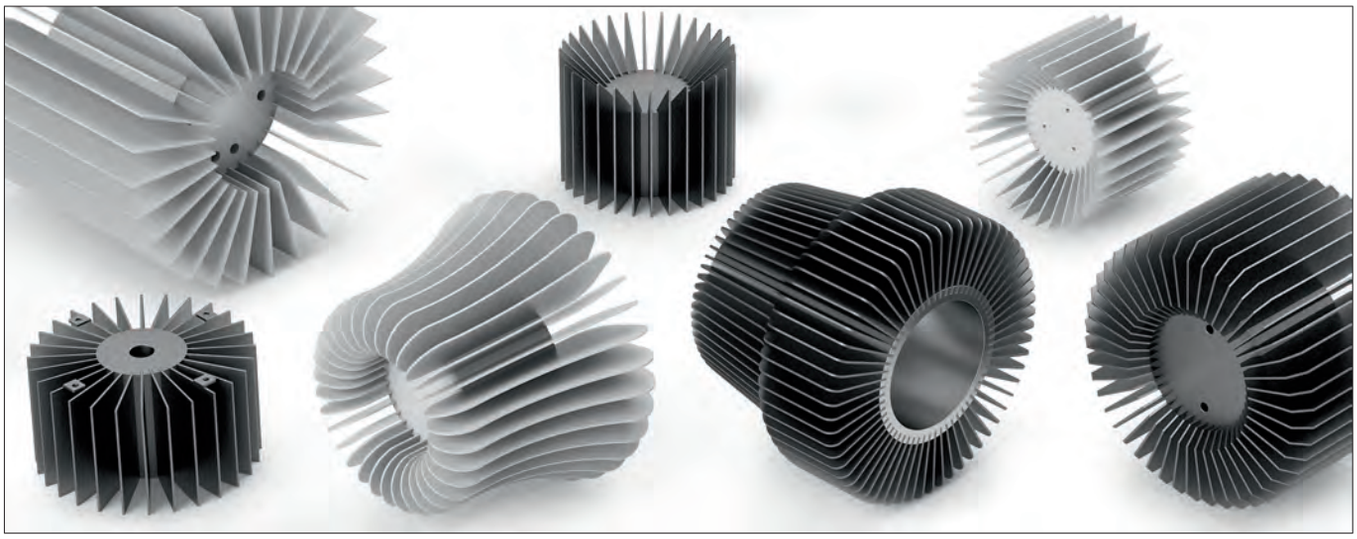


– particularly light and compact conception made of aluminium
– thermotechnically optimally fitted lamellas
– precise milled flat LED mounting surface
– adaptable to all common LED modules and seizes
– bottom plate for heat dissipation made of copper upon request
– customised designs and modifications acc. to drawing

art. no.	
SK LED R 65 weight: 132g	 R_{th} = 2,1 K/W
art. no.	
SK LED R 80 weight: 207g	 R_{th} = 1,35 K/W

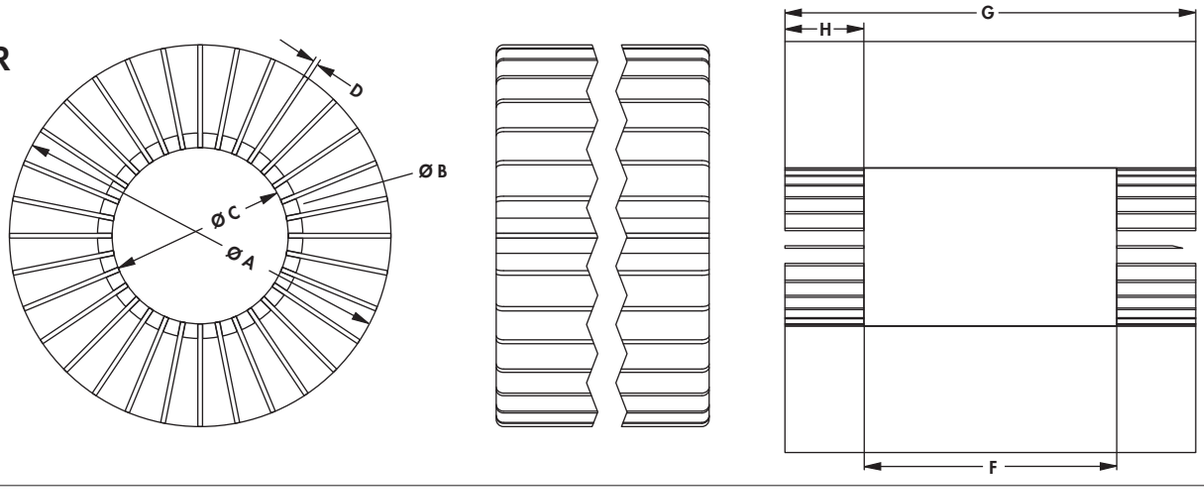
surface:	black anodised
material:	aluminium bottom plate: EN AW 6060; sheet metal: AlMg3
number of plates:	22

LED fin cooler KTE R customised



– individual LED heatsinks acc. to customer's requests
– adaptable to all common LED modules and sizes
– integration possibility of reflectors or fans by using special sheet metal design
– entry core for heat dissipation made of copper upon request
– other dimensions, sheet metal geometries, surfaces and mechanical machinings upon request

KTE R



possible dimensions:

dim. [mm]							
A	B	C	D	E	F	G	H
B + 20 to 200	35	30	0.8	32	max. 400	max. 800	max. 200
	40	35	1	36			
	55	50	1.5	50			
	80	75	2	72			
	90	85		84			
	100	95		92			
E max. number of grooves at D = 0.8 mm							

please indicate with your order:

dim. [mm]							
A	B	C	D	E	F	G	H
please indicate:	**... surface** **SA = black anodised** **ME = clear anodised**						
material:	aluminium						

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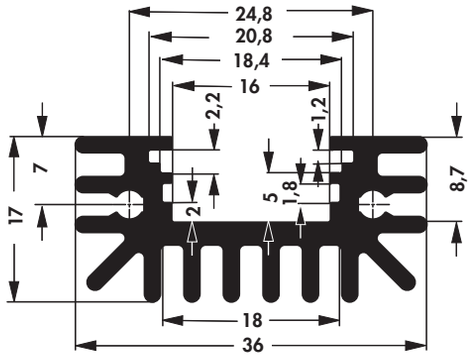
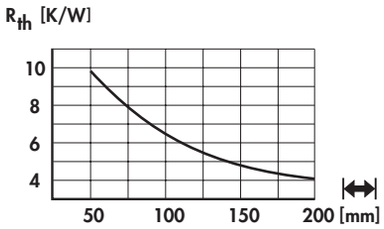
Heatsinks for LEDs

– suitable for flexible and rigid LED Line Modules
– possibility to insert covers made from metal sheets and plexiglass
– respective cases ➔ **G LED ...** case catalogue **f.case**
– customer specific designs, lengths and treatments upon request

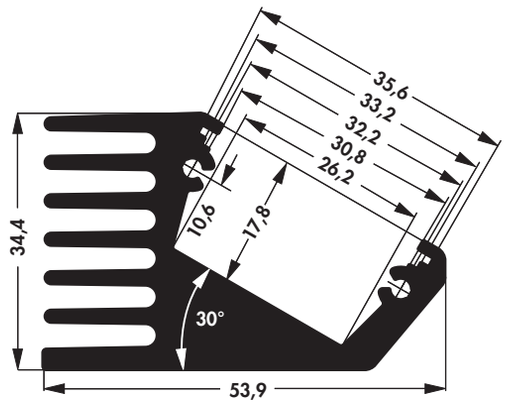
art. no.

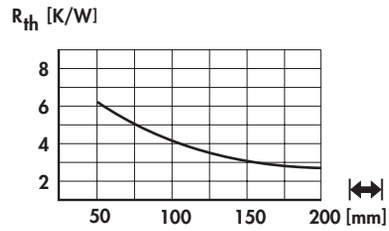




SK LED 1

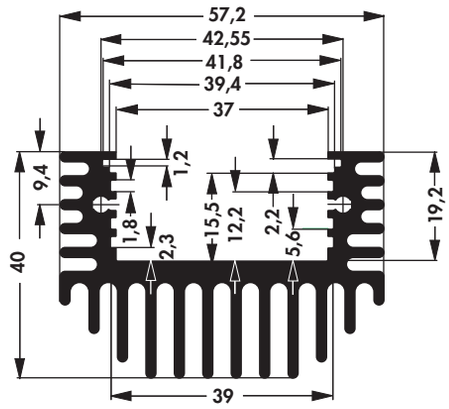
art. no.

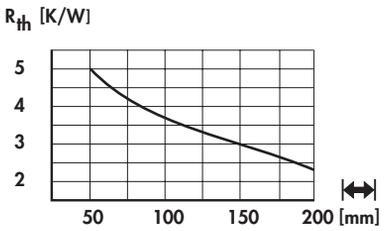




SK LED 2

art. no.





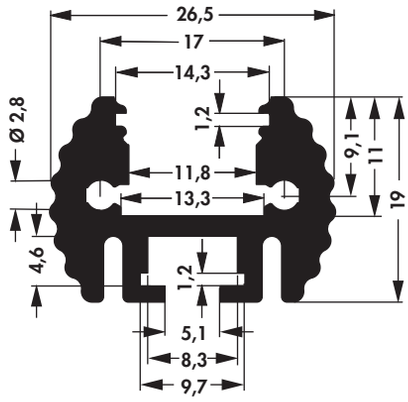
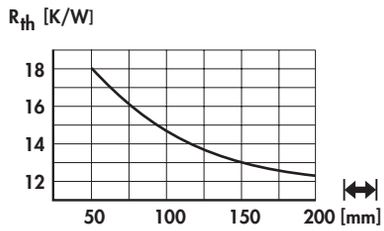
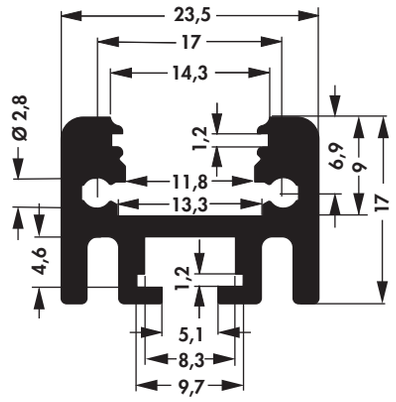
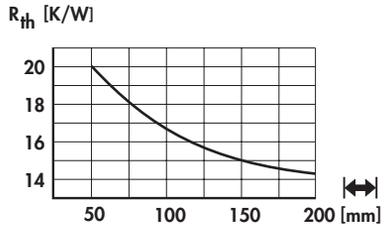
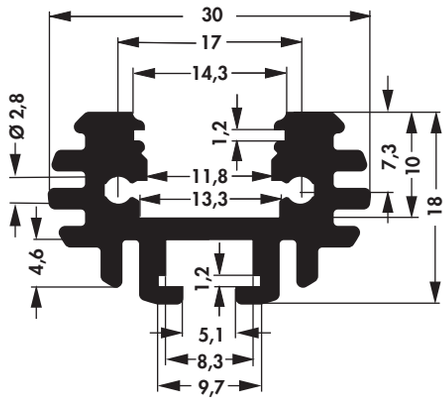
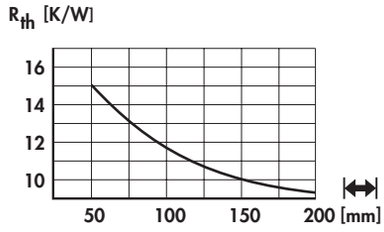
SK LED 3

please indicate: **... ↔**
50 75 100 150 1000 mm

... surface
SA = black anodised
ME = natural colour anodised

Heatsinks for LEDs

– suitable for flexible and rigid LED Line Modules
– possibility to insert covers from sheet metal, plexiglass and plastic
– respective cases with cover options ➔ **G LED ...** case catalogue **f.case**
– customer specific designs, lengths and treatments upon request

art. no.	
SK LED 5	 
art. no.	
SK LED 6	 
art. no.	
SK LED 7	 

please indicate: **... ⟷**
50 75 100 150 1000 mm

... surface
SA = black anodised
ME = natural colour anodised

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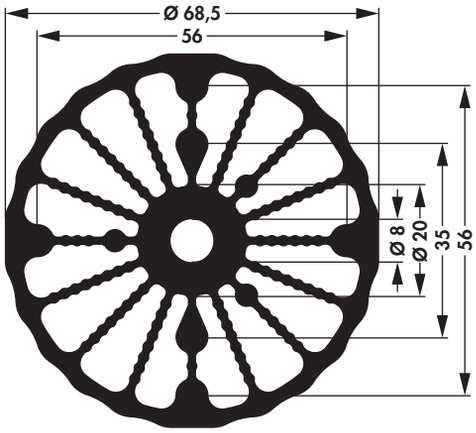
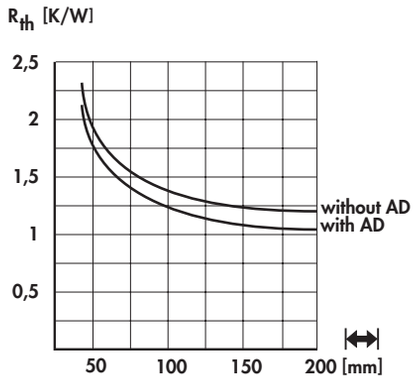
Heatsinks for LEDs

art. no.	
SK LED 4 ...	 

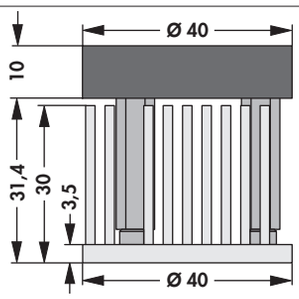
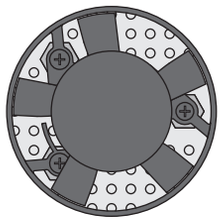
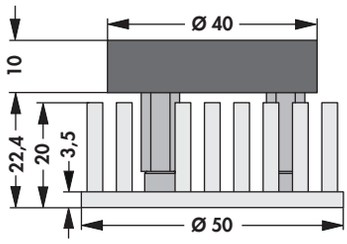
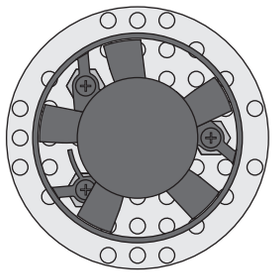
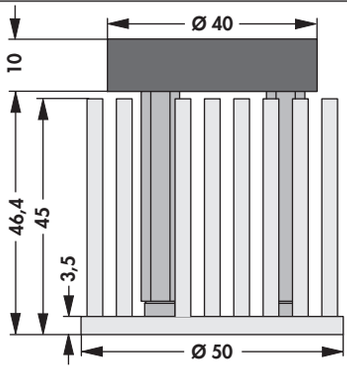
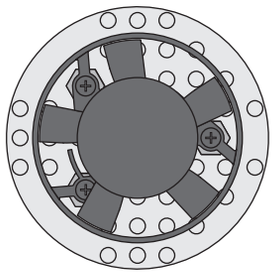
please indicate:

... ↔
50 75 100 150 1000 mm

... surface
SA = black anodised
ME = natural colour anodised

... adapter (optional)
AD = adapter plate (art. no. AD LED 53)

adapter plate → B 57

		
art. no.	R_{th} [K/W]	
LA LED 40 x 30	1.4	
		
art. no.	R_{th} [K/W]	
LA LED 50 x 20	1.25	
		
art. no.	R_{th} [K/W]	
LA LED 50 x 45	0.9	
surface:	Al-natural	

Technical data of the fans

	LF 40B12
circuit voltage	12 V
bearing type	two-way plain bearing
cur. consumpt.	50 mA
max. iuitial current	160 mA
max. volume flow	157 l/min - 9.4 m^3/h
max. static pressure	3.4 mmH_2O - 33 Pa
noise level	26 dB(A), 1 m lateral
temperature range	-20°C... +60°C
failure rate (L_{10})	60,000 h
MTBF	1,900,000 h (20°C)
Type rotor speed	6,600 min^{-1}
weight	10 g

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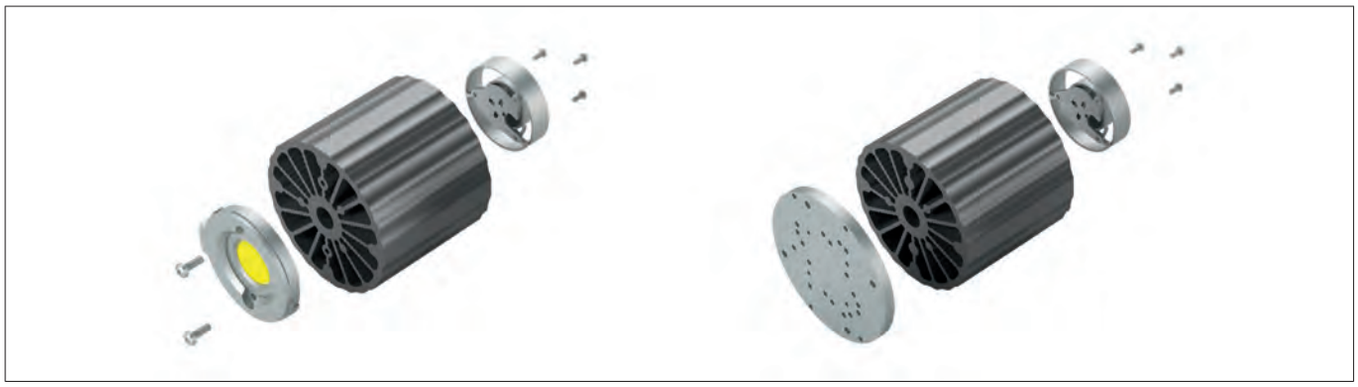
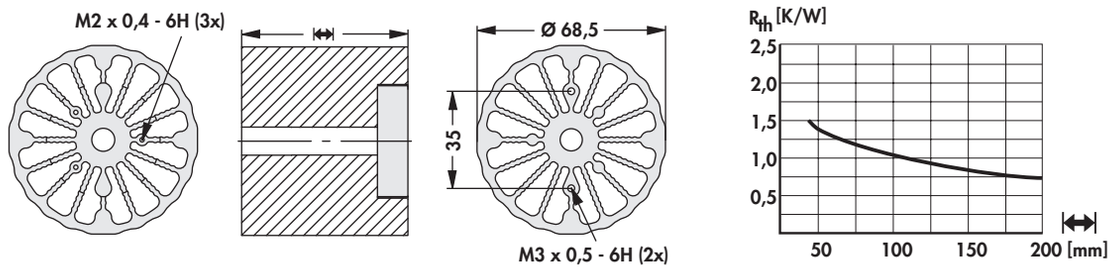
Active heat dissipation of LEDs



– active heat dissipation of LED modules
– Zhaga compliant mounting possibility
– integrated low noise fan
– optional adapter plate suitable for LED modules:
Bridgelux Vero, Citizen CitiLED, Cree XLamp, Edison Edilex, GE Infusion, Luga Shop und Industrial, Lustrous Lustron, Megaman Teco, Osram PrevaLED und Soleriq, Philips Fortimo und Luxeon, Prolight Opto, Sharp Mega Zenigata, Toshiba E-Core, Tridonic Stark, Vexica Lumaera, Vossloh Schwabe

art. no.	
LA LED 68 ...	

please indicate:

... ↔
50 75 100 mm

... surface
SA = black anodised
ME = natural colour anodised

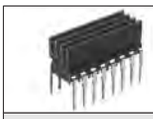
... adapter (optional)
AD = adapter plate (art. no. AD LED 53)

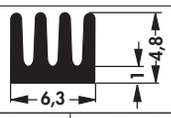
Technical data of the fans

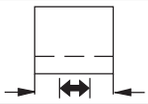
	LF 40B12
circuit voltage	12 V
bearing type	two-way plain bearing
cur. consumpt.	50 mA
max. iuitial current	160 mA
max. volume flow	157 l/min - 9.4 m^3/h
max. static pressure	3.4 mmH_2O - 33 Pa
noise level	26 dB(A), 1 m lateral
temperature range	-20°C... +60°C
failure rate (L_{10})	60,000 h
MTBF	1,900,000 h (20°C)
Type rotor speed	6,600 min^{-1}
weight	10 g

Heatsinks for DIL-IC

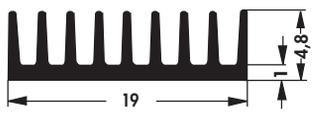
– other length on request

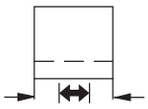






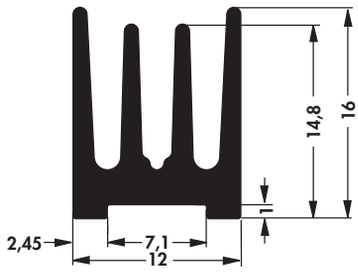
art. no.	for cases	⟷ [mm]	R_{th} [K/W]	art. no.	for cases	⟷ [mm]	R_{th} [K/W]
ICK 6 8 L	6/8 contacts	8.5	90	**ICK 20 L**	20 contacts	25.0	43
ICK 14 16 L	14/16 contacts	19.0	62				

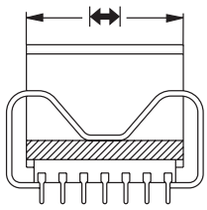




art. no.	for cases	⟷ [mm]	R_{th} [K/W]	art. no.	for cases	⟷ [mm]	R_{th} [K/W]
ICK 14 16 B	14/16 contacts	6.3	54.0	**ICK 36 B**	36 contacts	47.0	24.3
ICK 24 B	24 contacts	33.0	25.8	**ICK 40 B**	40 contacts	51.0	24.0
ICK 28 B	28 contacts	37.0	25.6	**ICK 1000 B**	—	1000.0	—
surface:		black anodised					

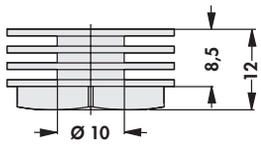
– with clip
– other length on request

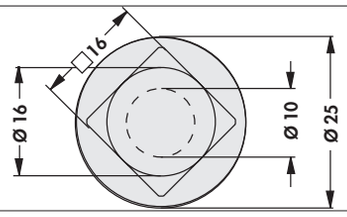




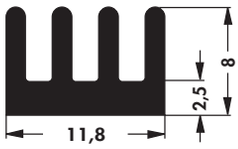
art. no.	for cases	⟷ [mm]	R_{th} [K/W]	art. no.	for cases	⟷ [mm]	R_{th} [K/W]
ICK 14 H	14 polig	18.0	20	**ICK 18 H**	18 contacts	23.0	16
ICK 16 H	16 contacts	20.5	18	**ICK 1000 H**	—	1000.0	—
surface:		black anodised					

Heatsinks for PLCC





art. no.	R_{th} [K/W]
ICK R	19



art. no.	⟷ [mm]	R_{th} [K/W]
ICK PLCC 28	11.8	25
surface:	black anodised	

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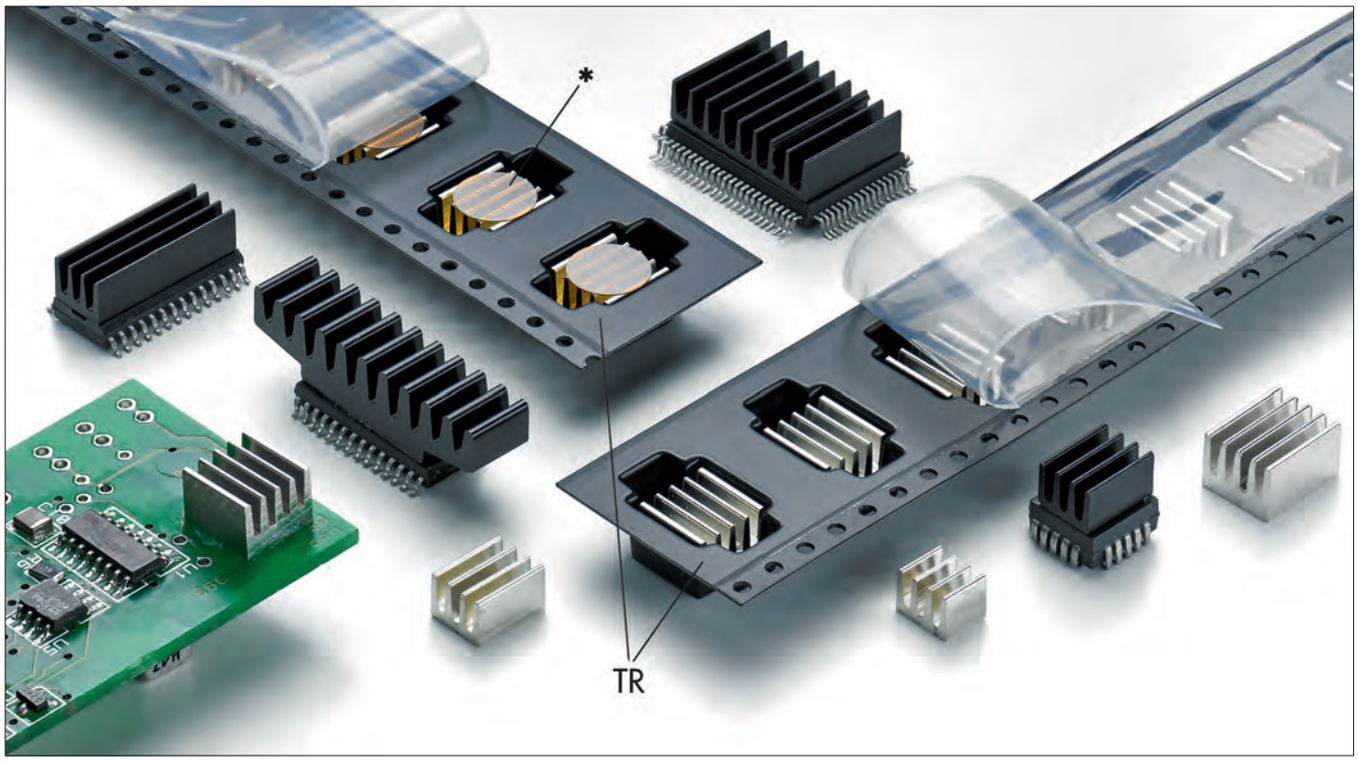
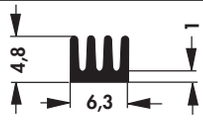
Heatsinks for SMD

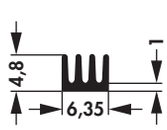


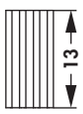
- especially suitable for SMD components
- low profile
- reduced weight
- effective heat dissipation
- can be glued directly onto the component
- solderable versions
- customer specific versions on request
- special packaging like tape and reel, bar magazin, tray etc. on request
- * = capton point
- TR = pick and place pad, tape and reel



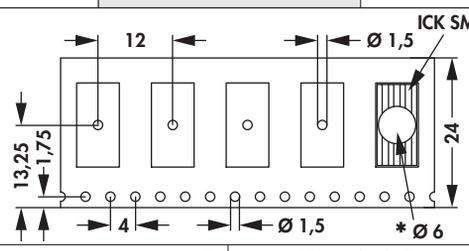
art. no.	⟷ [mm]	R_{th} [K/W]	art. no.	⟷ [mm]	R_{th} [K/W]
ICK SMD A 5 ...	5	123	**ICK SMD A 13 ...**	13	63
ICK SMD A 8 ...	8	87	**ICK SMD A 17 ...**	17	51
ICK SMD A 10 ...	10	75	**ICK SMD A 22 ...**	22	34

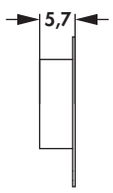
ICK SMD A 13





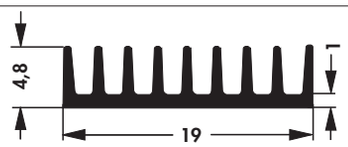
ICK SMD A 13



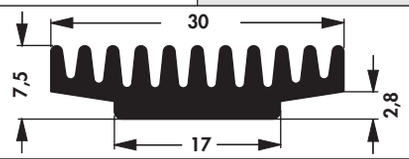


art. no.	R_{th} [K/W]	diamater of tape [mm]	width of belt [mm]	quantity per reel
ICK SMD A 13 ... TR	63	330	24	1000

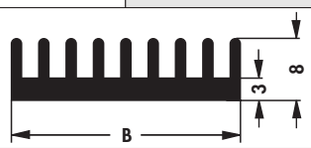
please indicate: **... surface**
SA = black anodised
MI = solderable surface



art. no.	⟷ [mm]	R_{th} [K/W]	art. no.	⟷ [mm]	R_{th} [K/W]
ICK SMD B 5 ...	5	56	**ICK SMD B 13 SA**	13	29
ICK SMD B 7 SA	7	47	**ICK SMD B 19 ...**	19	22
ICK SMD B 10 SA	10	35			

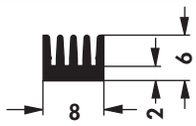


art. no.	⟷ [mm]	R_{th} [K/W]	art. no.	⟷ [mm]	R_{th} [K/W]
ICK SMD C 7 SA	7	33	**ICK SMD C 17 ...**	17	17
ICK SMD C 10 SA	10	26			



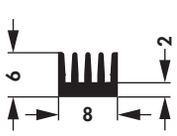
B ≙ ⟷

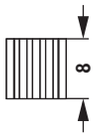
art. no.	⟷ [mm]	R_{th} [K/W]	art. no.	⟷ [mm]	R_{th} [K/W]
ICK SMD E 15 SA	15.3	27	**ICK SMD E 29 SA**	29.0	18
ICK SMD E 22 SA	22.3	21			



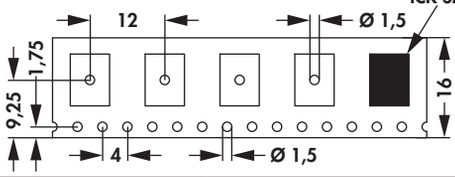
art. no.	⟷ [mm]	R_{th} [K/W]	art. no.	⟷ [mm]	R_{th} [K/W]
ICK SMD F 8 ...	8	74	**ICK SMD F 19 ...**	19	37
ICK SMD F 10 ...	10	71	**ICK SMD F 21 ...**	21	33
ICK SMD F 17 SA	17	42	**ICK SMD F 26 ...**	26	26

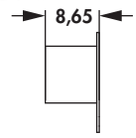
ICK SMD F 8





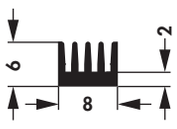
ICK SMD F 8 / ICK SMD N 8



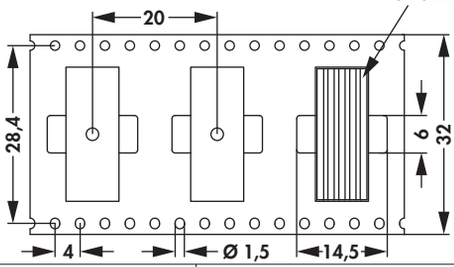


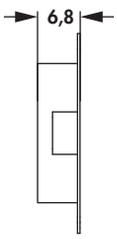
art. no.	R_{th} [K/W]	diamater of tape [mm]	width of belt [mm]	quantity per reel
ICK SMD F 8 ... TR	74	330	16	700

ICK SMD F 21



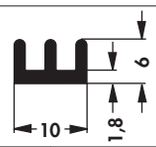
ICK SMD F 21



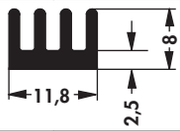


art. no.	R_{th} [K/W]	diamater of tape [mm]	width of belt [mm]	quantity per reel
ICK SMD F 21 ... TR	33	330	32	500

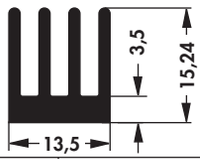
please indicate: **... surface**
SA = black anodised
MI = solderable surface



art. no.	↔ [mm]	R_{th} [K/W]	art. no.	↔ [mm]	R_{th} [K/W]
ICK SMD G 8 MI	8	73	**ICK SMD G 17 SA**	17	41
ICK SMD G 10 ...	10	70	**ICK SMD G 19 SA**	19	36
ICK SMD G 13 SA	13	61	**ICK SMD G 21 ...**	21	32

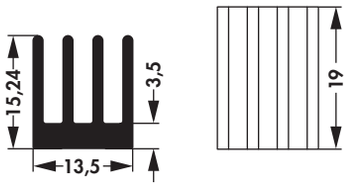


art. no.	↔ [mm]	R_{th} [K/W]	art. no.	↔ [mm]	R_{th} [K/W]
ICK SMD H 8 ...	8	33.0	**ICK SMD H 19 SA**	19	23.0
ICK SMD H 10 ...	10	29.0	**ICK SMD H 25 ...**	25	20.0
ICK SMD H 17 ...	17	24.5			

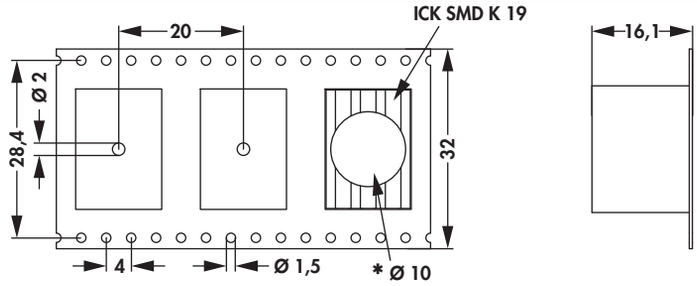


art. no.	↔ [mm]	R_{th} [K/W]	art. no.	↔ [mm]	R_{th} [K/W]
ICK SMD K 8 ...	8	25.6	**ICK SMD K 17 ...**	17	19.4
ICK SMD K 10 SA	10	23.4	**ICK SMD K 19 ...**	19	18.0
ICK SMD K 13 ...	13	21.5	**ICK SMD K 21 ...**	21	16.5

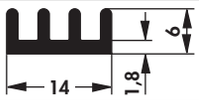
ICK SMD K 19



ICK SMD K 19

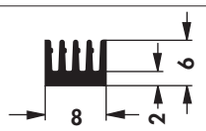


art. no.	R_{th} [K/W]	diamater of tape [mm]	width of belt [mm]	quantity per reel
ICK SMD K 19 ... TR	18	330	32	215



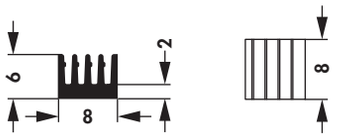
art. no.	↔ [mm]	R_{th} [K/W]	art. no.	↔ [mm]	R_{th} [K/W]
ICK SMD M 8 SA	8	72	**ICK SMD M 19 SA**	19	35
ICK SMD M 10 SA	10	66	**ICK SMD M 21 SA**	21	31
ICK SMD M 17 MI	17	40			

please indicate: **... surface**
SA = black anodised
MI = solderable surface

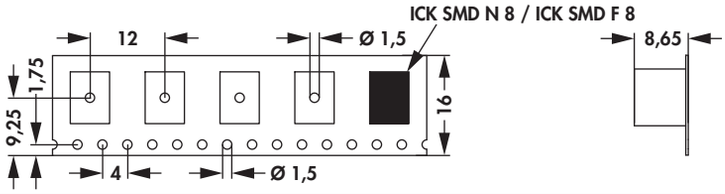


art. no.	↔ [mm]	R_{th} [K/W]	art. no.	↔ [mm]	R_{th} [K/W]
ICK SMD N 8 ...	8	74	**ICK SMD N 19 ...**	19	37
ICK SMD N 10 ...	10	71	**ICK SMD N 21 ...**	21	33
ICK SMD N 17 ...	17	42	**ICK SMD N 26 ...**	26	26

ICK SMD N 8

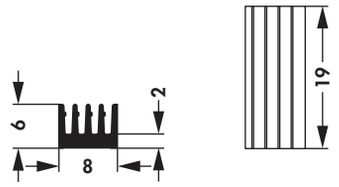


ICK SMD N 8 / ICK SMD F 8

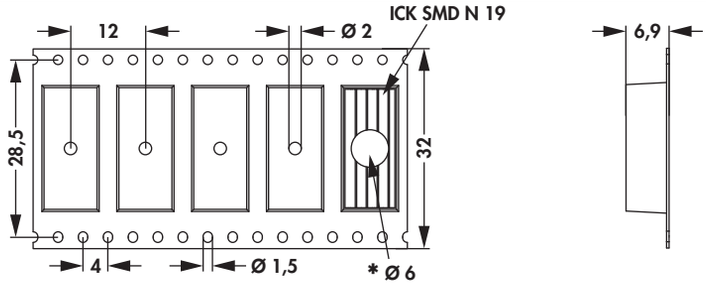


art. no.	R_{th} [K/W]	diamater of tape [mm]	width of belt [mm]	quantity per reel
ICK SMD N 8 ... TR	74	330	24	700

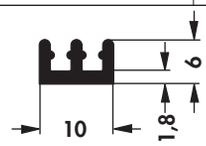
ICK SMD N 19



ICK SMD N 19



art. no.	R_{th} [K/W]	diamater of tape [mm]	width of belt [mm]	quantity per reel
ICK SMD N 19 ... TR	37	330	32	800



art. no.	↔ [mm]	R_{th} [K/W]	art. no.	↔ [mm]	R_{th} [K/W]
ICK SMD O 8 ...	8	73	**ICK SMD O 19 ...**	19	36
ICK SMD O 10 ...	10	70	**ICK SMD O 21 ...**	21	31
ICK SMD O 17 ...	17	41	**ICK SMD O 25 ...**	25	26

please indicate: **... surface**
SA = black anodised
MI = solderable surface

Sample box SMD heatsinks

– contains an assortment of SMD heatsinks with anodised and solderable surface as well as thermally conductive glue (**WLK**) and double-sided adhesive thermal foil (**WLF**)

art. no.
ICK SMD BOX 1

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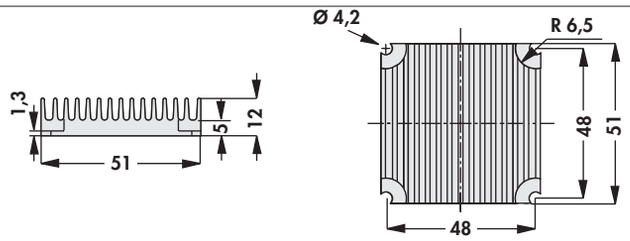
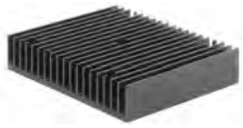
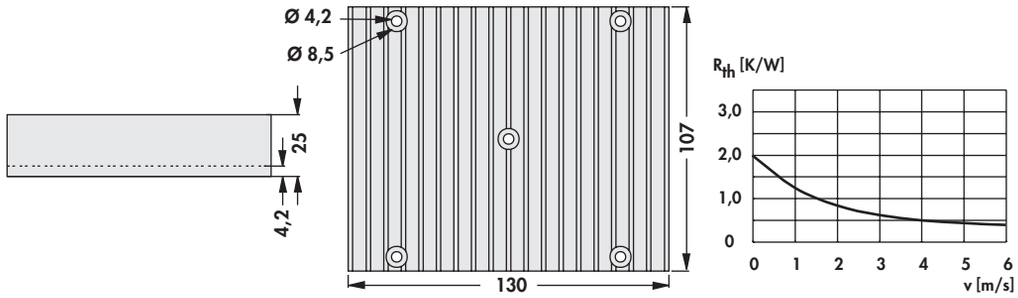
Passive heatsinks for processors

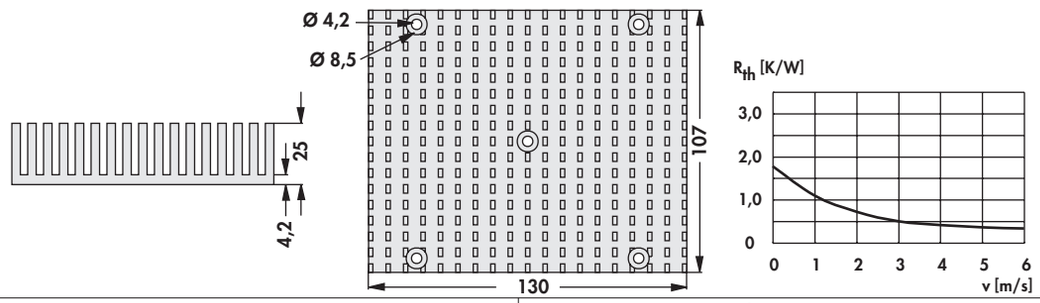


art. no.	R_{th} [K/W]	suitable for processor type
ICK PPC 51	8.1	Power PC



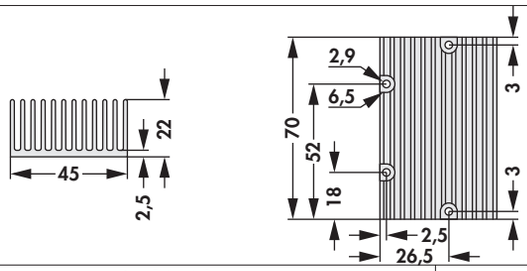


art. no.	R_{th} [K/W]	suitable for processor type
ICK PEN 3 XE	2	Intel® Pentium® III-Xeon™ Slot II Format

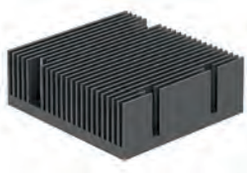


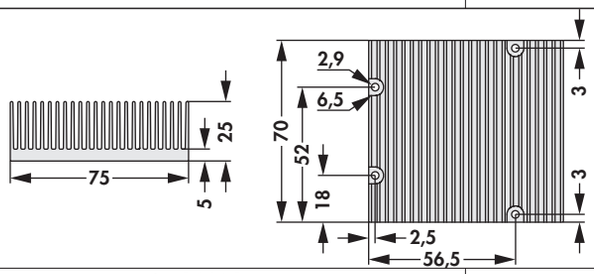
art. no.	R_{th} [K/W]	suitable for processor type
ICK PEN 3 XE 1	1.8	Intel® Pentium® III-Xeon™ Slot II Format

Heatsink specially for Q7 "Embedded-Boards"



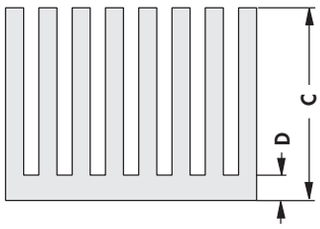
art. no.	R_{th} [K/W]	suitable for processor type
ICK EM 22	4.4	MQ7 Board

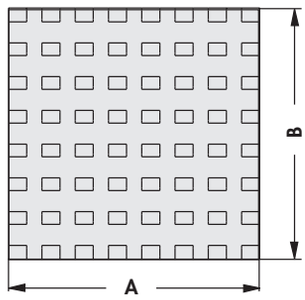


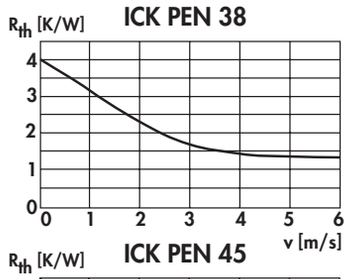


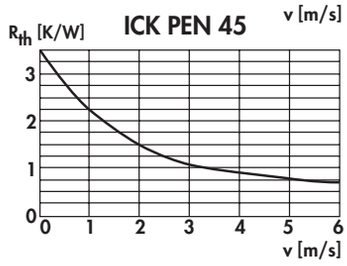
art. no.	R_{th} [K/W]	suitable for processor type
ICK EM 25	3.9	Q7 Board

– customer specific versions and modifications on request

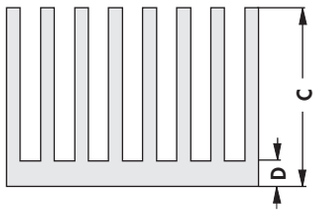


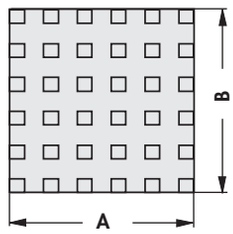


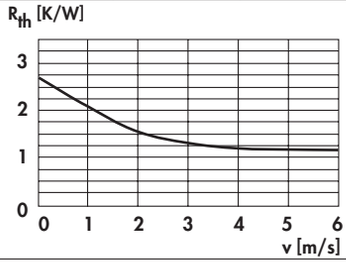




art. no.	R_{th} [K/W]	suitable for processor type	dim. [mm] A	B	C	D
ICK PEN 38 F	4.0	AMD® K6-III/ IDT W2A/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2	49.5	49.5	38	5.0
ICK PEN 38 W						
ICK PEN 45 W	3.5		50.0	50.0	45	3.5

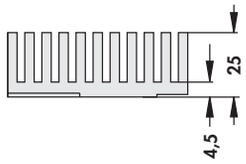


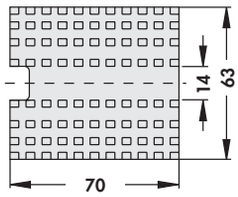


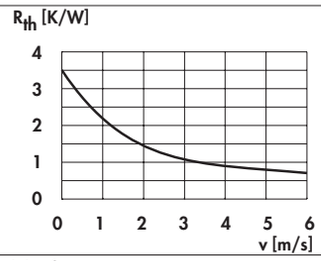


art. no.	R_{th} [K/W]	suitable for processor type	dim. [mm] A	B	C	D
ICK PRO 40 W	2.7	Intel® Pentium® PRO	65	67.5	40	4.5

F = with double-sided thermally conductive adhesive foil
W = for thermally conductive adhesive (please order separately)
WLK ... → E 72





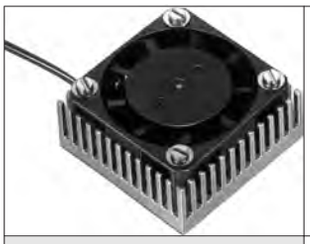


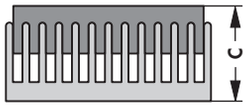
art. no.	R_{th} [K/W]	suitable for processor type
ICK PEN 3 FC	3.5	Intel® Pentium® III FC PGA (Mendocino, Coppermine)

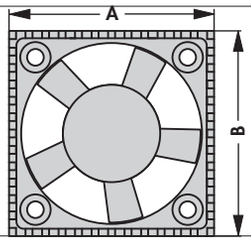
fixing method: K = with fixing clamp (incl. one-sided adherent thermal foil)

fischer elektronik

Active heatsinks for processors







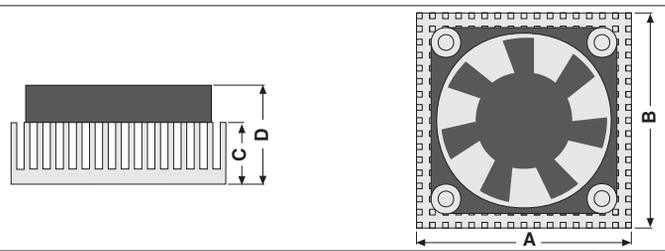
art. no.	R_{th} [K/W]	suitable for processor type	dim. [mm] A	dim. [mm] B	dim. [mm] C
LA ICK 15 x 15 F 05	2.3	universal	37.92	38.10	20
LA ICK 15 x 15 F 12					
LA ICK 17 x 17 F 12	1.6		43.10	43.10	
LA ICK 17 x 17 F 12 A					
LA ICK 17 x 17 W 05					
LA ICK 17 x 17 W 12					
LA ICK 18 x 18 F 12	1.5		45.70	45.70	
LA ICK 18 x 18 W 12					
LA ICK 21 x 21 F 05	1.4		53.34	53.34	
LA ICK 21 x 21 F 12					
LA ICK 21 x 21 W 05					
LA ICK 21 x 21 W 12					

used fans:
5 Volt = **Sepa MFB 25 F 05 L / MFB 40 H 05 / MFB 40 H 05 A**;
12 Volt = **Sepa MFB 25 F 12 / MFB 40 H 12 / MFB 40 H 12 A**

F = with double-sided thermally conductive adhesive foil
W = for thermally conductive adhesive (please order separately) **WLK ...** ➔ E 72
A = alarm exit

Active heatsinks for processors

– easy assembly on ZIF socket by fixing clamp



art. no.	R_{th} [K/W]	suitable for processor type	dim. [mm] A	B	C	D
LA ICK PEN 8 F 05	2.50	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2	50.8	50.8	8.00	9.00
LA ICK PEN 8 F 12						
LA ICK PEN 8 W 05						
LA ICK PEN 8 W 12						
LA ICK PEN 16 W 12	1.20				16.51	26.51
LA ICK PEN 16 W 12 A						
LA ICK PEN 18 W 12	1.60				8.00	18.00
LA ICK PEN 38 W 12	1.10		49.5	49.5	38.00	48.00
LA ICK PRO 25 F 12	0.97	Intel® Pentium® PRO	63.5	67.5	25.00	35.00

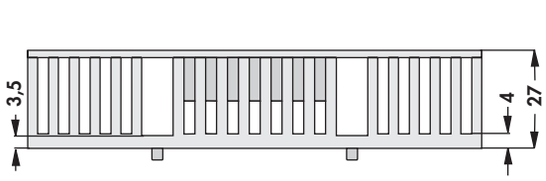
used fans: 5 Volt = **Sepa MFB 50 E 05**; 12 Volt = **Sepa MFB 50 E 12/ Sepa MFB 50 E 12 A**;
LA ICK PEN 8: 5 Volt = **Sepa HFB 44 X 05 A**; 12 Volt = **Sepa HFB 44 B 12 A**

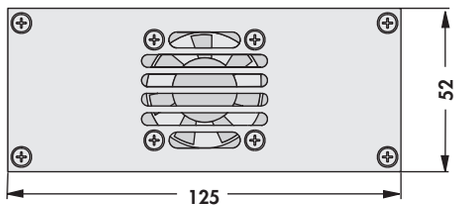
F = with double-sided thermally conductive adhesive foil
W = for thermally conductive adhesive (please order separately) **WLK ...** ➔ E 72

A = alarm exit

Active heatsinks for processors

– incl. one-sided adherent thermal foil

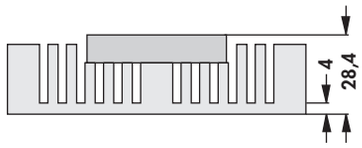


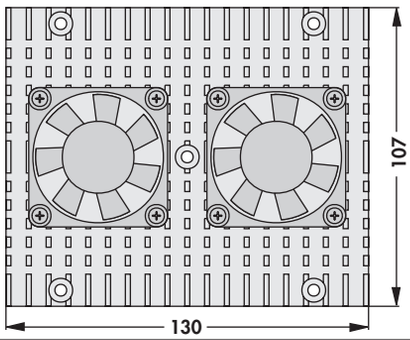


art. no.	R_{th} [K/W]	suitable for processor type
LA ICK PEN 2 K 12 ...	1.2	Intel® Pentium® II/ AMD® Athlon®

please indicate: **... accessories (optional)**
SM = molex connection plug

utilized fans: 12 Volt = **Sepa MFB 40 H 12**



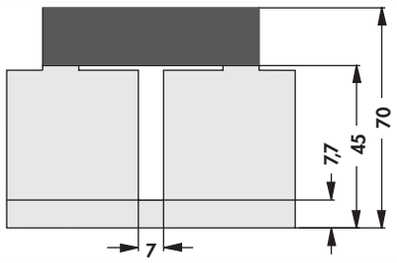


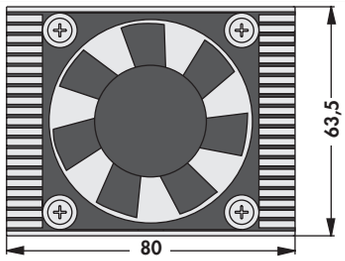
art. no.	R_{th} [K/W]	suitable for processor type
LA ICK PEN 3 XE ...	0.8	Intel® Pentium® III-Xeon™

please indicate: **... accessories (optional)**
A = alarm exit
SM = molex connection plug

fixing method: SB = screw fixing
utilized fans: 12 Volt = **Sepa MFB 50 E 12**

– with copper base plate
– customer specific designs and modifications on request





art. no.	R_{th} [K/W]	suitable for processor type
LA ICK PEN 4 1 K ...	0.6	Intel® Pentium® IV

please indicate: **... accessories (optional)**
SM = molex connection plug

fixing method: K = with fixing clamp
operating voltage of the fan motor: 12 Volt (Papst 612 NHH-118)

Technical data of the fans

molex crimp case series: 2695; molex crimp terminals: 2759

– Sepa-fan 24 h BURN-IN tested

5 Volt Lüfter

	Sepa MFB 25 F 05 L	Sepa MFB 40 H 05	Sepa MFB 40 H 05 A	Sepa MFB 50 E 05	Sepa HFB 44 X 05 A	ebmpapst 405 F
circuit voltage	4.5...5.5 V DC	4.5...5.5 V DC	4.5...5.5 V DC	4.5...5.5 V DC	4.5...5.5 V DC	4.5...5.5 V DC
bearing type	double ball bearing	double ball bearing	double ball bearing	double ball bearing	ball bearing	double slide bearing
fan dimensions	25x25x10 mm	40x40x10 mm	40x40x10 mm	50x50x10 mm	44x44x6.2 mm	40x40x10 mm
cur. consumpt.	90 mA	90 mA	90 mA	50 mA	90 mA	140 mA
max. iuitial current	170 mA	250 mA	250 mA	120 mA	160 mA	
max. volume flow	46 l/min 2.8 m^3/h	184 l/min 11 m^3/h	184 l/min 11 m^3/h	169 l/min 10.1 m^3/h	50 l/min 3 m^3/h	132 l/min 8 m^3/h
max. static pressure	2.2 mmH_2O 22 Pa	3.1mm H_2O 30.5 Pa	3.1mm H_2O 30.5 Pa	1.6mm H_2O 15.6 Pa	2.6mm H_2O 25.5 Pa	3.06mm H_2O 30 Pa
noise level	18 dB(A), 1 m lateral	24 dB(A), 1 m lateral	24 dB(A), 1 m lateral	17 dB(A), 1 m lateral	28 dB(A), 1 m lateral	22.1 dB(A), 1 m lateral
temperature range	-10°C ... +85°C	-40°C... +80°C	-40°C... +80°C	-10°C... +70°C	-40°C... +80°C	-20°C... +70°C
failure rate (L_{10})	95,000 h	95,000 h	95,000 h	95,000 h	95,000 h	45,000 h (20°C)
MTBF	280,000 h (20°C)	280,000 h (20°C)	280,000 h (20°C)	280,000 h (20°C)	280,000 h (20°C)	
weight	8 g	13 g	13 g	19 g	7 g	17 g
cases	plastic PBT (UL E54695)	plastic PBT (UL E54695)	plastic PBT (UL E54695)	plastic PBT (UL E54695)	plastic PBT (UL E54695)	plastic PBT (UL E38324)

12 Volt Lüfter

	Sepa MFB 25 F 12	Sepa MFB 40 H 12	Sepa MFB 40 H 12 A	Sepa MFB 50 E 12	Sepa HFB 44 B 12 A	ebmpapst 412 F
circuit voltage	10.2...13.8 V DC	10.2...13.8 V DC	10.2...13.8 V DC	10.2...13.8 V DC	10.2...13.8 V DC	10-14 V DC
bearing type	double ball bearing	double ball bearing	double ball bearing	ball bearing	ball bearing	double slide bearing
fan dimensions	25x25x10 mm	40x40x10 mm	40x40x10 mm	50x50x10 mm	44x44x6.2 mm	40x40x10 mm
cur. consumpt.	70 mA	50 mA	50 mA	50 mA	40 mA	60 mA
max. iuitial current	150 mA	130 mA	130 mA	140 mA	70 mA	
max. volume flow	70 l/min 4.1 m^3/h	173 l/min 10.3 m^3/h	173 l/min 10.3 m^3/h	238 l/min 14.3 m^3/h	50 l/min 3 m^3/h	132 l/min 8 m^3/h
max. static pressure	2.24mm H_2O 41.5 Pa	2.9 mmH_2O 28.5 Pa	2.9 mmH_2O 28.5 Pa	2.7mm H_2O 26.9 Pa	2.6mm H_2O 25.5 Pa	3.06mm H_2O 30 Pa
noise level	23 dB(A), 1 m lateral	24 dB(A), 1 m lateral	21 dB(A), 1 m lateral	22 dB(A), 1 m lateral	28 dB(A), 1 m lateral	22.1 dB(A), 1 m lateral
temperature range	-40°C... +80°C	-40°C... +80°C	-40°C... +80°C	-10°C... +70°C	-40°C... +80°C	-20°C... +70°C
failure rate (L_{10})	95,000 h	95,000 h	95,000 h	95,000 h	95,000 h	45,000 h (20°C)
MTBF	280,000 h (20°C)	280,000 h (20°C)	280,000 h (20°C)	280,000 h (20°C)	280,000 h (20°C)	
weight	8 g	13 g	13 g	19 g	20 g	17 g
cases	plastic PBT (UL E54695)	plastic PBT (UL E54695)	plastic PBT (UL E54695)	plastic PBT (UL E54695)	steel/aluminium (UL E54695)	plastic PBT (UL E38324)

Fans with pulse output - Technical data of fans with pulse output:

– pulse output for activation of the alarm control
– pulse similar to a square pulse with three times the frequency of the rotor speed
– when the rotor is blocked, the output signal may be L (≤0.8 V) or H (Vcc-1 V)
– the pulse output must not be connected to GND or Vcc withoutb protective resistor (>10 K)
– in order to avoid short circuits, the pulse output not being used must be insulated

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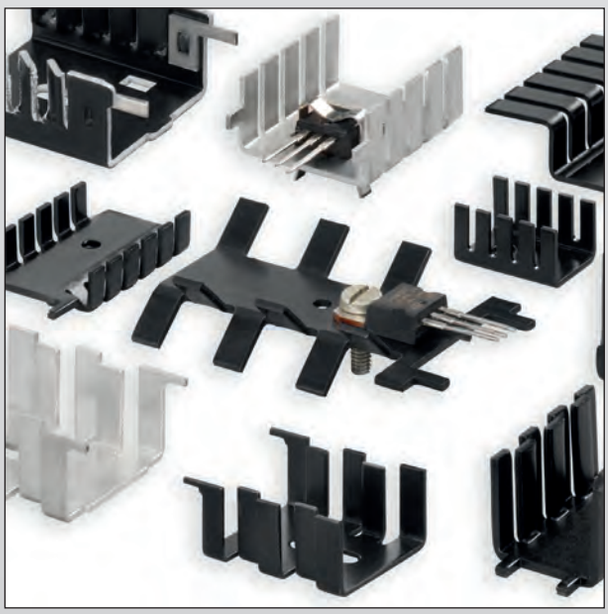
Finger shaped heatsinks for power semiconductors
Attachable heatsinks
Finger shaped heatsinks for transistors
Miniature heatsinks

Finger shaped heatsinks for power semiconductors
- specially compatible for power semiconductors in a TO-case
- made as a bent sheet metal part or die cast heatsink made of aluminium
- aligned heatsink contours for the best heat dissipation
- direct screwing of the component to the heatsink on the PCB

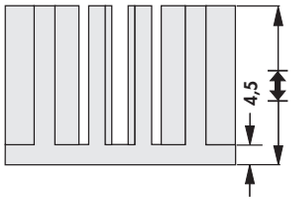
Attachable heatsinks
- made of aluminium or copper material
- solderable surface coating
- integrated spring clip for easy and fast mounting of the transistor
- secure hold of the component due to optimized spring force and geometry
- customer specific version upon request

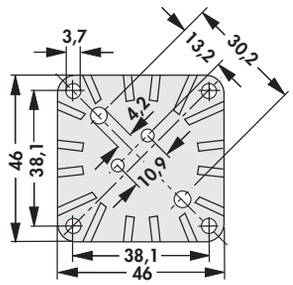


Finger shaped heatsinks for transistors
- effective heat dissipation of transistors
- efficient radiation of heat at a horizontal or vertical mounting position
- component fastening by means of screws or special transistor retaining springs
- solder mounting by means of integrated solder pins and solderable surfaces

Miniature heatsinks
- for TO 5, SOT 82, D PAK and similar semiconductors
- made of aluminium, phosphorus bronze or copper
- simple mounting by direct plugging or soldering of the heatsink
- special types of packaging such as tape & reel, magazine or tray upon request
- versions and designs for your application

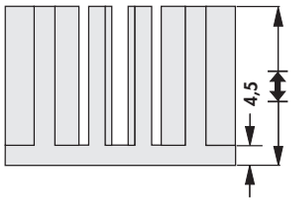
Finger shaped heatsinks for power semiconductors

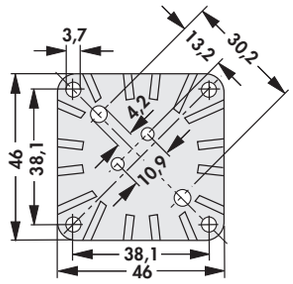




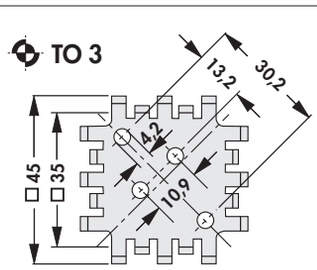
art. no.	↕ [mm]	R_{th} [K/W]	⌖
FK 318 SA 3	31.8	4.8	TO 3
material:	die-casting aluminium		
surface:	black lacquered		

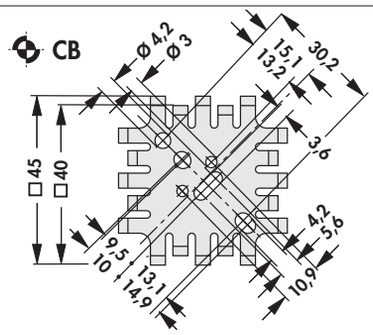
– packing unit = 24 pieces





art. no.	↕ [mm]	R_{th} [K/W]	⌖
FK 254 1 SA	25.4	5.4	without
FK 254 1 SA 3			TO 3
FK 318 1 SA	31.8	4.4	without
FK 318 1 SA 3			TO 3
material:	aluminium, Al99.5, cold extruded part		
surface:	black anodised		





art. no.	↕ [mm]	R_{th} [K/W]	⌖
FK 201 SA	25.4	6	without
FK 201 SA 3			TO 3
FK 201 SA CB			CB
FK 202 SA	12.7	8	without
FK 202 SA 3			TO 3
FK 202 SA CB			CB
material:	aluminium		
surface:	black anodised		

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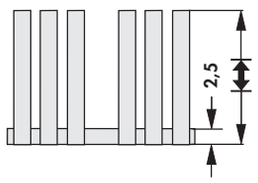
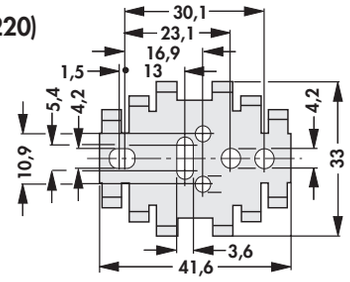
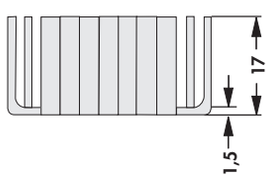
Finger shaped heatsinks for power semiconductors

L (TO 3 – SOT 9 + TO 66 – SOT 32 – TO220)

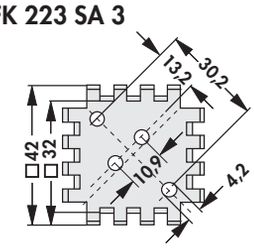




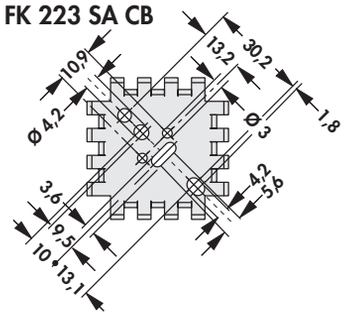
art. no.	[mm]	R_{th} [K/W]	
FK 205 SA L	31.8	9.0	L
FK 206 SA L	25.4	10.5	
FK 207 SA L	19.1	12.0	
FK 208 SA L	12.7	14.0	



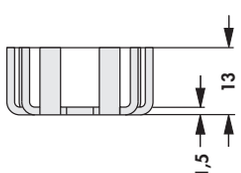
FK 223 SA 3

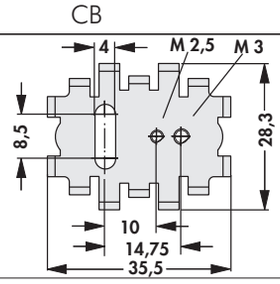


FK 223 SA CB



art. no.	R_{th} [K/W]	
FK 223 SA	6.8	without
FK 223 SA 3		TO 3
FK 223 SA CB		CB



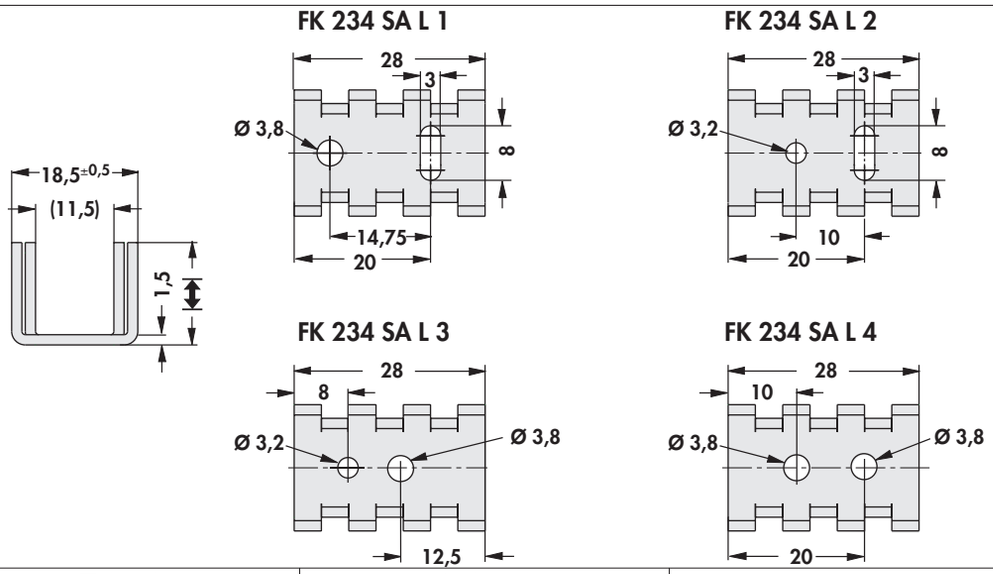


art. no.	R_{th} [K/W]	
FK 217 SA CB 2	16	CB 2 (SOT 32; TO 220)

material:	aluminium
surface:	black anodised

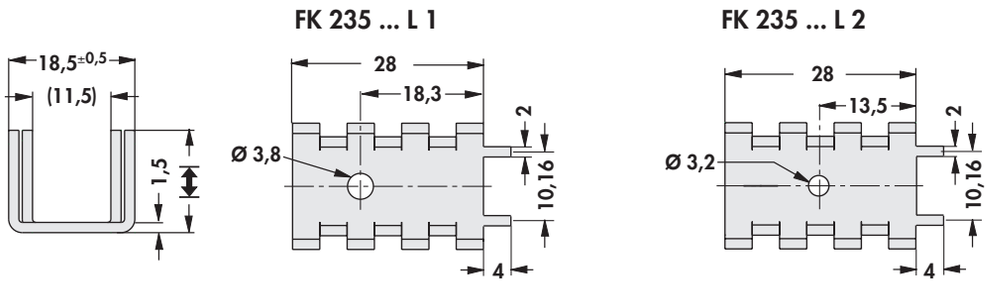
Heatsinks for transistors in plastic case

– for semiconductor screw-assembly, horizontal



art. no.	↕ [mm]	R_{th} [K/W]	⌖
FK 234 SA L 1	15	17	TO 220
FK 234 SA L 2			SOT 32
FK 234 SA L 3			CB
FK 234 SA L 4			
material:	aluminium		
surface:	black anodised		

– for semiconductor screw-assembly, vertical



art. no.	↕ [mm]	R_{th} [K/W]	⌖
FK 235 ... L 1	15	16	TO 220
FK 235 ... L 2			SOT 32
please indicate:	**... surface** **SA = black anodised** **MI = solderable surface**		
material:	aluminium		

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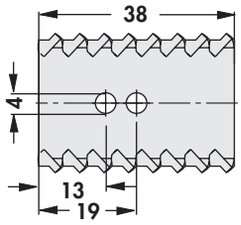
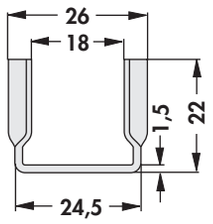
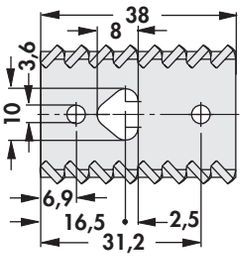
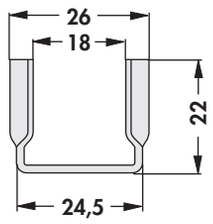
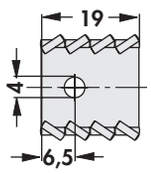
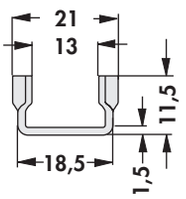
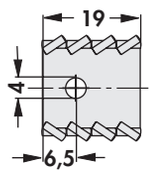
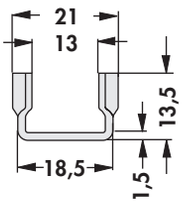
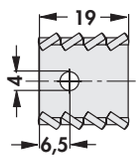
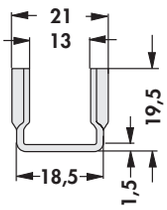
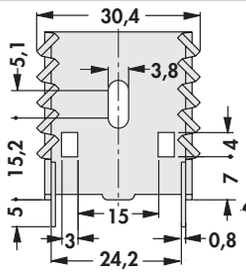
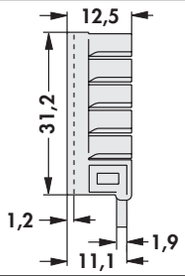
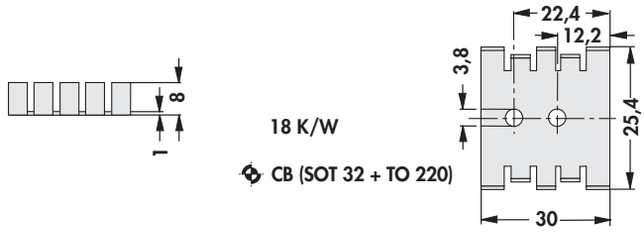
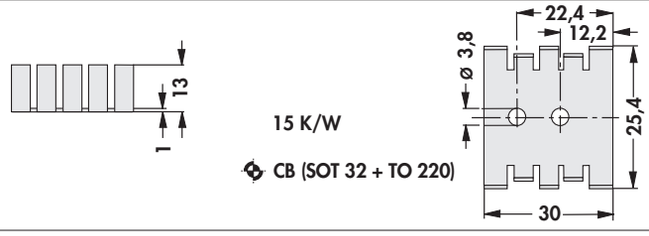
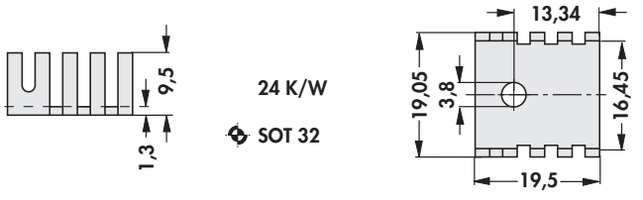
Heatsinks for transistors in plastic case

art. no.				
FK 225 SA L 1			9,9 K/W TO 220	
art. no.				
FK 225 SA L 2			9,9 K/W TO 220	
art. no.				
FK 228 SA L 1			30 K/W TO 220	
art. no.				
FK 229 SA L 1			27 K/W TO 220	
art. no.				
FK 230 SA L 1			21 K/W TO 220	
material:	aluminium			
surface:	black anodised			

art. no.				
FK 249 SA 220			17 K/W TO 220	
material:	aluminium			
surface:	black passivated, solder pins tin plated			

art. no.		
FK 209 SA 32		
	available without hole pattern as well	
art. no.		
FK 210 SA CB		
	available without hole pattern as well	
art. no.		
FK 213 SA 32		
	available without hole pattern as well	
art. no.		
FK 214 SA CB		
	available without hole pattern as well	
art. no.		
FK 231 SA 220		
art. no.		
FK 239 SA 32		
material:	aluminium	
surface:	black anodised	

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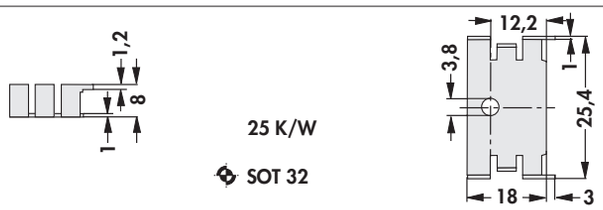
Heatsinks for transistors in plastic case

art. no.		
FK 211 32 ...		
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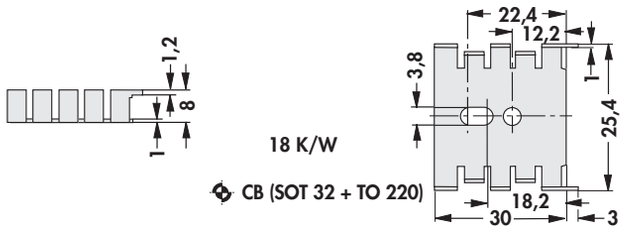
FK 212 CB ...		
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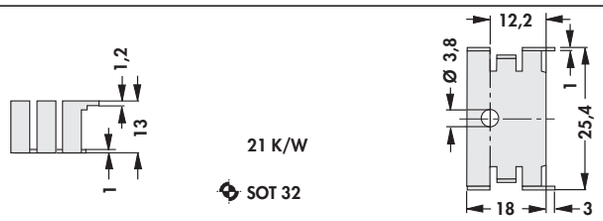
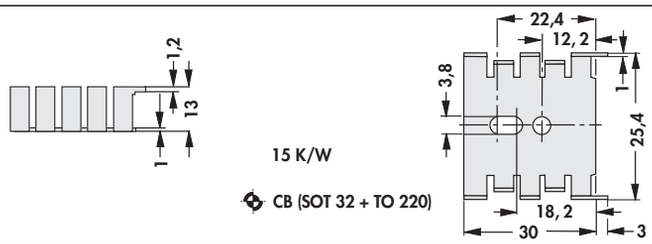
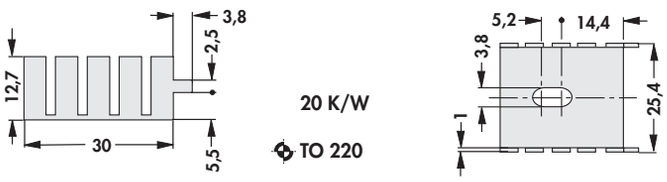
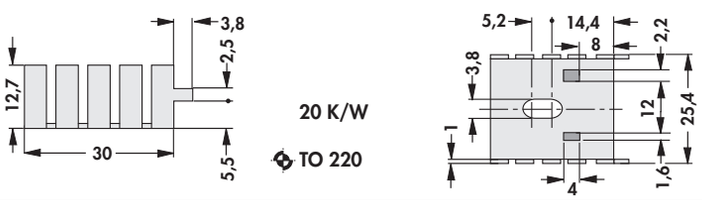
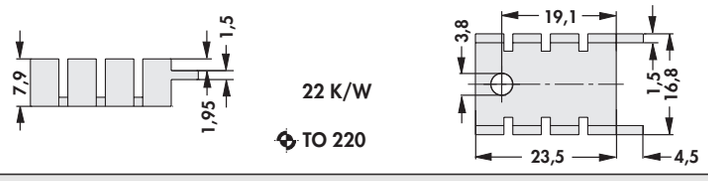
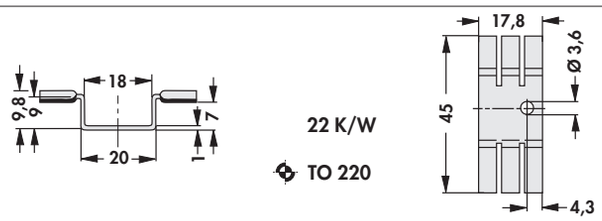
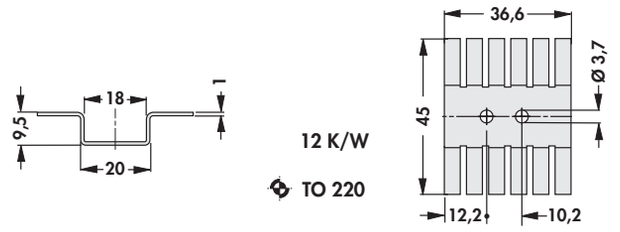
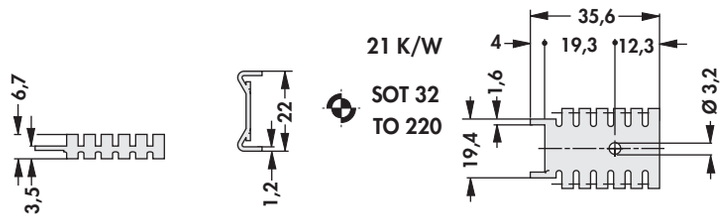
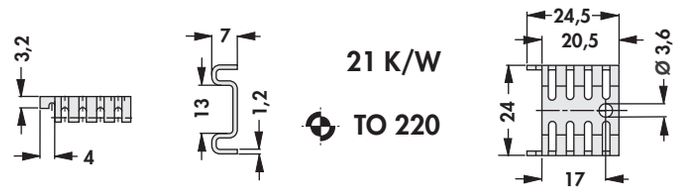
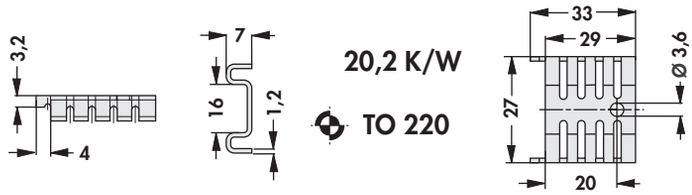
art. no.		
FK 215 32 ...		
	available without hole pattern as well	
art. no.		
FK 216 CB		
	available without hole pattern as well	
art. no.		
FK 222 ...		
	available without hole pattern as well	
art. no.		
FK 222 THF ...		
art. no.		
FK 247 220 ...		

please indicate: **... surface**
SA = black anodised
MI = solderable surface

material:	aluminium

Heatsinks for transistors in plastic case

art. no.		
FK 227 SA L 1		
art. no.		
FK 238 SA L 1		
material:	aluminium	
surface:	black anodised	

art. no.		
FK 218 32 ...		
art. no.		
FK 232 220 ...		
art. no.		
FK 233 220 ...		
please indicate:	... surface SA = black anodised MI = solderable surface	
material:	aluminium	

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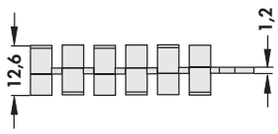
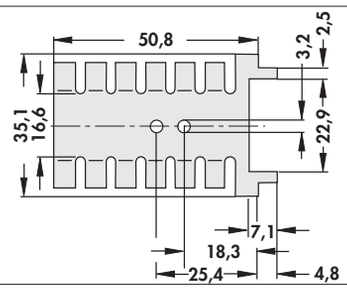
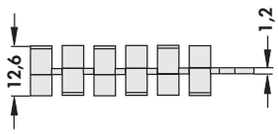
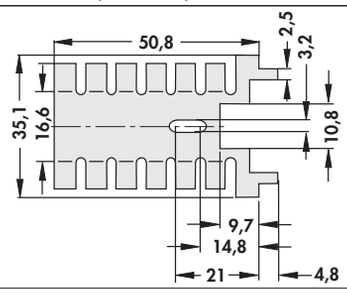
Heatsinks for transistors in plastic case



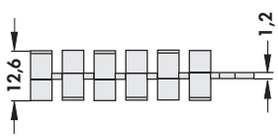


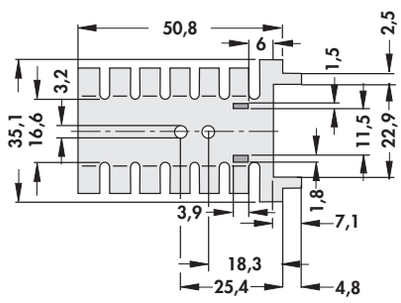
art. no.	R_{th} [K/W]	⌖
FK 219 CB 1 ...	14	CB 1 (TO 220)





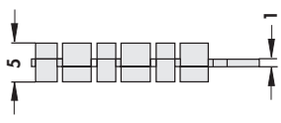
art. no.	R_{th} [K/W]	⌖
FK 219 CB 2 ...	14	CB 2 (TO 220)

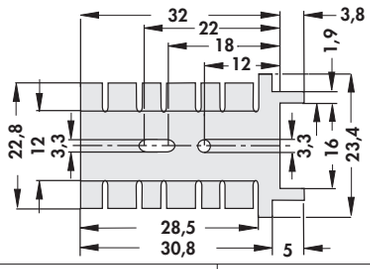




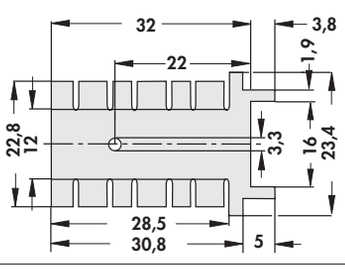
art. no.	R_{th} [K/W]	⌖
FK 219 CB 3 ...	14	CB 3 (TO 220)

FK 236 CB ...





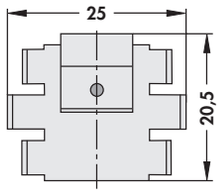
FK 236 220 ...

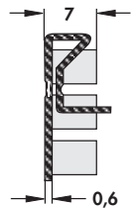


art. no.	R_{th} [K/W]	⌖
FK 236 220 ...	18	TO 220
FK 236 CB ...		CB

please indicate: **... surface**
SA = black anodised
MI = solderable surface

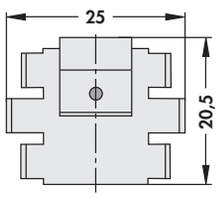
material:	aluminium

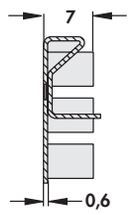




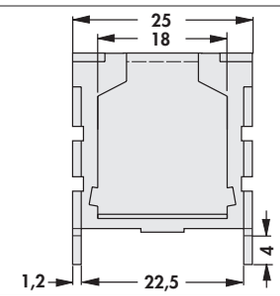
art. no.	R_{th} [K/W]	⌖
FK 220 SA 220	25	TO 220
material:	aluminium	
surface:	black anodised	

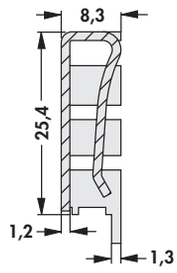
– for transistiors with thin bottom thickness (0.5 mm)





art. no.	R_{th} [K/W]	⌖
FK 258 SA 220	25	TO 220
material:	aluminium	
surface:	black anodised	

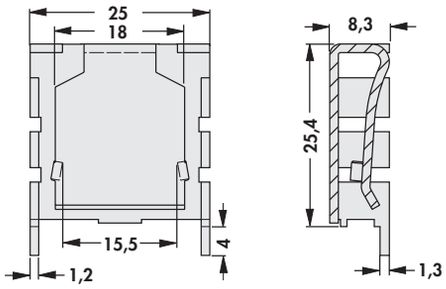




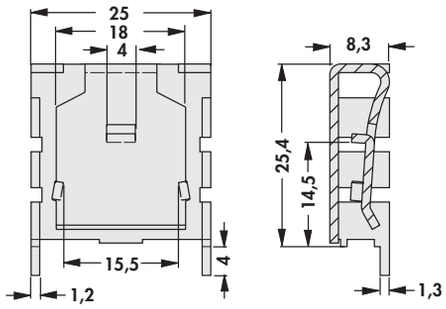
art. no.	R_{th} [K/W]	⌖
FK 224 ... P SIP	18	P SIP
please indicate:	**... surface** **SA = black anodised** **MI = solderable surface**	
material:	aluminium	

Attachable heatsinks

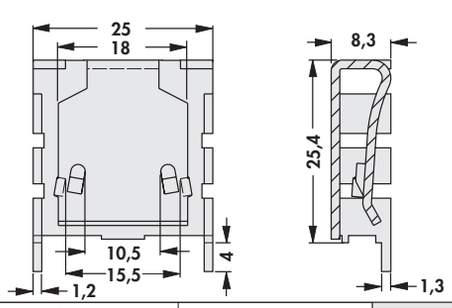
FK 224 ... 218 1



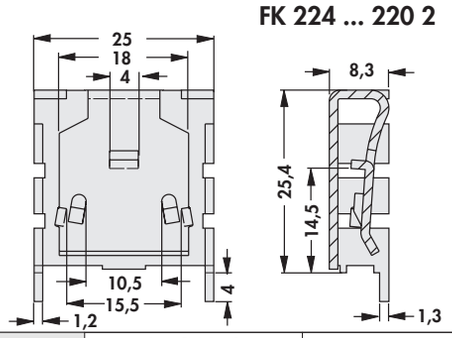
FK 224 ... 218 2



FK 224 ... 220 1



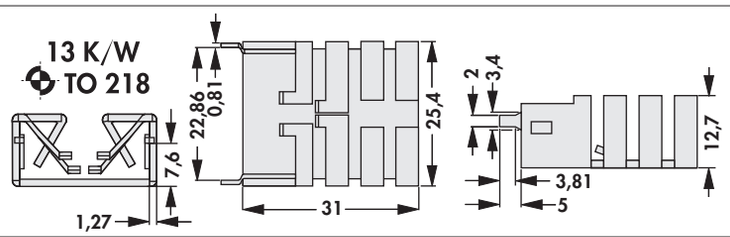
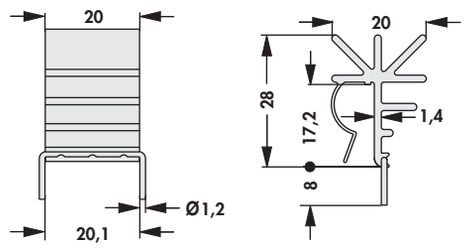
FK 224 ... 220 2



art. no.	R_{th} [K/W]	⌖	art. no.	R_{th} [K/W]	⌖
FK 224 ... 218 1	18	TO 218	**FK 224 ... 220 1**	18	TO 220
FK 224 ... 218 2			**FK 224 ... 220 2**		

please indicate: **... surface**
SA = black anodised
MI = solderable surface

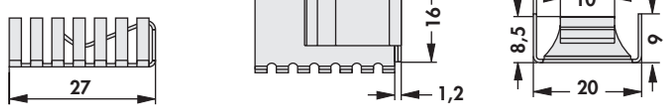
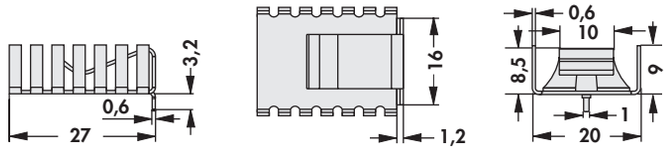
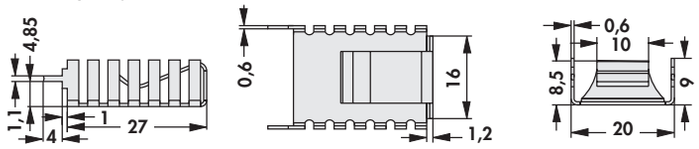
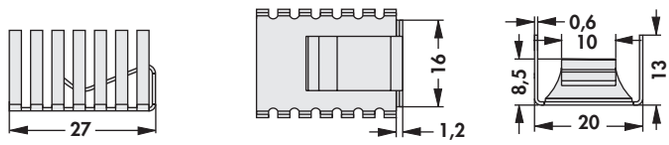
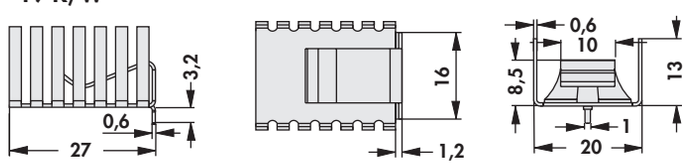
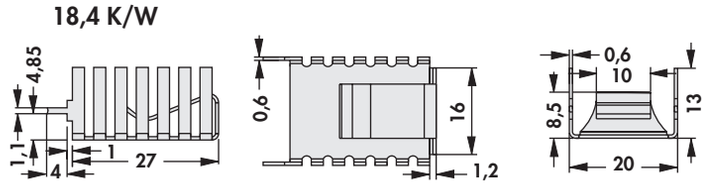
material:	aluminium

art. no.		
FK 241 SA 218 V		**13 K/W** ⌖ **TO 218** 
	with tin-plated soldering lug for direct soldering onto circuit board, for vertical installation	
art. no.		
FK 248 SA 220		**9,8 K/W** ⌖ **TO 220** 

material:	aluminium
surface:	black anodised, solder pins tin plated

Attachable heatsinks

– universal clip on heatsinks for type TO 218, TO 229, TO 247, TO 248, SIP-Muliwatt and similar
– easy assembly by pushing the heatsink onto the component
– for vertical and horizontal fastening by soldering
– fin height variations on request
– special design accord. to customized specification

art. no.		
FK 245 MI 247 O		20,2 K/W 
	without soldering lug	
art. no.		
FK 245 MI 247 H		20,5 K/W 
	with soldering lug for horizontal mounting	
art. no.		
FK 245 MI 247 V		19,7 K/W 
	with soldering lug for vertical mounting	
art. no.		
FK 243 MI 247 O		18,4 K/W 
	without soldering lug	
art. no.		
FK 243 MI 247 H		19 K/W 
	with soldering lug for horizontal mounting	
art. no.		
FK 243 MI 247 V		18,4 K/W 
	with soldering lug for vertical mounting	

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

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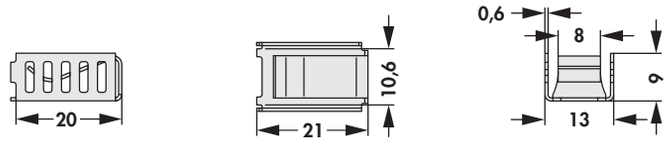
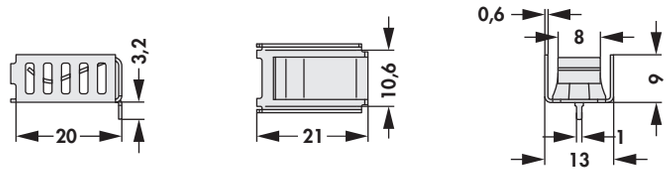
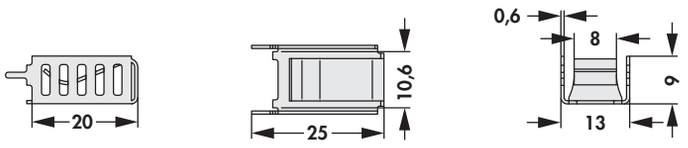
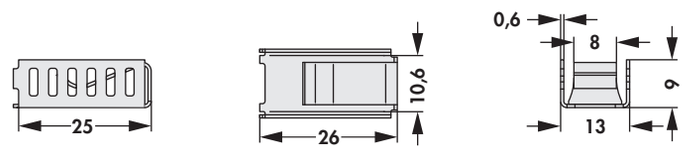
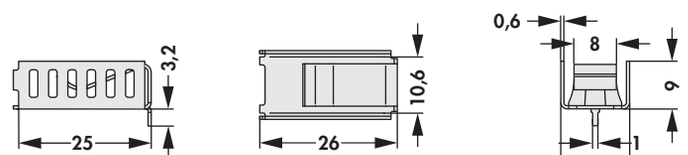
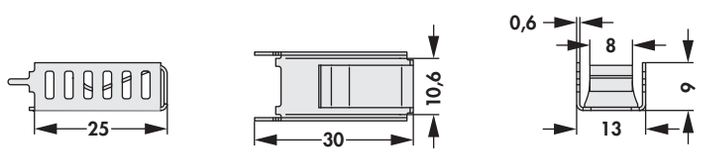
Attachable heatsink

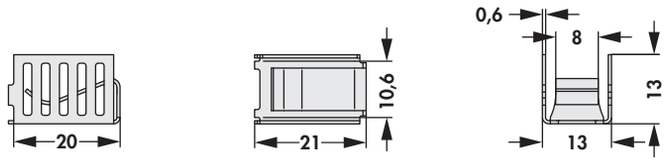
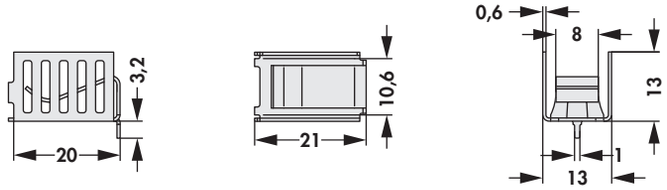
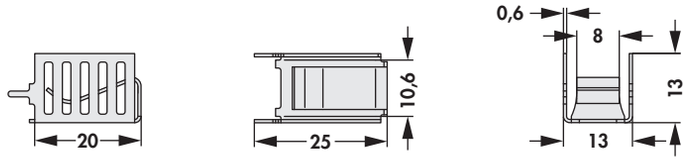
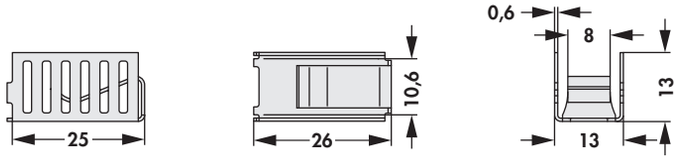
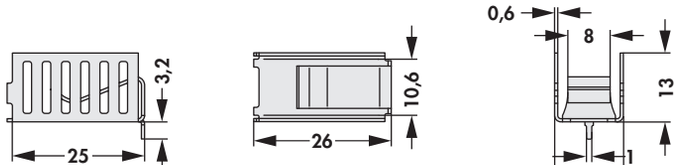
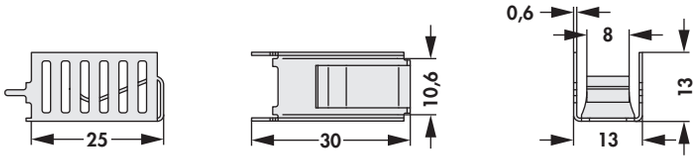
– universal clip-on heatsinks for design TO 220 and similar
– integrated clamp geometry for a secure fixing of the device
– angled designs with enlarged surface
– modifications and special designs according to customer's specifications

art. no.		24,4 K/W
FK 259 MI 220 O		
art. no.		24,7 K/W
FK 259 MI 220 H		
art. no.		23,9 K/W
FK 259 MI 220 V		
art. no.		24,1 K/W
FK 260 MI 220 O		
art. no.		24,4 K/W
FK 260 MI 220 H		
art. no.		23,6 K/W
FK 260 MI 220 V		

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

Technical introduction ➔ **A 2 – 8**

Attachable heatsink

art. no.		23,8 K/W
FK 261 MI 220 O		
art. no.		24,1 K/W
FK 261 MI 220 H		
art. no.		23,3 K/W
FK 261 MI 220 V		
art. no.		23,5 K/W
FK 262 MI 220 O		
art. no.		23,8 K/W
FK 262 MI 220 H		
art. no.		23 K/W
FK 262 MI 220 V		

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

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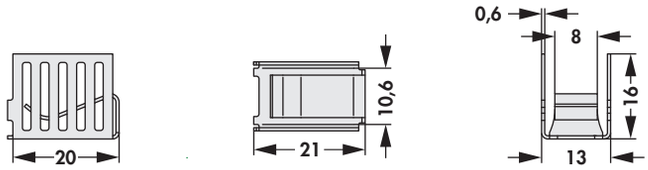
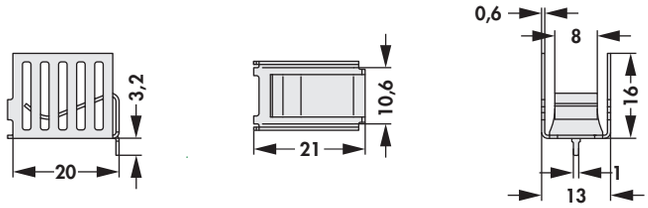
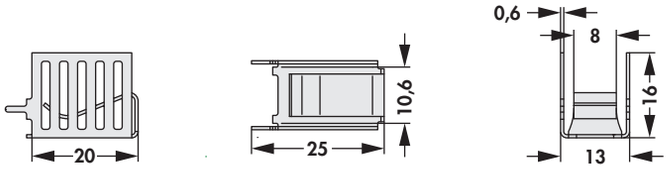
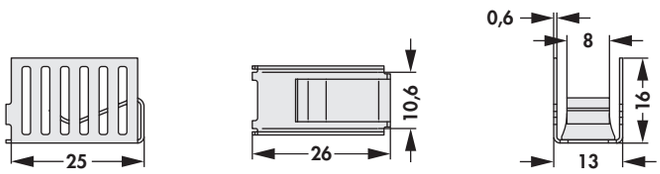
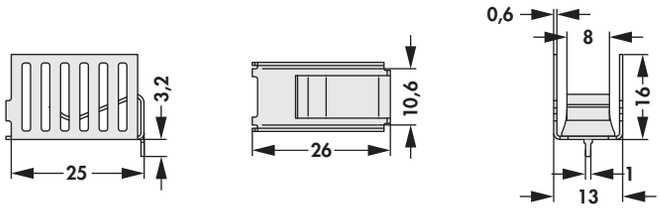
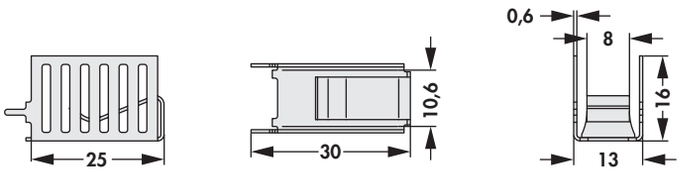
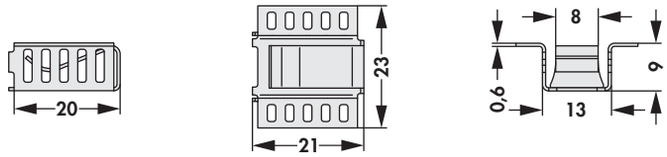
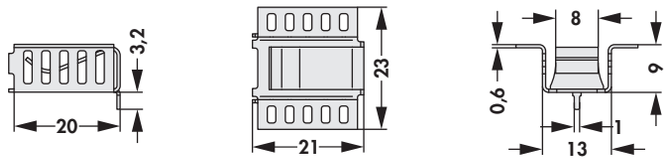
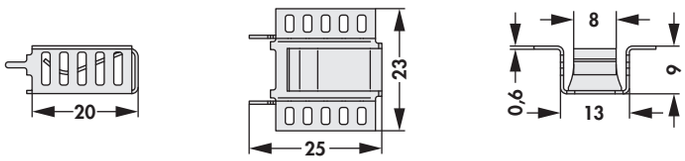
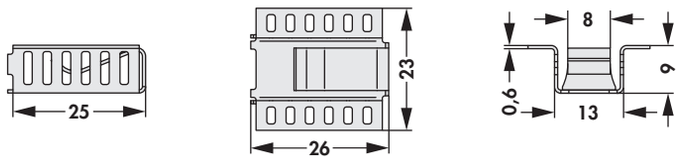
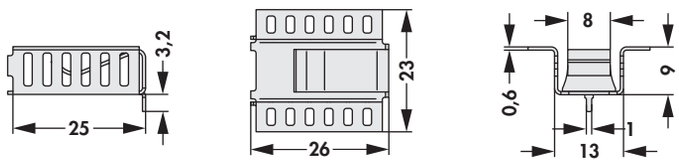
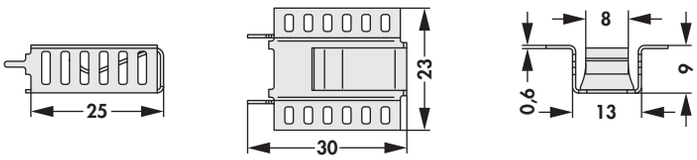
Attachable heatsink

art. no.		23,2 K/W
FK 263 MI 220 O		
art. no.		23,5 K/W
FK 263 MI 220 H		
art. no.		22,7 K/W
FK 263 MI 220 V		
art. no.		22,9 K/W
FK 264 MI 220 O		
art. no.		23,2 K/W
FK 264 MI 220 H		
art. no.		22,4 K/W
FK 264 MI 220 V		

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

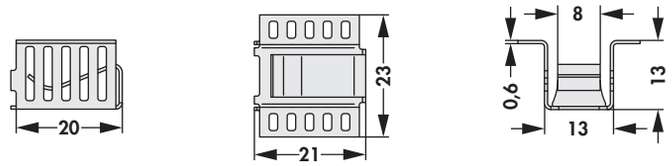
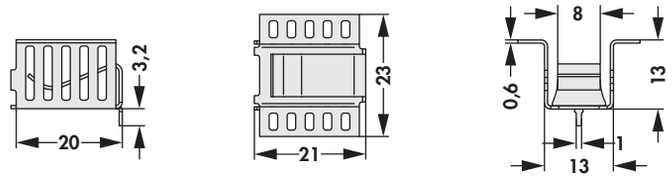
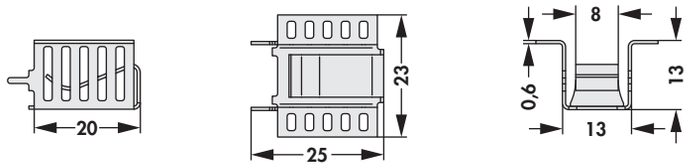
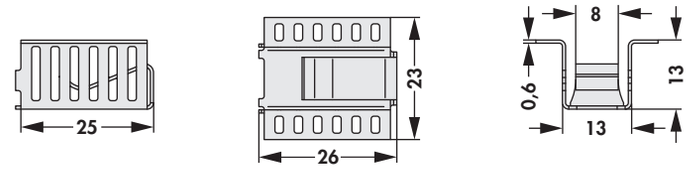
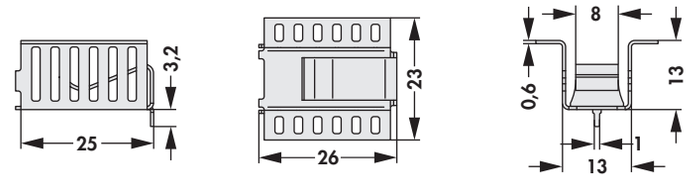
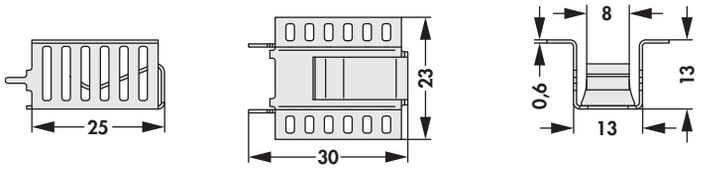
Attachable heatsink

art. no.		22,5 K/W
FK 265 MI 220 O		
art. no.		22,8 K/W
FK 265 MI 220 H		
art. no.		22 K/W
FK 265 MI 220 V		
art. no.		22,2 K/W
FK 266 MI 220 O		
art. no.		22,5 K/W
FK 266 MI 220 H		
art. no.		21,7 K/W
FK 266 MI 220 V		

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

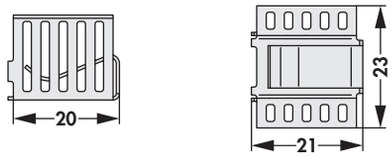
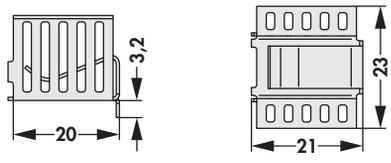
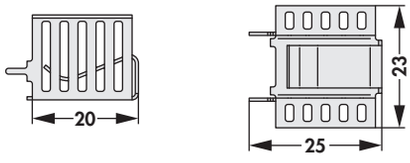
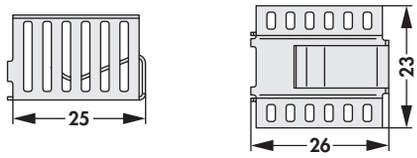
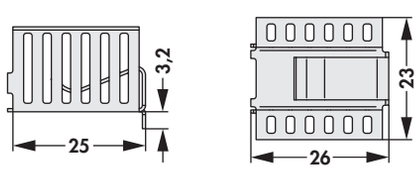
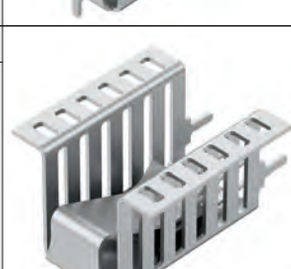
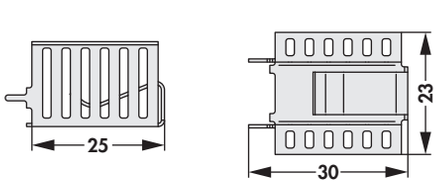
fischer elektronik

Attachable heatsink

art. no.		
FK 267 MI 220 O		21,9 K/W 
art. no.		
FK 267 MI 220 H		22,2 K/W 
art. no.		
FK 267 MI 220 V		21,4 K/W 
art. no.		
FK 268 MI 220 O		21,6 K/W 
art. no.		
FK 268 MI 220 H		21,9 K/W 
art. no.		
FK 268 MI 220 V		21,1 K/W 

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

Attachable heatsink

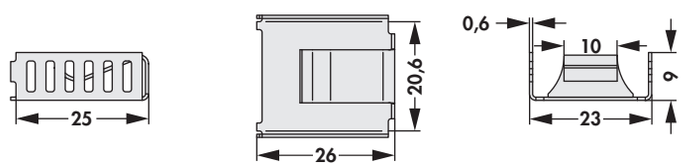
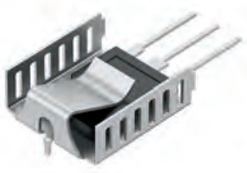
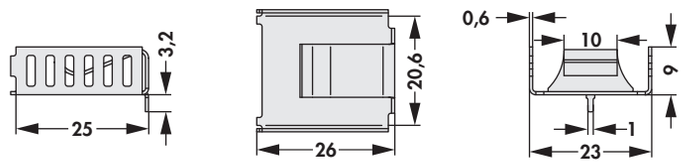
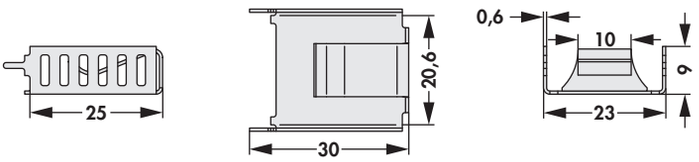
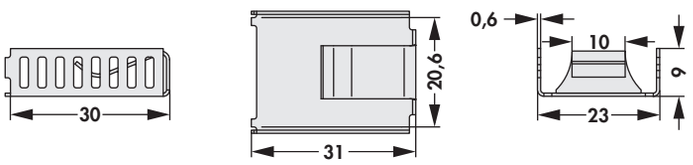
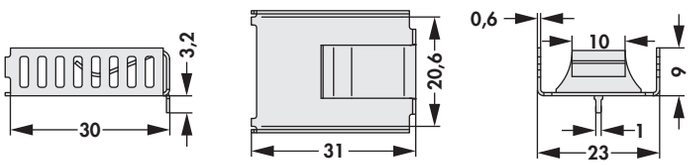
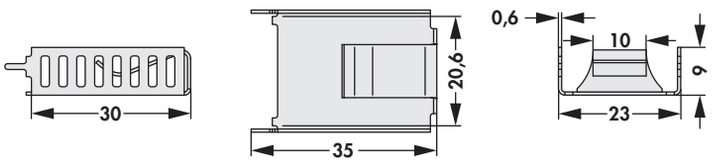
art. no. **FK 269 MI 220 O**		**21,2 K/W** 
art. no. **FK 269 MI 220 H**		**21,5 K/W** 
art. no. **FK 269 MI 220 V**		**20,7 K/W** 
art. no. **FK 270 MI 220 O**		**20,9 K/W** 
art. no. **FK 270 MI 220 H**		**21,2 K/W** 
art. no. **FK 270 MI 220 V**		**20,4 K/W** 

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

fischer elektronik

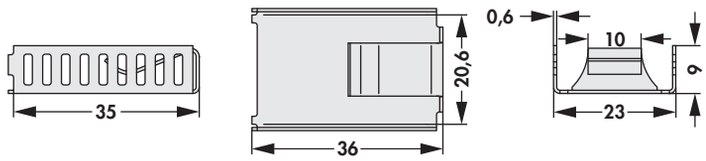
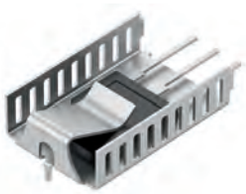
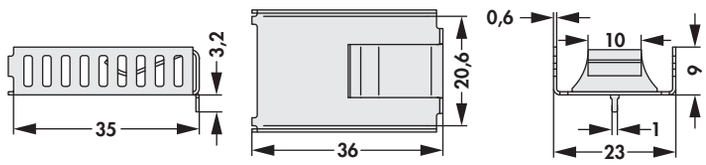
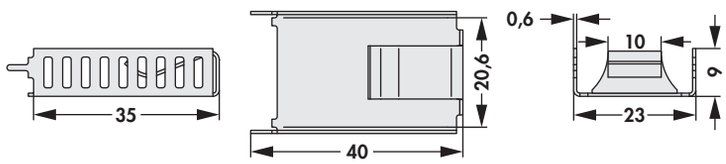
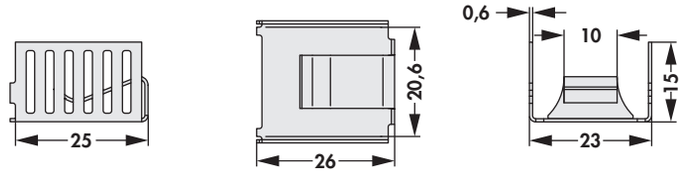
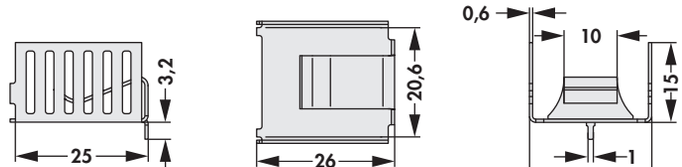
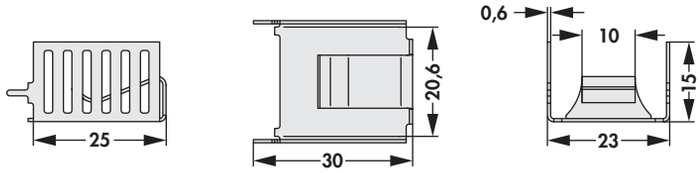
Attachable heatsink

– universal clip-on heatsinks for design TO 218, TO 247, TO 248, SIP-Multiwatt and similar
– integrated clamp geometry for a secure fixing of the device
– angled designs with enlarged surface
– modifications and special designs according to customer's specifications

art. no.		19,9 K/W
FK 271 MI 247 O		
art. no.		20,2 K/W
FK 271 MI 247 H		
art. no.		19,4 K/W
FK 271 MI 247 V		
art. no.		19,6 K/W
FK 272 MI 247 O		
art. no.		19,9 K/W
FK 272 MI 247 H		
art. no.		19,1 K/W
FK 272 MI 247 V		

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

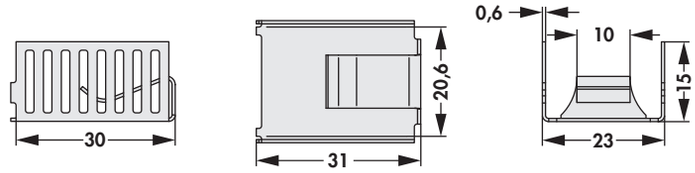
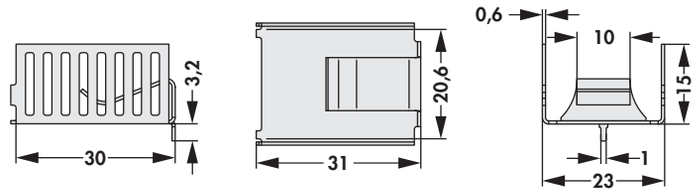
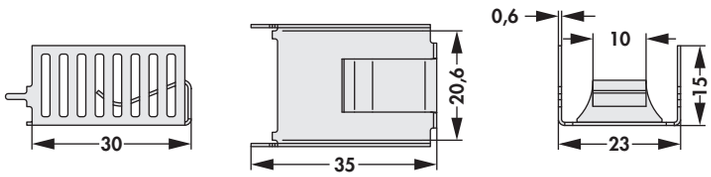
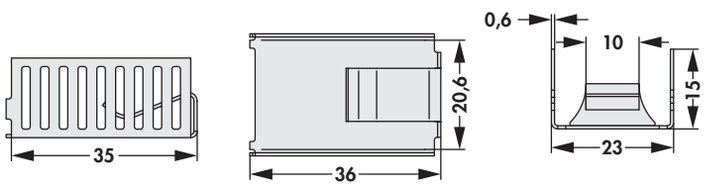
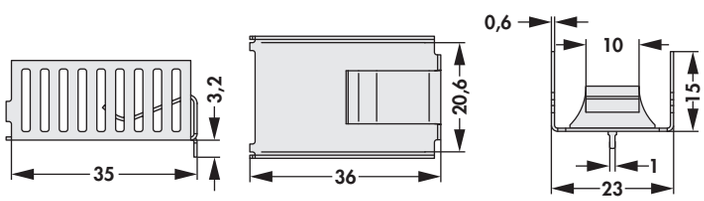
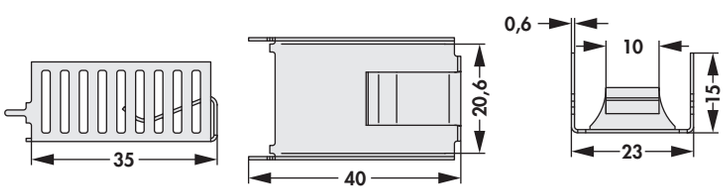
Attachable heatsink

art. no.		19,3 K/W
FK 273 MI 247 O		
art. no.		19,6 K/W
FK 273 MI 247 H		
art. no.		18,8 K/W
FK 273 MI 247 V		
art. no.		19,2 K/W
FK 274 MI 247 O		
art. no.		19,5 K/W
FK 274 MI 247 H		
art. no.		18,7 K/W
FK 274 MI 247 V		

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

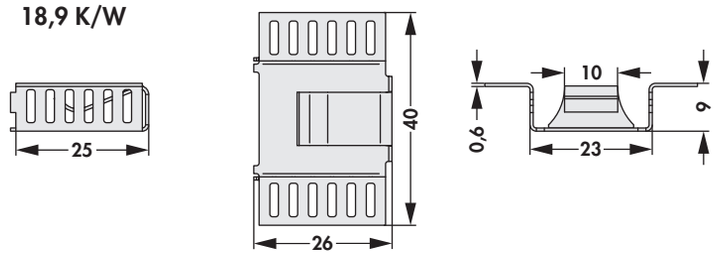
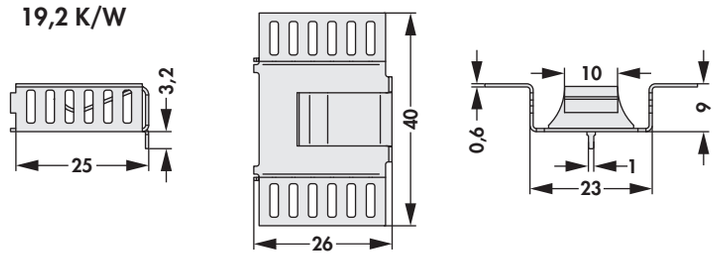
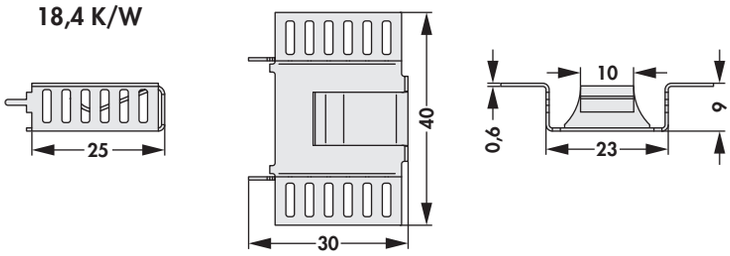
fischer elektronik

Attachable heatsink

art. no.		
FK 275 MI 247 O		18,9 K/W 
art. no.		
FK 275 MI 247 H		19,2 K/W 
art. no.		
FK 275 MI 247 V		18,4 K/W 
art. no.		
FK 276 MI 247 O		18,6 K/W 
art. no.		
FK 276 MI 247 H		18,9 K/W 
art. no.		
FK 276 MI 247 V		18,1 K/W 

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

Attachable heatsink

art. no.			
FK 277 MI 247 O		18,9 K/W 	
art. no.			
FK 277 MI 247 H		19,2 K/W 	
art. no.			
FK 277 MI 247 V		18,4 K/W 	
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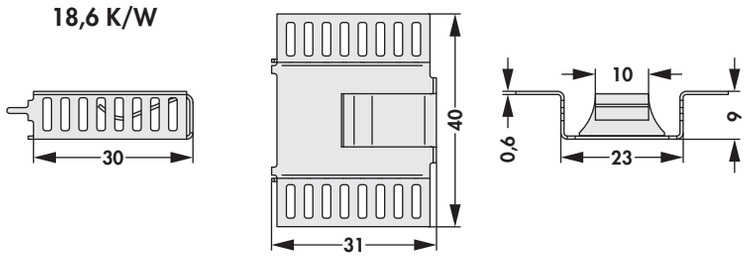
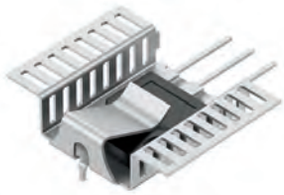
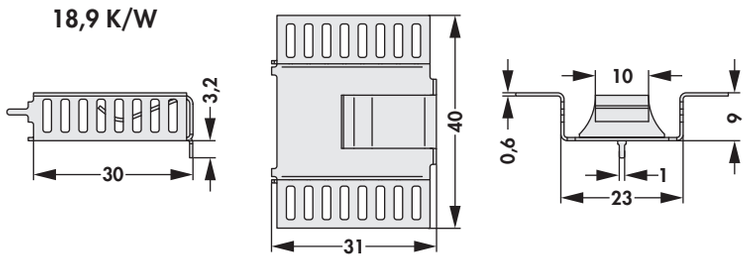
FK 278 MI 247 O		18,6 K/W 	
art. no.			
FK 278 MI 247 H		18,9 K/W 	
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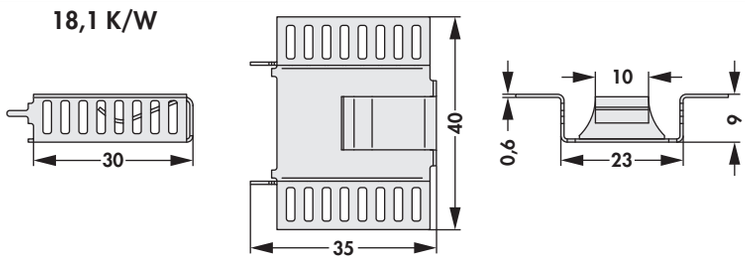
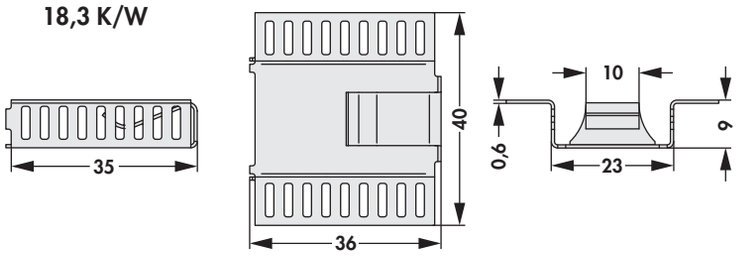
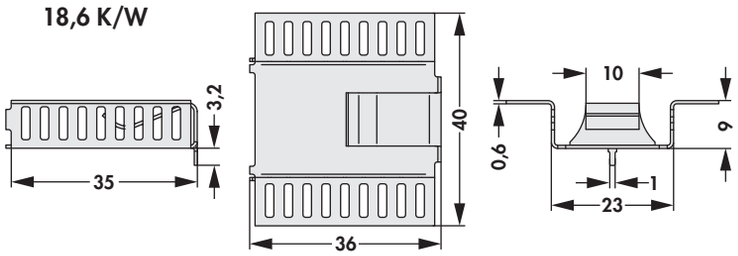
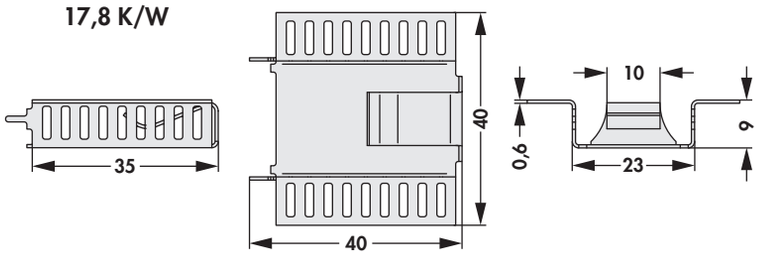
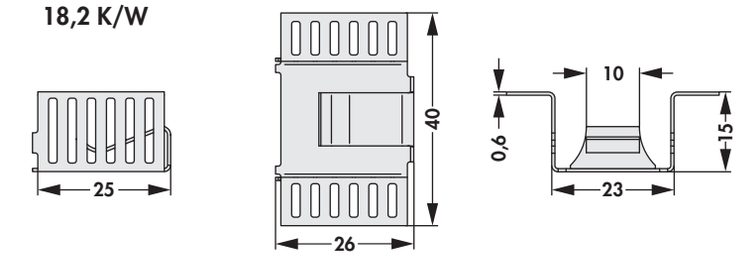
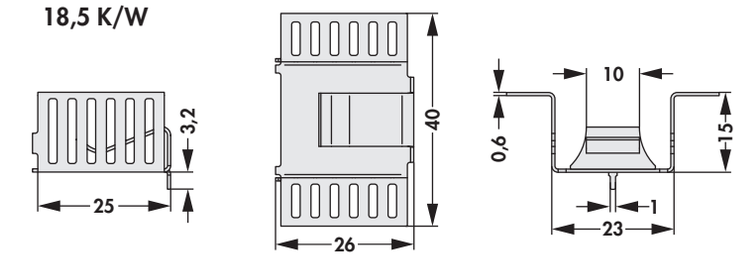
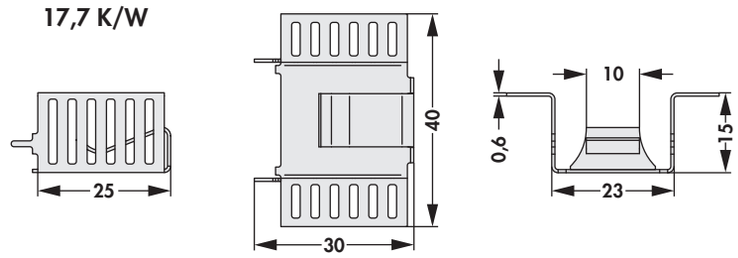
FK 278 MI 247 V		18,1 K/W 	

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

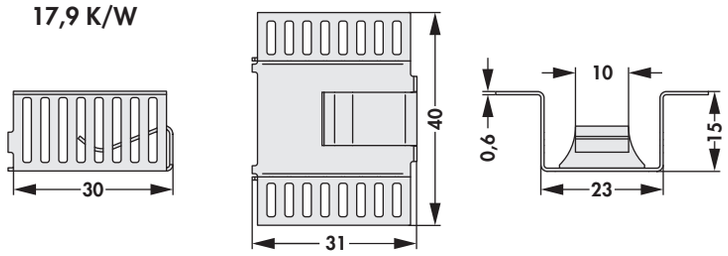
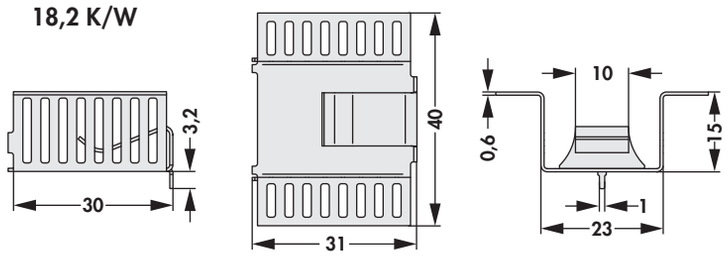
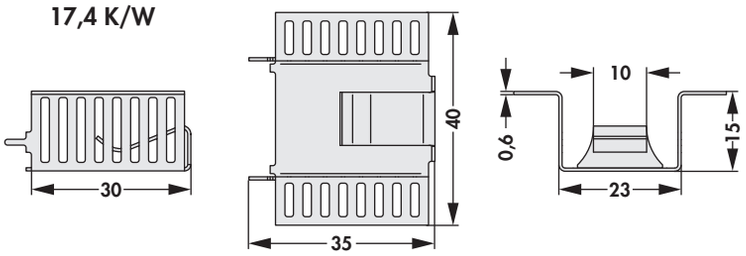
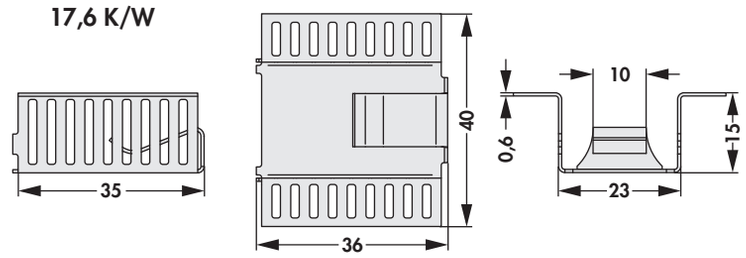
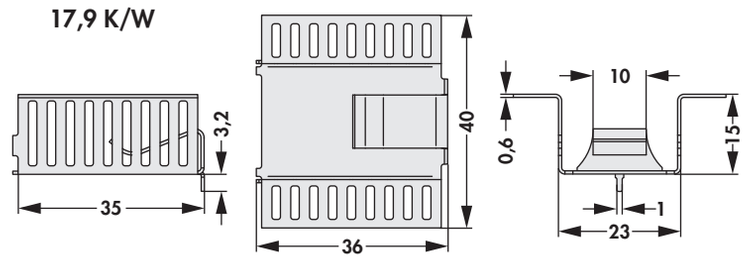
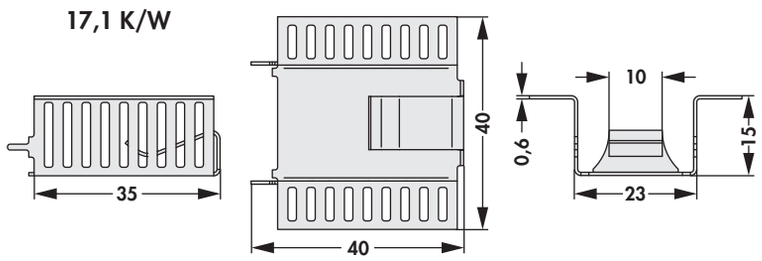
fischer elektronik

Attachable heatsink

art. no.		
FK 279 MI 247 O		18,3 K/W 
art. no.		
FK 279 MI 247 H		18,6 K/W 
art. no.		
FK 279 MI 247 V		17,8 K/W 
art. no.		
FK 280 MI 247 O		18,2 K/W 
art. no.		
FK 280 MI 247 H		18,5 K/W 
art. no.		
FK 280 MI 247 V		17,7 K/W 

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

Attachable heatsink

art. no. **FK 281 MI 247 O**		**17,9 K/W** 
art. no. **FK 281 MI 247 H**		**18,2 K/W** 
art. no. **FK 281 MI 247 V**		**17,4 K/W** 
art. no. **FK 282 MI 247 O**		**17,6 K/W** 
art. no. **FK 282 MI 247 H**		**17,9 K/W** 
art. no. **FK 282 MI 247 V**		**17,1 K/W** 

material:	copper (Cu)
surface:	solderable surface
material thickness:	0.6 mm

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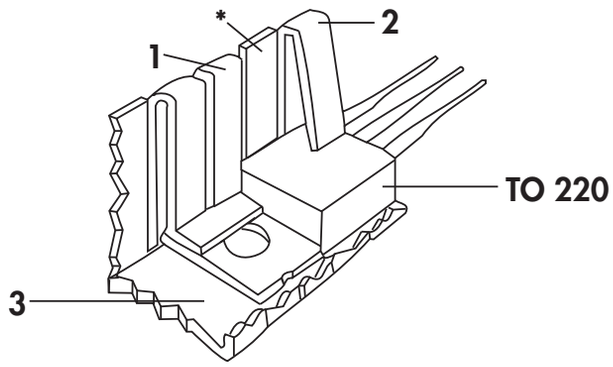
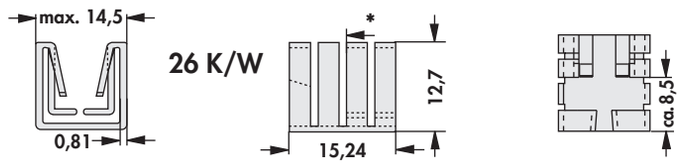
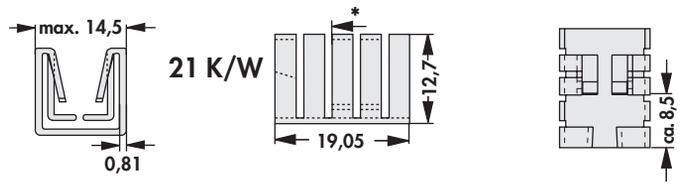
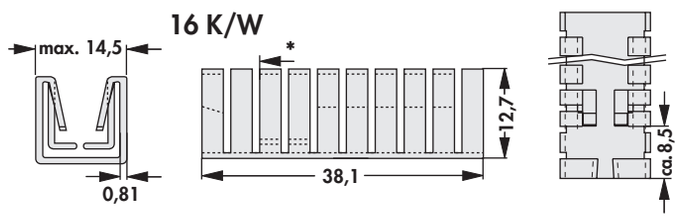
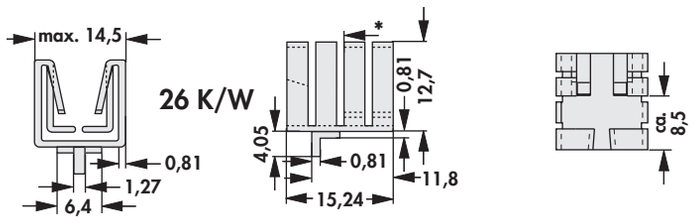
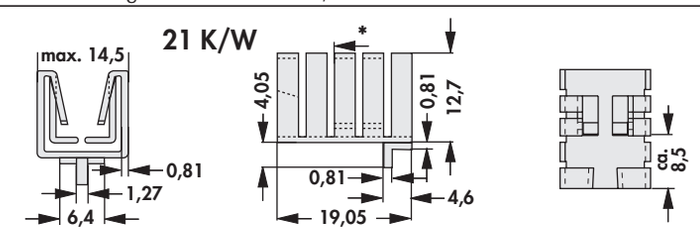
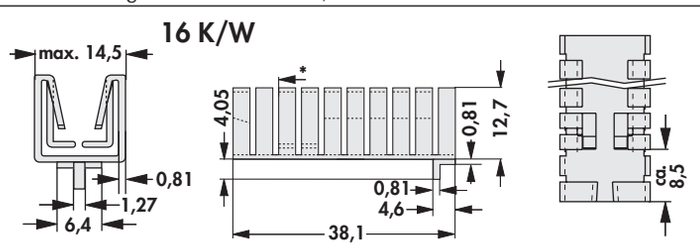
Attachable heatsinks

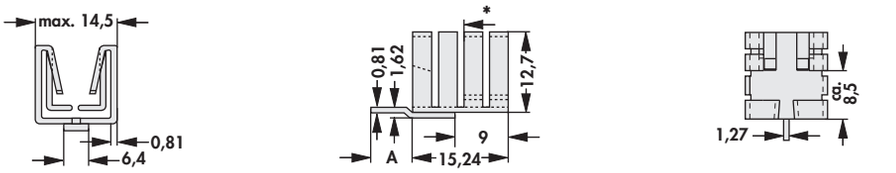
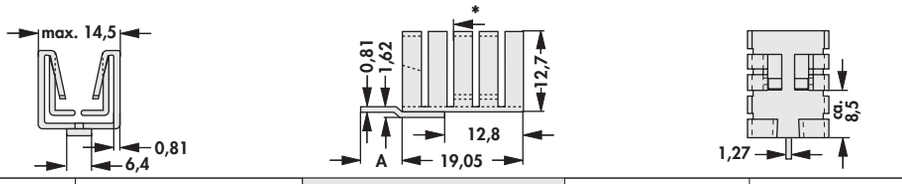
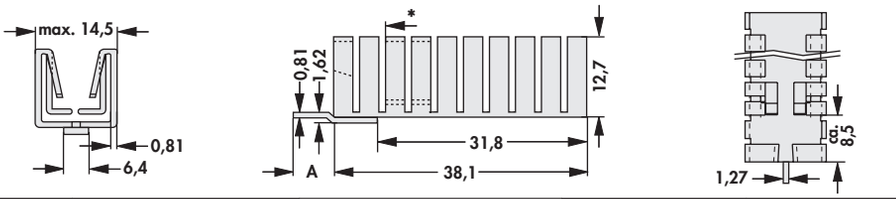


– narrow version with better thermal resistance
– max. 14.5 mm wide
– 3 different lengths for varied dissipation power
– takes less space than any other attachable heatsink
– simple assembly by pushing the heatsink onto the TO 220 housing
– the cooling fingers form spring clamps **(1+2)**, which pushes the TO 220 and it's mounting flange onto the heatsink **(3)**
– optimum heat transfer due the constant pressure on the entire contact surface of the TO 220 cases
– effective heat emmision with horizontal and vertical mounting
– * = touch in edge of transistor

art. no.		
FK 242 SA 220 O		
	without soldering lug	
art. no.		
FK 237 SA 220 O		
	without soldering lug	
art. no.		
FK 240 SA 220 O		
	without soldering lug	
material:	aluminium	
surface:	black anodised, solder pins tin plated	

art. no.		
		
FK 242 SA 220 H	with tinned soldering lug for direct soldering onto circuit board, for horizontal installation	
art. no.		
		
FK 237 SA 220 H	with tinned soldering lug for direct soldering onto circuit board, for horizontal installation	
art. no.		
		
FK 240 SA 220 H	with tinned soldering lug for direct soldering onto circuit board, for horizontal installation	
material:	aluminium	
surface:	black anodised, solder pins tin plated	

– with tinned soldering lug for direct soldering onto circuit board, for vertical installation

					
art. no.	A [mm]	R_{th} [K/W]	**art. no.**	A [mm]	R_{th} [K/W]
FK 242 SA 220 V	6.35	26	**FK 242 SA 220 VL**	9.53	26
					
art. no.	A [mm]	R_{th} [K/W]	**art. no.**	A [mm]	R_{th} [K/W]
FK 237 SA 220 V	6.35	21	**FK 237 SA 220 VL**	9.53	21
					
art. no.	A [mm]	R_{th} [K/W]	**art. no.**	A [mm]	R_{th} [K/W]
FK 240 SA 220 V	6.35	16	**FK 240 SA 220 VL**	9.53	16
material:	aluminium				
surface:	black anodised, solder pins tin plated				

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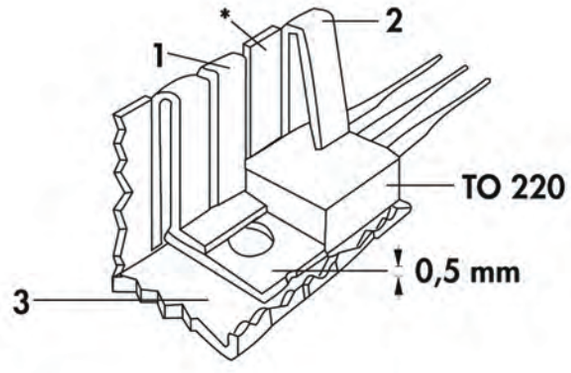
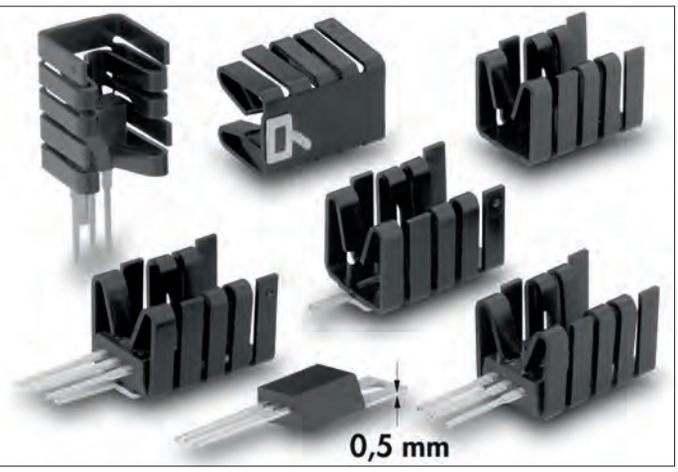
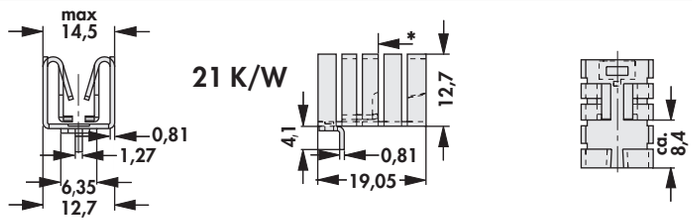
Attachable heatsinks for TO 220 with a bottom plate of 0.5 mm

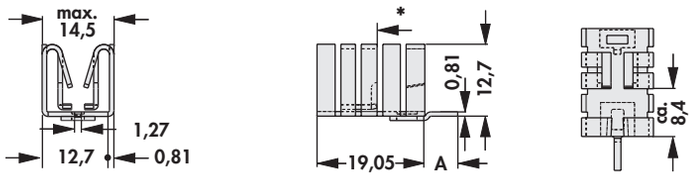




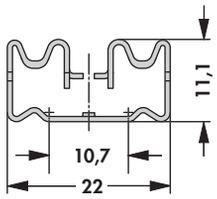
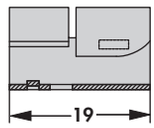
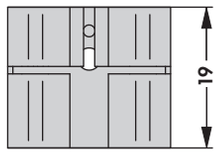
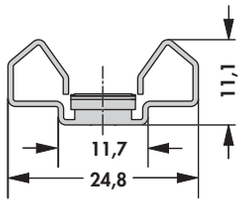
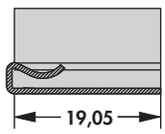
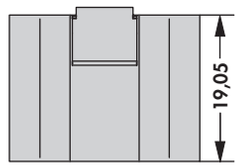
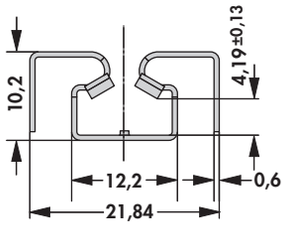
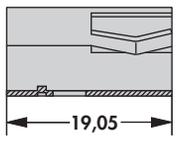
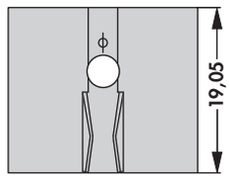
– narrow version with better thermal resistance
– max. 14.5 mm wide
– takes less space than any other attachable heatsink
– simple assembly by pushing the heatsink onto the TO 220 housing
– the cooling fingers form spring clamps **(1+2)**, which pushes the TO 220 and it's mounting flange onto the heatsink **(3)**
– optimum heat transfer due the constant pressure on the entire contact surface of the TO 220 cases
– effective heat emmision with horizontal and vertical mounting
– * = touch in edge of transistor

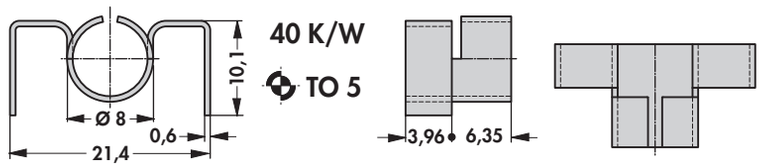
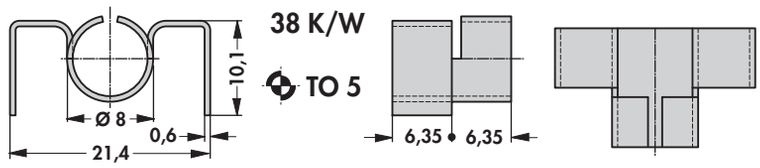
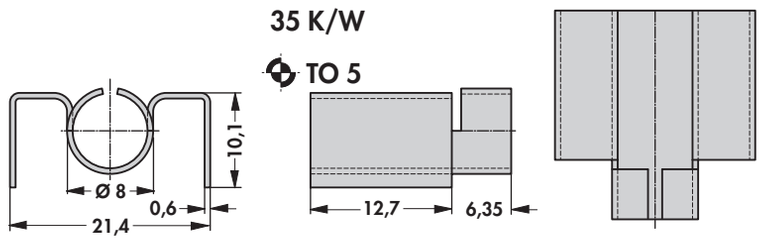
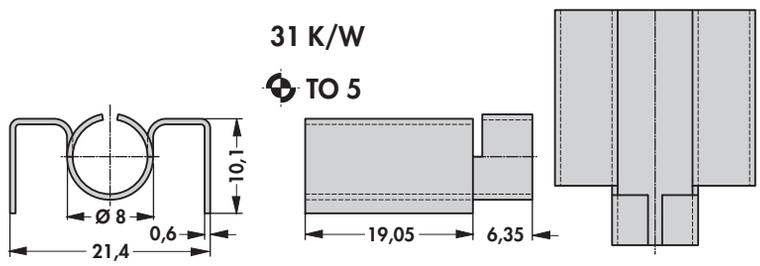
art. no.		
		
FK 252 SA 220 H	with tinned soldering lug for direct soldering onto circuit board, for horizontal installation	
material:	aluminium	
surface:	black anodised	

– with tinned soldering lug for direct soldering onto circuit board, for vertical installation

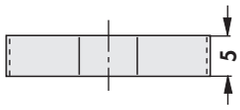
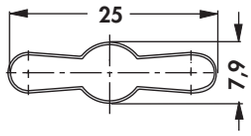
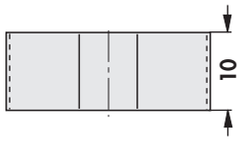
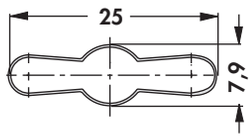
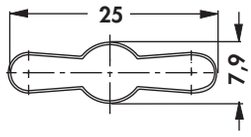


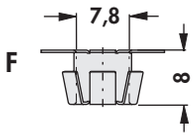
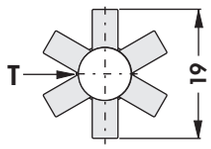
art. no.	A [mm]	R_{th} [K/W]	art. no.	A [mm]	R_{th} [K/W]
FK 252 SA 220 V	6.35	21	**FK 252 SA 220 VL**	9.53	21
material:	aluminium				
surface:	black anodised				

			
art. no.	R_{th} [K/W]		
FK 253	23.7		TO 220
			
art. no.	R_{th} [K/W]		
FK 255	16.8		TO 220
			
art. no.	R_{th} [K/W]		
FK 257	21.2		TO 220
material:	aluminium		
surface:	black anodised		

art. no.		
KK 1 3,96		
art. no.		
KK 1 6,35		
art. no.		
KK 1 12,7		
art. no.		
KK 1 19,05		

material:	aluminium
surface:	black anodised

art. no.		
KF 5/5		 57 K/W TO 5 
art. no.		
KF 5/10		 46 K/W TO 5 
art. no.		
KF 5/15		 40 K/W TO 5 
material:	brass	
surface:	blackened	

art. no.		
KK 562 GS		 60 K/W TO 5 
	T = gap; **F** = spring loaded	
material:	special bronze CuSn 15	
material thickness:	0.3 mm	
surface:	blackened	

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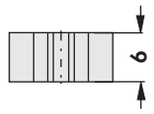
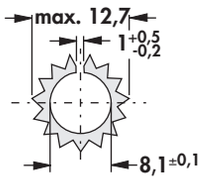
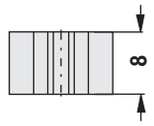
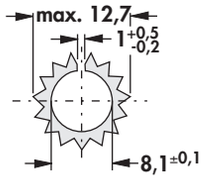
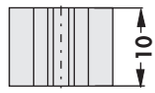
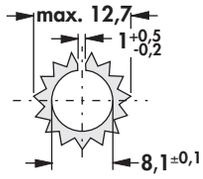
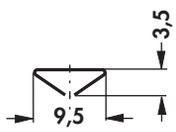
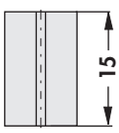
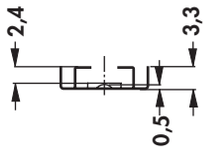
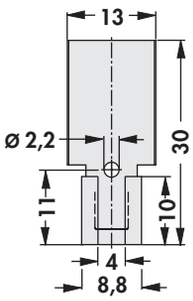
Small heatsinks

art. no.				
SKK 56			63 K/W TO 5	
art. no.				
SKK 58			55 K/W TO 5	
art. no.				
SKK 510			44 K/W TO 5	
material:	aluminium			
surface:	etched (other surfaces on request)			

art. no.				
KK 92			80 K/W TO 126 SOT 32 SOT 82	
art. no.				
KK 32			60 K/W TO 126 SOT 32 SOT 82	
material:	special bronze CuSn 6			
surface:	blackened			

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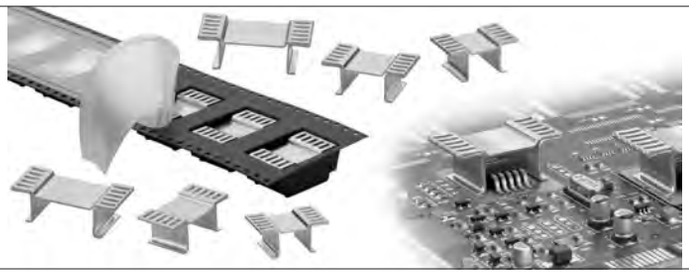
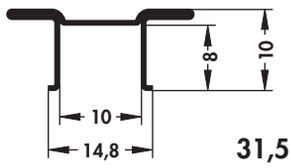
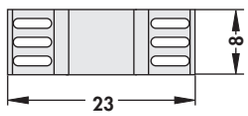
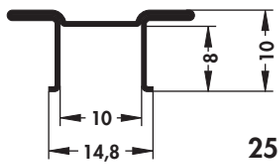
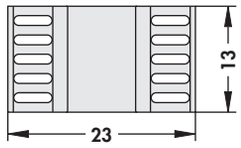
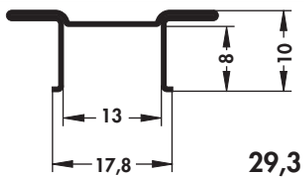
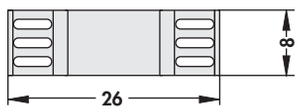
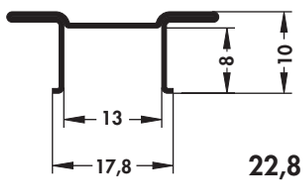
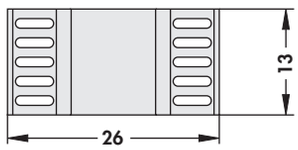
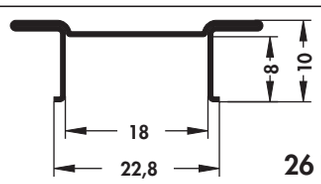
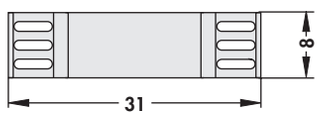
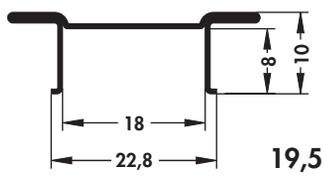
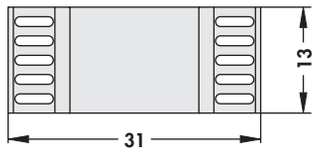
Copper heatsinks for D PAK and others



- copper heatsinks with excellent heat conductivity
- direct mounting on printed circuit through solderable surface
- especially suitable for SMD components of type D PAK (TO 252), D^2 PAK (TO 263), D^3 PAK (TO 268), SOT 669 LF PAK, SO IC-8 FL MP, Power SO-8, Power SO-10, Power SO-20, Power SO-36, SO-14, SO-16, SOT 223 etc
- available standard packing: bulk parts or reel
- special packing like magazine, tray etc. on request; - special versions according to customers specifications
- **tape width**: 44 mm, **reel diameter**: 330 mm, **quantity**: FK 244 08 = 450, FK 244 13 = 200

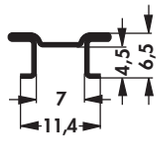
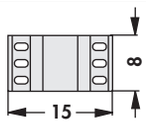
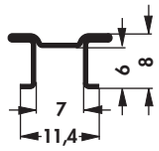
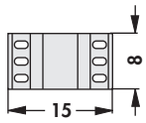
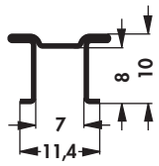
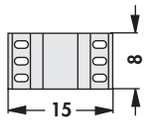
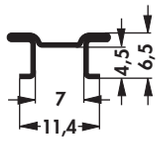
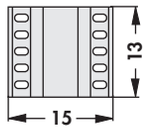
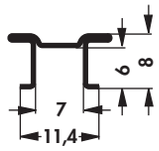
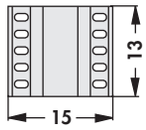
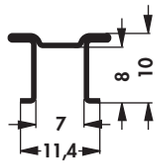
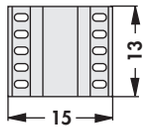
art. no.			
FK 244 08 D PAK ... weight: 2g		 **31,5 K/W**	
art. no.			
FK 244 13 D PAK ... weight: 3.3g		 **25 K/W**	
art. no.			
FK 244 08 D2 PAK ... weight: 2.2g		 **29,3 K/W**	
art. no.			
FK 244 13 D2 PAK ... weight: 3.6g		 **22,8 K/W**	
art. no.			
FK 244 08 D3 PAK ... weight: 2.5g		 **26 K/W**	
art. no.			
FK 244 13 D3 PAK ... weight: 3.9g		 **19,5 K/W**	

please indicate: **... packing (optional)**
TR = tape and reel

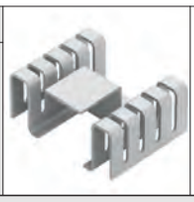
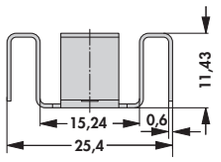
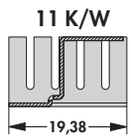
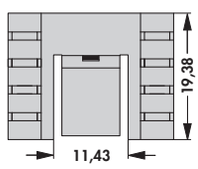
surface:	solderable surface
material:	copper (Cu)
material thickness:	0.6 mm

Copper heatsinks for D PAK and others

– **tape width**: 24 mm, **reel diameter**: 330 mm, **quantity**: FK 250 06 = 450, FK 250 08 = 450, FK 250 10 = 350
– **tape width**: 24 mm, **reel diameter**: 330 mm, **quantity**: FK 251 06 = 450, FK 251 08 = 350, FK 251 10 = 250

art. no.				
FK 250 06 LF PAK ... weight: 1g			**37 K/W**	
art. no.				
FK 250 08 LF PAK ... weight: 1.1g			**34,8 K/W**	
art. no.				
FK 250 10 LF PAK ... weight: 1.2g			**28,8 K/W**	
art. no.				
FK 251 06 LF PAK ... weight: 1.3g			**32 K/W**	
art. no.				
FK 251 08 LF PAK ... weight: 1.4g			**29,8 K/W**	
art. no.				
FK 251 10 LF PAK ... weight: 1.5g			**24 K/W**	

please indicate:	**... packing (optional)** **TR = tape and reel**
surface:	solderable surface
material:	copper (Cu)
material thickness:	0.6 mm

art. no.				
FK 256 ... weight: 5.7g			**11 K/W** 	

please indicate:	**... packing (optional)** **TR = tape and reel**
surface:	solderable surface
material:	copper (Cu)
material thickness:	0.6 mm

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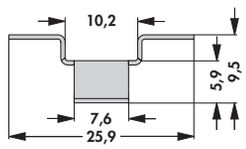
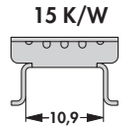
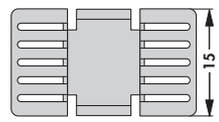
Copper heatsinks for D PAK and others

art. no.			
FK 283 weight: 2.3g				

surface:	solderable surface
material:	copper (Cu)
material thickness:	0.6 mm

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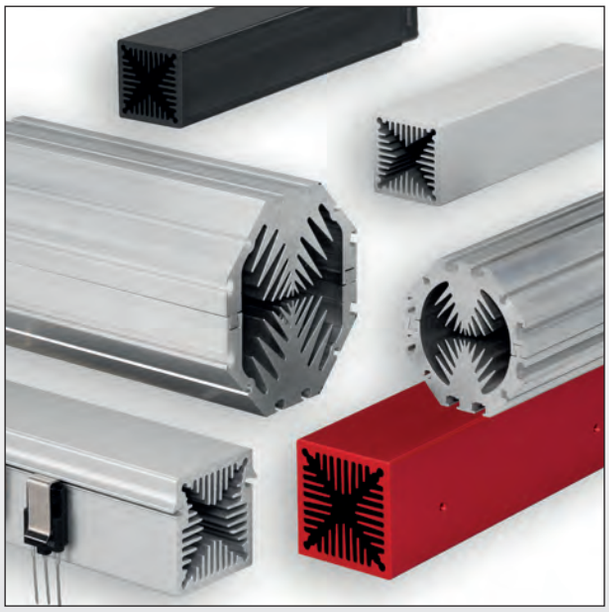
Segment cooling aggregates
Miniature cooling aggregates
Hollow fin cooling aggregates
High performance heatsinks

Segment cooling aggregates
- modular assembly consisting of different circle- and length segments
- electrical and thermal insulation of the single cooling segment sections
- standard drilling patterns TO 3 and pressfit
- segment profile also sold by the meter
- other fan types and fan voltages upon request

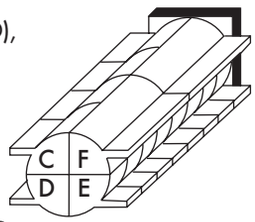


Miniature cooling aggregates
- compact construction for dissipating high power losses on smallest installation space
- heatsink geometries and fixed length optimal adjusted to the fan being used
- homogeneous heat dissipation
- mounting of the semi-conductor by means of sliding nut chanels or specific snap-to-retaining springs for transistors

Hollow fin cooling aggregates
- flow-optimized hollow fin geometry
- precise milled flat semiconductor mounting surface, single- and double-sided
- laminar airflow and noise reduction by means of harmonized chamber systems
- additional treatments, modifications and designs according to customers specifications

High performance heatsinks
- exclusive for forced convection
- for radial- and tangential fans
- flow-optimized design, best heat dissipation by means of especially thick bottom plates
- precise milled flat semiconductor mounting surfaces
- mechanical treatments, special designs and surface coating for your application

Order example (see drawing on the right)

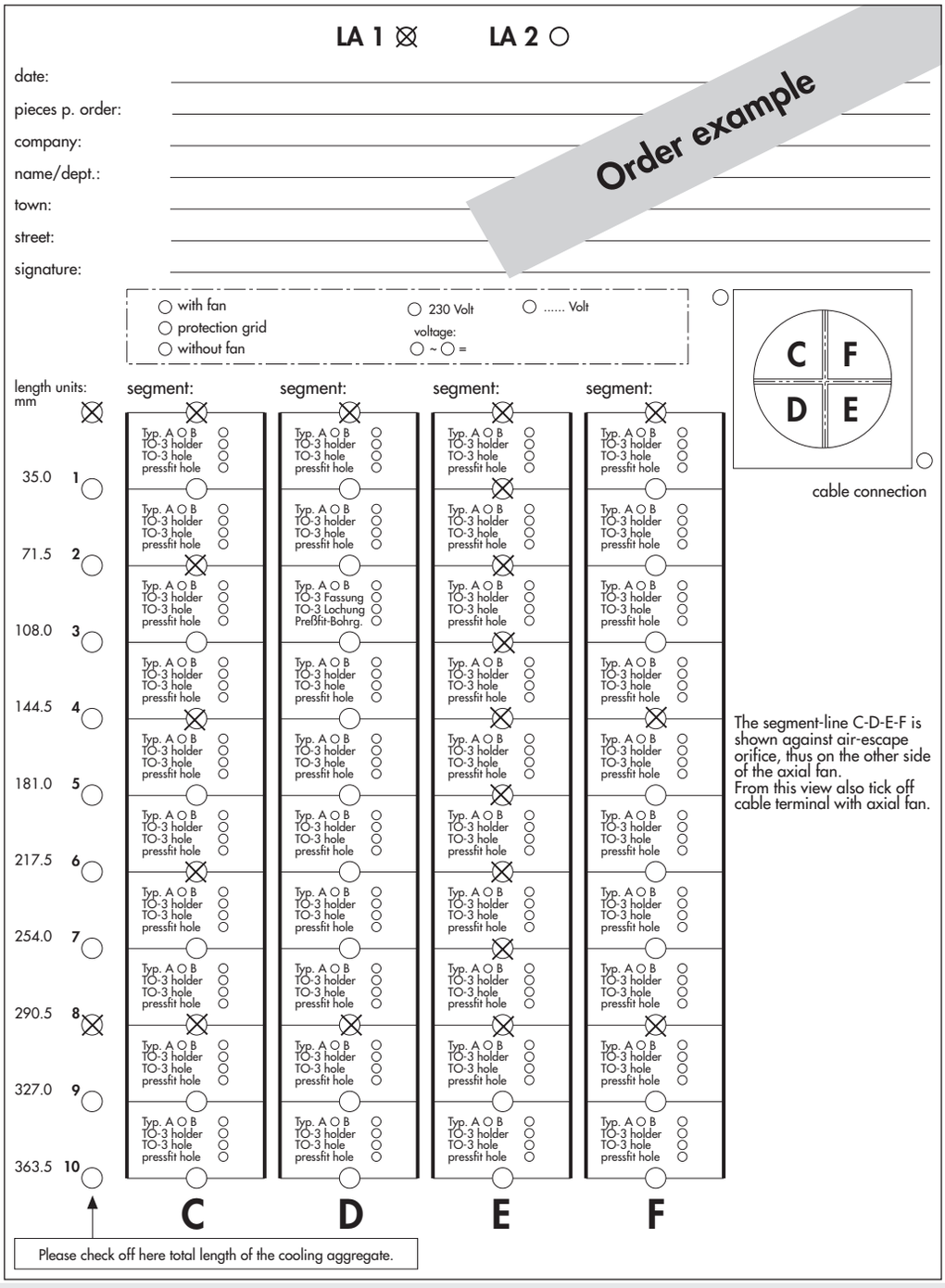


Semiconductor cooling package, consisting of 4 heatsinks LA 1 -2 A (segment C), 1 heatsink LA 1 - 8 A (segment D), 8 heatsinks LA 1 - 1 A (segment E) and 2 heatsinks LA 1- 4 A (segment F).
Total dissipation 1280 W.

How to tick off?

1. Tick on the left hand side the circles corresponding to an eight element long package, and also at the end of each row of the segments C, D, E and F to define the length.
2. For segment C: 4 marks for four double length elements, insulated from each other. This indicates 4 units LA 1 - 2.
3. For segment D: 1 mark for one single length of heatsink, 290.5 mm long. This indicates 1 unit LA 1 - 8.
4. For segment E: 8 marks for 8 elements of the standard length (35 mm) each insulated from the other. This indicates 8 units LA 1 - 1.
5. For segment F: 2 marks for each two heatsinks of 144.5 mm length, each insulated from the other. This indicates 2 units LA 1 - 4.
6. For each segment the profile types, either A or B, must be indicated for aggregate LA 1.
7. In the rectangle corresponding to the heatsink elements, the pin layouts for the transistor should also be indicated.
8. In the order form please indicate whether the cooling-aggregate is to be supplied with a fan and whether this is equipped with a protection-grid, or if it is to be supplied without a fan.

Upon request, it is possible to supply fans for special voltages and higher temperatures.



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www.facebook.de/fischerelektronik

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Order / inquiry

LA 1 ○ **LA 2 ○**

date: _____

pieces p. order: _____

company: _____

name/dept.: _____

town: _____

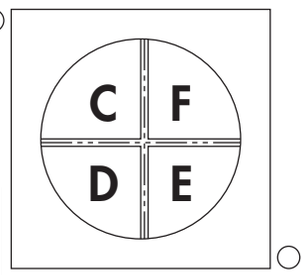
street: _____

signature: _____

○ with fan
○ protection grid
○ without fan

○ 230 Volt ○ ..... Volt

voltage:
○ ~ ○ =



cable connection

length units: mm

	segment: C	segment: D	segment: E	segment: F
35.0 **1**	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
71.5 **2**	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
108.0 **3**	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 Fassung ○ TO-3 Lochung ○ Preßfit-Bohrg. ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
144.5 **4**	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
181.0 **5**	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
217.5 **6**	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
254.0 **7**	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
290.5 **8**	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
327.0 **9**	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
363.5 **10**	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○

The segment-line C-D-E-F is shown against air-escape orifice, thus on the other side of the axial fan.
From this view also tick off cable terminal with axial fan.

Please check off here total length of the cooling aggregate.

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Fax: +49 23 51 45754

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www.fischerelektronik.de
www.facebook.de/fischerelektronik

Order / inquiry

LA 1 ○ **LA 2 ○**

date: _____

pieces p. order: _____

company: _____

name/dept.: _____

town: _____

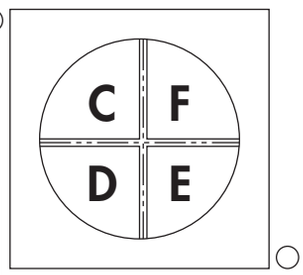
street: _____

signature: _____

○ with fan
○ protection grid
○ without fan

○ 230 Volt ○ ..... Volt

voltage:
○ ~ ○ =



cable connection

length units: mm

		segment:	segment:	segment:	segment:
	○				
35.0	1 ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
71.5	2 ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
108.0	3 ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 Fassung ○ TO-3 Lochung ○ Preßfit-Bohrg. ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
144.5	4 ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
181.0	5 ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
217.5	6 ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
254.0	7 ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
290.5	8 ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
327.0	9 ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
363.5	10 ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○	Typ. A ○ B TO-3 holder ○ TO-3 hole ○ pressfit hole ○
		C	**D**	**E**	**F**

The segment-line C-D-E-F is shown against air-escape orifice, thus on the other side of the axial fan.
From this view also tick off cable terminal with axial fan.

Please check off here total length of the cooling aggregate.

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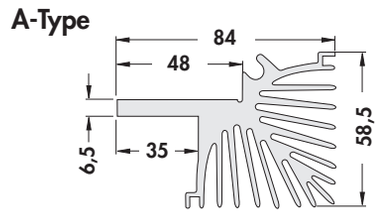
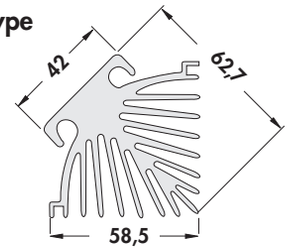
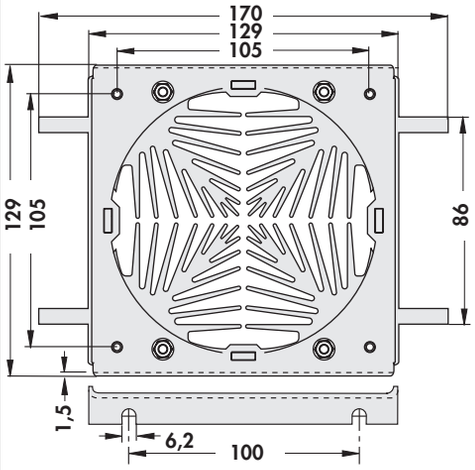
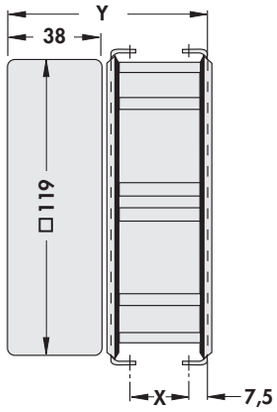
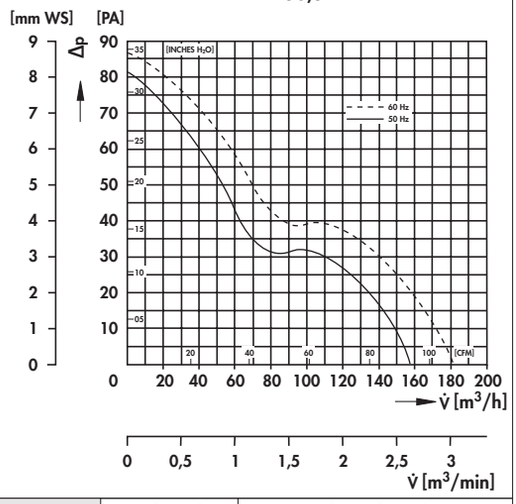
Segment cooling aggregates











art. no.	L [mm]	dim. [mm]		art. no.	L [mm]	dim. [mm]	
		X	Y			X	Y
LA 1 01 ...	35.0	26.0	88.6	**LA 1 06 ...**	217.5	208.5	271.1
LA 1 02 ...	71.5	62.5	125.1	**LA 1 07 ...**	254.0	245.0	307.6
LA 1 03 ...	108.0	99.0	161.6	**LA 1 08 ...**	290.5	281.5	344.1
LA 1 04 ...	144.5	135.5	198.1	**LA 1 09 ...**	327.0	318.0	380.6
LA 1 05 ...	181.0	172.0	234.6	**LA 1 10 ...**	363.5	354.5	417.1

... for A-types: please add an "A", for B-types: please add a "B".
L: unit lengths of the segments incl. insulation; **X**: mounting distance; **Y**: length of the cooling aggregate incl. fan

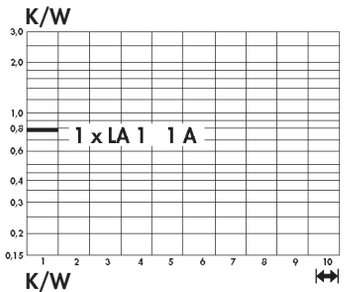
24 V DC fan on request
In case of order please use order form.
segments also available in meter length:
art. no. for A-type: LA 1 1000 A; art. no. for B-type: LA 1 1000 B
Other fan types and fan voltages on request.

Technical data of the fans

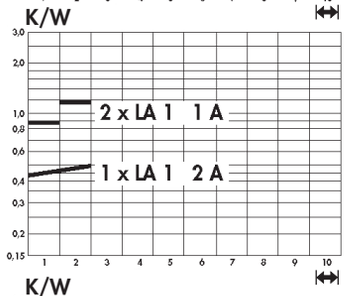
	... 230
type	ebmpapst 4656N
dimensions	119x119x38 mm
tension	230 V AC
power inout	19 W
max. air volume	160 m^3/h
temperature range	-40°C... +85°C
noise level	47 dB(A)
speed	2,650 min^{-1}
weight	550 g
failure rate (L_{10})	L_{10} > 37,500 h (40°C)

Thermal resistance LA 1

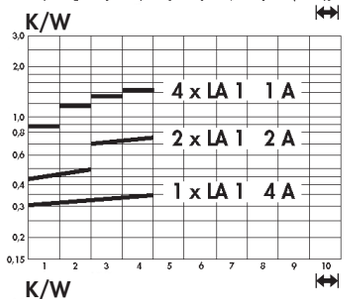
The thermal resistance in the following diagrams is given on the base of a total dissipation of 40 Watt per heatsink of the „A"-type. When using „B"-types this value increases by 3 %.



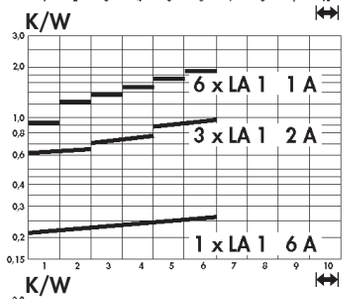
1. Cooling aggregate consisting of 4 heatsinks LA 1 - 1 A.
   Total dissipation 160 W.



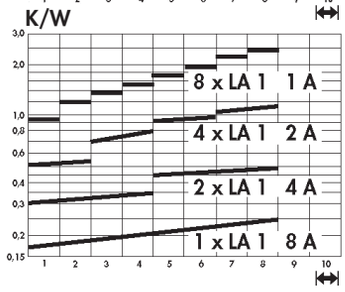
2. Cooling aggregate consisting of 4 heatsinks LA 1 - 1 A and 2 x 1 heatsink LA 1 - 2 A.
   Total dissipation 320 W.



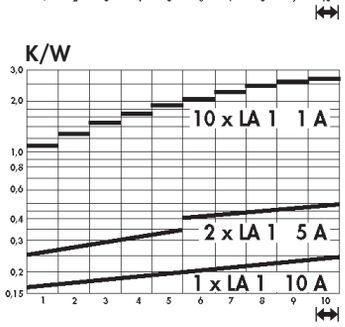
3. Cooling aggregate consisting of 4 heatsinks LA 1 - 1 A, 2 heatsinks
   LA 1 - 2 A and 2 x 1 heatsink LA 1 - 4 A. Total dissipation 640 W.



4. Cooling aggregate consisting of 6 heatsinks LA 1 - 1 A, 3 heatsinks
   LA 1 - 2 A and 2 x 1 heatsink LA 1 - 6 A. Total dissipation 960 W.



5. Cooling aggregate consisting of 8 heatsinks LA 1 - 1 A, 4 heatsinks LA 1 - 2 A,
   2 heatsinks LA 1 - 4 A and 1 heatsink LA 1 - 8 A. Total dissipation 1280 W.



6. Cooling aggregate consisting of 10 heatsinks LA 1 – 1 A, 2 heatsinks LA 1 – 5 A,
   and 2 x 1 heatsink LA 1 – 10 A. Total dissipation 1600 W.

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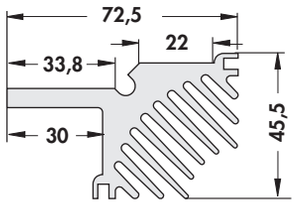
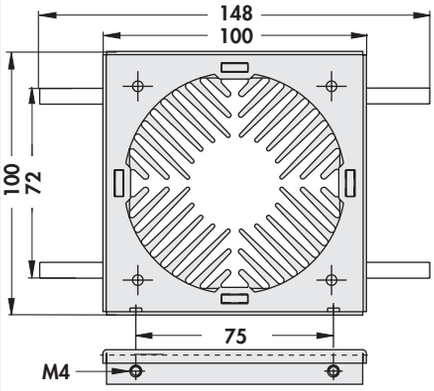
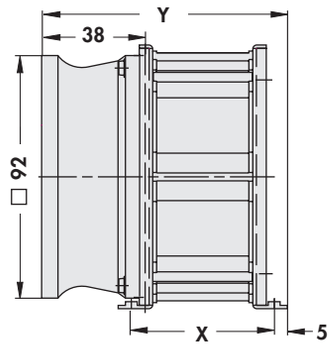
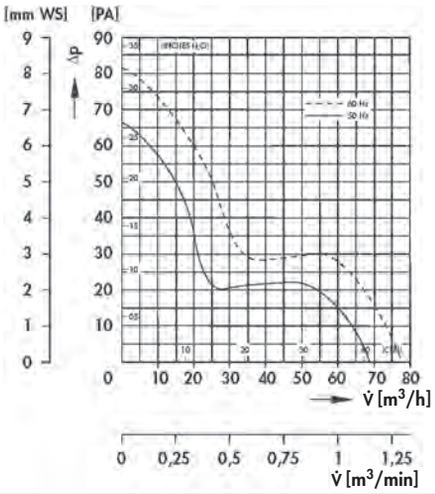
Segment cooling aggregates









art. no.	L [mm]	dim. [mm] X	dim. [mm] Y	art. no.	L [mm]	dim. [mm] X	dim. [mm] Y
LA 2 01 ...	35.0	54.2	92.0	**LA 2 06 ...**	217.5	236.7	274.5
LA 2 02 ...	71.5	90.7	128.5	**LA 2 07 ...**	254.0	273.2	311.0
LA 2 03 ...	108.0	127.2	165.0	**LA 2 08 ...**	290.5	309.7	347.5
LA 2 04 ...	144.5	163.7	201.5	**LA 2 09 ...**	327.0	346.2	384.0
LA 2 05 ...	181.0	200.2	238.0	**LA 2 10 ...**	363.5	382.7	420.5

L: unit lengths of the segments incl. insulation; **X**: mounting distance; **Y**: length of the cooling aggregate incl. fan

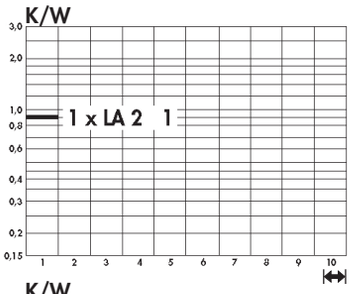
24 V DC fan on request
In case of order please use order form.
segments also available in meter length: **art. no. LA 2 1000**
Other fan types and fan voltages on request.

Technical data of the fans

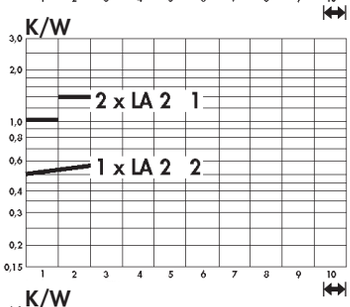
	... 230
type	ebmpapst 3656
dimensions	92x92x38 mm
tension	230 V AC
power inout	12 W
max. air volume	75 m^3/h
temperature range	-40°C... +75°C
noise level	37 dB(A)
speed	2,700 min^{-1}
weight	420 g
failure rate (L_{10})	L_{10} > 52,500 h (40°C)

Thermal resistance LA 2

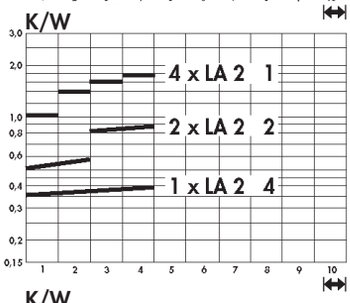
The thermal resistance in the following diagrams is given on the base of a total dissipation of 40 Watt per heatsink of the „A"-type.



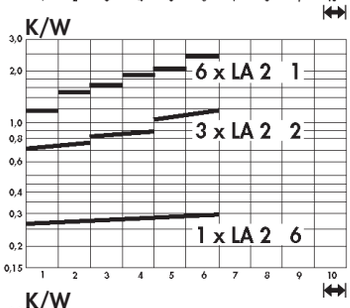
1. Cooling aggregate consisting of 4 heatsinks LA 2 - 1. Total dissipation 160 W maximal.



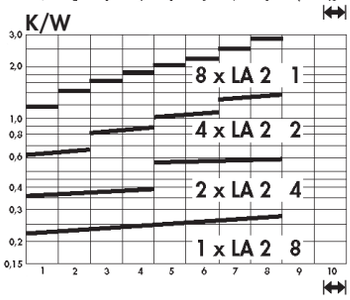
2. Cooling aggregate consisting of 4 heatsinks LA 2 - 1 and 2 x 1 heatsink LA 2 - 2. Total dissipation 320 W.



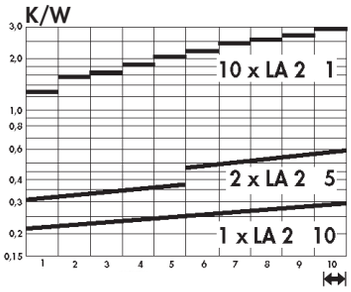
3. Cooling aggregate consisting of 4 heatsinks LA 2 - 1, 2 heatsinks LA 2 - 2 and 2 x 1 heatsink LA 2 - 4. Total dissipation 640 W.



4. Cooling aggregate consisting of 6 heatsinks LA 2 - 1, 3 heatsinks LA 2 - 2 and 2 x 1 heatsink LA 2 - 6. Total dissipation 960 W.



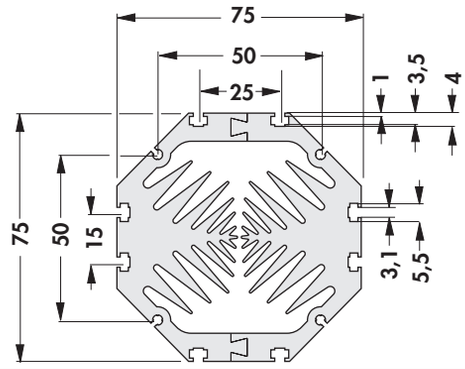
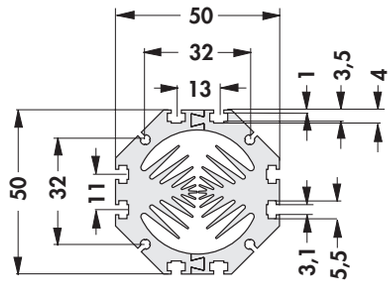
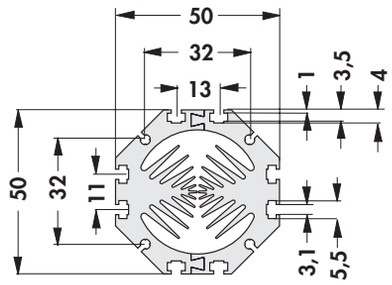
5. Cooling aggregate consisting of 8 heatsinks LA 2 - 1, 4 heatsinks LA 2 - 2, 2 heatsinks LA 2 - 4 and 1 heatsink LA 2 - 8. Total dissipation 1280 W.



6. Cooling aggregate consisting of 10 heatsinks LA 2 - 1, 2 heatsinks LA 2 - 5, and 2 x 1 heatsink LA 2 - 10. Total dissipation 1600 W.

Miniature cooling aggregates

– made for dissipation of high power within a very small space
– fixed length is optimised to the fan
– slide-nut channels for M3 nuts for mounting the transistors and circuit boards
– other fan types and fan voltages on request

art. no.			
LAM 1		↔ 140 mm 0,3 K/W	
art. no.			
LAM 2		↔ 100 mm 0,73 K/W	
art. no.			
LAM 2 S		 ↔ 100 mm 0,67 K/W	
LAM 2 S	pre-assembled with Molex case 2695 including alarm output, 3 pins; ➔ B 78; strand length: 70 mm		
surface:	natural colour anodised		

Technical data of the fans

	LAM 1	**LAM 2**	**LAM 2**
type	ebmpapst 612 NHH-118	ebmpapst 412 F	sepa MFB 40 H 12 HA
dimensions	60x60x25 mm	40x40x10 mm	40x40x10 mm
tension	12 V DC	12 V DC	12 V DC
power inout	2.9 W	0.7 W	
max. air volume	56 m^3/h	8 m^3/h	13.9 m^3/h
temperature range	-20°C... +70°C	-20°C... +70°C	-40°C... +85°C
noise level	41 dB(A)	22.1 dB(A)	33 dB(A)
speed	6,800 min^{-1}	5,400 min^{-1}	7,300 min^{-1}
weight	66 g	17 g	13 g
failure rate (L_{10})	L_{10} > 60,000 h (40°C)	L_{10} > 45,000 h (20°C)	L_{10} > 70,000 h (40°C)

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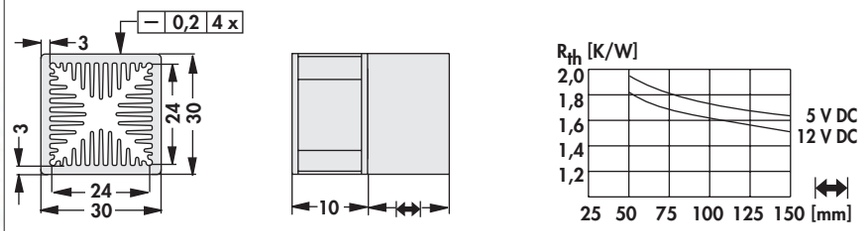
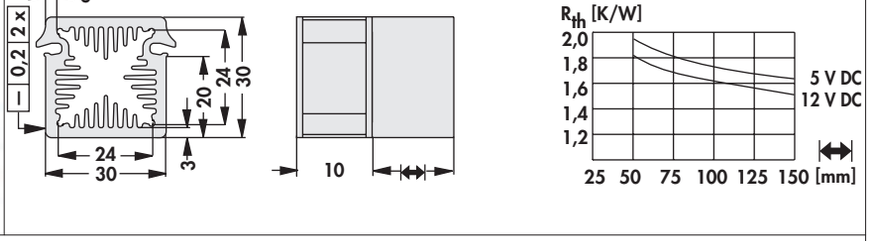
Miniature cooling aggregates

– compact design
– homogeneous heat distribution
– mounting possible on any side
– powerful axial-fan motor
– other lengths, special designs and machinings according to customer's specifications
– other surfaces, fan types and fan voltages upon request

art. no.		
LAM 3 ...		
art. no.		
LAM 3 K ...		
	with grooves for lock-in retaining spring for transistors THFU ➔ A 149	

please indicate: **... ↔ 50 75 100 125 150 mm**

... fan type
5 = 5 V DC
12 = 12 V DC

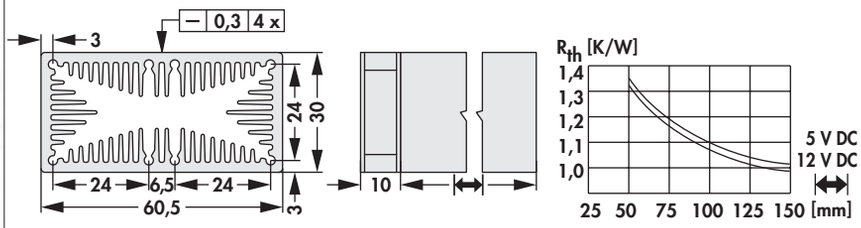
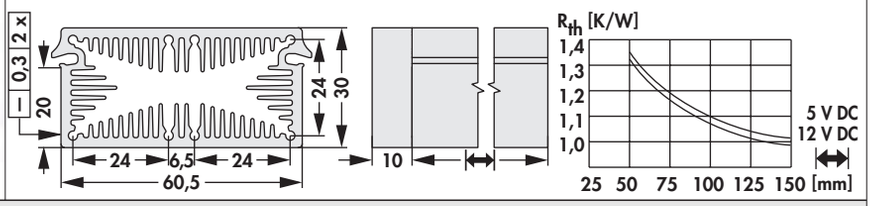
surface:	natural colour anodised

Technical data of the fans

	... 5	**... 12**
type	Sepa, MFB 30 G 05	Sepa, MFB 30 G 12
dimensions	30x30x10 mm	30x30x10 mm
tension	5 V DC	12 V DC
max. air volume	6.8 m^3/h	7.7 m^3/h
cur. consumpt.	130 mA	60 mA
temperature range	-10°C... +70°C	-10°C ... +85°C
noise level	21 dB(A)	27 dB(A)
speed	8,500 min^{-1}	9,100 min^{-1}
weight	8 g	8 g
failure rate (L_{10})	L_{10} > 95,000 h (20°C) MTBF > 280,000 h (20°C)	L_{10} > 100,000 h (20°C) MTBF > 400,000 h (20°C)

Miniature cooling aggregates

– compact design
– homogeneous heat distribution
– mounting possible on any side
– powerful axial-fan motor
– other lengths, special designs and machinings according to customer's specifications
– other surfaces, fan types and fan voltages upon request

art. no.		
LAM 3 D ...		
art. no.		
LAM 3 D K ...		
please indicate:	**... ↔** **50 75 100 125 150 mm**	**... fan type** **5 = 5 V DC** **12 = 12 V DC**
surface:	natural colour anodised	

Technical data of the fans

	... 5	**... 12**
type	Sepa, MFB 30 G 05	Sepa, MFB 30 G 12
dimensions	30x30x10 mm	30x30x10 mm
tension	5 V DC	12 V DC
max. air volume	6.8 m^3/h	7.7 m^3/h
cur. consumpt.	130 mA	60 mA
temperature range	-10°C... +70°C	-10°C ... +85°C
noise level	21 dB(A)	27 dB(A)
speed	8,500 min^{-1}	9,100 min^{-1}
weight	8 g	8 g
failure rate (L_{10})	L_{10} > 95,000 h (20°C) MTBF > 280,000 h (20°C)	L_{10} > 100,000 h (20°C) MTBF > 400,000 h (20°C)

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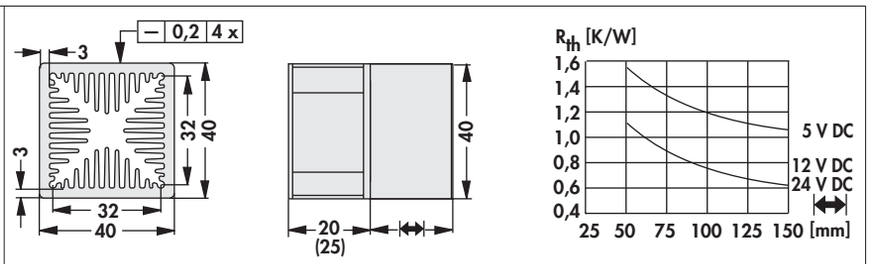
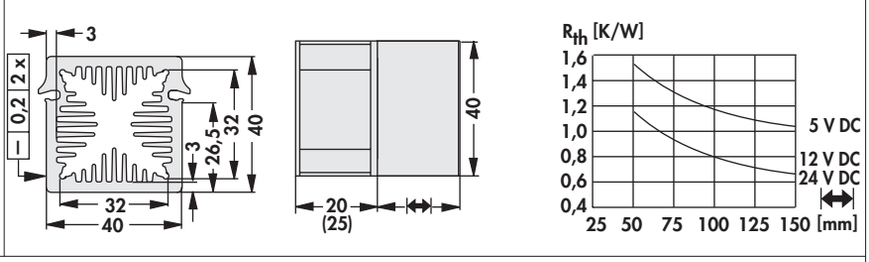
Miniature cooling aggregates

- compact design
- homogeneous heat distribution
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and machinings according to customer's specifications
- other surfaces, fan types and fan voltages upon request

art. no.		
LAM 4 ...		
art. no.		
LAM 4 K ...		
	with grooves for lock-in retaining spring for transistors THFU ➔ A 149	

please indicate: **... ↔**
50 75 100 125 150 mm

... fan type
5 = 5 V DC
12 = 12 V DC
24 = 24 V DC

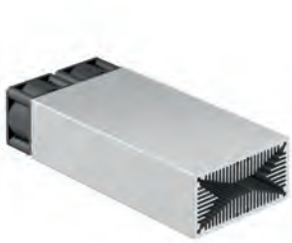
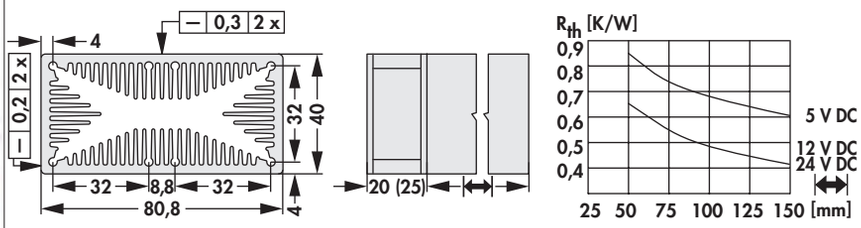
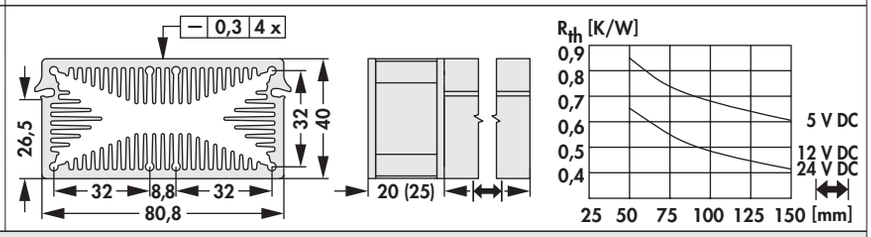
surface:	natural colour anodised

Technical data of the fans

	... 5	**... 12**	**... 24**
type	ebmpapst 405	ebmpapst 412 JHH	ebmpapst 414 JHH
dimensions	40x40x20 mm	40x40x25 mm	40x40x25 mm
tension	5 V DC	12 V DC	24 V DC
power inout	0.9 W	3.3 W	3.6 W
max. air volume	10 m^3/h	24 m^3/h	24 m^3/h
temperature range	-20°C... +70°C	-20°C... +60°C	-20°C... +60°C
noise level	18 dB(A)	46 dB(A)	46 dB(A)
speed	6,000 min^{-1}	13,000 min^{-1}	13,000 min^{-1}
weight	27 g	50 g	50 g
failure rate (L_{10})	L_{10} < 50,000 h (40°C) L_{10} < 20,000 h (tmax)	L_{10} < 57,500 h (40°C) L_{10} < 35,000 h (tmax)	L_{10} < 57,500 h (40°C) L_{10} < 35,000 h (tmax)

Miniature cooling aggregates

– compact design
– homogeneous heat distribution
– mounting possible on any side
– powerful axial-fan motor
– other lengths, special designs and machinings according to customer's specifications
– other surfaces, fan types and fan voltages upon request

art. no.		
LAM 4 D ...		
art. no.		
LAM 4 D K ...		

please indicate: **... ↔ 50 75 100 125 150 mm**

... fan type
5 = 5 V DC
12 = 12 V DC
24 = 24 V DC

surface:	natural colour anodised

Technical data of the fans

	... 5	**... 12**	**... 24**
type	ebmpapst 405	ebmpapst 412 JHH	ebmpapst 414 JHH
dimensions	40x40x20 mm	40x40x25 mm	40x40x25 mm
tension	5 V DC	12 V DC	24 V DC
power inout	0.9 W	3.3 W	3.6 W
max. air volume	10 m^3/h	24 m^3/h	24 m^3/h
temperature range	-20°C... +70°C	-20°C... +60°C	-20°C... +60°C
noise level	18 dB(A)	46 dB(A)	46 dB(A)
speed	6,000 min^{-1}	13,000 min^{-1}	13,000 min^{-1}
weight	27 g	50 g	50 g
failure rate (L_{10})	L_{10} < 50,000 h (40°C) L_{10} < 20,000 h (tmax)	L_{10} < 57,500 h (40°C) L_{10} < 35,000 h (tmax)	L_{10} < 57,500 h (40°C) L_{10} < 35,000 h (tmax)

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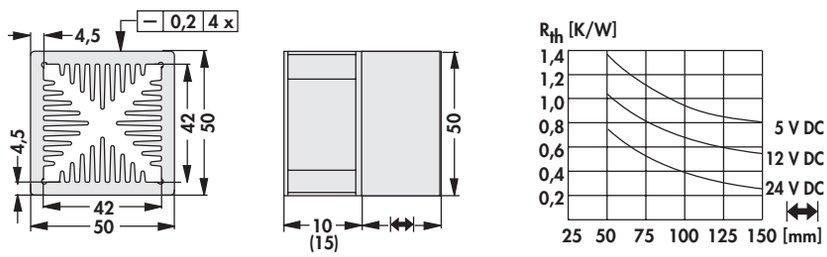
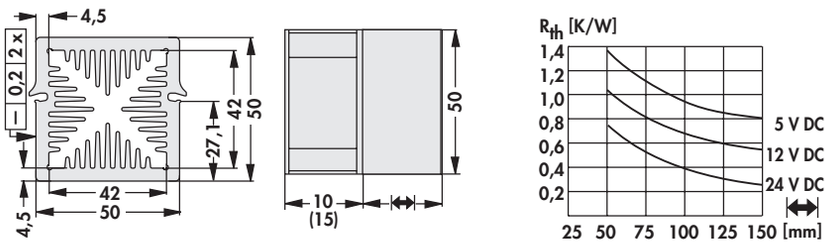
Miniature cooling aggregates

– compact design
– homogeneous heat distribution
– mounting possible on any side
– powerful axial-fan motor
– other lengths, special designs and machinings according to customer's specifications
– other surfaces, fan types and fan voltages upon request

art. no.		
LAM 5 ...		
art. no.		
LAM 5 K ...		
	with grooves for lock-in retaining spring for transistors THFU ➔ A 149	

please indicate: **... ↔** **50 75 100 125 150 mm**

... fan type
5 = 5 V DC
12 = 12 V DC
24 = 24 V DC

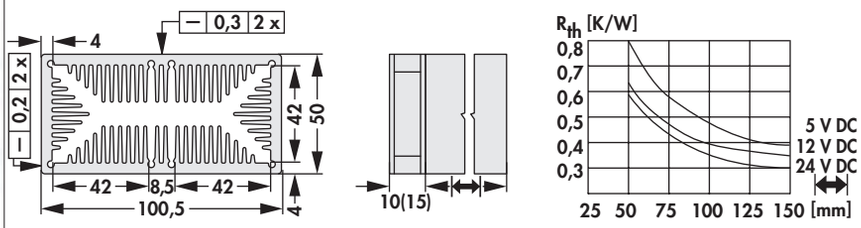
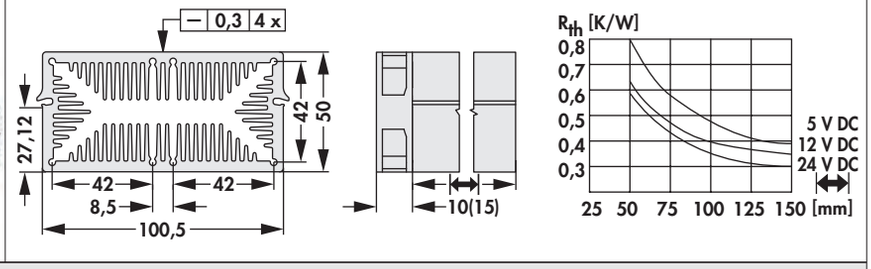
surface:	natural colour anodised

Technical data of the fans

	... 5	**... 12**	**... 24**
type	Sepa, MFB 50 E 05 A	Sepa, MFB 50 E 12 A	ebmpapst 514 F
dimensions	50x50x10 mm	50x50x10 mm	50x50x15 mm
tension	5 V DC	12 V DC	24 V DC
max. air volume	10 m^3/h	14.3 m^3/h	20 m^3/h
temperature range	-10°C... +70°C	-10°C... +70°C	-20°C... +70°C
speed	3,400 min^{-1}	4,800 min^{-1}	5,000 min^{-1}
noise level	17 dB(A)	22 dB(A)	30 dB(A)
weight	19 g	19 g	27 g
failure rate (L_{10})	L_{10} > 95,000 h (20°C) MTBF > 280,000 h (20°C)	L_{10} > 95,000 h (20°C) MTBF > 280,000 h (20°C)	L_{10} 50,000 h (20°C)
alarm output	with	with	

Miniature cooling aggregates

– compact design
– homogeneous heat distribution
– mounting possible on any side
– powerful axial-fan motor
– other lengths, special designs and machinings according to customer's specifications
– other surfaces, fan types and fan voltages upon request

art. no.		
LAM 5 D ...		
art. no.		
LAM 5 D K ...		

please indicate: **... ↔**
50 75 100 125 150 mm

... fan type
5 = 5 V DC
12 = 12 V DC
24 = 24 V DC

surface:	natural colour anodised

Technical data of the fans

	... 5	**... 12**	**... 24**
type	Sepa, MFB 50 E 05 A	Sepa, MFB 50 E 12 A	ebmpapst 514 F
dimensions	50x50x10 mm	50x50x10 mm	50x50x15 mm
tension	5 V DC	12 V DC	24 V DC
max. air volume	10 m^3/h	14.3 m^3/h	20 m^3/h
temperature range	-10°C... +70°C	-10°C... +70°C	-20°C... +70°C
speed	3,400 min^{-1}	4,800 min^{-1}	5,000 min^{-1}
noise level	17 dB(A)	22 dB(A)	30 dB(A)
weight	19 g	19 g	27 g
failure rate (L_{10})	L_{10} > 95,000 h (20°C) MTBF > 280,000 h (20°C)	L_{10} > 95,000 h (20°C) MTBF > 280,000 h (20°C)	L_{10} 50,000 h (20°C)
alarm output	with	with	

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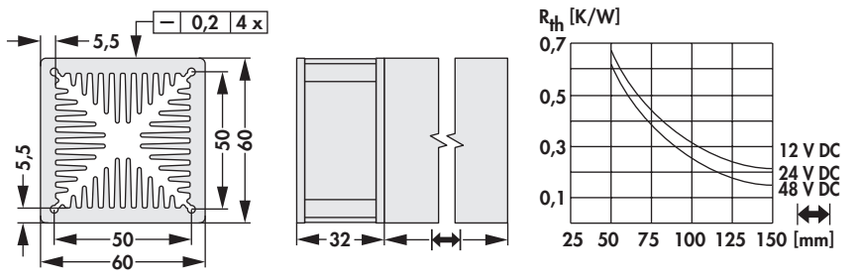
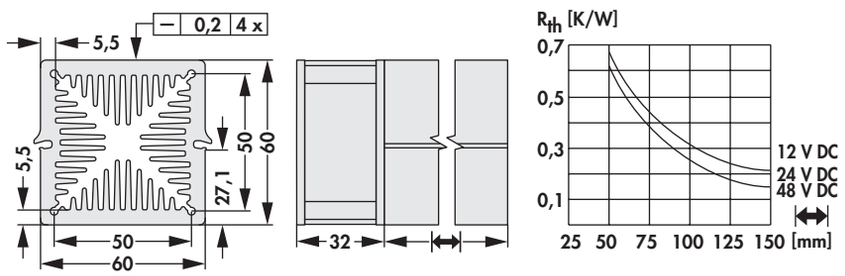
Miniature cooling aggregates

– compact design
– homogeneous heat distribution
– mounting possible on any side
– powerful axial-fan motor
– other lengths, special designs and machinings according to customer's specifications
– other surfaces, fan types and fan voltages upon request

art. no.		
LAM 6 ...		
art. no.		
LAM 6 K ...		
	with grooves for lock-in retaining spring for transistors THFU ➔ A 149	

please indicate: **... ⟷** **50 75 100 125 150 mm**

... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

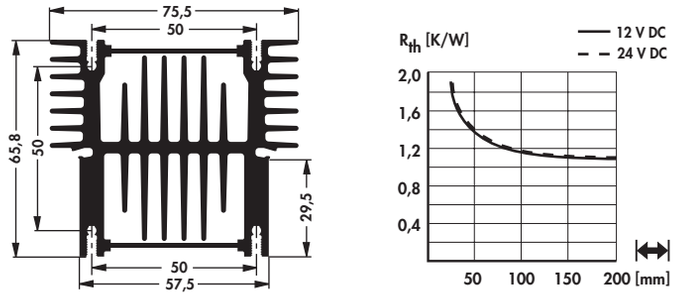
surface:	natural colour anodised

Technical data of the fans

	... 12	**... 24**	**... 48**
type	ebmpapst 612 JH	ebmpapst 614 J/2HHP	ebmpapst 618 J/2HHP
dimensions	60x60x32 mm	60x60x32 mm	60x60x32 mm
tension	12 V DC	24 V DC	48 V DC
power inout	7.7 W	14.6 W	14.6 W
max. air volume	70 m^3/h	82 m^3/h	82 m^3/h
temperature range	-20°C... +70°C	-20°C... 75°C	-20°C... 75°C
noise level	53 dB(A)	62 dB(A)	62 dB(A)
speed	11,700 min^{-1}	15,000 min^{-1}	15,000 min^{-1}
weight	100 g	100 g	100 g
failure rate (L_{10})	L_{10} > 57,500 h (40°C)	L_{10} > 65,000 h (40°C)	L_{10} > 65,000 h (40°C)

Heatsink-cooling aggregates

– screw-in solder pin M3 **(art. no.: ELS 3)**
– different lengths, special designs and machinings according to customer specifications
– different surfaces, fan types and fan voltages upon request

art. no.		
		
LA 27 K ...	with grooves for lock-in retaining spring for transistors THFU ➔ A 149	

please indicate: **... ↔**
50 75 84 94 100 125 150 mm

... fan type
12 = 12 V DC
24 = 24 V DC

Technical data of the fans

	... 12	**... 24**
type	ebmpapst 612 NHH-118	ebmpapst 614 NHH-119
dimensions	60x60x25 mm	60x60x25 mm
tension	12 V DC	24 V DC
power inout	2.9 W	2.9 W
max. air volume	56 m^3/h	56 m^3/h
temperature range	-20°C... +70°C	-20°C... +70°C
noise level	41 dB(A)	41 dB(A)
speed	6,800 min^{-1}	6,850 min^{-1}
weight	66 g	66 g
failure rate (L_{10})	L_{10} > 60,000 h (40°C)	L_{10} > 60,000 h (40°C)

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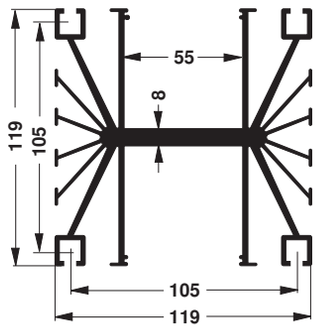
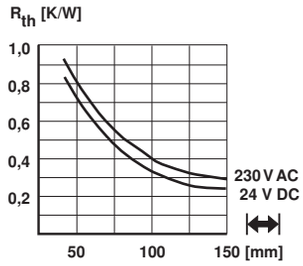
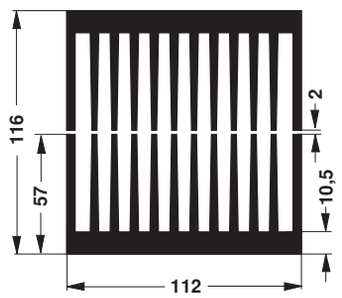
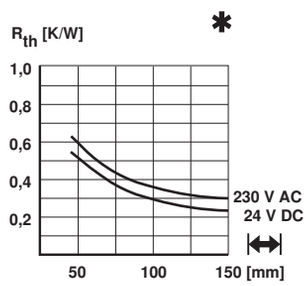
Cooling aggregates with axial fan

Heatsink-cooling aggregates

– especially suitable for IGBT, SSR, semiconductor modules, high performance transistors etc.
– effective construction with axial fans
– good thermal performance
– additional machining according to customer's instructions
– cooling aggregates also available without fans
– other fan types and fan voltages on request

art. no.			
LA 4 ...			
art. no.			
LA 5 ...			

* for one segment

please indicate: **... ⟷** **75 100 150 mm**

... fan type
24 = 24 V DC
230 = 230 V AC

Technical data of the fans

	... 24	**... 230**
type	ebmpapst 4184NXH	ebmpapst 4656N
dimensions	119x119x38 mm	119x119x38 mm
tension	24 V DC	230 V AC
power inout	11 W	19 W
max. air volume	237 m^3/h	160 m^3/h
temperature range	-30°C ... +70°C	-40°C... +85°C
noise level	57 dB(A)	47 dB(A)
speed	4,400 min^{-1}	2,650 min^{-1}
weight	390 g	550 g
failure rate (L_{10})	L_{10} > 70,000 h (40°C)	L_{10} > 37,500 h (40°C)

Technical introduction ➔ **A 2 – 8**

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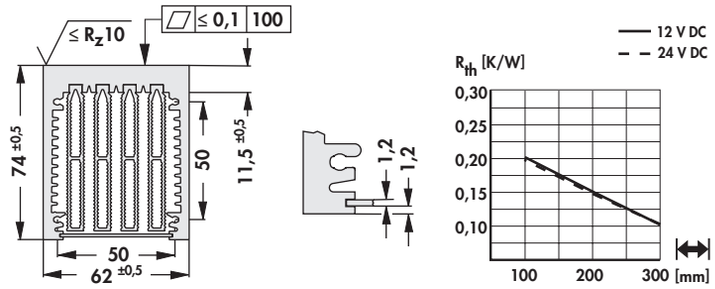
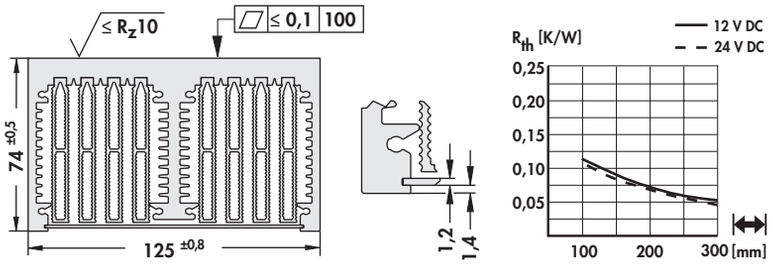
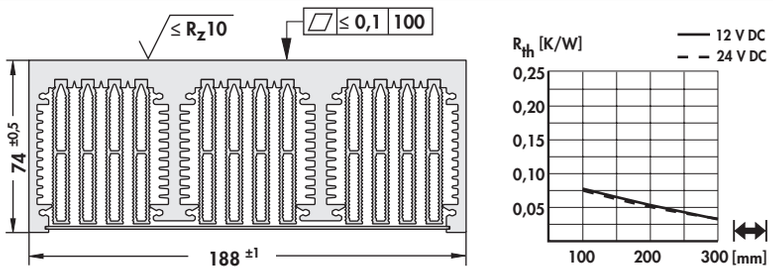
Cooling aggregates with axial fan

Hollow-fin cooling aggregates

– geometry of hollow fin optimising the air flow
– particularly effective heat dissipation
– compact construction
– milled flat semiconductor mounting surface
– other fan types and fan voltages on request

art. no.		
LA 6 ...		
	without air flow chamber	
art. no.		
LA 7 ...		
	without air flow chamber	
art. no.		
LA 8 ...		
	without air flow chamber	

please indicate: **... ↔**
100 150 200 250 300 mm

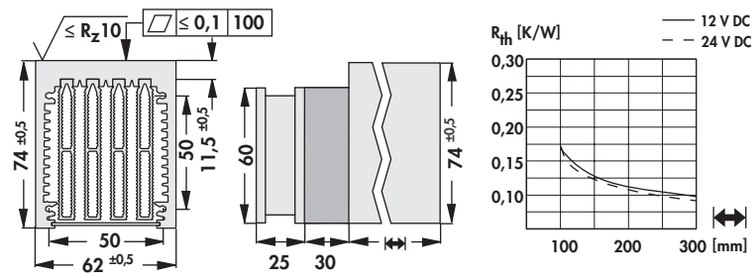
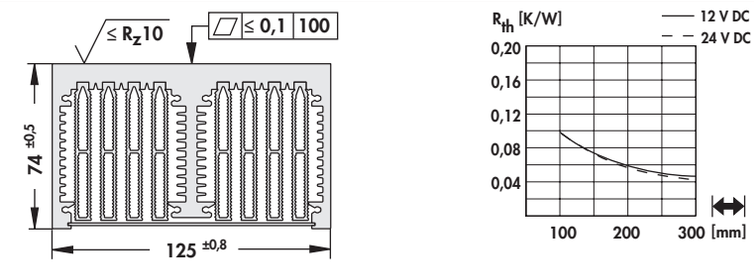
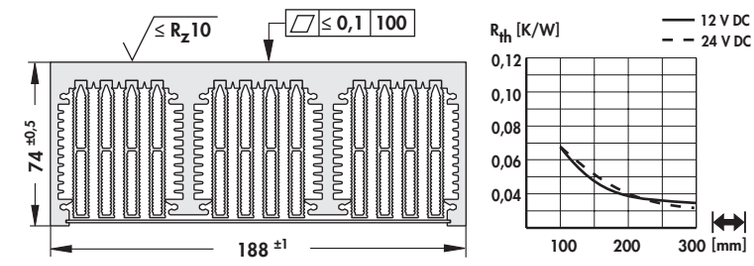
... fan type
12 = 12 V DC
24 = 24 V DC

Technical data of the fans

	... 12	**... 24**
type	ebmpapst 612 NHH-118	ebmpapst 614 NHH-119
dimensions	60x60x25 mm	60x60x25 mm
tension	12 V DC	24 V DC
power inout	2.9 W	2.9 W
max. air volume	56 m^3/h	56 m^3/h
temperature range	-20°C... +70°C	-20°C... +70°C
noise level	41 dB(A)	41 dB(A)
speed	6,800 min^{-1}	6,850 min^{-1}
weight	66 g	66 g
failure rate (L_{10})	L_{10} > 60,000 h (40°C)	L_{10} > 60,000 h (40°C)

Hollow-fin cooling aggregates

– geometry of hollow fin optimising the air flow
– particularly effective heat dissipation
– compact construction
– milled flat semiconductor mounting surface
– other fan types and fan voltages on request

art. no.		
LA V 6 ...		
	with air flow chamber	
art. no.		
LA V 7 ...		
	with air flow chamber	
art. no.		
LA V 8 ...		
	with air flow chamber	

please indicate: **... ↔**
100 150 200 250 300 mm

... fan type
12 = 12 V DC
24 = 24 V DC

Technical data of the fans

	... 12	... 24
type	ebmpapst 612 NHH-118	ebmpapst 614 NHH-119
dimensions	60x60x25 mm	60x60x25 mm
tension	12 V DC	24 V DC
power inout	2.9 W	2.9 W
max. air volume	56 m^3/h	56 m^3/h
temperature range	-20°C... +70°C	-20°C... +70°C
noise level	41 dB(A)	41 dB(A)
speed	6,800 min^{-1}	6,850 min^{-1}
weight	66 g	66 g
failure rate (L_{10})	L_{10} > 60,000 h (40°C)	L_{10} > 60,000 h (40°C)

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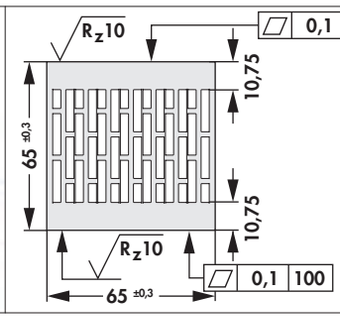
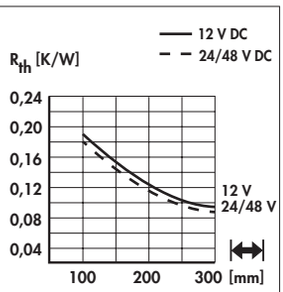
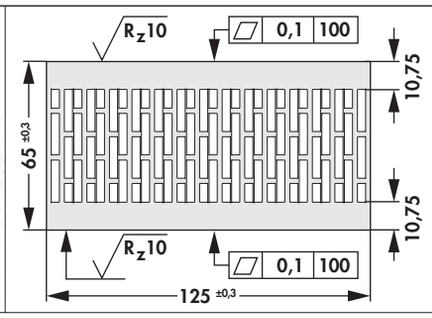
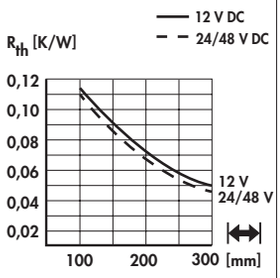
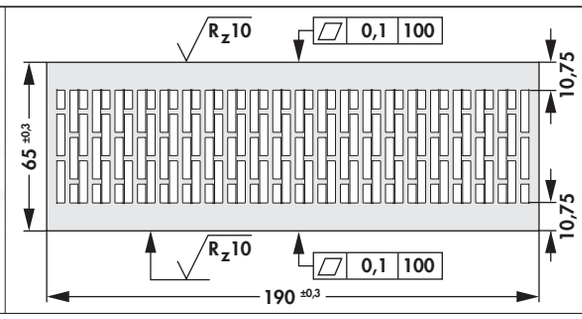
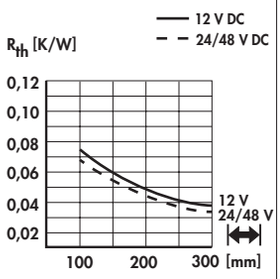
Cooling aggregates with axial fan

High performance cooling aggregate

– compact construction by means of connected extruded profiles
– excellent efficiency by means of flow-optimised hollow fin structure
– powerful axial fans
– double-sided precise milled semiconductor mounting surfaces
– different width dimensions, customised machinings, surfaces, fan types and fan voltages upon request

art. no.			
LA 28 ...			
	without air flow chamber		
art. no.			
LA 29 ...			
	without air flow chamber		
art. no.			
LA 30 ...			
	without air flow chamber		

please indicate: **... ↔**
100 150 200 250 300 mm

... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

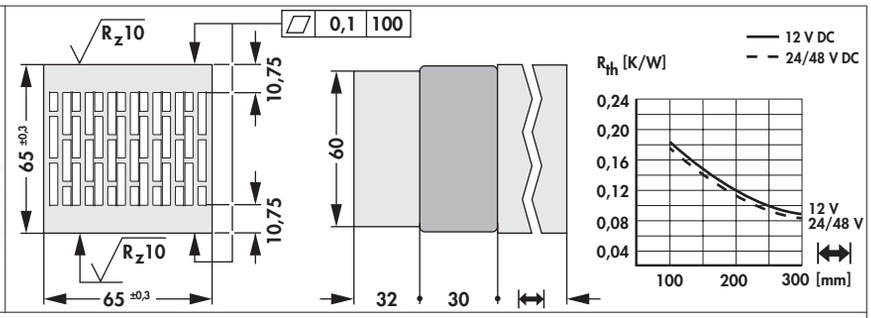
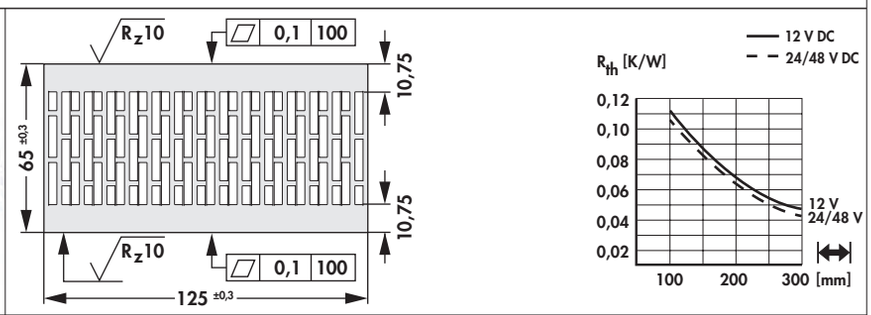
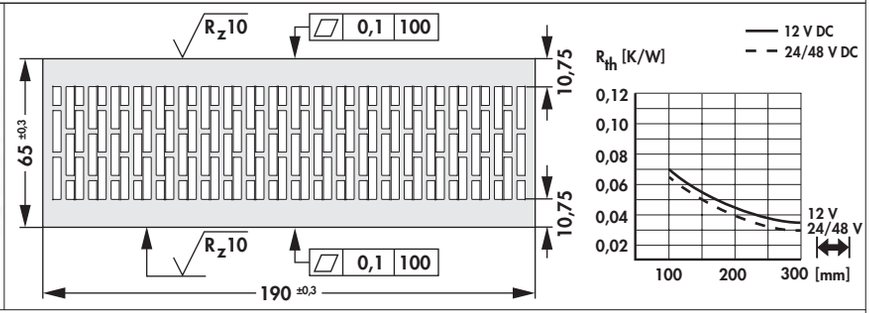
Technical data of the fans

	... 12	... 24	... 48
type	ebmpapst 612 JH	ebmpapst 614 J/2HHP	ebmpapst 618 J/2HHP
dimensions	60x60x32 mm	60x60x32 mm	60x60x32 mm
tension	12 V DC	24 V DC	48 V DC
power inout	7.7 W	14.6 W	14.6 W
max. air volume	70 m^3/h	82 m^3/h	82 m^3/h
temperature range	-20°C... +70°C	-20°C... 75°C	-20°C... 75°C
noise level	53 dB(A)	62 dB(A)	62 dB(A)
speed	11,700 min^{-1}	15,000 min^{-1}	15,000 min^{-1}
weight	100 g	100 g	100 g
failure rate (L_{10})	L_{10} > 57,500 h (40°C)	L_{10} > 65,000 h (40°C)	L_{10} > 65,000 h (40°C)

Cooling aggregates with axial fan

High performance cooling aggregate

– additional efficiency enhancement and noise reduction by means of air-technically adjusted airflow chambers
– excellent thermal efficiency in connection with powerful axial fans
– double-sided precise milled semiconductor mounting surfaces
– different width dimensions, customised machinings, surfaces, fan types and fan voltages upon request

art. no.		
LA V 28 ...		
	with air flow chamber	
art. no.		
LA V 29 ...		
	with air flow chamber	
art. no.		
LA V 30 ...		
	with air flow chamber	

please indicate: **... ↔**
100 150 200 250 300 mm

... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

Technical data of the fans

	... 12	**... 24**	**... 48**
type	ebmpapst 612 JH	ebmpapst 614 J/2HHP	ebmpapst 618 J/2HHP
dimensions	60x60x32 mm	60x60x32 mm	60x60x32 mm
tension	12 V DC	24 V DC	48 V DC
power inout	7.7 W	14.6 W	14.6 W
max. air volume	70 m^3/h	82 m^3/h	82 m^3/h
temperature range	-20°C... +70°C	-20°C... 75°C	-20°C... 75°C
noise level	53 dB(A)	62 dB(A)	62 dB(A)
speed	11,700 min^{-1}	15,000 min^{-1}	15,000 min^{-1}
weight	100 g	100 g	100 g
failure rate (L_{10})	L_{10} > 57,500 h (40°C)	L_{10} > 65,000 h (40°C)	L_{10} > 65,000 h (40°C)

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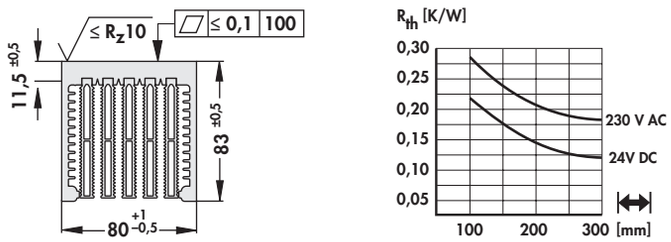
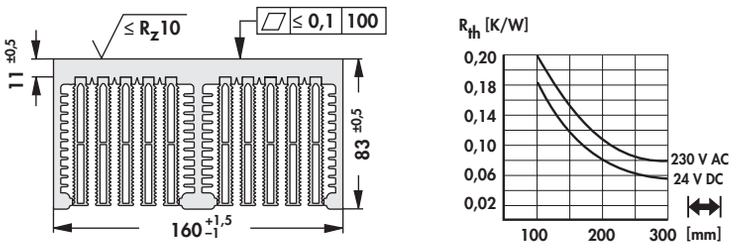
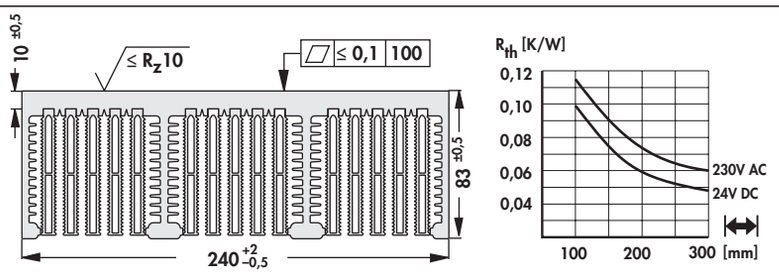
Cooling aggregates with axial fan

Hollow-fin cooling aggregates

- geometry of hollow fin optimising the air flow
- particularly effective heat dissipation
- compact construction
- milled flat semiconductor mounting surface
- other fan types and fan voltages on request

art. no.		
LA 9 ...		
	without air flow chamber	
art. no.		
LA 10 ...		
	without air flow chamber	
art. no.		
LA 11 ...		
	without air flow chamber	

please indicate: **... ↔**
100 150 200 250 300 mm

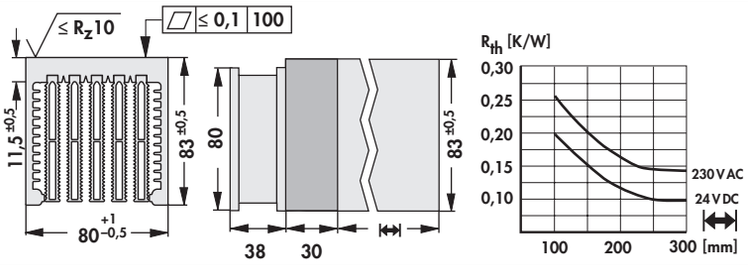
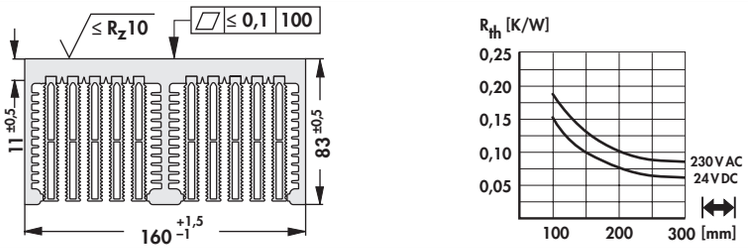
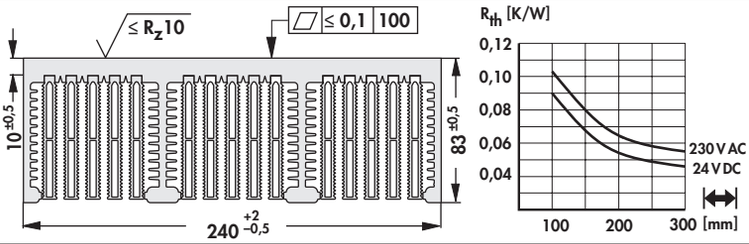
... fan type
24 = 24 V DC
230 = 230 V AC

Technical data of the fans

	... 24	**... 230**
type	ebmpapst 8314H	ebmpapst 8556N
dimensions	80x80x32 mm	80x80x38 mm
tension	24 V DC	230 V AC
power inout	6 W	12 W
max. air volume	80 m^3/h	50 m^3/h
temperature range	-20°C... 75°C	-40°C... +90°C
noise level	48 dB(A)	31 dB(A)
speed	5,000 min^{-1}	2,800 min^{-1}
weight	170 g	490 g
failure rate (L_{10})	L_{10} > 55,000 h (40°C)	L_{10} > 52,500 h (40°C)

Hollow-fin cooling aggregates

– geometry of hollow fin optimising the air flow
– particularly effective heat dissipation
– compact construction
– milled flat semiconductor mounting surface
– other fan types and fan voltages on request

art. no.		
LA V 9 ...		
	with air flow chamber	
art. no.		
LA V 10 ...		
	with air flow chamber	
art. no.		
LA V 11 ...		
	with air flow chamber	

please indicate: **... ↔ 100 150 200 250 300 mm**

... fan type
24 = 24 V DC
230 = 230 V AC

Technical data of the fans

	... 24	... 230
type	ebmpapst 8314H	ebmpapst 8556N
dimensions	80x80x32 mm	80x80x38 mm
tension	24 V DC	230 V AC
power inout	6 W	12 W
max. air volume	80 m^3/h	50 m^3/h
temperature range	-20°C... 75°C	-40°C... +90°C
noise level	48 dB(A)	31 dB(A)
speed	5,000 min^{-1}	2,800 min^{-1}
weight	170 g	490 g
failure rate (L_{10})	L_{10} > 55,000 h (40°C)	L_{10} > 52,500 h (40°C)

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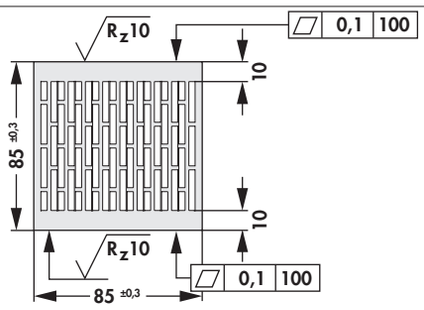
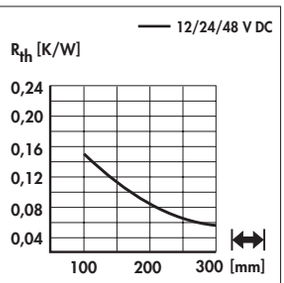
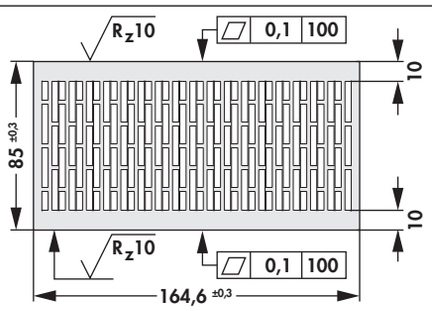
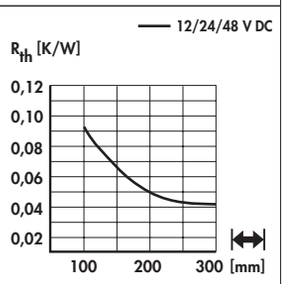
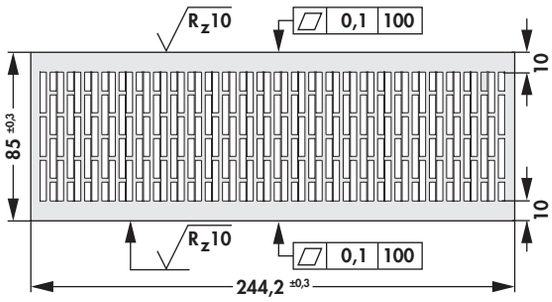
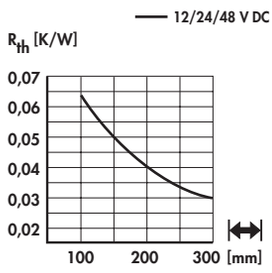
Cooling aggregates with axial fan

High performance cooling aggregate

– compact construction by means of connected extruded profiles
– excellent efficiency by means of flow-optimised hollow fin structure
– powerful axial fans
– double-sided precise milled semiconductor mounting surfaces
– different width dimensions, customised machinings, surfaces, fan types and fan voltages upon request

art. no.			
LA 31 ...			
	without air flow chamber		
art. no.			
LA 32 ...			
	without air flow chamber		
art. no.			
LA 33 ...			
	without air flow chamber		

please indicate: **... ↔**
100 150 200 250 300 mm

... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

Technical data of the fans

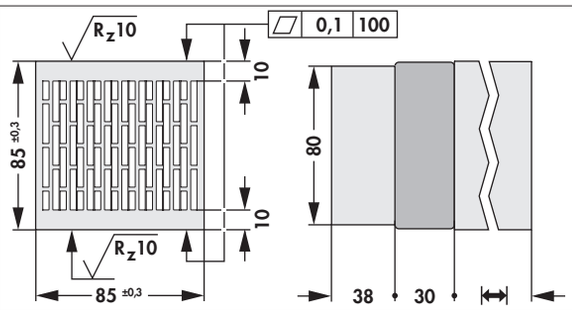
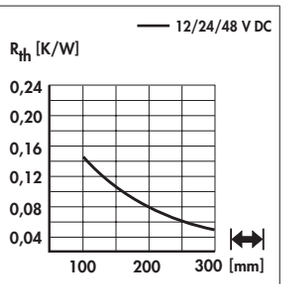
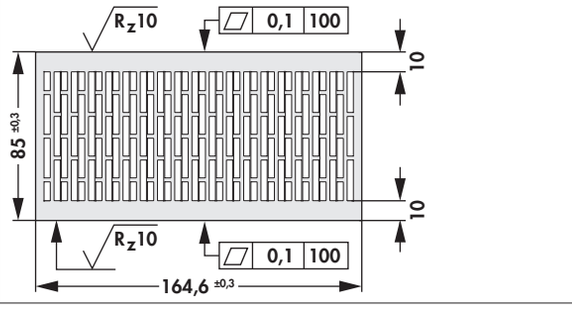
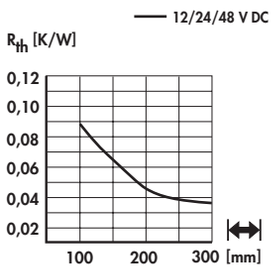
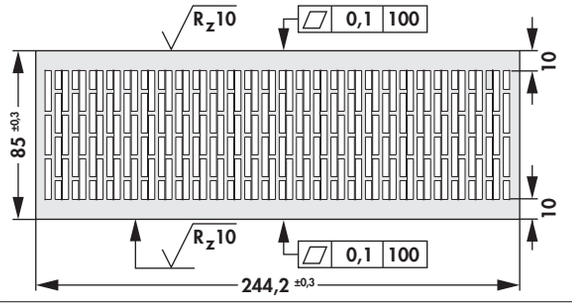
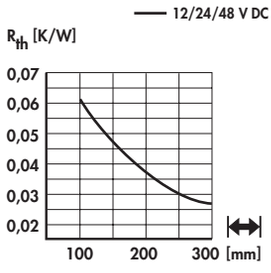
	... 12	... 24	... 48
type	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
dimensions	80x80x38 mm	80x80x38 mm	80x80x38 mm
tension	12 V DC	24 V DC	48 V DC
power inout	39 W	38 W	36 W
max. air volume	222 m^3/h	222 m^3/h	222 m^3/h
temperature range	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
noise level	71 dB(A)	71 dB(A)	71 dB(A)
speed	14,000 min^{-1}	14,000 min^{-1}	14,000 min^{-1}
weight	200 g	200 g	200 g
failure rate (L_{10})	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)

Technical introduction ➔ **A 2 – 8**

Cooling aggregates with axial fan

High performance cooling aggregate

– additional efficiency enhancement and noise reduction by means of air-technically adjusted airflow chambers
– excellent thermal efficiency in connection with powerful axial fans
– double-sided precise milled semiconductor mounting surfaces
– different width dimensions, customised machinings, surfaces, fan types and fan voltages upon request

art. no.			
LA V 31 ...			
	with air flow chamber		
art. no.			
LA V 32 ...			
	with air flow chamber		
art. no.			
LA V 33 ...			
	with air flow chamber		

please indicate: **... ↔ 100 150 200 250 300 mm**

... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

Technical data of the fans

	... 12	... 24	... 48
type	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
dimensions	80x80x38 mm	80x80x38 mm	80x80x38 mm
tension	12 V DC	24 V DC	48 V DC
power inout	39 W	38 W	36 W
max. air volume	222 m^3/h	222 m^3/h	222 m^3/h
temperature range	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
noise level	71 dB(A)	71 dB(A)	71 dB(A)
speed	14,000 min^{-1}	14,000 min^{-1}	14,000 min^{-1}
weight	200 g	200 g	200 g
failure rate (L_{10})	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)

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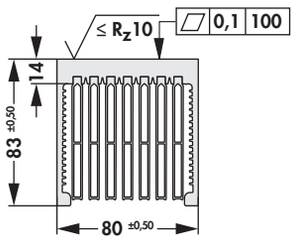
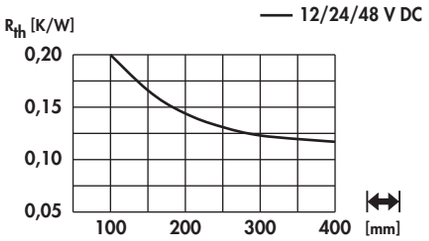
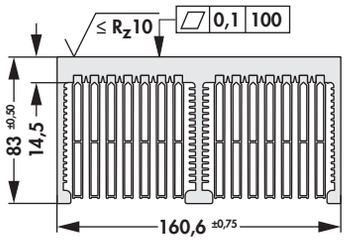
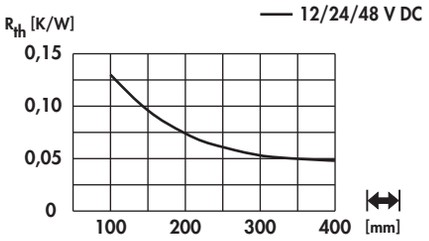
Cooling aggregates with axial fan

Hollow-fin cooling aggregates

– hollow-fin geometry of new conception
– enlarged surface due to larger fin quantity
– effective heat dissipation with low pressure drop
– available with and without air-flow chamber
– milled flat semiconductor mounting surface
– mechanical treatments according to customer's specifications

art. no.			
LA 34 ...			
	without air flow chamber		
art. no.			
LA 35 ...			
	without air flow chamber		

please indicate: **... ↔** **100 150 200 250 300 mm**

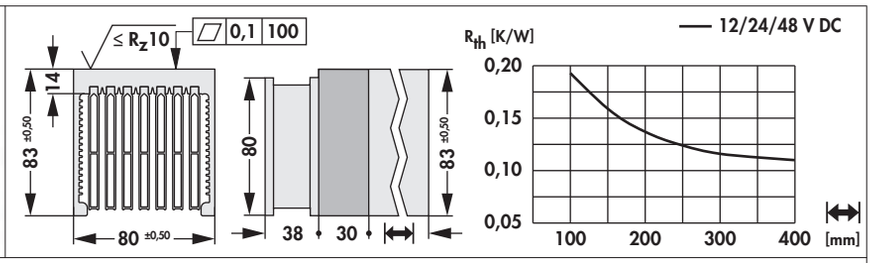
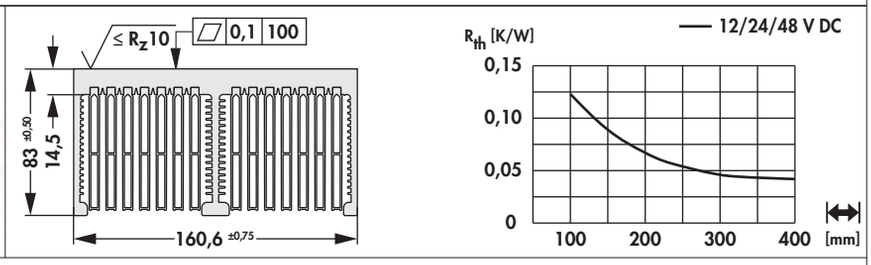
... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

Technical data of the fans

	... 12	... 24	... 48
type	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
dimensions	80x80x38 mm	80x80x38 mm	80x80x38 mm
tension	12 V DC	24 V DC	48 V DC
power inout	39 W	38 W	36 W
max. air volume	222 m^3/h	222 m^3/h	222 m^3/h
temperature range	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
noise level	71 dB(A)	71 dB(A)	71 dB(A)
speed	14,000 min^{-1}	14,000 min^{-1}	14,000 min^{-1}
weight	200 g	200 g	200 g
failure rate (L_{10})	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)

Hollow-fin cooling aggregates

– hollow-fin geometry of new conception
– enlarged surface due to larger fin quantity
– effective heat dissipation with low pressure drop
– available with and without air-flow chamber
– milled flat semiconductor mounting surface
– mechanical treatments according to customer's specifications

art. no.		
LA V 34 ...		
	with air flow chamber	
art. no.		
LA V 35 ...		
	with air flow chamber	

please indicate: **... ↔**
100 150 200 250 300 mm

... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

Technical data of the fans

	... 12	**... 24**	**... 48**
type	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
dimensions	80x80x38 mm	80x80x38 mm	80x80x38 mm
tension	12 V DC	24 V DC	48 V DC
power inout	39 W	38 W	36 W
max. air volume	222 m^3/h	222 m^3/h	222 m^3/h
temperature range	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
noise level	71 dB(A)	71 dB(A)	71 dB(A)
speed	14,000 min^{-1}	14,000 min^{-1}	14,000 min^{-1}
weight	200 g	200 g	200 g
failure rate (L_{10})	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)

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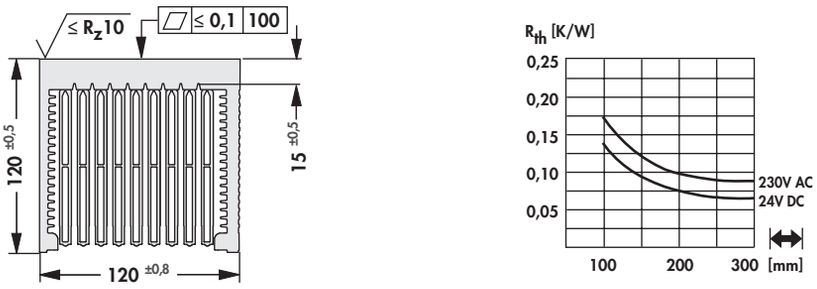
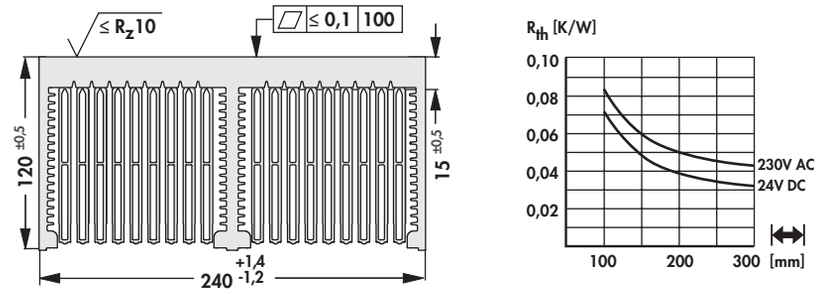
Cooling aggregates with axial fan

Hollow-fin cooling aggregates

– extremly low losses due to optimised hollow fin geometry
– particularly effective heat dissipation
– compact design with axial fan
– milled flat semiconductor mounting surface
– addtional design to customer's intructions
– other fan types and fan voltages on request

art. no.		
LA 14 ...		
	without air flow chamber	
art. no.		
LA 15 ...		
	without air flow chamber	

please indicate: **... ↔**
100 150 200 250 300 400 mm

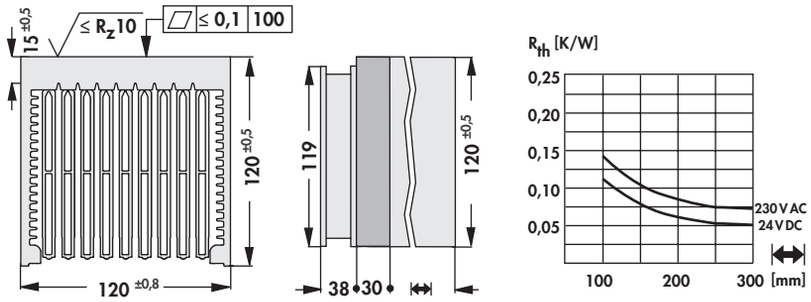
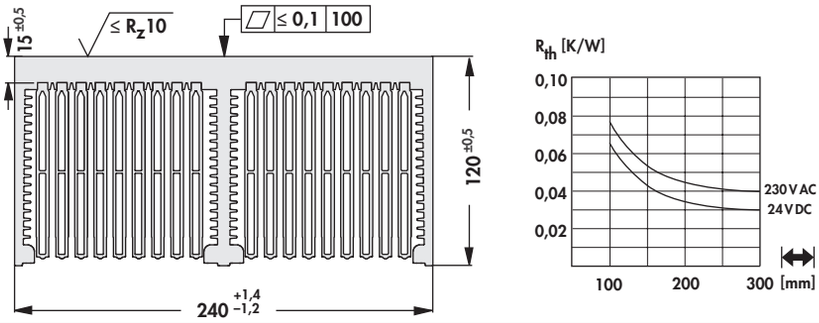
... fan type
24 = 24 V DC
230 = 230 V AC

Technical data of the fans

	... 24	... 230
type	ebmpapst 4184NXH	ebmpapst 4656N
dimensions	119x119x38 mm	119x119x38 mm
tension	24 V DC	230 V AC
power inout	11 W	19 W
max. air volume	237 m³/h	160 m³/h
temperature range	-30°C ... +70°C	-40°C... +85°C
noise level	57 dB(A)	47 dB(A)
speed	4,400 min^{-1}	2,650 min^{-1}
weight	390 g	550 g
failure rate (L_{10})	L_{10} > 70,000 h (40°C)	L_{10} > 37,500 h (40°C)

Hollow-fin cooling aggregates

– extremly low losses due to optimised hollow fin geometry
– particularly effective heat dissipation
– compact design with axial fan
– milled flat semiconductor mounting surface
– addtional design to customer's intructions on request
– other fan types and fan voltages on request

art. no.		
LA V 14 ...		
	with air flow chamber	
art. no.		
LA V 15 ...		
	with air flow chamber	

please indicate: **... ⟷** **100 150 200 250 300 400 mm** **... fan type** **24 = 24 V DC** **230 = 230 V AC**

Technical data of the fans

	... 24	**... 230**
type	ebmpapst 4184NXH	ebmpapst 4656N
dimensions	119x119x38 mm	119x119x38 mm
tension	24 V DC	230 V AC
power inout	11 W	19 W
max. air volume	237 m^3/h	160 m^3/h
temperature range	-30°C ... +70°C	-40°C... +85°C
noise level	57 dB(A)	47 dB(A)
speed	4,400 min^{-1}	2,650 min^{-1}
weight	390 g	550 g
failure rate (L_{10})	L_{10} > 70,000 h (40°C)	L_{10} > 37,500 h (40°C)

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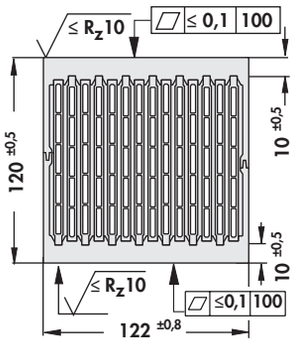
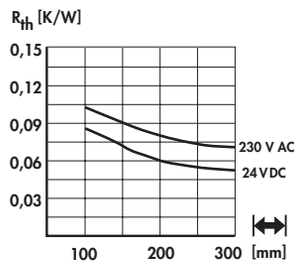
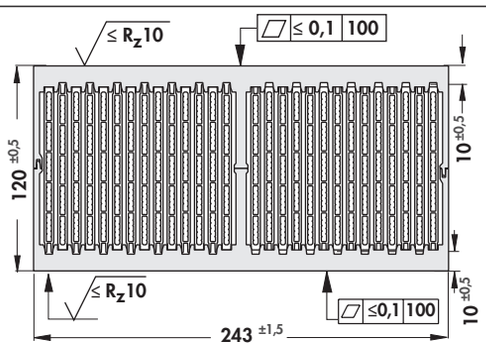
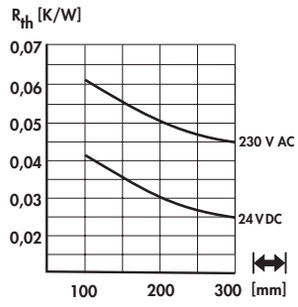
Cooling aggregates with axial fan

Hollow-fin cooling aggregates

– extremly low losses due to optimised hollow fin geometry
– effective heat dissipation
– compact construction with axial fans
– two oposite mounting surfaces are milled flat
– additional treatment upon customer's request
– other fan types and fan voltages on request

art. no.			
LA 17 ...			
	without air flow chamber		
art. no.			
LA 18 ...			
	without air flow chamber		

please indicate: **... ↔**
100 150 200 250 300 400 mm

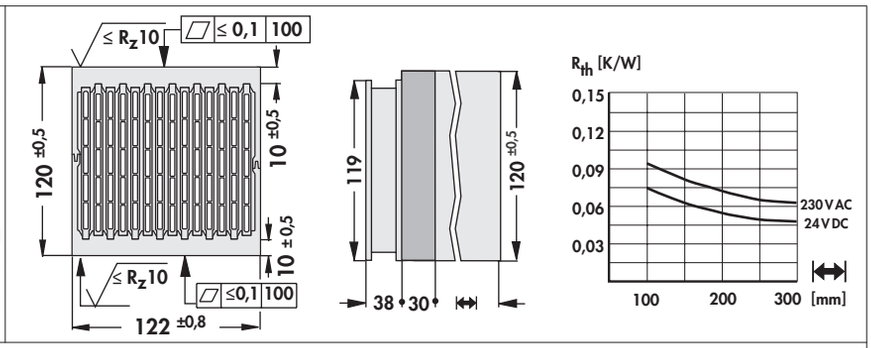
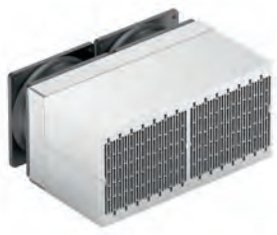
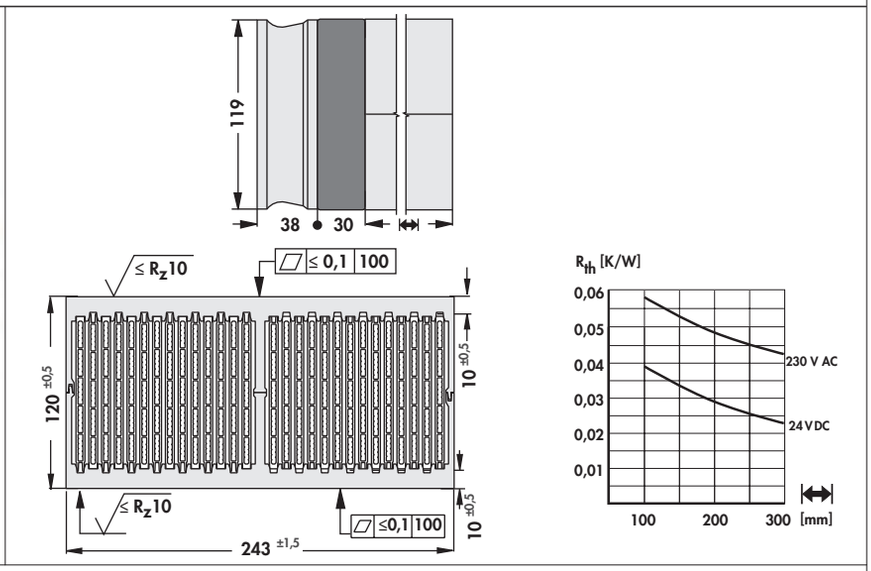
... fan type
24 = 24 V DC
230 = 230 V AC

Technical data of the fans

	... 24	**... 230**
type	ebmpapst 4184NXH	ebmpapst 4656N
dimensions	119x119x38 mm	119x119x38 mm
tension	24 V DC	230 V AC
power inout	11 W	19 W
max. air volume	237 m^3/h	160 m^3/h
temperature range	-30°C ... +70°C	-40°C... +85°C
noise level	57 dB(A)	47 dB(A)
speed	4,400 min^{-1}	2,650 min^{-1}
weight	390 g	550 g
failure rate (L_{10})	L_{10} > 70,000 h (40°C)	L_{10} > 37,500 h (40°C)

Hollow-fin cooling aggregates

– extremly low losses due to optimised hollow fin geometry
– effective heat dissipation
– compact construction with axial fans
– two oposite mounting surfaces are milled flat
– additional treatment upon customer's request
– other fan types and fan voltages on request

art. no.		
LA V 17 ...		
	with air flow chamber	
art. no.		
LA V 18 ...		
	with air flow chamber	

please indicate: **... ↔** **100 150 200 250 300 400 mm** **... fan type** **24 = 24 V DC** **230 = 230 V AC**

Technical data of the fans

	... 24	... 230
type	ebmpapst 4184NXH	ebmpapst 4656N
dimensions	119x119x38 mm	119x119x38 mm
tension	24 V DC	230 V AC
power inout	11 W	19 W
max. air volume	237 m^3/h	160 m^3/h
temperature range	-30°C ... +70°C	-40°C... +85°C
noise level	57 dB(A)	47 dB(A)
speed	4,400 min^{-1}	2,650 min^{-1}
weight	390 g	550 g
failure rate (L_{10})	L_{10} > 70,000 h (40°C)	L_{10} > 37,500 h (40°C)

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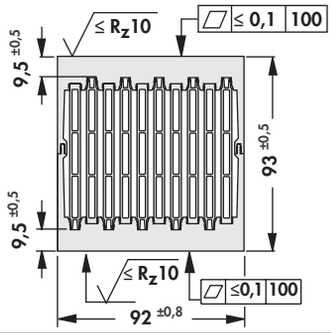
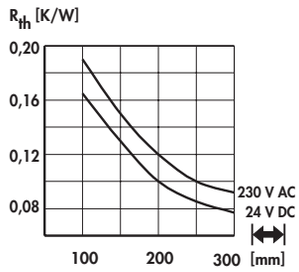
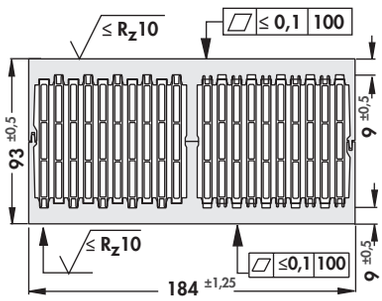
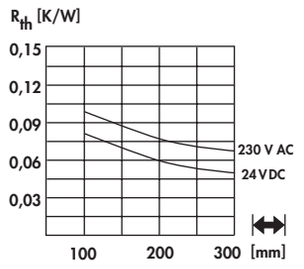
Cooling aggregates with axial fan

Hollow-fin cooling aggregates

– extremly low losses due to optimised hollow fin geometry
– effective heat dissipation
– compact construction with axial fans
– two oposite mounting surfaces are milled flat
– additional treatment upon customer's request
– other fan types and fan voltages on request

art. no.			
LA 21 ...			
	without air flow chamber		
art. no.			
LA 22 ...			
	without air flow chamber		

please indicate: **... ↔**
100 150 200 250 300 400 mm

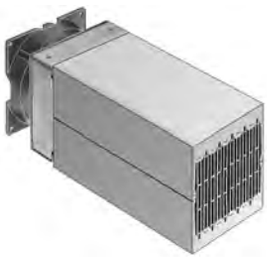
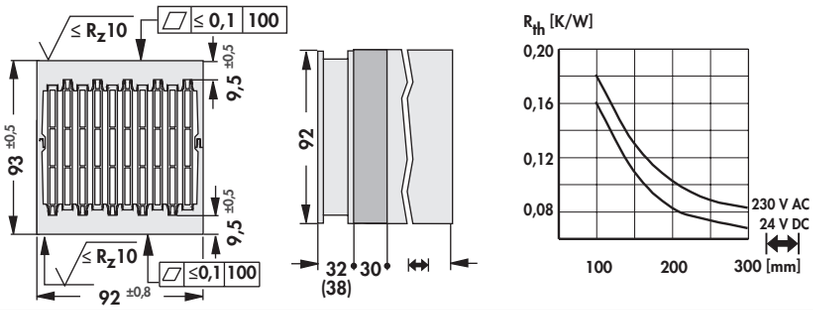
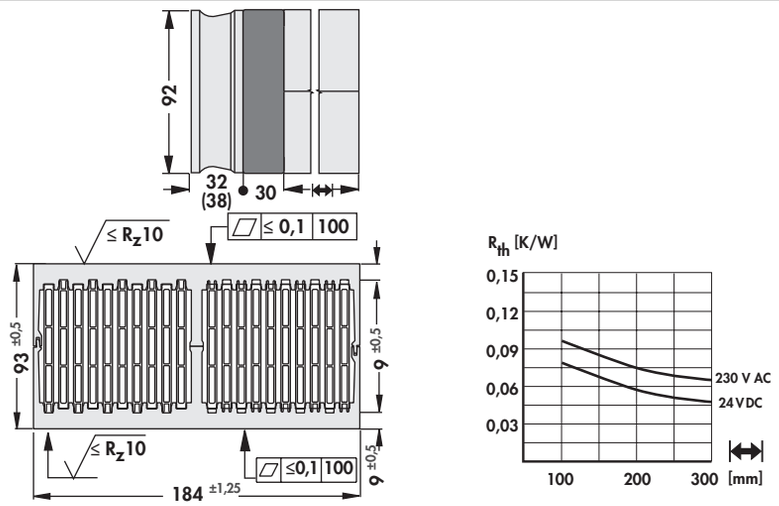
... fan type
24 = 24 V DC
230 = 230 V AC

Technical data of the fans

	... 24	... 230
type	ebmpapst 3314 NHH	ebmpapst 3656
dimensions	92x92x32 mm	92x92x38 mm
tension	24 V DC	230 V AC
power inout	3.4 W	12 W
max. air volume	107 m^3/h	75 m^3/h
temperature range	-20°C... 75°C	-40°C... +75°C
noise level	42 dB(A)	37 dB(A)
speed	3,450 min^{-1}	2,700 min^{-1}
weight	190 g	420 g
failure rate (L_{10})	L_{10} > 57,500 h (40°C)	L_{10} > 52,500 h (40°C)

Hollow-fin cooling aggregates

– extremly low losses due to optimised hollow fin geometry
– effective heat dissipation
– compact construction with axial fans
– two oposite mounting surfaces are milled flat
– additional treatment upon customer's request
– other fan types and fan voltages on request

art. no.		
LA V 21 ...		
	with air flow chamber	
art. no.		
LA V 22 ...		
	with air flow chamber	

please indicate: **... ⟷** **100 150 200 250 300 400 mm** **... fan type** **24 = 24 V DC** **230 = 230 V AC**

Technical data of the fans

	... 24	**... 230**
type	ebmpapst 3314 NHH	ebmpapst 3656
dimensions	92x92x32 mm	92x92x38 mm
tension	24 V DC	230 V AC
power inout	3.4 W	12 W
max. air volume	107 m^3/h	75 m^3/h
temperature range	-20°C... 75°C	-40°C... +75°C
noise level	42 dB(A)	37 dB(A)
speed	3,450 min^{-1}	2,700 min^{-1}
weight	190 g	420 g
failure rate (L_{10})	L_{10} > 57,500 h (40°C)	L_{10} > 52,500 h (40°C)

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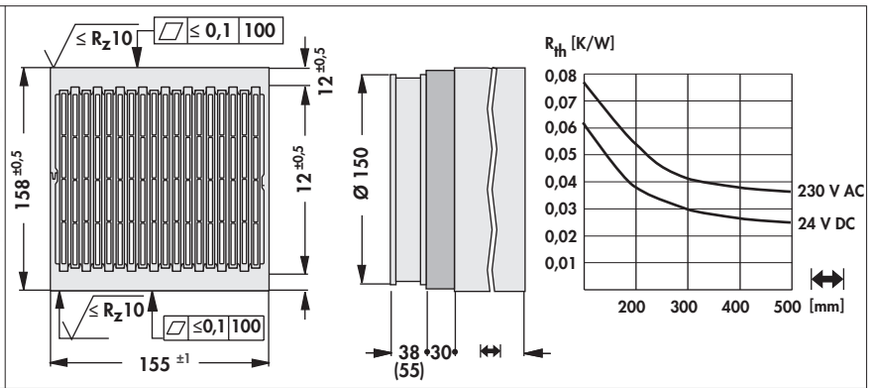
Cooling aggregates with axial fan

Hollow-fin cooling aggregates

- extremly low losses due optimised hollow fin geometry
- especially effective heat dissipation
- compact construction with axial fans
- two oposite mounting surfaces are miled flat
- additional treatment upon customer's request
- other fan types and fan voltages on request

art. no.		
		
LA V 24 ...	with air flow chamber	

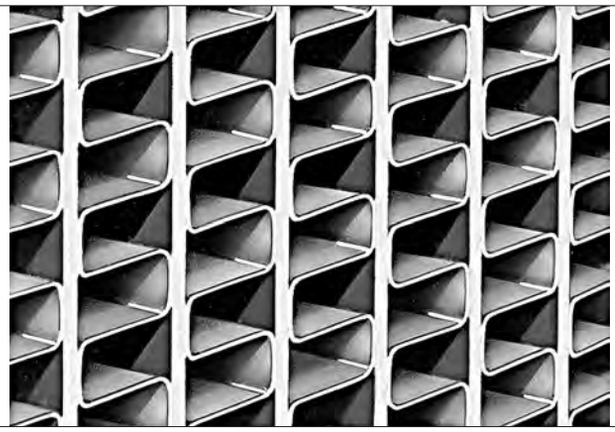
please indicate: **... ↔**
200 300 400 mm

... fan type
24 = 24 V DC
230 = 230 V AC

Technical data of the fans

	... 24	**... 230**
type	ebmpapst, ball bearing, with grid	ebmpapst, ball bearing, with grid
dimensions	Ø150x38 mm	Ø150x55 mm
tension	24 V DC	230 V AC
power inout	19 W	47 W
max. air volume	420 m^3/h	380 m^3/h
temperature range	-25°C... +72°C	-30°C... +60°C
noise level	59 dB(A)	60 dB(A)
speed	3,350 min^{-1}	2,700 min^{-1}
weight	620 g	1,100 g
failure rate (L_{10})	L_{10} > 75,000 h (40°C)	L_{10} > 40,000 h (40°C)

High performance cooling aggregate



extremely low losses of air flow as compared to cooling aggregates with extruded aluminium
– compact dimensions, that means high performance density due to large heat-conducting surfaces
– maximum heat flow due to brazing or thermal adhesion
– high performance cooling aggregates are only effective with forced ventilation by means of the fan, but not with free convection
– other fan types and fan voltages on request

material: solder-plated aluminium sheet, thus minimal weight due to the thickness of the material

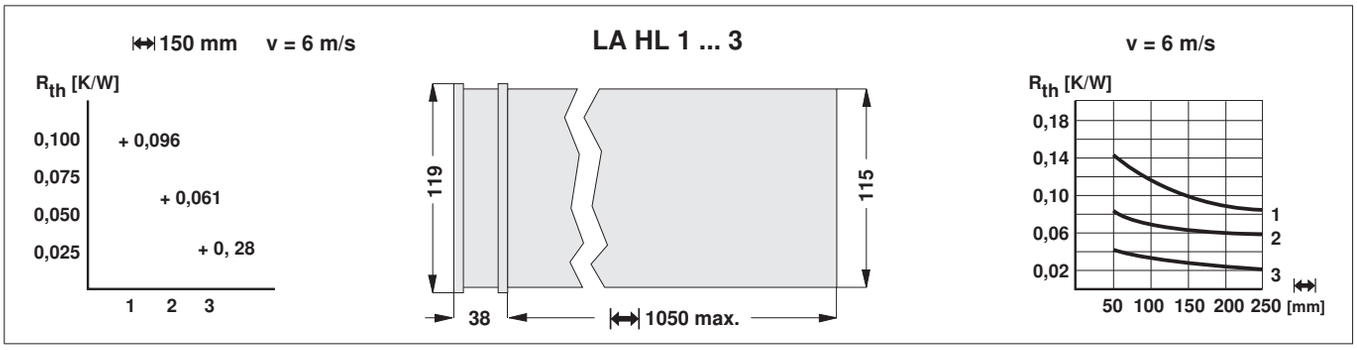
An optimised unit for any application can be produced from the wide range of existing components upon request.
The specific capacity will be determined by a test run upon customer´s request.

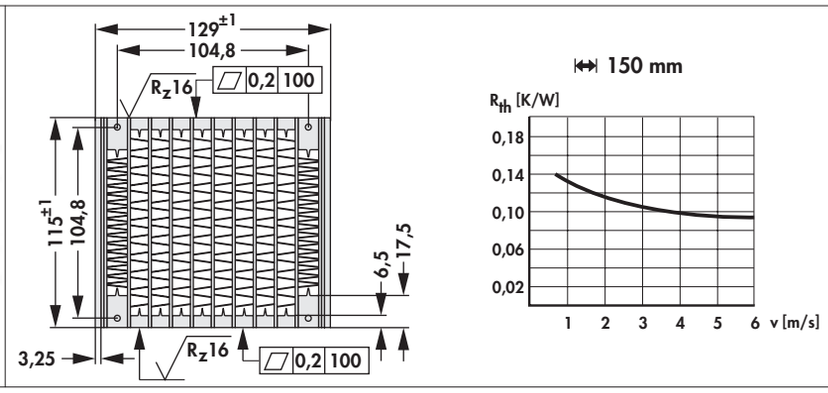
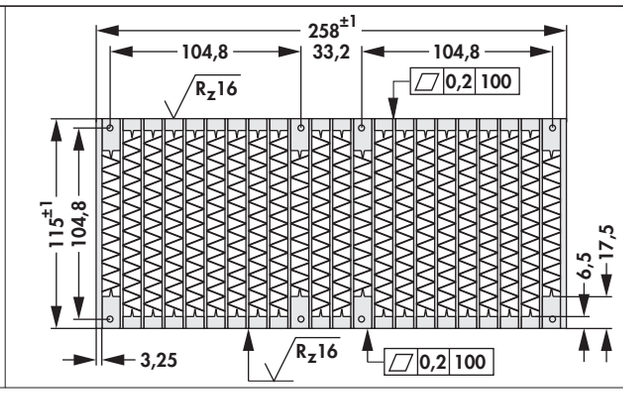
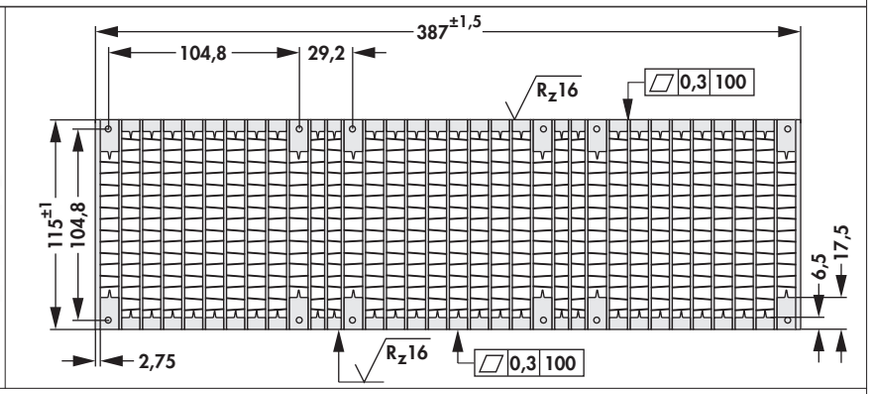
Technical data of the fans

	... 230
type	ebmpapst 4656N
dimensions	119x119x38 mm
tension	230 V AC
power inout	19 W
max. air volume	160 m^3/h
temperature range	-40°C... +85°C
noise level	47 dB(A)
speed	2,650 min^{-1}
weight	550 g
failure rate (L_{10})	L_{10} > 37,500 h (40°C)

Cooling aggregates with axial fan

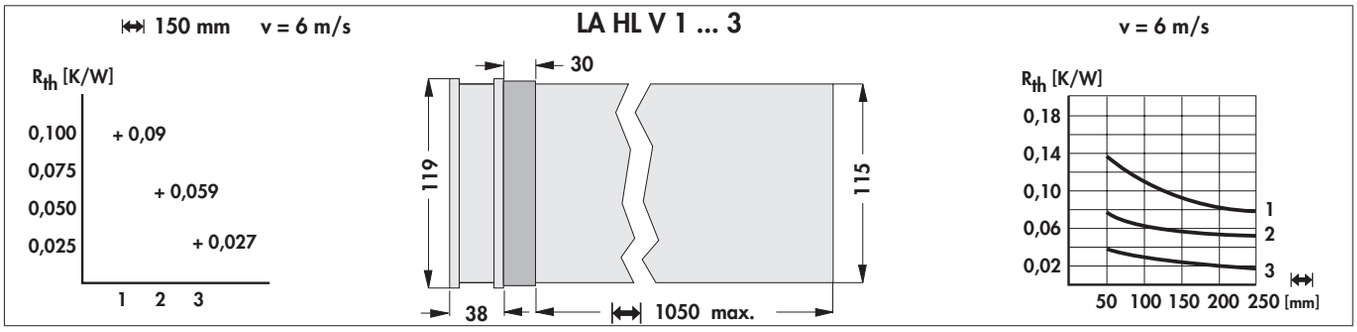
High performance cooling aggregate

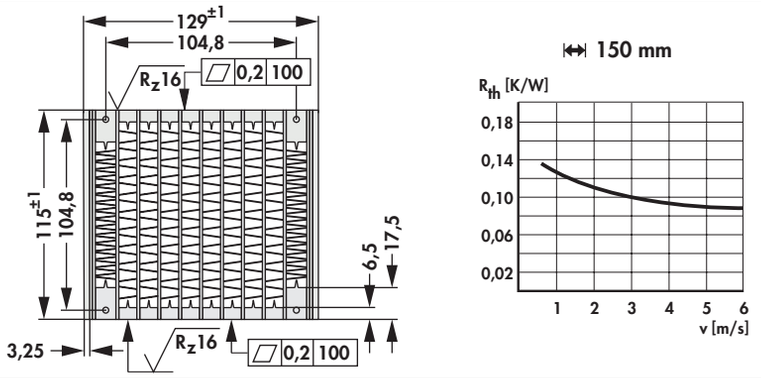
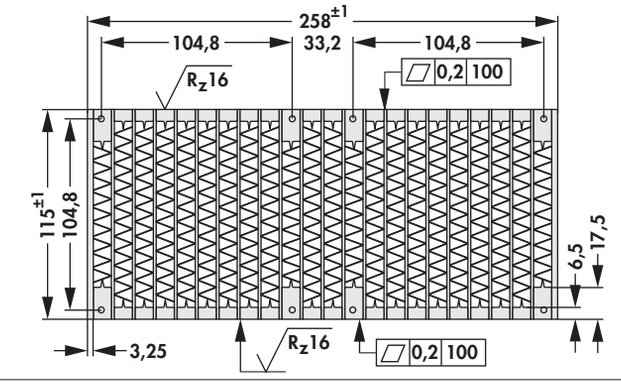
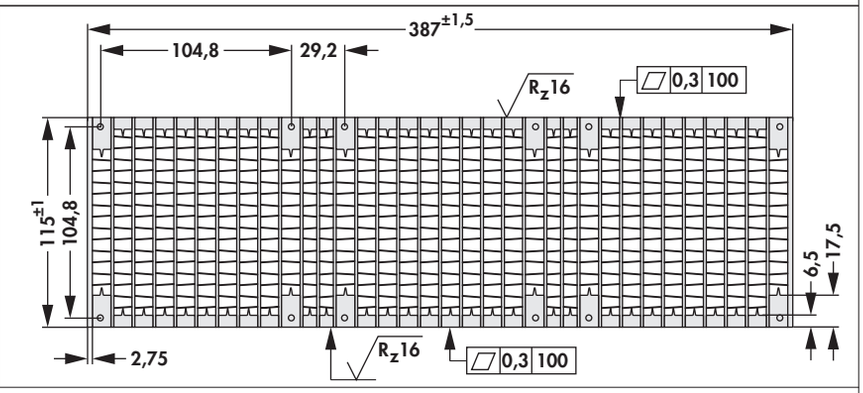


art. no.		
LA HL 1 ...		
	without air flow chamber	
art. no.		
LA HL 2 ...		
	without air flow chamber	
art. no.		
LA HL 3 ...		
	without air flow chamber	

please indicate: ... ↔
100 150 200 250 300 400 mm

High performance cooling aggregate



art. no.		
		
LA HLV 1 ...	with air flow chamber	
art. no.		
		
LA HLV 2 ...	with air flow chamber	
art. no.		
		
LA HLV 3 ...	with air flow chamber	

please indicate: ... ↔
100 150 200 250 300 400 mm

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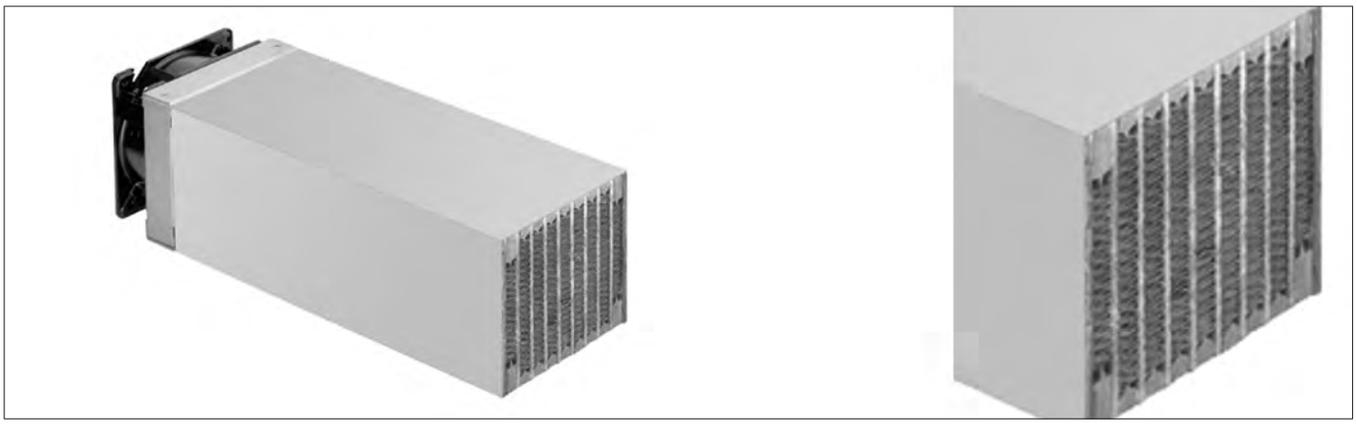
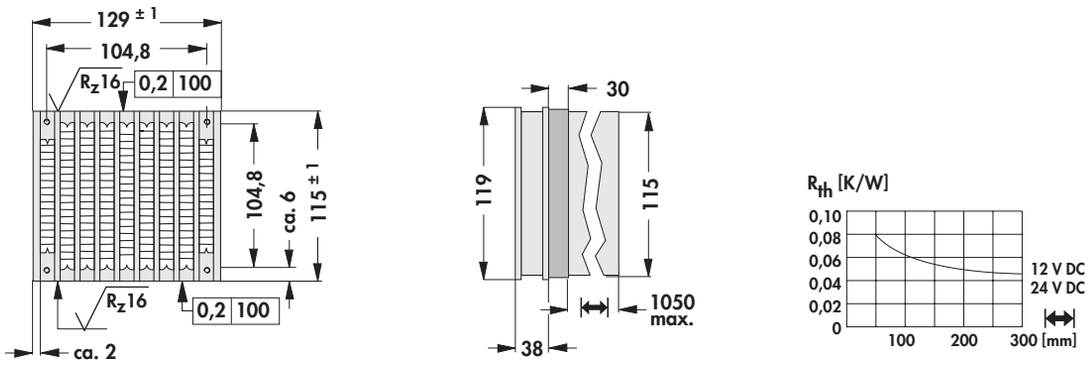
Cooling aggregates with axial fan



High performance cooling aggregate

- innovative, efficient heatsink design
- thick multiwall sheets for maximum heat dissipation
- specially formed laminated structures ensure optimum heat exchange with the air flow
- powerful mixed axial fan for highly effcient heat dissipation
- reduced noise output achieved by an optimised adaption of fan and heatsink
- additional treatment and modifications upon customer's request
- double and triple versions upon request

art. no.	
LAHL D 1 ...	

please indicate: **... ↔**
100 150 200 250 300 400 mm

... fan type
12 = 12 V DC
24 = 24 V DC

Technical data of the fans

	... 12	... 24
type	ebmpapst 4112NH3	ebmpapst 4114NH3
dimensions	119x119x38 mm	119x119x38 mm
tension	12 V DC	24 V DC
power inout	21 W	19.5 W
max. air volume	310 m^3/h	310 m^3/h
temperature range	-20°C... +65°C	-20°C... +65°C
noise level	65 dB(A)	65 dB(A)
speed	6,000 min^{-1}	6,000 min^{-1}
weight	390 g	390 g
failure rate (L_{10})	L_{10} > 60,000 h (40°C) L_{10} > 37,500 h (tmax)	L_{10} > 65,000 h (40°C) L_{10} > 37,500 h (tmax)

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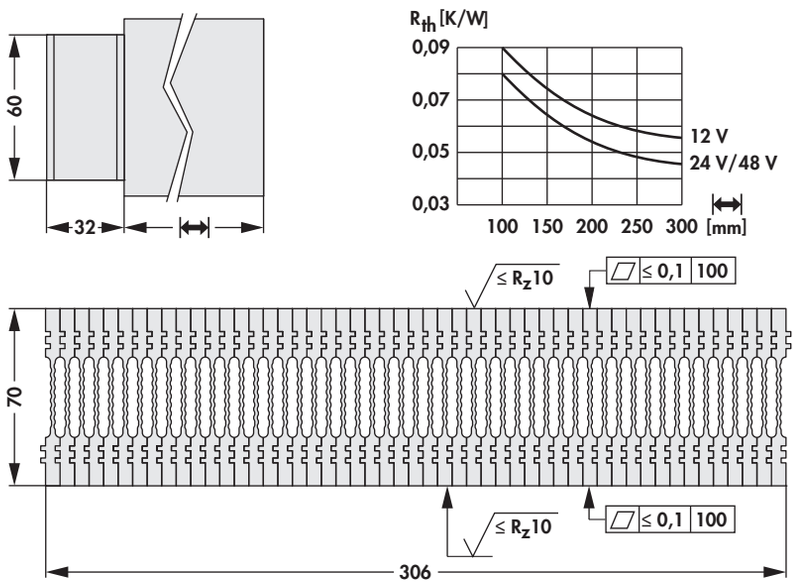
Cooling aggregates with axial fan

High performance cooling aggregate

– cooling aggregates of special conception with pressed in fins
– enlarged surface by means of fluted fin geometry
– flow-optimised hollow fin structure
– milled flat mounting surface for component assembly
– maximum heatsink length 300 mm
– special designs and other fans upon request

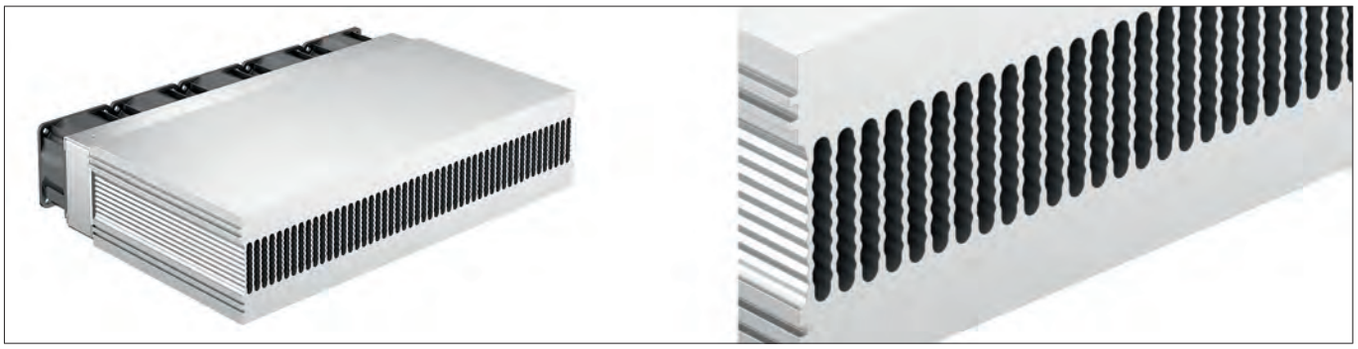
art. no.	
	
LA HPK 1 ...	without air flow chamber

please indicate: **... ↔**
100 150 200 250 300 mm

... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

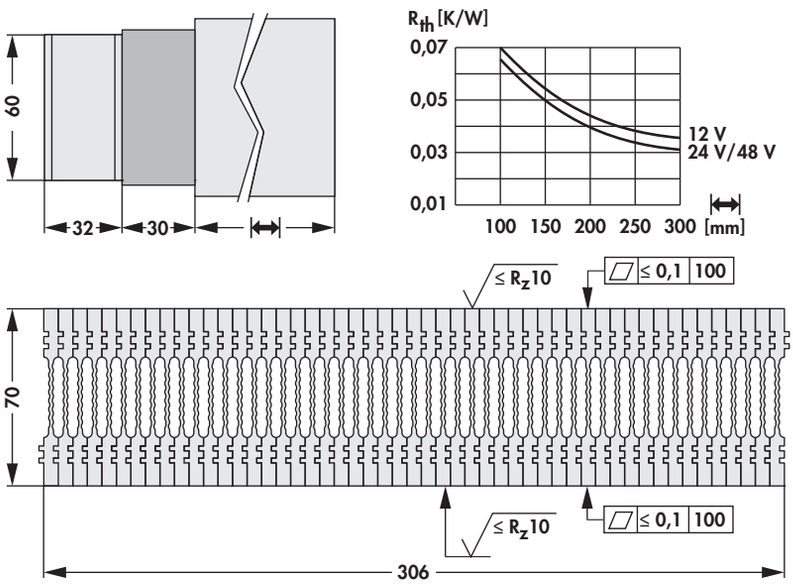
Technical data of the fans

	... 12	**... 24**	**... 48**
type	ebmpapst 612 JH	ebmpapst 614 J/2HHP	ebmpapst 618 J/2HHP
dimensions	60x60x32 mm	60x60x32 mm	60x60x32 mm
tension	12 V DC	24 V DC	48 V DC
power inout	7.7 W	14.6 W	14.6 W
max. air volume	70 m³/h	82 m³/h	82 m³/h
temperature range	-20°C... +70°C	-20°C... 75°C	-20°C... 75°C
noise level	53 dB(A)	62 dB(A)	62 dB(A)
speed	11,700 min^{-1}	15,000 min^{-1}	15,000 min^{-1}
weight	100 g	100 g	100 g
failure rate (L_{10})	L_{10} > 57,500 h (40°C)	L_{10} > 65,000 h (40°C)	L_{10} > 65,000 h (40°C)



High performance cooling aggregate

– cooling aggregates of special conception with pressed in fins
– enlarged surface by means of fluted fin geometry
– flow-optimised hollow fin structure
– milled flat mounting surface for component assembly
– maximum heatsink length 300 mm
– special designs and other fans upon request

art. no.	
	
LA V HPK 1 ...	without air flow chamber

please indicate: **... ⟷** **100 150 200 250 300 mm**

... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

Technical data of the fans

	... 12	**... 24**	**... 48**
type	ebmpapst 612 JH	ebmpapst 614 J/2HHP	ebmpapst 618 J/2HHP
dimensions	60x60x32 mm	60x60x32 mm	60x60x32 mm
tension	12 V DC	24 V DC	48 V DC
power inout	7.7 W	14.6 W	14.6 W
max. air volume	70 m^3/h	82 m^3/h	82 m^3/h
temperature range	-20°C... +70°C	-20°C... 75°C	-20°C... 75°C
noise level	53 dB(A)	62 dB(A)	62 dB(A)
speed	11,700 min^{-1}	15,000 min^{-1}	15,000 min^{-1}
weight	100 g	100 g	100 g
failure rate (L_{10})	L_{10} > 57,500 h (40°C)	L_{10} > 65,000 h (40°C)	L_{10} > 65,000 h (40°C)

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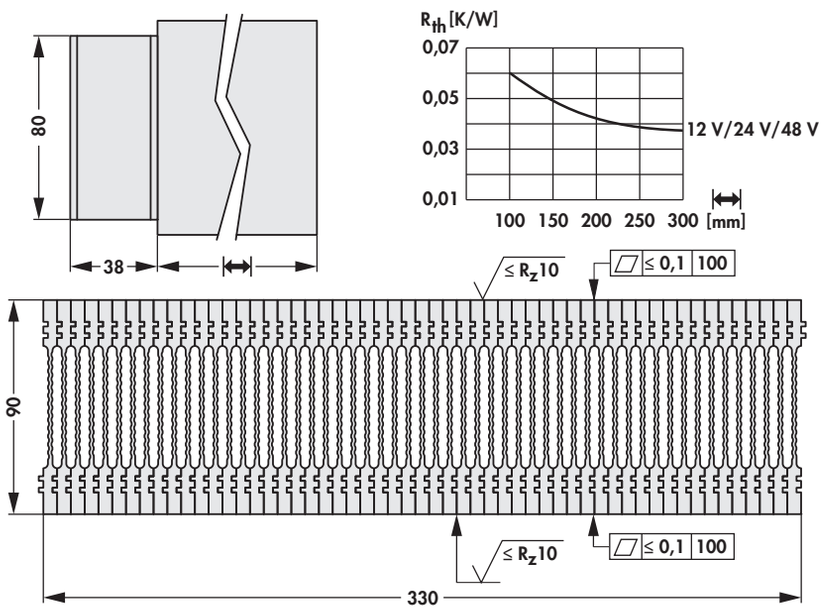
Cooling aggregates with axial fan

High performance cooling aggregate

– cooling aggregates of special conception with pressed in fins
– enlarged surface by means of fluted fin geometry
– flow-optimised hollow fin structure
– milled flat mounting surface for component assembly
– maximum heatsink length 300 mm
– special designs and other fans upon request

art. no.	
	
LA HPK 2 ...	without air flow chamber

please indicate: **... ↔**
100 150 200 250 300 mm

... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

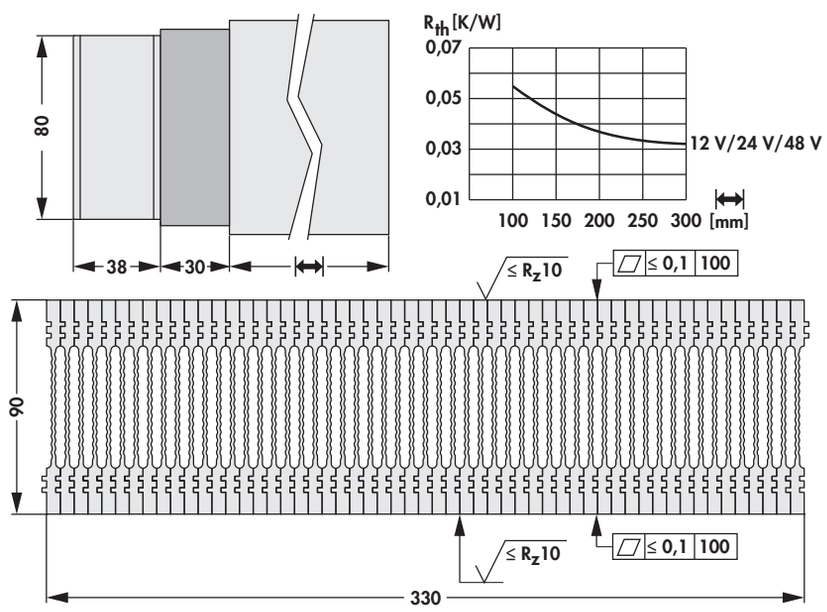
Technical data of the fans

	... 12	**... 24**	**... 48**
type	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
dimensions	80x80x38 mm	80x80x38 mm	80x80x38 mm
tension	12 V DC	24 V DC	48 V DC
power inout	39 W	38 W	36 W
max. air volume	222 m^3/h	222 m^3/h	222 m^3/h
temperature range	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
noise level	71 dB(A)	71 dB(A)	71 dB(A)
speed	14,000 min^{-1}	14,000 min^{-1}	14,000 min^{-1}
weight	200 g	200 g	200 g
failure rate (L_{10})	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)

Technical introduction ➔ **A 2 – 8**

High performance cooling aggregate

– cooling aggregates of special conception with pressed in fins
– enlarged surface by means of fluted fin geometry
– flow-optimised hollow fin structure
– milled flat mounting surface for component assembly
– maximum heatsink length 300 mm
– special designs and other fans upon request

art. no.	
	
LA V HPK 2 ...	without air flow chamber

please indicate: **... ↔ 100 150 200 250 300 mm**

... fan type
12 = 12 V DC
24 = 24 V DC
48 = 48 V DC

Technical data of the fans

	... 12	**... 24**	**... 48**
type	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
dimensions	80x80x38 mm	80x80x38 mm	80x80x38 mm
tension	12 V DC	24 V DC	48 V DC
power inout	39 W	38 W	36 W
max. air volume	222 m^3/h	222 m^3/h	222 m^3/h
temperature range	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
noise level	71 dB(A)	71 dB(A)	71 dB(A)
speed	14,000 min^{-1}	14,000 min^{-1}	14,000 min^{-1}
weight	200 g	200 g	200 g
failure rate (L_{10})	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)	L_{10} > 50,000 h (40°C)

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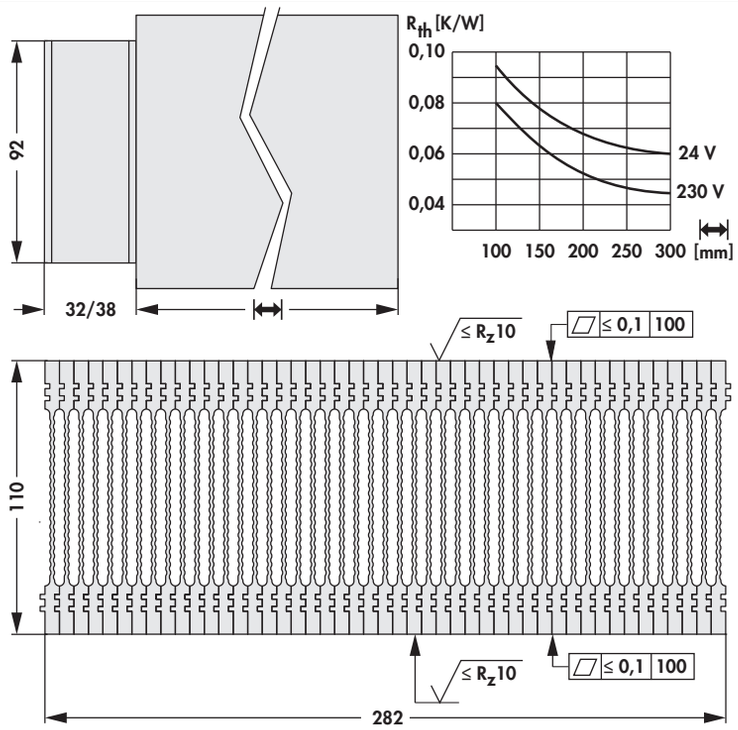
Cooling aggregates with axial fan

High performance cooling aggregate

- high performance cooling aggregates of special design
- optimal pressed in single lamellae
- low pressure losses due to adjusted fin geometry
- smallest fin spacings give a big heat exchange area
- maximum heatsink length 300 mm
- special designs according to drawing

art. no.	
	
LA HPK 3 ...	without air flow chamber

please indicate: **... ↔**
100 150 200 250 300 mm

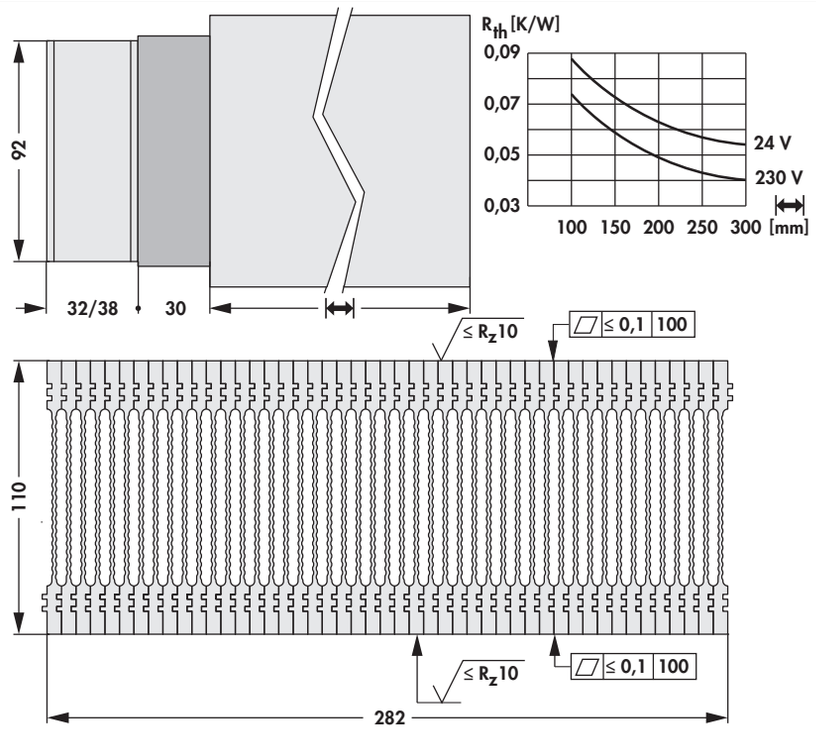
... fan type
24 = 24 V DC
230 = 230 V AC

Technical data of the fans

	... 24	**... 230**
type	ebmpapst 3314 NHH	ebmpapst 3656
dimensions	92x92x32 mm	92x92x38 mm
tension	24 V DC	230 V AC
power inout	3.4 W	12 W
max. air volume	107 m^3/h	75 m^3/h
temperature range	-20°C... 75°C	-40°C... +75°C
noise level	42 dB(A)	37 dB(A)
speed	3,450 min^{-1}	2,700 min^{-1}
weight	190 g	420 g
failure rate (L_{10})	L_{10} > 57,500 h (40°C)	L_{10} > 52,500 h (40°C)

High performance cooling aggregate

– high performance cooling aggregates of special design
– optimal pressed in single lamellae
– low pressure losses due to adjusted fin geometry
– smallest fin spacings give a big heat exchange area
– maximum heatsink length 300 mm
– special designs according to drawing

art. no.	
	
LA V HPK 3 ...	without air flow chamber

please indicate: **... ↔**
100 150 200 250 300 mm

... fan type
24 = 24 V DC
230 = 230 V AC

Technical data of the fans

	... 24	**... 230**
type	ebmpapst 3314 NHH	ebmpapst 3656
dimensions	92x92x32 mm	92x92x38 mm
tension	24 V DC	230 V AC
power inout	3.4 W	12 W
max. air volume	107 m^3/h	75 m^3/h
temperature range	-20°C... 75°C	-40°C... +75°C
noise level	42 dB(A)	37 dB(A)
speed	3,450 min^{-1}	2,700 min^{-1}
weight	190 g	420 g
failure rate (L_{10})	L_{10} > 57,500 h (40°C)	L_{10} > 52,500 h (40°C)

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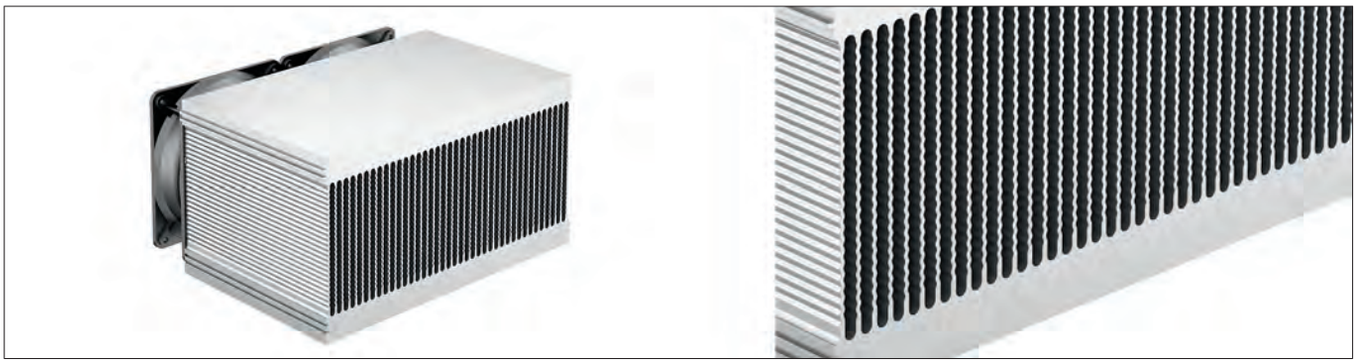
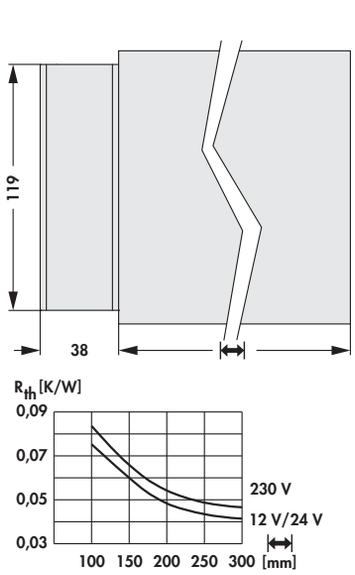
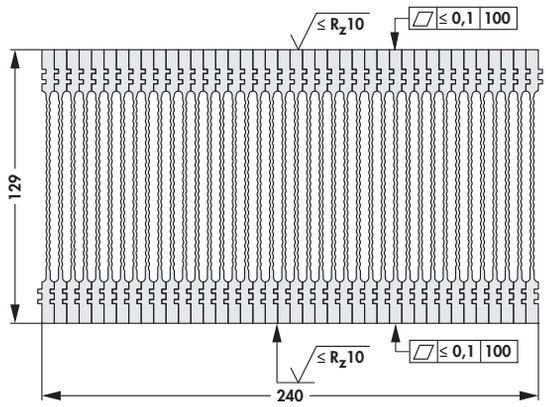
Cooling aggregates with axial fan



High performance cooling aggregate

- high performance cooling aggregates of special design
- optimal pressed in single lamellae
- low pressure losses due to adjusted fin geometry
- smallest fin spacings give a big heat exchange area
- maximum heatsink length 300 mm
- special designs according to drawing

art. no.	
	 
LA HPK 4 ...	without air flow chamber

please indicate: **... ⟷** **100 150 200 250 300 mm**

... fan type
12 = 12 V DC
24 = 24 V DC
230 = 230 V AC

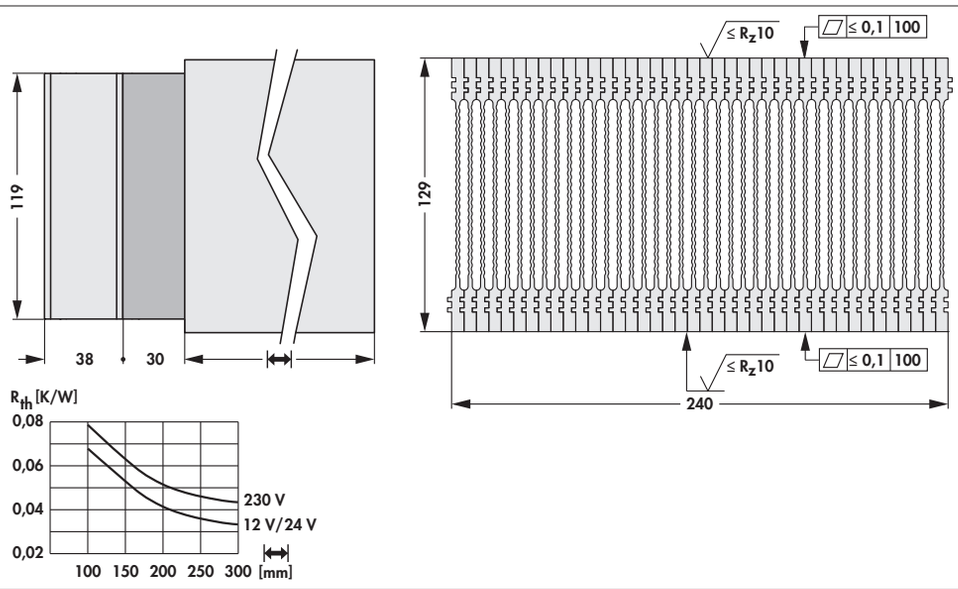
Technical data of the fans

	... 12	**... 24**	**... 230**
type	ebmpapst 4112NH3	ebmpapst 4114NH3	ebmpapst 4656N
dimensions	119x119x38 mm	119x119x38 mm	119x119x38 mm
tension	12 V DC	24 V DC	230 V AC
power inout	21 W	19.5 W	19 W
max. air volume	310 m³/h	310 m³/h	160 m³/h
temperature range	-20°C... +65°C	-20°C... +65°C	-40°C... +85°C
noise level	65 dB(A)	65 dB(A)	47 dB(A)
speed	6,000 min^{-1}	6,000 min^{-1}	2,650 min^{-1}
weight	390 g	390 g	550 g
failure rate (L_{10})	L_{10} > 60,000 h (40°C) L_{10} > 37,500 h (tmax)	L_{10} > 65,000 h (40°C) L_{10} > 37,500 h (tmax)	L_{10} > 37,500 h (40°C)

Cooling aggregates with axial fan

High performance cooling aggregate

– high performance cooling aggregates of special design
– optimal pressed in single lamellae
– low pressure losses due to adjusted fin geometry
– smallest fin spacings give a big heat exchange area
– maximum heatsink length 300 mm
– special designs according to drawing

art. no.	
	
LA V HPK 4 ...	without air flow chamber

please indicate: **... ↔**
100 150 200 250 300 mm

... fan type
12 = 12 V DC
24 = 24 V DC
230 = 230 V AC

Technical data of the fans

	... 12	**... 24**	**... 230**
type	ebmpapst 4112NH3	ebmpapst 4114NH3	ebmpapst 4656N
dimensions	119x119x38 mm	119x119x38 mm	119x119x38 mm
tension	12 V DC	24 V DC	230 V AC
power inout	21 W	19.5 W	19 W
max. air volume	310 m^3/h	310 m^3/h	160 m^3/h
temperature range	-20°C... +65°C	-20°C... +65°C	-40°C... +85°C
noise level	65 dB(A)	65 dB(A)	47 dB(A)
speed	6,000 min^{-1}	6,000 min^{-1}	2,650 min^{-1}
weight	390 g	390 g	550 g
failure rate (L_{10})	L_{10} > 60,000 h (40°C) L_{10} > 37,500 h (tmax)	L_{10} > 65,000 h (40°C) L_{10} > 37,500 h (tmax)	L_{10} > 37,500 h (40°C)

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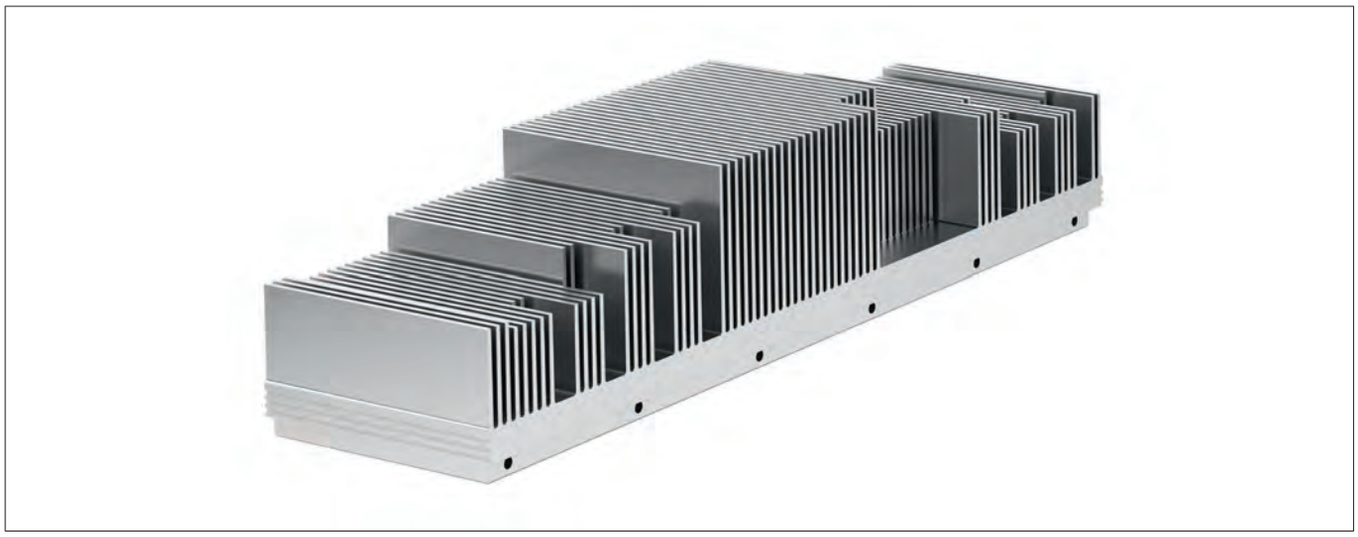
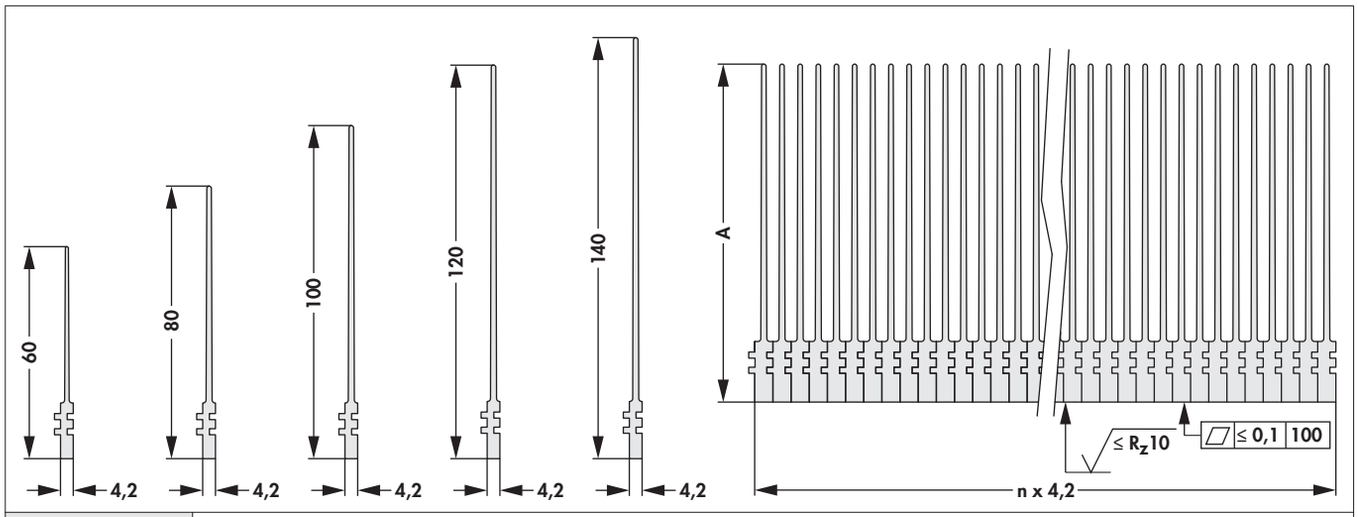
Cooling aggregates with axial fan



High performance heatsinks

– flexible designable heatsink solutions
– modular system with different fin heights
– for free and forced convection
– milled flat semiconductor mounting surface
– maximum heatsink length 420 mm
– customer specific designs, machinings and surfaces upon request



art. no.	A [mm]
HPK 60 ...	60
HPK 80 ...	80
HPK 100 ...	100
HPK 120 ...	120
HPK 140 ...	140

please indicate:

... number of fins (min. - max.)
24 - 83

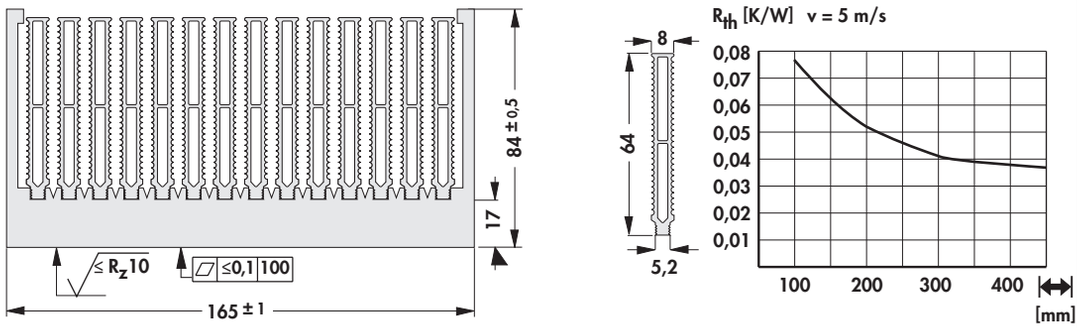
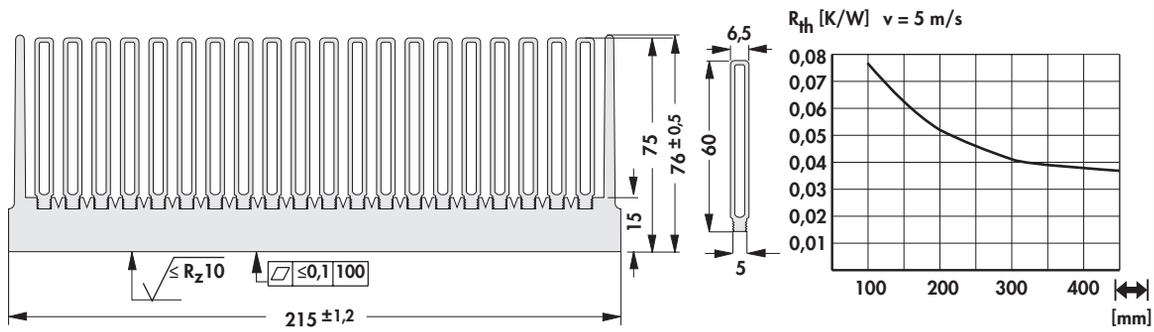
... ↔
100 150 200 250 300 mm

... surface
SA = black anodised
ME = natural colour anodised

Technical introduction ➔ **A 2 – 8**

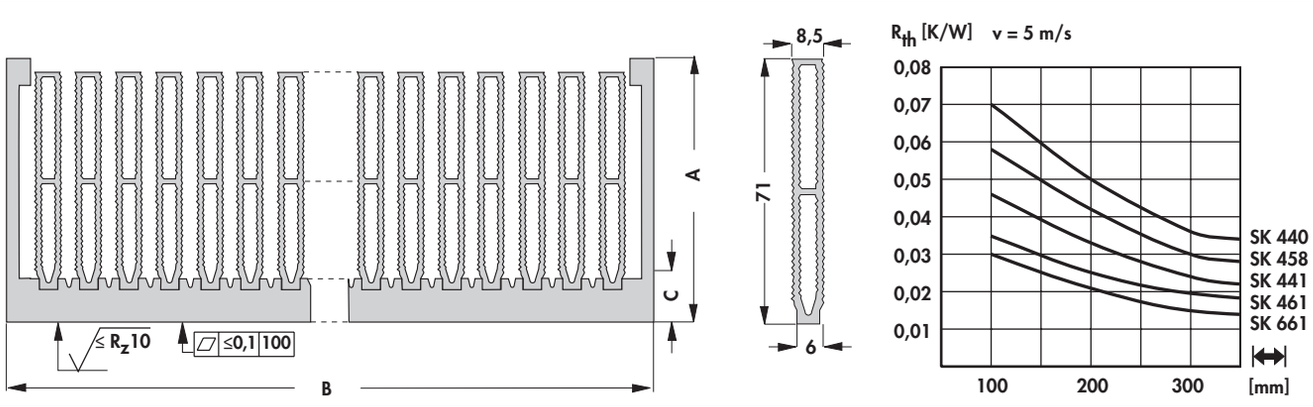
High performance heatsinks with hollow-fin profile

– high performance heatsinks for fan operation
– exclusively for forced convection
– preferably for radial or tangential fans
– hollow fin geometry optimises the air flow
– particularly effective heat dissipation
– milled flat base (except length 1000 mm)

art. no.	
SK 497 ...	
art. no.	
SK 498 ...	

please indicate: **... ↔**
150 200 250 300 1000 mm

... surface
SA = black anodised
AL = raw degreased aluminium (by the metre raw aluminium)



art. no.	number of fins	dim. [mm] A	B	C
SK 440 ...	15	84 ±1	200 ±1.2	16
SK 458 ...	19		250 ±1.4	
SK 441 ...	23		300 ±1.6	
SK 461 ...	31	88 ±1	400 ±2.0	20
SK 661 ...	48	84 ±1	500 ±2.5	19

please indicate: **... ↔**
150 200 300 1000 mm

... surface
SA = black anodised
AL = raw degreased aluminium (by the metre raw aluminium)

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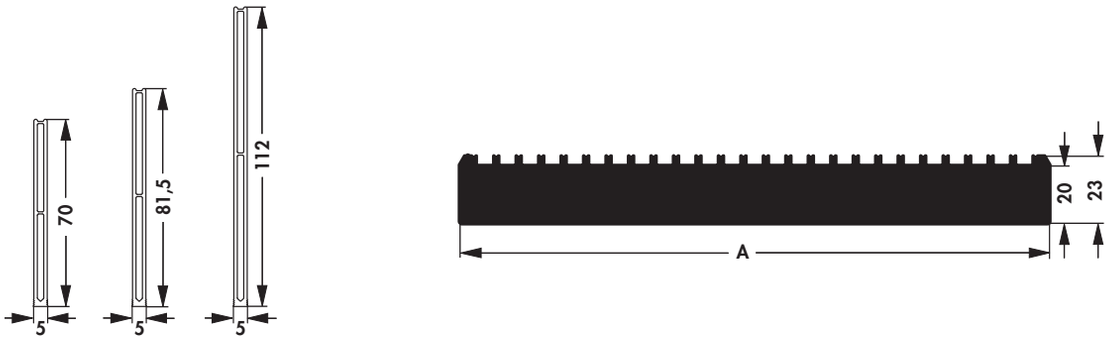
High performance heatsinks with hollow-fin profile

– high capacity heatsinks for fan operation preferably for radial- or tangential fan motors
– universal modular design
– exclusively for forced convection
– flow-optimized hollow fin geometry



art. no.	number of fins	dim. [mm] A
SK 603 1120 ...	25	200
SK 604 700 ...	32	250
SK 605 1120 ...	39	300
SK 606 ...	45	350
SK 607 700 ...	52	400
SK 607 1120 ...		
SK 608 ...	65	500

please indicate:

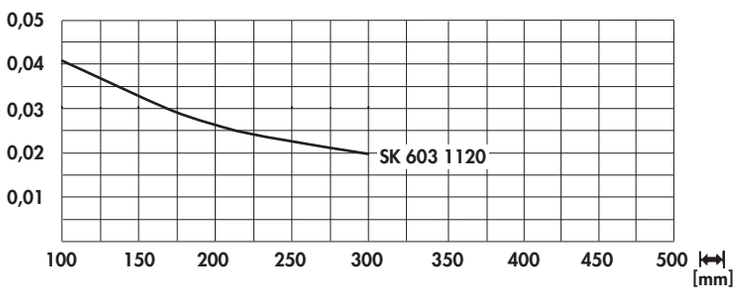
... fin height
700 = 70 mm
815 = 81.5 mm
1120 = 112 mm

... ↔
200 300 400 500 mm

... surface
SA = black anodised
ME = natural colour anodised

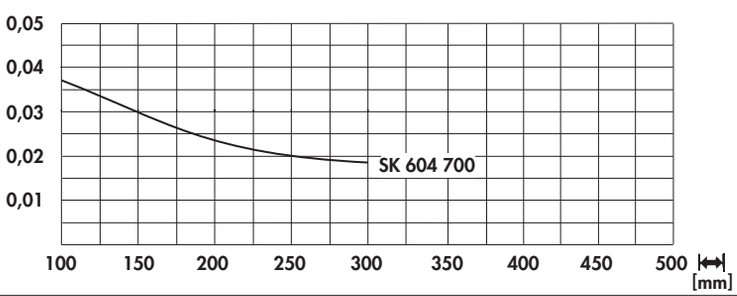
SK 603

R_{th} [K/W] v = 11 m/s



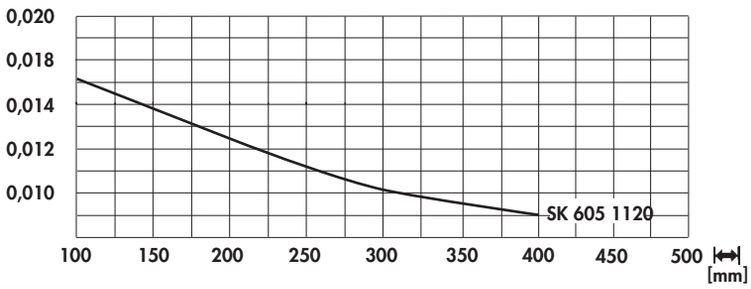
SK 604

R_{th} [K/W] v = 11 m/s



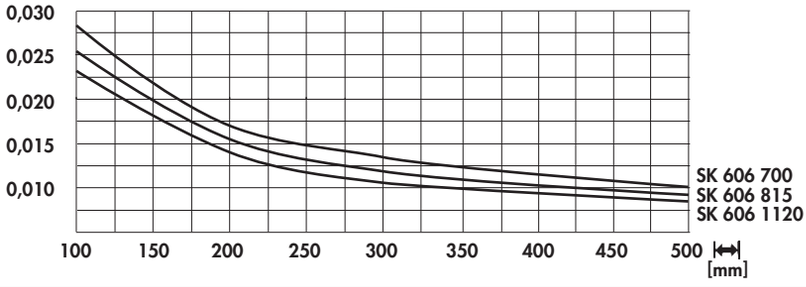
SK 605

R_{th} [K/W] v = 11 m/s



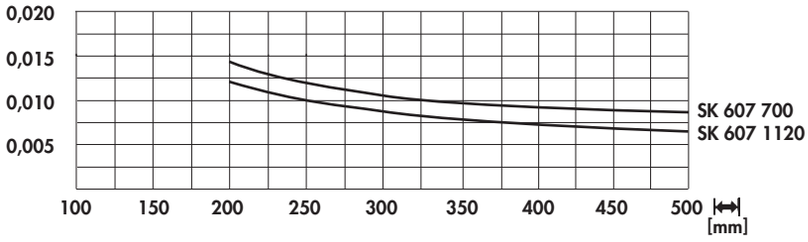
SK 606

R_{th} [K/W] v = 11 m/s



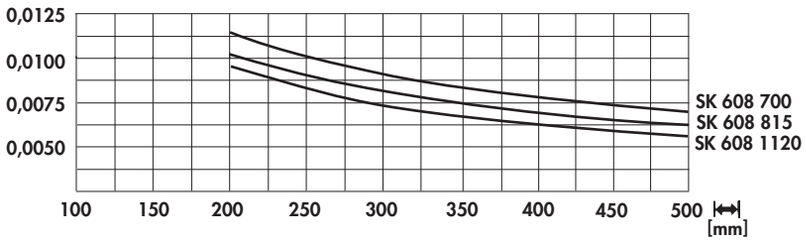
SK 607

R_{th} [K/W] v = 11 m/s



SK 608

R_{th} [K/W] v = 11 m/s



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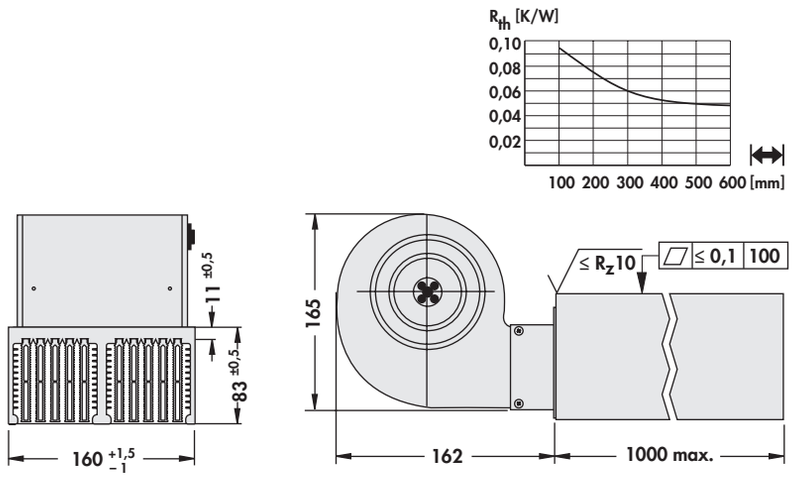
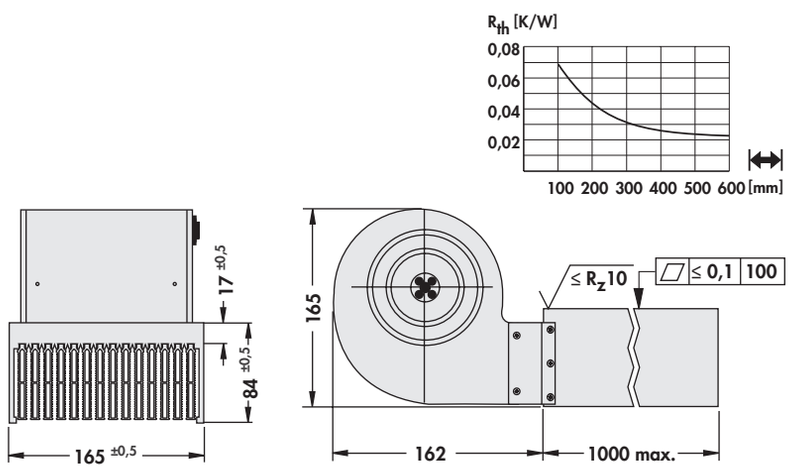
Cooling aggregates with radial fan

High performance cooling aggregate

– optimised air flow due to hollow fin geometrie
– very good thermal performance
– optimized high performance construction with radial fan
– milled flat mounting surface for semiconductor
– cover plate for fin side upon request
– additional customized treatment upon request
– fan condenser: **art. no. LAHLR K 2**

art. no.		
LA 25 ...		
art. no.		
LA 26 ...		
please indicate:	**... ↔** **200 300 400 500 600 mm**	

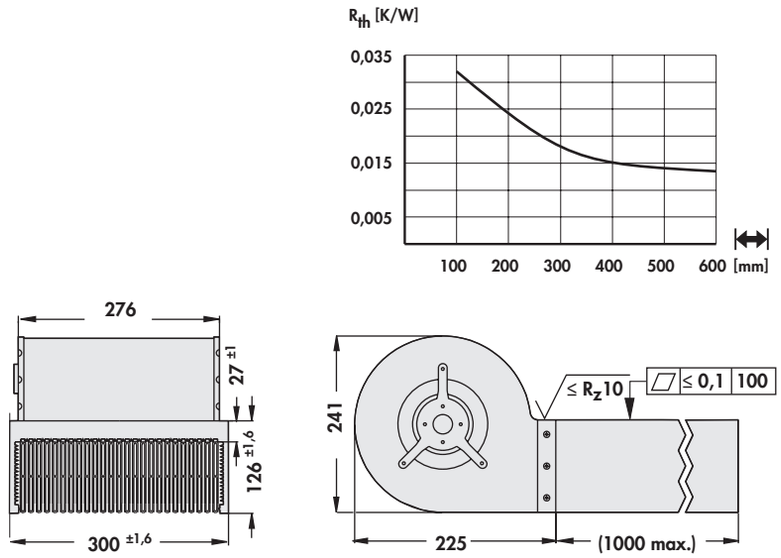
Technical data of the fans

	... 230
type	ebmpapst, radial blower with grid, double sided absorbtion
bearing type	ball bearing
discharge air flow	435 m^3/h
rotation speed	1,950 min^{-1}
power inout	87 W
current consumption	0.39 A
temperature range	-25°C... +40°C
circuit voltage	230 V AC
motor condenser	2 µF/400 V
noise level	58 dB(A)
weight	1,500 g

Cooling aggregates with radial fan

High performance cooling aggregate

– optimised air flow due to hollow fin geometrie
– very good thermal performance
– optimized high performance construction with radial fan
– milled flat mounting surface for semiconductor
– cover plate for fin side upon request
– additional customized treatment upon request
– fan condenser: **art. no. LA 20 K 6**

art. no.		
LA 20 ...		

please indicate: **... ↔**
200 300 400 500 600 mm

Technical data of the fans

	... 230
bearing type	ball bearing
type	ebmpapst, radial blower with grid, double sided absorbtion
discharge air flow	1,310 m^3/h
rotation speed	1,350 min^{-1}
power inout	185 W
current consumption	0.81 A
circuit voltage	230 V AC
temperature range	-25°C... +70°C
motor condenser	6 µF
noise level	64 dB(A)
weight	5,900 g

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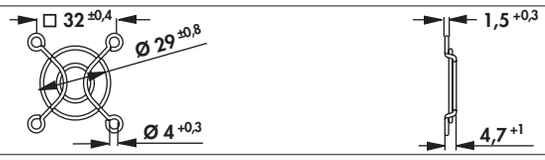
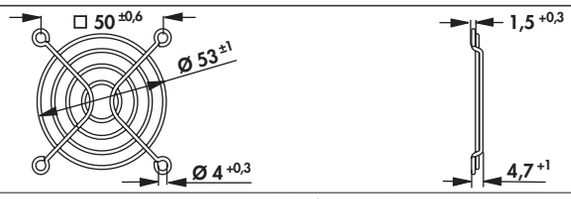
Protection grid for fans

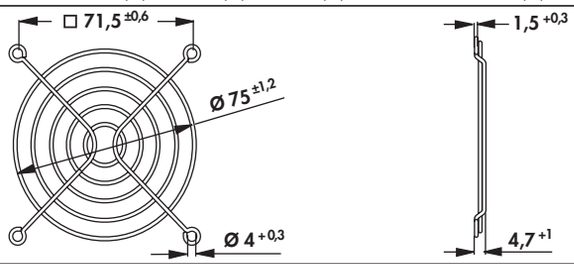
– protection against contact as per EN 294
– aerodynamic contruction
– minimized noise modification
– only low modification of the air flow



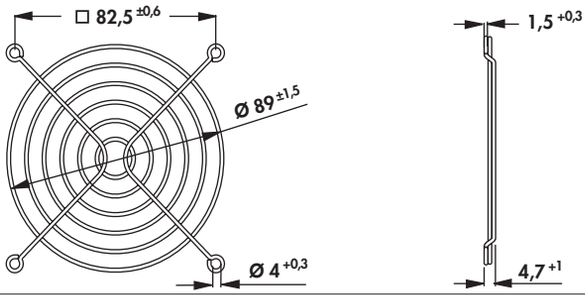
art. no.	suitable for cooling aggregate
LAGI 40	LAM 2/ LAM 4/ LAM 4 D/ LAM 4 K/ LAM 4 DK



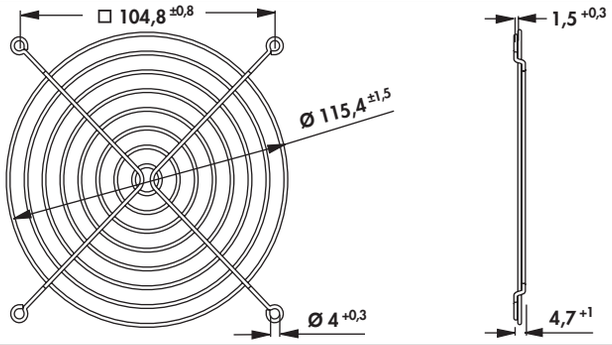
art. no.	suitable for cooling aggregate
LAGI 60	LAM 1/ LAM 6/ LAM 6 K/ LA (V) 6/ LA (V) 7/ LA (V) 8/ LA 27 K/ LA (V) 28/ LA (V) 29/ LA (V) 30/ LA (V) HPK 1



art. no.	suitable for cooling aggregate
LAGI 80	LA (V) 9/ LA (V) 10/ LA (V) 11/ LA (V) 31/ LA (V) 32/ LA (V) 33/ LA (V) 34/ LA (V) 35/ LA (V) HPK 2



art. no.	suitable for cooling aggregate
LAGI 92	LA 2/ LA (V) 21/ LA (V) 22/ LA (V) HPK 3



art. no.	suitable for cooling aggregate
LAGI 119	LA 1/ LA 4/ LA 5/ LA (V) 14/ LA (V) 15/ LA (V) 17/ LA (V) 18/ LA HL (V) 1/ LA HL (V) 2/ LA HL (V) 3 / LA HL D1/ LA (V) HPK 4

material:	steel wire, nickel-plated

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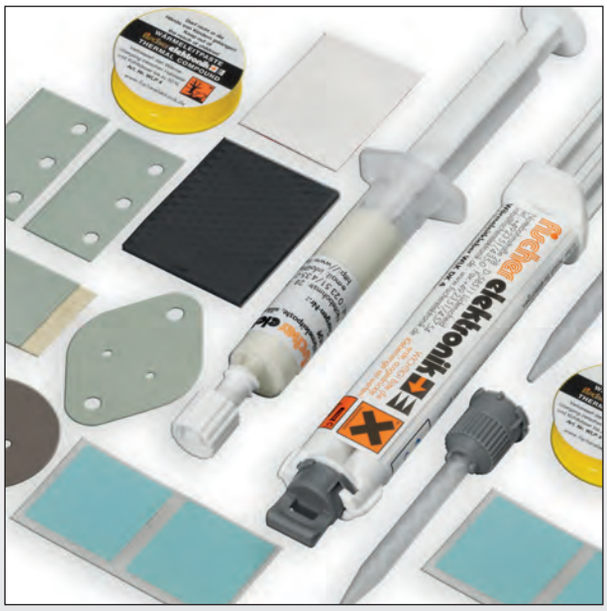
Thermal conductive material
Guide rails for PCBs
Mounting material for semiconductors-
Mounting material for mechanical components



Thermal conductive material
- large standard programme for thermal conductive pastes and glues, silicone-, GEL-, and foam foils (Gap Filler), cuts, tapes, tubes and caps
- thermal conductive electrically insulating foils
- customer specific productions made in our in-house punching shop

Guide rails for PCBs
- for horizontal and vertical assembly
- suitable for sheet thicknesses of 0.5 - 1.85 mm
- with and without lock mechanism
- slim an wide designs
- screwable and snapable versions, extractors with locking pin fixing
- special designs upon request

Mounting material for semiconductors
- mounting disc for discrete devices such as transistors, capacitors and LEDs
- electrically insulating mounting of the transistors
- simple and fast assembly
- insulating clamping pins for various semiconductors for increasing the dielectric strength
- cover and insulating cap for transistors

Mounting material for mechanical components
- distance bolts made of metal and plastics with inner or outer thread
- clamp mounting made of aluminium and plastics for mounting the heatsinks and cases on the mounting rail acc. to DIN EN 50022
- anti-vibration device for minimizing the noise and resonance

High quality thermal interface materials

The connection of the device to be dissipated to the heat sink is especially important as for a poor heat transfer, i.e. from the device to the heatsink, the heat conduction respectively the heat transition is reduced and the device temperature will be significantly increased. Beside functional restrictions an uncontrolled temperature increase or even a device destruction is also possible. An optimal heat transfer can only be achieved if the inevitable tolerances, unevennesses and roughnesses of the surfaces to be connected which occur by production processes will be equalised. Suitable thermal conductive foils matching to the application provide excellent solutions for the thermotechnical contact optimization.

Our wide range of products contains i.e. silicon-containing and silicone-free thermal conductive foils, one sided and double sided adhesive thermal conductive foils, high thermal conductive graphite foils, thermal conductive silicone foam foils, silicone-containing and silicone-free GEL thermal conductive foils, dispensable GEL thermal conductive foils, kapton insulating washers, aluminium oxide and mica washers, phase change thermal conductive materials, silicone-containing and silicone-free thermal conductive pastes as well as various thermal conductive glues.

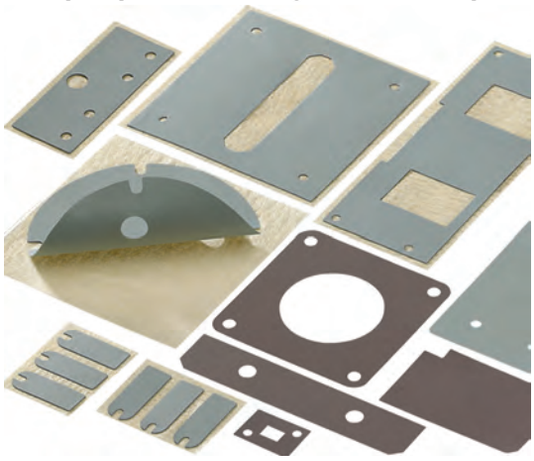
The different thermal conductive foils can be produced individually out of plate- or roll material according to customer specific drawings. Please also use our **24 hour sample service** for individual cuts of our standard thermal conductive materials according to your specification.

Production process:

Drawing parts with digital cutter

CAD data as a dxf file can be realised directly in ready and zero-toleranced exact cut templates without tooling costs. The outstanding production speed and a cutting technology perfected to the last detail provide an optimal result.

Stamped parts according to customer specific requirements



We produce contour die-cutting according to your drawing specification flexibly and fast for you.
The fully automised punching machine with the associated steel strip blanking die is particularly suitable for smaller, but also for higher quantities. Beside contour- and kiss-cut parts the possibility of cutting roll material to size or machining according to customer's requirements is also given.

The thermal data in the catalogue refers to an area of 1 inch^2 (6.45 cm^2) if not indicated otherwise.

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Overview thermal interface material

art. no.	thermal conductivity [W/m*K]	material thickness [mm]	page
WLFT 404 ... / WLFT 414 ... (double sided)	0,400	0,127	E 37
WLFT 405 ... (double sided)	0,500	0,15	E 37
WLPF ...	0,500	-	E 70
WSF(S) ...	0,460 @ 1,6 mm 0,520 @ 3,2 mm	0,8 / 1,6 / 2,4 / 3,2 / 4,8 / 6,35	E 41
WLFT 88 ... (double sided)	0,600	0,13 / 0,25 / 0,38 / 0,5	E 39
WLP ...	0,610	-	E 70
WLK ...	0,836	-	E 72
FSF 52 P	0,900	0,127	E 67
WFPK 09	0,900	0,152	E 26
WFS 09 ...	0,900	0,178 / 0,229	E 14
WFP 09	0,900	0,229	E 27
WK ... (one sided)	0,920	0,2	E 12
WLK DK ...	1,000	-	E 73
WG ...	1,130	0,2	E 12
WS ...	1,220	0,3	E 12
WFPK 13	1,300	0,152	E 28
WLFT 412 ... (double sided)	1,400	0,23	E 37
GEL 14 (G) ...	1,400	0,5 / 1,0 / 1,5 / 2,0 / 2,5 / 3,0 / 3,5 / 4,0 / 4,5 / 5,0	E 45
WB ...	1,430	0,15	E 12
FSF 15 P ...	1,500	0,114 / 0,127 / 0,140	E 68
WLFT 8926 ... (double sided)	1,500	0,2 / 0,25 / 0,5	E 40
GEL (G) ...	1,500	0,5 / 1,0 / 1,5 / 2,0 / 2,5 / 3,0 / 3,5 / 4,0 / 4,5 / 5,0	E 46
WFG 15 ...	1,500	0,508 / 1,016 / 1,524 / 2,032 / 2,54 / 3,175 / 4,064 / 5,08	E 47
GEL F 15 (G) ...	1,500	1,0 / 1,5 / 2,0	E 42
FSF 16 P ...	1,600	0,102 / 0,114 / 0,127	E 69
WFS 16	1,600	0,229	E 15
WFKF 18 ...	1,800	0,150 / 0,175 / 0,325	E 29
WFS 18	1,800	0,203	E 16
WFK 18 ...	1,800	0,225 / 0,25	E 17
GEL S 18 (liquid)	1,800	-	E 60
GEL S 20 (liquid)	1,800	-	E 61
FSF 20 P	2,000	0,200	E 67
WFKF 20 ...	2,000	0,5 / 1,0	E 43
WLK SK 50	2,000	-	E 74
WFQ 25	2,500	0,152	E 32
WFK 25 ...	2,500	0,225 / 0,25	E 18
GEL 28 (G) ...	2,500	0,5 / 1,0 / 1,5 / 2,0 / 2,5 / 3,0 / 3,5 / 4,0 /4,5 / 5,0	E 50
GEL 28 S ...	2,500	1,0 / 1,5 / 2,0 / 2,5 / 3,0 / 3,5 / 4,0 /4,5 / 5,0	E 56
FSF 30 P	3,000	0,12	E 67

Explanation of the colours:

Thermally conductive foils containing silicone	Silicone-free thermally conductive foils	Aluminium and graphite foils	Adhesive thermally conductive foils	GAP Filler thermally conductive foils	GAP Fillers for extreme compressions	Phase Change thermally conductive foils	Thermally conductive pastes	Thermally conductive glues

Technical introduction → A 2 – 8

Overview thermal interface material

art. no.	thermal conductivity [W/m*K]	material thickness [mm]	page
WLFT 30 ... (one sided)	3,000	0,15 / 0,23	E 35
WFKF 30 02	3,000	0,2	E 30
WFSA 30 ...	3,000	0,381 / 0,508	E 19
GEL F 30 ...	3,000	0,5 / 1,0 / 1,5	E 44
WFGH 30 ...	3,000	0,508 / 1,016 / 1,524 / 2,032 / 2,54 / 3,175	E 49
GEL 30 S ...	3,000	0,5 / 1,0 / 1,5 / 2,0 / 2,5 / 3,0 / 3,5 / 4,0	E 55
GEL S 30 (liquid)	3,000	-	E 61
WFF 33 ...	3,300	0,2 / 0,3	E 20
WFS 34 ...	3,400	0,2 / 0,3 / 0,45	E 21
WFK 35 ...	3,500	0,125 / 0,225 / 0,25	E 22
GEL S 35 ... (liquid)	3,500	-	E 62
WLFT 40 023 (one sided)	4,000	0,23	E 36
GEL S 40 (liquid)	4,300	-	E 61
GEL 45 (G) ...	4,500	0,5 / 1,0 / 1,5 / 2,0 / 2,5 / 3,0 / 3,5 / 4,0 /4,5 / 5,0	E 50
WFC 50 ...	5,000	0,2 / 0,3 / 0,45 / 0,8	E 23
WFGH 50 ...	5,000	0,508 / 1,016 / 1,524 / 2,032 / 2,54 / 3,175	E 51
GEL 50 S ...	5,000	0,5 / 1,0 / 1,5 / 2,0 / 2,5 / 3,0 / 3,5 / 4,0	E 56
WFK 60 ...	6,000	0,1 / 0,2 / 0,225 / 0,3	E 31
GEL 60 (G) ...	6,000	0,5 / 1,0 / 1,5 / 2,0 / 2,5	E 54
GEL 60 S ...	6,000	1,5 / 2,0 / 2,5	E 57
WFK 65 ...	6,500	0,25 / 0,275	E 24
GEL 70 S ...	7,000	1,0 / 1,5 / 2,0 / 2,5 / 3,0 / 3,5 / 4,0	E 58
WLFG S 900 ...	7,500	0,15 / 0,175	E 33
WLFG 98 ...	8,000	0,13 / 0,25 / 0,5	E 34
WFS 80 ...	8,000	0,2 / 0,3 / 0,45	E 25
WLPK ...	10,000	-	E 71
GEL 80 (G) ...	13,000	0,3 / 0,5 / 1,0 / 1,5 / 2,0 / 2,5 / 3,0	E 53
GEL 130 S ...	13,000	0,5 / 1,0 / 1,5 / 2,0	E 59

Explanation of the colours:

Thermally conductive foils containing silicone	Silicone-free thermally conductive foils	Aluminium and graphite foils	Adhesive thermally conductive foils	GAP Filler thermally conductive foils	GAP Fillers for extreme compressions	Phase Change thermally conductive foils	Thermally conductive pastes	Thermally conductive glues

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Thermal conductive foils for semiconductors

– thermal conductive foils cut to size for IGBT, DC/DC converters and Solid State Relais
– other thermal conductive materials and cuts according to to customer's specifications

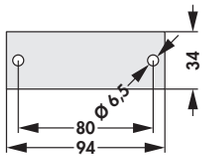
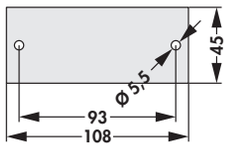
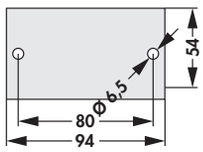
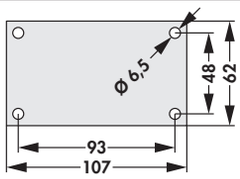
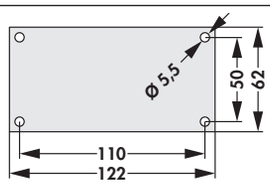
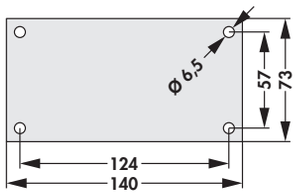
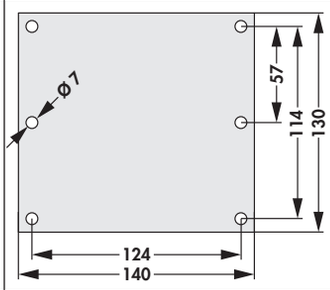
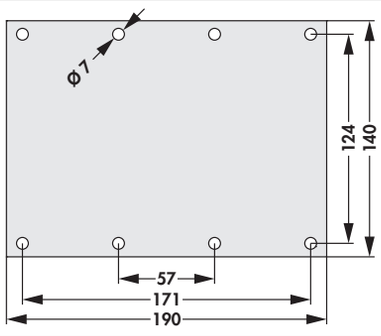
art. no.	page	thermal conductivity [W/m·k]	material thickness [mm]	type
WFQ 25 ...	E 32	2.5	0.152	aluminium foil
WLFG S 900 **WLFG S 900 K** **WLFG 9813** **WLFG 9825** **WLFG 9850**	E 33 E 33 E 34 E 34 E 34	7.5 7.5 8.0 8.0 8.0	0.150 0.175 0.130 0.250 0.500	graphite foil
FSF 15 P 011 **FSF 15 P 012** **FSF 15 P 014** **FSF 20 P**	E 68 E 68 E 68 E 67	1.5 1.5 1.5 2.0	0.114 0.127 0.140 0.200	phase-change thermal conductive foil

Order example

WLFG 9010 — **Thermally conductive foil**

54 x 94 — **dimension**

IGBT

dimension [mm]	blanks	manufacturer	component
34 x 94		Infineon MCC IXYS Semikron	Int-A-Pak (New) / 34mm Module MF … F2 / MT … T2 / MD … D2 Y4-M6 SEMITRANS 2 / SEMIPACK 2
45 x 108		Infineon IXYS	Econo 2 / Econo PIM 2 / Econo PACK 2 / Econo BRIDGE / Iso PACK 2 E2-Pack
54 x 94		Infineon MCC IXYS Semikron	MTC / Iso PACK 54 MD … M3 / MD … M5 PWS-E Flat / PWS-E SEMIPOINT 4
62 x 107		Infineon MCC IXYS Semikron	Dual Int-A-Pak / 62 mm Module MT … L2 E3-Pack SEMITRANS 3 / SEMITRANS 4
62 x 122		Infineon IXYS Semikron	Econo 3 / Econo DUAL + / Econo PIM 3 / Econo PACK 3 SimBus F SEMIX 3p / SEMIX 3Ip
73 x 140		Infineon	IHV
130 x 140		Infineon	IHM / IHV
140 x 190		Infineon	IHM / IHV

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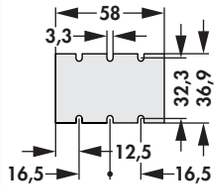
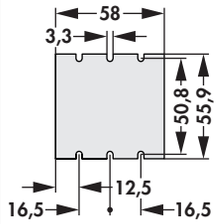
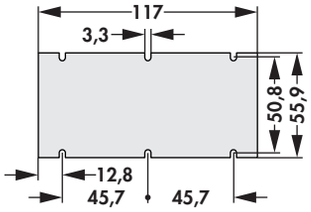
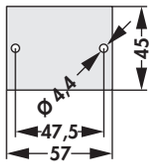
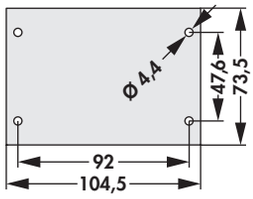
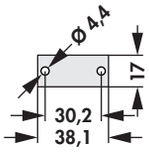
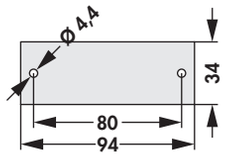
Thermal conductive foils for semiconductors

DC/DC converter

dimension [mm]	blanks	component
36.9 x 58		Micro DC/DC-converter
55.9 x 58		Mini DC/DC-converter
55.9 x 117		Maxi DC/DC-converter

Solid State Relais

dimension [mm]	blanks	component
45 x 57		SSR 1
73.5 x 104.5		SSR 2
17 x 38.1		SSR 3
34 x 94		SSR 4

Thermal conductive foils for LED

– thermal conductive foils cut to size for LEDs
– other thermal conductive materials and cuts according to to customer's specifications

art. no.	page	thermal conductivity [W/m·k]	material thickness [mm]	type
WFQ 25 ...	E 32	2.5	0.152	aluminium foil
WLFG S 900	E 33	7.5	0.150	graphite foil
WLFG S 900 K	E 33	7.5	0.175	
WLFG 9813	E 34	8.0	0.130	
WLFG 9825	E 34	8.0	0.250	
WLFG 9850	E 34	8.0	0.500	
WLFT 404	E 37	0.4	0.127	double-sided adhesive thermal conductive foil
WLFT 405	E 37	0.5	0.150	
WLFT 8805	E 39	0.6	0.130	
WLFT 8810	E 39	0.6	0.250	
WLFT 8815	E 39	0.6	0.380	
WLFT 8820	E 39	0.6	0.500	
WLFT 8926	E 40	1.5	0.2 / 0.25 / 0.5	
WLFT 30	E 35	3.0	0.15 / 0.23	one-side adhesive thermal conductive foil
FSF 15 P 011	E 68	1.5	0.114	phase-change thermal conductive foil
FSF 15 P 012	E 68	1.5	0.127	
FSF 15 P 014	E 68	1.5	0.140	
FSF 20 P	E 67	2.0	0.200	

Order example

WLFT 8810 — **Thermally conductive foil**

20 x 24 — **dimension**

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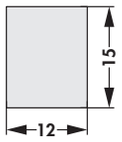
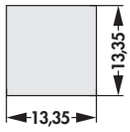
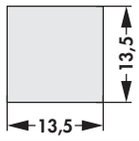
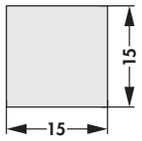
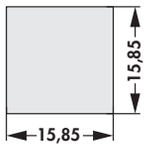
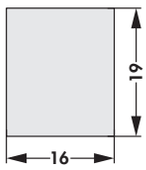
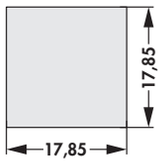
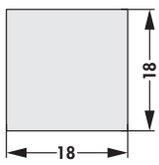
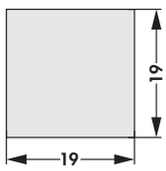
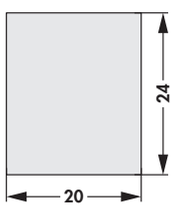
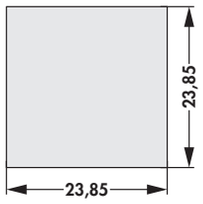
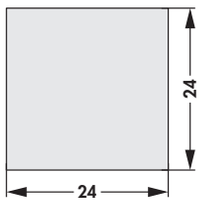
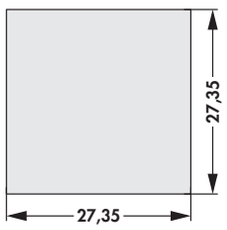
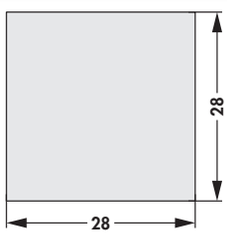
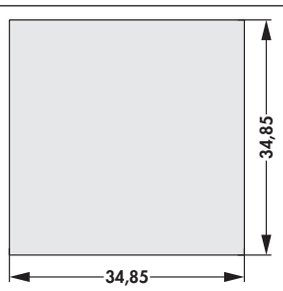
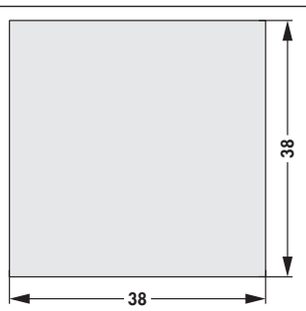
Thermal conductive foils for LED

dimension [mm]	blanks	manufacturer	LED package
12 x 15		Lumileds Luxeon Sharp Nichia LG Innotec	CoB 1202S Mini ZENIGATA / GW6BMG / GW6BGG / GW6BMW / GW6BGW / GW6NGW NTCWT / NTCWS / NVNWS / NJCWS LEMWM12480 / LEMWM12490
13.35 x 13.35		Cree Seoul Semiconductor	CXA13XX / CXB13XX SAW 806 / SAW810 / SAW906 / SAW910
13.5 x 13.5		Citizen	CLU026 / CLU027 / CLU028 / CLU700 / CLU701
15 x 15		Osram	Soleriq P9
15.85 x 15.85		Cree	CXA15XX / CXB15XX
16 x 19		Lumileds Luxeon Nichia LG Innotec	CoB 1202 / CoB 1203 NFCWL / NVEWL / NVCWL LEMWM19480 / LEMWM19490 / LEMWM19680 / LEMWM19690
17.85 x 17.85		Cree	CXA18XX / CXB18XX
18 x 18		Osram	Soleriq S13
19 x 19		Citizen Seoul Semiconductor	CLU036 / CLU038 / CLU710 / CLU711 / CLU720 / CLU721 SAW815 / SAW915
20 x 24		Lumileds Luxeon Sharp LG Innotec	CoB1204 / CoB1205 / CoB1208 Mini ZENIGATA / GW6DMB / GW6DGB / GW6DMC / GW6DGC / GW6DMD / GW6DGD / GW6DME / GW6DGE / GW6TGB / Tiger ZENIGATA / GW6TGC LEMWM24780 / LEMWM24790 / LEMWM24980 / LEMWM24990 / LEMWM24B80 / LEMWM24B90

Thermal conductive foils for LED

dimension [mm]	blanks	manufacturer	LED package
23.85 x 23.85		Cree	CXA25XX / CXB25XX
24 x 24		Osram	Soleriq S19
27.35 x 27.35		Cree	CXA30XX / CXB30XX
28 x 28		Lumileds Luxeon Citizen Seoul Semiconductor LG Innotec	CoB 1211 CLU046 / CLU048 / CLU731 SAW822 / SAW922 LEMWM28D80 / LEMWM28D90 / LEMWM28E80 / LEMWM28E90
34.85 x 34.85		Cree	CXA35XX / CXB35XX / CXA2Studio
38 x 38		Citizen Seoul Semiconductor Nichia	CLU056 / CLU058 / CLU550 SAW833 / SAW933 NFEWH

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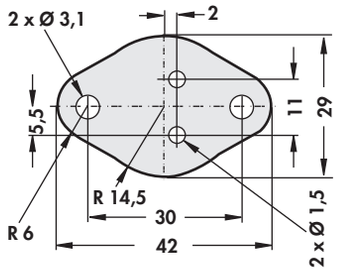
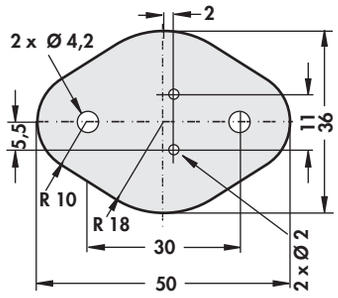
Silicone rubber insulating material for semiconductors

– other cuttings on request

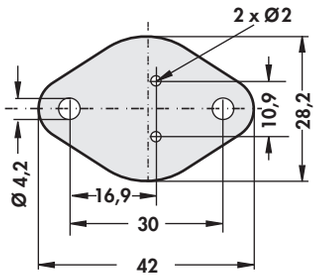
TO 3



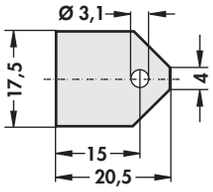
TO 3 M



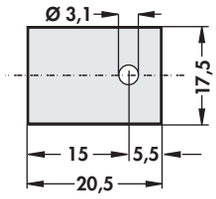
TO 3/4



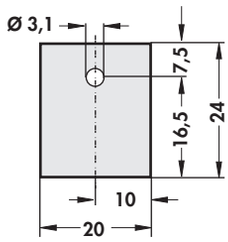
TOP 3



TOP 3/1

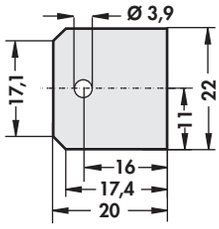


TOP 3 PF

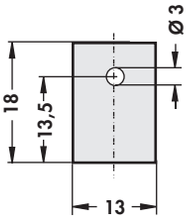


TO 218

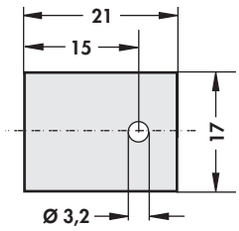
Multiwatt



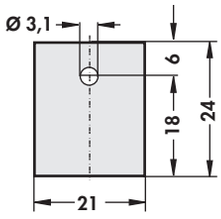
TO 220



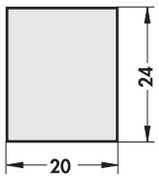
TO 247



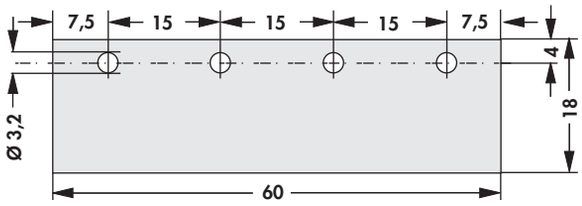
TO 247/1



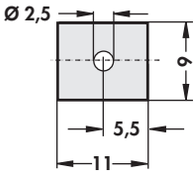
TO 3158



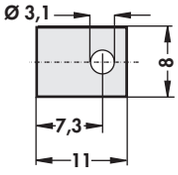
4 x TO220



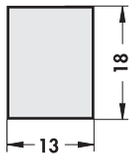
TO 126



SOT 32



TO 3159



Silicone rubber insulating material for semiconductors

foil type	foil WS	foil WG	foil WK	foil WB
material	silicone foil, standard	silicone foil, GF reinforced	silicone foil, GF reinforced, one side self-adhesive	silicone foil, GF reinforced
washer				
TO-3	**WS 3**	**WG 3**	**WK 3**	**WB 3**
TO-3 M	**WS 3 M**			
TO-3/4	**WS 3/4**		**WK 3/4**	
TO-3 PF	**WS 3 P**	**WG 3 P**	**WK 3 P**	**WB 3 P**
3158	**WS 3158**		**WK 3158**	**WB 3158**
TOP 3	**WS TOP 3**			
TOP 3/1	**WS TOP 3/1**		**WK TOP 3/1**	
TO 218 (Multiwatt)		**WG 218**		
TO 247	**WS 247**		**WK 247**	
TO 220	**WS 220**	**WG 220**	**WK 220**	**WB 220**
4 X TO 220	**WS 4 220**			
3159	**WS 3159**		**WK 3159**	**WB 3159**
TO 126			**WK 126**	
SOT 32			**WK 32**	
TO 247/1	**WS 247/1**			
insulating tube				
TO-220 Ø 11 mm, length 25 mm	**WSC-220**			
TO-3 PF Ø 13.5 mm, length 25 mm	**WSC-3 P**			
TO-247 Ø 14.5 mm, length 30 mm	**WSC-247**			
insulating tube as meterpiece				
TO-220 Ø 11 mm	**WSM-220**			
TO-3 PF Ø 13.5 mm	**WSM-3 P**			
tape material (width)				
24 mm			**WKT 24**	
30 mm	**WST 30**		**WKT 30**	**WBT 30**
36 mm	**WST 36**	**WGT 36**	**WKT 36**	**WBT 36**
85 mm	**WST 85**		**WKT 85**	
300 mm		**WGT 300**	**WKT 300**	**WBT 300**

	Foil WS	**Foil WG**	**Foil WK**	**Foil WB**
colour	green			brown
material	silicone foil, standard	silicone foil, GF reinforced	silicone foil, GF reinforced, one side self-adhesive	silicone foil, GF reinforced
material thickness	0.3 mm $^{+0.1/-0}$	0.2 mm $^{+0.02/-0.04}$		0.15 mm $^{+0.02/-0.04}$
thermal resistance	0.4 K/W	0.42 K/W	0.45 K/W	0.34 K/W
hardness	75 IRHD	87 IRHD		92 IRHD
thermal conductivity	1.2 W/m·K	0.9 W/m·K		1.44 W/m·K
temperature range	-40°C... +150°C			
insulation resistance	$1 \cdot 10^{13}$ Ω·m			
elongation	100 %	2 %		
dielectric strength	10 kV	6 kV		3 kV
class of inflammability	UL 94 V-0			

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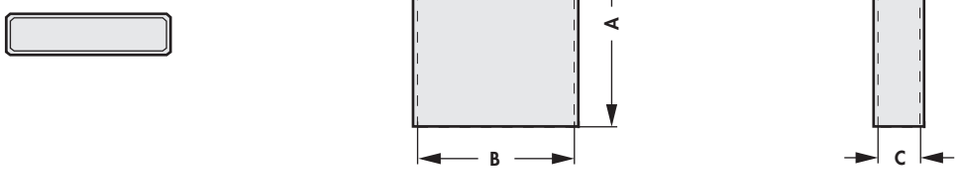
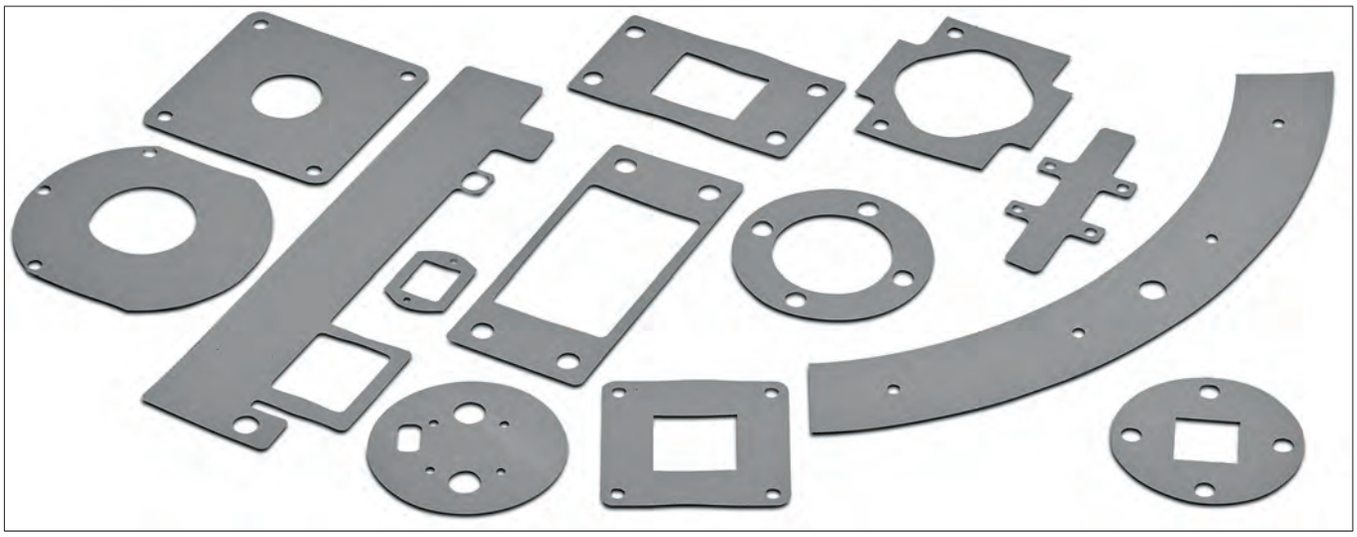
Insulating caps



art. no.	type	dim. [mm]		
		A	B	C
WSI 220 225	TO 220	22.5	11	5.0
WSI TOP 3 280	TO 3 PL/TO 247	28.0	16	
WSI 220 210	TO 220	21.0	11	
WSI TOP 3 235	TOP 3	23.5	18	
WSI TO 3 PL	TO 3 PL/TO 247	34.0	22	5.5

	Foil WSI 0.3 mm	**Foil WSI 0.9 mm**
colour	green	
material thickness	0.3 mm $^{+0.1/-0}$	0.9 mm $^{+0.15/-0.1}$
thermal resistance	0.4 K/W	0.96 K/W
hardness	75 Shore A	
thermal conductivity	1.22 W/m·K	
temperature range	-60°C... +180°C	
insulation resistance	$2.9 \cdot 10^{15}$ Ω·cm	
elongation	100 %	
dielectric strength	10 kV	15 kV
class of inflammability	UL 94 V-0	

Thermally conductive foil made of siliconelastomer



– silicone foil with glass fibre reinforcement
– free from toxic substances
– very good thermal and mechanical properties
– one-sided or double-sided adhesive layer upon request
– cuts and contours according to customer specific drawing specifications

art. no.	material thickness [mm]	art. no.	material thickness [mm]
WFS 09 18	0.178	**WFS 09 23**	0.229

	WFS 09 18	**WFS 09 23**
version	silicone foil with glass fibre reinforcement	
colour	grey	
hardness	85 Shore A	
thermal conductivity	0.9 W/m·K	
temperature range	-60°C... +180°C	
elongation	54 %	
volume resistance	10^{11} Ω·m	
dielectric constant	5.5 [1 kHz]	
tear strength	3,000 psi	
tensile strength	5 kN/m	
dielectric strength	3.5 kV	4.5 kV
class of inflammability	UL 94 V-0	
type of delivery	rolled goods, roll width 300mm/ cuttings on customer's requirement	

Thermal resistances vs. contact pressure / surface TO 220					
pressure [psi]	**10**	**25**	**50**	**100**	**200**
thermal resistance WFS 09 18 [K/W]	6.62	5.93	5.14	4.38	3.61
thermal resistance WFS 09 23 [K/W]	8.51	7.62	6.61	5.63	4.64
thermal impedance WFS 09 18 [K-cm²/W]	11.37	8.87	7.06	5.12	3.37
thermal impedance WFS 09 23 [K-cm²/W]	14.62	11.43	9.06	6.56	4.31

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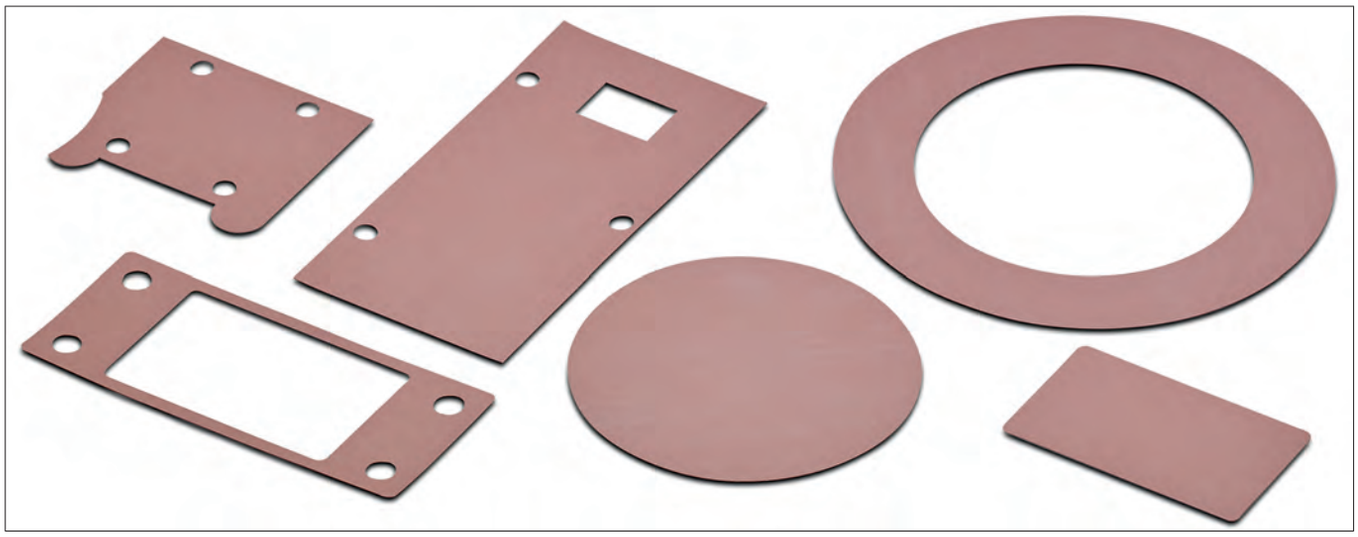
Thermally conductive foil made of siliconelastomer



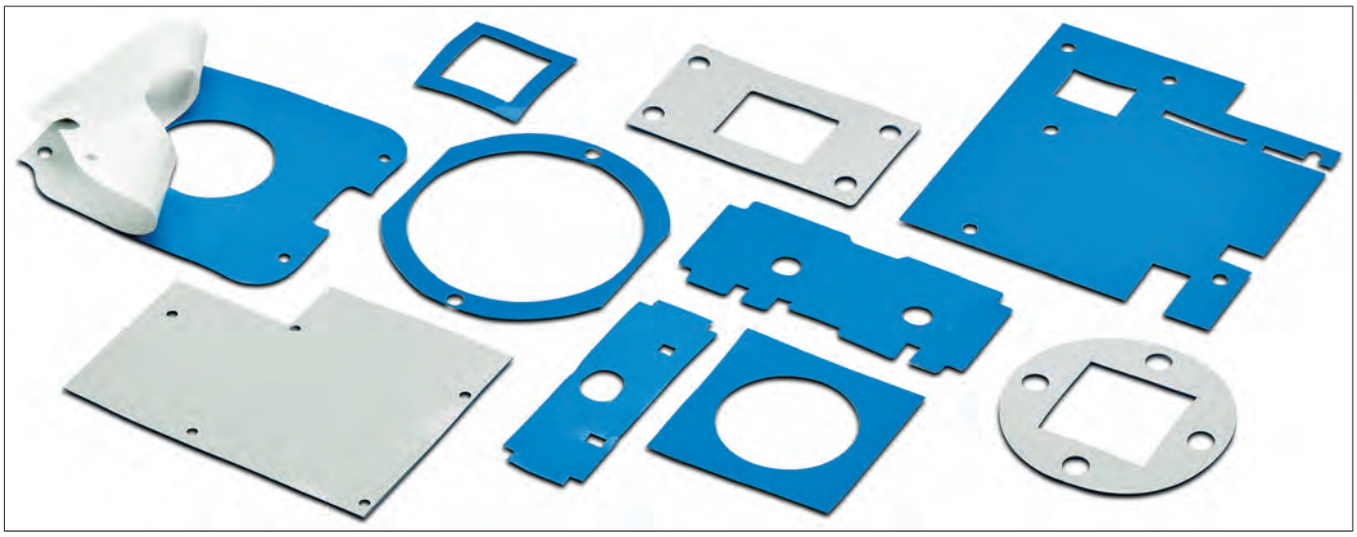
– very good suitable for low tightening torques or spring applications
– good electrical insulating properties
– optimal contacting between device and heatsink
– one-sided adhesive layer upon request
– cuts and contours according to customer specific drawing specifications

art. no.	material thickness [mm]
WFS 16	0.229

	WFS 16
version	silicone foil with glass fibre reinforcement
colour	pink
hardness	92 Shore A
thermal conductivity	1.6 W/m·K
temperature range	-60°C... +180°C
elongation	20 %
volume resistance	10^{10} Ω·m
dielectric constant	6 [1 kHz]
tear strength	1,300 psi
dielectric strength	5.5 kV
class of inflammability	UL 94 V-0
type of delivery	rolled goods, roll width 300mm/ cuttings on customer's requirement

Thermal resistances vs. contact pressure / surface TO 220					
pressure [psi]	10	25	50	100	200
thermal resistance WFS 16 [K/W]	3.96	3.41	2.90	2.53	2.32
thermal impedance WFS 16 [K-cm²/W]	5.93	4.68	3.81	2.93	2.56

Thermally conductive foil made of siliconelastomer



– silicone material with glass fibre reinforcement
– optimal contacting between device and heatsink
– simplified mounting by means of double-sided adhesive layer
– automatic assembling possible
– cuts and contours according to customer specific drawing specifications

art. no.	material thickness [mm]
WFS 18	0.203

	WFS 18
version	silicone foil with glass fibre reinforcement
colour	blue
hardness	75 Shore A
thermal conductivity	1.8 W/m·K
temperature range	-60°C... +180°C
elongation	22 %
volume resistance	10^{11} Ω·m
dielectric constant	6.1 [1 kHz]
tear strength	238 psi
tensile strength	0,34 kN/m
dielectric strength	3 kV
class of inflammability	UL 94 V-0
type of delivery	rolled goods, roll width 250mm/ cuttings on customer's requirement

Thermal resistances vs. contact pressure / surface TO 220					
pressure [psi]	**10**	**25**	**50**	**100**	**200**
thermal resistance WFS 18 [K/W]	1.54	1.52	1.51	1.49	1.46
thermal impedance WFS 18 [K-cm²/W]	2.31	1.75	1.43	1.31	1.25

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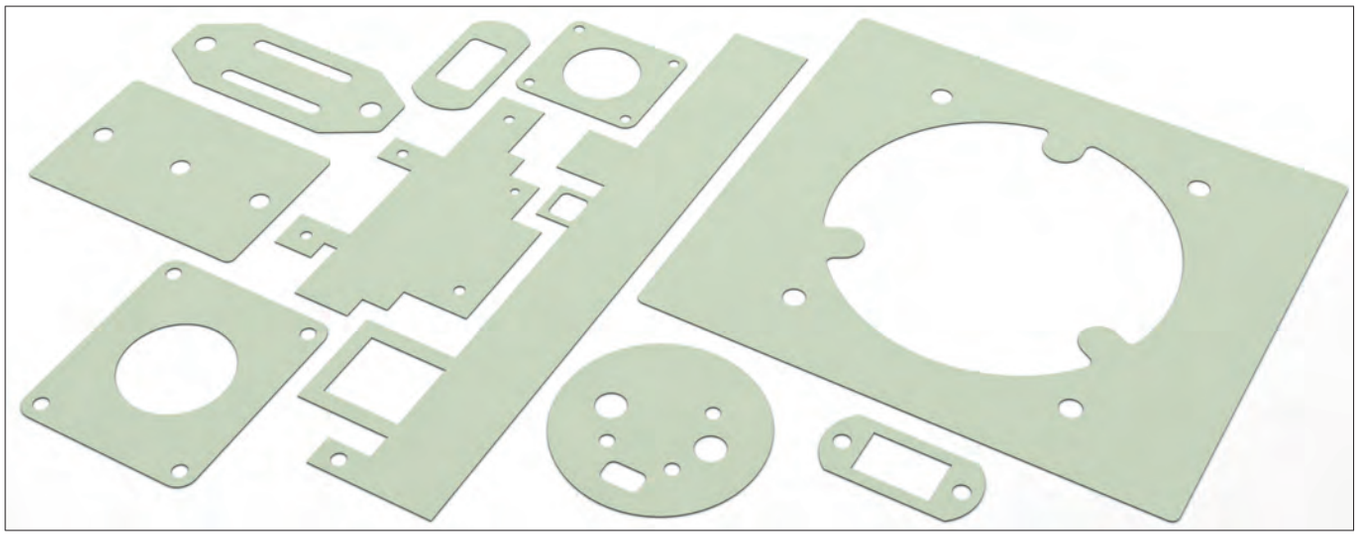
Thermally conductive foil made of siliconelastomer



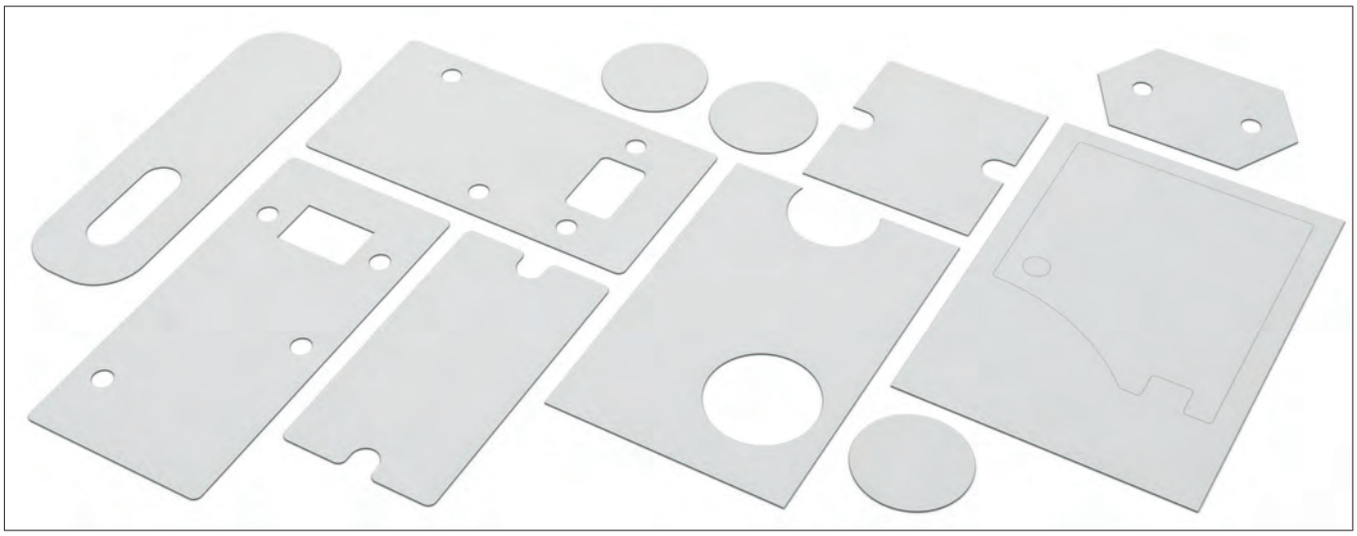
– silicone foil with a high operating temperature range
– high mechanical stability
– easy handling and application
– cuts, punch-outs and contours according to customer-specific drawing specifications

art. no.	material thickness [mm]	art. no.	material thickness [mm]
WFK 18	0.225	**WFK 18 GK**	0.250
WFK 18 G		**WFK 18 K**	

	WFK 18	**WFK 18 G**	**WFK 18 GK**	**WFK 18 K**
version	silicone foil without glass fibre reinforcement, one-sided protection foil	silicone foil with glass fibre reinforcement, one-sided protection foil	silicone foil with glass fibre reinforcement and one-sided adhesive layer, one-sided protection foil	silicone foil without glass fibre reinforcement and one-sided adhesive layer, one-sided protection foil
colour	lime-green			
density	2.29 g/cm³			
hardness	65 - 75 Shore A			
thermal conductivity	1.8 W/m·K			
thermal resistance	0.32 K/W	0.5 K/W	0.55 K/W	0.39 K/W
temperature range	-60°C ... +250°C			
elongation	75 %			
volume resistance	$2.5 \cdot 10^{11}$ Ω·m			
dielectric constant	2.9 [1 kHz]			
tensile strength	2 N/mm²	7,5 N/mm²		2 N/mm²
dielectric strength	8 kV			
class of inflammability	UL 94 V-0			
type of delivery	plates, usable area 300x250mm/ other dimensions upon request			

Thermal resistances vs. contact pressure				
pressure [psi]	**7.25**	**29**	**58**	**87**
thermal resistance WFK 18 [K/W]	0.50	0.42	0.37	0.33
thermal impedance WFK 18 [K-cm²/W]	1.75	1.38	1.25	1.18

Thermally conductive foil made of siliconelastomer



– silicone foil with very good thermal properties
– good electrical insulation resistance
– easy handling and application
– cuts and contours according to customer specifications

art. no.	material thickness [mm]	art. no.	material thickness [mm]
WFK 25	0.225	**WFK 25 GK**	0.250
WFK 25 G		**WFK 25 K**	

	WFK 25	WFK 25 G	WFK 25 GK	WFK 25 K
version	silicone foil without glass fibre reinforcement, one-sided protection foil	silicone foil with glass fibre reinforcement, one-sided protection foil	silicone foil with glass fibre reinforcement and one-sided adhesive layer, one-sided protection foil	silicone foil without glass fibre reinforcement and one-sided adhesive layer, one-sided protection foil
colour	white			
density	2.33 g/cm³			
hardness	70 - 80 Shore A			
thermal conductivity	2.5 W/m·K			
thermal resistance	0,22 K/W	0,25 K/W	0,3 K/W	0,265 K/W
temperature range	-60°C ... +250°C			
elongation	31 %			
volume resistance	$2.5 \cdot 10^{11}$ Ω·m			
dielectric constant	3 [1 kHz]			
tensile strength	1,5 N/mm²	7,5 N/mm²		1,5 N/mm²
dielectric strength	1.5 kV			
class of inflammability	UL 94 V-0			
type of delivery	plates, usable area 300x250mm/ other dimensions upon request		plates, usable area 300x235mm/ other dimensions upon request	

Thermal resistances vs. contact pressure				
pressure [psi]	**7.25**	**29**	**58**	**87**
thermal resistance WFK 25 [K/W]	0.38	0.33	0.30	0.27
thermal impedance WFK 25 [K-cm²/W]	1.13	1.00	0.92	0.83

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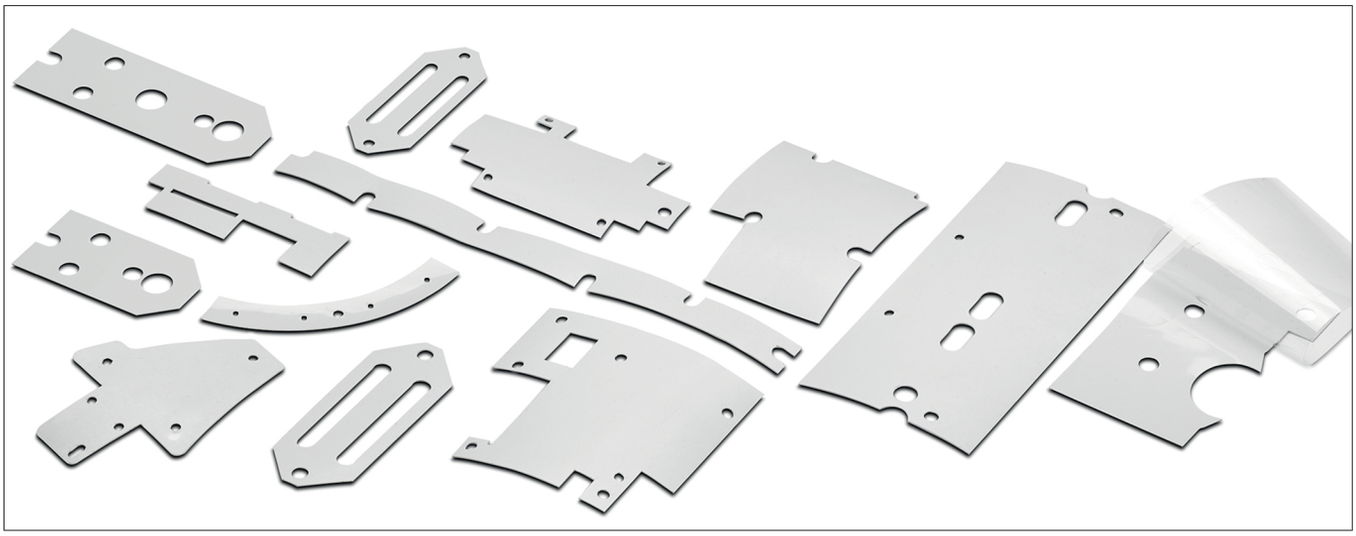
Thermally conductive foil made of siliconelastomer

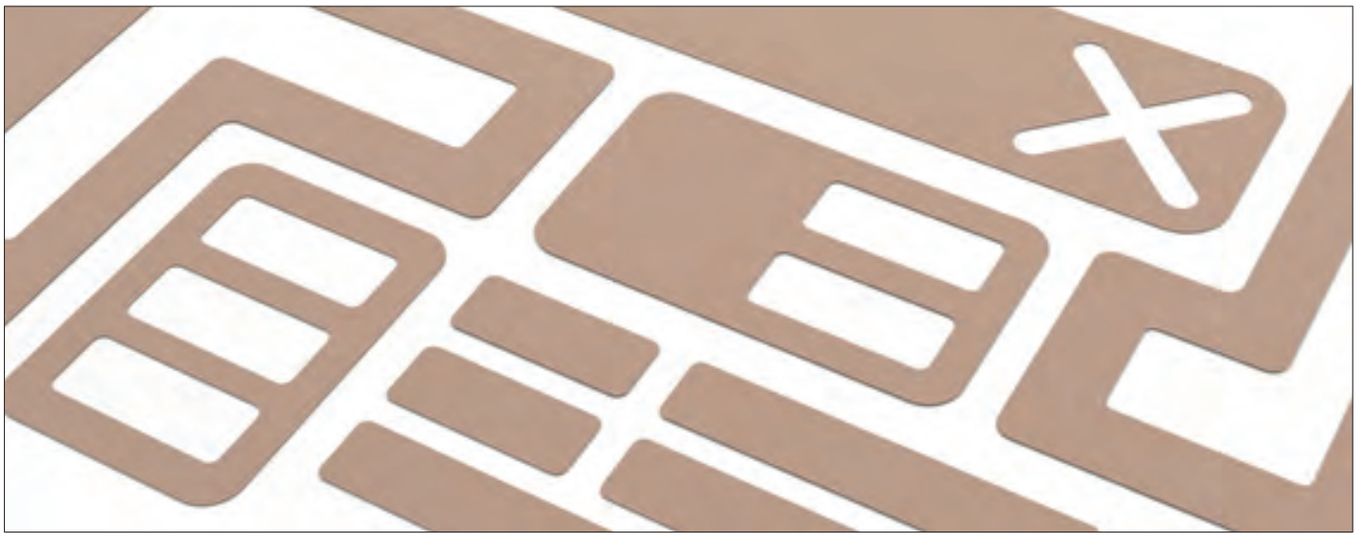


– silicone-foil with very good thermal properties
– excellent insulating properties
– simple and stable handling by means of glass fibre carrier material
– one-sided adhesive layer upon request
– cuts and contours according to customer specific drawing specifications

art. no.	material thickness [mm]
WFSA 30 50	0.508

	WFSA 30 50
version	silicone foil with glass fibre reinforcement
colour	white
hardness	90 Shore A
thermal conductivity	3 W/m·K
temperature range	-60°C ... +200°C
volume resistance	10^{11} Ω·m
dielectric constant	7 [1 kHz]
heat capacity	1 J/g·K
dielectric strength	4 kV
class of inflammability	UL 94 V-0
type of delivery	rolled goods, roll width 250mm/ cuttings on customer's requirement

Thermally conductive foil made of siliconelastomer



– silicone material with glass fibre reinforcement
– very good thermal conductivity, electrical insulating
– excellent mechanical and physical properties
– cuttings and different punchings on customer's requirement

art. no.	material thickness [mm]	art. no.	material thickness [mm]
WFF 33 02	0.2	**WFF 33 02 K**	0.2
WFF 33 03	0.3	**WFF 33 03 K**	0.3

	WFF 33 02	**WFF 33 03**	**WFF 33 02 K**	**WFF 33 03 K**
version	silicone foil with glass fibre reinforcement		silicone foil with glass fibre reinforcement, double-sided adhesive layer	
colour	light brown			
density	2.7 g/cm³			
hardness	80 IRHD	94 IRHD	80 IRHD	94 IRHD
thermal conductivity	3.3 W/m·K			
temperature range	-40°C... +150°C			
elongation	3 %			
volume resistance	$1.6 \cdot 10^{12}$ W·m	$1.8 \cdot 10^{12}$ W·m	$1.6 \cdot 10^{12}$ W·m	$1.8 \cdot 10^{12}$ W·m
dielectric constant	2.9 [50Hz] / 2.8 [1kHz] / 2.8 [1MHz]	3.6 [50Hz] / 3.6 [1kHz] / 3.6 [1MHz]	2.9 [50Hz] / 2.8 [1kHz] / 2.8 [1MHz]	3.6 [50Hz] / 3.6 [1kHz] / 3.6 [1MHz]
heat capacity	1 J/g·K			
tear strength	782 psi	810 psi	782 psi	810 psi
dielectric strength	6 kV	9 kV	6 kV	9 kV
class of inflammability	UL 94 V-0			
type of delivery	rolled goods, different roll widths on request/ cuttings on customer's requirement			

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Thermally conductive foil made of siliconelastomer

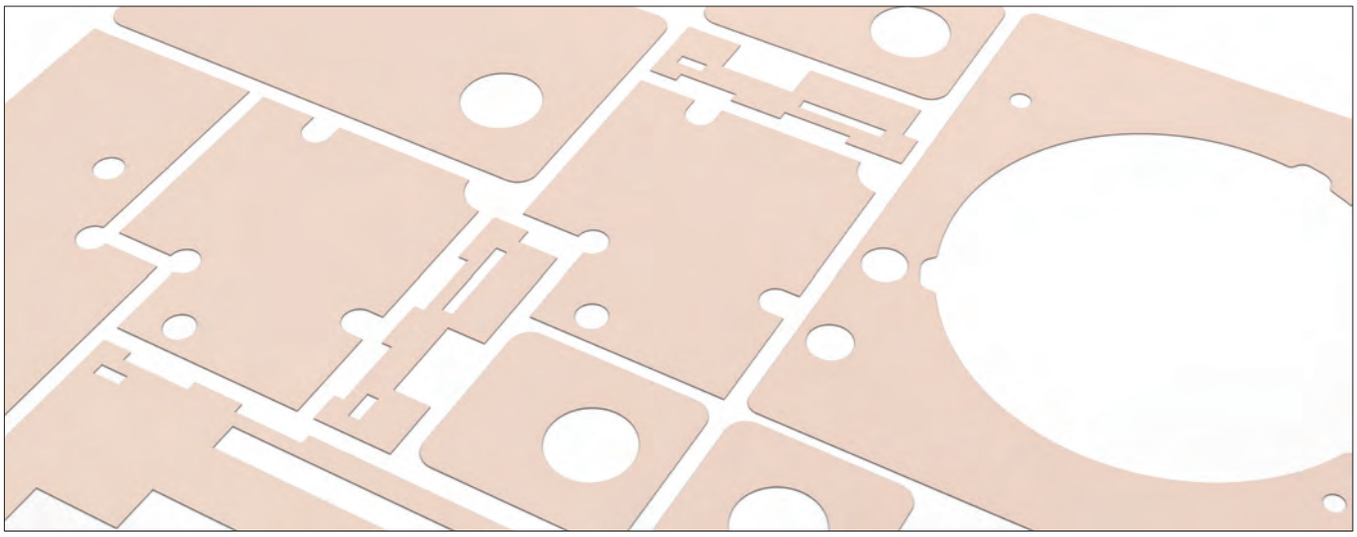
– silicone foil with very good thermal conduction properties
– high dimensional stability due to glass fibre layer
– good electrical properties
– excellent processing properties
– contour and drawing parts according to customer specifications

art. no.	material thickness [mm]
WFS 34 020	0.20
WFS 34 030	0.30
WFS 34 045	0.45

	WFS 34
version	silicone foil with glass fibre reinforcement
colour	dark gray
density	2.84 g/cm^3
hardness	90 Shore A
thermal conductivity	3.4 W/m·K
temperature range	-40°C ... +180°C
volume resistance	3·10^{13} Ω·cm
dielectric strength	7 kV
class of inflammability	UL 94 V-0
type of delivery	rolled goods, roll width 300mm/ other dimensions upon request

Technical introduction ➔ **A 2 – 8**

Thermally conductive foil made of siliconelastomer



– silicone foil with very good thermal conductivity
– high insulation and dielectric strength
– very large operating temperature range
– one-sided adhesive coating as an mounting aid
– customer-specific cuts and punch-outs according to drawing

art. no.	material thickness [mm]
WFK 35 012	0.125
WFK 35 022	0.225
WFK 35 G	
WFK 35 GK	0.250
WFK 35 K	

	WFK 35	**WFK 35 G**	**WFK 35 GK**	**WFK 35 K**
version	silicone foil without glass fibre reinforcement, one-sided protection foil	silicone foil with glass fibre reinforcement, one-sided protection foil	silicone foil with glass fibre reinforcement and one-sided adhesive layer, one-sided protection foil	silicone foil without glass fibre reinforcement and one-sided adhesive layer, one-sided protection foil
colour	pink			
density	1.97 g/cm³			
hardness	70 - 80 Shore A			
thermal conductivity	3.5 W/m·K			
thermal resistance	0.16 K/W	0.22 K/W	0.27 K/W	0.26 K/W
temperature range	-60°C ... +250°C			
elongation	25 %			
volume resistance	1.3·10¹⁴ Ω·m			
dielectric constant	2.3 [1 kHz]			
tensile strength	1,3 N/mm²	10 N/mm²		1,3 N/mm²
dielectric strength	1.5 kV			
class of inflammability	UL 94 V-0			
type of delivery	plates, usable area 300x250mm/ other dimensions upon request		plates, usable area 300x235mm/ other dimensions upon request	

Thermal resistances vs. contact pressure				
pressure [psi]	**7.25**	**29**	**58**	**87**
thermal resistance WFK 35 [K/W]	0.25	0.21	0.17	0.15
thermal impedance WFK 35 [K-cm²/W]	0.94	0.81	0.75	0.56

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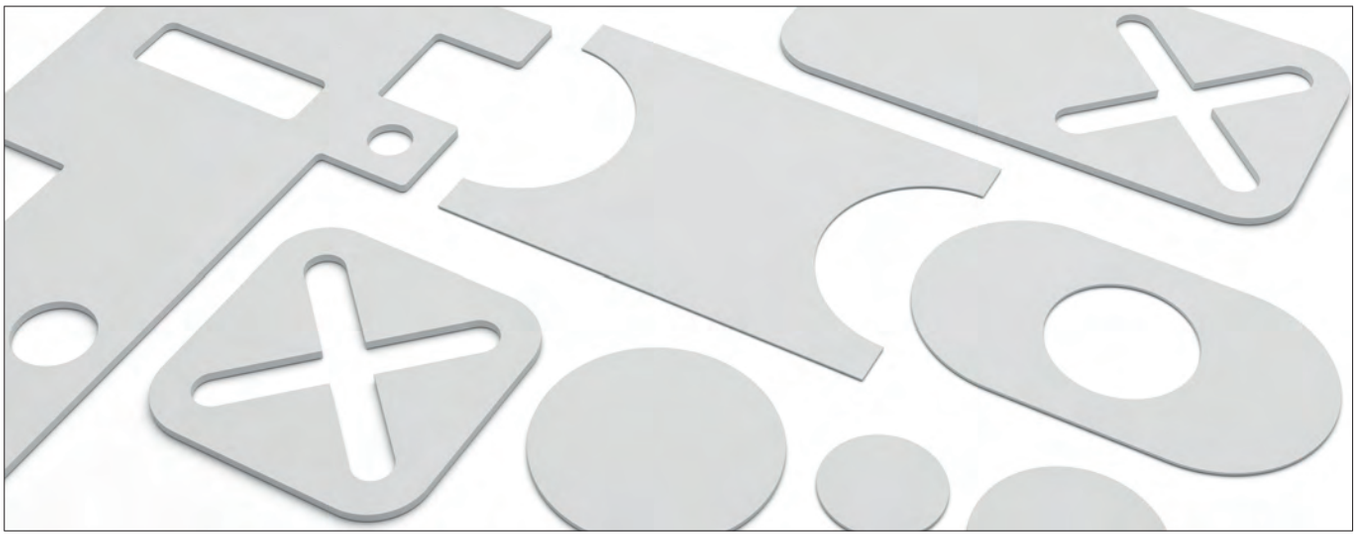
Thermally conductive foil made of siliconelastomer



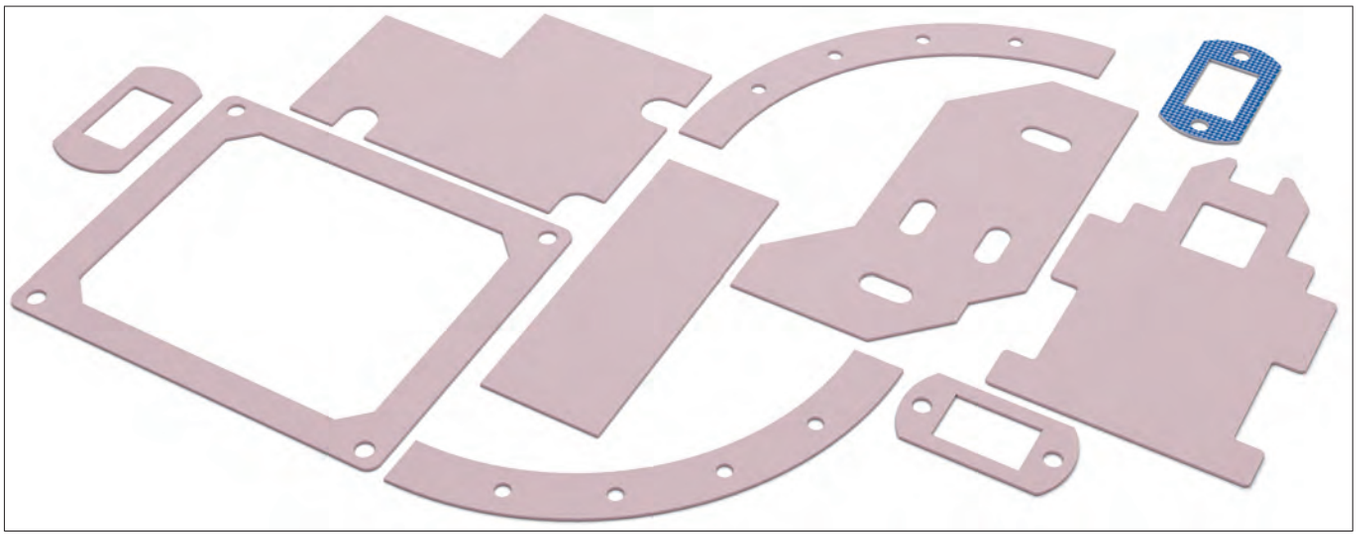
– silicone foil with ceramic filling and high thermal conductivity
– optimal connection of electronic components
– high mechanical stability and easy handling
– extreme aging- and chemical resistance
– special cuts or geometries according to customer specifications

art. no.	material thickness [mm]	art. no.	material thickness [mm]
WFC 50 02	0.20	**WFC 50 04**	0.45
WFC 50 03	0.30	**WFC 50 08**	0.80

	WFC 50 02	WFC 50 03	WFC 50 04	WFC 50 08
version	silicone foil with ceramic filling and glass fibre reinforced design			
colour	white			
thermal conductivity	5 W/m·K			
temperature range	-50°C ... +200°C			
volume resistance	$1.7 \cdot 10^{13}$ Ω·m	$7.9 \cdot 10^{13}$ Ω·m	$9.2 \cdot 10^{13}$ Ω·m	$8.9 \cdot 10^{13}$ Ω·m
dielectric constant	3.3 [1 MHz]			
dielectric strength	3 kV	6 kV	9 kV	>10 kV
class of inflammability	UL 94 V-0			
type of delivery	plates, usable area 440x510mm/ other dimensions upon request			

Thermal resistances vs. contact pressure		
pressure [psi]	**29**	**145**
thermische impedance WFC 50 02 [K-cm²/W]	1.87	0.71
thermische impedance WFC 50 03 [K-cm²/W]	2.06	0.96
thermische impedance WFC 50 04 [K-cm²/W]	2.26	1.10
thermische impedance WFC 50 08 [K-cm²/W]	3.35	1.74

Thermally conductive foil made of siliconelastomer



– silicone foil with excellent thermal conductivity
– very good electrical properties
– adhesive coating for easy assembly handling
– particularly suitable for high-performance applications
– cuts and contours according to customer's drawing specifications

art. no.	material thickness [mm]
WFK 65	0.250
WFK 65 K	0.275

	WFK 65	**WFK 65 K**
version	silicone foil without glass fibre reinforcement, one-sided protection foil	silicone foil with adhesive layer, one-sided protection foil
colour	red	
density	1.23 g/cm³	
hardness	60 - 70 Shore A	
thermal conductivity	6,5 W/m·K	
thermal resistance	0,09 K/W	
temperature range	-40°C... +200°C	
elongation	2 %	
volume resistance	$2 \cdot 10^{14}$ Ω·m	
dielectric constant	2.4 [1 kHz]	
tensile strength	13 N/mm²	
dielectric strength	1 kV	
class of inflammability	UL 94 V-0	
type of delivery	plates, usable area 300x250mm/ other dimensions upon request	plates, usable area 300x235mm/ other dimensions upon request

Thermal resistances vs. contact pressure				
pressure [psi]	**7.25**	**29**	**58**	**87**
thermal resistance WFK 65 [K/W]	0.18	0.12	0.10	0.08
thermal impedance WFK 65 [K-cm²/W]	0.68	0.50	0.39	0.31

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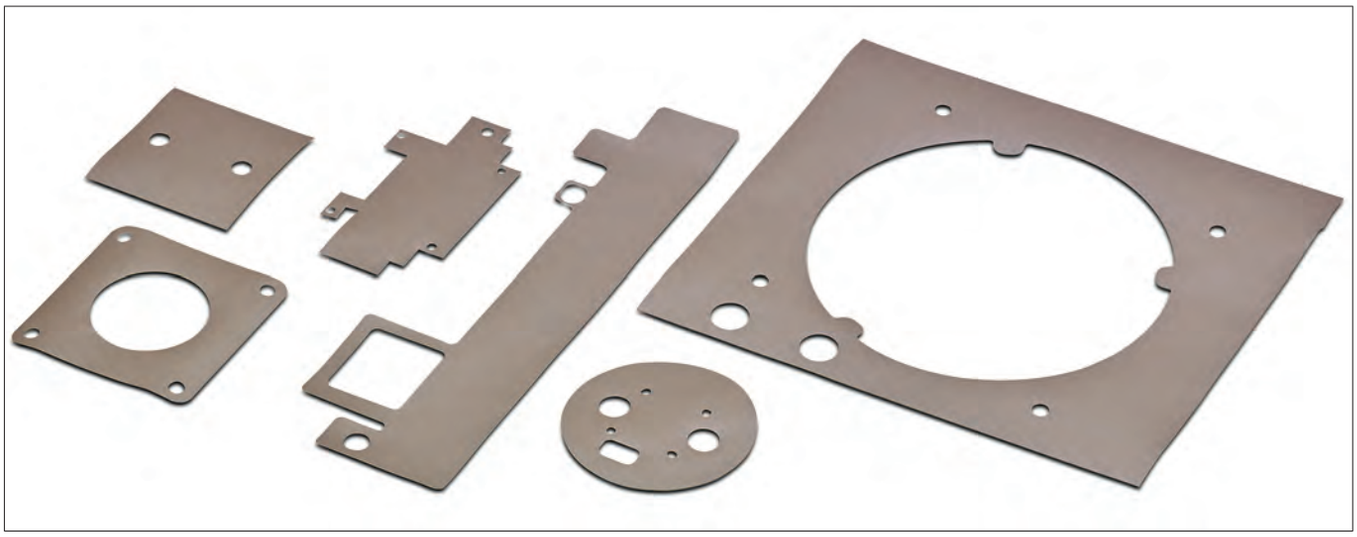
Thermally conductive foil made of siliconelastomer

– silicone foil with excellent thermal conductivity
– very good insulation properties
– high material strength due to glass fibre reinforcement
– simple handling and application
– customised cuts and geometries according to drawing

art. no.	material thickness [mm]
WFS 80 020	0.20
WFS 80 030	0.30
WFS 80 045	0.45

	WFS 80
version	silicone foil with glass fibre reinforcement
colour	light gray
density	1.6 g/cm³
hardness	85 Shore A
thermal conductivity	8 W/m·K
temperature range	-40°C ... +180°C
volume resistance	$2.9 \cdot 10^{14}$ Ω·cm
tear strength	1,885 psi
tensile strength	45 kN/m
dielectric strength	7 kV
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 420x500mm/ other dimensions upon request

Silicone-free thermal conductive foils



– thermal conductive foil based on polyester
– particularly suitable for silicone-free applications
– very good insulating properties
– one-sided adhesive layer upon request
– cuts and contours according to customer specific drawing specifications

art. no.	material thickness [mm]
WFPK 09	0.152

	WFPK 09
version	kapton carrier foil with ceramic filled polyester resin double-sided fully coated
colour	brown
hardness	90 Shore A
thermal conductivity	0.9 W/m·K
temperature range	-20°C... +150°C
elongation	40 %
volume resistance	10^{12} Ω·m
dielectric constant	5 [1 kHz]
tear strength	5,000 psi
tensile strength	5 kN/m
dielectric strength	6 kV
class of inflammability	UL 94 V-0
type of delivery	rolled goods, roll width 292mm/ cuttings on customer's requirement

Thermal resistances vs. contact pressure / surface TO 220					
pressure [psi]	10	25	50	100	200
thermal resistance WFPK 09 [K/W]	5.64	5.04	4.34	3.69	3.12
thermal impedance WFPK 09 [K-cm²/W]	9.68	7.56	5.93	4.37	2.87

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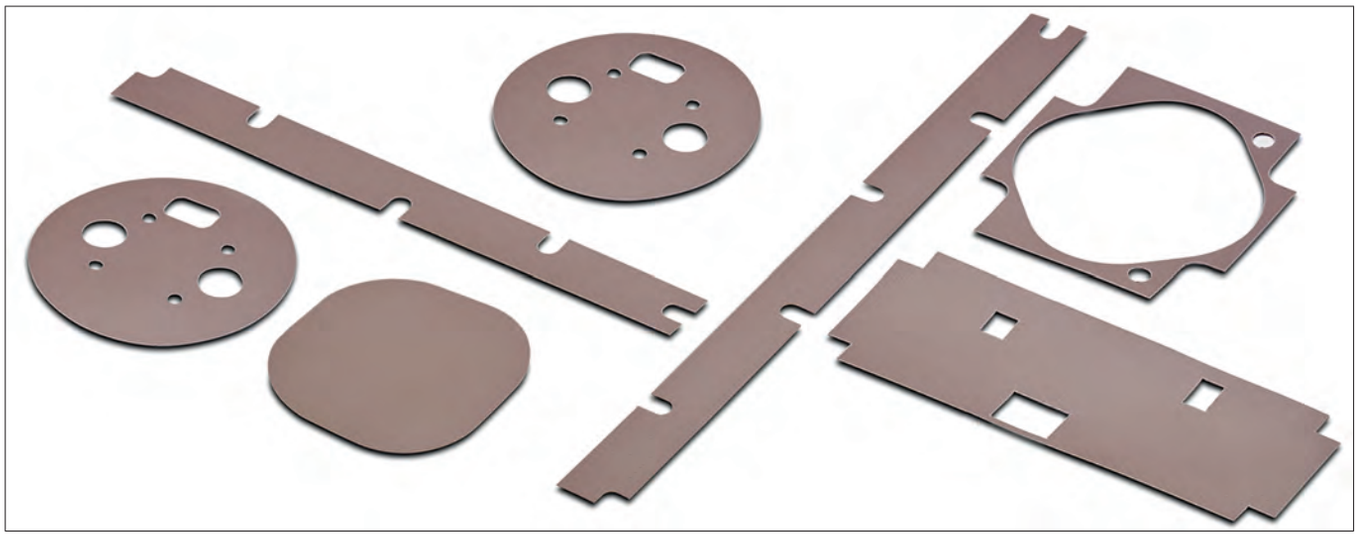
Silicone-free thermal conductive foils



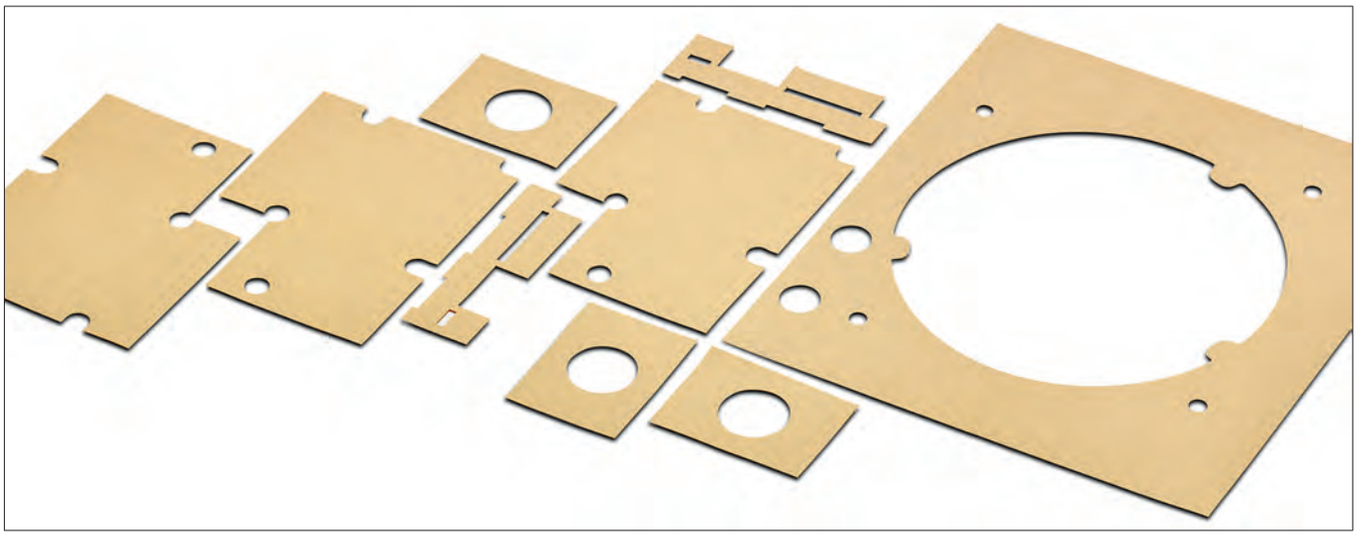
– thermal conductive foil based on polyester
– particularly suitable for silicone-free applications
– very good thermal and mechanical properties
– simplified mounting by means of adhesive layers upon request
– cuts and contours made of sheet or roll material as per your specifications

art. no.	material thickness [mm]
WFP 09	0.229

	WFP 09
version	glass fibre-carrier foil with ceramic filled polyester resin double-sided fully coated
colour	brown
hardness	90 Shore A
thermal conductivity	0.9 W/m·K
temperature range	-20°C... +150°C
elongation	10 %
volume resistance	10^{11} Ω·m
dielectric constant	5.5 [1 kHz]
tear strength	7,000 psi
tensile strength	18 kN/m
dielectric strength	2.5 kV
class of inflammability	UL 94 V-0
type of delivery	rolled goods, roll width 300mm/ cuttings on customer's requirement

Thermal resistances vs. contact pressure / surface TO 220					
pressure [psi]	**10**	**25**	**50**	**100**	**200**
thermal resistance WFP 09 [K/W]	5.85	5.61	5.13	4.59	4.12
thermal impedance WFP 09 [K-cm²/W]	10.12	8.43	7.06	5.37	3.81

Silicone-free thermal conductive foils



– thermal conductive foil for silicone-free applications
– thermal conductive foil based on polyester
– very good insulating properties
– one-sided adhesive layer upon request
– cuts and contours according to customer specific drawing specifications

art. no.	material thickness [mm]
WFPK 13	0.152

	WFPK 13
version	kapton carrier foil with ceramic filled polyester resin double-sided fully coated
colour	yellow
hardness	90 Shore A
thermal conductivity	1.3 W/m·K
temperature range	-20°C... +150°C
elongation	40 %
volume resistance	10^{12} Ω·m
dielectric constant	3.7 [1 kHz]
tear strength	5,000 psi
tensile strength	5 kN/m
dielectric strength	6 kV
class of inflammability	UL 94 V-0
type of delivery	rolled goods, roll width 292mm/ cuttings on customer's requirement

Thermal resistances vs. contact pressure / surface TO 220					
pressure [psi]	**10**	**25**	**50**	**100**	**200**
thermal resistance WFPK 13 [K/W]	3.76	3.35	2.75	2.30	2.03
thermal impedance WFPK 13 [K-cm²/W]	6.50	5.00	3.75	2.68	1.88

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Silicone-free thermal conductive foils

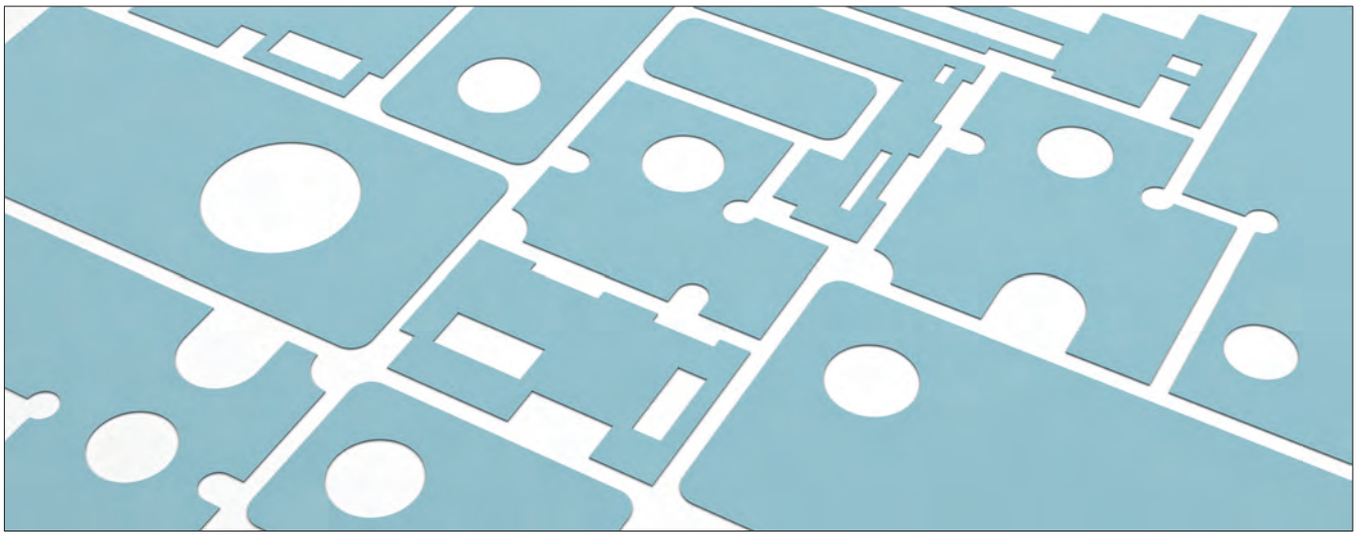
– polyurethane-based thermal conductive foil
– very good mechanical properties
– excellent insulation properties
– adhesive coating for easy handling
– cut to size and contours according to customised drawing specifications

art. no.	material thickness [mm]
WFKF 18 015	0.150
WFKF 18 017 K	0.175
WFKF 18 032 K	0.325

	WFKF 18 015	**WFKF 18 ... K**
version	ceramic-filled heat-conducting foil based on polyurethane, one-sided protective film	ceramic-filled heat-conducting foil based on polyurethane including adhesive coating, one-sided protective film
colour	blue	
density	2.26 g/cm^3	
hardness	80 - 90 Shore A	
thermal conductivity	1.8 W/m·K	
thermal resistance	0.2 K/W	
temperature range	-40°C... +125°C	
elongation	130 %	
volume resistance	1.4·10^{14} W·m	
dielectric constant	3.2 [1 kHz]	
tensile strength	3 N/mm^2	
dielectric strength	4 kV	
class of inflammability	UL 94 V-0	
type of delivery	plates, usable area 500x470mm/ other dimensions upon request	plates, usable area 500x460mm/ other dimensions upon request

Thermal resistances vs. contact pressure				
pressure [psi]	**7.25**	**29**	**58**	**87**
thermal resistance WFKF 18 [K/W]	0.19	0.15	0.12	0.11
thermal impedance WFKF 18 [K-cm^2/W]	1.23	0.94	0.74	0.70

Silicone-free thermal conductive foils



– thermal conductive foil for silicone-free applications
– epoxy-based thermal conductive foil
– excellent insulation properties
– cuts and contours according to customised drawing specifications

art. no.	material thickness [mm]
WFKF 30 02	0.2

	WFKF 30 02
version	silicone-free, ceramic-filled heat conducting foil
colour	light blue
density	1.44 g/cm³
hardness	70 - 85 Shore A
thermal conductivity	3 W/m·K
thermal resistance	0.165 K/W
temperature range	-40°C... +150°C
elongation	>50 %
volume resistance	4.1·10⁹ Ω·m
dielectric constant	2 [1 kHz]
tensile strength	1 N/mm²
dielectric strength	6 kV
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 500x500mm/ other dimensions upon request

Thermal resistances vs. contact pressure				
pressure [psi]	7.25	29	58	87
thermal resistance WFKF 30 02 [K/W]	0.25	0.18	0.16	0.16
thermal impedance WFKF 30 02 [K-cm²/W]	0.49	0.35	0.32	0.31

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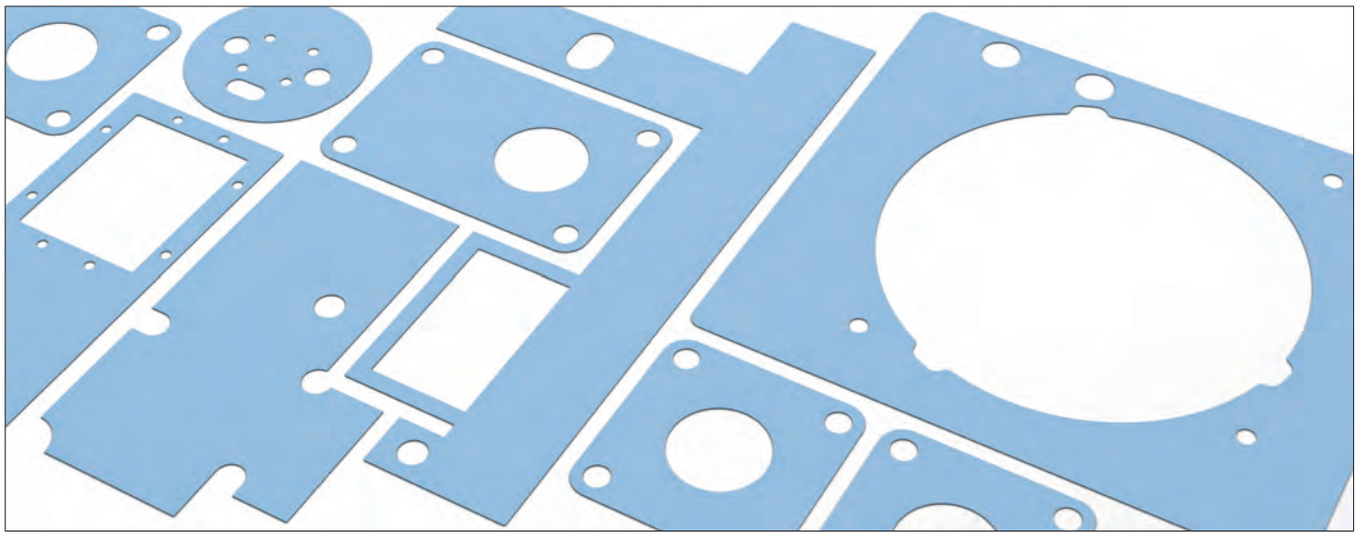
Silicone-free thermal conductive foils



– heat conductive foil based on polyurethane
– very good mechanical properties
– high thermal conductivity for smallest heat transfer resistances
– adhesive coating for easy handling (WFK 60 K)
– cuts and contours according to customer's drawing specifications

art. no.	material thickness [mm]
WFK 60 01	0.100
WFK 60 02	0.200
WFK 60 03	0.300
WFK 60 K	0.225

	WFK 60	**WFK 60 K**
version	ceramic-filled heat-conducting foil based on polyurethane	ceramic-filled heat-conducting foil based on polyurethane including adhesive coating, one-sided protective film
colour	light blue	
density	1.46 g/cm^3	
hardness	70 - 85 Shore A	
thermal conductivity	6 W/m·K	
thermal resistance	0.82 K/W	
temperature range	-40°C... +125°C	
elongation	150 %	
volume resistance	2·10^{11} Ω·m	
dielectric constant	3.1 [1 kHz]	
tensile strength	2 N/mm^2	
dielectric strength	4 kV	
class of inflammability	UL 94 V-0	
type of delivery	plates, usable area 300x235mm/ other dimensions upon request	plates, usable area 300x230mm/ other dimensions upon request

Thermal resistances vs. contact pressure				
pressure [psi]	**7.25**	**29**	**58**	**87**
thermal resistance WFK 60 [K/W]	0.24	0.16	0.12	0.09
thermal impedance WFK 60 [K-cm^2/W]	0.88	0.56	0.38	0.31

Thermal conductive foil made of aluminium

– double-sided coated aluminium foil
– good replacement for thermal pastes
– electroconductive with wide temperature range
– low heat-transmission resistance between device and heatsink
– cuts and contours according to customer specific drawing specifications

art. no.	material thickness [mm]
WFQ 25	0.152

	WFQ 25
version	aluminium foil with double-sided coating
colour	black
hardness	93 Shore A
thermal conductivity	2.5 W/m·K
temperature range	-60°C... +180°C
volume resistance	10^2 Ω·m
dielectric strength	electrically conductive
class of inflammability	UL 94 V-0
type of delivery	rolled goods, roll width 300mm/ cuttings on customer's requirement

Thermal resistances vs. contact pressure / surface TO 220					
pressure [psi]	**10**	**25**	**50**	**100**	**200**
thermal resistance WFQ 25 [K/W]	2.44	1.73	1.23	1.05	0.92
thermal impedance WFQ 25 [K-cm²/W]	3.25	1.88	1.38	0.94	0.75

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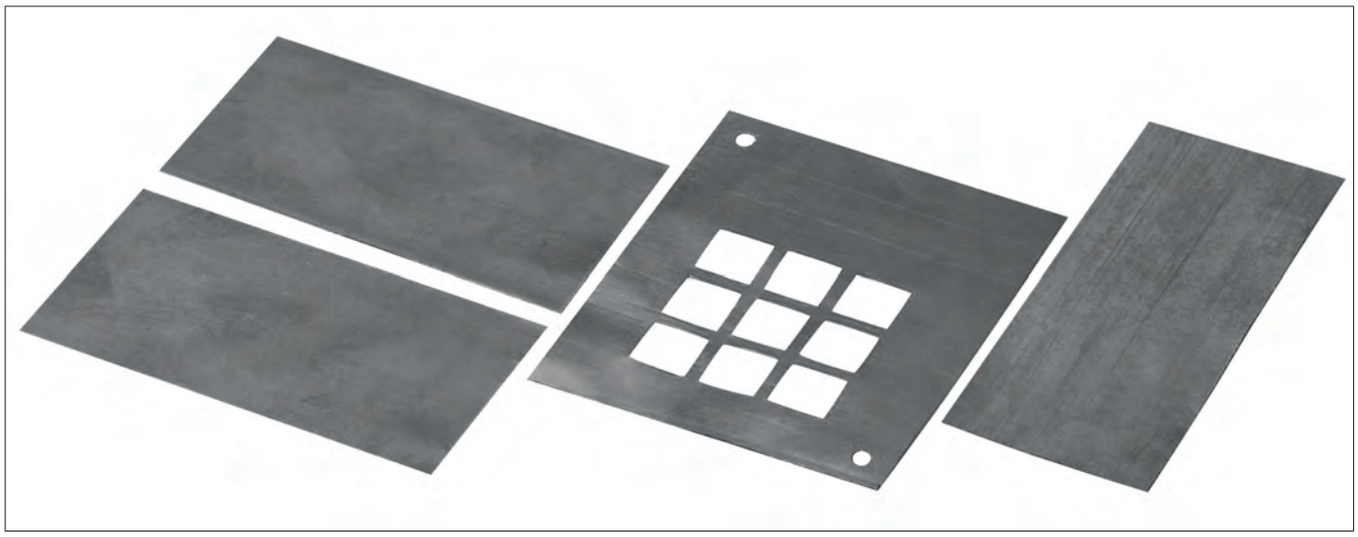
High thermoconducting graphite foils

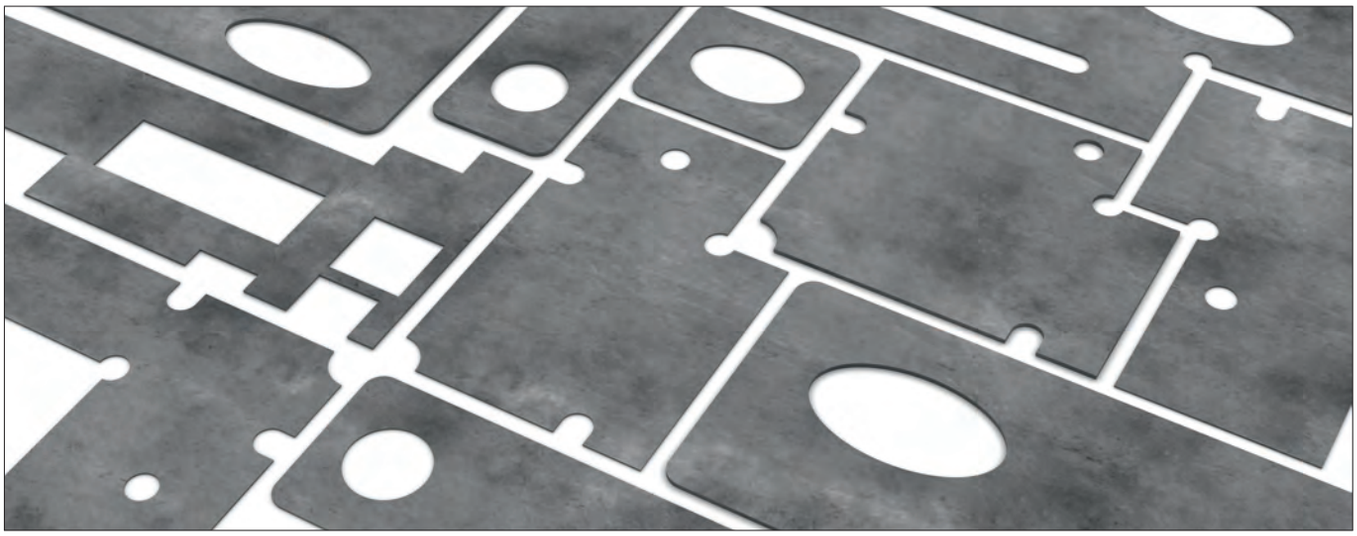


– high-compressed anisotropic natural graphite
– very good thermal characteristics
– optimal for heat spreading
– high operating temperature range
– tape width (B) available in different dimensions and lengths
– different material thicknesses and coatings upon request
– customer specified cuttings and stampings acc. to drawing

art. no.	B [mm]
WLFG S 900 R 25	25
WLFG S 900 R 50	50
WLFG S 900 R 100	100

	WLFG S 900
version	graphite foil, electrically conductive
material thickness	0.15 mm
version	without adhesive coating
colour	dark gray
density	>1.6 g/cm^3
hardness	30 Shore D
thermal conductivity z (x/y)	7.5 (>450) W/m·K
thermal resistance	0,08 K/W
specific thermal resistance	34°C mm^2/W
temperature range	-40°C... +500°C
tear strength	10 N/mm^2
elongation at break	5 %
class of inflammability	UL 94 V-0
type of delivery	sold by the meter

High thermoconducting graphite foils



– highly thermally conductive graphite foil
– with and without adhesive coating
– very good temperature resistance
– ideally suited as a heat spreader
– customer-specific cuts and molded parts

art. no.	material thickness [mm]	art. no.	material thickness [mm]
WLFG 9813 R310	0.13	**WLFG 9813 K R310**	0.13
WLFG 9825 R310	0.25	**WLFG 9825 K R310**	0.25
WLFG 9850 R310	0.50	**WLFG 9850 K R310**	0.50

	WLFG 98 ...	**WLFG 98 ... K**
version	graphite foil, electrically conductive	
version	without adhesive coating	adherent layer on one side
colour	grey	
hardness	85 Shore A	
thermal conductivity z (x/y)	8 (140) W/m·K	
temperature range	-240°C ... +350°C	
volume resistance	$11 \cdot 10^{-4}$ Ω·cm	
dielectric constant	<0,001 [1 MHz]	
class of inflammability	UL 94 V-0	
type of delivery	rolled goods, roll width 310mm/ other dimensions upon request/ sheet material auf Anfrage	

Thermal resistances vs. contact pressure / surface TO 220			
pressure [psi]	**10**	**29**	**145**
thermal impedance WLFG 9813 (K) R310 [K-cm²/W]	0.77	0.58	0.39
thermal impedance WLFG 9825 (K) R310 [K-cm²/W]	1.55	1.00	0.64
thermal impedance WLFG 9850 (K) R310 [K-cm²/W]	2.60	1.48	1.00

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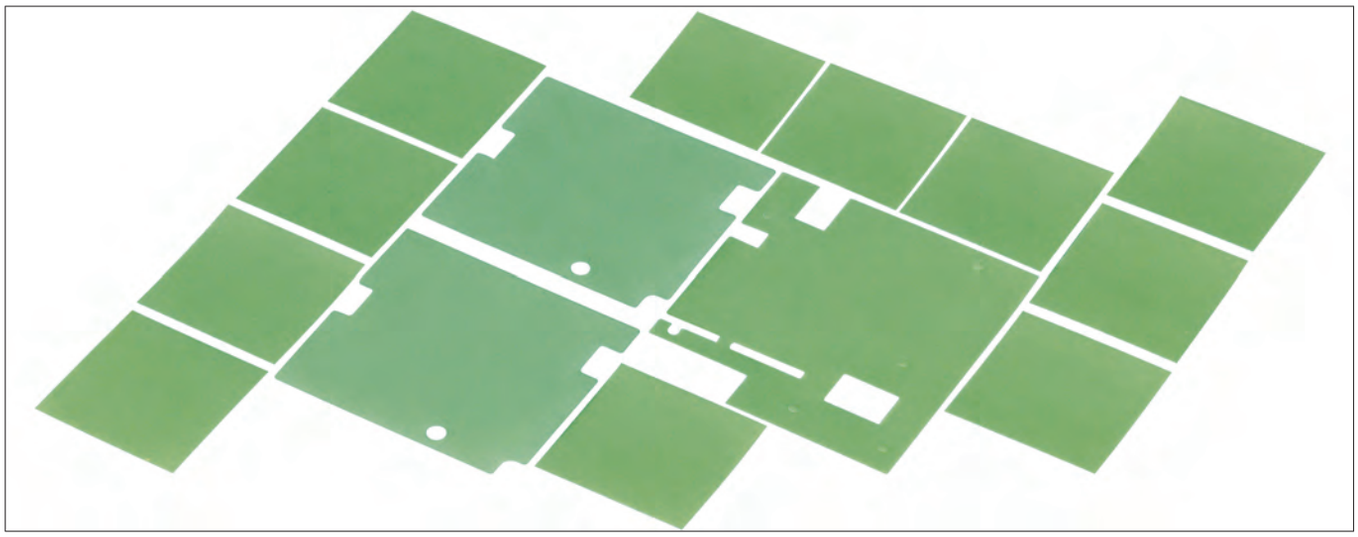
Thermal conductive foil one-sided adhesive

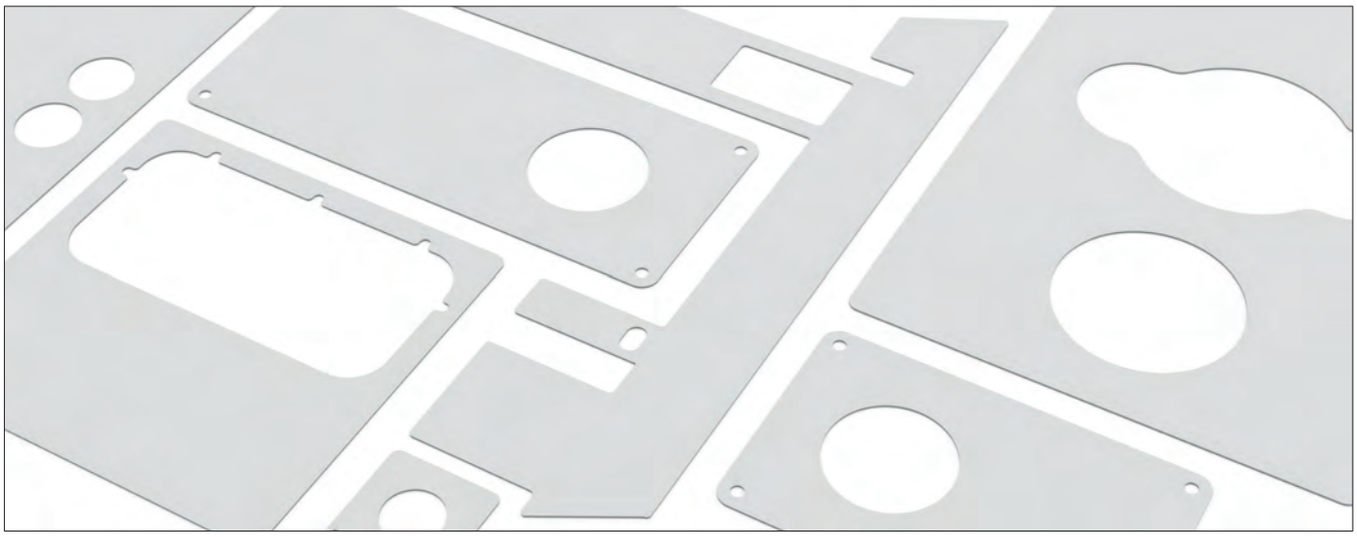


– one-side adhesive thermal conductive foil
– glass fibre reinforced design
– very good thermal conductivity
– simple handling and mounting
– cuts and contours according to customer's drawing specifications

art. no.	material thickness [mm]
WLFT 30 015	0.15
WLFT 30 023	0.23

	WLFT 30 015	WLFT 30 023
version	silicone foil with glass fibre reinforcement	
colour	green	
hardness	80 Shore A	
thermal conductivity	3 W/m·K	
temperature range	-60°C ... +200°C	
elongation	5 %	
volume resistance	$>10^9$ Ω·cm	
dielectric constant	6 [1 kHz]	
tear strength	1 N/mm²	
dielectric strength	4 kV	6 kV
class of inflammability	UL 94 V-0	
type of delivery	plates, usable area 300x200mm/ other dimensions upon request	

Thermal conductive foil one-sided adhesive



– one-sided adhesive thermal conductive foil
– additional fiberglass reinforcement
– high long-term and mechanical stability
– easy handling and mounting
– cuts and contours according to customer-specific drawing specifications

art. no.	material thickness [mm]
WLFT 40 023	0.23

	WLFT 40 023
version	silicone foil with glass fibre reinforcement
colour	white
hardness	90 Shore A
thermal conductivity	4 W/m·K
temperature range	-60°C ... +200°C
elongation	5 %
volume resistance	$10 \cdot 10^{11}$ Ω·cm
dielectric constant	4.2 [1 MHz]
tear strength	4.9 N/mm²
dielectric strength	6 kV
class of inflammability	UL 94 V-0
type of delivery	rolled goods, roll width 300mm/ cuttings on customer's requirement

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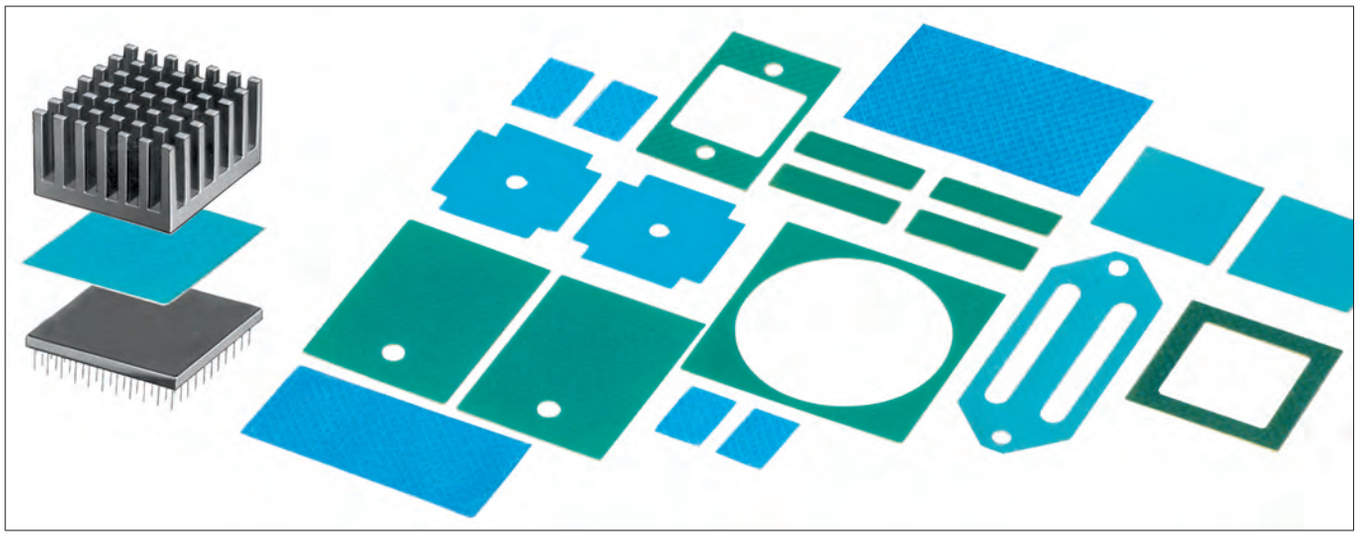
Thermally conductive foil both sides adhesive



– double-side adhesive thermal conductive foil with good thermal properties
– coated carrier film with pressure-sensitive acrylate adhesive
– curing of the adhesive layer can be influenced by temperature and time
– serves as a substitute for mechanical connections
– excellent adhesive properties on aluminium and ceramics
– simple and secure attachment of e.g. heatsinks to electronic devices
– designs as electrically conductive or electrically insulating thermal conductive foil
– supplied in sheet and tape form, other forms on request
– tape width (B) available in different dimensions and lengths
– 24h sample delivery service for individual production according to customer drawing
– customised cuts and contours according to drawing specifications

art. no.	B [mm]	type of delivery
WLFT 404 R25	25	sold by the meter
WLFT 404 R50	50	
WLFT 404 R100	100	
WLFT 404 R200	200	
WLFT 414 R25	25	
WLFT 414 R50	50	
WLFT 414 R100	100	
WLFT 414 R200	200	
WLFT 405 R25	25	
WLFT 405 R50	50	
WLFT 405 R100	100	
WLFT 405 R200	200	
WLFT 412 R25	25	
WLFT 412 R50	50	
WLFT 412 R100	100	
WLFT 412 R200	200	

Thermally conductive foil both sides adhesive

art. no.	dimensions [mm]	type of delivery
WLFT 404 100x100	100x100	plate
WLFT 404 100x200	100x200	
WLFT 404 200x200	200x200	
WLFT 414 100x100	100x100	
WLFT 414 100x200	100x200	
WLFT 414 200x200	200x200	
WLFT 405 100x100	100x100	
WLFT 405 100x200	100x200	
WLFT 405 200x200	200x200	
WLFT 412 100x100	100x100	
WLFT 412 100x200	100x200	
WLFT 412 200x200	200x200	

	WLFT 404	**WLFT 414**	**WLFT 405**	**WLFT 412**
version	insulating, double sided adhesive		non insulating, double-sided adhesive	
material thickness	0.127 mm ± 0.03		0.15 mm ± 0.03	0.23 mm ± 0.025
material filling	polyimide (Kapton MT) 0.025mm		aluminium foil 0.05mm	aluminum mesh
glue layer	acrylate (pressure sensitive) double-sided			
colour	blue			grey
thermal conductivity	0.4 W/m·K		0.5 W/m·K	1.4 W/m·K
thermal impedance (@ 300 psi)	3.7 °C cm²/W		3.4 °C cm²/W	2 °C cm²/W
holding force (overlapping)	0.86 MPa	0.69 MPa	0.93 MPa	
temperature range	-30°C... +125°C			
holding force (shear force)	**Al** 25°C 0.897 [MPa]/ **Al** 150°C 0.345 [MPa]/ **Cu** 25°C 0.828 [MPa]/ **Cu** 150°C 0.31 [MPa]/ **Al**$_2$O$_3$ 25°C 1.17 [MPa]/ **Al**$_2$O$_3$ 150°C 0.34 [MPa]	**Al** 25°C 1.04 [MPa]/ **Al** 150°C 0.104 [MPa]	**Al** 25°C 0.86 [MPa]/ **Al** 150°C 0.38 [MPa]/ **Cu** 25°C 1.1 [MPa]/ **Cu** 150°C 0.48 [MPa]/ **Al**$_2$O$_3$ 25°C 1.0 [MPa]/ **Al**$_2$O$_3$ 150°C 0.41 [MPa]	
dielectric strength	5 kV (AC)			
class of inflammability	UL 94 V-0			

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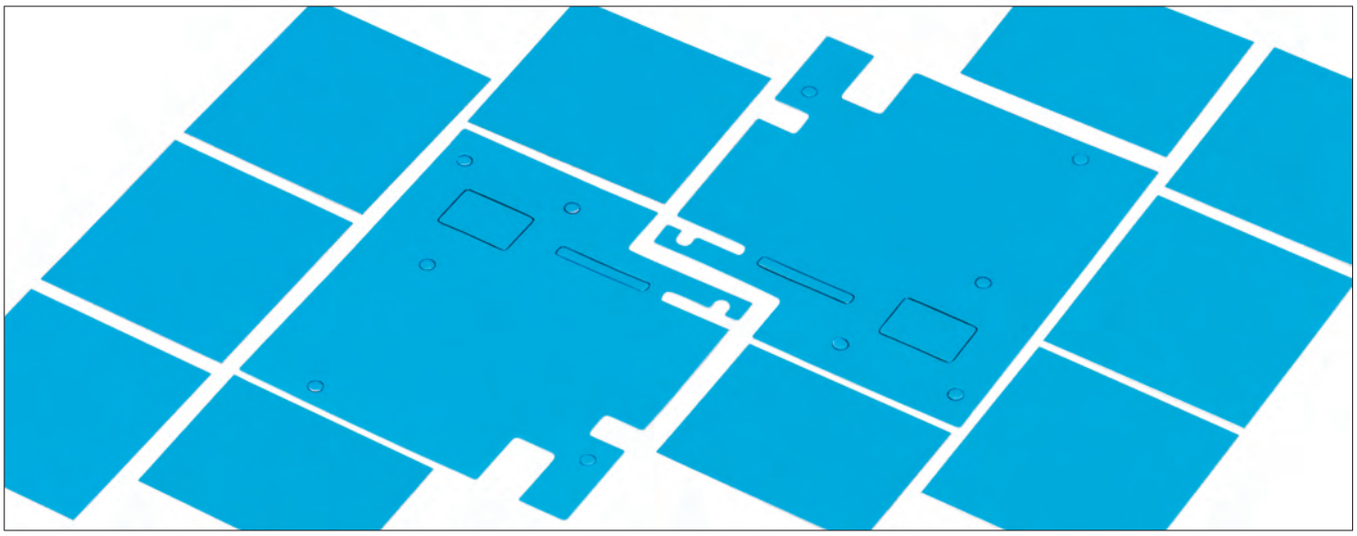
Thermally conductive foil both sides adhesive

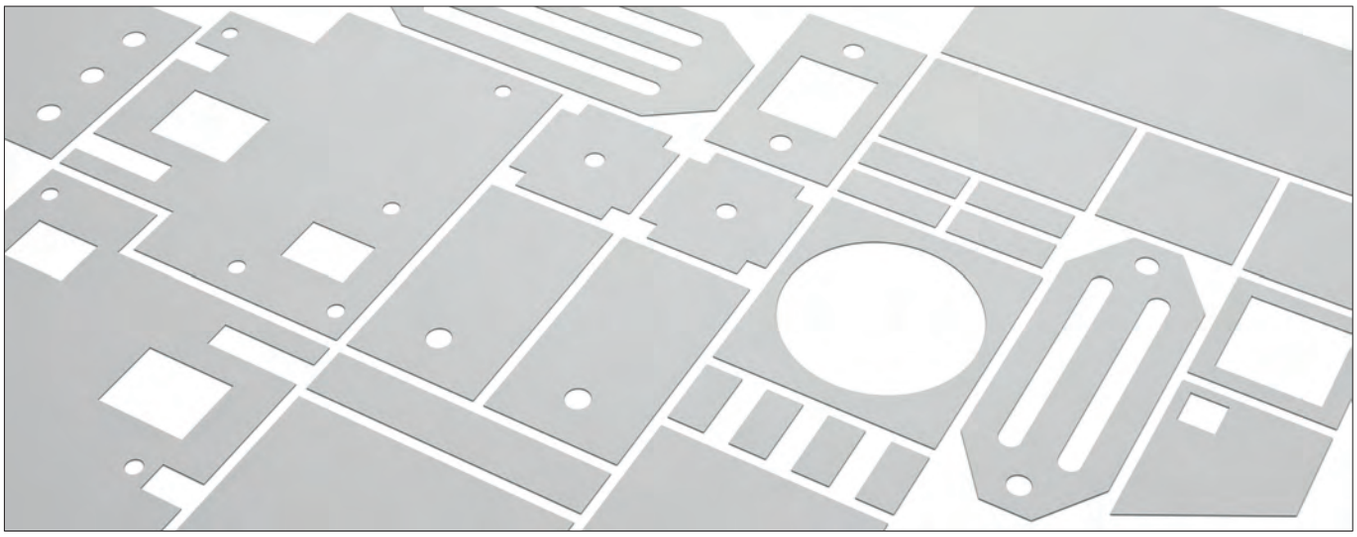


– double sided adhesive layer
– optimal adhesion of different substrates
– very good thermal conductivity, electrical insulating
– easy handling due to double sided protection foil
– optimized surface moistening and excellent impact strength
– cutouts and different punchings according to customer drawing

art. no.	type of delivery
WLFT 8805	plates, usable area 300x200mm/ other dimensions upon request
WLFT 8810	
WLFT 8815	
WLFT 8820	

	WLFT 8805	**WLFT 8810**	**WLFT 8815**	**WLFT 8820**
version	double sided adhesive, filled acrylic polymer			
material thickness	0.13 mm	0.25 mm	0.38 mm	0.5 mm
filling material	ceramic			
protection cover	silicone treated polyester, 37.5 - 50 µm			
colour	blue			
thermal conductivity	0.6 W/m·K			
specific thermal resistance	3.2°C cm²/W	5.8°C cm²/W	7.7°C cm²/W	9.7°C cm²/W
temperature range	permanent up to 100°C			
peel strength at RT 70°C and 72 h	5.8 N/cm	8.3 N/cm	9.8 N/cm	11.9 N/cm
volume resistance	$5.2 \cdot 10^{11}$ Ω/cm	$3.9 \cdot 10^{11}$ Ω/cm	$3.8 \cdot 10^{11}$ Ω/cm	
dielectric strength	26 kV/mm			
class of inflammability	UL 746 C			

Thermally conductive foil both sides adhesive



– double-sided adhesive thermal conductive foil
– excellent adhesive properties on different materials
– filling material with ceramic particles
– very good thermal conductivity and technical performance
– cuts and contours according to customer's drawing specifications

art. no.	type of delivery
WLFT 8926 02	plates, usable area 300x200mm/ other dimensions upon request
WLFT 8926 025	
WLFT 8926 05	

	WLFT 8926 02	**WLFT 8926 025**	**WLFT 8926 05**
version	double sided adhesive, filled acrylic polymer		
material thickness	0.2 mm	0.25 mm	0.5 mm
filling material	ceramic		
protection cover	silicone treated polyester		
colour	yellowish white		
thermal conductivity	1.5 W/m·K		
specific thermal resistance	8.49 °C cm²/W	8.74°C cm²/W	9.7°C cm²/W
temperature range	permanent up to 80°C		
peel strength at RT 70°C and 72 h	15 N/cm		
dielectric strength	15 kV/mm		
class of inflammability	UL 94 V-0		

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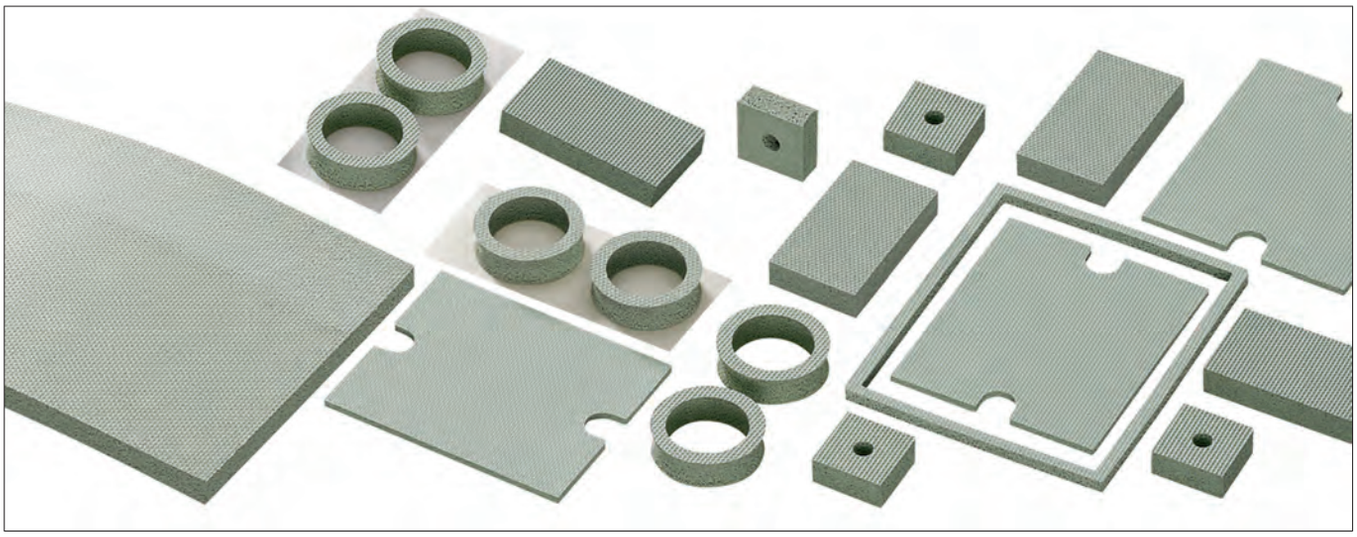
Thermally conductive silicon foam foils



– elastomer foam with closed cell structure
– good heat conductor e.g. between components, heatsinks and casing parts
– electrical insulating
– can be compressed even with a low contact pressure
– absorbs shocks and vibrations

art. no.	material thickness [mm]
WSF 08	0.80 ±0.4
WSF 16	1.60 ±0.4
WSF 24	2.40 ±0.8
WSF 32	3.20 ±0.8
WSF 48	4.80 ±0.8
WSF 635	6.35 ±1.2
WSFS 635	

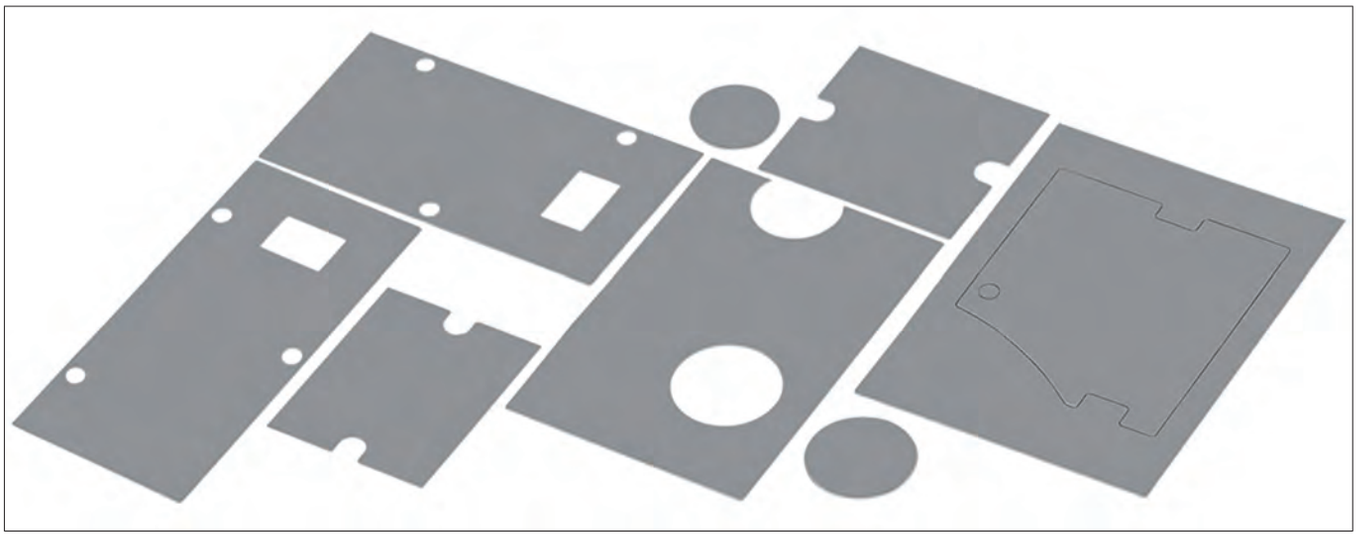
Thermal resistance at 3.2 mm material thickness:

compression [%]	10	30	50
contact pressure [psi]	5	20	42
R_{th} [K/W] (1 in² x 3.2 mm)	13	9	3.5
heat conductivity [W/mK]	0.36	0.52	0.82

– **WSFS 635** double sided adhesive and **WSF** self-adhesive upon request
– according to NASA gas emission requirements

	WSF	**WSFS 635**
version	non adhesive	one-sided self-adhesive
colour	green	
density	1.105 g/cm³	
hardness	13 Shore A	
temperature range	-62°C ... +205°C	
compression, 25%	18 psi	
elongation	150 %	
tear strength	120 psi	
dielectric strength	100 V/mm	
class of inflammability	UL 94 V-1 (at thickness ≥3.2mm)	
type of delivery	plates, usable area 914x914mm/ other dimensions upon request	

Silicone free thermal adhesive foils



– silicone free gap-filler with good thermal characteristics
– smooth, compressible and elastic
– cut outs, punchings and modifications according to customer specification
– other material thicknesses upon request

art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]	art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]
GEL F 15 10	1.0 ±0.2	1.02	6.60	**GEL F 15 G 10**	1.0 ±0.2	1.16	7.50
GEL F 15 15	1.5 ±0.2	1.39	9.00	**GEL F 15 G 15**	1.5 ±0.2	1.66	10.75
GEL F 15 20	2.0 ±0.3	1.75	11.30	**GEL F 15 G 20**	2.0 ±0.3	2.17	14.00

	GEL F 15	**GEL F 15 G**
version	standard	polyamide film mash reinforced
colour	light gray	
density	2.1 g/cm³	
hardness	53 Shore 00	
thermal conductivity	1.5 W/m·K	
temperature range	-40°C... +105°C	
elongation	150 %	
volume resistance	$1 \cdot 10^9$ Ω·m	
dielectric constant	9.12 [50 Hz] / 8.55 [1 kHz] / 5.83 [1 MHz]	
dielectric loss factor	0,152 [50 Hz] / 0,135 [1 kHz] / 0,034 [1 MHz]	
dielectric strength	11 kV/mm	
class of inflammability	accordant UL 94 V-0	
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request	

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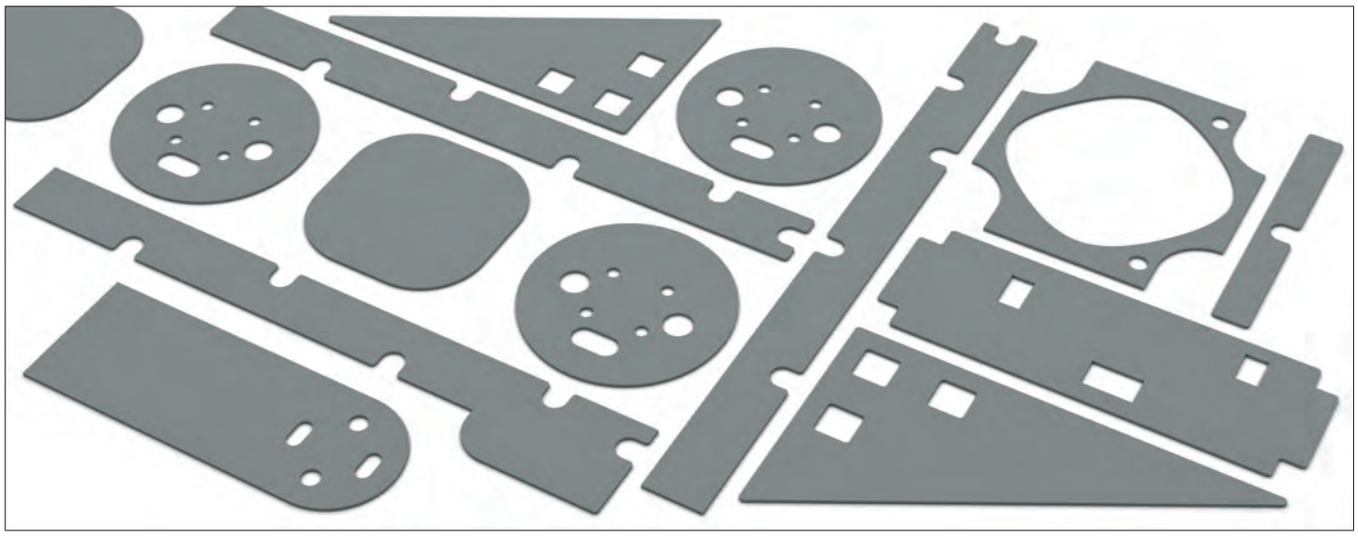
Silicone free thermal adhesive foils



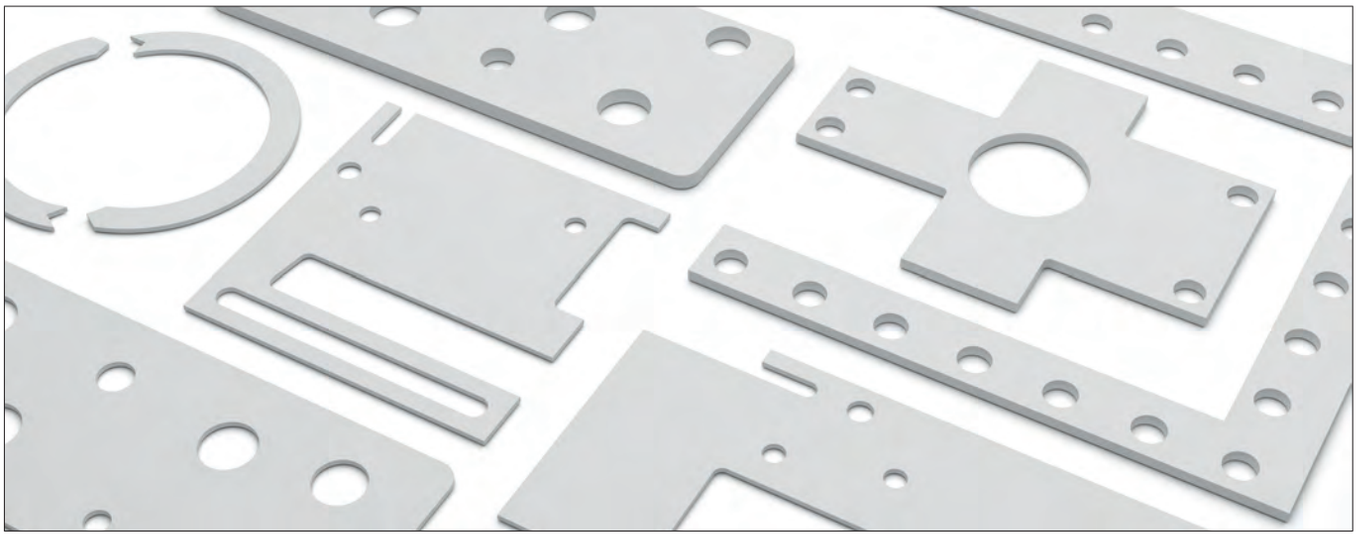
– silicone-free thermal conductive foil
– particularly suitable for silicone-free applications
– very good thermal and mechanical properties
– high electrical insulation
– cuts and contours made of sheet or roller material according to your specifications

art. no.	material thickness [mm]
WFKF 20 05	0.5
WFKF 20 10	1.0

	WFKF 20
version	silicone-free foil without glass fibre reinforcement
colour	grey
density	1.5 g/cm³
hardness	55 - 65 Shore 00
thermal conductivity	2 W/m·K
thermal resistance	0.6 K/W
temperature range	-40°C ... +130°C
volume resistance	$5.3 \cdot 10^9$ Ω·m
dielectric constant	5.6 [1 KHz]
tensile strength	18 kN/m
dielectric strength	7 kV
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 450x250mm/ other dimensions upon request

Thermal resistances vs. contact pressure				
pressure [psi]	0	14.50	29	43.51
thermal resistance WFKF 20 05 [K/W]	0.60	0.56	0.53	0.50
thermal resistance WFKF 20 10 [K/W]	1.31	1.20	0.98	0.89

Silicone free thermal adhesive foils



– soft and adaptable acrylic-based thermal conductive foil
– very good compensation of unevennesses and differences in components
– natural adhesive properties and high dielectric strength
– cuts and contours with cutouts according to customer drawings

art. no.	material thickness [mm]
GEL F 30 05	0.5
GEL F 30 10	1.0
GEL F 30 15	1.5

	GEL F 30 ...
version	silicone-free thermal conductive foils
colour	white-grey
density	2.1 g/cm^3
hardness	70 Shore 00
thermal conductivity	3 W/m·K
temperature range	-40°C ... +110°C
volume resistance	6·10^9 Ω·m
dielectric constant	5.4 [1 GHz]
dielectric strength	12 kV/mm
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 240x300mm/ other dimensions upon request

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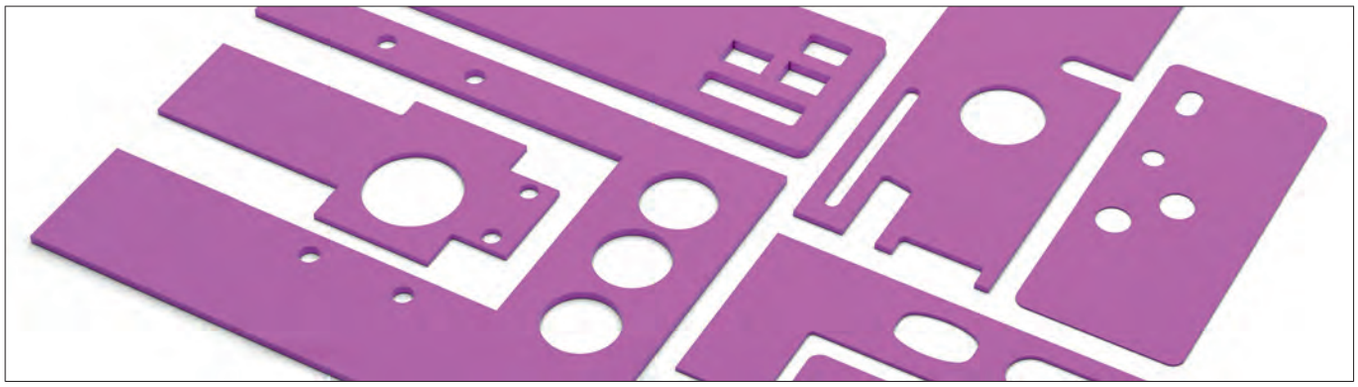
Gel thermal conducting foils



– highly thermally conductive silicone foil
– soft, elastic and compressible
– design with hardened surface on one side for better handling
– optimum compensation of air gaps and unevennesses
– customised contour parts according to drawing specifications

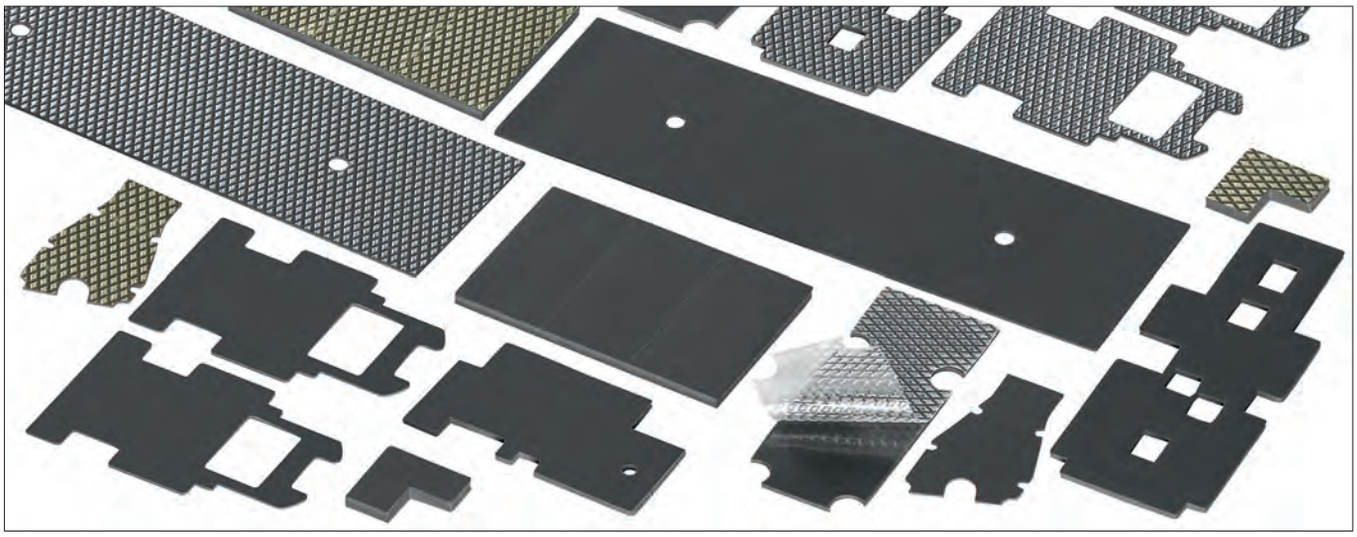
art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]	art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]
GEL 14 05	0.5 ±0.15	0.60	3.9	**GEL 14 G 05**	0.5 ±0.15	0.64	4.1
GEL 14 10	1.0 ±0.20	0.90	5.8	**GEL 14 G 10**	1.0 ±0.20	0.99	6.4
GEL 14 15	1.5 ±0.20	1.13	7.3	**GEL 14 G 15**	1.5 ±0.20	1.35	8.7
GEL 14 20	2.0 ±0.30	1.55	10.0	**GEL 14 G 20**	2.0 ±0.30	1.69	10.9
GEL 14 25	2.5 ±0.30	1.84	11.9	**GEL 14 G 25**	2.5 ±0.30	2.03	13.1
GEL 14 30	3.0 ±0.30	1.92	12.4	**GEL 14 G 30**	3.0 ±0.30	2.09	13.5
GEL 14 35	3.5 ±0.35	2.30	15.0	**GEL 14 G 35**	3.5 ±0.35	2.45	15.5
GEL 14 40	4.0 ±0.40	2.65	17.1	**GEL 14 G 40**	4.0 ±0.40	2.74	17.7
GEL 14 45	4.5 ±0.45	2.75	17.8	**GEL 14 G 45**	4.5 ±0.45	3.05	19.5
GEL 14 50	5.0 ±0.50	2.81	18.1	**GEL 14 G 50**	5.0 ±0.50	3.30	21.3

	GEL 14	**GEL 14 G**
version	standard	surface hardened on one side
colour	pink	
hardness	30 Shore 00	
thermal conductivity	1.4 W/m·K	
temperature range	-40°C... +150°C	
volume resistance	$2{,}4 \cdot 10^{11}$ Ω·m	
dielectric constant	5 [50 Hz] / 4.4 [1 kHz] / 4.2 [1 MHz]	
dielectric loss factor	0.095 [50 Hz] / 0.042 [1 kHz] / 0.004 [1 MHz]	
dielectric strength	17 kV/mm	
class of inflammability	UL 94 V-0	
type of delivery	plates, usable area 300x200mm/ other dimensions upon request	

GEL 14 ... compression force [N/6,4cm²] vs. material thickness								
material thickness [mm]	**0,5**	**1,0**	**1,5**	**2,0**	**2,5**	**3,0**	**4,0**	**5,0**
compression rate 10%	109	130	116	79	57	43	32	24
compression rate 30%	392	351	240	180	128	109	87	71
compression rate 50%	752	660	523	442	317	297	216	182

GEL 14 G ... compression force [N/6,4cm²] vs. material thickness								
material thickness [mm]	**0,5**	**1,0**	**1,5**	**2,0**	**2,5**	**3,0**	**4,0**	**5,0**
compression rate 10%	106	145	144	98	64	51	38	25
compression rate 30%	524	428	258	222	165	135	105	80
compression rate 50%	867	805	580	526	406	341	260	209

Gel thermal conducting foils



– highly heat-conductive silocon foil
– smooth, elastic and compressible
– equals uneven surfaces very well (Gap-Filler)

art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]	art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]
GEL 05	0.5 ±0.1	0.69	4.45	**GEL G 05**	0.5 ±0.1	0.63	4.04
GEL 10	1.0 ±0.2	1.03	6.64	**GEL G 1**	1.0 ±0.2	1.17	7.56
GEL 15	1.5 ±0.2	1.39	8.96	**GEL G 15**	1.5 ±0.2	1.59	10.27
GEL 20	2.0 ±0.3	1.52	9.78	**GEL G 2**	2.0 ±0.3	2.07	13.33
GEL 25	2.5 ±0.3	2.10	13.58	**GEL G 25**	2.5 ±0.3	2.61	16.81
GEL 30	3.0 ±0.3	2.35	15.15	**GEL G 3**	3.0 ±0.3	2.89	18.66
GEL 35	3.5 ±0.3	2.56	16.51	**GEL G 35**	3.5 ±0.3	3.35	21.63
GEL 40	4.0 ±0.4	3.25	20.95	**GEL G 4**	4.0 ±0.4	3.56	22.96
GEL 45	4.5 ±0.4	3.38	21.82	**GEL G 45**	4.5 ±0.4	3.89	25.10
GEL 50	5.0 ±0.5	3.52	22.70	**GEL G 5**	5.0 ±0.5	4.22	27.23

	GEL	**GEL G 05 - 25**	**GEL G 3 - 5**
version	standard	polyamide film mash reinforced, adherent layer on one side	
colour	dark gray		
density	2.6 g/cm³		
hardness	49 Shore 00		
thermal conductivity	1.5 W/m·K		
temperature range	-60°C ... +200°C		
elongation	100 %	60 %	
volume resistance	$1 \cdot 10^6$ MΩ/m		
dielectric constant	5.8 [50 Hz]/ 5.6 [1 KHz]/ 5.5 [1 MHz]		
dielectric loss factor	0.048 [50 Hz]/ 0.015 [1 KHz]/ 0.003 [1 MHz]		
dielectric strength	14 kV/mm (AC)	8 kV/mm (AC)	
class of inflammability	UL 94 V-0	UL 94 V-1	UL 94 V-0
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request		

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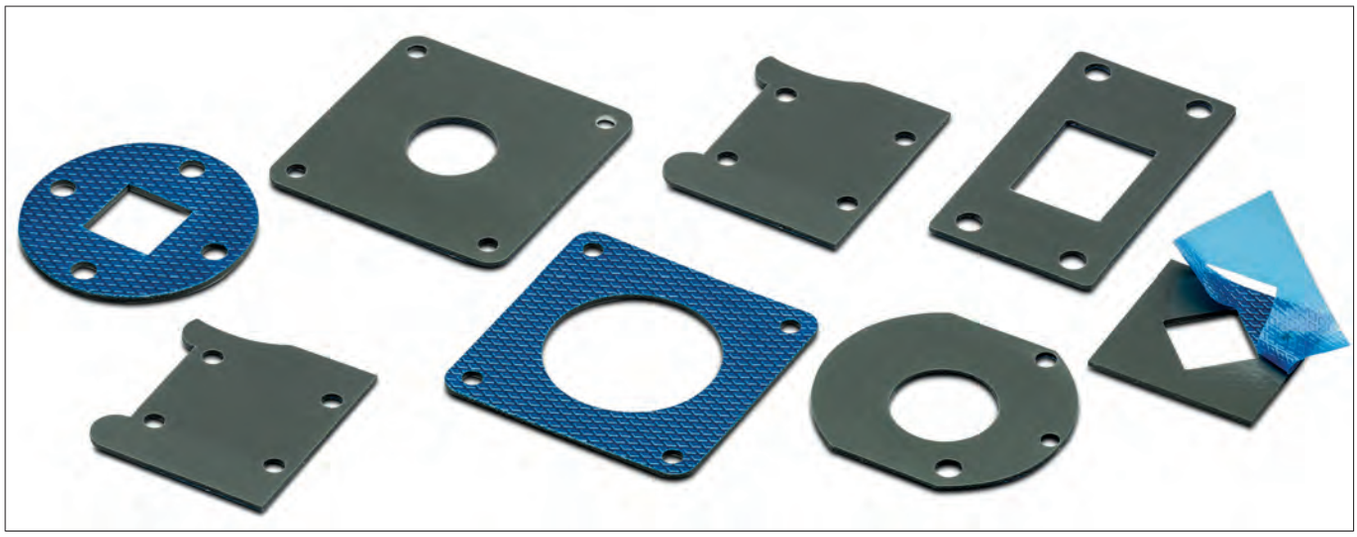
Gel thermal conducting foils



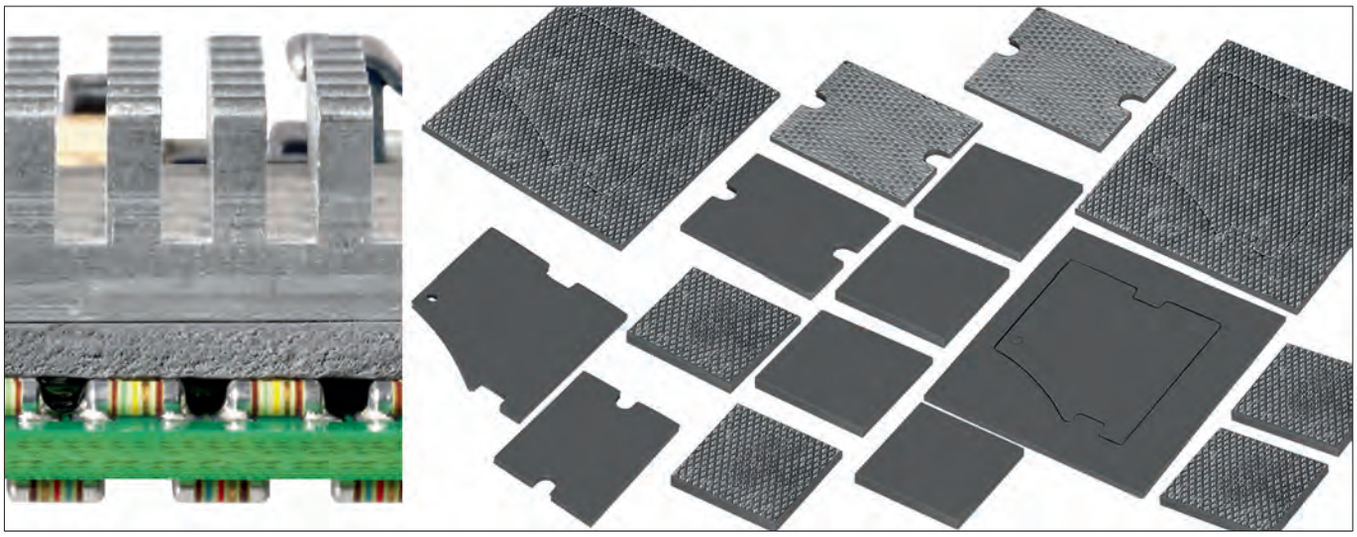
– very soft thermal conductive foil
– without any reinforcing layer
– optimal balance of bigger unevennesses
– thermal conductive foil both-sided adherent
– cuts and contours according to customer specific drawing specifications

art. no.	material thickness [mm]	art. no.	material thickness [mm]
WFG 15 05	0.508	**WFG 15 25**	2.540
WFG 15 10	1.016	**WFG 15 30**	3.175
WFG 15 15	1.524	**WFG 15 40**	4.064
WFG 15 20	2.032	**WFG 15 50**	5.080

	WFG 15
version	silicone film without reinforcement
colour	black
hardness	40 Shore 00
thermal conductivity	1.5 W/m·K
temperature range	-60°C ... +200°C
volume resistance	10^{11} Ω·m
dielectric constant	5.5 [1 kHz]
heat capacity	1 J/g·K
dielectric strength	6 kV
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 406x203mm/ other dimensions upon request

Thermal resistances vs. material thickness								
material thicknesses [mm]	**0.508**	**1.016**	**1.524**	**2.032**	**2.540**	**3.175**	**4.064**	**5.08**
thermal impedance WFG 15 [K-cm²/W]	3	7.5	10	13.13	16.25	21.25	26.25	33.125

Gel thermal conducting foils



– GEL thermal conductive foils with very good thermical characteristics
– for balancing non-planarities and differences in components (gap-filler)
– soft, elastic and compressible
– customer specific cuts and punchings according to drawing

art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]	art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]
GEL 28 05	0.5 ±0.05	0.31	2.00	**GEL 28 G 05**	0.5 ±0.05	0.38	2.50
GEL 28 10	1.0 ±0.10	0.57	3.70	**GEL 28 G 10**	1.0 ±0.10	0.62	4.00
GEL 28 15	1.5 ±0.15	0.79	5.10	**GEL 28 G 15**	1.5 ±0.15	0.93	6.00
GEL 28 20	2.0 ±0.20	1.03	6.70	**GEL 28 G 20**	2.0 ±0.20	1.25	8.10
GEL 28 25	2.5 ±0.25	1.16	7.50	**GEL 28 G 25**	2.5 ±0.25	1.42	9.15
GEL 28 30	3.0 ±0.30	1.42	9.20	**GEL 28 G 30**	3.0 ±0.30	1.59	10.20
GEL 28 35	3.5 ±0.30	1.60	10.40	**GEL 28 G 35**	3.5 ±0.30	1.87	12.05
GEL 28 40	4.0 ±0.30	1.79	11.60	**GEL 28 G 40**	4.0 ±0.30	2.16	13.90
GEL 28 50	5.0 ±0.30	2.16	13.90	**GEL 28 G 50**	5.0 ±0.30	2.48	16.00

	GEL 28	**GEL 28 G**
version	standard	surface hardened on one side
colour	grey	
density	2.6 g/cm³	
hardness	50 Shore 00	55 Shore 00
thermal conductivity	2.5 W/m·K	
temperature range	-40°C... +150°C	
elongation	64 %	32 %
volume resistance	$1 \cdot 10^{11}$ Ω·m	
dielectric constant	6.6 [50 Hz]/6.05 [1 kHz]/5.74 [1 MHz]	
dielectric loss factor	0.0826 [50 Hz]/0.0300 [1 kHz]/0.0052 [1 MHz]	
dielectric strength	15 kV/mm	
class of inflammability	UL 94 V-0	
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request	

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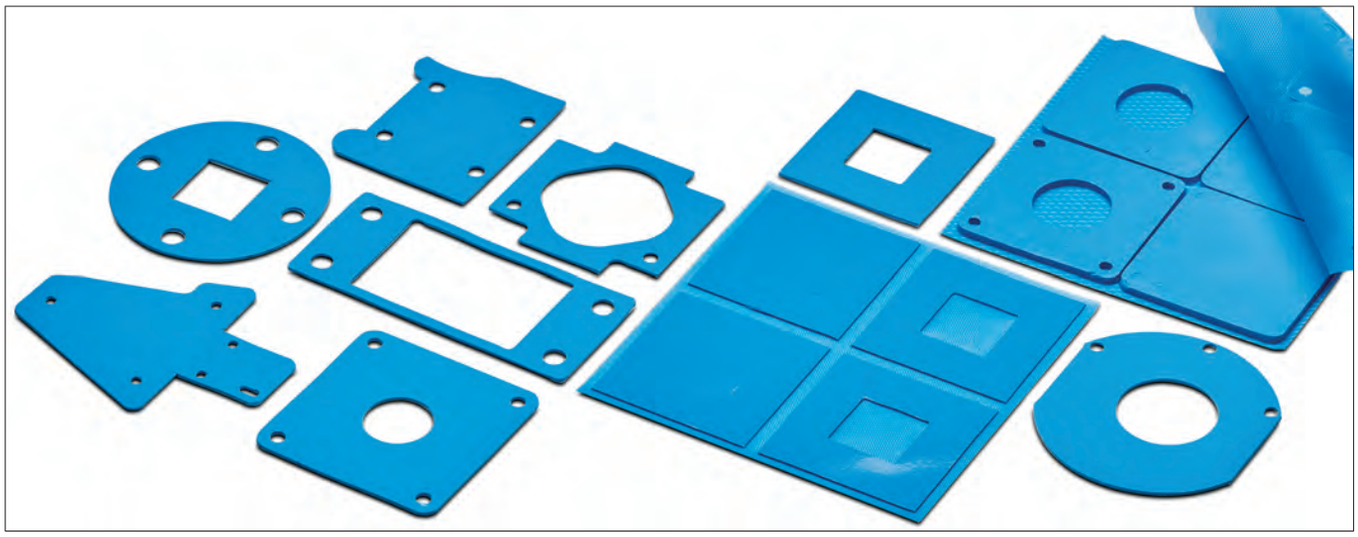
Gel thermal conducting foils



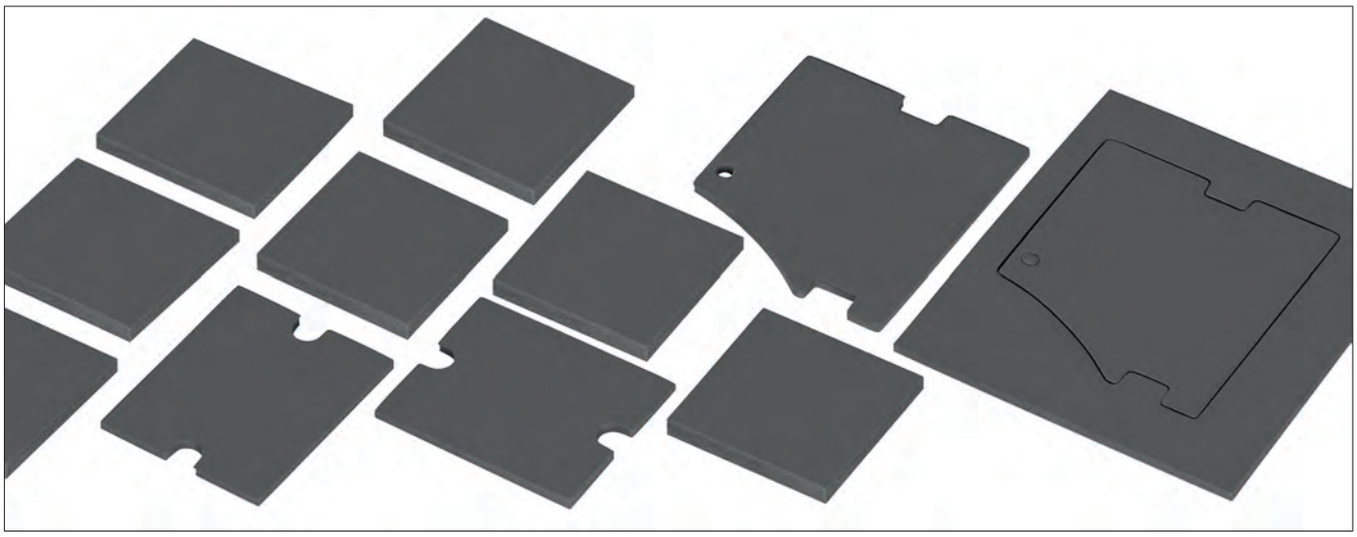
– good compressible gap filling material
– high thermal conductivity
– very good shearing and tensile strength
– double-sided natural adhesive layer
– cuts and contours according to customer specific drawing specifications

art. no.	material thickness [mm]	art. no.	material thickness [mm]
WFGH 30 05	0.508	**WFGH 30 20**	2.032
WFGH 30 10	1.016	**WFGH 30 25**	2.540
WFGH 30 15	1.524	**WFGH 30 30**	3.175

	WFGH 30
version	silicone foil with glass fibre reinforcement
colour	blue
hardness	15 Shore 00
thermal conductivity	3 W/m·K
temperature range	-60°C ... +200°C
volume resistance	10^{10} Ω·m
dielectric constant	6.5 [1 kHz]
heat capacity	1 J/g·K
dielectric strength	5 kV
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 406x203mm/ other dimensions upon request

Thermal resistances vs. material thickness						
material thicknesses [mm]	**0.508**	**1.016**	**1.524**	**2.032**	**2.540**	**3.175**
thermal impedance WFGH 30 [K-cm²/W]	1.88	3.75	5	6.88	8.13	10.93

Gel thermal conducting foils



– gap filler with exceptionally good thermal conductivity and low outgassing
– especially smooth, compressible and elastic
– cut outs, punchings and modifications according to customer specification
– other material thicknesses upon request

art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]	art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]
GEL 45 05	0.5 ±0.15	0.28	1.80	**GEL 45 G 05**	0.5 ±0.15	0.22	1.40
GEL 45 10	1.0 ±0.20	0.37	2.40	**GEL 45 G 10**	1.0 ±0.20	0.35	2.30
GEL 45 15	1.5 ±0.20	0.46	2.90	**GEL 45 G 15**	1.5 ±0.20	0.45	2.90
GEL 45 20	2.0 ±0.30	0.56	3.60	**GEL 45 G 20**	2.0 ±0.30	0.55	3.60
GEL 45 25	2.5 ±0.30	0.68	4.40	**GEL 45 G 25**	2.5 ±0.30	0.62	4.00
GEL 45 30	3.0 ±0.30	0.79	5.10	**GEL 45 G 30**	3.0 ±0.30	0.73	4.70
GEL 45 35	3.5 ±0.35	0.87	5.65	**GEL 45 G 35**	3.5 ±0.35	0.83	5.35
GEL 45 40	4.0 ±0.40	0.95	6.20	**GEL 45 G 40**	4.0 ±0.40	0.93	6.00
GEL 45 45	4.5 ±0.45	1.04	6.80	**GEL 45 G 45**	4.5 ±0.45	1.00	6.45
GEL 45 50	5.0 ±0.50	1.14	7.40	**GEL 45 G 50**	5.0 ±0.50	1.07	6.90

	GEL 45	**GEL 45 G**
version	standard	surface hardened on one side
colour	grey	
density	3.2 g/cm³	
hardness	60 Shore 00	
thermal conductivity	4.5 W/m·K	
temperature range	-40°C... +150°C	
elongation	50 %	
volume resistance	$1 \cdot 10^{11}$ Ω·m	
dielectric constant	8.98 [50 Hz] / 8.63 [1 kHz] / 8.05 [1 MHz]	
dielectric loss factor	0.0249 [50 Hz] / 0.0219 [1 kHz] / 0.0068 [1 MHz]	
dielectric strength	17 kV/mm	
class of inflammability	UL 94 V-0	
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request	

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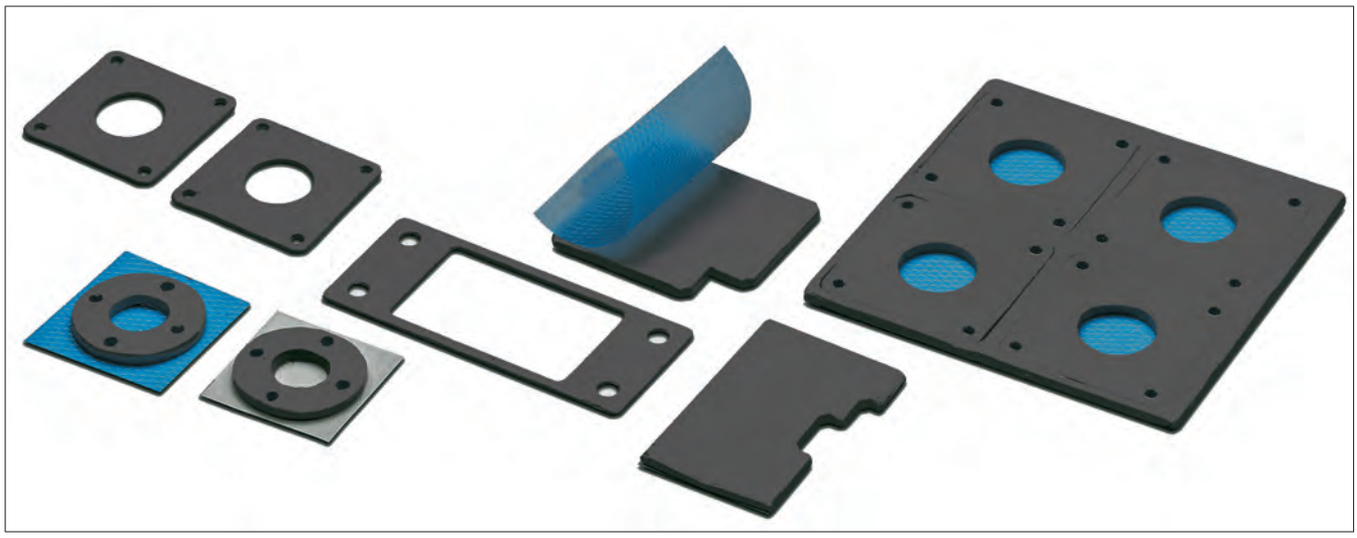
Gel thermal conducting foils



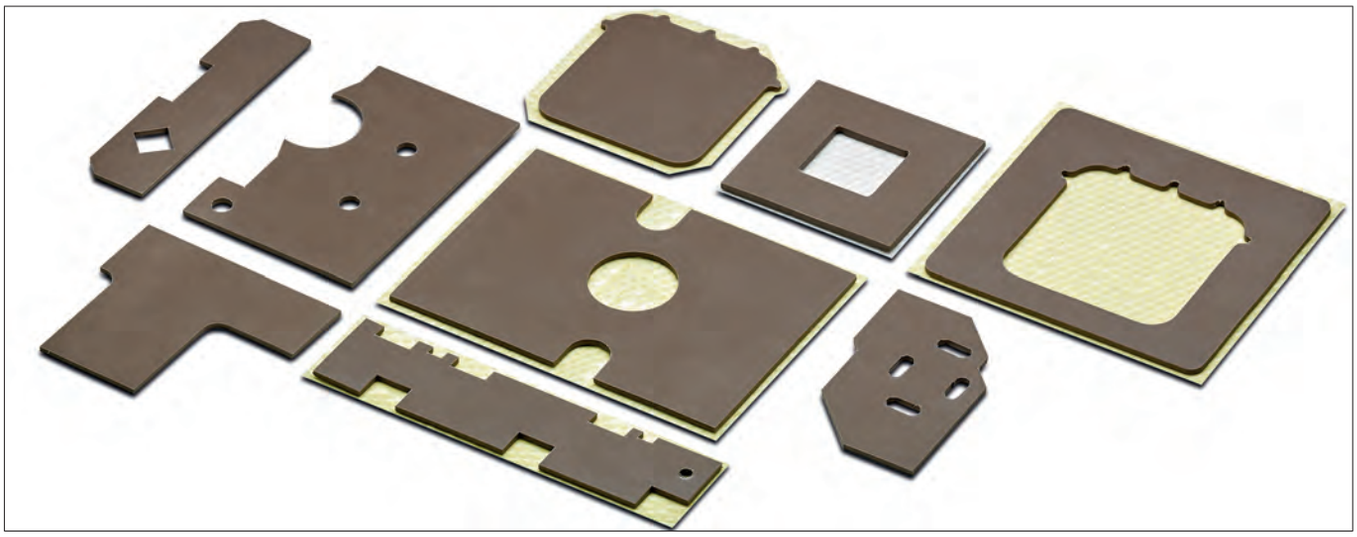
– very good compressibility
– particularly suitable for low contact pressure
– double-sided natural adhesive layer
– wide temperature range
– cuts and contours according to customer specific drawing specifications

art. no.	material thickness [mm]	art. no.	material thickness [mm]
WFGH 50 05	0.508	**WFGH 50 20**	2.032
WFGH 50 10	1.016	**WFGH 50 25**	2.540
WFGH 50 15	1.524	**WFGH 50 30**	3.175

	WFGH 50
version	silicone foil with glass fibre reinforcement
colour	grey
hardness	35 Shore 00
thermal conductivity	5 W/m·K
temperature range	-60°C ... +200°C
volume resistance	10^{10} Ω·m
dielectric constant	8 [1 kHz]
heat capacity	1 J/g·K
dielectric strength	5 kV
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 406x203mm/ other dimensions upon request

Thermal resistances vs. material thickness						
material thicknesses [mm]	**0.508**	**1.016**	**1.524**	**2.032**	**2.540**	**3.175**
thermal impedance WFGH 50 [K-cm²/W]	1.25	2.5	3.75	5.18	6.25	8.13

Gel thermal conducting foils



– GEL silicone foils with especially high thermal conductivity
– balances non-planarities and differences in components (Gap filler)
– soft, elastic and compressible
– cuts, punchings and special designs according to customer specifications

art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]	art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]
GEL 60 05	0.5 ±0.1	0.21	1.30	**GEL 60 G 05**	0.5 ±0.1	0.27	1.68
GEL 60 10	1.0 ±0.2	0.32	2.11	**GEL 60 G 10**	1.0 ±0.2	0.45	2.80
GEL 60 15	1.5 ±0.2	0.53	3.45	**GEL 60 G 15**	1.5 ±0.2	0.60	3.72
GEL 60 20	2.0 ±0.3	0.64	3.97	**GEL 60 G 20**	2.0 ±0.3	0.75	4.65
GEL 60 25	2.5 ±0.3	0.72	4.67	**GEL 60 G 25**	2.5 ±0.3	0.90	5.58

	GEL 60	**GEL 60 G**
version	standard	polyamide film mash reinforced
colour	dark reddish grey	
density	3.2 g/cm³	
hardness	52 Shore 00	
thermal conductivity	6 W/m·K	
temperature range	-60°C ... +200°C	
elongation	80 %	
volume resistance	$1{,}3 \cdot 10^{12}$ Ω·m	
dielectric constant	6.4 [50 Hz]/6.4 [1 kHz]/6.4 [1 MHz]	
dielectric loss factor	0.035 [50 Hz]/0.005 [1 kHz]/0.001 [1 MHz]	
dielectric strength	13 kV/mm	
class of inflammability	UL 94 V-0	
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request	

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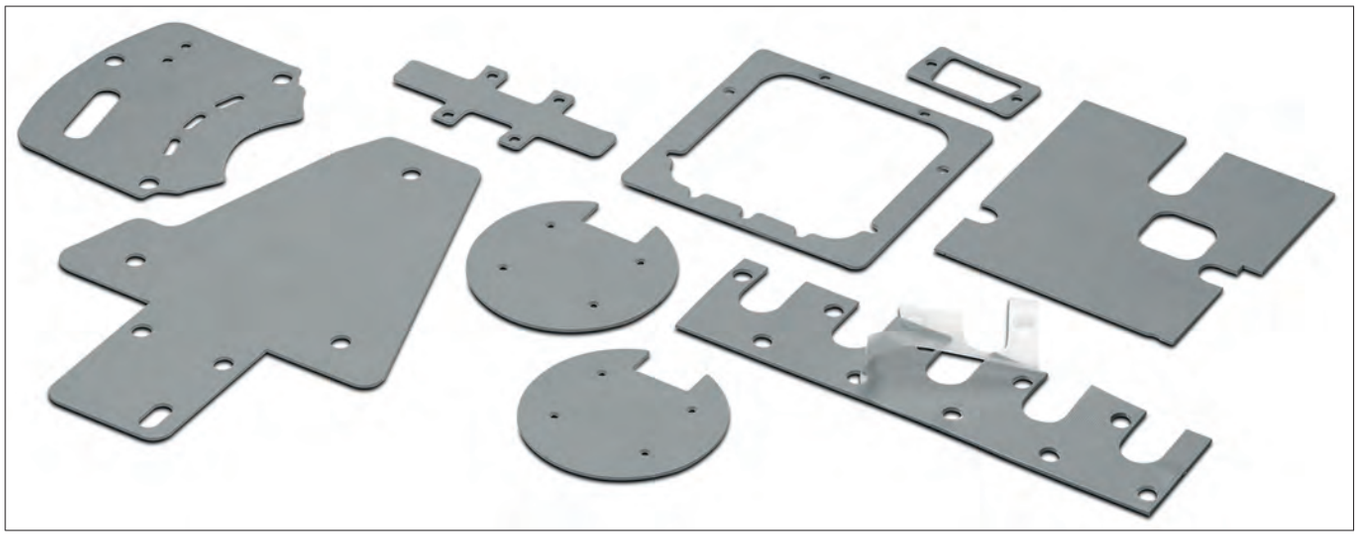
Gel thermal conducting foils

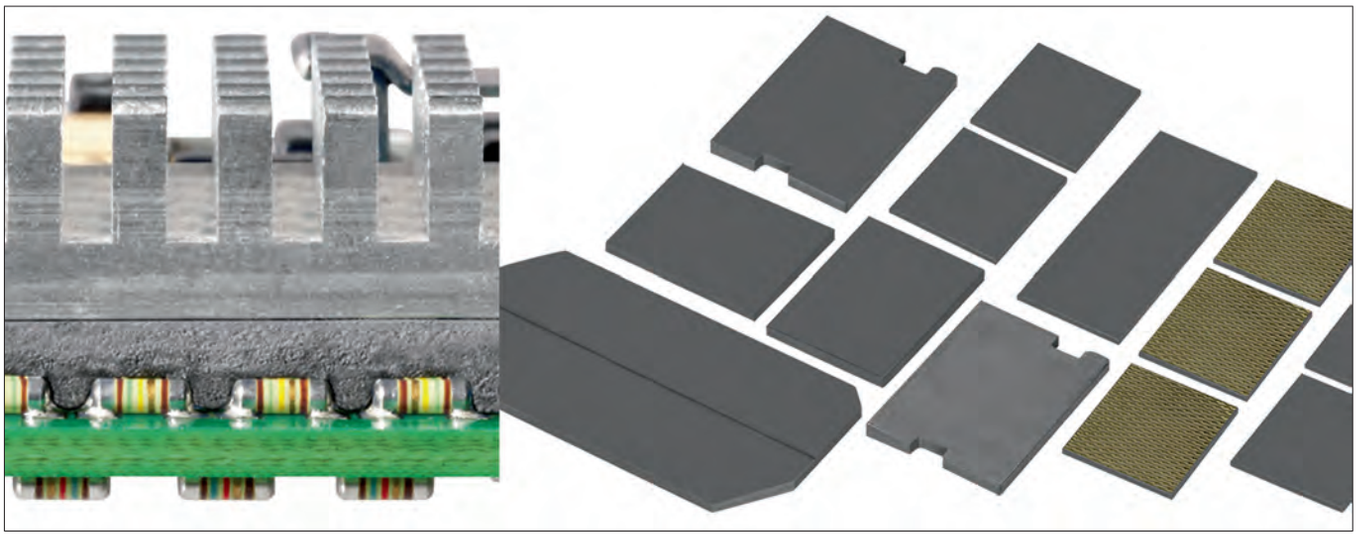


– high heat conducting silicone foil as a gap-filler
– very good compression with high dielectric strength
– optimal for balancing big unevennesses or production tolerances
– customer specific cuts according to drawing
– other material compositions and thicknesses upon request

art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]	art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]
GEL 80 10	1.0 ±0.15	0.17	1.10	**GEL 80 G 05**	0.5 ±0.10	0.12	0.77
GEL 80 15	1.5 ±0.20	0.26	1.68	**GEL 80 G 10**	1.0 ±0.15	0.19	1.22
GEL 80 20	2.0 ±0.30	0.36	2.32	**GEL 80 G 15**	1.5 ±0.20	0.28	1.81
GEL 80 25	2.5 ±0.30	0.45	2.91	**GEL 80 G 20**	2.0 ±0.30	0.38	2.45
GEL 80 30	3.0 ±0.30	0.57	3.68	**GEL 80 G 25**	2.5 ±0.30	0.47	3.01
GEL 80 G 03	0.3 ±0.06	0.09	0.58	**GEL 80 G 30**	3.0 ±0.30	0.59	3.49

	GEL 80	**GEL 80 G**
version	standard	surface hardened on one side
colour	light gray	
density	3.3 g/cm³	
hardness	75 Shore 00	
thermal conductivity	13 W/m·K	
temperature range	-40°C... +150°C	
elongation	50 %	
volume resistance	$1 \cdot 10^{11}$ Ω·m	
dielectric constant	9.54 [50 Hz] / 8.82 [1 kHz] / 7.92 [1 MHz]	
dielectric loss factor	0,063 [50 Hz] / 0,044 [1 kHz] / 0,014 [1 MHz]	
dielectric strength	15 kV/mm	
class of inflammability	UL 94 V-0	
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request	

Gel thermal conductive foils for extreme compression



– specially soft design
– levels smallest air gaps and unevennesses
– cuts and contours with cutouts according to customer's specifactions

art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]
GEL 28 S 10	1.0 ±0.15	0.42	2.7
GEL 28 S 15	1.5 ±0.20	0.60	3.9
GEL 28 S 20	2.0 ±0.30	0.76	4.9
GEL 28 S 25	2.5 ±0.30	0.90	5.8
GEL 28 S 30	3.0 ±0.30	1.02	6.6
GEL 28 S 35	3.5 ±0.35	1.15	7.4
GEL 28 S 40	4.0 ±0.40	1.27	8.2
GEL 28 S 45	4.5 ±0.45	1.45	9.4
GEL 28 S 50	5.0 ±0.50	1.64	10.6

	GEL 28 S
version	standard
colour	grey
density	2.6 g/cm³
hardness	9 ASKER C
thermal conductivity	2.5 W/m·K
temperature range	-40°C... +150°C
volume resistance	1·10¹¹ Ω·m
dielectric constant	7.21 [50 Hz] / 6.73 [1 kHz] / 6.25 [1 MHz]
dielectric loss factor	0.059 [50 Hz] / 0.031 [1 kHz] / 0.007 [1 MHz]
dielectric strength	18 kV/mm
class of inflammability	UL 94 V-0
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request

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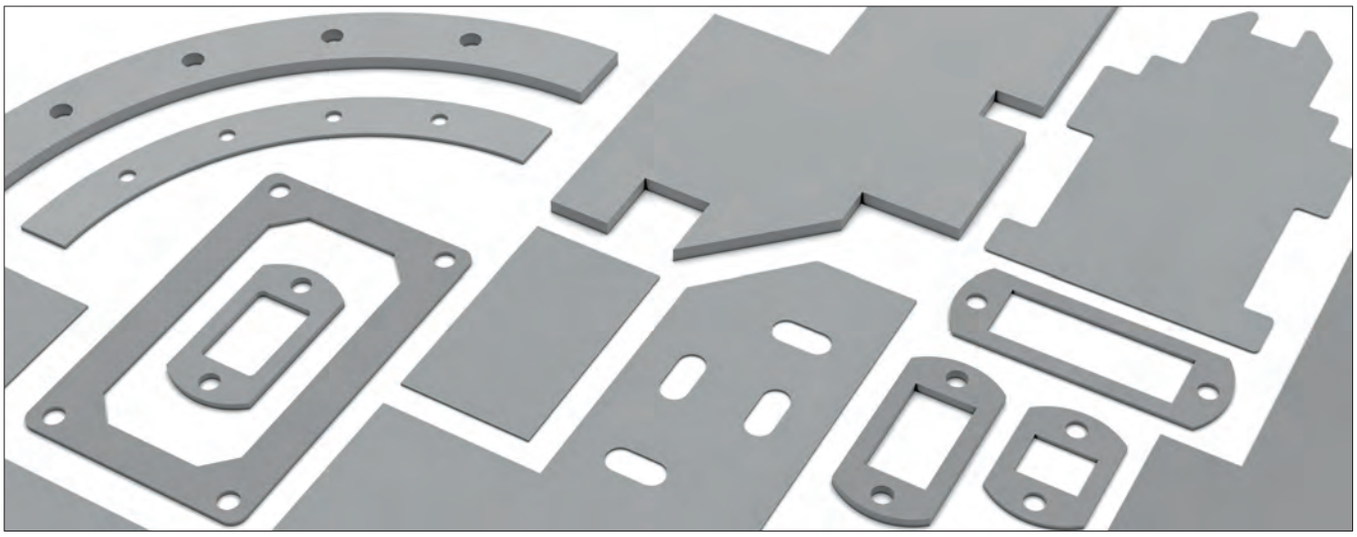
Gel thermal conductive foils for extreme compression



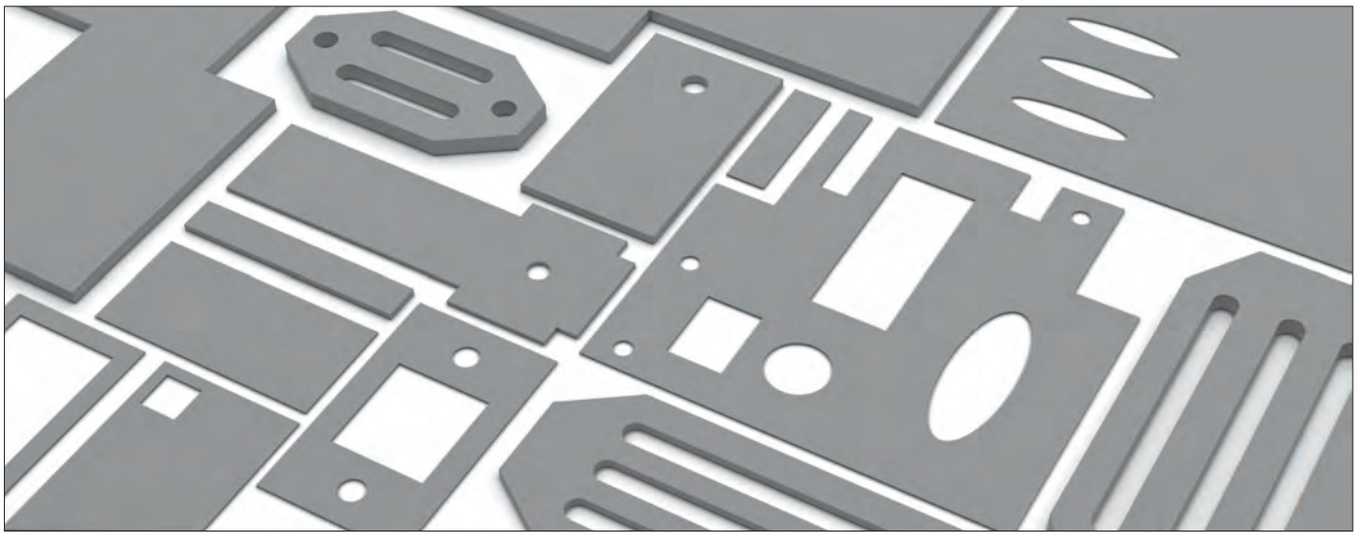
– very soft silicone-based thermal conductive material
– double side adhesive surface
– good chemical and ageing resistance
– other material thicknesses on request
– cuts and contours according to customised drawing specifications

art. no.	material thickness [mm]
GEL 30 S 05	0.5
GEL 30 S 10	1.0
GEL 30 S 15	1.5
GEL 30 S 20	2.0
GEL 30 S 25	2.5
GEL 30 S 30	3.0
GEL 30 S 35	3.5
GEL 30 S 40	4.0

	GEL 30 S
version	silicone foil, protective film on both sides
colour	grey
hardness	7 Shore A
thermal conductivity	3 W/m·K
temperature range	-60°C ... +200°C
elongation	450 %
tear strength	0.7 N/mm²
dielectric strength	1 kV/mm
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 305x305mm/ other dimensions upon request

Thermal resistances vs. contact pressure					
pressure [psi]	**10**	**20**	**30**	**40**	**50**
thermal impedance GEL 30 S 30 [K-cm²/W]	16.7	15.9	26.3	13.5	12.7

Gel thermal conductive foils for extreme compression



– very soft silicone foil with good compressibility
– mounting facilitation due to adherent surfaces
– very good compensation of larger unevennesses
– low contact pressure to reduce thermal transfer resistances
– shaped parts and material cuts according to your specifications

art. no.	material thickness [mm]
GEL 50 S 05	0.5
GEL 50 S 10	1.0
GEL 50 S 15	1.5
GEL 50 S 20	2.0
GEL 50 S 25	2.5
GEL 50 S 30	3.0
GEL 50 S 35	3.5
GEL 50 S 40	4.0

	GEL 50 S
version	silicone foil, protective film on both sides
colour	grey
hardness	20 Shore A
thermal conductivity	5 W/m·K
temperature range	-60°C ... +200°C
elongation	250 %
tear strength	0.34 N/mm²
dielectric strength	2 kV/mm
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 305x305mm/ other dimensions upon request

Thermal resistances vs. contact pressure					
pressure [psi]	**10**	**20**	**30**	**40**	**50**
thermal impedance GEL 50 S 20 [K-cm²/W]	8.2	8	7.6	7.3	7

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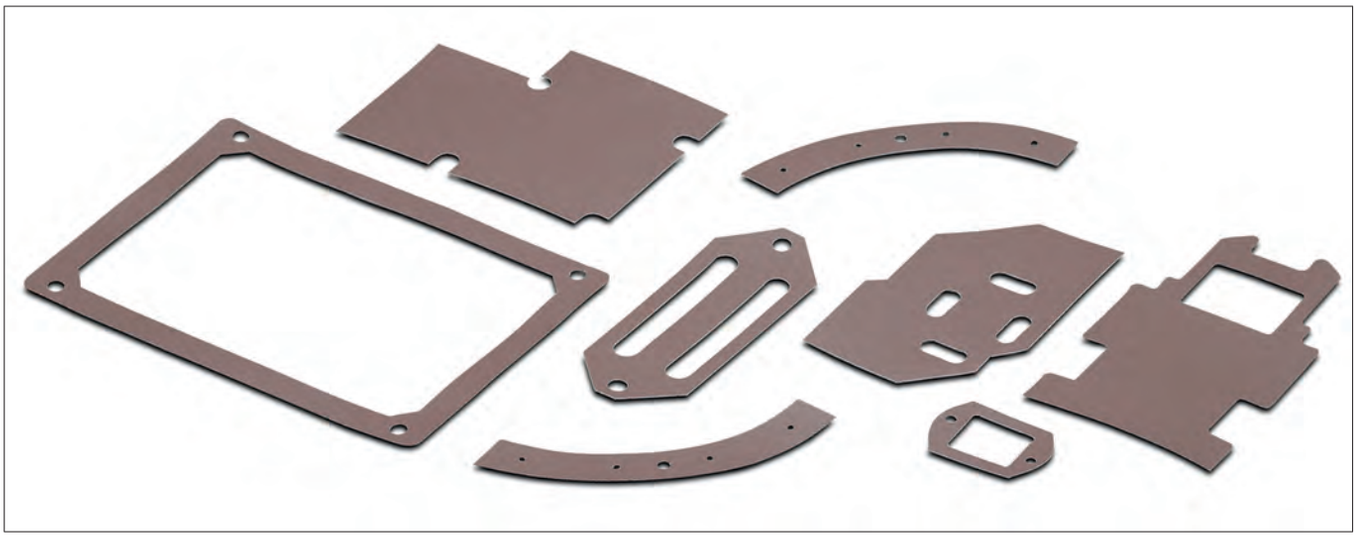
Gel thermal conductive foils for extreme compression

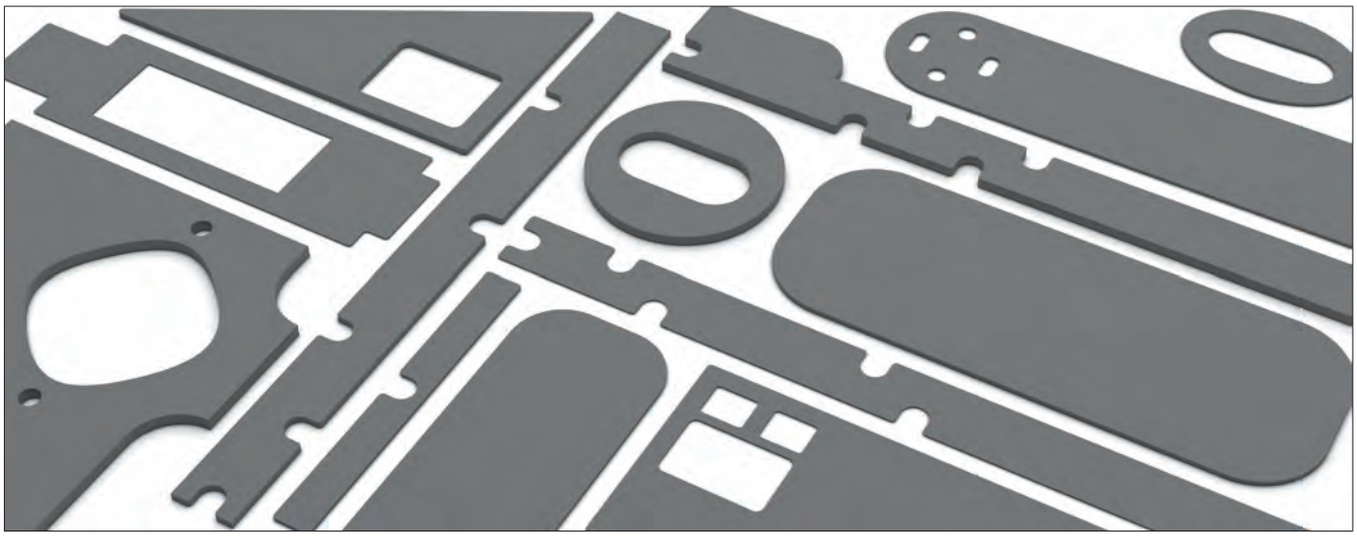


– very soft and compressible thermal conductive foil
– simple compensation of bigger differences in components
– double-sided adhesive surfaces with protective foil
– excellent dielectric strength
– drawing parts acc. to customer's specification upon request

art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]
GEL 60 S 15	1.5 +0.5/ -0.0	0.45	2.9
GEL 60 S 20	2.0 +0.7/ -0.0	0.52	3.3
GEL 60 S 25	2.5 +0.7/ -0.0	0.67	4.3

	GEL 60 S
version	standard with double-sided adhesive surface
colour	dark gray
density	3.2 g/cm³
thermal conductivity	6 W/m·K
temperature range	-40°C... +150°C
volume resistance	$1 \cdot 10^{12}$ Ω·m
dielectric constant	7.37 [50 Hz] / 7.31 [1 kHz] / 7.34 [1 MHz]
dielectric loss factor	0,0101 [50 Hz] / 0,0022 [1 kHz] / 0,0007 [1 MHz]
dielectric strength	13 kV/mm
class of inflammability	UL 94 V-0
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request

Gel thermal conductive foils for extreme compression



– very adaptable gel thermal conductive foil
– high thermal conductivity and application temperature range
– very good compression with light contact pressure
– other sheet dimensions and material thicknesses on request
– individual moulded parts according to customer drawing

art. no.	material thickness [mm]
GEL 70 S 05	0.5
GEL 70 S 10	1.0
GEL 70 S 15	1.5
GEL 70 S 20	2.0
GEL 70 S 25	2.5
GEL 70 S 30	3.0
GEL 70 S 35	3.5
GEL 70 S 40	4.0

	GEL 70 S
version	silicone foil, protective film on both sides
colour	dark gray
hardness	10 Shore A
thermal conductivity	7 W/m·K
temperature range	-60°C ... +200°C
elongation	40 %
tear strength	0.34 N/mm²
dielectric strength	6 kV/mm
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 305x305mm/ other dimensions upon request

Thermal resistances vs. contact pressure					
pressure [psi]	**10**	**20**	**30**	**40**	**50**
thermal impedance GEL 70 S 20 [K-cm²/W]	5.3	5	4.6	4.2	3.9

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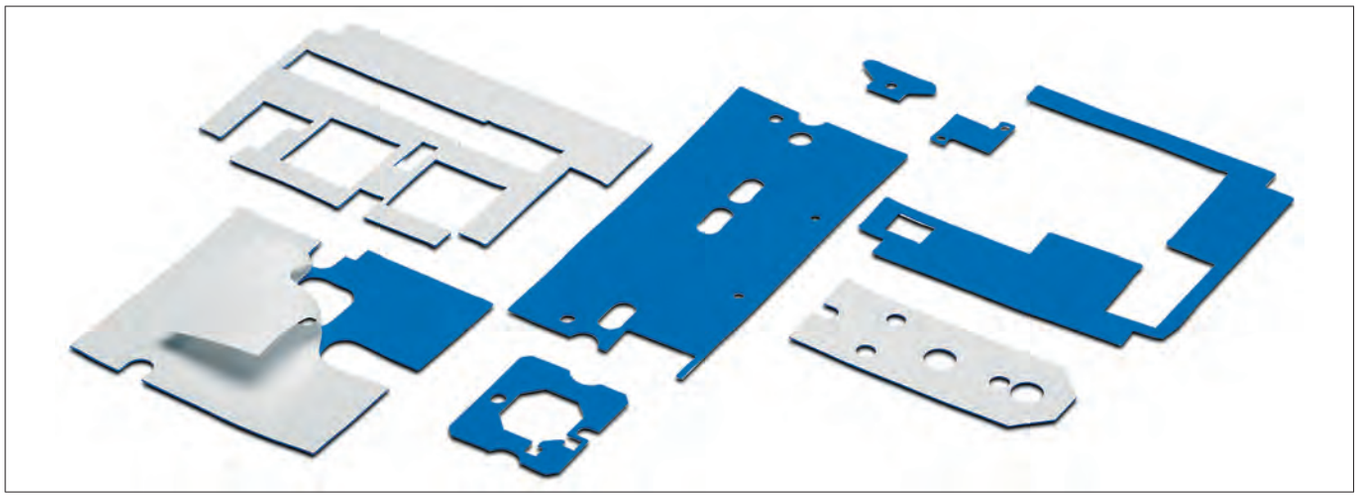
Gel thermal conductive foils for extreme compression



– extremely strong compressible gap-filler thermal conductive foil
– very high efficiency in connection with very high thermal conductivity
– little force for material compression
– perfectly suitable for balancing smallest unevennesses
– cuts and contours according to customer drawing

art. no.	material thickness [mm]	R_{th} (100 kPa) [°C in²/W]	R_{th} (100 kPa) [°C cm²/W]
GEL 130 S 05	0.5 ±0.10	0.08	0.5
GEL 130 S 10	1.0 ±0.15	0.17	1.1
GEL 130 S 15	1.5 ±0.25	0.23	1.5
GEL 130 S 20	2.0 ±0.35	0.28	1.8

	GEL 130 S
version	standard with double-sided adhesive surface
colour	blue
density	3.3 g/cm³
thermal conductivity	13 W/m·K
temperature range	-40°C... +150°C
volume resistance	$1 \cdot 10^{11}$ Ω·m
dielectric constant	9.28 [50 Hz] / 8.58 [1 kHz] / 7.761 [1 MHz]
dielectric loss factor	0,0483 [50 Hz] / 0,0389[1 kHz] / 0,0147 [1 MHz]
dielectric strength	12 kV/mm
class of inflammability	UL 94 V-0
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request

Fluid GEL thermal conductive material

– two-part fluid gap filling material
– high dimensional stability after mounting
– automatic dispensation
– optimum balance of roughness and unevennesses
– to be stored at 25 °C room temperature, vertical standing with opening pointing downwards
– other delivery forms and container seizes upon request
– more package sizes and container types upon request
– store cool and dry

art. no.	basin	contents of delivery
GEL S 18	cartridge	1x 50 ml cartridge / 3x mixer GEL M 18

	GEL S 18
version	two-part fluid gap filling material
colour	yellow/ white (A/B)
density	2.7 g/cm³
hardness	50 Shore 00
thermal conductivity	1.8 W/m·K
mixture proportion	1:1
viscosity	25 Pa·s
temperature range	-60°C ... +200°C
volume resistance	10^{10} Ω·m
dielectric constant	6.4 [1 kHz]
heat capacity	1 J/g·K
dielectric strength	400 V
durability	6 months @ 25°C
working life at room temperature	60 min @ 25°C
hardening time	300 min @ 25°C / 10 min @ 100°C
class of inflammability	UL 94 V-0
type of delivery	cartridge with additional mixers

Accessories

art. no.	contents of delivery
GEL M 18	10x mixer für 50 ml cartridge (packing unit 10 pieces)
WLK P	1x applicator gun for 50 ml cartridge

Fluid GEL thermal interface material

– two-component liquid gap filler material
– ceramic highly filled silicone elastomers and gels
– high heat dissipation and good insulation properties with low viscosity
– automatic dispensing option
– storage at 25 °C room temperature, vertically upright with the opening facing down
– other delivery forms and container sizes on request
– store in a cool, dry place

art. no.	basin	contents of delivery
GEL S 20	cartridge	1x 50 ml cartridge / 3x mixer GEL M 50
GEL S 30		
GEL S 40		

	GEL S 20	GEL S 30	GEL S 40
version	two-part fluid gap filling material		
colour	yellow	green	lila
density	2.3 g/cm³	2.94 g/cm³	3.05 g/cm³
hardness	45 - 60 Shore 00	65 - 85 Shore 00	
thermal conductivity	1.8 W/m·K	3 W/m·K	4.3 W/m·K
mixture proportion	1:1		
viscosity	45-70 Pa·s	50-80 Pa·s	55-85 Pa·s
temperature range	-40°C... +200°C		
heat capacity	1 J/g·K		
dielectric strength	20 kV/mm	12 kV/mm	10 kV/mm
durability	6 months @ 25°C		
working life at room temperature	20 min @ 25 °C		
hardening time	60 min @ 25 °C		
class of inflammability	UL 94 V-0		
type of delivery	cartridge with additional mixers		

Accessories

art. no.	contents of delivery
GEL M 50	10x mixer für 50 ml cartridge (packing unit 10 pieces)
WLK P	1x applicator gun for 50 ml cartridge

Fluid GEL thermal interface material

– fully curing one-component system
– very good thermal conductivity
– thicker and thinner layer thicknesses possible
– no bleeding, small compression force necessary
– automatic dispensable
– more package sizes and container types upon request
– store cool and dry

art. no.	basin	contents of delivery
GEL S 35 10	syringe	1x 10 ml syringe
GEL S 35	cartridge	1x 30 ml cartridge

	GEL S 35
version	one-part fluid gap filling material
colour	pink
density	3.2 g/cm^3
thermal conductivity	3.5 W/m·K
temperature range	-55°C … +200°C
volume resistance	10^{12} Ω·m
dielectric constant	7 [100 kHz]
heat capacity	1 J/g·K
dielectric strength	8 kV/mm
durability	18 months
class of inflammability	UL 94 V-0
type of delivery	syringe/ cartridge

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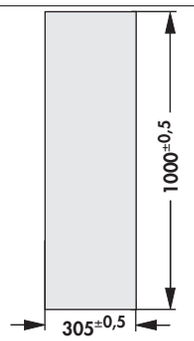
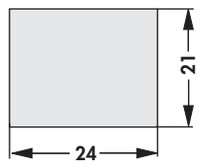
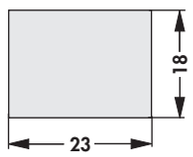
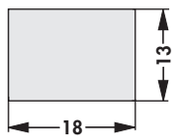
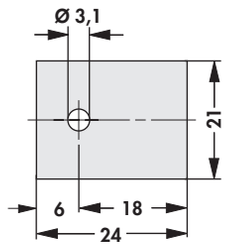
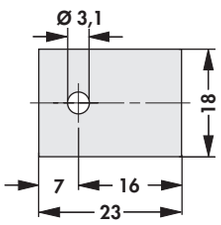
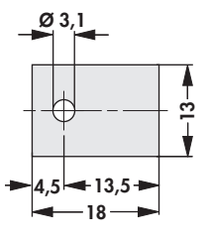
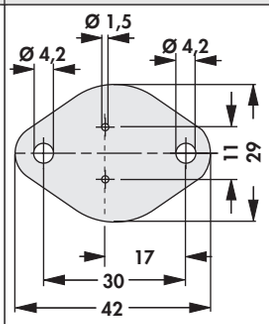
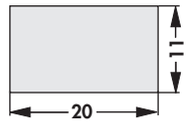
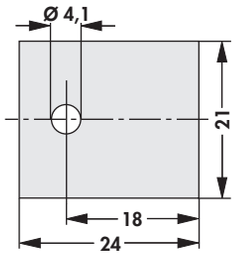
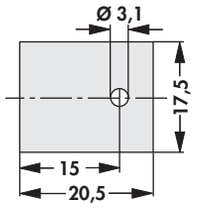
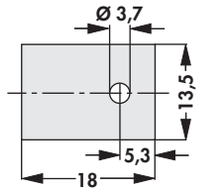
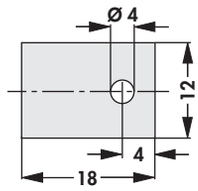
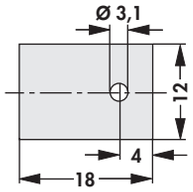
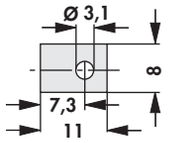
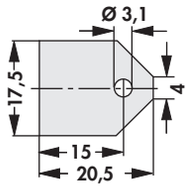
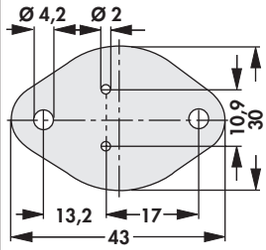
Kapton insulator washers

- very low thermal resistance
- optimised heat conductivity
- best mechanical charactaristics
- polyimide-carrier foil with silicone-free phase changing thermal conductive layer completely coated on both sides
- clean processing, no abrasion of the coating
- stacked foils do not stick together
- good resistance against cleening agents
- no cold flow
- low pressure force necessary, thus particularly applicable for spring-fixing of semiconductors
- cuttings and special versions according to customer's requirements
- the thermal details refer to an area of 1 inch² (6.45 cm²)

				
art. no.	**art. no.**	**art. no.**	**art. no.**	**art. no.**
KAP 1 P suitable for pre-cut parts (plate)	**KAP 247 O** TO 248/ TO 218/ TO 247	**KAP 218 O** TO 218	**KAP 220 O** TO 220	**KAP 218** TO 248/ TO 218/ TO 247
				
art. no.	**art. no.**	**art. no.**		
KAP 220 G TO 220	**KAP 220 K** TO 220	**KAP 3 K** TO 3		

	KAP 1 P	**KAP**
material	polyimide-carrier foil with silicone-free phase changing thermal conductive layer completely coated on both sides	
phase change temperature	52 °C	
thermal resistance	0.15 K/W [at 1 inch²; = 6.45 cm²; = TO 3 (KAP 3)]	
temperature range	-40°C... +150°C	
thermal conductivity	0.45 W/m·K (substrate)	
insulation resistance	10^{14} Ω	
material thickness	0.077mm (substrate 0.05mm)	
elongation	30 %	
dielectric strength	7.8 kV	
class of inflammability	UL 94 V-0	
type of delivery	plate	cut

				
art. no.	**art. no.**	**art. no.**	**art. no.**	**art. no.**
GS 220 C TO 220	**GS 218** TO 218	**GS 3 P SL** TOP 3	**GS 66 P** TO 66	**GS 220 4** TO 220
				
art. no.	**art. no.**	**art. no.**	**art. no.**	
GS 220 P TO 220	**GS 32 P** SOT 32	**GS 3 P** TOP 3	**GS 3** TO 3	

	GS
material	muskovit
material thickness	0.05 mm
thermal resistance (GS 3)	0.4 K/W
dielectric strength	5 kV
insulation resistance	$3 \cdot 10^{17}$ Ω·cm

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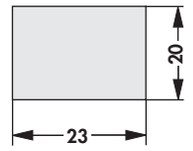
Aluminium oxide wafers

– other thicknesses and versions on request

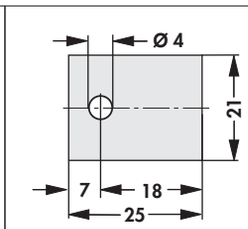
≑ = thickness; ▱ = flatness



art. no.

AOS 247

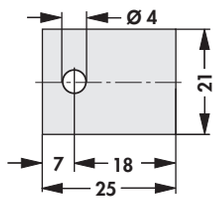
≑ 1 mm ▱ 0.02 mm



art. no.

AOS 218 247

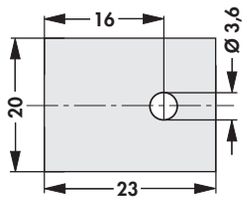
≑ 3 mm ▱ 0.02 mm



art. no.

AOS 218 247 1

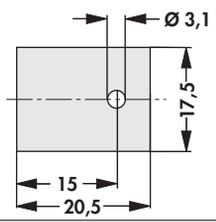
≑ 1.5 mm ▱ 0.02 mm



art. no.

AOS 3 P 2

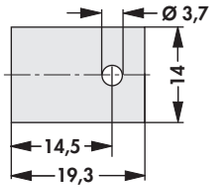
≑ 1 mm ▱ 0.02 mm



art. no.

AOS 3 P SL

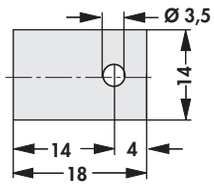
≑ 1.5 mm ▱ 0.02 mm



art. no.

AOS 220 3

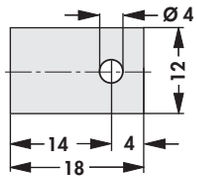
≑ 1.6 mm ▱ 0.02 mm



art. no.

AOS 220 SL

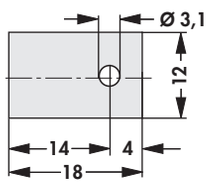
≑ 4.5 mm ▱ 0.02 mm



art. no.

AOS 220 4

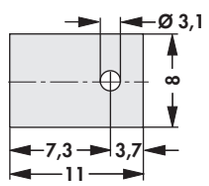
≑ 1.5 mm ▱ 0.02 mm



art. no.

AOS 220

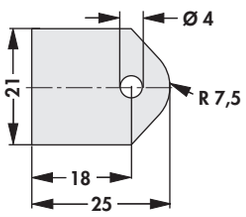
≑ 1.5 mm ▱ 0.02 mm



art. no.

AOS 32

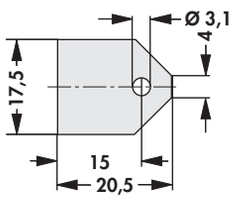
≑ 1.5 mm ▱ 0.02 mm



art. no.

AOS 127

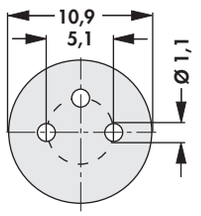
≑ 3 mm ▱ 0.02 mm



art. no.

AOS 3 P

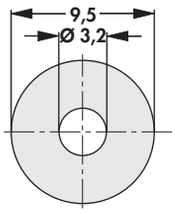
≑ 1.5 mm ▱ 0.02 mm



art. no.

AOS 5

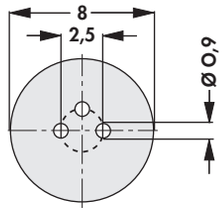
≑ 1.5 mm ▱ 0.02 mm



art. no.

AOS 93

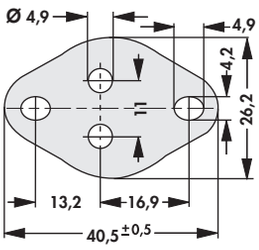
≑ 2.3 mm ▱ 0.02 mm



art. no.

AOS 18

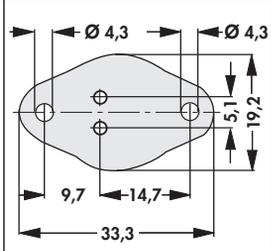
≑ 1.5 mm ▱ 0.02 mm



art. no.

AOS 3

≑ 3 mm ▱ 0.02 mm



art. no.

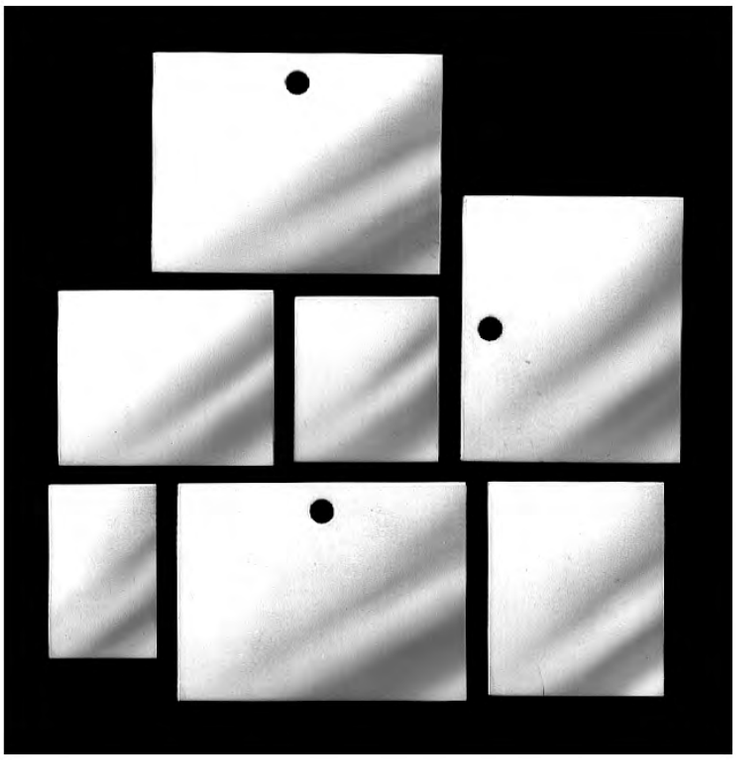
AOS 66

≑ 2.5 mm ▱ 0.02 mm

	AOS
material	AL_2O_3 - ceramics
specific electrical resistance	$>10^{14}$ Ω/cm
thermal conductivity	25 W/m·K
dielectric constant	9
linear expansion coefficient	~8·10-6/K
thermal resistance	0.3 K/W [at 1 inch²; = 6.45 cm²; = TO 3 (AOS 3 G)]
dielectric strength	10 kV/mm

Aluminium oxide wafers according to customer's instructions

– laser-cut versions with outer dimensions and cutouts according to customer's requirements
– other plate dimensions upon request



material thickness [mm]	outer dimensions [mm]
0.250	106,6x106,6
0.300	
0.400	114.3x114.3
0.500	106,6x106,6/ 160x113
0.635	106,6x106,6/ 160x113/ 180x113
0.800	114.3x114.3/ 160x113/ 165x114
1.000	114.3x114.3/ 160x113/ 165x114/ 180x130
1.270	114.3x114.3
1.500	114.3x114.3/ 290x100
2.000	114.3x114.3
2.540	

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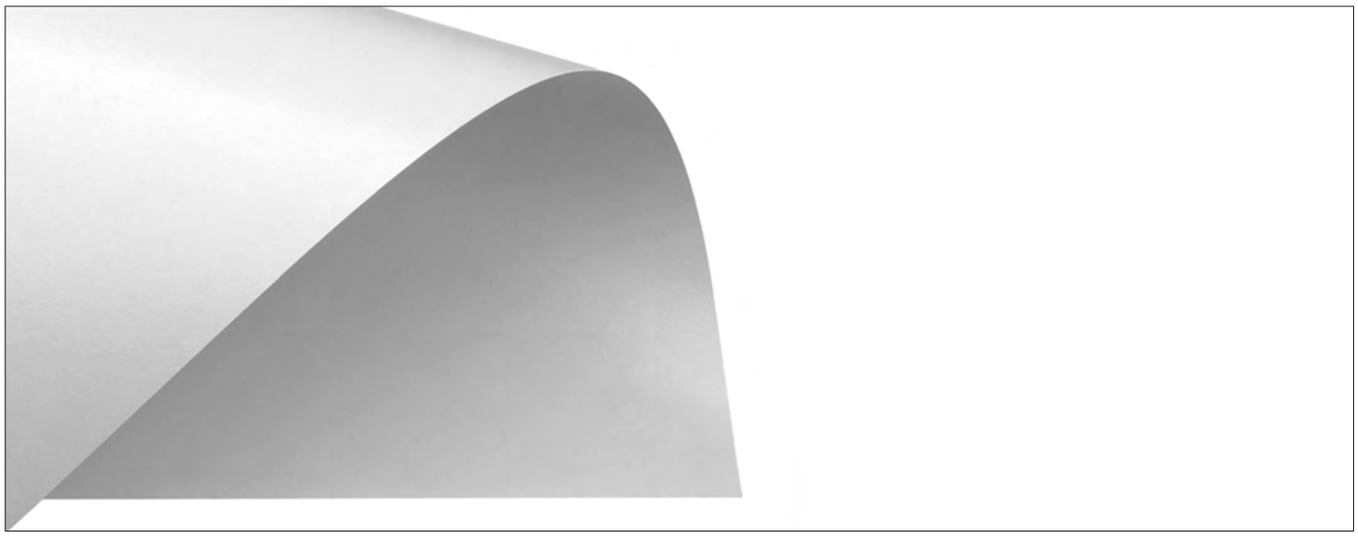
Phase Change thermal interface material

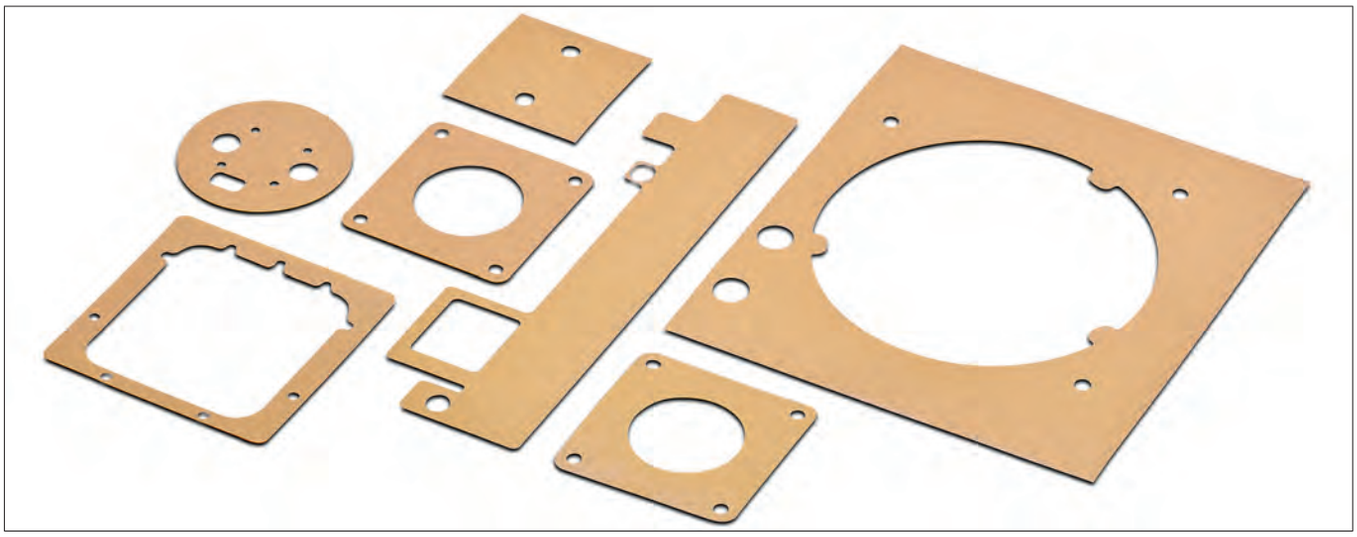


– strapless (free standing film) changing condition thermal conductive material as a foil
– material with phase changing temperature at 48 °C or 52 °C
– best thermal conductivity, above the phase change temperature the material flows in all gaps of the impinged device and heatsink
– thixotropic, therefore no migration of the material away from the moistened surface
– no influence on the thermal conductivity due to thermal cycles
– only low contact pressure necessary, as it is no elastomer and therefore ideally suitable for clamp mounting of the devices
– not electrically conductive, but no insulator
– self-adhesive properties, also suitable for large surfaces
– no toxic ingredients
– customised cuts upon request
– with double-sided protective film

art. no.	material thickness [mm]
FSF 30 P	0.120 ± 0.025
FSF 52 P	0.127 ± 0.025
FSF 20 P	0.200 ± 0.025

	FSF 30 P	**FSF 52 P**	**FSF 20 P**
colour	grey	white	
density	2.4 g/cm³	2 g/cm³	2.9 g/cm³
phase change temperature	50 °C	52 °C	48 °C
thermal conductivity	3 W/m·K	0.9 W/m·K	2 W/m·K
thermal resistance (1 in², TO 3) at contact pressure of	0.1 K/W 0.031 N/mm²	0.03 K/W 0.031 N/mm²	0.08 K/W 0.031 N/mm²
temperature range	≤+150°C	≤+200°C	≤+150°C
adhesive holding force	0.6 N/mm²	0.35 N/mm²	0.6 N/mm²
dielectric constant	5.2 [1 kHz] / 4.8 [1 MHz]	3.8 [1 kHz] 3.4 [1 MHz]	4.8 [1 kHz] / 4.4 [1 MHz]
class of inflammability	UL 94 V-0		
type of delivery	plates, usable area 400x300mm/ other dimensions upon request	plates, usable area 343x330mm/ other dimensions upon request	plates, usable area 400x300mm/ other dimensions upon request

Phase Change thermal interface material



– phase change material on a polyimide basis
– very good thermal properties
– one-sided adhesive layer eases the mounting
– particularly suitable for the application of spring clips
– cuts and contours upon customised drawing specifications

art. no.	material thickness [mm]
FSF 15 P 011	0.114
FSF 15 P 012	0.127
FSF 15 P 014	0.140

	FSF 15 P
version	electrically insulating phase change material with polyimide reinforcement and one-sided adhesive layer
colour	gold
phase change temperature	52 °C
thermal conductivity	1.5 W/m·K
temperature range	-40°C... +150°C
elongation	40 %
volume resistance	10^{12} Ω·m
dielectric constant	4.5 [1 kHz]
tear strength	7,000 psi
dielectric strength	5 kV
class of inflammability	UL 94 V-0
type of delivery	rolled goods, roll width 266mm/ cuttings on customer's requirement

Thermal resistances vs. contact pressure / surface TO 220					
pressure [psi]	**10**	**25**	**50**	**100**	**200**
thermal resistance FSF 15 P 011 [K/W]	1.20	1.15	1.11	1.06	1.00
thermal resistance FSF 15 P 012 [K/W]	1.47	1.41	1.37	1.33	1.29
thermal resistance FSF 15 P 014 [K/W]	1.59	1.48	1.43	1.38	1.35
thermal impedance FSF 15 P 011 [K-cm²/W]	1.31	1.25	1.19	1.13	1.06
thermal impedance FSF 15 P 012 [K-cm²/W]	1.44	1.38	1.31	1.25	1.19
thermal impedance FSF 15 P 014 [K-cm²/W]	1.75	1.69	1.63	1.56	1.50

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Phase Change thermal interface material

– phase change material on a polyimide basis
– very good thermal properties
– easy handling and high dielectric strength
– particularly suitable for the application of spring clips
– cuts and contours upon customised drawing specifications

art. no.	material thickness [mm]
FSF 16 P 010	0.102
FSF 16 P 011	0.114
FSF 16 P 012	0.127

	FSF 16 P
version	electrically insulating phase change material with polyimide reinforcement
colour	green
phase change temperature	55 °C
thermal conductivity	1.6 W/m·K
temperature range	-40°C... +150°C
elongation	40 %
volume resistance	10^{12} Ω·m
dielectric constant	4.5 [1 kHz]
tear strength	7,000 psi
dielectric strength	5 kV
class of inflammability	UL 94 V-0
type of delivery	plates, usable area 300x275mm/ other dimensions upon request

Thermal resistances vs. contact pressure					
pressure [psi]	10	25	50	100	200
thermal resistance FSF 16 P 010 [K/W]	0.95	0.94	0.92	0.91	0.90
thermal resistance FSF 16 P 011 [K/W]	1.19	1.17	1.16	1.14	1.12
thermal resistance FSF 16 P 012 [K/W]	1.38	1.37	1.35	1.33	1.32
thermal impedance FSF 16 P 010 [K-cm²/W]	0.81	0.81	0.75	0.75	0.75
thermal impedance FSF 16 P 011 [K-cm²/W]	1.06	1.00	1.00	1.00	0.93
thermal impedance FSF 16 P 012 [K-cm²/W]	1.18	1.18	1.18	1.12	1.12

Thermal conductive paste

Silicon thermal transfer compound

– thermal conductive paste used to reduce the thermal transmission resistance between semiconductor and heatsink

art. no.	basin	delivery quantity [g]
WLP 004	box	4
WLP 035		35
WLP 500		500
WLP 300 S	cartridge (310 ml)	300
WLP 500 S		500

Silicone-free thermal transfer compound

– thermal conductive paste used to reduce the thermal transmission resistance between semiconductor and heatsink

art. no.	basin	delivery quantity [ml]	delivery quantity [g]
WLPF 05	syringe	2	—
WLPF 10		5	
WLPF 20		10	
WLPF 50		20	
WLPF 300 S	cartridge (310 ml)	—	300

	WLP	**WLPF**
composition	silicone oil, inorganic filling material	silicone free synthetic liquid. Metal oxide filling.
specific electrical resistance	$>10^{12}$ Ω/cm	
flashpoint	none (DIN 53213)	
drop point	>260°C	
thermal resistance	no bleeding at (4 h/200°C)	
acid number	< 0.01 mg KOH/g	
consistance	pastey	
colour	white	white-grey
density	1.1 g/cm³	
thermal conductivity	0.61 W/m·K	0.5 W/m·K
temperature range	-40°C ... +250°C	-40°C... +150°C
solubility in water	insoluble	
oil separation (thickener)		≤ 2% (40°C / 168h)
flow pressure at 20°C (thickener)		≤ 200 mbar
kinetic viscosity (base oil)		ca. 90 mm²/s (40°C) ca. 13 mm²/s (100°C)

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Thermal conductive paste

Ceramic filled, silicone-free thermal conductive paste with high thermal conductivity

– suitable especially for silicone-sensitive applications
– no drying out, hardening or melting of the thermal conductive paste
– high long-term stability
– further package sizes, container types such as cans, cartridge, etc. upon request

art. no.	basin	delivery quantity [ml]
WLPK 3	syringe	3
WLPK 5		5
WLPK 10		10

	WLPK
composition	silicone-free, synthetic fluid ceramic filled
consistance	pastey
colour	silver
density	1.4 g/cm³
thermal conductivity	10 W/m·K
temperature range	-60°C ... +150°C
dielectric strength	not applicable, because conducting
solubility in water	insoluble

Thermally conductive adhesive

– thermally conductive, electrically non-conductive adhesive
– two part epoxy resin adhesive, metaloxide filled
– fully replaces mechanical fastenings
– excellent function and application characteristics
– **to be stored at a cool and dark place**

WLK 5

art. no.	composition
WLK 5	5 g resin/0.5 g hardener

WLK 10

art. no.	composition
WLK 10	10 g resin/1 g hardener

WLK 30

art. no.	composition
WLK 30	30 g resin/3 g hardener

WLK 120

art. no.	composition
WLK 120	120 g resin/12 g hardener

	WLK
thermal conductivity	0.836 W/m·K
specific thermal resistance	1.2 m·K/W
temperature range	-56°C... +149°C
hardening time	20°C approx. 16-24h / 25°C approx. 8 h / 120°C approx. 20 min
volume resistance	10^{16} Ω/cm
glue layer	Epoxid
mixture proportion	10:1

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Thermally conductive adhesive

- solvent-free and thermal conductive two part adhesive
- epoxy based filled with aluminium oxide
- composition of hardener and resin (1:1) with statical mixing tube
- lockability of the container via Luer-Lock System
- good usage and working properties
- more package sizes and container types upon request
- store cool and dry

art. no.	basin	contents of delivery
WLK DK 4	syringe	1x 4 ml syringe / 3x mixer WLK M4
WLK DK 10		1x 10 ml syringe / 3x mixer WLK M4
WLK DK 50	cartridge	1x 50 ml cartridge / 3x mixer WLK M 50

	WLK DK
thermal conductivity	1 W/m·K
specific thermal resistance	118°C cm/W
temperature range	-50°C... +145°C
working life at room temperature	approx. 30 min
hardening time	60°C approx. 4 h/25°C approx. 16 h
volume resistance	$8 \cdot 10^{11}$ Ω/cm
glue layer	Epoxid
mixture proportion	1:1

Accessories

art. no.	contents of delivery
WLK M 4	10x mixer für 4 & 10 ml syringe (packing unit 10 pieces)
WLK M 50	10x mixer für 50 ml cartridge (packing unit 10 pieces)
WLK P	1x applicator gun for 50 ml cartridge

Thermally conductive adhesive

– space networking thermal conductive glue made on silicone basis
– very good thermal conductivity
– mixing in ration 1:1 with static mixing tube
– hardening will be proceeded at room temperature
– wide range of temperatures
– store cool, dark and dry

art. no.	basin	contents of delivery
WLK SK 50	cartridge	1x 50 ml cartridge / 3x mixer WLK SK M

	WLK SK 50
version	2-component silicone thermal adhesive
colour	violet
density	2.8 g/cm^3
hardness	65 Shore A
thermal conductivity	2 W/m·K
temperature range	-60°C... +180°C
working life at room temperature	approx. 30 min
hardening time	25°C approx. 8 h / 50°C approx. 4 h / 85°C approx. 1 h
volume resistance	10^{11} Ω·m
dielectric constant	6.9 [1 KHz]
heat capacity	1 J/g·K
dielectric strength	10.8 kV/mm
Scherfestigkeit bei RT	1.4 MPa
class of inflammability	UL 94 V-0

Accessories

art. no.	contents of delivery
WLK SK M	10x mixer für 50 ml cartridge (packing unit 10 pieces)
WLK P	1x applicator gun for 50 ml cartridge

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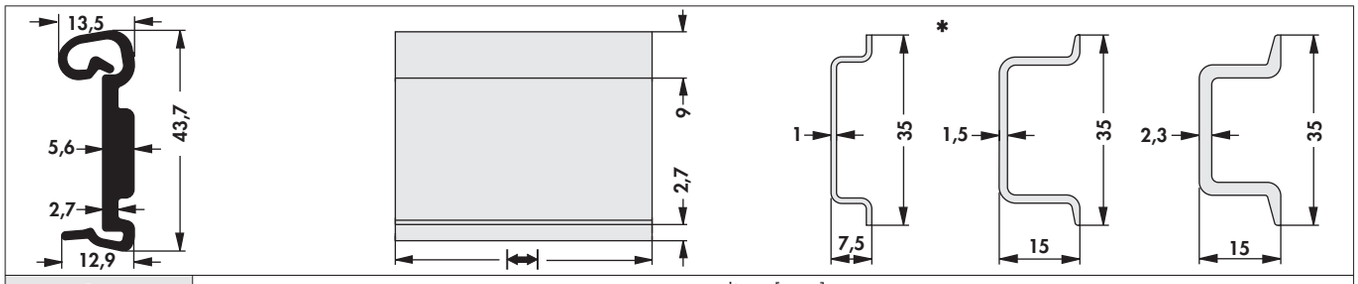
Fastening for mounting rail

– universal, solid plastic clip fastening for all 35 mm mounting rails
– suitable for rail material thicknesses from 1 to 2.3 mm according to DIN EN 60 715 (formerly DIN EN 50 022)
– registrated design DE 200 07 435.0
– fast and easy mounting of heatsinks, casings etc. due to direct snap up on the mounting rail

– safe hold due to a stable extruded plastic profile with integrated spring back
– electroconductive material or surface on request
– special lengths and treatments on customer's request
– * = examples of mounting rail versions suitable for **KL 35 K**

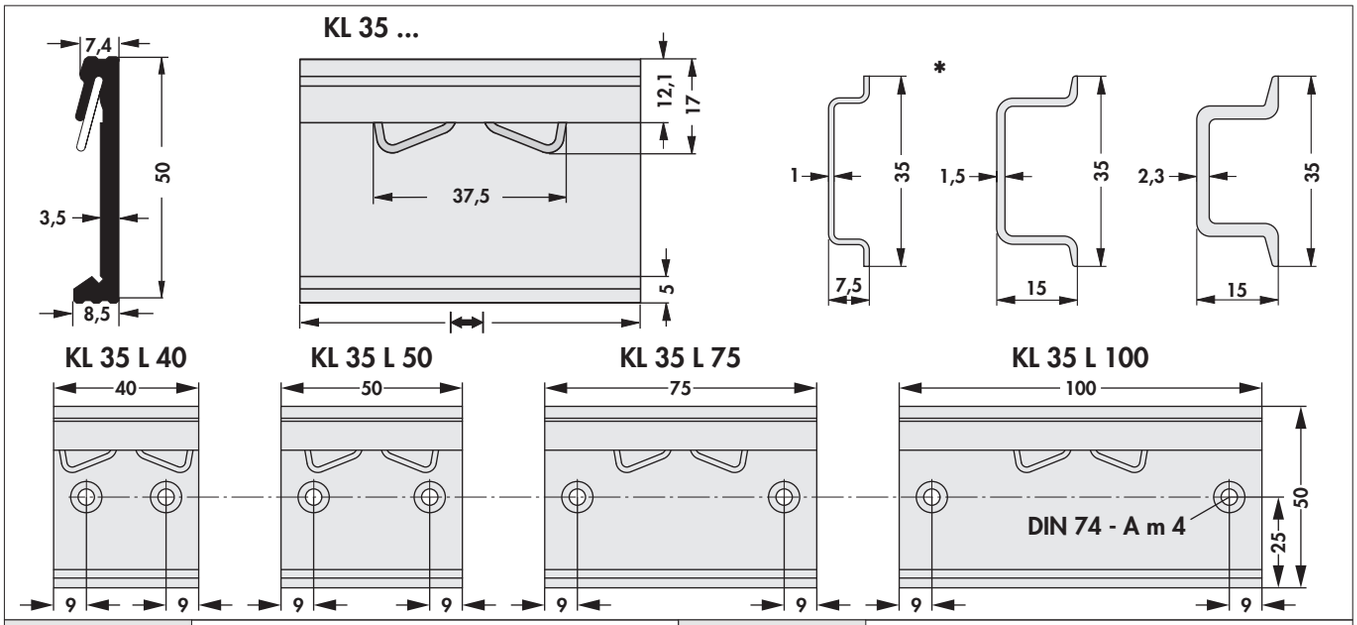


art. no.	dim. [mm] ↔
KL 35 K 40	40
KL 35 K 50	50
KL 35 K 75	75
KL 35 K 100	100

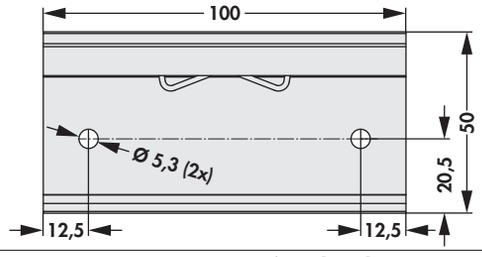
material:	rigid PVC
heat distortion:	-30°C ... +80°C
colour:	anthracite grey
class of inflammability:	accordant UL 94 V-0

Fastening for mounting rail

– universal, massive aluminium clamp mounting for all 35mm mounting rails
– suitable for rail material thicknesses from 1 to 2.3 mm according to DIN EN 60 715 (formerly DIN EN 50 022)
– fast and easy mounting of heatsinks, casings etc. by direct snap up on the mounting rail
– safe hold due to a stable extruded profile with integrated wire form spring made of stainless steel
– special lengths (≥40mm), machinings and surfaces upon request
– * = examples of mounting rail versions suitable for KL 35



art. no.	dim. [mm] ↔	art. no.	dim. [mm] ↔
KL 35 40	40	**KL 35 L 40**	40
KL 35 50	50	**KL 35 L 50**	50
KL 35 75	75	**KL 35 L 75**	75
KL 35 100	100	**KL 35 L 100**	100



art. no.	dim. [mm] ↔
KL 35 SL 100	100

material:	aluminium
surface:	natural colour anodised

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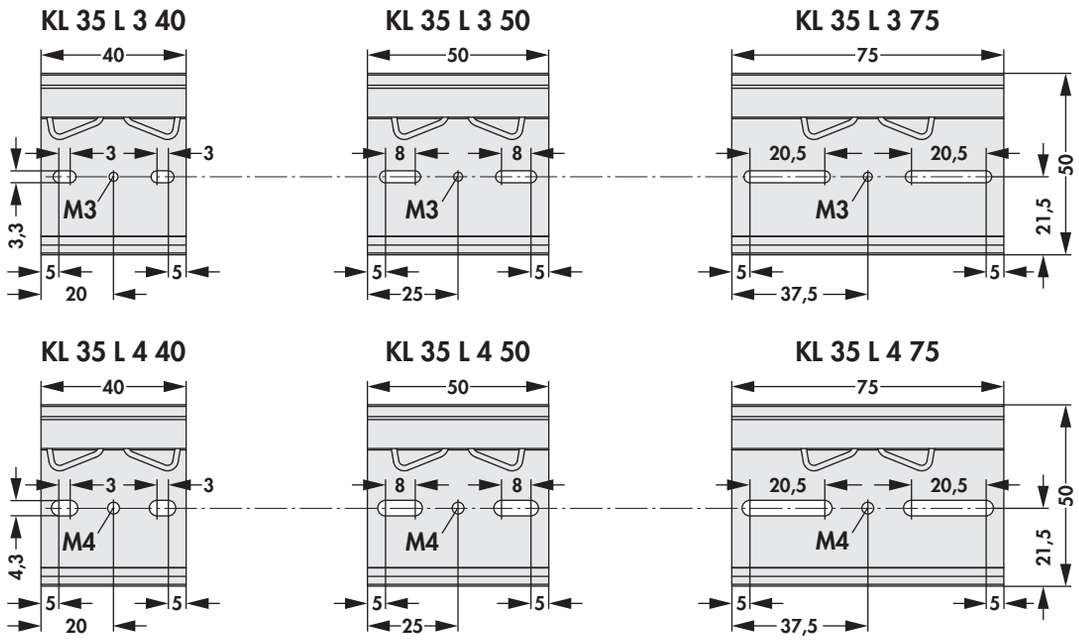
Fastening for mounting rail

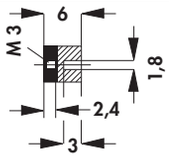
– universal, massive aluminium clamp mounting for all 35mm mounting rails
– suitable for rail material thicknesses from 1 to 2.3 mm according to DIN EN 60 715 (formerly DIN EN 50 022)
– fast and easy mounting of heatsinks, casings etc. by direct snap up on the mounting rail
– safe hold due to a stable extruded profile with integrated wire form spring made of stainless steel
– special lengths (≥40mm), machinings and surfaces upon request
– * = examples of mounting rail versions suitable for KL 35

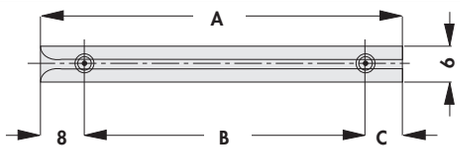


art. no.	dim. [mm] ↔	art. no.	dim. [mm] ↔
KL 35 L 3 40	40	**KL 35 L 4 40**	40
KL 35 L 3 50	50	**KL 35 L 4 50**	50
KL 35 L 3 75	75	**KL 35 L 4 75**	75

material:	aluminium
surface:	natural colour anodised

Screw-on type



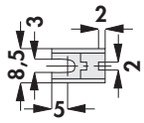


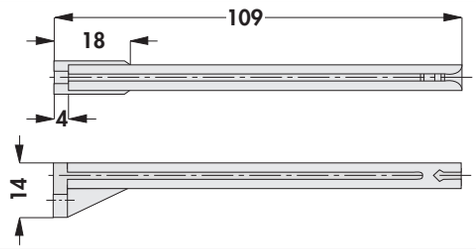
art. no.	dim. [mm] A	B	C
FS 6 065	65	50	7
FS 6 070	70		12
FS 6 080	80	67	5
FS 6 090	90		15
FS 6 100	100	84	8
FS 6 110	110		18
FS 6 120	120		28
FS 6 130	130		38

material:	polycarbonate, GF reinforced
temperature range:	-20°C... +130°C
thread nut:	brass nickel-plated
class of inflammability:	UL 94 V-0

art. no.

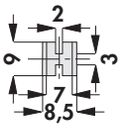
FS 109

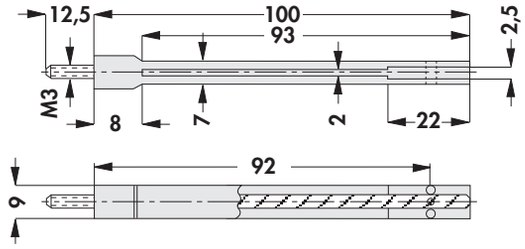




art. no.

FS 100





material:	polyamide, GF reinforced
temperature range:	permanent up to 100°C
class of inflammability:	UL 94 V-0

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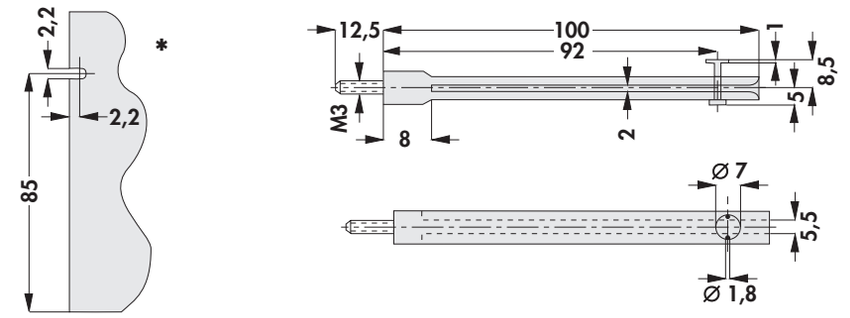
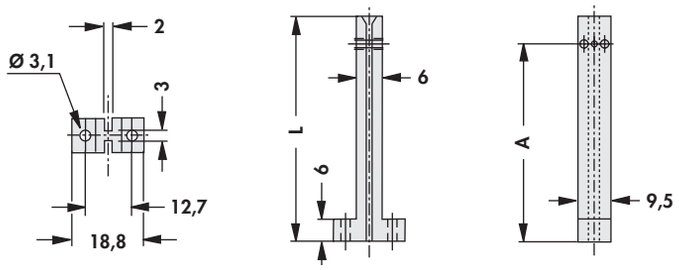
Guide rails

art. no.		
MSVL 100		
	* = position of snap-in slot	

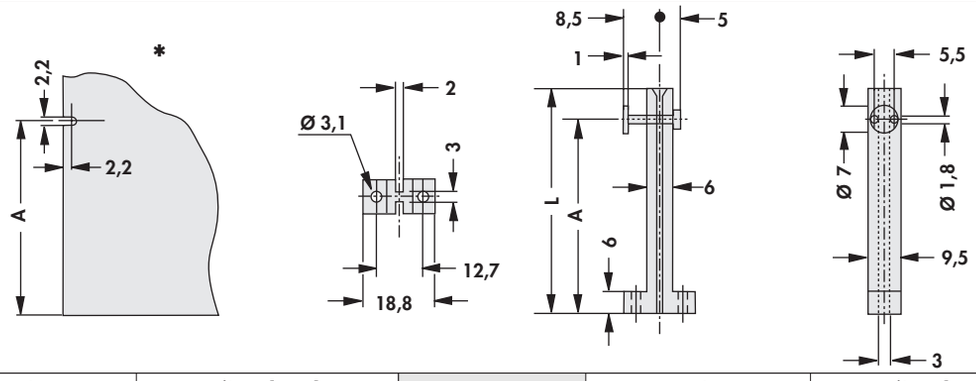
material:	polyamide, GF reinforced
temperature range:	-40°C... +205°C
class of inflammability:	UL 94 V-0

Lockable mounting rails

– lockable by pushing the plastic pin or the metal button
– no conductive connection to the PCB
– the PCB requires a snap-in slot in accordance to the drawing
– other position with locking device on request
– * = position of snap-in slot

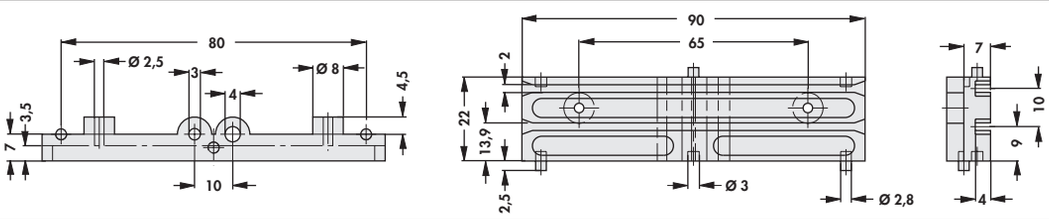


art. no.	version	dim. [mm] L	dim. [mm] A	art. no.	version	dim. [mm] L	dim. [mm] A
FS 85 50	without bolting device	50	42	**FS 85 70**	without bolting device	70	62
FS 85 60		60	52	**FS 85**		85	76
material:	polyamide, GF reinforced						
temperature range:	permanent up to 100°C						
class of inflammability:	UL 94 V-0						



art. no.	version	dim. [mm] L	dim. [mm] A	art. no.	version	dim. [mm] L	dim. [mm] A
MSVL 50	with bolting device	50	42	**MSVL 70**	with bolting device	70	62
MSVL 60		60	52	**MSVL 85**		85	76
material:	polyamide, GF reinforced						
temperature range:	-40°C... +205°C						
class of inflammability:	UL 94 V-0						

– the guide bars have got mounting holes for vertical and horizontal assembly of printed circuits
– they can also be stacked together horizontally or vertically using pins and treatments

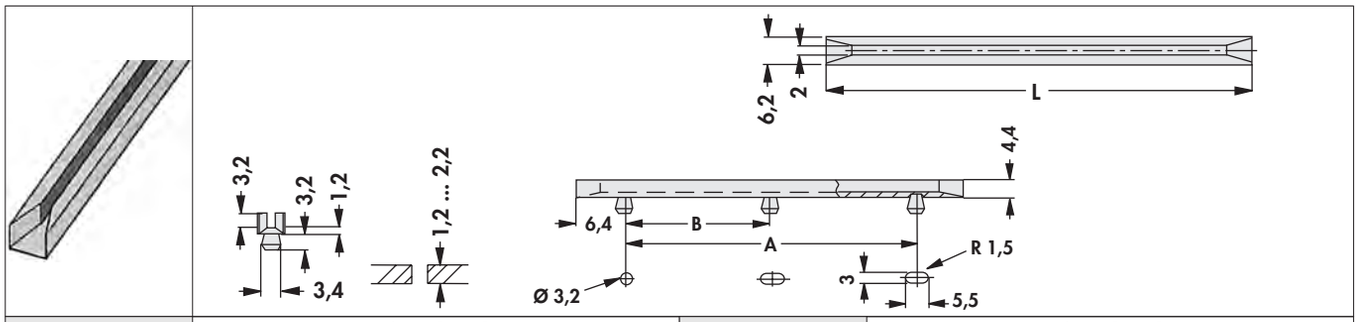


art. no.
MSHV 90

material:	polyamide, GF reinforced
class of inflammability:	UL 94 V-0

Snap-in

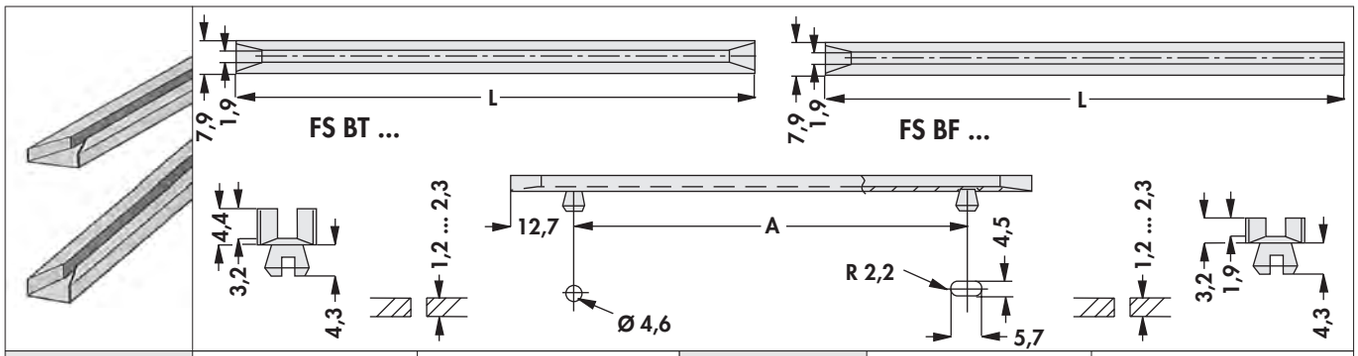
– narrow version



art. no.	dim. [mm] L	dim. [mm] A	art. no.	dim. [mm] L	dim. [mm] A	dim. [mm] B
FS S 06 2	63.5	50.8	**FS S 15 2**	152.4	139.7	—
FS S 07 2	76.2	63.5	**FS S 16 2**	165.1	152.4	
FS S 08 2	88.9	76.2	**FS S 19 3**	190.5	177.8	88.9
FS S 10 2	101.6	88.9	**FS S 20 3**	203.2	190.5	95.2
FS S 11 2	114.3	101.6	**FS S 21 2**	215.9	203.2	—
FS S 12 2	127.0	114.3	**FS S 21 3**			101.6
FS S 13 2	139.7	127.0				

material:	nylon, natural coloured
temperature range:	-40°C... +120°C
class of inflammability:	UL 94 V-2

– wide version

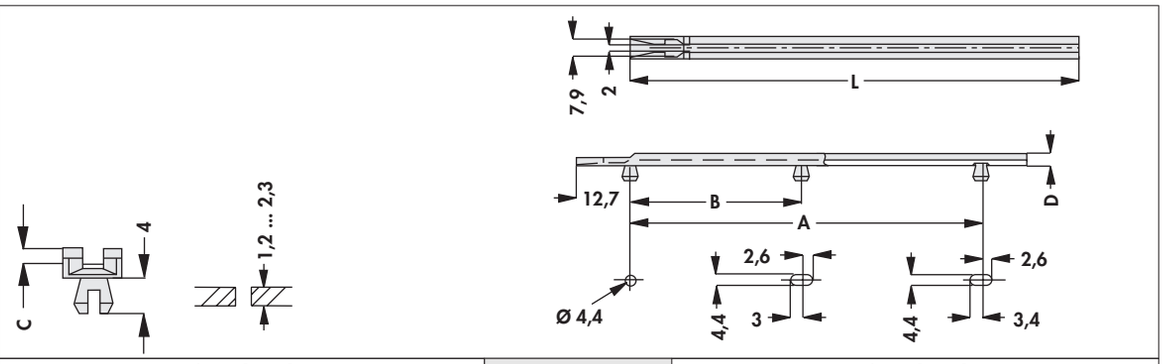


art. no.	version	dim. [mm] L	dim. [mm] A	art. no.	version	dim. [mm] L	dim. [mm] A
FS BT 06	deep groove	63.5	38.1	**FS BF 06**	shallow groove	63.5	38.1
FS BT 08		88.9	63.5	**FS BF 07**		76.2	50.8
FS BT 10		101.6	76.2	**FS BF 10**		101.6	76.2
FS BT 11		114.3	88.9	**FS BF 11**		114.3	88.9
FS BT 13		139.7	114.3	**FS BF 13**		139.7	114.3
FS BT 15		152.4	127.0	**FS BF 15**		152.4	127.0
FS BT 16		165.1	139.7	**FS BF 19**		190.5	165.1
FS BT 19		190.5	165.1	**FS BF 20**		203.2	177.8
FS BT 20		203.2	177.8				

material:	nylon, natural coloured
temperature range:	-40°C... +120°C
class of inflammability:	UL 94 V-2

Ejectors

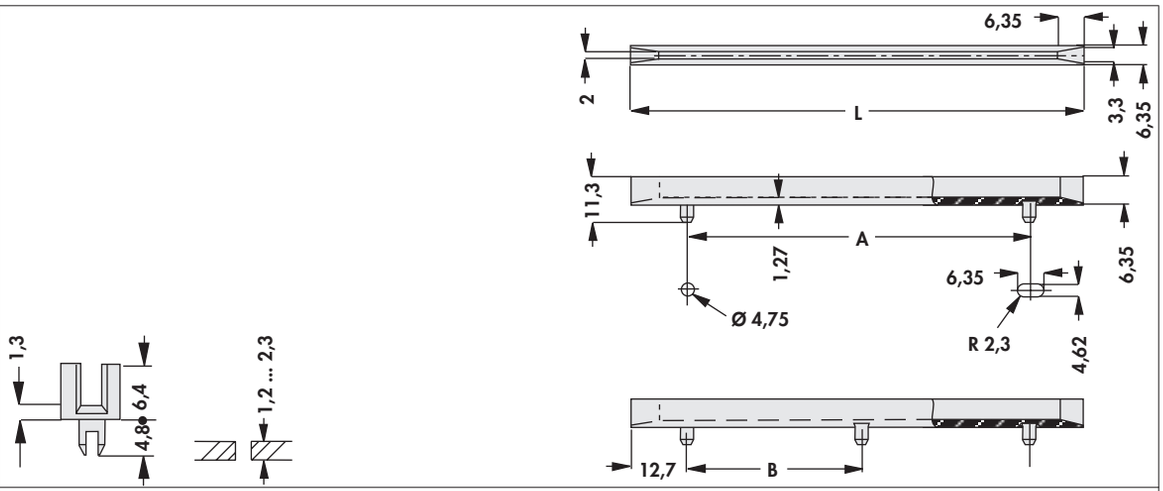
– low profile
– suitable for ejectors **art. no. AHG V 14** und **AHG V 17**



art. no.	dim. [mm]				art. no.	dim. [mm]				
	L	A	C	D		L	A	B	C	D
FS LP 05	50.8	25.8	2.0	3.2	**FS LP 15**	152.4	127.4	—	2.0	3.2
FS LP 07	76.2	38.5			**FS LP 16**	165.1				
FS LP 08	88.9				**FS LP 17**	177.8	153.2			
FS LP 10	101.6	76.6			**FS LP 22**	228.6	191.3	95.7		3.6
FS LP 11	114.3				**FS LP 30**	304.8	267.9	134.0	2.4	4.0
FS LP 13	139.7									

material:	polyamide, GF reinforced
temperature range:	-40°C... +120°C
class of inflammability:	UL 94 V-0

– deep guideway
– bevelled entrance zone



art. no.	dim. [mm]		
	L	A	B
FS U 06	63.5	38.1	—
FS U 11	114.3	88.9	
FS U 20	203.2	177.8	88.9

material:	polyamide, GF reinforced
temperature range:	-40°C... +120°C
class of inflammability:	UL 94 V-0

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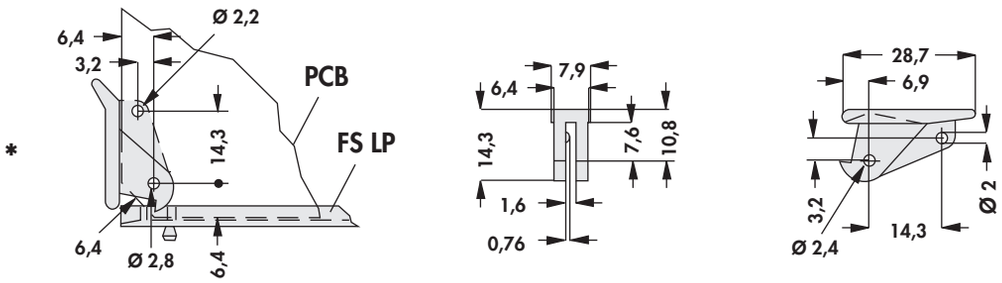
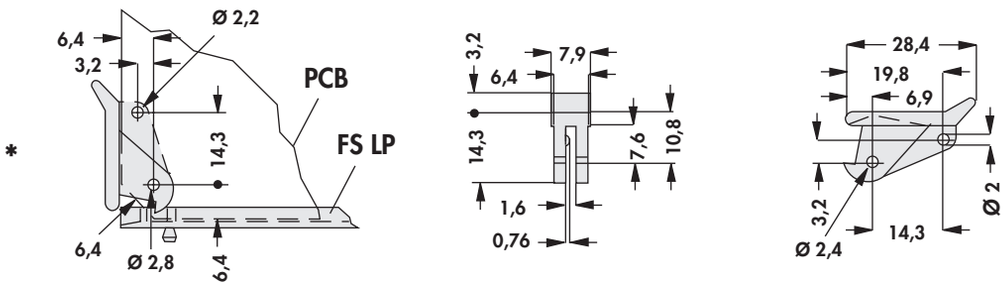
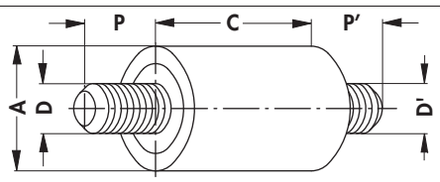
Ejectors

art. no.	
AHG V 14	 * = mounting dimensions; locking in **FS LP**
AHG V 17	 * = mounting dimensions; locking in **FS LP**
AHG K 27	
AHG K 28	
AHG L 7	

material:	nylon
temperature range:	-40°C... +120°C
class of inflammability:	UL 94 V-2
type of delivery:	all ejectors with matching spring pin

Insulating spacers with internal and external thread

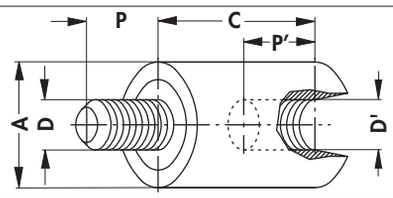
field of applications:
– insulated assembly of stacked PCB
– insulated assembly of stacked heatsinks with varying capacities
– insulated assembly of chassis plates in cases
– insulated supports in the wiring
– mechanicaly very stable as threads are made of brass
– other lengths on request
– dimensions = nominal size: deviation ±0.5 mm
– **... please indicate length "C"**



art. no.	dim. [mm]			
	A	C	D/D'	P/P'
ISAB 25 A ...	8.0	10/ 15/ 20/ 25	M2.5/M2.5	6.0
ISAB 3 A ...		10/ 20	M3/M3	
ISAB 4 A ...		15/ 20	M4/M4	
ISAB 6 A ...	12.7	25	M6/M6	12.7

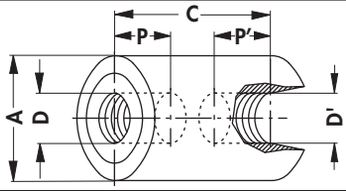
creeping current resistance:	CTI 600
thread inserts:	brass
temperature range:	-30°C... +85°C (short term +200°C)
surface:	raw
plastic body:	polyamide 66
colour:	natural (opaque)
dielectric strength:	27 kV/mm

Insulating spacers with internal and external thread



art. no.	dim. [mm]			
	A	C	D/D'	P/P'
ISAB 25 B ...	8.0	10/ 13/ 15/ 18/ 20/ 25/ 30	M2.5/M2.5	6.0
ISAB 3 B ...		10/ 13/ 15/ 18/ 20/ 25/ 30/ 35/ 40	M3/M3	
ISAB 4 B ...		15/ 20/ 25/ 30/ 40	M4/M4	
ISAB 5 B ...	9.5	20/ 30/ 40	M5/M5	10.0
ISAB 6 B ...	12.7	25/ 30/ 35/ 40/ 50	M6/M6	12.7

– dimensions = nominal size: deviation ±0.5 mm; at **ISAB 3 C ...** L=10 => P/P'=3.5

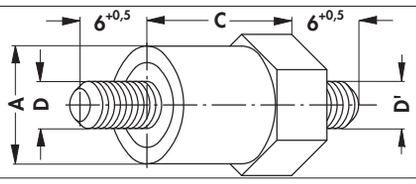


art. no.	dim. [mm]			
	A	C	D/D'	P/P'
ISAB 25 C ...	8.0	10/ 13/ 15/ 18/ 20/ 25/ 30	M2.5/M2.5	6.0
ISAB 3 C ...		10/ 13/ 15/ 18/ 20	M3/M3	
ISAB 4 C ...		15/ 35	M4/M4	
ISAB 5 C ...	9.5	20	M5/M5	10.0
ISAB 6 C ...	12.7	25	M6/M6	12.0
ISAB 6 C ...		30		12.7

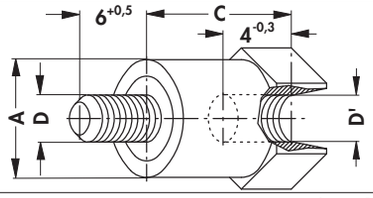
creeping current resistance:	CTI 600
thread inserts:	brass
temperature range:	-30°C... +85°C (short term +200°C)
surface:	raw
plastic body:	polyamide 66
colour:	natural (opaque)
dielectric strength:	27 kV/mm

Miniature spacers with threads

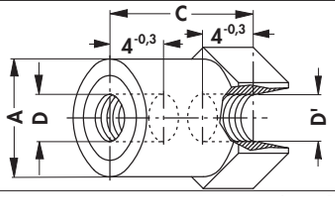
– allows compact, insulated constructions
– reduced volume in case of stack assembly
– insulated mounting of heatsinks, PCB, housingparts etc.
– very good mechanical stability due to brass inserts
– dimensions = nominal size: deviation ±0.5 mm
– **... please indicate length "C"**



art. no.	dim. [mm]		
	A	C	D/D'
ISAM 2 A ...	6	4/ 5/ 7/ 9/ 11/ 12	M2.5/M2.5
ISAM 3 A ...	7	4/ 5/ 7/ 8/ 9/ 10	M3/M3



art. no.	dim. [mm]		
	A	C	D/D'
ISAM 2 B ...	6	8/ 9/ 10/ 11	M2.5/M2.5
ISAM 3 B ...	7	7/ 8/ 9/ 10/ 11/ 12	M3/M3



art. no.	dim. [mm]		
	A	C	D/D'
ISAM 2 C ...	6	9	M2.5/M2.5
ISAM 3 C ...	7	9/ 10/ 12	M3/M3

creeping current resistance:	CTI 600
thread inserts:	brass
temperature range:	-30°C... +85°C (short term +200°C)
surface:	raw
plastic body:	polyamide 6
colour:	natural (opaque)
dielectric strength:	28 kV/mm

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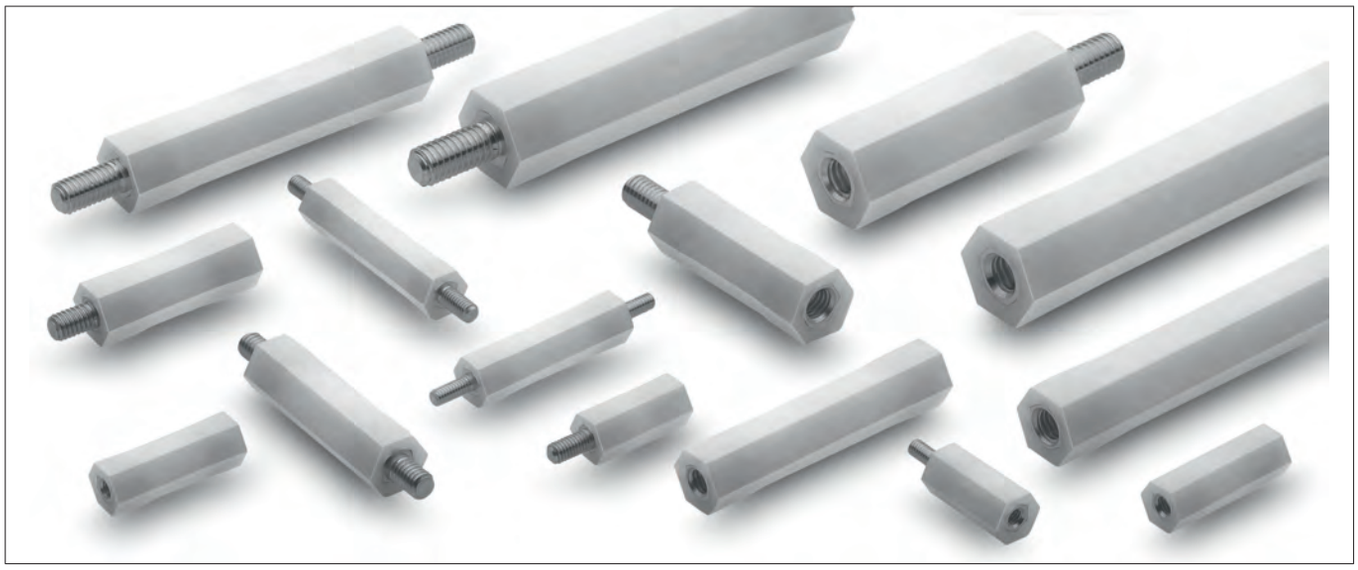
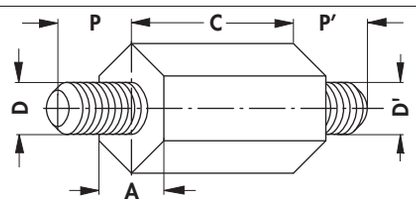
Distance hexagonal bolts insulating



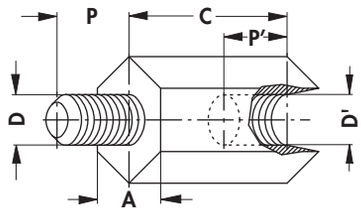
field of applications:
- insulated assembly of stacked PCBs
- insulated assembly of stacked heatsinks with varying capacities
- insulated assembly of chassis plates in cases
- insulated supports in the wiring
- mechanicaly very stable, as threads are made of brass
- other lengths on request
- dimensions = nominal size: deviation ±0.5 mm
- **... please indicate length "C"**



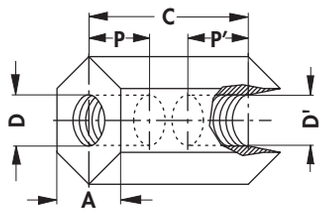
art. no.	dim. [mm]			
	A	C	D/D'	P/P'
ISAS 25 A ...	6.35	15/ 20/ 25/ 30/ 35/ 40	M2.5/M2.5	6.0
ISAS 30 A ...		15/ 20/ 25/ 30/ 35/ 40/ 45/ 50	M3/M3	
ISAS 40 A ...	8.00		M4/M4	
ISAS 50 A ...	9.50	20/ 25/ 30/ 35/ 40/ 45/ 50	M5/M5	10.0
ISAS 60 A ...	12.70	25/ 30/ 35/ 40/ 45/ 50/ 60	M6/M6	12.7

creeping current resistance:	CTI 600
thread inserts:	brass
temperature range:	-30°C... +85°C (short term +200°C)
surface:	raw
plastic body:	polyamide 66
colour:	natural (opaque)
dielectric strength:	27 kV/mm

Distance hexagonal bolts insulating



art. no.	dim. [mm]			
	A	C	D/D'	P/P'
ISAS 25 B ...	6.35	15/ 20/ 25/ 30/ 35/ 40	M2.5/M2.5	6.0
ISAS 30 B ...		15/ 20/ 25/ 30/ 35/ 40/ 45/ 50	M3/M3	
ISAS 40 B ...	8.00		M4/M4	
ISAS 50 B ...	9.50	20/ 25/ 30/ 35/ 40/ 45/ 50	M5/M5	10.0
ISAS 60 B 25	12.70	25	M6/M6	11.5
ISAS 60 B ...		30/ 35/ 40/ 45/ 50/ 60		12.7

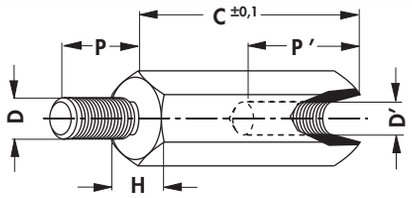


art. no.	dim. [mm]			
	A	C	D/D'	P/P'
ISAS 25 C ...	6.35	15/ 20/ 25/ 30/ 35/ 40	M2.5/M2.5	6.0
ISAS 30 C ...		15/ 20/ 25/ 30/ 35/ 40/ 45/ 50	M3/M3	
ISAS 40 C ...	8.00		M4/M4	
ISAS 50 C ...	9.50	20/ 25/ 30/ 35/ 40/ 45/ 50	M5/M5	10.0
ISAS 60 C 25	12.70	25	M6/M6	11.5
ISAS 60 C ...		30/ 35/ 40/ 45/ 50/ 60		12.7

creeping current resistance:	CTI 600
thread inserts:	brass
temperature range:	-30°C... +85°C (short term +200°C)
surface:	raw
plastic body:	polyamide 66
colour:	natural (opaque)
dielectric strength:	27 kV/mm

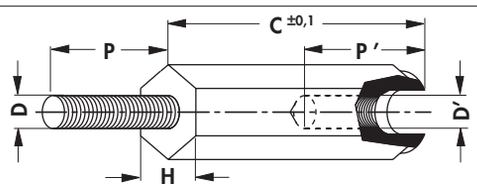
Spacers with internal and external thread

– other lengths and threads on request
– **... please indicate length "C"**



art. no.	dim. [mm]				
	H	C	D/D'	P	P'
GBM 2550 ...	5	5	M2.5	6	2.5
GBM 2550 ...		10			5.0
GBM 2550 ...		15/ 20			8.0
GBM 2550 ...		25/ 30/ 35		8	10.0
GBM 3050 ...		5	M3		2.5
GBM 3050 ...		10/ 12			5.0
GBM 3050 ...		14/ 15/ 18/ 20			10.0
GBM 3050 ...		25/ 30/ 35/ 40/ 45/ 50		10	
GBM 4070 ...	7	5	M4	8	2.5
GBM 4070 ...		10			5.0
GBM 4070 ...		15			8.0
GBM 4070 ...		20			10.0
GBM 4070 ...		25/ 30/ 35/ 40/ 45/ 50		10	
GBM 5080 ...	8	10	M5	8	5.0
GBM 5080 ...		15/ 20			6.0
GBM 5080 ...		25/ 30/ 35/ 40/ 45/ 50		10	10.0
material:	brass				
surface:	6 µm nickel-plated, solderable				

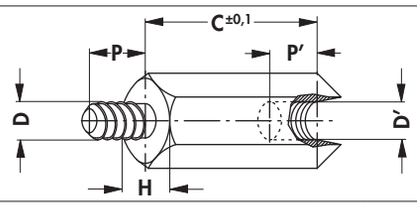
– other lengths and threads on request
– **... please indicate length "C"**



art. no.	dim. [mm]				
	H	C	D/D'	P	P'
GBP 3060 ...	6	10	M3	8	8
GBP 3060 ...		12/ 15/ 18/ 20/ 25/ 30			10
GBP 4080 ...	8	10	M4		8
GBP 4080 ...		12/ 15/ 18/ 20/ 25/ 30/ 35/ 40/ 45			10
material:	polyamide, GF reinforced				
temperature range:	-30°C... +110°C				
colour:	black				

Spacers with internal and external thread

– with self-cutting external thread
– extternal thread with undercut according to DIN 76-B
– different lengths, materials and types of thread upon request
– **... please indicate length "C"**

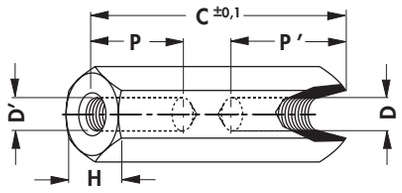


art. no.	dim. [mm]				
	H	C	D/D'	P	P'
GBMS 2550 ...	5.0	8	ST2,2/M2,5	5	5
GBMS 2550 ...		10			6
GBMS 2550 ...		12			7
GBMS 2550 ...		15/ 20			10
GBMS 3055 29 ...	5.5	8	ST2,9/M3	6	5
GBMS 3055 29 ...		10			6
GBMS 3055 29 ...		12			7
GBMS 3055 29 ...		15/ 20			10
GBMS 3055 33 ...		8	ST3,3/M3		5
GBMS 3055 33 ...		10			6
GBMS 3055 33 ...		12			7
GBMS 3055 33 ...		15/ 20			10
GBMS 3060 ...	6.0	8	ST3,5/M3	7	5
GBMS 3060 ...		10			6
GBMS 3060 ...		12			7
GBMS 3060 ...		15/ 20			10
GBMS 4070 ...	7.0	8	ST4,2/M4	8	5
GBMS 4070 ...		10			6
GBMS 4070 ...		12			7
GBMS 4070 ...		15/ 20			10
GBMS 5080 ...	8.0	8	ST4,8/M5		5
GBMS 5080 ...		10			6
GBMS 5080 ...		12			7
GBMS 5080 ...		15/ 20			10
GBMS 6010 ...	10.0	10	ST6,3/M6	10	6
GBMS 6010 ...		12			7
GBMS 6010 ...		15/ 20			10

material:	brass
surface:	8 µm nickel-plated, solderable

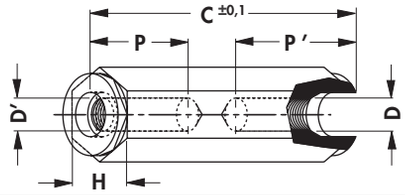
Distance sleeves with internal thread

– other lengths and threads on request
– **... please indicate length "C"**



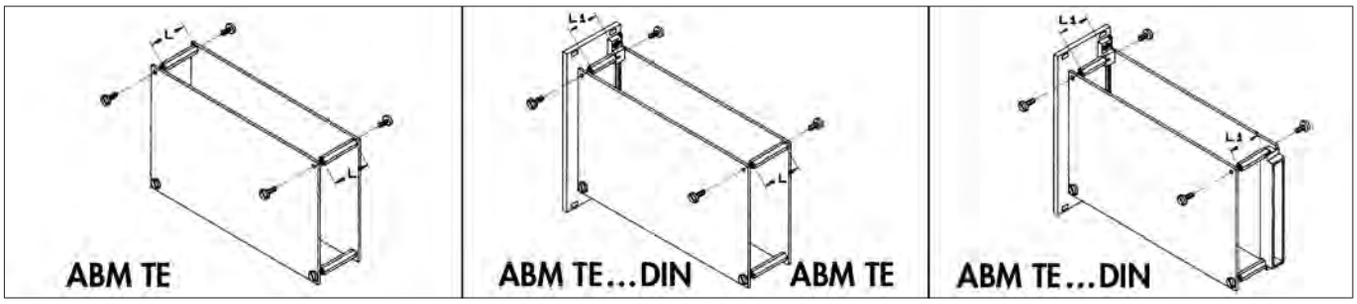
art. no.	dim. [mm]				
	H	C	D/D'	P	P'
ABM 2550 ...	5	5/ 8/ 10/ 12/ 15	M2.5	=C	—
ABM 2550 ...		18		8	8
ABM 2550 ...		20/ 25/ 30/ 35/ 40/ 45/ 50		10	10
ABM 3050 ...		5/ 8/ 9/ 10/ 12/ 13/ 15	M3	=C	—
ABM 3050 ...		16/ 18/ 19		8	8
ABM 3050 ...		20/ 25/ 29/ 30/ 35/ 40/ 45/ 50		10	10
ABM 4070 ...	7	5/ 8/ 10/ 12/ 15	M4	=C	—
ABM 4070 ...		18		9	9
ABM 4070 ...		20/ 25/ 30/ 35/ 40/ 45/ 50		10	10
ABM 5080 ...	8	5/ 12	M5	=C	—
ABM 5080 ...		20/ 30/ 40/ 50		10	10
material:	brass				
surface:	6 µm nickel-plated, solderable				

– other lengths and threads on request
– **... please indicate length "C"**

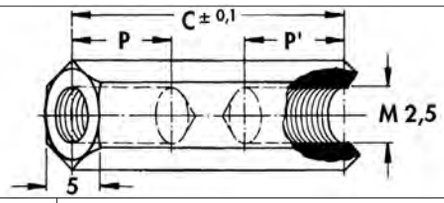


art. no.	dim. [mm]				
	H	C	D/D'	P	P'
ABP 2550 ...	5	10	M2.5	=C	—
ABP 2550 ...		15/ 20/ 25/ 30		6	6
ABP 3060 ...	6	10/ 12/ 15	M3	=C	—
ABP 3060 ...		20		8	8
ABP 3060 ...		25/ 30		10	10
ABP 4080 ...	8	10/ 15/ 20	M4	=C	—
ABP 4080 ...		30/ 40		10	10
material:	polyamide, GF reinforced				
temperature range:	-30°C... +110°C				
colour:	black				

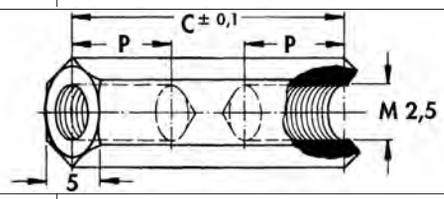
Distance sleeves for PCB in HP grid



– these internally threaded distance sleeves mount PCBs to the correct pitch for insertion into subracks
– **ABM TE**: spacer between two PC boards
– **ABM TE ... DIN**:spacer between two PC boards, one of them equipped with DIN-connector resp. A front panal/PCB Interconnection deviece VS 1
– spacers with internal and external thread to HP grid on request



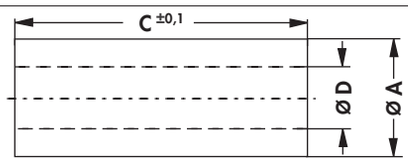
art. no.	suitable for TE	dim. [mm] C	P/P'
ABM TE 04	4	18.72	8
ABM TE 06	6	28.88	
ABM TE 08	8	39.04	



art. no.	suitable for TE	dim. [mm] C	P
ABM TE 06 DIN	6	22.88	8
ABM TE 08 DIN	8	33.04	
ABM TE 04 DIN	4	12.72	=C

material:	brass
surface:	8 µm nickel-plated, solderable

– **... please indicate length "C"**



art. no.	dim. [mm] A	D	C
AHM 3260 ...	6	3.2	1/ 2/ 3/ 4/ 5/ 6/ 7/ 8/ 9/ 10/ 12/ 15/ 18/ 25/ 30
AHM 4380 ...	8	4.3	2/ 3/ 4/ 5/ 6/ 7/ 8/ 9/ 10/ 12/ 15/ 18/ 20

material:	brass
surface:	8 µm nickel-plated, solderable

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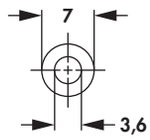
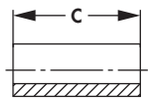
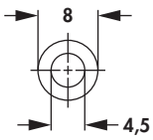
Spacers

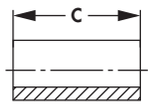
– special lengths on request



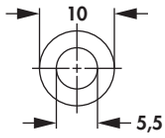


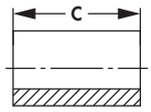
art. no.	dim. [mm] C	art. no.	dim. [mm] C	art. no.	dim. [mm] C
DR 071 V0	1	**DR 079 V0**	9	**DR 725 V0**	25
DR 072 V0	2	**DR 710 V0**	10	**DR 730 V0**	30
DR 073 V0	3	**DR 711 V0**	11	**DR 735 V0**	35
DR 074 V0	4	**DR 712 V0**	12	**DR 740 V0**	40
DR 075 V0	5	**DR 713 V0**	13	**DR 745 V0**	45
DR 076 V0	6	**DR 714 V0**	14	**DR 750 V0**	50
DR 077 V0	7	**DR 715 V0**	15	**DR 760 V0**	60
DR 078 V0	8	**DR 720 V0**	20		





art. no.	dim. [mm] C	art. no.	dim. [mm] C	art. no.	dim. [mm] C
DR 081 V0	1	**DR 089 V0**	9	**DR 825 V0**	25
DR 082 V0	2	**DR 810 V0**	10	**DR 830 V0**	30
DR 083 V0	3	**DR 811 V0**	11	**DR 835 V0**	35
DR 084 V0	4	**DR 812 V0**	12	**DR 840 V0**	40
DR 085 V0	5	**DR 813 V0**	13	**DR 845 V0**	45
DR 086 V0	6	**DR 814 V0**	14	**DR 850 V0**	50
DR 087 V0	7	**DR 815 V0**	15	**DR 860 V0**	60
DR 088 V0	8	**DR 820 V0**	20		





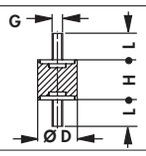
art. no.	dim. [mm] C	art. no.	dim. [mm] C	art. no.	dim. [mm] C
DR 105 V0	5	**DR 125 V0**	25	**DR 145 V0**	45
DR 110 V0	10	**DR 130 V0**	30	**DR 150 V0**	50
DR 115 V0	15	**DR 135 V0**	35		
DR 120 V0	20	**DR 140 V0**	40		

material:	polyamide
heat distortion:	180°C
temperature range:	+180°C
colour:	black
class of inflammability:	UL 94 V-0

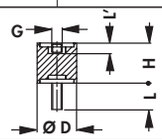
Contructional elements to vibration damping and insulation

– universal applicable round metal, antivibration buffers for solving vibration problems
– other lengths and hardness range on request

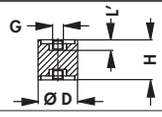
Field of applications:
– reduction of dynamic component stress
– vibration insulation for disc drives and motors
– impact reducing on sensitive instruments
– reduction of the noise level
– prevention of vibration resonance phenomena (amplified effect)
– compensation of mechanical inbalances



art. no.	dim. [mm]			
	H	type of thread	Ø D	L
SMP 410 A 10	10	M4	10	10
SMP 415 A 15	15		15	
SMP 515 A 15		M5		12



art. no.	dim. [mm]				
	H	type of thread	Ø D	L'	L
SMP 410 B 10	10	M4	10	4	10
SMP 415 B 15	15		15		
SMP 515 B 15		M5		5	12



art. no.	dim. [mm]			
	H	type of thread	Ø D	L'
SMP 410 C 15	15	M4	10	4
SMP 410 C 20	20			
SMP 415 C 15	15		15	
SMP 415 C 20	20			
SMP 515 C 20		M5		5

material:	rubber-metal connection
rubber:	natural rubber (NR according to ISO)
hardness:	~ 50 Shore A
elongation and tebsile strength:	very good
colour:	black
metall parts:	steel tin-plated
temperature range:	-40°C... +80°C (short term +90°C)

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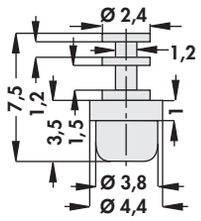
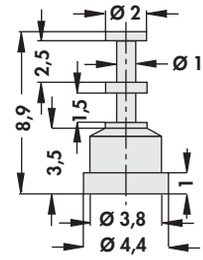
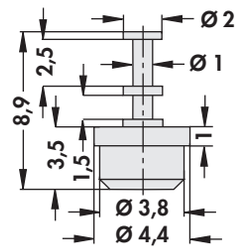
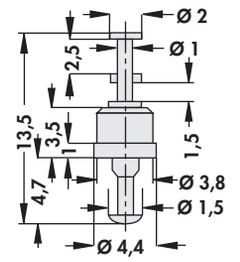
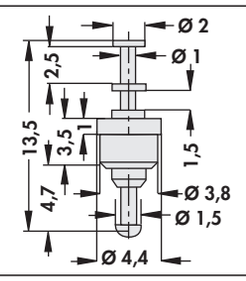
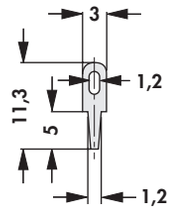
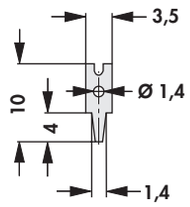
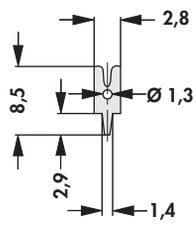
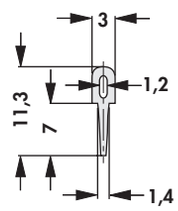
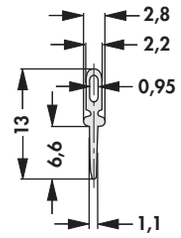
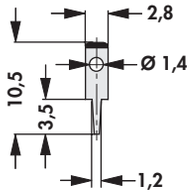
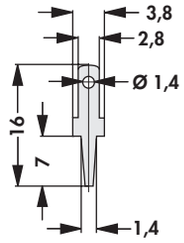
Solder terminals

art. no.		
LSD 07520		
art. no.		
LSD 08910		
art. no.		
LSD 08920		
art. no.		
LSD 13510		
art. no.		
LSD 13520		

material:	insulating body: PTFE (teflon)
contact pin:	brass, 2 µm Ni, 4 µm Ag
temperature range:	-200°C ... +260°C

Solder pins

				
art. no.	**art. no.**	**art. no.**	**art. no.**	**art. no.**
LS 101 0.6 mm	**LS 102** 0.6 mm	**LS 103** 0.6 mm	**LS 104** 0.6 mm	**LS 105** 0.5 mm
				
art. no.	**art. no.**			
LS 106 0.8 mm	**LS 107** 0.5 mm			

= thickness

	LS
material	brass, 6 µm Sn

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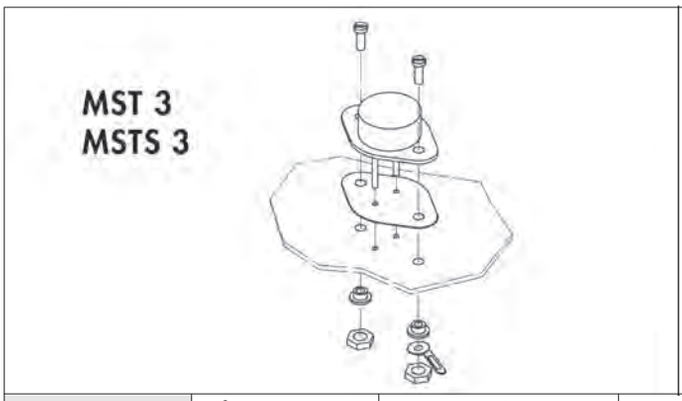
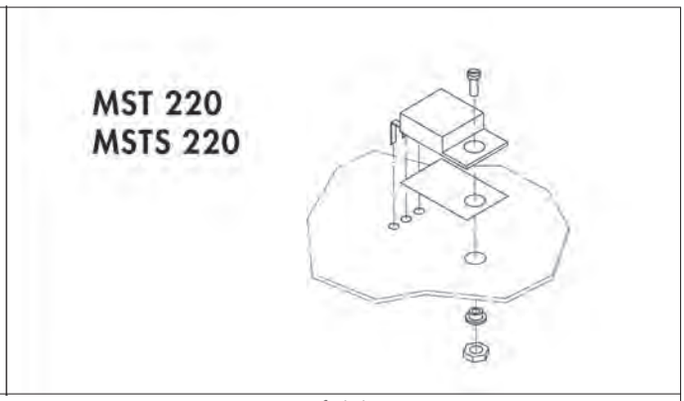
Mounting kits for insulation of power transistors

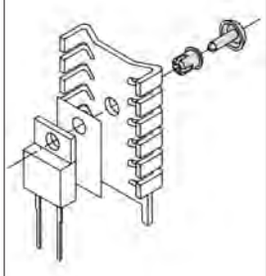


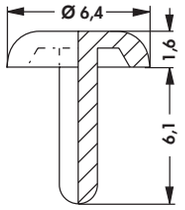


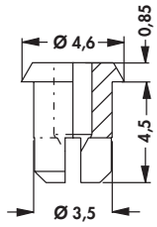
art. no.	for transistor	version	contents of delivery
MST 3	TO 3	with mica wafer GS 3	1 mica wafer, 2 insulating bushes, 1 tin-plated solder lug, 2 cheese head screws, nickel-plated, 2 screw nuts M3 nickel-plated
MSTS 3		with silicone wafer WS 3	1 silicone wafer, 2 insulating bushes, 1 tin-plated solder lug, 2 cheese head screws, nickel-plated, 2 screw nuts M3 nickel-plated
MST 220	TO 220	with mica wafer GS 220	1 mica wafer, 1 tin-plated solder lug, 1 cheese head screw, nickel-plated, 1 screw nut M3 nickel-plated
MSTS 220		with silicone wafer WS 220	1 silicone wafer, 1 insulator sleeve, 1 tin-plated solder lug, 1 cheese head screw, nickel-plated, 1 screw nut M3 nickel-plated

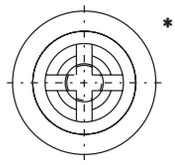
Snap rivet for quick fastening of TO 220

– detachable plastic snap rivet for quick fastening of transistors onto heatsinks and cooling plates (e.g. FK 212-CB, FK 216-CB, FK 222-220. FK 232. FK 233. FK 235-L 1)
– suitable for material thickness: 1 – 1.5 mm
– suitable for hole diameter: 3.5 – 4 mm
– * = bottom view, pin not inserted









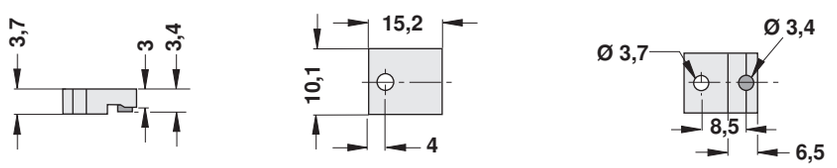
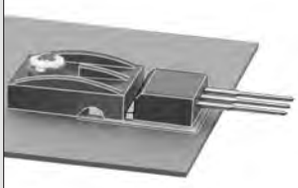
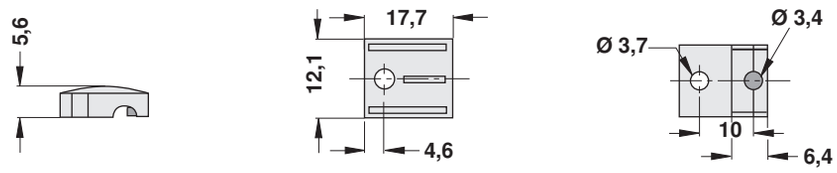
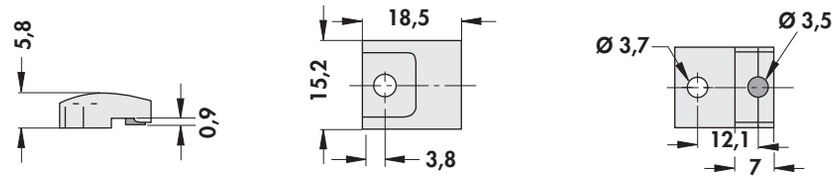
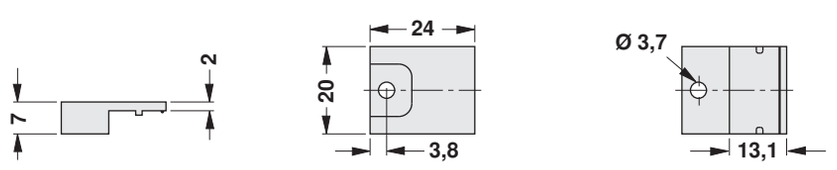
art. no.	for transistor
EPN 1	TO 220

material:	polysulphone, GF reinforced
temperature range:	-70°C... +180°C (260°C/5 s)
class of inflammability:	UL 94 V-0

Insulating clamping parts for power transistors

Plastic insulating clamping parts for mounting transistors in cases TO 220, TO 218 and TO 247 for enhanced dielectric stengths

– electrically insulating assembly of the transistor by means of a plastic clamping part
– pin reaching into the hole of the transistor plate
– fastening of clamping part onto the mounting plate by screws, no electroinsulating connection to the transistor
– dielectric strength only determined by the insulating washer between transistor and mounting surface
– no insulating bush necessary, thus no dielectric breakdown

art. no.		
ISP 220		
art. no.		
ISP 220 V		
art. no.		
ISP 218		
art. no.		
ISP 247		

material:	polyamide 6, GF reinforced
heat distortion:	215°C(0.45 MPa); 205°C(1.8 MPa)
dielectric constant:	4 [1 MHz]
dielectric loss factor:	400 [1 MHz]
specific volume resistance:	10^{15} Ω·cm
colour:	black
class of inflammability:	UL 94 V-0
dielectric strength:	28 kV/mm

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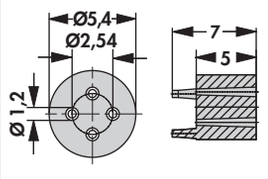
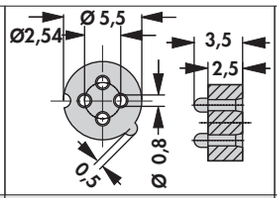
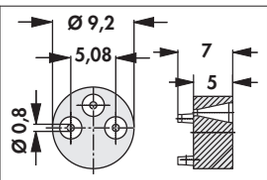
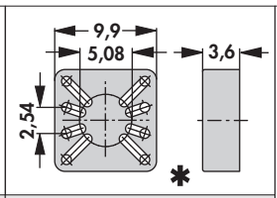
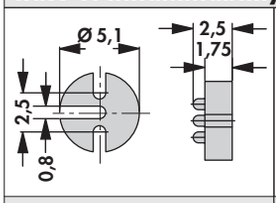
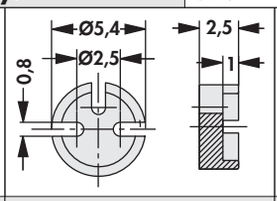
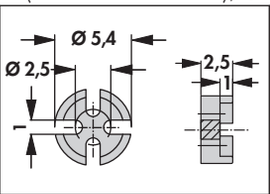
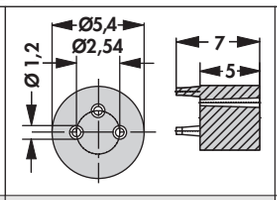
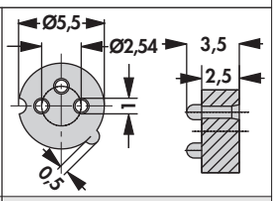
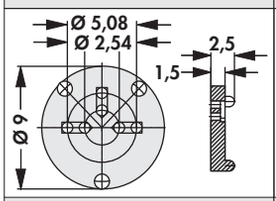
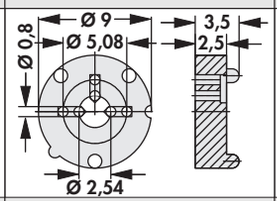
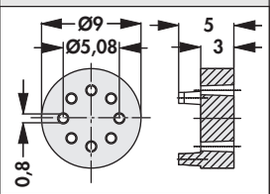
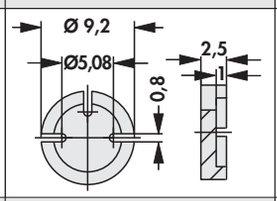
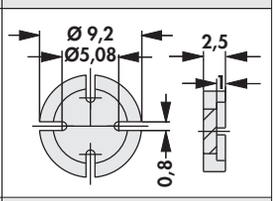
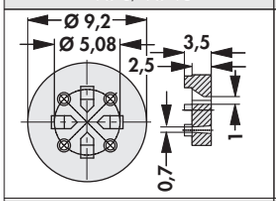
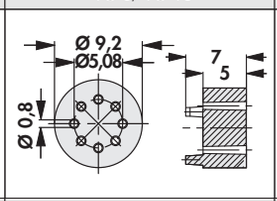
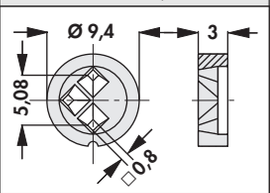
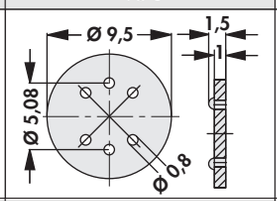
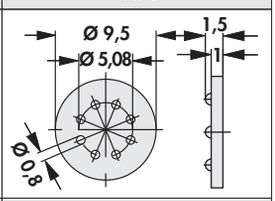
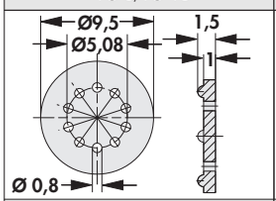
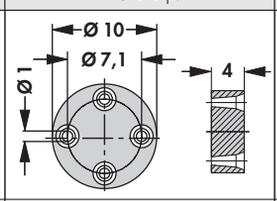
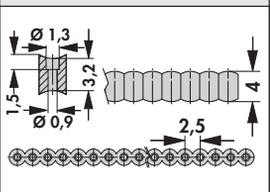
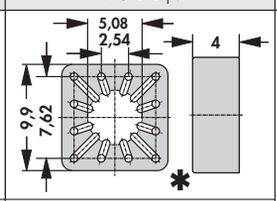
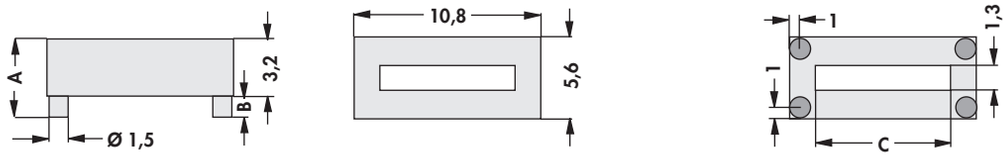
Mounting pads

– * = **transfer washer**: the US-pads convent the TO 5 pin circle to a pitch of 2.54 mm

				
art. no.	**art. no.**	**art. no.**	**art. no.**	
MS 184 7 TO 18	**MS 184 35** TO 18	**MS 53 7** TO 5	**US 58 4** TO 5	
material:	polyamide 6, GF reinforced			
temperature range:	-40°C... +205°C			
class of inflammability:	UL 94 V-0 (at thickness ≥3mm), UL 94 V-1			
				
art. no.	**art. no.**	**art. no.**	**art. no.**	**art. no.**
MS 923 25 TO 92	**MS 183 25** TO 18	**MS 184 25** TO 18	**MS 183 7** TO 18	**MS 183 35** TO 18
				
art. no.	**art. no.**	**art. no.**	**art. no.**	**art. no.**
MS 3518 25 TO 5/ TO 18	**MS 3518 35** TO 5/ TO 18	**MS 58 5** TO 5-8 p.	**MS 53 25** TO 5	**MS 54 25** TO 5
				
art. no.	**art. no.**	**art. no.**	**art. no.**	**art. no.**
MS 34 518 TO 5/TO 18	**MS 58 7** TO 5-8 p.	**MS 53 3** TO 5	**MS 56 15** TO 5-6 p.	**MS 58 15** TO 5-8 p.
				
art. no.	**art. no.**	**art. no.**	**art. no.**	
MS 510 15 TO 5-10 p.	**MS 84 4** TO 8	**MS 4016** max. 16 contacts	**US 512 4** TO 5	
material:	polyamide 6, GF reinforced			
temperature range:	permanent up to 100°C			
class of inflammability:	UL 94 V-0			

Mounting pads for power transistors

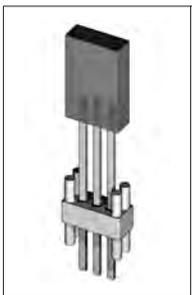
– for TO 220, TO 219, TO 202 and similar
– for vertical and horizontal mounting
– also suitable as mounting bracket for angled connections

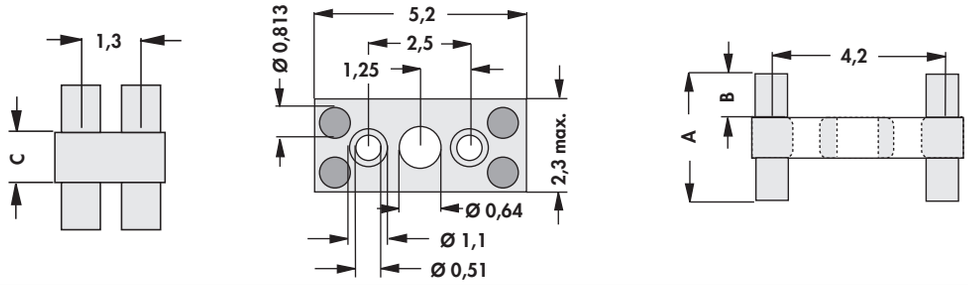


art. no.	colour	dim. [mm] A	B	C
MLW 32	white	3.2	—	7.1
MLW 44		4.4	1.3	
MLW 51		5.1	1.9	
material:	polyamide 6 (nylon)			
temperature range:	-40°C... +120°C			
class of inflammability:	UL 94 V-2			

Mounting pads for rectangular LEDs

– for LED 2x4 mm oder 2x5 mm
– symmetric version for easy assembly
– self-adhesive

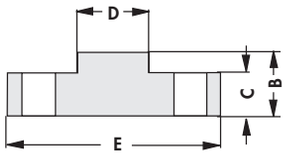


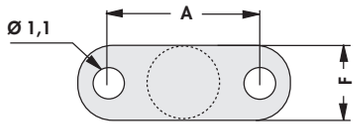


art. no.	colour	dim. [mm] A	B	C
MRL 20	white	2	0.5	1
material:	polyamide 6 (nylon)			
temperature range:	-40°C... +120°C			
class of inflammability:	UL 94 V-2			

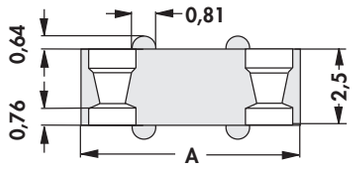
Mounting pads for discrete components

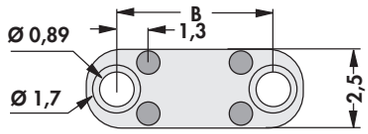
– suitable for various components e.g. resistors, capacitors etc.



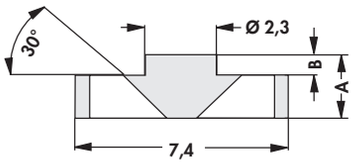


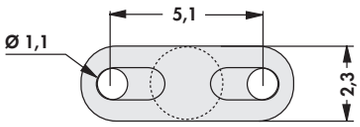
art. no.	dim. [mm] A	B	C	D	E	F	art. no.	dim. [mm] A	B	C	D	E	F
MD A 04	2.5	1.1	0.55	1.3	4.6	2.3	**MD A 09**	7.6	1.1	0.66	3.6	9.9	2.3
MD A 06	3.8			2.3	6.9	3.2	**MD A 12**	10.2		0.76	4.8	12.4	
MD A 07	5.1				7.4	2.3							





art. no.	dim. [mm] A	B	art. no.	dim. [mm] A	B
MD B 07	7.6	5.1	**MD B 10**	10.2	7.6

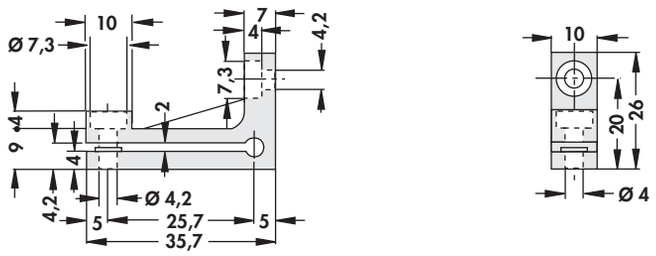
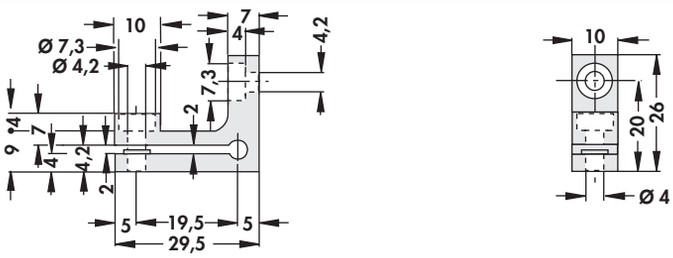
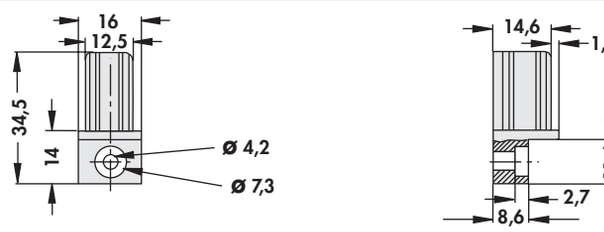
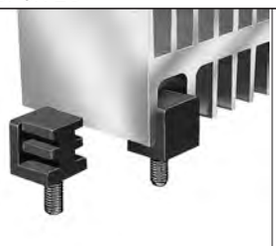




art. no.	dim. [mm] A	art. no.	dim. [mm] A	B
MD C 13	1.3	**MD C 22**	2.2	0.89

material:	polyamide 6 (nylon)
temperature range:	-30°C... +110°C
class of inflammability:	UL 94 V-2

Mounting parts for heatsinks

art. no.		
		
IS 1	for SK 01, 02, 03, 14, 21, 30, 34, 36, 39, 46, 69; heatsink length: 50 mm	
art. no.		
		
IS 2	for SK 01, 02, 03, 14, 21, 30, 34, 36, 39, 46, 69; heatsink length: 37.5 75 100 mm	
art. no.		
		
IS 3	for SK 01, 02, 03, 14, 21, 30, 34, 36, 39, 46, 69	
art. no.		
		
IS 4	for SK 06	
art. no.		
		
IS 5	for SK 20	
art. no.		
		
IS 6	for SK 67	

material:	polyamide 6, GF reinforced
class of inflammability:	UL 94 V-0

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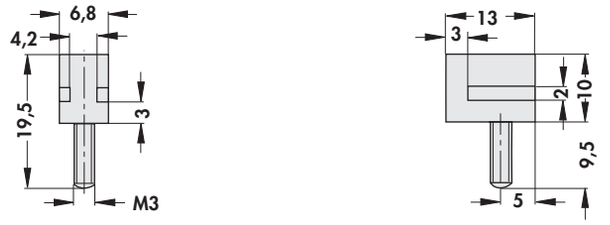
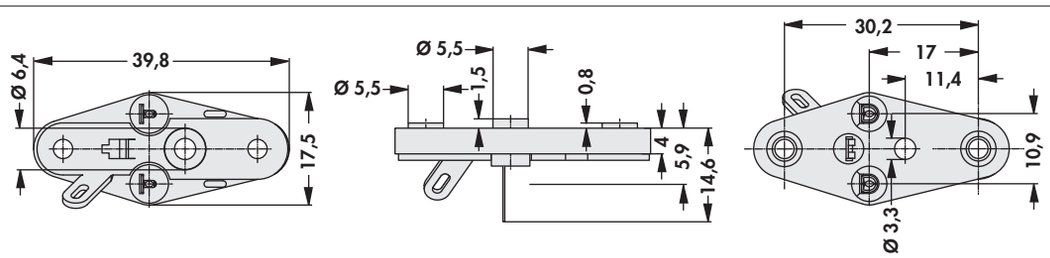
Mounting parts for heatsinks

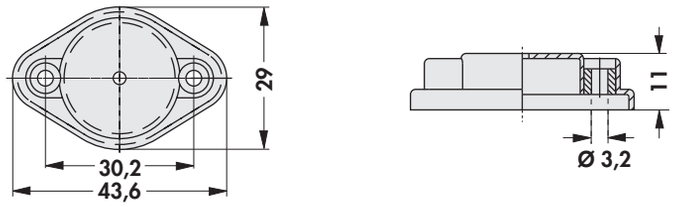
art. no.		
IS 8		
	for SK 20	
material:	polyamide 6, GF reinforced	
class of inflammability:	UL 94 V-0	

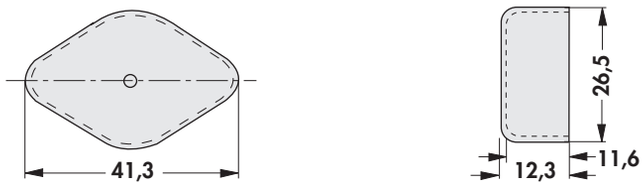
Sockets for power transistors TO 3

		
art. no.	no. of contacts	
TF 3 2	3	
insulating body material:	stanyl PA 4.6	
contact:	CuSn-alloy, CuSn 6; Ni 1-2µm, Au 0.2µm	
current rating:	15 A max.	
contact resistance:	<10 mΩ	
temperature range:	-65°C ... +290°C	
capacity:	1 pF	
test voltage:	1650 V	
class of inflammability:	UL 94 V-0	

Insulating caps

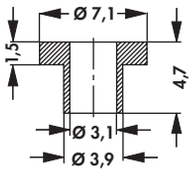
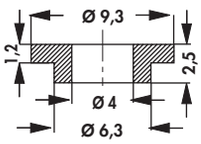
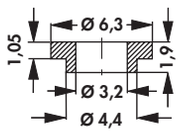
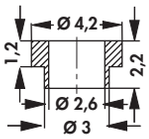
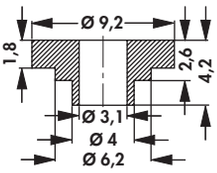
– different transistor flange levels will be by the sleeves

art. no.		
IK 341 3		
material:	polyamide, GF reinforced	
pressed-in sleeves:	brass, nickel-plated	
class of inflammability:	UL 94 V-0	

art. no.		
IK 3		
material:	polyamide, GF reinforced	
class of inflammability:	UL 94 V-0	

fischer elektronik

insulating bushes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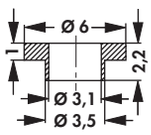
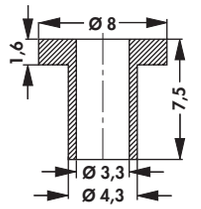
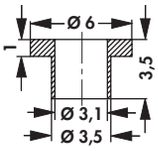
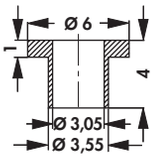
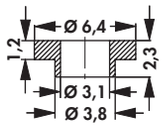
IB 1 / IBT 1	**IB 2 / IBT 2**	**IB 3 / IBT 3**	**IB 4 / IBT 4**	**IB 5**
				
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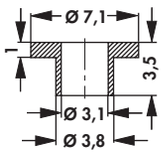
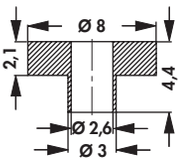
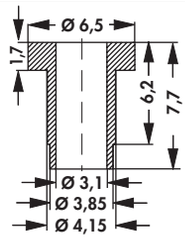
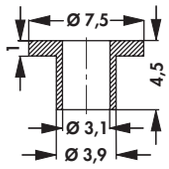
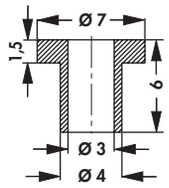
IB 6 / IBT 6	**IB 7 / IBT 7**	**IB 8 / IBT 8**	**IB 9 / IBT 9**	**IB 10 / IBT 10**
				
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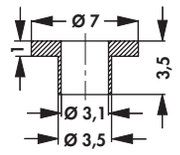
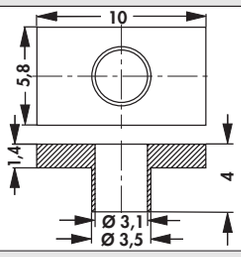
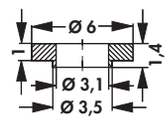
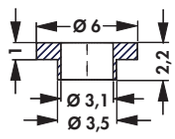
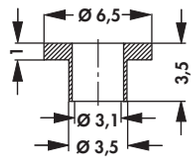
IB 11 / IBT 11	**IB 12 / IBT 12**	**IB 13**	**IB 14 / IBT 14**	**IB 15 / IBT 15**
				
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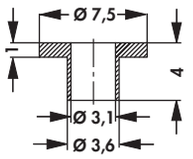
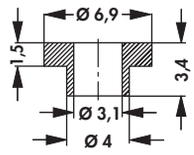
IB 16	**IB 17**	**IB 18 / IBT 18**	**IB 19**	**IB 20**
				
art. no.	**art. no.**			
IB 21	**IB 22**			

	IB 1 - IB 7 / 18	IBT 1 - IBT 15 / 18	IB 8 - IB 17 / 19 - 22
material	polyamide 4.6, GF reinforced	PTFE (teflon)	thermoplastic resin
form stability	-40°C ... +250°C (1.8 MPa)	-260°C ... +250°C	-40°C ... +200°C
class of inflammability	UL 94 V-0		
dielectric strength	30 kV/mm	40 kV/mm	38 kV/mm

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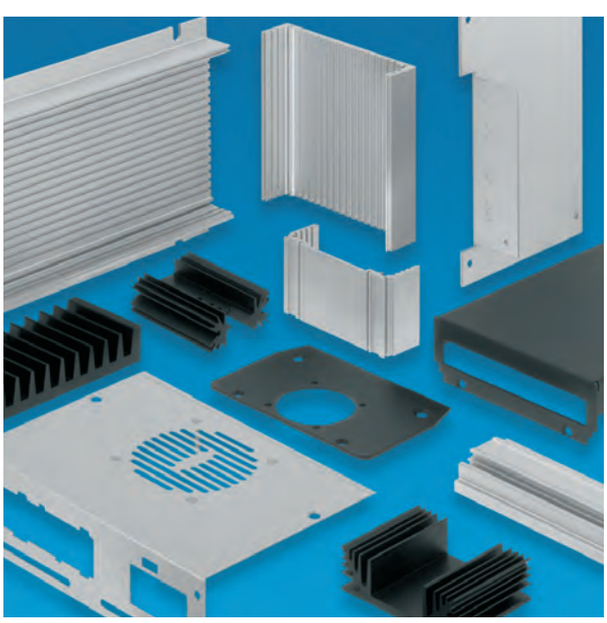
High quality surface treatment for electronic components

Gold-plating

properties:	high resistance to wear, good corrosion resistance, temperature stability and solderability
process:	drum technology
materials:	non-ferrous metals
coating system:	copper/nickel/gold

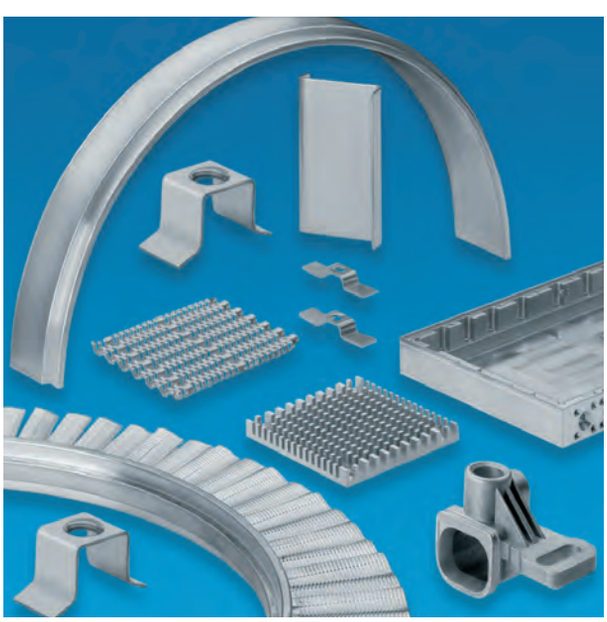
Tin-plating

properties:	solderable layers with improved tarnishing and corrosion resistance
process:	drum technology
materials:	non-ferrous metals
coating system:	copper/nickel/tin



Anodising

performance:	fabrication of corrosion resistant, decorative oxide films
process:	anodic oxidation in fully automated equipment
materials:	aluminium and aluminium alloys
max. component size:	1500 x 2000 x 450 mm
colour:	natural aluminium or black



Degreasing

performance:	degreasing of oily or greasy metallic surfaces
process:	steam degreasing using chlorinated hydro-carbons in hermetically sealed equipment
material:	aluminium and aluminium alloys
min. component size:	30 x 30 x 30 mm
max. component size:	600 x 400 x 380 mm
max. component weight:	80 kg

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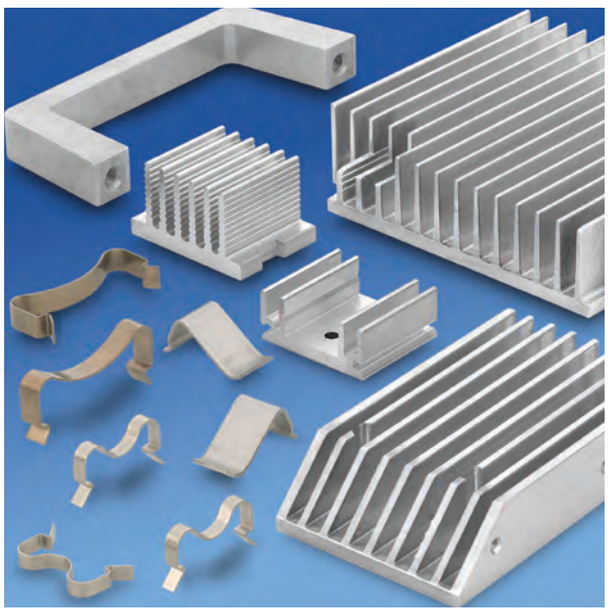
High quality surface treatment for electronic components

Transparent passivating (surface free from chromium)

characteristics: environmental compatibility due to chrome free passivation of the aluminium surfaces
process: fabrication of conversion coatings by immersion process
materials: aluminium und aluminium alloys
max. component size: 1500 x 2000 x 450 mm
colour: natural aluminium



Vibratory grinding (trowalization)

characteristics: deburring, removing of sharp edges, rough and fine grinding
process: treatment using vibration technique and grinding tools (trowalization)
materials: aluminium
max. component size: 230 x 200 mm

Anodisation facility

- economization of water by using spray-rinsing, automized ion exchange installation, cascade water guided system and recirculation of splash water
- reduction of electrical energy by means of current density regulation
- reduction of chemicals by recirculation of the dragged-off chemicals using a compensation of the evaporation losses
- recycling of the sulphuric acid out of the anodizing bathes

Zertifikat

Prüfungsnorm **ISO 9001:2015**

Zertifikat-Registrier-Nr. **01 100 052055**

Unternehmen: **Fischer Oberflächenveredelung GmbH**
Nottebohmstr. 26
58511 Lüdenscheid
Deutschland

Geltungsbereich: Oberflächen für die Elektronik: vergolden, verzinnen, vernickeln, eloxieren, passivieren, trowalisieren

Durch ein Audit wurde der Nachweis erbracht, dass die Forderungen der ISO 9001:2015 erfüllt sind.

Gültigkeit: Dieses Zertifikat ist gültig vom 15.12.2020 bis 14.12.2023.
Erstzertifizierung 2005

18.01.2021

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

www.tuv.com IAF DAkkS Deutsche Akkreditierungsstelle D-ZM-16031-01-00 TÜVRheinland® Genau. Richtig.

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Terms and conditions of business

1. General provisions

1.1. The present General Terms and Conditions (GTC) apply to all of our business relationships with out customers ("Purchaser"). The GTC only apply if the Purchaser is an entrepreneur (§ 14 of the German Civil Code), a legal entity of public law or a special fund under public law.
The GTC particularly apply for contracts about the sale and/or the delivery of transportable objects ("Goods"), regardless of whether we manufacture the Goods ourselves or buy them in from suppliers (§§ 433, 651 of the German Civil Code). Unless otherwise agreed, the GTC apply, in the version valid at the time of the Purchaser's order or in the version last transmitted to them, as a framework agreement for similar future contracts, without us having to refer to them each time.

1.2. Our GTC apply exclusively. Deviating, contradicting or additional General Terms and Conditions of the Purchaser are only part of the contract if we have expressly authorised their validity. This approval requirement applies in any case, also if we make deliveries to the Purchaser without reserve, in full knowledge of their Terms and Conditions. Individual, isolated agreements with the Purchaser (including ancillary agreements, additions and changes) always take priority over these GTC. The content of this type of agreement, subject to counterevidence, is to be determined according to a written contract or our written confirmation.

1.3. Legally relevant declarations and announcements of the Purchaser with regards to the contract (for example deadline agreements, defect notifications, withdrawal or reduction) are to be submitted in writing, i.e. in written or text form (for example letter, e-mail, fax). Legal form provisions and other certificates, especially in case of doubts about the legitimation of the declaring party, remain unaffected.

1.4. References to the validity of legal provisions are only for clarification purposes. The legal provisions therefore apply even if there is no reference, unless they have been modified directly in these GTC or expressly excluded.

2. Quotations and orders

Our quotations shall be subject to change without notice and are non-binding. This applies also to information contained in price lists, leaflets etc. Delivery dates stated in our quotations or given to the purchaser by any other means are approximate, and we shall endeavour to keep to them. Delays in delivery shall give no right to claims, unless we have explicitly confirmed such delivery dates and an adequate period of grace granted to us has expired. Orders shall only be binding on us when they have been explicitly confirmed in writing, regard- less of the form in which they have been placed with us. Statements made in catalogues are simply descriptions of goods and under no circumstances do they constitute warranted qualities. Furthermore, the characteristics of our samples cannot be regarded as warranted characteristics.

3. Prices

Prices shall be valid only when confirmed by us in writing. They are exclusive of VAT at the current rate and incidentals such as postage and packing, freight, insurance etc., as of storage. If deli- very is made more than 3 months after the date of order, we shall be entitled to invoice the price valid at the date of despatch, even though different prices were initially confirmed. The price valid at the date of despatch shall also apply if the order was confirmed without prices being stated. When an order on call is placed, partial deliveries shall be invoiced at the price valid at the date of despatch. Any request by the purchaser for subsequent modifications shall entitle us to amend prices.

4. Conditions of payment

The invoiced sum is to be paid net within 30 days of date of invoice and delivery. If the purchaser is in default with any payment, we are entitled to claim interest for such default at the normal rate of interest charged for current accounts. If we are able to prove that we have incurred greater losses as a result of the delay, we shall be entitled to claim compensation for such damages. We are however entitled at any time, in the context of an ongoing business relationship, to execute a delivery in full or in part only against an advance deposit. We shall declare a corresponding reserve at the latest at the confirmation of the contract.

5. Set-off, right to retention

Only claims which have been recognised by us or have become legally binding may be offset against our invoices. Any right to a retention to be exercised by the purchaser in connection with our claims is explicitly excluded. In case of defects in the delivery, the rights of the Purchaser remain unaffected, particularly with regards to point 10.3. of these GTC.

6. Delivery

The delivery is performed from the storage, wherever the place of fulfilment for the delivery and any subsequent fulfilment may be. Upon request by the Purchaser, the Goods will be sent to a different place of their choice (shipped purchase). Delivery of our goods is explicitly made on behalf of and at the risk of the purchaser. The risk shall pass over to the purchaser when the ordered goods leave our premises. The same applies if goods are collected in our premises from the point in time at which we notify the purchaser that they are ready for collection. Unless we have received instructions to the contrary from the purchaser, we shall decide at our discretion on the most economical delivery method without assuming any liability for the chosen means of delivery.

7. Specially manufactured goods

Components made according to a sample or a drawing or by special request must be taken over and paid for, unless they have a defect we are answerable for and which makes the components completely unfit for the purchaser's purposes. If their fitness for the purchaser's purposes is only reduced, the purchaser may request a reduction of payment but the contract shall not be cancelled.

8. Quantities

We are entitled to supply quantities which are above or below the ordered quantities by up to 10%. Such deviations are usual in this trade and the deliveries are deemed as being in compliance with the contract. If delivery quantities fall below the ordered quantities there shall be no right to subsequent delivery of the missing quantity.

9. Reservation of proprietary rights

9.1. All goods supplied shall remain our property until all current and future claims resulting from the Purchase contract and the business relationship with the purchaser (secured claims) have been paid in full. The purchaser is entitled to dispose of the purchased goods in the ordinary course of business transactions. Reservation of proprietary rights also applies to products resulting from processing, mixing up or combining our goods, in which case we are considered as manufacturers. In the case where our goods are processed, mixed up or combined with goods of third parties, and the proprietary rights of such third parties remain in force, we are entitled to co-ownership according to the proportion of the amount invoiced for such processed goods. In such cases such rights to co-ownership shall be safeguarded by the purchaser.

9.2. The purchaser shall transfer to us, as a security, his claims against third parties resulting from the re-sale of our goods in full or in the proportion of our coownership (see subparagraph 9.1). He is entitled to collect the amount of such claims on our behalf until revoked or until cessation of his payments made to us. The purchaser is not entitled to assign these claims to third parties.

9.3. The purchaser is not entitled to mortgage or transfer the goods which are subject to reservation by way of security.

9.4. The purchaser shall advise us immediately at any seizure of our goods or of any infringement of our rights by third parties.

9.5. In case of a default in payment or a deterioration in the financial situation, we are entitled to request immediate handing over of the goods which are subject to reservation. Any time limited claims shall immediately become due.

9.6. If the value of the securities exceeds our claims by more than 20%, securities to a corresponding amount will be released by us on request at our discretion.

9.7. The extended retention of title (9.1.) does not apply to prepayment orders that have been paid in full.

10. Warranty

10.1. We expressly point out that all information and data is given to the best of our knowledge and belief. The user is solely responsible for the proper use of our products and he should check their suitability for the intended application.
Fischer Elektronik do not assume any warranty, whether expressed or implied, for the suitability, function or merchantibility of their products in specific or general applications, and they cannot be held liable for accidental or consequential damage due to non-observance of the above.

10.2. Claims for defects can only be considered if the purchaser has complied with their obligation to check goods and submit a complaint as per Sections 377, 381 of the German Commercial Code [HGB]. If goods have a defect attributable to us, we are obliged to effect a cure, excluding the purchaser's right to withdraw from the contract or to reduce the purchase price (reduction), unless we are entitled to refuse to effect a cure by virtue of legal regulations. The purchaser shall grant us an adequate period of grace for effecting a cure. A cure may at our discretion be an elimination of the defect (rectification) or the supply of new products. We are entitled to determine the cure owed according to the payment of the purchase price due by the Purchaser. The Purchaser, however, is entitled to retain a part of the purchase price that is proportionate to the defect. The expenses incurred for the verification and cure, particularly transport, road, work and materials costs (not: expansion and installation costs) are borne by us, if there is indeed a defect. Otherwise, we can require that the Purchaser bear the costs arising from the unjustified defect rectification request (particularly examination and transport costs), unless the Purchaser could not have been aware that the defect rectification was unnecessary.

10.3. If rectification of the defect has failed, the purchaser shall be entitled to request a reduction in the purchase price (abatement) or to withdraw from the contract. Rectification shall be deemed to have failed after the second vain attempt, unless further attempts are reasonable in view of the object of the contract and can be reasonably imposed on the purchaser.

10.4. The purchaser's right to put forward further claims for damages shall remain unaffected by this.

10.5. The purchaser's warranty claims shall be subject to a time limit of 12 months from the delivery of the goods to the purchaser, unless we have fraudulently concealed the defect. In this case, the legal regulations shall apply.

10.6. The purchaser's claims for damages shall be subject to a time limit of 12 months from the delivery of the goods. This does not apply if we, our legal representatives or other vicarious agents are responsible for death, personal injury or physical harm, or if we or our legal representatives have been grossly negligent, or if our vicarious agents have acted with intent.

10.7. Contractual penalties which have been agreed between our customers and their customers cannot be imposed upon us unless we have been notified of them and have agreed to them in writing prior to accepting an order.

10.8. If it becomes apparent (by the opening of an application for an insolvency procedure for example) after the conclusion of the contract that our claims to the purchase price are endangered due to lacking payment capacities of the Purchaser, we will then be entitled to refuse the delivery and – after a possible period of notice – to withdraw from the contract in accordance with the legal provisions (§ 321 of the German Civil Code). For contracts about the manufacturing of specific items (making to specification), we can declare the withdrawal immediately; the legal regulations about the dispensability of giving a period of notice remain unaffected.

11. Withdrawal

When delivery in accordance with the contract is not possible for reasons beyond our control, we are entitled to withdraw from the contract. Such withdrawal shall not en title the purchaser to assert any right against us.

12. Export clause

We are not obliged to reimburse damages arising from delays in delivery or it being completely impossible to deliver as a result of statutory or official export restrictions, unless we act with intent or gross negligence suffered by the Customer or other persons. The Customer's duty to pay the agreed remuneration shall not be affected by disruptions in our performance as a result of export restrictions. We shall be entitled to withdraw from the contract if, after the contract is signed, our performance is disrupted as a result of export restrictions.

13. Place of performance and jurisdiction, applicable law

13.1. The place of performance and the place of venue for deliveries and payments andfor any litigation arising between us andthe purchaser shall be the headquarters of our company.

13.2. The relationship between the contractual parties shall be regulated solely in accordance with the law in force in the Federal Republic of Germany. The regulations of international uniform law, particularly the UN CISG, shall not apply.

Status as at: 26.08.2022
The latest T&Cs shall apply at all times. They may be downloaded at www.fischerelektronik.de/en

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art. no.	HEATSINKS SURFACES & CASES SURFACES
AL	raw degreased aluminium
BZ	raw pickled aluminium
LP	outside black lacquered RAL 9005 / chrome-free transparent passivated
ME	clear anodised
MI	solderable surface
SA	black anodised
TP	chrome-free transparent passivated

art. no.	CONNECTOR CONTACT SURFACE FINISH
G	gold-plated
S	selective gold-plated
Z	tin-plated

art. no.	RAL	COLOURS	ARTICLES
NB	5022	night blue	system cases "RackCase" / shell cases
S	9005	deep black	TG / shell cases / system cases "RackCase"
TB	5018	turquoise blue	system cases "RackCase" / shell cases
UL	5002	ultramarine blue	Plusline / shell cases

The surface coatings and colours listed here in the catalogue only represent the standard designs.
Other coating types and colours can be realised on request according to customer-specific requirements.

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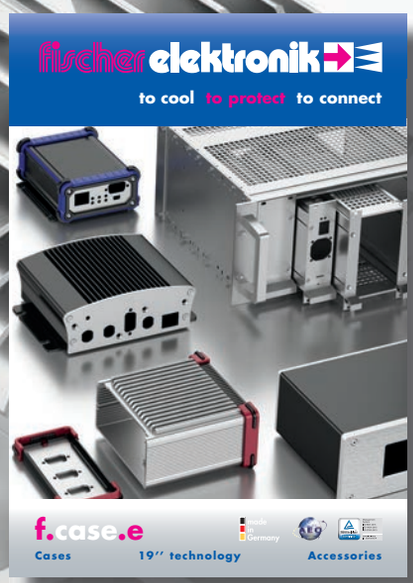

Cases
19" technology
Accessories

Sockets
Connectors
Brackets

Slip-Case for collecting the Fischer catalogues

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