

fischer elektronik

to cool to protect to connect



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ISO 9001
ISO 14001
ISO 27001

Extruded heatsinks LED heatsinks Cooling aggregates

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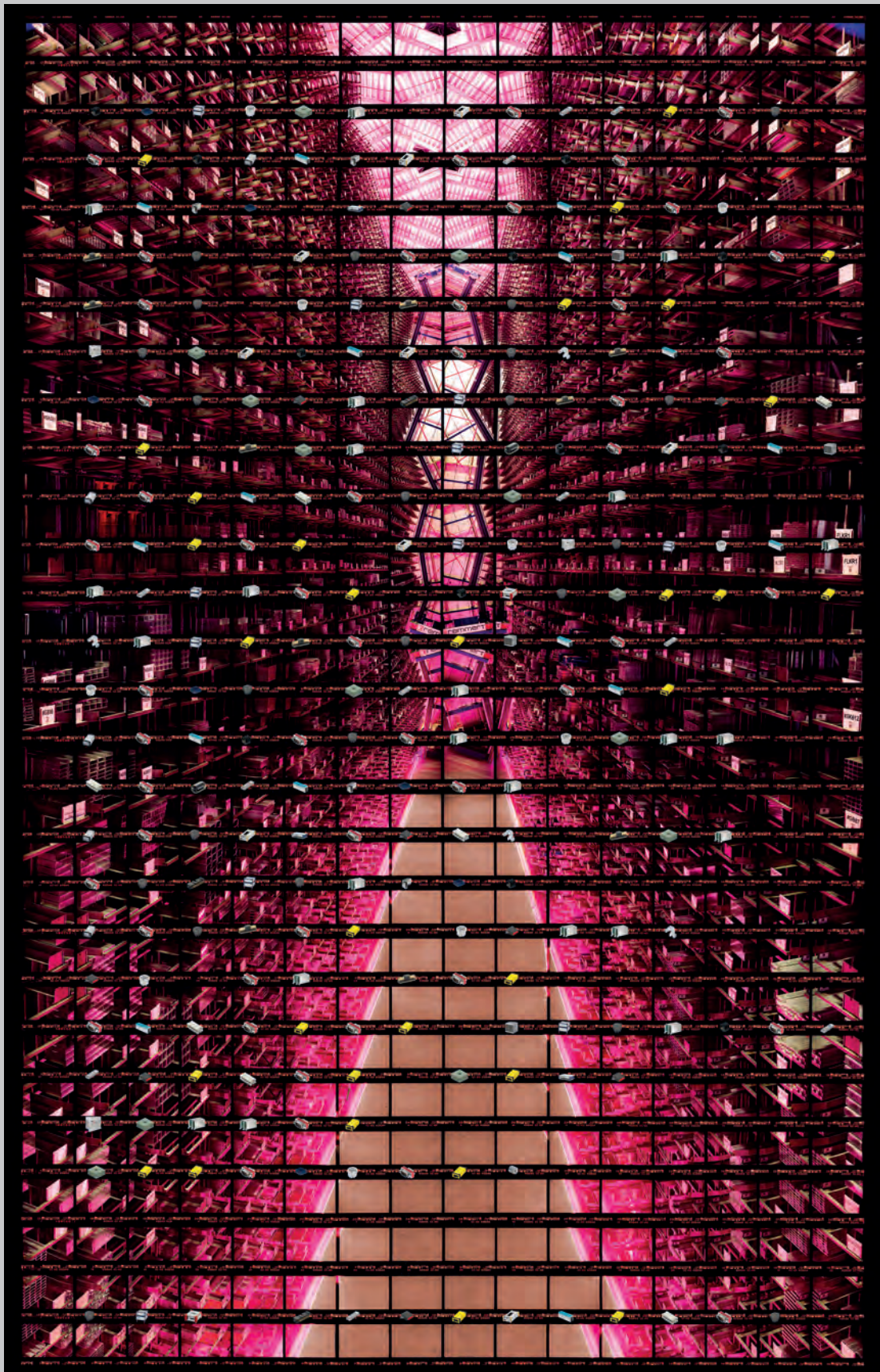
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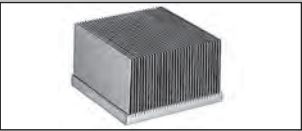
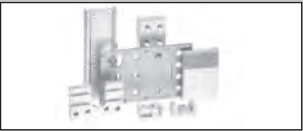
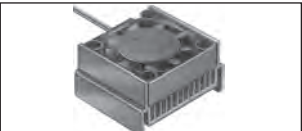
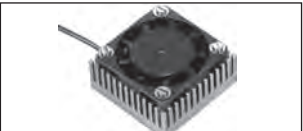
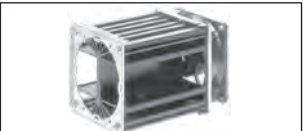
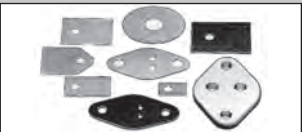
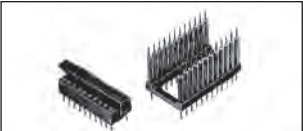
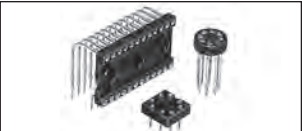
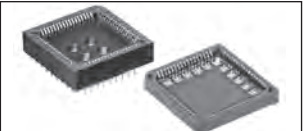
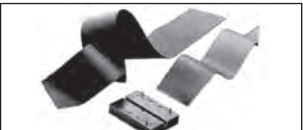
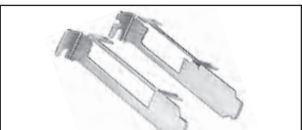
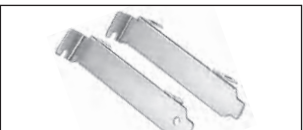
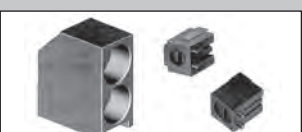
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Quotations for Fischer Elektronik 3

C-print on Alu Dibond 65,5 x 98 cm

from:
Thomas Kellner
www.thomaskellner.com

A	A 1 – A 140				
B	B 1 – B 62				
C	C 1 – C 22				
D	D 1 – D 36				
E	E 1 – E 52				
F	F 1 – F 28				
G	G 1 – G 84				
H	H 1 – H 12				
I	I 1 – I 28				
K	K 1 – K 28				
L	L 1 – L 10				
M	M 1 – M 56				
N	N 1 – N 80				

Extruded profiles: extruded heatsinks, extruded heatsinks with solder pins, fin coolers, fluid coolers, high-performance heatsinks	A 1 – A 140	A
Heatsinks for processors and LED: heatsinks and fan coolers for universal PGA/BGA, DIL, PLCC, Intel Pentium Xeon, Intel Pentium IV, heatsinks for LED	B 1 – B 62	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 22	C
Cooling aggregates: miniature cooling aggregates, heatsink cooling aggregates, high capacity cooling aggregates, multi module cooling aggregates, hollow-fin aggregates	D 1 – D 36	D
Accessories for electronic components: mounting parts for heatsinks, thermal transfer compound, thermally conductive material, aluminium oxide and mica wafers, silicone washers, guide rails, solder stop plug, clip fastening for mounting rail	E 1 – E 50	E
Sockets: IC-sockets for DIL, PLCC, sockets for transistors, LED displays, crystal oscillators and connector-sleeves	F 1 – F 28	F
PCB connectors and accessories: male and female headers, grid spacing 2.54, 2.00 and 1.27 mm, high precision contact strips, jumpers	G 1 – G 84	G
IDC connectors: design DIL, single and double row female headers, lockable connectors, ribbon cable	H 1 – H 12	H
D-Sub connectors: male and female headers, connectors with mounting angle, connectors for ribbon cable, SMD and mixed layout, D-Sub shells, cut-out covers	I 1 – I 28	I
Brackets: brackets for PC and PCI with or without fixing tab, retainer for ISA versions	K 1 – K 32	K
Optoelectronics: LED-holders for front panel assembly, LED-holder without LED, LED-holder with mounted LED, light pipes for SMDs	L 1 – L 10	L
Cases: desk consoles, shell cases, extruded assembled cases, combination cases, tube cases, miniature aluminium cases, design cases, cooling cases, ventilation frames, feet and bushings, special front panels, sheet constructions	M 1 – M 56	M
19" Extension systems: plug-in chassis, subracks, bench cases, system cases, insert modules, part front panels, rack handles, PC-board holder, extender cards	N 1 – N 80	N

Alphanumerical product list

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ABM 4070	E 38	DR 145 V0	E 40	FK 234 SA L 1	C 4	FS 6 120	E 27
ABM 5080	E 38	DR 150 V0	E 40	FK 234 SA L 2	C 4	FS 6 130	E 27
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ABM TE 06 DIN	E 39	DR 713 V0	E 40	FK 235 MI L 2	C 4	FS 85 70	E 28
ABM TE 08	E 39	DR 714 V0	E 40	FK 235 SA L 1	C 4	FS 100	E 27
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ABP 4080	E 38	DR 730 V0	E 40	FK 237 SA 220 H	C 14	FS BF 07	E 29
AHG K 27	E 31	DR 735 V0	E 40	FK 237 SA 220 O	C 13	FS BF 10	E 29
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AHG L 7	E 31	DR 745 V0	E 40	FK 237 SA 220 VL	C 14	FS BF 13	E 29
AHG V 14	E 31	DR 750 V0	E 40	FK 238 SA L 1	C 8	FS BF 15	E 29
AHG V 17	E 31	DR 760 V0	E 40	FK 239 SA 32	C 6	FS BF 19	E 29
AHM 3260	E 39	DR 810 V0	E 40	FK 240 SA 220 H	C 14	FS BF 20	E 29
AHM 4380	E 39	DR 811 V0	E 40	FK 240 SA 220 O	C 13	FS BT 06	E 29
AKK 127	A 125	DR 812 V0	E 40	FK 240 SA 220 V	C 14	FS BT 08	E 29
AKK 191	A 125	DR 813 V0	E 40	FK 240 SA 220 VL	C 14	FS BT 10	E 29
AOS 3	E 17	DR 814 V0	E 40	FK 241 SA 218 V	C 11	FS BT 11	E 29
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AOS 18	E 17	DR 835 V0	E 40	FK 243 MI 247 H	C 12	FS BT 20	E 29
AOS 32	E 17	DR 840 V0	E 40	FK 243 MI 247 O	C 12	FSF 52 P	E 20
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DR 072 V0	E 40	FK 217 SA CB 2	C 3	FK 253	C 16	FS S 21 3	E 29
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DR 074 V0	E 40	FK 219 CB 1	C 9	FK 255	C 16	FS U 11	E 30
DR 075 V0	E 40	FK 219 CB 2	C 9	FK 256	C 22	FS U 20	E 30
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DR 078 V0	E 40	FK 222	C 7	FK 318 SA	C 2	GBM 4070	E 37
DR 079 V0	E 40	FK 222 THF	C 7	FK 318 SA 3	C 2	GBM 5080	E 37
DR 081 V0	E 40	FK 223 SA	C 3	FL 0,55	A 128	GBP 3060	E 37
DR 082 V0	E 40	FK 223 SA 3	C 3	FL 1,1	A 128	GBP 4080	E 37
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DR 085 V0	E 40	FK 224 ... 218 2	C 11	FLKI 80 G 300	A 132	GEL 27 S ...	E 15
DR 086 V0	E 40	FK 224 ... 220 1	C 11	FLKI 80 G 500	A 132	GEL 28 ...	E 13
DR 087 V0	E 40	FK 224 ... 220 2	C 11	FLKR 1	A 133	GEL 28 G ...	
DR 088 V0	E 40	FK 224 ... P SIP	C 10	FLKU 140	A 131	GEL 45 ...	E 14
DR 089 V0	E 40	FK 225 SA L 1	C 5	FLKU 140 G 200	A 132	GEL 45 G ...	
DR 105 V0	E 40	FK 225 SA L 2	C 5	FLKU 140 G 300	A 132	GEL 60 ...	E 15
DR 110 V0	E 40	FK 227 SA L 1	C 8	FLKU 140 G 500	A 132	GEL 60 G ...	
DR 115 V0	E 40	FK 228 SA L 1	C 5	FS 6 065	E 27	GEL F 15 ...	E 11
DR 120 V0	E 40	FK 229 SA L 1	C 5	FS 6 070	E 27	GEL F 15 G ...	
DR 125 V0	E 40	FK 230 SA L 1	C 5	FS 6 080	E 27	GS 3	E 19
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GS 66 P	E 19	ICK LED R 27 x 10 G	B 35	ICK S 14 x 14 x 6,5	B 22	ICK SMD K 17	B 54
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GS 220 4	E 19	ICK LED R 28 x 15 G	B 36	ICK S 14 x 14 x 12,5	B 22	ICK SMD K 21	B 54
GS 220 C	E 19	ICK LED R 29 x 11,5	B 36	ICK S 14 x 14 x 18,5	B 22	ICK SMD M 8 SA	B 54
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IB 2	E 52	ICK LED R 32 x 14 G	B 36	ICK S 18 x 18 x 6,5	B 23	ICK SMD M 19 SA	B 54
IB 3	E 52	ICK LED R 33 x 10	B 36	ICK S 18 x 18 x 10	B 23	ICK SMD M 21 SA	B 54
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IB 6	E 52	ICK LED R 33 x 16,5 G	B 37	ICK S 25 x 25 x 6,5	B 23	ICK SMD N 17	B 55
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IB 10	E 52	ICK LED R 36 x 12 G	B 37	ICK S 29 x 29 x 20	B 24	ICK S R 28,5 x 6,5	B 29
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IB 12	E 52	ICK LED R 40 x 10 G	B 38	ICK S 32 x 32 x 10	B 24	ICK S R 28,5 x 12,5	B 29
IB 13	E 52	ICK LED R 40 x 27	B 38	ICK S 32 x 32 x 20	B 25	ICK S R 28,5 x 18,5	B 29
IB 14	E 52	ICK LED R 40 x 27 G	B 38	ICK S 36 x 36 x 10	B 25	ICK S R 32,5 x 10	B 29
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IB 18	E 52	ICK LED R 50,8 x 16,5 G	B 39	ICK S 40 x 40 x 10	B 25	ICK S R 32,5 x 50	B 30
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IBT 3	E 52	ICK LED R 54 x 20	B 39	ICK S 45 x 45 x 10	B 26	ICK S R 40 x 20	B 30
IBT 4	E 52	ICK LED R 54 x 20 G	B 39	ICK S 45 x 45 x 20	B 26	ICK S R 40 x 30	B 31
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IBT 8	E 52	ICK LED R 84 x 40	B 40	ICK S 50 x 50 x 40	B 27	ICK S R 45 x 45	B 31
IBT 9	E 52	ICK LED R 100 x 40	B 40	ICK S 50 x 50 x 50	B 27	ICK S R 50 x 10	B 31
IBT 10	E 52	ICK LED R 160 x 40	B 40	ICK S 98 x 98 x 30	B 27	ICK S R 50 x 20	B 32
IBT 11	E 52	ICK LED R 200 x 40	B 41	ICK S 98 x 98 x 45	B 27	ICK S R 50 x 30	B 32
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IBT 14	E 52	ICK PEN 3 XE	B 56	ICK S D 18 x 12 x 7,5	B 28	ICK S R 54 x 20	B 32
IBT 15	E 52	ICK PEN 3 XE 1	B 56	ICK S D 24 x 18 x 7,5	B 28	ICK S R 54 x 30	B 32
IBT 18	E 52	ICK PEN 38 F	B 57	ICK S D 98 x 98 x 10	B 28	ICK S R 54 x 45	B 33
ICK 6 8 L	B 52	ICK PEN 38 W	B 57	ICK SMD A 5	B 53	ICK S R 70 x 30	B 33
ICK 14 16 B	B 52	ICK PEN 45 W	B 57	ICK SMD A 8	B 53	ICK S R 70 x 50	B 33
ICK 14 16 L	B 52	ICK PGA 6 x 6 x 14	B 11	ICK SMD A 10	B 53	ICK S R 85 x 30	B 33
ICK 14 H	B 52	ICK PGA 8 x 8 x 12	B 11	ICK SMD A 13	B 53	ICK S R 85 x 45	B 33
ICK 16 H	B 52	ICK PGA 9 x 9	B 11	ICK SMD A 17	B 53	ICK S R 98 x 30	B 34
ICK 18 H	B 52	ICK PGA 11 x 11	B 11	ICK SMD A 22	B 53	ICK S R 98 x 50	B 34
ICK 20 L	B 52	ICK PGA 11 x 11 x 8	B 11	ICK SMD B 5	B 53	ICK S R A 40 x 20	B 31
ICK 24 B	B 52	ICK PGA 11 x 11 x 12	B 12	ICK SMD B 7 SA	B 53	IK 3	E 51
ICK 28 B	B 52	ICK PGA 14 x 14	B 12	ICK SMD B 10 SA	B 53	IK 341 3	E 51
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ICK 36 B	B 52	ICK PGA 14 x 14 x 12	B 12	ICK SMD B 19	B 53	IS 2	E 49
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ICK BGA 10 x 10	B 17	ICK PGA 16 x 16 x 10	B 13	ICK SMD C 17	B 53	IS 6	E 49
ICK BGA 10 x 10 x 10	B 17	ICK PGA 16 x 16 x 12	B 13	ICK SMD E 15 SA	B 54	IS 7	E 50
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ICK BGA 14 x 14 x 10	B 17	ICK PGA 17 x 17 x 8	B 13	ICK SMD E 29 SA	B 54	IS 53	A 127
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ICK BGA 23 x 23	B 18	ICK PGA 18 x 18	B 14	ICK SMD F 10	B 54	ISAB 3 B	E 33
ICK BGA 23 x 23 x 10	B 18	ICK PGA 19 x 19	B 14	ICK SMD F 17 SA	B 54	ISAB 3 C	E 33
ICK BGA 27 x 27	B 18	ICK PGA 19 x 19 x 12	B 14	ICK SMD F 19	B 54	ISAB 4 A	E 32
ICK BGA 27 x 27 x 10	B 18	ICK PGA 20 x 20	B 14	ICK SMD F 21	B 54	ISAB 4 B	E 33
ICK BGA 27 x 27 x 14	B 18	ICK PGA 20 x 20 K	B 15	ICK SMD F 26	B 54	ISAB 4 C	E 33
ICK BGA 27 x 27 x 22	B 19	ICK PGA 20 x 20 x 8	B 15	ICK SMD G 8 MI	B 54	ISAB 5 B	E 33
ICK BGA 31 x 31	B 19	ICK PGA 20 x 20 x 10	B 14	ICK SMD G 10	B 54	ISAB 5 C	E 33
ICK BGA 31 x 31 x 10	B 19	ICK PGA 20 x 20 x 12	B 15	ICK SMD G 13 SA	B 54	ISAB 6 A	E 32
ICK BGA 35 x 35	B 19	ICK PGA 21 x 21	B 15	ICK SMD G 17 SA	B 54	ISAB 6 B	E 33
ICK BGA 35 x 35 x 10	B 19	ICK PGA 22 x 22	B 15	ICK SMD G 19 SA	B 54	ISAB 6 C	E 33
ICK BGA 37 x 37 x 6	B 19	ICK PGA 25 x 25	B 16	ICK SMD G 21	B 54	ISAB 25 A	E 32
ICK BGA 37 x 37 x 10	B 20	ICK PLCC 28	B 52	ICK SMD H 8	B 54	ISAB 25 B	E 33
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ICK EM 25	B 56	ICK S 10 x 10 x 6,5	B 21	ICK SMD H 25	B 54	ISAM 2 C	E 34
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ISAS 25 B	E 36	LA 5	D 14	LA V 17	D 22	SFP 060	A 135
ISAS 25 C	E 36	LA 6	D 15	LA V 18	D 22	SFP 067	A 135
ISAS 30 A	E 35	LA 7	D 15	LA V 21	D 24	SFP 074	A 135
ISAS 30 B	E 36	LA 8	D 15	LA V 22	D 24	SFP 076	A 135
ISAS 30 C	E 36	LA 9	D 17	LA V 24	D 25	SFP 079	A 135
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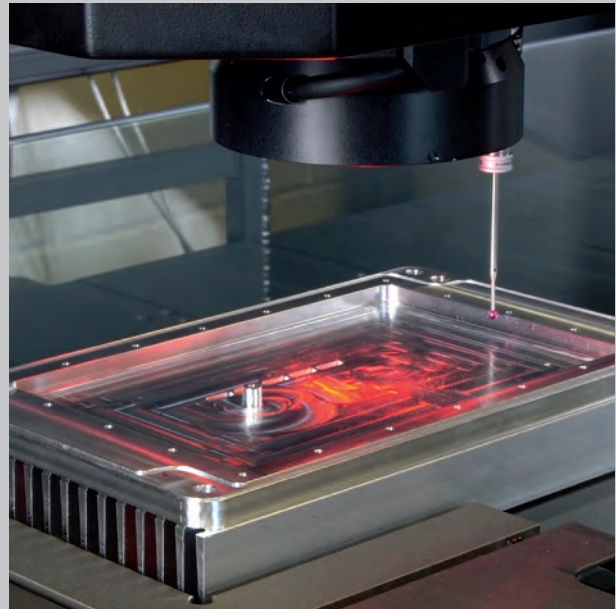
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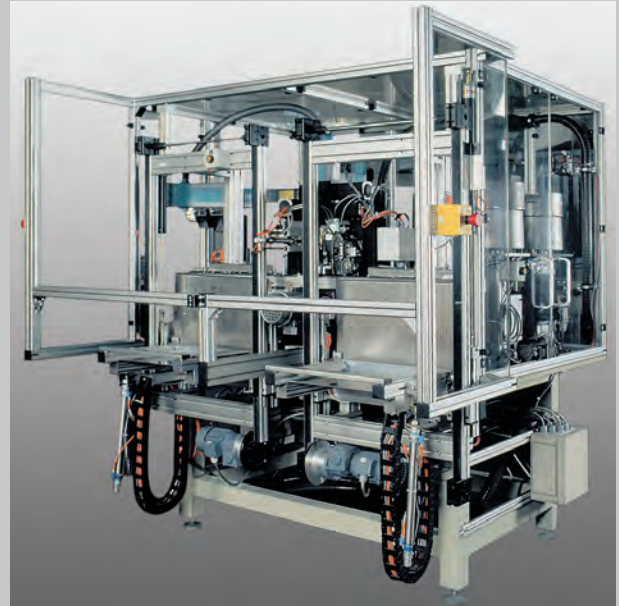
certified quality management



own tool-making department



foresighted storekeeping



efficient special machines



precise punching department



up-to-date milling technology



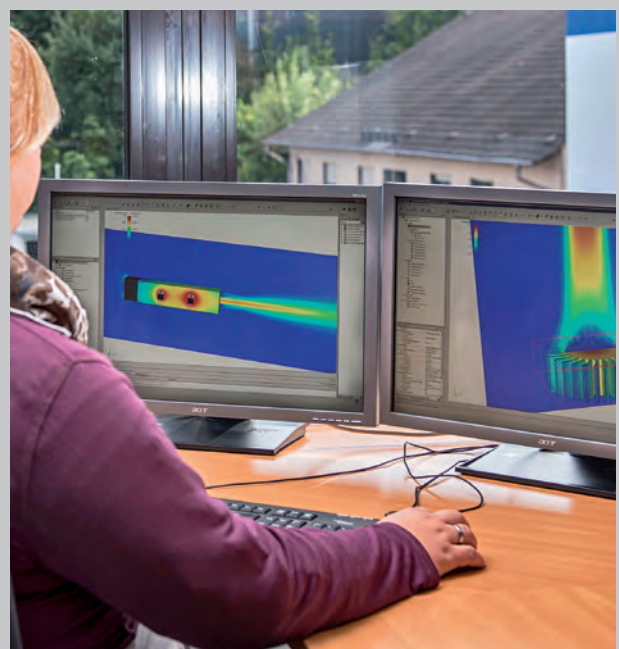
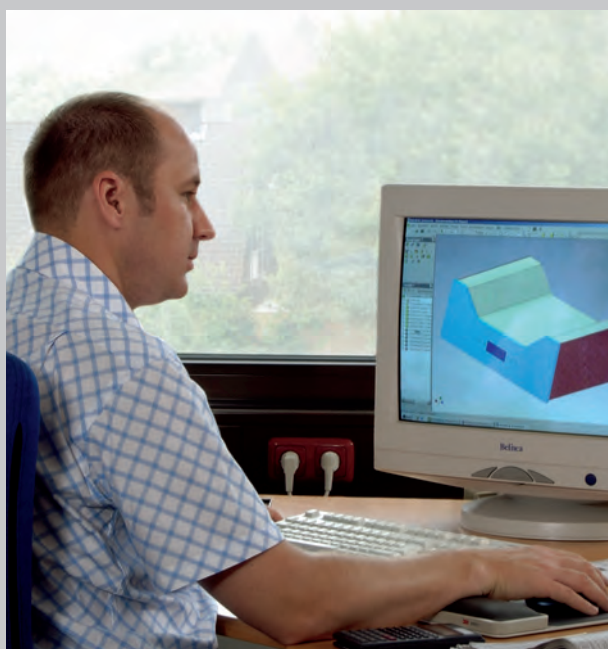
foyer of the company



motivated employees



committed field service



innovative product development

Quality-Management System DIN EN ISO 9001

We are certified to DIN EN 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 9001:2008**

Certificate Registr. No. 09 100 4274

TÜV Rheinland Cert GmbH certifies:

Certificate Holder:

fischer elektronik 

Fischer Elektronik GmbH & Co. KG
Nottebohmstraße 28
D - 58511 Lüdenscheid

Scope:

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

An audit was performed, Report No. 4274. Proof has been furnished that the requirements according to ISO 9001:2008 are fulfilled.

The due date for all future audits is 31-10 (dd.mm).

Validity:

The certificate is valid from 2012-11-01 until 2015-10-31.
First certification 1994

2012-10-23


TÜV Rheinland Cert GmbH
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DGA-ZM-58-95-00

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2013-10-22


Management
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Environmental Management System DIN EN ISO 14001

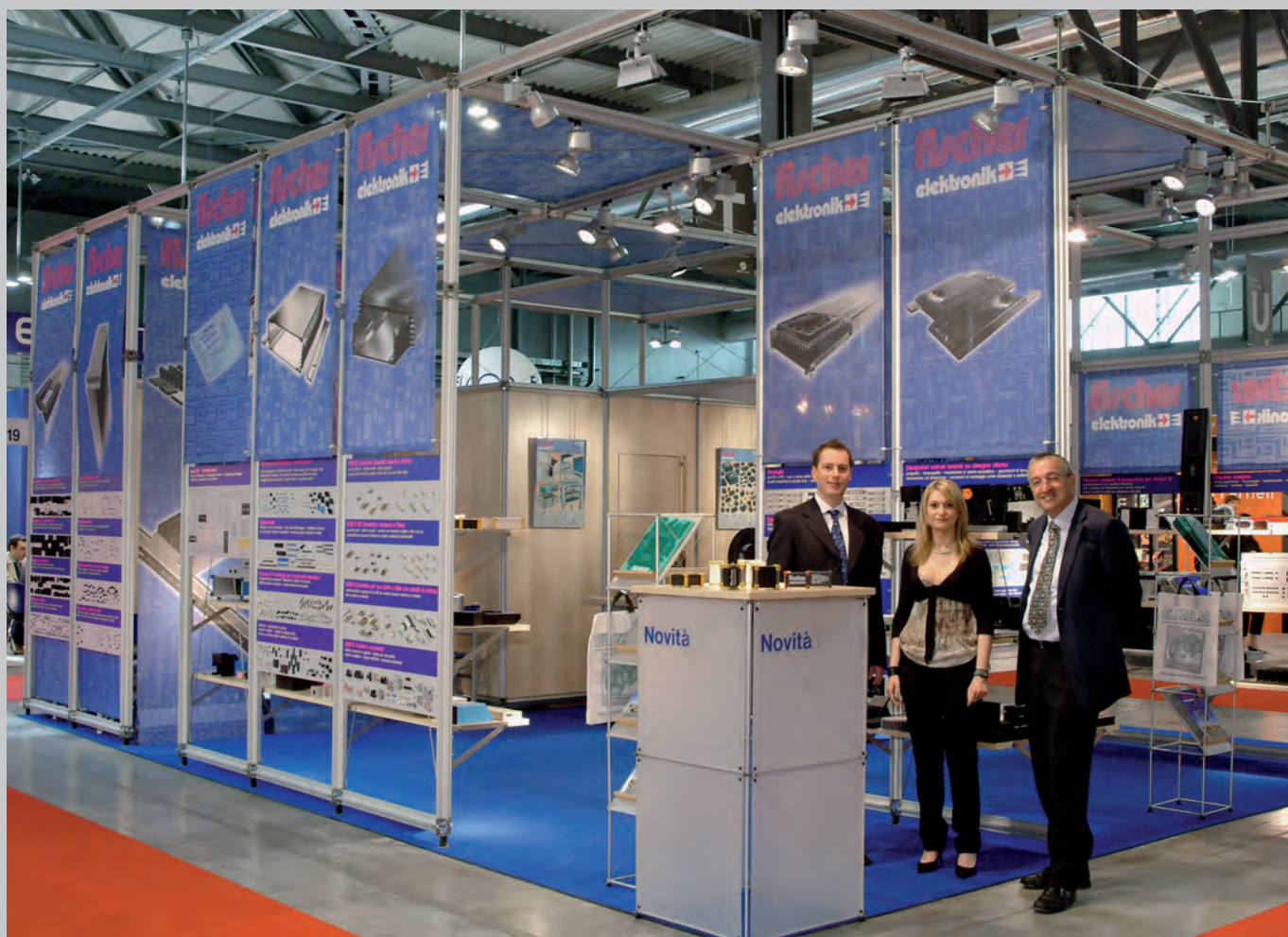
Fischer Elektronik considers protection of the environment and saving of natural resources entrepreneurial tasks of high priority.

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

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 at 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.



BIAS, Milan

I



Electronica, Tel Aviv

IL



PCIM, Nuremberg

D



Electro Salon, Budapest

HU



Elkom, Helsinki

FI



Paris **F**
16. 9. - 18. 9. 2014
www.enova-event.com
hall 7.2



WindEnergy
Hamburg

Hamburg **D**
23. 9. - 26. 9. 2014
www.windenergyhamburg.com
hall B 7, stand 537



Bregenz **A**
30. 9. - 2. 10. 2014
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Paris **F**
14. 10. - 15. 10. 2014
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electronica

Munich **D**
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www.electronica.de
hall B 1, stand 155



London **GB**
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hall A 32



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stand 4 A - 311



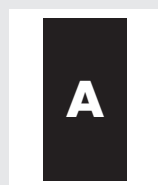
Nuremberg **D**
20. 5. - 22. 5. 2015
www.pcim.de



S.E.E.
SCANDINAVIAN
ELECTRONICS
EVENT

Stockholm **S**
19. 4. - 21. 4. 2016
www.see-event.se

Explanations – references – printings

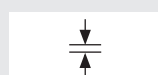


... index area:
shows topics/categories
"current"



Standard aluminium profiles → A 135 - 136
Technical explanations → A 2 - 8
Extruded heatsinks → A 22 - 83
Assignment table → A 18 - 22

SA = black anodised
MI = solderable surface
ME = clear anodised
TP = chrom-free transparent passivated



... index area:
shows topics/categories
"following"

... page number

... footnotes, give references to pages with
combinable or similar products

... option for surface finishing

... link to page

... length on stock in mm

... hole pattern

... symbol of heatsink geometry

... thermal resistance in K/W

... thickness of sheet/plate

... air/speed in m/s

Imprinting of cardholders - Your and our time is expensive

An order for imprinting must state the font, the font size and the exact position of the imprint with dimensions, taking due account of countersunk holes etc.. When placing the first order, the company logo must be supplied as a vector file. If these conditions are not complied with, the order for imprinting may have to be turned down, or additional costs will have to be charged.

Compliance with the following criteria ensures smooth handling:

Adobe Illustrator (.ai/.eps) without half-tone images, fonts transformed into paths or supplied

CorelDraw (.cdr)

Adobe Acrobat (.pdf)

QuarkXPress (.qxd)

InDesign (.indd)

all fonts enclosed; half-tone images colour-separated (full-tone or scale colours) and
with correct resolution (300 dpi colour, black / white 600 dpi), no RGB

All this takes additional time and consequently incurs extra costs.

The usability must be checked by our printing shop:

screen formats (.jpg, .gif, .png) and paper copies, stickers and the like are not suitable for preparing printer's copies!

Copies that definitely cannot be used:

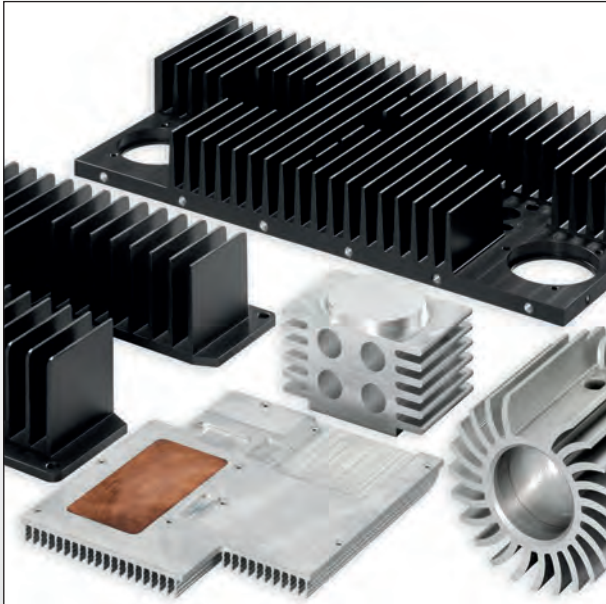
Imperfect copies such as fax copies / Microsoft Office files (.doc, .xls, .ppt) can only be used for information or for transmitting texts.

Please always add dimensional drawings (.dxf) to the parts to be imprinted! Please note as a general rule:

Retouching work extending beyond the standard time will be invoiced additionally at cost price.

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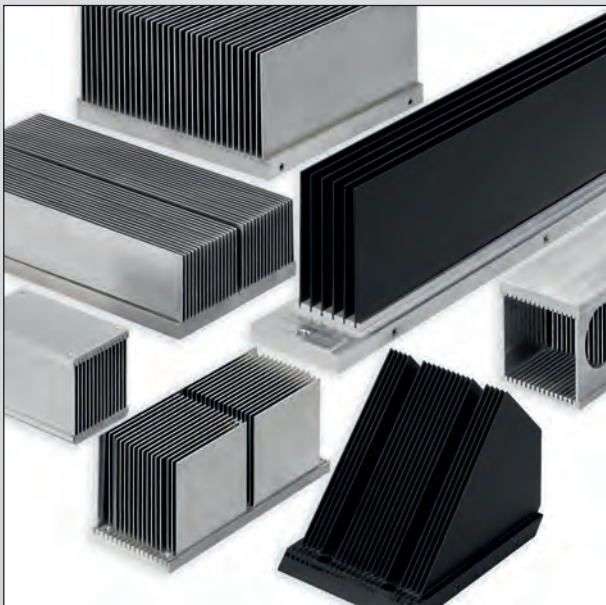
Machined heatsinks

- 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

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 merchantability 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 watts

R_{th} = thermal resistance in K/W

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

Heatsinks profile-overview

→ A 13 - 17

Heatsink special design

→ A 137 - 138

Special profiles

→ A 140

Heatsink as visual & decor-parts

→ A 10

Heatsinks for SSR

Die-cast heatsinks

Assignment table

Order example

→ A 11 - 12

→ A 125

→ A 18 - 20

→ A 21

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

- | | |
|---|------------------|
| 1. dry, without insulator | 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:

$$\frac{1}{R_{thGM \text{ ges.}}} = \frac{1}{R_{thG1} + R_{thM1}} + \frac{1}{R_{thG2} + R_{thM2}} + \dots + \frac{1}{R_{thGn} + R_{thMn}}$$

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:

$$P = 60 \text{ W}$$

$$\vartheta_i = 180^\circ\text{C} - 20^\circ\text{C} = 160^\circ\text{C} \text{ (for safety margin)}$$

$$\vartheta_u = 40^\circ\text{C}$$

$$R_{thG} = 0.6 \text{ K/W}$$

$$R_{thM} = 0.4 \text{ K/W (average value)}$$

find: R_{thK} using equation 1

$$R_{thK} = \frac{\vartheta_i - \vartheta_u}{P} - (R_{thG} + R_{thM}) = \frac{160^\circ\text{C} - 40^\circ\text{C}}{60 \text{ W}} - (0.6 \text{ K/W} + 0.4 \text{ K/W}) = 1.0 \text{ K/W}$$

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

solution use equation 1 and equation 3

$$\frac{1}{R_{thGM \text{ ges.}}} = \frac{1}{0.6 + 0.4 \text{ K/W}} + \frac{1}{0.6 + 0.4 \text{ K/W}} + \frac{1}{0.6 + 0.4 \text{ K/W}} = \frac{3}{1} \text{ W/K}$$

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

substitute into Equation 1 gives:

$$R_{thK} = \frac{160^\circ\text{C} - 40^\circ\text{C}}{60 \text{ W}} - 0.33 \text{ K/W} = 1.67 \text{ K/W}$$

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:

$$P = 50 \text{ W}$$

$$R_{thG} = 0.5 \text{ K/W}$$

$$\vartheta_G = 40^\circ\text{C}$$

find: ϑ_i using equation 2

$$\vartheta_i = \vartheta_G + (P \cdot R_{thG})$$

$$\vartheta_i = 40^\circ\text{C} + (50 \text{ W} \cdot 0.5 \text{ K/W}) = 65^\circ\text{C}$$

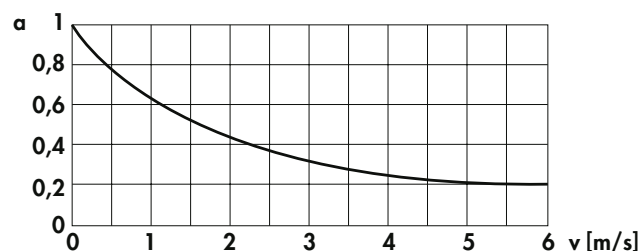
Thermal resistances of any profiles with forced convection

$$R_{thKf} \approx \alpha \cdot R_{thK}$$

R_{thKf} = thermal resistance with forced convection

R_{thK} = thermal resistance with natural convection

α = factor of proportion



Computer based thermal simulation for optimal cooling concepts

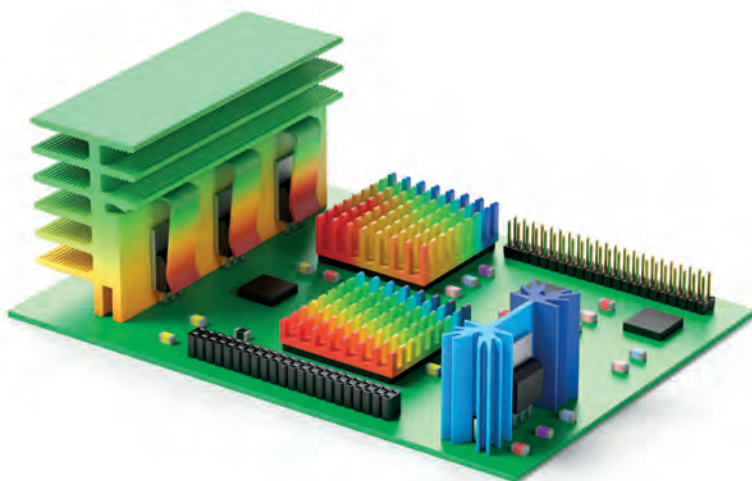
Performance, service life and reliability of electronic semiconductor devices are significantly determined by the thermal load to which the devices are exposed. An exceeding of the maximum operating temperature leads to malfunctions. An exceeding of the permissible junction temperature leads to a destruction 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.

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 competitively 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 catalogue 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 - August 2014

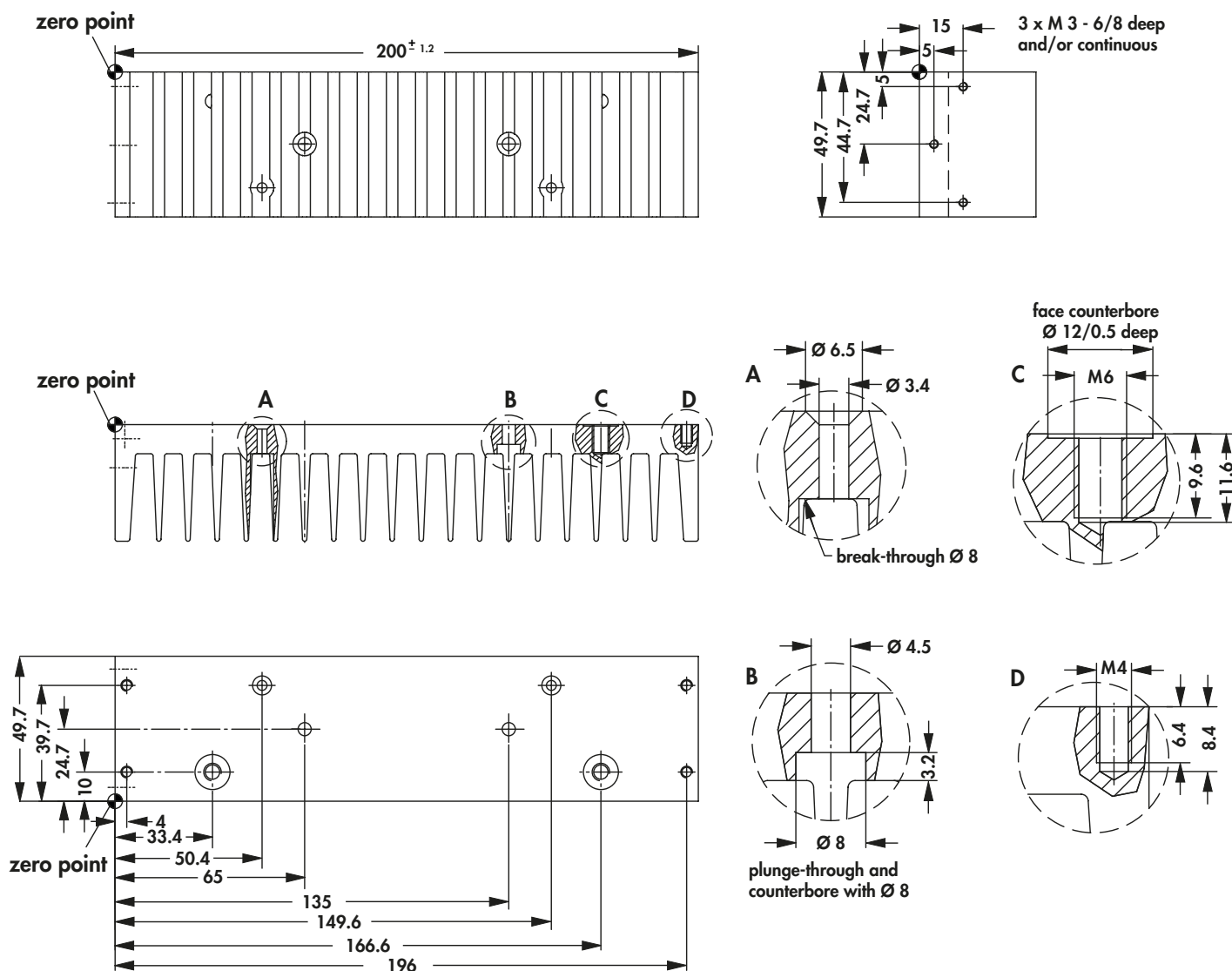
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General information

Blind holes are produced after anodising. Through holes are produced before anodising. With completely visual parts, additional painting is recommended. The sections are extruded according to DIN EN 12020. For sections that exceed a circumscribed circle of 300 mm, DIN EN 755 apply. The machining tolerances are specified according to DIN ISO 2768 m.

Visual parts: Please indicate at which place **clamp points** are allowed! We recommend e.g. supplementary laquering.



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 M 5:

thread: $<M> 5 \times 1.6 \text{ mm} = 8 \text{ mm}$

core bore: $8 \text{ mm} + 2 \text{ mm} = 10 \text{ mm}$

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 M 6. Depth of thread $1.6 \times 6 \text{ mm} = 9.6 \text{ mm}$, bore depth $9.6 \text{ mm} + 2 \text{ mm} = 11.6 \text{ mm}$.
Bore hole on fin base is plunged through. Face counterbore dia. 12×0.5 on bottom side.

cutout D: Blind thread M 4. Depth of thread $1.6 \times 4 \text{ mm} = 6.4 \text{ mm}$, bore depth $6.4 \text{ mm} + 2 \text{ mm} = 8.4 \text{ mm}$.

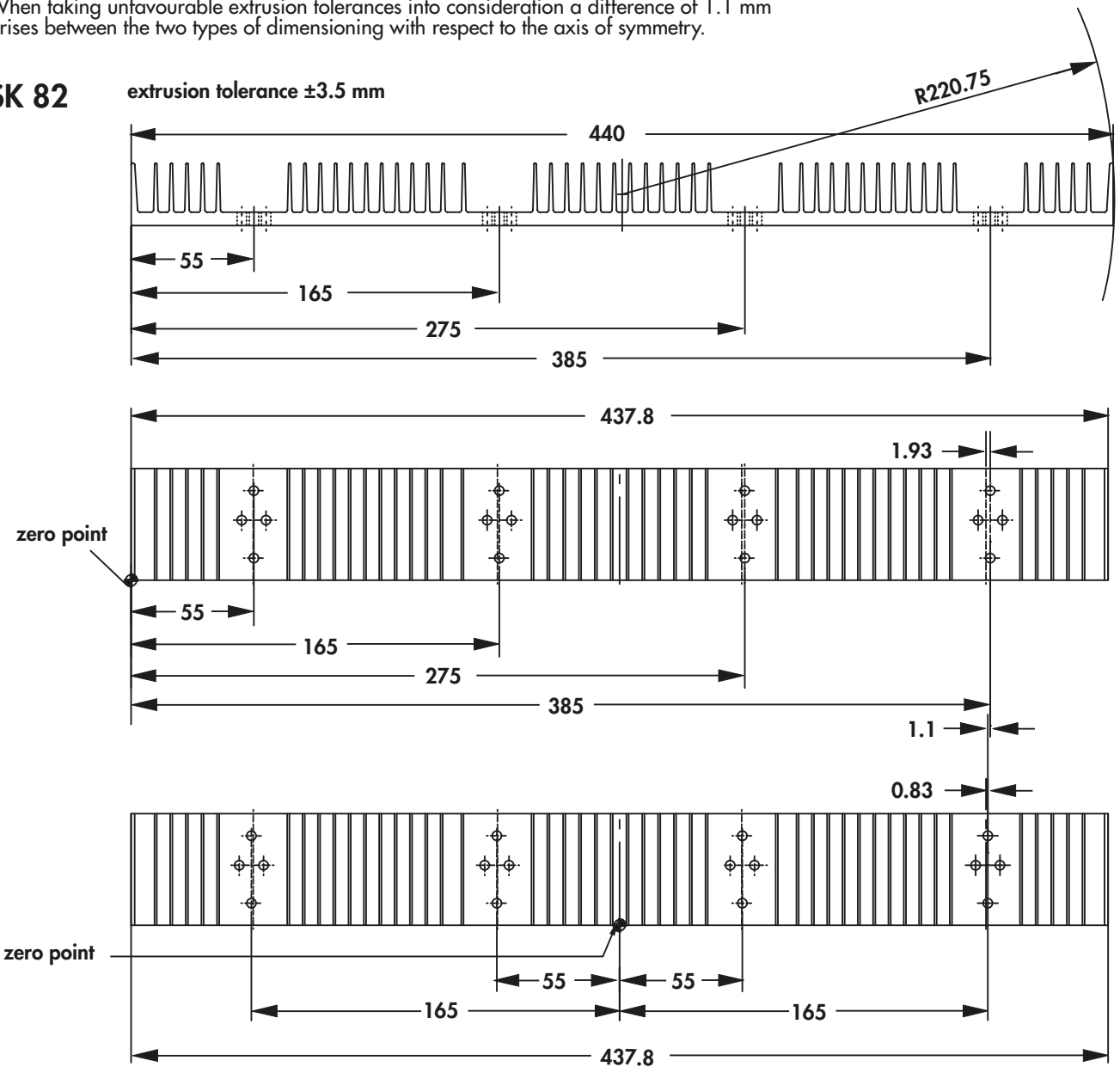
Extrusion tolerances – production tolerances

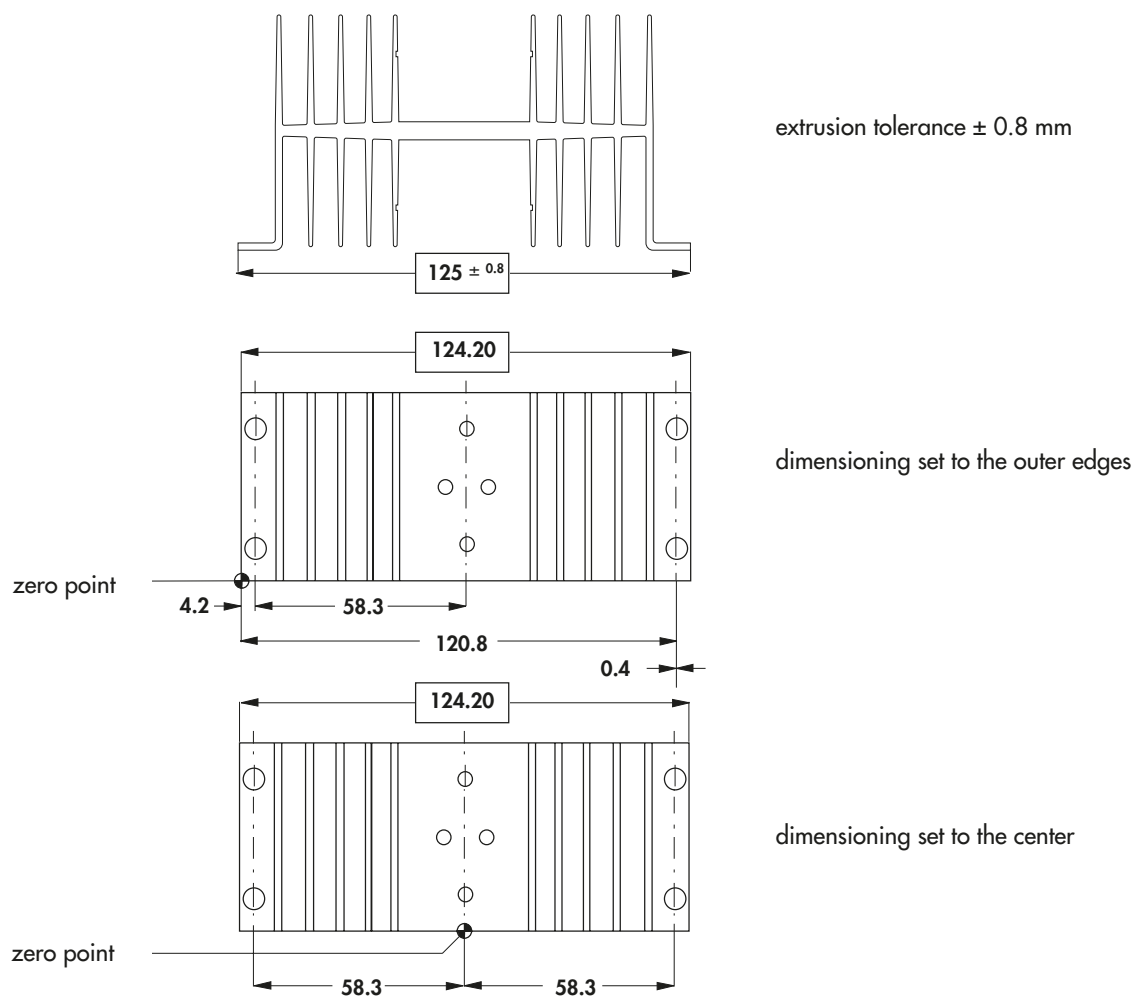
There is often the problem, that the production tolerances cannot be adhered to, due to the extrusion tolerances. The two examples show how the production tolerances can be cut in half by means of suitable dimensioning (here: extension of the zero point from the outer edge to the center of the section).

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 $\pm 3.5 \text{ mm}$

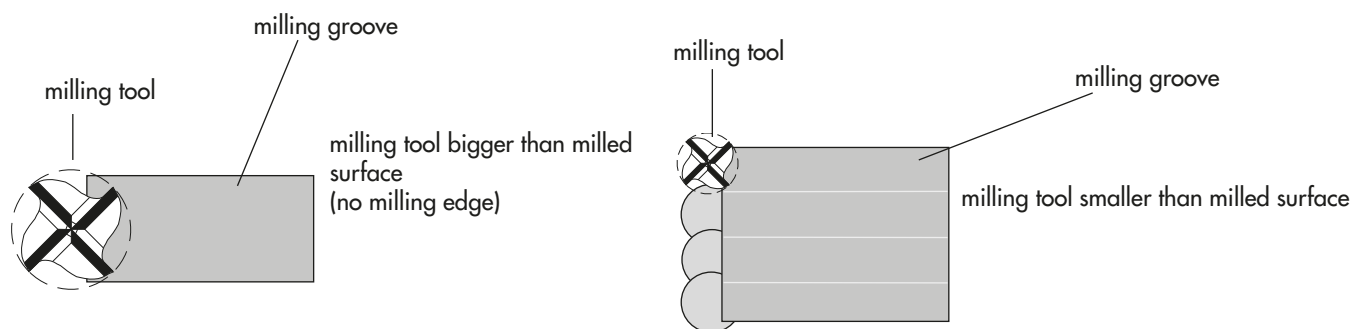


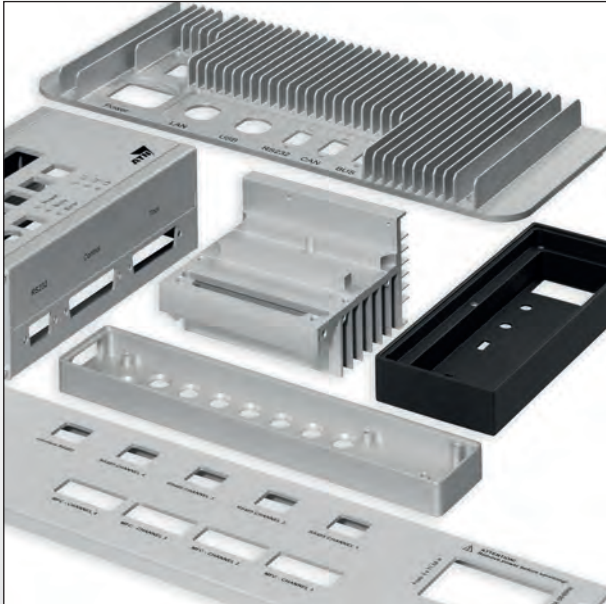
SK 34


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

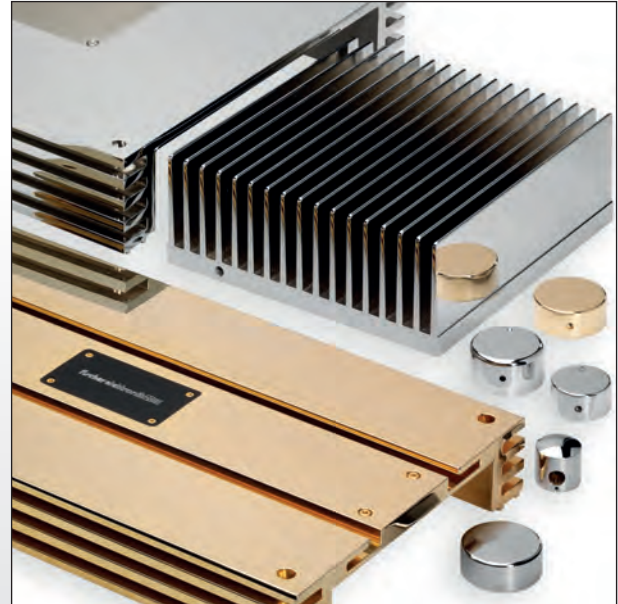
If, when milling heatsinks, cooling aggregates, etc., the milling tool diameter is smaller than the area being milled for production reasons, so called „milling grooves“ with steps or edges are produced (see sketch). Even if the roughness depth value for the surface is observed, it is a good idea to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





Decorative aluminium milled parts

- high quality, very precise milled, decorative aluminium parts
- exact radii and sharp-edged cutouts
- precision ground surfaces
- natural colour and black anodized



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



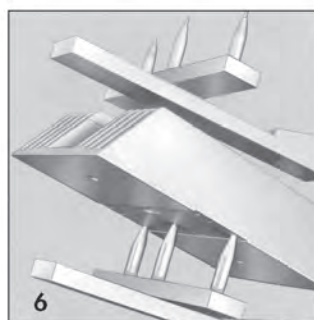
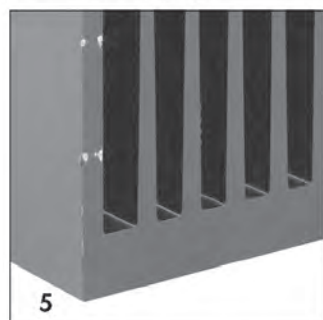
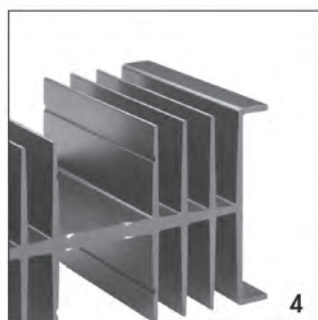
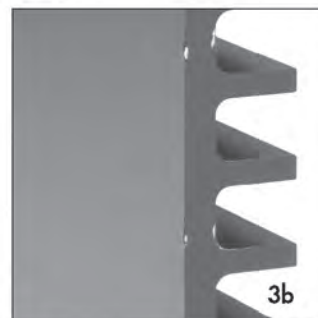
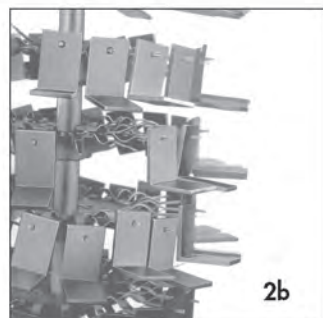
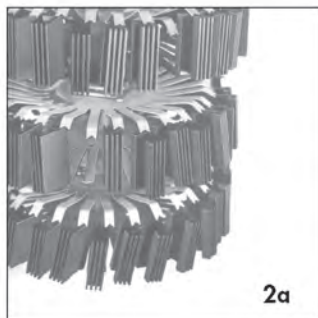
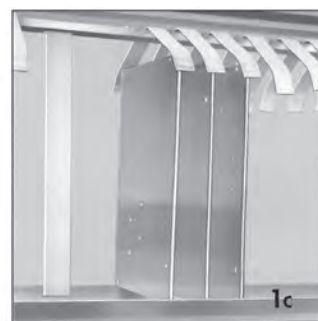
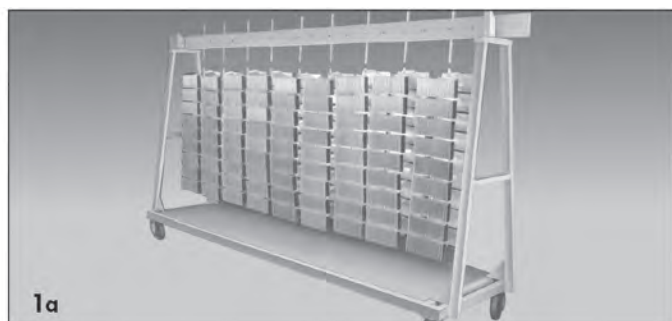
Surface refinements

- 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

- competent 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



Anodising (also known as ELOXAL: **E**lectrically **O**Xidised **A**luminium) 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 oxygen-containing 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.

A

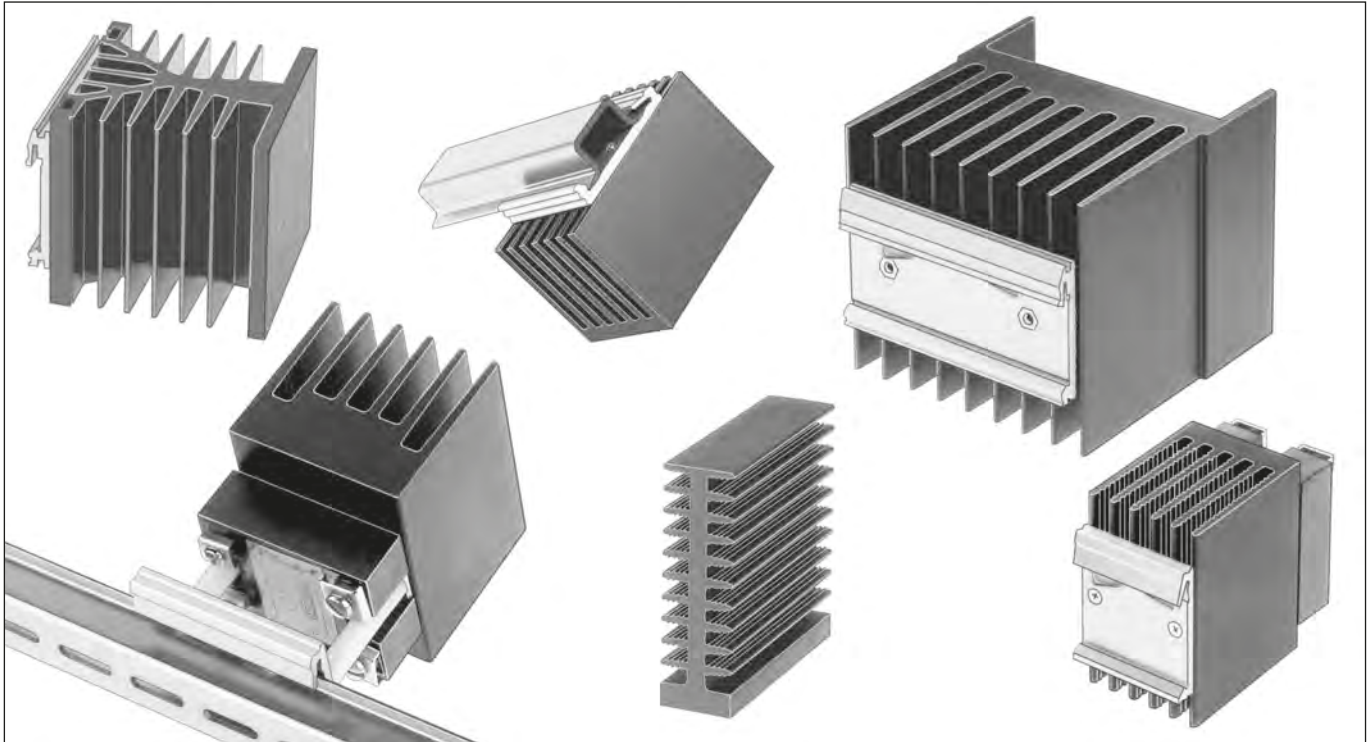
B

C

D

E

F



- universal clip fastening, suitable for all 35 mm mounting rails
according to DIN EN 50 022, rail thickness from 1 to 2.3 mm → E 25
- fast and simple assembly 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

G

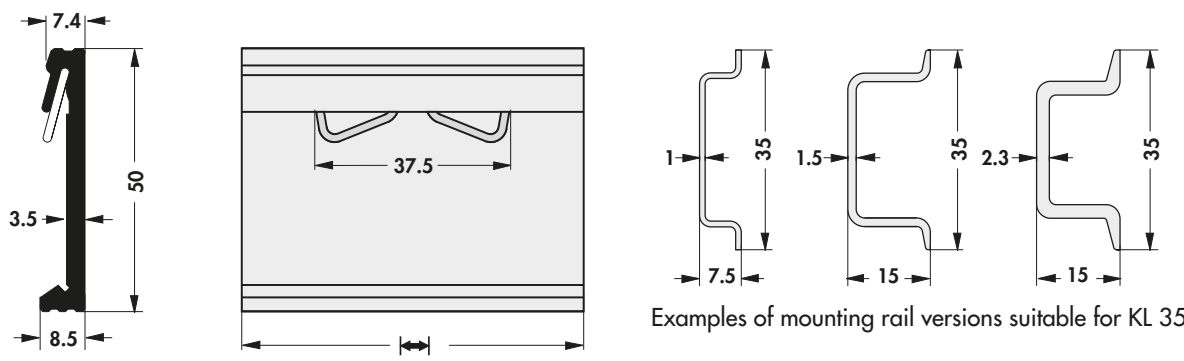
H

I

K

L

M



Examples of mounting rail versions suitable for KL 35

surface:	finish clear anodised
----------	-----------------------

N

A 11	Distance sleeves	→ E 32 - 39	Spacers	→ E 40
	Fastening for mounting rail	→ E 25	Mica wafers	→ E 19
	Guide rails for PCBs	→ E 26 - 30	Aluminium oxide wafers	→ E 17 - 18
	Mounting material f. semiconduct.	→ E 44 - 48	Technical introduction	→ A 2 - 8

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		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 SSR 1 SK 453 75 KL SSR 1 SK 467 75 KL SSR 1 SK 507 75 KL SSR 1	SK 04 75 SSR 1 SK 33 75 SSR 1 SK 453 75 SSR 1 SK 455 75 SSR 1 SK 467 75 SSR 1 SK 507 75 SSR 1
SSR 2 		SK 89 100 KL SSR 2 SK 89 150 KL SSR 2 SK 176 100 KL SSR 2 SK 176 150 KL SSR 2 SK 194 75 KL SSR 2 SK 507 100 KL SSR 2	SK 04 150 SSR 2 SK 33 75 SSR 2 SK 507 100 SSR 2 SK 507 150 SSR 2
SSR 3 	SK 187 75 KL SSR 3	SK 111 75 KL SSR 3	SK 48 50 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

Heatsink-chart

SK 440 D 30	SK 441 D 30	SK 458 D 30	SK 461 D 30	SK 497 D 30	SK 498 D 30
SK 47 A 49	SK 49 A 51	SK 56 A 54	SK 66 A 55	SK 90 A 48	SK 91 A 52
SK 93 A 56	SK 101 A 54	SK 102 A 50	SK 130 A 56	SK 139 A 53	
SK 149 A 53	SK 154 A 46	SK 155 A 45	SK 157 A 54	SK 158 A 58	
SK 159 A 58	SK 160 A 58	SK 161 A 58	SK 162 A 58		
SK 168 A 50	SK 190 A 52	SK 191 A 56	SK 193 A 50		
SK 198 A 53	SK 199 A 51	SK 416 A 47	SK 418 A 58	SK 438 A 52	
SK 439 A 55	SK 446 A 53	SK 466 A 43	SK 479 A 55		
SK 501 A 54	SK 502 A 49	SK 507 A 40	SK 510 A 46	SK 520 A 50	SK 523 A 55
SK 524 A 52	SK 530 A 57	SK 531 A 57	SK 533 A 57		
SK 535 A 57	SK 536 A 57	SK 537 A 57	SK 538 A 57		

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

SK 539 A 57		SK 540 A 57		SK 553 A 44	SK 555 A 51	SK 557 A 50
SK 568 A 54	SK 579 A 55		SK 580 A 51	SK 588 A 45	SK 591 A 49	SK 601 A 44
SK 613 A 43	SK 614 A 52		SK 621 A 56		SK 57 A 64	SK 30 A 67
SK 82 A 75		SK 86 A 75		SK 15 A 77	SK 163 A 78	SK 556 A 77
SK 83 A 79	SK 108 A 80	SK 109 A 80	SK 110 A 80	SK 435 A 81	SK 144 A 82	SK 584 B 44
SK 615 B 45	SK 33 A 42	SK 42 A 49		SK 58 A 45		SK 85 A 46
SK 94 A 49		SK 113 A 48		SK 118 A 51		SK 119 A 47
SK 120 A 45	SK 121 A 42	SK 132 A 44	SK 133 A 44	SK 135 A 39	SK 136 A 48	
SK 412 A 47		SK 413 A 43	SK 429 A 37	SK 463 A 43		SK 467 A 33
SK 504 A 45		SK 519 A 48	SK 583 A 53		SK 595 A 43	SK 71 A 64
SK 404 A 65		SK 02 A 66	SK 34 A 67	SK 67 A 69	SK 148 A 68	SK 88 A 73
SK 80 A 74		SK 147 A 74				

< 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

Heatsink-chart

SK 89 A 77	SK 140 A 77	SK 06 A 79	SK 23 A 79	SK 194 A 81	SK 40 A 82	SK 61 A 82	SK 415 A 90	SK 569 B 43
SK 570 B 44	SK 571 B 44	SK 572 B 44	SK 577 B 43	SK 578 B 43	SK 599 B 45	SK 602 B 43	SK 50 A 37	SK 100 A 38
SK 166 A 48			SK 408 A 40		SK 410 A 44		SK 417 A 46	
SK 421 A 47		SK 433 A 41	SK 442 A 42		SK 453 A 33	SK 455 A 33	SK 464 A 39	SK 527 A 35
SK 04 A 64	SK 72 A 63	SK 401 A 63	SK 403 A 64	SK 14 A 67	SK 39 A 67	SK 20 A 68	SK 84 A 68	
SK 184 A 68	SK 74 A 71	SK 124 A 71	SK 195 A 71		SK 500 A 72	SK 08 A 73	SK 60 A 74	
SK 176 A 78	SK 172 A 81	SK 432 A 82	SK 46 B 43	SK 598 B 42	SK 407 A 39	SK 436 A 37	SK 450 A 34	SK 505 A 41
SK 508 A 41		SK 612 A 39		SK 73 A 64		SK 97 A 62	SK 03 A 66	SK 419 A 70
SK 16 A 72		SK 79 A 73	SK 187 A 76	SK 11 A 79	SK 111 A 81	SK 44 A 90		SK 81 A 41
SK 189 A 32	SK 405 A 47		SK 406 A 38	SK 434 A 35	SK 445 A 34	SK 05 A 62	SK 18 A 62	SK 25 A 61
SK 28 A 63		SK 63 A 62	SK 402 A 62	SK 01 A 66	SK 64 A 70	SK 48 A 73	SK 52 A 74	SK 32 A 76

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

Heatsink-chart

SK 544 A 76	SK 596 A 76	SK 175 A 83	SK 105 A 90	SK 484 A 110		SK 487 A 87	SK 499 A 87	SK 514 A 86
SK 593 A 87	SK 617 A 88	SK 99 A 37	SK 106 A 31	SK 134 A 28	SK 182 A 40	SK 424 A 34	SK 425 A 34	SK 426 A 36
SK 475 A 35	SK 545 A 39		SK 546 A 40		SK 567 A 35	SK 594 A 38		SK 19 A 63
SK 45 A 63		SK 51 A 61	SK 165 A 61	SK 181 A 60	SK 36 A 66	SK 21 A 70		SK 65 A 70
SK 69 A 71		SK 07 A 72	SK 55 A 83	SK 68 A 89	SK 112 A 89	SK 128 A 91	SK 414 A 90	
SK 481 A 85	SK 482 A 86	SK 483 A 87	SK 489 A 85	SK 495 A 87	SK 517 A 93	SK 518 A 93	SK 585 ... B 42	SK 589 A 86
SK 610 A 92	SK 618 B 42	SK 619 B 42	SK 620 B 42	SK 156 A 36	SK 174 A 30	SK 179 A 30	SK 180 A 36	SK 422 A 32
SK 444 A 38	SK 468 A 36	SK 472 A 31	SK 485 A 38	SK 566 A 26	SK 78 A 61	SK 107 A 60	SK 122 A 60	SK 150 A 61
SK 173 A 59	SK 185 A 73	LA LED 68 B 50	SK 96 A 91	SK 138 A 91	SK 451 A 91	SK 490 A 84	SK 573 A 85	SK 574 A 86
SK 576 A 85	SK 611 A 92	SK LED 2 B 48	SK LED 3 B 48	SK 177 A 27	SK 178 A 28	SK 400 A 28	SK 420 A 31	SK 423 A 32
SK 427 A 36	SK 437 A 24	SK 447 A 26	SK 448 A 27	SK 452 A 27		SK 454 A 24	SK 456 A 30	SK 469 A 23

< 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

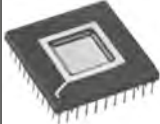
Heatsink-chart

SK 470 A 22	SK 471 A 29	SK 473 A 25	SK 476 A 24	SK 477 A 24	SK 478 A 23	SK 486 A 25	SK 493 A 28	SK 496 A 22
SK 509 A 29	SK 511 A 32	SK 513 A 31	SK 521 A 24	SK 522 A 23	SK 547 A 31	SK 548 A 34	SK 549 A 29	SK 550 A 27
SK 551 A 25	SK 552 A 23	SK 554 A 26	SK 558 A 23	SK 559 A 25	SK 560 A 26	SK 561 A 26	SK 562 A 29	SK 563 A 30
SK 564 A 30	SK 565 A 22	SK 581 A 28	SK 582 A 25	SK 586 A 22	SK 587 A 29	SK 597 A 27	SK 616 A 22	SK 09 A 59
SK 59 A 60	SK 145 A 59	SK 443 A 59	SK 31 A 72	SK 153 A 83	SK 494 A 83	ICK ... B B 52	ICK ... H B 52	ICK ... L B 52
SFP A 135	SK 12 A 123	SK 13 A 123	SK 75 A 105	SK 76 A 105	SK 95 A 108	SK 115 A 123	SK 125 A 91	SK 126 A 107
SK 431 ... A 124	SK 480 A 84	SK 492 A 84	SK 512 A 84	SK 515 A 94	SK 515 05 A 94	SK 516 A 94	SK 575 A 84	SK 609 A 92
SK LED 1 B 48	STP A 136	SU A 135	SVP A 136	SWP A 135	UK 14 SA ... A 123			

	TO 3	TO 66	SOT 9	TO 220	SOT 32
					
extruded profiles	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 28 SK 30 SK 31 SK 34 SK 36 SK 39 SK 45 SK 48 SK 52 SK 53 SK 55 SK 60 SK 63 SK 67 SK 69 SK 71 SK 72 SK 73 SK 74 SK 78 SK 79 SK 80 SK 84 SK 88 SK 97 SK 122 SK 124 SK 147 SK 148 SK 150 SK 165 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 28 SK 30 SK 31 SK 34 SK 36 SK 39 SK 45 SK 48 SK 52 SK 53 SK 55 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 150 SK 165 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 28 SK 30 SK 31 SK 34 SK 36 SK 39 SK 45 SK 48 SK 52 SK 53 SK 55 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 150 SK 165 SK 185 SK 195 SK 197 SK 401 SK 402 SK 404	SK 09 SK 59 SK 145	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 28 SK 30 SK 31 SK 34 SK 36 SK 39 SK 45 SK 48 SK 52 SK 53 SK 55 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 150 SK 165 SK 185 SK 195 SK 197 SK 401 SK 402 SK 404

Assignment table of transistor heatsinks

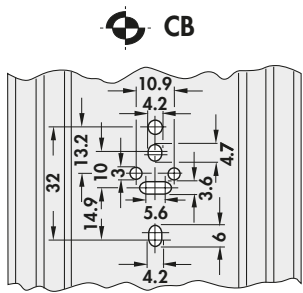
	TO 3 	TO 66 	SOT 9 	TO 5 	TO 247 	TO 3 P 
extruded heatsink with solder pins					SK 126 SK 145 SK 437 SK 459 SK 484	SK 104 SK 129 SK 400 SK 409 SK 448 SK 456 SK 484
extruded heatsinks	WP 4030				SK 126 SK 452	SK 452
set-up/clip-on heatsinks	AKK 127 AKK 191				FK 243 FK 245	
finger-shaped heatsinks	FK 201 FK 202 FK 205 FK 206 FK 223 FK 236	FK 201 FK 202 FK 205 FK 206 FK 207 FK 208 FK 217 FK 225 FK 234 FK 236	FK 201 FK 202 FK 205 FK 206 FK 207 FK 208 FK 217 FK 234 FK 236			
small heatsinks				KF KK 562 SKK		

	TO 218 	TO 220 	SOT 32 	DIL 	PLCC 	P-SIP 	PGA/BGA 
U-heatsinks		ICK 35 SK 13 SK 431 UK 14	SK 12				assignment table → B 2 - 10
extruded heatsink with solder pin	SK 145 SK 437 SK 459 SK 460	SK 75 SK 104 SK 129 SK 145 SK 185 SK 409 SK 459 SK 460	SK 104 SK 129 SK 409 SK 459 SK 469 SK 470			SK 459 SK 460	
extruded heatsinks	SK 126 SK 452	SK 95 SK 126 SK 452 SK 454 SK 517 SK 518	SK 95 SK 454	ICK...B ICK...H ICK...L	ICK PLCC ICK R		
set-up/clip-on heatsinks	FK 224 FK 241 SK 516	FK 220 FK 224 FK 237 SK 515				FK 224 FK 241	
finger-shaped heatsinks	FK 224 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 220 FK 222 FK 225 FK 227 FK 228 FK 229 FK 230 FK 231 FK 232 FK 233 FK 234 FK 235 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 219 FK 223 FK 234 FK 235 FK 236 FK 239			FK 224	
small heatsinks			KK 32 KK 92				

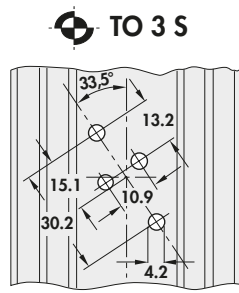
A

B

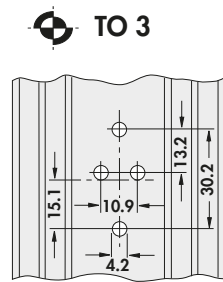
Hole pattern



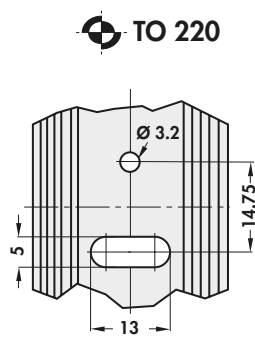
CB = TO 3 + SOT 9 + TO 66 + SOT 32
at $\longleftrightarrow$ 37.5 mm oblique drilling



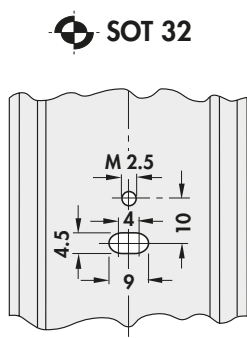
TO 3 oblique drilling for $\longleftrightarrow$ 37.5 mm



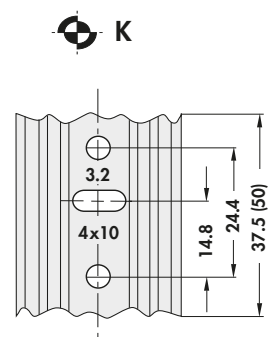
TO 3 exceeding $\longleftrightarrow$ 50 mm



TO 220



SOT 32



K

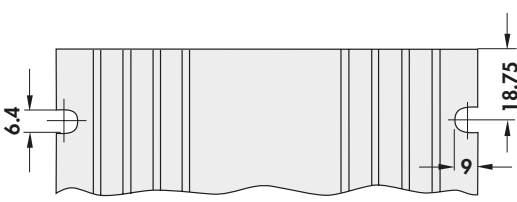
SOT 32 / TO 220 exceeding $\longleftrightarrow$ 37.5 mm

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.

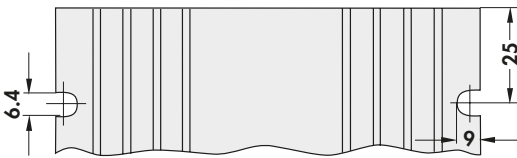
For heatsinks exceeding $\longleftrightarrow$ 75 mm standard hole pattern can be supplied in multiple design.

H

Fixing slots



$\longleftrightarrow$ [mm]	number of fixing slots
37.5	2
75	4



$\longleftrightarrow$ [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

L

Order example

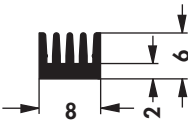
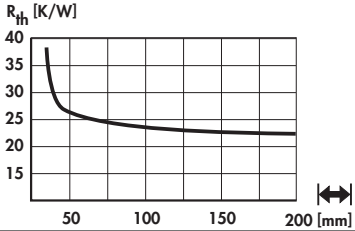
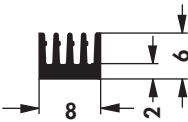
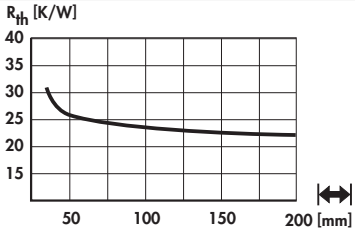
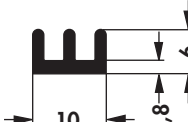
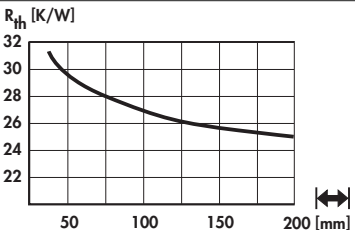
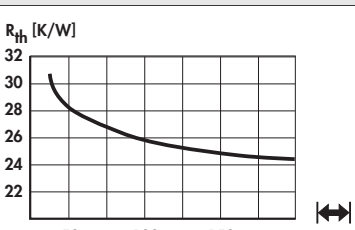
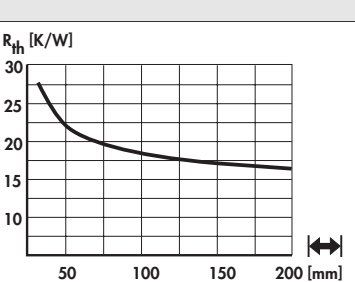
SK 01	50	SA	TO3
profile	length	surface	pin layout

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

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

N

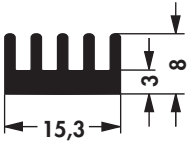
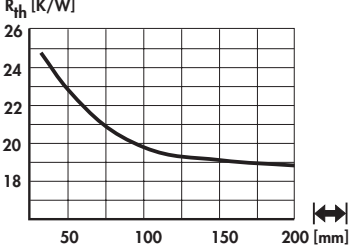
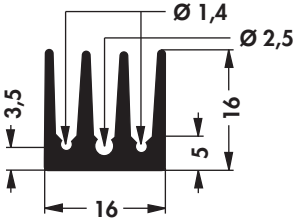
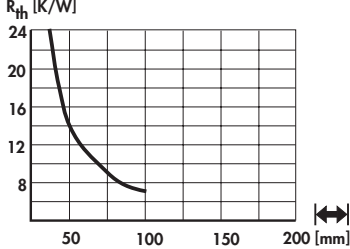
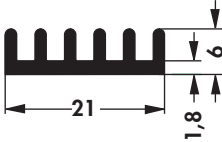
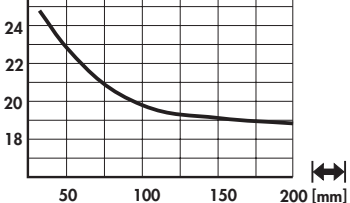
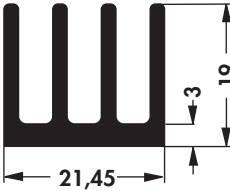
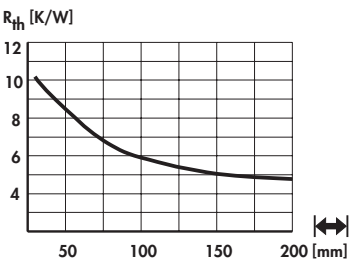
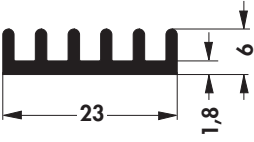
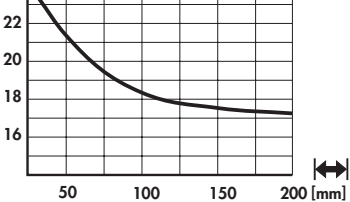
Standard extruded heatsinks

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 565 ...		
please indicate: ... 37.5 50 75 100 1000 mm		
art. no. SK 470 ...		
SK 470 ... extruded heatsinks for PCB mounting → A 110		
please indicate: ... 25 37.5 50 75 100 1000 mm		
... (optional) SOT 32; TO 220		

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 110	
please indicate: ... 25 37.5 75 100 1000 mm ... Φ (optional) SOT 32; TO 220		
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		

Standard extruded heatsinks

art. no. SK 521 ...		
please indicate: ... 25 37.5 50 75 100 1000 mm		
art. no. SK 437 ...		
extruded heatsinks for PCB mounting → A 109		
please indicate: ... 100 1000 mm		
... (optional) TO 218; TO 220; TO 247; TO 248		
art. no. SK 476 ...		
please indicate: ... 37.5 50 75 100 1000 mm		
art. no. SK 454 ...		
extruded heatsinks for PCB mounting → A 96		
please indicate: ... 37.5 50 75 100 150 1000 mm		
... (optional) SOT 32; TO 220		
art. no. SK 477 ...		
please indicate: ... 37.5 50 100 1000 mm		

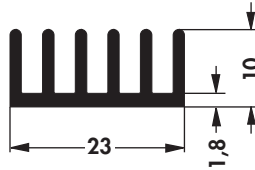
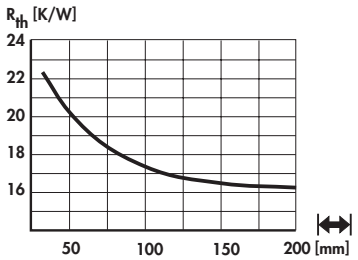
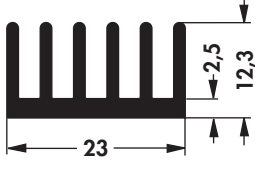
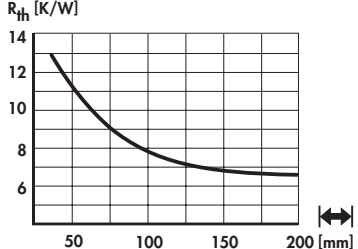
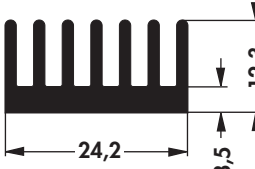
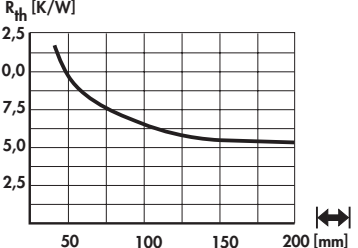
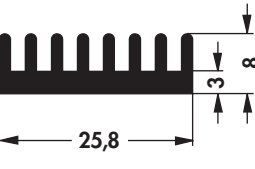
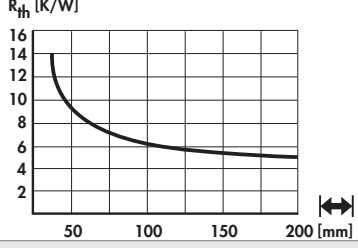
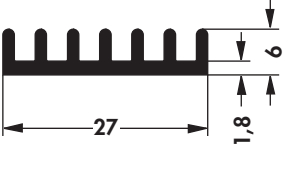
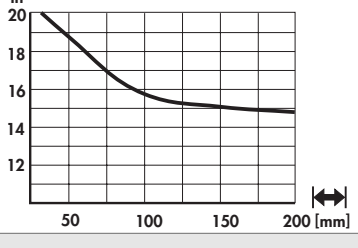
High decorative surfaces → A 9
 Order example → A 21
 Heatsink as visual & decor-parts → A 10
 Drilling pattern for Solid State Relais → A 12

Heatsinks for Solid State Relay
 Special heatsink design
 Special profiles
 Technical introduction

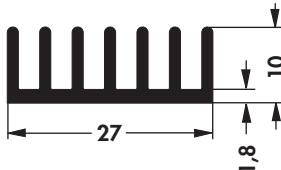
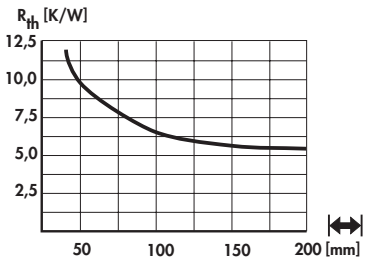
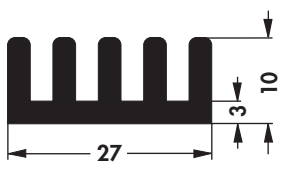
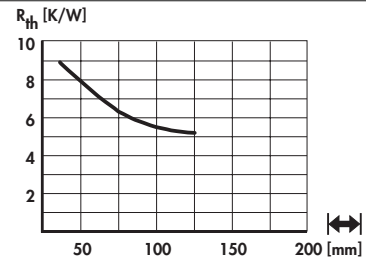
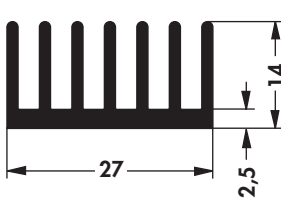
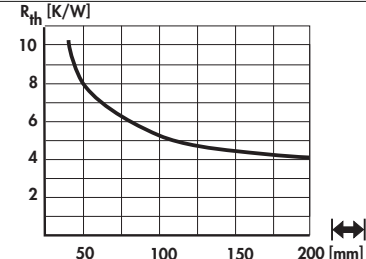
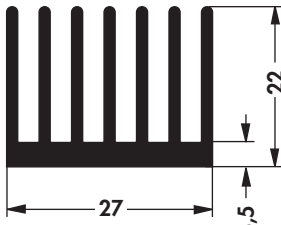
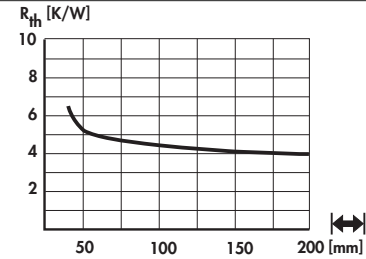
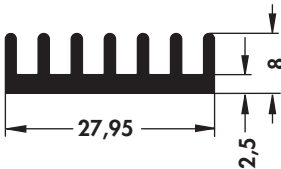
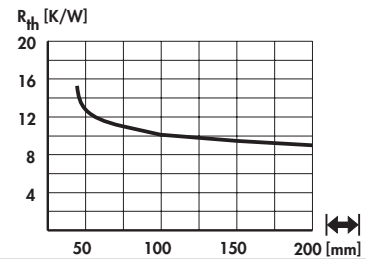
→ A 11 – 12
 → A 137 – 138
 → A 140
 → A 2 – 8

A 24

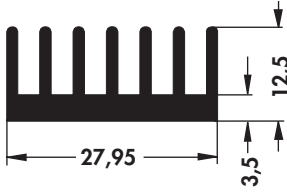
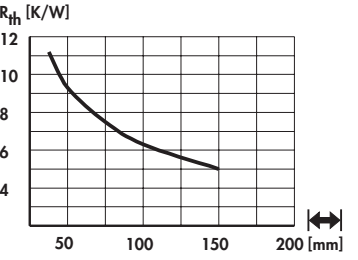
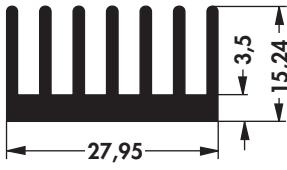
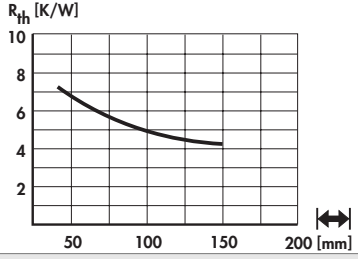
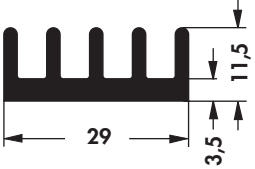
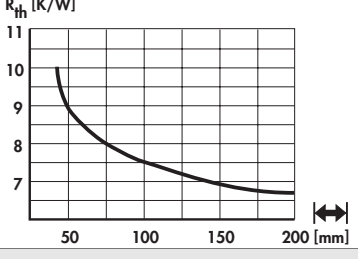
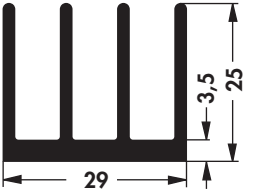
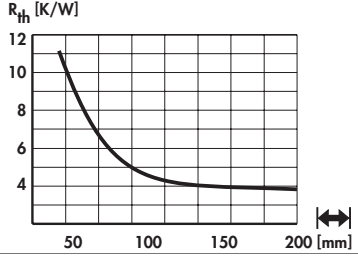
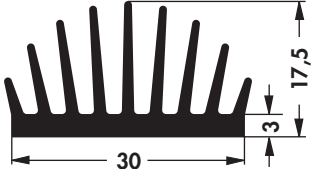
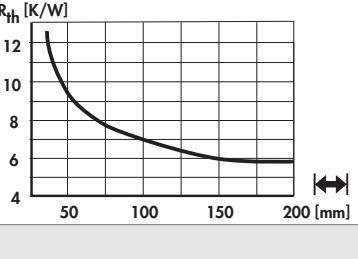
Standard extruded heatsinks

art. no. SK 582 ...		
please indicate: ... $\left[\text{mm} \right]$ 37.5 50 75 100 1000 mm		
art. no. SK 559 ...		
please indicate: ... $\left[\text{mm} \right]$ 37.5 75 100 1000 mm		
art. no. SK 551 ...		
please indicate: ... $\left[\text{mm} \right]$ 37.5 50 75 100 1000 mm		
art. no. SK 486 ...		
please indicate: ... $\left[\text{mm} \right]$ 37.5 50 75 100 1000 mm		
art. no. SK 473 ...		
please indicate: ... $\left[\text{mm} \right]$ 37.5 50 75 1000 mm		

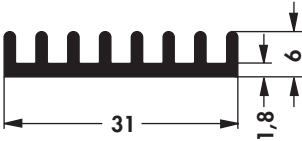
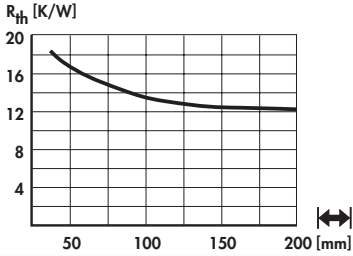
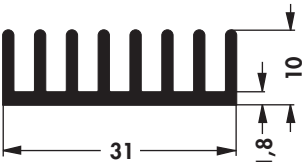
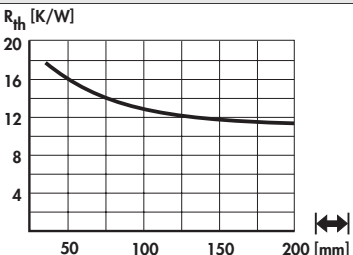
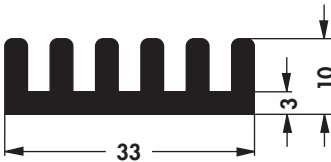
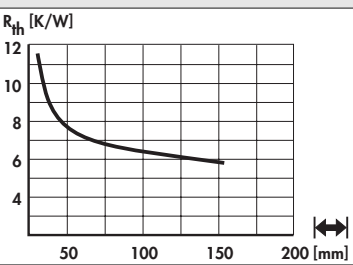
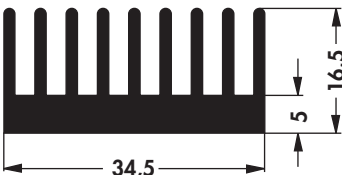
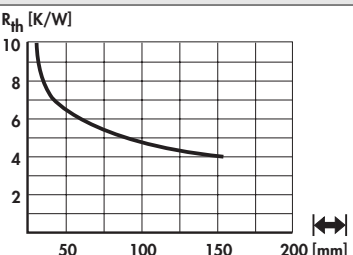
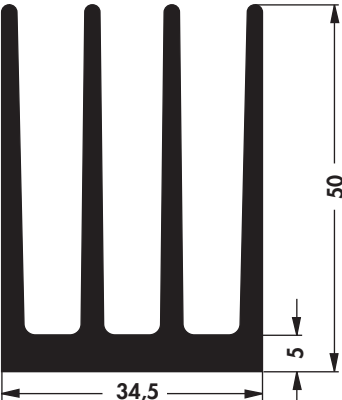
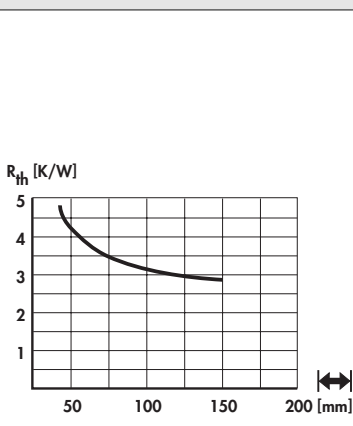
Standard extruded heatsinks

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		

Standard extruded heatsinks

art. no. SK 448 ...		
please indicate: ... 37.5 50 75 mm		
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 452 ...		
please indicate: ... 37.5 100 1000 mm		
... ❖ (optional) TO 218; TO 220; TO 247; TO 248; TO 3 P		
art. no. SK 597 ...		
please indicate: ... 37.5 50 75 100 1000 mm		

Standard extruded heatsinks

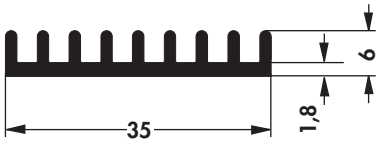
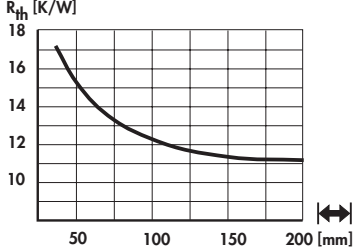
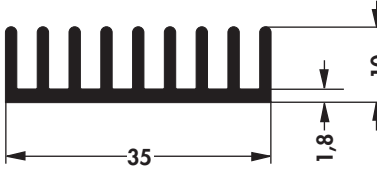
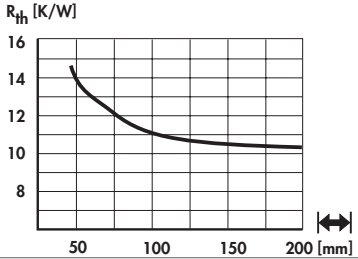
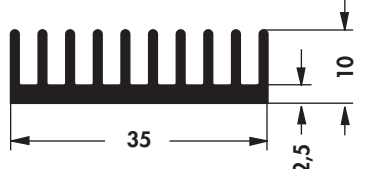
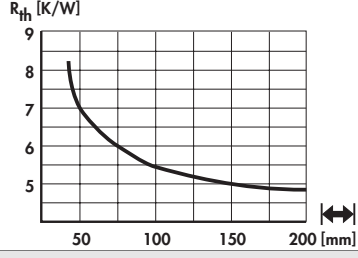
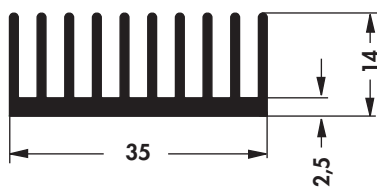
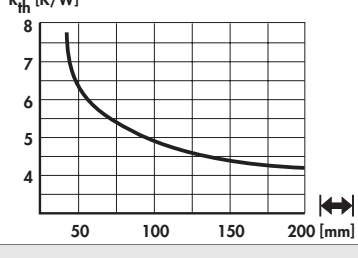
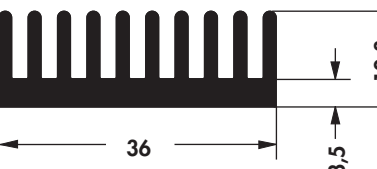
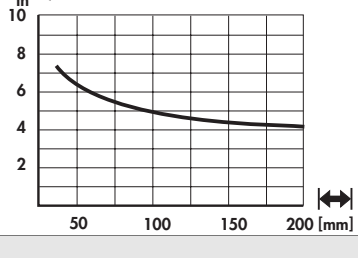
art. no. SK 493 ...		
please indicate: ... 37.5 50 75 100 1000 mm		
art. no. SK 581 ...		
please indicate: ... 37.5 50 75 100 1000 mm		
art. no. SK 400 ...		
please indicate: ... 37.5 50 75 100 1000 mm extruded heatsinks for PCB mounting → A 111		
art. no. SK 178 ...		
please indicate: ... 37.5 75 100 1000 mm		
art. no. SK 134 ...		
please indicate: ... 37.5 50 100 1000 mm		

High decorative surfaces → A 9
 Order example → A 21
 Heatsink as visual & decor-parts → A 10
 Drilling pattern for Solid State Relais → A 12

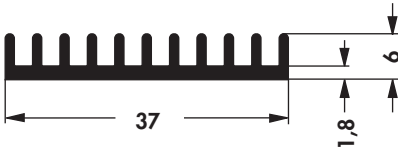
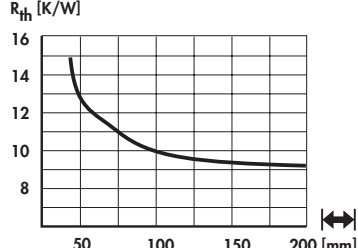
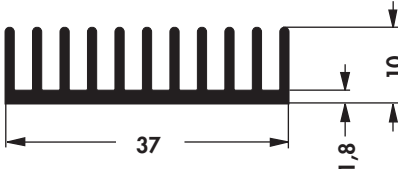
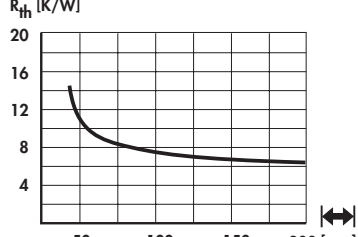
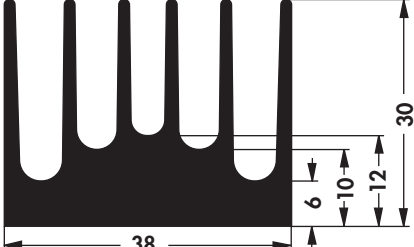
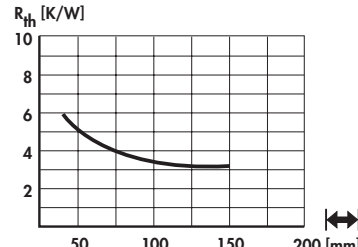
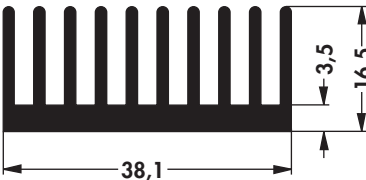
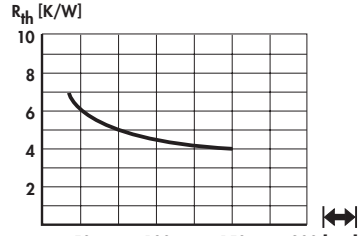
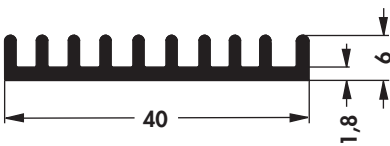
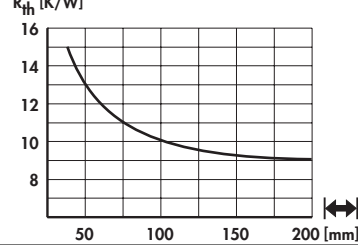
Heatsinks for Solid State Relay
 Special heatsink design
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→ A 11 – 12
 → A 137 – 138
 → A 140
 → A 2 – 8

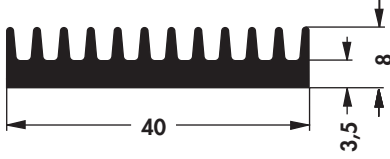
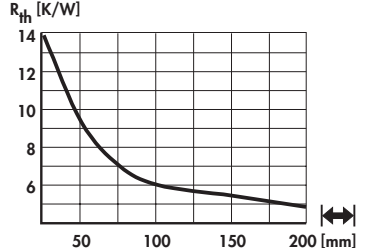
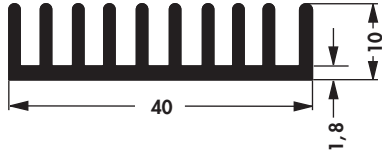
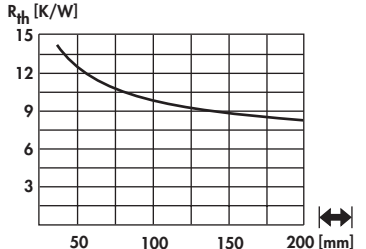
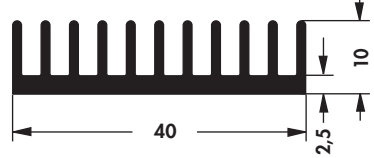
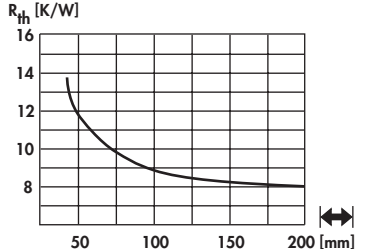
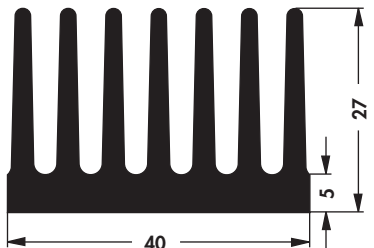
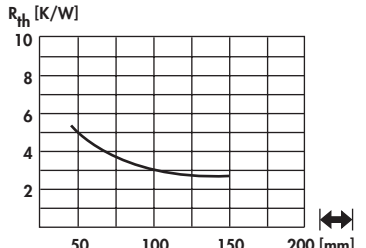
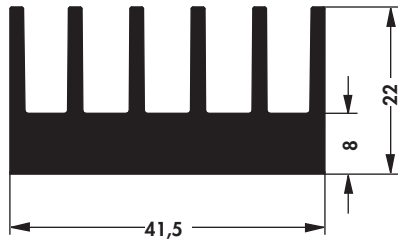
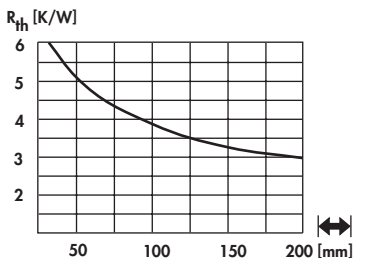
Standard extruded heatsinks

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		
art. no. SK 562 ...		
please indicate: ... 37.5 50 75 100 1000 mm		
art. no. SK 509 ...		
please indicate: ... 37.5 50 100 1000 mm		

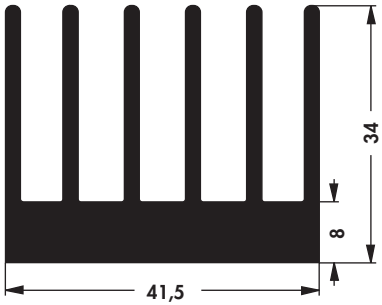
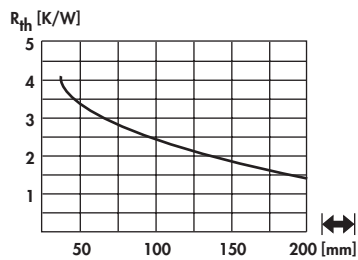
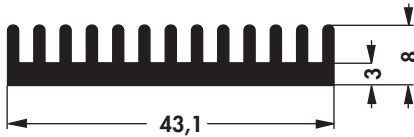
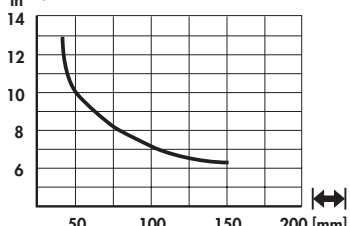
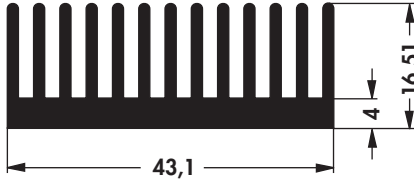
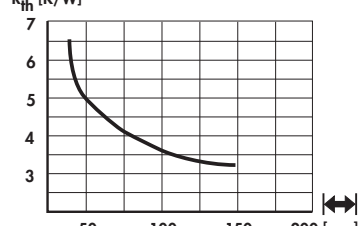
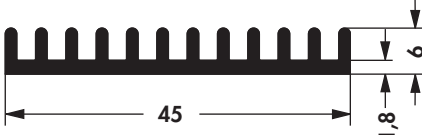
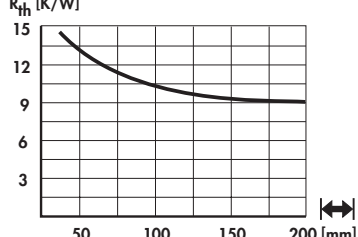
Standard extruded heatsinks

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 ...		
SK 456 ... extruded heatsinks for PCB mounting → A 111 please indicate: ... 37.5 50 75 100 1000 mm		

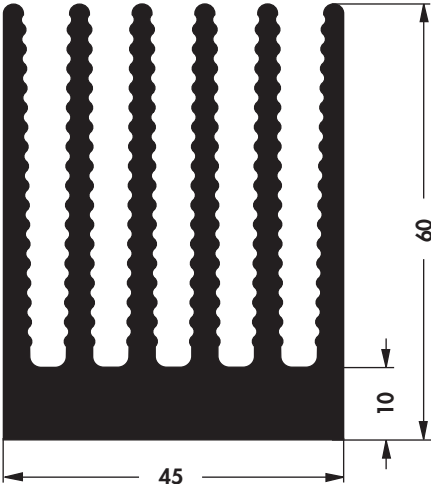
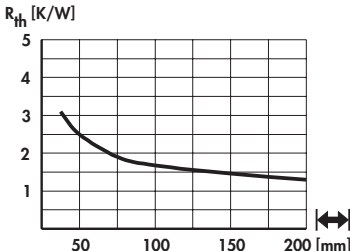
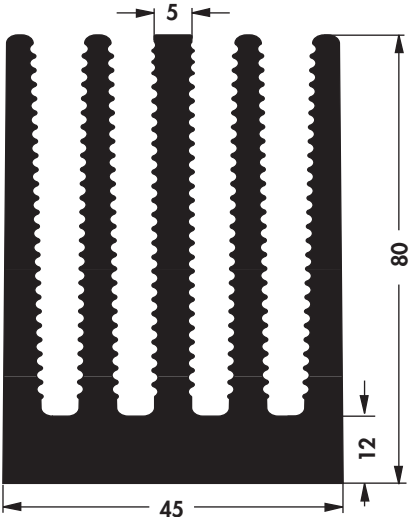
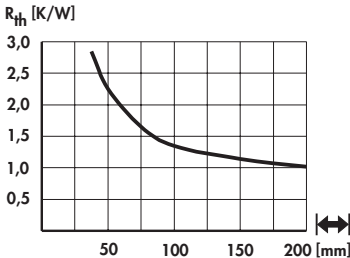
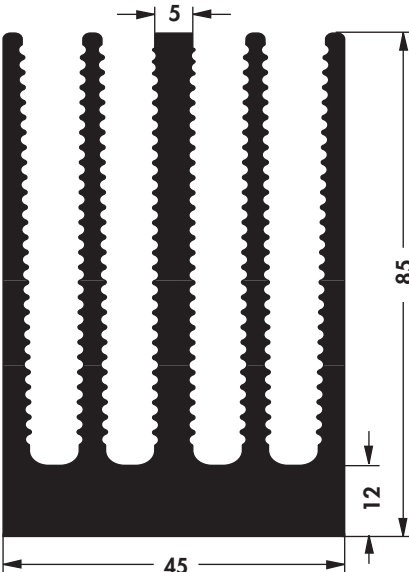
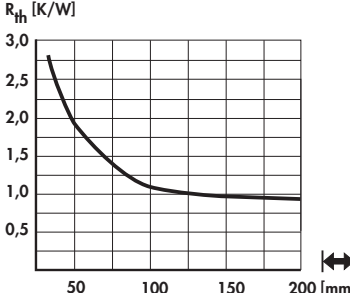
Standard extruded heatsinks

art. no. SK 420 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 37.5 75 1000 mm		
art. no. SK 513 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 37.5 50 75 100 1000 mm		
art. no. SK 547 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 37.5 50 75 100 1000 mm		
art. no. SK 106 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 50 75 1000 mm		
art. no. SK 472 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 37.5 50 75 100 1000 mm		

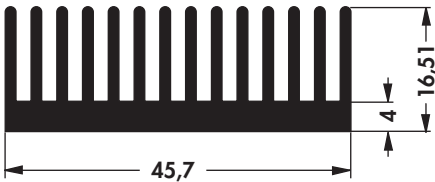
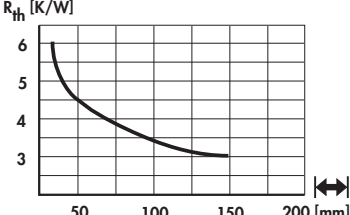
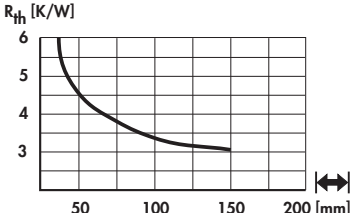
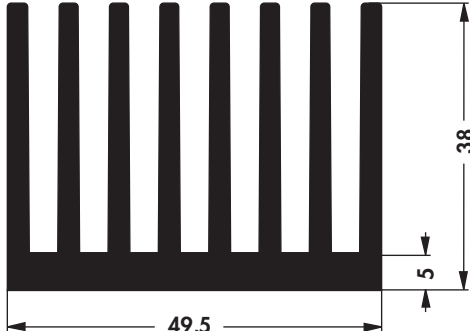
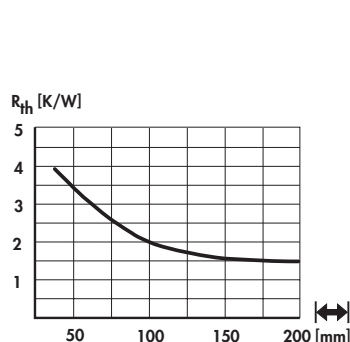
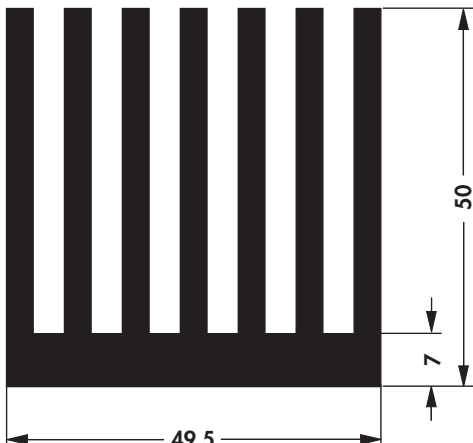
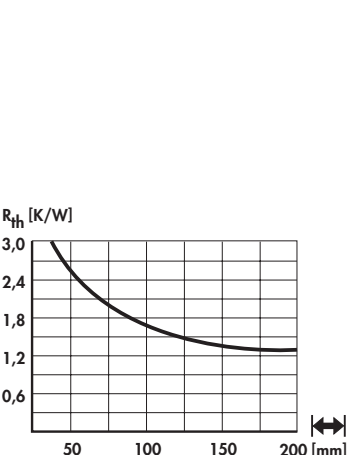
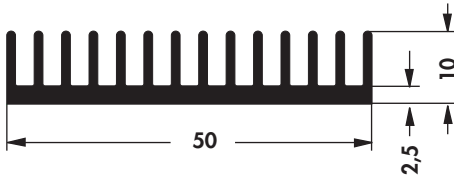
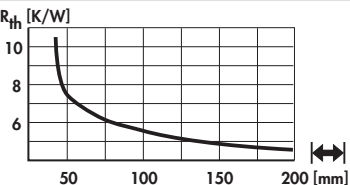
Standard extruded heatsinks

art. no. SK 189 ...		
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		

Standard extruded heatsinks

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	

Standard extruded heatsinks

art. no. SK 424 ...		
please indicate: ... 75 1000 mm		
art. no. SK 425 ...		
please indicate: ... 75 mm		
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		

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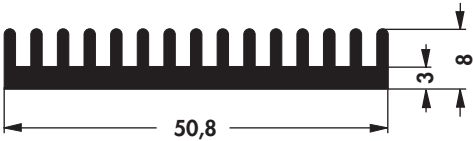
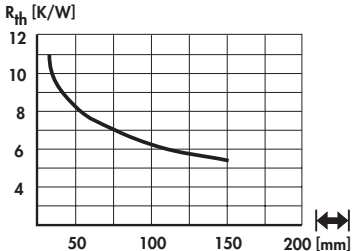
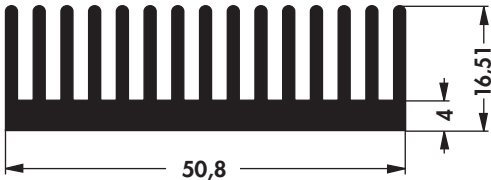
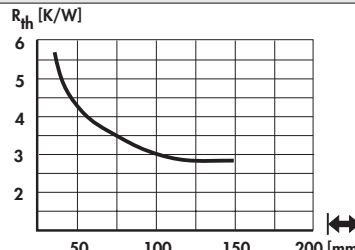
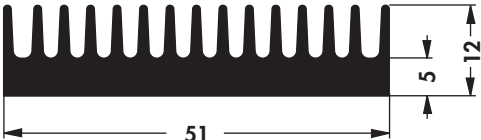
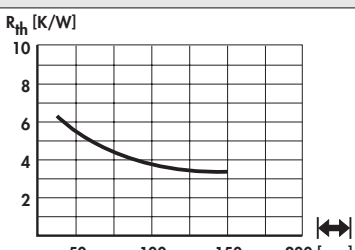
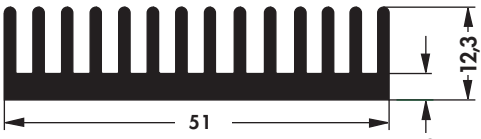
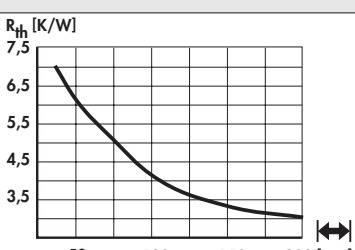
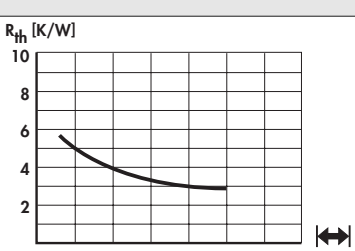
→ A 11 – 12
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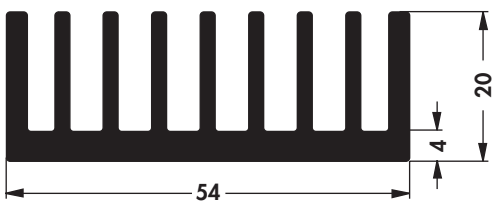
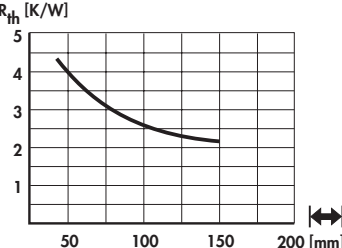
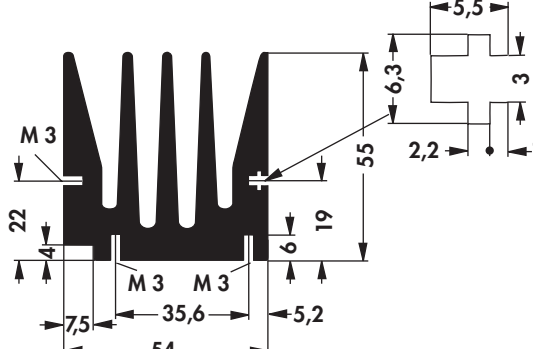
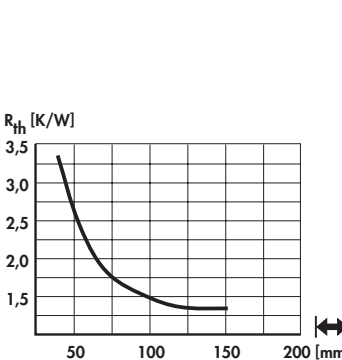
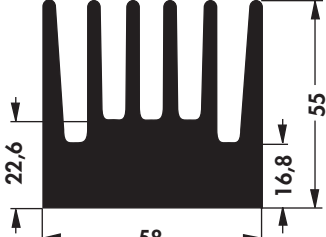
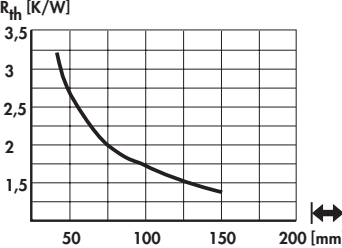
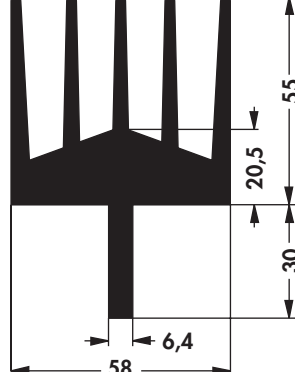
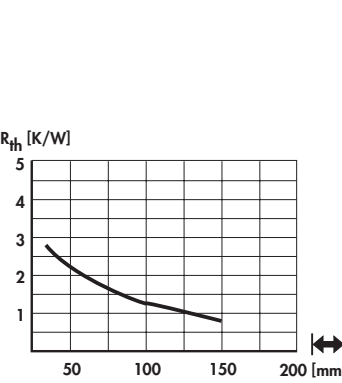
Standard extruded heatsinks

art. no. SK 567 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 37.5 50 75 100 1000 mm		
art. no. SK 434 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 50 75 100 1000 mm ... $\diamond$ (optional) SSR 1		
art. no. SK 475 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 37.5 50 100 1000 mm		
art. no. SK 527 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 50 75 100 1000 mm		

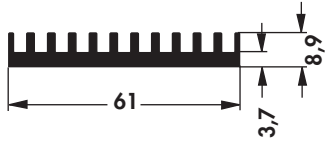
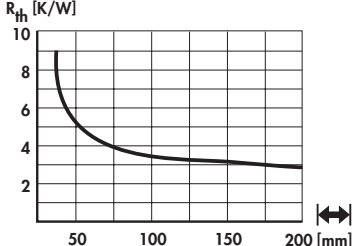
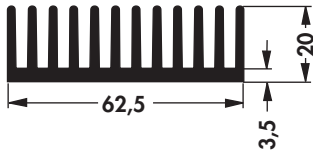
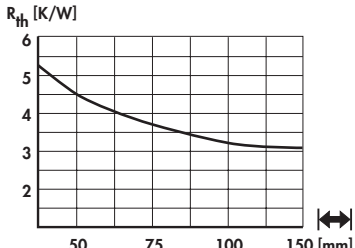
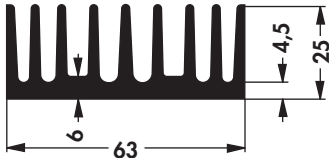
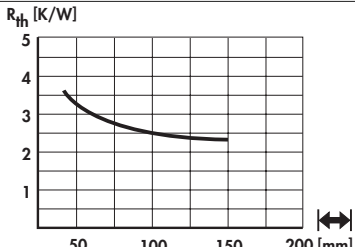
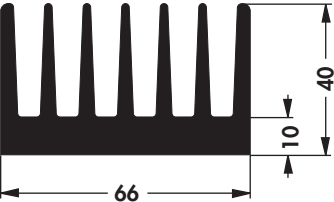
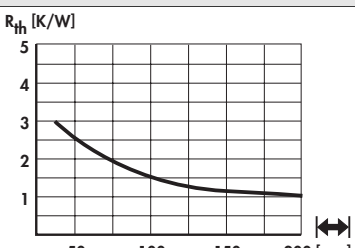
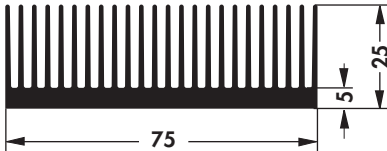
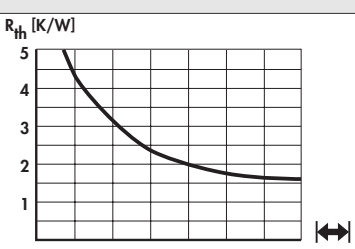
Standard extruded heatsinks

art. no. SK 427 ...		
please indicate: ... 50 75 1000 mm		
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 180 ...		
please indicate: ... 37.5 50 75 100 1000 mm		

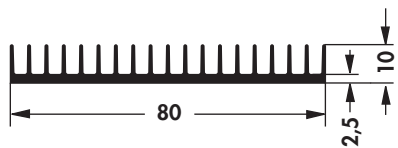
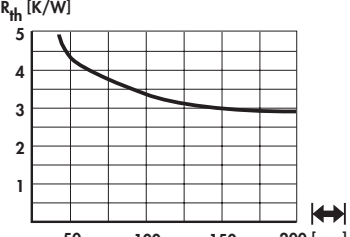
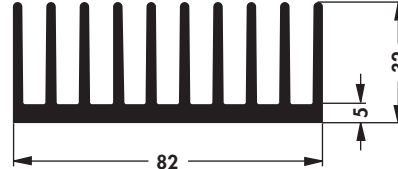
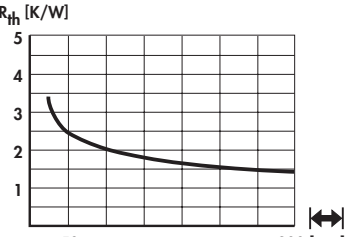
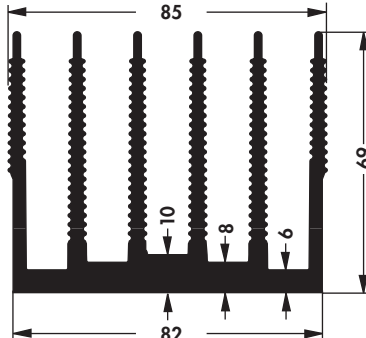
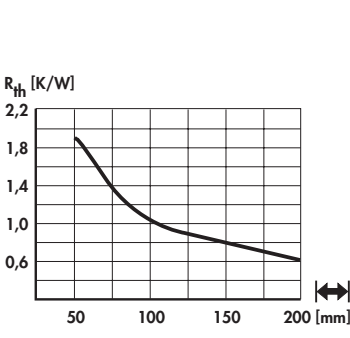
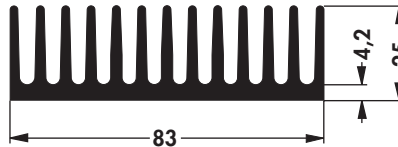
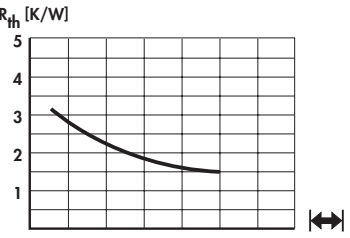
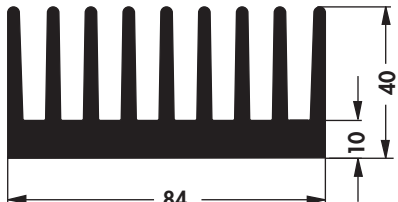
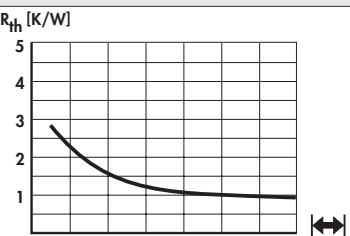
Standard extruded heatsinks

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 436 ...		
please indicate: ...	75 1000 mm	
art. no. SK 50 ...		
please indicate: ...	75 1000 mm	

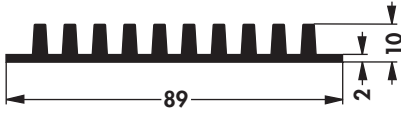
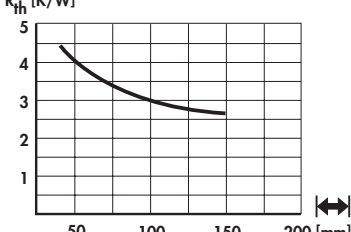
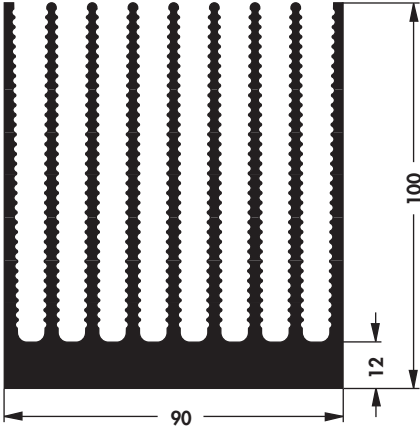
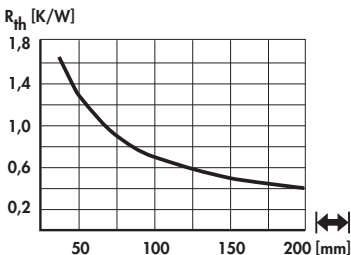
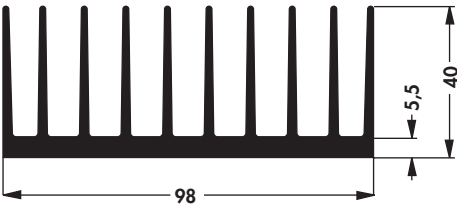
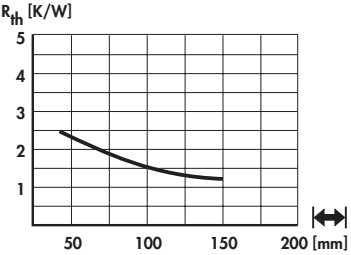
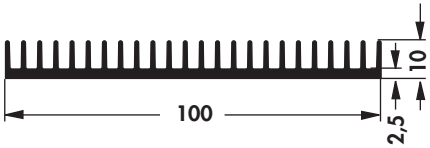
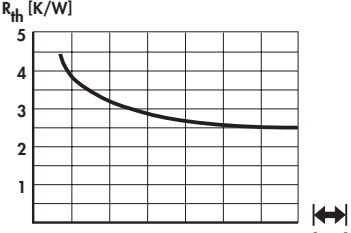
Standard extruded heatsinks

art. no. SK 485 ...		
please indicate: ... 50 75 100 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 100 ...		
please indicate: ... 37.5 50 75 100 150 1000 mm		
art. no. SK 594 ...		
please indicate: ... 37.5 50 75 100 1000 mm		

Standard extruded heatsinks

art. no. SK 545 ...		
please indicate: ... 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		
art. no. SK 464 ...		
please indicate: ... 50 75 100 150 1000 mm		

Standard extruded heatsinks

art. no. SK 182 ...		
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 408 ...		
please indicate: ... 50 75 100 150 1000 mm		
art. no. SK 546 ...		
please indicate: ... 37.5 50 75 100 150 1000 mm		

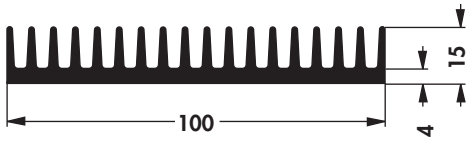
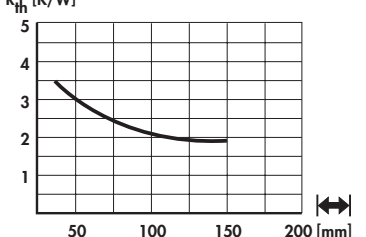
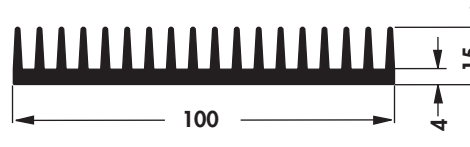
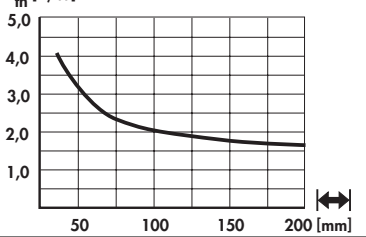
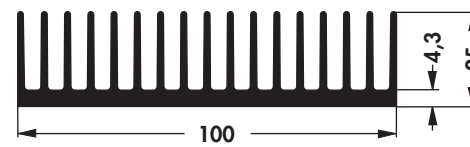
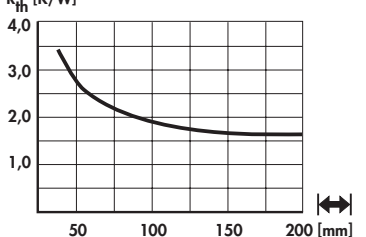
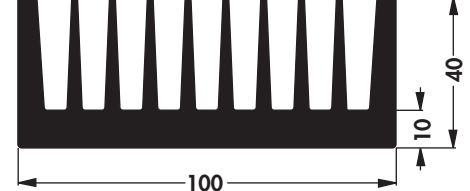
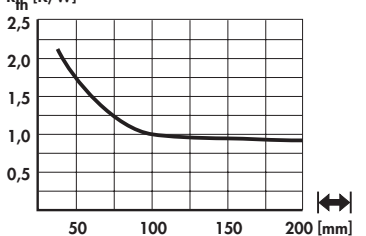
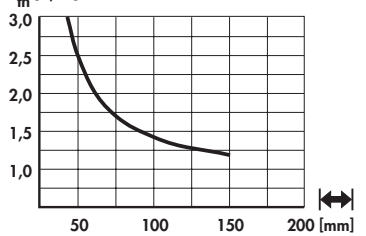
High decorative surfaces → A 9
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A 40

Standard extruded heatsinks

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

Standard extruded heatsinks

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 442 ...		
please indicate: ... 50 75 100 150 1000 mm		

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A 42

Standard extruded heatsinks

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		

Standard extruded heatsinks

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

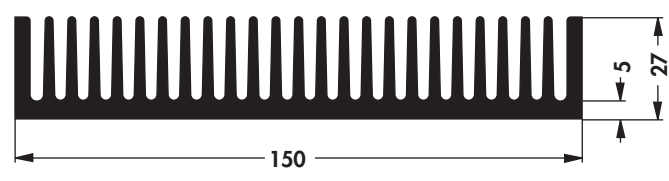
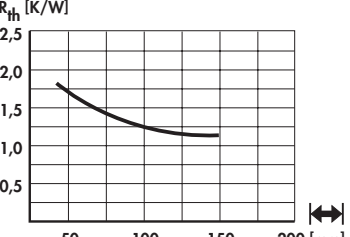
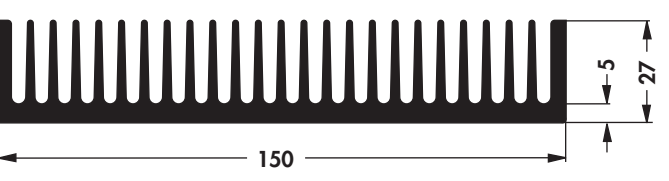
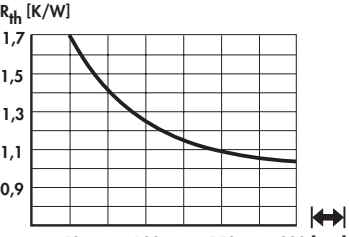
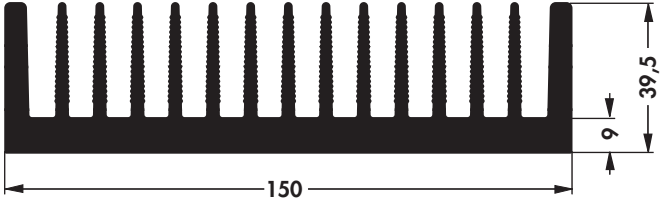
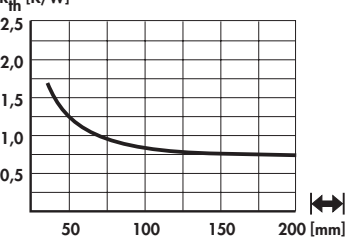
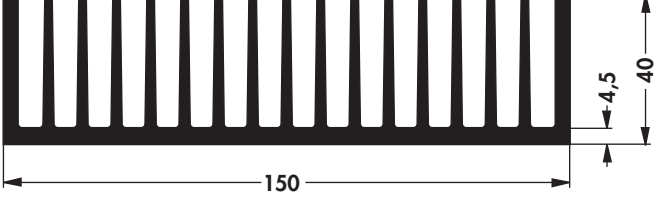
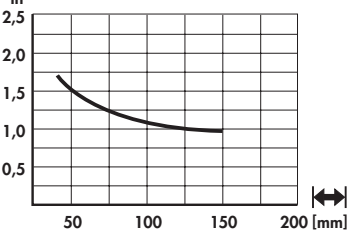
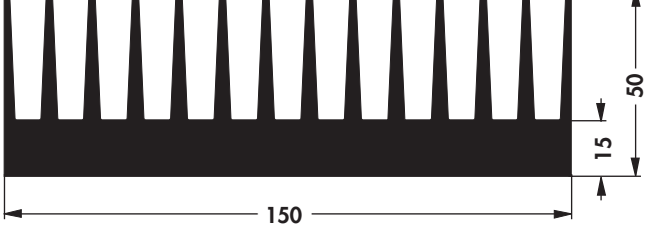
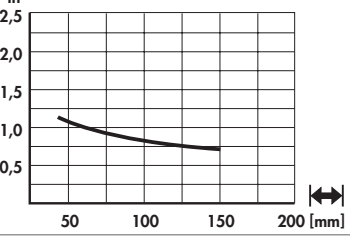
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A 44
A
B
C
D
E
F
G
H
I
K
L
M
N

Standard extruded heatsinks

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: ... 75 100 150 1000 mm		

Standard extruded heatsinks

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 ...		
please indicate: ... 75 100 1000 mm weight reduced like SK 85		
art. no. SK 510 ...		
please indicate: ... 50 75 100 150 1000 mm		

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 → A 137 – 138
 → A 140
 → A 2 – 8

A 46

Standard extruded heatsinks

art. no. SK 416 ...		
please indicate: ... 50 75 100 150 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		

Standard extruded heatsinks

art. no. SK 519 ...		
please indicate: ... 50 100 1000 mm		
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		

High decorative surfaces → A 9
 Order example → A 21
 Heatsink as visual & decor-parts → A 10
 Drilling pattern for Solid State Relais → A 12

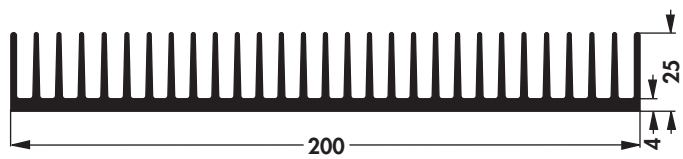
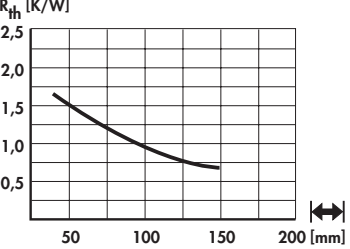
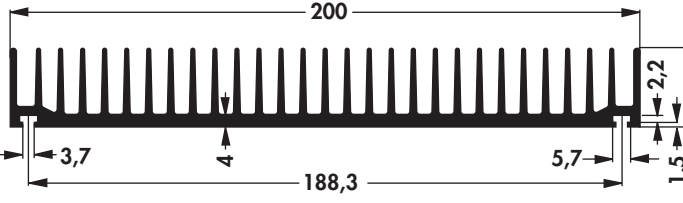
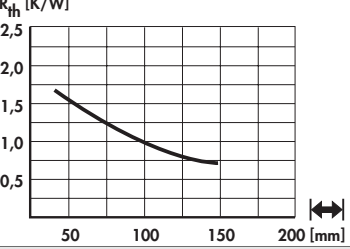
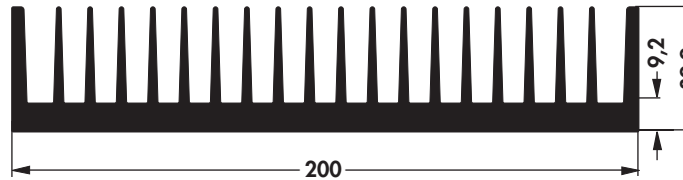
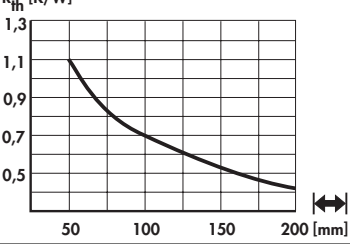
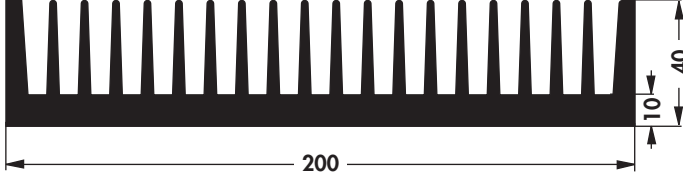
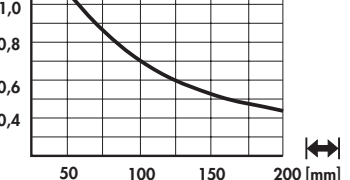
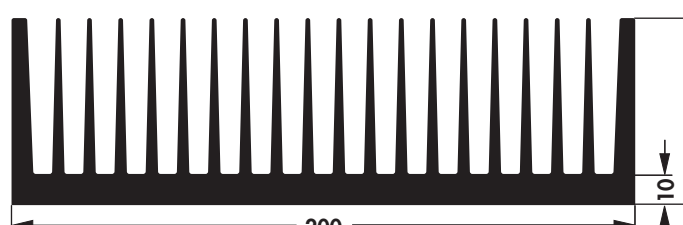
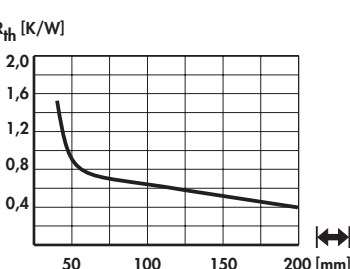
Heatsinks for Solid State Relay
 Special heatsink design
 Special profiles
 Technical introduction

→ A 11 – 12
 → A 137 – 138
 → A 140
 → A 2 – 8

A 48



Standard extruded heatsinks

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		

Standard extruded heatsinks

art. no. SK 520 ...		
please indicate: ... 75 100 150 1000 mm		
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		

High decorative surfaces → A 9
 Order example → A 21
 Heatsink as visual & decor-parts → A 10
 Drilling pattern for Solid State Relais → A 12

Heatsinks for Solid State Relay
 Special heatsink design
 Special profiles
 Technical introduction

→ A 11 – 12
 → A 137 – 138
 → A 140
 → A 2 – 8

A 50

Standard extruded heatsinks

art. no. SK 580 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 75 100 150 200 1000 mm		
art. no. SK 118 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 75 100 150 1000 mm		
art. no. SK 49 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 50 75 150 200 1000 mm		
art. no. SK 555 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 75 100 150 1000 mm		
art. no. SK 199 ...		
please indicate: ... $\left[\begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ 75 100 1000 mm		

Standard extruded heatsinks

art. no. SK 524 ...		
please indicate: ... 75 100 150 1000 mm		
art. no. SK 91 ...		
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		

High decorative surfaces → A 9
 Order example → A 21
 Heatsink as visual & decor-parts → A 10
 Drilling pattern for Solid State Relais → A 12

Heatsinks for Solid State Relay
 Special heatsink design
 Special profiles
 Technical introduction

→ A 11 – 12
 → A 137 – 138
 → A 140
 → A 2 – 8

A 52
A
B
C
D
E
F
G
H
I
K
L
M
N

Standard extruded heatsinks

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 198 ... please indicate: ... 100 150 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 101 ...		
please indicate: ... 75 100 1000 mm		

Standard extruded heatsinks

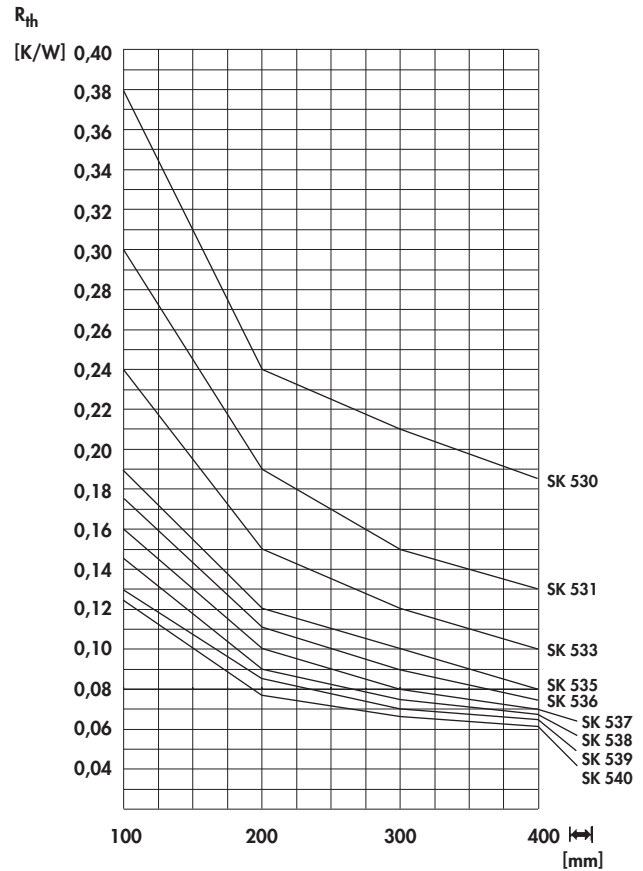
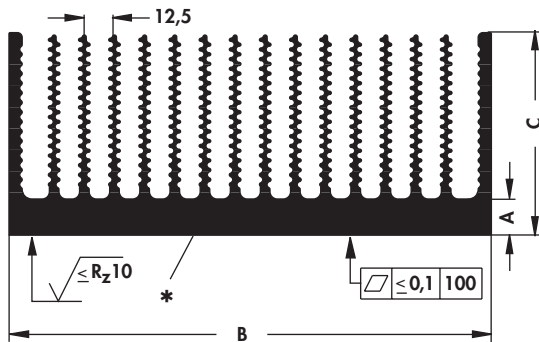
art. no. SK 579 ...		
please indicate: ... 75 100 150 200 1000 mm		
art. no. SK 66 ...		
please indicate: ... 75 100 1000 mm		
art. no. SK 523 ...		
please indicate: ... 100 150 200 1000 mm		
art. no. SK 439 ...		
please indicate: ... 100 150 1000 mm		
art. no. SK 479 ...		
please indicate: ... 75 100 150 1000 mm		

Standard extruded heatsinks

art. no. SK 93 ...		
please indicate:	... 75 100 150 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 panel in 19" cases		
please indicate:	... 75 100 150 200 1000 mm	

Welded high performance heatsinks

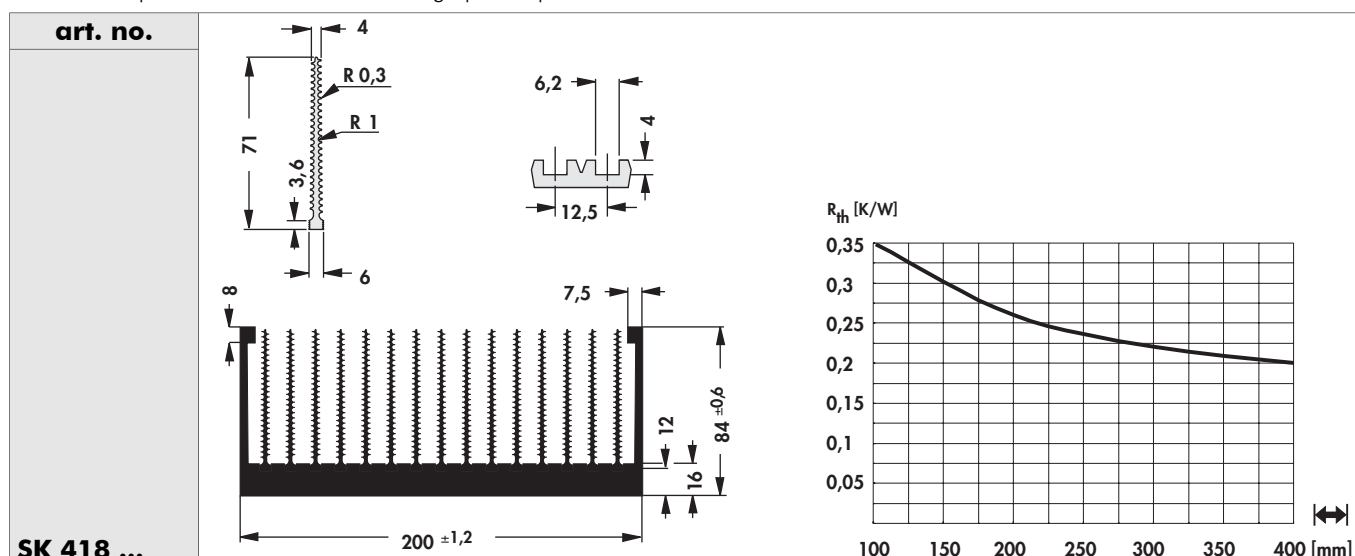
- optimum fin geometry and fin quantity for free convection
- well suited for forced convection
- flat milled base (not SK 530, SK 531)
- * = welded joint (not SK 530, SK 531)
- length according customer's details
- customer specific versions and machining on request



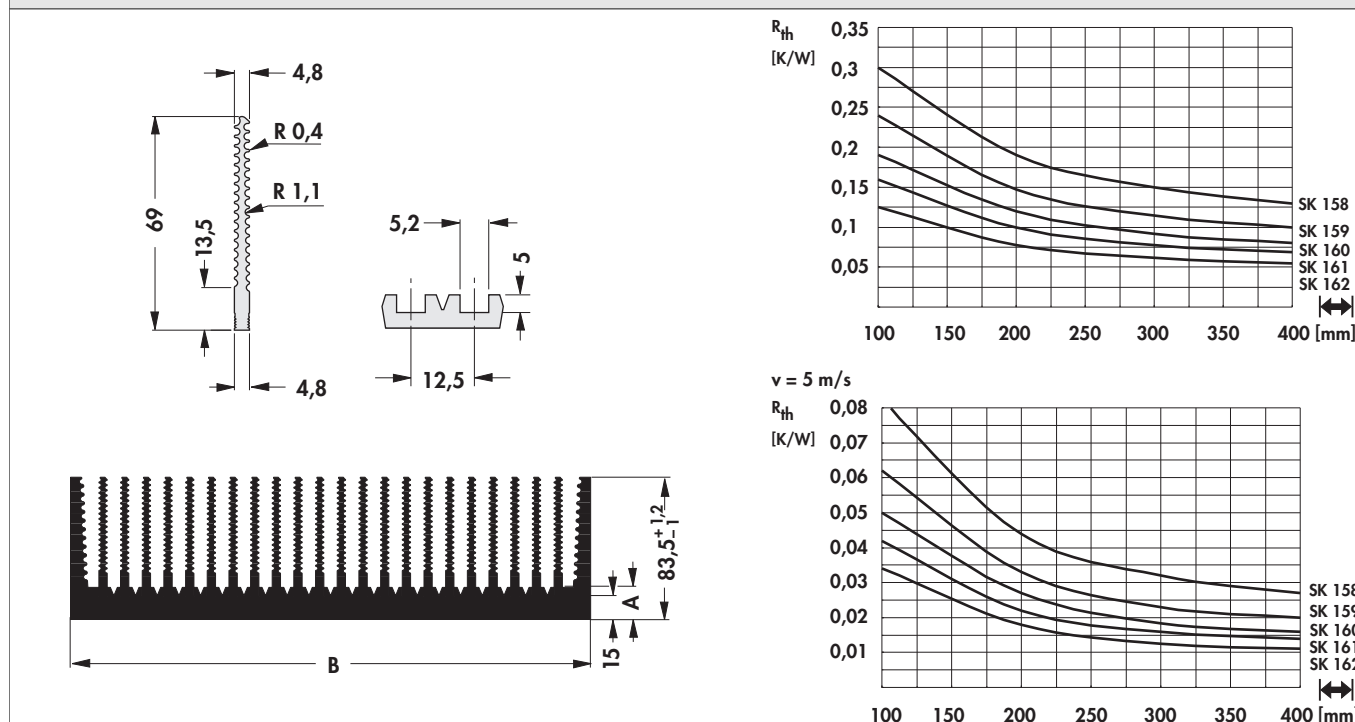
art. no.	number of fins	dim. [mm]		
		A	B	C
SK 530 ...	14	15 ±0.7	200 ±0.7	84 ±0.7
SK 531 ...	22	15 ±0.7	300 ±1	84 ±0.7
SK 533 ...	30	16 +0/-1.5	400 +0.6/-1.6	84 +0/-1.5
SK 535 ...	38	16 +0/-1.5	500 +0.6/-1.6	84 +0/-1.5
SK 536 ...	42	16 +0/-1.5	550 +0.6/-1.6	84 +0/-1.5
SK 537 ...	46	16 +0/-1.5	600 +0.6/-1.6	84 +0/-1.5
SK 538 ...	50	16 +0/-1.5	650 +0.6/-1.6	84 +0/-1.5
SK 539 ...	54	16 +0/-1.5	700 +0.6/-1.6	84 +0/-1.5
SK 540 ...	58	16 +0/-1.5	750 +0.6/-1.6	84 +0/-1.5
please indicate: ... $\longleftrightarrow$ 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



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



art. no.	number of fins	dim. [mm]	
		A	B
SK 158 ...	22	20	300 ±2
SK 159 ...	30	20	400 ±2
SK 160 ...	38	20	500 ±2.5
SK 161 ...	46	20	600 ±3
SK 162 ...	58	20	750 ±4

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

High decorative surfaces → **A 9**
 Heatsink profile-overview → **A 21**
 Heatsink as visual & decor-parts → **A 10**
 Drilling pattern for Solid State Relais → **A 12**

heatsinks for Solid State Relais
 Special heatsink design
 Special profiles
 Technical introduction

→ **A 11 – 12**
 → **A 137 – 138**
 → **A 140**
 → **A 2 – 8**

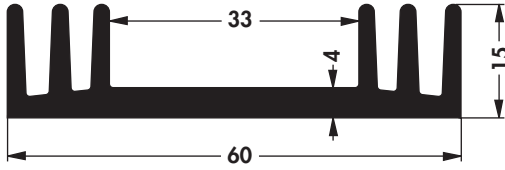
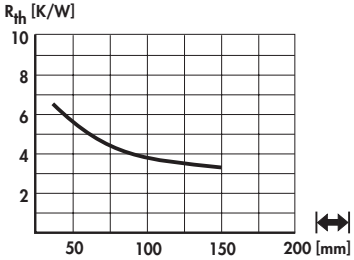
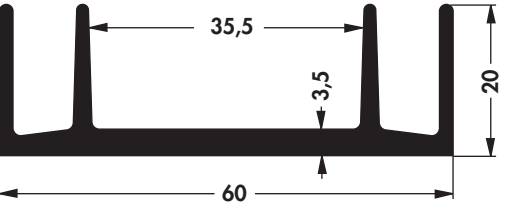
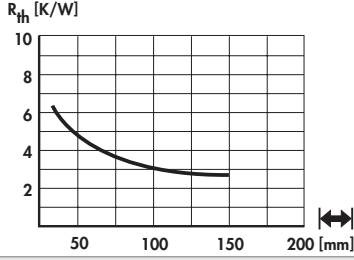
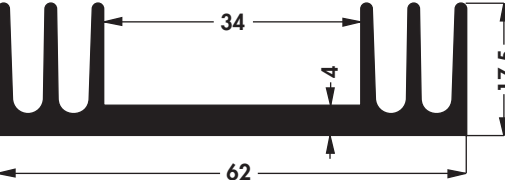
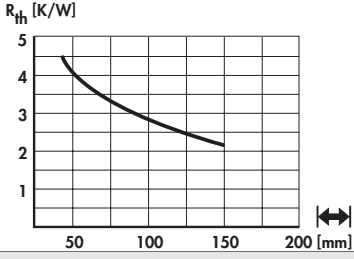
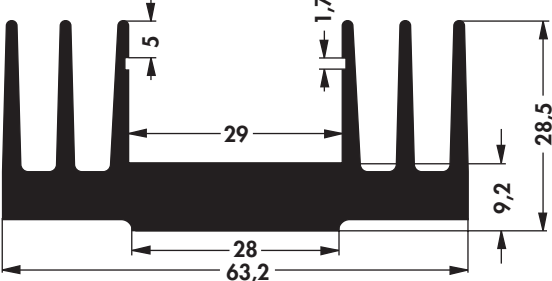
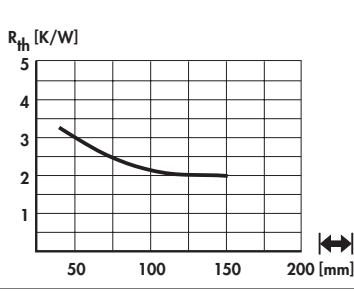
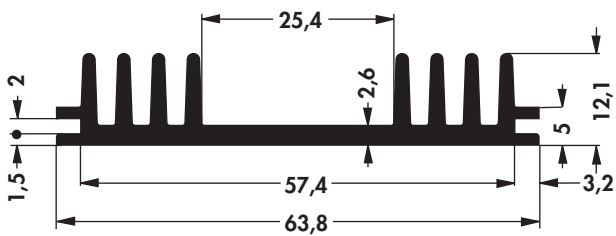
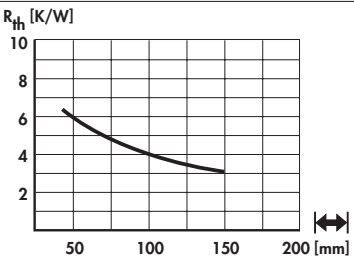
Standard extruded heatsinks

art. no.	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	
SK 09 ...										
please indicate: ... 20 37.5 50 1000 mm										
... (optional) K; TO 220										
art. no.	SK 145 20 TO 220		SK 145 37,5 TO 220		SK 145 50 TO 220		SK 145 25 TO 220			
SK 145 ...										
please indicate: ... 20 25 37.5 50 1000 mm										
... (optional) TO 220										
art. no.	SK 443 ...									
SK 443 ...										
please indicate: ... 37.5 75 100 1000 mm										
art. no.	SK 173 ...									
SK 173 ...										
please indicate: ... 1000 mm										

Standard extruded heatsinks

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 115	

Standard extruded heatsinks

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 165 ...		
please indicate:	... 37.5 50 75 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 150 ...		
please indicate:	... 1000 mm	

Standard extruded heatsinks

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

Standard extruded heatsinks

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 28 ...		
please indicate:	... 37.5 50 75 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

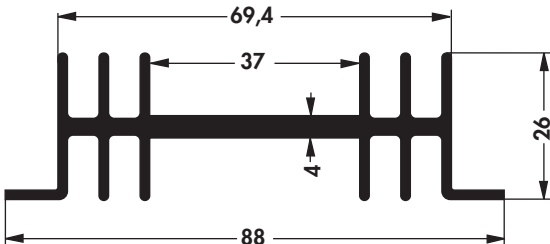
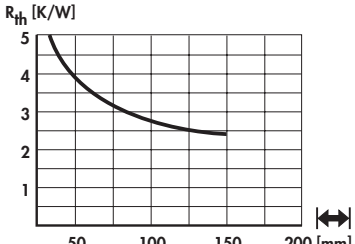
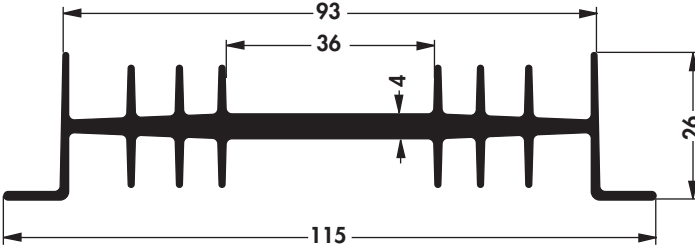
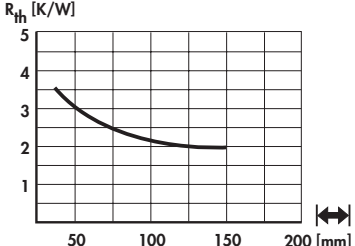
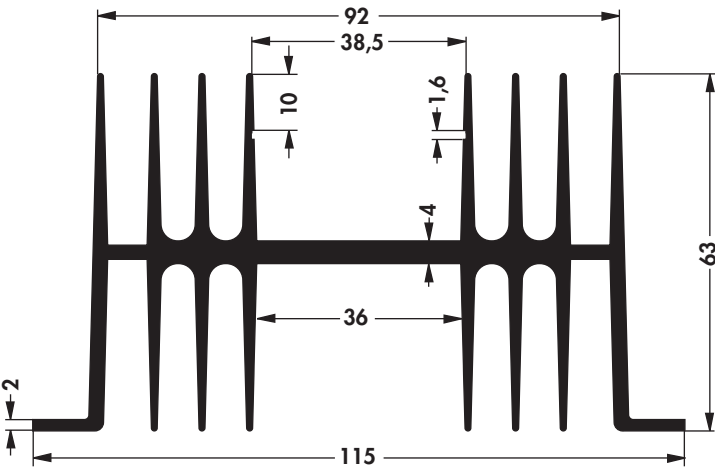
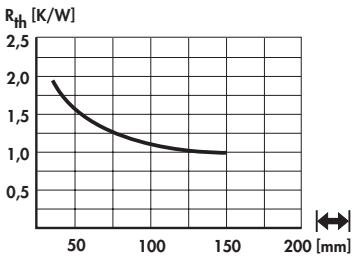
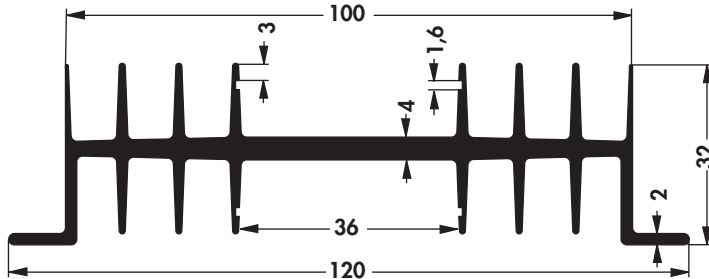
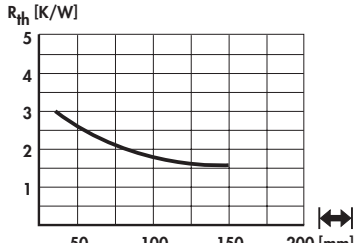
Standard extruded heatsinks

art. no. SK 04 ...		
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 ...		
please indicate:	... 37.5 75 100 1000 mm	

Standard extruded heatsinks

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

Standard extruded heatsinks

art. no.			
SK 36 ...			mounting parts IS 1, IS 2, IS 3 → E 49
please indicate:	...  50 75 1000 mm	...  (optional) TO 3; CB	
art. no.			
SK 01 ...			mounting parts IS 1, IS 2, IS 3 → E 49
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 49
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 49
please indicate:	...  50 75 100 1000 mm	...  (optional) TO 3; CB	

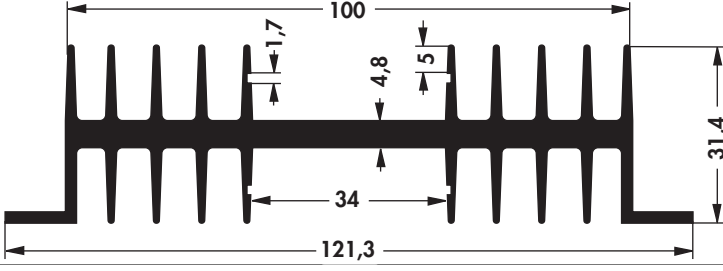
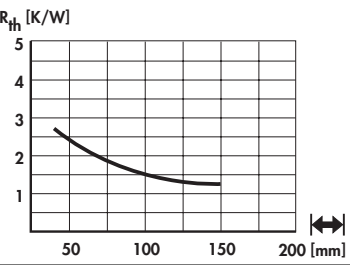
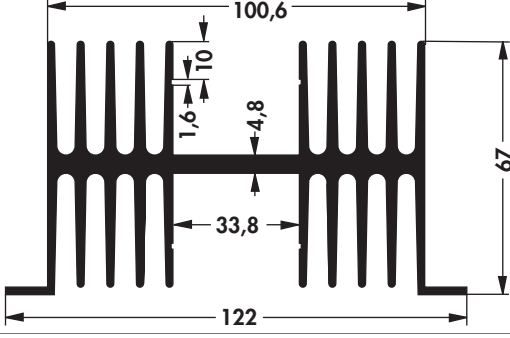
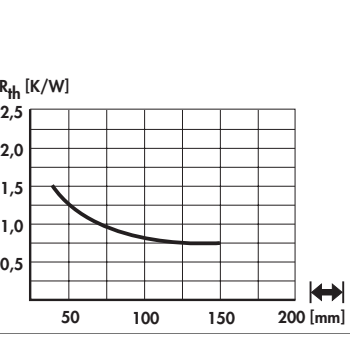
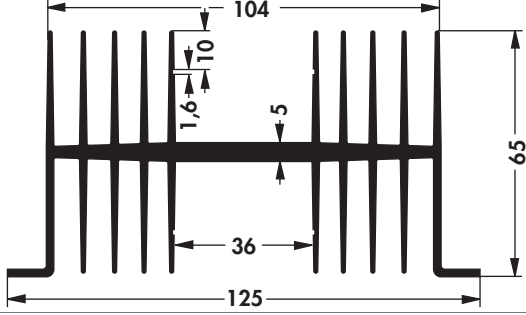
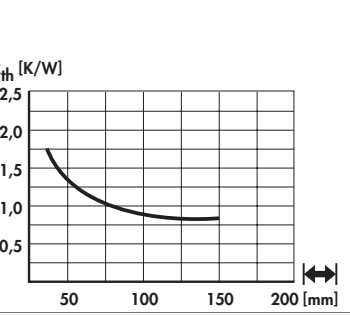
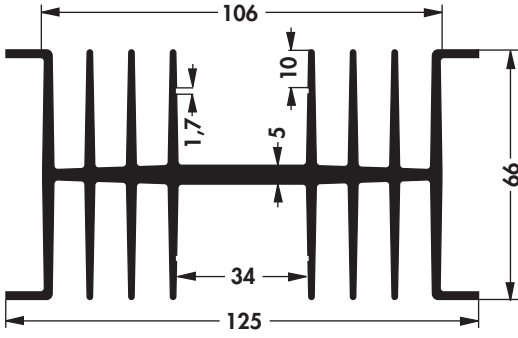
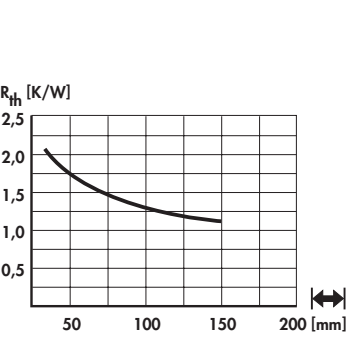
Thermal conductive material → E 2 – 5
Mounting material for semiconduct. → E 44 – 48
Mounting parts for heatsinks → E 49 – 50
Distance sleeves for PCB's in HP grid → E 39

Order example
Guide rails for PCBs
Heatsink-cooling aggregates
Technical introduction

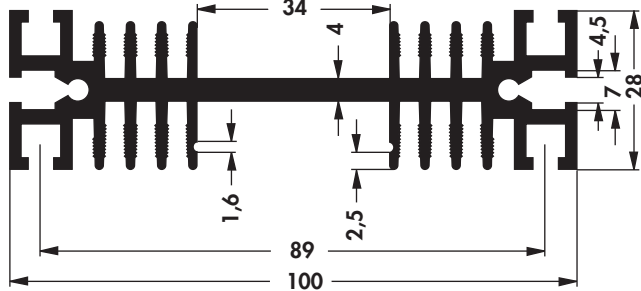
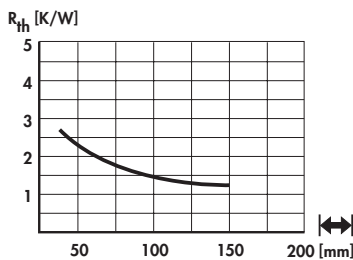
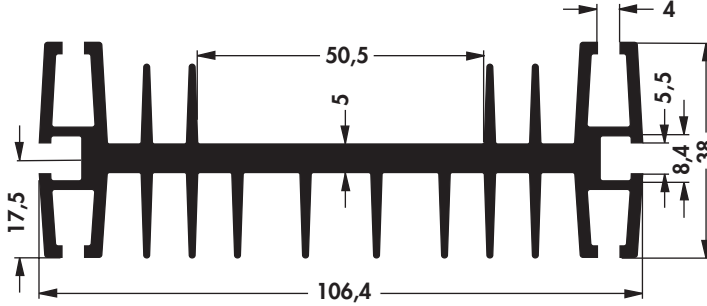
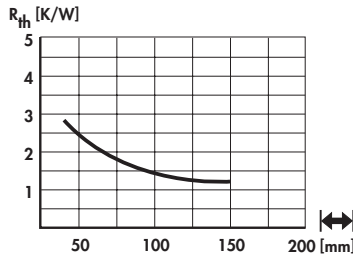
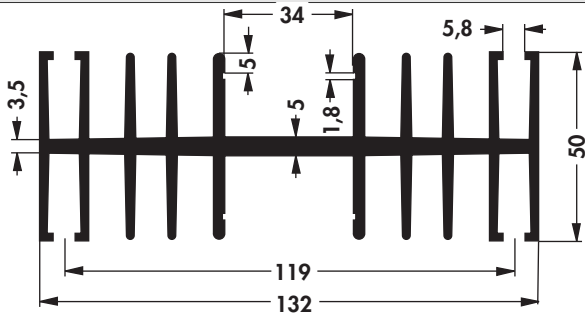
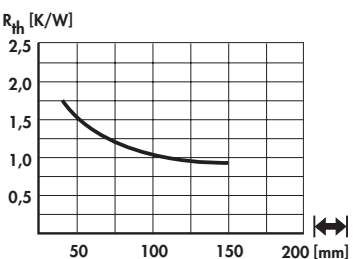
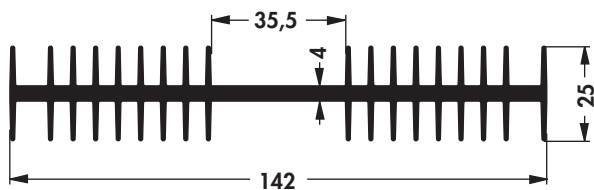
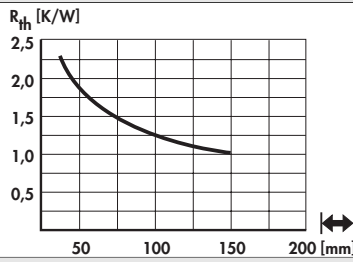
- A 21
- E 26 – 27
- D 14
- A 2 – 8

A 66

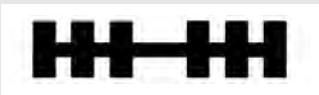
Standard extruded heatsinks

art. no. SK 39 ...	 with slots for cover plates or PCBs; mounting parts IS 1, IS 2, IS 3 → E 49	
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 49	
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 49	
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 49	
please indicate:	...  50 75 100 mm	...  (optional) TO 3; CB

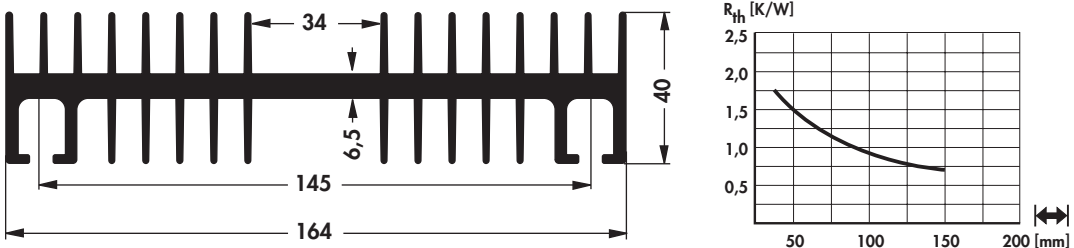
Standard extruded heatsinks

art. no.		
SK 20 ...	 	with slots for cover plates or PCBs; mounting parts IS 5, IS 8 → E 49
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 84 ...	 	
please indicate:	...  50 150 1000 mm	...  (optional) TO 3

A
B
C
D
E
F
G
H
I
K
L
M
N



Standard extruded heatsinks

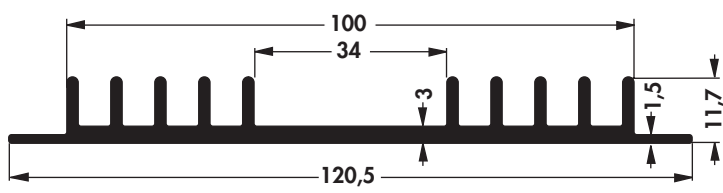
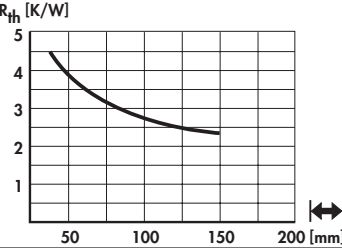
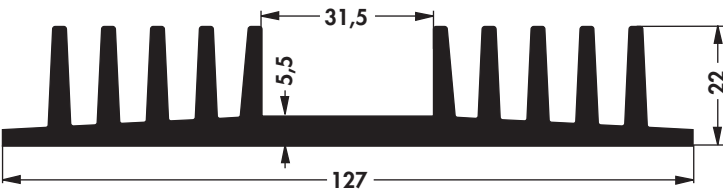
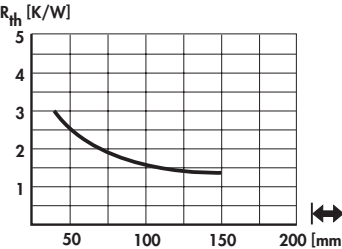
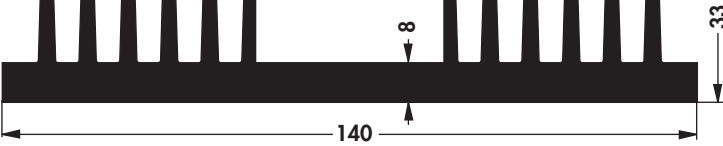
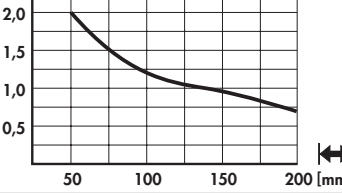
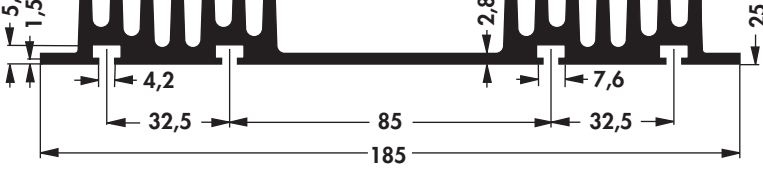
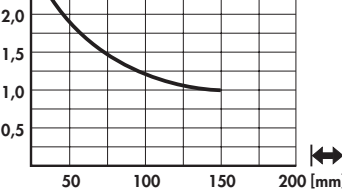
art. no.	
mounting part IS 6 → E 49	
please indicate:	...  37.5 50 100 1000 mm
	... Φ (optional) TO 3

Standard extruded heatsinks

art. no.		
SK 65 ...	for cases SOT 32	
please indicate:	... 37.5 75 mm	... $\diamond$ (optional) 1xM3; 2xM3
art. no.		
SK 64 ...	for cases TO 220, TOP 3	
please indicate:	... 37.5 75 mm	... $\diamond$ (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 49	
please indicate:	... 37.5 1000 mm	... $\diamond$ (optional) TO 3; CB



Standard extruded heatsinks

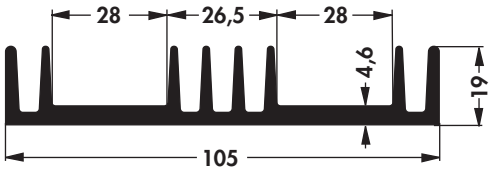
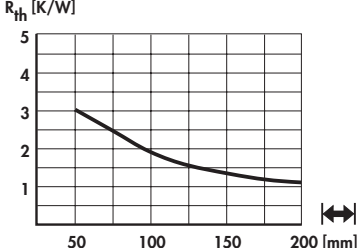
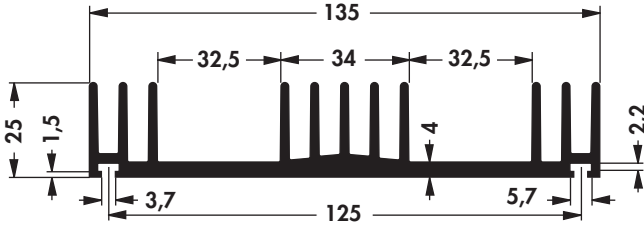
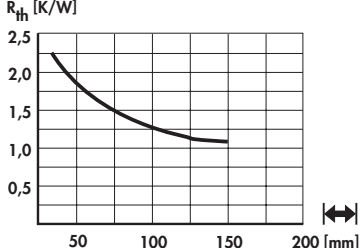
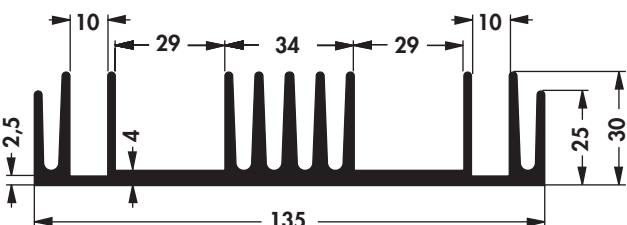
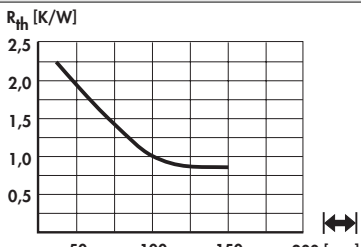
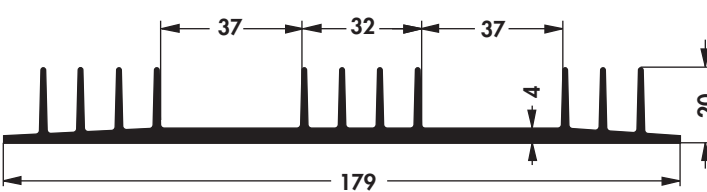
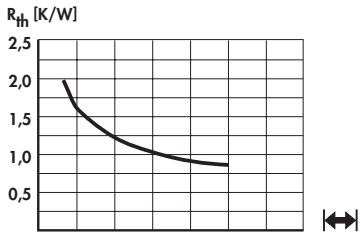
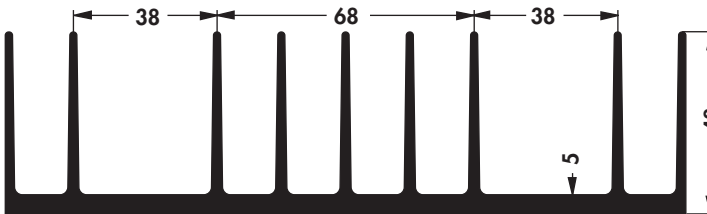
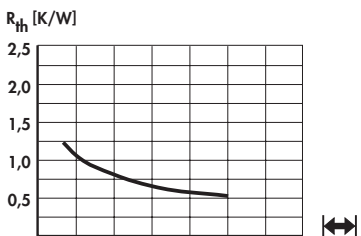
art. no. SK 69 ...		
mounting parts IS 1, IS 2, IS 3 → E 49 please indicate: ... 50 75 100 1000 mm ... TO 3; CB		
art. no. SK 74 ...		
please indicate: ... 37.5 100 1000 mm ... TO 3; CB		
art. no. SK 124 ...		
please indicate: ... 50 100 150 1000 mm ... TO 3		
art. no. SK 195 ...		
please indicate: ... 75 100 mm ... TO 3; CB		

Standard extruded heatsinks

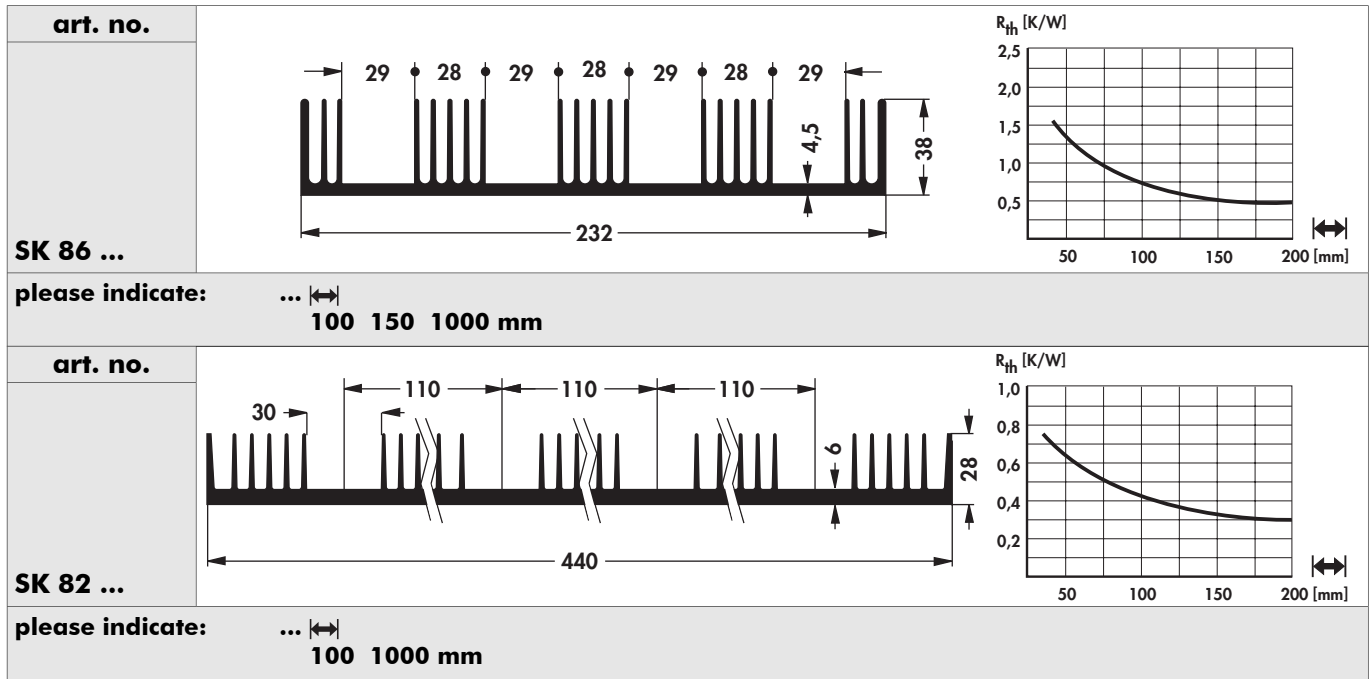
art. no. SK 31 ...		
please indicate: ... 37.5 50 75 1000 mm ... (optional) TO 3; CB		
art. no. SK 07 ...		
please indicate: ... 37.5 50 75 1000 mm ... (optional) TO 3; CB		
art. no. SK 16 ...	mountingpart IS 3 → E 49	
please indicate: ... 75 1000 mm ... (optional) TO 3; CB		
art. no. SK 500 ...		
please indicate: ... 37.5 50 75 100 1000 mm		

A 73	Assignment table	→ A 18 – 20	Retaining springs for transistors	→ A 115 – 117
	Standard aluminium profiles	→ A 135 – 136	Thermal. conductive silicone foam foil	→ E 10
	Extruded heatsinks	→ A 22 – 83	Thermal conductive foil	→ E 7
	High capacity cooling aggregat.	→ D 26 – 28	Technical introduction	→ A 2 – 8

Standard extruded heatsinks

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

Standard extruded heatsinks

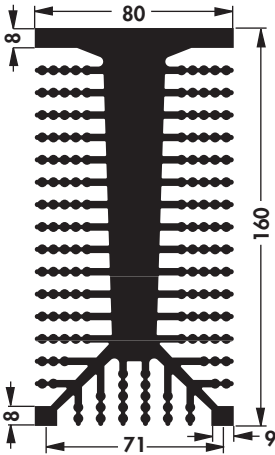
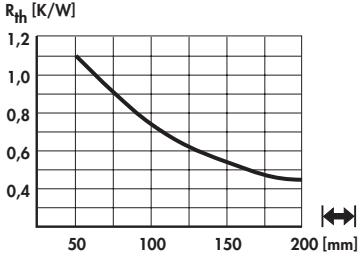
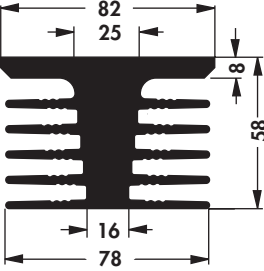
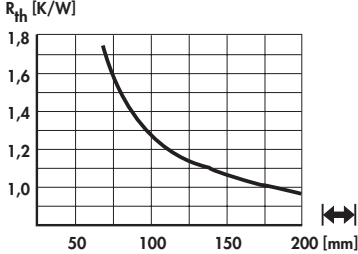


Standard extruded heatsinks

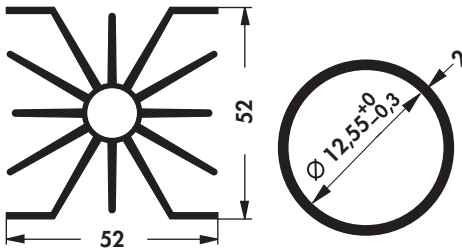
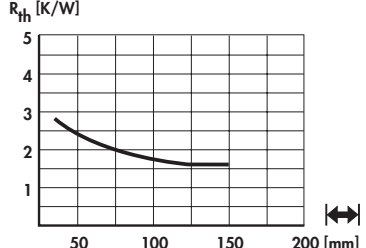
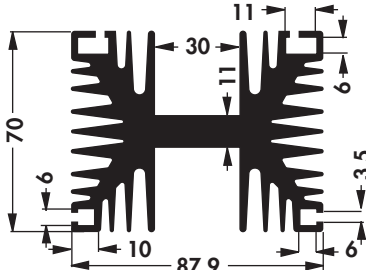
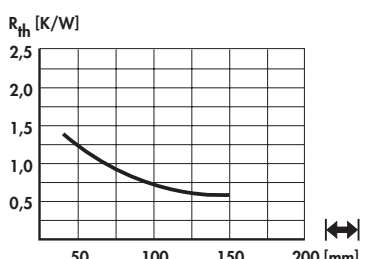
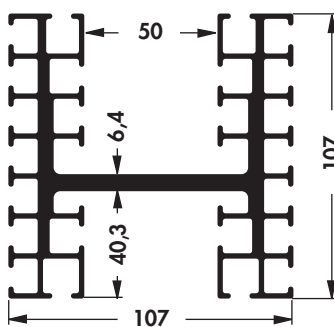
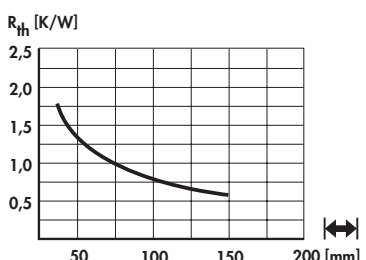
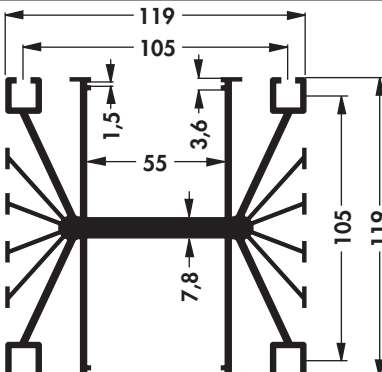
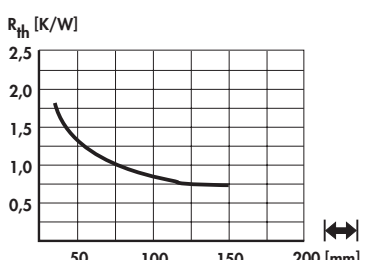
art. no. SK 596 ...		
please indicate: ... 37.5 50 75 100 1000 mm		
art. no. SK 544 ...		
please indicate: ... 50 75 100 1000 mm		
art. no. SK 32 ...		
please indicate: ... 37.5 50 75 100 1000 mm		
art. no. SK 187 ...		
please indicate: ... 75 1000 mm		
... (optional) SSR 3		

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

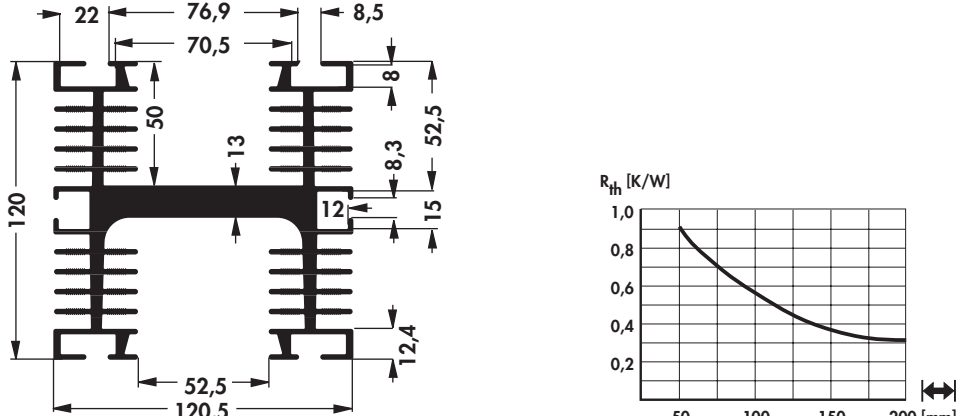
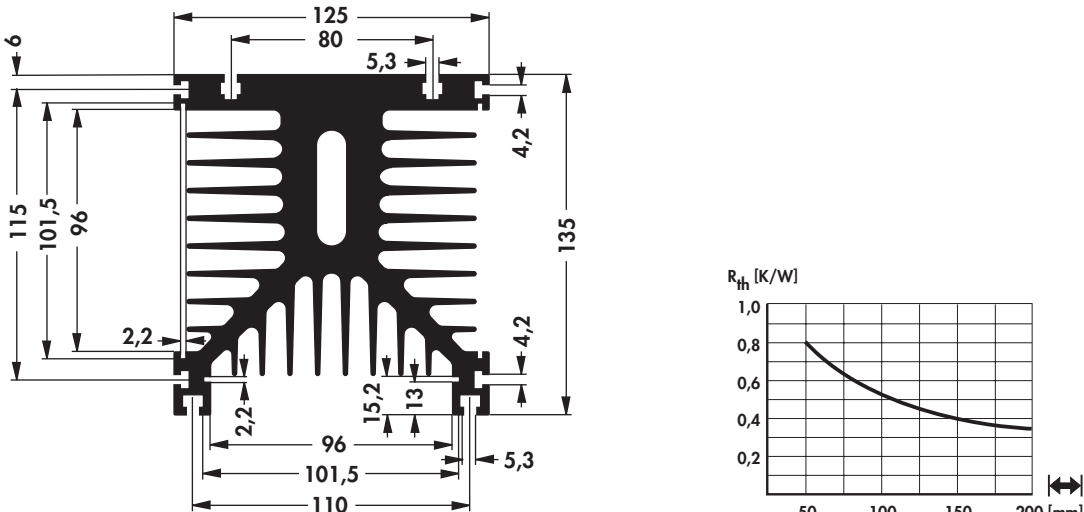
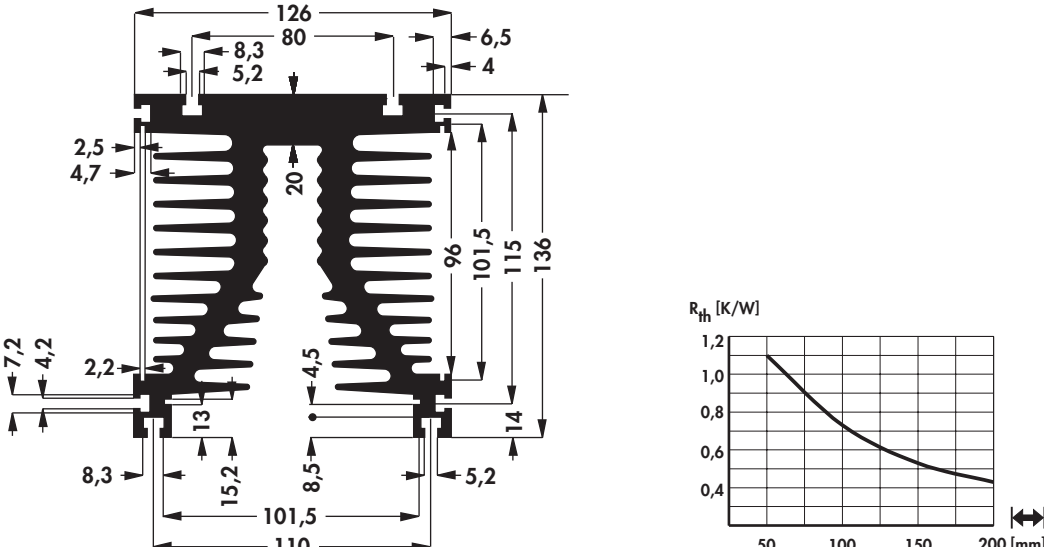
Standard extruded heatsinks

art. no.		
SK 163 ...		
please indicate:	...  100 150 1000 mm	
art. no.		
SK 176 ...		
please indicate:	...  75 100 150 1000 mm	...  (optional) SSR 2

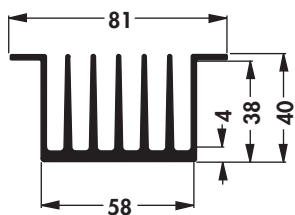
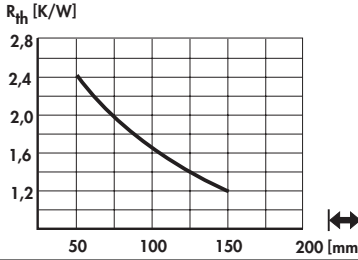
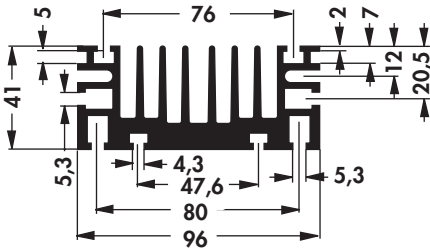
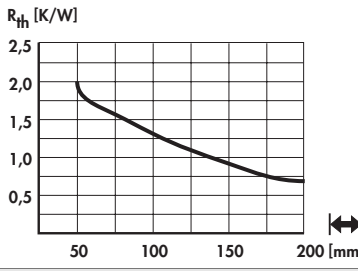
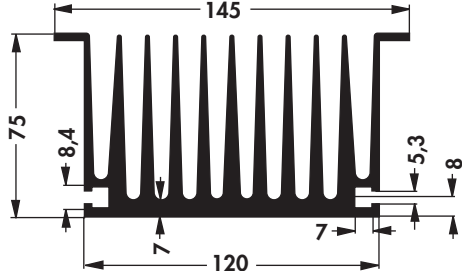
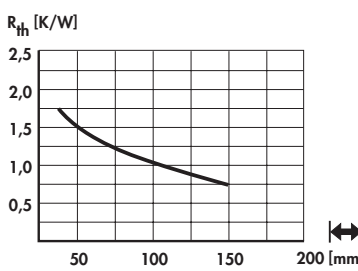
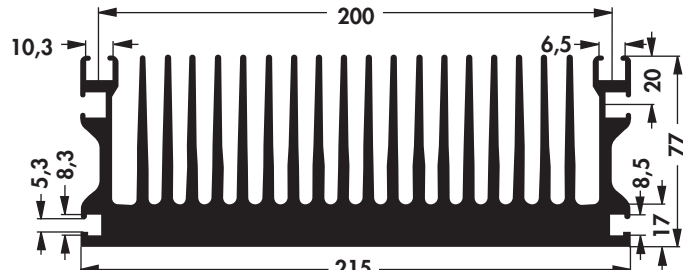
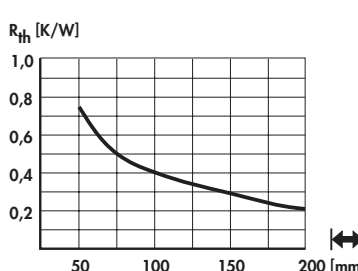
Standard extruded heatsinks

art. no. SK 11 ...	  threads, through holes and fixing according to your demand; mounting parts IS 1, IS 2, IS 3 → E 49
please indicate:	... 1000 mm
art. no. SK 83 ...	  please indicate: ... 100 1000 mm
art. no. SK 06 ...	  mounting part IS 4 → E 49 please indicate: ... 75 1000 mm
art. no. SK 23 ...	  with slots for cover plates or PCBs; equipped with fan and endplates = LA 4 → D 14 please indicate: ... 75 mm

Standard extruded heatsinks

art. no. SK 110 ...	
please indicate: ...  150 200 1000 mm	
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	

Standard extruded heatsinks

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	... (optional) SSR 1; SSR 4
art. no. SK 194 ...		
please indicate:	... 75 1000 mm	... (optional) SSR 2
art. no. SK 435 ...		
please indicate:	... 150 200 1000 mm	

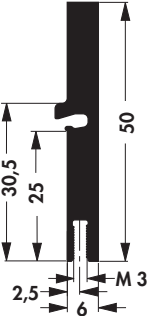
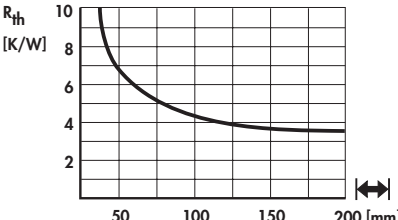
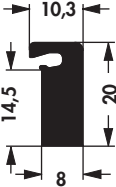
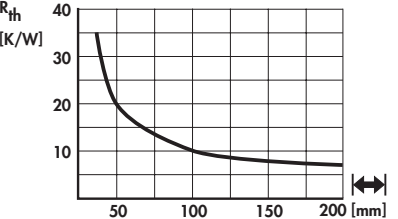
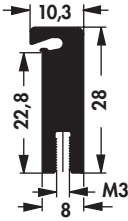
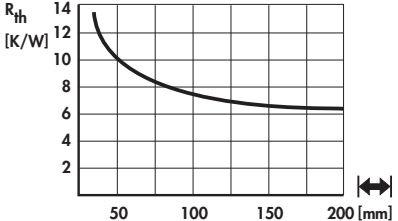
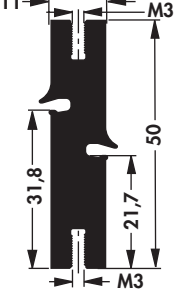
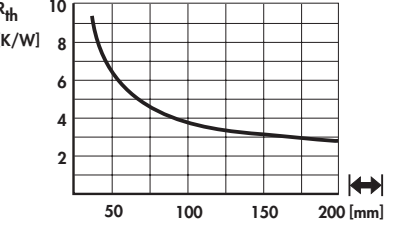
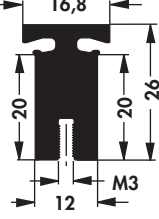
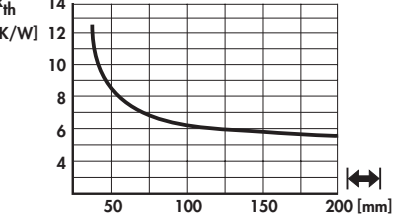
Standard extruded heatsinks

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 → M 29	
please indicate:	... 75 100 150 1000 mm	
art. no.		
SK 144 ...		
please indicate:	... 1000 mm	

Standard extruded heatsinks

art. no. SK 494 ...		
please indicate: ... $\pm$ 25 37.5 50 75 100 1000 mm		
art. no. SK 153 ...		
please indicate: ... $\pm$ 50 mm		
art. no. SK 55 ...		
please indicate: ... $\pm$ 37.5 1000 mm ... ϕ (optional) TO 3; CB		
art. no. SK 175 ...		
please indicate: ... $\pm$ 50 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 490 ...			
please indicate: ...  37.5 50 75 84 100 1000 mm			
art. no. SK 492 ...			
please indicate: ...  25 37.5 50 75 84 100 1000 mm			

please note: profile threads → A 5

Mounting parts for heatsinks

→ E 49 – 50

Insulating caps

→ E 51

Mounting pads

→ E 46

Lock-in retaining spring for transistors

→ A 119 – 121

Heatsinks for PCB

Profiles for PCB components

Heatsinks with threaded rail

Technical introduction

→ A 89

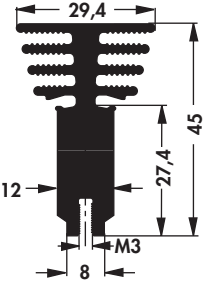
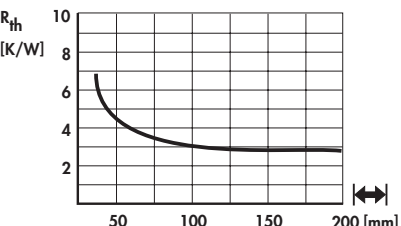
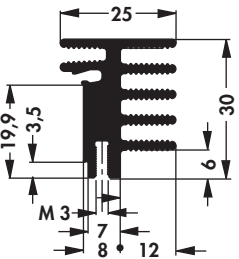
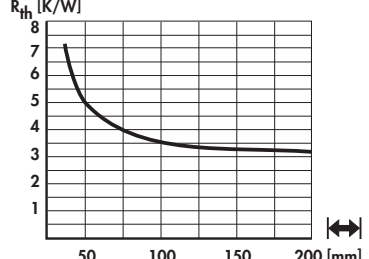
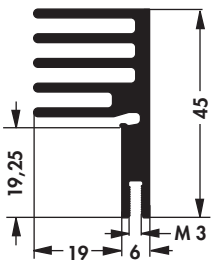
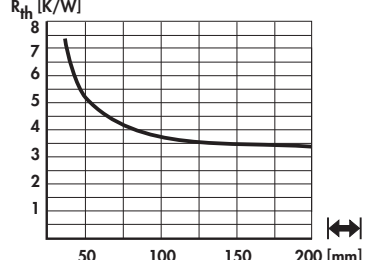
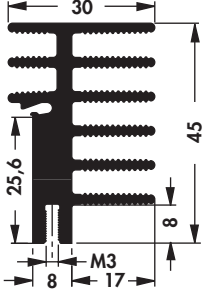
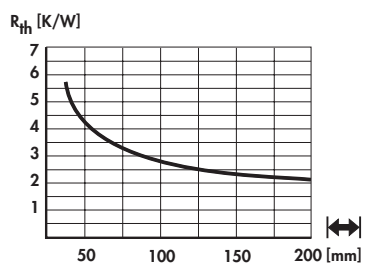
→ A 91

→ A 93

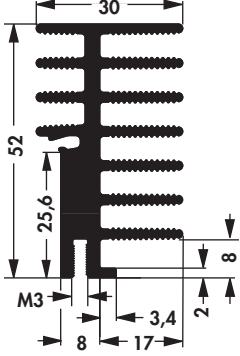
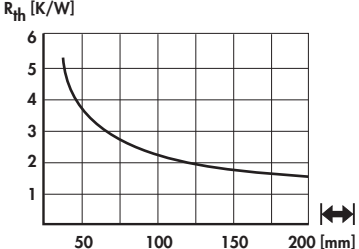
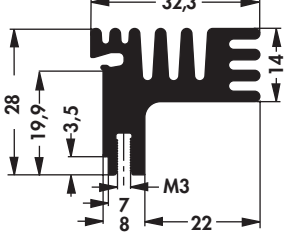
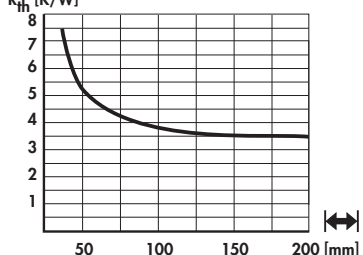
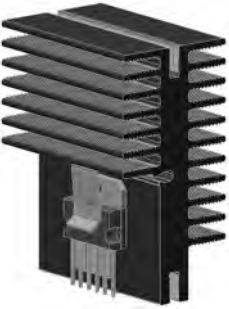
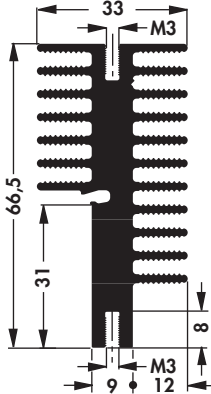
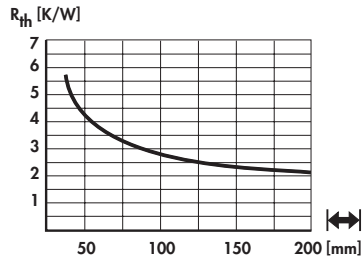
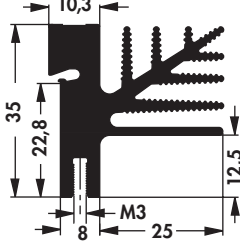
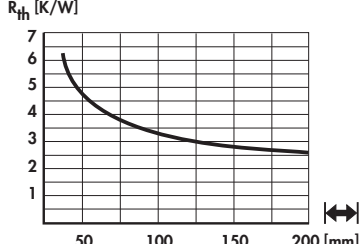
→ A 2 – 8

A 84

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 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			
art. no. SK 481 ...			
please indicate: ... 25 37.5 50 75 84 100 1000 mm			

please note: profile threads → A 5

art. no. SK 514 ...			
please indicate: ...  25 37.5 50 75 100 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 482 ...			
please indicate: ...  25 37.5 50 75 84 100 1000 mm			

please note: profile threads → A 5

Mounting parts for heatsinks

→ E 49 – 50

Insulating caps

→ E 51

Mounting pads

→ E 46

Lock-in retaining spring for transistors → A 119 – 121

Heatsinks for PCB

Profiles for PCB components

Heatsinks with threaded rail

Technical introduction

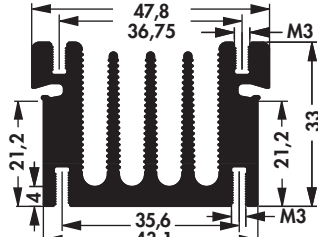
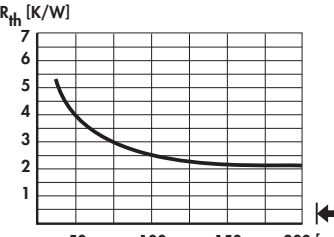
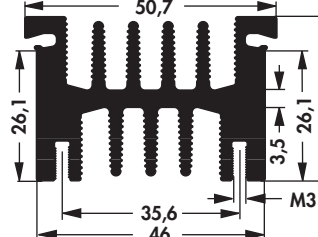
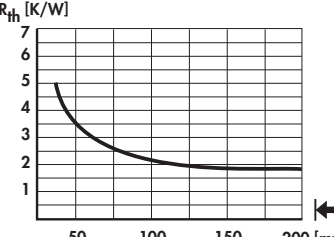
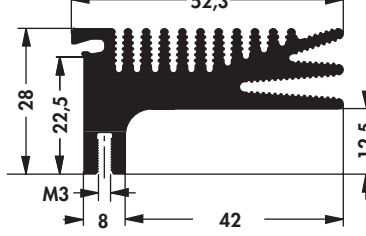
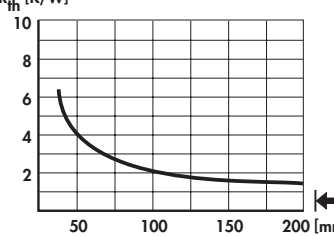
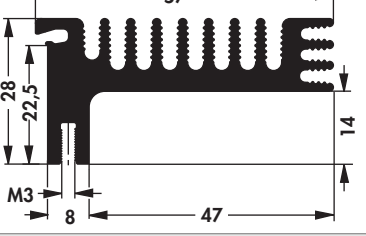
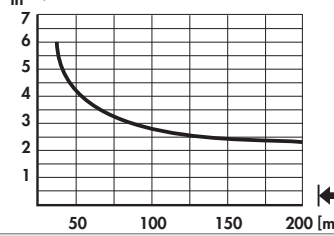
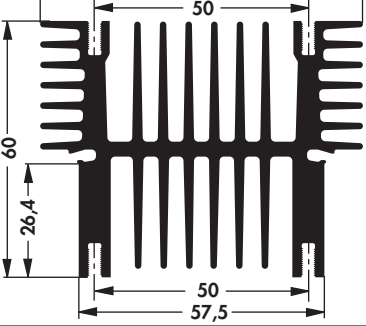
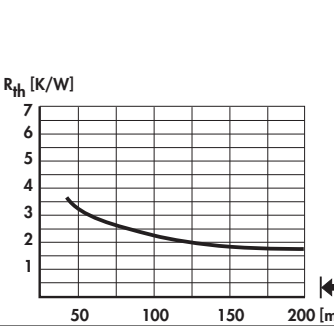
→ A 89

→ A 91

→ A 93

→ A 2 – 8

Extruded heatsinks for lock-in retaining spring

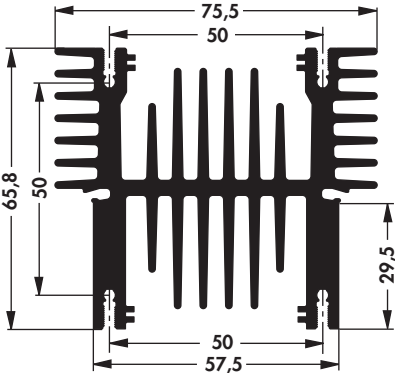
art. no. SK 495 ...			
please indicate: ... 25 37.5 50 75 100 1000 mm			
art. no. SK 499 ...			
please indicate: ... 25 37.5 50 75 100 1000 mm			
art. no. SK 487 ...			
please indicate: ... 25 37.5 50 75 84 100 1000 mm			
art. no. SK 483 ...			
please indicate: ... 25 37.5 50 75 84 100 1000 mm			
art. no. SK 593 ...			
please indicate: ... 25 37.5 50 75 84 100 1000 mm			

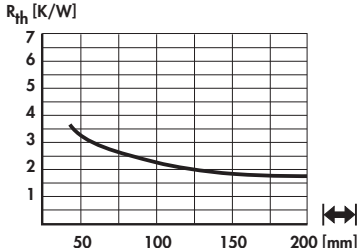
please note: profile threads → A 5

Extruded heatsinks for lock-in retaining spring

art. no.







SK 617 ...

please indicate: ...  25 37.5 50 75 84 94 100 1000 mm

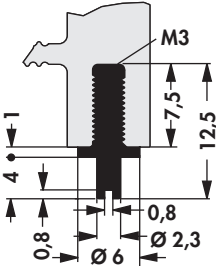
please note: profile threads → A 5

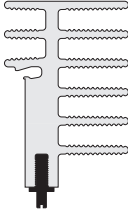
Screw-in solder pin ELS 3

- 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.





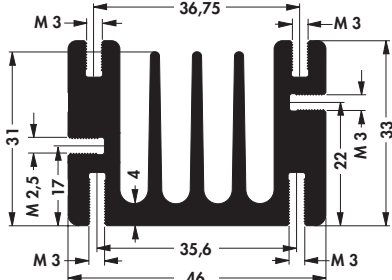
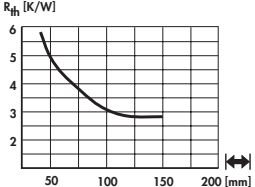
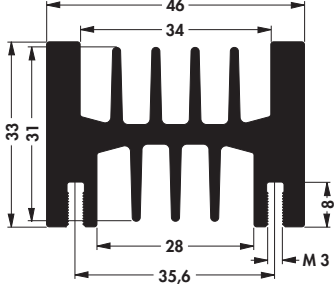
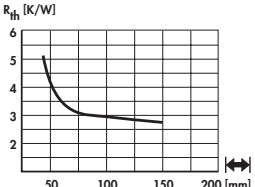


ELS 3

Extruded heatsinks for PCB mounting

Heatsinks for printed circuit boards

- matching cylindrical screws according to DIN 84 with zinc coated surface
- M 3 thread diameter: 2.90 ... 2.94 mm (**art. no.: SZ M 3 x 8**)
- screw-in solder pin M 3 (**art. no.: ELS 3**)

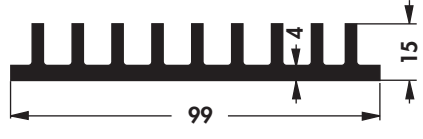
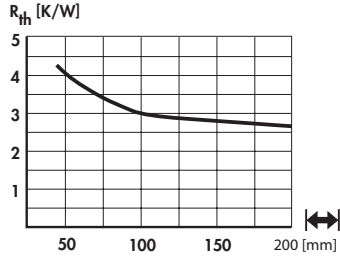
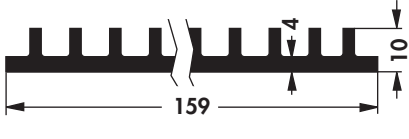
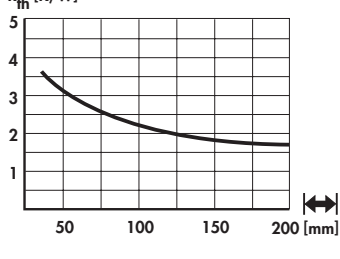
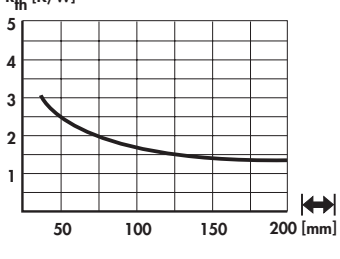
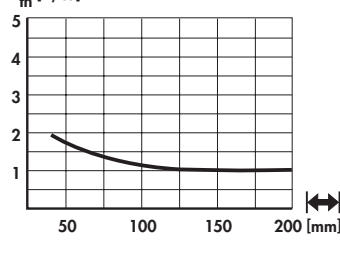
art. no. SK 68 ...		 
art. no. SK 112 ...		 
please indicate: ...  37.5 50 75 94 100 1000 mm		

please note: profile threads → A 5

Extruded heatsinks for PCB mounting

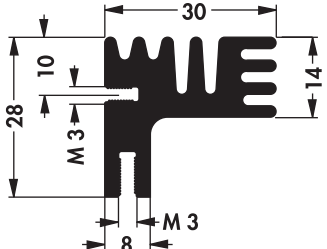
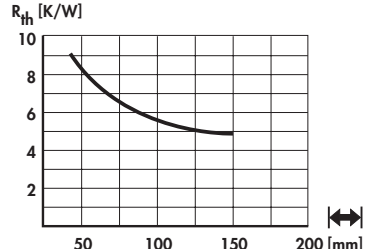
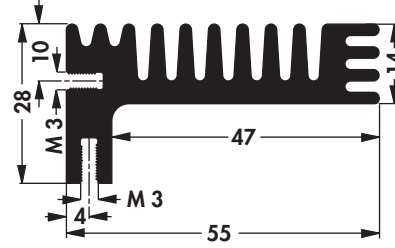
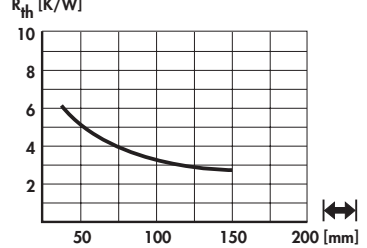
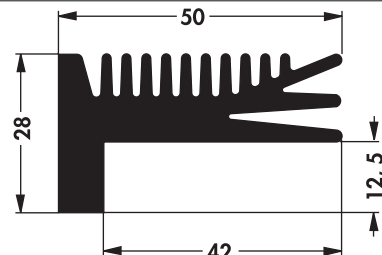
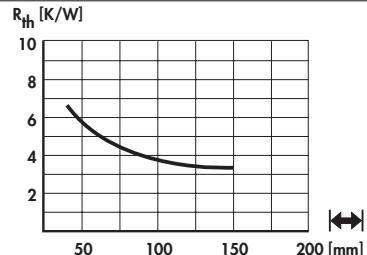
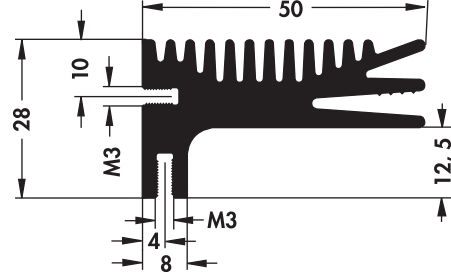
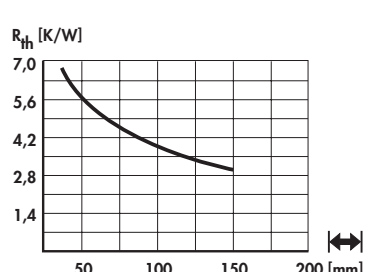
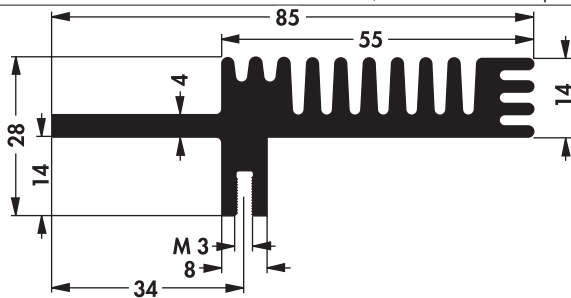
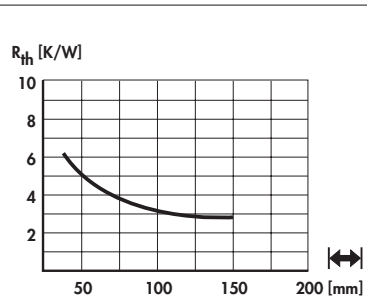
Heatsinks for printed circuit boards

- 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			

Heatsinks for printed circuit boards

- for use on eurocards

art. no.			
SK 125 ...	 		
art. no.			
SK 96 ...	 		
please indicate:	... 		
	50 84 94 1000 mm		
art. no.			
SK 138 ...	 		
art. no.			
SK 451 ...	 		
art. no.			
SK 128 ...	 		
please indicate:	... 		
	50 84 94 1000 mm		

please note: profile pressed threads → A 5

BC

D

E

F

G

Н

1

K

L

M

N

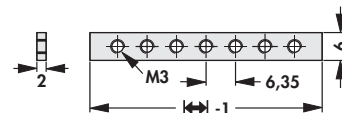
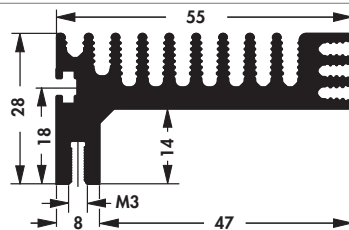
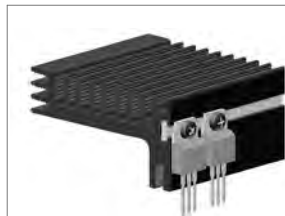
- E 2 – 23
- A 84 – 88
- A 115 – 117
- A 2 – 8

A 92

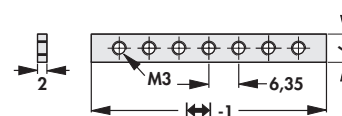
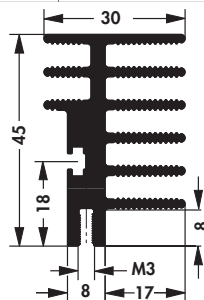
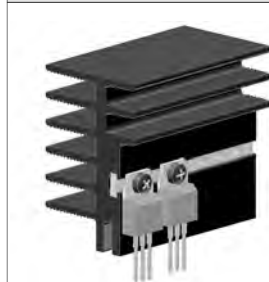
Extruded heatsinks for PCB mounting

Heatsink for PCB with threaded rail

- transistor mounting onto the heatsink using a slide-in rail with M 3 thread
- easy positioning using a grid 6.35mm
- other rail grids upon request
- suitable for TO 220, TO 218, TO 247 and similar
- suitable screws M 3 (**art. no.: SZ M 3 x 8**)
- screw-in solder pin M 3 (**art. no.: ELS 3**)
- specific versions upon customer's request



art. no.	l [mm]	R _{th} [K/W]	⌀	version
SK 517 50 GS	50	5.0	TO 220	with threaded rail
SK 517 75 GS	75	3.9	TO 220	with threaded rail
SK 517 84 GS	84	3.6	TO 220	with threaded rail
SK 517 50	50	5.0	—	without threaded rail
SK 517 75	75	3.9	—	without threaded rail
SK 517 84	84	3.6	—	without threaded rail



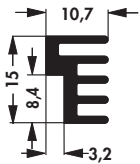
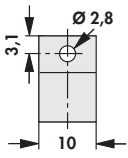
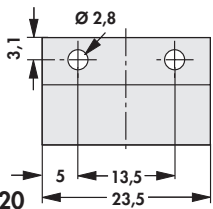
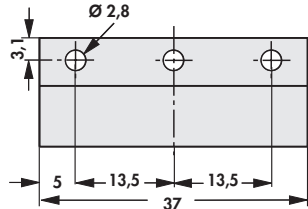
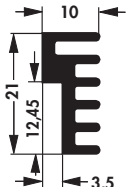
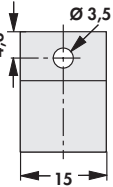
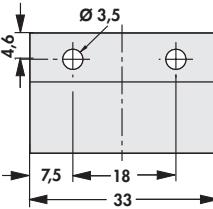
art. no.	l [mm]	R _{th} [K/W]	⌀	version
SK 518 50 GS	50	4.3	TO 220	with threaded rail
SK 518 75 GS	75	3.3	TO 220	with threaded rail
SK 518 84 GS	84	3.0	TO 220	with threaded rail
SK 518 50	50	4.3	—	without threaded rail
SK 518 75	75	3.3	—	without threaded rail
SK 518 84	84	3.0	—	without threaded rail

please note: profile threads → A 5

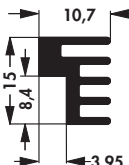
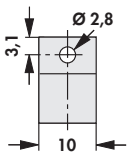
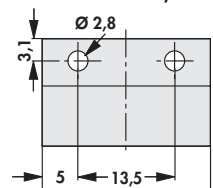
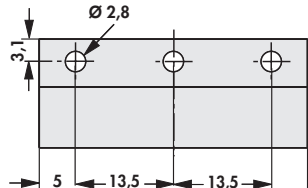
surface:	black anodised
-----------------	----------------

Attachable heatsinks for transistors

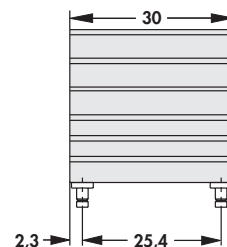
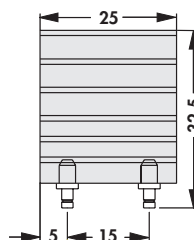
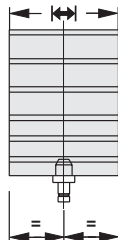
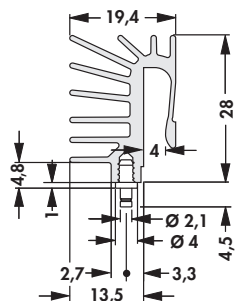
- compact heatsink in transistor dimensions
- for horizontal and vertical transistors
- can be screwed or glued
- specific versions upon customer's request

				
   				
SK 515 10 S TO 220				
art. no.	W [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	for screw fastening M2.5
SK 515 37 S 3 x TO 220	37.0	26.1	3xTO 220	for screw fastening M2.5
SK 515 10 TO 220	10.0	30.0	—	without screw fastening
SK 515 23,5 TO 220	23.5	27.5	—	without screw fastening
SK 515 37 TO 220	37.0	26.1	—	without screw fastening
				
  				
SK 516 15 S TO 218				
SK 516 33 S 2 x TO 218				
SK 516 15 TO 218				
art. no.	W [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	for screw fastening M3
SK 516 15 TO 218	15	28.4	—	without screw fastening
surface:		black anodised		

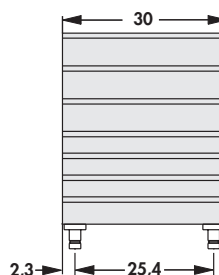
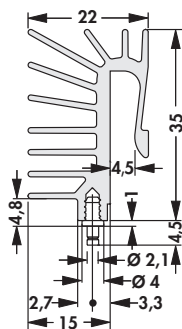
Attachable extruded heatsinks for transistors with thin bottom plate (0.5 mm)

				
   				
SK 515 05 10 S				
SK 515 05 23,5 S 2				
SK 515 05 37 S 3				
art. no.	W [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	for screw fastening M2.5
SK 515 05 37 S 3	37.0	26.1	3xTO 220	for screw fastening M2.5
SK 515 05 10	10.0	30.0	—	without screw fastening
SK 515 05 23,5	23.5	27.5	—	without screw fastening
SK 515 05 37	37.0	26.1	—	without screw fastening
surface:		black anodised		

- extruded heatsink with integrated 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	TO 220	30	7.8	100	without solder pins
SK 525 15 ST	TO 220	15	13.3	54	with 1 solder pin
SK 525 20 ST	TO 220	20	10.7	70	with 1 solder pin
SK 525 25 ST	TO 220	25	9.0	85	with 2 solder pins
SK 525 30 ST	TO 220	30	7.8	100	with 2 solder pins

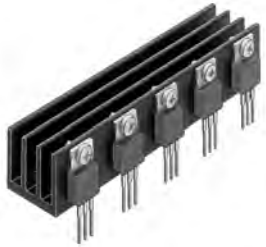
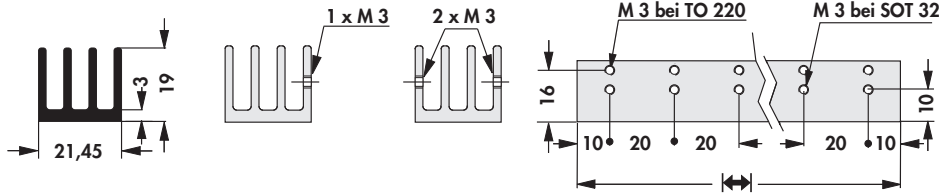
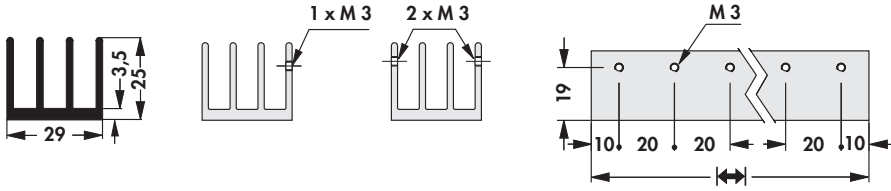


art. no.	for transistor	 [mm]	R_{th} [K/W]	spring force [N]	version
SK 526 30 ST	TO 247	30	6.3	100	with 2 solder pins
surface:	black anodised				

Extruded heatsinks for PCB mounting

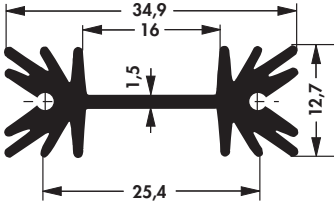
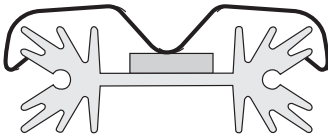
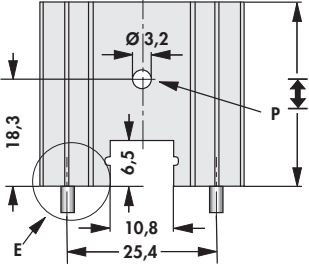
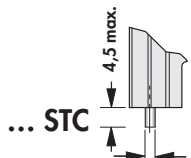
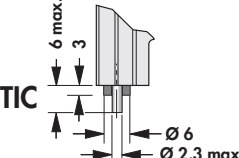
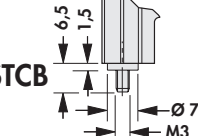
Extruded heatsinks for transistors

- compact PCB heatsink
- effective heat dissipation for single and double row transistor mounting
- profile **SK 454** → A 24
- profile **SK 452** → A 27
- specific versions upon customer's request

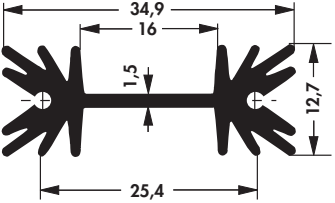
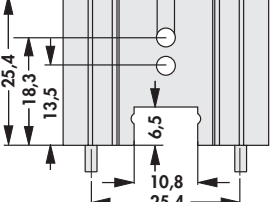
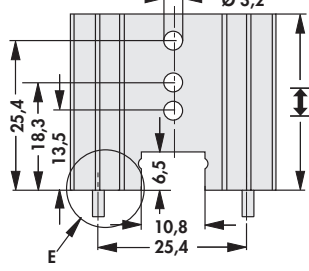
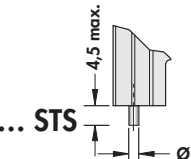
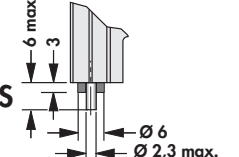
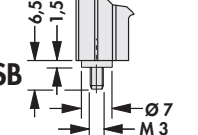
			
			
art. no.	↔ [mm]	R _{th} [K/W]	⚡
SK 454 20 1 x M3 ...	20	10.8	SOT 32/ TO 220
SK 454 60 3 x M3 ...	60	7.7	SOT 32/ TO 220
SK 454 20 2 x M3 ...	20	10.8	SOT 32/ TO 220
SK 454 40 4 x M3 ...	40	9.4	SOT 32/ TO 220
SK 454 60 6 x M3 ...	60	7.7	SOT 32/ TO 220
SK 454 40 2 x M3 TO 220	40	9.4	TO 220
SK 454 80 4 x M3 TO 220	80	6.5	TO 220
SK 454 100 5 x M3 TO 220	100	5.9	TO 220
SK 454 80 8 x M3 TO 220	80	6.5	TO 220
SK 454 100 10xM3 TO 220	100	5.9	TO 220
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	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 452 60 3 x M3	60	5.9	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 452 80 4 x M3	80	4.9	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 452 100 5 x M3	100	4.3	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 452 20 2 x M3	20	11.1	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 452 40 4 x M3	40	7.5	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 452 60 6 x M3	60	5.9	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 452 80 8 x M3	80	4.9	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
SK 452 100 10 x M3	100	4.3	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P
surface:	black anodised		

Extruded heatsinks for PCB mounting

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

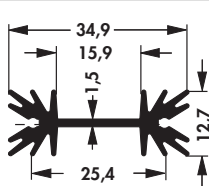
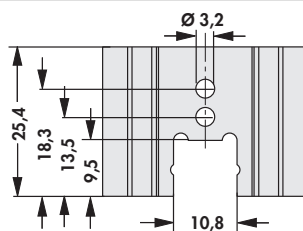
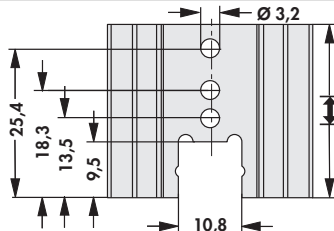
	  		
	  		
	art. no.	l [mm]	R_{th} [K/W]
	SK 104 25,4 ...	25.4	14
	SK 104 38,1 ...	38.1	11
	SK 104 50,8 ...	50.8	9
	SK 104 63,5 ...	63.5	8
please indicate: ... mounting method STC = with solder pin STIC = with solder pin and insulating washer STCB = with threaded bolt M 3, brass			
surface:		black anodised	

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

	  		
	  		
	art. no.	l [mm]	R_{th} [K/W]
	SK 104 25,4 ...	25.4	14
	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 M 3, brass			
surface:		black anodised	

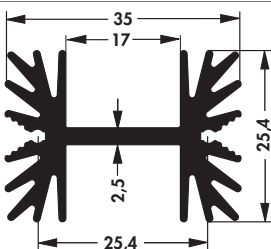
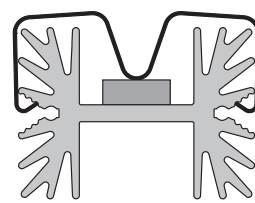
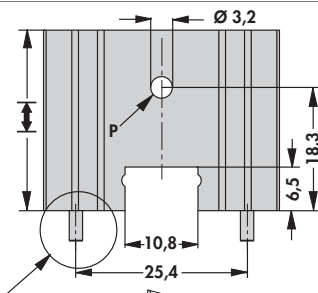
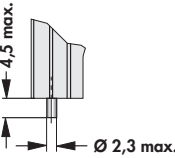
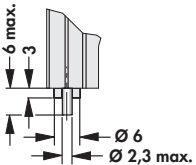
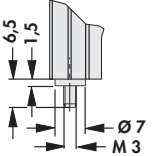
Extruded heatsinks for PCB mounting

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

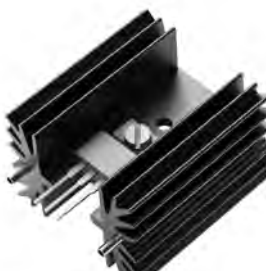
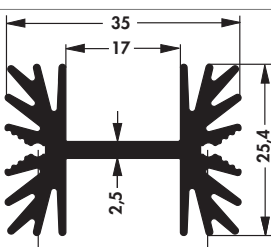
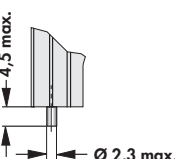
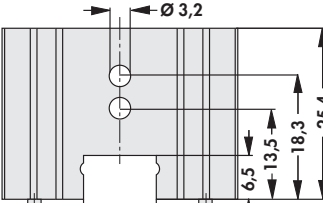
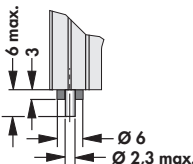
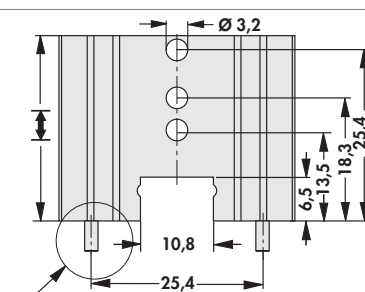
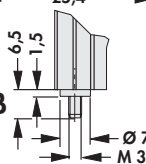
						
art. no.	 [mm]	R _{th} [K/W]	Ø			
SK 104 25,4 LS	25.4	14	SOT 32/ TO 220/ TO 3 P			
SK 104 38,1 LS	38.1	11	SOT 32/ TO 220/ TO 3 P			
SK 104 50,8 LS	50.8	9	SOT 32/ TO 220/ TO 3 P			
surface:		black anodised				

Extruded heatsinks for PCB mounting

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

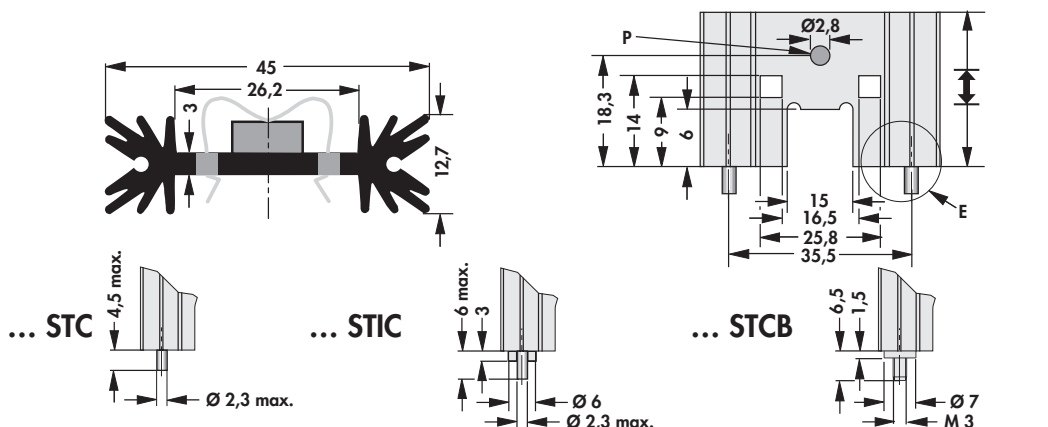
					
					
	... STC	... STIC			... STCB
art. no.	↔ [mm]	R _{th} [K/W]			
SK 600 25,4 ...	25.4	11.0	TO 218/ TO 220/ TO 247/ TO 3 P		
SK 600 38,1 ...	38.1	9.0	TO 218/ TO 220/ TO 247/ TO 3 P		
SK 600 50,8 ...	50.8	7.3	TO 218/ TO 220/ TO 247/ TO 3 P		
SK 600 63,5 ...	63.5	6.5	TO 218/ TO 220/ TO 247/ TO 3 P		
please indicate: ... mounting method					
STC = with solder pin					
STIC = with solder pin and insulating washer					
STCB = with threaded bolt M 3, brass					
surface:		black anodised			

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

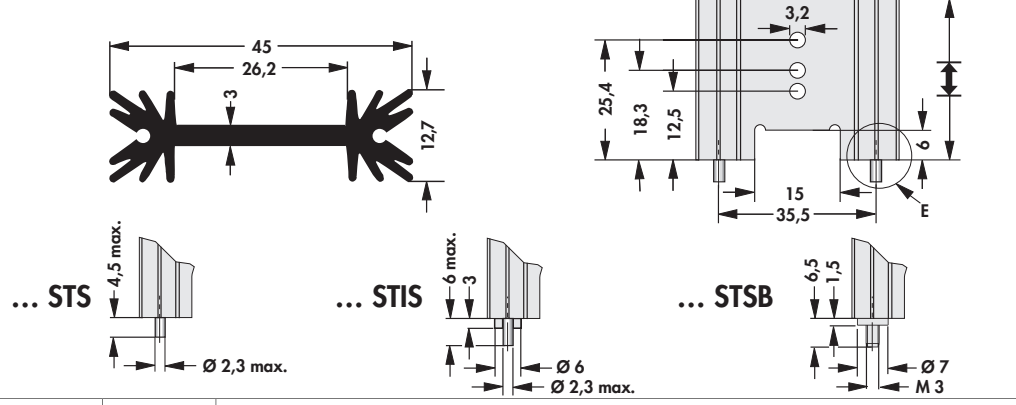
	  ... STS			  ... STIS	  ... STSB
art. no.	[mm]	R _{th} [K/W]	⊗		
SK 600 25,4 ...	25.4	11.0	TO 218/ TO 220/ TO 247/ TO 3 P		
SK 600 38,1 ...	38.1	9.0	TO 218/ TO 220/ TO 247/ TO 3 P		
SK 600 50,8 ...	50.8	7.3	TO 218/ TO 220/ TO 247/ TO 3 P		
SK 600 63,5 ...	63.5	6.5	TO 218/ TO 220/ TO 247/ TO 3 P		
please indicate:	... mounting method STS = with solder pin STIS = with solder pins and insulating washer STSB = with threaded bolt M 3, brass				
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

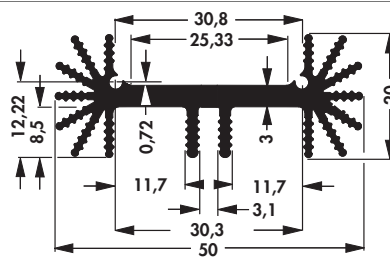
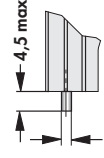
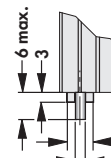
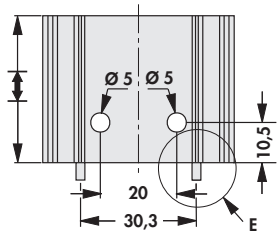
			
			
art. no.	l [mm]	R _{th} [K/W]	⌀
SK 409 25,4 ...	25.4	8.2	TO 220/ TO 3 P
SK 409 38,1 ...	38.1	7.0	TO 220/ TO 3 P
SK 409 50,8 ...	50.8	6.2	TO 220/ TO 3 P
SK 409 63,5 ...	63.5	5.6	TO 220/ TO 3 P
please indicate: ... mounting method STC = with solder pin STIC = with solder pin and insulating washer STCB = with threaded bolt M 3, brass			
surface:		black anodised	

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

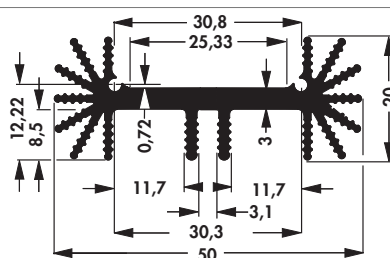
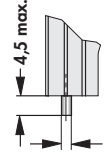
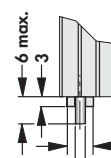
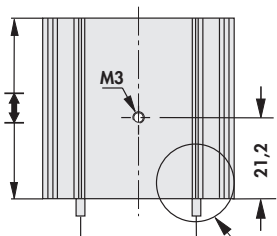
			
			
art. no.	l [mm]	R _{th} [K/W]	⌀
SK 409 25,4 ...	25.4	8.2	TO 220/ TO 3 P
SK 409 38,1 ...	38.1	7.0	TO 220/ TO 3 P
SK 409 50,8 ...	50.8	6.2	TO 220/ TO 3 P
SK 409 63,5 ...	63.5	5.6	TO 220/ TO 3 P
please indicate: ... mounting method STS = with solder pin STIS = with solder pins and insulating washer STSB = with threaded bolt M 3, brass			
surface:		black anodised	

Extruded heatsinks for PCB mounting

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

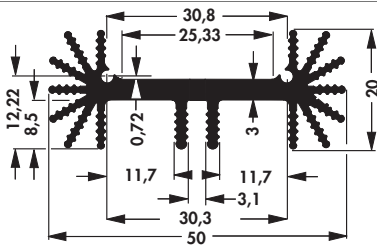
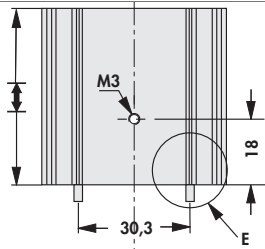
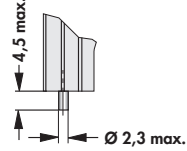
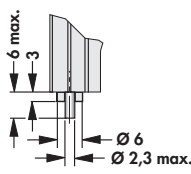
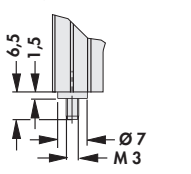
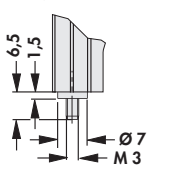
						
... STC		... STIC		... STCB		
art. no.	H [mm]	R_{th} [K/W]				
SK 459 25 ...	25.0	7.9	TO 218/ TO 220/ TO 247/ TO 248			
SK 459 37,5 ...	37.5	6.3	TO 218/ TO 220/ TO 247/ TO 248			
SK 459 50 ...	50.0	5.6	TO 218/ TO 220/ TO 247/ TO 248			
please indicate: ... mounting method						
STC = with solder pin						
STIC = with solder pin and insulating washer						
STCB = with threaded bolt M 3, brass						
surface:		black anodised				

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

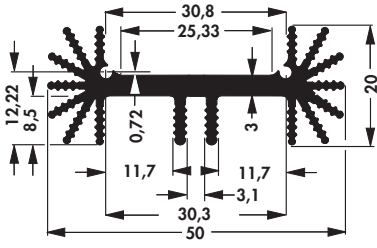
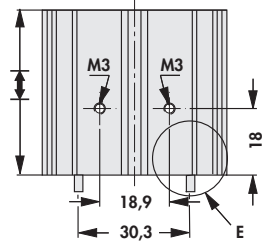
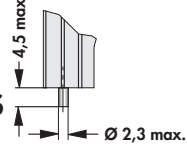
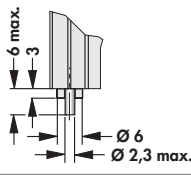
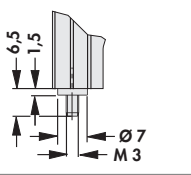
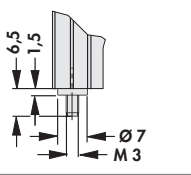
						
... STS		... STIS		... STSB		
art. no.	 [mm]	R _{th} [K/W]				
SK 459 25 ...	25.0	7.9	TO 218/ TO 220/ TO 247/ TO 248			
SK 459 37,5 ...	37.5	6.3	TO 218/ TO 220/ TO 247/ TO 248			
SK 459 50 ...	50.0	5.6	TO 218/ TO 220/ TO 247/ TO 248			
please indicate: ... mounting method						
STS = with solder pin						
STIS = with solder pins and insulating washer						
STSB = with threaded bolt M 3, brass						
surface:		black anodised				

Extruded heatsinks for PCB mounting

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

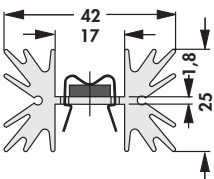
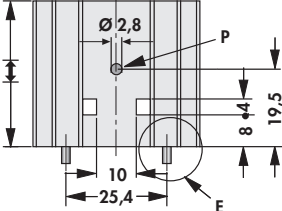
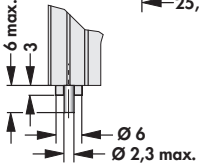
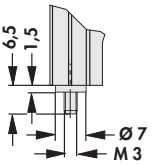
				
... STS 				
... STIS 				
... STSB 				
				
art. no.	l [mm]	R_{th} [K/W]		
SK 459 25 M ...	25.0	7.9	SIP-Multiwatt	
SK 459 37,5 M ...	37.5	6.3	SIP-Multiwatt	
SK 459 50 M ...	50.0	5.6	SIP-Multiwatt	
please indicate: ... mounting method STS = with solder pin STIS = with solder pins and insulating washer STSB = with threaded bolt M 3, 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

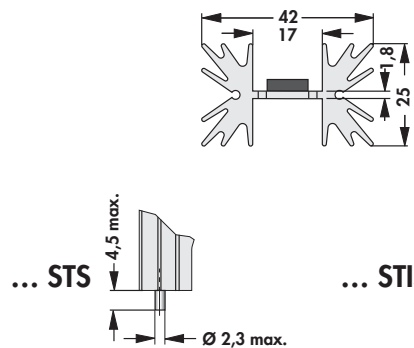
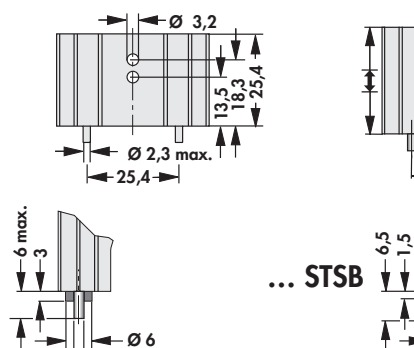
				
				
				
				
				
art. no.	l [mm]	R_{th} [K/W]		
SK 459 25 2 x TO 220 ...	25.0	7.9	2xSOT 32/ 2xTO 220	
SK 459 37,5 2 x TO 220...	37.5	6.3	2xSOT 32/ 2xTO 220	
SK 459 50 2 x TO 220 ...	50.0	5.6	2xSOT 32/ 2xTO 220	
please indicate: ... mounting method				
STS = with solder pin				
STIS = with solder pins and insulating washer				
STSB = with threaded bolt M 3, brass				
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

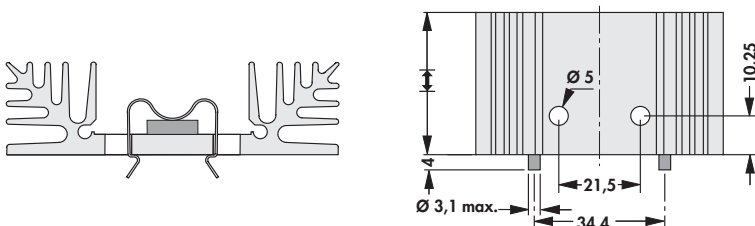
	   			
art. no.	l [mm]	R_{th} [K/W]		
SK 129 25,4 ...	25.4	7.8	TO 220	
SK 129 38,1 ...	38.1	6.5	TO 220	
SK 129 50,8 ...	50.8	5.3	TO 220	
SK 129 63,5 ...	63.5	4.5	TO 220	
please indicate: ... mounting method				
STC = with solder pin				
STIC = with solder pin and insulating washer				
STCB = with threaded bolt M 3, brass				
surface:		black anodised		

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

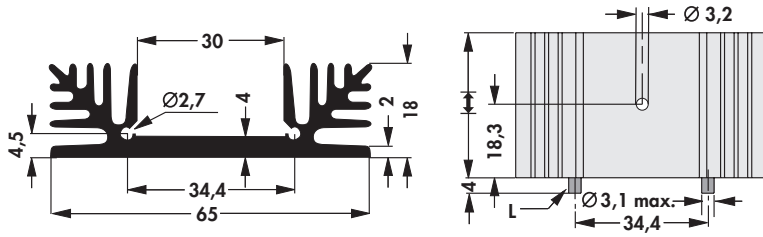
				
... STS				
... STIS				
... STSB				
art. no.	l [mm]	R_{th} [K/W]		
SK 129 25,4 ...	25.4	7.8	SOT 32/ TO 220/ TO 3 P	
SK 129 38,1 ...	38.1	6.5	SOT 32/ TO 220/ TO 3 P	
SK 129 50,8 ...	50.8	5.3	SOT 32/ TO 220/ TO 3 P	
SK 129 63,5 ...	63.5	4.5	SOT 32/ TO 220/ TO 3 P	
please indicate:				
... mounting method				
STS = with solder pin				
STIS = with solder pins and insulating washer				
STSB = with threaded bolt M 3, brass				
surface:		black anodised		

Extruded heatsinks for PCB mounting

- for semiconductor clip-mounting
- profile **SK 185** → A 73
- special lengths and drillings on request
- **L** = solderable pins

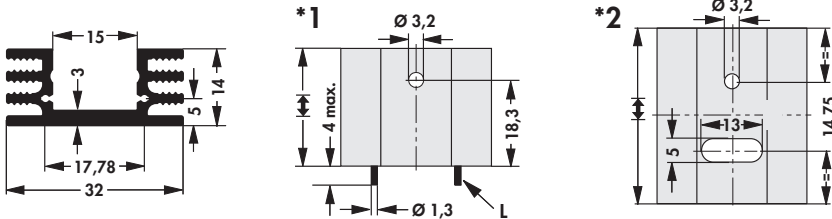
				
art. no.	l [mm]	R _{th} [K/W]	Φ	version
SK 185 25 STC TO 220	25.0	7.9	TO 220	with solder pins
SK 185 37,5 STC TO 220	37.5	6.4	TO 220	with solder pins
SK 185 50 STC TO 220	50.0	4.9	TO 220	with solder pins
SK 185 50 C TO 220	50.0	4.9	TO 220	without solder pins
surface:		black anodised		

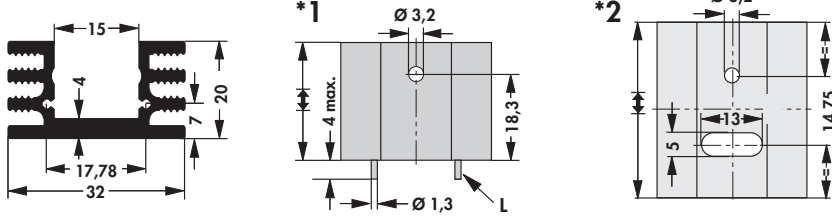
- for semiconductor screw-mounting
- profile **SK 185** → A 73
- special lengths and drillings on request
- **L** = solderable pins

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

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

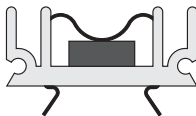
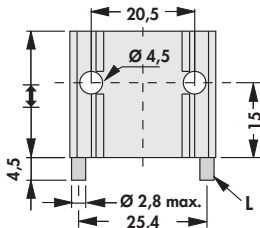
				
art. no.	l [mm]	R _{th} [K/W]	⌀	version
SK 75 25 STS TO 220	25.0	12.5	TO 220/*1	with solder pins
SK 75 37,5 STS TO 220	37.5	10.0	TO 220/*1	with solder pins
SK 75 50 STS TO 220	50.0	8.5	TO 220/*1	with solder pins
SK 75 25	25.0	12.5	—	without solder pins
SK 75 25 TO 220	25.0	12.5	TO 220/*2	without solder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

				
art. no.	l [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	TO 220/*1	with solder pins
SK 76 50 STS TO 220	50.0	7.0	TO 220/*1	with solder pins
SK 76 25	25.0	10.0	—	without solder pins
SK 76 25 TO 220	25.0	10.0	TO 220/*2	without solder pins
SK 76 37,5	37.5	8.0	—	without solder pins
SK 76 37,5 TO 220	37.5	8.0	TO 220/*2	without solder pins
SK 76 50	50.0	7.0	—	without solder pins
SK 76 50 TO 220	50.0	7.0	TO 220/*2	without solder pins
SK 76 75	75.0	5.9	—	without solder pins
SK 76 1000	1000.0	—	—	without solder pins

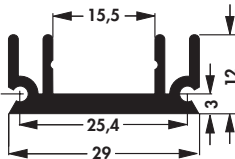
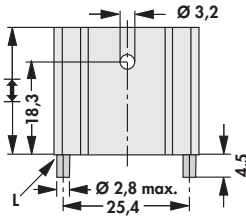
surface:	black anodised
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Extruded heatsinks for PCB mounting

- for semiconductor clip-mounting
- profile **SK 145** → A 73
- special lengths and drillings on request
- **L** = solderable pins

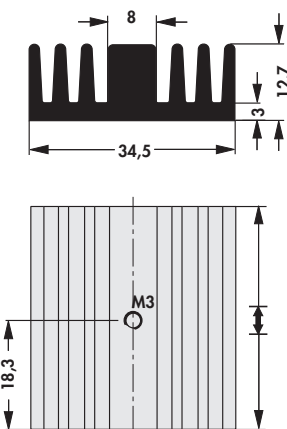
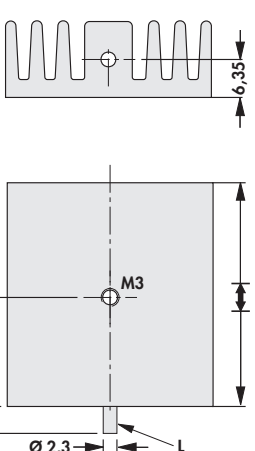
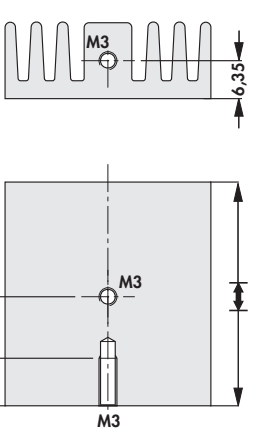
				
art. no.	 [mm]	R _{th} [K/W]		version
SK 145 25 STC	25	13.5	TO 218/ TO 220/ TO 247/ TO 248	with solder pins
SK 145 30 STC	30	12.4	TO 218/ TO 220/ TO 247/ TO 248	with solder pins
SK 145 50 STC	50	10.0	TO 218/ TO 220/ TO 247/ TO 248	with solder pins
surface:		black anodised		

- for semiconductor screw-mounting
- profile **SK 145** → A 73
- 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	TO 218/ TO 220/ TO 247/ TO 248	with solder pins
SK 145 50 STS TO 220	50.0	10.0	TO 218/ TO 220/ TO 247/ TO 248	with solder pins
surface:		black anodised		

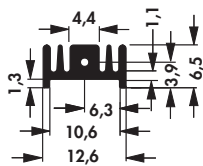
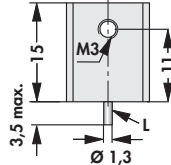
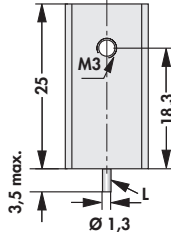
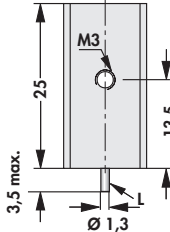
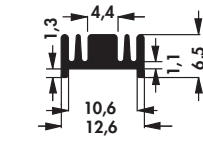
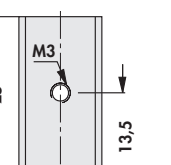
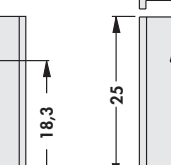
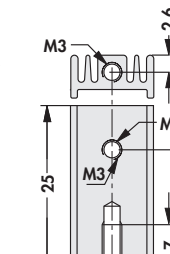
Extruded heatsinks for PCB mounting

- 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																																																							
																																																												
	<table><tr><th>art. no.</th><th>$\lvert\lvert$ [mm]</th><th>R_{th} [K/W]</th><th>$\varnothing$</th><th>version</th></tr><tr><td>SK 126 25 STS TO 220</td><td>25.0</td><td>8.0</td><td>TO 218/ TO 220/ TO 247/ TO 248</td><td>with solder pin and thread M3</td></tr><tr><td>SK 126 37,5 STS TO 220</td><td>37.5</td><td>6.5</td><td>TO 218/ TO 220/ TO 247/ TO 248</td><td>with solder pin and thread M3</td></tr><tr><td>SK 126 25 TO 220</td><td>25.0</td><td>8.0</td><td>TO 218/ TO 220/ TO 247/ TO 248</td><td>ohne Lötstift, mit M3-Gewinde</td></tr><tr><td>SK 126 25 2 x M 3</td><td>25.0</td><td>8.0</td><td>TO 218/ TO 220/ TO 247/ TO 248</td><td>ohne Lötstift, mit M3-Gewinde</td></tr><tr><td>SK 126 37,5 TO 220</td><td>37.5</td><td>6.5</td><td>TO 218/ TO 220/ TO 247/ TO 248</td><td>ohne Lötstift, mit M3-Gewinde</td></tr><tr><td>SK 126 37,5 2 x M 3</td><td>37.5</td><td>6.5</td><td>TO 218/ TO 220/ TO 247/ TO 248</td><td>ohne Lötstift, mit M3-Gewinde</td></tr><tr><td>SK 126 25</td><td>25.0</td><td>8.0</td><td>—</td><td>—</td></tr><tr><td>SK 126 37,5</td><td>37.5</td><td>6.5</td><td>—</td><td>—</td></tr><tr><td>SK 126 1000</td><td>1000.0</td><td>—</td><td>—</td><td>—</td></tr><tr><td colspan="2">surface:</td><td colspan="4">black anodised</td></tr></table>					art. no.	$\lvert\lvert$ [mm]	R_{th} [K/W]	$\varnothing$	version	SK 126 25 STS TO 220	25.0	8.0	TO 218/ TO 220/ TO 247/ TO 248	with solder pin and thread M3	SK 126 37,5 STS TO 220	37.5	6.5	TO 218/ TO 220/ TO 247/ TO 248	with solder pin and thread M3	SK 126 25 TO 220	25.0	8.0	TO 218/ TO 220/ TO 247/ TO 248	ohne Lötstift, mit M3-Gewinde	SK 126 25 2 x M 3	25.0	8.0	TO 218/ TO 220/ TO 247/ TO 248	ohne Lötstift, mit M3-Gewinde	SK 126 37,5 TO 220	37.5	6.5	TO 218/ TO 220/ TO 247/ TO 248	ohne Lötstift, mit M3-Gewinde	SK 126 37,5 2 x M 3	37.5	6.5	TO 218/ TO 220/ TO 247/ TO 248	ohne Lötstift, mit M3-Gewinde	SK 126 25	25.0	8.0	—	—	SK 126 37,5	37.5	6.5	—	—	SK 126 1000	1000.0	—	—	—	surface:		black anodised		
art. no.	$\lvert\lvert$ [mm]	R_{th} [K/W]	$\varnothing$	version																																																								
SK 126 25 STS TO 220	25.0	8.0	TO 218/ TO 220/ TO 247/ TO 248	with solder pin and thread M3																																																								
SK 126 37,5 STS TO 220	37.5	6.5	TO 218/ TO 220/ TO 247/ TO 248	with solder pin and thread M3																																																								
SK 126 25 TO 220	25.0	8.0	TO 218/ TO 220/ TO 247/ TO 248	ohne Lötstift, mit M3-Gewinde																																																								
SK 126 25 2 x M 3	25.0	8.0	TO 218/ TO 220/ TO 247/ TO 248	ohne Lötstift, mit M3-Gewinde																																																								
SK 126 37,5 TO 220	37.5	6.5	TO 218/ TO 220/ TO 247/ TO 248	ohne Lötstift, mit M3-Gewinde																																																								
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SK 126 25	25.0	8.0	—	—																																																								
SK 126 37,5	37.5	6.5	—	—																																																								
SK 126 1000	1000.0	—	—	—																																																								
surface:		black anodised																																																										

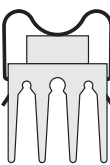
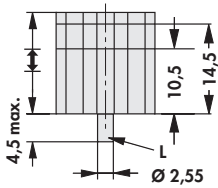
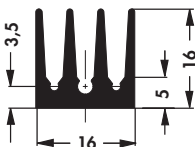
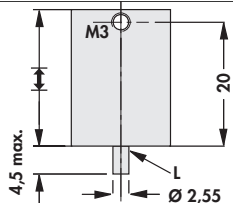
Extruded heatsinks for PCB mounting

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

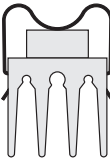
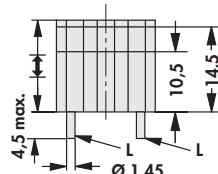
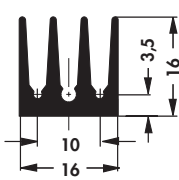
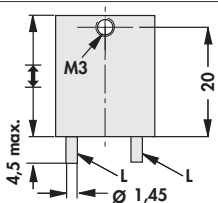
	   			SK 95 15 STS SOT 32 S SK 95 25 STS TO 220 SK 95 25 STS SOT 32			
art. no.	L [mm]	R _{th} [K/W]	⊗				
SK 95 15 STS SOT 32 S	15	38.5	SOT 32				
SK 95 25 STS SOT 32	25	36.0	SOT 32				
SK 95 25 STS TO 220	25	36.0	TO 220				
	   			SK 95 25 1 x M2,5 1 x M3			
	SK 95 15 SOT 32 S	SK 95 25 SOT 32	SK 95 25 TO 220	SK 95 25 2 x M3			
	art. no.	L [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					

Extruded heatsinks for PCB mounting

- single solder pin
- profile **SK 437** → A 24
- special lengths and drillings on request
- **L** = solderable pin

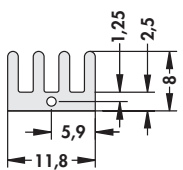
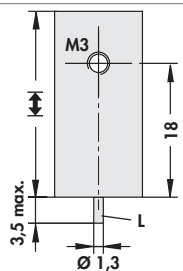
				
art. no.	l [mm]	R _{th} [K/W]	⚡	
SK 437 25 STC	25	24	TO 218/ TO 220/ TO 247/ TO 248	
SK 437 30 STC	30	22	TO 218/ TO 220/ TO 247/ TO 248	
SK 437 35 STC	35	18	TO 218/ TO 220/ TO 247/ TO 248	
SK 437 50 STC	50	14	TO 218/ TO 220/ TO 247/ TO 248	
				
art. no.	l [mm]	R _{th} [K/W]	⚡	
SK 437 25 STS	25	24	TO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

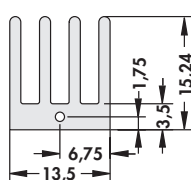
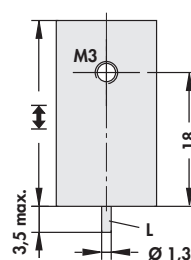
- double solder pin
- profile **SK 437** → A 24
- special lengths and drillings on request
- **L** = solderable pin

				
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	TO 218/ TO 220/ TO 247/ TO 248	
SK 437 35 STC 2	35	18	TO 218/ TO 220/ TO 247/ TO 248	
				
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	TO 218/ TO 220/ TO 247/ TO 248	
SK 437 35 STS 2	35	18	TO 218/ TO 220/ TO 247/ TO 248	
surface:		black anodised		

Extruded heatsinks for PCB mounting

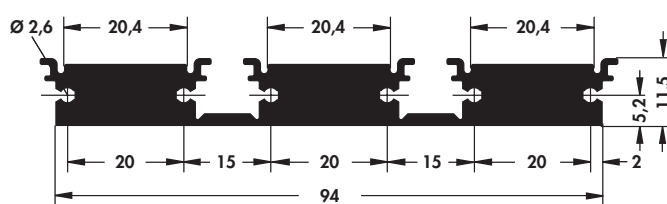
- special versions on customer's request
- **L** = solderable pin

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

  			
art. no.	W [mm]	R _{th} [K/W]	Φ
SK 469 25 STS	25	15.3	SOT 32/ TO 220
SK 469 30 STS	30	14.3	SOT 32/ TO 220
SK 469 35 STS	35	13.0	SOT 32/ TO 220
SK 469 50 STS	50	10.6	SOT 32/ TO 220

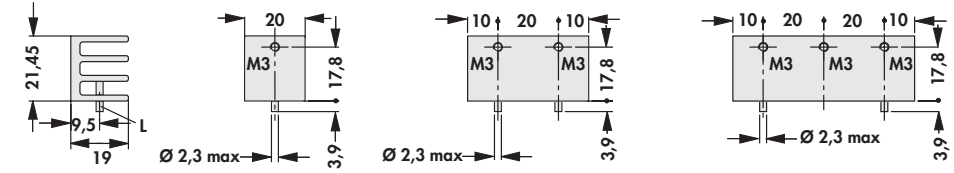
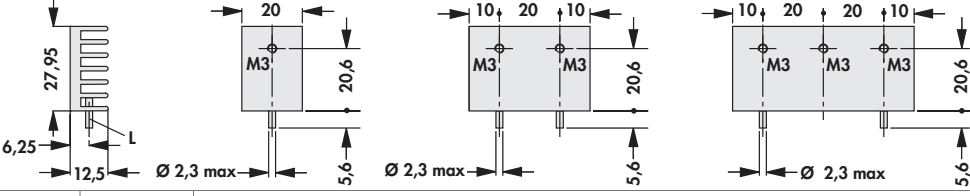
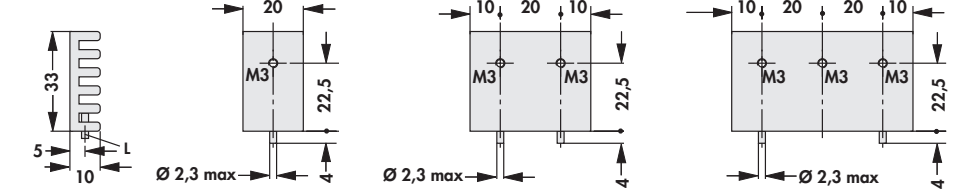
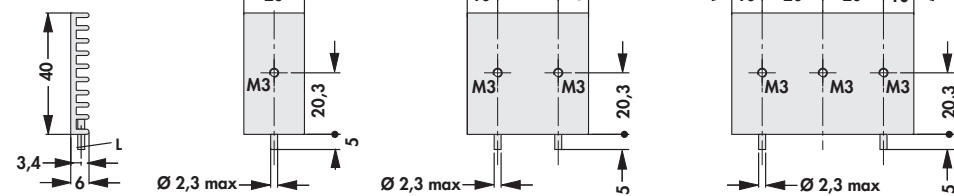
surface:	black anodised
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- as mounting- and connecting piece
- for clamp mounting of the transistors
- triple unit can be separated
- solder pin mounting possible
- special versions on customer's request

 			
art. no.	W [mm]	R _{th} [K/W]	Φ
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	TO 218/ TO 220/ TO 247/ TO 264/ TO 3 P
SK 484 50	50.0	3.7	TO 218/ TO 220/ TO 247/ TO 264/ TO 3 P
SK 484 75	75.0	2.8	TO 218/ TO 220/ TO 247/ TO 264/ TO 3 P

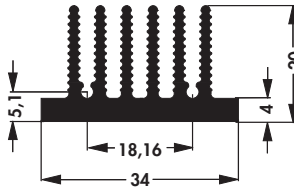
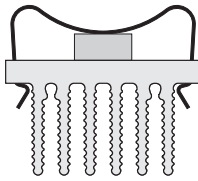
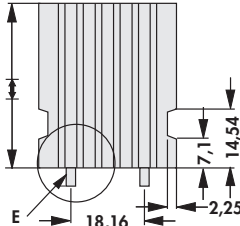
Extruded heatsinks for PCB mounting

- 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

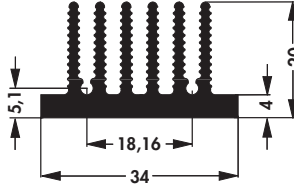
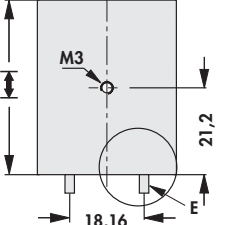
	SK 454 20 1 x M3 L SK 454 40 2 x M3 L SK 454 60 3 x M3 L		
			
	art. no.	W [mm]	R_{th} [K/W]
	SK 454 20 1 x M3 L	20	10.1
	SK 448 20 1 x M3 L SK 448 40 2 x M3 L SK 448 60 3 x M3 L		
			
	art. no.	W [mm]	R_{th} [K/W]
	SK 448 20 1 x M3 L	20	11.8
	SK 400 20 1 x M3 L SK 400 40 2 x M3 L SK 400 60 3 x M3 L		
			
	art. no.	W [mm]	R_{th} [K/W]
	SK 400 20 1 x M3 L	20	11.6
	SK 456 20 1 x M3 L SK 456 40 2 x M3 L SK 456 60 3 x M3 L		
			
	art. no.	W [mm]	R_{th} [K/W]
	SK 456 20 1 x M3 L	20	13.0

Extruded heatsinks for PCB mounting

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

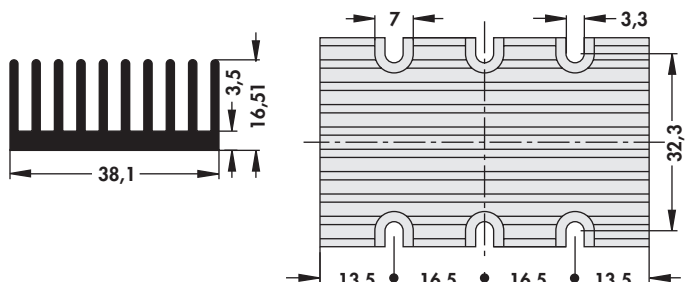
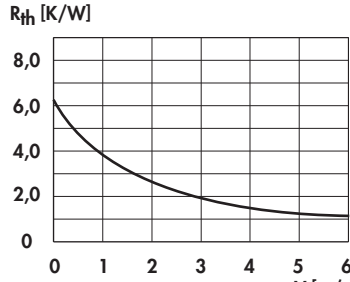
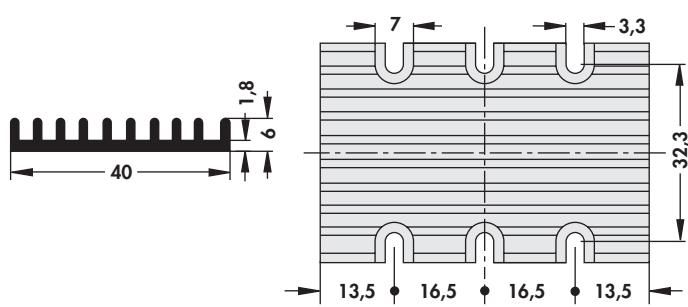
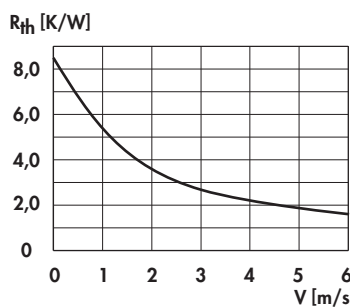
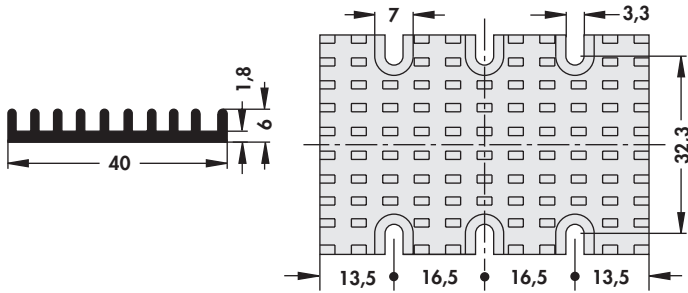
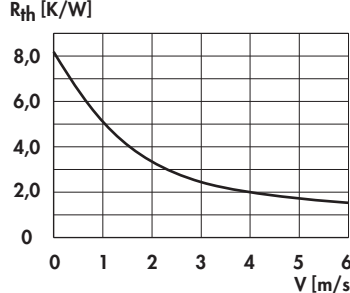
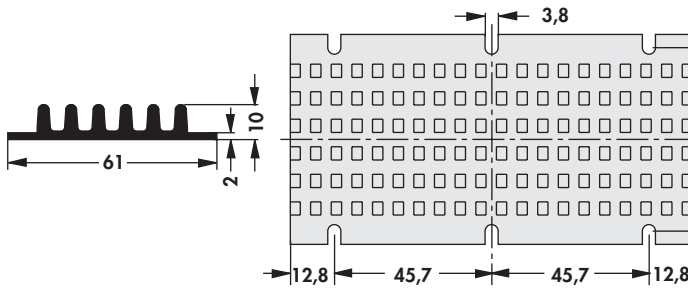
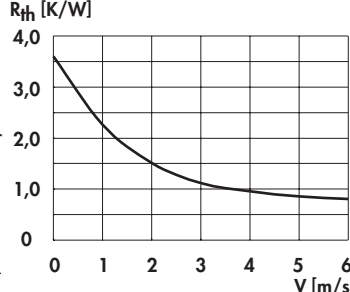
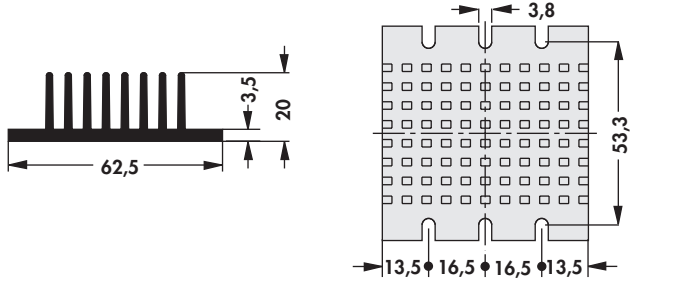
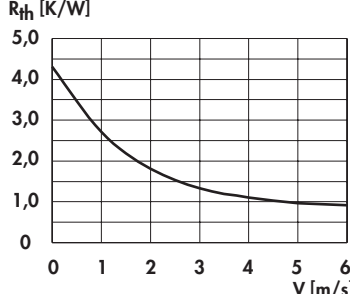
	 ... STC	 ... STIC	 ... STCB
art. no.	L [mm]	R _{th} [K/W]	
SK 460 25 ...	25.0	9.0	SIP-Multiwatt/ TO 218/ TO 220/ TO 247/ TO 248
SK 460 37,5 ...	37.5	7.9	SIP-Multiwatt/ TO 218/ TO 220/ TO 247/ TO 248
SK 460 50 ...	50.0	7.0	SIP-Multiwatt/ TO 218/ TO 220/ TO 247/ TO 248
please indicate: ... mounting method STC = with solder pin STIC = with solder pin and insulating washer STCB = with threaded bolt M 3, brass			
surface:		black anodised	

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

	 STS	 STIS	
art. no.	L [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	SIP-Multiwatt/ TO 218/ TO 220/ TO 247/ TO 248
SK 460 50 STIS	50.0	7.0	SIP-Multiwatt/ TO 218/ TO 220/ TO 247/ TO 248
surface:		black anodised	

Extruded heatsinks for DC/DC converter

– special versions on customer's request

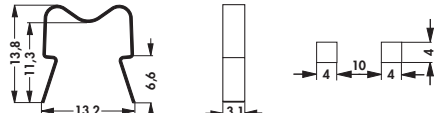
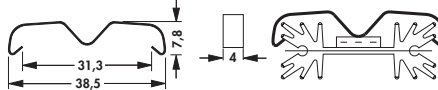
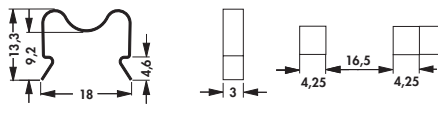
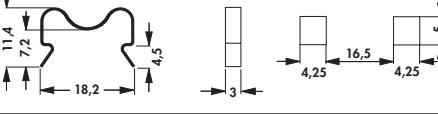
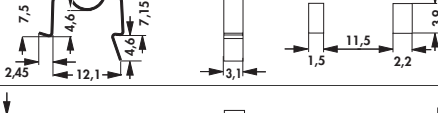
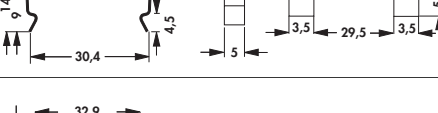
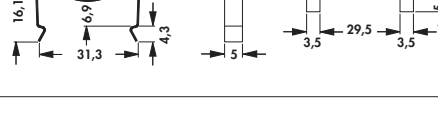
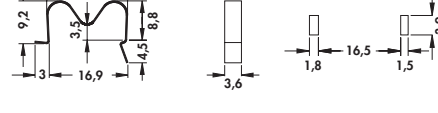
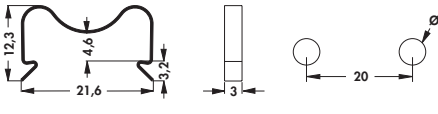
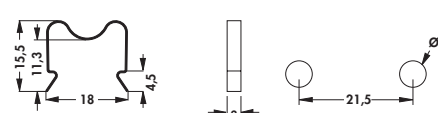
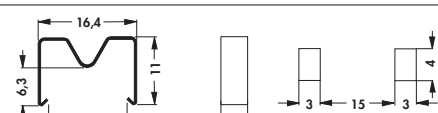
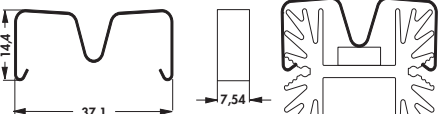
art. no. SK DC 10 60 SA		
art. no. SK DC 8 60 SA		
art. no. SK DC 8 1 60 SA		
art. no. SK DC 4 1 117 SA		
art. no. SK DC 6 1 60 SA		
surface:	black anodised	

Extruded heatsinks for DC/DC converter

– special versions on customer's request

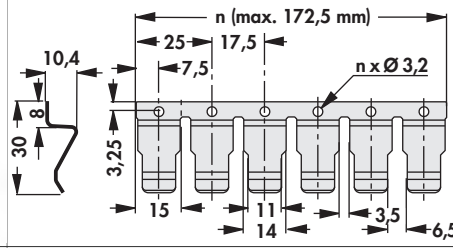
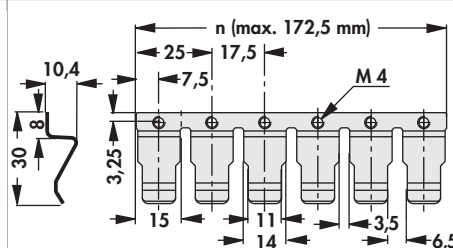
art. no.		
SK DC 7 117 SA		
SK DC 7 1 117 SA		
SK DC 2 1 76 SA		
SK DC 5 59 SA		
SK DC 5 1 59 SA		
surface:	black anodised	

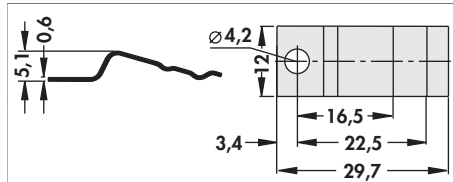
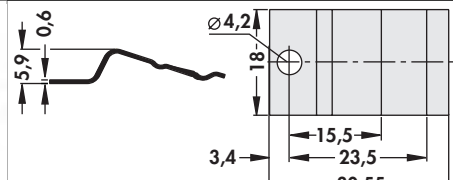
Retaining springs for transistors

art. no.	for transistor-housing	suitable for heatsinks	plate thickness [mm]	material	
THF 129 TO 220	TO 220	FK 219/ FK 222/ SK 129	1-2	spring steel, corrosion protected	
THF 104	TO 220/ TO 247/ TO 248/ TO 3 P	SK 104	1-2	stainless steel	
THF 409 TO 220	TO 220/ TO 247/ TO 248/ TO 3 P	SK 409	1.5-3.0	stainless steel	
THF 409 SOT 32	TO 126/ SOT 32/ SOT 82	SK 409	2-3	stainless steel	
THF 220	TO 220	FK 219/ FK 222	1-2	spring steel, corrosion protected	
THF 247	TO 220/ 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 17	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P	UK 35	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 409 220 2	TO 218/ TO 220/ TO 247/ TO 248/ TO 3 P	SK 145/ SK 185/ SK 437	4	stainless steel	
THF 249	TO 220	FK 249	1.0-1.5	spring steel, corrosion protected	
THF 600	TO 218/ TO 220/ TO 247/ TO 3 P	SK 600	2.5	spring steel, corrosion protected	

Retaining springs for transistors

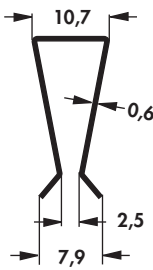
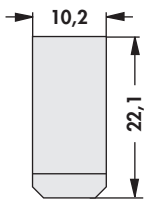
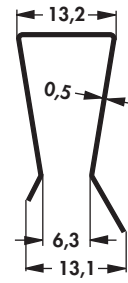
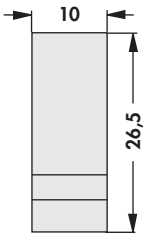
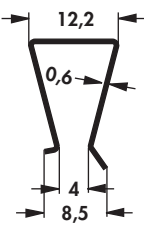
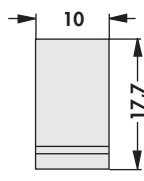
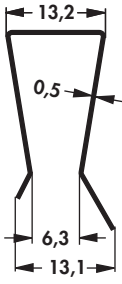
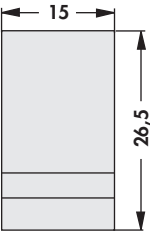
- universal **retaining spring** for transistor housings types TO 218, TO 220, TO 247, TO 264, SOT 32 and various SIP Multiwatt etc.
- utility patent 200 14 739.0
- fast and easy mounting of the transistors
- number of retaining spring elements can be chosen (**n = max. 10**)
- **THFMG** with thread 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	60 ±5	stainless steel		
THFMG ...	TO 218/ TO 220/ TO 247/ TO 264/ SOT 32/ SIP Multiwatt	60 ±5	stainless steel		
please indicate: ... number of retaining-spring elements 1 - 10					

art. no.	for transistor-housing	spring force [N]	material		
THFK 220	TO 220	79	stainless steel		
THFK 247	TO 218/ TO 247	119	stainless steel		

Retaining springs for transistors

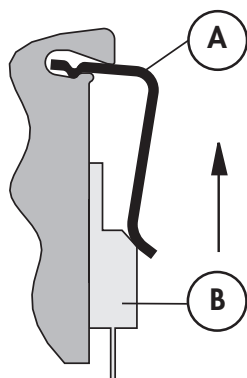
- able to slide on the transistor and mounting plate
- easy mounting
- high pressure force and firm grip
- specific versions upon customer's request

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			

- **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 range of suitable heat sinks is continuously extended
- versions specifically designed to meet customers requirements on request

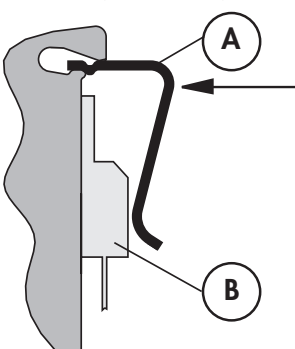
Installation

THFU 1

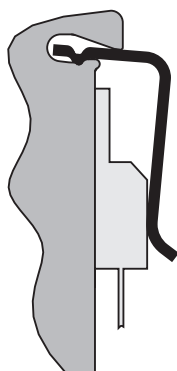


- **insert** the lock-in retaining spring for transistors THFU 1 (A) into the groove of the profile
- **push** transistor (B) below the spring

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

Mica wafers

Lock-in retaining spring for transistors

Heatsinks for PCB

Mounting material for semiconduct.

→ E 19

→ A 119 – 121

→ A 89 – 91

→ E 44 – 48

Thermal conductive material

Mounting parts for heatsinks

Thermal conductive paste

Technical introduction

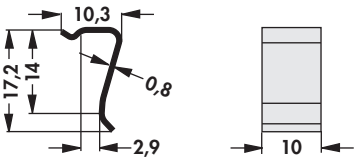
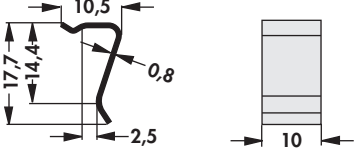
→ E 2 – 5

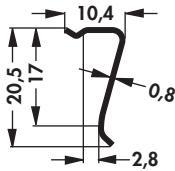
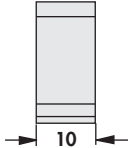
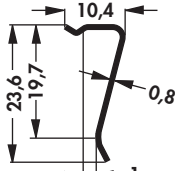
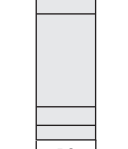
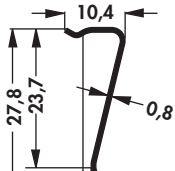
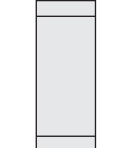
→ E 49 – 50

→ E 21 – 22

→ A 2 – 8

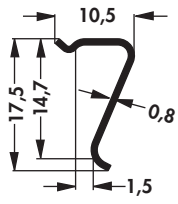
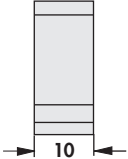
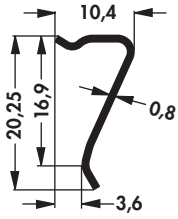
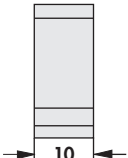
Lock-in retaining spring for transistors

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/	60 ±5	stainless steel		
		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/				
		LAM 3 K/				
		LAM 4 K/				
		LAM 5 K/				
		LA 27 K				
THFU 2	TO 218/ TO 220/ TO 247/ TO 262/ TO 3 P/ SOT 199/ SOT 429	SK 480/	60 ±5	stainless steel		
		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/				
		LAM 3 K/				
		LAM 4 K/				
		LAM 5 K/				
		LA 27 K				

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/ LAM 3 K/ LAM 4 K/ LAM 5 K/ LA 27 K	50 ±5	stainless steel	  
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 490/ SK 495/ SK 499/ SK 514/ SK 575/ SK 589/ SK 593/ SK 617/ LAM 5 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/ LAM 5 K/ LA 27 K	25 ±5	stainless steel	  

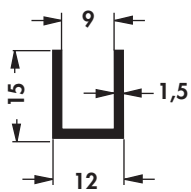
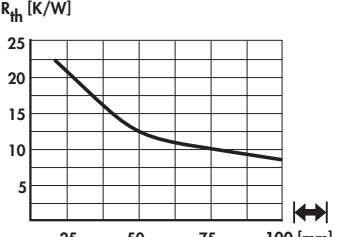
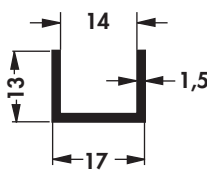
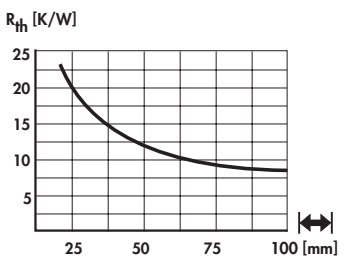
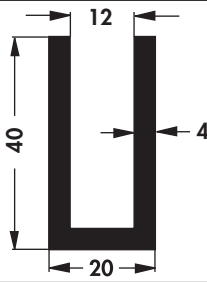
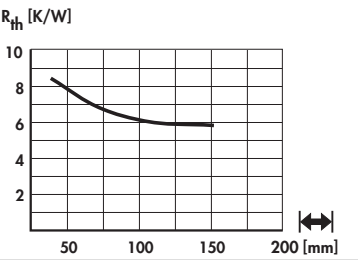
Lock-in retaining spring for transistors

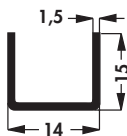
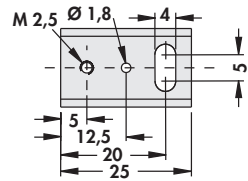
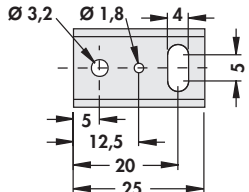
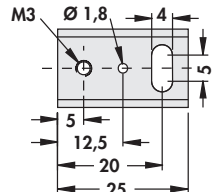
– THFU for transistors with low component height

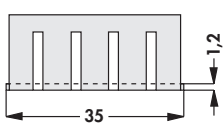
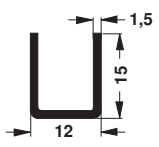
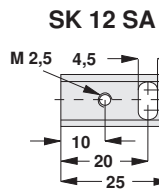
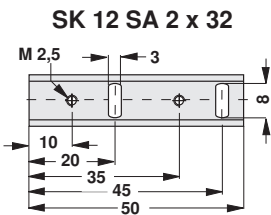
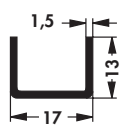
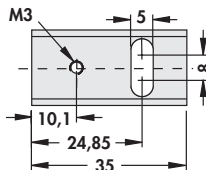
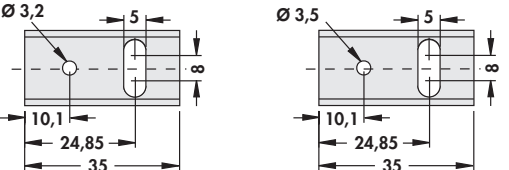
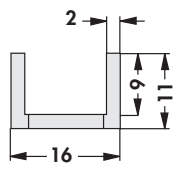
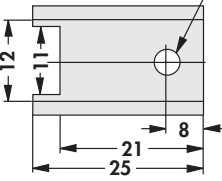
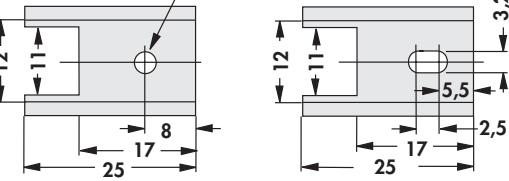
art. no.	for transistor-housing	suitable for heatsinks	spring force [N]	material		
THFU 6	TO 126/ TO 218/ TO 220/ TO 225/ TO 247/ TO 248/ TO 251/ TO 3 P/ SOT 32	SK 480/ SK 481/ SK 482/ SK 483/ SK 487/ SK 489/ SK 490/ SK 492/ SK 495/ SK 499/ SK 512/ SK 514/ SK 573/ SK 574/ SK 575/ SK 576/ SK 589/ SK 593/ SK 617/ LAM 3 K/ LAM 4 K/ LAM 5 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/ LAM 3 K	46 ±5	stainless steel		 

A
B
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M
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U-Extruded heatsinks

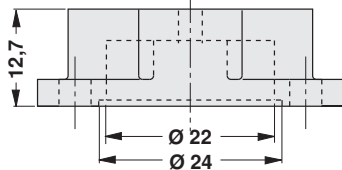
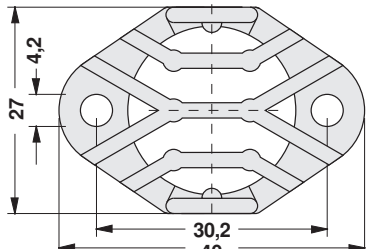
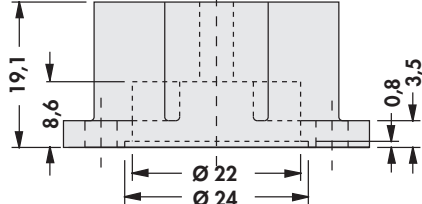
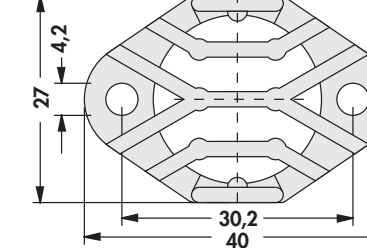
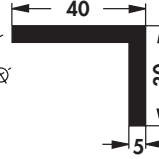
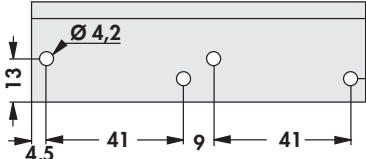
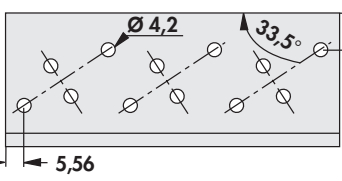
art. no. SK 12 ...		
please indicate: ...  1000 mm		
art. no. SK 13 ...		
please indicate: ...  25 35 mm		
art. no. SK 115 ...		
please indicate: ...  37.5 50 1000 mm		

	 UK 14 SA 220  UK 14 SA 220 3,2  UK 14 SA M3 		
art. no.	R_{th} [K/W]	Φ	
UK 14 SA 220	20	TO 220	
UK 14 SA 220 3,2	20	TO 220	
UK 14 SA M3	20	TO 220	
surface:	black anodised		

		
art. no. ICK 35 SA	R_{th} [K/W] 15	Φ TO 220
	 	
art. no.	R_{th} [K/W]	Φ
SK 12 SA 32	30	1xSOT 32
SK 12 SA 2 x 32	15	2xSOT 32
	 	
art. no.	R_{th} [K/W]	Φ
SK 13 35 SA 220	17	TO 220
SK 13 35 SA 220 3,2	17	TO 220
SK 13 35 SA 220 3,5	17	TO 220
	 	
art. no.	R_{th} [K/W]	Φ
SK 431 1	18	TO 220
SK 431 2	18	TO 220
SK 431 3	18	TO 220
surface:	black anodised	

Die-cast heatsinks

Setup 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 ...	100	3.7	TO 3
please indicate: ... surface			
SA = black anodised			
AL = raw degreased aluminium			

socket: TF 3 2 → E 50

Die-cast heatsinks

Die-cast acc. to german standard DIN 41882

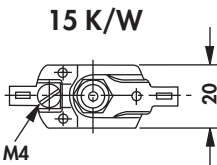
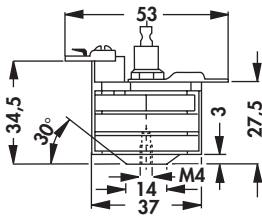
– other lengths and drillings on request

art. no.			
K 3 ...		for mounting use insulator: art. no.: IS 53	
please indicate: ... semiconductor retaining thread M 6, M 8, M 10, M 12, 1/4"-28 UNF			
art. no.			
K 3 T ...		Cathode lug insulator with an additional insulated connection (M 3). for mounting use insulator: art. no.: IS 53	
please indicate: ... semiconductor retaining thread M 6, M 8			
art. no.			
K 5 ...		for mounting use insulator: art. no.: IS 53	
please indicate: ... semiconductor retaining thread M 5, M 6, M 8, 1/4"-28 UNF			
art. no.			
K 9 ...			
please indicate: ... semiconductor retaining thread M 4, M 5			
surface:		black lacquered	

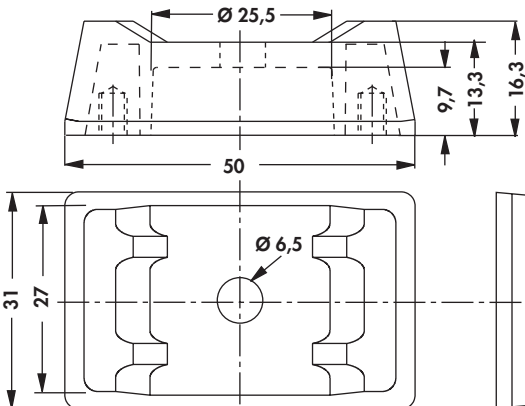
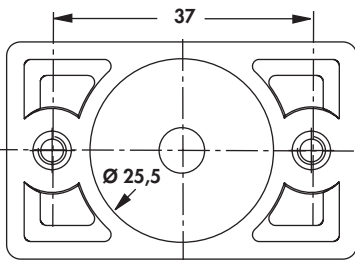
Die-cast heatsinks

Die-cast acc. to german standard DIN 41882

– other lengths and drillings on request

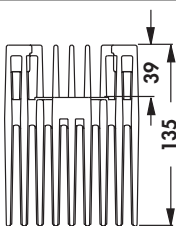
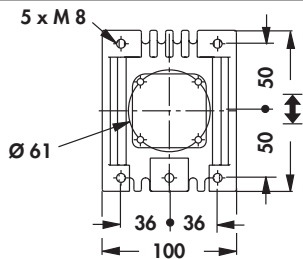
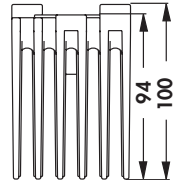
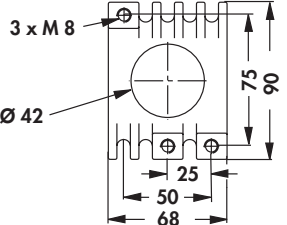
art. no.				
K 15 ...				
please indicate: ... semiconductor retaining thread M 4, M 5				
surface:		black lacquered		

Mounting parts for heatsinks

art. no.				
IS 53				

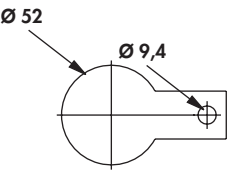
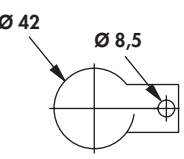
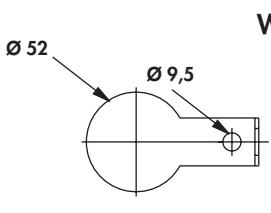
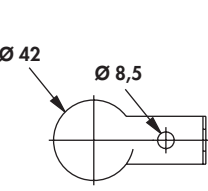
Die-cast heatsinks

- 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
- strap fastening thread M 8
- delivery without anode strap
- other lengths and drillings on request

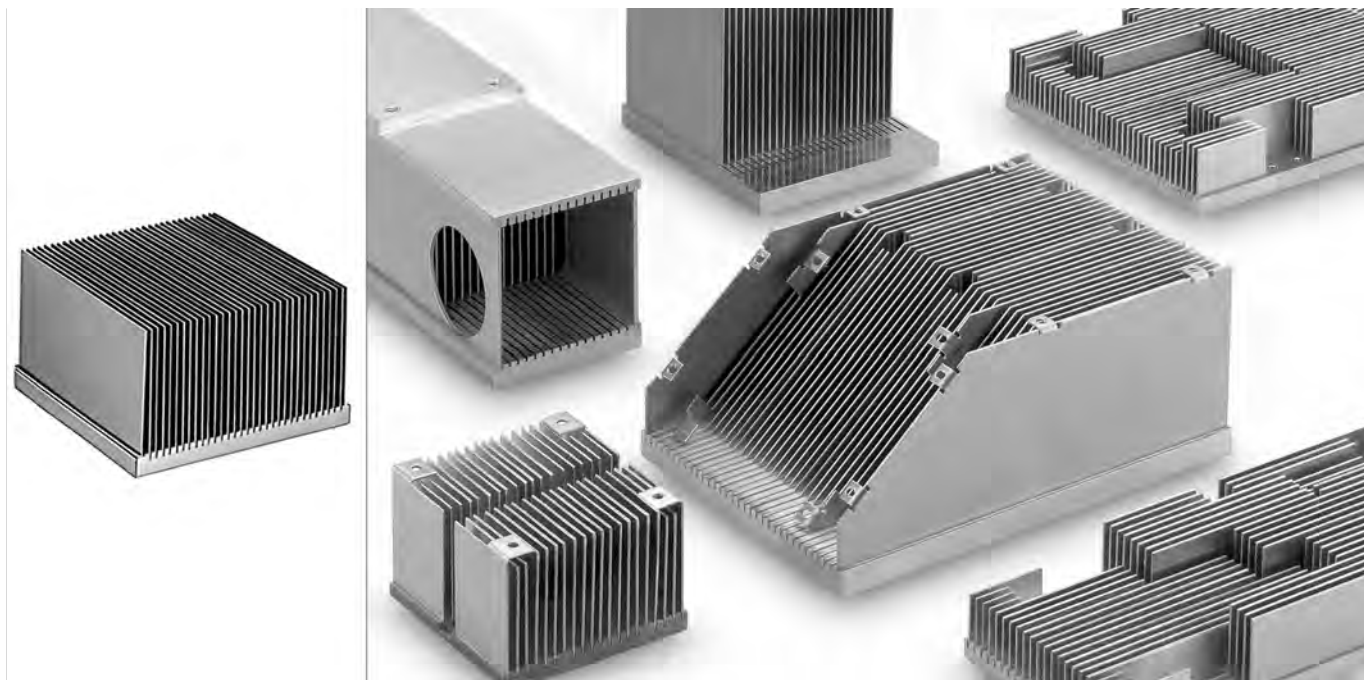
		
art. no.	[mm]	R_{th} [K/W]
K 0,55 ...	120	0.55
please indicate: ... semiconductor retaining thread M 12, M 24 x 1,5		
		
art. no.	[mm]	R_{th} [K/W]
K 1,1 ...	90	1.1
please indicate: ... semiconductor retaining thread M 8, M 12, M 16 x 1,5		
surface:	black lacquered	

Accessories

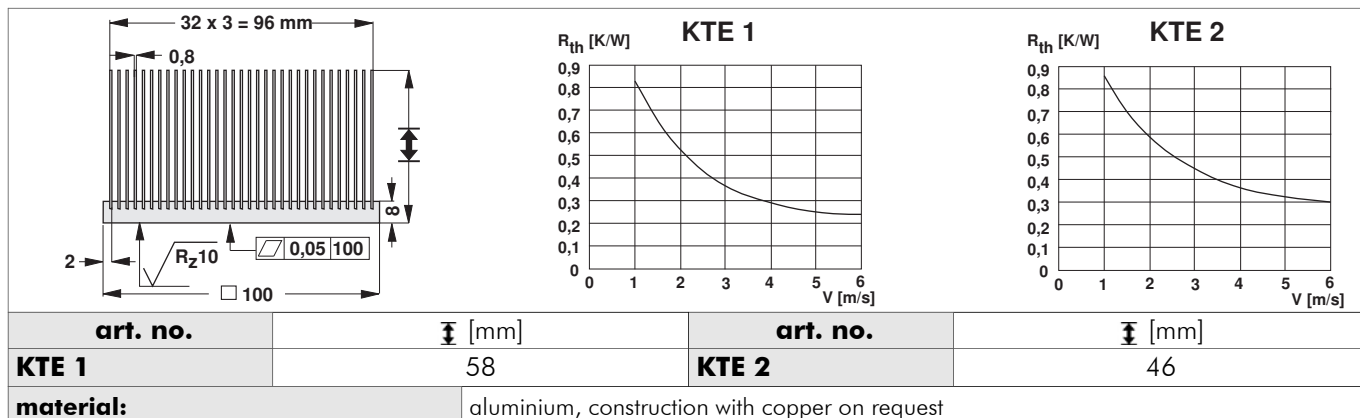
- anode end strap made of tin-plated cathode copper

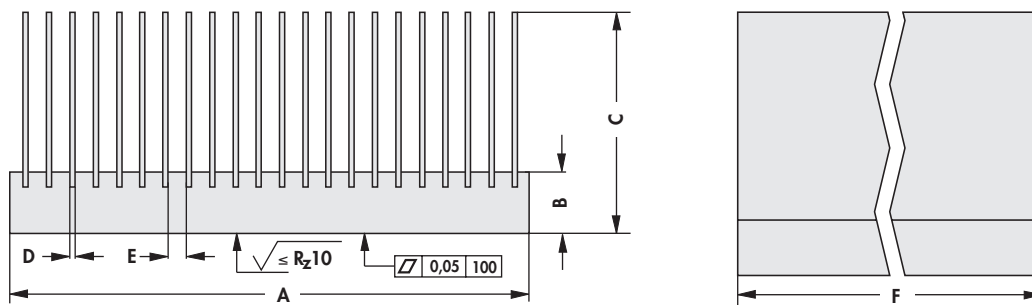
	FL 0,55		FL 1,1
art. no.	FL 0,55	art. no.	FL 1,1
	WL 0,55		WL 1,1
art. no.	WL 0,55	art. no.	WL 1,1

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 cooling
- ideally fitted fins from a heat engineer's point of view
- 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



KTE


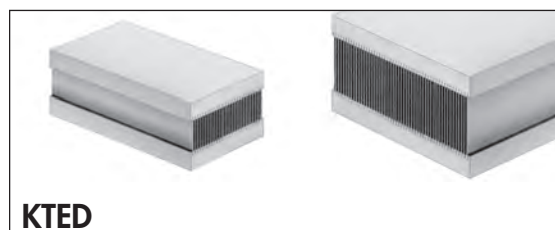
possible dimensions:

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

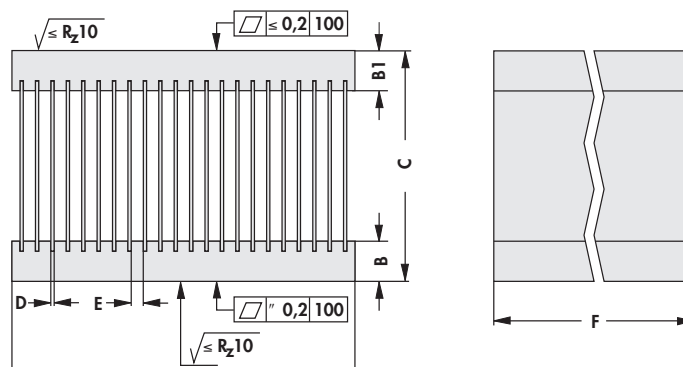
please indicate with your order:

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 fins from a heat engineering point of view
- lapped finish on request
- additional machining according to customer's requirements
- fan versions on request
- special constructions to customer's indications



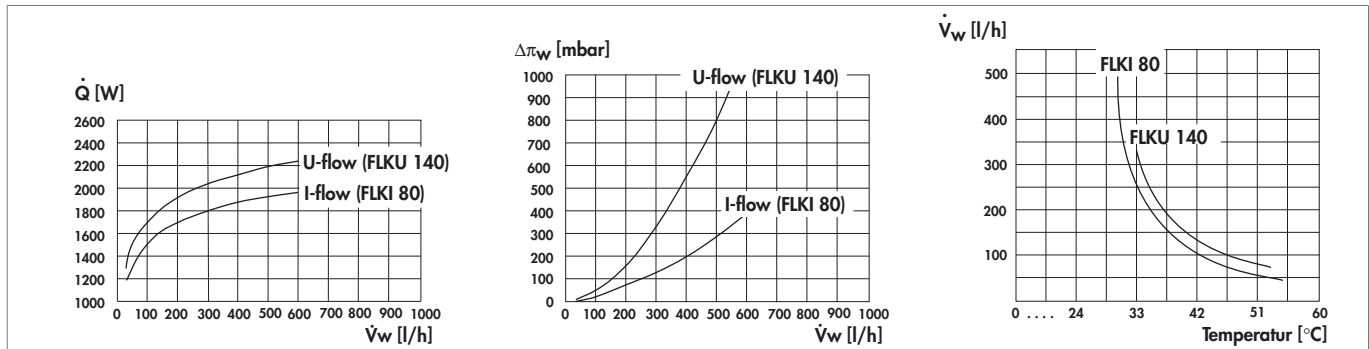
possible dimensions:

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				

material: aluminium, construction with copper upon request



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

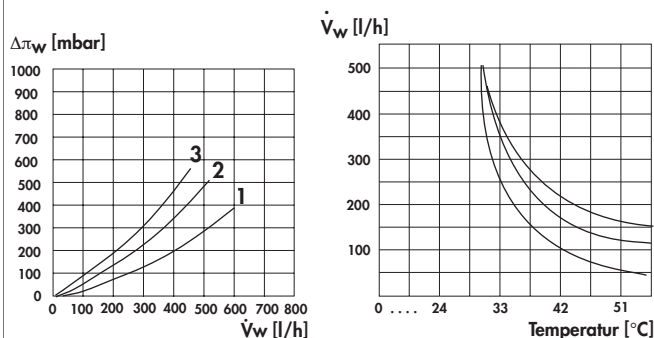
Fluid cooler for dissipating large quantities of heat with low space requirement; **effective system to cool power modules**; suitable for water pH 6.5-8.5 with anticorrosives, as well as other fluids (eg. oil, alcohols, etc.); **compact design with internal fin structure for particularly good heat transfer 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.

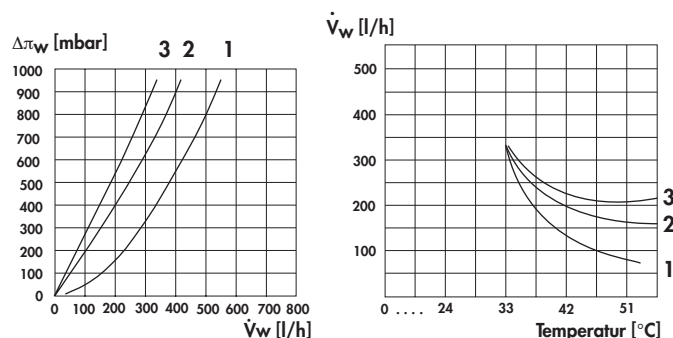
– dimensions and designs using customer's instructions

art. no.		
FLKI 80		
art. no.		
FLKU 140		
material:	EN AW 6060 (AlMgSi 0.5)	

1 = FLKI 80 G 500 2 = FLKI 80 G 300 3 = FLKI 80 G 200



1 = FLKU 140 G 500 2 = FLKU 140 G 300 3 = FLKU 140 G 200

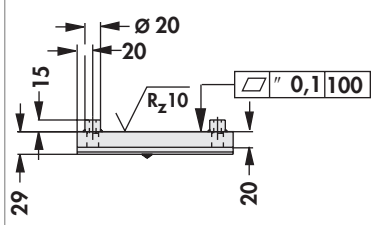
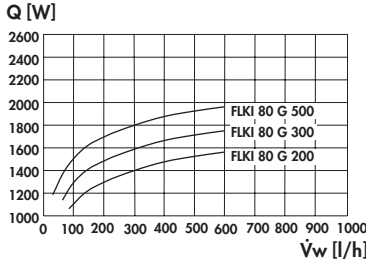
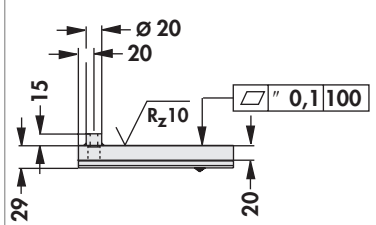
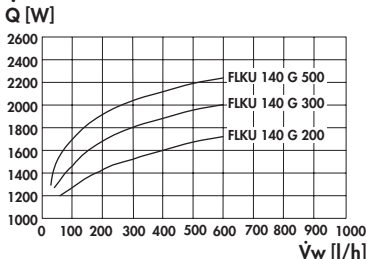


– water-glycol mixture (60/40); inlet temperature approx. 26 °C

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 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 evenness 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; **connctions 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.

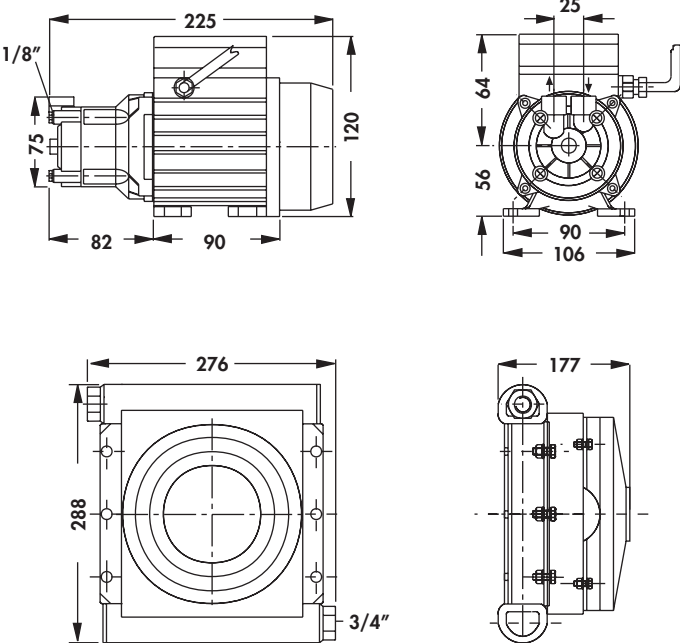
– dimensions and designs using customer's instructions

			
	art. no.	art. no.	
	FLKI 80 G 200	FLKI 80 G 500	
	FLKI 80 G 300		
			
	art. no.	art. no.	
	FLKU 140 G 200	FLKU 140 G 500	
	FLKU 140 G 300		
material:		EN AW 6060 (AlMgSi 0.5)	

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 recooling
- pump as normally aspirating, single-stage centrifugal pump with spiral housing in block construction
- recooling 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)

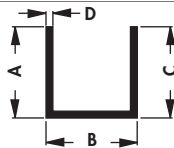
To avoid corrosion in the water cooler the cooling fluid has to flow in a closed circuit and it has to contain 40-60% (preferred is 50%) anti-corrosive fluids for aluminium, if necessary with anti-freeze. For the choice and approval of the cooling fluid as well as for the possible consequences in the 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 recooling

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	20	40	20	2.0	SU 27	40	40	40	2.5
SU 05	30	20	30	2.0	SU 29	40	40	40	4.0
SU 09	20	20	20	1.5	SU 32	30	30	30	3.0
tolerances:				EN 755					
material:				EN AW 6060 (AlMgSi 0.5)					

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	8
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	10	SFP 079	90	100
SFP 037	55	10	SFP 090	120	15
SFP 046	25	5	SFP 100	100	15
SFP 054	50	10	SFP 106	40	20
SFP 057	115	100	SFP 112	100	25
tolerances:				EN 755	
material:				EN AW 6060 (AlMgSi 0.5)	

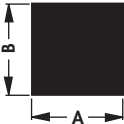
angled profile



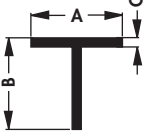
art. no.	A [mm]	B [mm]	C [mm]	art. no.	A [mm]	B [mm]	C [mm]
SWP 02	80	80	8	SWP 29	15	10	2
SWP 06	80	40	6	SWP 36	75	50	5
SWP 10	30	20	2	SWP 40	40	30	5
SWP 15	40	20	4	SWP 55	40	40	5
SWP 23	20	15	2	SWP 57	60	30	5
SWP 25	50	30	5				
tolerances:				EN 755			
material:				EN AW 6060 (AlMgSi 0.5)			

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 (AlMgSi 0.5)			

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 (AlMgSi 0.5)				

Hole pattern
Extruded heatsinks
Mounting for TO 3 angle
High capacity heatsinks

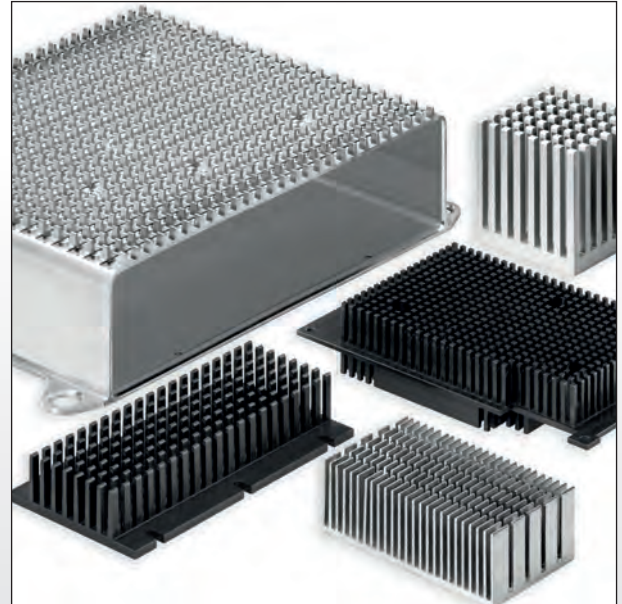
→ A 21
→ A 22 – 83
→ A 125 – 126
→ A 57 – 58

Construction parts made of aluminium→ A 139
Heatsink as visual & decor-parts → A 10
Special profiles → A 140
Technical introduction → A 2 – 8



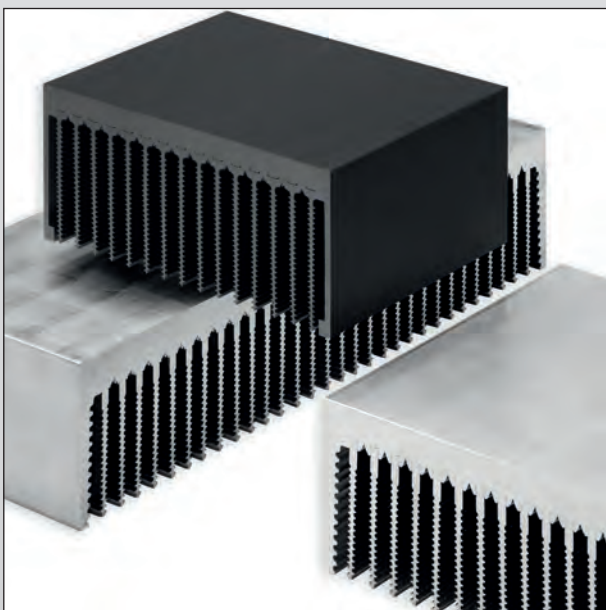
Customer specified CNC treatments of cooling profiles

- latest CNC machining centres for highest quality demands
- profile treatments for sizes 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



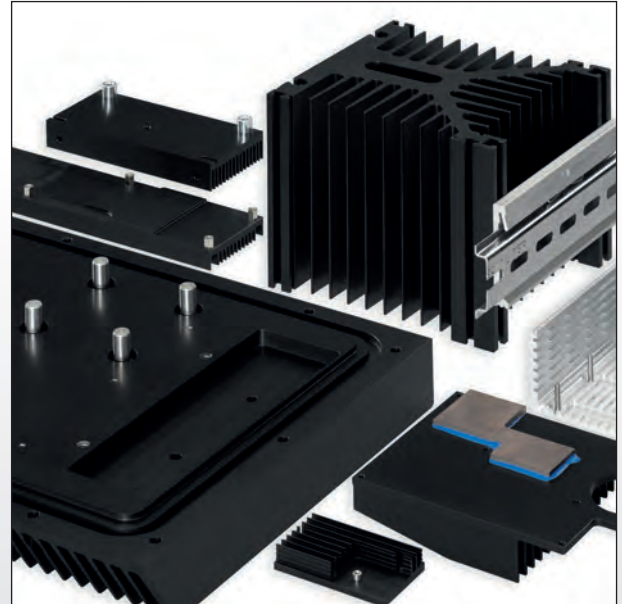
Precise milled flat surfaces

- 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



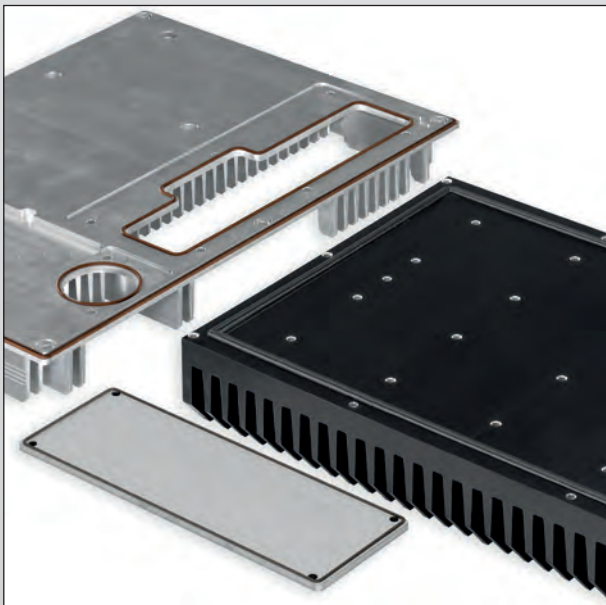
Surface labelling

- 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



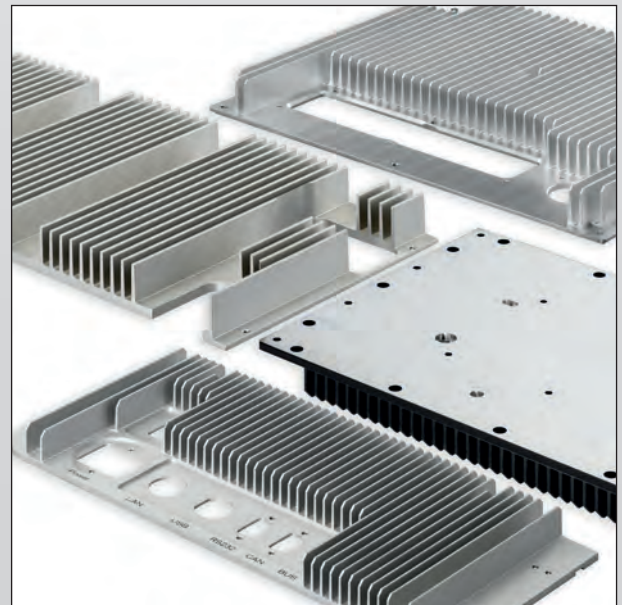
Additional equipments

- 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



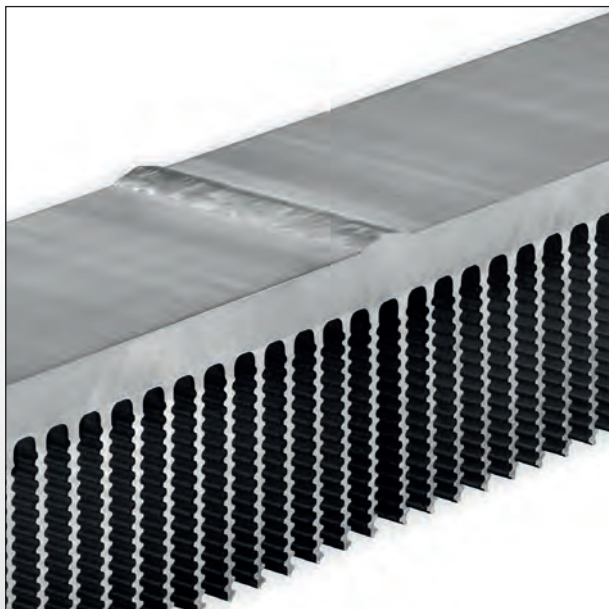
Heatsinks with integrated sealing

- 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



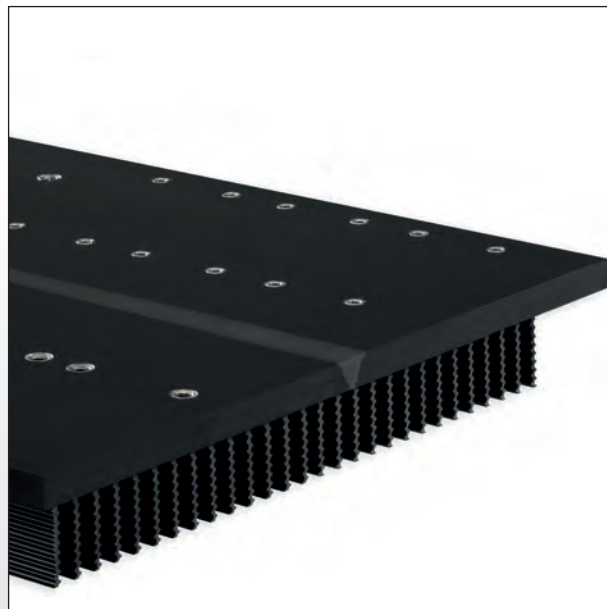
19" compliant CNC-treatment

- 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



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



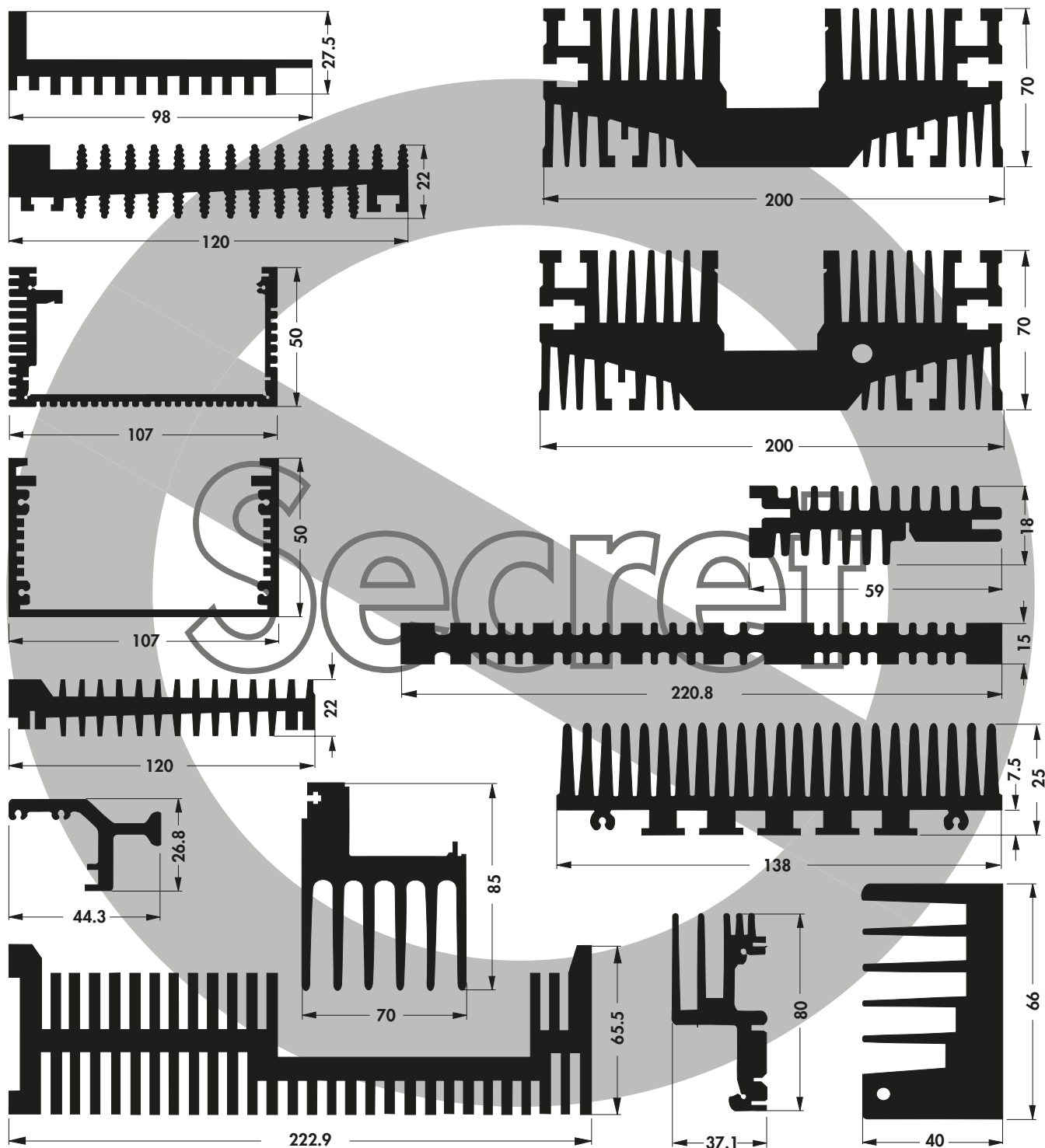
Cases and contour milled parts made of aluminium

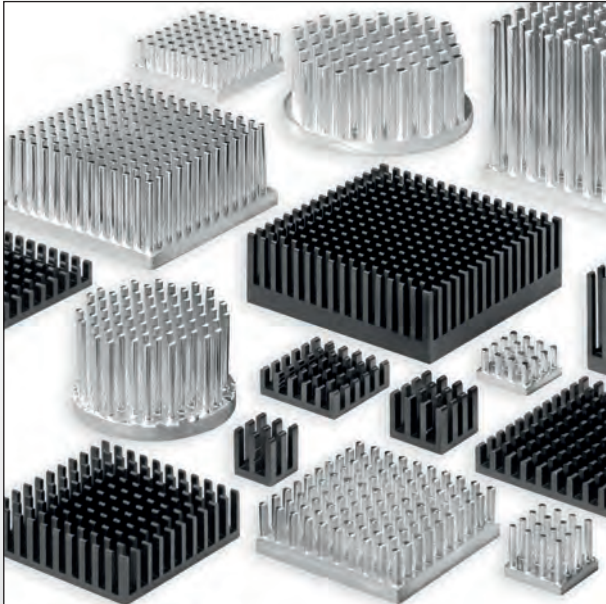
- customer specific cases and construction parts
- precise mechanical treatments for highest quality demands
- all requested surface designs
- modifications and versions, special requirements, treatments and designs according to your drawing specification

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.





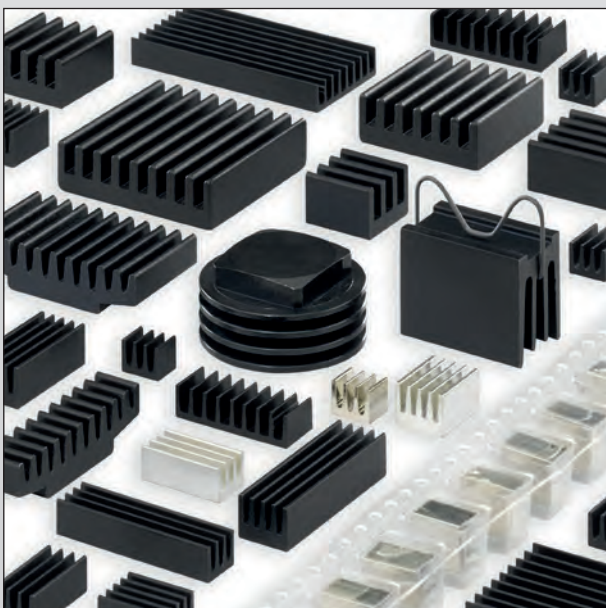
Round and pin heatsinks

- 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



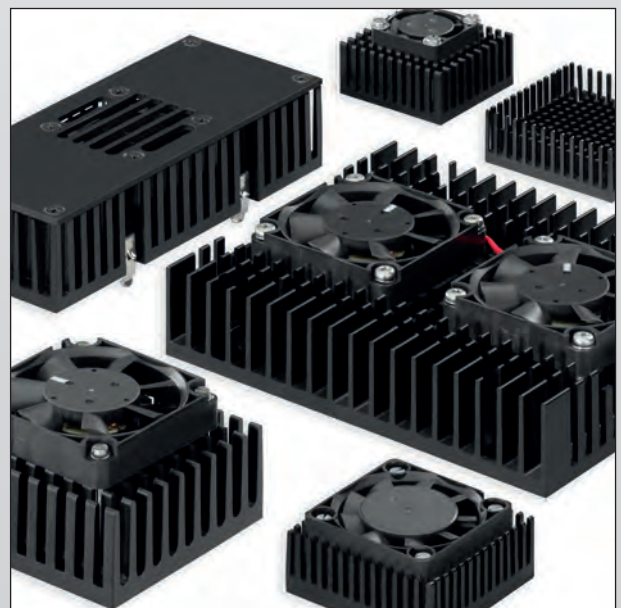
Heatsinks for LEDs

- 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 11	20	6.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 8 x 8 x 12	B 11	14.8	8.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 9 x 9	B 11	14	3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 11 x 11 x 8	B 11	16	7.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 11 x 11	B 11	10.9	4.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 11 x 11 x 12	B 12	12.3	3.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 14 x 14	B 12	10	4.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 14 x 14 x 10	B 12	10.5	11.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 14 x 14 x 14	B 12	9.6	12.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 14 x 14 x 12	B 12	9.8	5.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 15 x 15	B 12	9.4	5.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 16 x 16 x 8	B 13	14	4.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 16 x 16 x 10	B 13	10.5	12.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 16 x 16 x 12	B 13	9.3	6.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 17 x 17	B 13	8.6	6.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 17 x 17 x 8	B 13	13.2	5.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 17 x 17 x 12	B 13	9	6.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 18 x 18	B 14	8.4	7.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 19 x 19	B 14	8.6	7.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 19 x 19 x 12	B 14	9	6.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 20 x 20 x 10	B 14	8.5	15.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 20 x 20	B 14	7.6	8.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 20 x 20 K	B 15	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 8	B 15	12	6.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 20 x 20 x 12	B 15	8	8.1	therm. conductive foil/ therm. cond. adhesive	universal	universal

- 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

Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK PGA 21 x 21	B 15	7	8.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 22 x 22	B 15	6.2	8.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PGA 25 x 25	B 16	5	11.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 10 x 10	B 17	30	1.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 10 x 10 x 10	B 17	28.5	1.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 14 x 14	B 17	30	2.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 14 x 14 x 10	B 17	27.4	2.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 21 x 21	B 18	24.3	2.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 23 x 23	B 18	22.5	2.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 23 x 23 x 10	B 18	21.5	2.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 27 x 27	B 18	20	3.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 27 x 27 x 10	B 18	18.5	3.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 27 x 27 x 14	B 18	13.5	9.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 27 x 27 x 22	B 19	10.5	9.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 31 x 31	B 19	18.6	3.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 31 x 31 x 10	B 19	17	3.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 35 x 35	B 19	16.5	3.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 35 x 35 x 10	B 19	15.7	3.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 37 x 37 x 6	B 19	15.7	9.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 37 x 37 x 10	B 20	14	10.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 40 x 40	B 20	14.6	4.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 40 x 40 x 10	B 20	13.8	4.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK BGA 42,5 x 45	B 20	13.6	4.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 10 x 10 x 6,5	B 21	25	2.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 10 x 10 x 10	B 21	23.75	2.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 10 x 10 x 12,5	B 21	22.5	2.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 10 x 10 x 18,5	B 22	21.75	3	therm. conductive foil/ therm. cond. adhesive	universal	universal

Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK S 14 x 14 x 6,5	B 22	9	5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 14 x 14 x 10	B 22	8.8	5.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 14 x 14 x 12,5	B 22	8.1	5.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 14 x 14 x 18,5	B 22	7.9	5.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 17 x 17 x 15	B 22	8.36	5.95	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 17 x 17 x 20	B 23	7.89	6.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 18 x 18 x 6,5	B 23	7	7.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 18 x 18 x 10	B 23	6.8	8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 22 x 22 x 10	B 23	5.9	8.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 22 x 22 x 18,5	B 23	5	10	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 25 x 25 x 6,5	B 23	5.8	12.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 25 x 25 x 12,5	B 24	5.3	14.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 25 x 25 x 18,5	B 24	5.2	14.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 29 x 29 x 10	B 24	5.7	13.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 29 x 29 x 20	B 24	3.7	20.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 29 x 29 x 30	B 24	2.9	21	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 32 x 32 x 10	B 24	5.4	13.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 32 x 32 x 20	B 25	3.7	20.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 36 x 36 x 10	B 25	4.7	16	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 36 x 36 x 15	B 25	3.9	19.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 36 x 36 x 20	B 25	3.2	22	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 36 x 36 x 30	B 25	2.5	23.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 40 x 40 x 10	B 25	4.6	16.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 40 x 40 x 20	B 26	3.5	21.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 40 x 40 x 25	B 26	3.1	23.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 45 x 45 x 10	B 26	4.7	16	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 45 x 45 x 20	B 26	4.4	17	therm. conductive foil/ therm. cond. adhesive	universal	universal

- 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

Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK S 50 x 50 x 20	B 26	2.7	27.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 50 x 50 x 25	B 26	2.4	31.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 50 x 50 x 40	B 27	6.05	13.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 50 x 50 x 50	B 27	4.05	14.32	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 98 x 98 x 30	B 27	2.4	35	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S 98 x 98 x 45	B 27	3.5	42	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S D 12 x 12 x 7,5	B 28	10.85	4.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S D 18 x 12 x 7,5	B 28	9	5.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S D 24 x 18 x 7,5	B 28	8.5	5.85	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S D 98 x 98 x 10	B 28	4.88	10.25	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 28,5 x 6,5	B 29	5.82	15.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 28,5 x 10	B 29	5.65	16	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 28,5 x 12,5	B 29	5.53	16.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 28,5 x 18,5	B 29	4.25	20.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 32,5 x 10	B 29	5.54	9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 32,5 x 20	B 29	5.6	8.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 32,5 x 30	B 30	4.2	11	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 32,5 x 40	B 30	3.2	15	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 32,5 x 50	B 30	2.7	18	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 36,5 x 20	B 30	6.41	18	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 40 x 10	B 30	11.04	8.4	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 40 x 20	B 30	10.32	8.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R A 40 x 20	B 31	11.62	8.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 40 x 30	B 31	9.77	16	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 40 x 50	B 31	2	25	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 45 x 30	B 31	8	9.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 45 x 45	B 31	6	9.2	therm. conductive foil/ therm. cond. adhesive	universal	universal

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 50 x 10	B 31	5.28	9.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 50 x 20	B 32	8.55	9.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 50 x 30	B 32	8.26	10	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 50 x 45	B 32	6.32	12.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 54 x 20	B 32	8.11	10.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 54 x 30	B 32	6.95	11.57	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 54 x 45	B 33	5.37	15.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 70 x 30	B 33	1.8	27	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 70 x 50	B 33	1.5	33	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 85 x 30	B 33	2	25	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 85 x 45	B 33	1.8	27	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 98 x 30	B 34	1.65	30	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK S R 98 x 50	B 34	1.4	35	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 23,5 x 14	B 35	18.58	6.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 23,5 x 14 G	B 35	19.16	6.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 27 x 10	B 35	17.69	6.7	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 27 x 10 G	B 35	18.24	6.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 28 x 15	B 35	15.24	7.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 28 x 15 G	B 36	15.72	7.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 29 x 11,5	B 36	17.26	8.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 29 x 11,5 G	B 36	17.8	8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 32 x 14	B 36	15.23	7.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 32 x 14 G	B 36	15.23	7.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 33 x 10	B 36	17.6	6.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 33 x 10 G	B 36	18.15	6.6	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 33 x 16,5	B 37	13.87	8.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 33 x 16,5 G	B 37	14.3	8.3	therm. conductive foil/ therm. cond. adhesive	universal	universal

- 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

Heatsinks for IC processor

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
ICK LED R 35 x 10	B 37	16.9	9.35	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 35 x 10 G	B 37	17.5	9.2	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 36 x 12	B 37	12.88	10	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 36 x 12 G	B 37	13.28	8.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 40 x 10	B 37	12.28	9.45	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 40 x 10 G	B 38	12.66	9.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 40 x 27	B 38	9.41	12.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 40 x 27 G	B 38	9.71	11.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 45,7 x 16,5	B 38	10.46	11.05	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 45,7 x 16,5 G	B 38	10.49	10.8	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 50 x 10	B 38	10.57	10.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 50 x 10 G	B 39	10.9	10.3	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 50,8 x 16,5	B 39	10.17	11.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 50,8 x 16,5 G	B 39	10.49	10.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 54 x 20	B 39	9.48	12.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 54 x 20 G	B 39	9.78	11.9	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 66 x 40	B 39	3.2	21	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 75 x 10	B 40	5.2	12.1	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 84 x 40	B 40	2.5	14.5	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 100 x 40	B 40	2	27	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 160 x 40	B 40	1.4	42	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK LED R 200 x 40	B 41	1	51	therm. conductive foil/ therm. cond. adhesive	universal	universal

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 49	1.4	35	therm. conductive foil/ therm. cond. adhesive	universal	universal
LA LED 50 x 20	B 49	1.25	40	therm. conductive foil/ therm. cond. adhesive	universal	universal
LA LED 50 x 45	B 49	0.9	50	therm. conductive foil/ therm. cond. adhesive	universal	universal
ICK PPC 51	B 56	8.1	14	screw fastening		Power PC
ICK PEN 3 XE	B 56	2	31.3	screw fastening	Slot 2	Intel® Pentium® III-Xeon™ Slot II Format
ICK PEN 3 XE 1	B 56	1.8	33.6	screw fastening	Slot 2	Intel® Pentium® III-Xeon™ Slot II Format
ICK EM 25	B 56	3.9	20.4	screw fastening		Q7 Board
ICK PEN 38 F	B 57	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 57	4	15.1	therm. cond. adhesive	socket 7/ socket 370	AMD® K6-III/ IDT W2A/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2
ICK PEN 45 W	B 57	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 57	2.7	22	therm. cond. adhesive	socket 8	Intel® Pentium® PRO
ICK PEN 3 FC	B 57	3.5	22	fixing clamp	socket 7/ socket 370	Intel® Pentium® III FC PGA (Mendocino, Coppermine)
LA ICK 15 x 15 F 05	B 58	2.3	22.2	therm. conductive foil	universal	universal
LA ICK 15 x 15 F 12	B 58	2.3	22.2	therm. conductive foil	universal	universal
LA ICK 17 x 17 F 12	B 58	1.6	35.8	therm. conductive foil	universal	universal
LA ICK 17 x 17 F 12 A	B 58	1.6	35.8	therm. conductive foil	universal	universal
LA ICK 17 x 17 W 05	B 58	1.6	35.8	therm. cond. adhesive	universal	universal
LA ICK 17 x 17 W 12	B 58	1.6	35.8	therm. cond. adhesive	universal	universal
LA ICK 18 x 18 F 12	B 58	1.5	41.7	therm. conductive foil	universal	universal
LA ICK 18 x 18 W 12	B 58	1.5	41.7	therm. cond. adhesive	universal	universal
LA ICK 21 x 21 F 05	B 58	1.4	46.3	therm. conductive foil	universal	universal
LA ICK 21 x 21 F 12	B 58	1.4	46.3	therm. conductive foil	universal	universal
LA ICK 21 x 21 W 05	B 58	1.4	46.3	therm. cond. adhesive	universal	universal
LA ICK 21 x 21 W 12	B 58	1.4	46.3	therm. cond. adhesive	universal	universal

- 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

art. no.	page	R_{th} [K/W]	dissipation loss [W]	way of fixation	socket	suitable for processor type
LA ICK PEN 8 F 05	B 59	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 59	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 59	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 59	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 K 12	B 59	1.2	51.1	fixing clamp	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 59	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 16 W 12 A	B 59	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

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 18 W 12	B 59	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 59	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 59	0.97	60	therm. conductive foil	socket 8	Intel® Pentium® PRO
LA ICK PEN 2 K 12	B 60	1.2	58		Slot A/ Slot 1	Intel® Pentium® II/ AMD® Athlon®
LA ICK PEN 3 XE	B 60	0.8	61.8	screw fastening	Slot 2	Intel® Pentium® III-Xeon™
LA ICK PEN 4 1 K	B 60	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

Heatsinks for PGA



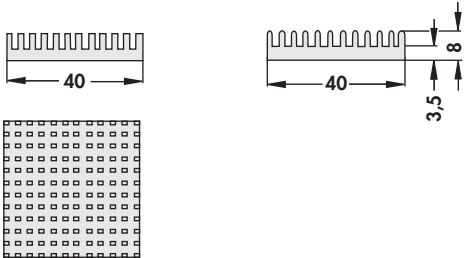
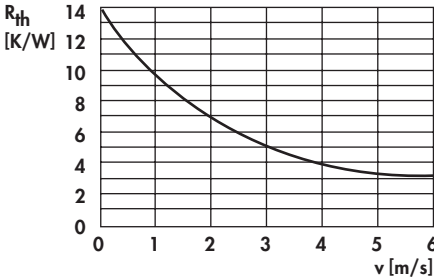
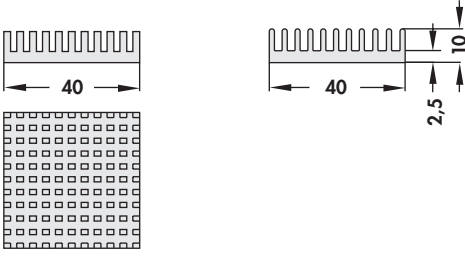
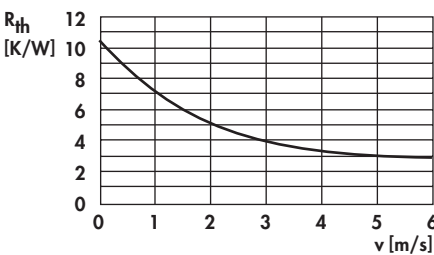
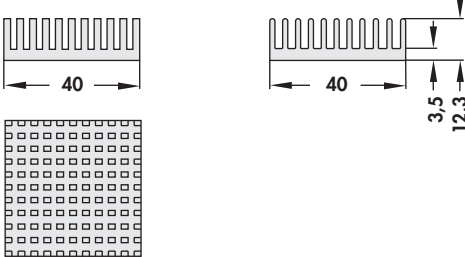
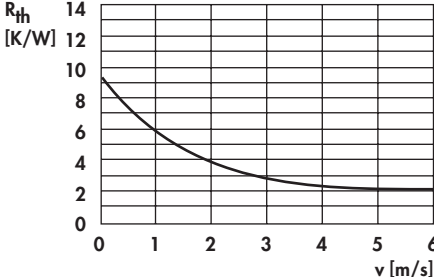
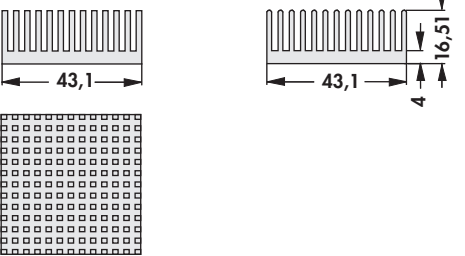
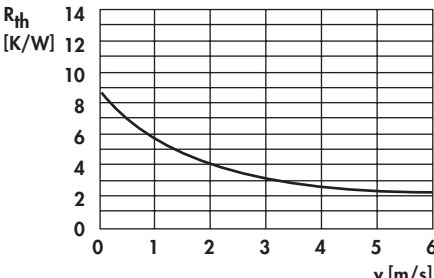
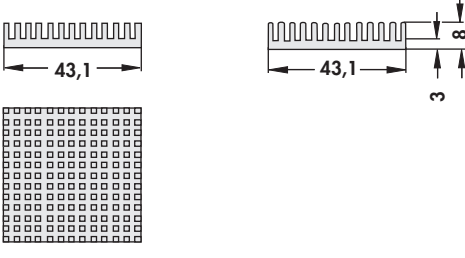
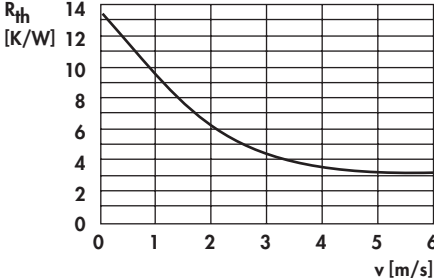
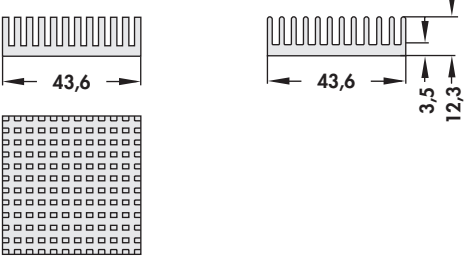
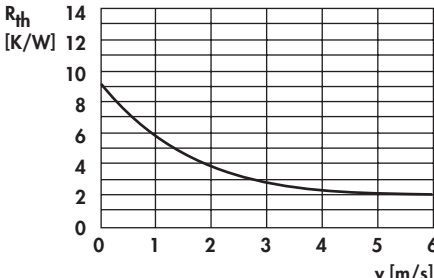
- double-sided adhesive thermal conductive foil **WLF ...** → E 7
- **surface:** black anodised

art. no.			
ICK PGA 6 x 6 x 14 WLF ... 14 x 14			
ICK PGA 8 x 8 x 12 WLF ... 23 x 23			
ICK PGA 9 x 9 WLF ... 24 x 24			
ICK PGA 11 x 11 x 8 WLF ... 24 x 27			
ICK PGA 11 x 11 WLF ... 24 x 27			

Heatsinks for PGA

art. no. ICK PGA 11 x 11 x 12 WLF ... 24 x 27		
art. no. ICK PGA 14 x 14 WLF ... 31 x 34		
art. no. ICK PGA 14 x 14 x 10 WLF ... 35 x 35		
art. no. ICK PGA 14 x 14 x 14 WLF ... 35 x 35		
art. no. ICK PGA 14 x 14 x 12 WLF ... 36 x 36		
art. no. ICK PGA 15 x 15 WLF ... 37 x 37		

Heatsinks for PGA

art. no. ICK PGA 16 x 16 x 8 WLF ... 40 x 40		
art. no. ICK PGA 16 x 16 x 10 WLF ... 40 x 40		
art. no. ICK PGA 16 x 16 x 12 WLF ... 40 x 40		
art. no. ICK PGA 17 x 17 WLF ... 43 x 43		
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		

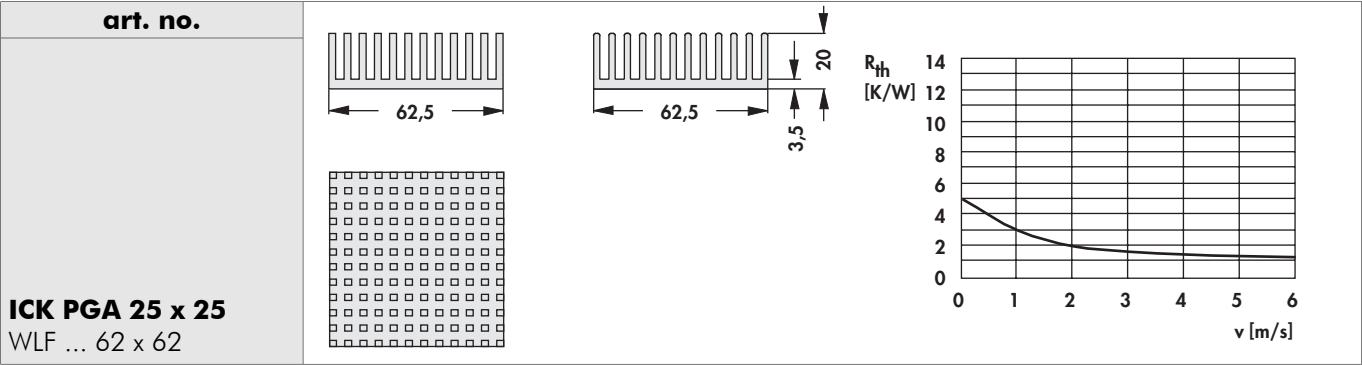
art. no.		
ICK PGA 18 x 18 WLF ... 45 x 45		
art. no.		
ICK PGA 19 x 19 WLF ... 48 x 48		
art. no.		
ICK PGA 19 x 19 x 12 WLF ... 47 x 47		
art. no.		
ICK PGA 20 x 20 x 10 WLF ... 48 x 48		
art. no.		
ICK PGA 20 x 20 WLF ... 50 x 50		

Mounts
Heatsinks for PLCC
Thermal conductive paste
Thermal conductive glue

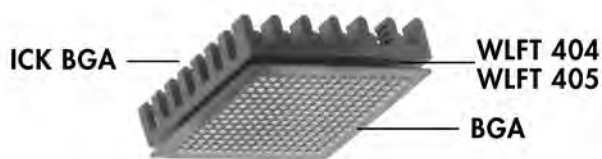
- **E 44 – 48** **Pin heatsinks for IC**
- **B 52** **SMD-heatsinks**
- **E 21 – 24** **Heatsinks for PGA**
- **E 23 – 24** **Technical introduction**

- B 21 – 27
- B 53 – 54
- B 11 – 16
- A 2 – 8

Heatsinks for PGA



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 7
- **surface:** black anodised

art. no.			
ICK BGA 10 x 10 WLF ... 10 x 10			
ICK BGA 10 x 10 x 10 WLF ... 10 x 10			
ICK BGA 14 x 14 WLF ... 14 x 14			
ICK BGA 14 x 14 x 10 WLF ... 14 x 14			

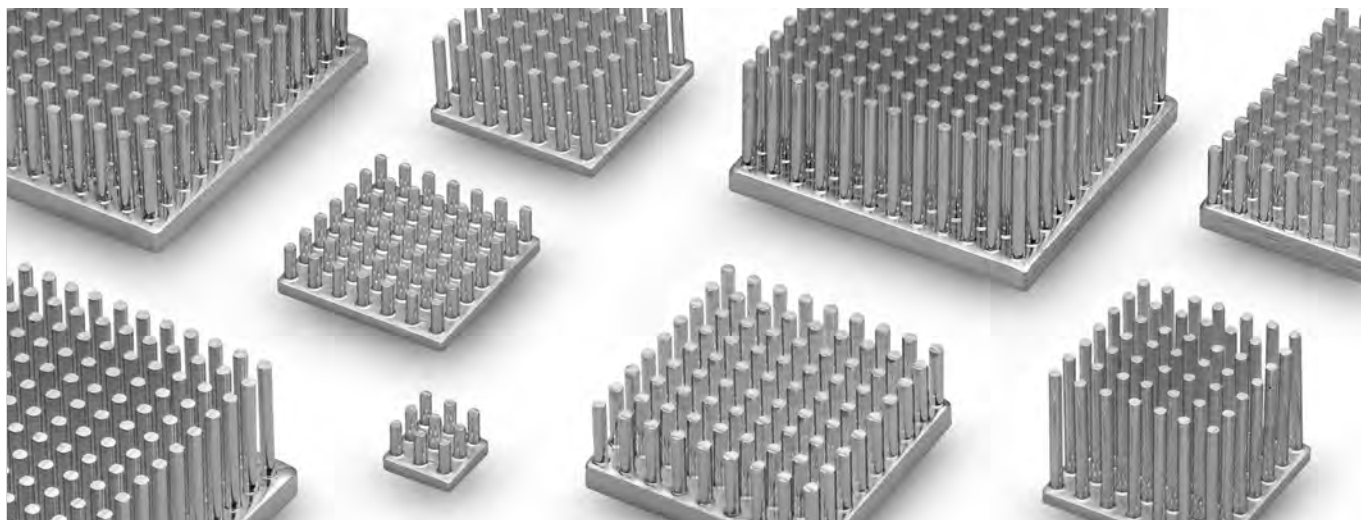
art. no. ICK BGA 21 x 21 WLF ... 21 x 21		
art. no. ICK BGA 23 x 23 WLF ... 23 x 23		
art. no. ICK BGA 23 x 23 x 10 WLF ... 23 x 23		
art. no. ICK BGA 27 x 27 WLF ... 27 x 27		
art. no. ICK BGA 27 x 27 x 10 WLF ... 27 x 27		
art. no. ICK BGA 27 x 27 x 14 WLF ... 27 x 27		

B 19	Mounts	→ E 44 – 48	Thermal conductive glue	→ E 23 – 24
	SMD-heatsinks	→ B 53 – 55	Hole pattern	→ A 21
	Thermally conductive foil	→ E 5 – 15	Processor overview	→ B 2 – 10
	Thermal conductive paste	→ E 21 – 22	Technical introduction	→ A 2 – 8

Heatsinks for BGAs

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		
art. no. ICK BGA 42,5 x 45 WLF ... 42,5 x 45		

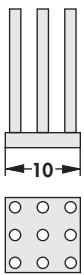
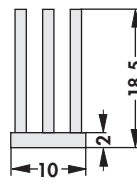
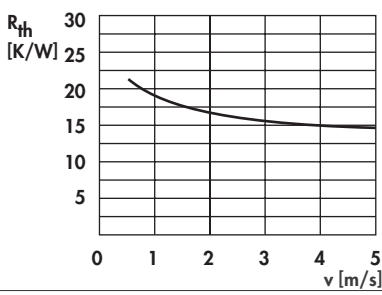
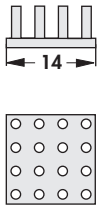
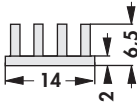
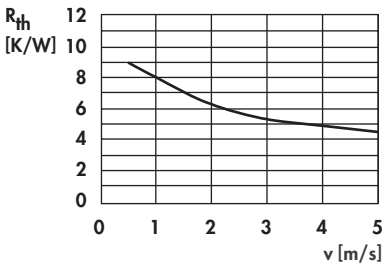
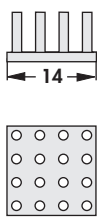
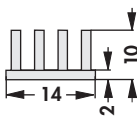
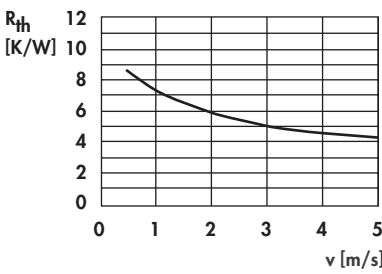
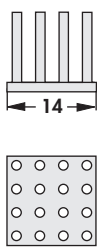
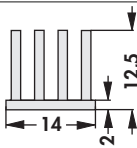
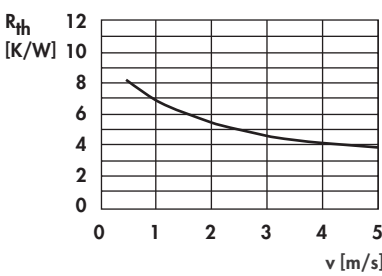
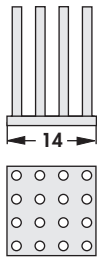
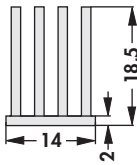
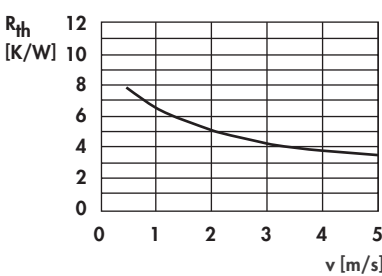
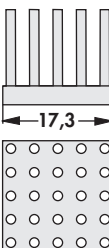
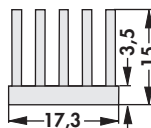
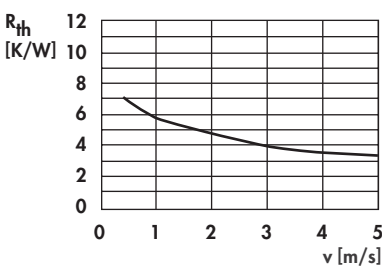
Pin heatsinks



- 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
- **surface:** Al-natural

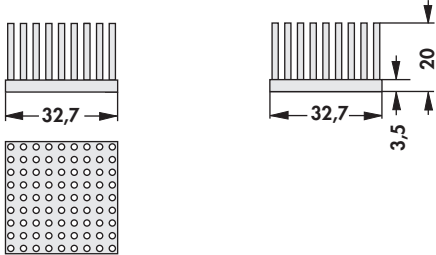
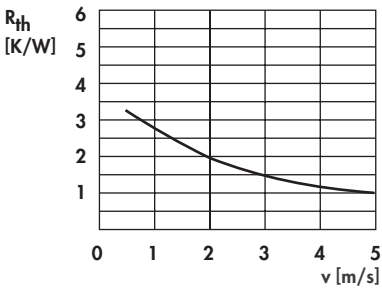
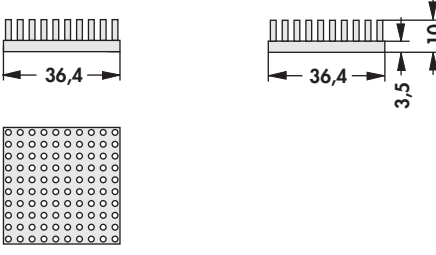
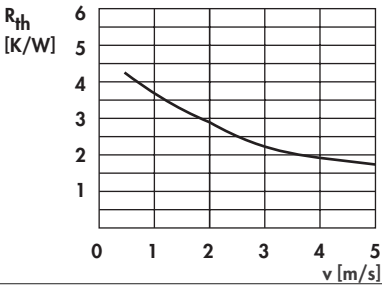
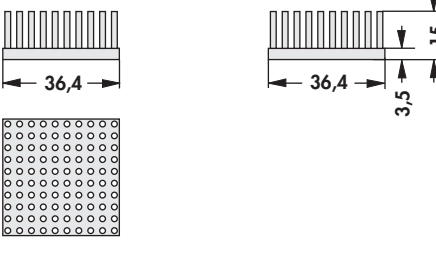
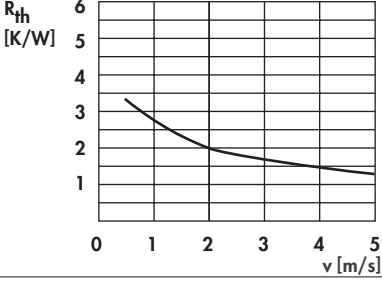
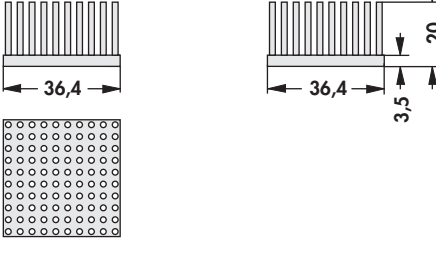
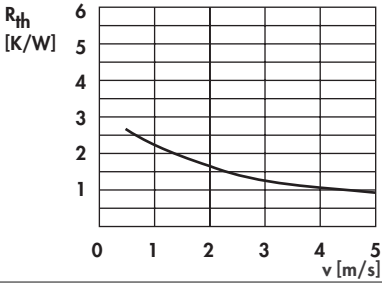
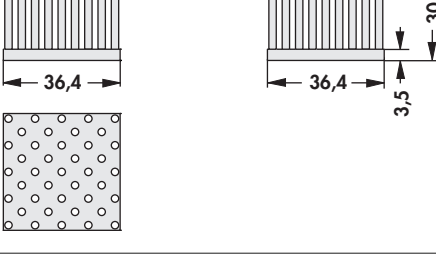
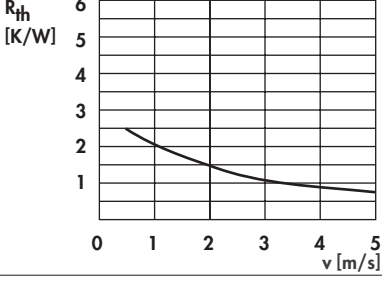
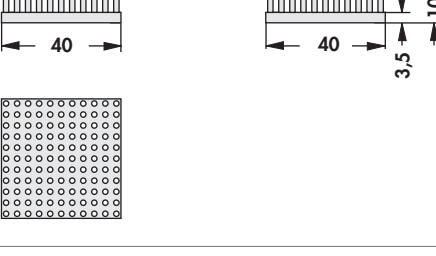
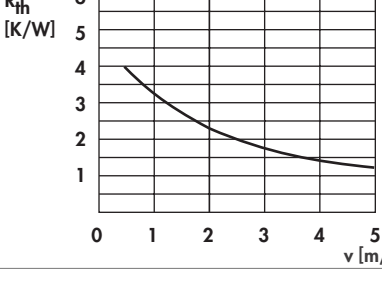
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ICK S 10 x 10 x 10 WLF ... 10 x 10 weight: 1g			
ICK S 10 x 10 x 12,5 WLF ... 10 x 10 weight: 1.3g			

Pin heatsinks

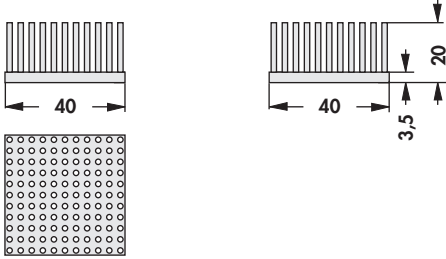
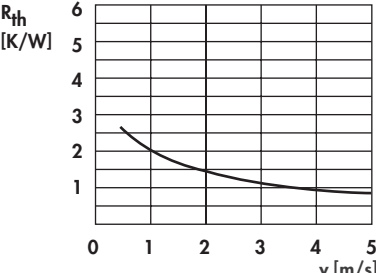
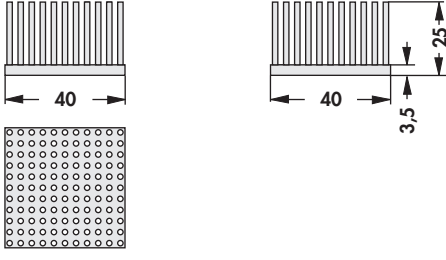
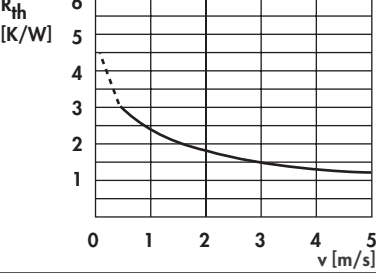
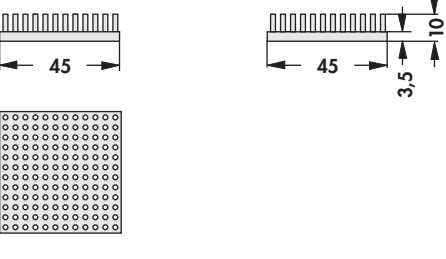
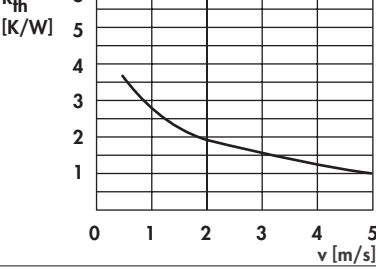
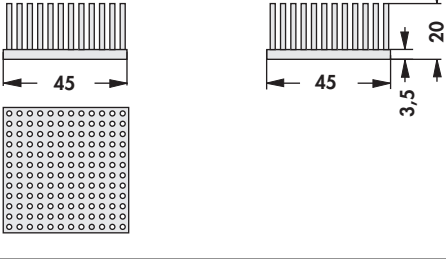
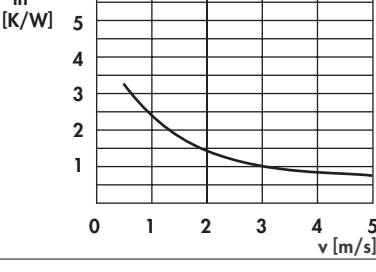
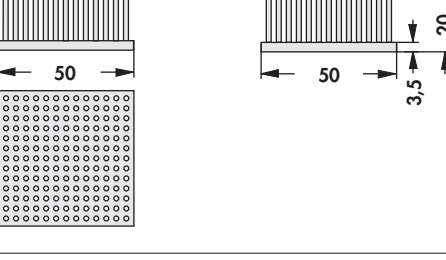
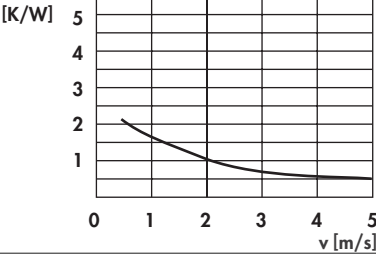
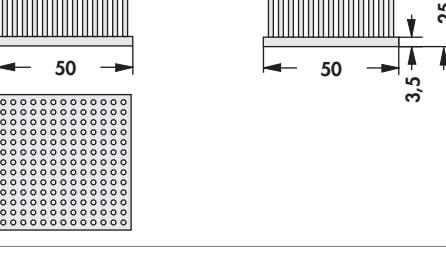
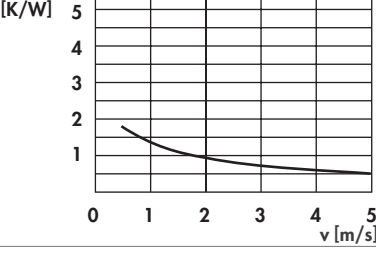
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art. no.			
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art. no.			
ICK S 14 x 14 x 10 WLF ... 14 x 14 weight: 1.9g			
art. no.			
ICK S 14 x 14 x 12,5 WLF ... 14 x 14 weight: 2g			
art. no.			
ICK S 14 x 14 x 18,5 WLF ... 14 x 14 weight: 2.4g			
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 10 WLF ... 22 x 22 weight: 4g		
art. no. ICK S 22 x 22 x 18,5 WLF ... 22 x 22 weight: 5.4g		
art. no. ICK S 25 x 25 x 6,5 WLF ... 25 x 25 weight: 4g		

Pin heatsinks

art. no. ICK S 32 x 32 x 20 WLF ... 32 x 32 weight: 19g		
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 10 WLF ... 40 x 40 weight: 21g		

Pin heatsinks

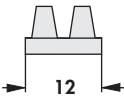
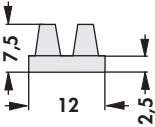
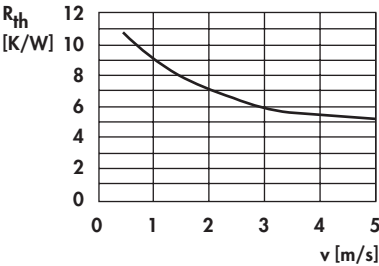
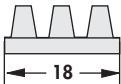
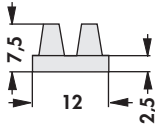
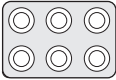
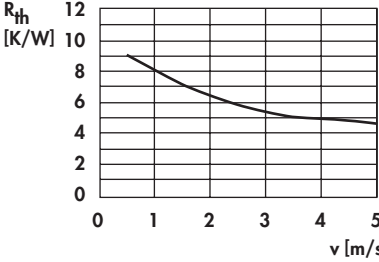
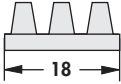
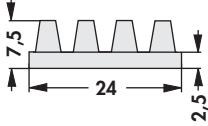
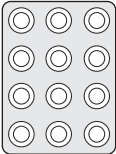
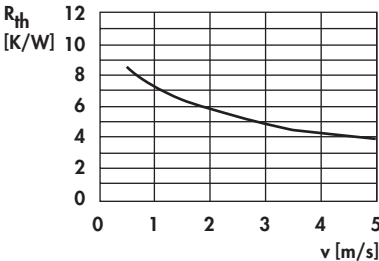
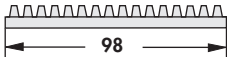
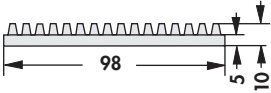
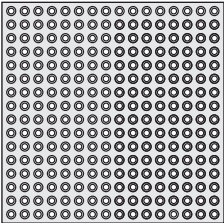
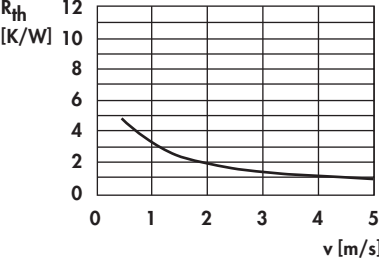
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art. no. ICK S 40 x 40 x 25 WLF ... 40 x 40 weight: 37g		
art. no. ICK S 45 x 45 x 10 WLF ... 45 x 45 weight: 26g		
art. no. ICK S 45 x 45 x 20 WLF ... 45 x 45 weight: 36g		
art. no. ICK S 50 x 50 x 20 WLF ... 50 x 50 weight: 43g		
art. no. ICK S 50 x 50 x 25 WLF ... 50 x 50 weight: 49g		

B 27

- E 21 – 22
- E 23 – 24
- B 35 – 48
- A 2 – 8

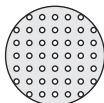
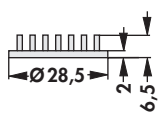
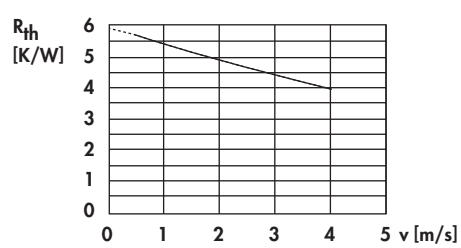
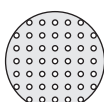
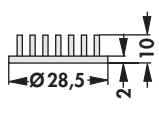
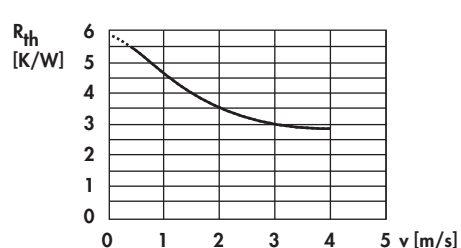
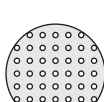
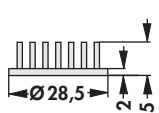
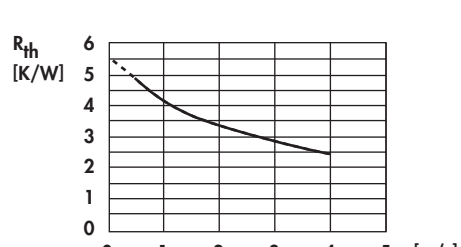
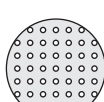
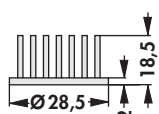
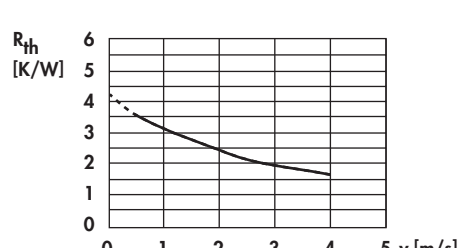
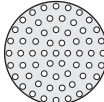
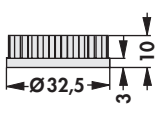
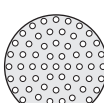
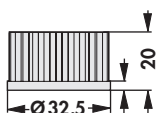
Pin heatsinks

Dome

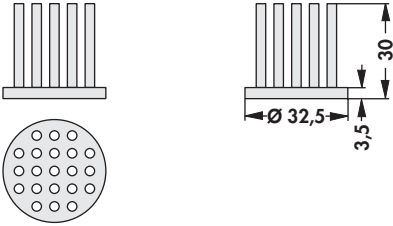
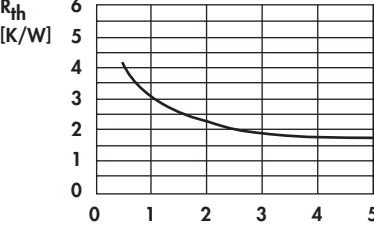
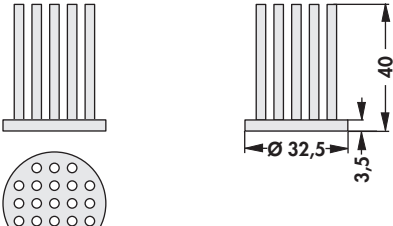
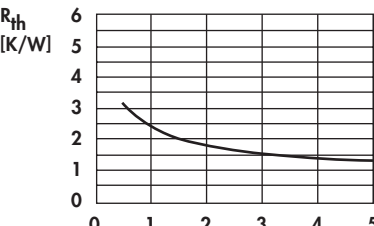
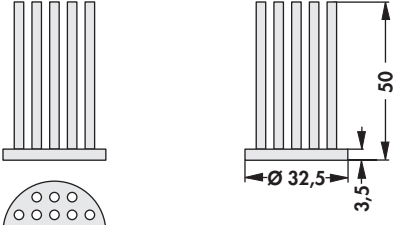
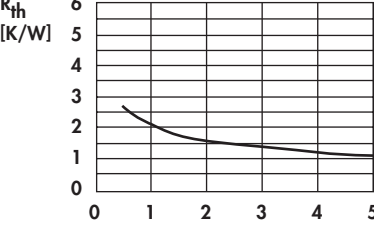
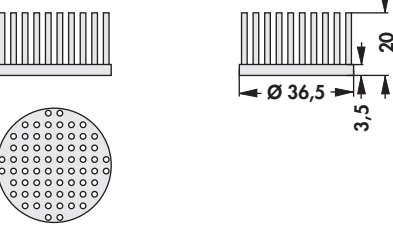
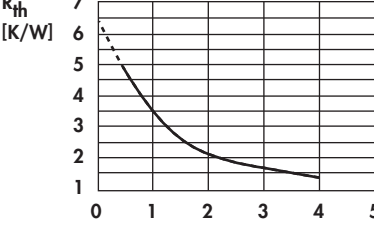
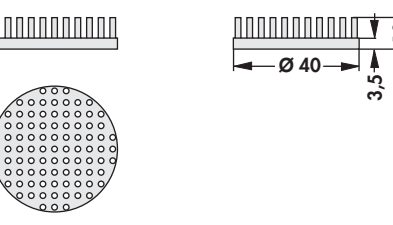
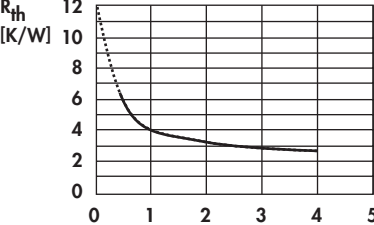
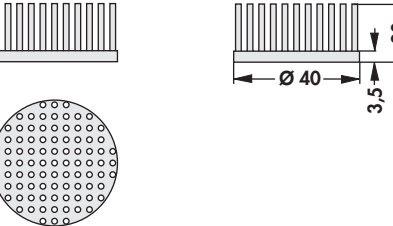
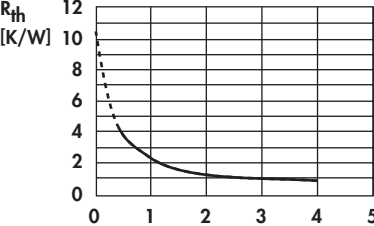
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art. no. ICK S D 18 x 12 x 7,5 WLF ... 12 x 18 weight: 2.7g	   
art. no. ICK S D 24 x 18 x 7,5 WLF ... 18 x 24 weight: 4.4g	   
art. no. ICK S D 98 x 98 x 10 WLF ... 98 x 98 weight: 154g	   

Pin heatsinks

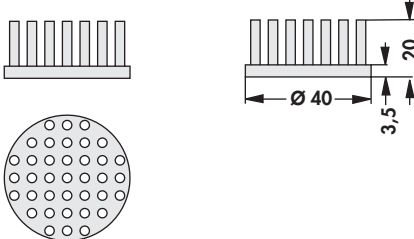
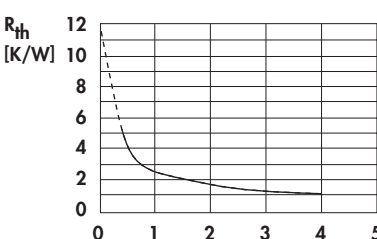
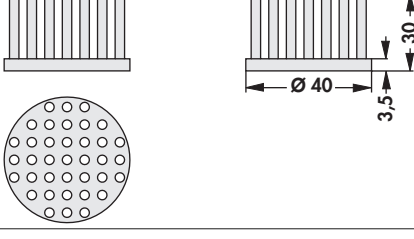
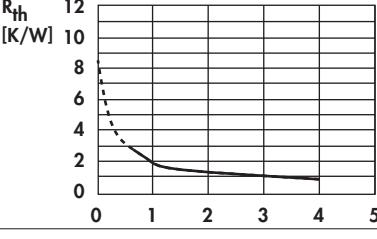
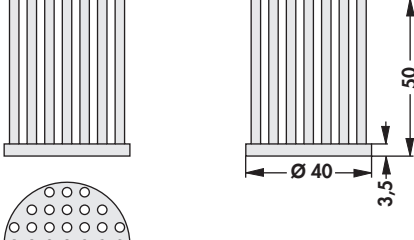
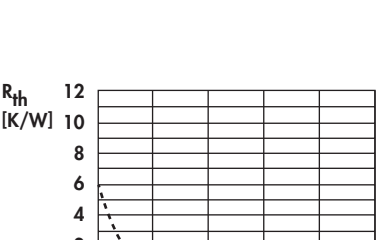
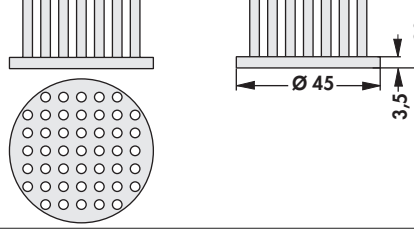
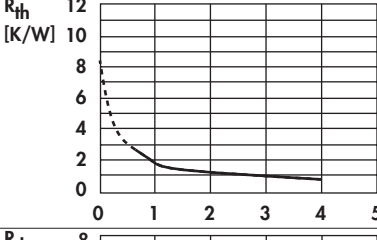
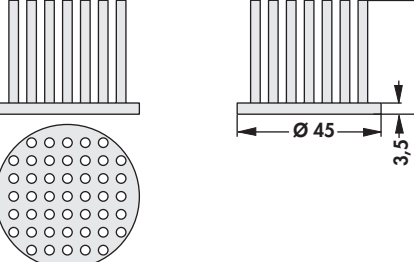
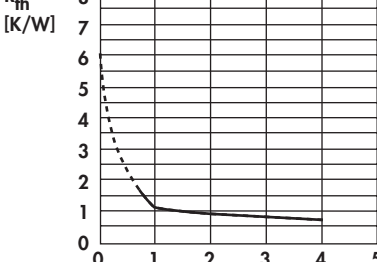
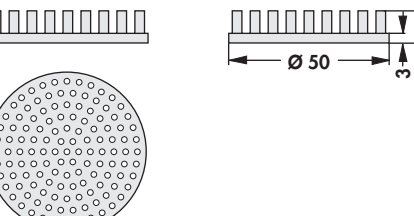
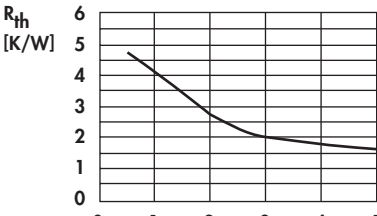
Round

art. no.			
ICK S R 28,5 x 6,5 WLF ... D 28,5 weight: 4.41g	 		
ICK S R 28,5 x 10 WLF ... D 28,5 weight: 5.16g	 		
ICK S R 28,5 x 12,5 WLF ... D 28,5 weight: 5.7g	 		
ICK S R 28,5 x 18,5 WLF ... D 28,5 weight: 6.98g	 		
ICK S R 32,5 x 10 WLF ... D 32 weight: 9.7g	 		
ICK S R 32,5 x 20 WLF ... D 32 weight: 13.8g	 		

Pin heatsinks

art. no. ICK S R 32,5 x 30 WLF ... D 32 weight: 20.6g		
art. no. ICK S R 32,5 x 40 WLF ... D 32 weight: 24.61g		
art. no. ICK S R 32,5 x 50 WLF ... D 32 weight: 28.62g		
art. no. ICK S R 36,5 x 20 WLF ... D 36,5 weight: 17.59g		
art. no. 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		

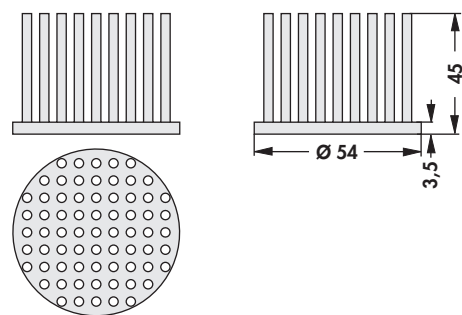
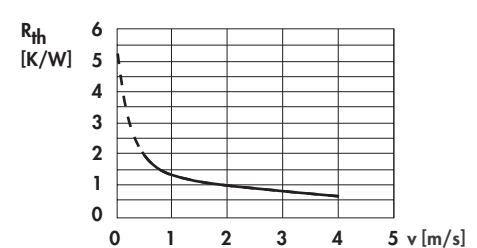
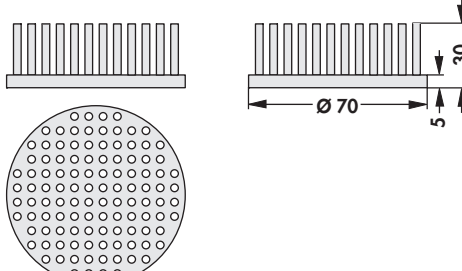
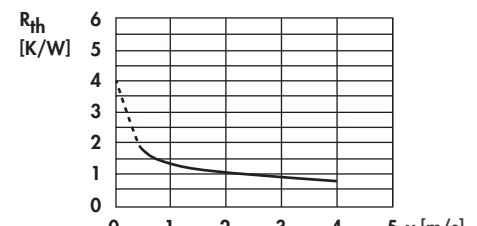
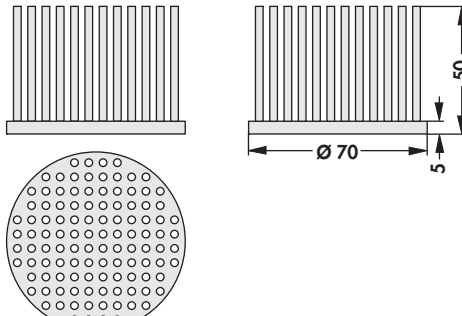
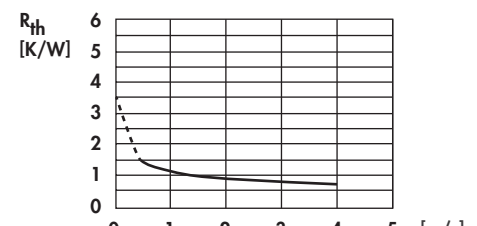
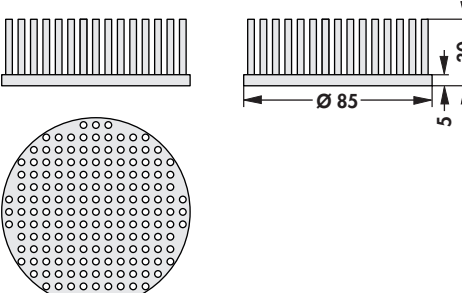
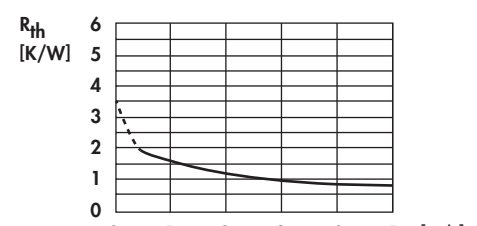
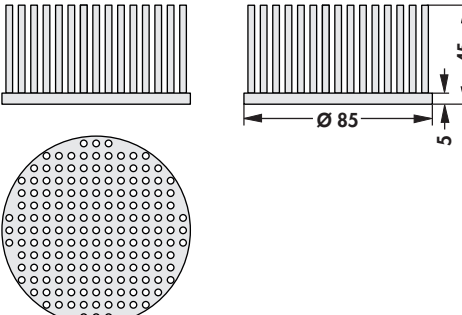
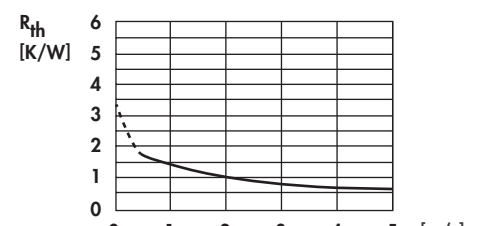
Pin heatsinks

art. no. ICK S R A 40 x 20 WLF ... D 40 weight: 22.18g		
art. no. ICK S R 40 x 30 WLF ... D 40 weight: 29.24g		
art. no. ICK S R 40 x 50 WLF ... D 40 weight: 47.96g		
art. no. ICK S R 45 x 30 WLF ... D 45 weight: 37.78g		
art. no. ICK S R 45 x 45 WLF ... D 45 weight: 50.67g		
art. no. ICK S R 50 x 10 WLF ... D 50 weight: 22g		

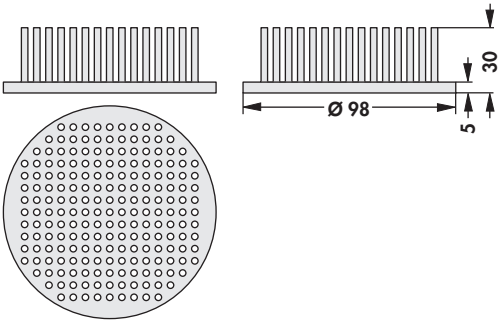
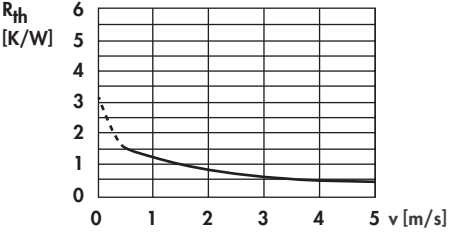
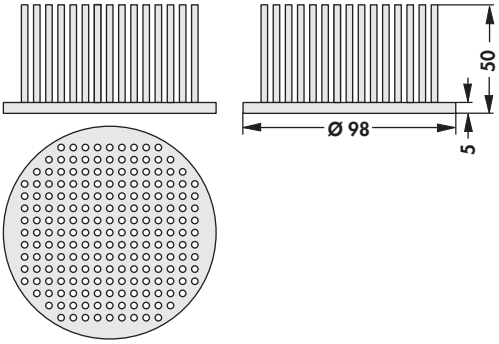
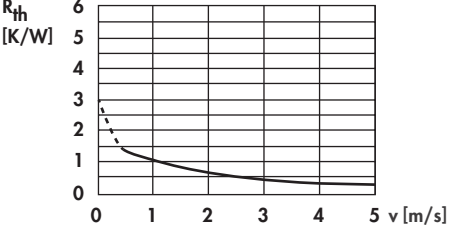
Pin heatsinks

art. no. ICK S R 50 x 20 WLF ... D 50 weight: 34.39g		
art. no. 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		
art. no. ICK S R 54 x 30 WLF ... D 54 weight: 54.11g		

Pin heatsinks

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: nullg	 
art. no. ICK S R 85 x 45 WLF ... D 85 weight: nullg	 

Pin heatsinks

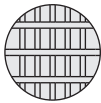
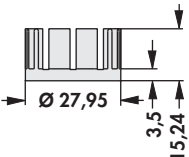
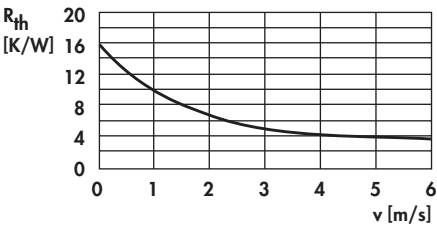
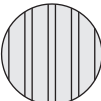
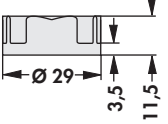
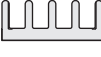
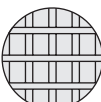
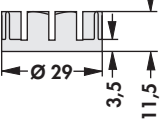
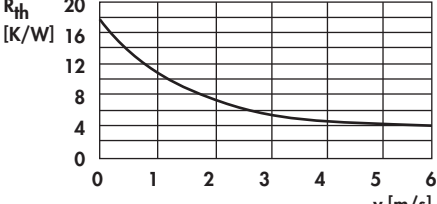
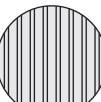
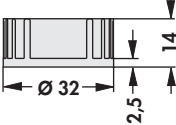
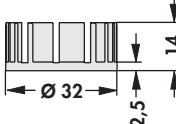
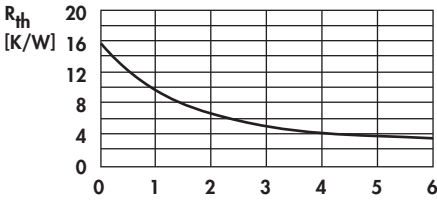
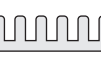
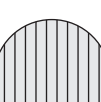
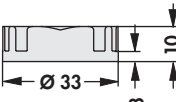
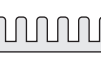
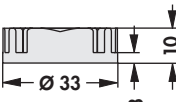
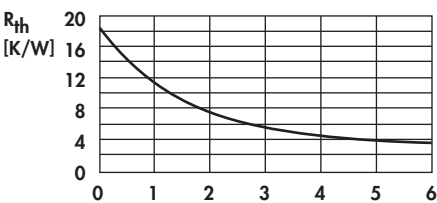
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art. no. ICK S R 98 x 50 WLF ... D 98 weight: 194.23g	 

Heatsinks for LEDs

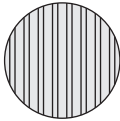
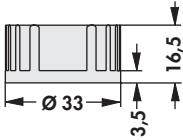
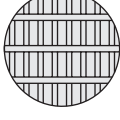
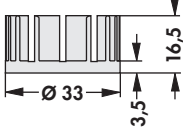
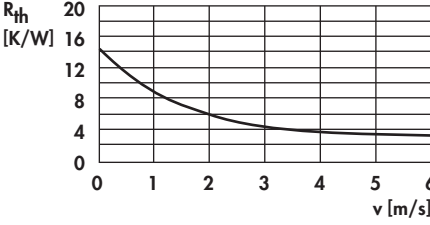
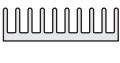
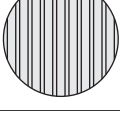
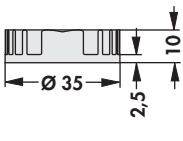
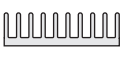
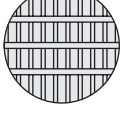
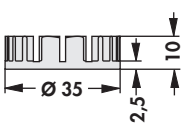
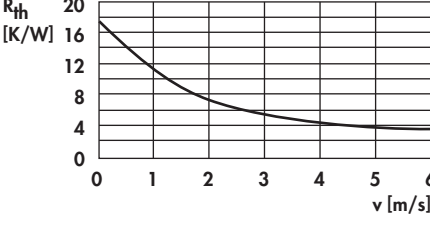
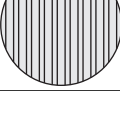
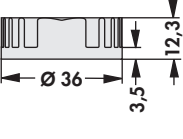
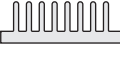
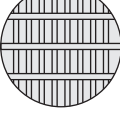
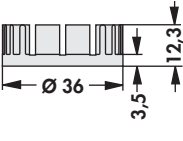
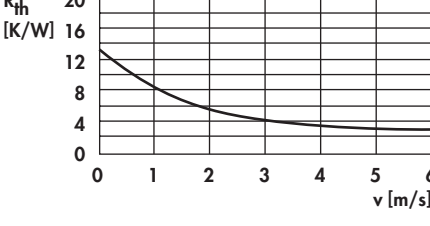
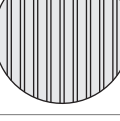
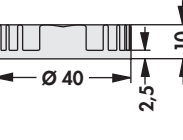


- suitable for free or forced convection
- heat sink dimensions are fitted to the respective LED type
- simple mounting by using thermally conductive adhesive foil, glue or screw mounting
- specific versions on customer's request
- double-sided adhesive thermal conductive foil **WLF ...** → E 7
- special design, surfaces and modification to customer specification on request
- **surface:** black anodised

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

art. no.	 	 $\varnothing 27,95$ 3,5 15,24	 R_{th} [K/W] v [m/s]
ICK LED R 28 x 15 G WLF ... D 28			
art. no.	 	 $\varnothing 29$ 3,5 11,5	$R_{th} = 17,26 \text{ K/W}$
ICK LED R 29 x 11,5 WLF ... D 29			
art. no.	 	 $\varnothing 29$ 3,5 11,5	 R_{th} [K/W] v [m/s]
ICK LED R 29 x 11,5 G WLF ... D 29			
art. no.	 	 $\varnothing 32$ 2,5 14	$R_{th} = 15,23 \text{ K/W}$
ICK LED R 32 x 14 WLF ... D 32			
art. no.	 	 $\varnothing 32$ 2,5 14	 R_{th} [K/W] v [m/s]
ICK LED R 32 x 14 G WLF ... D 32			
art. no.	 	 $\varnothing 33$ 3 10	$R_{th} = 17,6 \text{ K/W}$
ICK LED R 33 x 10 WLF ... D 33			
art. no.	 	 $\varnothing 33$ 3 10	 R_{th} [K/W] v [m/s]
ICK LED R 33 x 10 G WLF ... D 33			

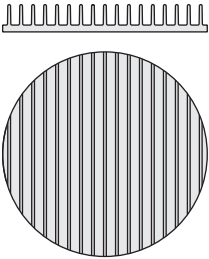
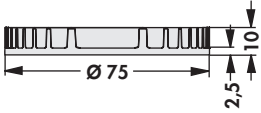
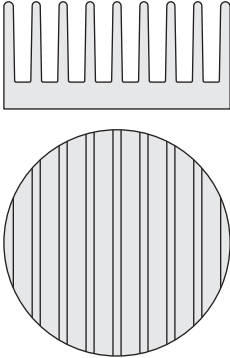
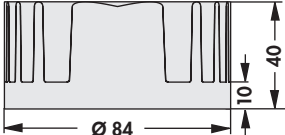
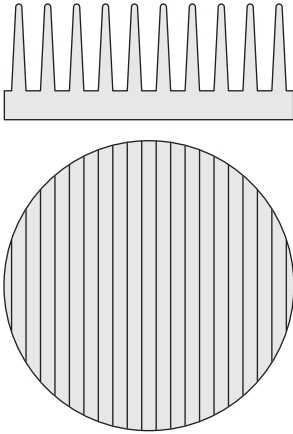
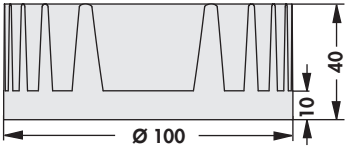
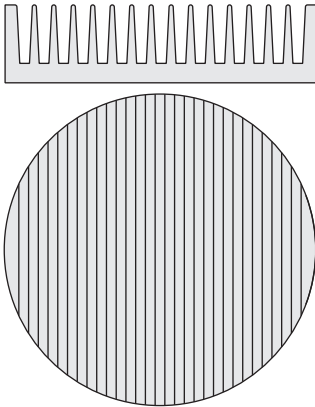
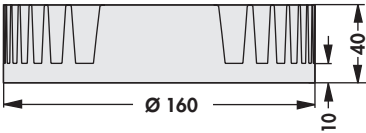
Heatsinks for LEDs

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

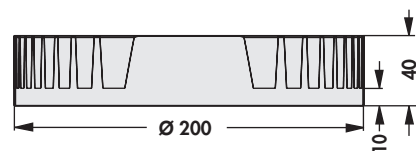
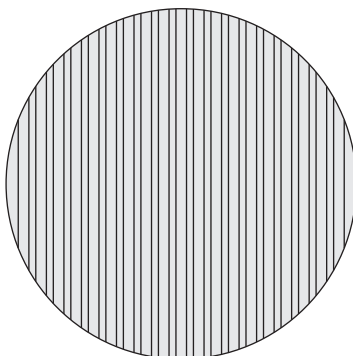
art. no. ICK LED R 40 x 10 G WLF ... D 40		
art. no. ICK LED R 40 x 27 WLF ... D 40		$R_{th} = 9,41 \text{ K/W}$
art. no. ICK LED R 40 x 27 G WLF ... D 40		
art. no. ICK LED R 45,7 x 16,5 WLF ... D 45		$R_{th} = 10,46 \text{ K/W}$
art. no. ICK LED R 45,7 x 16,5 G WLF ... D 45		
art. no. ICK LED R 50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

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		$R_{th} = 10,17 \text{ K/W}$
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		$R_{th} = 9,48 \text{ K/W}$
art. no. ICK LED R 54 x 20 G WLF ... D 54		
art. no. ICK LED R 66 x 40 WLF ... D 66		$R_{th} = 3,2 \text{ K/W}$

art. no. ICK LED R 75 x 10 WLF ... D 75	  $R_{th} = 5,2 \text{ K/W}$
art. no. ICK LED R 84 x 40 WLF ... D 84	  $R_{th} = 2,5 \text{ K/W}$
art. no. ICK LED R 100 x 40 WLF ... D 100	  $R_{th} = 2 \text{ K/W}$
art. no. ICK LED R 160 x 40 WLF ... D 160	  $R_{th} = 1,4 \text{ K/W}$

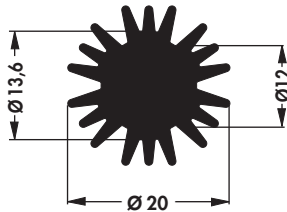
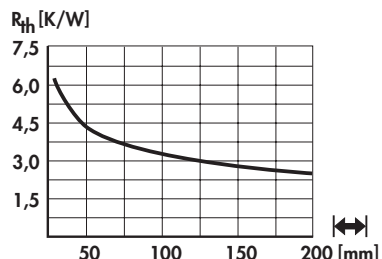
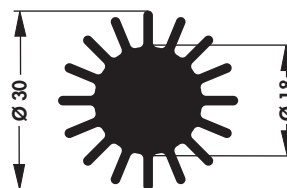
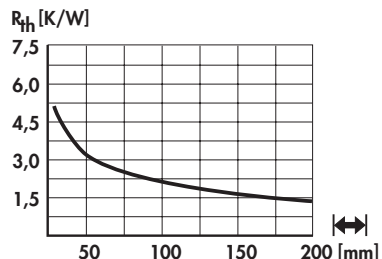
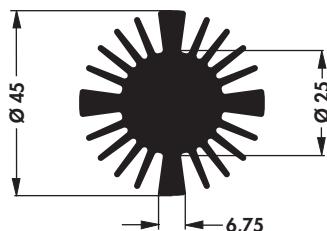
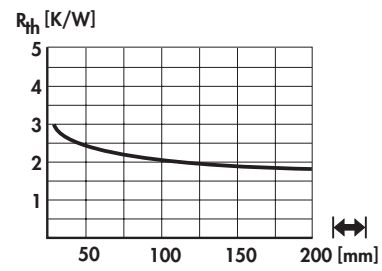
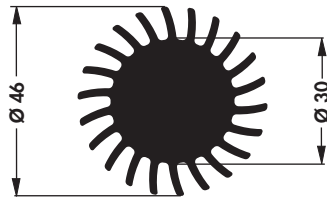
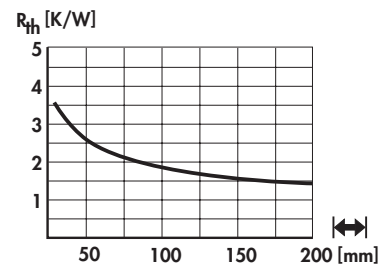
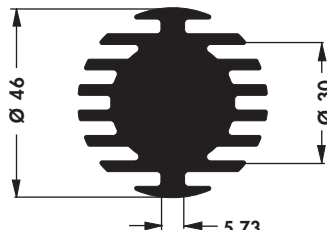
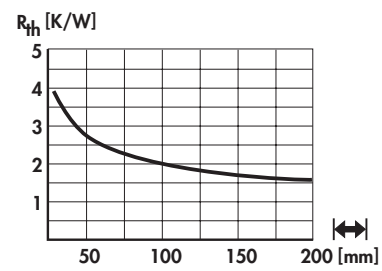
art. no.

 $R_{th} = 1 \text{ K/W}$ 

WLF ... D 200

Heatsinks for LEDs

- special design, surfaces and modification to customer specification on request
- up from a profile length of 25 mm: optional adapter plate **LA LED 68 ...** → B 50 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.			
SK 585 ...			
art. no.			
SK 620 ...			
art. no.			
SK 618 ...			
please indicate: ...  10 15 20 25 37.5 50 1000 mm			
surface:		black anodised	
art. no.			
SK 619 ...			
art. no.			
SK 598 ...			
please indicate: ...  10 15 20 25 37.5 50 1000 mm			
		... adapter (optional) AD = adapter plate	
surface:		black anodised	

Pin heatsinks Ø
Hole pattern
Special heatsink design
Thermal conductive paste

→ B 29 – 33 Mounts
→ A 21 Thermally conductive foil
→ A 137 – 138 Thermal conductive glue
→ E 21 – 22 Technical introduction

→ E 44 – 48
→ E 5 – 15
→ E 23 – 24
→ A 2 – 8

B 42

A

B

C

D

E

F

G

H

I

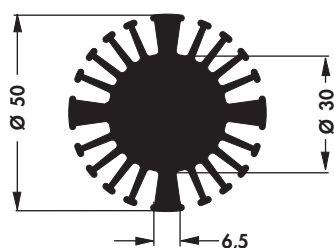
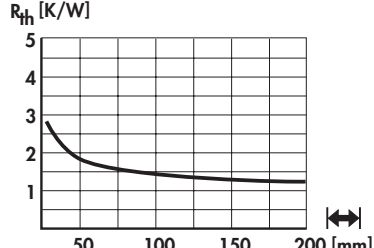
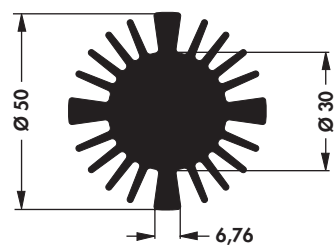
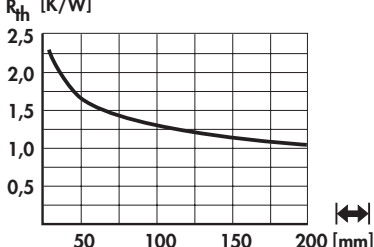
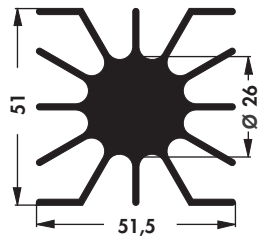
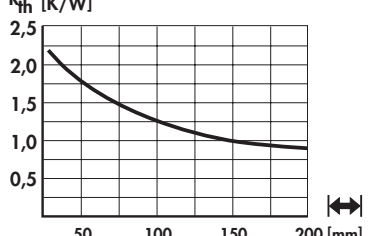
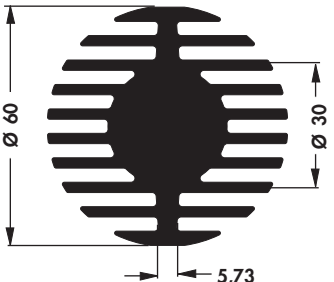
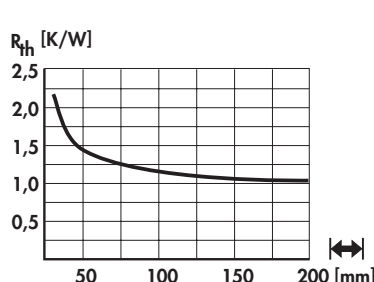
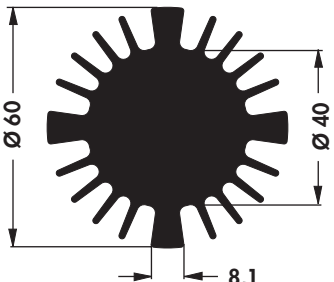
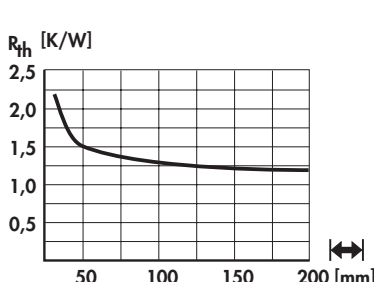
K

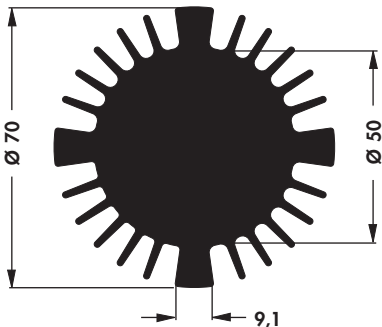
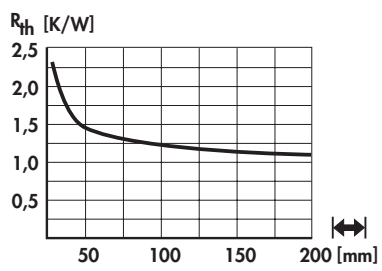
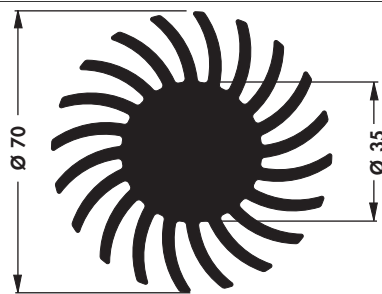
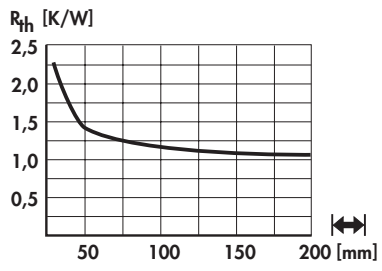
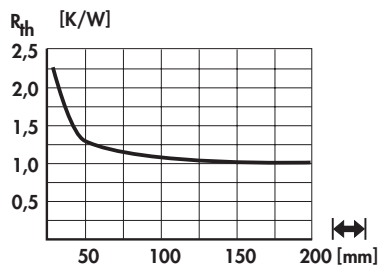
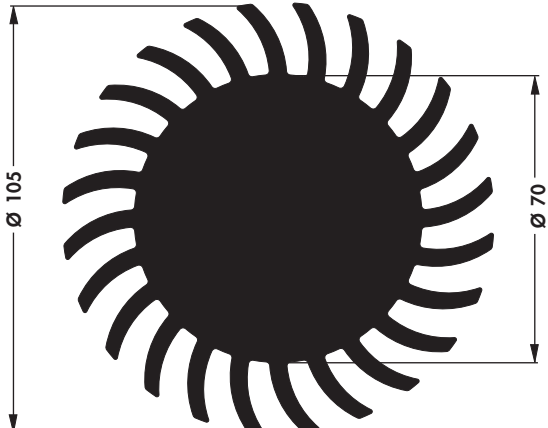
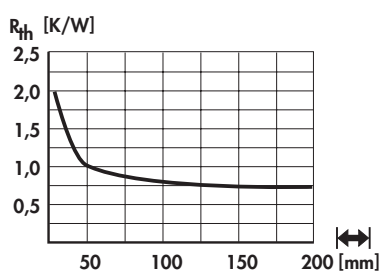
L

M

N

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		
surface:	black anodised	

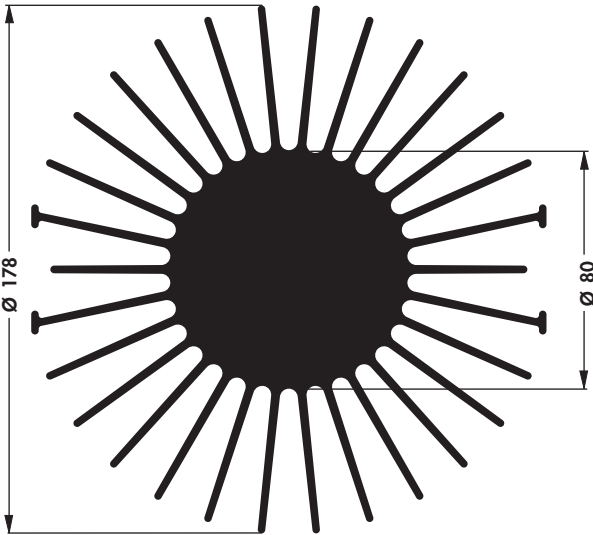
art. no.		
SK 570 ...		
art. no.		
SK 571 ...		
art. no.		
SK 572 ...		
please indicate:	...  10 15 20 25 37.5 50 1000 mm	... adapter (optional) AD = adapter plate
surface:	black anodised	
art. no.		
SK 584 ...		
please indicate:	...  10 15 20 25 37.5 50 1000 mm	
surface:	black anodised	

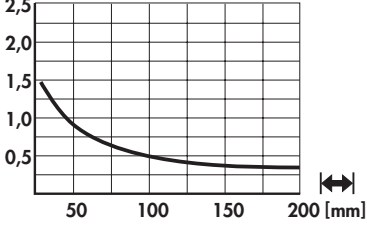
Pin heatsinks Ø
Hole pattern
Special heatsink design
Thermal conductive paste

- E 44 – 48
- E 5 – 15
- E 23 – 24
- A 2 – 8

Heatsinks for LEDs

art. no.



R_{th} [K/W]


Distance l [mm]	Thermal resistance R_{th} [K/W]
50	1.5
100	0.7
150	0.5
200	0.4

SK 590 ...

please indicate: ...
10 15 20 25 37.5 50 75 100 150 1000 mm

surface: black anodised

Pin heatsinks Ø
Hole pattern
Special heatsink design
Thermal conductive paste

→ B 29 – 33 Mounts
→ A 21 Thermally conductive foil
→ A 137 – 138 Thermal conductive glue
→ E 21 – 22 Technical introduction

→ E 44 – 48
→ E 5 – 15
→ E 23 – 24
→ A 2 – 8

B 46

A

B

C

D

E

F

G

H

I

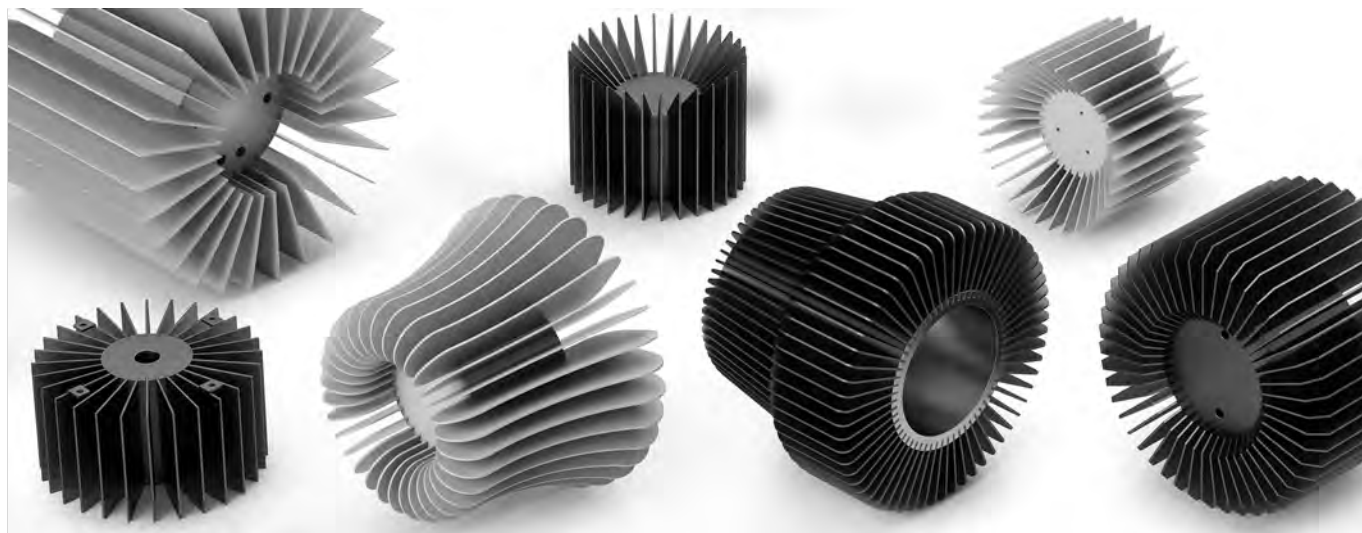
K

L

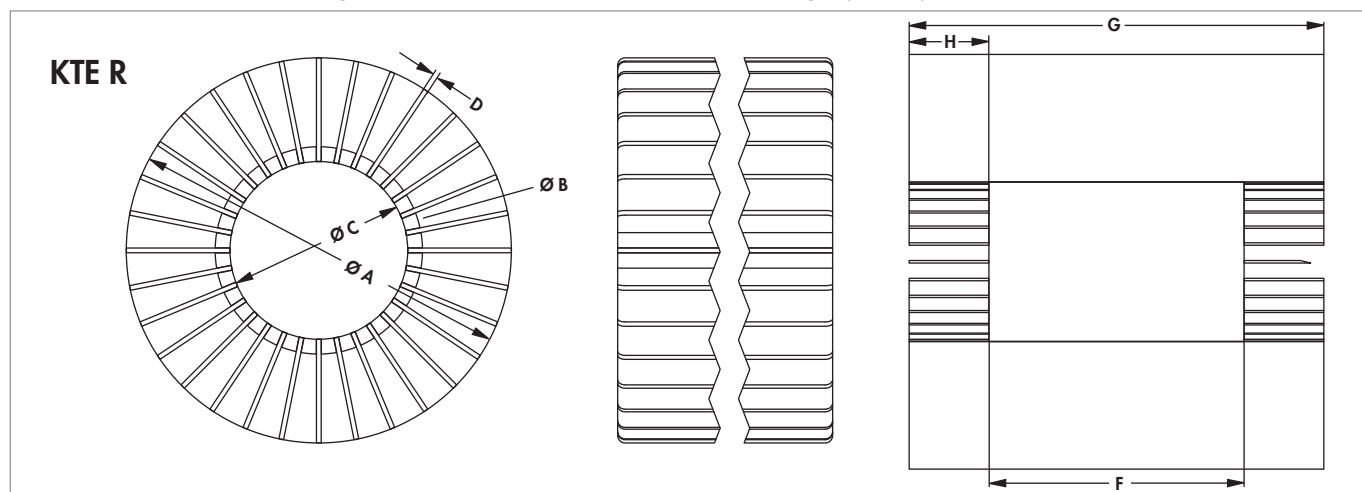
M

N

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



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

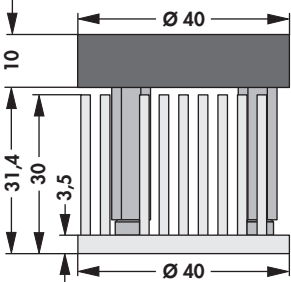
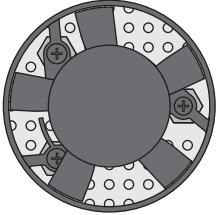
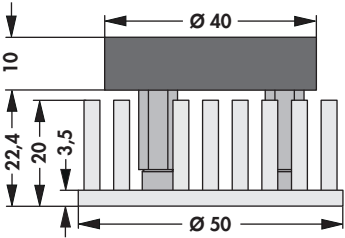
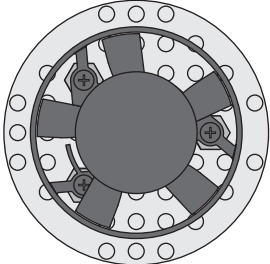
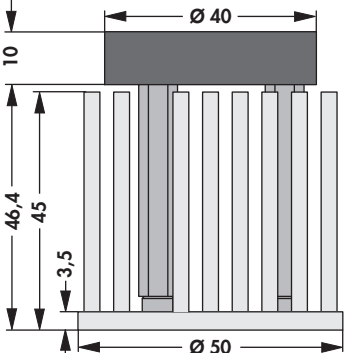
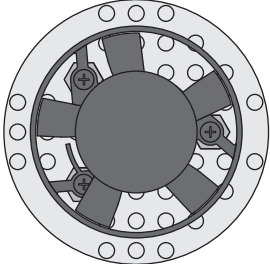
please indicate with your order:

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

Heatsinks for LEDs

- heatsink specially made for flexible and fixed LED Line Modules
- insertion possibility of metal sheets and sheets of Plexiglas
- customer specified 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 = clear anodised

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

Technical data of the fans

	LF 40B12
circuit voltage	12 V
bearing type	two-way plain bearing
cur. consumpt.	50 mA
max. initial current	160 mA
max. volume flow	157 l/min - 9.4 m ³ /h
max. static pressure	3.4 mmH ₂ O - 33 Pa
noise level	26 dB(A), 1 m lateral
temperature range	-20°C... +60°C
failure rate (L₁₀)	60,000 h
MTBF	1,900,000 h (20°C)
Type rotor speed	6,600 min ⁻¹
weight	10 g



- 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.

M2x0,4 - 6H (3x)

Ø 68,5

35

M3x0,5 - 6H (2x)

R_{th} [K/W]

50 100 150 200 [mm]

LA LED 68 ...

please indicate:

... 50 75 100 mm

... surface
SA = black anodised
ME = clear anodised

... adapter (optional)
AD = adapter plate

Technical data of the fans

	LF 40B12
circuit voltage	12 V
bearing type	two-way plain bearing
cur. consumpt.	50 mA
max. initial current	160 mA
max. volume flow	157 l/min - 9.4 m³/h
max. static pressure	3.4 mmH₂O - 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

Sample box LED Heatsinks

- Sample box for verification of the thermal management for LEDs
- Contains a choice of different extruded heatsinks, LED extruded heatsinks in round design, LED pin heatsinks and extruded profiles for LED-Line modules
- for thermal contacting or mounting of LED a high-performance thermal conductive graphite foil is also enclosed (**WLFG**, sample strips 25x150mm), a high-performance thermal conductive (silicone-free) ceramic-filled thermal conductive paste (**WLPK**, syringe), a double-sided sticky thermal conductive foil (**WLFT 404**, sample strips 25x150mm) and a thermal conductive epoxy based two-component adhesive (**WLK DK**, syringe)



art. no.
SK LED BOX 1

B 51

Pin heatsinks Ø
Hole pattern
Special heatsink design
Thermal conductive paste

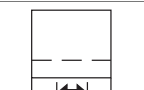
→ B 29 – 33
→ A 21
→ A 137 – 138
→ E 21 – 22

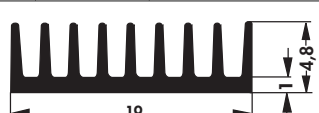
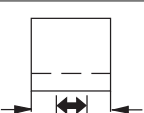
Mounts
Thermally conductive foil
Processor overview
Technical introduction

→ E 44 – 48
→ E 5 – 15
→ B 2 – 10
→ A 2 – 8

Heatsinks for DIL-IC

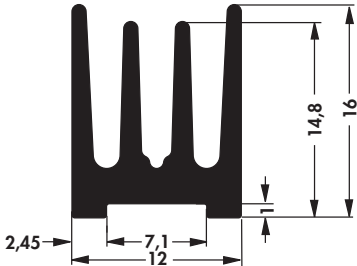
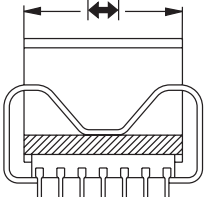
– other length on request

							
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	83	ICK 20 L	20 contacts	25.0	34
ICK 14 16 L	14/16 contacts	19.0	46				

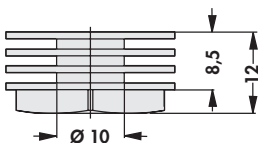
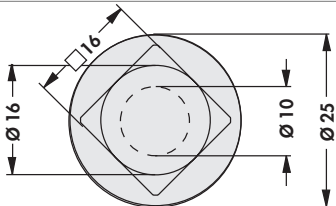
							
art. no.	for cases	 [mm]	R_{th} [K/W]	art. no.	for cases	 [mm]	R_{th} [K/W]
ICK 14 16 B	14/16 contacts	6.3	54.0	ICK 36 B	36 contacts	47.0	16.5
ICK 24 B	24 contacts	33.0	19.4	ICK 40 B	40 contacts	51.0	15.8
ICK 28 B	28 contacts	37.0	18.5	ICK 1000 B	—	1000.0	—
surface:		black anodised					

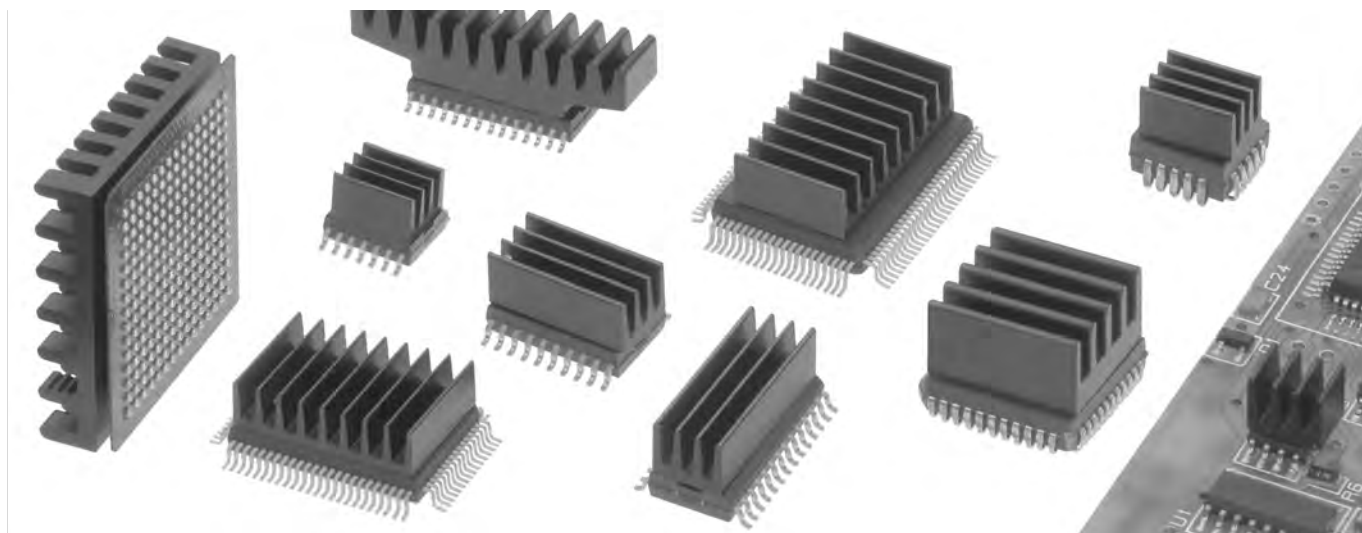
– with clip

– other length on request

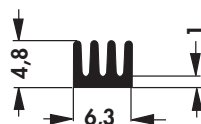
							
art. no.	for cases	 [mm]	R_{th} [K/W]	art. no.	for cases	 [mm]	R_{th} [K/W]
ICK 14 H	14 contacts	18.0	20	ICK 18 H	18 contacts	23.0	16
ICK 16 H	16 contacts	20.5	18	ICK 1000 H	—	1000.0	—
surface:		black anodised					

Heatsinks for PLCC

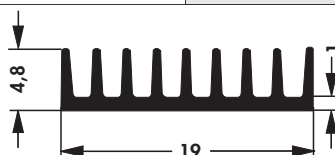
		
art. no.	R_{th} [K/W]	
ICK R	19	
		
art. no.	↔ [mm]	R_{th} [K/W]
ICK PLCC 28	11.8	25
surface:		black anodised



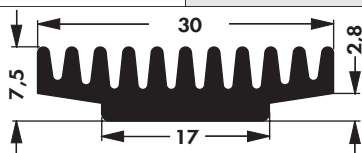
- particularly suitable for SMD components
- low profile
- reduced weight
- effective heat dissipation
- can be glued directly onto the component
- solderable versions
- customer specific versions on request
- special packaging like tape and reel, bar magazin, tray etc. on request



art. no.	l [mm]	R _{th} [K/W]	art. no.	l [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

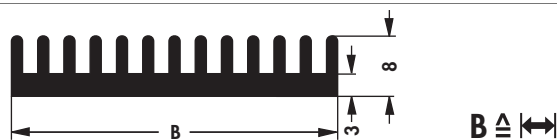


art. no.	l [mm]	R _{th} [K/W]	art. no.	l [mm]	R _{th} [K/W]
ICK SMD B 5 ...	5	56	ICK SMD B 13 SA	13	29
ICK SMD B 7 SA	7	47	ICK SMD B 19 ...	19	22
ICK SMD B 10 SA	10	35			

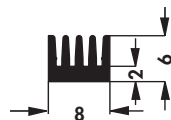


art. no.	l [mm]	R _{th} [K/W]	art. no.	l [mm]	R _{th} [K/W]
ICK SMD C 7 SA	7	33	ICK SMD C 17 ...	17	17
ICK SMD C 10 SA	10	26			

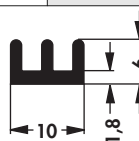
please indicate: ... surface
SA = black anodised
MI = solderable surface



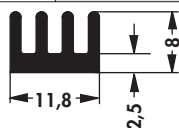
art. no.	↔ [mm]	R_{th} [K/W]	art. no.	↔ [mm]	R_{th} [K/W]
ICK SMD E 15 SA	15.3	27	ICK SMD E 29 SA	29.0	18
ICK SMD E 22 SA	22.3	21			



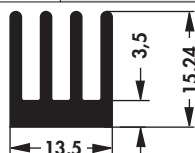
art. no.	↔ [mm]	R_{th} [K/W]	art. no.	↔ [mm]	R_{th} [K/W]
ICK SMD F 8 ...	8	74	ICK SMD F 19 ...	19	37
ICK SMD F 10 ...	10	71	ICK SMD F 21 ...	21	33
ICK SMD F 17 SA	17	42	ICK SMD F 26 ...	26	26



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			



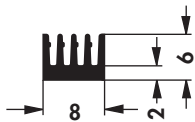
art. no.	↔ [mm]	R_{th} [K/W]	art. no.	↔ [mm]	R_{th} [K/W]
ICK SMD K 8 ...	8	25.6	ICK SMD K 17 ...	17	19.4
ICK SMD K 10 SA	10	23.4	ICK SMD K 19 ...	19	18.0
ICK SMD K 13 ...	13	21.5	ICK SMD K 21 ...	21	16.5



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

heatsink for SMD



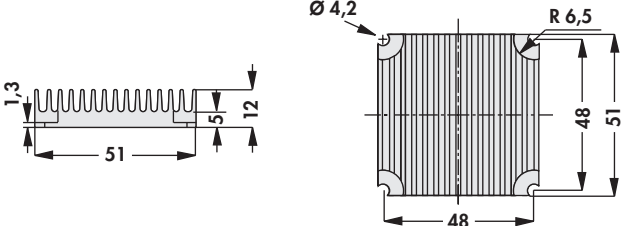
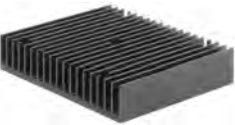
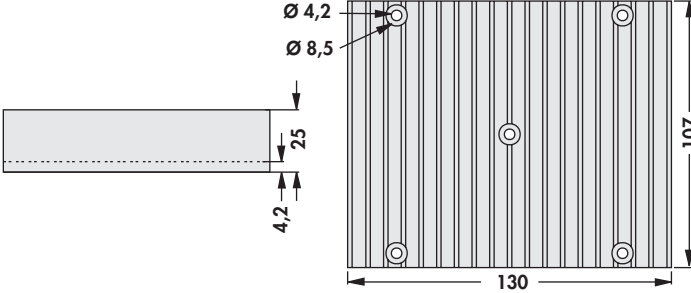
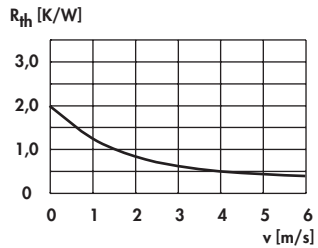
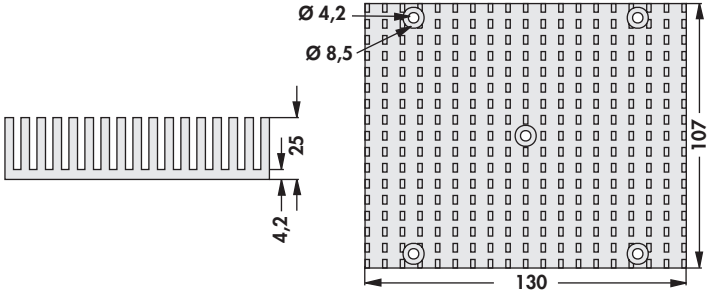
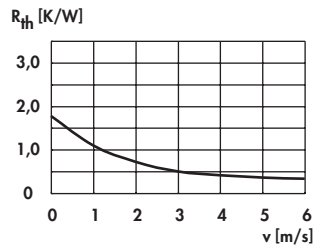
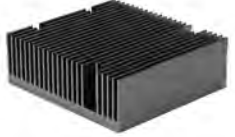
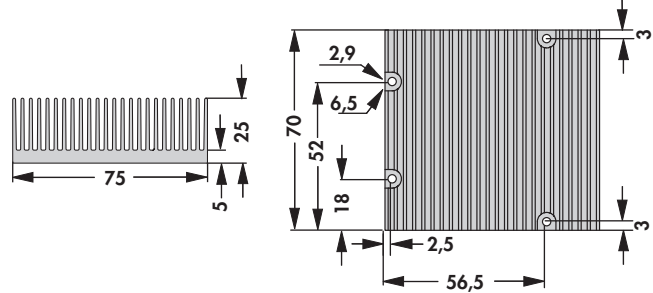
art. no.	↔ [mm]	R _{th} [K/W]	art. no.	↔ [mm]	R _{th} [K/W]
ICK SMD N 8 ...	8	74	ICK SMD N 19 ...	19	37
ICK SMD N 10 ...	10	71	ICK SMD N 21 ...	21	33
ICK SMD N 17 ...	17	42	ICK SMD N 26 ...	26	26
please indicate: ... surface SA = black anodised MI = solderable surface					

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)

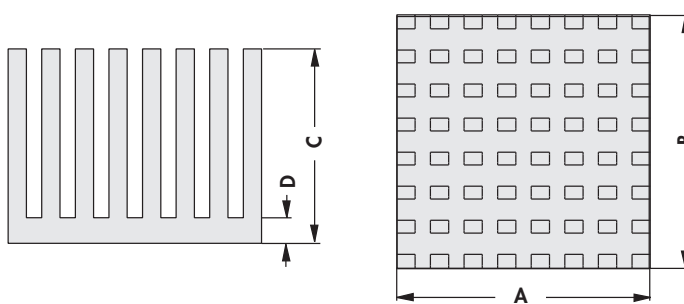
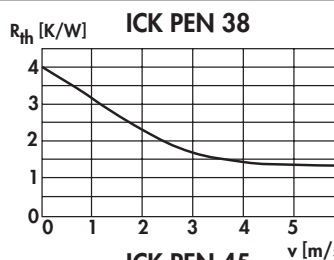
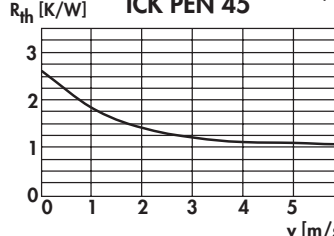
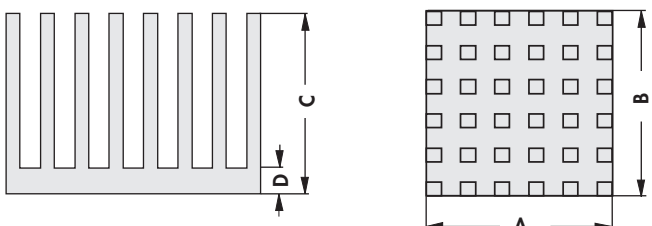
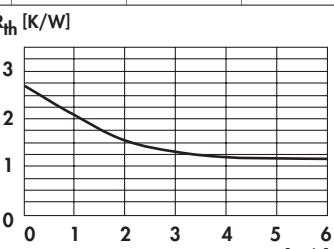


art. no.
ICK SMD BOX 1

		
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 25	3.9	Q7 Board

Passive heatsinks for processors

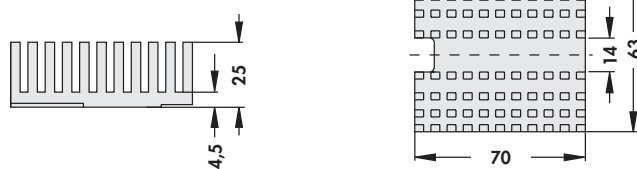
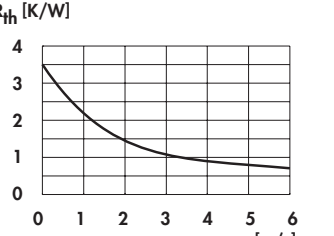
– customer specific versions and modifications on request

			 			
art. no.	R_{th} [K/W]	suitable for processor type	dim. [mm]			
ICK PEN 38 F	4.0	AMD® K6-III/ IDT W2A/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2	A	B	C	D
ICK PEN 38 W	4.0	AMD® K6-III/ IDT W2A/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2	49.5	49.5	38	5.0
ICK PEN 45 W	3.5	AMD® K6-III/ IDT W2A/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2	50.0	50.0	45	3.5
						
art. no.	R_{th} [K/W]	suitable for processor type	dim. [mm]			
ICK PRO 40 W	2.7	Intel® Pentium® PRO	A	B	C	D

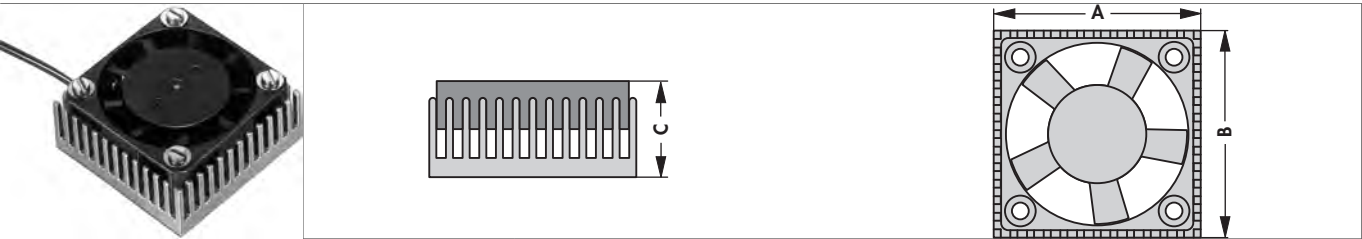
F = with double-sided thermally conductive adhesive foil

W = for thermally conductive adhesive (please order separately)

WLK ... → E 23

		
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)



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

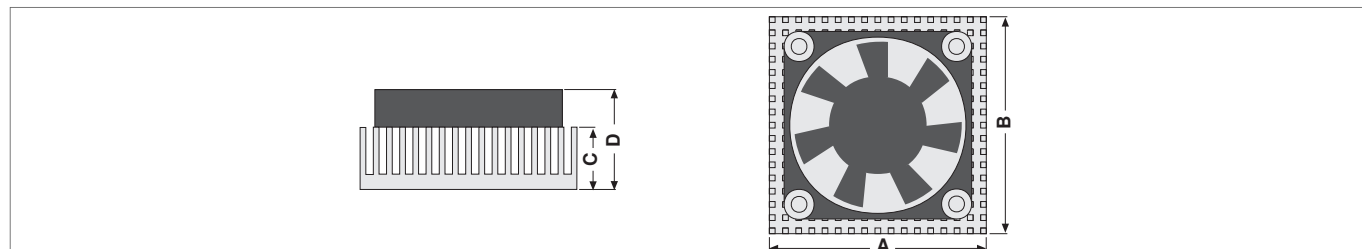
used fans:
5 Volt = **Sepa MFB 25 F 05 L / MFB 40 H 05 / MFB 40 H 05 A**;
12 Volt = **Sepa MFB 25 F 12 / MFB 40 H 12 / MFB 40 H 12 A**

F = with double-sided thermally conductive adhesive foil
W = for thermally conductive adhesive (please order separately) **WLK ...** → E 23
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	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 W 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 W 12	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 16 K 12	1.20	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2	50.8	50.8	16.51	26.51
LA ICK PEN 16 W 12	1.20	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2	50.8	50.8	16.51	26.51
LA ICK PEN 16 W 12 A	1.20	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2	50.8	50.8	16.51	26.51
LA ICK PEN 18 W 12	1.60	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2	50.8	50.8	8.00	18.00
LA ICK PEN 38 W 12	1.10	AMD® K6-III/ IDT W2A/ Cyrix MII and similar/ MMX/ IDT C6/ Intel® Pentium®/ AMD® K6-2	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**

K = with fixing clamp (incl. one-sided adherent conductive foil)

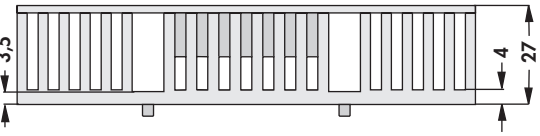
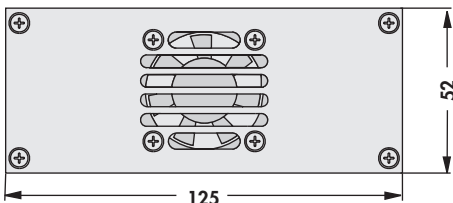
F = with double-sided thermally conductive adhesive foil

W = for thermally conductive adhesive (please order separately) **WLK ...** → E 23

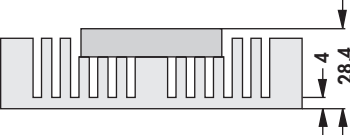
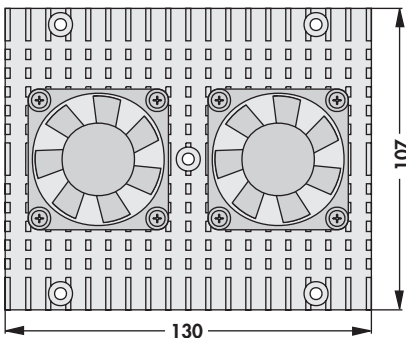
A = alarm exit

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: ... accessory (optional) SM = molex connection plug		

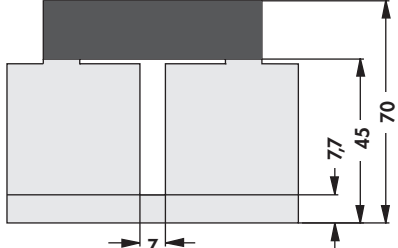
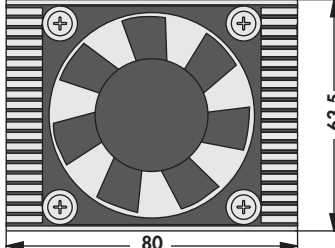
utilized fans: 12 Volt = Sepa MFB 40 H 12

		
art. no.	R_{th} [K/W]	suitable for processor type
LA ICK PEN 3 XE	0.8	Intel® Pentium® III-Xeon™
please indicate: ... accessory (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: ... accessory (optional) SM = molex connection plug		

fixing method: K = with fixing clamp

operating voltage of the fan motor: 12 Volt (Papst 612 NHH)

A
B
C
D
E
F
G
H
I
K
L
M
N



molex crimp case series: 6471; molex crimp terminals: 2759

– Sepa-fan 24 h BURN-IN tested

5 volt fan

	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. iitial current	170 mA	250 mA	250 mA	120 mA	160 mA	
max. volume flow	46 l/min 2.8 m³/h	184 l/min 11 m³/h	184 l/min 11 m³/h	169 l/min 10.1 m³/h	50 l/min 3 m³/h	132 l/min 8 m³/h
max. static pressure	2.2 mmH ₂ O 22 Pa	3.1 mm H ₂ O 30.5 Pa	3.1 mm H ₂ O 30.5 Pa	1.6 mm H ₂ O 15.6 Pa	2.6 mm H ₂ O 25.5 Pa	3.06 mm H ₂ O 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 (L₁₀)	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 fan

	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	60 mA	40 mA	60 mA
max. iitial current	150 mA	130 mA	130 mA	140 mA	70 mA	
max. volume flow	70 l/min 4.1 m³/h	173 l/min 10.3 m³/h	173 l/min 10.3 m³/h	238 l/min 14.3 m³/h	50 l/min 3 m³/h	132 l/min 8 m³/h
max. static pressure	2.24 mm H ₂ O 41.5 Pa	2.9 mmH ₂ O 28.5 Pa	2.9 mmH ₂ O 28.5 Pa	2.7 mm H ₂ O 26.9 Pa	2.6 mm H ₂ O 25.5 Pa	3.06 mm H ₂ O 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 (L₁₀)	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 ($V_{cc}-1$ 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



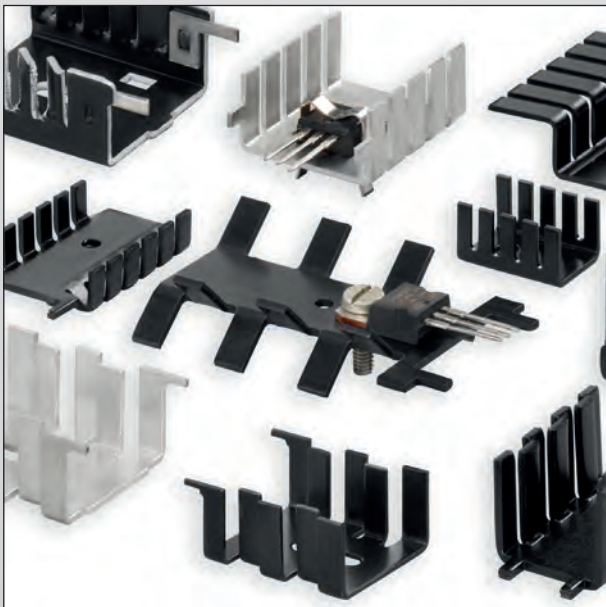
Finger shaped heatsinks for power semiconductors

- 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



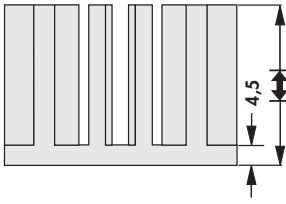
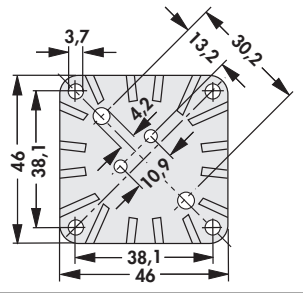
Finger shaped heatsinks for transistors

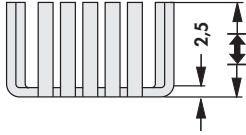
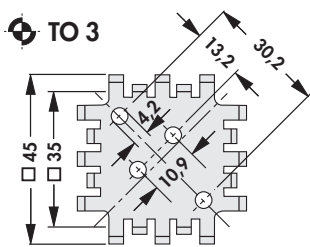
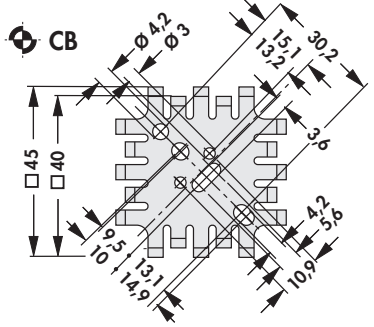
- effective heat dissipation of transistors
- efficient radiation of heat at a horizontal or vertical mounting position
- component fastening by means of screws or special transistor retaining springs
- solder mounting by means of integrated solder pins and solderable surfaces

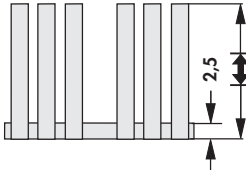
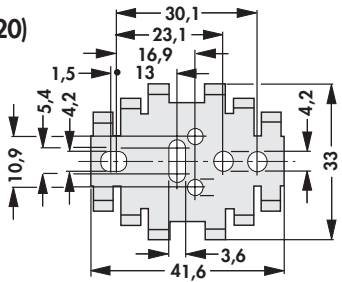


Miniature heatsinks

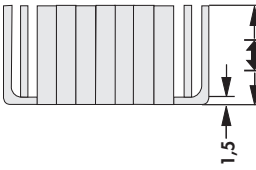
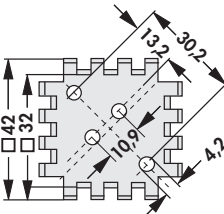
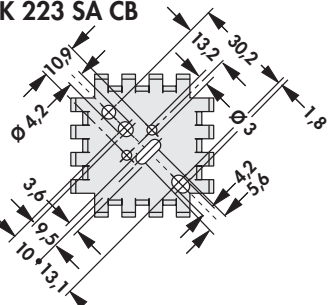
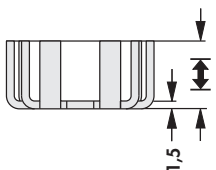
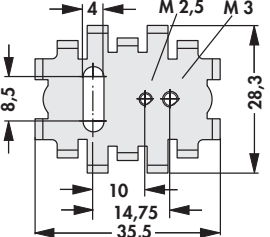
- for TO 5, SOT 82, D PAK and similar semiconductors
- made of aluminium, phosphorus bronze or copper
- simple mounting by direct plugging or soldering of the heatsink
- special types of packaging such as tape & reel, magazine or tray upon request
- versions and designs for your application

  			
art. no.	$\pm$ [mm]	R_{th} [K/W]	Φ
FK 254 SA 3	25.4	5.8	TO 3
FK 318 SA	31.8	4.8	without
FK 318 SA 3	31.8	4.8	TO 3
material:	die-casting aluminium		
surface:	black lacquered		

   			
art. no.	$\pm$ [mm]	R_{th} [K/W]	Φ
FK 201 SA	25.4	6	without
FK 201 SA 3	25.4	6	TO 3
FK 201 SA CB	25.4	6	CB
FK 202 SA	12.7	8	without
FK 202 SA 3	12.7	8	TO 3
FK 202 SA CB	12.7	8	CB

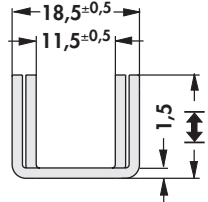
  			
art. no.	$\pm$ [mm]	R_{th} [K/W]	Φ
FK 205 SA L	31.8	9.0	L
FK 206 SA L	25.4	10.5	L
FK 207 SA L	19.1	12.0	L
FK 208 SA L	12.7	14.0	L
material:	aluminium		
surface:	black anodised		

Finger shaped heatsinks for power semiconductors

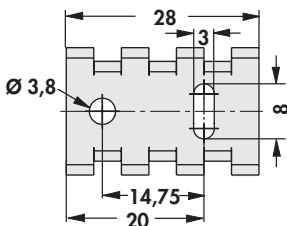
		FK 223 SA 3 	FK 223 SA CB 
art. no.	$\pm$ [mm]	R_{th} [K/W]	Φ
FK 223 SA	17	6.8	without
FK 223 SA 3	17	6.8	TO 3
FK 223 SA CB	17	6.8	CB
			
art. no.	$\pm$ [mm]	R_{th} [K/W]	Φ
FK 217 SA CB 2	13	16	CB 2 (SOT 32; TO 220)
material:	aluminium		
surface:	black anodised		

Heatsinks for transistors in plastic case

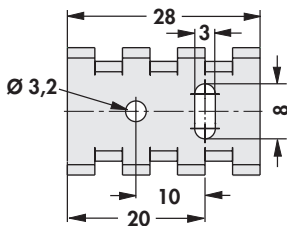
– for semiconductor screw-assembly, horizontal



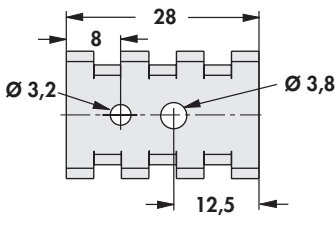
FK 234 SA L 1



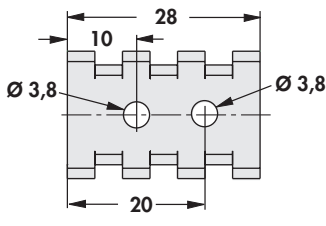
FK 234 SA L 2



FK 234 SA L 3



FK 234 SA L 4

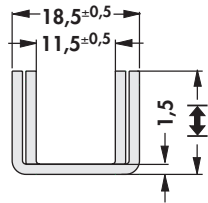


art. no.	± [mm]	R _{th} [K/W]	⌀
FK 234 SA L 1	15	17	TO 220
FK 234 SA L 2	15	17	SOT 32
FK 234 SA L 3	15	17	CB
FK 234 SA L 4	15	17	CB

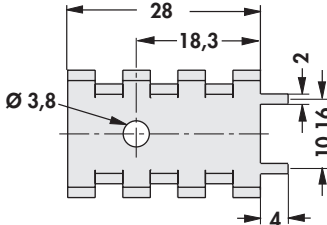
material: aluminium

surface: black anodised

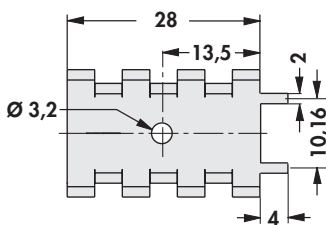
– for semiconductor screw-assembly, vertical



FK 235 ... L 1



FK 235 ... L 2

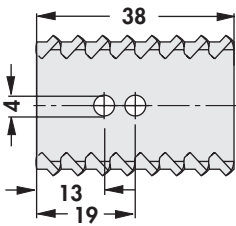
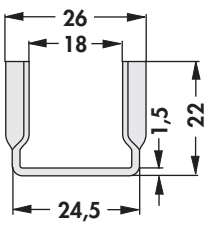
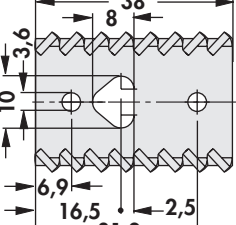
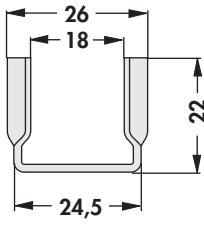
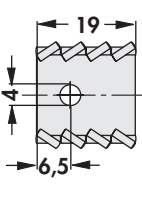
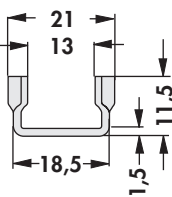
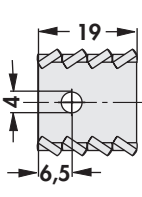
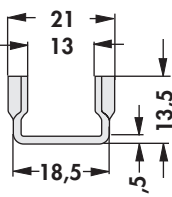
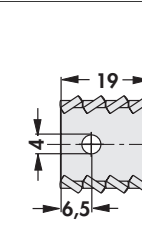
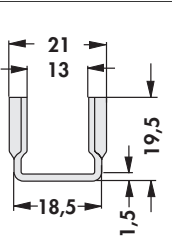
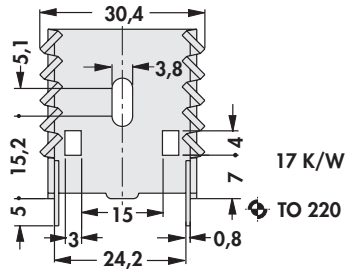
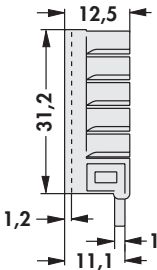


FK 235 MI L 1	15	16	TO 220
FK 235 MI L 2	15	16	SOT 32
FK 235 SA L 1	15	16	TO 220
FK 235 SA L 2	15	16	SOT 32

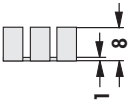
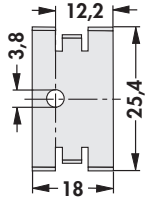
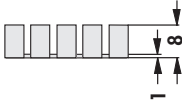
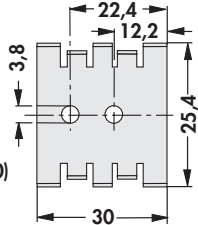
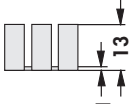
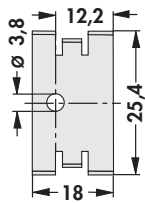
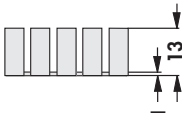
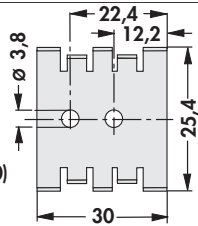
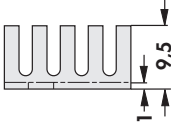
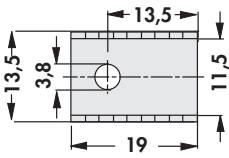
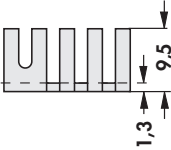
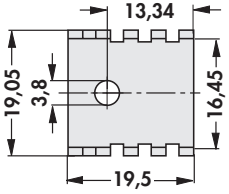
material: aluminium

surface: solderable surface/ black anodised

Heatsinks for transistors in plastic case

art. no.			9,9 K/W TO 220	
FK 225 SA L 1				
art. no.			9,9 K/W TO 220	
FK 225 SA L 2				
art. no.			30 K/W TO 220	
FK 228 SA L 1				
art. no.			27 K/W TO 220	
FK 229 SA L 1				
art. no.			21 K/W TO 220	
FK 230 SA L 1				
material:		aluminium		
surface:		black anodised		
art. no.			17 K/W TO 220	
FK 249 SA 220				
material:		aluminium		
surface:		black passivated, solder pins tin plated		

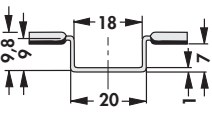
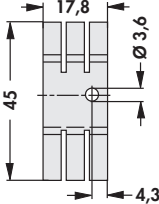
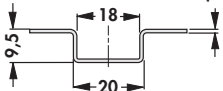
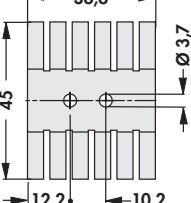
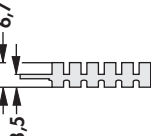
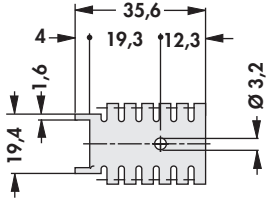
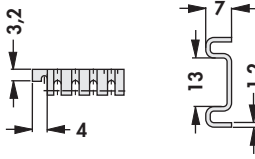
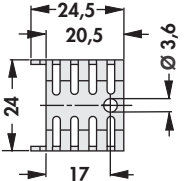
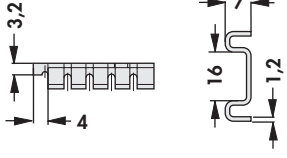
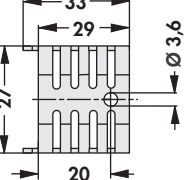
Heatsinks for transistors in plastic case

art. no.		 25 K/W SOT 32	
FK 209 SA 32	available without hole pattern as well		
art. no.		 18 K/W CB (SOT 32 + TO 220)	
FK 210 SA CB	available without hole pattern as well		
art. no.		 21 K/W SOT 32	
FK 213 SA 32	available without hole pattern as well		
art. no.		 15 K/W CB (SOT 32 + TO 220)	
FK 214 SA CB	available without hole pattern as well		
art. no.		 24 K/W TO 220	
FK 231 SA 220			
art. no.		 24 K/W SOT 32	
FK 239 SA 32			
material:	aluminium		
surface:	black anodised		

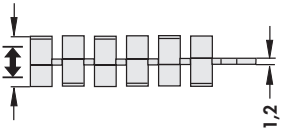
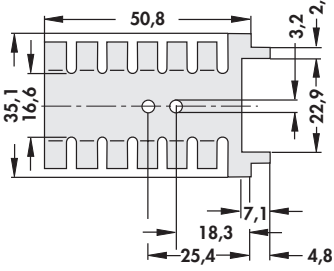
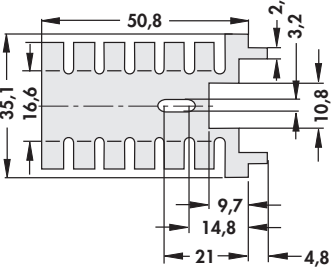
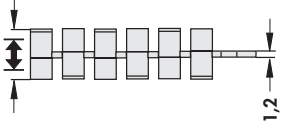
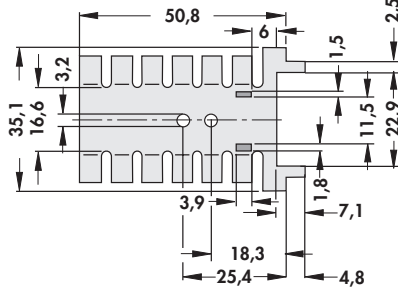
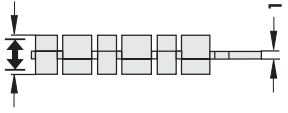
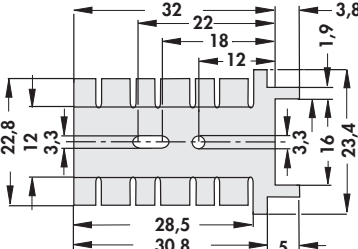
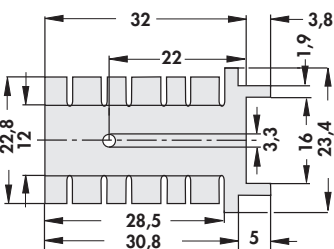
Heatsinks for transistors in plastic case

art. no.				
			25 K/W SOT 32	
FK 211 32 ...	available without hole pattern as well			
art. no.				
			18 K/W CB (SOT 32 + TO 220)	
FK 212 CB ...	available without hole pattern as well			
art. no.				
			21 K/W SOT 32	
FK 215 32 ...	available without hole pattern as well			
art. no.				
			15 K/W CB (SOT 32 + TO 220)	
FK 216 CB	available without hole pattern as well			
art. no.				
			20 K/W TO 220	
FK 222 ...	available without hole pattern as well			
art. no.				
			20 K/W TO 220	
FK 222 THF ...				
art. no.				
			22 K/W TO 220	
FK 247 220 ...				
please indicate:	... surface SA = black anodised MI = solderable surface			
material:	aluminium			

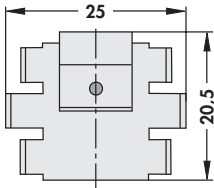
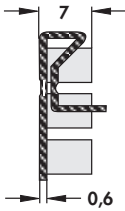
Heatsinks for transistors in plastic case

art. no.			
FK 227 SA L 1		 22 K/W TO 220	
art. no.			
FK 238 SA L 1		 12 K/W TO 220	
material:	aluminium		
surface:	black anodised		
art. no.			
FK 218 32 ...		 21 K/W SOT 32 TO 220	
art. no.			
FK 232 220 ...		 21 K/W TO 220	
art. no.			
FK 233 220 ...		 20,2 K/W TO 220	
please indicate:	... surface SA = black anodised MI = solderable surface		
material:	aluminium		

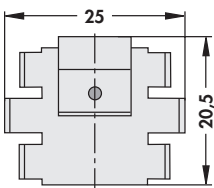
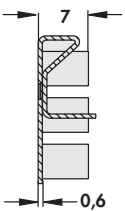
Heatsinks for transistors in plastic case

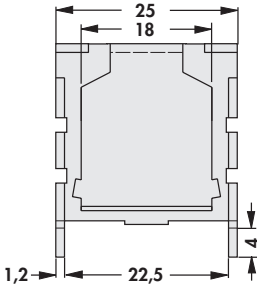
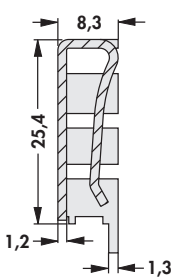
		FK 219 CB 1 ... 	FK 219 CB 2 ... 
art. no. FK 219 CB 1 ... FK 219 CB 2 ...	$\pm$ [mm] 12.6 12.6	R_{th} [K/W] 14 14	Φ CB 1 (TO 220) CB 2 (TO 220)
			
art. no. FK 219 CB 3 ...	$\pm$ [mm] 12.6	R_{th} [K/W] 14	Φ CB 3 (TO 220)
		FK 236 CB ... 	FK 236 220 ... 
art. no. FK 236 220 ... FK 236 CB ...	$\pm$ [mm] 5 5	R_{th} [K/W] 18 18	Φ TO 220 CB
please indicate: ... surface SA = black anodised MI = solderable surface			
material:	aluminium		

Attachable heatsinks

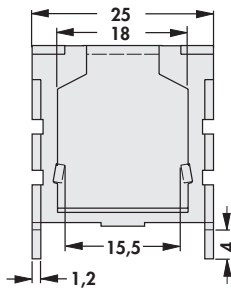
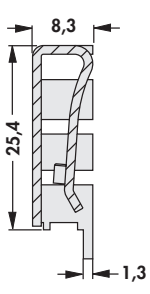
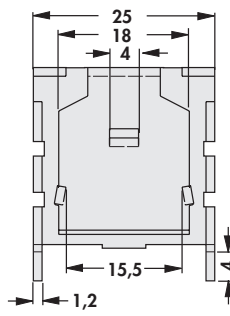
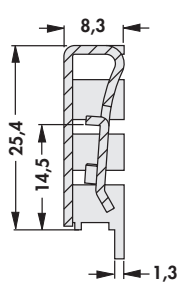
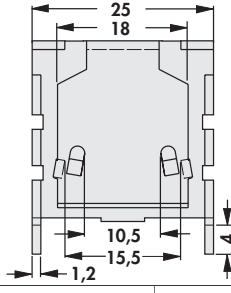
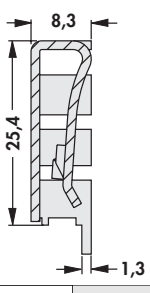
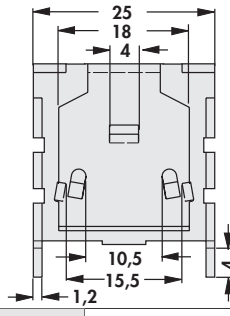
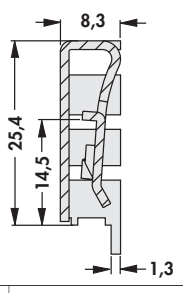
		
art. no.	R_{th} [K/W]	Φ
FK 220 SA 220	25	TO 220
material:	aluminium	
surface:	black anodised	

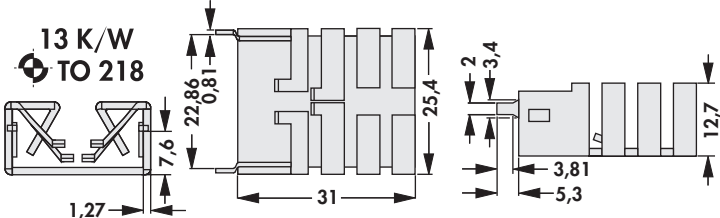
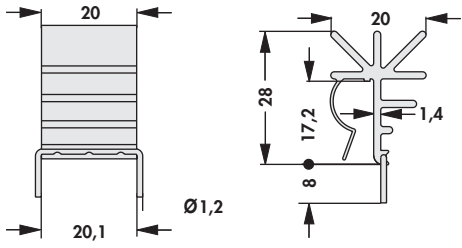
– for transistors with thin bottom thickness (0.5 mm)

		
art. no.	R_{th} [K/W]	Φ
FK 258 SA 220	25	TO 220
material:	aluminium	
surface:	black anodised	

		
art. no.	R_{th} [K/W]	Φ
FK 224 ... P SIP	18	P SIP
please indicate:	... surface SA = black anodised MI = solderable surface	
material:	aluminium	

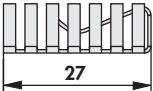
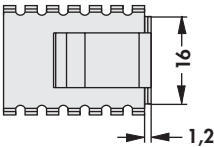
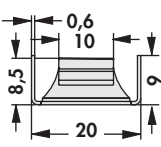
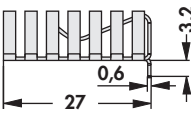
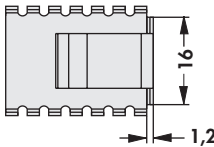
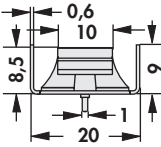
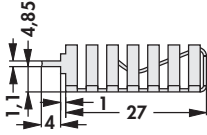
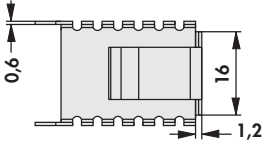
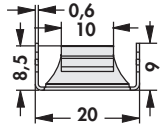
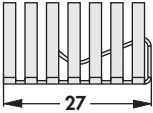
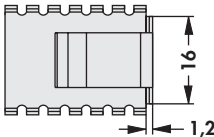
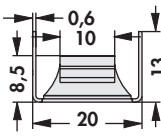
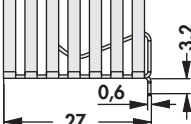
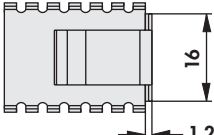
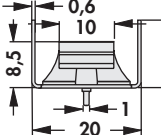
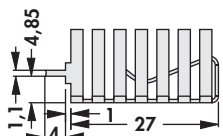
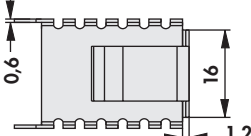
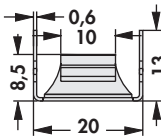
Attachable heatsinks

	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	18	TO 218	FK 224 ... 220 2	18	TO 220	
please indicate: ... surface						
SA = black anodised						
MI = solderable surface						
material:		aluminium				

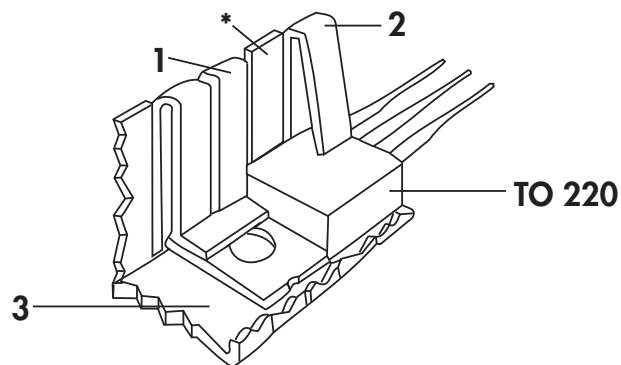
art. no.			
FK 241 SA 218 V			
with tin-plated soldering lug for direct soldering onto circuit board, for vertical installation			
art. no.			
FK 248 SA 220			
material:		aluminium	
surface:		black anodised, solder pins tin plated	

Attachable heatsinks

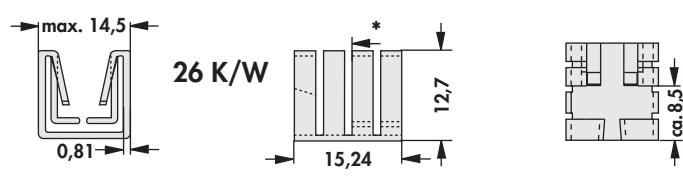
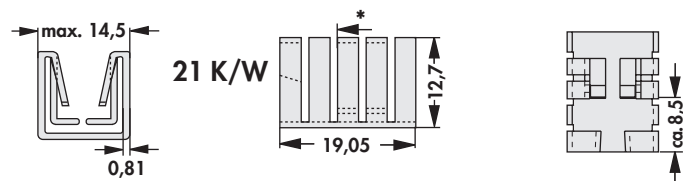
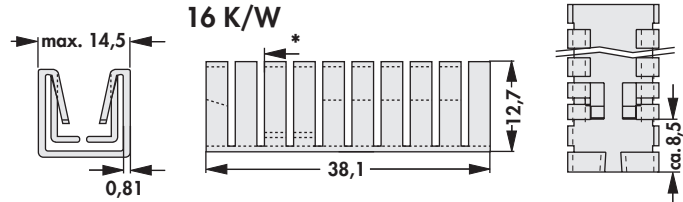
- universal clip on heatsinks for type TO 218, TO 229, TO 247, TO 248, SIP-Multiwatt and similar
- easy assembly by pushing the heatsink onto the component
- for vertical and horizontal fastening by soldering
- fin height variations on request
- special design accord. to customized specification

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				

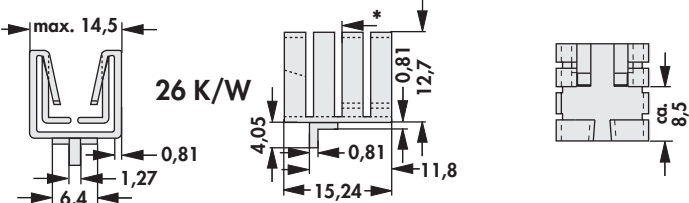
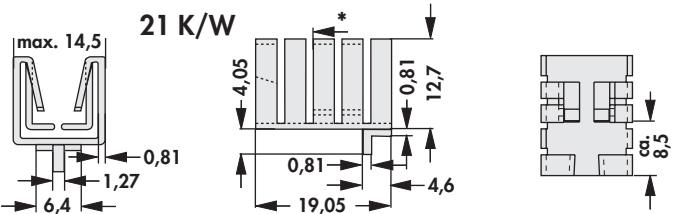
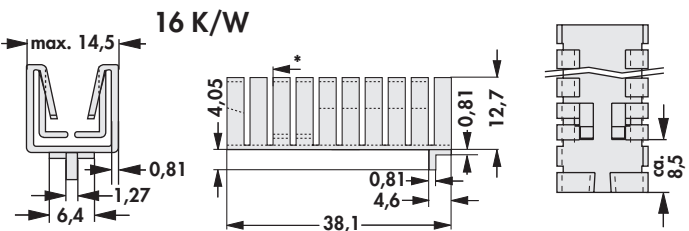
Attachable heatsinks



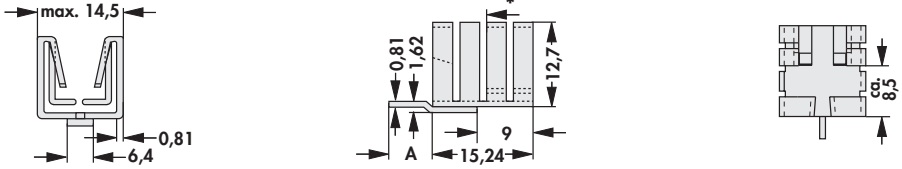
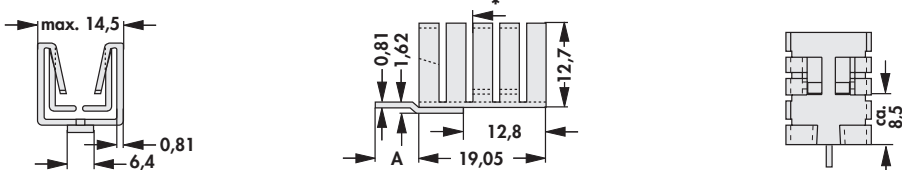
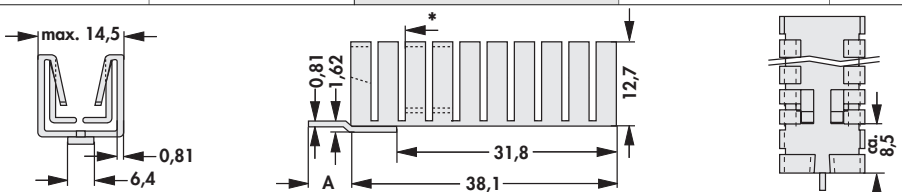
- narrow version with better thermal resistance
- max. 14.5 mm wide
- 3 different lengths for varied dissipation power
- takes less space than any other attachable heatsink
- simple assembly by pushing the heatsink onto the TO 220 housing
- the cooling fingers form spring clamps **(1+2)**, which pushes the TO 220 and its mounting flange onto the heatsink **(3)**
- optimum heat transfer due to the constant pressure on the entire contact surface of the TO 220 cases
- effective heat emission with horizontal and vertical mounting
- * = touch in edge of transistor

art. no.				
FK 242 SA 220 O		without soldering lug		26 K/W
FK 237 SA 220 O		without soldering lug		21 K/W
FK 240 SA 220 O		without soldering lug		16 K/W
material:	aluminium			
surface:	black anodised, solder pins tin plated			

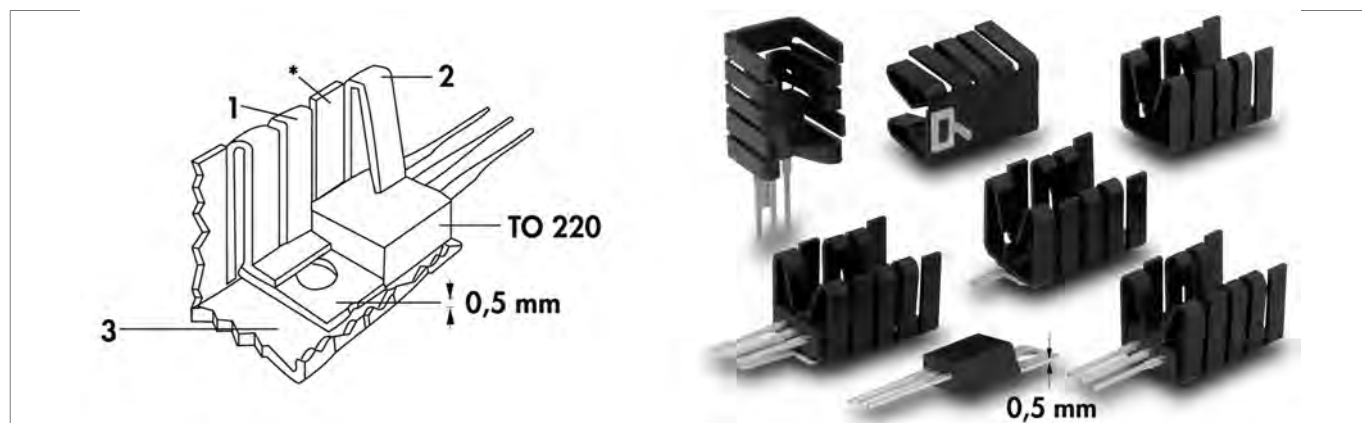
Attachable heatsinks

art. no.			
FK 242 SA 220 H			with tinned soldering lug for direct soldering onto circuit board, for horizontal installation
FK 237 SA 220 H			with tinned soldering lug for direct soldering onto circuit board, for horizontal installation
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		

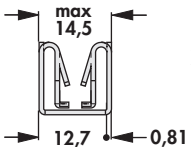
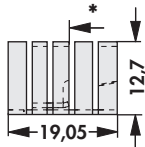
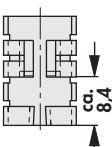
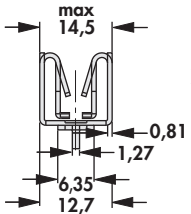
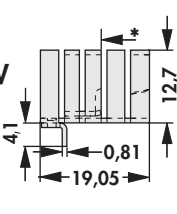
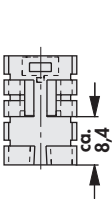
– with tinned soldering lug for direct soldering onto circuit board, for vertical installation

					
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				

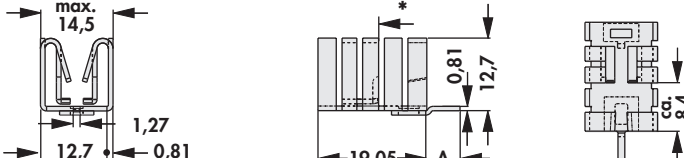
Attachable heatsinks for TO 220 with a bottom plate thickness of 0.5 mm



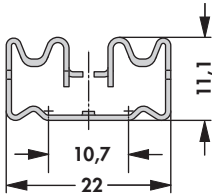
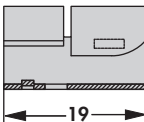
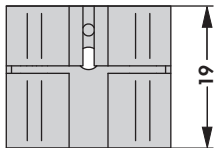
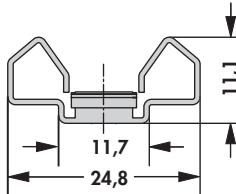
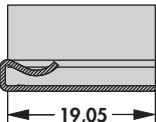
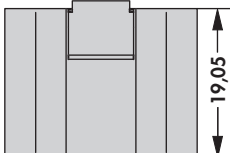
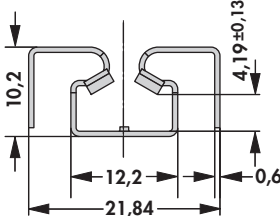
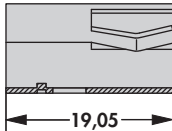
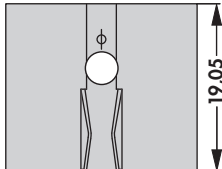
- narrow version with better thermal resistance
- max. 14.5 mm wide
- takes less space than any other attachable heatsink
- simple assembly by pushing the heatsink onto the TO 220 housing
- the cooling fingers form spring clamps **(1+2)**, which pushes the TO 220 and its mounting flange onto the heatsink **(3)**
- optimum heat transfer due to the constant pressure on the entire contact surface of the TO 220 cases
- effective heat emission with horizontal and vertical mounting
- * = touch in edge of transistor

art. no.				
FK 252 SA 220 O				
	without soldering lug	21 K/W		
FK 252 SA 220 H				
	with tinned soldering lug for direct soldering onto circuit board, for horizontal installation	21 K/W		
material:	aluminium			
surface:	black anodised			

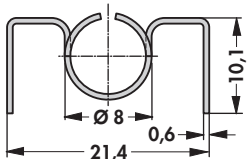
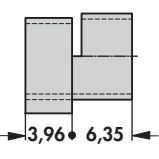
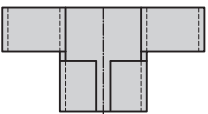
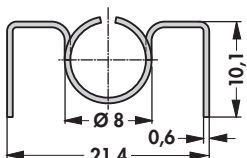
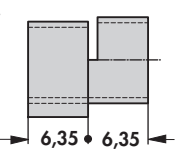
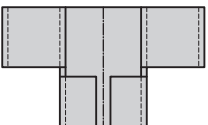
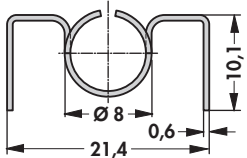
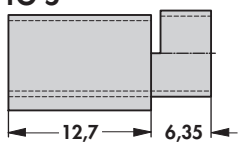
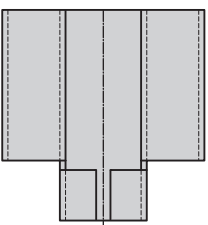
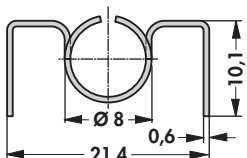
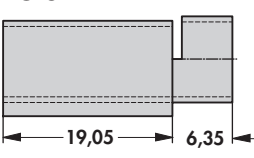
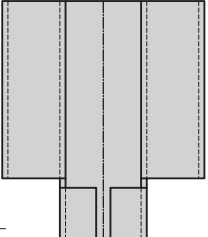
- with tinned soldering lug for direct soldering onto circuit board, for vertical installation

					
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			

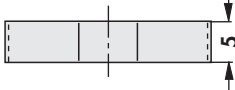
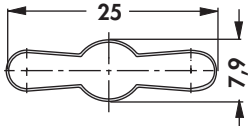
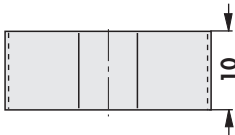
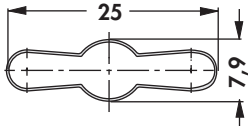
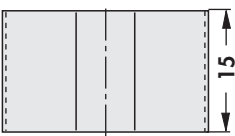
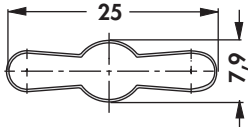
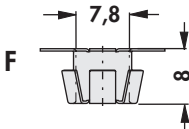
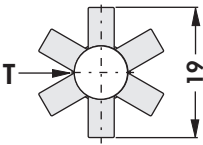
Attachable heatsinks

				
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			

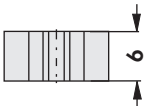
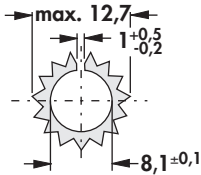
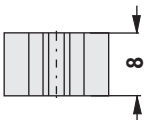
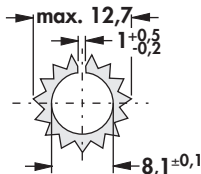
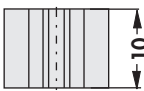
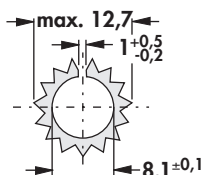
Small heatsinks

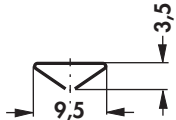
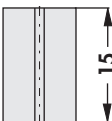
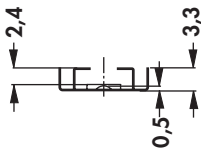
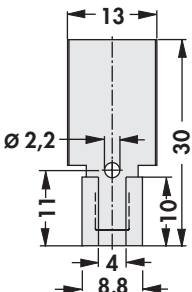
art. no. KK 1 3,96	  40 K/W TO 5  
art. no. KK 1 6,35	  38 K/W TO 5  
art. no. KK 1 12,7	  35 K/W TO 5  
art. no. KK 1 19,05	  31 K/W TO 5  
material: surface:	aluminium black anodised

Small heatsinks

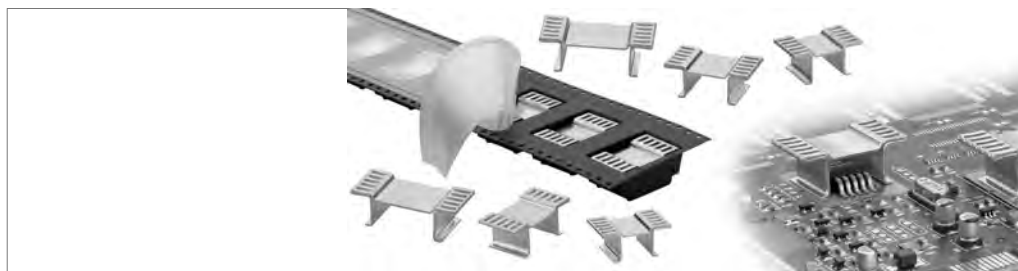
art. no.				
KF 5/5			57 K/W TO 5	
art. no.				
KF 5/10			46 K/W TO 5	
art. no.				
KF 5/15			40 K/W TO 5	
material:	brass			
surface:	blackened			
art. no.				
KK 562 GS			60 K/W TO 5	
	T = gap; F = spring loaded			
material:	special bronze CuZn 15			
material thickness:	0.3 mm			
surface:	blackened			

Small heatsinks

art. no.				63 K/W  TO 5	
SKK 56					
art. no.				55 K/W  TO 5	
SKK 58					
art. no.				44 K/W  TO 5	
SKK 510					
material:			aluminium		
surface:			etched (other surfaces on request)		

art. no.				80 K/W  TO 126 SOT 32 SOT 82	
KK 92					
art. no.				60 K/W  TO 126 SOT 32 SOT 82	
KK 32					
material:			special bronze CuZn 6		
surface:			blackened		

Heatsinks for D PAK and others

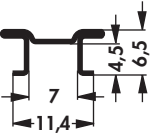
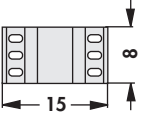
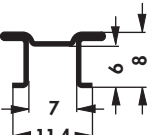
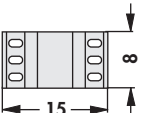
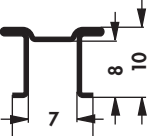
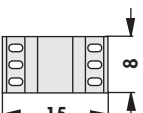
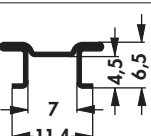
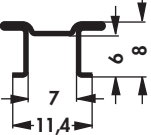
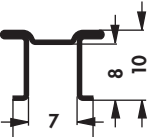


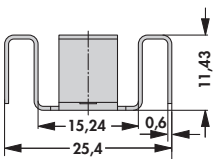
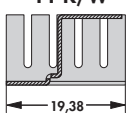
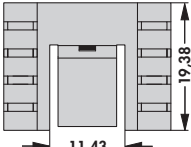
- copper heatsinks with excellent heat conductivity
- direct mounting on printed circuit through solderable surface
- especially suitable for SMD components of type D PAK (TO 252), D² PAK (TO 263), D³ PAK (TO 268), SOT 669 LF PAK, SO IC-8 FL MP, Power SO-8, Power SO-10, Power SO-20, Power SO-36, SO-14, 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

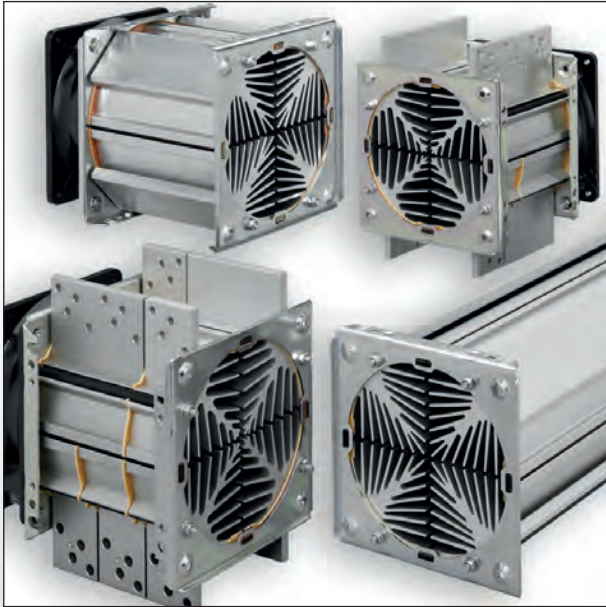
art. no.				
FK 244 08 D PAK ... weight: 2g				31,5 K/W
FK 244 13 D PAK ... weight: 3.3g				25 K/W
FK 244 08 D2 PAK ... weight: 2.2g				29,3 K/W
FK 244 13 D2 PAK ... weight: 3.6g				22,8 K/W
FK 244 08 D3 PAK ... weight: 2.5g				26 K/W
FK 244 13 D3 PAK ... weight: 3.9g				19,5 K/W
please indicate:	... packing (optional) TR = tape and reel			
surface:	solderable surface			
material:	copper (Cu)			
material thickness:	0.6 mm			

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

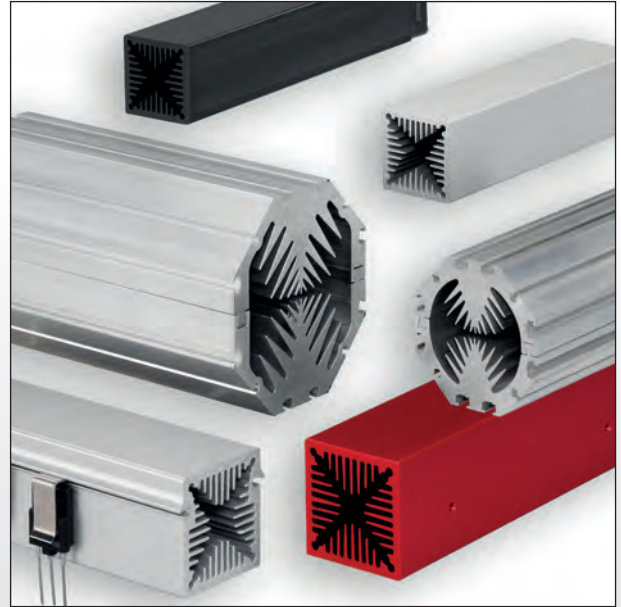
art. no.				
FK 250 06 LF PAK ... weight: 1g			37 K/W	
art. no.				
FK 250 08 LF PAK ... weight: 1.1g			34,8 K/W	
art. no.				
FK 250 10 LF PAK ... weight: 1.2g			28,8 K/W	
art. no.				
FK 251 06 LF PAK ... weight: 1.3g			32 K/W	
art. no.				
FK 251 08 LF PAK ... weight: 1.4g			29,8 K/W	
art. no.				
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			11 K/W 	
surface:	solderable surface			
material:	aluminium			
material thickness:	0.6 mm			



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 channels 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

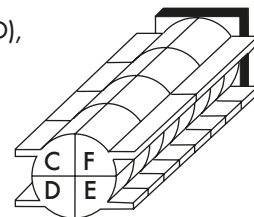


High performance heatsinks

- 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.

LA 1 ☒ **LA 2** ☐

date: _____

pieces p. order: _____

company: _____

name/dept.: _____

town: _____

street: _____

signature: _____

☐ with fan ☐ 230 Volt ☐ Volt
☐ protection grid voltage: ☐ ~ ☐ =
☐ without fan ☐ ~ ☐ =

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 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 ☐
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**

☐ cable connection

Please check off here total length of the cooling aggregate.

Order example

C F
D E

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.

LA 1 ○

LA 2 ○

date: _____

pieces p. order: _____

company: _____

name/dept.: _____

town: _____

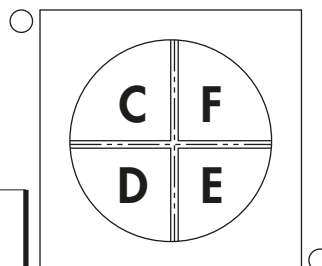
street: _____

signature: _____

☐ with fan
☐ protection grid
☐ without fan

☐ 230 Volt
 voltage:
☐ ~ ☐ =

☐ Volt



cable connection

length units:
mm

segment:	segment:	segment:	segment:
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
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 Fassung TO-3 Lochung Pressfit-Bohrung	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 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
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			

C

D

E

F

Please check off here total length of the cooling aggregate.

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.

LA 1 ○

LA 2 ○

date: _____

pieces p. order: _____

company: _____

name/dept.: _____

town: _____

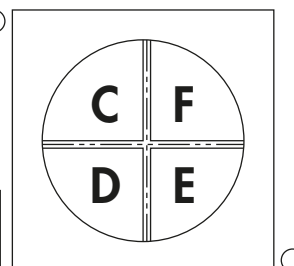
street: _____

signature: _____

- ☐ with fan ☐ 230 Volt ☐ Volt
☐ protection grid voltage:
☐ without fan ☐ ~ ○ =

length units:
mm

length units: mm	segment:	segment:	segment:	segment:
35.0	☐ 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	☐ 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	☐ Typ. A ○ B ☐ TO-3 holder ☐ TO-3 hole ☐ pressfit hole	☐ Typ. A ○ B ☐ TO-3 Fassung ☐ TO-3 Lochung ☐ Preßfit-Bohrung	☐ Typ. A ○ B ☐ TO-3 holder ☐ TO-3 hole ☐ pressfit hole	☐ Typ. A ○ B ☐ TO-3 holder ☐ TO-3 hole ☐ pressfit hole
144.5	☐ 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
181.0	☐ 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	☐ 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	☐ 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	☐ 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	☐ 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	☐ 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

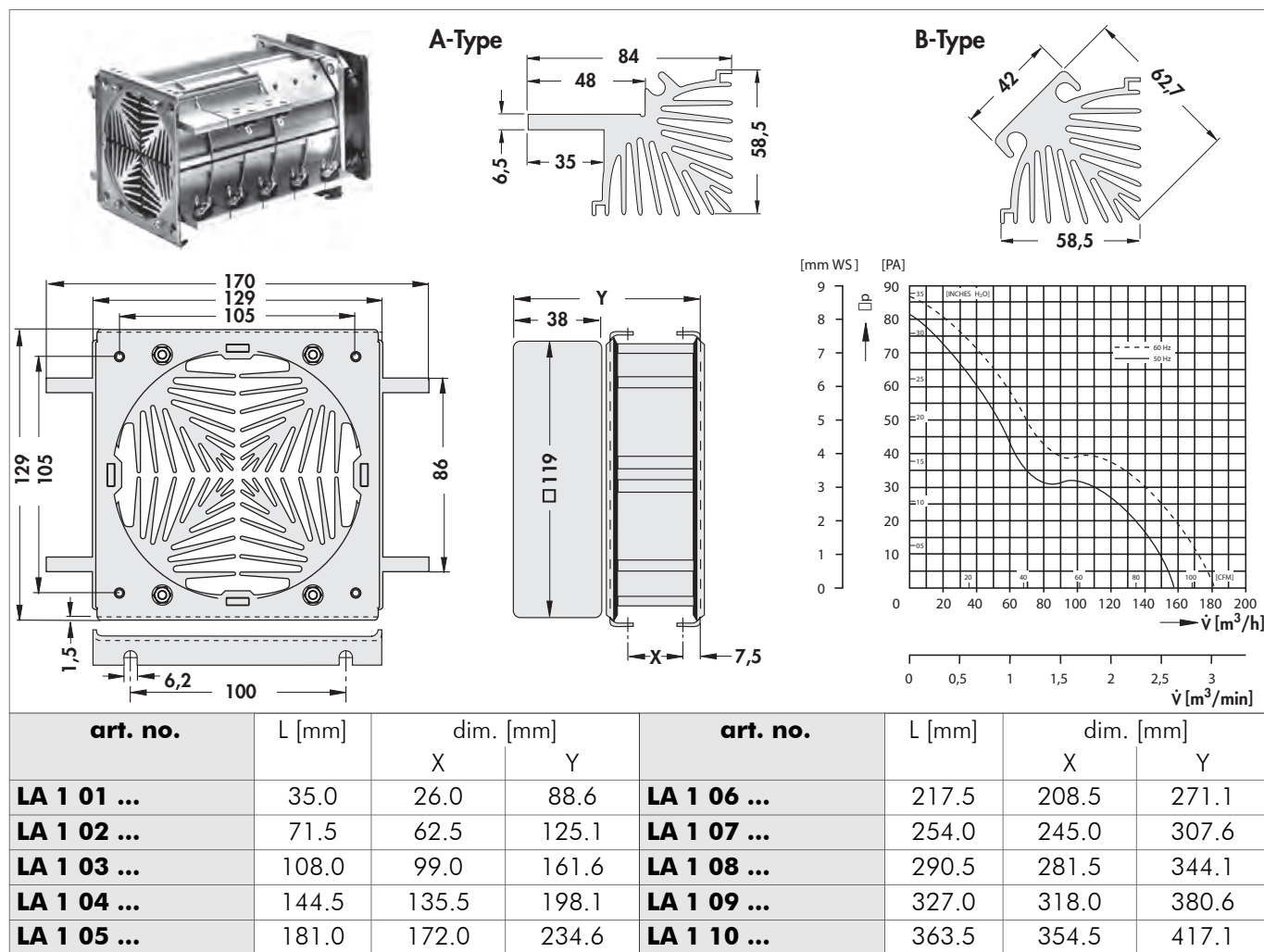


cable connection

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.

Segment cooling aggregates



... 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, ball bearing
dimensions	119x119x38 mm
tension	230 V AC
power inout	19 W
max. air volume	160 m³/h
temperature range	-40°C... +85°C
noise level	47 dB(A)
speed	2,650 min⁻¹
weight	550 g
failure rate (L₁₀)	L ₁₀ < 37,500 h (40°C)

D 5

Miniature cooling aggregates
Protection grid for axial fans
Thermal conductive material
Heatsinks with hollow fin profile

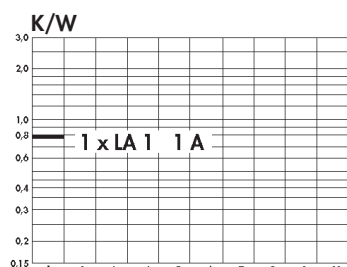
→ D 9 – 11
→ D 36
→ E 2 – 29
→ D 30

Order example
Order form
Mounting parts for heatsinks
Technical introduction

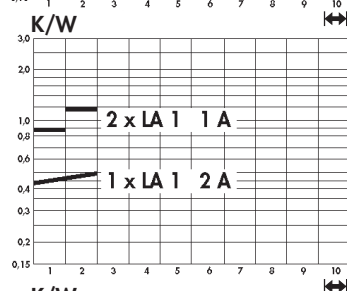
→ D 2
→ D 3 – 4
→ E 49 – 50
→ A 2 – 8

Thermal resistance LA 1

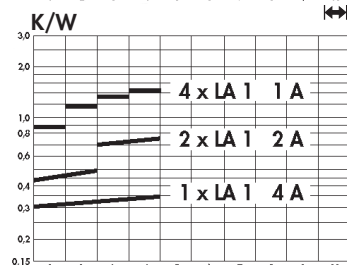
The thermal resistance in the following diagrams is given on the base of a total dissipation of 40 Watt per heatsink of the „A“-type. When using „B“-types this value increases by 3 %.



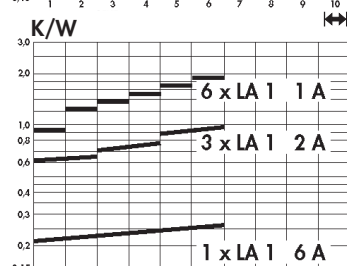
1. Cooling aggregate consisting of 4 heatsinks LA 1 - 1 A.
Total dissipation 160 W.



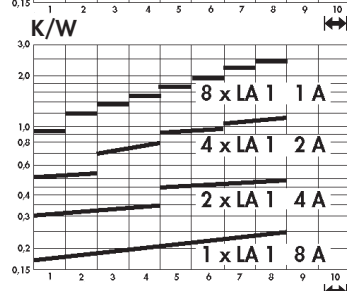
2. Cooling aggregate consisting of 4 heatsinks LA 1 - 1 A and 2 x 1 heatsink LA 1 - 2 A.
Total dissipation 320 W.



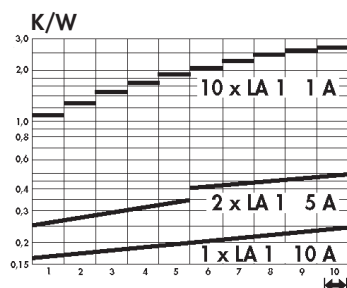
3. Cooling aggregate consisting of 4 heatsinks LA 1 - 1 A, 2 heatsinks LA 1 - 2 A and 2 x 1 heatsink LA 1 - 4 A. Total dissipation 640 W.



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.

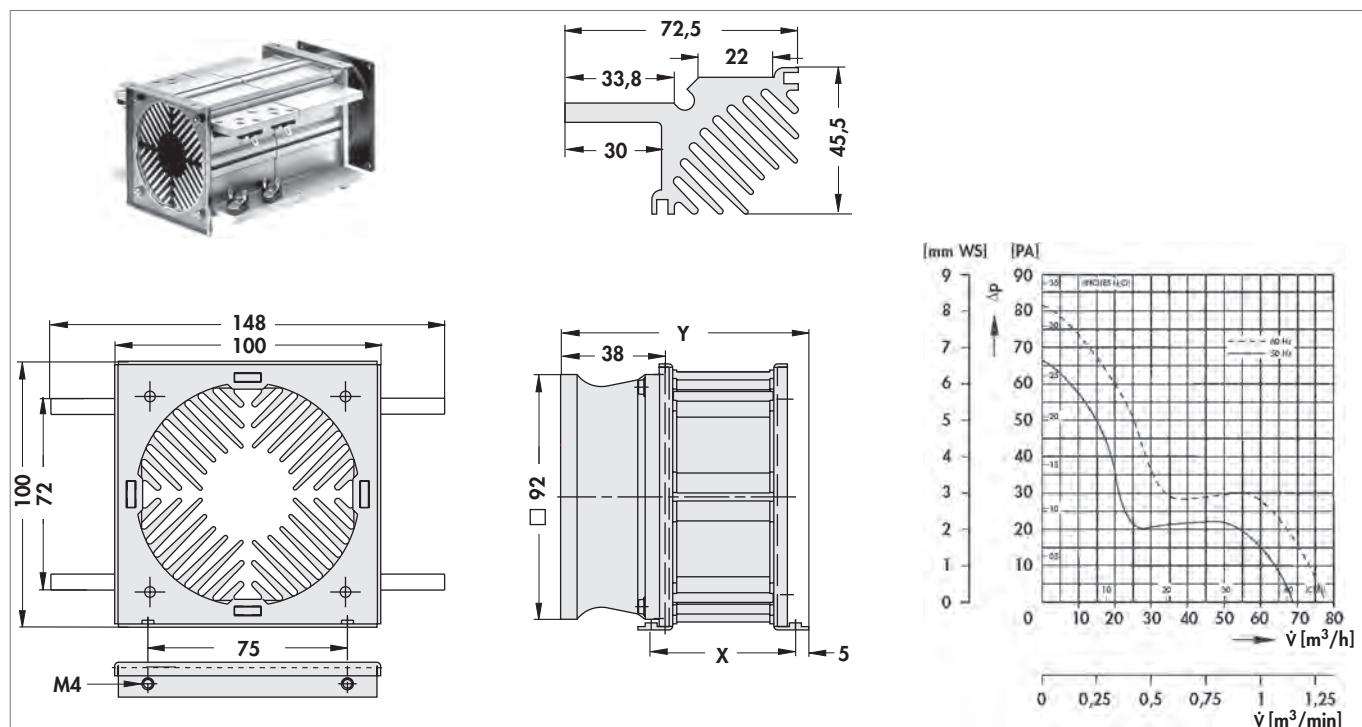


5. Cooling aggregate consisting of 8 heatsinks LA 1 - 1 A, 4 heatsinks LA 1 - 2 A, 2 heatsinks LA 1 - 4 A and 1 heatsink LA 1 - 8 A. Total dissipation 1280 W.



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.

Segment cooling aggregates



art. no.	L [mm]	dim. [mm]		art. no.	L [mm]	dim. [mm]	
		X	Y			X	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.

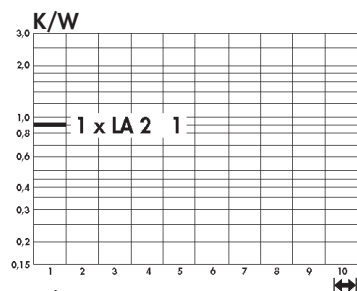
segments also available in meter length: **art. no. for A-type: LA 1 1000 A; art. no. for B-type: LA 2 1000 B**

Other fan types and fan voltages on request.

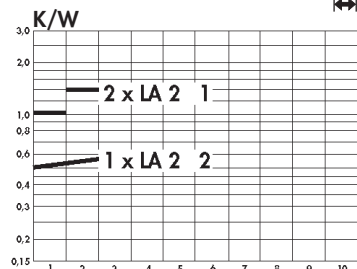
Technical data of the fans

	... 230
type	ebmpapst, ball bearing
dimensions	92x92x38 mm
tension	230 V AC
power inout	12 W
max. air volume	75 m³/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)

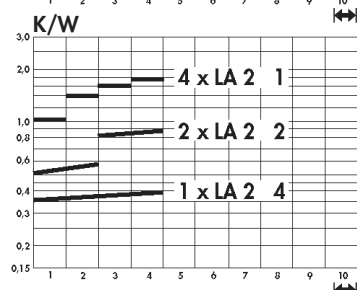
The thermal resistance in the following diagrams is given on the base of a total dissipation of 40 Watt per heatsink of the „A“-type.



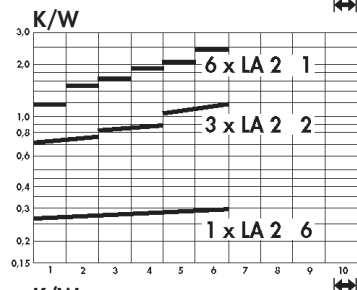
1. Cooling aggregate consisting of 4 heatsinks LA 2 - 1. Total dissipation 160 W maximal.



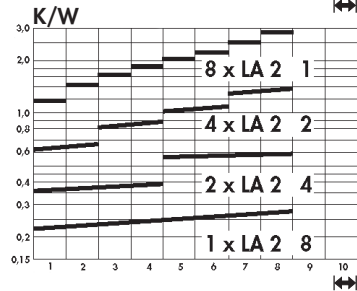
2. Cooling aggregate consisting of 4 heatsinks LA 2 - 1 and 2 x 1 heatsink LA 2 - 2. Total dissipation 320 W.



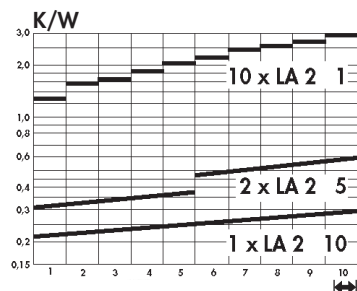
3. Cooling aggregate consisting of 4 heatsinks LA 2 - 1, 2 heatsinks LA 2 - 2 and 2 x 1 heatsink LA 2 - 4. Total dissipation 640 W.



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.



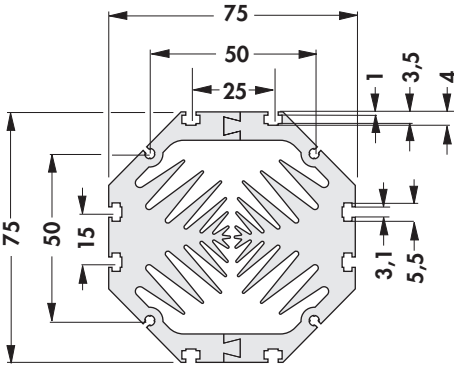
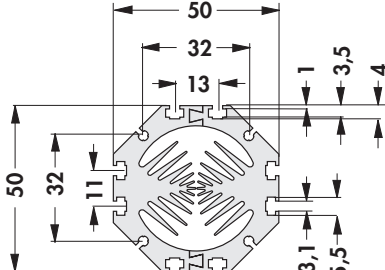
5. Cooling aggregate consisting of 8 heatsinks LA 2 - 1, 4 heatsinks LA 2 - 2, 2 heatsinks LA 2 - 4 and 1 heatsink LA 2 - 8. Total dissipation 1280 W.



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
- approximate length is optimised to the fan motor
- slide-nut channels for M3 nuts for mounting the transistors and circuit boards
- other fan types and fan voltages on request

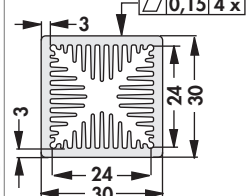
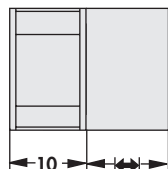
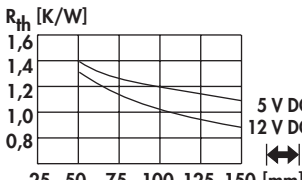
art. no.		
LAM 1	140 mm 0,3 K/W	
art. no.		
LAM 2	100 mm 0,73 K/W	
surface:	natural colour anodised	

Technical data of the fans

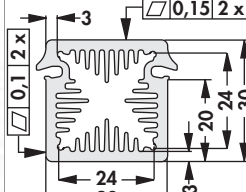
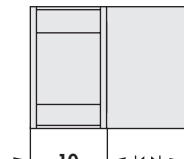
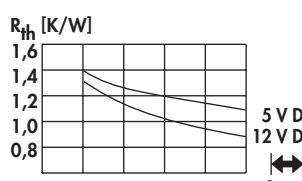
	LAM 1	LAM 2
type	ebmpapst 612 NHH-118	ebmpapst 412 F
dimensions	60x60x25 mm	40x40x10 mm
tension	12 V DC	12 V DC
power inout	2.9 W	0.7 W
max. air volume	56 m ³ /h	8 m ³ /h
temperature range	-20°C... +70°C	-20°C... +70°C
noise level	41 dB(A)	22.1 dB(A)
speed	6,800 min ⁻¹	5,400 min ⁻¹
weight	66 g	17 g
failure rate (L₁₀)	L ₁₀ < 60,000 h (40°C)	L ₁₀ < 45,000 h (20°C)

Miniature cooling aggregates

- compact design
- homogeneous heat dissipation
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and processing according to customer's requirements
- other surfaces treatment, fan types and fan voltages on request

art. no.				
LAM 3 ...				
please indicate:	... fan type 5 = 5 V DC 12 = 12 V DC			
surface:	natural colour anodised			

- with grooves for lock-in retaining spring for transistors THFU → A 119
- compact design
- homogeneous heat dissipation
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and processing according to customers requirements
- other surfaces treatment, fan types and fan voltages on request

art. no.				
LAM 3 K ...				
please indicate:	... fan type 5 = 5 V DC 12 = 12 V DC			
surface:	natural colour anodised			

Technical data of the fans

	... 5	... 12
type	Sepa, ball bearing	Sepa, ball bearing
dimensions	30x30x10 mm	30x30x10 mm
tension	5 V DC	12 V DC
max. air volume	6.8 m³/h	7.7 m³/h
cur. consumpt.	130 mA	70 mA
temperature range	-10°C... +70°C	-10°C... +70°C
noise level	21 dB(A)	23 dB(A)
speed	8,500 min⁻¹	9,100 min⁻¹
weight	8 g	8 g
failure rate (L₁₀)	L₁₀ < 95,000 h (20°C) MTBF < 280,000 h (20°C)	L₁₀ < 95,000 h (20°C) MTBF < 280,000 h (20°C)

Retaining springs for transistors
Special heatsink design
Hollow-fin cooling aggregates
High capacity cooling aggregat.

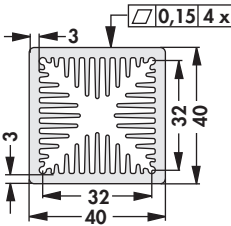
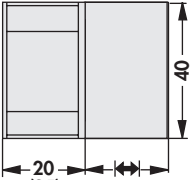
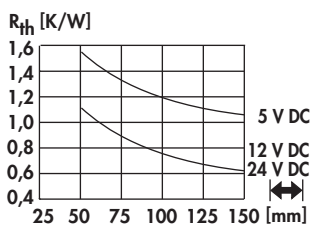
→ A 115 – 117 Fluid coolers
→ A 137 – 138 Protection grid for axial fans
→ D 15 – 25 Thermally conductive foil
→ D 26 – 35 Technical introduction

→ A 131 – 133
→ D 36
→ E 5 – 15
→ A 2 – 8

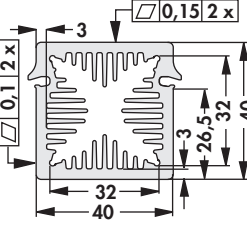
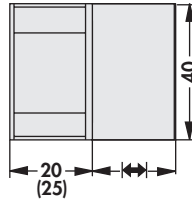
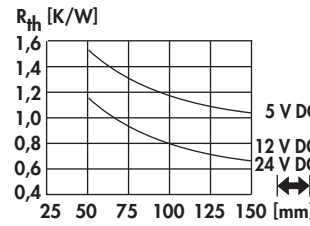
D 10

Miniature cooling aggregates

- compact design
- homogeneous heat dissipation
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and processing according to customer's requirements
- other surfaces treatment, fan types and fan voltages on request

art. no.				
LAM 4 ...				
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			

- with grooves for lock-in retaining spring for transistors THFU → A 119
- compact design
- homogeneous heat dissipation
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and processing according to customer's requirements
- other surfaces treatment, fan types and fan voltages on request

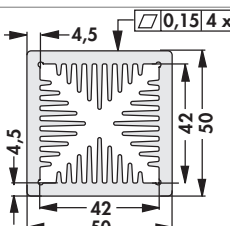
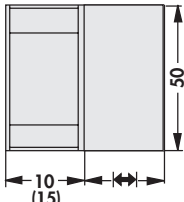
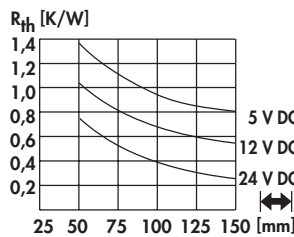
art. no.				
LAM 4 K ...				
please indicate:	...  50 75 100 125 150 mm			... fan type 5 = 5 V DC 12 = 12 V DC 24 = 24 V DC
surface:	natural colour anodised			

Technical data of the fans

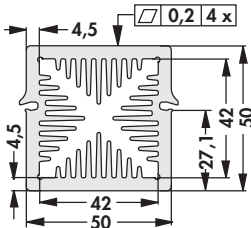
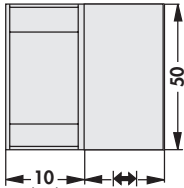
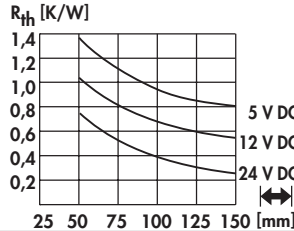
	... 5	... 12	... 24
type	ebmpapst 405	ebmpapst 412 JHH	ebmpapst 414 JHH
dimensions	40x40x20 mm	40x40x25 mm	40x40x25 mm
tension	5 V DC	12 V DC	24 V DC
power inout	0.9 W	3.3 W	3.6 W
max. air volume	10 m³/h	24 m³/h	24 m³/h
temperature range	-20°C... +70°C	-20°C... +60°C	-20°C... +60°C
noise level	18 dB(A)	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 (L₁₀)	L₁₀ < 50,000 h (40°C) L₁₀ < 20,000 h (tmax)	L₁₀ < 57,500 h (40°C) L₁₀ < 35,000 h (tmax)	L₁₀ < 57,500 h (40°C) L₁₀ < 35,000 h (tmax)

Miniature cooling aggregates

- compact design
- homogeneous heat dissipation
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and processing according to customer's requirements
- other surfaces treatment, fan types and fan voltages on request

art. no.				
LAM 5 ...				
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			

- with grooves for lock-in retaining spring for transistors THFU → A 119
- compact design
- homogeneous heat dissipation
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and processing according to customer's requirements
- other surfaces treatment, fan types and fan voltages on request

art. no.				
LAM 5 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			

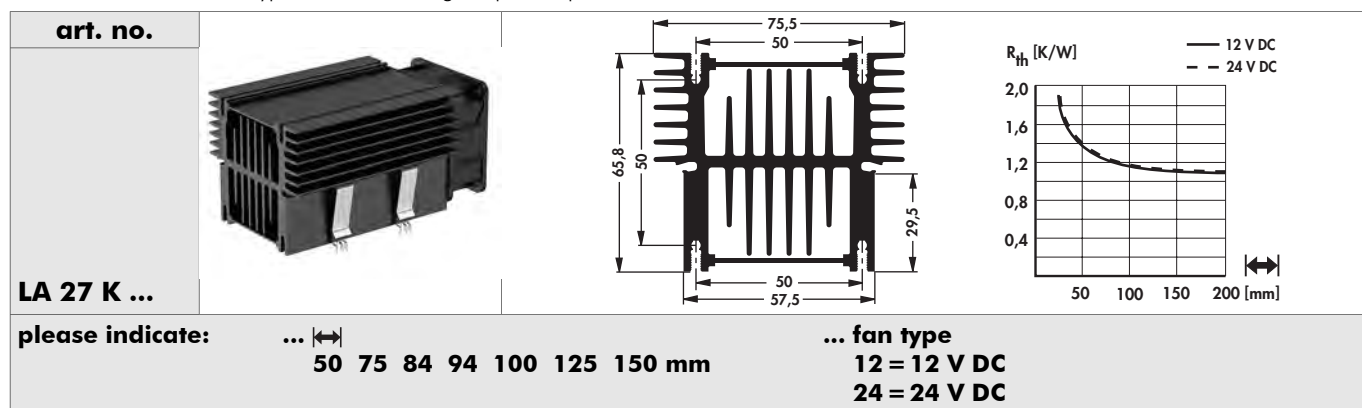
Technical data of the fans

	... 5	... 12	... 24
type	Sepa, ball bearing	Sepa, ball bearing	ebmpapst
dimensions	50x50x10 mm	50x50x10 mm	50x50x15 mm
tension	5 V DC	12 V DC	24 V DC
max. air volume	10 m³/h	14.3 m³/h	20 m³/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 (L₁₀)	L₁₀ < 95,000 h (20°C) MTBF < 280,000 h (20°C)	L₁₀ < 95,000 h (20°C) MTBF < 280,000 h (20°C)	L₁₀ 50,000 h (20°C)
alarm output	with	with	

Cooling aggregates with axial fan

Heatsink-cooling aggregates

- with grooves for lock-in retaining springs THFU → A 119
- screw-in solder pin M 3 (**art. no.: ELS 3**)
- different lengths, special designs and machinings according to customer specifications
- different surfaces, fan types and fan voltages upon request

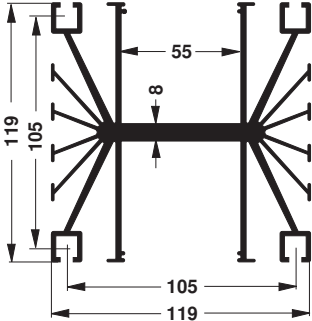
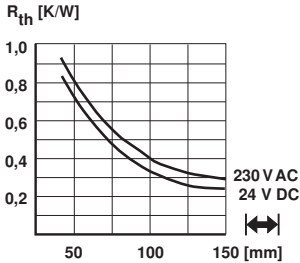
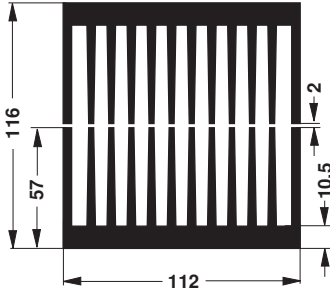
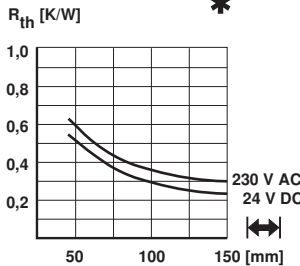


Technical data of the fans

	... 12	... 24
type	ebmpapst, ball bearing	ebmpapst, ball bearing
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 (L₁₀)	L ₁₀ < 60,000 h (40°C)	L ₁₀ < 60,000 h (40°C)

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

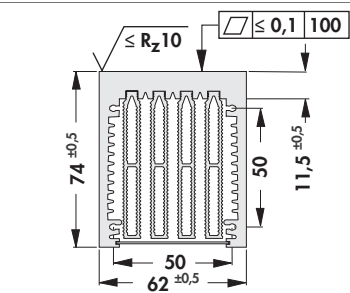
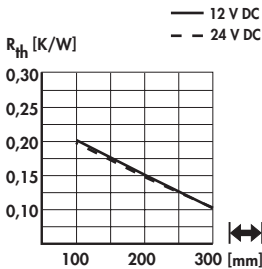
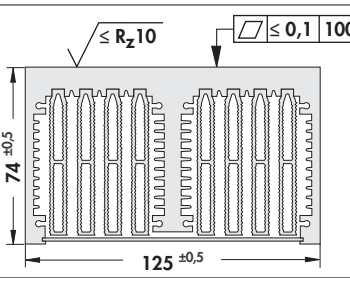
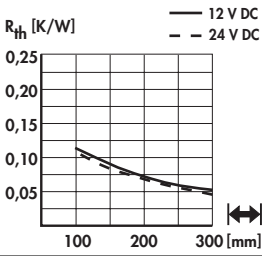
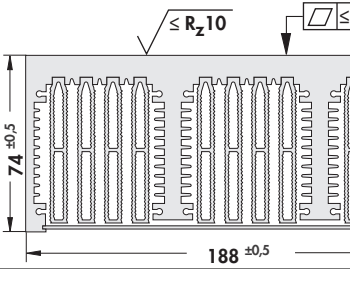
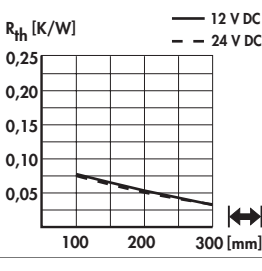
Technical data of the fans

	... 24	... 230
type	ebmpapst, ball bearing	ebmpapst, ball bearing
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)

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

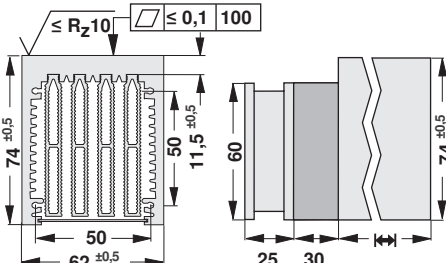
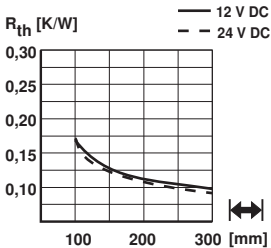
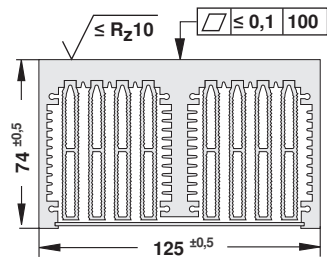
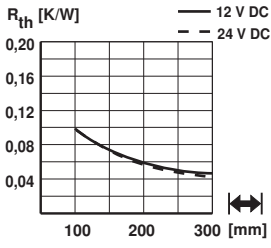
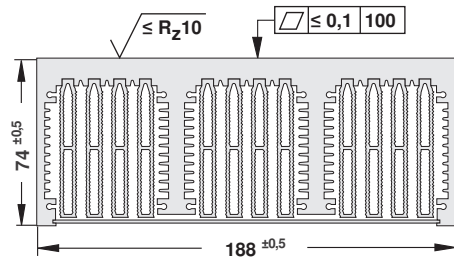
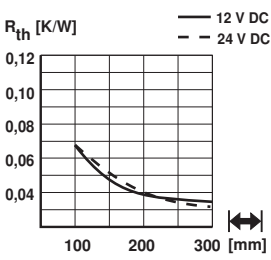
art. no.			
LA 6 ...			
	without air flow chamber		
LA 7 ...			
	without air flow chamber		
LA 8 ...			
	without air flow chamber		
please indicate: ...  100 150 200 250 300 mm ... fan type 12 = 12 V DC 24 = 24 V DC			

Technical data of the fans

	... 12	... 24
type	ebmpapst, ball bearing	ebmpapst, ball bearing
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		
LA V 7 ...			
	with air flow chamber		
LA V 8 ...			
	with air flow chamber		
please indicate:	... 	... fan type 12 = 12 V DC 24 = 24 V DC	
	100 150 200 250 300 mm		

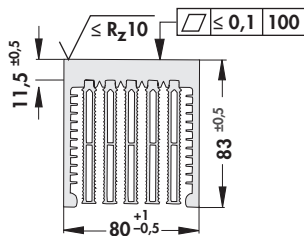
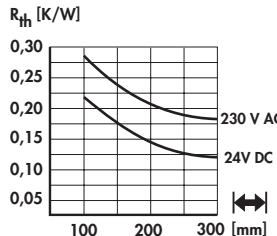
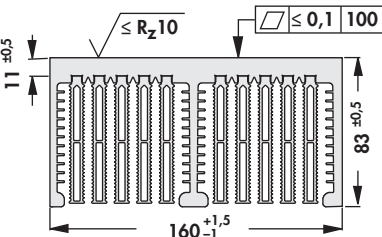
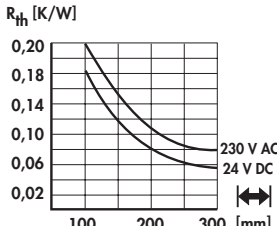
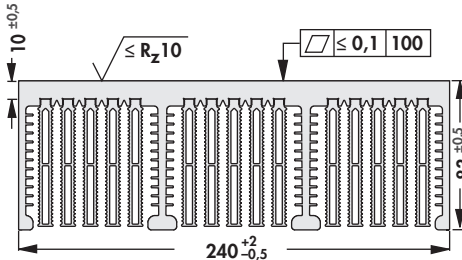
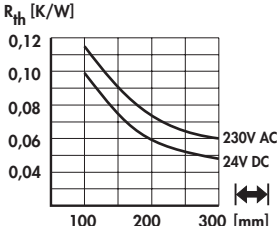
Technical data of the fans

	... 12	... 24
type	ebmpapst, ball bearing	ebmpapst, ball bearing
dimensions	60x60x25 mm	60x60x25 mm
tension	12 V DC	24 V DC
power in/out	2.9 W	2.9 W
max. air volume	56 m³/h	56 m³/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 (L₁₀)	L₁₀ < 60,000 h (40°C)	L₁₀ < 60,000 h (40°C)

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

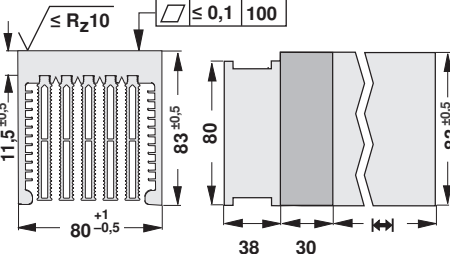
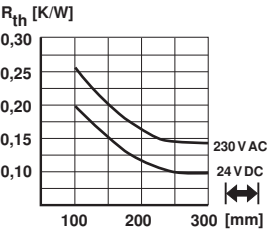
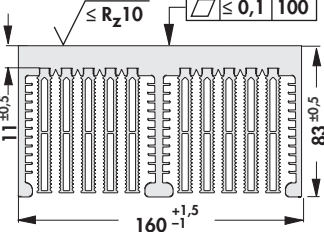
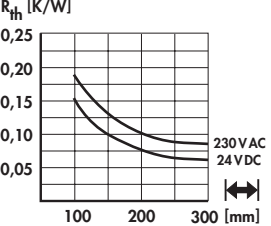
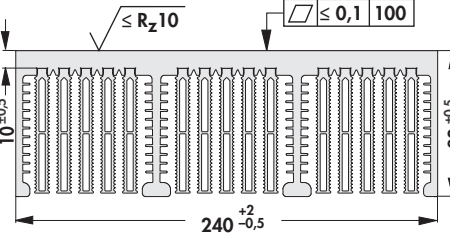
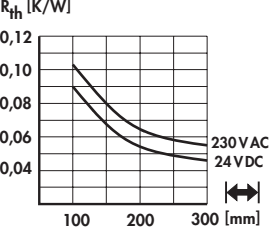
art. no.			
LA 9 ...	without air flow chamber		
art. no.			
LA 10 ...	without air flow chamber		
art. no.			
LA 11 ...	without air flow chamber		
please indicate:	...  100 150 200 250 300 mm ... fan type 24 = 24 V DC 230 = 230 V AC		

Technical data of the fans

	... 24	... 230
type	ebmpapst, ball bearing	ebmpapst, ball bearing
dimensions	80x80x32 mm	80x80x38 mm
tension	24 V DC	230 V AC
power inout	6 W	12 W
max. air volume	80 m³/h	50 m³/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 (L₁₀)	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		
LA V 10 ...			
	with air flow chamber		
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			

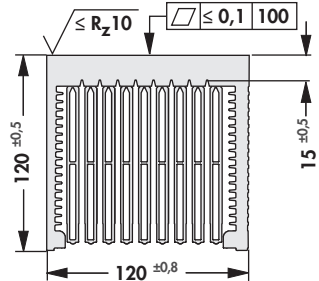
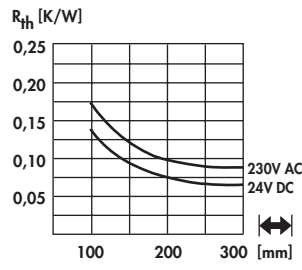
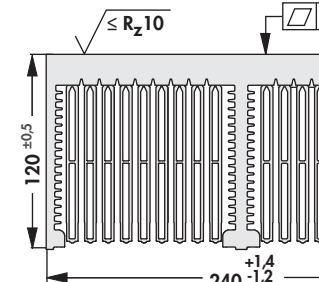
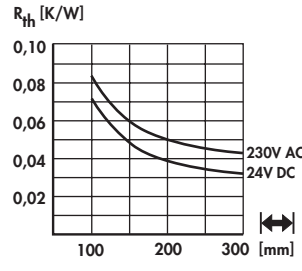
Technical data of the fans

	... 24	... 230
type	ebmpapst, ball bearing	ebmpapst, ball bearing
dimensions	80x80x32 mm	80x80x38 mm
tension	24 V DC	230 V AC
power in/out	6 W	12 W
max. air volume	80 m³/h	50 m³/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 (L₁₀)	L₁₀ < 55,000 h (40°C)	L₁₀ < 52,500 h (40°C)

Cooling aggregates with axial fan

Hollow-fin cooling aggregates

- extremely low losses due to optimised hollow fin geometry
- particularly effective heat dissipation
- compact design with axial fan
- milled flat semiconductor mounting surface
- additional design to customer's instructions
- other fan types and fan voltages on request

art. no.			
LA 14 ...			
	without air flow chamber		
LA 15 ...			
	without air flow chamber		
please indicate:	... 	... fan type	
	100 150 200 250 300 400 mm	24 = 24 V DC	
		230 = 230 V AC	

Technical data of the fans

	... 24	... 230
type	ebmpapst, ball bearing	ebmpapst, ball bearing
dimensions	119x119x38 mm	119x119x38 mm
tension	24 V DC	230 V AC
power in/out	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 (L₁₀)	L ₁₀ < 70,000 h (40°C)	L ₁₀ < 37,500 h (40°C)

Cooling aggregates with axial fan

Hollow-fin cooling aggregates

- extremely low losses due to optimised hollow fin geometry
- particularly effective heat dissipation
- compact design with axial fan
- milled flat semiconductor mounting surface
- additional design to customer's instructions on request
- other fan types and fan voltages on request

art. no.			
LA V 14 ...	with air flow chamber		
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, ball bearing	ebmpapst, ball bearing
dimensions	119x119x38 mm	119x119x38 mm
tension	24 V DC	230 V AC
power in/out	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 (L₁₀)	L ₁₀ < 70,000 h (40°C)	L ₁₀ < 37,500 h (40°C)

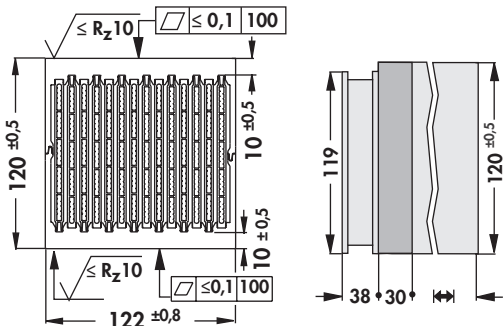
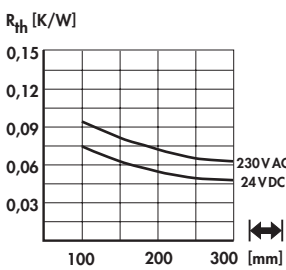
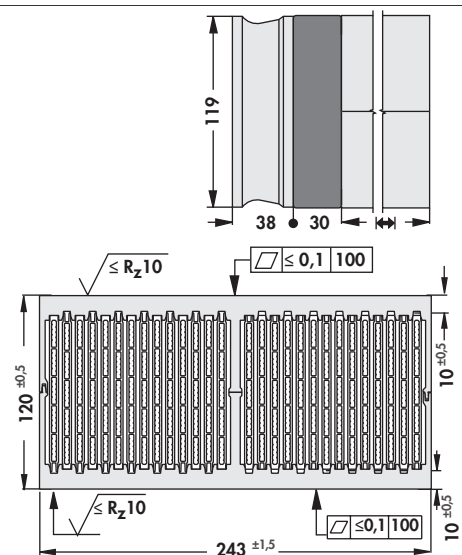
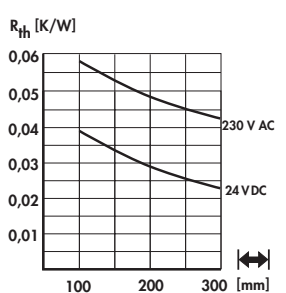
- extremely low losses due to optimised hollow fin geometry
- effective heat dissipation
- compact construction with axial fans
- two opposite mounting surfaces are milled flat
- additional treatment upon customer's request
- other fan types and fan voltages on request

Technical data of the fans

	... 24	... 230
type	ebmpapst, ball bearing	ebmpapst, ball bearing
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

- extremely low losses due to optimised hollow fin geometry
- effective heat dissipation
- compact construction with axial fans
- two opposite 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:		... 	... fan type	
		100 150 200 250 300 400 mm	24 = 24 V DC	
			230 = 230 V AC	

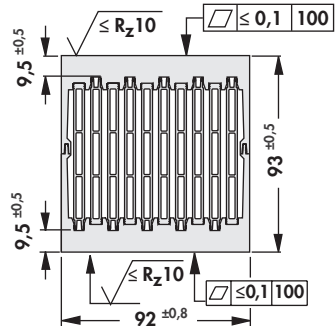
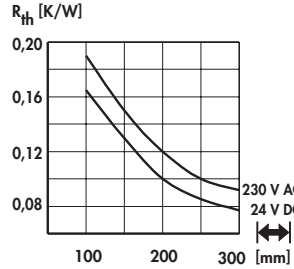
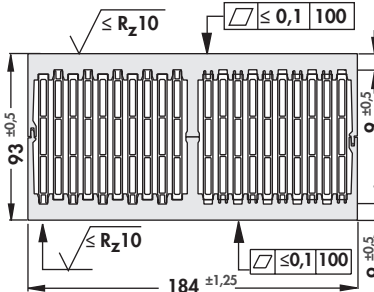
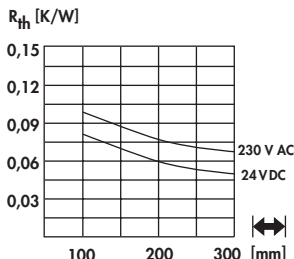
Technical data of the fans

	... 24	... 230
type	ebmpapst, ball bearing	ebmpapst, ball bearing
dimensions	119x119x38 mm	119x119x38 mm
tension	24 V DC	230 V AC
power in/out	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 (L10)	L10 < 70,000 h (40°C)	L10 < 37,500 h (40°C)

Cooling aggregates with axial fan

Hollow-fin cooling aggregates

- extremely low losses due to optimised hollow fin geometry
- effective heat dissipation
- compact construction with axial fans
- two opposite mounting surfaces are milled flat
- additional treatment upon customer's request
- other fan types and fan voltages on request

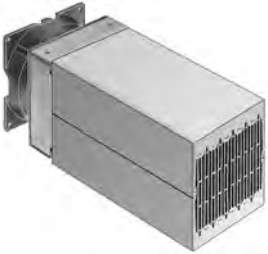
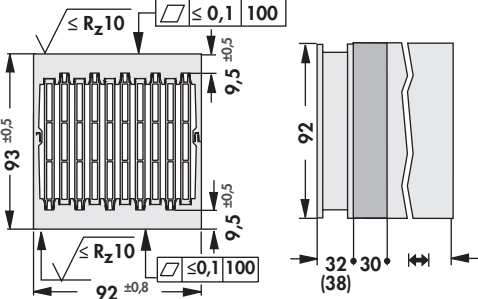
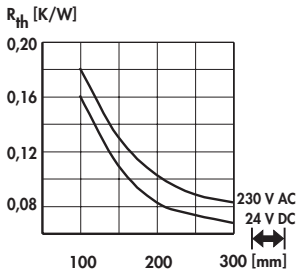
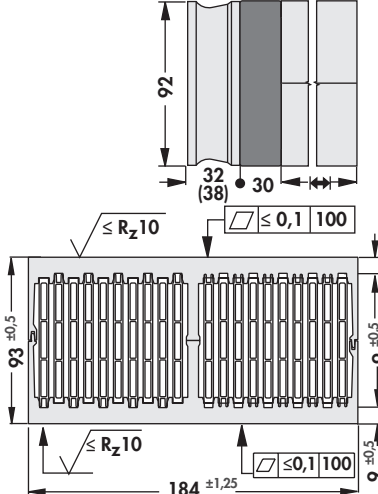
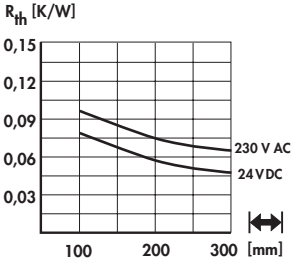
art. no.			
LA 21 ...	without air flow chamber		
art. no.			
LA 22 ...	without air flow chamber		
please indicate:	...  100 150 200 250 300 400 mm ... fan type 24 = 24 V DC 230 = 230 V AC		

Technical data of the fans

	... 24	... 230
type	ebmpapst, ball bearing	ebmpapst, ball bearing
dimensions	92x92x32 mm	92x92x38 mm
tension	24 V DC	230 V AC
power inout	5 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	47 dB(A)	37 dB(A)
speed	4,000 min ⁻¹	2,700 min ⁻¹
weight	190 g	420 g
failure rate (L₁₀)	L ₁₀ < 57,500 h (40°C)	L ₁₀ < 52,500 h (40°C)

Hollow-fin cooling aggregates

- extremely low losses due to optimised hollow fin geometry
- effective heat dissipation
- compact construction with axial fans
- two opposite 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: ... 		... fan type	
100 150 200 250 300 400 mm		24 = 24 V DC	
		230 = 230 V AC	

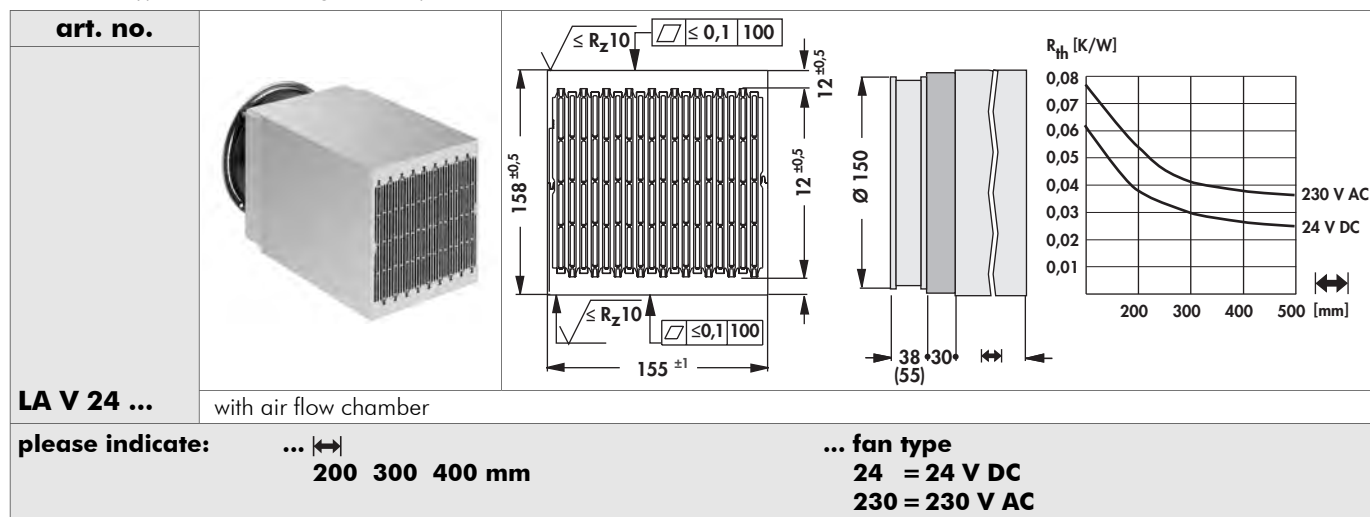
Technical data of the fans

	... 24	... 230
type	ebmpapst, ball bearing	ebmpapst, ball bearing
dimensions	92x92x32 mm	92x92x38 mm
tension	24 V DC	230 V AC
power inout	5 W	12 W
max. air volume	107 m³/h	75 m³/h
temperature range	-20°C... 75°C	-40°C... +75°C
noise level	47 dB(A)	37 dB(A)
speed	4,000 min⁻¹	2,700 min⁻¹
weight	190 g	420 g
failure rate (L₁₀)	L ₁₀ < 57,500 h (40°C)	L ₁₀ < 52,500 h (40°C)

Cooling aggregates with axial fan

Hollow-fin cooling aggregates

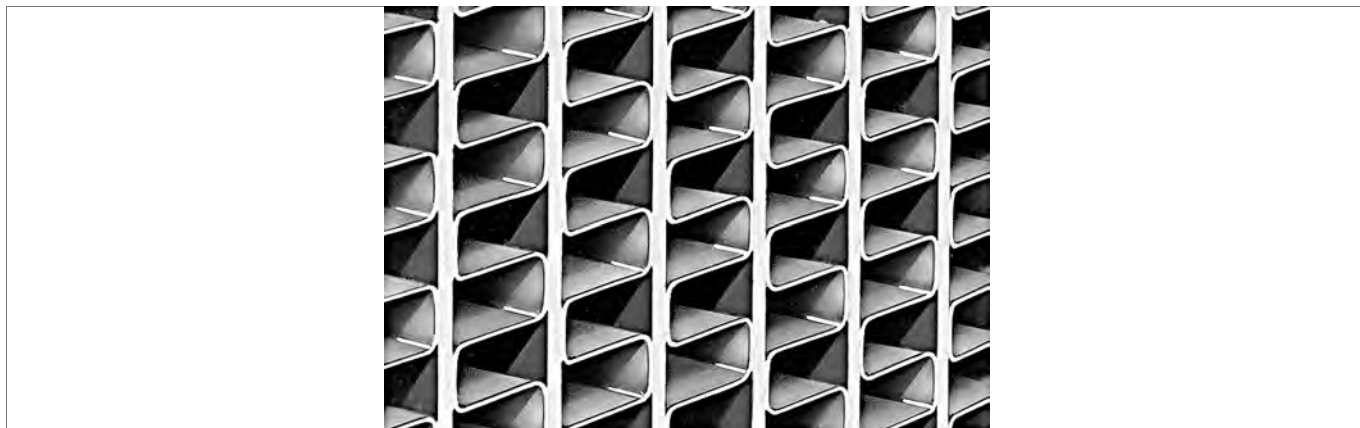
- extremely low losses due optimised hollow fin geometry
- especially effective heat dissipation
- compact construction with axial fans
- two opposite mounting surfaces are milled flat
- additional treatment upon customer's request
- other fan types and fan voltages on request



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 in/out	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 (L₁₀)	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

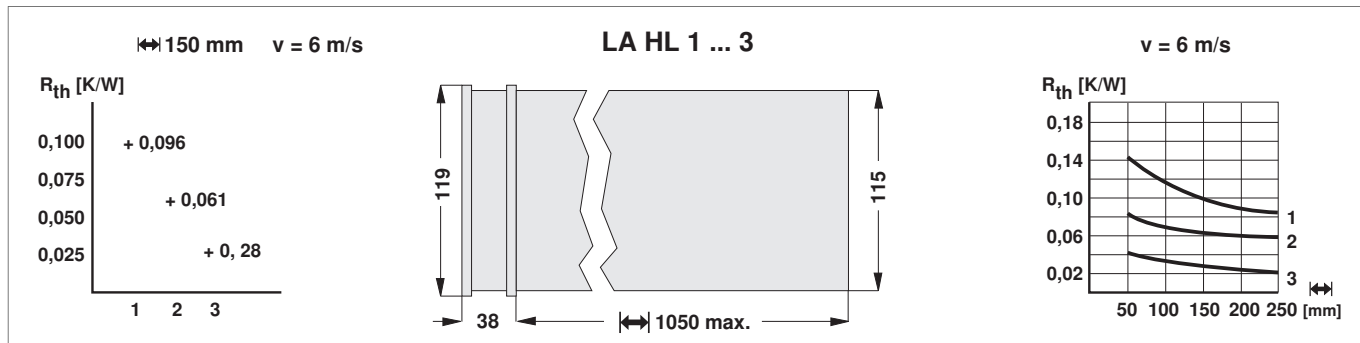
An optimised unit for any application can be produced from the wide range of existing components upon request.
The specific capacity will be determined by a test run upon customer's request.

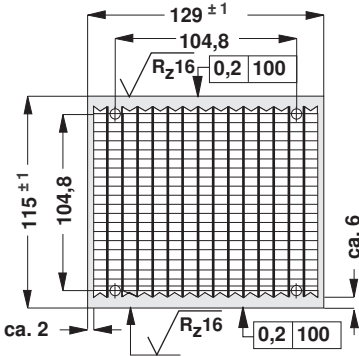
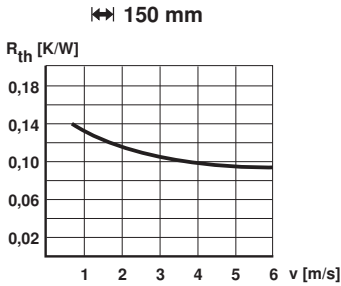
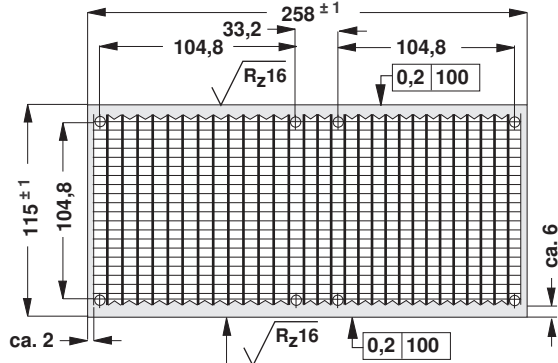
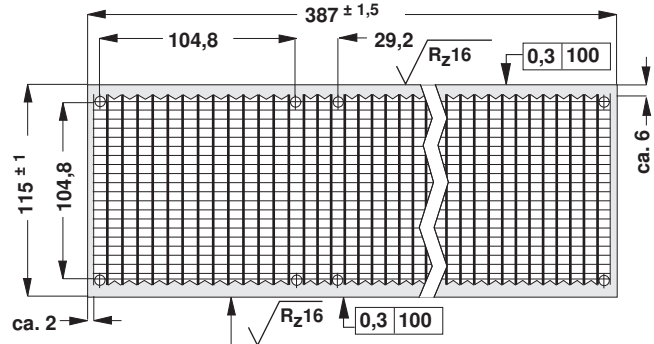
Technical data of the fans

	... 230
type	ebmpapst, ball bearing
dimensions	119x119x38 mm
tension	230 V AC
power inout	19 W
max. air volume	160 m³/h
temperature range	-40°C... +85°C
noise level	47 dB(A)
speed	2,650 min ⁻¹
weight	550 g
failure rate (L₁₀)	L ₁₀ < 37,500 h (40°C)

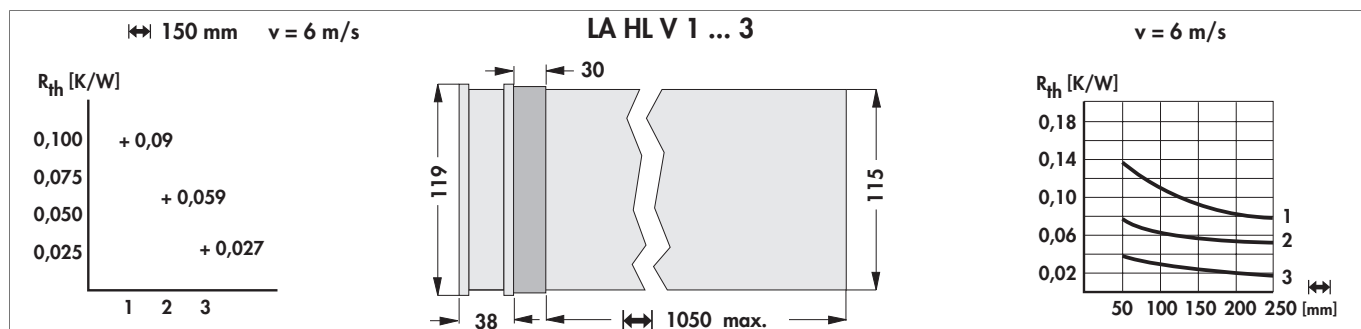
Cooling aggregates with axial fan

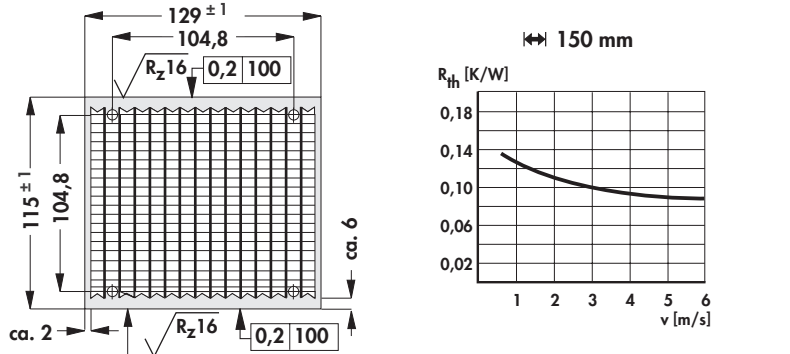
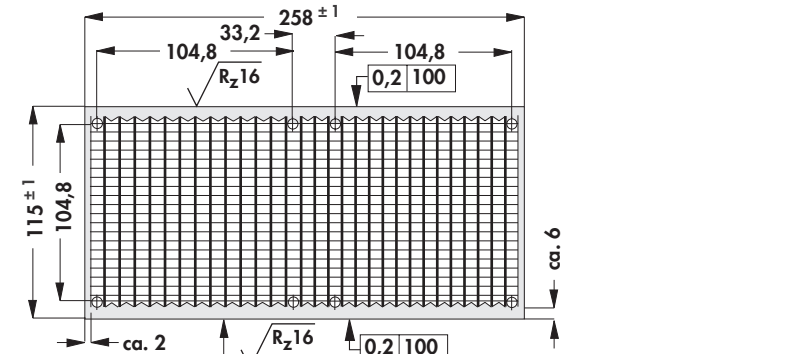
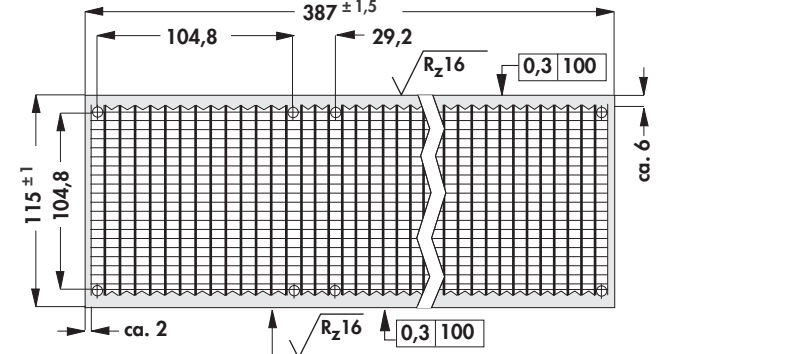
High performance cooling aggregate



art. no.			  <table border="1"><caption>Graph Data for LA HL 1</caption><thead><tr><th>v [m/s]</th><th>R_{th} [K/W]</th></tr></thead><tbody><tr><td>1</td><td>0,14</td></tr><tr><td>2</td><td>0,12</td></tr><tr><td>3</td><td>0,11</td></tr><tr><td>4</td><td>0,105</td></tr><tr><td>5</td><td>0,102</td></tr><tr><td>6</td><td>0,10</td></tr></tbody></table>	v [m/s]	R _{th} [K/W]	1	0,14	2	0,12	3	0,11	4	0,105	5	0,102	6	0,10
v [m/s]	R _{th} [K/W]																
1	0,14																
2	0,12																
3	0,11																
4	0,105																
5	0,102																
6	0,10																
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

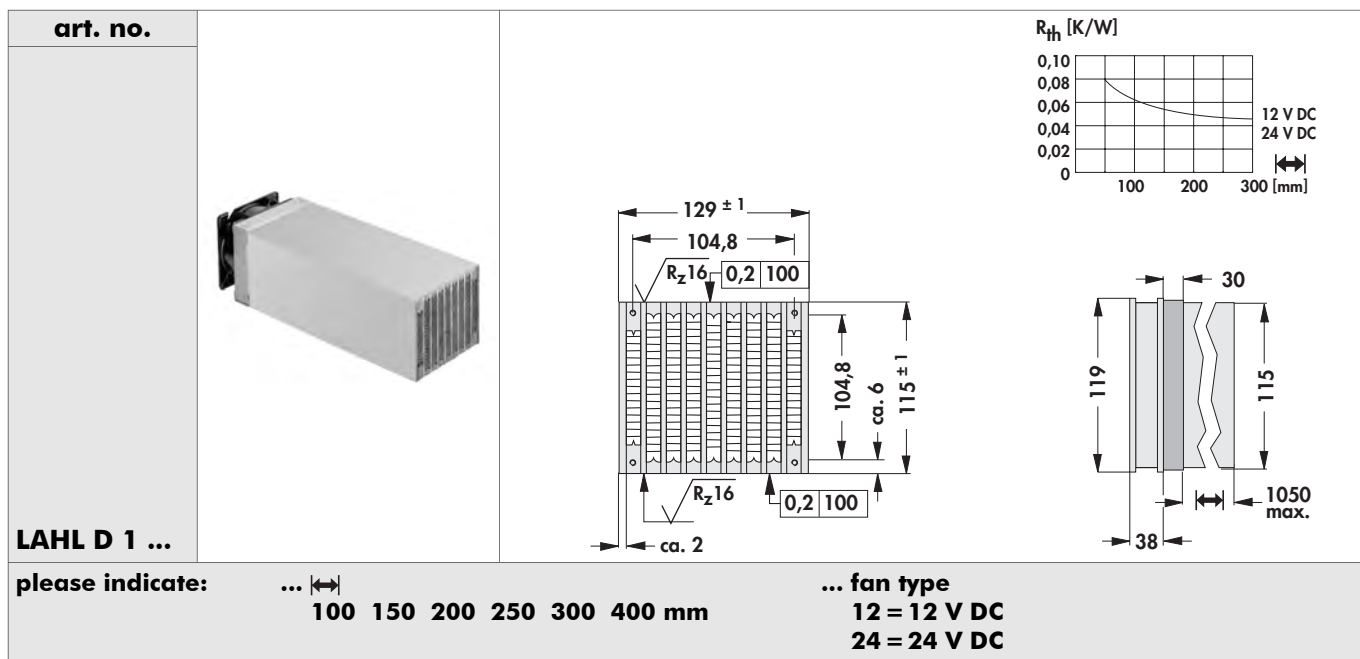


art. no.		
LA HL V 1 ...	with air flow chamber	
art. no.		
LA HL V 2 ...	with air flow chamber	
art. no.		
LA HL V 3 ...	with air flow chamber	
please indicate: ... $\text{v} = 6 \text{ m/s}$ 100 150 200 250 300 400 mm		

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 efficient 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



Technical data of the fans

	... 12	... 24
type	ebmpapst, ball bearing, with grid	ebmpapst, ball bearing, with grid
dimensions	119x119x38 mm	119x119x38 mm
tension	12 V DC	24 V DC
power in/out	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 (L₁₀)	L ₁₀ > 60,000 h (40°C) L ₁₀ > 37,500 h (t _{max})	L ₁₀ > 65,000 h (40°C) L ₁₀ > 37,500 h (t _{max})

High-performance heatsinks

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 ...

$R_{th} [K/W] \quad v = 5 \text{ m/s}$

art. no.

SK 498 ...

$R_{th} [K/W] \quad v = 5 \text{ m/s}$

please indicate: ... mm

150 200 250 300 1000 mm

... surface

SA = black anodised

AL = raw degreased aluminium

$v = 5 \text{ m/s}$
 $R_{th} [K/W]$

art. no.	number of fins	dim. [mm]		
		A	B	C
SK 440 ...	15	84 ± 1	200 ± 1.2	16
SK 458 ...	19	84 ± 1	250 ± 1.4	16
SK 441 ...	23	84 ± 1	300 ± 1.6	16
SK 461 ...	31	88 ± 1	400 ± 2	20

please indicate: ... mm

150 200 300 1000 mm

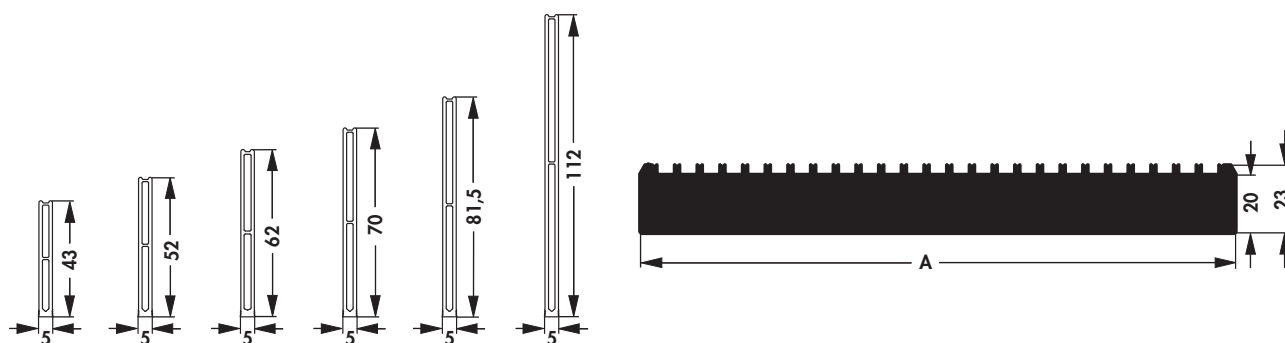
... surface

SA = black anodised

AL = raw degreased aluminium

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
- minimum order quantity: 1000 kg, samples on request



art. no.	number of fins	dim. [mm] A
SK 603 ...	25	200
SK 604 ...	32	250
SK 605 ...	39	300
SK 606 ...	45	350
SK 607 ...	52	400
SK 608 ...	65	500

please indicate:

... fin height

430 = 43 mm

520 = 52 mm

620 = 62 mm

700 = 70 mm

815 = 81.5 mm

1120 = 112 mm

... $\longleftrightarrow$

200 300 400 500 mm

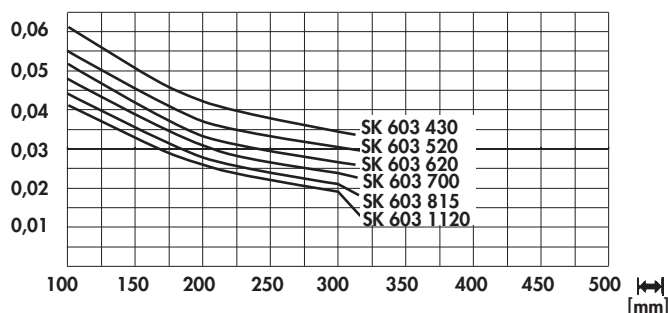
... surface

SA = black anodised

ME = clear anodised

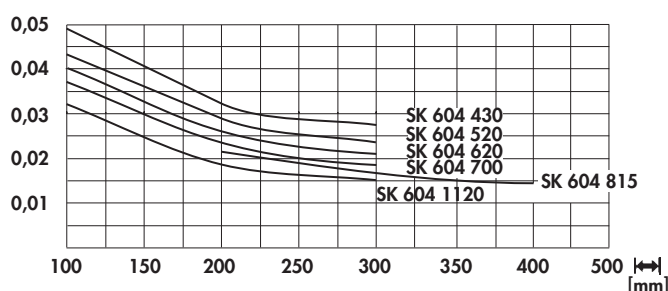
SK 603

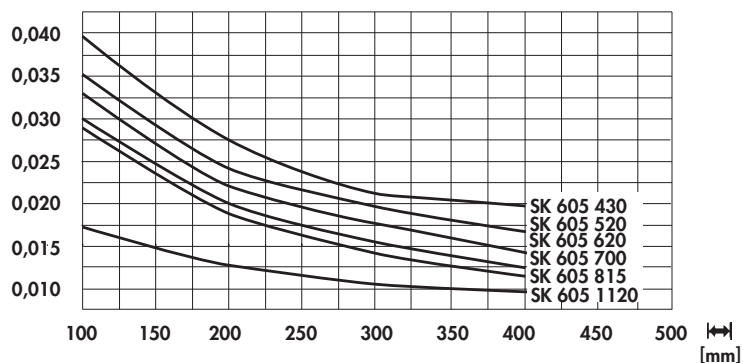
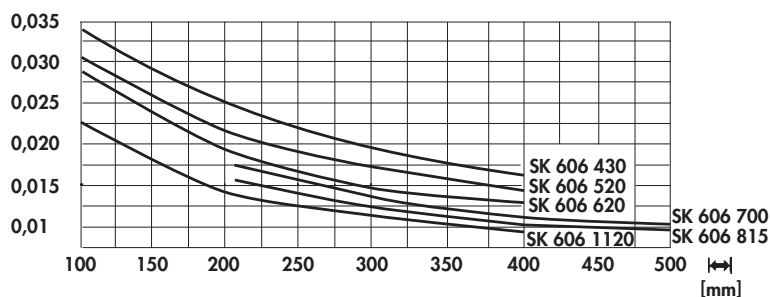
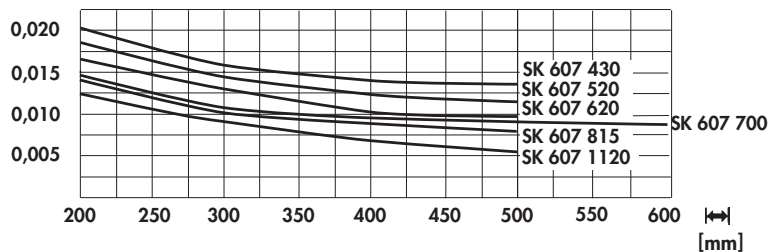
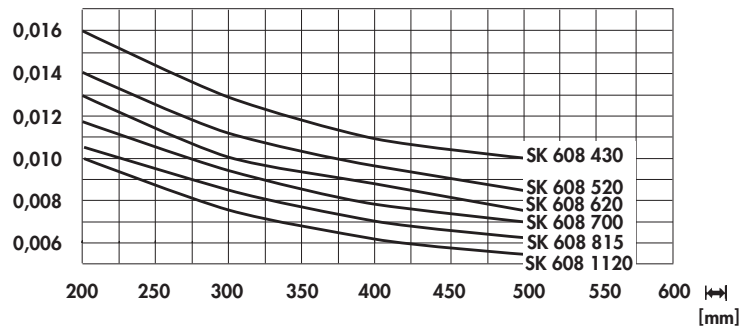
R_{th} [K/W] $v = 11$ m/s



SK 604

R_{th} [K/W] $v = 11$ m/s



SK 605
 $R_{th} [K/W]$ $v = 11 \text{ m/s}$

SK 606
 $R_{th} [K/W]$ $v = 11 \text{ m/s}$

SK 607
 $R_{th} [K/W]$ $v = 11 \text{ m/s}$

SK 608
 $R_{th} [K/W]$ $v = 11 \text{ m/s}$


- 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**

Technical data of the fans

	... 230
type	ebmpapst, radial blower with grid, double sided absorbtion
bearing type	ball bearing
discharge air flow	435 m³/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

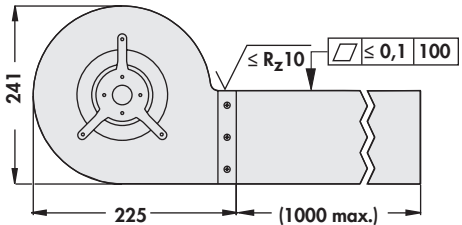
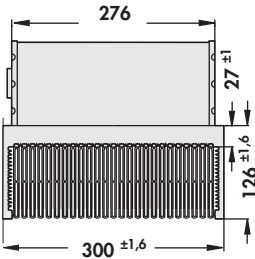
High performance cooling aggregate

- 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.

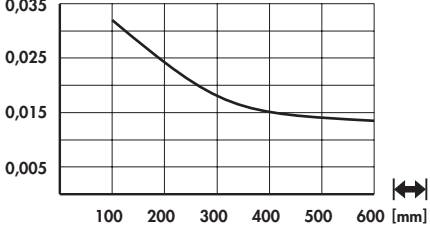


LA 20 ...



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

R_{th} [K/W]



$\leq R_z 10$ $\leq 0,1$ 100

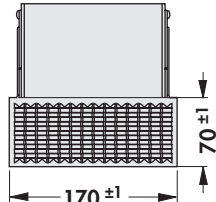
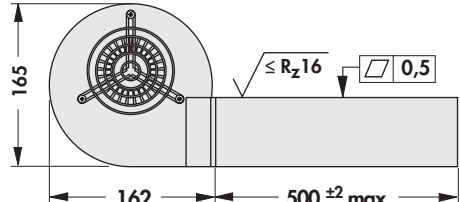
Technical data of the fans

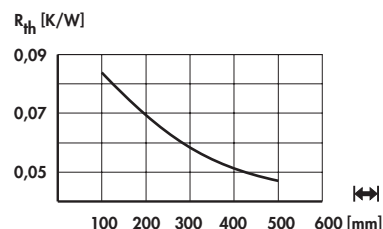
	... 230
bearing type	ball bearing
type	ebmpapst, radial blower with grid, double sided absorbtion
discharge air flow	1,310 m³/h
rotation speed	1,350 min ⁻¹
power inout	185 W
current consumption	0.81 A
circuit voltage	230 V AC
temperature range	-25°C... +70°C
motor condenser	6 µF
noise level	64 dB(A)
weight	5,900 g

Cooling aggregates with radial fan

High performance cooling aggregate

- other lengths upon request
- fan condenser: **art. no. LAHLR K 2**

art. no.				
LAHLR 1 500				
construction:		solid frame construction with inner animation and carrier plates, thermally connected by soldering		
weight:		6,300 g		
material:		aluminium alloy		
surface:		blanc, milled flat		



Technical data of the fans

	... 230
type	ebmpapst, radial blower with grid, double sided absorption
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

Protection grid for fans

- protection against contact as per EN 294
- aerodynamic construction
- minimized noise modification
- only low modification of the air flow

art. no.	suitable for cooling aggregate	
LAGI 40	LAM 2/ LAM 4/ LAM 4 K	
art. no.	suitable for cooling aggregate	
LAGI 60	LAM 1/ LA (V) 6/ LA (V) 7/ LA (V) 8/ LA 27 K	
art. no.	suitable for cooling aggregate	
LAGI 80	LA (V) 9/ LA (V) 10/ LA (V) 11	
art. no.	suitable for cooling aggregate	
LAGI 92	LA 2/ LA (V) 21/ LA (V) 22	
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	
material:	steel wire, nickel-plated	

High capacity cooling aggregat.
Cooling aggregates with radial fan
Heatsinks with hollow fin profile
Hollow-fin cooling aggregates

→ D 26 – 29
→ D 33 – 35
→ D 30
→ D 15 – 25

Heatsink-cooling aggregates
Cooling aggreg. in segment mount.
Miniature cooling aggregates
Technical introduction

→ D 14
→ D 5
→ D 9 – 11
→ A 2 – 8

D 36

A

B

C

D

E

F

G

H

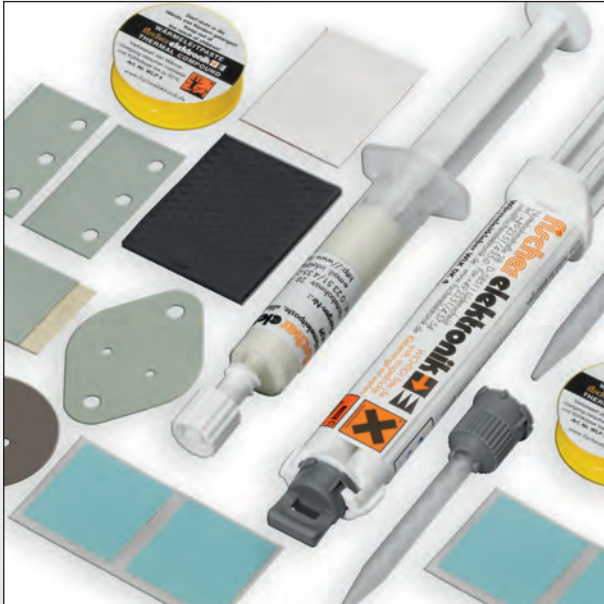
I

K

L

M

N



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 and wide designs
- screwable and snapable versions, extractors with locking pin fixing
- special designs upon request



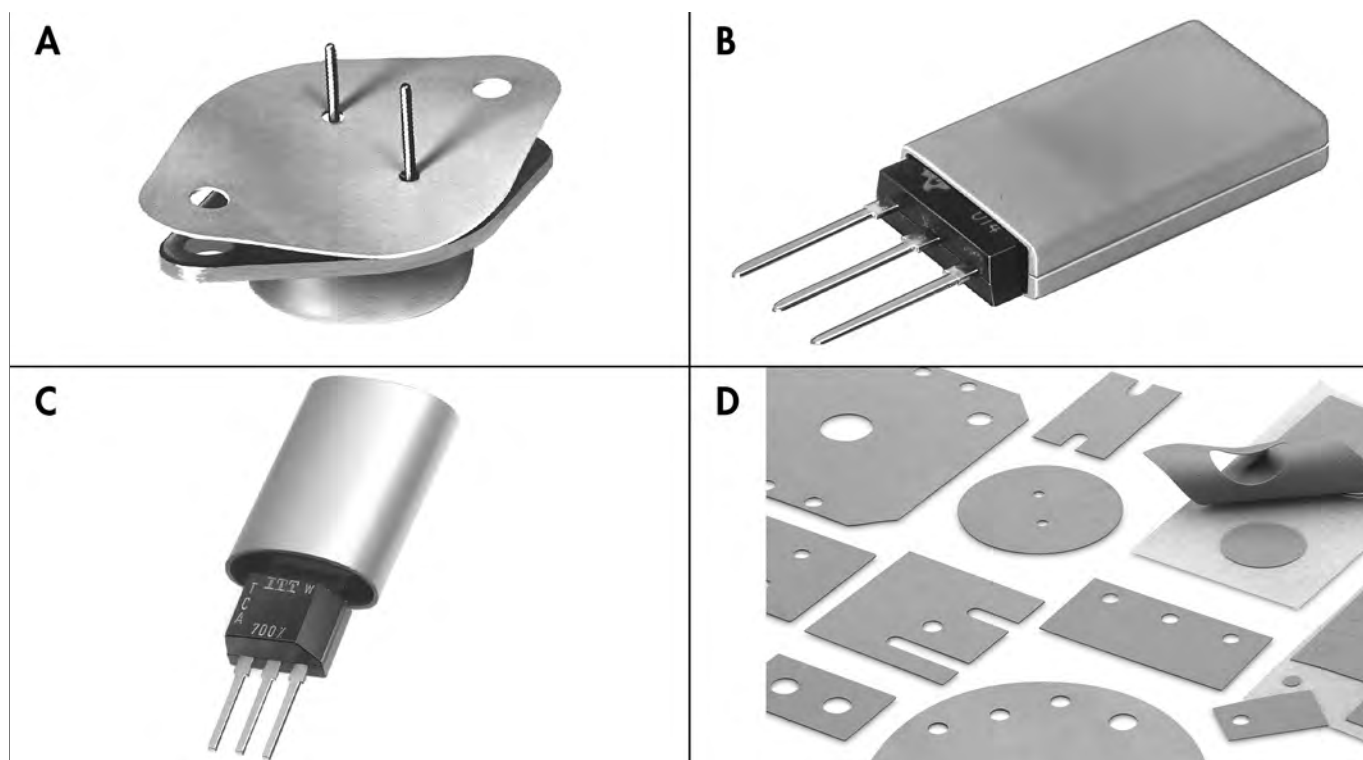
Mounting material for semiconductors

- 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



A: washer

B: insulating cap

C: insulating tube

D: cuts

Our thermal conduction wafers effect following advantages:

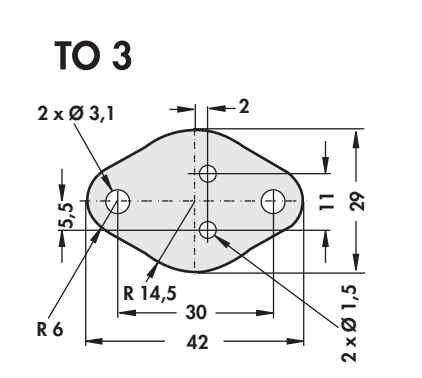
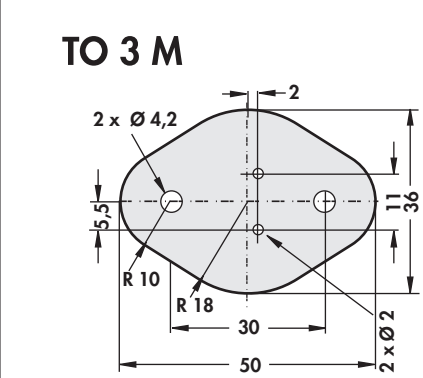
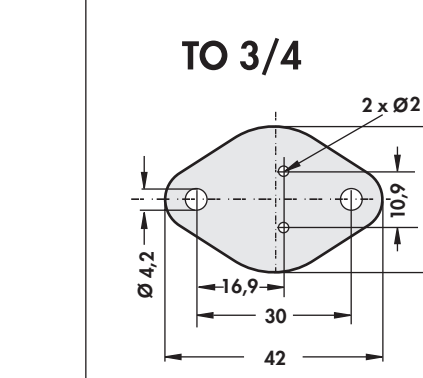
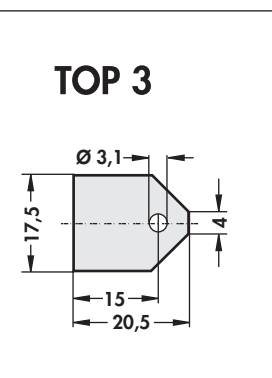
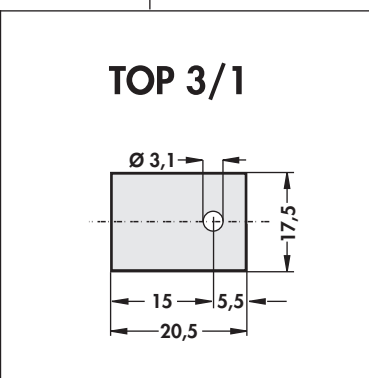
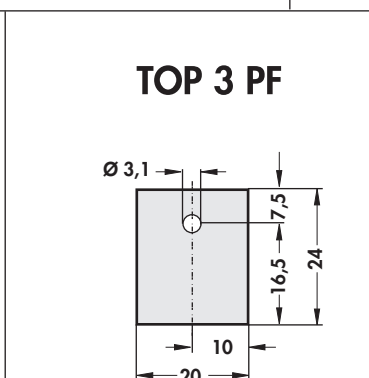
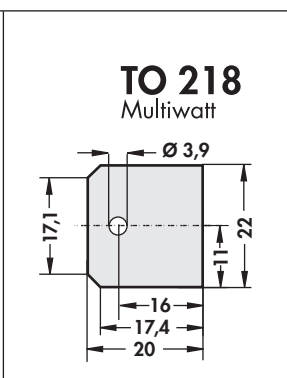
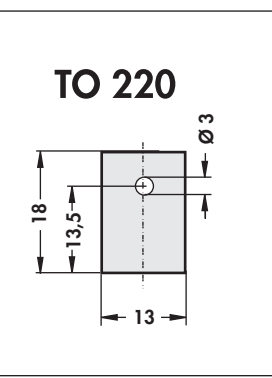
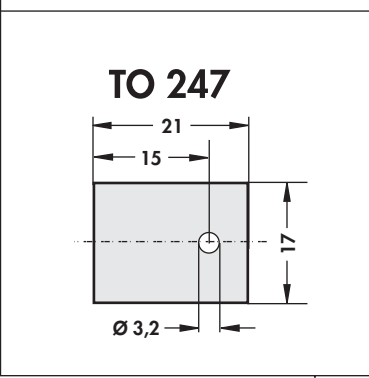
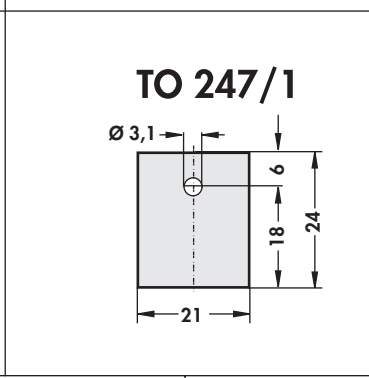
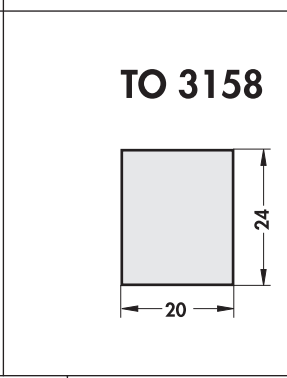
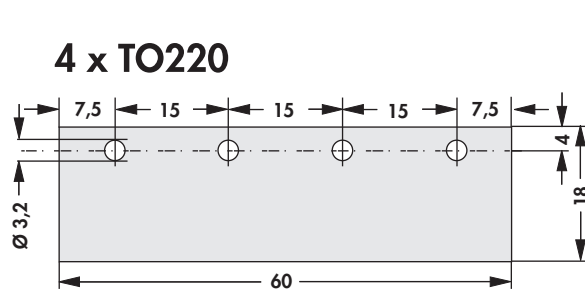
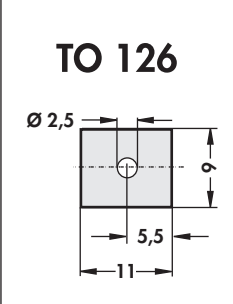
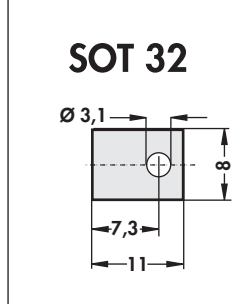
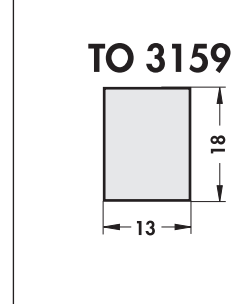
- good surface contact as material is flexible
- reduced production costs as a matter of mounting without thermal conducting paste (clean and fast)
- spring-back of the elastic material protects the transistor against damage
- free of any toxic substances

Customer specific versions:

- punching and cuts of our thermal conductive foil according to drawing
- sold per sheet or by the meter
- other foils, plastics, papers, etc. upon request

The thermal details refer to an area of 1 inch² (6.45 cm²).

– 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 

Thermally conductive foil made of siliconelastomer

foil type	foil WS	foil WG	foil WK	foil WB
material	silicone foil, standard	silicone foil, GF reinforced	silicone foil, GF reinforced, one-sided 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

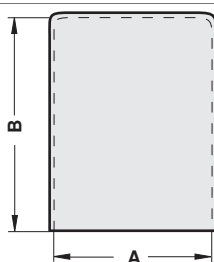
TO-220 Ø 11 mm	WSM-220			
TO-3 PF Ø 13.5 mm	WSM-3 P			

Tape material (width)

24 mm			WKT 24	
30 mm	WST 30			WBT 30
36 mm	WST 36			
85 mm	WST 85			
300 mm		WGT 300	WKT 300	WBT 300

	Foil WS	Foil WG	Foil WK	Foil WB
material thickness	0.3 mm	0.2 mm		0.15 mm
material hardness	75 Shore A	87 Shore A		90 Shore A
dielectric strength	10 kV	6.5 kV		3 kV
thermal resistance	0.4 K/W	0.42 K/W	0.45 K/W	0.34 K/W
thermal conductivity	1.22 W/m·K	1.13 W/m·K	0.92 W/m·K	1.43 W/m·K
insulation resistance	2.9·10 ¹⁵ Ω·cm	5.7·10 ¹⁵ Ω·cm		1.6·10 ¹⁵ Ω·cm
extensibility	100 %	2 %		4 %
temperature range	-60°C... +180°C			
class of flammability	UL 94 V-0			

Insulating cap



art. no.	type	dim. [mm]			
		A	B	C	D
WSI 220 210	TO 220	11	21.0	5.0	0.9
WSI 220 225	TO 220	11	22.5	5.0	0.3
WSI TOP 3 235	TOP 3	18	23.5	5.0	0.9
WSI TOP 3 280	TO 3 PL/TO 247	16	28.0	5.0	0.3
WSI TO 3 PL	TO 3 PL/TO 247	22	34.0	5.5	0.9

	Foil WSI	Foil WSI
material thickness	0.9 mm	0.3 mm
material hardness	75 Shore A	
dielectric strength	15 kV	10 kV
thermal resistance	0.96 K/W	0.4 K/W
thermal conductivity	1.22 W/m·K	
insulation resistance	$2.9 \cdot 10^{15} \Omega \cdot \text{cm}$	
extensibility	100 %	
temperature range	-60°C... +180°C	
class of flammability	UL 94 V-0	

Thermal conductive foil one-sided adhesive

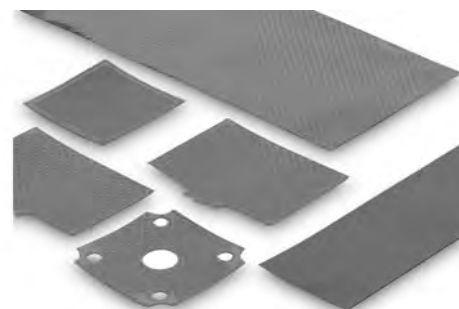


- one-sided acrylate adhesive coating, silicone-free carrier material
- good thermal characteristics with high operating temperature
- thin material thickness for optimal thermal resistance
- high dielectric strength, electrically insulating
- cuttings and customised cut-outs acc. to customer specific requirements

art. no.	type of delivery
WLFT 8943	plates, usable area 300x200mm

	WLFT 8943
description	one-sided adhesive, filled Copolymer
overall thickness	0.17 mm
filling material	ceramic
specific thermal resistance	4.7°C cm²/W
thermal conductivity	0.4 W/m·K
temperature range	-40°C... +150°C
volume resistance	2.5·10¹³ Ω/cm
dielectric strength	62,7 kV/mm
peel strength at ambient temperature and 24 h	6 N/cm
class of flammability	UL 94 V-0

Thermally conductive foil both sides adhesive



- good thermal characteristics
- double-sided adhesive layers
- replaces mechanical fastenings
- cuttings and cut-outs upon request

art. no.	width [mm]	type of delivery	art. no.	width [mm]	type of delivery
WLFT 404 R25	25	sold by the meter	WLFT 414 R100	100	sold by the meter
WLFT 404 R50	50	sold by the meter	WLFT 414 R200	200	sold by the meter
WLFT 404 R100	100	sold by the meter	WLFT 405 R25	25	sold by the meter
WLFT 404 R200	200	sold by the meter	WLFT 405 R50	50	sold by the meter
WLFT 414 R25	25	sold by the meter	WLFT 405 R100	100	sold by the meter
WLFT 414 R50	50	sold by the meter	WLFT 405 R200	200	sold by the meter

art. no.	dimensions [mm]	type of delivery	art. no.	dimensions [mm]	type of delivery
WLFT 404 100x100	100x100	plate	WLFT 414 200x200	200x200	plate
WLFT 404 100x200	100x200	plate	WLFT 405 100x100	100x100	plate
WLFT 404 200x200	200x200	plate	WLFT 405 100x200	100x200	plate
WLFT 414 100x100	100x100	plate	WLFT 405 200x200	200x200	plate
WLFT 414 100x200	100x200	plate			

	WLFT 404	WLFT 414	WLFT 405
description	insulating, double sided adhesive		non insulating, double-sided adhesive
overall thickness	0.127 mm ±0.03		0.15 mm ±0.03
truss material	polyimide (Kapton MT) 0.025mm		aluminium foil 0.05mm
glue layer	acrylate (pressure sensitive) double-sided		
thermal conductivity	0.4 W/m·K		0.5 W/m·K
specific thermal resistance	3.7°C cm²/W		3.4°C cm²/W
temperature range	-30°C... +125°C		
holding force (overlapping)	0.86 MPa		0.93 MPa
holding force (shear rate)	Al 25°C 0.897 [MPa]/ Al 150°C 0.345 [MPa]/ Cu 25°C 0.828 [MPa]/ Cu 150°C 0.31 [MPa]/ Al₂O₃ 25°C 1.17 [MPa]/ Al₂O₃ 150°C 0.34 [MPa]	Al 25°C 0.897 [MPa]/ Al 150°C 0.345 [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]/ Al₂O₃ 25°C 1.0 [MPa]/ Al₂O₃ 150°C 0.41 [MPa]
dielectric strength	5 kV (AC)		
class of flammability	UL 94 V-0		

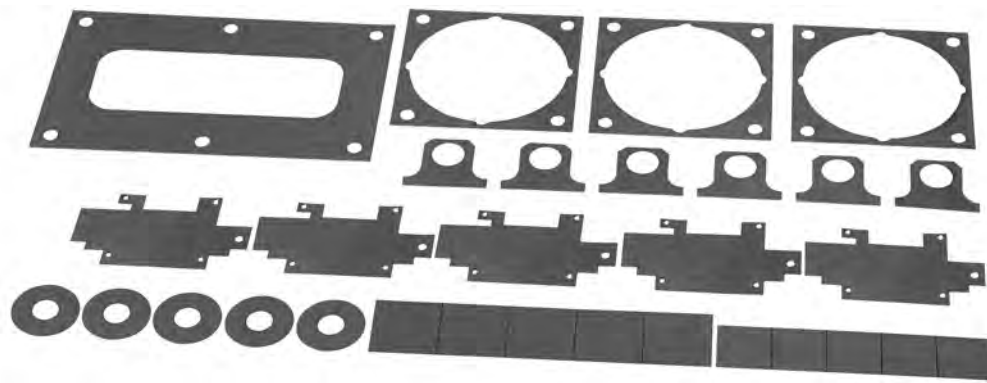


- double sided adhesive layer
- optimal adhesion of different substrates
- very good thermal conductivity, electrical insulating
- easy handling due to double sided protection foil
- optimized surface moistening and excellent impact strength
- cutouts and different punchings according to customer drawing

art. no.	type of delivery
WLFT 8805	plates, usable area 300x200mm
WLFT 8810	plates, usable area 300x200mm
WLFT 8815	plates, usable area 300x200mm
WLFT 8820	plates, usable area 300x200mm
WLFT 8940	plates, usable area 300x200mm

	WLFT 8805	WLFT 8810	WLFT 8815	WLFT 8820	WLFT 8940
description	double sided adhesive, filled acrylic polymer				
overall thickness	0.13 mm	0.25 mm	0.38 mm	0.5 mm	0.19 mm
filling material	ceramic				
protection cover	silicone treated polyester, 37.5 - 50 μm				
thermal conductivity	0.6 W/m·K				0.9 W/m·K
specific thermal resistance	3.1°C cm²/W	5.7°C cm²/W	7.6°C cm²/W	9.7°C cm²/W	
temperature range	permanent up to 100°C				permanent up to 150°C
volume resistance	5.2·10 ¹¹ Ω/cm	3.9·10 ¹¹ Ω/cm	3.8·10 ¹¹ Ω/cm		2.5·10 ¹³ Ω/cm
dielectric strength	37 kV/mm				55 kV/mm
peel strength at ambient temperature and 72 h	5.8 N/cm	8.3 N/cm	9.8 N/cm	11.9 N/cm	6 N/cm
class of flammability	UL 746 C				UL 94 V-0

High thermoconducting graphite foils



- high-compressed anisotropic natural graphite
- very good thermal characteristics
- optimal for heat spreading
- high operating temperature range
- different material thicknesses and coatings upon request
- customer specified cuttings and stampings acc. to drawing

art. no.	width [mm]	type of delivery	art. no.	width [mm]	type of delivery
WLFG 9010 R 25	25	sold by the meter	WLFG 9020 R 25	25	sold by the meter
WLFG 9010 R 50	50	sold by the meter	WLFG 9020 R 50	50	sold by the meter
WLFG 9010 R 100	100	sold by the meter	WLFG 9020 R 100	100	sold by the meter
WLFG 9015 R 25	25	sold by the meter	WLFG S 900 K R 25	25	sold by the meter
WLFG 9015 R 50	50	sold by the meter	WLFG S 900 K R 50	50	sold by the meter
WLFG 9015 R 100	100	sold by the meter	WLFG S 900 K R 100	100	sold by the meter

	WLFG 9010	WLFG 9015	WLFG 9020	WLFG S 900 K
description	base film made of graphite, electrically conductive	graphite foil, electrically conductive		
version		adherent layer on one side		
overall thickness	0.15 mm	0.2 mm	0.25 mm	0.175 mm
thermal resistance	0,09 K/W	0,07 K/W	0,23 K/W	0,08 K/W
thermal conductivity z (x/y)	5.5 (55) W/m·K	6 (55) W/m·K	4 (55) W/m·K	7.5 (<450) W/m·K
specific thermal resistance	36°C mm²/W	28.8°C mm²/W	72°C mm²/W	34°C mm²/W
temperature range	-40°C... +500°C			
hardness range	30 Shore D			
tensile strength	5.5 N/mm²	6 N/mm²	5.5 N/mm²	10 N/mm²
elongation at break	10 %			5 %
tightness	1 g/cm³			<1.6 g/cm³
class of flammability	UL 94 V-0			

Heat conductive silicon foam foil



- 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 16	1.60 ±0.4
WSF 32	3.20 ±0.8
WSF 635	6.35 ±1.2
WSFS 635	6.35 ±1.2

Thermal resistance at 3.2 mm material thickness:

compression %	contact	10	25	50
contact pressure PSI	> 1	5	12	34
R _{th} K/W (1 in² x 3.2 mm)	6	4.5	2.5	1
heat conductivity W/mK	0.3	0.4	0.45	0.65

- **WSFS 635** double sided adhesive and **WSF** adhesive upon request
- according to NASA gas emission requirements

	WSF	WSFS 635
version	no adhesive	one-sided self-adhesive
thermal conductivity	0.108 W/m·K (substrate)	
hardness range	13 Shore D	
compression, 25%	18 PSI	
temperature range	-62°C... +205°C	
extensibility	150 %	
tensile strength	120 PSI	
dielectric strength	4 kV/mm	
tightness	1.118 g/cm³	
class of flammability	UL 94 V-1 (at thickness ≥3.2mm)	
type of delivery	plates 914x914mm/ cuttings on customer's requirements	

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 thick- ness [mm]	R _{th} (100 kPa) [°C in ² /W]	R _{th} (100 kPa) [°C cm ² /W]	art. no.	material thick- ness [mm]	R _{th} (100 kPa) [°C in ² /W]	R _{th} (100 kPa) [°C cm ² /W]
GEL F 15 10	1.0 ±0.2	1.06	6.56	GEL F 15 G 10	1.0 ±0.2	1.16	7.55
GEL F 15 15	1.5 ±0.2	1.44	8.01	GEL F 15 G 15	1.5 ±0.2	1.52	9.22
GEL F 15 20	2.0 ±0.3	1.83	11.26	GEL F 15 G 20	2.0 ±0.3	1.93	10.89

	GEL F 15	GEL F 15 G
version	standard	polyamide film mash reinforced
thermal conductivity	1.5 W/m·K	
volume resistance	2 · 10 ³ MΩ/m	
hardness range	53 Shore 00	
temperature range	-40°C... +105°C	
extensibility	150 %	
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	
tightness	2.1 g/cm ³	
class of flammability	UL 94 V-0	
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ cuttings on customer's requirements	

Gel thermal conducting foils

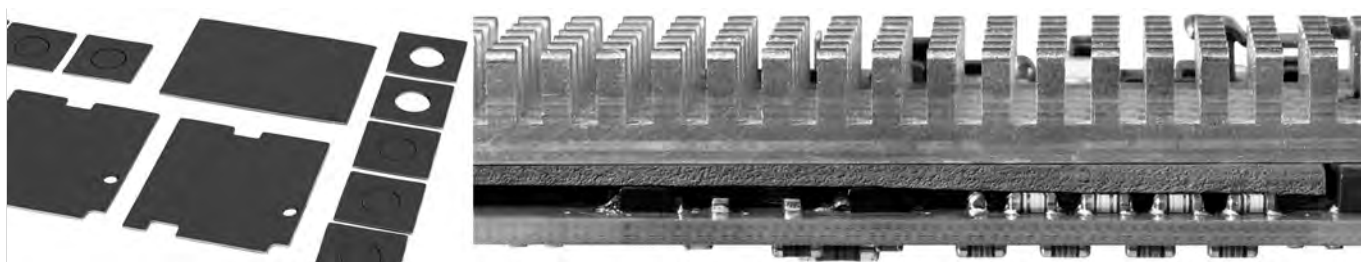


- highly heat-conductive silocon foil
- smooth, elastic and compressible
- equals uneven surfaces very well (Gap-Filler)

art. no.	material thick- ness [mm]	R _{th} (100 kPa) [°C in²/W]	R _{th} (100 kPa) [°C cm²/W]	art. no.	material thick- ness [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	
thermal conductivity	1.5 W/m·K		
volume resistance	1·10 ⁶ MΩ/m		
hardness range	49 Shore 00		
temperature range	-60°C ... +200°C		
extensibility	100 %	60 %	
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)	
tightness	2.6 g/cm ³		
class of flammability	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/ cuttings on customer's requirements		

Gel thermal conducting foils

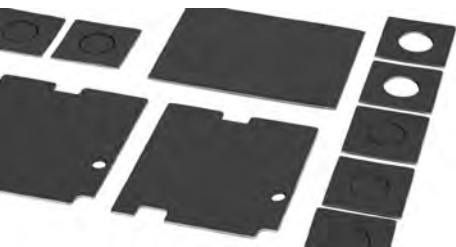


- GEL thermal conductive foils with very good thermal characteristics
- for balancing non-planarities and differences in components (Gap Filler)
- soft, elastic and compressible
- customer specific cuts and punchings according to drawing

art. no.	material thick- ness [mm]	R _{th} (100 kPa) [°C in ² /W]	R _{th} (100 kPa) [°C cm ² /W]	art. no.	material thick- ness [mm]	R _{th} (100 kPa) [°C in ² /W]	R _{th} (100 kPa) [°C cm ² /W]
GEL 28 05	0.5 ±0.15	0.23	1.48	GEL 28 G 05	0.5 ±0.15	0.29	1.85
GEL 28 10	1.0 ±0.2	0.44	2.76	GEL 28 G 10	1.0 ±0.2	0.47	2.99
GEL 28 15	1.5 ±0.2	0.61	3.82	GEL 28 G 15	1.5 ±0.2	0.72	4.53
GEL 28 20	2.0 ±0.3	0.80	5.00	GEL 28 G 20	2.0 ±0.3	0.97	6.07
GEL 28 25	2.5 ±0.3	0.90	5.65	GEL 28 G 25	2.5 ±0.3	1.15	7.23
GEL 28 30	3.0 ±0.3	1.10	6.90	GEL 28 G 30	3.0 ±0.3	1.23	7.69
GEL 28 35	3.5 ±0.3	1.27	7.97	GEL 28 G 35	3.5 ±0.3	1.35	8.46
GEL 28 40	4.0 ±0.3	1.39	8.69	GEL 28 G 40	4.0 ±0.3	1.67	10.47
GEL 28 50	5.0 ±0.3	1.67	10.47	GEL 28 G 50	5.0 ±0.3	1.92	12.02

	GEL 28	GEL 28 G
version	standard	polyamide film mash reinforced
thermal conductivity	2.5 W/m·K	
volume resistance	3.6·10 ⁴ MΩ/m	
hardness range	50 Shore 00	55 Shore 00
temperature range	-60°C ... +200°C	
extensibility	64 %	32 %
dielectric constant	8,98 [50 Hz] / 8,63 [1 kHz] / 8,05 [1 MHz]	
dielectric loss factor	0.0826 [50 Hz]/0.0300 [1 kHz]/0.0052 [1 MHz]	
dielectric strength	15 kV/mm	
tightness	2.7 g/cm ³	
class of flammability	UL 94 V-0	
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request	

Thermal adhesive 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 thick- ness [mm]	R _{th} (100 kPa) [°C in ² /W]	R _{th} (100 kPa) [°C cm ² /W]	art. no.	material thick- ness [mm]	R _{th} (100 kPa) [°C in ² /W]	R _{th} (100 kPa) [°C cm ² /W]
GEL 45 05	0.5 ±0.15	0.61	3.94	GEL 45 G 05	0.5 ±0.15	0.64	4.17
GEL 45 10	1.0 ±0.2	0.96	6.27	GEL 45 G 10	1.0 ±0.2	0.97	6.28
GEL 45 15	1.5 ±0.2	1.30	8.42	GEL 45 G 15	1.5 ±0.2	1.71	11.06
GEL 45 20	2.0 ±0.3	1.52	9.85	GEL 45 G 20	2.0 ±0.3	1.71	11.06
GEL 45 25	2.5 ±0.3	1.71	11.08	GEL 45 G 25	2.5 ±0.3	2.03	13.11
GEL 45 30	3.0 ±0.3	1.94	12.52	GEL 45 G 30	3.0 ±0.3	2.28	14.76
GEL 45 35	3.5 ±0.35	2.20	14.20	GEL 45 G 35	3.5 ±0.35	2.54	16.40
GEL 45 40	4.0 ±0.4	2.46	15.88	GEL 45 G 40	4.0 ±0.4	2.80	18.12
GEL 45 45	4.5 ±0.45	2.68	17.34	GEL 45 G 45	4.5 ±0.45	3.03	19.56
GEL 45 50	5.0 ±0.5	2.84	17.34	GEL 45 G 50	5.0 ±0.5	3.22	20.82

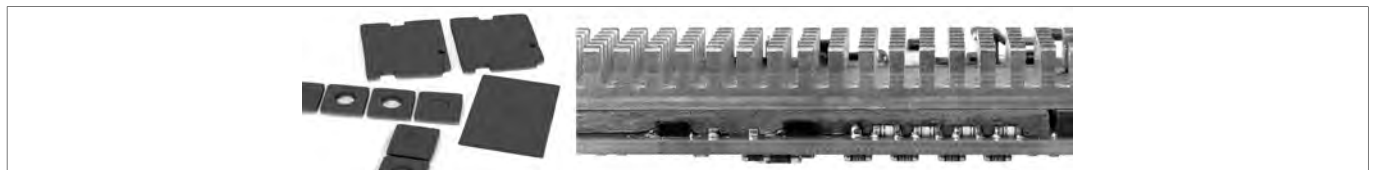
	GEL 45	GEL 45 G
version	standard	polyamide film mash reinforced
thermal conductivity	4.5 W/m·K	
volume resistance	1.4·10 ⁵ Ω/cm	
hardness range	45 Shore 00	
temperature range	-60°C ... +200°C	
extensibility	50 %	
dielectric constant	8,98 [50 Hz] / 8,63 [1 kHz] / 8,05 [1 MHz]	
dielectric loss factor	0,0249 [50 Hz] / 0,0219 [1 kHz] / 0,00675 [1 MHz]	
dielectric strength	11 kV/mm	
tightness	3.2 g/cm ³	
class of flammability	UL 94 V-0	
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ cuttings on customer's requirements	

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 in ² /W]	R _{th} (100 kPa) [°C cm ² /W]	art. no.	material thickness [mm]	R _{th} (100 kPa) [°C in ² /W]	R _{th} (100 kPa) [°C cm ² /W]
GEL 60 05	0.5 ±0.1	0.20	1.30	GEL 60 G 05	0.5 ±0.1	0.21	1.37
GEL 60 10	1.0 ±0.2	0.33	2.11	GEL 60 G 10	1.0 ±0.2	0.31	1.99
GEL 60 15	1.5 ±0.2	0.53	3.45	GEL 60 G 15	1.5 ±0.2	0.48	3.08
GEL 60 20	2.0 ±0.3	0.61	3.91	GEL 60 G 20	2.0 ±0.3	0.62	4.00
GEL 60 25	2.5 ±0.3	0.72	4.67	GEL 60 G 25	2.5 ±0.3	0.77	4.96

	GEL 60	GEL 60 G
version	standard	polyamide film mesh reinforced
thermal conductivity	6 W/m·K	
volume resistance	1·10 ⁶ MΩ/m	
hardness range	52 Shore 00	
temperature range	-60°C ... +200°C	
extensibility	80 %	
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	
tightness	3.2 g/cm ³	
class of flammability	UL 94 V-0	
type of delivery	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request	



- especially soft design
- levels smallest air gaps and unevennesses
- cuts and contours with cutouts according to customer specification

art. no.	material thickness [mm]	R _{th} (100 kPa) [°C in ² /W]	R _{th} (100 kPa) [°C cm ² /W]	art. no.	material thickness [mm]	R _{th} (100 kPa) [°C in ² /W]	R _{th} (100 kPa) [°C cm ² /W]
GEL 27 S 25	2.5	0.94	6.05	GEL 27 S 50	5.0	1.69	10.91
version:	standard						
thermal conductivity:	2.7 W/m·K						
volume resistance:	2·10 ⁷ MΩ/m						
hardness range:	53 Shore 00						
temperature range:	-60°C ... +200°C						
extensibility:	45 %						
dielectric strength:	15 kV/mm						
tightness:	3 g/cm ³						
class of flammability:	UL 94 V-0						
type of delivery:	on both sides covered with protective foil/ plates, usable area 300x200mm/ other dimensions upon request						

Kapton insulator washers

- very low thermal resistance
- optimised heat conductivity
- best mechanical characteristics
- 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 cleaning 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. KAP 1 P suitable for pre-cut parts (plate)	art. no. KAP 247 O TO 248/ TO 218/ TO 247	art. no. KAP 218 O TO 218	art. no. KAP 220 O TO 220	art. no. KAP 218 TO 248/ TO 218/ TO 247
art. no. KAP 220 G TO 220	art. no. KAP 220 K TO 220	art. no. KAP 3 G TO 3	art. no. KAP 3 K TO 3	

	KAP
material	polyimide-carrier foil with silicone-free phase changing thermal conductive layer completely coated on both sides
material thickness	0.077 mm (substrate 0.05 mm)
thermal conductivity	0.45 W/m·K (substrate)
insulation resistance	10 ¹⁴ Ω
thermal resistance	0.15 K/W [at 1 inch ² ; = 6.45 cm ² ; = TO 3 (KAP 3)]
temperature range	-40°C... +150°C
phase change temperature	52 °C
extensibility	30 %
dielectric strength	7.8 kV
class of flammability	UL 94 V-0

Aluminium oxide wafers

– other thicknesses and versions on request

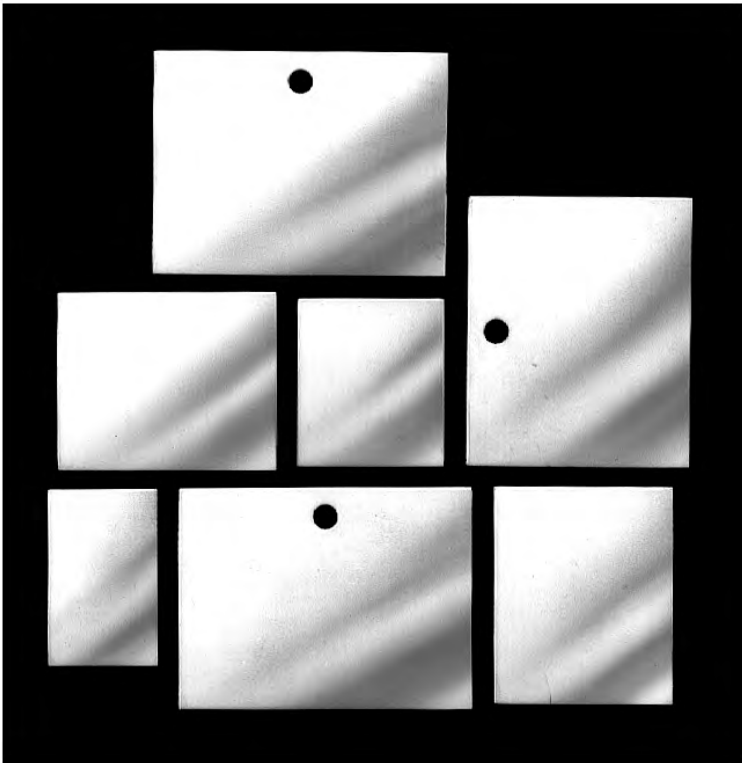
$\pm$ = thickness; $\square$ = flatness

art. no. AOS 247 ± 1 mm $\square$ 0.02 mm	art. no. AOS 218 247 ± 3 mm $\square$ 0.15 mm	art. no. AOS 218 247 1 ± 1.5 mm $\square$ 0.02 mm	art. no. AOS 3 P 2 ± 1 mm $\square$ 0.15 mm	art. no. AOS 3 P SL ± 1.5 mm $\square$ 0.15 mm
art. no. AOS 220 3 ± 1.6 mm $\square$ 0.11 mm	art. no. AOS 220 SL ± 4.5 mm $\square$ 0.054 mm	art. no. AOS 220 4 ± 1.5 mm $\square$ 0.054 mm	art. no. AOS 220 ± 1.5 mm $\square$ 0.054 mm	art. no. AOS 32 ± 1.5 mm $\square$ 0.033 mm
art. no. AOS 127 ± 3 mm $\square$ 0.076 mm	art. no. AOS 3 P ± 1.5 mm $\square$ 0.061 mm	art. no. AOS 5 ± 1.5 mm $\square$ 0.032 mm	art. no. AOS 93 ± 2.3 mm $\square$ 0.03 mm	art. no. AOS 18 ± 1.5 mm $\square$ 0.023 mm
art. no. AOS 3 ± 2.9 mm $\square$ 0.123 mm	art. no. AOS 66 ± 2.5 mm $\square$ 0.10 mm			

	AOS
material	AL ₂ O ₃ - ceramics
thermal resistance	0.3 K/W [at 1 inch ² ; = 6.45 cm ² ; = TO 3 (AOS 3 G)]
specific electrical resistance	>10 ¹⁴ Ω/cm
thermal conductivity	25 W/m·K
dielectric constant	9
linear expansion coefficient	~8·10 ⁻⁶ /K
snap through stability	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
- max. plate dimension 180 x 180 mm

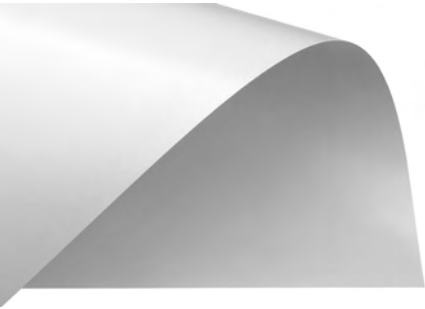


material thickness [mm]	outer dimensions [mm]
2.000	114x114
2.540	114x114
1.500	114x114
1.270	114x114
1.000	114x114/ 165x115/ 160x113
0.800	114x114/ 165x115/ 160x113
0.635	106.5x106.5/ 114x114/ 165x115/ 160x113
0.500	106.5x106.5/ 114x114
0.400	106.5x106.5/ 114x114
0.300	106.5x106.5/ 114x114
0.250	106.5x106.5/ 114x114

Mica wafers

art. no. GS 220 C TO 220	art. no. GS 218 TO 218	art. no. GS 3 P SL TOP 3	art. no. GS 66 P TO 66	art. no. GS 220 4 TO 220
art. no. GS 220 P TO 220	art. no. GS 32 P SOT 32	art. no. GS 3 P TOP 3	art. no. GS 3 TO 3	

	GS
material	muskovit
material thickness	0.05 mm
thermal resistance (GS 3)	0.4 K/W
insulation resistance	$3 \cdot 10^{17} \Omega \cdot \text{cm}$
snap through stability	5 kV



- self-supporting differential phase changing thermal interface material, contains no substrate (Free Standing Film)
- materials with phase change temperature at 52 °C;
- best thermal conductivity, exceeding phase change temperature point, material flows into all gaps between components and heatsink
- thixotropic, does not migrate from the interface area
- no lowering of thermal conductivity though thermal cycling
- application with very low contact pressure, due to non elastomeric material, particularly suitable for clamp mounting of components
- electrically non-conductive, but not an insulator
- self adhering characteristics, also suitable for large areas
- no toxic ingredients
- custom required shapes on request
- all with protection foil on both sides

art. no.	basin	dimensions [mm]
FSF 52 P	plate, protection foil on both sides	330x343x0.127 ±0.025

	FSF 52 P
phase change temperature	52 °C
colour	white
tightness	2 g/cm ³
thermal conductivity	0.9 W/m·K
thermal resistance (1 in ² , TO 3) at contact pressure of	0.03 K/W 0.031 N/mm ²
temperature range	≤ +200°C
adhesive holding force	0.35 N/mm ²
class of flammibility	UL 94 V-0
dielectric constant	3.8 [1 kHz] 3.4 [1 MHz]

Thermal transfer compounds

Silicon thermal transfer compound

– thermal transfer compound used to reduce the thermal transmission resistance between semiconductor and heatsink



art. no.	basin	delivery quantity [g]
WLP 004	box	4
WLP 035	box	35
WLP 500	box	500
WLP 300 S	cartridge (310 ml)	300
WLP 500 S	cartridge (310 ml)	500

Silicone-free thermal transfer compound

– thermal transfer compound 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	syringe	5	—
WLPF 20	syringe	10	—
WLPF 50	syringe	20	—
WLPF 300 S	cartridge (310 ml)	—	300

	WLP	WLPF
composition	silicone oil, inorganic filling material	silicone free synthetic liquid. Metal oxide filling.
consistance	pastey	
colour	white	white-grey
tightness	1.1 g/cm ³	approx. 2 g/cm ³
thermal conductivity	0.61 W/m·K	>0.7 W/m·K
specific electrical resistance	>10 ¹² Ω/cm	
flashpoint	none (DIN 53213)	of the basic oil >280°C (ISO 2592)
drop point	>260°C	
thermal resistance	no bleeding at (4 h/200°C)	<1% (96 h/200°C)
temperature range	-40°C ... +250°C	-40°C... +150°C
acid number	< 0.01 mg KOH/g	
solubility in water	insoluble	

Thermal transfer compounds

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	syringe	5
WLPK 10	syringe	10

	WLPK
composition	silicone-free, synthetic fluid ceramic filled
consistance	pastey
colour	silver
tightness	1.4 g/cm ³
thermal conductivity	10 W/m·K
dielectric strength	not applicable, because conducting
temperature range	-60°C ... +150°C
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

WLK 10


art. no.	composition	art. no.	composition
WLK 5	5 g resin/0.5 g hardener	WLK 10	10 g resin/1 g hardener

WLK 30

WLK 120


art. no.	composition	art. no.	composition
WLK 30	30 g resin/3 g hardener	WLK 120	120 g resin/12 g hardener

	WLK
thermal conductivity	0.836 W/m·K
specific thermal resistance	1.2 m·K/W
volume resistance	10 ¹⁶ Ω/cm
temperature range	-56°C... +149°C
hardening time	20°C approx. 16-24h / 25°C approx. 8 h / 120°C approx. 20 min
glue layer	Epoxid
mixture proportion	10:1

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

WLK DK 4



WLK DK 10



WLK DK 50



art. no.	basin	contents of delivery
WLK DK 4	syringe	1x 4 ml syringe / 3x mixer WLK M4
WLK DK 10	syringe	1x 10 ml syringe / 3x mixer WLK M4
WLK DK 50	cartridge	1x 50 ml cartridge / 3x mixer WLK M50

	WLK DK
thermal conductivity	1 W/m·K
specific thermal resistance	118°C cm/W
volume resistance	8·10 ¹¹ Ω/cm
temperature range	-50°C... +145°C
working life at room temperature	approx. 30 min
hardening time	25°C approx. 4 h/50°C approx. 1 h/85°C approx. 10 min/125°C approx. 2 min
glue layer	Epoxid
mixture proportion	1:1

Accessories

- more package sizes and container types upon request
- store cool and dry

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

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)
- registered 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]	art. no.	dim. [mm]
KL 35 K 40	40	KL 35 K 75	75
KL 35 K 50	50	KL 35 K 100	100
material:		rigid PVC	
heat distortion:		-30°C ... +80°C	
colour:		anthracite grey	
class of flammability:		UL 94 V-0	

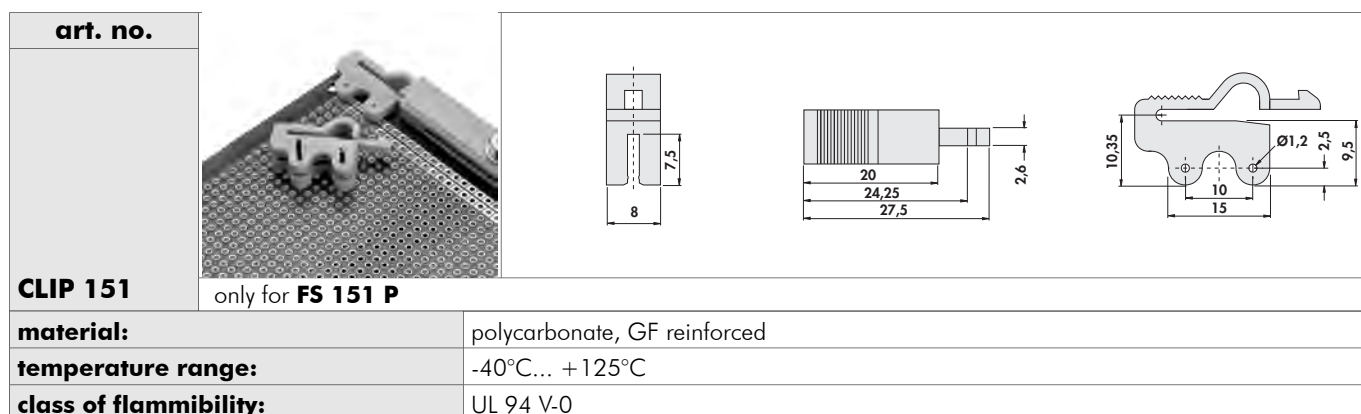
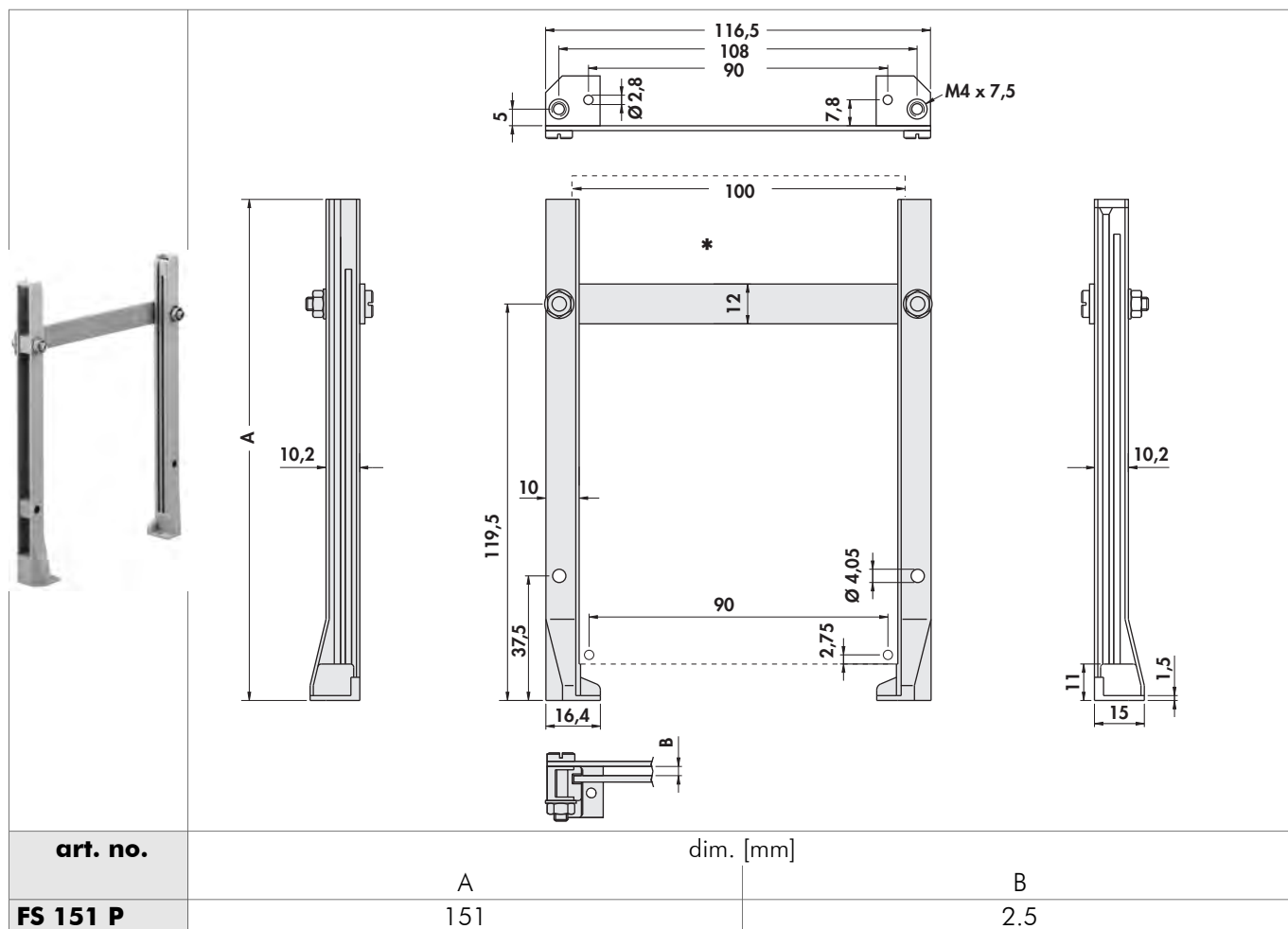
- safe hold due to a stable extruded profile with integrated stainless steel spring
- special lengths (≥40mm), treatments and surfaces on request
- * = examples of mounting rail versions suitable for KL 35

art. no.	dim. [mm]	art. no.	dim. [mm]	art. no.	dim. [mm]
KL 35 50	50	KL 35 75	75	KL 35 100	100
material:		aluminium			
surface:		clear anodised			

Guide rails

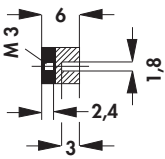
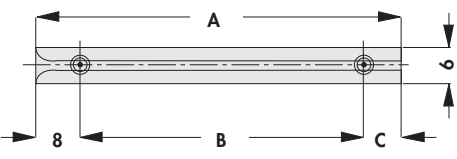
Screw-on type

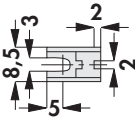
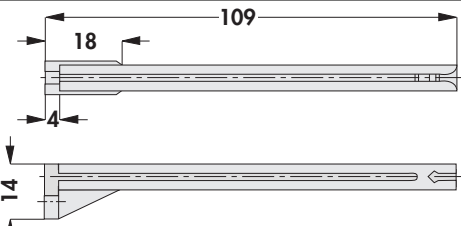
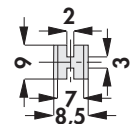
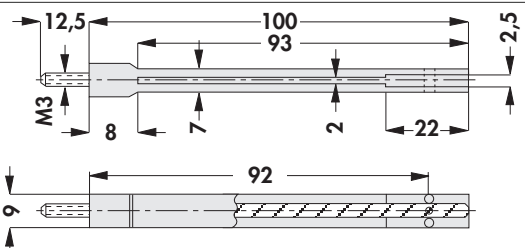
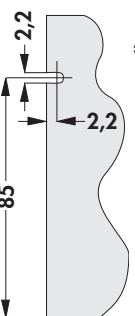
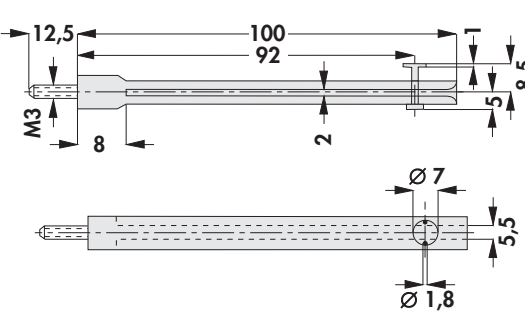
- for eurocards
- connectors according to DIN 41612 or VG 95324 mountable
- high stability through inner reinforcements
- stable foot mounting trough inserted brass- thread inserts
- groove depth: 2.2 mm, groove width 1.9 mm
- suitable for PCB thicknesses from 0.5 to 1.85 mm
- * = printed circuit board



Guide rails

Screw-on type

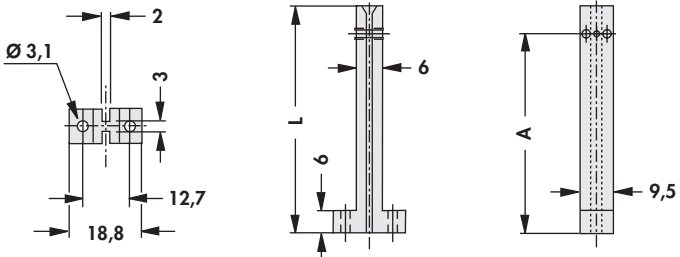
			
art. no.	dim. [mm]		
FS 6 065	A	B	C
FS 6 070	65	50	7
FS 6 080	70	50	12
FS 6 090	80	67	5
FS 6 100	90	67	15
FS 6 110	100	84	8
FS 6 120	110	84	18
FS 6 130	120	84	28
FS 6 130	130	84	38
material:	polycarbonate, GF reinforced		
temperature range:	-20°C... +130°C		
thread nut:	brass nickel-plated		
class of flammability:	UL 94 V-0		

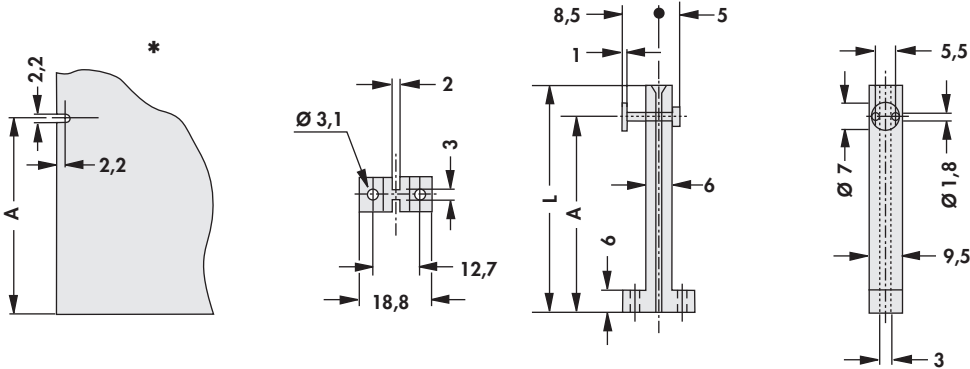
art. no.				
FS 109				
art. no.				
FS 100				
art. no.				
MSVL 100				
* = position of snap-in slot				
material:		polyamide, GF reinforced		
temperature range:		-40°C... +205°C		
class of flammability:		UL 94 V-0		

Guide rails

Lockable mounting rails

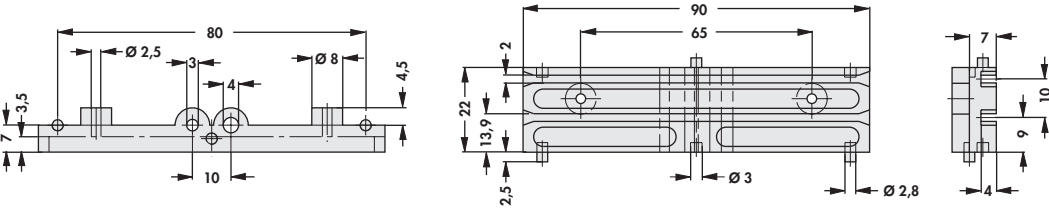
- lockable by pushing the plastic pin or the metal button
- no conductive connection to the PCB
- the PCB requires a snap-in slot in accordance to the drawing
- other position with locking device on request
- * = position of snap-in slot

							
art. no.	version	dim. [mm]		art. no.	version	dim. [mm]	
		L	A			L	A
FS 85 50	without bolting device	50	42	FS 85 70	without bolting device	70	62
FS 85 60	without bolting device	60	52	FS 85	without bolting device	85	76

							
art. no.	version	dim. [mm]		art. no.	version	dim. [mm]	
		L	A			L	A
MSVL 50	with bolting device	50	42	MSVL 70	with bolting device	70	62
MSVL 60	with bolting device	60	52	MSVL 85	with bolting device	85	76

material:		polyamide, GF reinforced					
temperature range:		-40°C... +205°C					
class of flammability:		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 flammability:		UL 94 V-0					

Solder pins
Snap-in guide rails
Extractors for guide rails
Insulating clamping parts

→ E 43
→ E 29 – 30
→ E 30
→ E 45

Distance sleeves for PCB's in HP grid → E 39
Mounting pads for transistors → E 47
Vibration dampers → E 41
Technical introduction → A 2 – 8

E 28

A

B

C

D

E

F

G

H

I

K

L

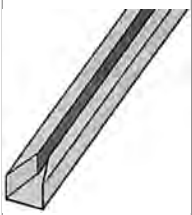
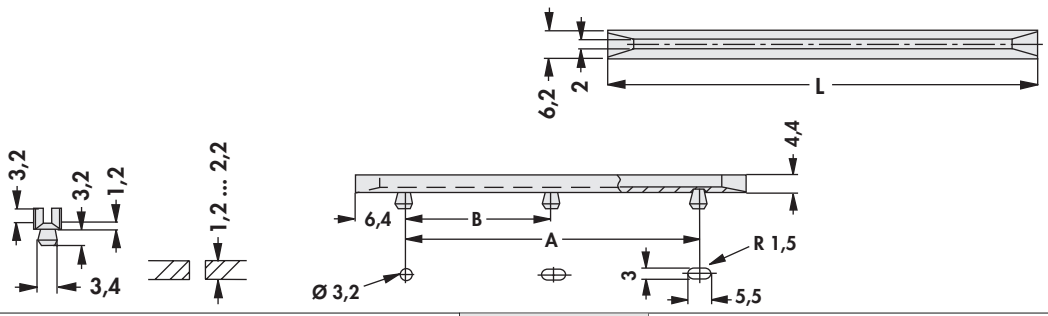
M

N

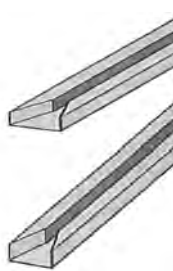
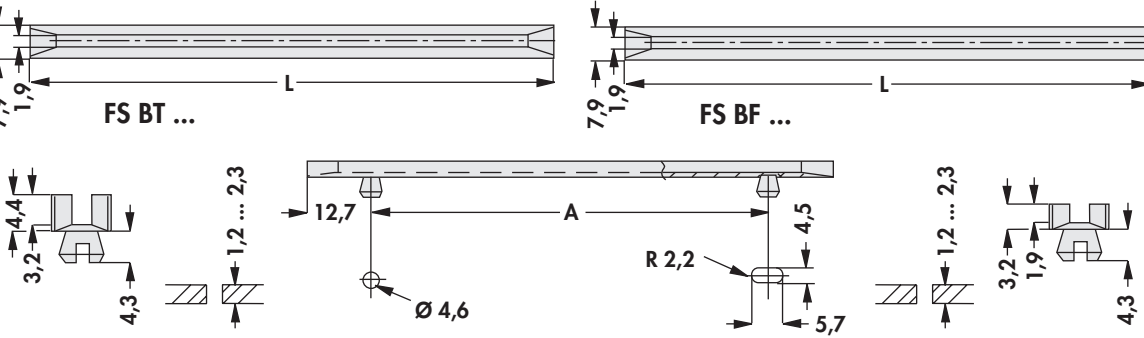
Guide rails

Snap-in

– narrow version

						
art. no.	dim. [mm]		art. no.	dim. [mm]		
	L	A		L	A	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	215.9	203.2	101.6
FS S 13 2	139.7	127.0				
material:		nylon, natural coloured				
temperature range:		-40°C... +120°C				
class of flammability:		UL 94 V-2				

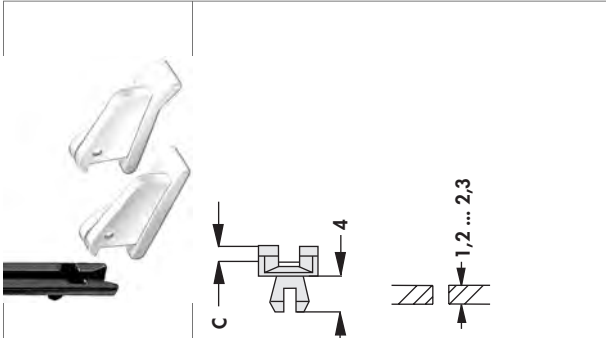
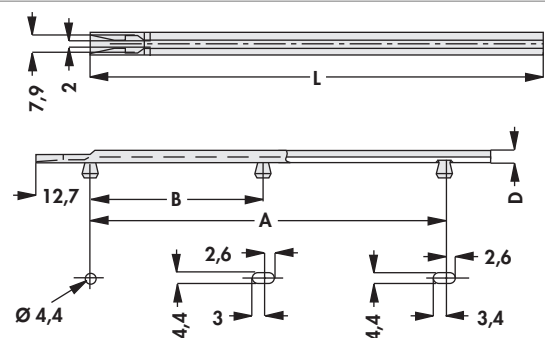
– wide version

							
art. no.	version	dim. [mm]		art. no.	version	dim. [mm]	
		L	A			L	A
FS BT 06	deep groove	63.5	38.1	FS BF 06	shallow groove	63.5	38.1
FS BT 08	deep groove	88.9	63.5	FS BF 07	shallow groove	76.2	50.8
FS BT 10	deep groove	101.6	76.2	FS BF 10	shallow groove	101.6	76.2
FS BT 11	deep groove	114.3	88.9	FS BF 11	shallow groove	114.3	88.9
FS BT 13	deep groove	139.7	114.3	FS BF 13	shallow groove	139.7	114.3
FS BT 15	deep groove	152.4	127.0	FS BF 15	shallow groove	152.4	127.0
FS BT 16	deep groove	165.1	139.7	FS BF 19	shallow groove	190.5	165.1
FS BT 19	deep groove	190.5	165.1	FS BF 20	shallow groove	203.2	177.8
FS BT 20	deep groove	203.2	177.8				
material:		nylon, natural coloured					
temperature range:		-40°C... +120°C					
class of flammability:		UL 94 V-2					

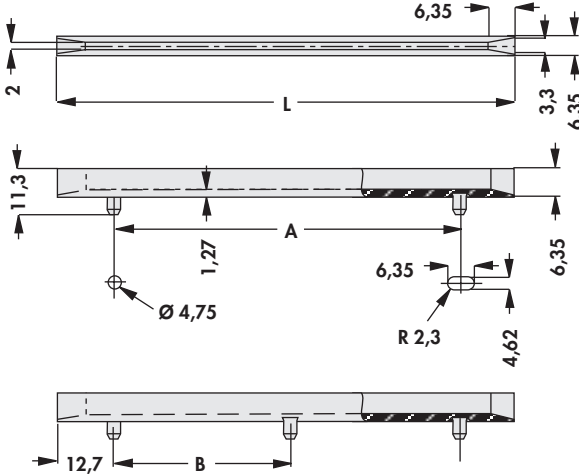
Guide rails

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	2.0	3.2	FS LP 16	165.1	127.4	—	2.0	3.2
FS LP 08	88.9	38.5	2.0	3.2	FS LP 17	177.8	153.2	—	2.0	3.2
FS LP 10	101.6	76.6	2.0	3.2	FS LP 22	228.6	191.3	95.7	2.0	3.6
FS LP 11	114.3	76.6	2.0	3.2	FS LP 30	304.8	267.9	134.0	2.4	4.0
FS LP 13	139.7	76.6	2.0	3.2						
material:			polyamide, GF reinforced							
temperature range:			-40°C... +120°C							
class of flammability:			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 flammability:		UL 94 V-0	

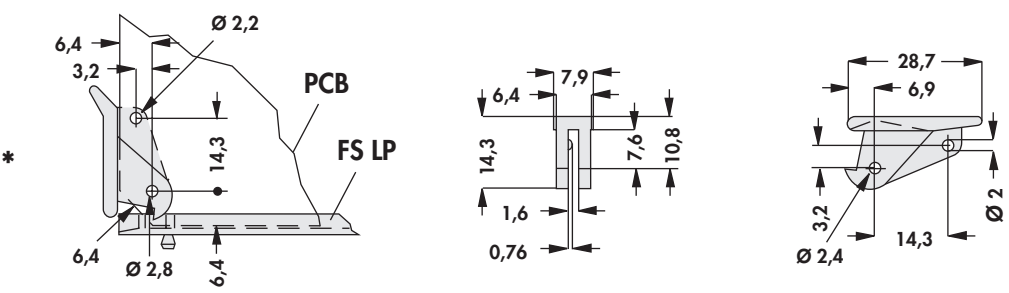
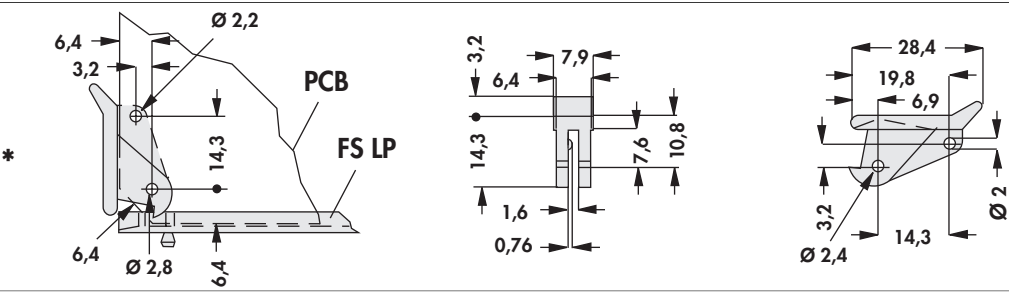
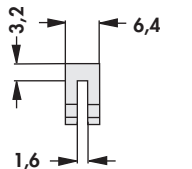
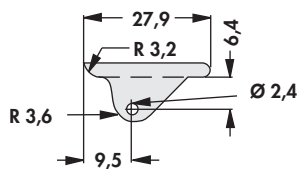
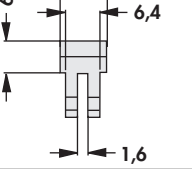
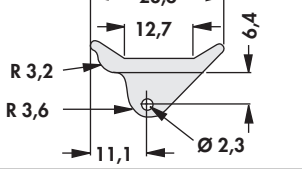
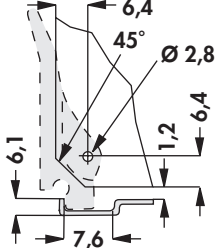
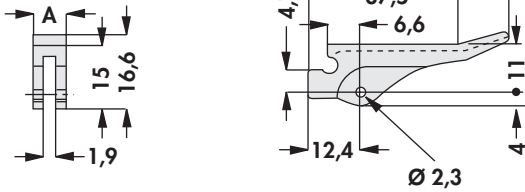
Solder pins
Snap-in guide rails
Extractors for guide rails
Insulating clamping parts

→ **E 43**
 → **E 29 – 30**
 → **E 30**
 → **E 45**

Distance sleeves for PCB's in HP grid → **E 39**
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Technical introduction → **A 2 – 8**

E 30

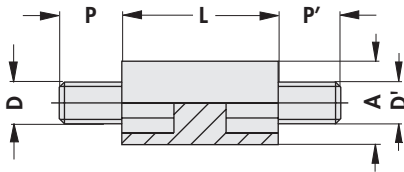
Ejectors

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			
			
art. no.	dim. [mm]		
AHG L 7	A 7.4		
material:	nylon		
temperature range:	-40°C... +120°C		
class of flammability:	UL 94 V-2		
type of delivery:	all ejectors with matching spring pin		



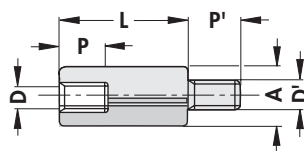
field of applications:

- 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
- mechanically very stable as threads are made of brass
- other lengths on request
- dimensions = nominal size: deviation ±0.5 mm
- ... please indicate length "L"



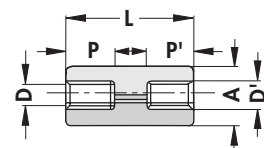
art. no.	dim. [mm]			
	A	D/D'	L	P/P'
ISAB 25 A ...	8.0	M2.5/M2.5	10/ 15/ 20/ 25	6.0
ISAB 3 A ...	8.0	M3/M3	10/ 20	6.0
ISAB 4 A ...	8.0	M4/M4	15/ 20	6.0
ISAB 6 A ...	12.7	M6/M6	25	12.7
dielectric strength:	27 kV/mm			
creeping current resistance:	CTI 600			
thread inserts:	brass			
temperature range:	-30°C... +85°C (short term +200°C)			
surface:	raw			
plastic body:	polyamide 66			
colour:	natural (opaque)			

Insulating spacers with internal and external thread



art. no.	dim. [mm]			
	A	D/D'	L	P/P'
ISAB 25 B ...	8.0	M2.5/M2.5	10/ 13/ 15/ 18/ 20/ 25/ 30	6.0
ISAB 3 B ...	8.0	M3/M3	10/ 13/ 15/ 18/ 20/ 25/ 30/ 35/ 40	6.0
ISAB 4 B ...	8.0	M4/M4	15/ 20/ 25/ 30/ 40	6.0
ISAB 5 B ...	9.5	M5/M5	20/ 30/ 40	10.0
ISAB 6 B ...	12.7	M6/M6	25/ 30/ 35/ 40/ 50	12.7

– dimensions = nominal size: deviation ± 0.5 mm; at **ISAB 3 C ...** L=10 => P/P'=3.5

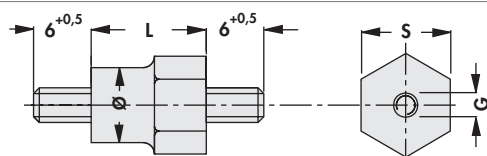


art. no.	dim. [mm]			
	A	D/D'	L	P/P'
ISAB 25 C ...	8.0	M2.5/M2.5	10/ 13/ 15/ 18/ 20/ 25/ 30	6.0
ISAB 3 C ...	8.0	M3/M3	10/ 13/ 15/ 18/ 20	6.0
ISAB 4 C ...	8.0	M4/M4	15/ 35	6.0
ISAB 5 C ...	9.5	M5/M5	20	10.0
ISAB 6 C ...	12.7	M6/M6	25	12.0
ISAB 6 C ...	12.7	M6/M6	30	12.7

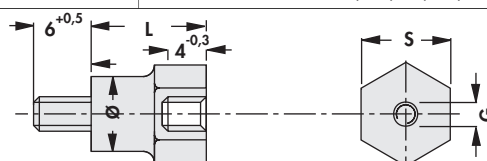
dielectric strength:	27 kV/mm
creeping current resistance:	CTI 600
thread inserts:	brass
temperature range:	-30°C... +85°C (short term +200°C)
surface:	raw
plastic body:	polyamide 66
colour:	natural (opaque)



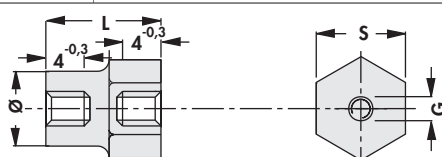
- allows compact, insulated constructions
- reduced volume in case of stack assembly
- insulated mounting of heatsinks, PCB, housing parts etc.
- very good mechanical stability due to brass inserts
- dimensions = nominal size: deviation ± 0.5 mm
- ... please indicate length "L"



art. no.	dim. [mm]			
	S	type of thread	L	max. diameter of the bushing
ISAM 2 A ...	6	M2.5	4/ 5/ 7/ 9/ 11/ 12	6
ISAM 3 A ...	7	M3	4/ 5/ 7/ 8/ 9/ 10	7



art. no.	dim. [mm]			
	S	type of thread	L	max. diameter of the bushing
ISAM 2 B ...	6	M2.5	8/ 9/ 10/ 11	6
ISAM 3 B ...	7	M3	7/ 8/ 9/ 10/ 11/ 12	7



art. no.	dim. [mm]			
	S	type of thread	L	max. diameter of the bushing
ISAM 2 C ...	6	M2.5	9	6
ISAM 3 C ...	7	M3	9/ 10/ 12	7

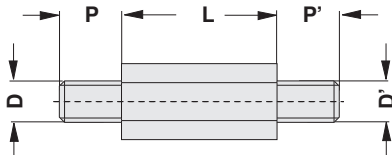
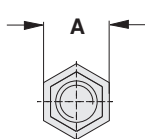
dielectric strength:	28 kV/mm
creeping current resistance:	CTI 600
thread inserts:	brass
temperature range:	-30°C... +85°C (short term +200°C)
surface:	raw
plastic body:	polyamide 6
colour:	natural (opaque)

Distance hexagonal bolts insulating



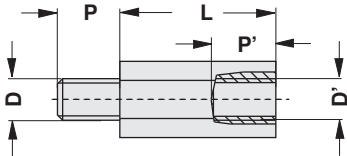
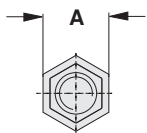
field of applications:

- 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
- mechanically very stable, as threads are made of brass
- other lengths on request
- dimensions = nominal size: deviation ± 0.5 mm
- ... **please indicate length "L"**

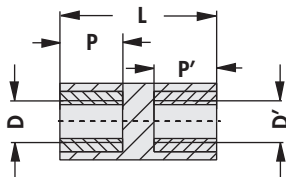
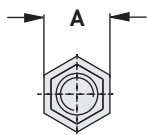


art. no.	dim. [mm]			
	A	D/D'	L	P/P'
ISAS 25 A ...	6.35	M2.5/M2.5	15/ 20/ 25/ 30/ 35/ 40	6.0
ISAS 30 A ...	6.35	M3/M3	15/ 20/ 25/ 30/ 35/ 40/ 45/ 50	6.0
ISAS 40 A ...	8.00	M4/M4	15/ 20/ 25/ 30/ 35/ 40/ 45/ 50	6.0
ISAS 50 A ...	9.50	M5/M5	20/ 25/ 30/ 35/ 40/ 45/ 50	10.0
ISAS 60 A ...	12.70	M6/M6	25/ 30/ 35/ 40/ 45/ 50/ 60	12.7
dielectric strength:	27 kV/mm			
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)			

Distance hexagonal bolts insulating



art. no.	dim. [mm]			
	A	D/D'	L	P/P'
ISAS 25 B ...	6.35	M2.5/M2.5	15/ 20/ 25/ 30/ 35/ 40	6.0
ISAS 30 B ...	6.35	M3/M3	15/ 20/ 25/ 30/ 35/ 40/ 45/ 50	6.0
ISAS 40 B ...	8.00	M4/M4	15/ 20/ 25/ 30/ 35/ 40/ 45/ 50	6.0
ISAS 50 B ...	9.50	M5/M5	20/ 25/ 30/ 35/ 40/ 45/ 50	10.0
ISAS 60 B ...	12.70	M6/M6	25/ 30/ 35/ 40/ 45/ 50/ 60	12.7

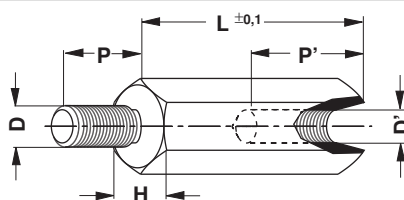


art. no.	dim. [mm]			
	A	D/D'	L	P/P'
ISAS 25 C ...	6.35	M2.5/M2.5	15/ 20/ 25/ 30/ 35/ 40	6.0
ISAS 30 C ...	6.35	M3/M3	15/ 20/ 25/ 30/ 35/ 40/ 45/ 50	6.0
ISAS 40 C ...	8.00	M4/M4	15/ 20/ 25/ 30/ 35/ 40/ 45/ 50	6.0
ISAS 50 C ...	9.50	M5/M5	20/ 25/ 30/ 35/ 40/ 45/ 50	10.0
ISAS 60 C ...	12.70	M6/M6	25/ 30/ 35/ 40/ 45/ 50/ 60	12.7

dielectric strength:	27 kV/mm
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)

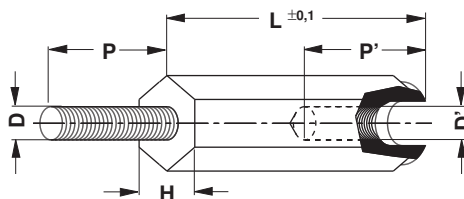
Spacers with internal and external thread

- other lengths and threads on request
- ... **please indicate length "L"**



art. no.	dim. [mm]				
	H	D/D'	L	P	P'
GBM 2550 ...	5	M2.5	5	6	2.5
GBM 2550 ...	5	M2.5	10	6	5.0
GBM 2550 ...	5	M2.5	15/ 20	6	8.0
GBM 2550 ...	5	M2.5	25/ 30/ 35	8	10.0
GBM 3050 ...	5	M3	5	8	2.5
GBM 3050 ...	5	M3	10/ 12/ 14	8	5.0
GBM 3050 ...	5	M3	15/ 18/ 20	8	10.0
GBM 3050 ...	5	M3	25/ 30/ 35/ 40/ 45/ 50	10	10.0
GBM 4070 ...	7	M4	5	8	2.5
GBM 4070 ...	7	M4	10	8	5.0
GBM 4070 ...	7	M4	15	8	8.0
GBM 4070 ...	7	M4	20	8	10.0
GBM 4070 ...	7	M4	25/ 30/ 35/ 40/ 45/ 50	10	10.0
GBM 5080 ...	8	M5	10	8	5.0
GBM 5080 ...	8	M5	15/ 20	8	6.0
GBM 5080 ...	8	M5	25/ 30/ 35/ 40/ 45/ 50	10	10.0
material:	brass				
surface:	6 µm nickel-plated, solderable				

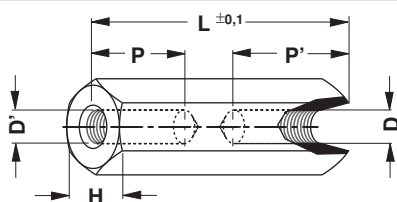
- other lengths and threads on request
- ... **please indicate length "L"**



art. no.	dim. [mm]				
	H	D/D'	L	P	P'
GBP 3060 ...	6	M3	10	8	7
GBP 3060 ...	6	M3	12	8	8
GBP 3060 ...	6	M3	15/ 18/ 20/ 25/ 30	8	10
GBP 4080 ...	8	M4	10	8	7
GBP 4080 ...	8	M4	12	8	9
GBP 4080 ...	8	M4	15/ 18/ 20/ 25/ 30/ 35/ 40/ 45	8	10
material:	polyamide, GF reinforced				
temperature range:	-30°C... +110°C				
colour:	black				

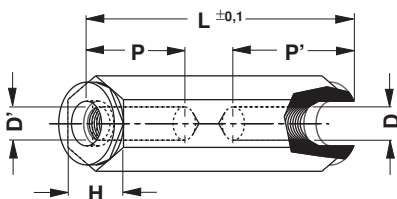
Distance sleeves with internal thread

- other lengths and threads on request
- ... **please indicate length "L"**



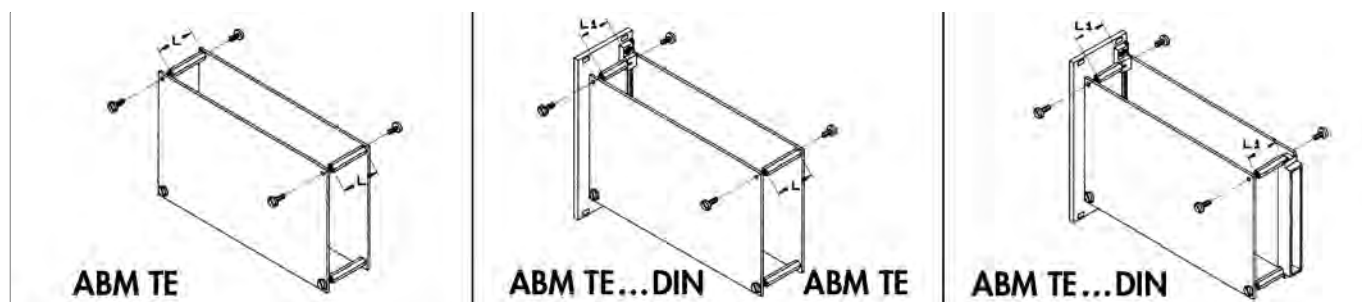
art. no.	dim. [mm]				
	H	D/D'	L	P	P'
ABM 2550 ...	5	M2.5	5/ 8/ 10/ 12/ 15	=L	—
ABM 2550 ...	5	M2.5	18	8	8
ABM 2550 ...	5	M2.5	20/ 25/ 30/ 35/ 40/ 45/ 50	10	10
ABM 3050 ...	5	M3	5/ 8/ 9/ 10/ 12/ 13/ 15	=L	—
ABM 3050 ...	5	M3	16/ 18/ 19	8	8
ABM 3050 ...	5	M3	20/ 25/ 29/ 30/ 35/ 40/ 45/ 50	10	10
ABM 4070 ...	7	M4	5/ 8/ 10/ 12/ 15	=L	—
ABM 4070 ...	7	M4	18	9	9
ABM 4070 ...	7	M4	20/ 25/ 30/ 35/ 40/ 45/ 50	10	10
ABM 5080 ...	8	M5	5/ 12/ 15	=L	—
ABM 5080 ...	8	M5	20/ 30/ 40/ 50	10	10
material:	brass				
surface:	6 µm nickel-plated, solderable				

- other lengths and threads on request
- ... **please indicate length "L"**

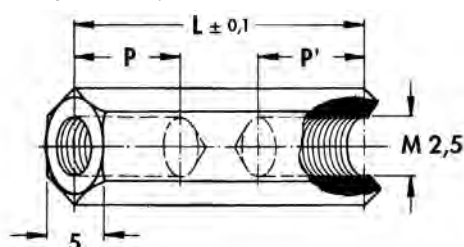


art. no.	dim. [mm]				
	H	D/D'	L	P	P'
ABP 2550 ...	5	M2.5	10	=L	—
ABP 2550 ...	5	M2.5	15/ 20/ 25/ 30	6	6
ABP 3060 ...	6	M3	10/ 12/ 15	=L	—
ABP 3060 ...	6	M3	20	8	8
ABP 3060 ...	6	M3	25/ 30	10	10
ABP 4080 ...	8	M4	10/ 15/ 20	=L	—
ABP 4080 ...	8	M4	30/ 40	10	10
material:	polyamide, GF reinforced				
temperature range:	-30°C... +110°C				
colour:	black				

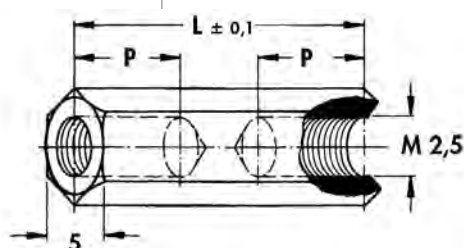
Distance sleeves for PCB in HP grid



- 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 panel/PCB Interconnection device VS 1
- spacers with internal and external thread to HP grid on request



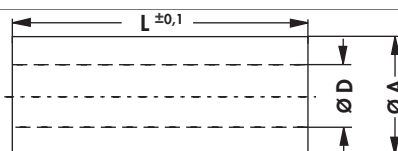
art. no.	suitable for TE	dim. [mm]	
		L	P/P'
ABM TE 04	4	18.72	8
ABM TE 06	6	28.88	8
ABM TE 08	8	39.04	8



art. no.	suitable for TE	dim. [mm]	
		L	P
ABM TE 04 DIN	4	12.72	=L
ABM TE 06 DIN	6	22.88	8
ABM TE 08 DIN	8	33.04	8

material:	brass
surface:	8 µm nickel-plated, solderable

– ... please indicate length "L"



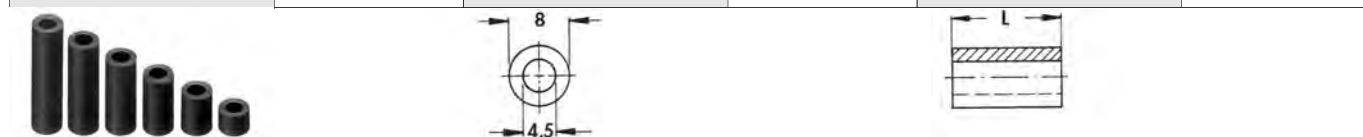
art. no.	dim. [mm]		
	A	D	L
AHM 3260...	6	3.2	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 12 / 15 / 18 / 25 / 30
AHM 4380...	8	4.3	2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 12 / 15 / 18 / 20
material:	brass		
surface:	8 µm nickel-plated, solderable		

Distance spacers

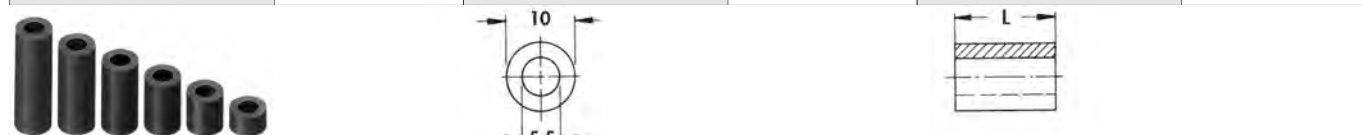
– special lengths on request



art. no.	C [mm]	art. no.	C [mm]	art. no.	C [mm]
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.	C [mm]	art. no.	C [mm]	art. no.	C [mm]
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.	C [mm]	art. no.	C [mm]	art. no.	C [mm]
DR 105 V0	5	DR 125 V0	25	DR 140 V0	40
DR 110 V0	10	DR 130 V0	30	DR 145 V0	45
DR 115 V0	15	DR 135 V0	35	DR 150 V0	50
DR 120 V0	20				

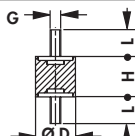
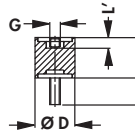
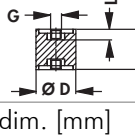
material:	polyamide
heat distortion:	180°C
temperature range:	+180°C
colour:	black
class of flammability:	UL 94 V-0

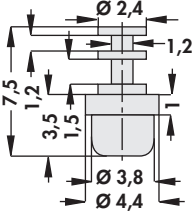
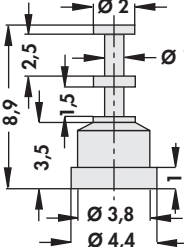
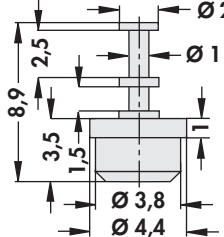
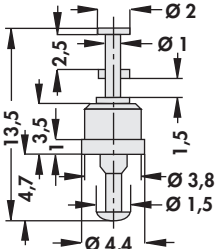
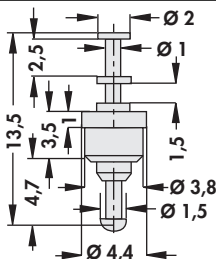
Construational elements to vibration damping and insulation

- universal applicable round metal, antivibration buffers for solving vibration problems
- other lengths and hardness range on request
- ... **please indicate height "H"**

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 imbalances

					
art. no.	dim. [mm]				
	H	type of thread	Ø D	L	
SMP 410 A ...	10	M4	10	10	
SMP 415 A ...	15	M4	15	10	
SMP 515 A ...	15	M5	15	12	
					
art. no.	dim. [mm]				
	H	type of thread	Ø D	L'	L
SMP 410 B ...	10	M4	10	4	10
SMP 415 B ...	15	M4	15	4	10
SMP 515 B ...	15	M5	15	5	12
					
art. no.	dim. [mm]				
	H	type of thread	Ø D	L'	
SMP 410 C ...	15/ 20	M4	10	4	
SMP 415 C ...	15/ 20	M4	15	4	
SMP 515 C ...	20	M5	15	5	
material:		rubber-metal connection			
rubber:		natural rubber (NR according to ISO)			
hardness range:		~ 50 Shore A			
extensibility and tebsile strength:		very good			
colour:		black			
metall parts:		steel tin-plated			
temperature range:		-40°C... +80°C (short term +90°C)			

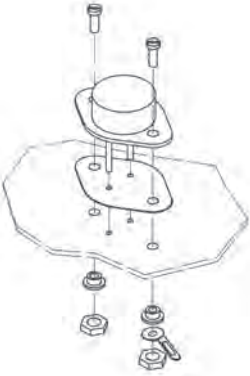
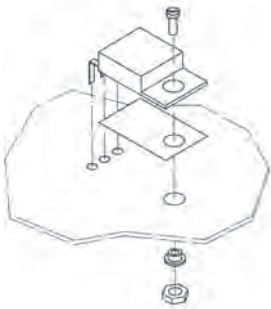
art. no.		
LSD 07520		
art. no.		
LSD 08910		
art. no.		
LSD 08920		
art. no.		
LSD 13510		
art. no.		
LSD 13520		
material:	insulating body: PTFE (teflon)	
contact pin:	brass, 2 µm Ni, 4 µm Ag	
temperature range:	-200°C ... +260°C	

Solder pins

art. no.	art. no.	art. no.	art. no.	art. no.
LS 101	LS 102	LS 103	LS 104	LS 105
± 0.6 mm	± 0.6 mm	± 0.6 mm	± 0.6 mm	± 0.5 mm
art. no.	art. no.			
LS 106	LS 107			
± 0.8 mm	± 0.5 mm			

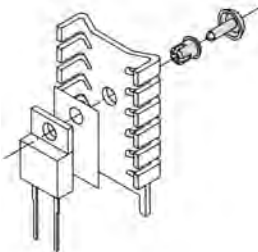
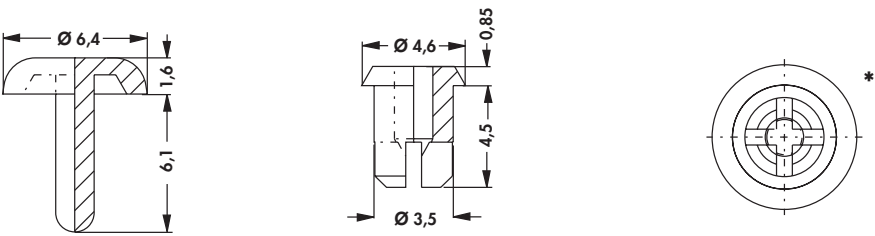
$\frac{\downarrow}{\uparrow}$ = thickness

	LS
material	brass, 6 μ m Sn

MST 3 MSTS 3		MST 220 MSTS 220	
			
art. no.	for transistor	version	contents of delivery
MST 3	TO 3	with mica wafer GS 3	1 mica wafer, 2 insulator sleeves, 1 tin-plated solder lug, 2 cheese head screws, nickel-plated, 2 screw nuts M3 nickel-plated
MSTS 3	TO 3	with silicone wafer WS 3	1 silicone wafer, 2 insulator sleeves, 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	TO 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

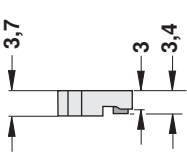
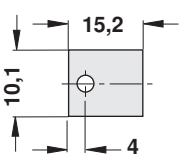
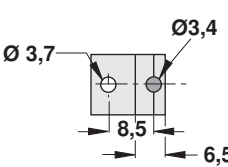
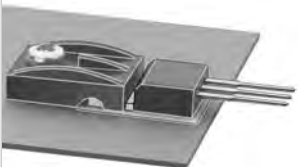
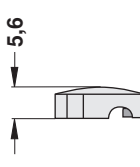
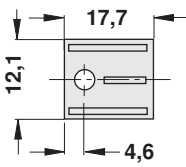
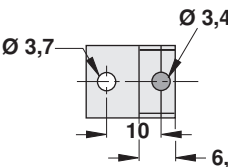
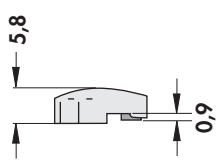
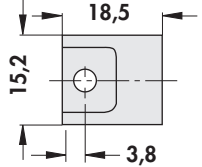
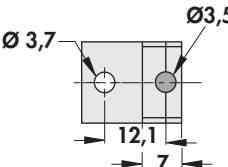
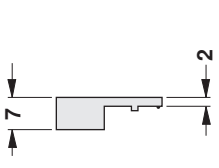
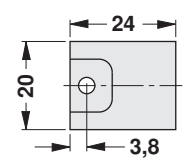
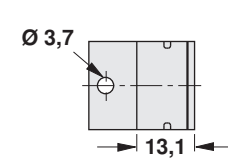
- detachable plastic snap rivet for quick fastening of transistors onto heatsinks and cooling plates (e.g. FK 212-CB, FK 216-CB, FK 222-220, FK 232, FK 233, FK 235-L 1)
- suitable for material thickness: 1 – 1.5 mm
- suitable for hole diameter: 3.5 – 4 mm
- * = bottom view, pin not inserted

			
art. no.	for transistor		
EPN 1	TO 220		
material:	polysulphone, GF reinforced		
temperature range:	-70°C... +180°C (5s+260°C)		
class of flammability:	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 strengths

- 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: dielectric strength: heat distortion: dielectric constant: dielectric loss factor: specific volume resistance: colour: class of flammability:	polyamide 6, GF reinforced <27 kV/mm 205°C (1.8 MPa); 135°C (8 MPa) 8 [100 Hz]/4.5 [1 MHz] 1300 [100 Hz] 450 [1 MHz] > 10 ¹³ Ω·cm black UL 94 V-0

Mounts

art. no. MS 53 3 TO 5	art. no. MS 53 7 TO 5	art. no. MS 53 25 TO 5	art. no. MS 54 25 TO 5	art. no. MS 58 5 TO 5-8 p.
art. no. MS 58 7 TO 5-8 p.	art. no. MS 56 15 TO 5-6 p.	art. no. MS 58 15 TO 5-8 p.	art. no. MS 510 15 TO 5-10 p.	art. no. MS 3518 25 TO 5/ TO 18
art. no. MS 3518 35 TO 5/ TO 18	art. no. MS 34 518 TO 5/TO 18	art. no. MS 183 25 TO 18	art. no. MS 184 25 TO 18	art. no. MS 183 35 TO 18
art. no. MS 184 35 TO 18	art. no. MS 183 7 TO 18	art. no. MS 184 7 TO 18	art. no. MS 84 4 TO 8	art. no. MS 923 25 TO 92
art. no. MS 4016 max. 16 contacts	art. no. US 58 4 TO 5	art. no. US 512 4 TO 5		

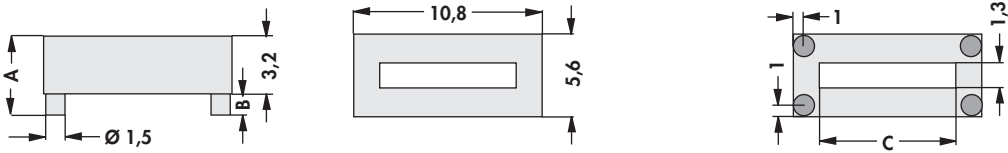
* = **transfer washer**: the US-pads convert the TO 5 pin circle to a pitch of 2.54 mm

material:	polyamide 6, GF reinforced
temperature range:	-40°C... +205°C
class of flammability:	UL 94 V-0 (at thickness ≥3mm), UL 94 V-1

Mounts

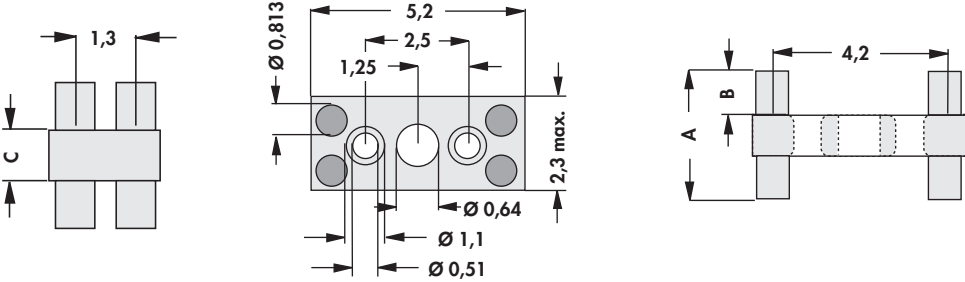
Mounts for power transistors

- 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	white	4.4	1.3	7.1
MLW 51	white	5.1	1.9	7.1
material:		polyamide 6 (nylon)		
temperature range:		-40°C... +120°C		
class of flammability:		UL 94 V-2		

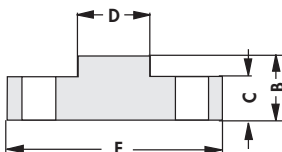
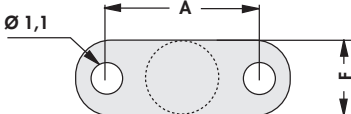
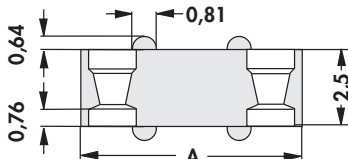
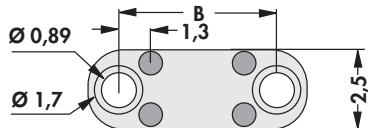
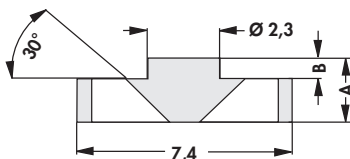
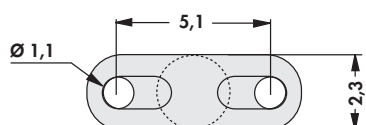
Mounts for rectangular LEDs

- for LED 2x4 mm oder 2x5 mm
- symmetric version for easy assembly
- self-adhesive

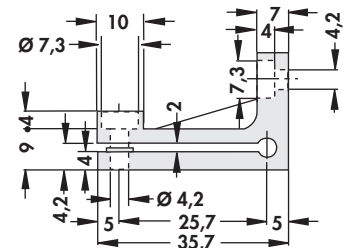
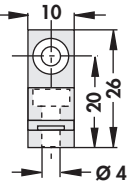
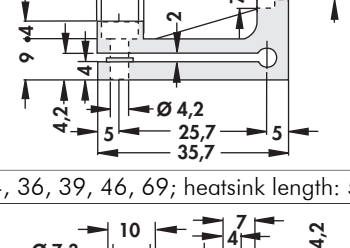
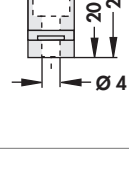
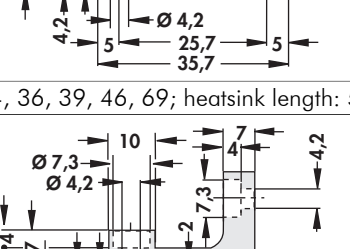
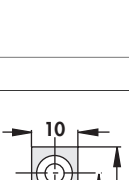
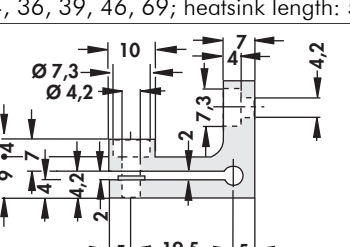
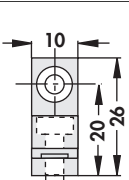
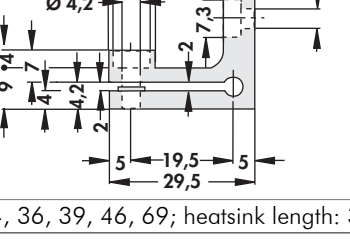
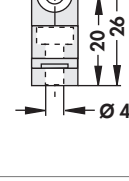
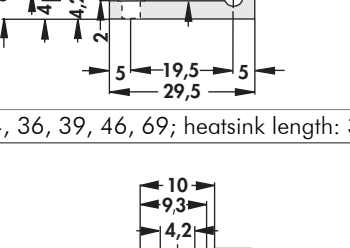
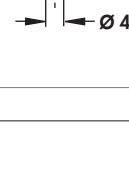
				
				
art. no.	colour	dim. [mm]		
		A	B	C
MRL 20	white	2	0.5	1
material:		polyamide 6 (nylon)		
temperature range:		-40°C... +120°C		
class of flammability:		UL 94 V-2		

Mounts for discrete components

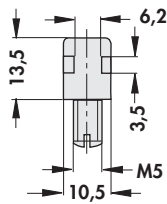
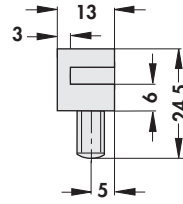
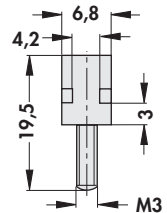
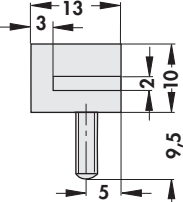
– suitable for various components e.g. resistors, capacitors etc.

													
art. no.	dim. [mm]						art. no.	dim. [mm]					
	A	B	C	D	E	F		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	1.1	0.55	2.3	6.9	3.2	MD A 12	10.2	1.1	0.76	4.8	12.4	2.3
MD A 07	5.1	1.1	0.55	2.3	7.4	2.3							
													
art. no.	dim. [mm]						art. no.	dim. [mm]					
	A			B				A			B		
MD B 07	7.6			5.1			MD B 12	12.7			10.2		
MD B 10	10.2			7.6			MD B 15	15.2			12.7		
MD B 11	11.4			8.9									
													
art. no.	dim. [mm]						art. no.	dim. [mm]					
	A							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 flammability:			UL 94 V-2										

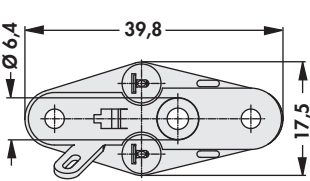
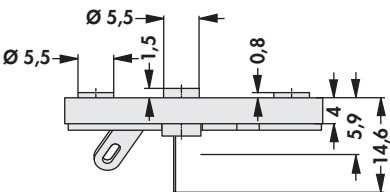
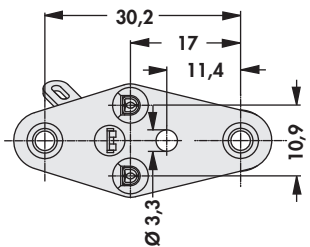
Mounting parts for heatsinks

art. no.			
IS 1		for SK 01, 02, 03, 11, 14, 21, 30, 34, 36, 39, 46, 69; heatsink length: 50 mm	
art. no.			
IS 2		for SK 01, 02, 03, 11, 14, 21, 30, 34, 36, 39, 46, 69; heatsink length: 37.5 75 100 mm	
art. no.			
IS 3		for SK 01, 02, 03, 11, 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 flammability:	UL 94 V-0		

Mounting parts for heatsinks

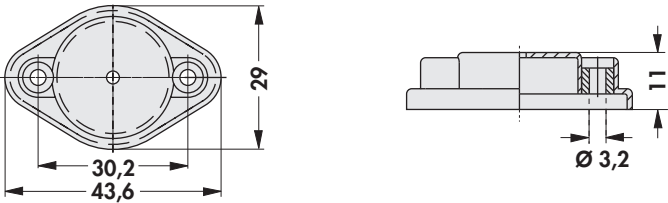
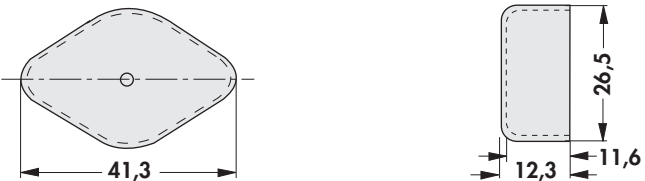
art. no.			
IS 7			
art. no.			
IS 8			
for SK 20			
material:	polyamide 6, GF reinforced		
class of flammability:	UL 94 V-0		

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 flammability:	UL 94 V-0			

Insulating caps

– different transistor flange levels will be by the sleeves

art. no. IK 341 3		
art. no. IK 3		
material:	polyamide, GF reinforced	
pressed-in sleeves:	brass, nickel-plated	
class of flammability:	UL 94 V-0	

art. no. IB 1 / IBT 1	art. no. IB 2 / IBT 2	art. no. IB 3 / IBT 3	art. no. IB 4 / IBT 4	art. no. IB 5
art. no. IB 6 / IBT 6	art. no. IB 7 / IBT 7	art. no. IB 8 / IBT 8	art. no. IB 9 / IBT 9	art. no. IB 10 / IBT 10
art. no. IB 11 / IBT 11	art. no. IB 12 / IBT 12	art. no. IB 13	art. no. IB 14 / IBT 14	art. no. IB 15 / IBT 15
art. no. IB 16	art. no. IB 17	art. no. IB 18 / IBT 18		

	IB 1 - IB 7 / 18	IBT 1 - IBT 15 / 18	IB 8 - IB 17
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
dielectric strength	30 kV/mm	40 kV/mm	38 kV/mm
class of flammability	UL 94 V-0		



OBERFLÄCHEN- VEREDELUNG GMBH

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:

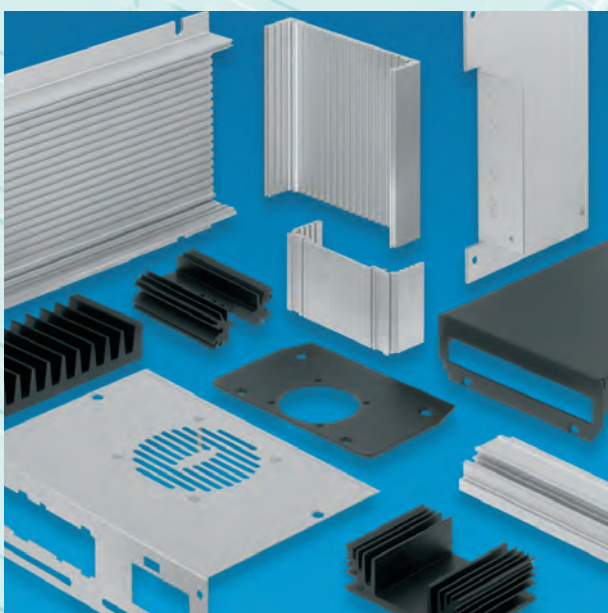
drum technology

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

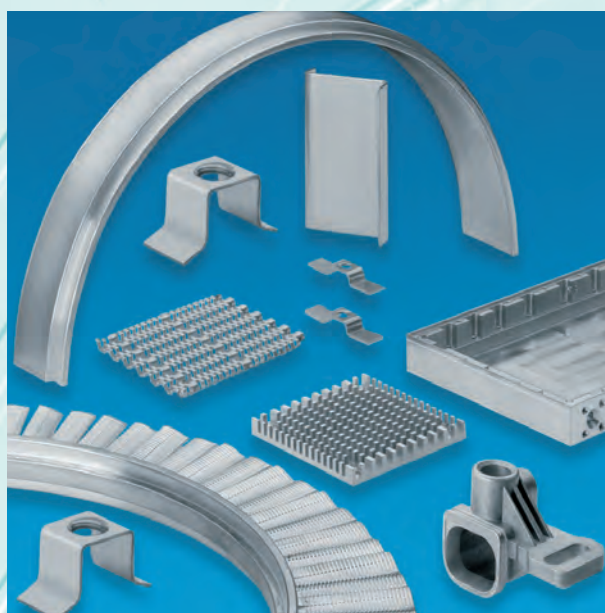
materials:

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:

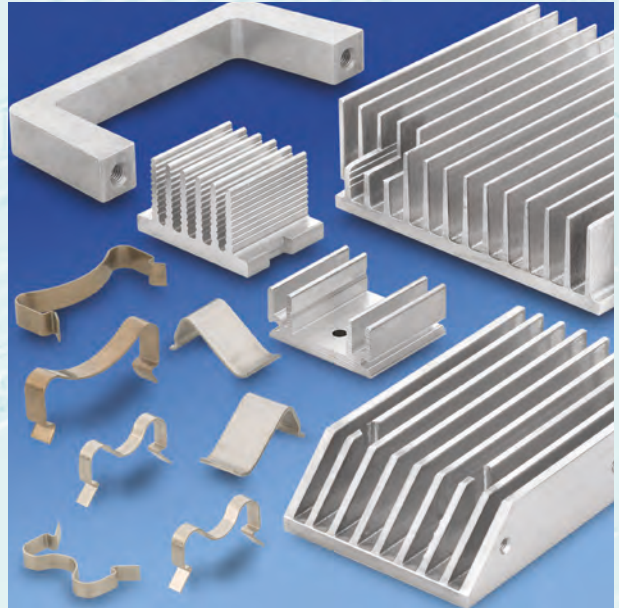
600 x 400 x 380 mm

max. component weight: 80 kg



OBERFLÄCHEN- VEREDELUNG GMBH

High quality surface treatment for electronic components



Transparent passivating (surface free from chromium VI)

characteristics: environmental compatibility due to chrome free passivation of the aluminium surfaces
fabrication of conversion coatings by immersion process

process:

materials: aluminium und aluminium alloys
max. component size: 1500 x 2000 x 450 mm
colour: natural aluminium or black

Vibratory grinding

characteristics: deburring, removing of sharp edges, rough and fine grinding

process: treatment using vibration technique and grinding tools (trowalization)

materials: metallic, aluminium favoured

max. component size: 230 x 200 mm



Anodisation facility

- economization of water by using spray-rinsing, automatized 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

Certificate

Standard **ISO 9001:2008**

Certificate Registr. No. 01 100 052055

TÜV Rheinland Cert GmbH certifies:

Certificate Holder:



Fischer Oberflächenveredelung GmbH
Nottebohmstraße 26
D - 58511 Lüdenscheid

Scope:

surfaces for electronics: goldplating, tinplating, nickelplating, anodizing, passivating, deburring.

An audit was performed, Report No. 052055. Proof has been furnished that the requirements according to ISO 9001:2008 are fulfilled.
The due date for all future audits is 06-12 (dd.mm).

Validity:

The certificate is valid from 2014-12-15 until 2017-12-14.
First certification 2005

2014-11-11



www.tuv.com

K. K.
TÜV Rheinland Cert GmbH
Am Grauen Stein 51105 Köln

TÜVRheinland®
Precisely Right.

General Business conditions

1. General provisions

Our deliveries are exclusively subject to the conditions set forth herein which shall be deemed to be explicitly accepted by the purchaser. No conditions which may appear on the purchaser's order shall be binding on us, even without our express contradiction.

2. Quotations and orders

Our quotations are not binding on us. 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 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 are explicitly confirmed in writing, regardless of the form in which they have been placed with us. Furthermore the characteristics of our samples cannot be regarded as guaranteed 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.. If delivery is made more than 4 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. 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 give us the right to amend prices.

4. Conditions of payment

Payment of the invoice amount shall become due following receipt of the invoice. Payments made within 14 days of the date of invoice give the right to a 2% cash discount. Payments 30 days after the date of invoice shall be made without any deduction. If the purchaser is in default with any payment, we are entitled to claim interest for such default at the normal rate for current accounts. If greater damage can be demonstrated to have been caused by the delay, we are entitled to request compensation for such damage.

5. Set-off, right to retention

Only uncontested or legally binding counter-claims 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.

6. Delivery

Delivery of our goods is explicitly made on behalf of and at the risk of the purchaser. The risk shall pass on to the purchaser when the ordered goods leave our premises. The same applies if goods are collected in our premises after notification of their readiness. We 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 of our claims resulting from the contract 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 with goods of third parties, 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. Such right to coownership 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 co-ownership (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.

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 merchantability 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 his obligation to check and put forward a complaint as per § 377 HGB.

10.3. If goods have a defect attributable to us, we are obliged to provide subsequent fulfilment, excluding the purchaser's right to withdraw from the contract or to reduce the purchase price (abatement), unless we are entitled to refuse subsequent fulfilment by virtue of legal provisions. The purchaser shall grant us an adequate period of grace for subsequent fulfilment. Subsequent fulfilment may at our discretion be an elimination of the defect (rectification) or the supply of new products.

10.4. 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.

10.5. The purchaser's right to put forward further claims for damages shall remain unaffected by this.

10.6. The purchaser's warranty claims shall come under the limitation of time which is 12 months from the delivery of the goods to the purchaser, unless we have fraudulently concealed the defect. In this case, the legal provisions shall apply.

10.7. The purchaser's claims for damages shall come under the limitation of time which is 12 months from the delivery of the goods. This does not apply if the threat to life, bodily injury or injury to health is imputable to us, our legal representatives or other vicarious agents, or if we or our legal representatives have been grossly negligent, or if our vicarious agents have acted deliberately.

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 entitle the purchaser to assert any right against us.

12. Place of performance, place of venue, applicable law

12.1. The place of performance and the place of venue for deliveries and payments and for any litigation arising between us and the purchaser shall be the headquarters of our company.

12.2. The relations between the parties to the contract shall be exclusively governed by the law of the Federal Republic of Germany. The application of the UN Conventions on contracts for the international sale of goods is excluded.

If any provision herein is or will become invalid, such provision shall not affect the validity of the remaining provisions. The invalid provision shall be replaced by a valid provision which shall meet as closely as possible the legal and commercial purpose of the original one.

How to find us

Fischer Elektronik GmbH und Co. KG

Nottebohmstraße 28

D – 58511 Lüdenscheid

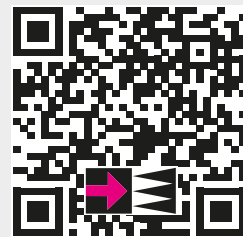
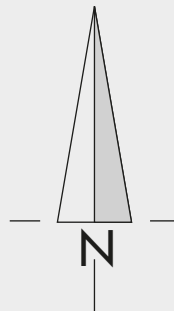
Telefon: +49 (0) 23 51 / 4 35 - 0

Telefax: +49 (0) 23 51 / 4 57 54

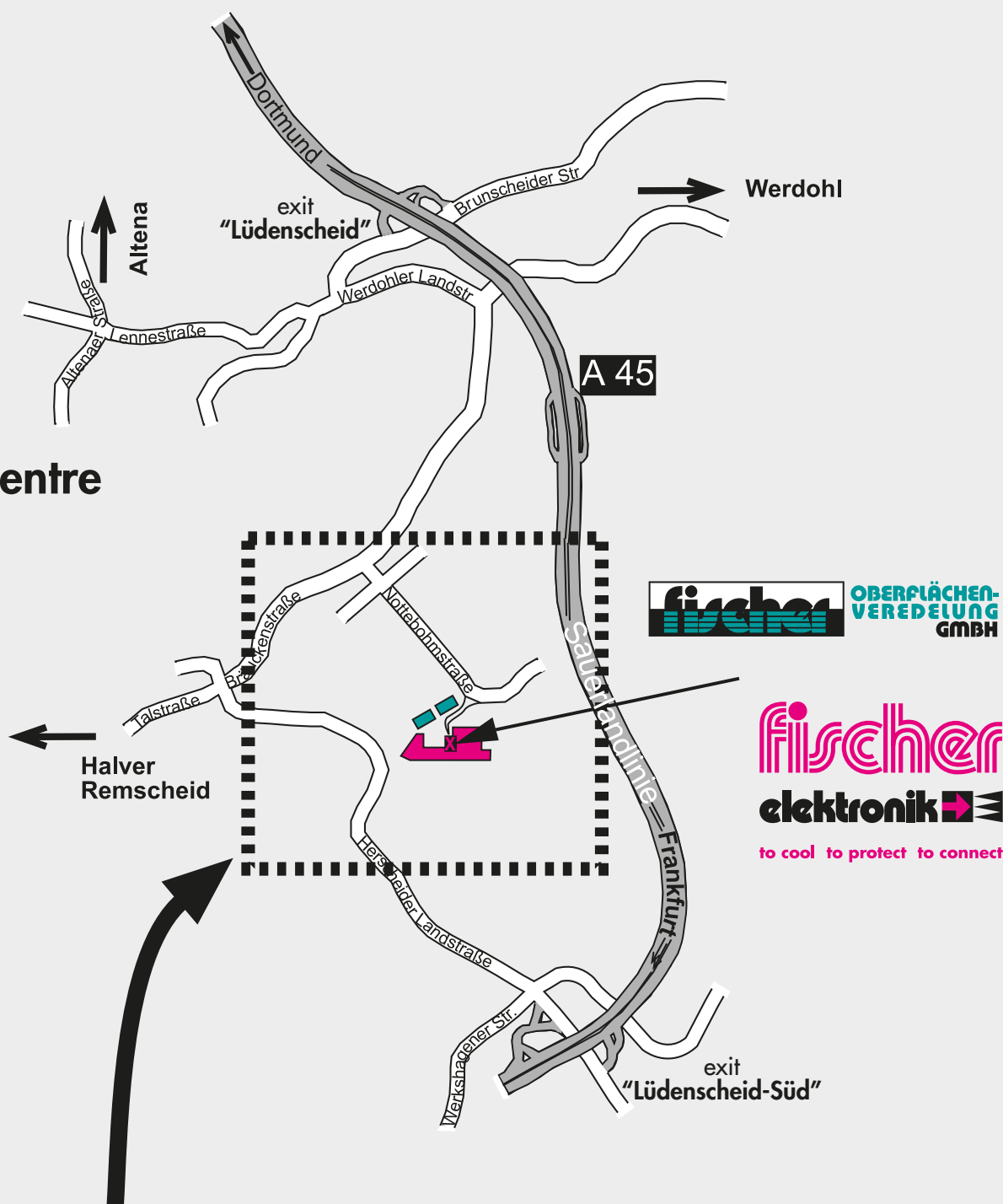
info@fischerelektronik.de

www.fischerelektronik.de

www.facebook.de/fischerelektronik



town centre

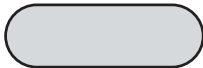
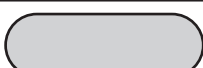


**OBERFLÄCHEN-
VEREDELUNG
GMBH**

**fischer
elektronik** 

to cool to protect to connect

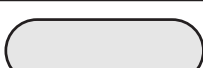
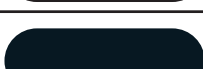
art. no.	HEATSINKS & CASES SURFACES
----------	----------------------------

AL	 raw degreased aluminium
BZ	 raw pickled aluminium
LP	 outside black lacquered RAL 9005/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
----------	-----	---------	----------

GO	6026	 opal green	system cases RackCase/shell cases
K	7032	 gravel grey	bench cases
LG	7035	 light grey	shell cases
NB	5022	 night blue	system cases RackCase/shell cases
S	9005	 deep black	bench cases/shell cases/system cases RackCase
TB	5018	 turquoise blue	system cases RackCase/shell cases
UL	5002	 ultramarine blue	Plusline/shell cases



Cases
19" technology
Test equipment



Sockets
Connectors
Brackets



Slip-Case
for collecting
the catalogues

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