THE MAX CLIP SYSTEM™
CLIP SOLUTIONS ONLY LIMITED BY THE IMAGINATION

The Max Clip System™ is approved by leading providers of power semiconductors, including: Advanced Power Technology, International Rectifier, STMicroelectronics, and IXYS

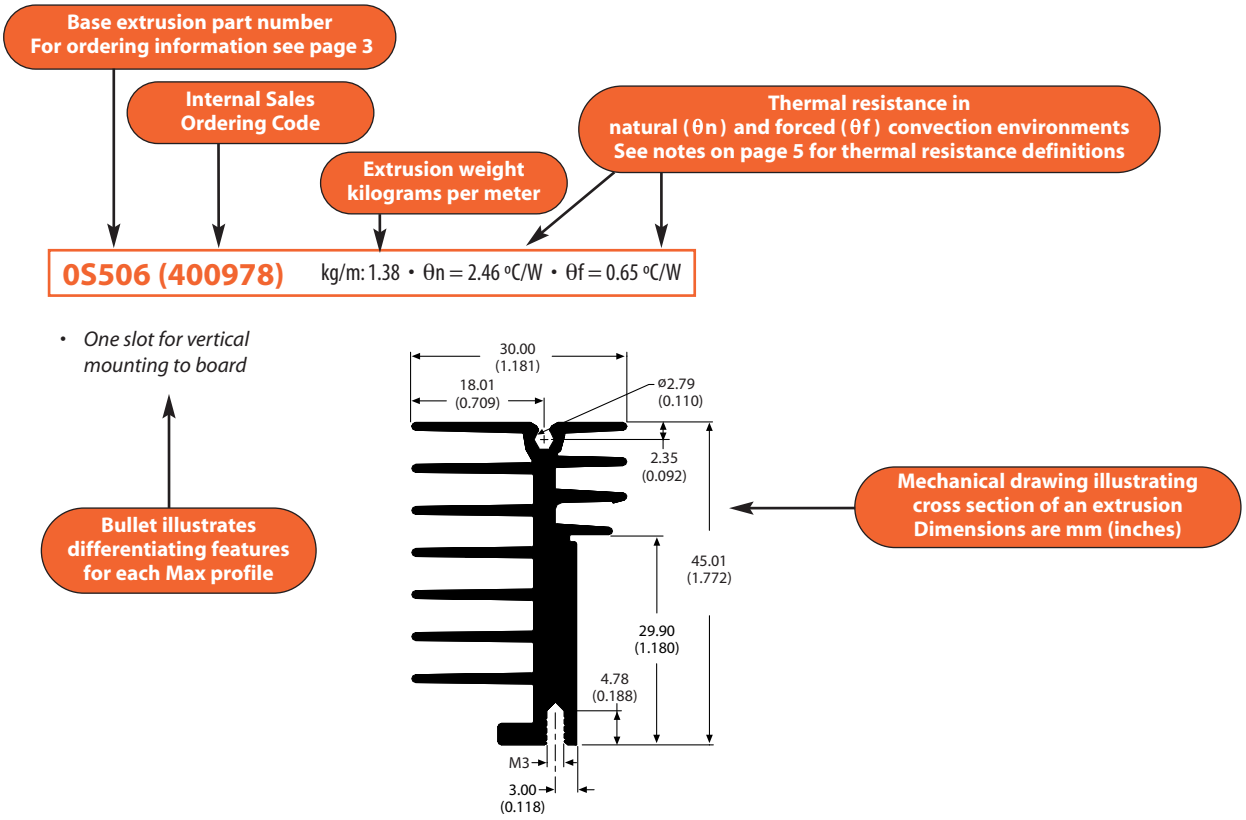
APT Advanced Power Technologies manufactures high power, high voltage, high performance power semiconductors for the internet, computers and high capacity mass storage products, wireless cellular base stations for telecommunications, advanced industrial, military and space applications.

International Rectifier is a global supplier of power semiconductors for power conversion. Its Hexfet MOSFETs are used in anti-lock braking and fuel injection systems, disk drives, printers, video cameras, power tools, electronic lighting ballasts, industrial test equipment, telephone networks/modems, and satellites.

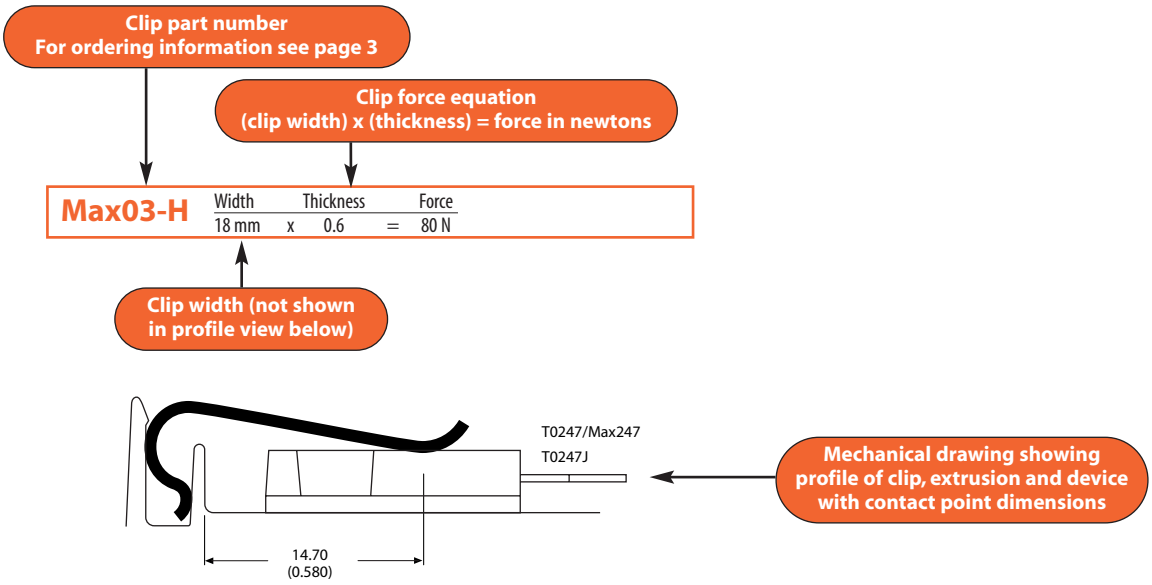
STMicroelectronics is one of the world's leading suppliers of semiconductor integrated circuits and discrete devices. STM is especially focused on MPEG2 decoder ICs, smartcard MCUs, special automotive ICs and EPROM memories.

IXYS Corporation designs, develops and markets power semiconductors for controlling energy in motor drives, power conversion (UPS uninterruptible power supplies and SMPS switch mode power supplies), and medical electronics. IXYS focuses on high power semiconductors processing over 500 watts of power.

Max Extrusions



Max Clips



To select a clip appropriate for the device cooled and the selected profile see the Clip Index on pages 23–25.

How to Order The Max Clip System™

General Information:
Extrusions are available in standard bar lengths of 5 meters.
Extrusions are unfinished and may be ordered with a black anodize finish.
The standard tolerances of extrusions and machining are reported on page 39.

Max Extrusion Profiles
The Max extrusions are often ordered cut to length without additional machining. In this case the customer needs only to specify the required length and the surface finish, usually black anodized or just washed.

For additional Solderable Pins, refer to page 36.

For additional machining it is always advisable to add a drawing, with the required tolerances, to the order.

Max Clips
Clips are ordered separately using the part number shown in the mechanical drawing header information. See How to Use this Catalog on page 2.

Potential Max Profiles
The Max Clip System™ is only limited by the imagination. For custom solutions or more information on the Potential Max Profiles listed on pages 22-24, please contact your local sales representative.

European Sales

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Tel: (39) 051 764011
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To find your local sales rep visit our web site at aavidthermalloy.com

The Max Clip System™

MINIMIZE LABOR...MAXIMIZE PERFORMANCE

The Max Clip System™ for discrete power semiconductors is a high performance, low cost thermal solution that eliminates mounting holes, screws, rivets, and the thermal inefficiency associated with using loose hardware to attach components to a heat sink. This quick, robust attachment method saves on labor and hardware costs while increasing performance and design flexibility.

The Max Clip System™ is also the most effective system for mounting power devices in packages that have no mounting holes. Max Clips apply consistent optimum pressure at the center of the semiconductor, improving contact with the heat sink for better thermal performance and maximum component reliability. Aavid offers approximately 50 extrusion profiles that accept over 20 different Max Clips to suit your application. The Max Clip System™ is designed to accommodate a variety of semiconductor packages including TO-220, TO-218, TO-247, TO-3P, and packages without mounting holes like TO-262, TO-273, TO-274, and TO-251.

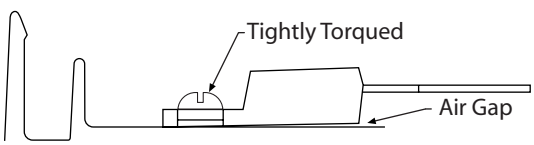
Features and Benefits of The Max Clip System™ include:

- *Optimizes thermal management of power transistors*
- *Provides mounting for discrete power devices with or without mounting holes*
- *Reduce labor costs by eliminating the need for drilled or tapped holes in heat sinks*
- *Allows flexibility for moving or changing devices*
- *Provides consistent mounting force for reduced thermal resistivity (over lifetime)*
- *Assembly costs using The Max Clip System™ are lower than with conventional hardware such as screws/nuts*

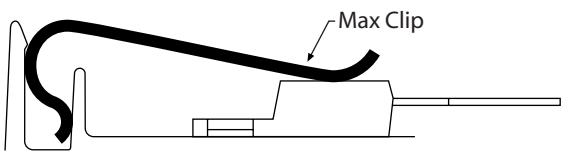
The Max Clip System™ provides ideal product lifetime contact to the center of the device package resulting in even force across the interface material. Max Clips maintain a constant assembly force even when interface material deteriorates over time. With conventional nuts, bolts and rivets mounting force is set at the time of assembly and can lessen over the product's service life with changes in interface material thickness. Nuts and bolts also impart force at one end of the package creating uneven pressure over the length of the device, actually creating thermal inefficiency. See Figure 1.

Figure 1

Poor Contact



Maximum Contact



Part Number	Oracle Number	North America Part Number	Page	Weight kg/m	Width mm	Height mm	Perimeter mm	θn	θf	Type
0S505	400977	78010	8	2.48	34.00	75.00	948.99	1.45	0.39	1
0S506	400978	78015	8	1.38	27.00	50.02	499.99	2.46	0.65	1
0S507	400979	78020	15	1.23	30.00	47.20	372.99	3.02	0.84	2
0S508	400980	78025	13	0.99	39.00	31.48	310.01	3.10	1.02	1
0S509	400981	78030	21	3.42	73.54	60.00	1002.00	1.10	0.36	5
0S510	400982	78035	9	2.53	74.50	40.01	808.99	1.23	0.42	1
0S511	400983	78040	15	4.64	102.00	71.20	1410.00	0.81	0.28	2
0S512	400984	78045	9	1.59	40.00	40.00	475.99	2.12	0.64	1
0S513	400985	78050	22	3.47	82.00	50.00	1161.62	0.63	0.25	6
0S515	400986	78060	10	1.18	30.00	45.01	424.99	2.33	0.76	1
0S517	400988	78070	14	2.57	40.00	75.00	783.00	1.55	0.41	2
0S518	400989	78075	10	1.64	38.00	54.00	581.99	1.71	0.57	1
0S520	400991	78220	14	1.66	30.00	60.00	488.01	2.49	0.74	2
0S521	400992	78225	18	1.75	23.00	45.00	178.00	-	-	4
0S522	400993	78230	19	1.39	28.00	45.00	211.98	-	-	4
0S526	400997	78245	8	1.67	27.00	60.00	596.01	2.29	0.56	1
0S527	400998	78345	16	2.21	68.00	39.00	670.00	1.64	0.49	2
0S528	400999	78250	15	2.15	60.00	56.00	632.99	1.42	0.52	2
0S529	401000	78255	18	0.68	27.00	27.00	154.00	3.43	1.59	4
0S533	401004	78265	11	0.48	22.00	28.50	199.99	4.12	1.68	1
0S546	401015	78335	20	0.31	30.10	12.50	138.98	6.34	2.38	3
0S547	401016	78270	19	0.95	27.00	29.50	156.99	3.43	1.59	4
0S549		78370	20	0.55	29.97	29.21	183.28	-	-	6
0S550	401019	78275	13	1.78	31.75	58.70	483.00	2.35	0.67	1
0S552	401021	78315	10	3.14	48.00	80.00	1010.00	1.06	0.34	1
0S553	401022	78215	9	1.32	61.21	28.00	386.99	2.50	0.85	1
0S555	401024	78205	14	1.57	30.00	57.00	437.99	2.42	0.75	2
0S556	401025	78200	19	0.89	25.00	35.98	181.00	-	-	4
0S559	401028	78195	12	1.10	34.00	36.60	313.99	2.70	0.93	1
0S560	401029	78190	11	2.37	58.00	66.50	648.00	1.25	0.50	1
0S562	401031	78185	19	2.14	40.00	57.00	246.98	-	-	4
0S565	401034	NA	20	0.90	15.00	54.00	264.00	3.43	1.12	3
0S567		NA	22							6
0S568	401037	NA	11	1.49	54.50	38.60	445.00	1.82	0.78	1
0S569	401038	NA	20	0.41	33.00	21.00	186.99	4.38	2.10	6
0S577	401046	NA	11	1.45	38.00	54.00	381.00	1.83	0.77	1
0S579	401048	NA	8	1.73	27.00	60.00	581.99	2.30	0.59	1
0S581	401050	NA	17	0.81	27.00	27.00	135.00	-	-	4
0SA06	400580	78295	11	2.18	35.00	60.00	688.00	1.67	0.47	1
0SA12		78300	22	4.51	165.00	62.00	499.82	-	-	6
0SA15	400589	78280	19	0.75	22.98	38.00	165.98	3.11	1.50	4
0SA16		78305	22	1.62	120.76	-	659.10	-	-	6
0SA17		78310	22	1.50	-	-	628.01	-	-	6
0SA21	400595	78355	13	1.15	32.30	49.0	456.99	2.34	0.76	1
0SA24		NA	22	-	-	-	-	-	-	6
0SA30	400604	78360	16	3.29	108.00	39.00	1054.98	1.18	0.41	2
0SA31		78290	22	9.64	240.80	77.00	1362.43	-	-	6
0SA34		78385	22	4.27	240.00	60.00	914.19	-	-	6
0SA35	400609	NA	11	2.38	35.00	75.00	899.00	1.56	0.41	1
0SA36	400610	78350	10	3.45	49.50	85.50	1153.00	0.93	0.29	1
0SA39	400613	78390	21	6.02	179.98	51.00	1737.00	0.44	0.19	5
0SA53	400627	NA	12	1.36	49.00	40.00	554.99	1.32	0.56	1
0SA55		NA	22	-	-	-	-	-	-	6

Notes:
θn: Thermal resistance—Natural convection. Length = 150 mm
θf: Thermal resistance—Forced convection. Air Speed Inlet Tunnel = 2 m/s
Black anodized or unfinished
Ambient T = 25 ºC
Heat sink T = 100 ºC

Type definitions:
1= Single Mounting Surface Style
2= Dual Mounting Surface Style
3= Single Mounting Surface with Flatback Style
4= Max Heat Connector Style
5= U-Channel/Multiple Screw Boss Style
6= Potential Max Profiles

Max Extrusion Index

Part Number	Oracle Number	North America Part Number	Page	Weight kg/m	Width mm	Height mm	Perimeter mm	θn	θf	Type
0SA57	400631	NA	18	1.69	38.00	30.00	180.00	-	-	4
0SA60	400634	NA	9	2.04	50.00	47.00	532.99	1.71	0.58	1
0SA61		NA	22	-	-	-	-	-	-	6
0SA63	400637	NA	14	1.41	30.00	49.80	378.00	2.99	0.83	2
0SA65	400639	NA	8	2.51	34.00	75.00	878.00	-	-	1
0SA66	400640	NA	21	2.75	73.50	50.00	721.00	1.30	0.46	5
0SA74		NA	22	-	-	-	-	-	-	6
0SA75	400649	NA	12	1.14	55.00	43.00	280.00	1.96	1.00	1
0SA80		NA	22	-	-	-	-	-	-	6
0SX96	400701	78110	21	5.13	155.00	85.00	1291.99	0.70	0.25	5
0SY54	400754	78080	8	1.74	27.00	60.00	604.01	2.27	0.55	1
0SY67	400767	78085	17	1.32	28.70	41.00	142.01	-	-	4
0SY73	400773	78105	21	6.10	206.00	90.00	1526.99	0.55	0.27	5
0SY76	400776	78090	17	0.84	17.00	37.28	143.00	-	-	4
0SY77	400777	78095	18	1.89	29.00	36.80	140.00	-	-	4
0SY94		NA	22	-	-	-	-	-	-	6
81400	038193	81400	21	5.51	124.16	80.26	1065.50	0.98	0.38	5
82005	038193	82005	16	2.60	71.12	38.81	610.69	2.07	0.79	2
BS005	406609	NA	9	3.09	35.00	90.10	1062.99	1.35	0.32	1
BS011	406582	NA	17	0.95	23.00	36.90	127.99	-	-	4
BS014		NA	23	-	-	-	-	-	-	6
BS019	406724	NA	18	1.72	30.00	49.70	226.99	-	-	4
BS034		NA	23	-	-	-	-	-	-	6
BS059	406990	NA	17	1.40	15.00	56.60	159.00	-	-	4
BS060		NA	23	-	-	-	-	-	-	6
BS070		NA	23	-	-	-	-	-	-	6
BS075	407175	NA	20	1.08	22.00	48.00	248.99	3.42	1.57	3
BS077	407015	NA	17	1.18	28.00	35.00	170.99	-	-	4
BS085	407371	NA	9	2.45	50.00	69.00	800.98	1.28	0.44	1
BS093		NA	23	-	-	-	-	-	-	6
BS094		NA	23	-	-	-	-	-	-	6
BS100	407325	NA	15	2.02	49.50	50.00	672.00	1.92	0.57	2
BS121		NA	23	-	-	-	-	-	-	6
BS138		NA	23	-	-	-	-	-	-	6
BS202		NA	23	-	-	-	-	-	-	6
BS208	408147	NA	18	1.89	27.00	38.00	146.98	-	-	4
BS348		NA	23	-	-	-	-	-	-	6
BS362		NA	23	-	-	-	-	-	-	6
BS372		NA	23	-	-	-	-	-	-	6
BS396		NA	23	-	-	-	-	-	-	-
BS422		NA	23	-	-	-	-	-	-	-
BS425		NA	24	-	-	-	-	-	-	-
BS464		NA	24	-	-	-	-	-	-	-
BS485		NA	24	-	-	-	-	-	-	-
BS542		NA	24	-	-	-	-	-	-	-
BS547		NA	24	-	-	-	-	-	-	-
BS595		NA	7	-	-	-	-	-	-	-
SS014	438114	NA	15	4.36	50.00	73.00	-	1.17	0.35	2
ZA5300	438955	NA	10	3.57	75.00	50.00	-	-	-	1
ZA5301	438950	NA	10	0.74	25.00	37.50	-	3.31	1.55	1
ZA5248	438024	NA	15	2.24	55.00	65.40	-	1.52	0.62	2
ZA5439	438058	NA	13	1.18	35.00	37.50	-	2.49	0.95	1
ZA5259	438026	NA	12	1.49	46.90	51.60	-	1.73	0.69	1

Notes:
θn: Thermal resistance—Natural convection. Length = 150 mm
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Black anodized or unfinished
Ambient T = 25 ºC
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Type definitions:
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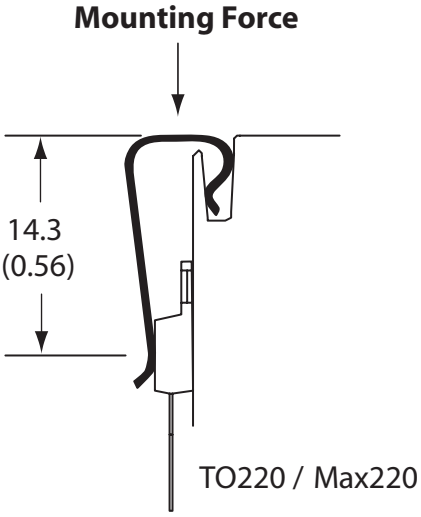
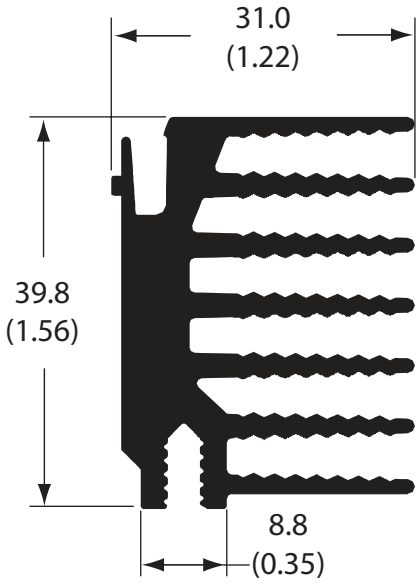
6= Potential Max Profiles

NEW! The Max Clip System™ Vertical Max Clips

Max15-V	Width		Thickness		Force
	12 mm	x	0.8	=	40 N



BS595

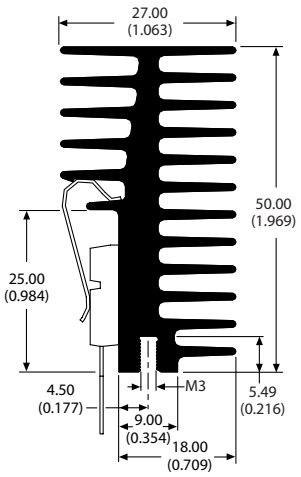


The Single Mounting Surface style provides a flat component mounting surface on one side of the profile. The back side of the extrusion is covered with fins creating additional surface area to aid in cooling. The component retaining clip interlocks between the first and second fin above the flat component mounting surface.

0S506 (400978)

kg/m: 1.38 • θn = 2.46 °C/W • θf = 0.65 °C/W

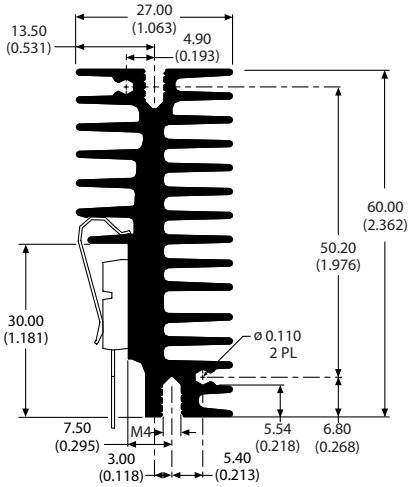
- *One slot for vertical mounting to board*



0S526 (400997)

kg/m: 1.66 • θn = 2.29 °C/W • θf = 0.56 °C/W

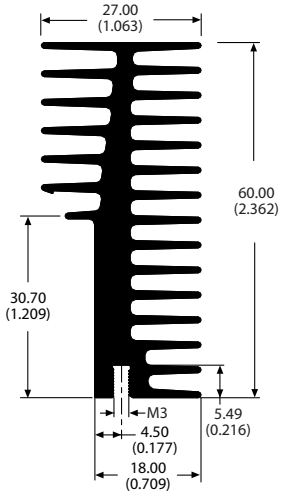
- *One slot for vertical mounting to board*



0SY54 (400754)

kg/m: 1.74 • θn = 2.27 °C/W • θf = 0.55 °C/W

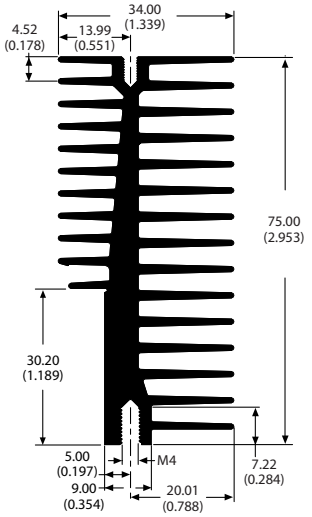
- *One slot for vertical mounting to board*



0S505 (400977)

kg/m: 2.48 • θn = 1.45 °C/W • θf = 0.39 °C/W

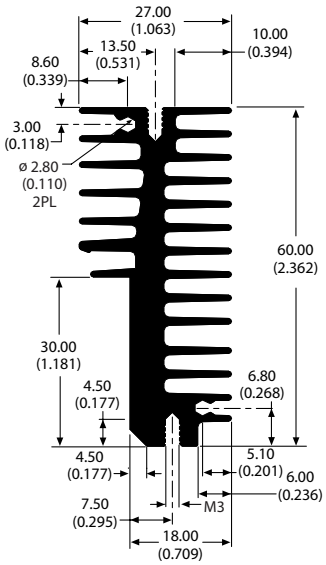
- *One slot for vertical mounting to board*



0S579 (401048)

kg/m: 1.73 • θn = 2.30 °C/W • θf = 0.59 °C/W

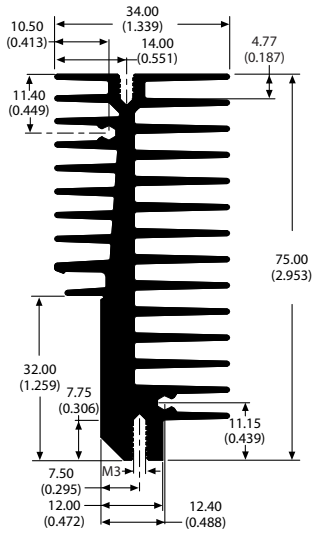
- *One slot for vertical mounting to board*



0SA65 (400639)

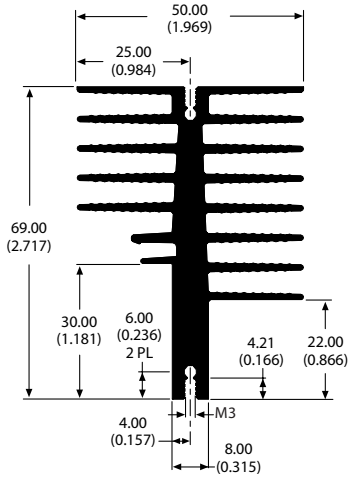
kg/m: 2.51 • θn = 1.45 °C/W • θf = 0.39 °C/W

- *One slot for vertical mounting to board*



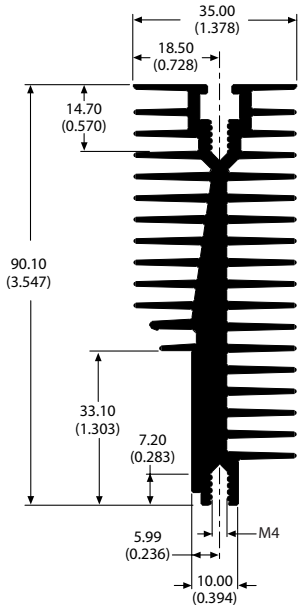
BS085 (407371)

- *One screw boss for vertical mounting to board*



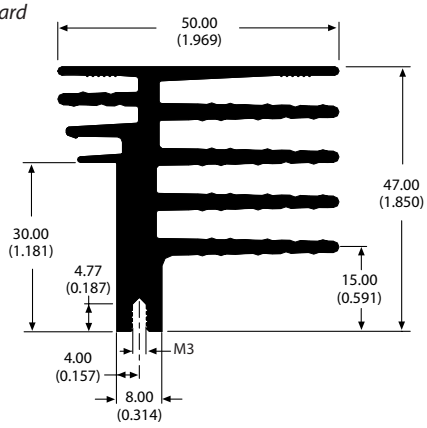
BS005 (406609)

- *One slot for vertical mounting to board*



0SA60 (400634)

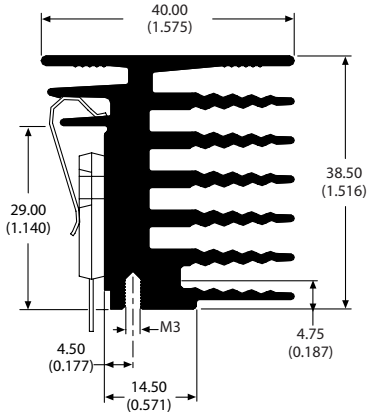
- *One slot for vertical mounting to board*



0S512 (400984)

kg/m: 1.59 • θn = 2.12 °C/W • θf = 0.64 °C/W

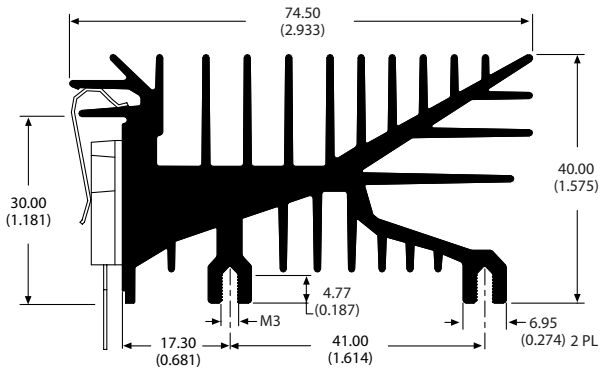
- *One slot for vertical mounting to board*



0S510 (400982)

kg/m: 2.53 • θn = 1.23 °C/W • θf = 0.42 °C/W

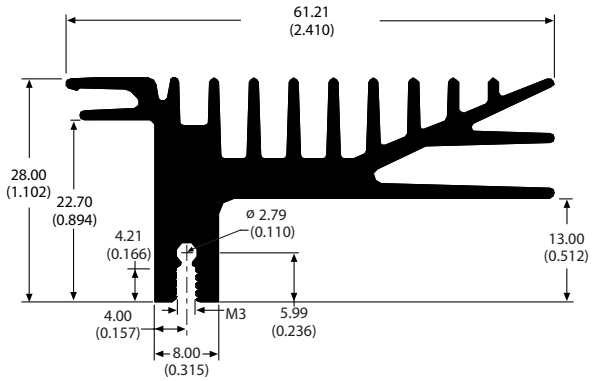
- *Two slots for vertical mounting to board*



0S553 (401022)

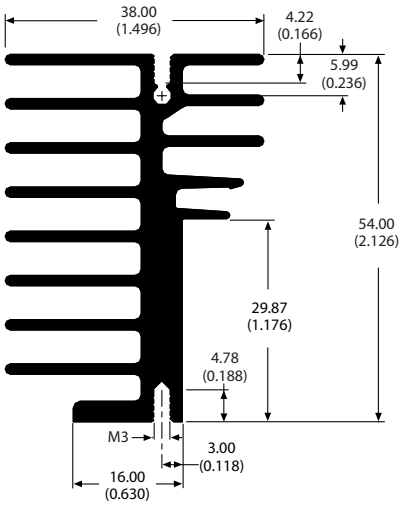
kg/m: 1.32 • θn = 2.50 °C/W • θf = 0.85 °C/W

- *One screw boss for vertical mounting to board*



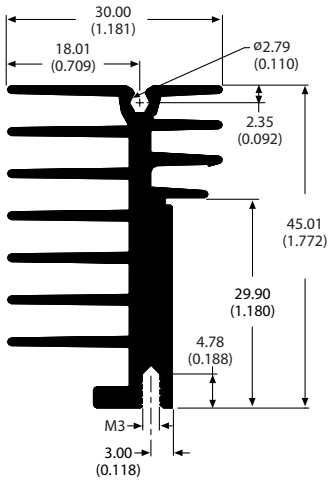
0S518 (400989) kg/m: 1.64 • θn = 1.71 °C/W • θf = 0.57 °C/W

- *One slot for vertical mounting to board*



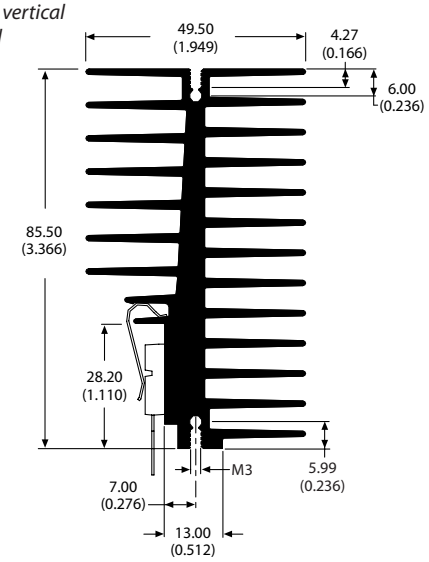
0S515 (400986) kg/m: 1.18 • θn = 2.33 °C/W • θf = 0.76 °C/W

- *One slot for vertical mounting to board*



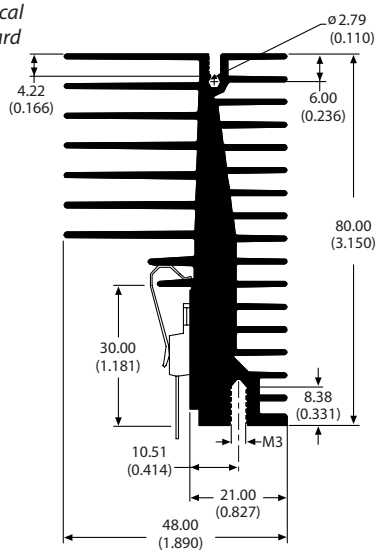
0SA36 (400610) kg/m: 3.45 • θn = 0.93 °C/W • θf = 0.29 °C/W

- *One screw boss for vertical mounting to board*



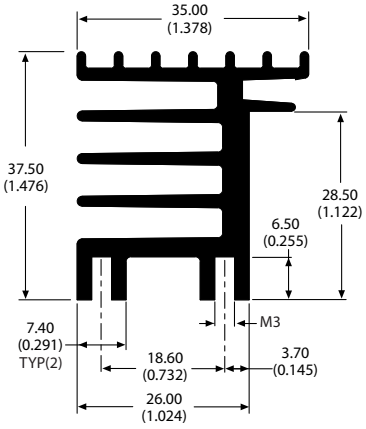
0S552 (401021) kg/m: 3.14 • θn = 1.06 °C/W • θf = 0.34 °C/W

- *One slot for vertical mounting to board*



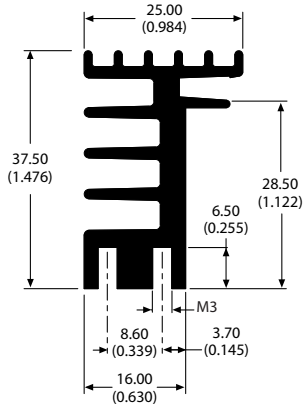
ZA5300 (438955) kg/m: 3.57

- *Two slots for vertical mounting to board*



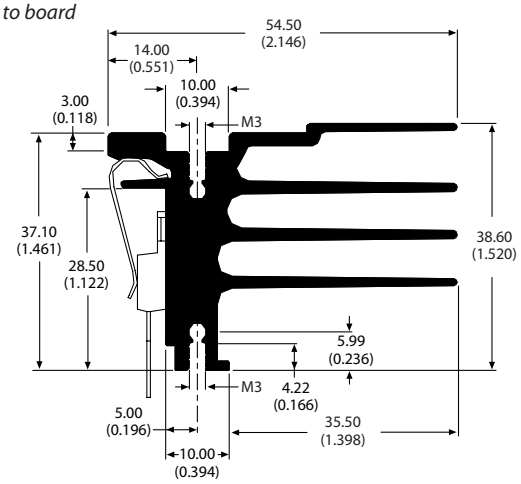
ZA5301 (438950)

- *Two slots for vertical mounting to board*



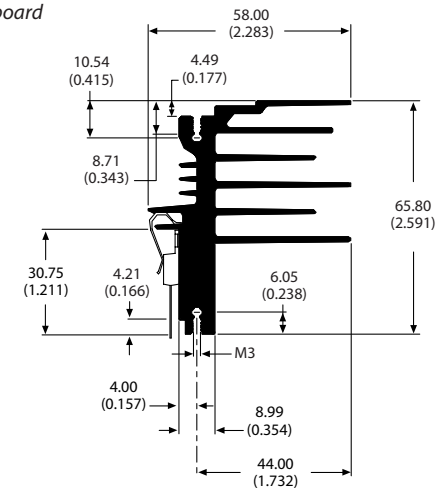
0S568 (401037) kg/m: 1.49 • θn = 1.82 °C/W • θf = 0.78 °C/W

- *One screw boss for vertical mounting to board*



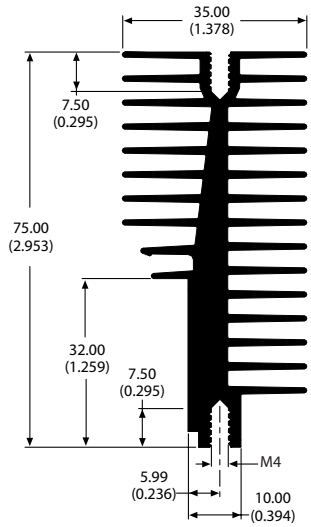
0S560 (401029) kg/m: 2.37 • θn = 1.25 °C/W • θf = 0.50 °C/W

- *One screw boss for vertical mounting to board*



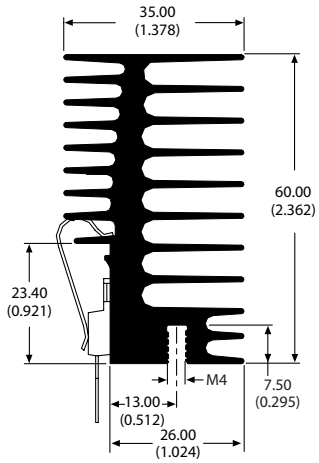
0SA35 (400609) kg/m: 2.38 • θn = 1.56 °C/W • θf = 0.41 °C/W

- *One slot for vertical mounting to board*



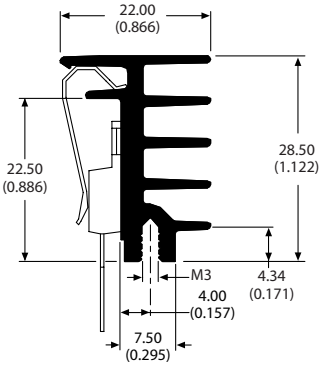
0SA06 (400580) kg/m: 2.18 • θn = 1.67 °C/W • θf = 0.47 °C/W

- *One slot for vertical mounting to board*



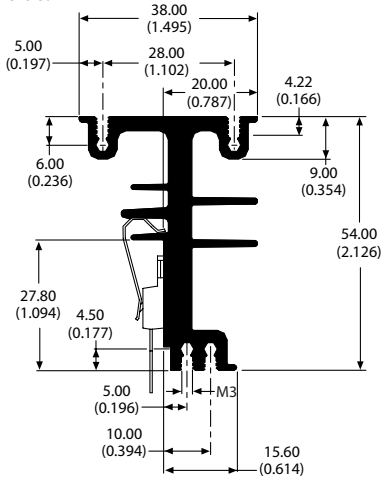
0S533 (401004) kg/m: 0.48 • θn = 4.12 °C/W • θf = 1.68 °C/W

- *One slot for vertical mounting to board*



0S577 (401046) kg/m: 1.45 • θn = 1.83 °C/W • θf = 0.77 °C/W

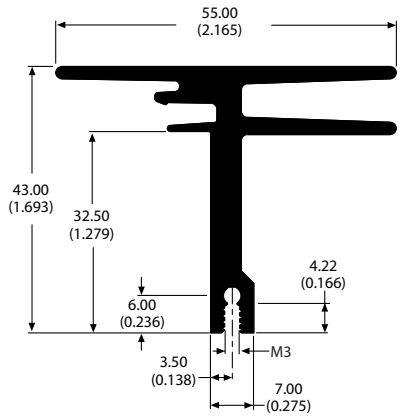
- *Two screw bosses for vertical mounting to board*



0SA75 (400649)

kg/m: 1.14 • θn = 1.96 °C/W • θf = 1.00 °C/W

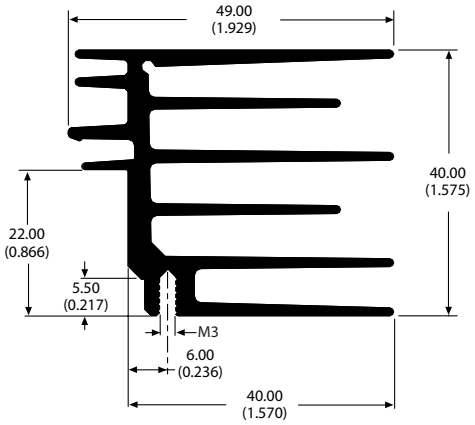
- *One screw boss for vertical mounting to board*



0SA53 (400627)

kg/m: 1.36 • θn = 1.32 °C/W • θf = 0.56 °C/W

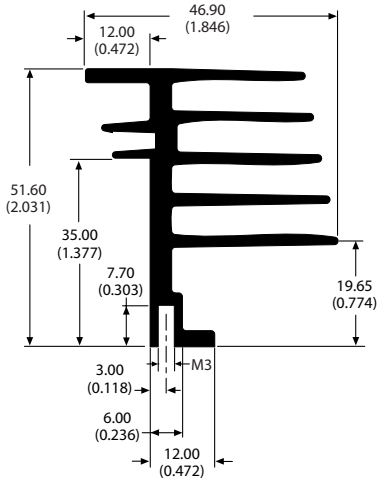
- *One slot for vertical mounting to board*



ZA5259 (438026)

kg/m: 1.49 • θn = 1.73 °C/W • θf = 0.69 °C/W

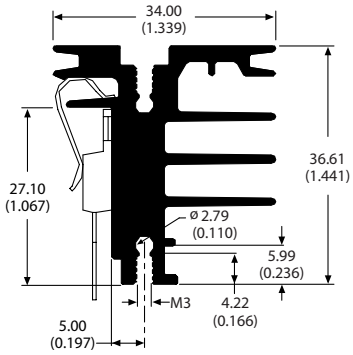
- *One slot for vertical mounting to board*



0S559 (401028)

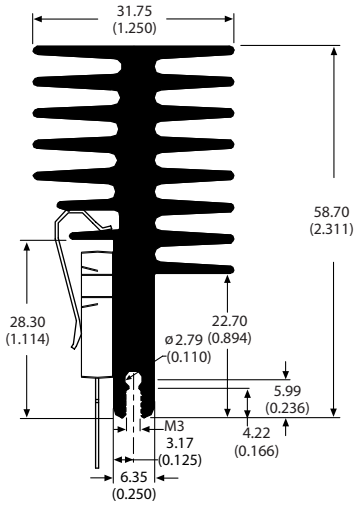
kg/m: 1.10 • θn = 2.70 °C/W • θf = 0.93 °C/W

- *One screw boss for vertical mounting to board*



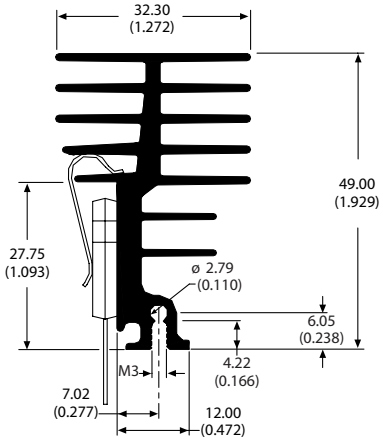
0S550 (401019) kg/m: 1.78 • θn = 2.35 °C/W • θf = 0.67 °C/W

- *One screw boss for vertical mounting to board*



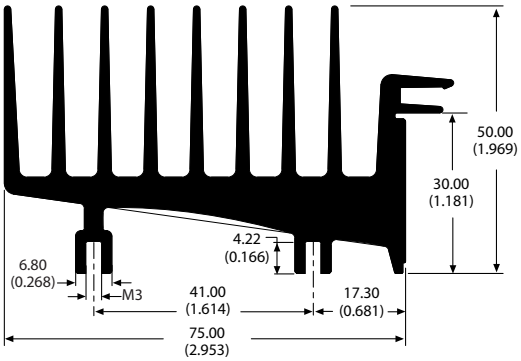
0SA21 (400595) kg/m: 1.15 • θn = 2.34 °C/W • θf = 0.76 °C/W

- *One screw boss for vertical mounting to board*



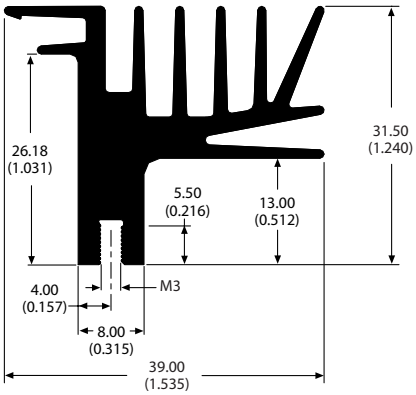
ZA5439 (438058)

- *Two slots for vertical mounting to board*



0S508 (400980) kg/m: 0.99 • θn = 3.10 °C/W • θf = 1.02 °C/W

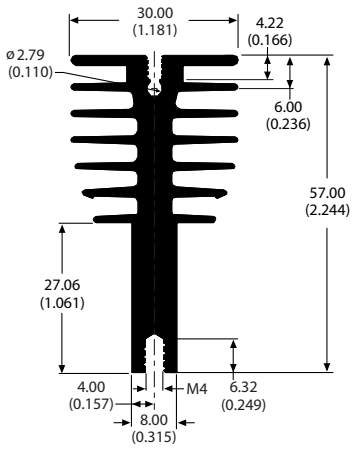
- *One slot for vertical mounting to board*



The Dual Mounting Surface style provides a flat component mounting surface on two sides of the profile. Some profiles allow back to back mounting of components on the circuit board permitting the sharing of a centrally mounted heat sink. Other profiles create a bridge configuration allowing components to be attached to each leg with a raised center section to clear adjacent components or create a tunnel for airflow. The clip used to retain the component interlocks between the first and second fin above the flat component mounting surface.

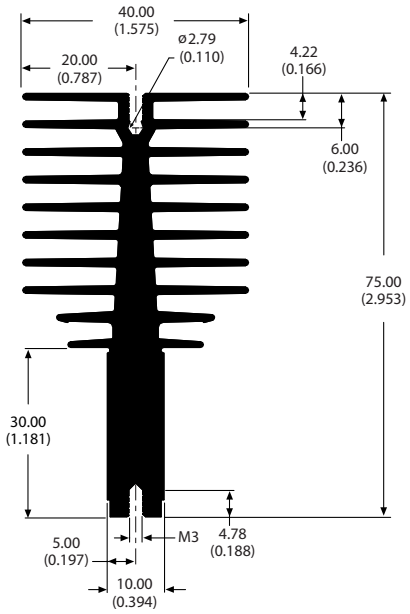
0S555 (401024) kg/m: 1.57 • θn = 2.42 °C/W • θf = 0.75 °C/W

- *One slot for vertical mounting to board*



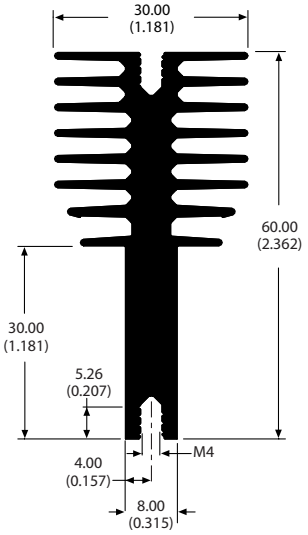
0S517 (400988) kg/m: 2.57 • θn = 1.55 °C/W • θf = 0.41 °C/W

- *One slot for vertical mounting to board*



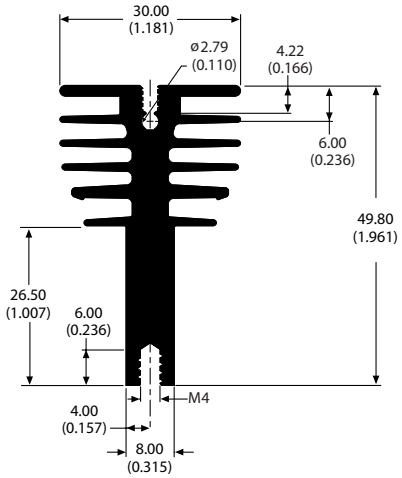
0S520 (400991) kg/m: 1.66 • θn = 2.49 °C/W • θf = 0.74 °C/W

- *One slot for vertical mounting to board*



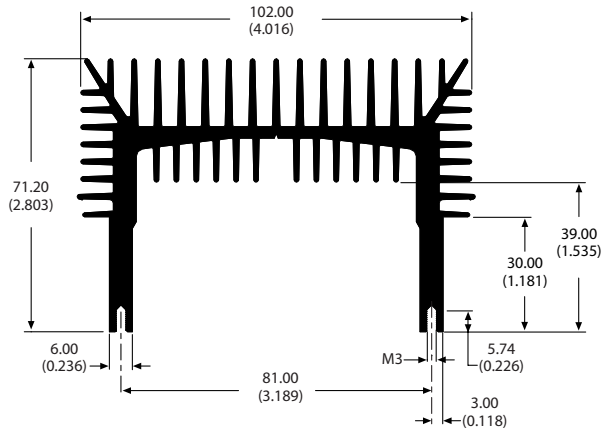
0SA63 (400637) kg/m: 1.41 • θn = 2.99 °C/W • θf = 0.83 °C/W

- *One slot for vertical mounting to board*



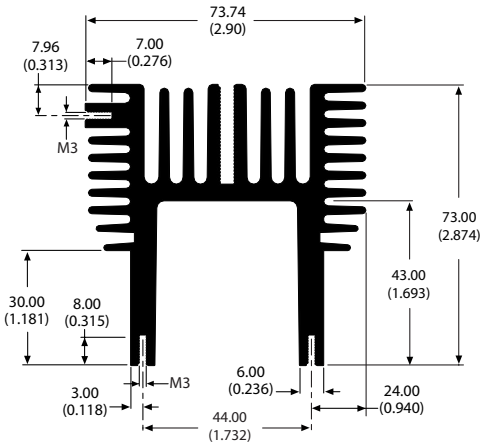
0S511 (400983) kg/m: 4.64 • θn = 0.81 °C/W • θf = 0.28 °C/W

- *Two slots for vertical mounting to board*



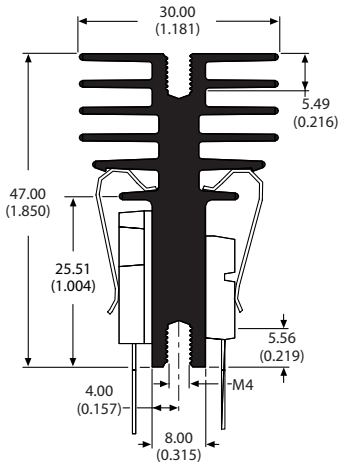
SS014 (438114)

- *Two slots for vertical mounting to board*



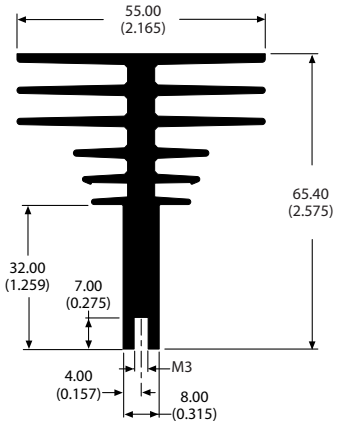
0S507 (400979) kg/m: 1.23 • θn = 3.02 °C/W • θf = 0.84 °C/W

- *One slot for vertical mounting to board*



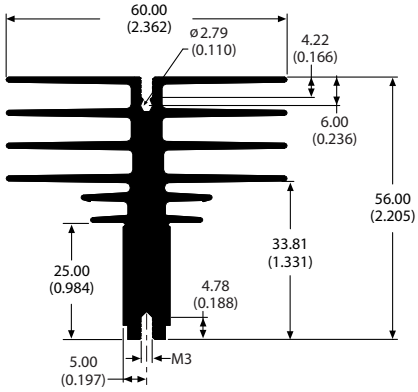
ZA5248 (438024) kg/m: 2.24 • θn = 1.52 °C/W • θf = 0.62 °C/W

- *One slot for vertical mounting to board*



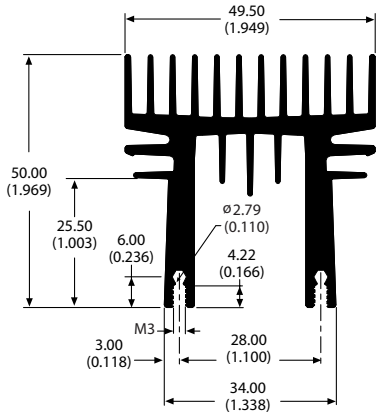
0S528 (400999) kg/m: 2.15 • θn = 1.42 °C/W • θf = 0.52 °C/W

- *One slot for vertical mounting to board*



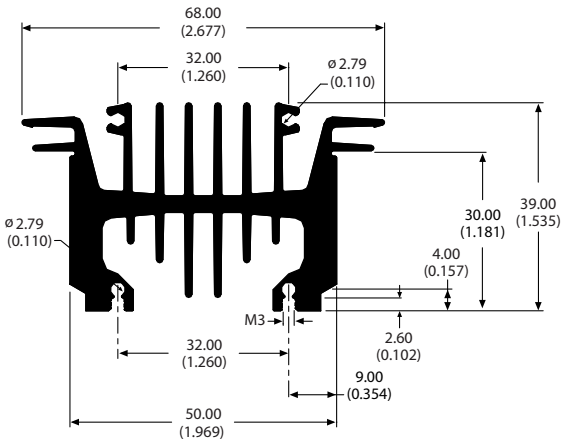
BS100 (407325) kg/m: 2.02 • θn = 1.92 °C/W • θf = 0.57 °C/W

- *Two screw bosses for vertical mounting to board*



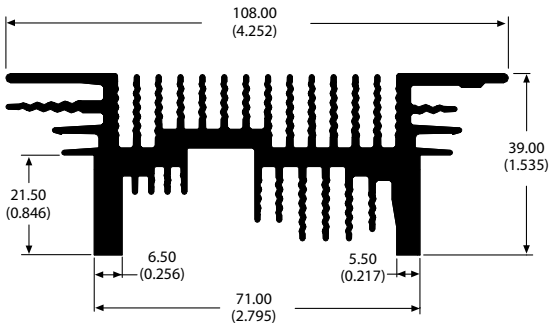
0S527 (400998) kg/m: 2.21 • θn = 1.64 °C/W • θf = 0.49 °C/W

- *Two screw bosses for vertical mounting to board*



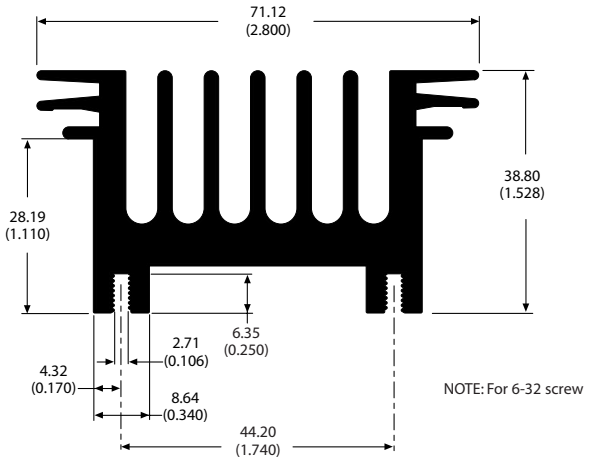
0SA30 (400604) kg/m: 3.29 • θn = 1.18 °C/W • θf = 0.41 °C/W

- *Secondary operation needed for mounting to board*



82005 (038193) kg/m: 2.60

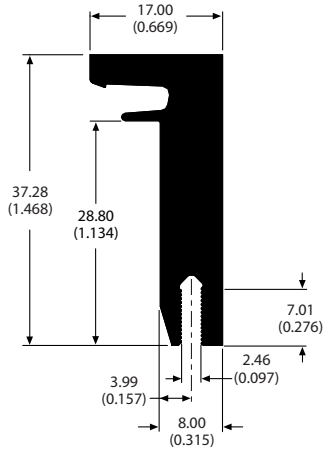
- *Two slots for vertical mounting to board*



The Max Heat Connector styles include single and dual component mounting surface profiles. Max Heat Connector profiles are designed to be fastened to conventional extruded heat sink or chassis surfaces providing a thermal conduction path for heat dissipation. Application examples are shown on page 29. Like other Max Extrusion Profiles, the clip used to retain the component interlocks between the first and second fin above the flat component mounting surface.

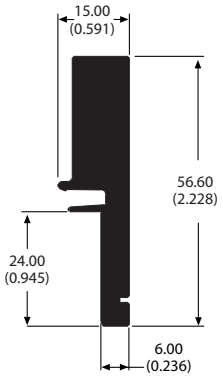
0SY76 (400776) kg/m: 0.84

- *One slot for vertical mounting to board*



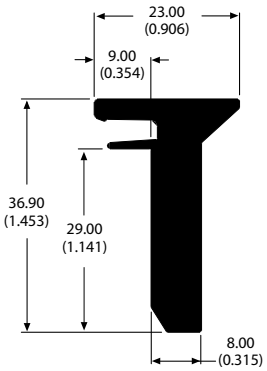
BS059 (406990) kg/m: 1.40

- *Secondary operation needed for mounting to board*



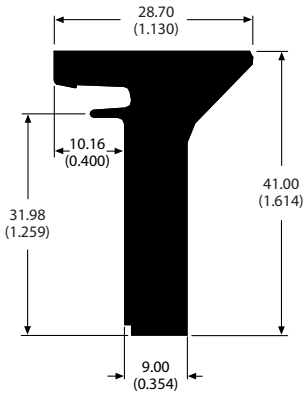
BS011 (406582) kg/m: 0.95

- *Secondary operation needed for mounting to board*



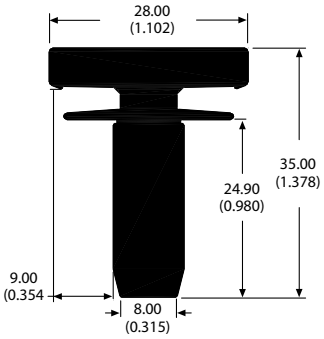
0SY67 (400767) kg/m: 1.32

- *Secondary operation needed for mounting to board*



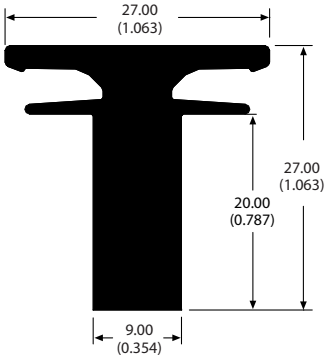
BS077 (407015) kg/m: 1.18

- *Secondary operation needed for mounting to board*



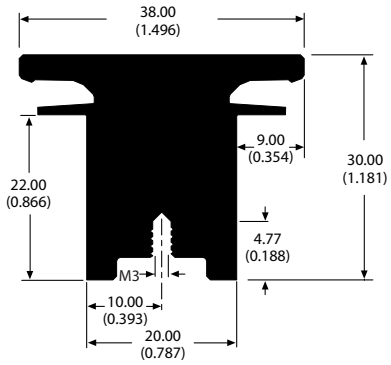
0S581 (401050) kg/m: 0.81

- *Secondary operation needed for mounting to board*



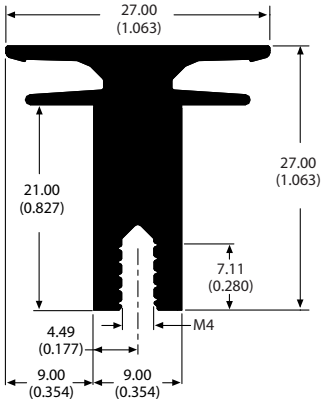
0SA57 (400631) kg/m: 1.69

- *One slot for vertical mounting to board*



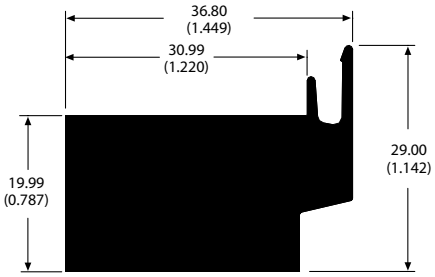
0S529 (401000) kg/m: 0.69 • θn=3.43 °C/W • θf=1.59 °C/W

- *One slot for vertical mounting to board*



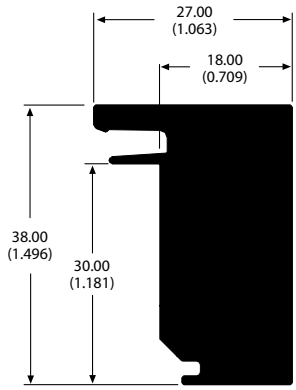
0SY77 (400777) kg/m: 1.89

- *Secondary operation needed for mounting to board*



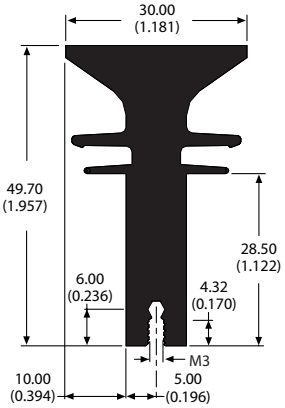
BS208 (408147) kg/m: 1.89

- *Secondary operation needed for mounting to board*



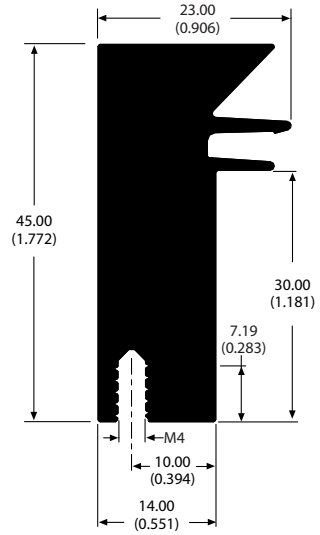
BS019 (406724) kg/m: 1.72

- *One screw boss for vertical mounting to board*



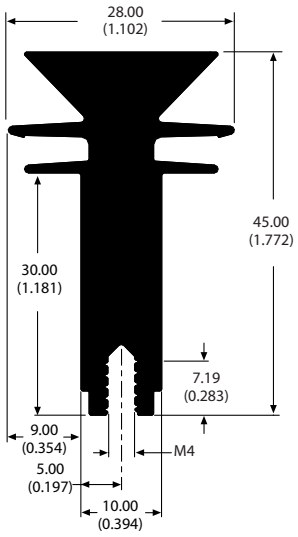
0S521 (400992) kg/m: 1.75

- *One slot for vertical mounting to board*



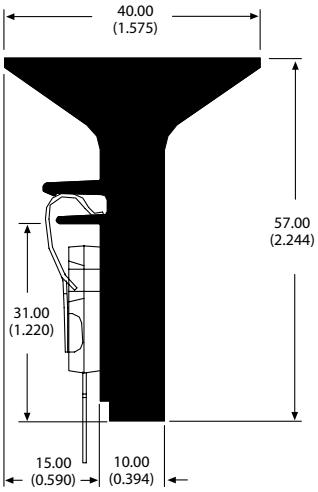
0S522 (400993) kg/m: 1.39

- *One slot for vertical mounting to board*



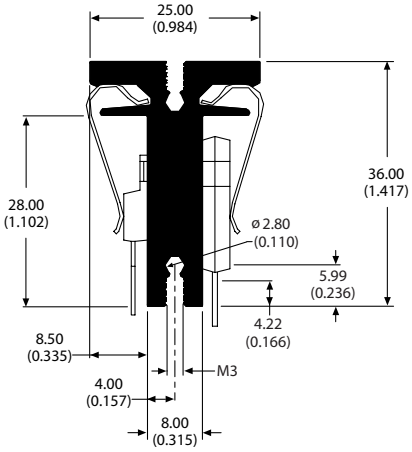
0S562 (401031) kg/m: 2.14

- *Secondary operation needed for mounting to board*



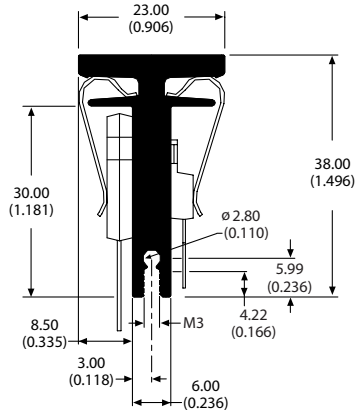
0S556 (401025) kg/m: 0.89

- *One screw boss for vertical mounting to board*



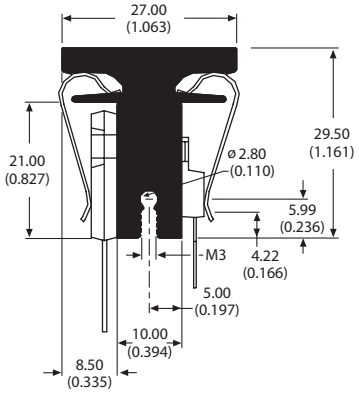
0SA15 (400589) kg/m: 0.75 • θn = 3.11 °C/W • θf = 1.50 °C/W

- *One screw boss for vertical mounting to board*



0S547 (401016) kg/m: 0.95 • θn = 3.43 °C/W • θf = 1.59 °C/W

- *One screw boss for vertical mounting to board*

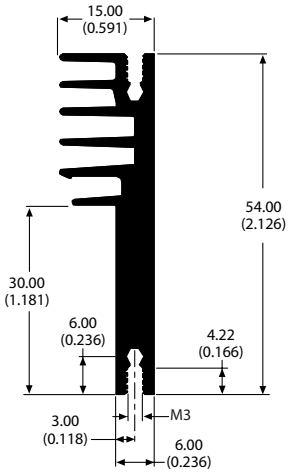


Single Mounting Surface with Flat Back styles feature profiles with one side dedicated to a single component mounting surface and cooling fins with a flat surface on the back side of the profile. This style is suitable in applications with tight space requirements or where the Max Extrusion will be mounted horizontally. The clip used to retain the component interlocks between the first and second fin above the flat component mounting surface.

0S565 (401034)

kg/m: 0.90 • θn = 3.43 °C/W • θf = 1.12 °C/W

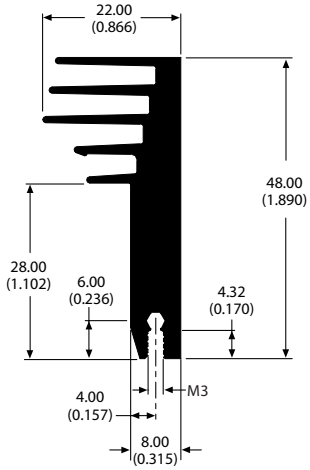
- *One screw boss for vertical mounting to board*



BS075 (407175)

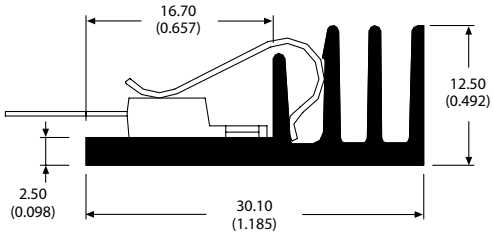
kg/m: 1.08 • θn = 3.42 °C/W • θf = 1.57 °C/W

- *One screw boss for vertical mounting to board*



0S546 (401015)

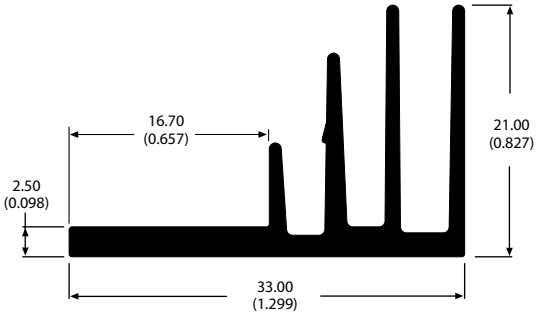
- *Horizontally mounted*



0S569 (401038)

kg/m: 0.41 • θn = 4.38 °C/W • θf = 2.10 °C/W

- *Horizontally mounted*

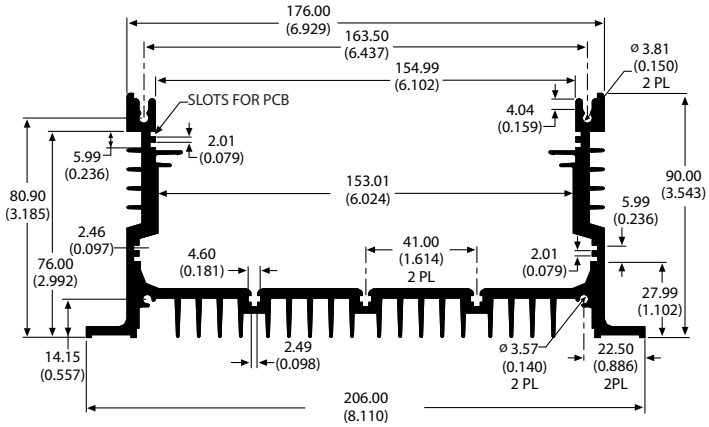


The U-Channel/Multiple Screw Boss section features a combination of U-Channel style and custom Max Profiles featuring multiple (2 or more) screw bosses. The U-Channel variations can accept assembled circuit cards to form the basis of a chassis. Additional screw bosses allow attachment of side and top panels completing a chassis assembly. The incorporation of Multiple Screw Boss features into a profile provides the flexibility to mount the heat sink to the board in horizontal or vertical orientation using a standard screw.

0SY73 (400773)

kg/m: 6.10 • θn = 0.55 °C/W • θf = 0.27 °C/W

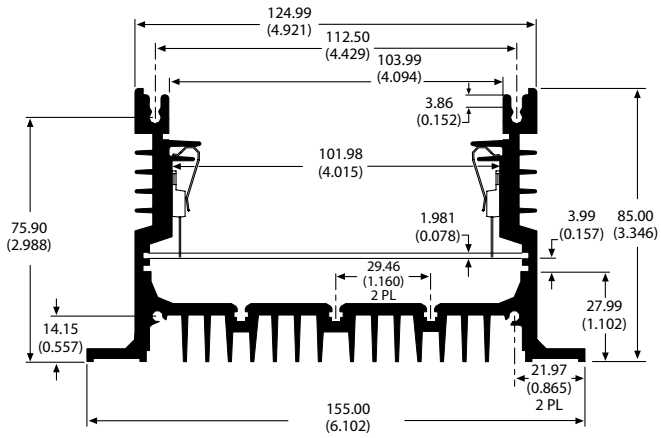
- *Chassis assembly capabilities*



0SX96 (400701)

kg/m: 5.13 • θn = 0.70 °C/W • θf = 0.50 °C/W

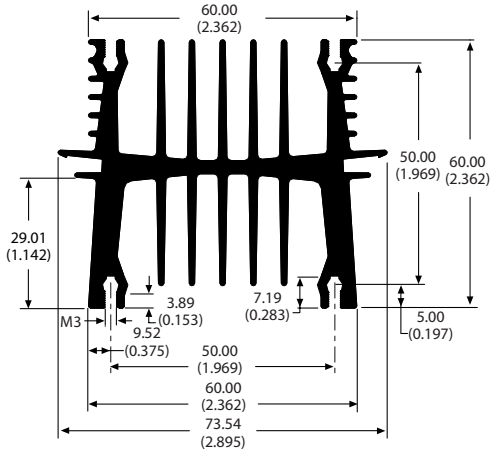
- *Chassis assembly capabilities*



0S509 (400981)

kg/m: 3.42 • θn = 1.10 °C/W • θf = 0.36 °C/W

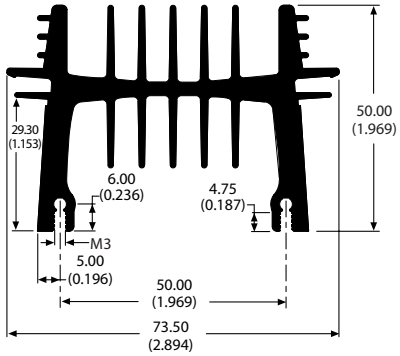
- *Four screw boss slots for vertical mounting to board*



0SA66 (400640)

kg/m: 2.75 • θn = 1.30 °C/W • θf = 0.46 °C/W

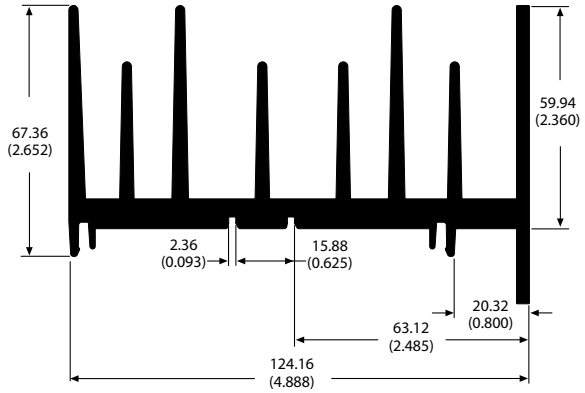
- *Two screw boss slots for vertical mounting to board*



81400

kg/m: 5.51

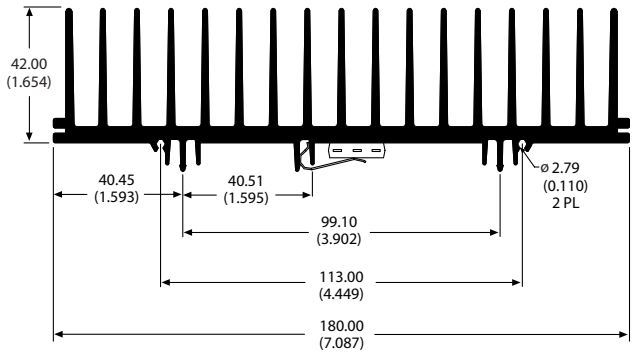
- *Two slots for circuit board mounting*



0SA39 (400613)

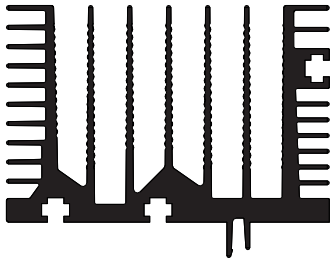
kg/m: 6.02 • θn = 0.44 °C/W • θf = 0.19 °C/W

- *Five slots for horizontal mounting to board*

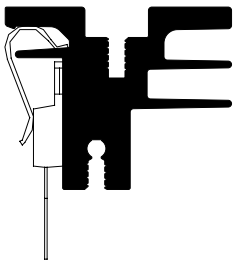


Application of The Max Clip System™ is limited only by the imagination. The following pages illustrate some examples of custom Max Extrusions. The system's flexibility allows the creation of shapes designed for specific thermal or mechanical system requirements. Please contact Aavid Thermalloy application engineering to discuss any of the shapes shown below or your custom application specifications.

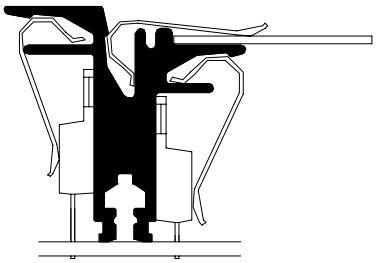
0S513



0S567

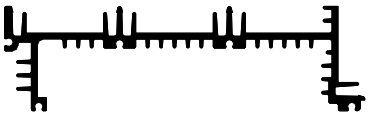


0S549



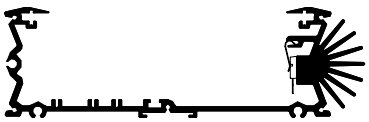
0SA12

0SA16



0SA17

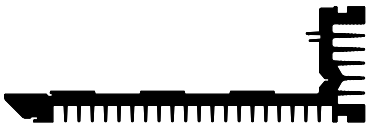
0SA24



POTENTIAL MAX PROFILES

Limited Only By The Imagination

0SA31



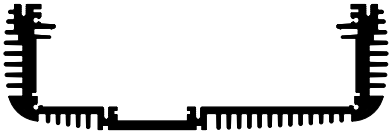
0SA34

0SA55

0SA61

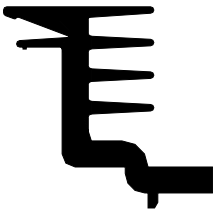
0SA74

0SA80

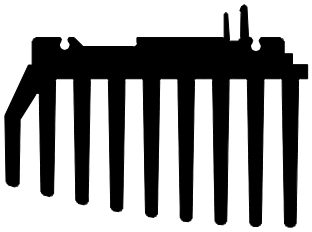


0SY94

BS014

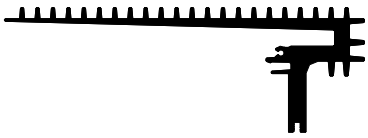


BS034

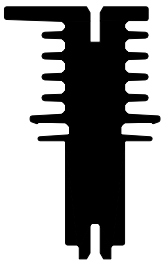


BS060

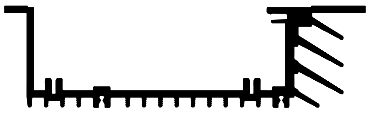
BS070



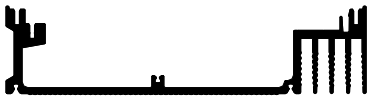
BS093



BS094



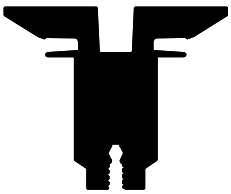
BS121



POTENTIAL MAX PROFILES

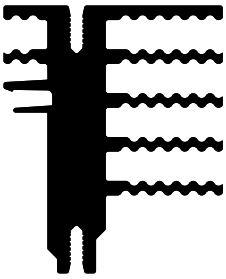
Limited Only By The Imagination

BS138

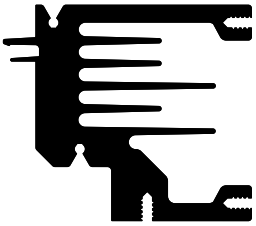


BS202

BS348

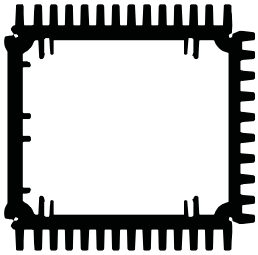


BS362

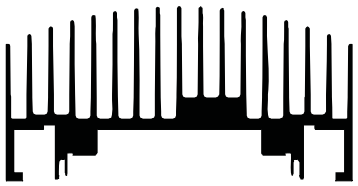


BS372

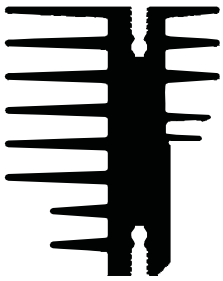
BS396



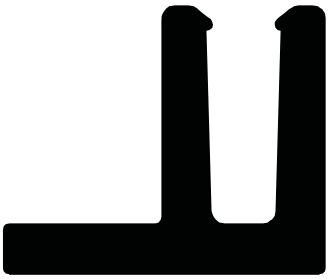
BS422



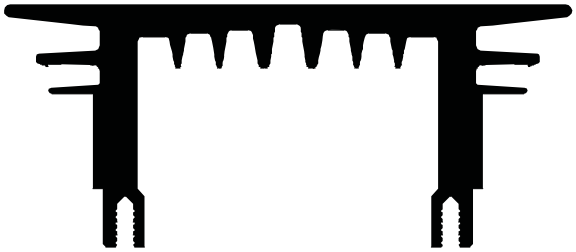
BS425



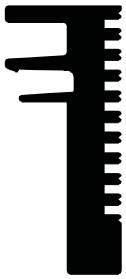
BS464



BS485



BS542



BS547

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Part Number	Normal Force 20N-40N TO-220 TO-218 TO-251 TO-262 TO-273	Short Clip TO-220 TO-218 TO-251 TO-262 TO-273	Long Clip TO-220 TO-218 TO-251 TO-262 TO-273	High Force 50N + TO-220 TO-218 TO-251 TO-262 TO-273	Normal Force 30N-50N TO-247 TO-274	High Force 60N + TO-247 TO-274 TO-3P	Sensors Small Component	Special D61 TO-247J TO-274	Special Thick Isolators Solid State Relay*
0S505	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S506	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	-	Max23
0S507	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max15	Max23
0S508	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max15	Max23
0S509	Max01 Max02	Max09	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S510	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S511	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S512	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S515	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S517	Max01 Max02	-	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S518	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S520	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S521	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S522	Max01 Max02	-	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S526	Max01 Max02	-	-	Max01-H	Max03	Max02-H Max03-H	-	Max04 Max15	Max23
0S527	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S528	Max01 Max02	Max09	-	Max01-H	Max03	Max02-H Max03-H	Max12	Max15	Max23
0S529	Max01 Max02	Max09	-	-	Max03	Max02-H	-	-	Max23
0S533	Max01 Max02	Max09	-	-	Max03	Max02-H	-	-	Max23
0S546	Max01 Max02	Max09	-	-	-	Max02-H	-	-	-
0S547	Max01 Max02	Max09	-	-	Max03	Max02-H	-	-	Max23
0S550	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S552	Max01 Max02	-	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S553	Max01 Max02	-	-	Max01-H	Max03	Max02-H Max03-H	-	-	Max23
0S555	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S556	Max01 Max02	Max09	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23

* Special thick isolator clips are used to fix components with a total thickness from 7 mm or greater. For example, fastening a TO-247 device and 3mm thick ceramic insulator would result in a total thickness of 8mm. A standard Max Clip does not deform sufficiently to accomodate the total thickness. The Max23 Clip was developed to exert the necessary force in these applications.

Part Number	Normal Force 20N-40N TO-220 TO-218 TO-251 TO-262 TO-273	Short Clip TO-220 TO-218 TO-251 TO-262 TO-273	Long Clip TO-220 TO-218 TO-251 TO-262 TO-273	High Force 50N + TO-220 TO-218 TO-251 TO-262 TO-273	Normal Force 30N-50N TO-247 TO-274	High Force 60N + TO-247 TO-274 TO-3P	Sensors Small Component	Special D61 TO-247J TO-274	Special Thick Isolators Solid State Relay*
0S559	Max01 Max02	Max09	-	Max01-H	Max03	Max02-H Max03-H	-	Max04 Max15	Max23
0S560	Max01 Max02	-	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S562	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S565	Max01 Max02	Max09	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S568	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S577	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S579	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0S581	Max01 Max02	Max09	-	-	Max03	Max02-H	-	-	Max23
0SA06	Max01 Max02	-	-	Max01-H	Max03	Max02-H Max03-H	-	-	Max23
0SA15	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SA21	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SA30	Max01 Max02	Max09	-	-	Max03	Max02-H	-	-	Max23
0SA35	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SA36	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SA39	Max01 Max02	Max09	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SA53	Max01 Max02	Max09	-	Max01-H	Max03	Max02-H Max03-H	-	-	Max23
0SA57	Max01 Max02	Max09	-	-	Max03	Max02-H	-	-	Max23
0SA60	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SA63	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SA65	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SA66	Max01 Max02	Max09	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SA75	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SY54	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SY67	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SY73	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SY76	Max01 Max02	Max09	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23

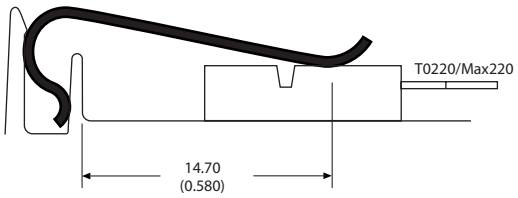
* Special thick isolator clips are used to fix components and insulators with a total thickness of 7 mm or greater. For example, fastening a TO-247 device and 3mm thick ceramic insulator would result in a total thickness of 8mm. A standard Max Clip does not deform sufficiently to accomodate the total thickness. The Max23 Clip was developed to exert the necessary force in these applications.

Part Number	Normal Force 20N-40N TO-220 TO-218 TO-251 TO-262 TO-273	Short Clip TO-220 TO-218 TO-251 TO-262 TO-273	Long Clip TO-220 TO-218 TO-251 TO-262 TO-273	High Force 50N + TO-220 TO-218 TO-251 TO-262 TO-273	Normal Force 30N-50N TO-247 TO-274	High Force 60N + TO-247 TO-274 TO-3P	Sensors Small Component	Special D61 TO-247J TO-274	Special Thick Isolators Solid State Relay*
0SY77	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
0SX96	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
81400	Max01 Max02	Max09	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
82005	Max01 Max02	Max09	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
BS005	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	
BS011	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
BS019	Max01 Max02	Max09	Max10 Max11	Max01-H Max04-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
BS059	Max01 Max02	Max09	-	Max01-H	Max03	Max02-H Max03-H	Max12	Max15	Max23
BS075	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
BS077	Max01 Max02	Max09	-	Max01-H	Max03	Max02-H Max03-H	Max12	Max15	Max23
BS085	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
BS100	Max01 Max02	Max09	Max10	Max01-H	Max03	Max02-H Max03-H	Max12	Max15 Max15	Max23
BS208	Max01 Max02	Max09	-	Max01-H	Max03	Max02-H Max03-H	Max12	Max15	Max23 Max23
SS014	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
ZA5248	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
ZA5259	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
ZA5300	Max01 Max02	Max09	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23
ZA5301	Max01 Max02	Max09	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	
ZA5439	Max01 Max02	-	Max10 Max11	Max01-H	Max03	Max02-H Max03-H	Max12	Max04 Max15	Max23

* Special thick isolator clips are used to fix components and insulators with a total thickness of 7 mm or greater. For example, fastening a TO-247 device and 3mm thick ceramic insulator would result in a total thickness of 8mm. A standard Max Clip does not deform sufficiently to accomodate the total thickness. The Max23 Clip was developed to exert the necessary force in these applications.

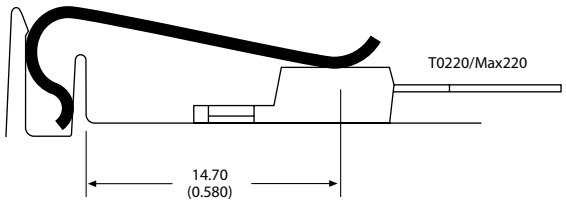
Max01

Width		Thickness		Force
10 mm	x	0.5	=	22 N



Max01-H

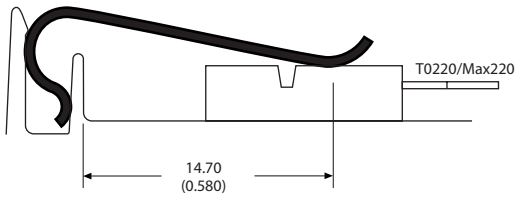
Width		Thickness		Force
10 mm	x	0.7	=	80 N



H = High Force

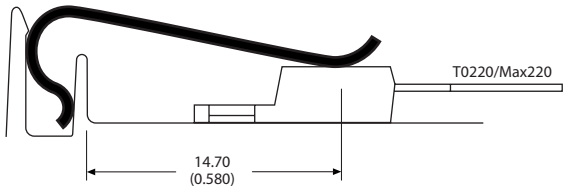
Max01-P

Width		Thickness		Force
8 mm	x	0.6	=	46 N



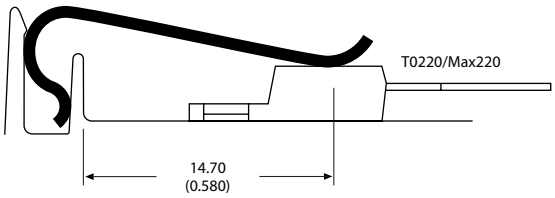
Max02

Width		Thickness		Force
12 mm	x	0.5	=	35 N



Max02-H

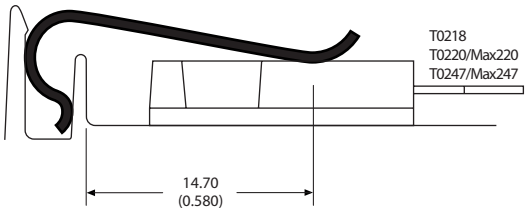
Width		Thickness		Force
13 mm	x	0.6	=	60 N



H = High Force

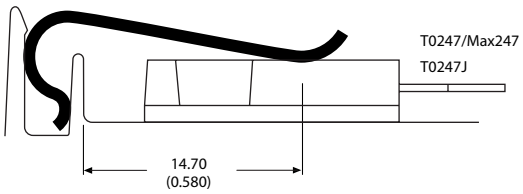
Max03

Width		Thickness		Force
15 mm	x	0.5	=	45 N



Max03-H

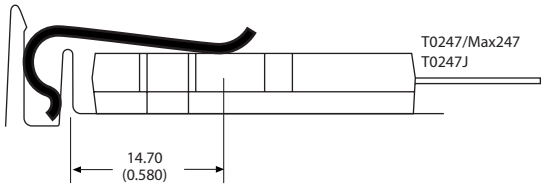
Width		Thickness		Force
18 mm	x	0.6	=	80 N



H = High Force

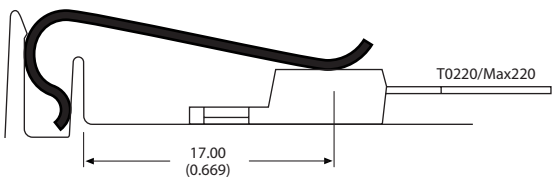
Max04

Width		Thickness		Force
20 mm	x	0.5	=	60 N



Max04-H

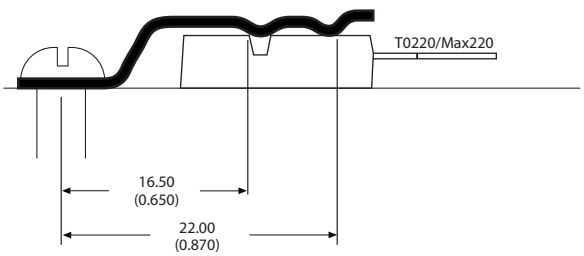
Width		Thickness		Force
10 mm	x	0.7	=	60 N



H = High Force

Max07

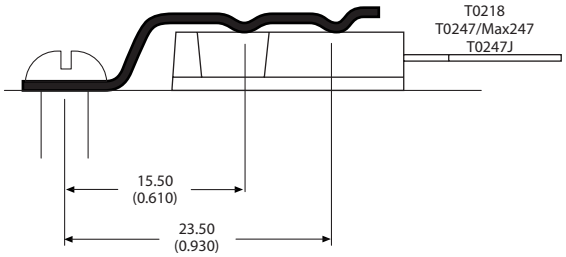
Width		Thickness		Force
12 mm	x	0.6	=	50 N



With Screws

Max08

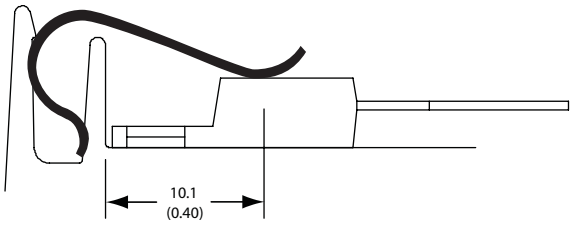
Width		Thickness		Force
18 mm	x	0.6	=	75 N



With Screws

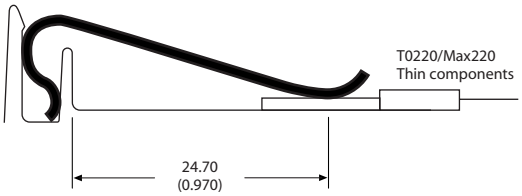
Max09-S

Width		Thickness		Force
8 mm	x	0.5	=	30 N



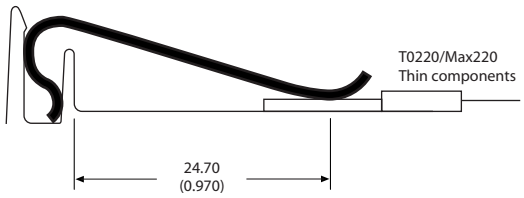
Max11

Width		Thickness		Force
12 mm	x	0.6	=	35 N



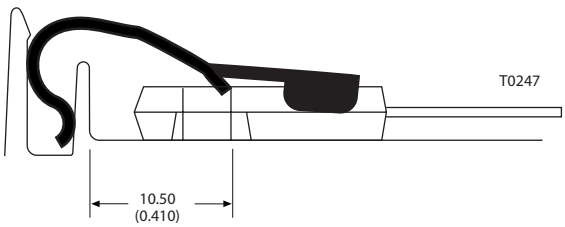
MAX11-S

Width		Thickness		Force
10 mm	x	0.5	=	37 N



Max13

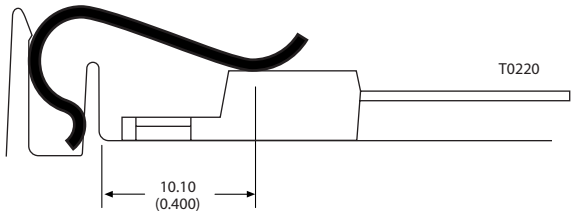
Width		Thickness		Force
17 mm	x	0.5	=	45 N



H = High Force

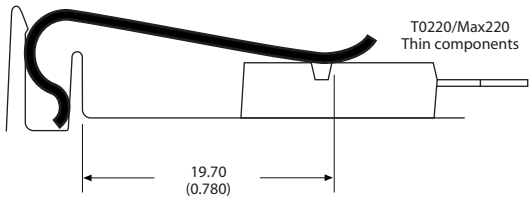
Max09

Width		Thickness		Force
10 mm	x	0.5	=	45 N



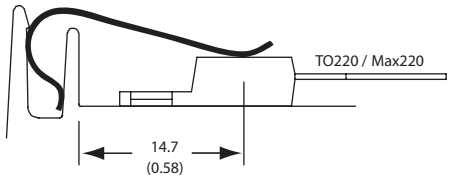
Max10

Width		Thickness		Force
12 mm	x	0.6	=	40 N



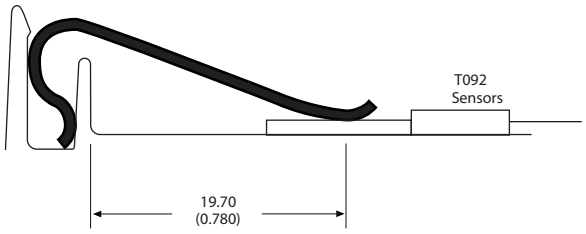
Max11-C

Width		Thickness		Force
8 mm	x	0.5	=	22 N



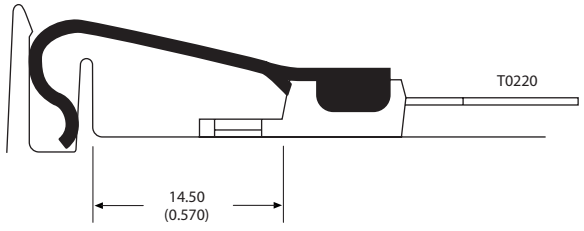
Max12

Width		Thickness		Force
6 mm	x	0.6	=	25 N



Max14

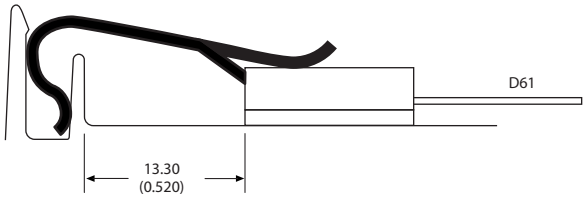
Width		Thickness		Force
13 mm	x	0.5	=	20 N



H = High Force

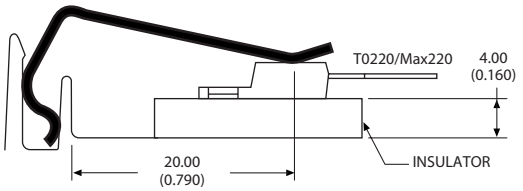
Max15

Width		Thickness		Force
18 mm	x	0.6	=	60 N



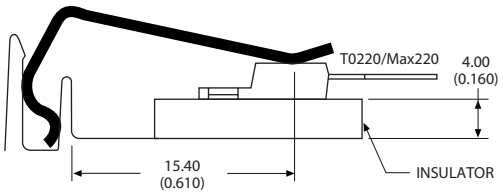
MAX20

Width		Thickness		Force
12 mm	x	0.6	=	47 N



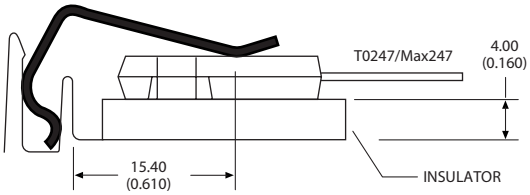
MAX21

Width		Thickness		Force
12 mm	x	0.6	=	48 N



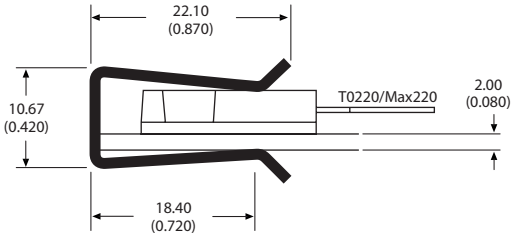
MAX23

Width		Thickness		Force
18 mm	x	0.6	=	100 N



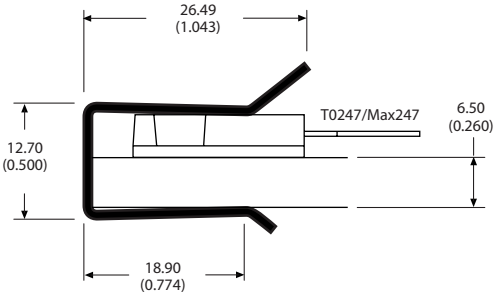
CLP212

Width		Thickness		Force
10.1 mm	x	0.5	=	21 N



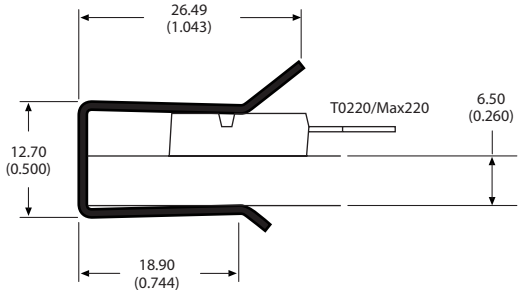
CLP212M

Width		Thickness		Force
15 mm	x	0.5	=	36 N



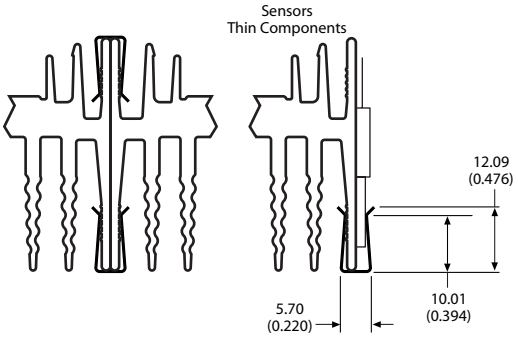
CLP212P

Width		Thickness		Force
10 mm	x	0.5	=	21 N



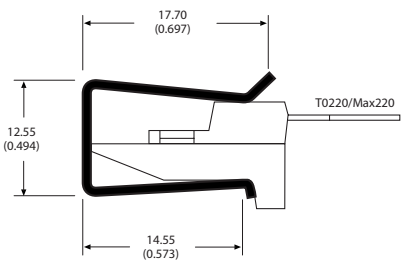
CLP212S

Width		Thickness		Force
7 mm	x	0.5	=	20 N



CLP212T

Width		Thickness		Force
10 mm	x	0.6	=	34 N

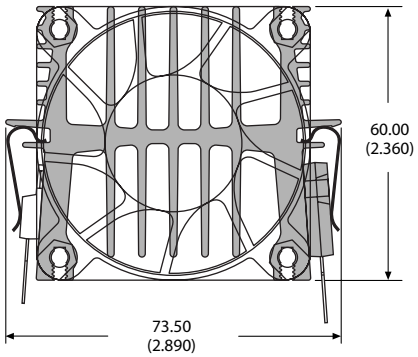


Below are examples of Assembly Ideas, using Aavid Thermalloy's Max Clip System™. The illustrations show the use of multiple extrusion profiles, fans and clips to assemble cost effective high performance thermal solutions. Please contact Aavid Thermalloy application engineering to discuss developing assembly configurations specific to your application.

Forced Convection Assemblies (using customer supplied fans)

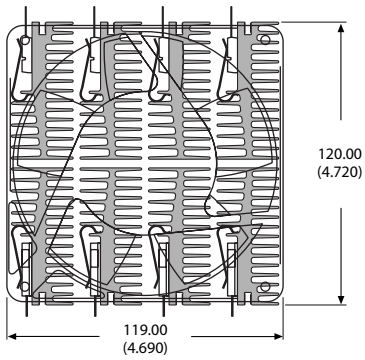
0S509 Extrusion with fan

θf = 0.36 °C/W



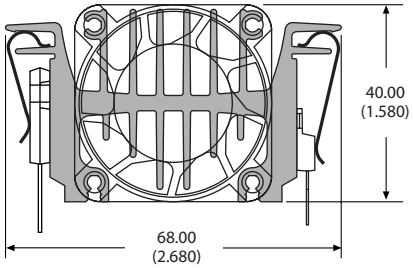
0SY54 8 Piece extrusion with fan

θf = 0.069 °C/W



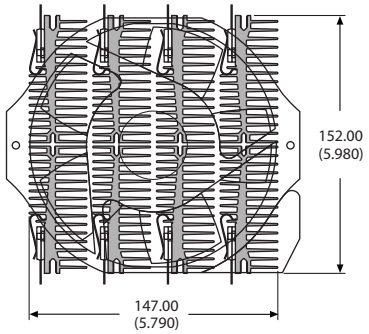
0S527 Extrusion with fan

θf = 0.49 °C/W



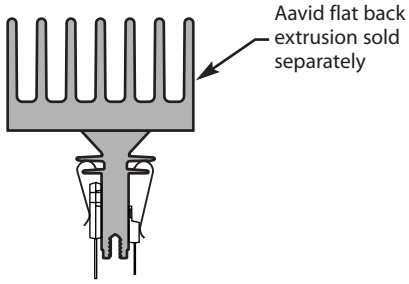
0S505 8 Piece extrusion with fan

θf = 0.049 °C/W

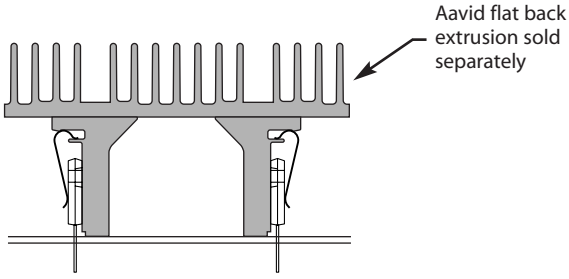


Max Heat Connector Assemblies

0S552 Max heat sink support

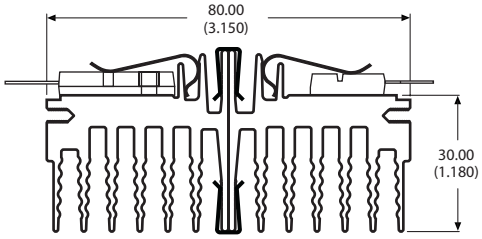


0SY67 Max heat sink support

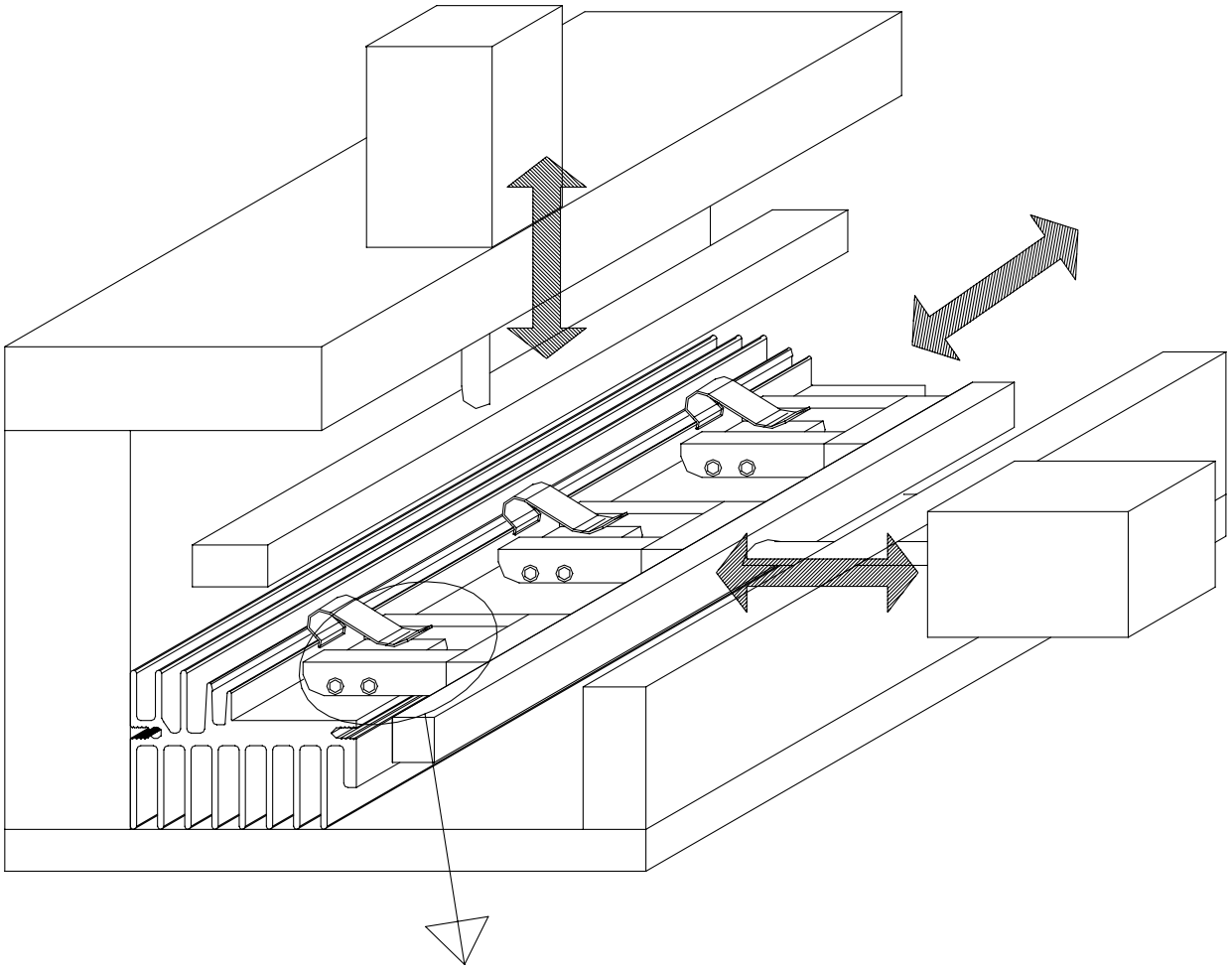


Connecting Max Profiles with U-Clips

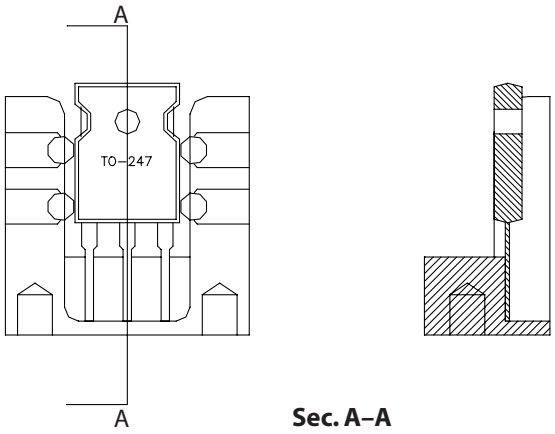
0S512 Extrusion with Clip CLP212S



One way of optimizing The Max Clip System™ for volume manufacturing is through the use of semi-automated assembly. The Max Clip System™ is suitable for pick and place machines and the following diagrams illustrate a method for automating the semiconductor and clip attachment to Max Extrusions.

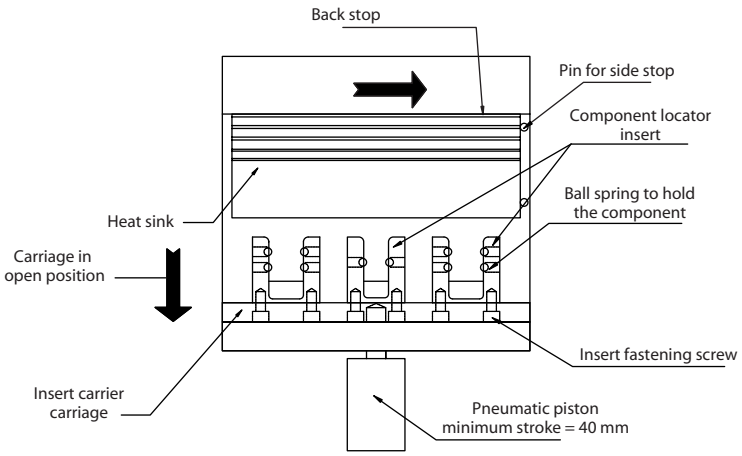


DETAIL OF COMPONENT LOCATOR INSERT

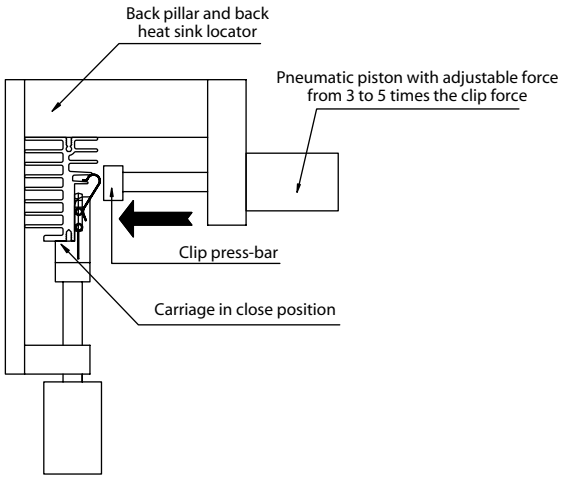


Sec. A–A

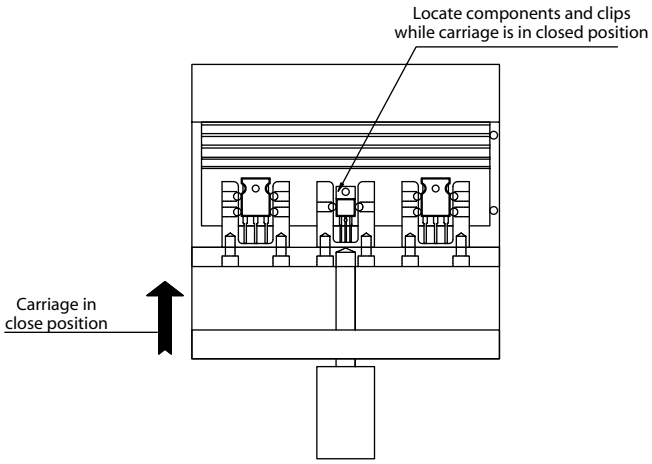
HEAT SINK LOCATING



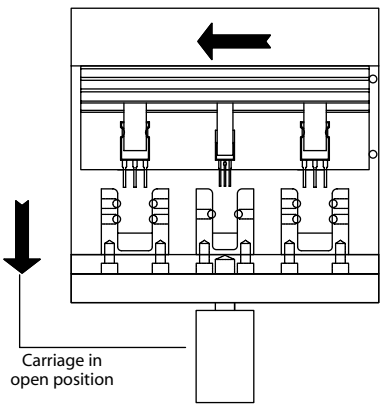
CLIP PRESSING



COMPONENTS AND CLIP LOCATING



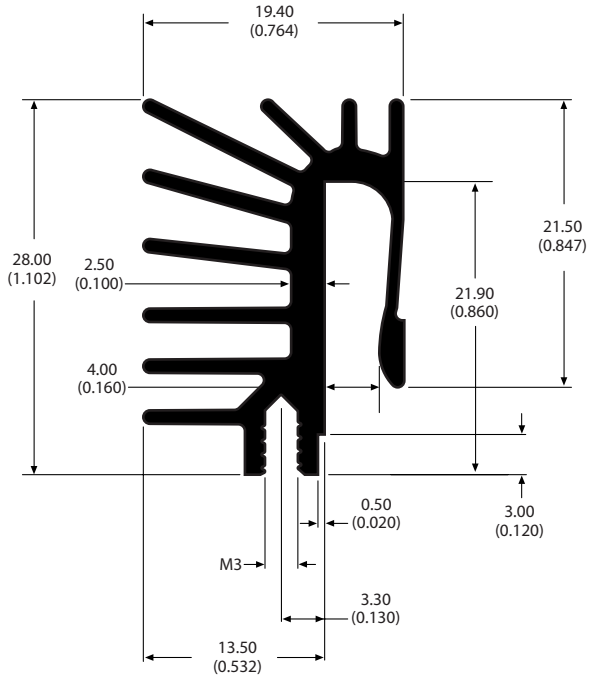
HEAT SINK REMOVAL



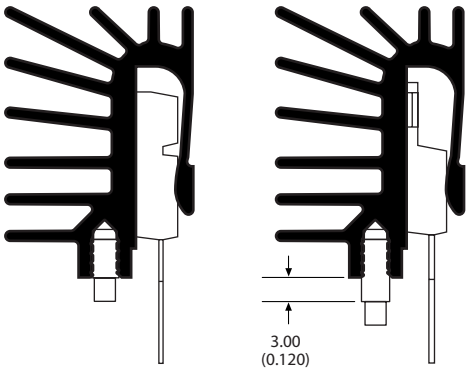
ML516 Indian Chief Profiles (TO-220, T0-252, TO-262)

kg/m: 0.493 • θn = 2.15 °C/W • θf = 0.73 °C/W

Max Indian Chief styles use a unique extrusion profile with an integrated clip. The Indian Chief shares all the advantages of The Max Clip System™ without the use of a discrete clip. The profiles are compact and suited for board level cooling requirements. These profiles are designed to accept packages with or without mounting tabs.



Scale 1:1



Max220™* TO-220

See page 34 for options on solderable pins

Black anodized heat sink thermal resistance (°C/W)

Part number	Length	Natural convection	Forced convection 1 m/s	2 m/s	3 m/s	Force on component (N)
405070	15 (0.590)	13.31	5.46	4.09	3.35	54
405071	20 (0.790)	10.66	4.30	3.20	2.60	70
405072	25 (0.980)	8.97	3.58	2.65	2.15	85
405073	30 (1.18)	7.77	3.08	2.27	1.84	100

Unfinished heat sink thermal resistance (°C/W)

Part number	Length	Natural convection	Forced convection 1 m/s	2 m/s	3 m/s	Force on component (N)
405074	15 (0.59)	16.18	6.05	4.41	3.56	54
405075	20 (0.790)	13.02	4.76	3.44	2.77	70
405076	25 (0.98)	10.98	3.96	2.85	2.28	85
405077	30 (1.18)	9.55	3.41	2.45	1.96	100

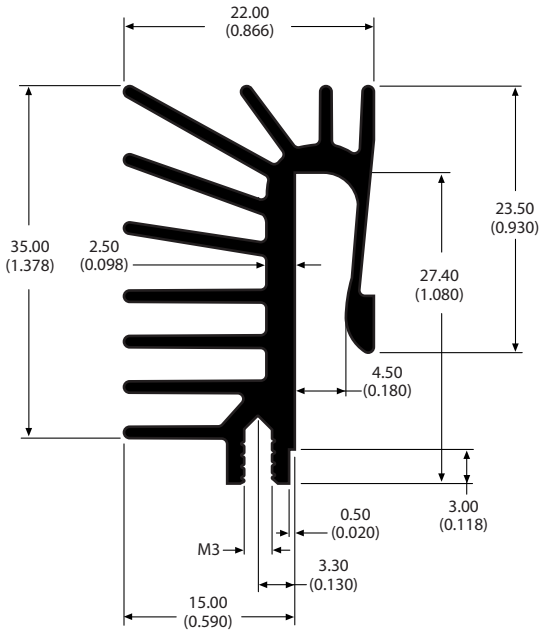
The heat sink thermal performance is evaluated in the vertical mode at a ΔT of 70°C.

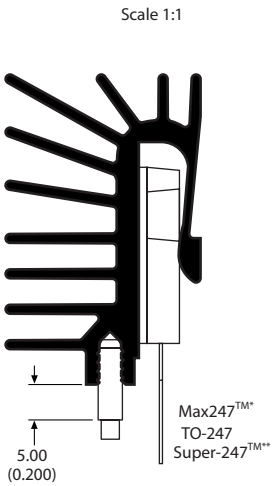
* Max220™ is a registered trademark of STMicroelectronics

ML524 Big Chief Profiles (TO-247, TO-218)

kg/m: 0.627 • θn = 1.74 °C/W • θf = 0.58 °C/W

Max Big Chief styles use a unique extrusion profile with an integrated clip. The Big Chief shares all the advantages of The Max Clip System™ without the use of a discrete clip. The profiles are compact and suited for board level cooling requirements. These profiles are designed to accept packages with or without mounting tabs.





See page 34 for options on solderable pins

Black anodized heat sink thermal resistance (°C/W)

Part number	Length	Natural convection	Forced convection 1 m/s	2 m/s	3 m/s	Force on component (N)
405086	15 (0.590)	10.71	4.49	3.40	2.80	54
405087	20 (0.790)	8.58	3.53	2.65	2.17	70
405088	25 (0.980)	7.22	2.93	2.19	1.79	85
405089	30 (1.18)	6.26	2.53	1.88	1.53	100

Unfinshed heat sink thermal resistance (°C/W)

Part number	Length	Natural convection	Forced convection 1 m/s	2 m/s	3 m/s	Force on component (N)
405090	15 (0.590)	12.96	5.02	3.69	2.99	54
405091	20 (0.790)	10.42	3.94	2.88	2.32	70
405092	25 (0.980)	8.79	3.28	2.38	1.91	85
405093	30 (1.18)	7.66	2.82	2.04	1.68	100

The heat sink thermal performance is evaluated in the vertical mode at a ΔT of 70°C.

* Max247™ is a registered trademark of STMicroelectronics
** Super-247™ is a registered trademark of International Rectifier

How to add solderable pins for easy attachment in circuit board applications

The Max Clip System™ can be mounted directly to printed circuit boards by installing tin plated pins in the base of the heat sink and then creating a pattern of plated through holes in the circuit card to accept the pins. The heat sink assembly can then be inserted into the circuit board holes and soldered into place during wave solder operations. These pins come in a variety of stand-off lengths as illustrated below. Since placement of the pins is specific to the application, a customer supplied drawing is required when ordering. The drawing should contain the information shown in Figure A.

Pin Dimensions

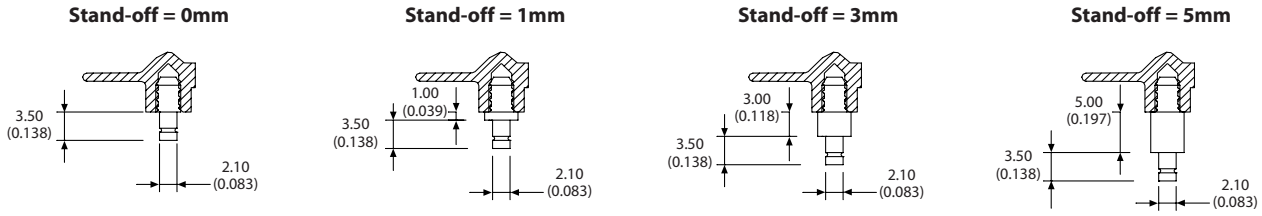
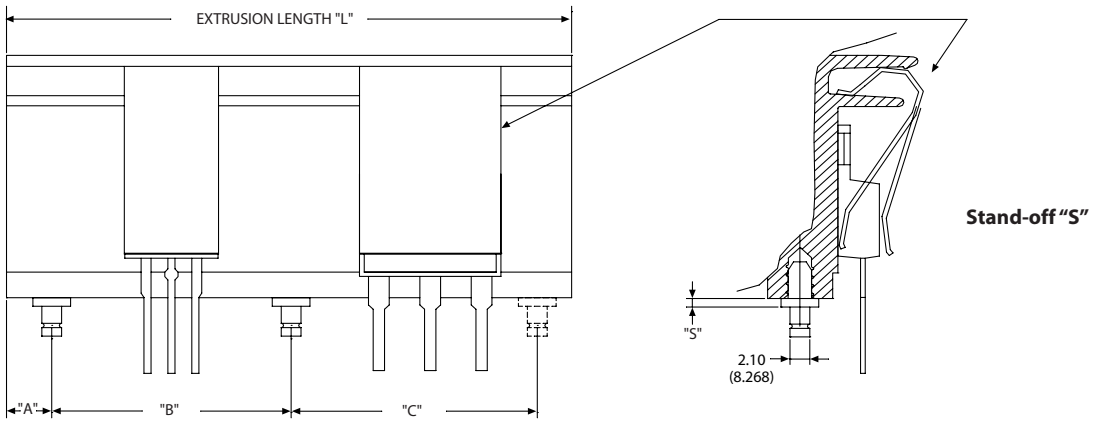


Figure A

View from component side

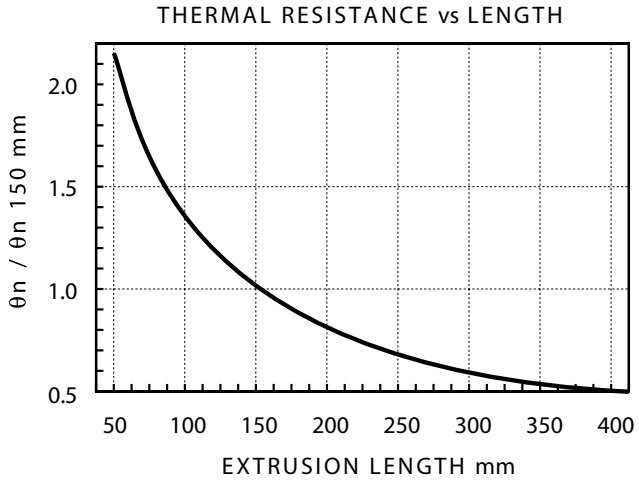


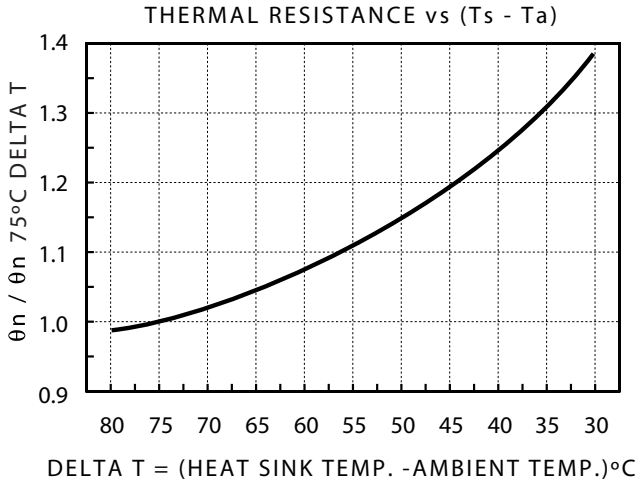
The suggested hole dia. in the PCB is 2.7 ± 0.1 mm with a pitch tolerance of ± 0.15 mm.

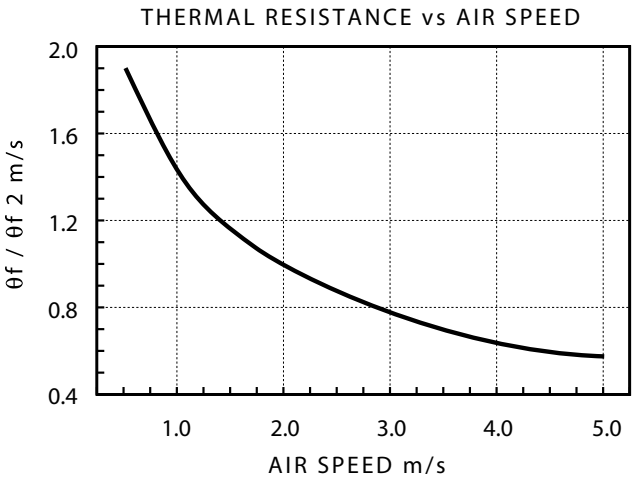
Dimensions "B" and "C" are not required for a heat sink with only 1 solderable pin
Dimension "C" is not required for a heat sink with 2 solderable pins
Tolerance ± 0.2 mm

Standard Stand-off = 0 mm
1 mm
3 mm
5 mm

NOTE: We suggest that soldering and mechanical resistance tests are made by customer before full production.







HOW TO INTERPRET THERMAL PERFORMANCE

The extrusions are presented in order by shape and size. Dimensions are in mm with (inches) following in parenthesis. On pages 5-6 there is an index sorted by extrusion part number. The part number, weight in kg/m, thermal resistance (θn with natural convection, thermal resistance θf with forced convection) at an air speed of 2.0 m/s is shown for each extrusion. The thermal resistances have been calculated using 150 mm long vertical anodized heat sinks with a sink-to-ambient temperature difference of 75ºC and a uniform thermal load on the heat sink base.

LENGTH CORRECTION FACTOR

Because the air heats up while circulating through the extrusion, the convection coefficient is not constant throughout the extrusion length. Therefore, the thermal resistance changes nonlinearly as the length changes. To calculate the correct thermal resistance for extrusion lengths other than the standard 150 mm length, multiply the given thermal resistance data by the appropriate factor taken from the thermal resistance vs length graph shown. The same correction factor must be used for thermal resistance in both natural convection and forced convection.

TEMPERATURE CORRECTION FACTOR

Both natural convection and radiation coefficients are related to the sink-to-ambient temperature difference. To evaluate the thermal performance of a heat sink for an application requiring a sink-to-ambient temperature rise other than 75ºC, use the correction factor from the thermal resistance vs (Ts - Ta) graph shown. This factor must be used only for thermal resistance in natural convection.

AIR SPEED CORRECTION FACTOR

The convection coefficient is also closely related to the air speed through the fins. Since evaluation of air speed through the fins is difficult to evaluate under normal circumstances, we show the thermal resistance of an extrusion in forced convection evaluated using a tunnel the same size as the extrusion. For a tunnel airflow other than 2 m/s, refer to the factor in the thermal resistance vs air speed graph shown. Use this factor to figure thermal resistance in forced convection.

Provided by PENNY + GILES • Test Certificate No. 3318

1. TEST CONDUCTED

1.1 Sine Vibration and 1/2 Sine Shock

2. SPECIMEN DATA

2.1	No. Off:	4 off
2.2	Identification:	Heat sink S509/40 with MAX Clips retaining 4 off semiconductors
2.3	Reference No.(s):	MAX 01, MAX 02, MAX 03, MAX 04
2.4	Serial No.(s):	1, 2, 3, and 4
2.5	Condition received:	OK

3. SPECIFICATIONS AND/OR NATIONAL STANDARDS

3.1	Equipment Specification	
3.1.1	Authority:	N/A
3.1.2	Title:	N/A
3.1.3	Issue:	N/A
3.1.4	Data:	N/A
3.1.5	Requirements:	N/A
3.2	RELATED NATIONAL STANDARD	
3.2.1	Authority:	BSI
3.2.2	Title:	BS2011
3.2.3	Issue:	As date
3.2.4	Data:	Test Ea: 1988, Test Fc: 1983.
3.2.5	Requirement(s):	Tests Ea and Fc, as modified by Request To Test form 3318

4. CLIENT

4.1 El.Bo.Mec Thermalloy - Via Del Tipografo, 4 - 40138 Bologna, Italy

5. RECEIPT OF TEST SPECIMEN

5.1 Specimen received 28.05.98 under request to test form No. 3318, dated 28.05.98.

6. DATE OF TEST

6.1 Test commenced and completed 01.06.98.

7. DISPOSAL OF TEST SPECIMEN

7.1 Specimen returned to client under delivery note 1362 dated 02.06.98.

8. TEST METHOD/PROCEDURE

8.1 The heat sink assembly was mounted onto the shaker table and subjected to a sinusoidal vibration test as follows:

Frequency Range:	8 Hz to 100 Hz
Vibration Amplitude:	± 3g pk
Rate of Change of Frequency:	1 Octave per minute
Test Duration:	20 minutes

8.2 During the above 20 minute period the heat sink assembly was observed visually for evidence of the max mounts becoming detached.

8.3 The procedures described in 8.1 and 8.2 above were repeated such that vibration test was conducted in all three mutually perpendicular axes.

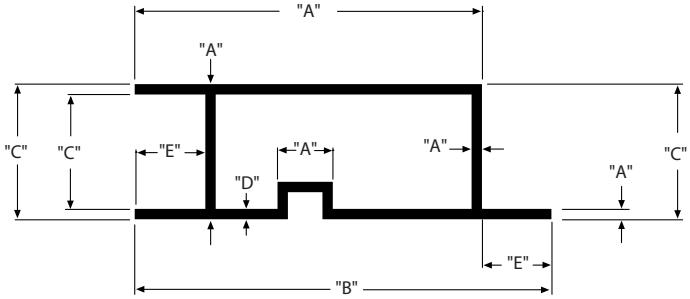
8.4 The heat sink assembly was then subjected to a shock test as follows:

Shock Pulse Envelope:	112 sine
Period:	6 ms
Amplitude:	5 g
Number of Shocks:	3
Application:	3 shocks per sense per axis

8.5 During the above 20 minute period the heat sink assembly was observed visually for evidence of the max mounts becoming detached.

9. TEST RESULTS

9.1 The max clips did not break free from the heat sink assembly. No physical degradation was observed.



(1) for "A" Dim or "B" Dim = 300 mm
tolerances supplied by customer
(2) for "E" Dim = 5 mm, tolerances equal "B"

"D" Dim (mm)	Tolerances (mm)
< 2.5	± 0.25
= 2.5	± 10%

"A" Dim or "B" Dim (mm)	Tolerances (mm)
< "A" or "B" = 2	± 0.15
2 < "A" ≤ 3	± 0.20
3 < "A" ≤ 5	± 0.25
5 < "A" ≤ 10	± 0.30
10 < "A" ≤ 15	± 0.35
15 < "A" ≤ 30	± 0.40
30 < "A" < 50	± 0.50
50 < "A" < 80	± 0.80
80 < "A" < 100	± 1.00
100 < "A" ≤ 120	± 1.20
120 < "A" ≤ 150	± 1.30
150 < "A" ≤ 200	± 1.50
200 < "A" ≤ 250	± 1.80
250 < "A" ≤ 300	± 2.10

"C" Dim (mm)	Tolerances (mm)			
	5 < "E" ≤ 15	15 < "E" ≤ 30	30 < "E" ≤ 60	"E" ≤ 60
"C" = 5	± 0.30	± 0.35	± 0.40	± 0.50
5 < "C" < 10	± 0.35	± 0.40	± 0.45	± 0.55
10 < "C" < 15	± 0.40	± 0.45	± 0.50	± 0.65
15 < "C" ≤ 20	± 0.45	± 0.50	± 0.60	± 0.75
20 < "C" ≤ 30	± 0.50	± 0.60	± 0.75	± 0.90
30 < "C" < 50	± 0.60	± 0.75	± 0.90	± 1.30
50 < "C" <70	± 0.85	± 0.95	± 1.10	± 1.45
70 < "C" ≤ 100	± 1.05	± 1.10	± 1.25	± 1.65
100 < "C" ≤ 150	± 1.35	± 1.40	± 1.65	± 2.20
150 < "C" ≤ 200	± 1.50	± 1.60	± 2.00	± 2.80
200 < "C" < 250	± 1.85	± 1.90	± 2.55	± 3.50
250 < "C" < 300	± 2.20	± 2.40	± 3.20	± 4.00

Machining Standard Tolerances		UNI–ISO 2768 m
Cut to length	L < 300	± 0. 25
	300 ≤ L < 500	± 0.5
	L = 500	± 1.0
Hole center to center	"D" < 30	± 0.2
	30 ≤ "D" < 120	± 0.3
	120 ≤ "D" < 400	± 0.5
	"D" = 400	± 0.8
Hole Diameter	"D" < 8	-0.05 + 0.08
Unmachined surfaces	Flatness	0.5 / 100
	Roughness	1.6 µm
Machined surfaces	Flatness	0.05 / 100
	Roughness	0.8 ~µm
Anodization thickness	12 µm	± 5 µm

Our products are typically made using
Al 6060 T5 (Aluminum Alloy 9006/1).

Parameters	Tolerance (mm)	
	Size	Maximum depth
Threaded holes maximum depth	M2	6
	M2.5	7.5
	M3	10
	M4	12
	M5	15
	M6	18
	M8	24

Parameter	Quantity (q)	Tolerance
Quantity	q < 10	– 1 pc
	10 ≤ q < 50	± 1 pc
	50 ≤ q < 200	± 2 pcs
	200 < q < 500	± 5 pcs
	500 < q < 100	± 10 pcs
	q = 1000	± 30 pcs

The Total Integrated Solution for Cooling Electronics®

AAVID THERMALLOY

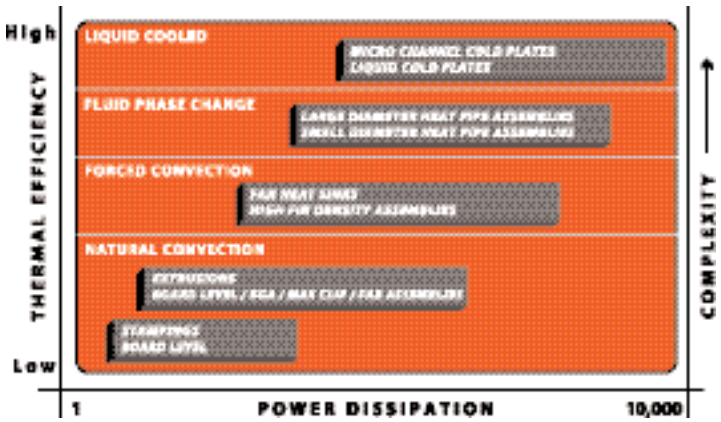
Aavid Thermalloy has the expertise to design and manufacture cooling solutions spanning the entire range of thermal efficiency and mechanical complexity. The board level products displayed in this catalog represent only a fraction of our capabilities. Most applications require custom solutions, which is why so many leading electronics companies partner with Aavid Thermalloy.

For demanding applications Aavid Thermalloy can design and validate custom innovative solutions utilizing the most advanced engineering resources saving you precious development time. Our manufacturing facilities, located in strategic markets around the globe, deliver cost effective products providing you a competitive advantage. From concept to production, Aavid Thermalloy can enable your design anywhere in the world.

Experts at solving cooling challenges ranging from networking, telecom and consumer electronics, to power and biomedical devices. Our clients include Cisco, Nortel, HP, Apple, Sun, Bio-Rad, Mitsubishi and other industry leading companies worldwide. Utilizing the latest CFD/FEA and experimental techniques we can:

- Perform conjugate analyses with conduction, convection and radiation
- Optimize venting and fan placement
- Increase power density
- Reduce noise, cost and size.
- Increase MTBF

Dedicated thermal engineers characterize your system and provide the most advanced and effective cooling solutions, saving thousands in engineering resources, thermal modeling software, and test hardware.



There are 4 cooling mechanisms that Aavid Thermalloy and Applied Thermal Technologies take pride in having expertise in: natural convection, forced convection, fluid phase change and liquid cooling. The above graph is a starting point to determine which technology can be used for your system configuration.

For more information regarding any of these cooling mechanisms, please contact Aavid Thermalloy at:

www.aavidthermalloy.com