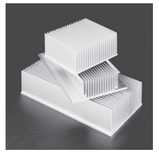
BONDED FIN HEAT SINKS

WAKEFIELDTHERMAL

Wakefield-Vette offers a variety of natural and forced convection bonded fin heat sink assemblies. Configurable in a variety of ways, they are reliable, cost effective, and highly efficient thermal management solutions for high power and densely packaged applications, even in demanding shock and vibration environments. Bonded fin heat sinks are used when the required combination of large heat sink size, tall fins and high fin density make simple extrusions impractical.

We offer these products in our standard catalog and also custom fabricated to meet a customer's needs.

HIGH FIN DENSITY HEAT SINKS FOR POWER MODULES, IGBTS, RELAYS



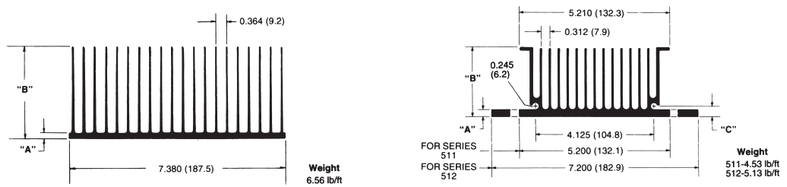
510, 511 & 512 SERIES

Standard Catalog P/N[5] Milled Base[1]	Nonmilled Base[2]	Base Width in. (mm)	Length in. (mm)	Height		Thermal Resistance[5] (Øsa) at Typical Load	
				Milled Base[1] ("M Series") in. (mm)	Nonmilled Base[2] ("U" Series) in. (mm)	Natural Convection[3] (°C/W)	Forced Convection[4] (°C/W @ 100 CFM)
510-3M	510-3U	7.380 (187.452)	3.000 (76.2)	3.106 (78.9)	3.136 (79.7)	0.56	0.088
510-6M	510-6U	7.380 (187.452)	6.000 (152.4)	3.106 (78.9)	3.136 (79.7)	0.38	0.070
510-9M	510-9U	7.380 (187.452)	9.000 (228.6)	3.106 (78.9)	3.136 (79.7)	0.29	0.066
510-12M	510-12U	7.380 (187.452)	12.000 (304.8)	3.106 (78.9)	3.136 (79.7)	0.24	0.062
510-14M	510-14U	7.380 (187.452)	14.000 (355.6)	3.106 (78.9)	3.136 (79.7)	0.21	0.059
511-3M	511-3U	5.210 (132.33)	3.000 (76.2)	2.350 (59.7)	2.410 (61.2)	0.90	0.120
511-6M	511-6U	5.210 (132.33)	6.000 (152.4)	2.350 (59.7)	2.410 (61.2)	0.65	0.068
511-9M	511-9U	5.210 (132.33)	9.000 (228.6)	2.350 (59.7)	2.410 (61.2)	0.56	0.060
511-12M	511-12U	5.210 (132.33)	12.000 (304.8)	2.350 (59.7)	2.410 (61.2)	0.45	0.045
512-3M	512-3U	7.200 (182.88)	3.000 (76.2)	2.350 (59.7)	2.410 (61.2)	0.90	0.120
512-6M	512-6U	7.200 (182.88)	6.000 (152.4)	2.350 (59.7)	2.410 (61.2)	0.65	0.068
512-9M	512-9U	7.200 (182.88)	9.000 (228.6)	2.350 (59.7)	2.410 (61.2)	0.56	0.060
512-12M	512-12U	7.200 (182.88)	12.000 (304.8)	2.350 (59.7)	2.410 (61.2)	0.45	0.045

510 SERIES			**510 Series** *(Extrusion Profile 5113)*
Series	A	B	Flatness
510-U	0.216 (5.5)	3.136 (79.7)	0.006 in./in. (0.15 mm/mm)
510-M	0.165 (4.2)	3.106 (78.9)	0.002 in./in. (0.05 mm/mm)

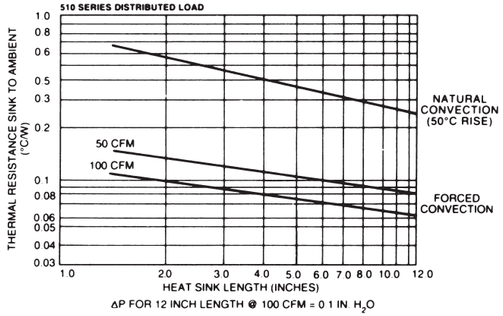
511 AND 512 SERIES				**511 Series** *(Extrusion Profile 6438-1)* **512 Series** *(Extrusion Profile 6438-2)*
Series	A	B	C	Flatness
511-U 512-U	0.250 (6.4)	2.410 (61.2)	0.372 (9.4)	0.006 in./in. (0.15 mm/mm)
511-M 512-M	0.220 (5.6)	2.350 (59.7)	0.342 (8.7)	0.002 in./in. (0.05 mm/mm)

MECHANICAL DIMENSIONS

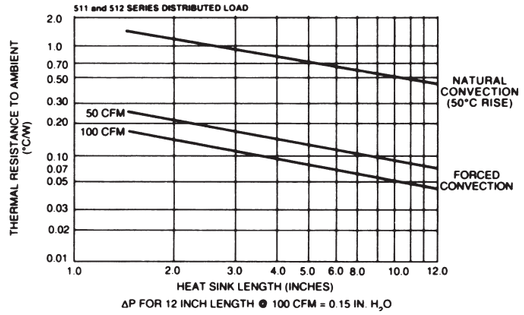


Dimensions: in. (mm)

NATURAL AND FORCED CONVECTION CHARACTERISTICS



NATURAL AND FORCED CONVECTION CHARACTERISTICS

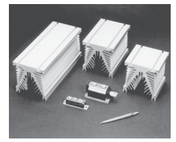


NOTES:

1. Precision-milled base for maximum heat transfer performance (flatness 0.002 in./in.)
2. Nonmilled base flatness: 0.006 in./in.
3. Natural convection heat dissipation for distributed heat sources at 50°C rise.
4. Forced convection heat dissipation for distributed heat sources at 100 cubic feet per minute, shrouded condition.
5. Standard models are provided without finish.

HIGH PERFORMANCE HEAT SINKS FOR POWER MODULES, IGBTS AND SOLID STATE RELAYS

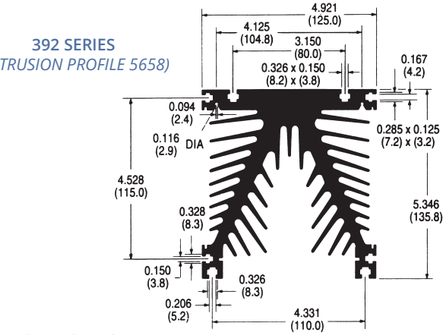
392 SERIES



Standard P/N, Finish			Thermal Resistance at Typical Load		
Black Anodized	Gold Iridite	Length in. (mm)	Natural Convection (Øsa) (°CW)	Forced Convection (Øsa) (°CW)	Weight lbs. (grams)
392-120AB	392-120AG	4.725 (120.0)	0.50	0.16 @ 100 CFM	4.452 (2019.43)
392-180AB	392-180AG	7.087 (180.0)	0.43	0.11 @ 100 CFM	6.636 (3010.09)
392-300AB	392-300AG	11.811 (300.0)	0.33	0.08 @ 100 CFM	1O.420 (4726.51)

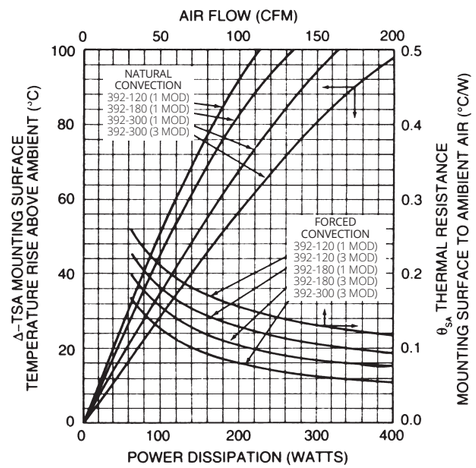
MECHANICAL DIMENSIONS

392 SERIES
(EXTRUSION PROFILE 5658)

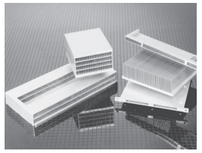


Dimensions: in. (mm)

NATURAL AND FORCED CONVECTION CHARACTERISTICS



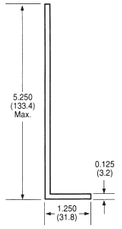
CUSTOM BONDED FIN HEAT SINKS & ASSEMBLIES

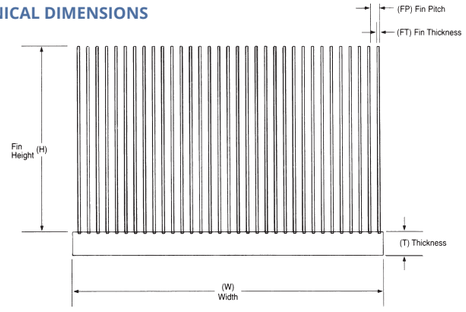


Wakefield-Vette offers an extensive line of natural convection and forced convection custom bonded fin heat sinks assemblies. Configurable in a variety of ways, they are reliable, cost effective, and highly efficient thermal management solutions for high power and densely packaged applications, even in demanding shock and vibration environments.

MECHANICAL DIMENSIONS

MOUNTING LEG
(EXTRUSION PROFILE 8930)
(EXTRUSION PROFILE 8120)





Dimensions: in. (mm)

BONDED FIN BASES						Thermal Resistance °C/W			
Base Extrusion Profile No.	W	T	FT	FP	Max # Fins	Natural Convection H = 2"	Natural Convection H = 4"	Forced Convection H = 2"	Forced Convection H = 4"
8711	2.800 (71.1)	0.520 (13.2)	.050 (1.3)	0.275 (5.4)	10	1.360	0.830	0.459	0.277
8731	3.615 (91.8)	0.575 (14.6)	.050 (1.3)	0.239 (6.1)	15	1.110	0.685	0.281	0.168
8546	4.000 (101.6)	0.500 (12.7)	.050 (1.3)	0.200 (5.1)	20	1.330	0.823	0.215	0.144
8737	4.425 (112.4)	0.650 (16.5)	.050 (1.3)	0.238 (6.0)	18	0.937	0.580	0.233	0.140
8119	4.750 (120.7)	0.500 (12.7)	.050 (1.3)	0.288 (7.3)	16	0.880	0.539	0.222	0.157
8712	5.000 (127.0)	0.530 (13.5)	.050 (1.3)	0.198 (5.0)	25	1.122	0.692	0.170	0.101
8732	5.650 (143.5)	0.500 (12.7)	.050 (1.3)	0.200 (5.1)	28	1.011	0.625	0.152	0.090
8556	6.000 (152.4)	0.500 (12.7)	.050 (1.3)	0.250 (6.4)	24	0.751	0.438	0.153	0.107
8542	6.620 (168.1)	0.500 (12.7)	.050 (1.3)	0.200 (5.1)	33	0.880	0.519	0.122	0.082
8671	7.230 (183.6)	0.550 (14.0)	.050 (1.3)	0.239 (6.1)	30	0.655	0.399	0.123	0.086
8823	7.440 (189.0)	0.525 (13.3)	.050 (1.3)	0.200 (5.1)	37	0.820	0.500	0.118	0.070
8734	7.500 (190.5)	0.560 (14.2)	.050 (1.3)	0.400 (10.2)	19	0.550	0.310	0.213	0.130
8545	8.000 (203.2)	0.500 (12.7)	.050 (1.3)	0.200 (5.1)	40	0.591	0.353	0.095	0.053
8709	8.327 (211.5)	0.400 (10.2)	.050 (1.3)	0.215 (5.5)	37	0.507	0.310	0.081	0.048
8715	8.780 (223.0)	0.600 (15.2)	.050 (1.3)	0.270 (6.9)	28	0.384	0.231	0.106	0.063
8707	10.00 (254.0)	0.550 (14.0)	.050 (1.3)	0.238 (6.0)	42	0.361	0.220	0.071	0.042
8121	10.78 (273.8)	0.560 (14.2)	.050 (1.3)	0.238 (6.0)	45	0.348	0.209	0.065	0.040
8733	12.60 (320.0)	0.600 (15.2)	.050 (1.3)	0.207 (5.3)	60	0.383	0.235	0.075	0.030
8714	14.00 (355.6)	0.525 (13.3)	.050 (1.3)	0.250 (6.4)	56	0.275	0.168	0.053	0.032
8735	15.00 (381.0)	0.625 (15.9)	.050 (1.3)	0.250 (6.4)	60	0.264	0.161	0.049	0.030

NOTES:

1. Natural and forced convection thermal resistances based on 6.000 in. length for profiles less than 8.000" wide.
2. Natural and forced convection thermal resistances based on 12.000 in. length for profiles 8.000" wide and greater
3. Forced convection thermal resistance based on 500 LFM, shrouded, horizontal. distributed heat load.
4. Forced convection bonded fin assemblies use standard "muffin" fans.
5. Dimensions shown are as extruded. To improve flatness across the width, bases can be machined. Machined base thickness will be reduced.

Order Guide - Example

Example Part Number - BE8546-1200-U4W

- BE8546 = Bonded fin base extrusion profile identifier
- Length (inches; 12.00 shown, two decimal point assumed)
- Finish (G = Gold Chromate, U = Unfinished)
- Fin Height (4 inches shown)
- Mounting Options (L = Mounting Legs, W = No Mounting Legs)

Part Numbering Order Guide*

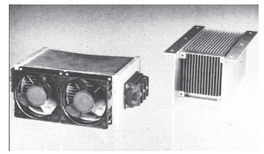
BEXXXX - XX - X X X

- Mounting options (L or W)
- Fin Height (inches)
- Finish (G or U)
- Length (inches, up to 36)
- BASE EXTRUSION PROFILE NUMBER

Contact Wakefield-Vette Thermal Solutions for additional standard profile options at 603-635-2800 / sales@wakefield.com

maxiTHERM-HD³™ BONDED FIN FORCED CONVECTION SERIES #1

SERIES #1

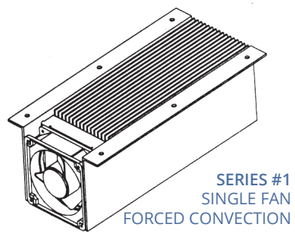


maxiTHERM-HD³™ Bonded Fin Forced Convection Series #1 heat sinks provide more effective cooling per cubic inch of space compared to extruded heat sinks. Exceptionally low thermal resistance values in forced convection applications are achieved with "Series #1" models, as low as 0.024°C/W for a double unit employing 2 fans. Mounting hole pattern is 4.125 in. sq. for standard 120 mm axial ("box") fans. These heat sinks are ideal for a variety of high power applications, even in the most demanding shock and vibration environments.

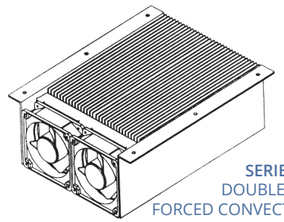
SERIES #1 (5.25" TALL ASSEMBLY)						
maxiTHERM-HD³™ Package Series #1	Standard Muffin Fan (S)	Dimension (in inches) "A"	Dimension (in inches) "B"	Dimension (in inches) "C"	Perimeter (in inches)	Thermal Resistance °C/W
1A	1	7.000 (177.8)	2.500 (63.5)	4.500 (114.3)	742.5 (18859.5)	0.10
1B	1	9.500 (241.3)	3.750 (95.3)	7.000 (114.3)	1515.0 (38481.0)	0.09
1C	1	12.000 (304.8)	5.000 (127.0)	9.500 (114.3)	1567.5 (39814.5)	0.07
1D	1	14.500 (368.3)	6.250 (158.8)	12.000 (114.3)	1980.5 (50304.7)	0.05
1E	2	14.590 (370.6)	6.000 (152.4)	12.000 (114.3)	4536.0 (115214.4)	0.028
1F	2	16.590 (429.0)	7.000 (177.8)	14.000 (114.3)	5292.0 (134416.8)	0.025
1G	2	18.590 (472.2)	8.000 (203.2)	16.000 (114.3)	60.48.0 (153619.2)	0.024

1Z	NON-STANDARD LENGTH
ZZ	NON-STANDARD CONFIGURATION & LENGTH

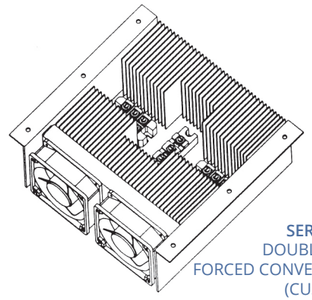
Refer to the following page for ordering information.



SERIES #1
SINGLE FAN
FORCED CONVECTION



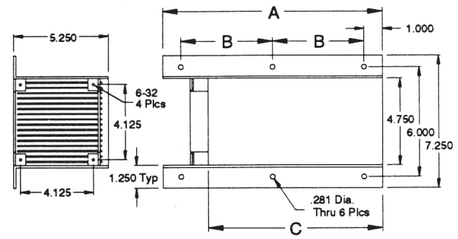
SERIES #1
DOUBLE FAN
FORCED CONVECTION



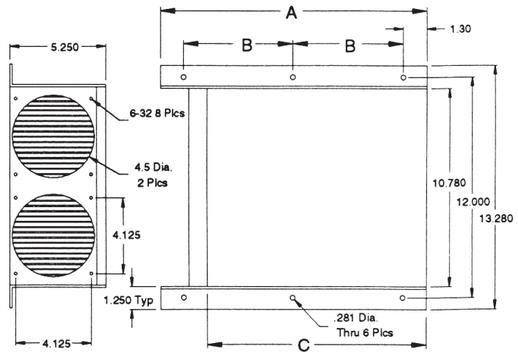
SERIES #1
DOUBLE FAN
FORCED CONVECTION
(CUSTOM)

MECHANICAL DIMENSIONS

SERIES #1
SINGLE FAN FORCED CONVECTION



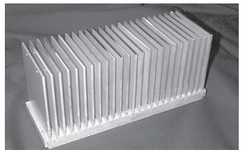
SERIES #1
DOUBLE FAN FORCED CONVECTION



NOTES:

1. Standard muffin fans not included, order separately.

maxiTHERM-HD³™ BONDED FIN FORCED CONVECTION SERIES #2

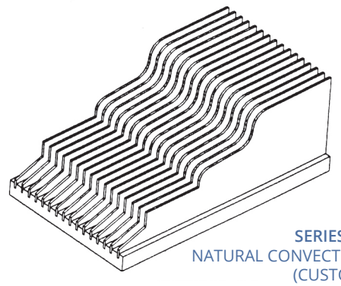


SERIES #2

maxiTHERM-HD³™ Bonded Fin Natural Convection Series #2 heat sinks are designed for a variety of high power applications. These heat sinks are ideal even in the most demanding shock and vibration environments. Standard heat sink lengths range from 7.000 in. (177.8 mm) to 18.590 in. (472.2 mm) and the overall height is 3.130 in. (79.5 mm). Custom lengths, mounting options, and other configurations can be accommodated.

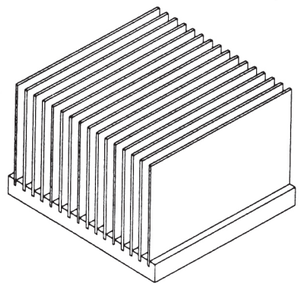
SERIES #2 (3.13" TALL ASSEMBLY)				
maxiTHERM-HD³™ Package Series #2	Dimension (in inches)		Perimeter (in inches)	Thermal Resistance °C/W
	"A"	"B"		
2A	4.500 (114.3)	1.250 (31.8)	427.5 (10858.5)	0.41**
2B	9.500 (177.8)	2.500 (63.5)	665.0 (16891.0)	0.38**
2C	9.500 (241.3)	3.750 (95.3)	902.0 (22910.8)	0.35**
2D	12.000 (304.8)	5.000 (127.0)	1140.0 (28956.0)	0.33**

2Z	NON-STANDARD LENGTH
ZZ	NON-STANDARD CONFIGURATION & LENGTH

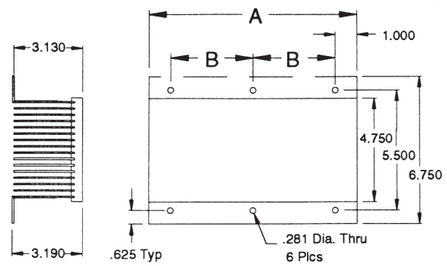


SERIES #2
NATURAL CONVECTION
(CUSTOM)

SERIES #2 NATURAL CONVECTION



MECHANICAL DIMENSIONS



ORDERING INFORMATION

BE8– -* -* -* -*

MODIFIER

NNNN	Factory issued number for modification to customer requirements.

PLATING OPTIONS

GI	Gold Iridite
CI	Clear Iridite
N	No Plating (Wash & Etch)

MOUNTING OPTIONS

L	Mounting Legs
F	Fan Brackets & Mounting Legs (series #1 only)
W	No Brackets or Legs

PACKAGE LENGTH ("A" Dimension) SERIES #1 (5.25" tall assembly)

PN	LENGTH
1A	7.000"
1B	9.500"
1C	12.000"
1D	14.500"
1E	14.590"
1F	16.590"
1G	18.590"
1Z	non-standard lengths (Note 2)
ZZ	non-standard configuration & length

PACKAGE LENGTH ("A" Dimension) SERIES #2 (3.13" tall assembly)

PN	LENGTH
2A	4.500"
2B	7.000"
2C	9.500"
2D	12.000"
2Z	non-standard length (Note 2)
ZZ	non-standard configuration & length

BASE EXTRUSION NUMBER

BE8119	Base profile identifier (SINGLE)
BE8121	Base profile identifier (DOUBLE)

NOTES:

1. All non-standard parts must have a modifier.
2. 1Z and 2Z denoting non-standard lengths should only be used for non-standard "A" dimensions. Part # must contain a modifier.

*3. When 105 CFM fan (s) used – fan mounting hole pattern for standard axial ("muffin") fan.

**4. Natural convection based on 50°C heat sink temperature rise above ambient.