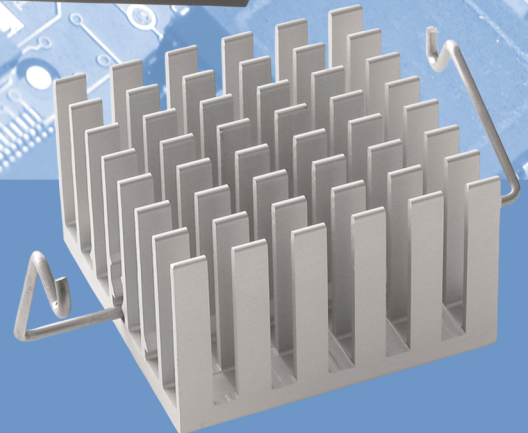
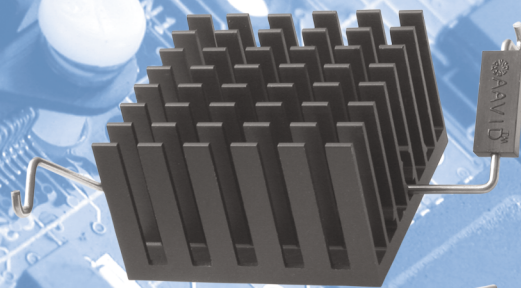
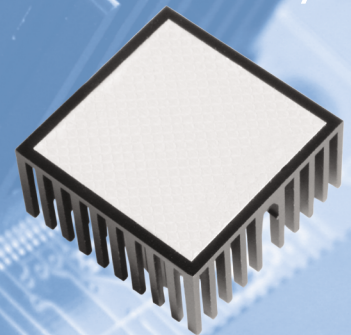
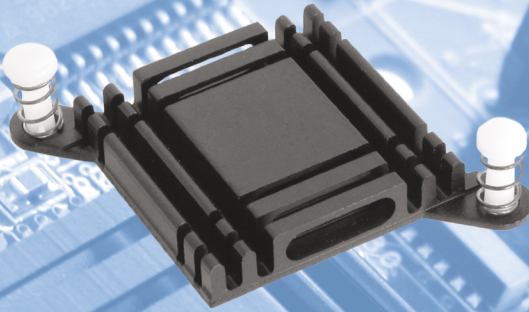




# AAVID THERMALLOY

PRODUCT SELECTOR GUIDE

## New Cooling Solutions for Ball Grid Arrays

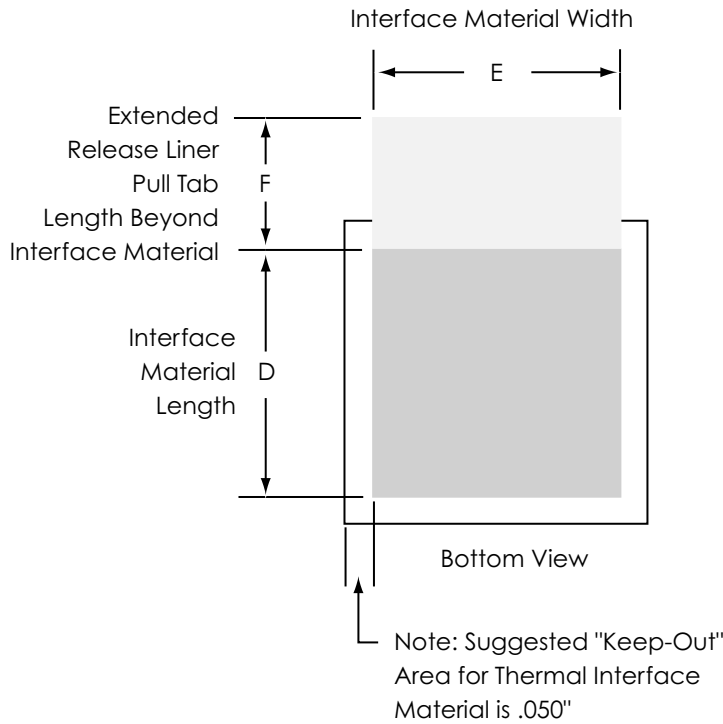


## The Industry's Most Comprehensive Selection of BGA Heat Sinks

Aavid Thermalloy offers the broadest line of innovative BGA heat sinks – including standard, off-the-shelf solutions to support all of your most demanding applications. Cost effective and highly functional, our BGA heat sinks range in size from 10mm x 10mm to 45mm x 45mm, and accommodate heights from 6mm to 35mm. All feature a variety of attachment methods including the new solder anchor technology, and deliver proven, long-term reliability.

# FLUTED FIN™ OPTIONS

## Double Sided Tape and Phase Change Material



Thermattach™ T405 Double Sided Tape for Ceramic and Metal Packages\*

| Ordering Code | Dimensions |      |    |
|---------------|------------|------|----|
|               | D          | E    | F  |
| T405-05       | 12.7       | 12.7 | 25 |
| T405-01       | 19.1       | 19.1 | 25 |
| T405-02       | 25.4       | 25.4 | 25 |
| T405-03       | 31.8       | 31.8 | 25 |
| T405-04       | 34.9       | 34.9 | 25 |

Thermattach™ T410 Double Sided Tape for plastic packages\*

| Ordering Code | Dimensions |       |    |
|---------------|------------|-------|----|
|               | D          | E     | F  |
| T410-01       | 20.00      | 20.00 | 25 |
| T410-02       | 25.40      | 25.40 | 25 |
| T410-03       | 30.00      | 30.00 | 25 |
| T410-04       | 35.00      | 35.00 | 25 |

Thermalflow™ T725 Phase Change Thermal Interface Pad for use with wire clip systems\*

| Ordering Code | Dimensions |      |    |
|---------------|------------|------|----|
|               | D          | E    | F  |
| T725-01       | 19.1       | 19.1 | 25 |
| T725-02       | 25.4       | 25.4 | 25 |
| T725-03       | 31.8       | 31.8 | 25 |
| T725-04       | 34.9       | 34.9 | 25 |

\*Other pad materials and sizes available

## Z Springs for use with J Clips

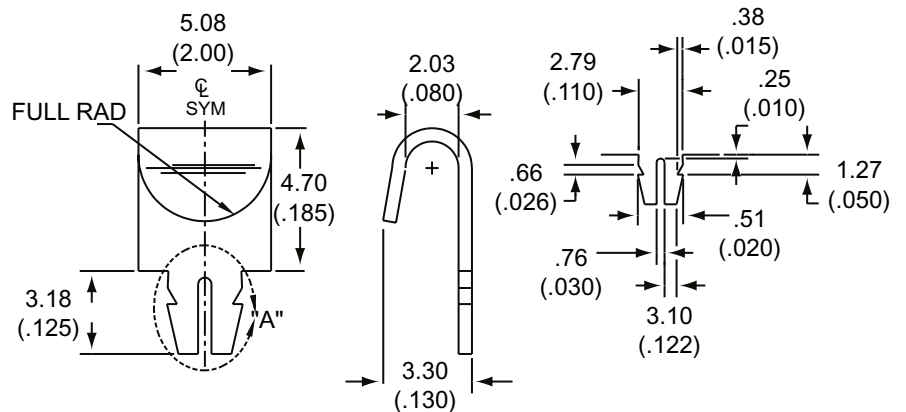
Please order two J1 Clips per heat sink  
Part Number 18874

### FEATURES AND BENEFITS

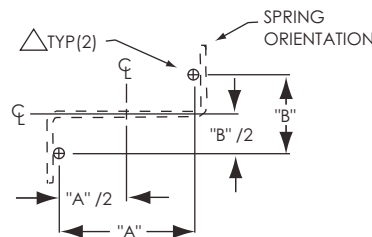
- Solderable J1 J Clips accommodate the Z spring and fit easily into the PC board.
- The J Clips provide a quick, reliable attachment of the heat sink and micro-processor to the PC board
- J Clips may also be used for electrical grounding.

| Z Spring | Dimensions (mm) |       |
|----------|-----------------|-------|
|          | A               | B     |
| PF11     | 34.09           | 19.05 |
| PF14     | 42.29           | 27.94 |
| PF15     | 44.81           | 30.38 |
| PF17     | 49.61           | 36.83 |
| PF18     | 52.32           | 38.20 |
| PF20     | 57.61           | 40.64 |

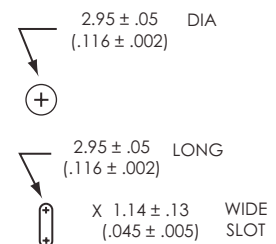
## J1 Clip Dimensions / Hole Size



## Hole Pattern and Size for J Clips



## Recommended Plated Thru Hole Sizes



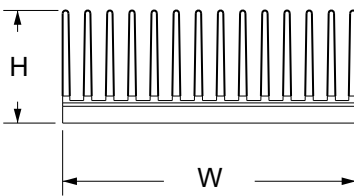
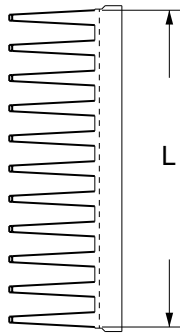
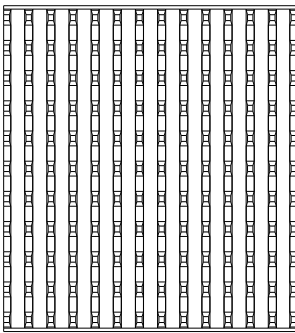
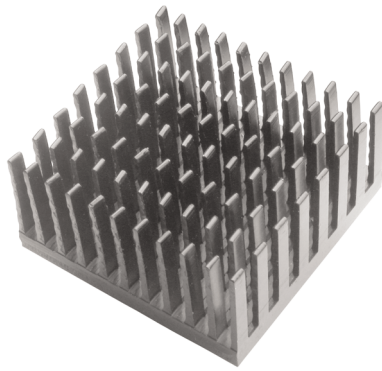
## Fluted Fin BGS Clips



Certain heat sinks may be off-center relative to device when BGS Clip is used. BGS Clip fits directly to the BGA.

| Clip Part Number | Max. BGA Size (mm) |
|------------------|--------------------|
| BGS 1            | 27.0               |
| BGS 2            | 35.0               |
| BGS 3            | 40.0               |
| BGS 5            | 42.5               |
| BGS 4            | 45.0               |

# FLUTED FIN™



## FEATURES AND BENEFITS

- Fluted Fin™ technology uses a patented manufacturing process to create cost effective BGA products with enhanced thermal performance verses conventional cross cut methods.
- Instead of straight edged rectangular pin fins, Fluted Fins™ are rippled and slightly staggered.
- Design optimised for maximum performance in applications with limited or no airflow.
- The fluting process enables the production of lighter weight heat sinks than those produced by conventional processes.
- Suitable for use with double sided tapes and wire clip systems (see page 2)
- Possible performance gains versus cross cut products ;
  - 10mm high products . . . . . upto 40%
  - 16.5mm high products . . . . . upto 30%
  - 25mm high products . . . . . upto 40%

| Part Number | Width | Length | Height | *θn  | *θf  | Pin Matrix |
|-------------|-------|--------|--------|------|------|------------|
| 3605B       | 25.9  | 17.2   | 10     | 23.2 | 12.8 | 6 X 3      |
| 3319B       | 25.9  | 23.9   | 10     | 20.9 | 11.5 | 6 X 4      |
| 3607B       | 25.9  | 30.6   | 10     | 17.7 | 9.7  | 6 X 5      |
| 3608B       | 25.9  | 37.3   | 10     | 15.5 | 8.5  | 6 X 6      |
| 3609B       | 25.9  | 44     | 10     | 14.1 | 7.8  | 6 X 7      |
| 3610B       | 25.9  | 50.7   | 10     | 13.1 | 7.2  | 6 X 8      |
| 3611B       | 30.8  | 17.2   | 10     | 22.2 | 12.2 | 7 X 3      |
| 3612B       | 30.8  | 23.9   | 10     | 18.8 | 10.3 | 7 X 4      |
| 3613B       | 30.8  | 30.6   | 10     | 16   | 8.8  | 7 X 5      |
| 3614B       | 30.8  | 37.3   | 10     | 14   | 7.7  | 7 X 6      |
| 3615B       | 30.8  | 44.0   | 10     | 12.5 | 6.9  | 7 X 7      |
| 3616B       | 30.8  | 50.7   | 10     | 11.1 | 6.1  | 7 X 8      |
| 3623B       | 40.6  | 23.9   | 10     | 15.5 | 8.5  | 9 X 4      |
| 3655B       | 40.6  | 23.9   | 16.5   | 12.5 | 6.9  | 9 X 4      |
| 3624B       | 40.6  | 30.6   | 10     | 13.6 | 7.5  | 9 X 5      |
| 3656B       | 40.6  | 30.6   | 16.5   | 10.2 | 5.6  | 9 X 5      |
| 3625B       | 40.6  | 37.3   | 10     | 11.3 | 6.2  | 9 X 6      |
| 3330B       | 40.6  | 37.3   | 16.5   | 8.7  | 4.8  | 9 X 6      |
| 3320B       | 40.6  | 44     | 10.0   | 10.4 | 5.7  | 9 X 7      |
| 3331B       | 40.6  | 44     | 16.5   | 7.6  | 4.2  | 9 X 7      |
| 3626B       | 40.6  | 50.7   | 10     | 9.6  | 5.3  | 9 X 8      |

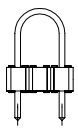
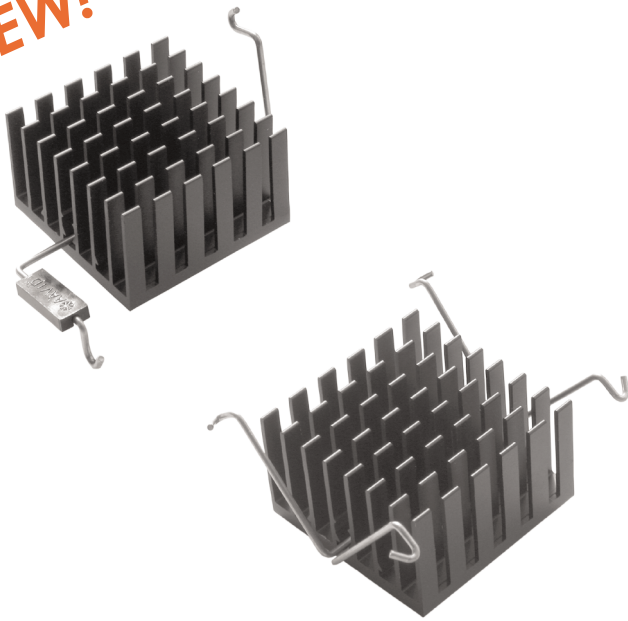
| Part Number | Width | Length | Height | *θn  | *θf | Pin Matrix |
|-------------|-------|--------|--------|------|-----|------------|
| 3657B       | 40.6  | 50.7   | 16.5   | 6.7  | 3.7 | 9 X 8      |
| 3627B       | 45.5  | 23.9   | 10     | 14.2 | 7.8 | 10 X 4     |
| 3658B       | 45.5  | 23.9   | 16.5   | 11.3 | 6.2 | 10 X 4     |
| 3628B       | 45.5  | 30.6   | 10     | 11.8 | 6.5 | 10 X 5     |
| 3659B       | 45.5  | 30.6   | 16.5   | 9.3  | 5.1 | 10 X 5     |
| 3629B       | 45.5  | 37.3   | 10     | 10.7 | 5.9 | 10 X 6     |
| 3660B       | 45.5  | 37.3   | 16.5   | 7.9  | 4.3 | 10 X 6     |
| 3321B       | 45.5  | 44     | 10     | 9.8  | 5.4 | 10 X 7     |
| 3332B       | 45.5  | 44     | 16.5   | 6.9  | 3.8 | 10 X 7     |
| 3630B       | 45.5  | 50.7   | 10     | 9.1  | 5.0 | 10 X 8     |
| 3661B       | 45.5  | 50.7   | 16.5   | 6.4  | 3.5 | 10 X 8     |
| 3633B       | 50.4  | 37.3   | 10.0   | 10.1 | 5.6 | 11 X 6     |
| 3664B       | 50.4  | 37.3   | 16.5   | 7.2  | 4.0 | 11 X 6     |
| 3634B       | 50.4  | 44     | 10     | 9.3  | 5.1 | 11 X 7     |
| 3665B       | 50.4  | 44     | 16.5   | 6.6  | 3.6 | 11 X 7     |
| 3325B       | 50.4  | 50.7   | 10     | 8.6  | 4.7 | 11 X 8     |
| 3334B       | 50.4  | 50.7   | 16.5   | 6    | 3.3 | 11 X 8     |
| 3354B       | 50.4  | 50.7   | 25     | 4.8  | 2.6 | 11 X 8     |
| 3356B       | 50.4  | 64.1   | 25     | 4.1  | 2.3 | 11 X 10    |
| 3357B       | 50.4  | 70.8   | 25     | 3.8  | 2.1 | 11 X 11    |
| 3358B       | 65.1  | 70.8   | 25     | 3.1  | 1.7 | 14 X 11    |

\* See bottom of page 6 for information on how to use this table



# SOLDER ANCHOR ATTACHMENT METHOD

**NEW!**



Solder Anchor Sold Separately  
**Part # D057**  
 Solder anchors must be soldered to PCB prior to attaching the heat sink clip  
 Consult P.C. Board Hole Pattern for number required

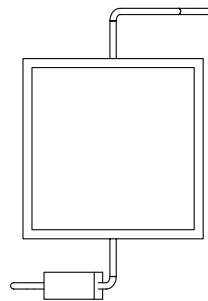
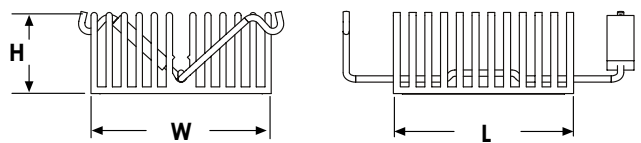
| Part Number  | Width | Length | Height | *θ n | *θ f  | *Finish | *Fig. |
|--------------|-------|--------|--------|------|-------|---------|-------|
| 374024B60023 | 23.0  | 23.0   | 10.0   | 40.0 | 11.69 | B       | A     |
| 374124B60023 | 23.0  | 23.0   | 18.0   | 23.4 | 7.39  | B       | A     |
| 374224B60023 | 23.0  | 23.0   | 25.0   | 19.7 | 6.37  | B       | A     |
| 374324B60023 | 27.0  | 27.0   | 10.0   | 30.6 | 9.35  | B       | A     |
| 374424B60023 | 27.0  | 27.0   | 18.0   | 20.3 | 6.46  | B       | A     |
| 374524B60023 | 27.0  | 27.0   | 25.0   | 16.5 | 5.47  | B       | A     |
| 10-5634-01** | 31.0  | 34.9   | 23.0   | 11.5 | 4.20  | B       | I     |
| 10-THMA-01** | 31.0  | 34.9   | 35.0   | 10.7 | 3.95  | B       | I     |
| 374624B60024 | 35.0  | 35.0   | 10.0   | 23.4 | 7.55  | B       | B     |
| 374724B60024 | 35.0  | 35.0   | 18.0   | 15.3 | 5.15  | B       | B     |
| 374824B60024 | 35.0  | 35.0   | 25.0   | 12.0 | 4.27  | B       | B     |
| 10-BRD2-01** | 35.7  | 37.3   | 23.0   | 11.5 | 4.20  | N       | B     |
| 10-BRD1-01** | 37.5  | 37.5   | 23.0   | 10.1 | 3.83  | B       | B     |
| 10-BRD1-03** | 37.5  | 37.5   | 23.0   | 10.1 | 3.83  | B       | G     |
| 10-BRD1-04** | 37.5  | 37.5   | 23.0   | 10.1 | 3.83  | B       | B     |
| 10-BRD1-05** | 37.5  | 37.5   | 23.0   | 10.1 | 3.83  | N       | G     |
| 10-BRD1-07** | 37.5  | 37.5   | 23.0   | 10.1 | 3.83  | N       | B     |
| 374924B60024 | 40.0  | 40.0   | 10.0   | 20.3 | 6.46  | B       | B     |
| 375024B60024 | 40.0  | 40.0   | 18.0   | 12.2 | 4.34  | B       | B     |
| 375124B60024 | 40.0  | 40.0   | 25.0   | 10.3 | 3.83  | B       | B     |
| 10-CLS1-01** | 42.3  | 42.3   | 23.0   | 8.8  | 3.51  | B       | H     |
| 10-CLS2-01** | 42.3  | 42.3   | 35.0   | 8.3  | 3.44  | B       | H     |

\* See bottom of page 6 for information on how to use this table  
 Refer to page 6 for PCB hole patterns  
 \*\* Heat Sinks for Flip Chip includes foam pad around perimeter.  
 This stabilizes the part so heat sink doesn't move.

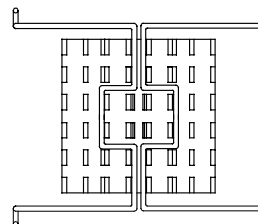
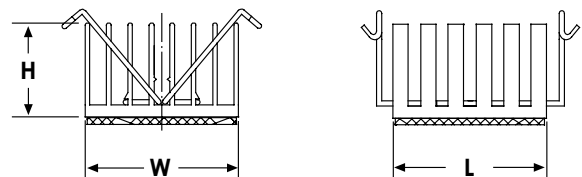
## FEATURES AND BENEFITS

- New unique wire clip design allows for complete reworkability after assembly without damage to the BGA package or PC Board
- Configurations are available for a wide range of BGA package sizes
- Minimal PC Board real estate is required for mounting
- Solder Anchors provide the most rugged mounting in the industry
- Each Heat Sink utilizes a phase change pad as the interface for optimal thermal performance

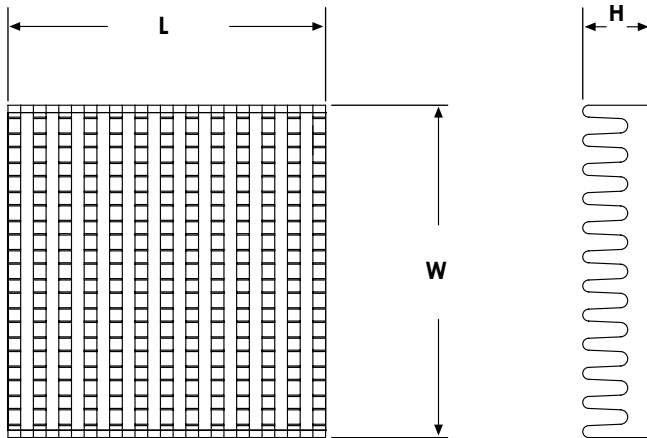
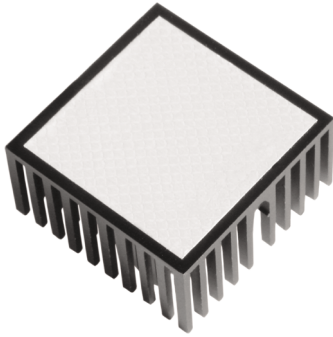
Drawing represents those heat sinks requiring 2 solder anchors



Drawing represents heat sink part numbers 10-BRD1-03 and 10-BRD1-05 that require 4 solder anchors



# TAPE ATTACHMENT METHOD



## FEATURES AND BENEFITS

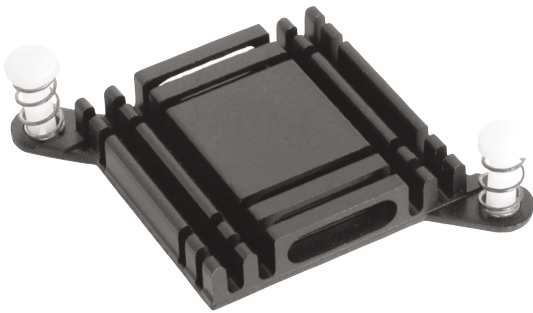
- Configurations are available for a wide range of BGA package sizes
- Tape mounted versions eliminate the need for mounting holes in the PC Board
- These Heat Sinks can be used with either plastic or metal/ceramic BGA Packages
- These Heat Sinks are compatible with Ther-a-grip tapes

| Part Number  | Width | Length | Height | *θn  | *θf   | Surface | *Finish |
|--------------|-------|--------|--------|------|-------|---------|---------|
| 375324B00035 | 10.2  | 10.2   | 10.2   | 71.4 | 21.20 | Plastic | B       |
| 375224B00032 | 10.2  | 11.1   | 10.2   | 71.4 | 21.20 | Metal   | B       |
| 375424B00034 | 15.2  | 15.2   | 6.4    | 62.5 | 17.60 | Plastic | B       |
| 374024B00032 | 23.0  | 23.0   | 10.0   | 40.0 | 11.69 | Metal   | B       |
| 374024B00035 | 23.0  | 23.0   | 10.0   | 40.0 | 11.69 | Plastic | B       |
| 374124B00032 | 23.0  | 23.0   | 18.0   | 23.4 | 7.39  | Metal   | B       |
| 374124B00035 | 23.0  | 23.0   | 18.0   | 23.4 | 7.39  | Plastic | B       |
| 374224B00032 | 23.0  | 23.0   | 25.0   | 19.7 | 6.37  | Metal   | B       |
| 374224B00035 | 23.0  | 23.0   | 25.0   | 19.7 | 6.37  | Plastic | B       |
| 335224B00032 | 25.0  | 25.0   | 9.9    | 34.0 | 10.39 | Metal   | B       |
| 335224B00034 | 25.0  | 25.0   | 9.9    | 34.0 | 10.39 | Plastic | B       |
| 335324B00032 | 26.9  | 26.9   | 11.4   | 27.7 | 8.71  | Metal   | B       |
| 374324B00032 | 27.0  | 27.0   | 10.0   | 30.6 | 9.35  | Metal   | B       |
| 374324B00035 | 27.0  | 27.0   | 10.0   | 30.6 | 9.35  | Plastic | B       |
| 374424B00032 | 27.0  | 27.0   | 18.0   | 20.3 | 6.46  | Metal   | B       |
| 374424B00035 | 27.0  | 27.0   | 18.0   | 20.3 | 6.46  | Plastic | B       |
| 374524B00032 | 27.0  | 27.0   | 25.0   | 16.5 | 5.47  | Metal   | B       |
| 374524B00035 | 27.0  | 27.0   | 25.0   | 16.5 | 5.47  | Plastic | B       |
| 373024B00032 | 27.9  | 27.9   | 8.9    | 33.3 | 10.00 | Metal   | B       |
| 373024B00034 | 27.9  | 27.9   | 8.9    | 33.3 | 10.00 | Plastic | B       |
| 2327B-TACH   | 27.9  | 28.1   | 15.2   | 23.4 | 7.43  | Plastic | B       |
| 2327B-CP50   | 27.9  | 28.1   | 15.2   | 23.4 | 7.43  | Metal   | B       |
| 373224M00032 | 28.0  | 28.0   | 6.0    | 44.1 | 13.13 | Metal   | M       |
| 335724B00032 | 30.1  | 30.1   | 6.6    | 35.7 | 10.84 | Metal   | B       |
| 335824B00032 | 30.0  | 30.0   | 9.4    | 29.4 | 9.11  | Metal   | B       |

| Part Number  | Width | Length | Height | *θn  | *θf  | Surface | *Finish |
|--------------|-------|--------|--------|------|------|---------|---------|
| 335824B00034 | 30.0  | 30.0   | 9.4    | 29.4 | 9.11 | Plastic | B       |
| 2338B-TACH   | 33.0  | 31.4   | 12.5   | 23.1 | 7.23 | Metal   | B       |
| 371824B00032 | 35.0  | 35.0   | 7.0    | 31.9 | 9.67 | Metal   | B       |
| 371824B00034 | 35.0  | 35.0   | 7.0    | 31.9 | 9.67 | Plastic | B       |
| 374624B00032 | 35.0  | 35.0   | 10.0   | 23.4 | 7.55 | Metal   | B       |
| 374624B00035 | 35.0  | 35.0   | 10.0   | 23.4 | 7.55 | Plastic | B       |
| 374724B00032 | 35.0  | 35.0   | 18.0   | 15.3 | 5.15 | Metal   | B       |
| 374724B00035 | 35.0  | 35.0   | 18.0   | 15.3 | 5.15 | Plastic | B       |
| 374824B00032 | 35.0  | 35.0   | 25.0   | 12.0 | 4.27 | Metal   | B       |
| 374824B00035 | 35.0  | 35.0   | 25.0   | 12.0 | 4.27 | Plastic | B       |
| 372024B00032 | 35.0  | 35.0   | 27.9   | 11.9 | 4.28 | Metal   | B       |
| 372024B00034 | 35.0  | 35.0   | 27.9   | 11.9 | 4.28 | Plastic | B       |
| 373324M00032 | 37.4  | 37.4   | 6.0    | 32.6 | 9.91 | Metal   | M       |
| 374924B00032 | 40.0  | 40.0   | 10.0   | 20.3 | 6.46 | Metal   | B       |
| 374924B00035 | 40.0  | 40.0   | 10.0   | 20.3 | 6.46 | Plastic | B       |
| 364424B00032 | 40.1  | 40.0   | 11.4   | 18.4 | 6.02 | Metal   | B       |
| 364424B00034 | 40.1  | 40.0   | 11.4   | 18.4 | 6.02 | Plastic | B       |
| 375024B00032 | 40.0  | 40.0   | 18.0   | 12.2 | 4.34 | Metal   | B       |
| 375024B00035 | 40.0  | 40.0   | 18.0   | 12.2 | 4.34 | Plastic | B       |
| 375124B00032 | 40.0  | 40.0   | 25.0   | 10.3 | 3.83 | Metal   | B       |
| 375124B00035 | 40.0  | 40.0   | 25.0   | 10.3 | 3.83 | Plastic | B       |
| 2321B-TACH   | 43.2  | 41.3   | 8.9    | 22.1 | 6.93 | Metal   | B       |
| 2332B-TACH   | 43.2  | 41.3   | 16.5   | 12.9 | 4.53 | Metal   | B       |
| 2342B-TACH   | 45.7  | 44.6   | 7.0    | 23.1 | 7.26 | Metal   | B       |

\* See bottom of page 6 for information on how to use this table

## PUSH PIN ATTACHMENT METHOD

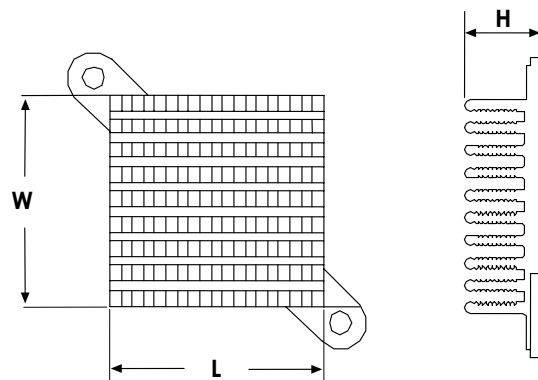


| Part Number  | Width | Length | Height | *θ n | *θ f  | *Finish | *Fig. |
|--------------|-------|--------|--------|------|-------|---------|-------|
| 10-6326-27   | 28.0  | 28.0   | 6.0    | 44.1 | 13.13 | B       | C     |
| 10-6326-28   | 28.0  | 28.0   | 6.0    | 44.1 | 13.13 | B       | C     |
| 10-6327-01   | 28.5  | 28.5   | 10.0   | 30.6 | 9.26  | B       | C     |
| 10-TNT2-01   | 36.1  | 48.0   | 11.6   | 18.8 | 6.13  | B       | F     |
| 10-5597-02   | 37.4  | 37.4   | 6.0    | 33.3 | 9.91  | M       | D     |
| 10-5597-22   | 37.4  | 37.4   | 6.0    | 33.3 | 9.91  | G       | D     |
| 10-5597-33   | 37.4  | 37.4   | 6.0    | 33.3 | 9.91  | G       | D     |
| 10-5607-04   | 37.4  | 37.4   | 10.0   | 22.1 | 6.99  | B       | D     |
| 10-5607-05   | 37.4  | 37.4   | 10.0   | 22.1 | 6.99  | B       | D     |
| 372924M02000 | 37.4  | 37.4   | 6.0    | 32.6 | 9.91  | M       | D     |
| 10-L4LB-03   | 41.4  | 45.2   | 11.7   | 16.7 | 5.60  | B       | E     |
| 10-L4LB-05   | 41.4  | 45.2   | 11.7   | 16.7 | 5.60  | B       | E     |
| 10-L4LB-11   | 41.4  | 45.2   | 11.7   | 14.2 | 4.91  | B       | E     |

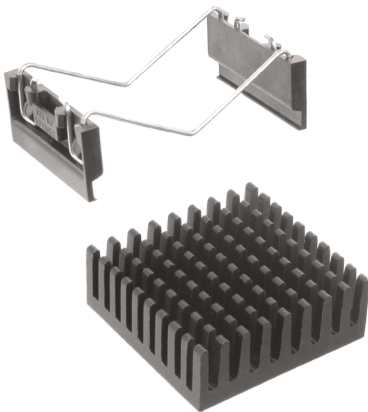
\* See bottom of page 6 for information on how to use this table  
Refer to page 6 for PCB hole Patterns

## FEATURES AND BENEFITS

- Configurations are available for a wide range of BGA Package sizes
- All Heat Sinks utilize industry standard hole patterns
- Plastic push pins are standard. Consult Aavid Thermalloy for versions available with brass push pins for more rugged applications
- Most Heat Sinks utilize a Phase Change Pad as the interface for Optimal Thermal Performance
- Minimal diameter holes are necessary for mounting to PC Board



## CLIP ATTACHMENT METHOD

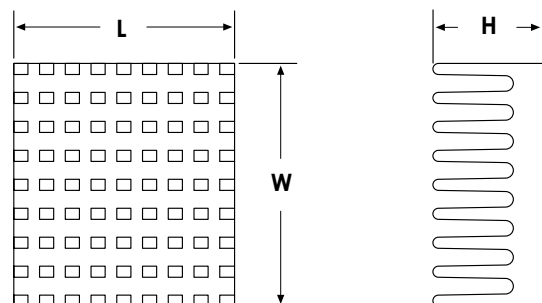


| Part Number     | Width | Length | Height | *θ n | *θ f | *Finish |
|-----------------|-------|--------|--------|------|------|---------|
| 2317B-EP11-BGS1 | 26.1  | 20.5   | 15.2   | 32.6 | 9.94 | B       |
| 2518B-EP11-BGS2 | 30.5  | 28.1   | 15.6   | 22.7 | 7.05 | B       |
| 2519B-EP11-BGS5 | 34.5  | 31.4   | 15.6   | 19.7 | 6.30 | B       |
| 2522B-EP04-BGS5 | 38.1  | 38.0   | 10.2   | 22.1 | 6.94 | B       |
| 2520B-EP04-BGS5 | 38.1  | 38.0   | 15.6   | 15.6 | 5.17 | B       |

\* See bottom of page 6 for information on how to use this table

## FEATURES AND BENEFITS

- A unique clip eliminates the need for mounting holes in the PC Board
- Each Heat Sink utilizes a Phase Change Pad as the interface for optimal thermal performance
- The clips unique design eliminates the need for thermal tape attachment
- The Clips are available in industry standard sizes to fit a wide variety of BGA package sizes



# PCB HOLE PATTERNS

FIGURE A

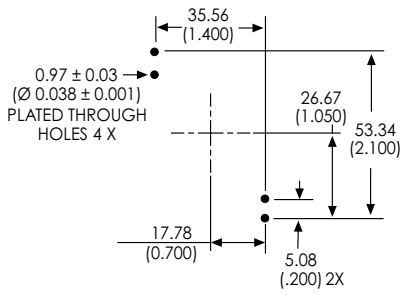


FIGURE B

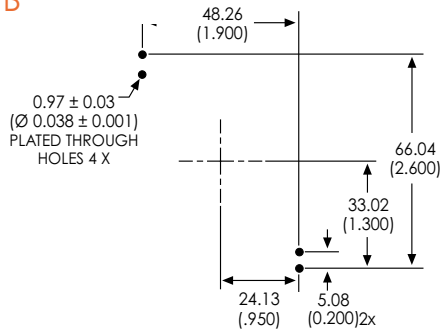


FIGURE C

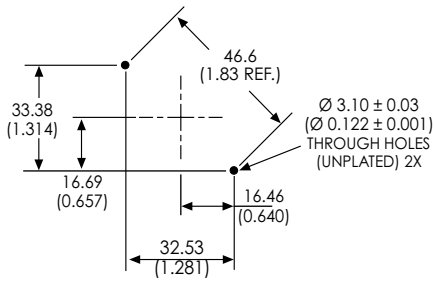


FIGURE D

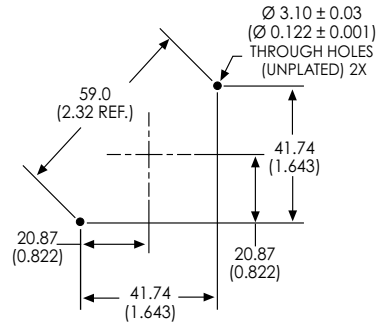


FIGURE E

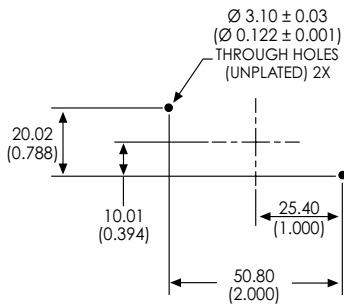


FIGURE F

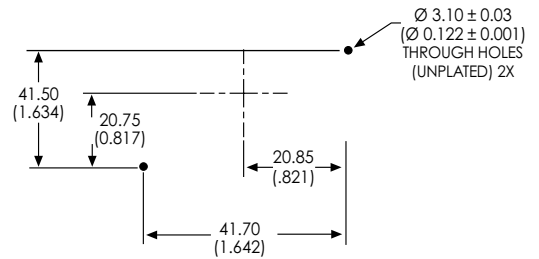


FIGURE G

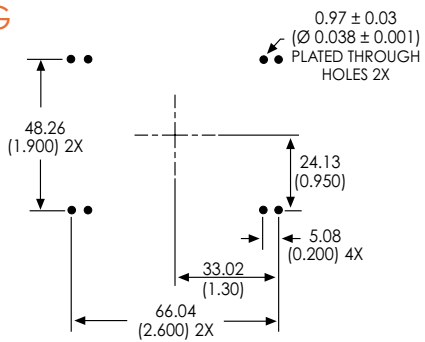


FIGURE H

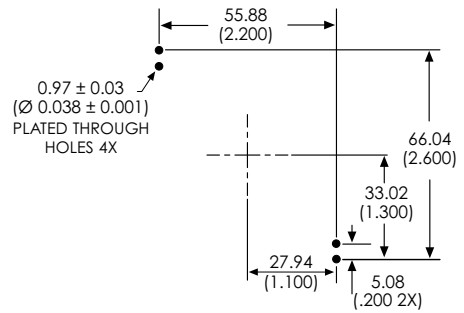


FIGURE I

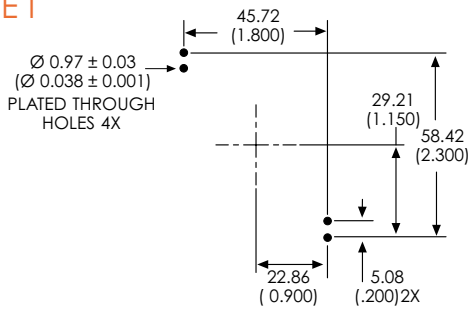


TABLE GUIDE

Dimensions are in mm

$\theta_n$  = Natural convection thermal resistance based on a 75°C heat sink temperature rise

$\theta_f$  = Forced convection thermal resistance based on an entering 1.0 m/s (200 lfm) airflow

Finish: B = Black Anodize, M = Green Anodize, N = Clear Anodize, G = Gold Anodize



# AAVID THERMALLOY

## THERMAL MANAGEMENT DESIGNER TOOL

Log on to our web site [www.aavidthermalloy.com](http://www.aavidthermalloy.com) for design assistance.  
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