Weal Lam Electronic Packaging Products

The Proprietary Thermal Management Products For Power Electronics

WEAL LAM
Parts & Tools Ltd.

ISO9002
TÜV
Certified

INTRODUCTION

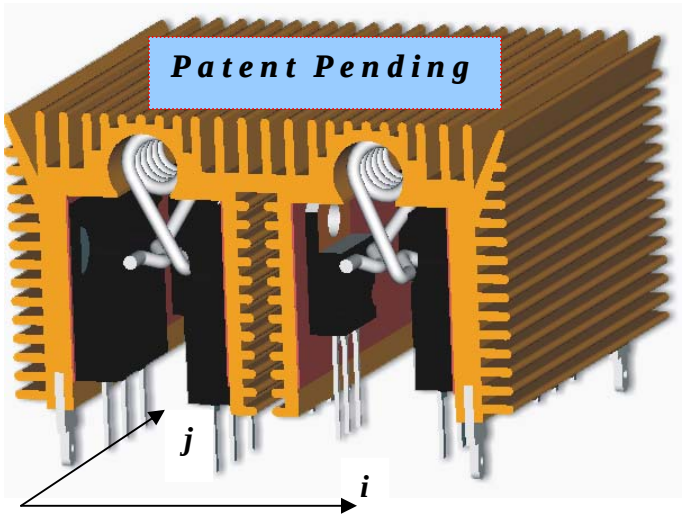
Weal Lam has been established to manufacture and market heat sinks and other types of thermal management products for use in electronic systems and equipments. Weal Lam offers an extensive product line of thermal management products and complete design services. Weal Lam's operation is also geared to provide our customers with custom parts to meet their special design needs for thermal management. Our patented configurable matrix clip system heat sinks are designed to meet customers' high power demands, small space restriction and universal mounting needs. We also can make minor modifications on our standard parts to achieve cost saving for our customers. Our products have the major metrics over those on markets:

- Innovative
- Cost effective
- Compact
- Scalable
- Configurable
- User-friendly
- Efficient
- All-in-One Solution
- Easy in Assembly & manufacturing

PRODUCTS AND SERVICES

- Standard and Customized Thermal Management Products
- Stamped and Extruded parts
- Operations from Concept Design, Tooling Development and Prototype to Production Run.
- Just-in-time delivery and Short Lead Time
- Free Thermal Analysis for Heat Sink Level Assembly

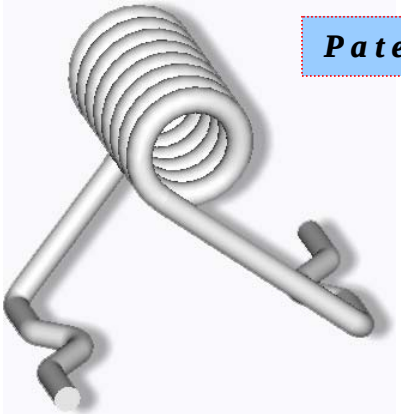
Matrix Clip System Heat Sink



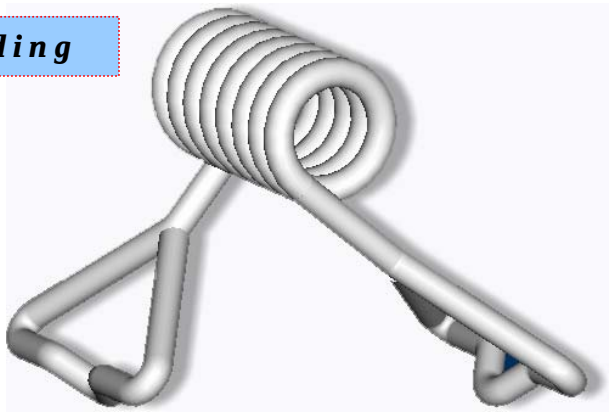
Matrix Clip System Heat Sink w/Power Devices

Weal Lam offers the patented, high performance, low cost and compact heat sink with matrix clip system. The unitary constructed heat sink can be universally mounted on printed circuit or wiring board to meet the circuit design needs without the requirement to change the air-flow direction. The new heat sink comprises of a base frame with extruded (or brazed or bonded) fins, solderable feet and torsion spring clips. The heat sink's capacity of holding power devices can be increased transversally & longitudinally. The matrix [i, j] with i spring clips along X axis and j along Y axis makes it very easy for designers to configure electronic packaging. ***All-in-One*** solution makes designers be no longer troubled with how to attach devices onto heat sink and how to mount the heat sink assembly onto PCB. Therefore, the time-to-market can be shortened. This heat sink provides easiest assembly, largest surface areas and smallest space occupation. Our ***bonded-fin heat sink*** is developed with military & aerospace grade and performance (fin density up to 20 fins/in.), but sold with commercial price. It is the ideal type of heat sink for high power density and small size (1U or 2U) electronic packaging with forced convention cooling.

Our patented ***pre-distortion coil spring clip*** and ***offset coil spring clip*** provide the uniform pressure on electronic devices or components, highest reliability and repeatability, shock and vibration resistance, minimum air drag and lighter weight. Two spring clips are 100% exchangeable but provide different foot-print for customer's preferences.

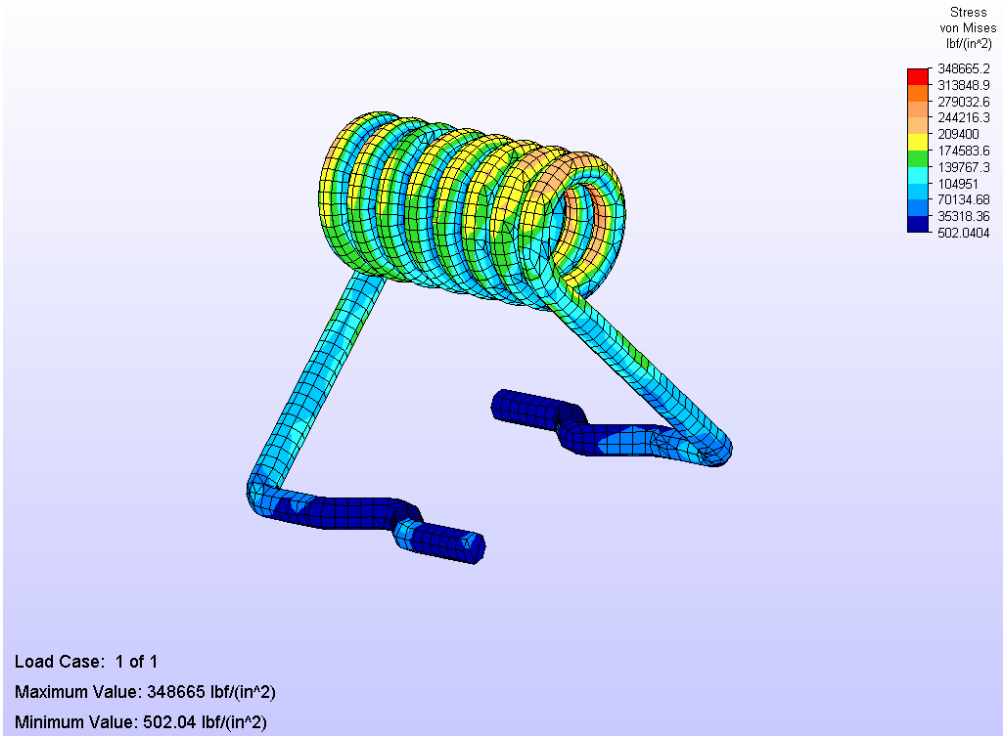


Pre-distortion Spring Clip

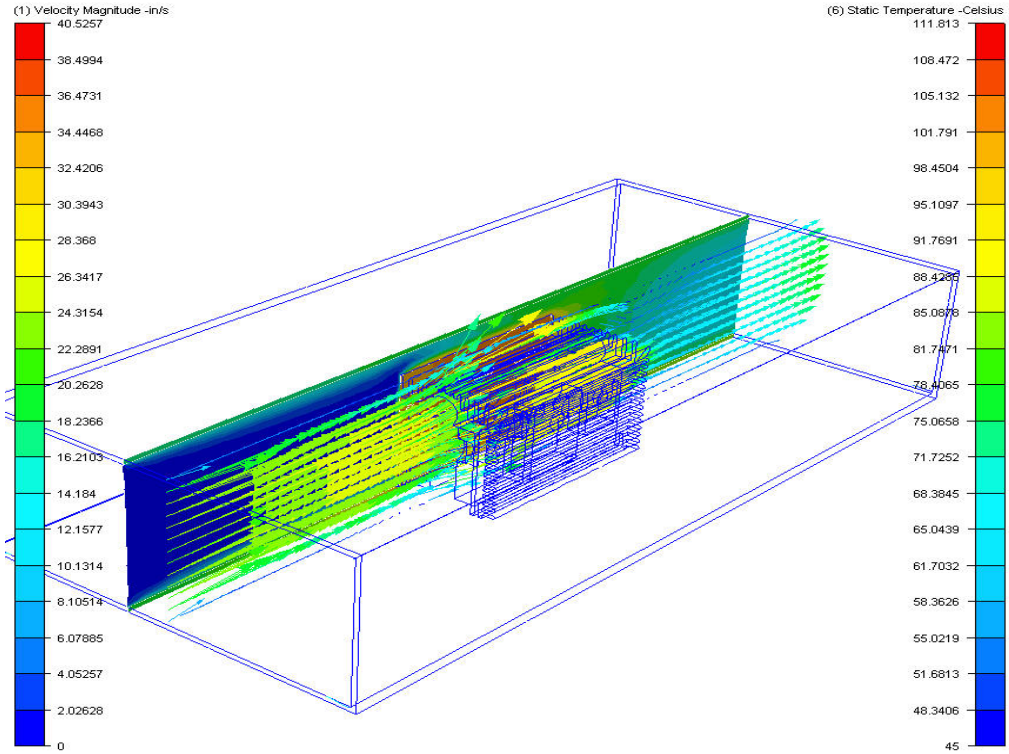


Offset Spring Clip

The thermal profile of the heat sink and the stress profile of the clip are analyzed with FEA software tool to make the sure the designs are robust.



Coil Spring Clip Stress Analysis



Matrix Clip System Heat Sink CFD and Thermal Analysis

Features and Benefits

- **Minimum assembly cost and labor**
  Spring clips make the mounting holes and fasteners obsolete in assembly.
- **Maximum Repeatability**
  Spring force easy removal and replacement of components
- **Maximum Thermal Transfer**
  Maximum surface area per unit volume, efficient cooling fins and consistent mounting force reduces thermal resistance.
- **Maximum Resistance to Shock & Vibration**
  Spring coil can store and absorb energy. Light weight and resilient spring clip locks electronic component in place to provide maximum resistance to shock and vibration. Pieced solder feet create maximum solder strength.
- **Maximum Reliability**
  Resilient spring action locks electronic component in place. Fewer parts in assembly and no fasteners and washers required. Prevent short circuit by eliminating metal particles generated from hardware or thread tapping.
- **Design Flexibility**
  Provide the maximum flexibility for dynamic device locations and changes, various mounting options, and customizing dimensions to meet the design needs without costly tooling alteration. "***Configure-to-Fit***" gives designers total freedom to configure heat sink needed for their packaging.

Material:

Heat Sink: Aluminum Alloy 6063-T5 or equivalent

Fins: Aluminum Alloy 6063-T5 or equivalent. Copper Alloy C110 or equivalent.

Spring Clip: Music Wire, Per ASTM A228.

Foot: Cold-rolled Steel, Per ASTM A-366, commercial quality, or equivalents.

Insulator (Optional): Sil-Pad 900-S, K6 800-S and K10, or equivalent.

Finish:

Heat Sink: Clear or Yellow Chromate Per Mil-5541-C, or Black Anodize per Mil-8625, Type II, Class 2, or Unfinished

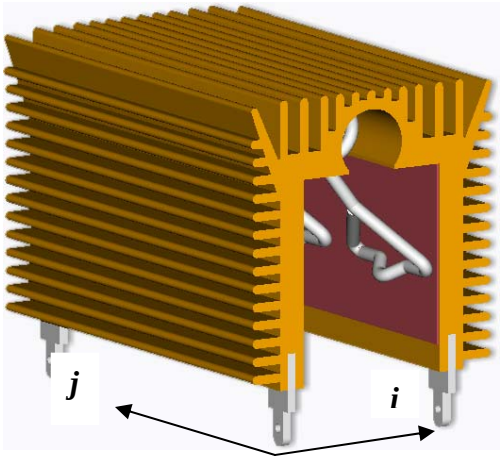
Copper Fin: Bright Tin Plated per Mil-10727 Or unfinished

Spring Clip: Bright Nickel Plated per QQ-N-290-A, Class 1, Grade G.

Foot: Bright Tin Plated per Mil-10727, Over copper strike.

Products Applications and Specifications

100 Series Matrix Clip System Heat Sink

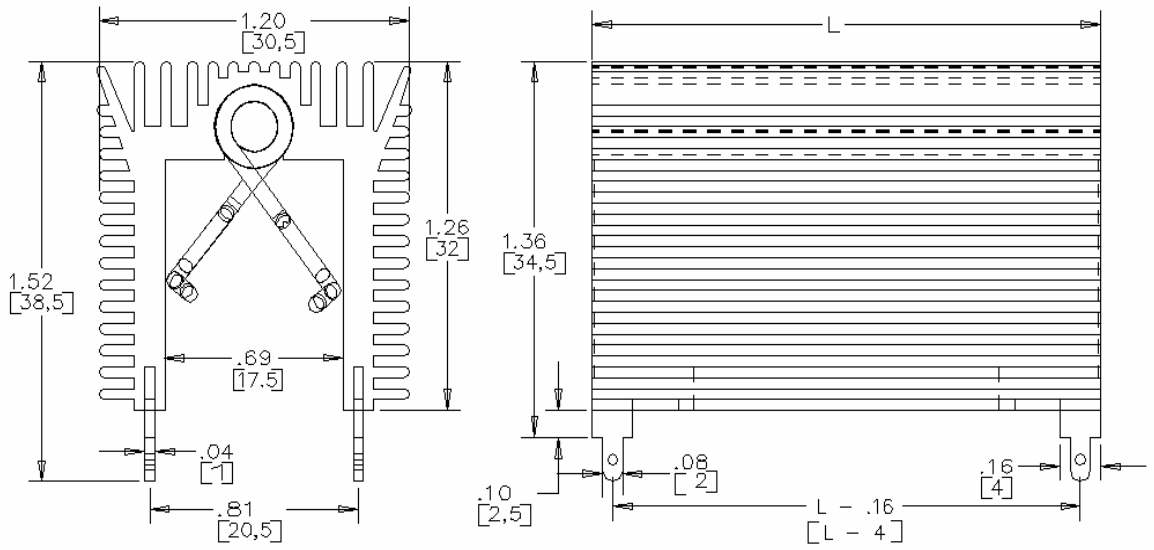


P/N: 102- EA – O - 2.40-YC - I

Surface Area (extruded/bonded fin) in^2/in (mm^2/mm)	Weight oz/in (g/mm)	Clip Force lb (kg)
18 (460)/27(677)	.65 (.96)	12.3 (5.9)
Applications	Cooling	Mounting
TO-247, TO-3P TO-220, TO-264 Etc.	Forced or Natural Convection	Thought Hole

NOTE: Customers can specify their own Height and Width of 100 Series M.C. S. Heat Sink.

Mechanical Dimensions in. [mm]



Patent Pending

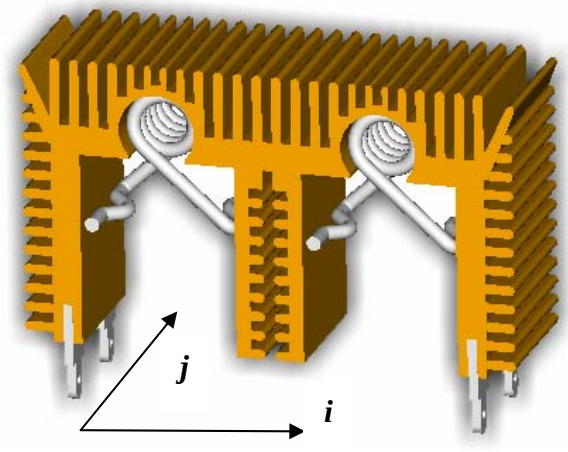
Part Number Specifications

1 [ ] - [ ] - [ ] - L (in/mm) - [ ] - [ ]

- NUMBERS OF CLIP ALONG "j" AXIS
- FIN STYLE/MAT'L
  "EA" - EXTRUDED/AL
  "BA" - BONDED/AL
  "BC" - BONDED/CU
- CLIP STYLE
  "C" FOR CENTER CLIP
  "O" FOR OFFSET CLIP
- LENGTH OF HEATSINK IN INCHES OR MILIMETERS
- HEAT SINK FINISH
  "YC" FOR YELLOW CHROMATE
  "CC" FOR CLEAR CHROMATE
  "BA" FOR BLACK ANODIZING
  "N" FOR UNFINISH
- INSULATOR: Y = I, N = BLANK

NOTE: Insulator size is 0.91 (23.1) x L-.16 (4.0).

200 Series Matrix Clip System Heat Sink

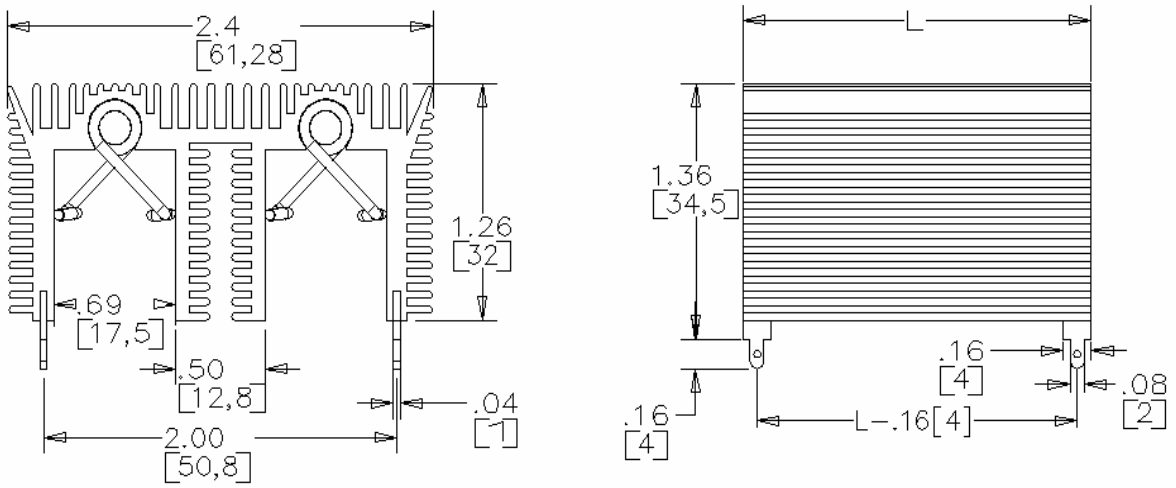


P/N: 201 - EA - C- 1.20 -YC

Surface Area (extruded/bonded fin) $in^2/in(mm^2/mm)$	Weight oz/in(g/mm)	Clip force lb (kg)
30 (771)/57(1443)	1.01 (1.5)	13 (5.9)
Applications	Cooling	Mounting
TO-247, TO-3P TO-220, TO-264 Etc.	Forced or free convective	Thought Hole

NOTE: Customers can specify their own Height and Width of 200 Series M.C.S. Heat Sink.

Mechanical Dimensions in. [mm]



Patent Pending

Part Number Specifications

2 [ ] - [ ] - [ ] - L (in/mm) - [ ] - [ ]

NUMBERS OF CLIP
ALONG "j" AXIS

FIN STYLE/MAT'L
"EA" - EXTRUDED/AL
"BA" - BONDED/AL
"BC" - BONDED/CU

CLIP STYLE
"C" FOR CENTER CLIP
"O" FOR OFFSET CLIP

LENGTH OF HEATSINK
IN INCHES OR MILIMETERS

HEAT SINK FINISH
"YC" FOR YELLOW CHROMATE
"CC" FOR CLEAR CHROMATE
"BA" FOR BLACK ANODIZING
"N" FOR UNFINISH

Y N
INSULATOR
I BLANK

NOTE: Insulator size is 0.91 (23.1) x L-.16 (4.0).

"***Configure-to-Fit***" makes it possible for our customers to configure their own Matrix Clip System Heat Sink to fit their PWB/PCB layouts and meet their design and thermal requirement without worrying about how to mount the heat sink onto PCB/PWB and how to clip the electronic devices onto heat sink. The configured heat sink will fit your design needs while fitting our matrix clipping system. The following numbering system will help you to specify your Matrix Clip System Heat Sink part number:

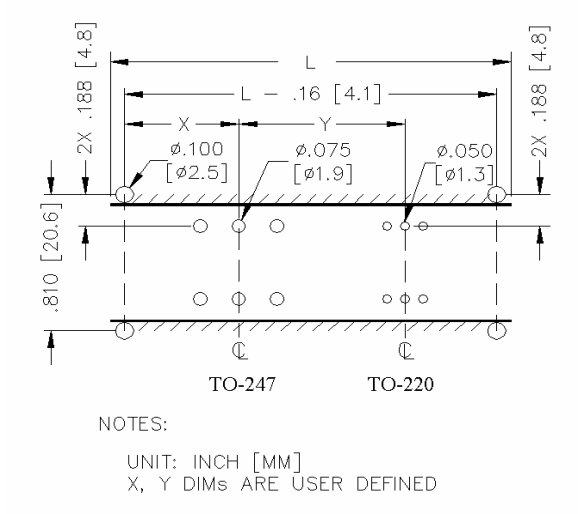
"*Configure-to-Fit*" Part Number Specifications

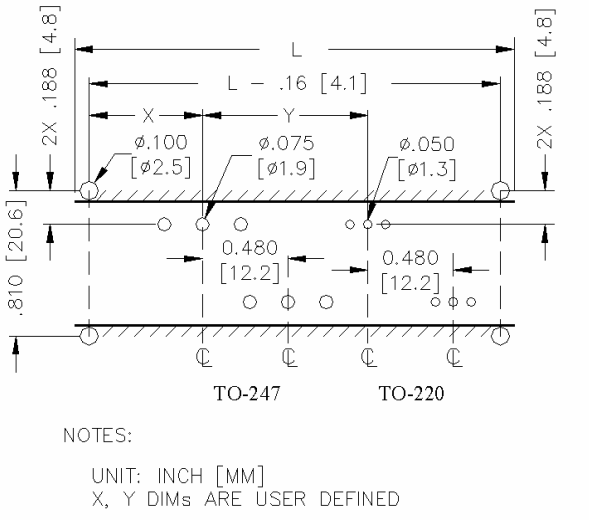
[ ] - [ ] - [ ]- [ ] -[ ] x [ ] x [ ] (in/mm) - [ ] - [ ]

- NUMBERS OF CLIP ALONG "i" & "j" AXIS
- FIN STYLE/MATERIAL
  "EA" - EXTRUDED/AL
  "BA" - BONDED/AL
  "BC" - BONDED/CU
- CLIP STYLE
  "C" FOR CENTER CLIP
  "O" FOR OFFSET CLIP
- HEATSINK Width x Height x Lenght IN INCHES OR MILIMETERS
  SPECIFY AS W1/W2-H1/H2 IF USE STEPPED FINS. W1, H1 UPPER WIDTH AND HEIGTH, W2, H2 LOWER WIDTH AND EHIGHT
- HEAT SINK FINISH
  "YC" FOR YELLOW CHROMATE
  "CC" FOR CLEAR CHROMATE
  "BA" FOR BLACK ANODIZING
  "N" FOR UNFINISH
- INSULATOR: Y (I) / N (BLANK)

NOTES: Insulator size is 0.91 (23.1) x L - .16 (4.0)

Recommended Foot Print for all Matrix Clip System Heat Sink



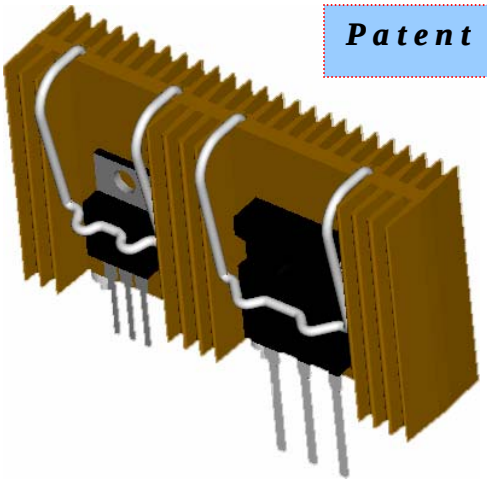


Use Center Clip & up to .010" thick insulators. Tolerance: +/- .010

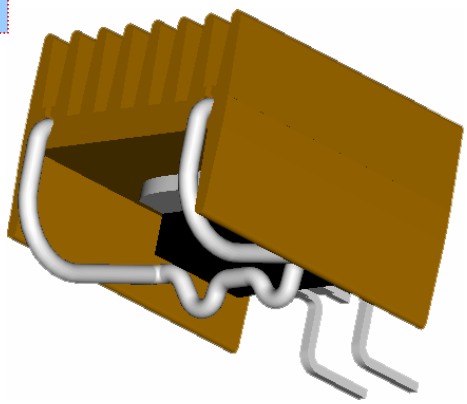
Universal Mountable Auto-align Clip System ™ Heat Sink

Weal Lam offers another patented, low cost heat sink which can be either through-hole or surface mounted to meet the circuit design, cooling and space needs. The new heat sink comprises an extruded or stamped heat sink body, insulated feet (optional, for Double-sided board and through-hole mounting only) and an integral spring clip which has an auto-align feature and solderable leads. This heat sink provides easy assembly and all-in-one solution. It can be used for TO-220, TO-247, TO-264, TO-218 and D-Pak series power devices with either natural or forced convention cooling.

Patent Pending

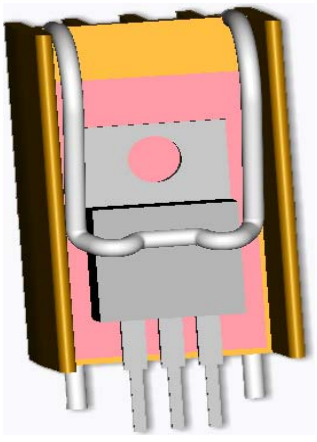


Through-hole Mounting
Double devices Heat Sink



Surface Mounting Heat
Single devices Heat Sink

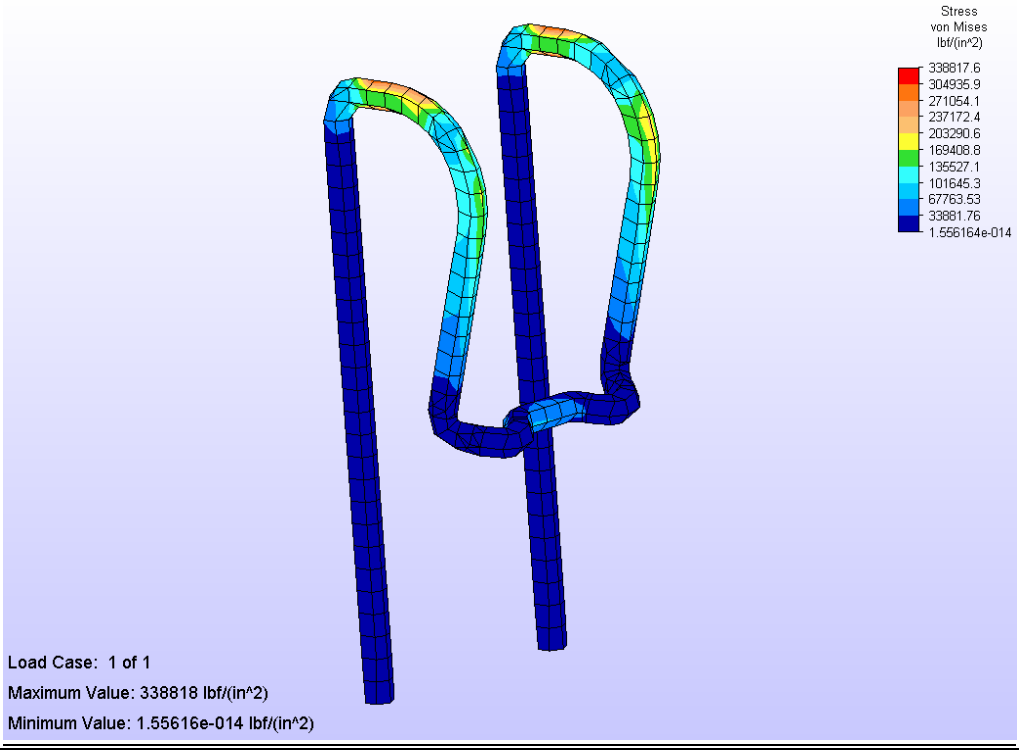
Patent Pending



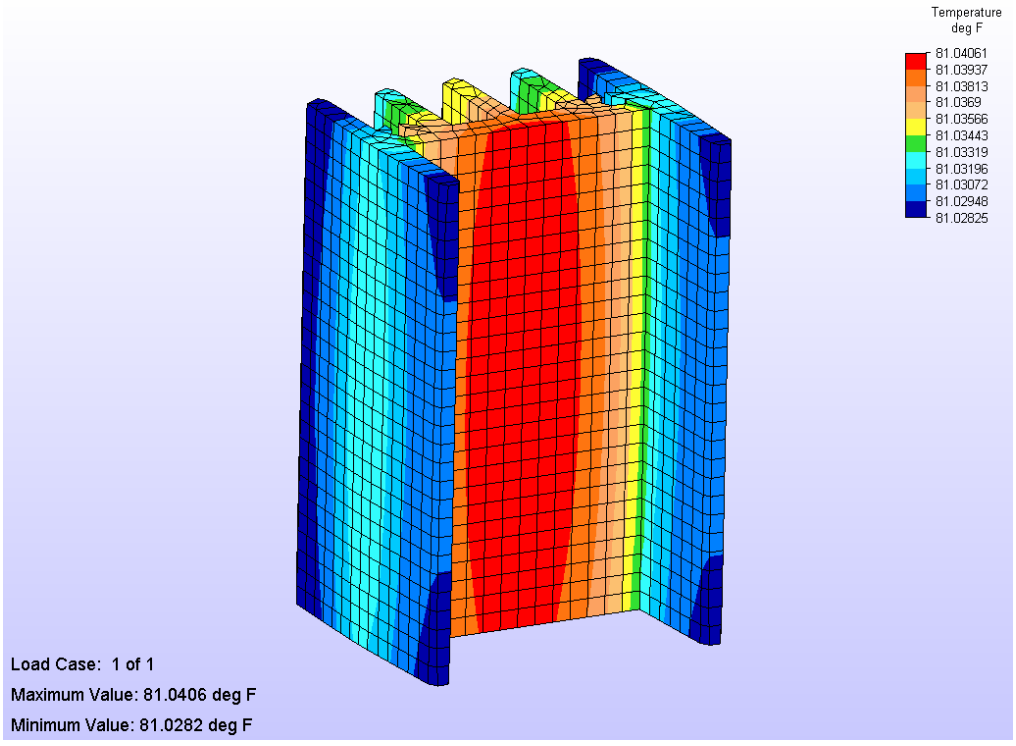
Single Device (TO-220) Heat Sink

Single-device (TO-247) Heat Sink

Weal lam Parts & Tools Ltd. 5081 S. State Road 7, Suite #809, Davie, FL 33314
Tel: 954/304-0094, Fax: 954/584-6161, E-mail: wlsales@weallam.com



Auto-align Spring Clip Stress Analysis



Auto-align Clip Heat Sink Thermal Analysis

Features and Benefits

- **Minimum assembly cost and labor**
  Spring clip and auto-align feature makes fasteners and fixtures obsolete in assemblies.
- **Maximum Repeatability**
  Clamping force on devices by resilient spring can be loaded and unloaded repeatedly without degrading the clamping force.
- **Maximum Thermal Transfer**
  Maximum surface area per unit volume and consistent mounting force reduce thermal resistance
- **Maximum Resistance to Shock & Vibration**
  Light weight and resilient spring clip locks electronic component in place to provide maximum resistance to shocand vibration
- **Maximum Reliability**
  Resilient spring action locks electronic component in place and few parts in assembly. Prevent short circuit by eliminating metal particles generated from hardware or thread tapping.
- **Design Flexibility**
  Provide the maximum flexibility for various mounting options: through hole or surface mounting, vertical or horizontal mounting and customizing the dimensions to meet the design needs without costly tooling alteration.

Material:

Heat Sink: Extruded: Aluminum Alloy 6063-T5 or equivalents
Stamped: Aluminum Alloy 5052- H32 or equivalents

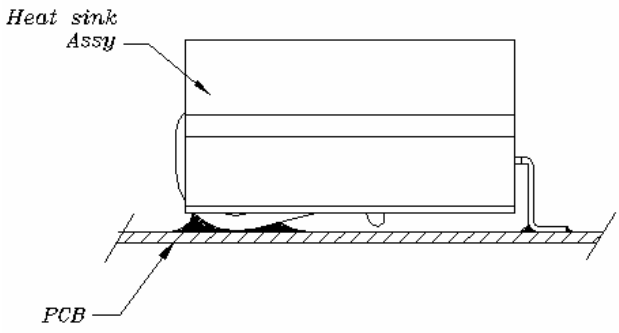
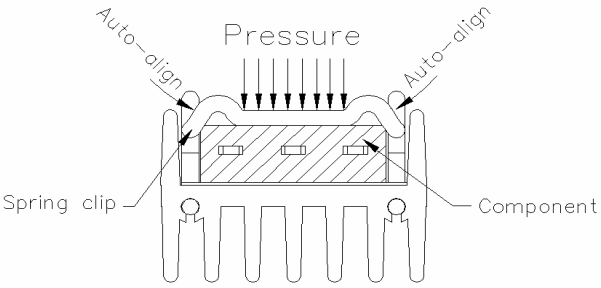
Spring Clip: Music Wire Per ASTM A228

Insulator (Optional): Sil-Pad 900-S, 800-S, K6 or equivalents.

Finish:

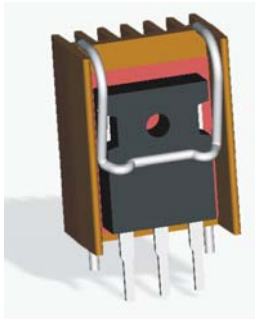
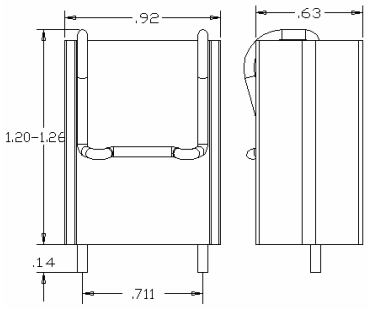
Heat Sink: Clear or Yellow Chromate per Mil-5541-C, or Black Anodize per Mil-8625, Type II, Class 2, or unfinished

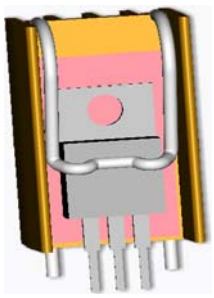
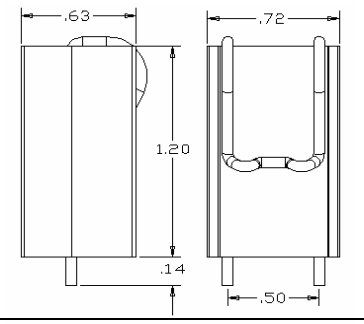
Spring Clip: Bright Tin Plated per Mil-10727 over copper strike.

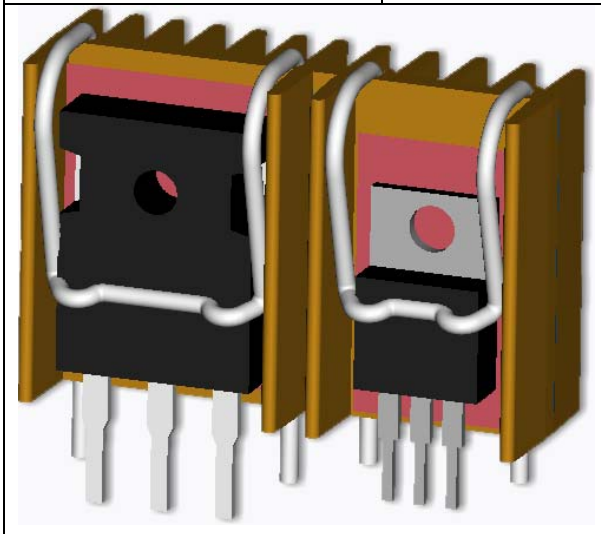
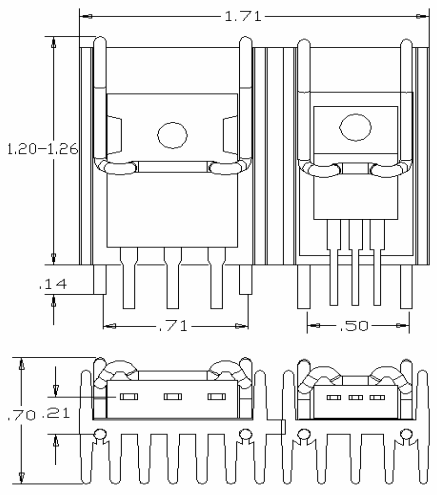
Surface Mounting Profile	Auto-Align Mechanism
	

Products Applications and Specifications

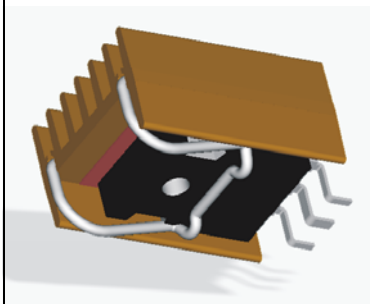
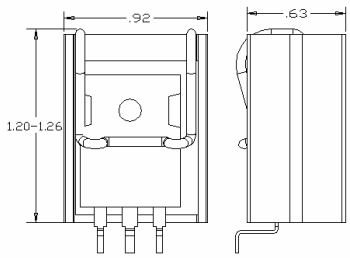
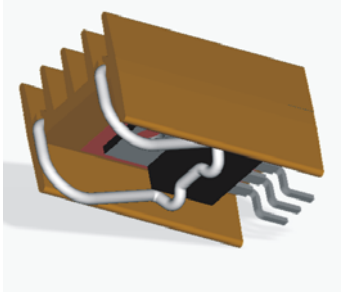
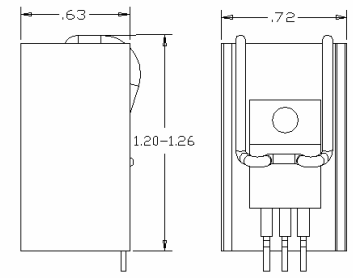
Patent Pending

Basic P/N: WV-T247-101	Mechanical Dimensions (in.)	Surface Area (in^2):	8.4
		Weight (oz):	2.7
		Clip Force (lbf):	13.2
		Mounting:	Thru Hole, vertical
		Thermal Resistance, Natural Convection **R_{s-a} =7 ˚C/W**	

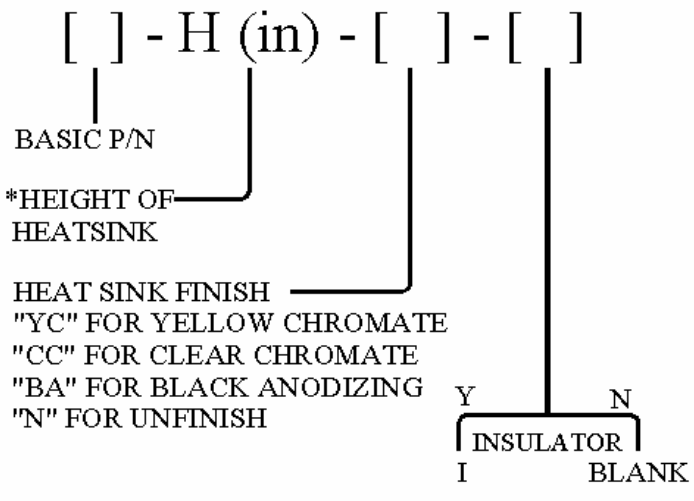
Basic P/N: WV-T220-101	Mechanical Dimensions (in.)	Surface Area (in^2):	6.5
		Weight (oz):	3.7
		Clip Force (lbf):	13.2
		Mounting:	Thru Hole, vertical
		Thermal Resistance Natural Convection **R_{s-a} =10 ˚C/W**	

Basic P/N: WH-DTO-101	Mechanical Dimensions (in.)	Surface Area (in^2):	3.4
			

Surface Area(in^2):	15 (H=1.1)	Mounting:	Thru Hole, vertical	Thermal Resistance @ N.C.
Weight (oz):	6.4(H=1.1)		Or SMT	**R_{s-a} =6 ˚C/W**

Basic P/N: WH-T247-101	Mechanical Dimensions (in.)	Surface Area (in^2):	8.4
		Weight (oz):	2.7
		Clip Force (lbf):	13.2
		Mounting:	Surface horizontal
		Thermal Resistance, Natural Convection **R_{s-a} =7 ˚C/W**	
Basic P/N: WH-T220-101	**Mechanical Dimensions (in.)**	**Surface Area (in^2):**	**6.5**
		Weight (oz):	3.7
		Clip Force (lbf):	13.2
		Mounting:	Surface horizontal
		Thermal Resistance Natural Convection **R_{s-a} =10 ˚C/W**	

Auto-align Clip Heat Sink Part Number Specification

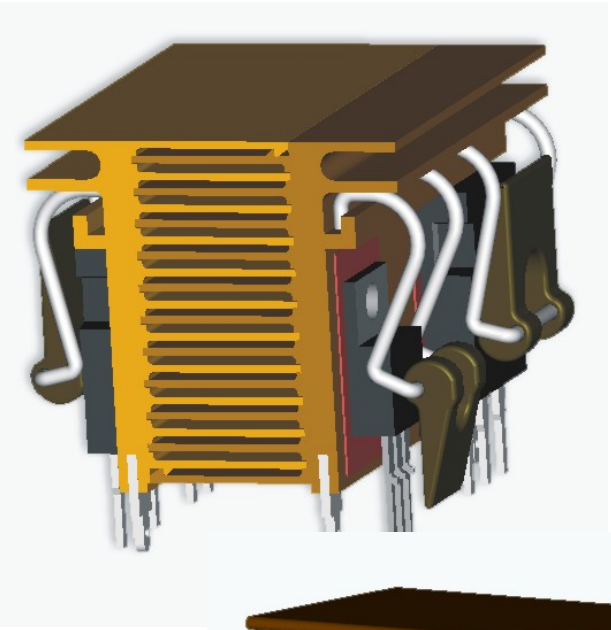


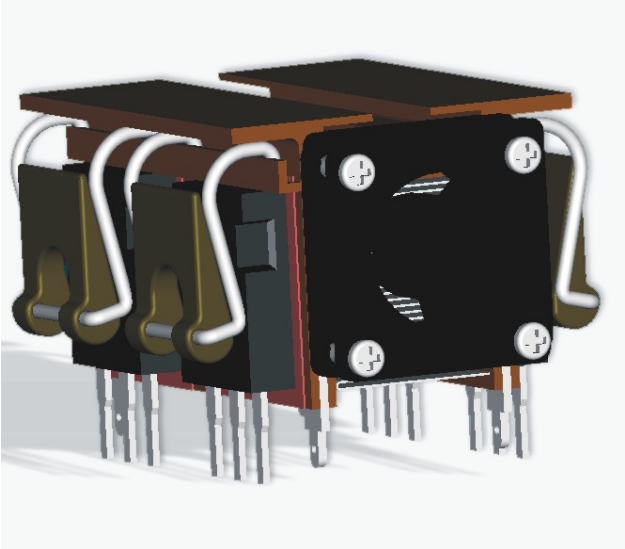
Notes:

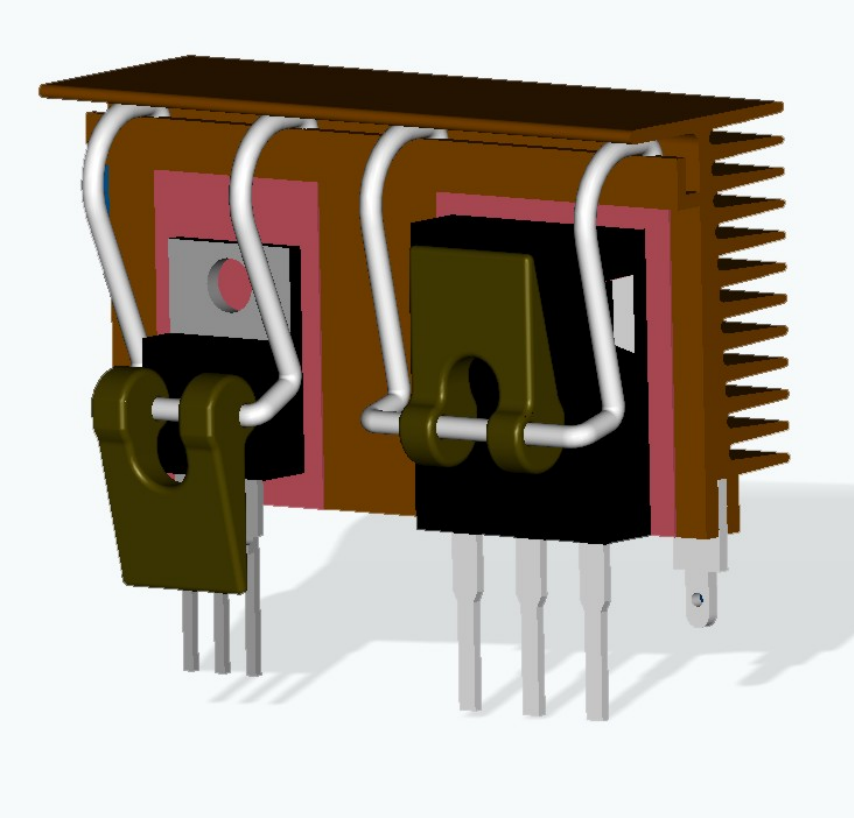
1). Customer can specify the Height of the Heat Sink
2). Insulator Pad size is the max size of the component + .20 in. (5.08mm). e.g. TO-247 max size is 20.30x15.90mm, so the insulator is 25.38x20.98mm.
3). Insulator Pad material to specified by customer.
4). The thermal resistance value may subject to change in different environments.

Camming Clip System ™ Heat Sink

Weal Lam offers another patented, super easily assembly and disassembly heat sink which requires no fixtures, jigs and tools to assembly devices onto the heat sink. The new heat sink comprises an heat sink body with extruded or brazed convoluted fins and an integral cam spring clip which has an auto-align feature and camming mechanism. This heat sink provides easy assembly and all-in-one solution. It can be used for TO-220, TO-247, TO-264 and TO-218 series power devices with either natural or forced convention cooling.



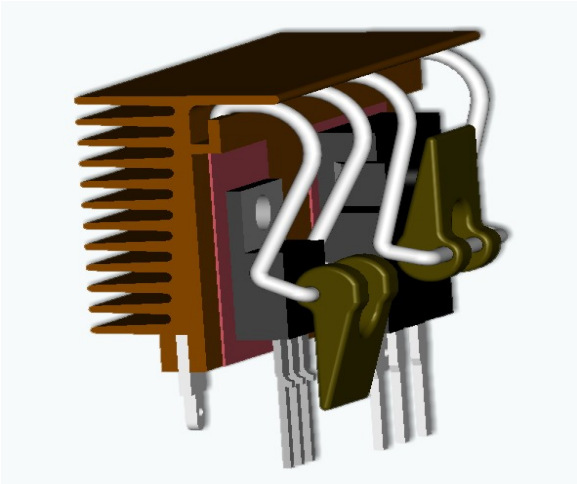




Products Applications and Specifications

Patent Pending

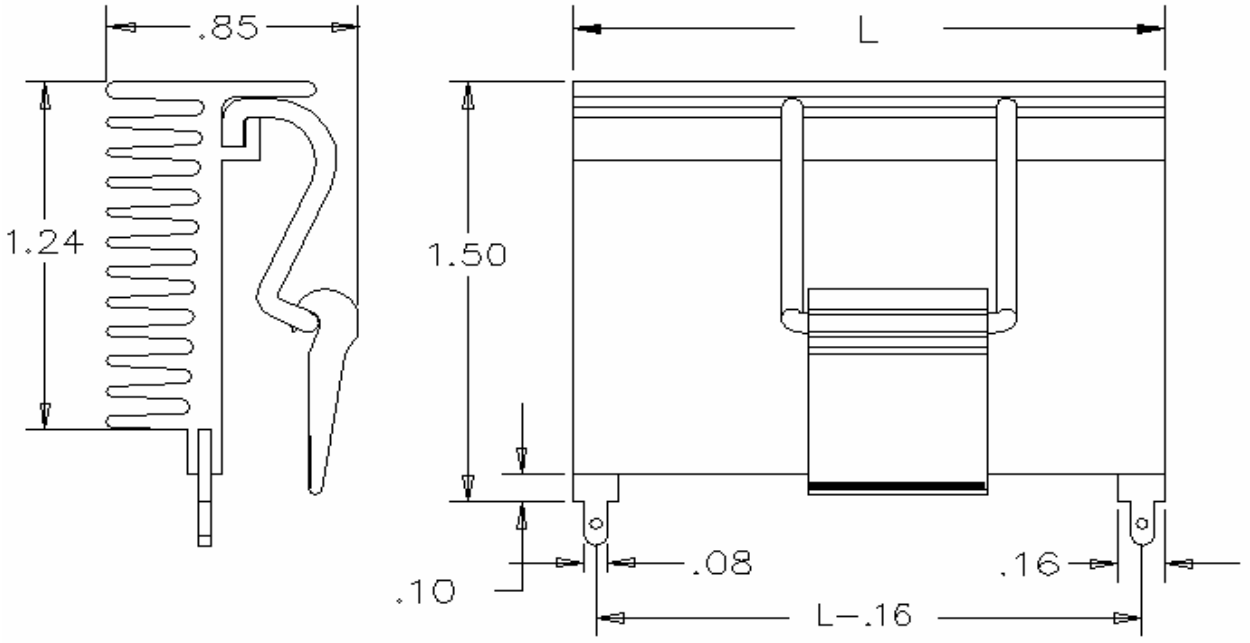
P/N: CM02 - EA – 2.0 –YC



Surface Area (extruded/bonded fin) $in^2/in(mm^2/mm)$	Weight lb/in(g/mm)	Clip force lb (kg)
12 (305)/25(635)	.32 (5.7)	13 (5.9)
Applications	Cooling	Mounting
TO-247, TO-3P TO-220, TO-264 Etc.	Forced or free convective	Thought Hole

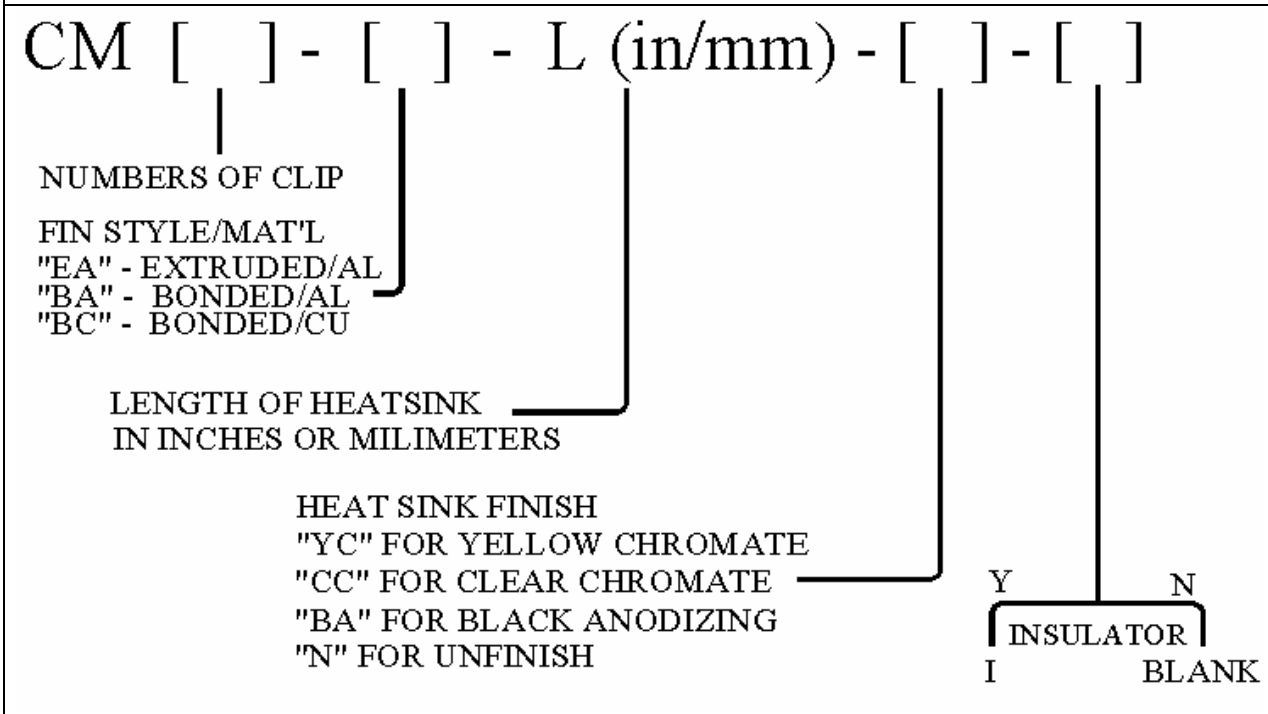
NOTE: Customers can specify their own length Heat Sink.

Mechanical Dimensions in. [mm]



Patent Pending (Unit: inch)

Part Number Specifications



Besides our patented heat sinks, Weal Lam can also manufacture the heat sinks cross referenced to those in Thermalloy, Wakefield Engineering and Avid, etc. catalogs products with lower cost and prompt technical services.

Weal Lam is committed to provide our customers with the most innovative thermal management products, the best services and the lowest prices of the products.

For more information about ***Matrix Clip System, Camming Clip System and Auto Align System Heat Sink***, Please

E-mail to kevinliu@weallam.com or
Call (954) 304-0094

For ordering, please specify proper part number (P/N):

E-mail to wlsales@weallam.com or
Call (954) 304-0094

Some Useful Landmarks on Temperature Scales