COFAN THERMAL

HEATSINKS, HEAT PIPES, VAPOR CHAMBER, COLD PLATES, THERMO ELECTRIC COOLERS

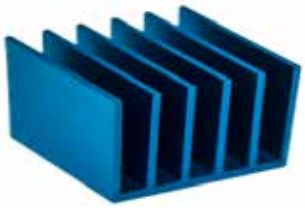
AND VALUE ADDED MANUFACTURING

Contact : info@cofanthermal.com

Heatsink Topologies:

Die casting is the technique of pouring molten metal into a high precision mold. The mode or die cavity can be complex and unique. It is often used to mass produce complex three-dimensional structures. It is usually done with a single manufacturing step without post treatment.

Forging is a deformation process in which the work is compressed between two dies, using either impact or gradual pressure to form the part. It is the oldest of the metal forming operations, dating back to perhaps 5000 BCE. Cold Forging is the technique of deforming metals into a desired shape by localized compressed force at room temperature. Fin arrays are formed by forcing raw material into modeling die by a punch. This process increased the impact and shear strength, and improved gain structure, reducibility and reliability of the final product.



Extrusion is the technique of pressing a heated billet through a die of desired cross section profile. It is similar to squeezing toothpaste out of a toothpaste tube. This process is very good for its low tooling cost and high production output.

Folded fins are created by a progressive stamping method. After the folding, the fins are bonded to a base with thermally conductive epoxy, or welding to bond the metals. Folding fins can combine aluminum and copper to tailor the performance of the heat sink to different applications.

Skived fins are made by a knife tool that shaves fins up from an extruded aluminum or copper block. This predecessor can create an externally high fin to gap aspect ratio, which increases the surface area and drastically improves the thermal performance in forced airflow environments.

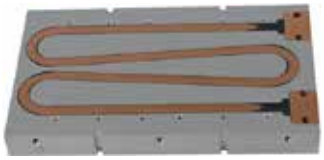
Heatsink Topologies:

Stacked fins (also know as zipper fins or snapped fins) are assembled out of individual pieces metal sheets, forming a dense interlocked fin array soldered to a copper or aluminum base. It allows a wide range of shapes and very long fin blades

CNC machines are electro-mechanical devices that use computers to control machine tools. CNC stands for Computer Numerical Control and it represents one of the two common methods (3d printing and fused filament fabrication) to generate prototypes. Unlike 3D printing, CNC machines remove material from a block of plastic or metal.

Sheet metalworking includes cutting and forming operations performed on relatively thin sheets of metal. Typical sheet-metal thicknesses are between 0.4 mm (1/64 in) and 6 mm (1/4 in). The sheet or plate stock used in sheet metalworking is produced by flat rolling. Sheet-metal processing is usually performed at room temperature (cold working).

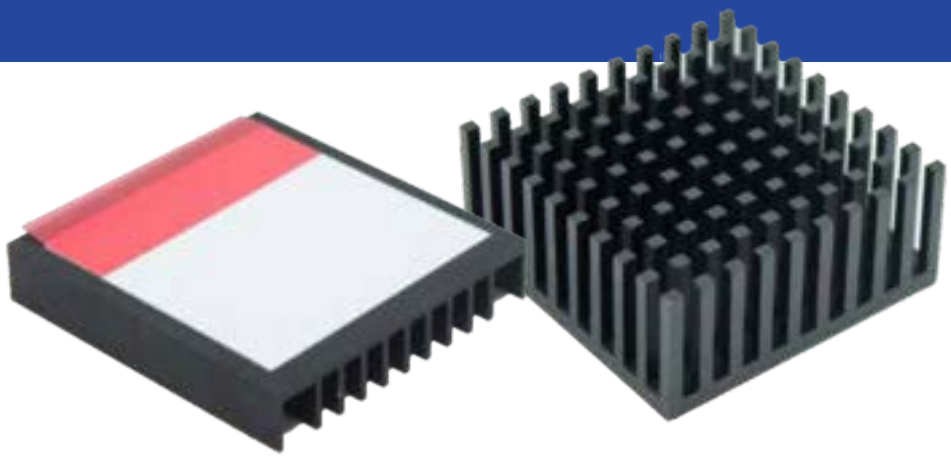
Injection molding is a process in which a polymer is heated to a highly plastic state and forced to flow under high pressure into a mold cavity, where it solidifies. The molded part, called a molding, is then removed from the cavity. The process produces discrete components that are almost always in a net shape. The production cycle time is typically in the range of 10 to 30 seconds, although cycles of 1 minute or longer are not uncommon for large parts.



Friction stir welding (FSW) is a solid-state joining process that uses a non-consumable tool to join two facing workpieces without melting the material. The process derives its name from this stirring or mixing action. The rotating tool is stepped, consisting of a cylindrical shoulder and a smaller probe projecting beneath it. The RPM of string head is usually between 600 to 1,800 RPM, and different string heads will be used for different welding materials.

BGA Heatsinks

- Aluminum or Copper Alloys
- Anodized or Powder Coat
  (special colors upon request)
- Plate Fin or Cross-Cut (Tight or Loose)
- Any footprint ranging from 17~50mm
- Any height from 10~40mm
- Optional Thermal Tape
- Optional Mounting

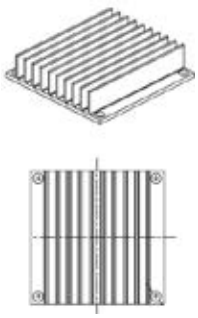


Standard Configurations:

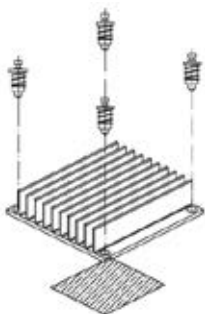
AL	01	PF	31	25	T	FL
Alloy	**Finish**	**Type**	**Footprint**	**Height**	**Thermal Pad**	**Mounting**
AL = Aluminum CU = Copper	01 = Anodized 02 = Black Powder Coat	PF = Plate Fin CL = Cross Cut (Loose) VT = Cross Cut (Tight)	17 ~ 50mm	10~40mm	Blank = None T = Pad	Blank = None FL = Flange SC = Screws SP = Spring-Loaded CL = Clip ZC = Z Clip

Standard Mounting Options:

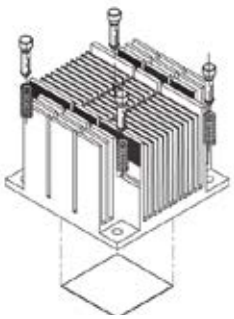
FLANGE



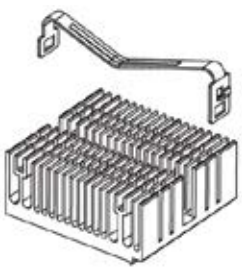
SCREW



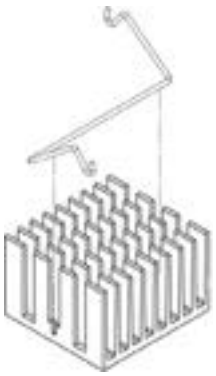
SPRING LOADED

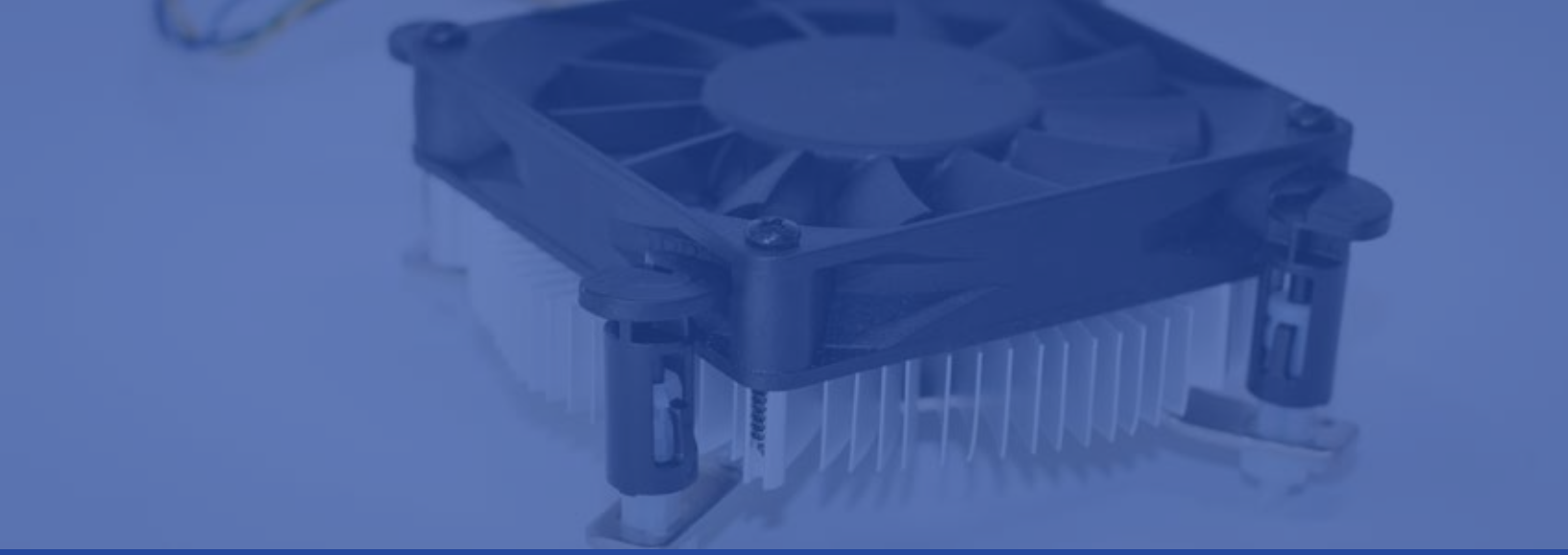


CLIP MOUNTING



Z-CLIP





CPU Coolers

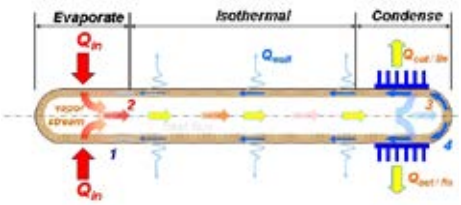
- Hundred of Existing Designs
- Designed & Manufactured to fit
- Endless combinations of Heatsink, Fans, Blowers, Vapor Chambers and Heatpipes
- Utilizing our experienced Thermal Engineers, Mechanical Engineers and CFD Analysis tools
- Prototyped locally with Hi-Volume China Manufacturing

These are a handful of examples:

Heat Pipes & Vapor Chambers

What Are Heat Pipes?

A heat pipe is composed of a vacuum-tightened vessel, wick structure, and working fluid. As heat is applied, the fluid vaporizes creating a pressure gradient which cycles hot vapor to flow along the pipe to the cooler section where it condenses and cools. The working fluid returns to the hot section by capillary forces developed in the wick structure or by gravity.



Main components:

- Container - High strength, high thermal conductivity
- Working fluid - High latent heat, high thermal conductivity
- Wick structure - to provide capillary action

The rapid miniaturization of electronics and their peripherals have introduced challenging heat dissipation problems. Heat pipes effectively transport heat away from heat sensitive components.

WICK STRUCTURES

Mesh
(worst)

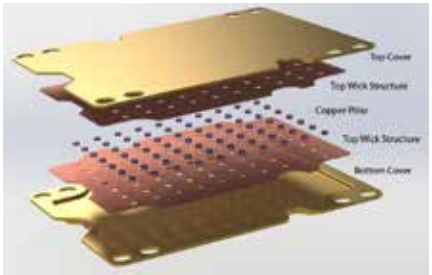
Groove
(good)

Sintered
(best)

We stock all types of heat pipes with Mesh / Groove / Sintered wick structures ranging in diameters from 2~14mm and lengths from 70~300mm (custom sizes upon request). We offer a range of working fluids to balance the needs for surface tension, vapor pressure, latent heat, conductivity and viscosity. Typical fluids include Ammonia, Freon, Acetone, Methanol, Ethnaol and Water. Consult one of our thermal engineers for the best mix to meet your needs.

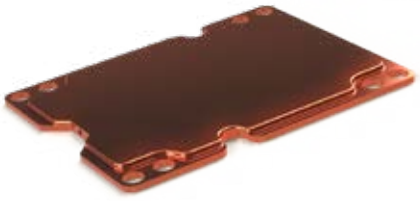
What Are Vapor Chambers?

A vapor Chamber is a planer heat pipe, which radiates heat in two dimensions. Often referred to as heat spreaders, vapor chambers effectively spread heat from it's hot spot with extreme efficiency. As shown in the diagram, a vapor chamber features a wick design that is filled with coolant. When heated, the coolant changes phase from a liquid to a gas and back again to transfer heat. Cycling heat away from the hot-spot to cooler locations.



It is common to combine the use of a vapor chamber to spread heat with heat pipes to pull heat away to a remote area where it can dissipate heat safely through heatsinks, safely removed from the heat sensitive component.

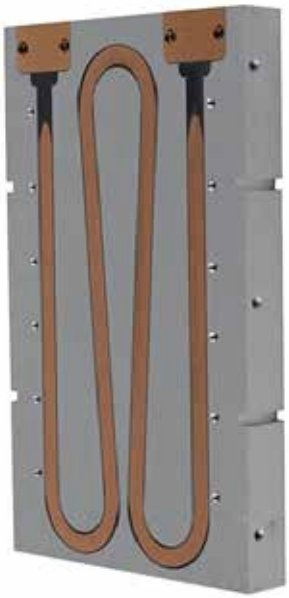
We stock a wide range of Vapor Chamber footprints with mesh / groove / sintered wick structures and the same range of working fluids mentioned above.



Cold Plates

What Are Cold Plates?

Liquid cooling, also known as cooling with liquid, is a very effective way to remove high heat loads from components. This is a natural evolution beyond air cooling where either due to thermal requirements or footprint requirements. A liquid cooling loop for contact cooling typically consists of a cold plate, pump, heat exchanger, and pipes or hoses. COFAN USA's custom liquid cooling component cold plates is compatible with water and a range of coolants.



Features Included:

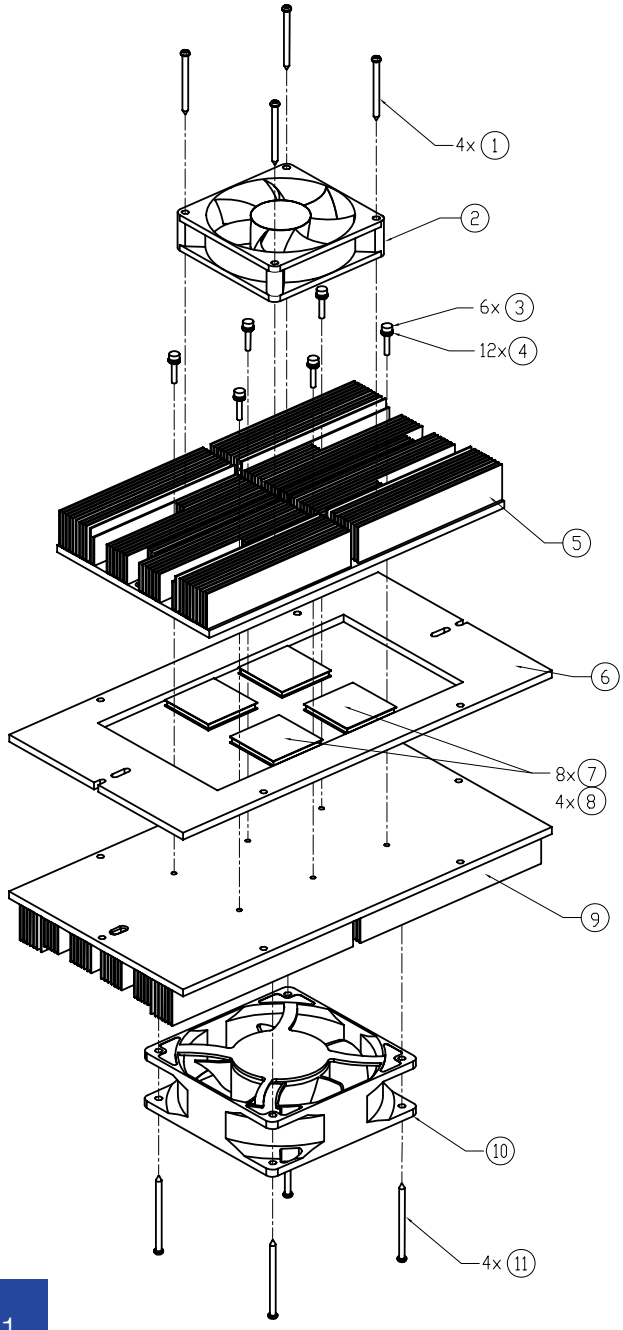
- Cost-effective and excellent performance
- compatible with water and a range of coolants
- Reliable and leak-free

Thermoelectric Coolers

What Are Thermoelectric Peltier Cooling Modules?

Air-to-air coolers are used to effectively convert the hot air to cool air within an enclosure. The methodology is known as Peltier effect, which is a method used to transfer heat as the DC current flows through the TE (Thermoelectric) module(s). Due to this effect, the cold side will decrease greatly in temperature, and the hot side will have stored heat that dissipates through the surrounding environment. These coolers are solid-state and only use a power source to run.

Technology's Thermoelectric, or Peltier Cooling Modules come in a wide variety of type and sizes. They are used for cooling and also be used for heating and event power generation.

Typically, two heat sinks, one at the hot side and another at the cold side of TEC, and two fans (help the air move actively) are used to accompany the TEC module(s). In other words, cooler components include a thermoelectric module sandwiched between two heat sink fan assemblies. The heat sink at the hot side is generally larger than the cold side heat sink. These air-to-air cooler assemblies can be easily mounted to the devices that require the thermal levels to be controlled.

We have dozens of existing designs, many equivalent to industry standards and can create a complete custom design upon request.