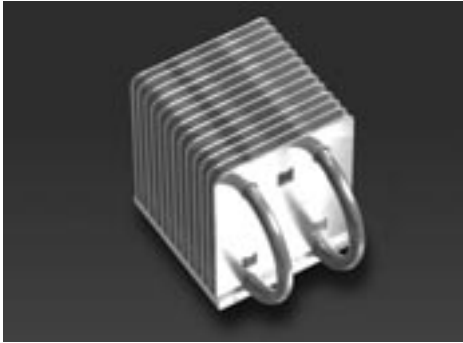


# The Power Heat Sink

## For High Performance Computer Systems



### INTRODUCTION

The Power Heat Sink is designed to solve the heat problems of high performance computer systems. With a weight per volume less than half that of a traditional solution, and with its smaller base surface area, the Power Heat Sink is a powerful thermal solution to the problems faced by designers of high performance computer systems.



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The Power Heat Sink's weight per volume is less than 50% of that of an extrusion, yet its performance capability is much higher than an extruded or bonded fin heat sink. Its lower weight allows the Power Heat Sink to reduce the problem of excessive stress on the board and processor.

Compact and highly efficient, the Power Heat Sink fin assembly consists of one or more heat pipes and several bonded fins. Because it is much more compact than an extruded heat sink, it allows the designer more room for other components, making the layout challenge easier to deal with. The dimensions of the Power Heat Sink can be tailored to fit inside a limited space. The heat pipes in the Power Heat Sink are used to maximize the efficiency of the fins by taking heat from the bottom of the sink and transferring it to the top of the sink. The heat sink volume per watt of heat dissipated can be as low as 0.25 in<sup>3</sup>/watt in an airflow driven by a common axial fan.

The Power Heatsink is designed to remove between 50 and 300 watts of heat generated by a high performance computer system. To achieve cost effectiveness, Enertron has developed a proprietary fabricating process that can manufacture any Power Heat Sink within the customer's requested lead time.

#### Specifications:

Dimensions .....	Depends upon customer specifications.
Weight .....	50% to 80% of an extruded heat sink. Actual weight depends upon customer specifications.
Heat sink volume per watt of heat dissipated: .....	0.25 in <sup>3</sup> /W
Typical heat dissipation range .....	50 to 300 W
Pressure drop of passing airflow: .....	<2 mm H <sub>2</sub> O
Heatsink weight per watt of heat dissipated: .....	3 g/W
Heat pipe and fin bonding method .....	Soldering or thermal epoxy bonded

#### Best Applications:

- Industrial Computer Systems
- Military-Use Computers
- Mainframe Computers
- High-End Amplifiers
- High-Performance Power Converters
- Workstation CPUs
- Central Servers
- Power Converter Modules
- High-Performance Power Supplies

The following information describes a sample Power Heat Sink. It was used along with an axial fan in a Workstation CPU. (Power Heat Sink Dimensions: 64 mm<sup>l</sup> x 62.5 mm<sup>w</sup> x 75 mm<sup>h</sup>)

#### Heat Pipe Structure

Shell Material: ..... f1/4" Copper x 2  
Wick Structure: ..... Groove  
Working Fluid: ..... Water  
Base Material: ..... t = 5 mm, A6063-T5

#### Fin Structure

Fin Type: ..... t = 1 mm, A1100-H14  
Fin Thickness: ..... 1 mm  
Fin Pitch: ..... 4 mm

#### Performance:

Size:	64 <sup>W</sup> mm x 62.5 <sup>L</sup> mm x 75 <sup>H</sup> mm		
Weight:	300 g		
Tested performance $\theta_{sa}$ (°C/W) @ Upright Position	$\theta = 0.32$ °C/W	$\theta = 0.25$ °C/W	$\theta = 0.14$ °C/W
	<1 mm water pressure drop 20 cfm	2 mm water pressure drop 40 cfm	12 mm water pressure drop 148 cfm
Tested performance $\theta_{sa}$ (°C/W) @ 90° inclination angle	$\theta = 0.34$ °C/W	$\theta = 0.25$ °C/W	$\theta = 0.15$ °C/W
	<1 mm water pressure drop 20 cfm	2 mm water pressure drop 47 cfm	12 mm water pressure drop 166 cfm
Tested performance $\theta_{sa}$ (°C/W) @ 180° inclination angle	$\theta = 0.38$ °C/W	$\theta = 0.25$ °C/W	$\theta = 0.18$ °C/W
	<1 mm water pressure drop 20 cfm	2 mm water pressure drop 66 cfm	12 mm water pressure drop 145 cfm

#### Enertron... A Powerful Thermal Management Team and a Skilled Production Partner

Enertron is both a powerful thermal management engineering service and a highly-skilled, cost effective production partner. Enertron offers custom thermal solutions at "off-the-shelf" prices and delivery times. Enertron's customers are Fortune 500 companies in the computer, microelectronics, aerospace, and defense industries. Enertron competes on its industrial expertise, timely service, and unerring commitment to excellence for its customers.

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