

## 1. Introduction

OCP-300L is a high performance thermoelectric cooling module designed for OEM applications for high power laser products, medical equipments and semiconductor processing. It is also a convenient solution for general cooling of common fiber coupled lasers in laboratory environment. It is designed to fit inside 19" racks.

Figure 1 below is the outline dimension of OCP-300L. The cold plate will be made to order with mounting hole patterns provided by customer. We also accept customer provided cold plates and install it in place of our standard cold plate. The size and material of the cold plate may be changed upon request except the location of the mounting holes for the cold plate itself.

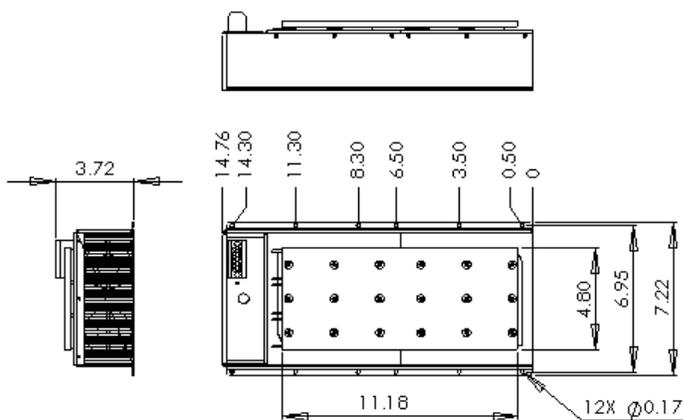


Figure 1 Outline of OCP-300L



HS-004L



OCP-300L



OCP-300L

The heatsink we use for OCP-300L is our model HS-004L. HS-004L has six heat pipes embedded in the base of the heatsink to minimize heat spreading resistance; the heatsink is nickel plated and the heat pipes are soldered into the heatsink. HS-004L is available for sale as a standalone unit. It is a great solution for high power lasers, electronics, IGBTs, etc.

**The thermal resistance of HS-004L is 0.04°C/w.**

All electrical connections are provided through the terminal block. Table 1 below lists the pin out designations (the TECs in OCP-300L maybe custom wired to meet users' specific needs; contact ETE for other wiring options and the corresponding power requirements):

Pin # marked on terminal block	Designation	Maximum rating
1	TEC set 1 +	7.5A x 40V
2	TEC set 1 -	
3	TEC set 2 +	7.5A x 40V
4	TEC set 2 -	
7	Fan +	1.35A x 12V
8	Fan -	

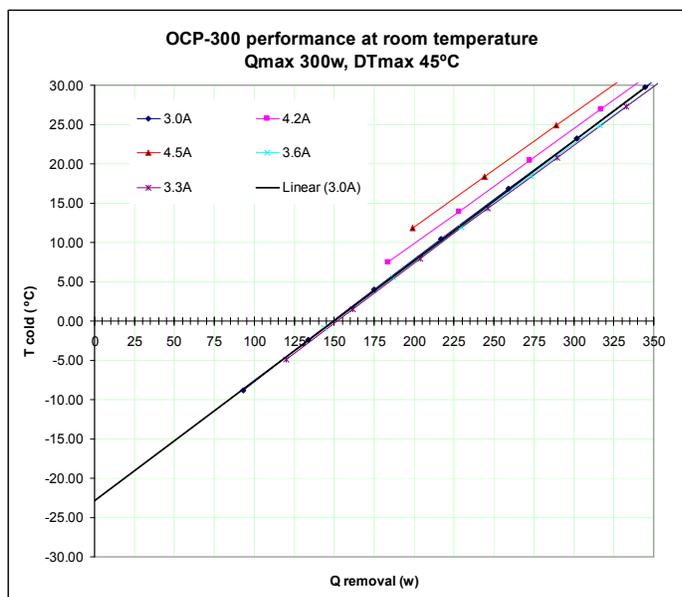


Figure 2 OCP-300L PERFORMANCE

## 2. Performance curve

The performance curve in Figure 2 illustrates the performance of OCP-300L at various current in room ambient temperature. The X-axis is the heat load to the cold plate, the Y-axis is the cold plate temperature at the heat load. Please notice that the cold plate temperature is an average figure, the temperature of the cold plate is very uniform ( $<0.5^{\circ}\text{C}$ ) with evenly distributed heat load; when used to cool high power laser diode, the temperature directly underneath the diode source will be slightly higher than the edge of the cold plate. The following curve indicates the optimum current to individual TEC is 3-3.6A depends on the operating point.

The performance, optimum current, maximum rating all changes depends on the heat load, cold side set temperature and ambient temperature.

### 3. Cooling Fan Specifications (5 fans in parallel)

Parameters	Standard
Rated voltage	12VDC
Operating voltage range	7~13.5 VDC
Input power	16W
Rated current	1.35A
Noise per fan	50dBA

### 4. TEC specifications

There are two sets of TECs in OCP-300L that are pre-wired and routed to the terminal block. The maximum operating current for each TEC set is 7.5 A, and maximum voltage is 40VDC at room temperature. Maximum operating current and voltage increases if ambient is higher. Exceeding the specified maximum current may reduce the performance and degrade the reliability of TECs. We highly recommend driving the 2 TEC sets in series to ensure optimum performance. The TECs shall run from constant current source.

Users are advised to manually ramp the TEC driving current after assembling the diode or other heat load on the cold plate to identify the optimum current and set current limit accordingly so that the TEC will not runaway.

All TECs are environmentally sealed for operating below dew points. The maximum rated operating temperature for TECs is  $150^{\circ}\text{C}$ . The thermal resistance from TEC to ambient of OCP-300L heatsink is  $0.04^{\circ}\text{C}/\text{w}$ .

Customers who are using ETE's MC-1000-300 controller needs to wire the two sets of TECs in parallel when connecting OCP-300L to MC-1000-300.

### 5. Diode Cooling Interface Guidelines

The actual performance of the cooling module is extremely sensitive to the quality of the thermal interface between the cold plate and the diode. For high power laser modules with large footprints, it is very difficult to maintain uniform high quality interface. We recommend customers to use copper cold plate for low spreading resistance if highly concentrated heat sources are to be mounted on the cold plate; for well distributed heat source, aluminum cold plate will be sufficient.

If diode set temperature is significantly below ambient, we highly recommend using thermal insulation materials such as silicone foam or ceramic-based insulation to insulate laser from ambient.

### 6. Pricing and Contacts

ETE offers standard controllers for all our thermoelectric products. The controller for OCP-300L is MC-1000-300. For pricing and availability, please contact ETE in any of the following options:

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