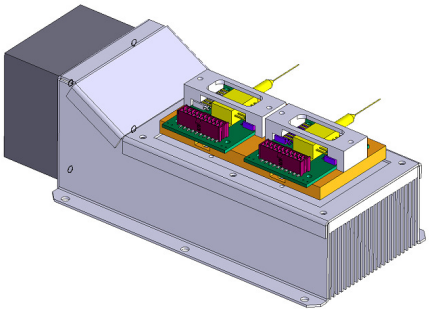
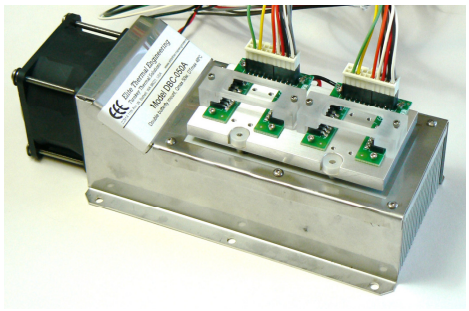
1. Introduction



Model DBC-050A is our OEM cold plate model **OCP-050A** with 2 **model BA-01** butterfly mounting PCAs.

The thermoelectric cold plate removes 50w with zero delta T from cold plate to ambient, more than enough to cool two most powerful butterfly laser packages on the market to below dew point temperatures.



Model **DBC-050A** can be used to keep uncooled butterfly laser diodes at the desired temperature, or to cool the butterfly lasers with internal TECs to obtain much lower diode temperature to obtain shorter wavelength.

The compact 40mm x 50mm **BA-01** module consists of the following:

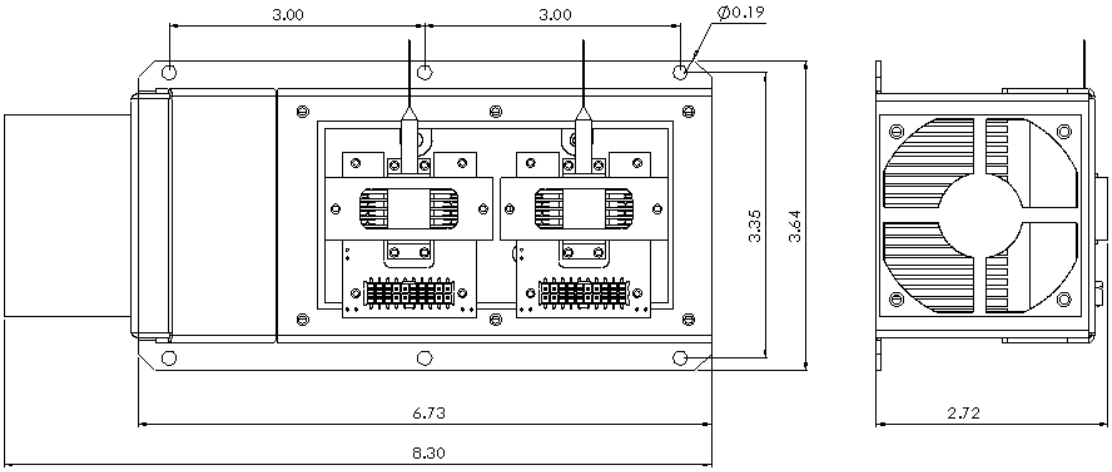
- ★ It has 2 rows of zero insertion force PCB headers that matches the butterfly's pin pattern; the contacts of the headers are spring loaded for maintaining robust electrical continuity.
- ★ An easy to use plastic clamp is provided for clamping the butterfly contact against the spring-loaded contacts of the header.
- ★ All butterfly connections are routed to the 20-pin connector at the end of PCB. .
- ★ The module also provides reverse bias protection for diode.

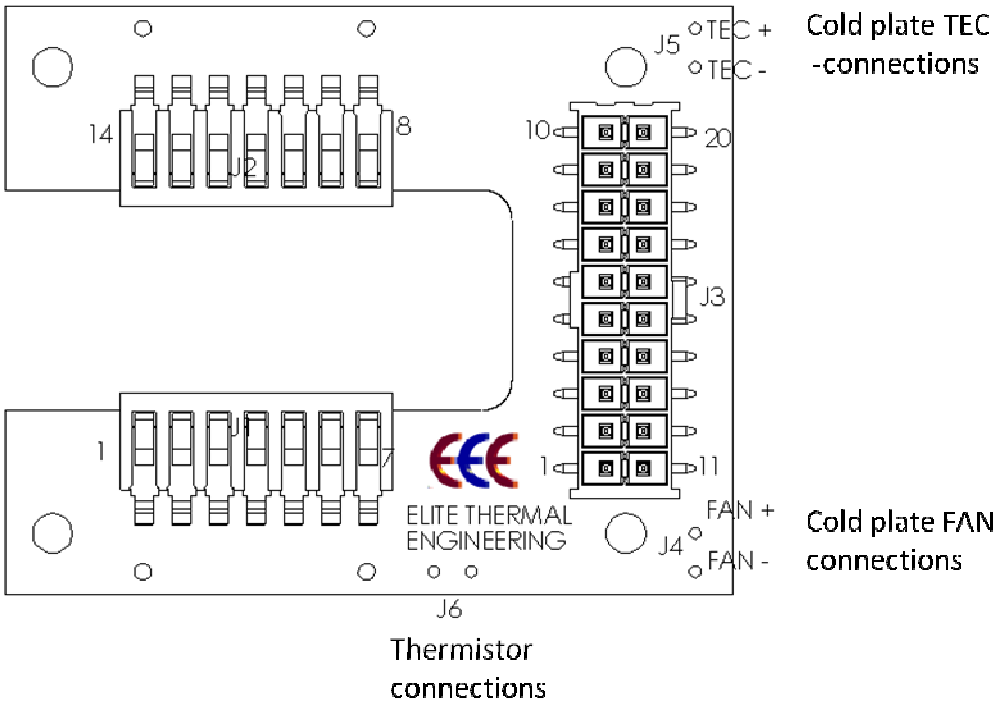
It provides a convenient way of installing and replacing butterfly packages with ease. And the spring contacts do not cause any stress to the hermetic feed thru as soldering the leads directly to PCB do.

The cold plate is also electrically floating.

2. Outline dimensions

The figures below provide the overall dimensions of DBC-050A with butterfly mount **BA-01**, and the cold plate thermistor and TEC connections' locations on BA-01.





Without **BA-01**, the cold plate can be used for cooling anything that requires temperature control. Custom mounting patterns can be provided upon request.

3. Output connector pin outs

The TECs, fan and the built-in thermistor in the copper cold plate are all connected to the 20-pin connector. Please note that only the BA-01 near the fan are connected to all TECs, fan and the thermistor. The BA-01 at the front will only have connections to butterfly leads.

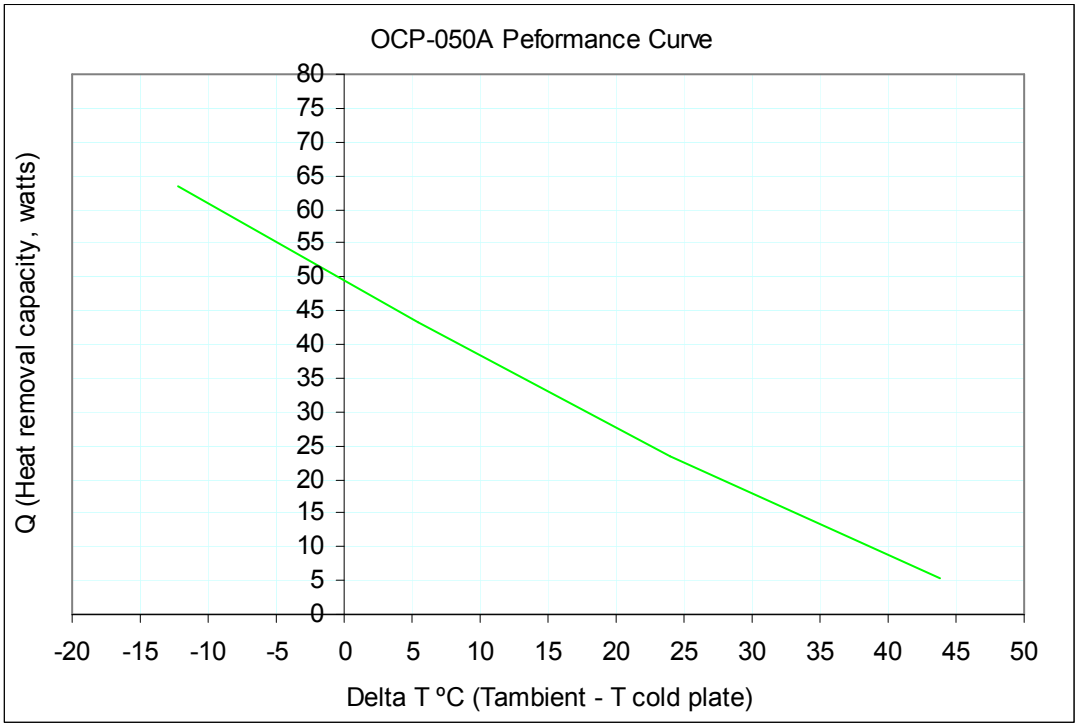
20 Pin connector	Designation	Butterfly pin #	Connections for cold plate parts
1	Thermistor	5	
2	PD cathode -	4	
3	PD Anode +	3	
4	Thermistor	2	
5	TEC +	1	
6	Cold plate thermistor +		Cold plate thermistor +
7	Cold plate thermistor -		Cold plate thermistor -
8	TEC -	14	
9	Case ground	13	
10	N/C	N/C	
11	Laser Cathode -	11	
12	Laser Cathode -	11	
13	Laser Anode +	10	
14	Laser Anode +	10	
15	Cold plate fan +		Cold plate fan +
16	Cold plate fan -		Cold plate fan -
17	Cold plate TEC +		Cold plate TEC +
18	Cold plate TEC +		Cold plate TEC +
19	Cold plate TEC -		Cold plate TEC -
20	Cold plate TEC -		Cold plate TEC -

Please note that only the butterfly packages that comply with the listed butterfly pin outs can be used on this PCB, users are recommended to check the butterfly pin outs carefully before making the connections. Other butterfly pin outs can be accommodated upon request. Please contact Elite for details.

The connector for user interface is SAMTEC IPL-1-110-02-S-D, the mating connector is SAMTEC IPD1-10-D-P. SAMTEC offers value-add service for the related cable assembly.

4. Performance curve

The following curve illustrates the cooling performance of **DBC-050A**. The X-axis is the heat load to the cold plate, the Y-axis shows lowest cold plate below ambient should be at a given heat load. Please notice that the cold plate temperature is an average figure, the temperature directly underneath the diode source will be higher and the edge of the cold plate will be lower. This curve is obtained with 3.6Amps current to each TEC with the cold side set at 25ºC. The performance will improve in hotter set points and decrease if the set point is lower.



5. Cooling Approach

The fan pushes through the heatsink in our standard configuration of DBC-050A to maximize the cooling performance. Users can easily take the fan off and change the direction of the airflow if pulling air away is desired.

6. Cooling Fan Specifications

The fan is used for most demanding applications. For most butterfly and lower power cooling applications, users can reduce the voltage to the fan to reduce noise while still obtaining the desired performance.

Parameters	Standard
Rated voltage	12VDC
Operating voltage range	5.5~13.8 VDC
Input power	9.9w
Rated current	.83A
Noise	47dBA

7. TEC specifications

The maximum operating current for each TEC is 4.2 A, and maximum voltage is 14VDC at room temperature. Maximum operating current and voltage increases with ambient. Exceeding the specified maximum current will reduce the performance and degrade the reliability of TECs.

The typical optimum current for each TEC is about 3~4 Amps depends on the set temperature, heat load, interface quality between the diode and cold plate, and ambient temperature.

We highly recommend driving the 2 TECs 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 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.

8. 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. Our cold plate is made of copper with very low spreading resistance so that the user can focus the attention primarily to the area directly underneath the laser diodes.

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.

9. Contact us

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