LASER DIODE
SOURCE & CONTROL SYSTEMS

LASER DIODE
HEAT SINKS

50 Watt Dual Butterfly Laser Diode Mount and Heatsink Assembly

TEC-Based Heat Removal and Temperature Management

DBC-050A includes 2x BA-02 Butterfly Mounts

DBC-050A Butterfly Mount and Heatsink

- Up to 50 Watts of Waste Heat Removal Capacity
- TEC Heat-Pumps for Temperature Control and Stabilization
- Includes two BA-02 Butterfly Laser Diode Mount Assembly
- BA-01 Butterfly Pump Laser Pre-Configured Mount Also Available
- Pre-Drilled Mounting Plate for Butterfly Lasers
- Custom Mounting Plates Available

Laser Lab Source
a division of Research Lab Source Corporation

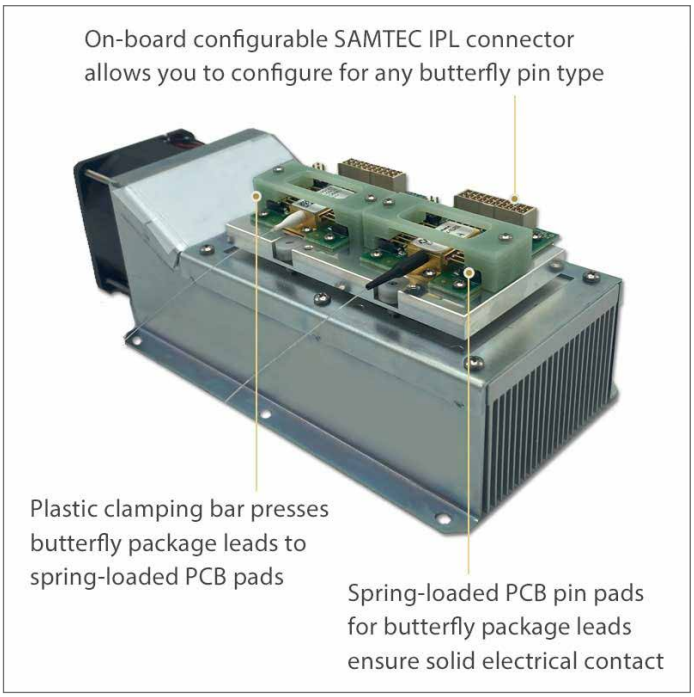
www.LaserLabSource.com
phone: 800-887-5065

1820 W. Lincoln Street
Bozeman, MT 59715

VERSATILE AND HIGH EFFICIENCY HEAT SINK

The DBC-050A is a high performance TEC- and fan-based cooling module designed for high power laser diodes. It is an affordable, high performance solution for cooling and temperature control of fiber coupled laser diodes in laboratory environments.

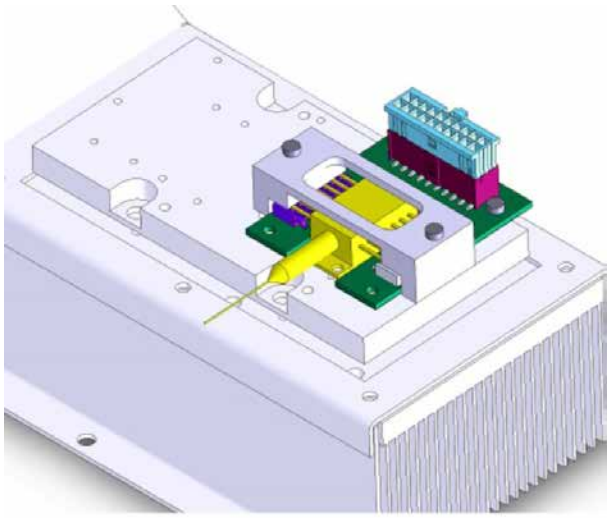
The DBC-050A is built on the OCP-050A 50 Watt heat-sink, and includes two BA-02 Butterfly Laser Diode Mount kits.

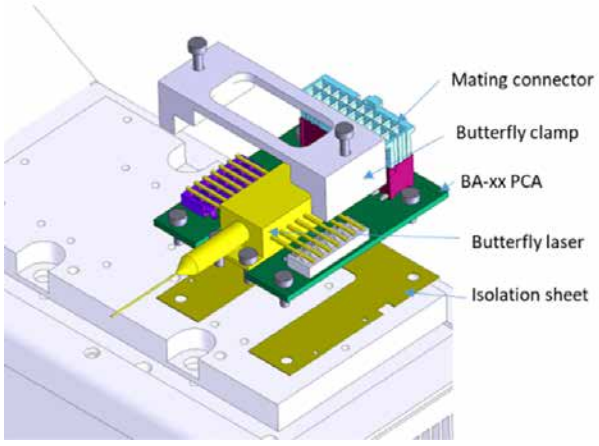


The cold plate is electrically isolated from the heatsink and the fan duct: it is safe to mount the diode directly on the cold plate using indium foil.

BA-02 BUTTERFLY LASER MOUNTING

The BA-02 provides electrical connections and a robust thermal contact to the surface of the cooling plate. Zero Insertion Force (ZIF) electrical PCB headers are spring loaded to maintain electrical continuity. The height of the electrical contacts matches the height of the pins on the butterfly laser package, so there's no stress induced to the pins or package.

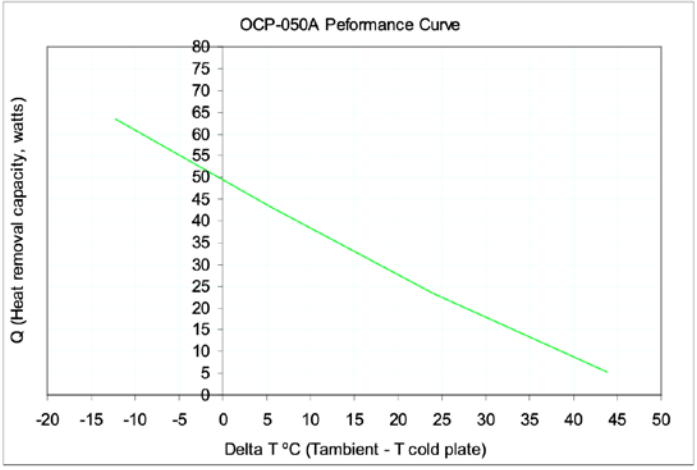




An isolation sheet is included to electrically insulate the laser package from the coldplate while providing improved thermal contact.

HIGH PERFORMANCE HEAT CONTROL

The chart below illustrates the heat removal capacity of the OCP-050A. The Y-axis is the heat load to the cold plate; the X-axis is the delta between the lowest temperature on the cold plate and ambient at the given heat load. The cold plate temperature is an average figure, and the temperature directly underneath the laser diode module will be higher, while the temperature at the edge of the cold plate will be lower.



This curve is obtained with 3.6 Amps current to each TEC with the cold side set point at 25°C.

Due to the physics of TEC operation, heat removal capacity performance improves with hotter set points and decrease if the set point is lower.

TEC SPECIFICATIONS

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

The typical optimum current for each TEC is 3 - 4 Amps, and depends on the set temperature, heat load, interface quality between the diode and cold plate, and ambient temperature. Users are advised to manually ramp the TEC driving current after assembling the diode on the cold plate to identify the optimum current, and then set the current limit accordingly so that the TEC current will not run away.

All TECs are environmentally sealed for operating below dew point.

DIODE COOLING INTERFACE GUIDELINES

The heat removal performance of the heat sink is sensitive to the quality of the thermal interface between the cold plate and the laser diode module.

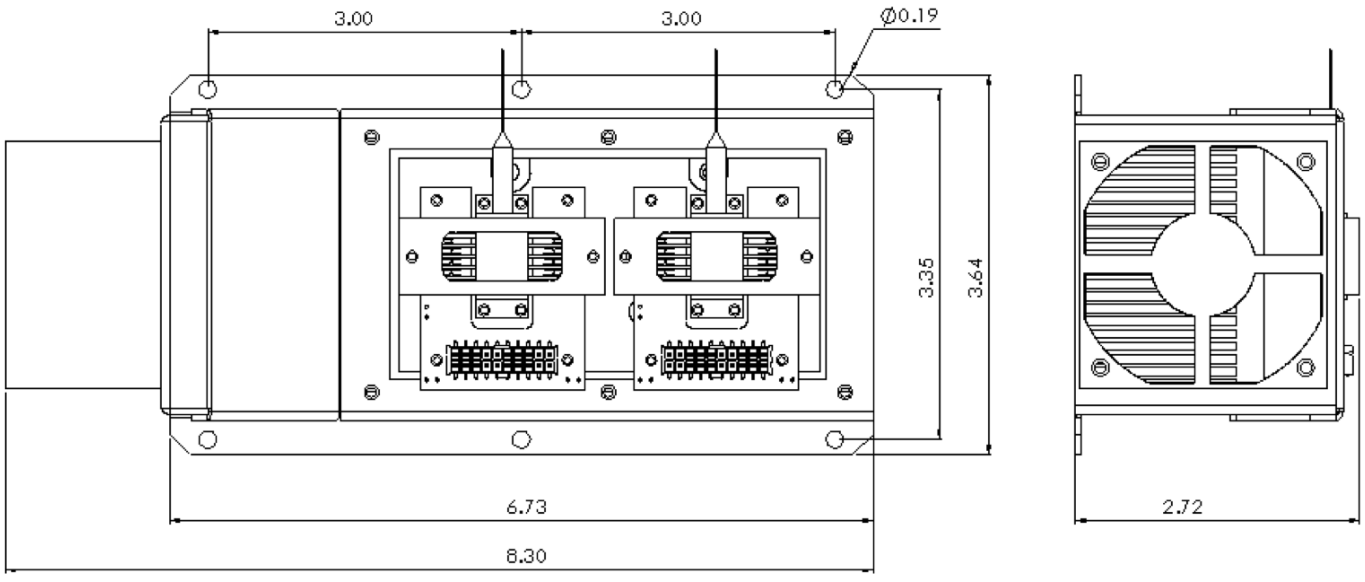
For high power laser modules with a large footprint, it is difficult to maintain a uniform high quality interface. The cold plate is made of copper with very low spreading resistance, and using dry interface materials will help considerably to form a uniform heat conduction interface.

If the laser diode set temperature is significantly below ambient, we recommend insulating the module on the top of the cold plate. Thermal insulation materials such as silicone foam or ceramic-based insulation work well to insulate laser from ambient.

DBC-050A SPECIFICATIONS

OVERVIEW	Cold Plate Temperature Regulated by TE Coolers Includes Two Universal Butterfly Laser Diode Mounting Sockets Thermal Resistance: TEC to Ambient 0.22ºC/W Typical Temperature Uniformity: <0.5ºC Across Mounting Plate TEC Max Rating: 150ºC Heat Load (Qmax) Maximum: 50 Watts Anodized Aluminum Mounting Plate
BUTTERFLY LASER DIODE MOUNTING SOCKET	Includes Two BA-02 Butterfly Laser Diode Mounting Sockets Laser Package Pin Connections Fully Configurable for Any Pin-Out Zero-Insertion Force Socket, No Soldering Required Plastic Clamp Ensures Positive Thermal Contact to Cooling Plate For Optimum Temperature Accuracy, the Butterfly Package Sits Directly over the Thermistor Installed in the Cold Plate
CONNECTORS	Fan/TEC Connection: 6 Pin Screw Terminal Block Connections: TEC x 2, Fan x 1 On-Board Configurable Connector: SAMTEC IPL-1-110-02-S-D Mating Connector SAMTEC IPD1-10-D-K (from laser diode driver cable)
INTEGRATED FAN AND TEC RATINGS	TEC Ratings (max): 4.2 Amps, 24 Volts Per TEC Fan Rated Voltage: 12 VDC Fan Operating Voltage Range: 5.5-13.8 VDC Fan Rated Current: 1.6 A Fan Input Power: 9.9 W

MECHANICAL DIMENSIONS OCP-050A HEATSINK WITH BA-0X MOUNTS



BUTTERFLY MOUNT OPTIONS

The BA-02 butterfly laser mount is universal, and can be adapted to suit any 14-pin butterfly laser package wiring configuration. The J4 jumper on the BA-02 configures the ZIF.

The BA-01 Pump Butterfly Mount is also available and can easily be installed on the DBC-050A heatsink.

20-PIN HEADER SPECIFICATION

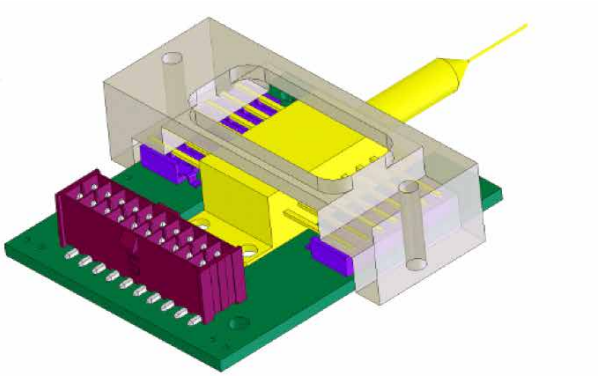
The 20-pin header on the PCB is the SAMTEC IPL-1-110-02-S-D.

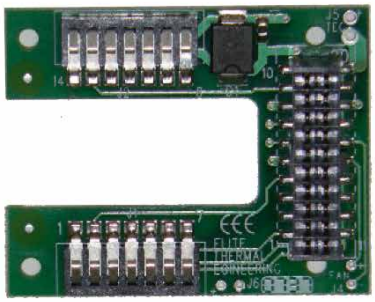
To connect to the header use SAMTEC part number IPD1-10-D-K.

PIN CONNECTIONS - 20-PIN SAMTEC CONNECTOR TO 14-PIN ZIF SOCKETS

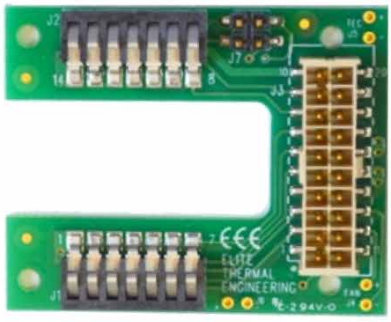
SAMTEC Pin	BA-01 Pinout		BA-02	Heatsink Function
	ZIF Pin No.	Laser Function	ZIF Pin No.	
1	5	Thermistor	1	-
2	4	PD Cathode –	2	-
3	3	PD Anode +	3	-
4	2	Thermistor	4	-
5	1	TEC +	5	-
6	-	-	6	BA-01: Cold Plate Thermistor
7	-	-	7	BA-01: Cold Plate Thermistor
8	14	TEC –	8	-
9	13	Case Gnd	9	-
10	n/c	-	10	-
11	11	Laser Cathode –	11	-
12	11	Laser Cathode –	Pin 12 w/ pins 2 & 4 of J7 SHORTED	BA-02: Fan + w/ pins 2 & 4 of J7 OPEN
13	12	Laser Anode +	Pin 13 w/ pins 1 & 3 of J7 SHORTED	BA-02: Fan – w/ pins 1 & 3 of J7 OPEN
14	12	Laser Anode +	-	-
15	-	-	-	Cold Plate Fan +
16	-	-	-	Cold Plate Fan –
17	-	-	-	Cold Plate TEC +
18	-	-	-	Cold Plate TEC +
19	-	-	1	Cold Plate TEC –
20	-	-	14	Cold Plate TEC –

MECHANICAL LAYOUT AND DIMENSIONS, BA-02 AND BA-01

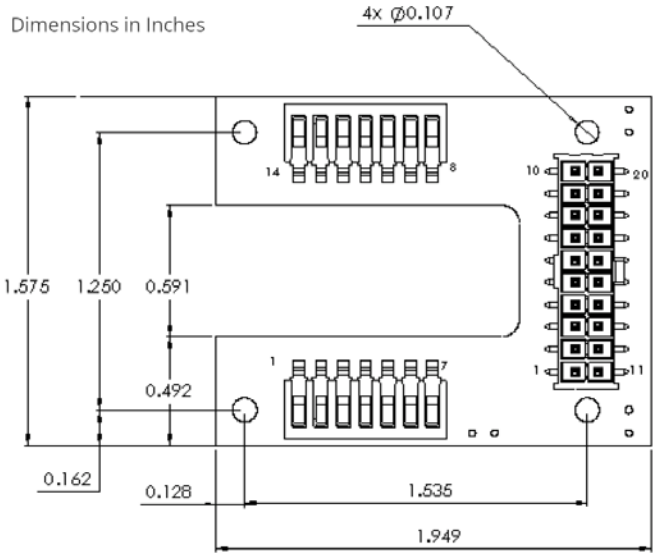




BA-01



BA-02



PRODUCT SALES AND SERVICE

Unlimited phone and email support is provided for products purchased through Laser Lab Source. Orders for this product are fulfilled by Laser Lab Source in North America and select international regions.

PRODUCT WARRANTY

This product is sold with a full one-year warranty. It is warrantied to be free from defects in material and/or workmanship for a period of one year from the date of shipment. The warranty does not cover damage to the to the product due to mishandling or use of the product outside of its specified maximum ratings.

LASER
LAB
SOURCE

Laser Lab Source, Inc
1820 W. Lincoln Street
Bozeman, MT 59715
contact@LaserDiodeSource.com
contact@LaserDiodeControl.com
800-877-5065