

HPLDD-60A-24V

Operating Manual



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Table of Content

Product Description.....	3
Technical Data.....	3
How to connect the HPLDD 60A	4
How to switch on the driver	5
How to switch off the driver.....	6
How to calculate power dissipation	6
Recommendations and requirements	6
Protection.....	7
Dos and Don'ts.....	7
Mechanical Details of the Heatsink.....	7
HPLDD 60A.....	8

Product Description

This is a professional driver dedicated for high power infra-red laser diodes. It can work with 20, 40, and 60W CS-mount 808nm, 940nm and 980nm laser diodes as also with other similar diodes.

With this driver you can power one diode or several diodes in series as also one diode stack which requires higher working voltages. In recommendation section there is a formula for maximum input voltage. Separate laser diode supply voltage input and logic input voltage allows to minimize the switch-on resistance of a power MOSFET. Inner layer of the heatsink is made of copper and helps in fast heat transmission. The outer body of a heatsink, made of aluminum, is isolated from all signals on the driver, including GND signal. It allows to mount the driver directly to the metal components in case of additional cooling needed. Analog input allows for the modulation of the current flowing through the diode up to 5/20 kHz (depending on version). Two potentiometers are used to set the values of maximum diode current and offset current. Attached to the driver is connector and pins which are used to power and control the unit as also the M5 stainless steel screws.



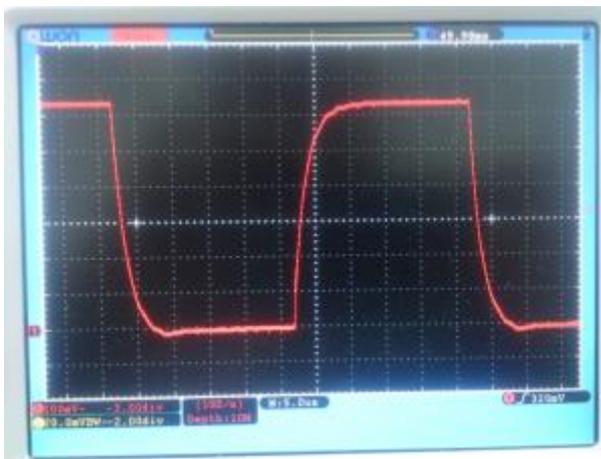
Capacitor bank is available as additional part for the driver. It is needed when weaker PSU is used.

Technical Data

Modulation frequency (kHz)	5 / 20
Modulation voltage range (V)	0 - 5
Maximum diode current (A)	60
Laser diode supply voltage (V)	3 - 24
Transistor type	High power N-MOSFET
Maximum offset current (A)	20
Logic supply voltage (V)	12 - 15
Connector material	Cooper

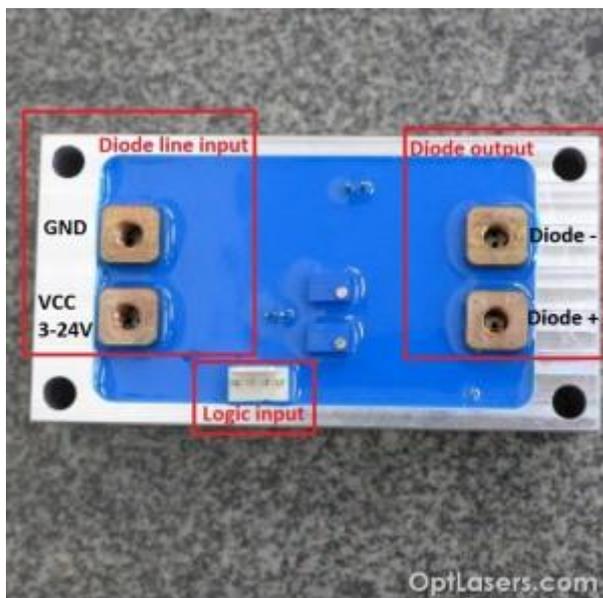
Power connectors screws	Stainless steel M5
Inner heatsink material	Cooper plate
Outer heatsink material	Aluminum
Isolated from all signals heatsink	Yes
Mounting holes raster (mm)	85x50
Mounting holes diameter (mm)	5,5
Maximum power dissipation (W)	200
Current monitor	10 mV / 1A
Current set by default (A)	10
Dimensions (mm)	50x95x35*

* 39mm dimension is different with capacitor bank. For more information please check mechanical data section.

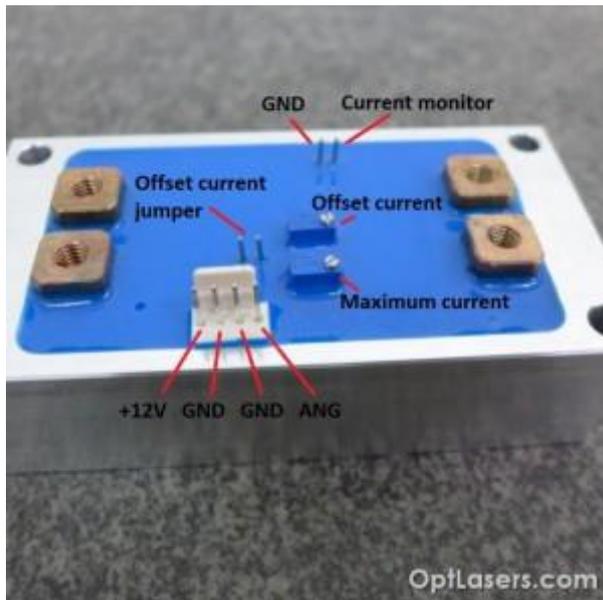


Current flowing through high power silicone diode. 62A 20kHz signal. Measured on sense resistor using current monitor output.

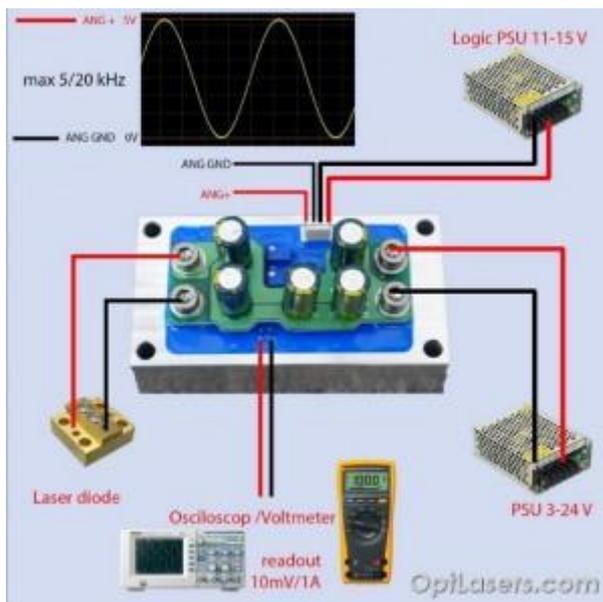
How to connect the HPLDD 60A



Pinout of the driver



Pinout of the driver



Schematic connections

How to switch on the driver

1. Connect the logic plug, diode power line, and laser diode, don't turn on the PSU yet.
2. Be sure that modulation input is switched off.
3. Switch on 12V logic input

4. Switch on diode main line
5. Start modulation on (ANG 0 - 5V)

How to switch off the driver

1. Switch off modulation input.
2. Switch off diode power line
3. Switch off 12V input.

How to calculate power dissipation

Although the maximum power dissipation of the driver is 240W at 25°C, it is recommended to calculate power dissipation and consider applying additional heatsink.

The power dissipated in the driver can be calculated from the formula:

$$\text{Power dissipation} = (U_{in} - n * U_d) * I$$

Where:

U_{in} - Total diode line input voltage

n - Number of diodes

U_d - Diode working voltage

I - current used

For example: Using 5V PSU and single 980 nm diode (1,9V working voltage) with 50 A current:

$$\text{Power dissipation} = (5V - 1 * (1,9V)) * 50A = 3,1V * 50A = 155W$$

Recommendations and requirements

Supply voltage range depends on the quantity of laser diodes used in series. For one laser diode which operating voltage is around 2V, maximum diode input voltage should not exceed 5V. For two diodes which operating voltage is around 4V, maximum diode input is 8V and so on. Therefore the maximum input voltage is given by the formula:

$$\text{VCC DIODE MAX} = (\text{Number of diodes in series}) * (\text{Each diode operating voltage}) + 4V.$$

Always power the logic with 12V before powering up the diode line. Because GND of the diode line and GND of the logic input are connected in the driver, always remember to connect GND of the diode line directly to the GND of a PSU with thick wires.

Always use high quality power supply unit with low ripple voltage. Adding large capacitor at the driver input is strongly recommended, but it depends on PSU, wires cross-section and

their length. The capacitor used during the tests was 1000uF 25V.

You should be very careful not to cause short circuit between the + (VCC) of the power nor + (LD) supply and -(GND) of the logic input or current monitor input, as a thin GND logic paths can be irreparably damaged.

Modulation input can be used as TTL input with its logic levels of 0V and 5V or as an analog input. Analog modulation means that by using 2,5 V on ANG input you get 50% output power, analogically by using 4 V you get 80% output power, etc.

We recommend the use of power cables with cross-section of at least 4 mm².

Protection

Due to high current flowing through the paths we minimized the voltage drop on the driver and there is no reverse polarity protection. We recommend using LASORB protection device mounted close to the diode or at least high power silicone diode connected backwards.

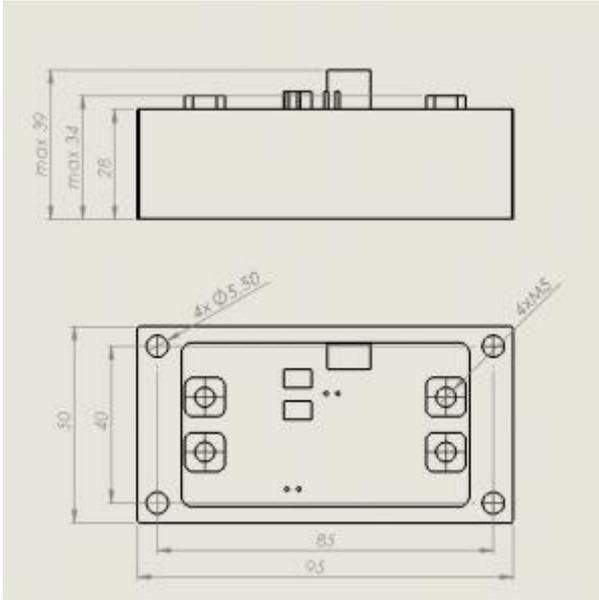
The driver's body is isolated from all signals of the driver and can be mounted directly to the metal heatsinks or other metal parts.

The analog input is protected by a 5V1 Zener diode on occasion there appears the voltage higher than 5V. Despite everything, this input should not be used with higher voltages.

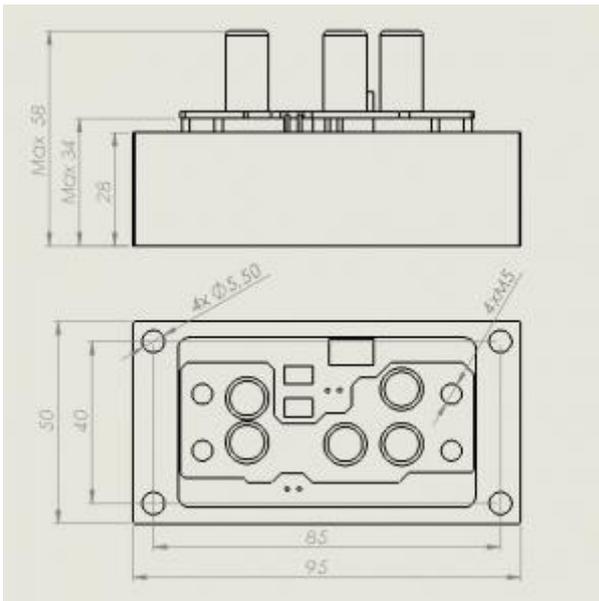
Dos and Don'ts

- Pay attention to proper cooling
- Do not touch the unit during operation
- Do not exceed specified parameters.

Mechanical Details of the Heatsink



Dimensions of the Heatsink

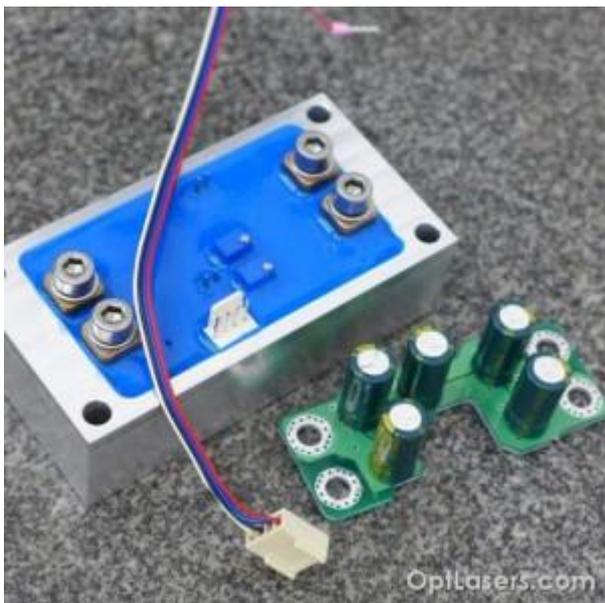


Dimensions of the Heatsink with 25V Capacitor Bank

HPLDD 60A



Driver with 25V Capacitor Bank



Driver with 25V Capacitor Bank