Operating Manual
LPLDD-5A-24V-TP-H Laser Diode Driver

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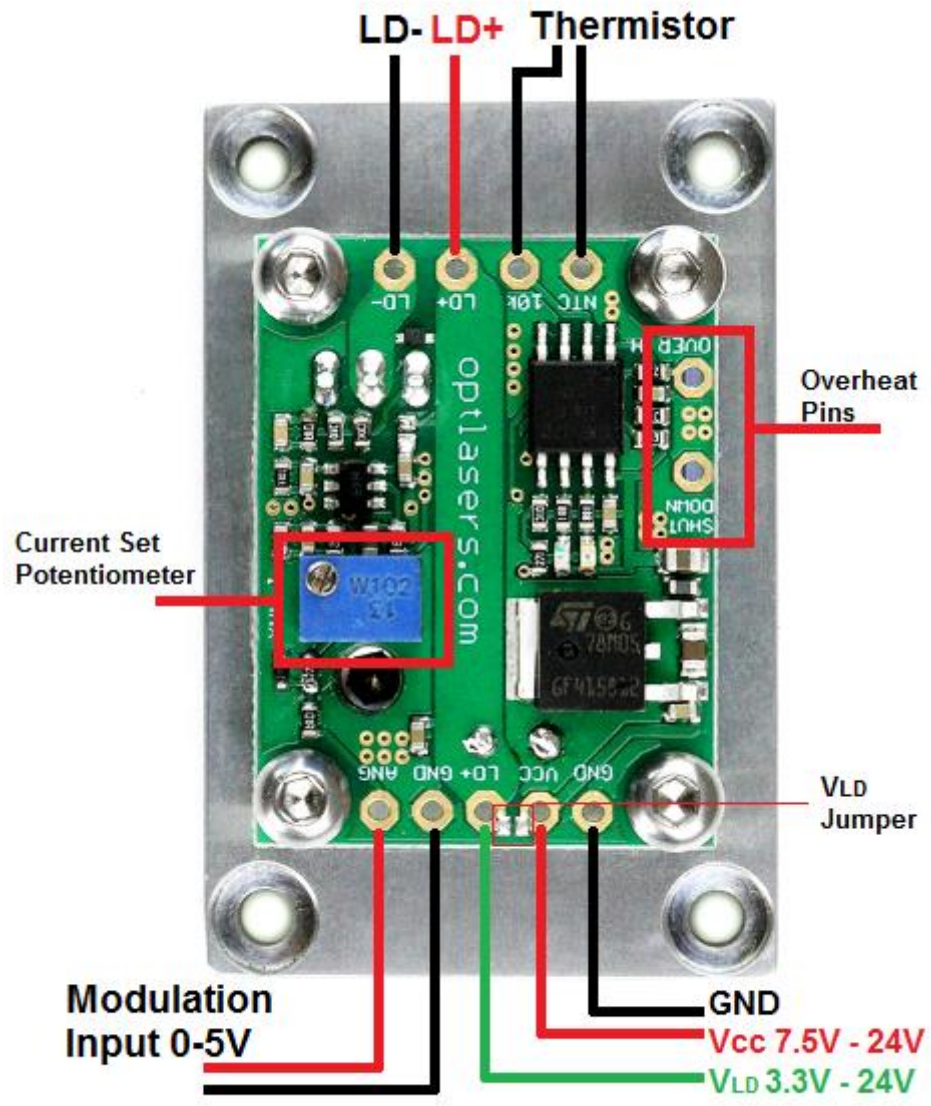
About the LPLDD-5A-24V-TP-H Laser Diode Driver

LPLDD-5A-24V-TP-H Laser Diode Driver is the new version of the classic laser diode driver with thermal protection which ensures proper work of the laser diode and protects it from overheating. The basic driver for powering laser diodes has the option to adjust the maximum output current in the range of 0-5 A, and to modulate the current flowing through the diode with frequency up to 100 kHz. The exemplary test with the 100 kHz square-wave input signal modulation is shown below.

LPLDD5A-24V-TP driver is capable to power literally every laser diode available on the market up to 5 W - 405 nm, 445 nm, 520 nm, 638 nm, 650 nm, 808 nm, 980 nm. The examples of diodes are: 1 W 445 nm, 3.5 W 445 nm, 700 mW 635 nm, 200 mW 808 nm, 1 W 808 nm, 5 W 808 nm, 1 W 520 nm.

Pinout



Power Supply and Modulation Input

When you are powering both the laser diode and the driver from one power supply in the range of 7.5 - 24 V DC the V_{LD} jumper should be connected.

In the case of powering a laser diode with low voltage, i.e 3 V, one should use two power supplies and the V_{LD} jumper should be disconnected.

The driver has to be powered with voltage in the range of 7.5 - 24 V DC and laser diode has to be connected to the power supply in the range of 3.3 V - 24 V DC

This feature allows you to power your laser diode from low voltage, therefore, lower power can be dissipated by the driver.

Modulation input can be used as TTL input with its logic levels of 0 V and 5 V 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. This input can also be used as PWM input; the only requirement is that the base frequency of the PWM signal is in range of 5-20 kHz.

Overheat Protection

This laser controller has a thermal protection system which protects laser diode from overheating.

- In the case of normal operation, when a thermistor measures the temperature of a laser unit below 40 degrees of Celsius, the green LED is ON. Overheat pin status: High, output 5 V DC.
- When the temperature measured by the thermistor reaches 40 degrees Celsius, the red LED starts to blink. Green LED is still ON. Overheat pin status: High, output 5 V DC.
- When the temperature measured by a thermistor reaches 45 degrees Celsius, the red LED is ON, and the laser diode driver switches off. Overheat pin status: Low, output 0 V DC. The laser diode driver will get back to normal operation when the temperature measured by a thermistor is lower than 40 degrees.
- Two blinking LEDs means that there is no connection between the laser diode driver and a thermistor, or the connection was temporarily lost. When the connection established - reset the driver. To reset the driver, disconnect and connect the power supply of the driver.

Electrical Protection

- Modulation input of the driver is protected by a 5V1 Zener diode. Nevertheless, one should not use a modulation voltage higher than 5 V.
- The output of the driver is protected by the Schottky diode which doesn't allow the reverse voltage to appear as well protects from ESD.

Recommendations and requirements

The laser diode supply voltage V_{LD} should always be set higher than or equal to 3.3 V. The minimum supply voltage for different diode currents is given by the formula:

$$V_{LD} = 0,2 * I_d + V_d$$

V_{LD} is the supply voltage [V]
V_d is the diode working voltage [V]
I_d is the laser diode operating current [A]

For powering the driver, we recommend the use a cable with cross-section of 0.1* I [mm^2], where I is the laser diode operating current [A].

Depending on the used laser diode and PSU, you should assure proper cooling of the MOSFET transistor. The MOSFET must be isolated from the heat sink/plate with the silicon pad as well as the plastic sleeve. A short circuit between MOSFET and heat sink/plate may damage the driver and can be dangerous for the Laser Diode.

Exemplary Test

The test was done using:

- 6 W NUBM44 laser diode (at 3.3 A)
- 15 cm long 0.35 mm2 wires
- 12 V input voltage (@ 10% duty cycle)
- 80 x 80 x 20 heat sink on power MOSFET

For CW work the voltage for NUBM44 diode should be not higher than 8V.