

PLD Series +5V Laser Diode Drivers

General Description

The **PLD** series of Laser Diode Drivers combines the high performance you expect from a Wavelength component with two distinct improvements: low voltage operation from +5 V DC, and an **Active Current Limit**.

Operating from a single +5 V supply minimizes heat dissipation. Modular packaging makes it easier to integrate the PLD into your system. For applications that require lasers in series, a separate laser diode power supply input lets you provide a higher compliance voltage. The **Active Current Limit** not only protects your laser diode, but ensures that you are operating with maximum stability. When the laser current reaches the level set by the Limit I Trimpot, the output disables and the Limit LED and Limit Status indicate the current limit has been reached.

Two photodiode ranges provide variable sensitivities for optimum operation. You can maintain excellent stability when operating in constant current, constant power, or modulated mode. All trimpots and switches are easily accessible and offer precision control. A slow start circuit, mechanical shorting relay, and Active Current Limit offer maximum protection for your laser diode even when power is removed.

Features

- 200 mA, 500 mA, and 5 Amp models
- Single supply operation: +5 VDC
- < 20 ppm constant current stability (24 hours)
- < 0.02% constant power stability (24 hours)
- Separate Laser Diode Supply input allows for flexible compliance voltages up to +28 VDC typical
- Manually adjust:
 - Setpoint & Current Limit
 - Constant Current or Constant Power Operation
 - Photodiode Sensitivity
- Remotely:
 - Adjust Setpoint Current with Analog Input
 - Enable or Disable Output
 - Monitor Laser Diode Current, Photodiode Current, and Laser Diode Limit Current
 - Monitor Limit Status
- Supports all laser diode / photodiode pin configurations
- Safety is maximized:
 - Slow start circuitry
 - Mechanical relay protects even when power is removed
 - Active Current Limit
- Integral Heatsink (Fan Assembly included with PLD-5000)

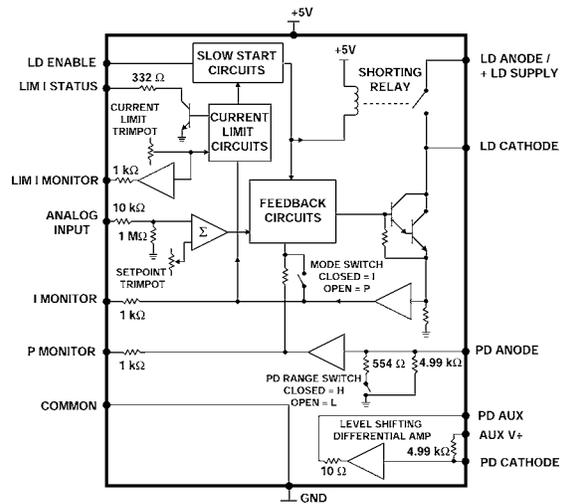
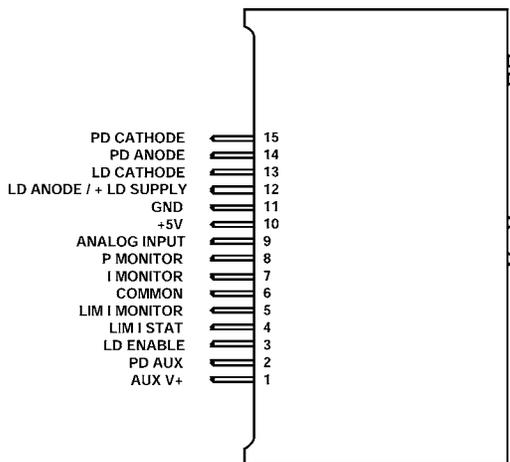
PLD-200 / PLD-500 / PLD-5000

Ordering Information

| | |
|-----------------|---------------------------|
| PLD-500 | 500 mA Laser Diode Driver |
| PLD-5000 | 5 Amp Laser Diode Driver |

Functional Diagram

Pin Descriptions

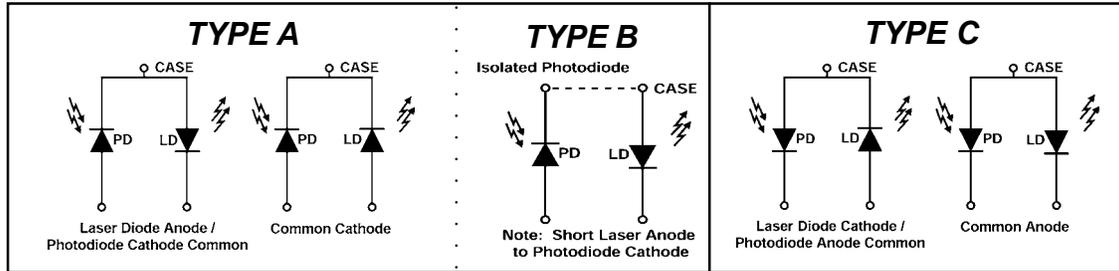


Laser Diode Types

The following laser diode / photodiode configurations are currently manufactured - Type A, Type B, and Type C. Setup and operation vary according to your type of laser diode. **Please identify which laser diode you will be using with the PLD and follow the appropriate operating instructions.**

Operating instructions for lasers of Type A or B are detailed on page 8.

Operating instructions for Type C Lasers are detailed on page 12.



Pin Descriptions

| PIN | NAME | DESCRIPTION |
|-----|-------------------------|--|
| 1 | AUX V+ | For TYPE C laser diodes only. See page 12. |
| 2 | PD AUX | For TYPE C laser diodes only. See page 12. |
| 3 | LD ENABLE | Enable Output Current = +3 to +5 V Disable Output Current = Ground or Floating |
| 4 | LIM I STAT | LIMIT status. LIMIT = Ground Normal Operation = High Impedance If Limit is detected, laser diode current will turn off, Limit I LED will light. Toggle LD ENABLE to restart laser diode current. |
| 5 | LIM I MONITOR | Current Limit setpoint monitor. Impedance = 1 kΩ Output 0 to 2.5 V NOTE: Current limit needs to be set 0.2 V above desired limit level. |
| 6 | COMMON | Measurement ground. Low current return used only with pins 5, 7, 8, & 9. Shorted to pin 11 internally. |
| 7 | I MONITOR | Laser Diode current monitor. Impedance is 1 kΩ Output 0 to 2.5 V |
| 8 | P MONITOR | Power monitor (PD current monitor). Impedance = 1 kΩ Output 0 to 2.5 V |
| 9 | ANALOG INPUT | Remote setpoint or modulation input. Input impedance = 1 MΩ Input 0 to 5 V Connect Pin 9 to Pin 6 when not in use. |
| 10 | +5V | Supply voltage to control electronics. Min +4.5 V Max +5.5 V |
| 11 | GND | Power supply ground. Used with pin 10 for high current return. |
| 12 | LD ANODE/ +LD SUPPLY | Laser Diode Anode and laser diode supply connection. Recommended +LD Supply for single laser is +5 V. Maximum +30 V. CAUTION: Too high a voltage may thermally damage the PLD. |
| 13 | LD CATHODE | Laser Diode Cathode |
| 14 | PD ANODE | For Type A or B laser diodes, Photodiode Anode. See page 12 for use with Type C laser diodes. |
| 15 | PD CATHODE | For TYPE C laser diodes only. See page 12. |

PLD-200 / PLD-500 / PLD-5000



POWER SUPPLY AND NOISE

The PLD Series Laser Diode Drivers are designed for stable, low noise operation. The power supply you select will directly affect the noise performance of the driver. We recommend using a regulated, linear supply for optimum performance. Depending on your requirements, you may be able to use a switching power supply. Each case must be evaluated independently because a switching power supply will affect noise, transient, and stability performance. The PLD series can be purchased with the PLDPCB series evaluation kit and / or the PWRPAK-5V +5V table top regulated switching power supply for easy initial operation.

WARNING: The PLD laser diode drivers can power Class IV laser diodes. Precautions should be taken to avoid exposure to the laser radiation. Do not stare directly into the beam or expose hands or other body parts to the beam. Before powering the laser diode, mount it securely and have beam dumps set up to catch both front and back facet outputs.

CAUTION: If you plan to operate the PLD with any Wavelength temperature controller, you **may** need to use separate power supplies. If the TE cooler or thermistor is connected to the laser diode, you must either use two separate power supplies and let each float independent of the other or use a bipolar power supply.

WARNING: Exceeding the maximum specified operating current ($I_{OP\ MAX}$) will damage your laser diode. Become familiar with the PLD series module operation and the exact specifications of your laser diode before attaching it to the PLD module. Seek assistance from someone with experience working with laser diodes if you have not operated one before.

FAN ELECTRICAL NOISE

PLD-5000 Only

The PLD-5000 is equipped with a +5 V fan that cools the heatsink. The fan in some cases may create excess electrical noise. To reduce the electrical noise level you must connect the heatsink to earth/chassis ground or the system ground (power supply common). **On the PLDPCB-5000 Evaluation kit the heatsink is already connected to the power supply common ground.** To ground the heatsink in other applications you need to connect ground to the tapped hole in the bottom of the heatsink.

LASER SAFETY ISSUES

WARNING: The following instruments may cause momentary opens, shorts, or impedance changes that will damage a laser diode if attached to the output of a laser diode driver.

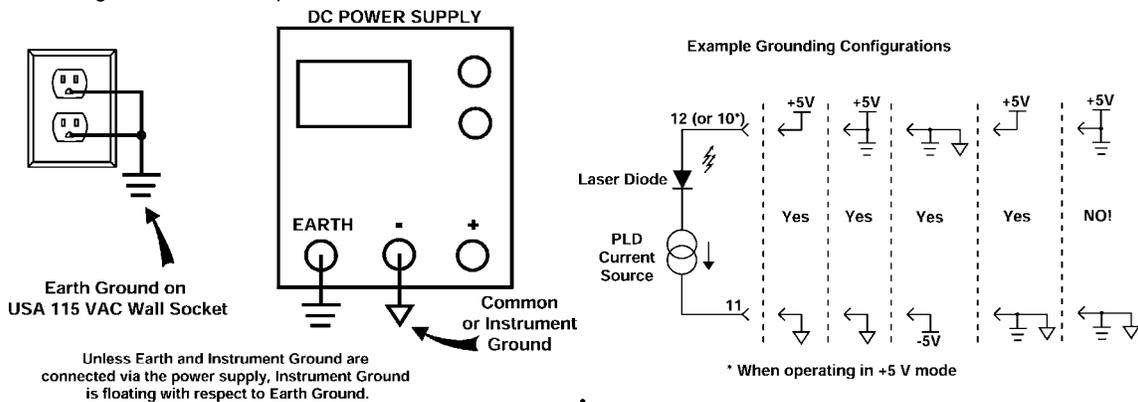
1. A **volt meter** across the laser diode.
2. An **oscilloscope** across the laser diode.
3. A **current meter** in series with the laser diode.

All measurements made with these instruments on the output should be made with a simulated load attached and not a laser diode.

CAUTION: IF LASER DIODE AND PHOTODIODE ARE ISOLATED (TYPE B LASER DIODE) Short the laser diode anode to the photodiode cathode. The PLD series laser diode drivers require the photodiode be connected to the laser diode. If no connection is made between the laser diode and the photodiode, then the PLD will not operate properly in constant power mode, and the power monitor will not read the proper photodiode current.

GROUNDING VARIATIONS

Some laser diode packages short either pin of the laser diode to the case, which may connect the pin to earth ground through system hardware. Special attention to the details of grounding will assure safe operation. We offer the following definitions and options:



PLD-200 / PLD-500 / PLD-5000

Electrical Specifications

| Model Number | PLD-200 | PLD-500 | PLD-5000 |
|---|-------------------|-------------------|-------------------|
| Drive Current Output | | | |
| Output Current Range | 0 - 200 mA | 0 - 500 mA | 0 - 5 Amps |
| Compliance Voltage with +5V input | > 3 V | > 3 V | > 3 V |
| Compliance Voltage ❶ | > 28 V | > 28 V | > 28 V |
| Temperature Coefficient | < 100 ppm/°C | < 100 ppm/°C | < 100 ppm/°C |
| Short Term Stability (1 hr) | < 10 ppm | < 10 ppm | < 10 ppm |
| Long Term Stability (24 hrs.) | < 20 ppm | < 20 ppm | < 20 ppm |
| Noise and Ripple (rms) ❷ | < 2 μA | < 5 μA | < 20 μA |
| Current Limit Range | 0 - 200 mA | 0 - 500 mA | 0 - 5 Amps |
| Photodiode Feedback | | | |
| Standard Range | 50 - 5000 μA | 50 - 5000 μA | 50 - 5000 μA |
| Optional Range (TYPE A & B ONLY) | 15 - 500 μA | 15 - 500 μA | 15 - 500 μA |
| Const. Power Output Stability | < 0.02 % | < 0.02 % | < 0.02 % |
| External Modulation (Constant Current) | | | |
| Input Impedance | 1 MΩ | 1 MΩ | 1 MΩ |
| Transfer Function ❸ to +5 V Max) | 40 mA/V | 100 mA/V | 1000 mA/V |
| Bandwidth (3 dB) ❹ | 65 kHz | 100 kHz | 100 kHz |
| Depth of Modulation at 20kHz | 90% | 90% | 90% |
| Power Supply | | | |
| Power Up Trip Point ❺ | 4.5 V | 4.5 V | 4.5 V |
| Power Down Trip Point | 3.5 V | 3.5 V | 3.5 V |
| Max. Internal Power Dissipation | 3 Watts | 9 Watts | 15 Watts |
| Setpoint and Monitor Accuracy | | | |
| Limit I Setpoint, Output Setpoint, I & P Setpoint Monitors (Pins 5, 7, & 8) | 5% | 5% | 5% |

PLD-200 / PLD-500 / PLD-5000

General Specifications

Power Supply Requirements: ❹

STD +5 V Operation, TYPE A or B lasers:

Pin 10: +5 VDC (+5.5 V MAX)

Add for High Compliance Voltage:

Pin 12: +3 VDC to +30 VDC (+32 V max)

Add for TYPE C lasers:

Pin 1: +8 VDC to +12 VDC (+12.5 V max)

Supply Current

PLD-200 & PLD-500: 50 mA plus max. LD current

PLD-5000: 150 mA plus max LD current

Operating Temperature

0 to +50°C (guaranteed)

-40 to +75°C (typical)

Warm-up

1 hour to rated accuracy

Weight

< 0.3 lbs.

Size (H x W x D)

1.52" x 2.65" x 0.81" (PLD-200)

1.52" x 2.65" x 1.10" (PLD-500)

1.52" x 2.65" x 1.82" (PLD-5000)

Connector

15 pins, see page 5 for PCB layout pattern

See page 16 for connector recommendation if not mounting PLD to a circuit board.

❶ Compliance Voltage will vary depending on power supply voltages. A maximum compliance voltage of +28 volts will be obtained with +30 volts input. A maximum compliance voltage of +3 volts will be obtained with +5 volts input. See page 8 for more detail.

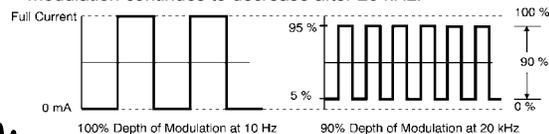
❷ With analog input (pin 9) shorted to common (pin 6).

❸ Modulation bandwidth in Constant Power mode will depend on photodiode response. It is typically 10% of Constant Current Bandwidth.

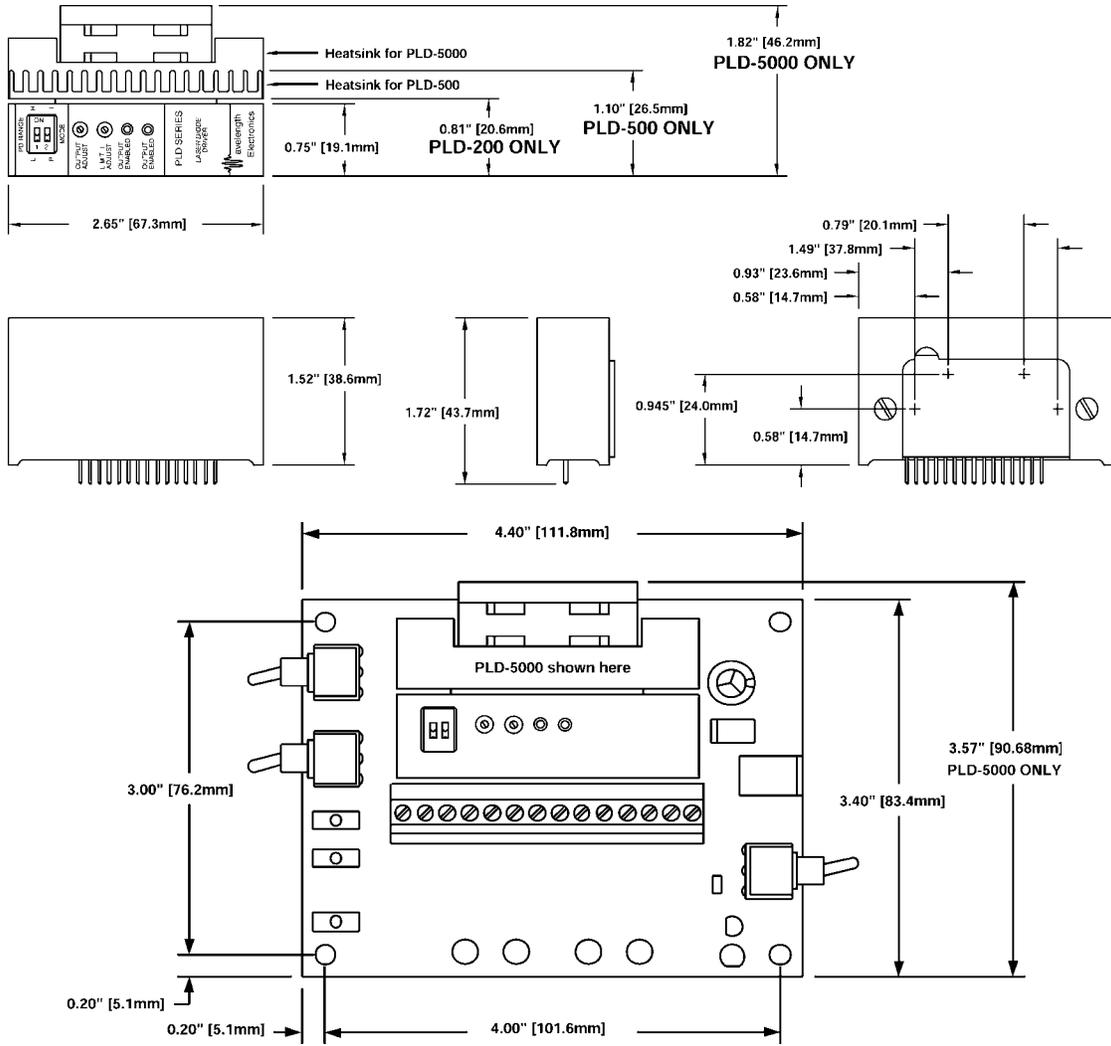
❹ The PLD series has internal control circuitry which turns the output on and off depending on the voltage at pin 10. When the voltage reaches the power up trip point (+4.5 V), and the LD Enable (pin 3) is greater than 3 V, the module soft starts the laser diode. When the voltage reaches the power down trip point (+3.5 V), the module shunts current around the laser diode, powering it down in a controlled fashion.

❺ If thermistor or TE module are case common with the laser diode, the PLD and temperature controller power supplies may need to be isolated from each other or a bipolar supply may be required.

❻ As pulse frequency increases on the analog input, the peak-to-peak output amplitude diminishes. For example, these graphs show the waveform shape at 10 Hz and 20 kHz. Depth of modulation continues to decrease after 20 kHz.

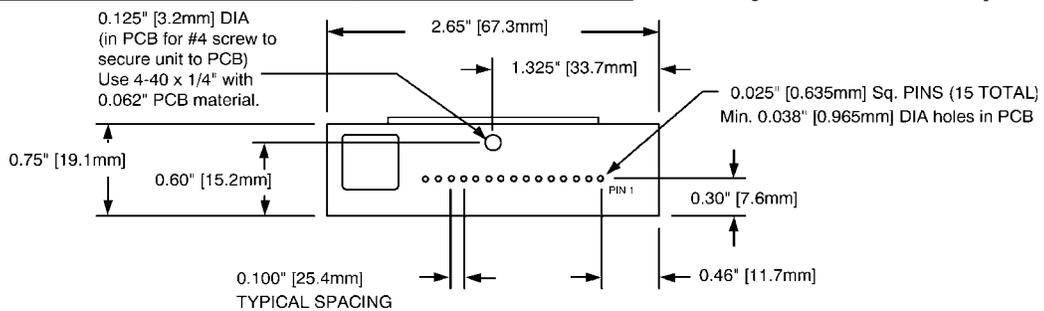


Mechanical Specifications



PLD-200 / PLD-500 / PLD-5000

PCB Layout Pattern - Top View

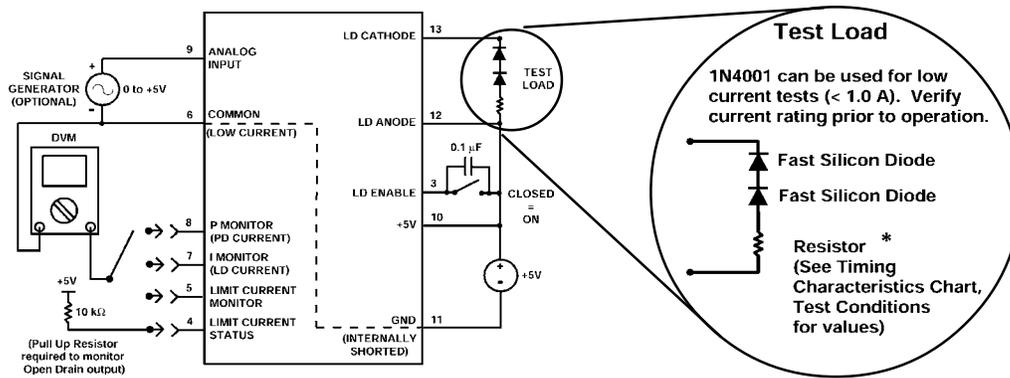


Timing Characteristics

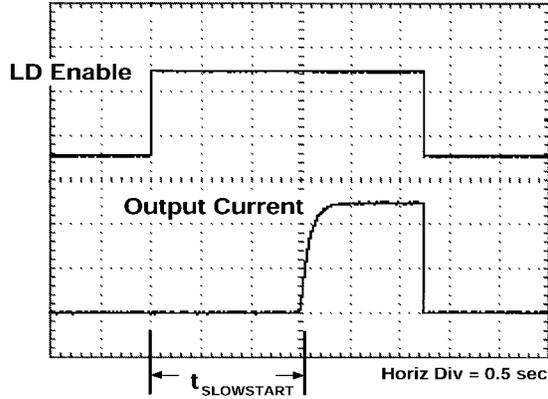
| Symbol | Parameter | Test Points | Test Conditions * | Typ |
|-----------------|-----------------|-------------|------------------------|---------------|
| t_{ON} | On Time | Load | PLD200 - 10 Ω | 6.8 μ sec |
| | | | PLD500 - 1.0 Ω | 6.8 μ sec |
| | | | PLD5000 - 0.1 Ω | 6.8 μ sec |
| t_{OFF} | Off Time | Load | PLD200 - 10 Ω | 6.8 μ sec |
| | | | PLD500 - 1.0 Ω | 6.8 μ sec |
| | | | PLD5000 - 0.1 Ω | 6.8 μ sec |
| $t_{SLOWSTART}$ | Slow Start Time | Load | PLD200 - 10 Ω | 1.5 sec |
| | | | PLD500 - 1.0 Ω | 1.5 sec |
| | | | PLD5000 - 0.1 Ω | 1.5 sec |

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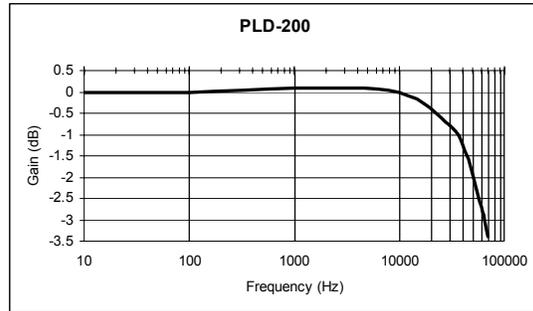
Test Setup for Parameter Measurement



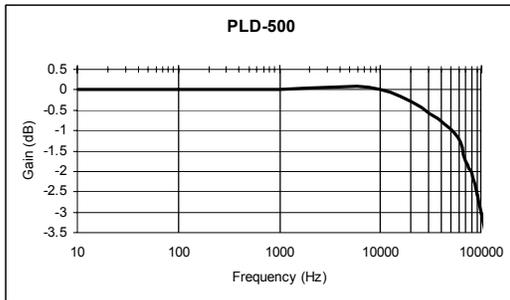
Slow Start Timing



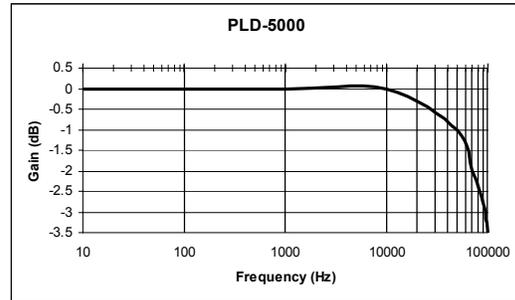
Large signal frequency response



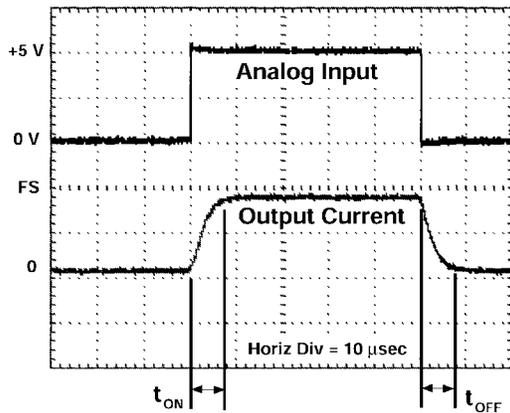
Large signal frequency response



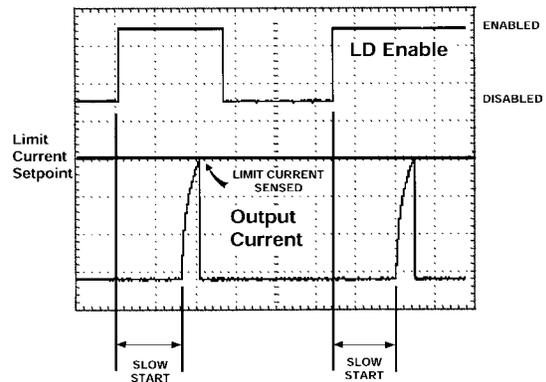
Large signal frequency response



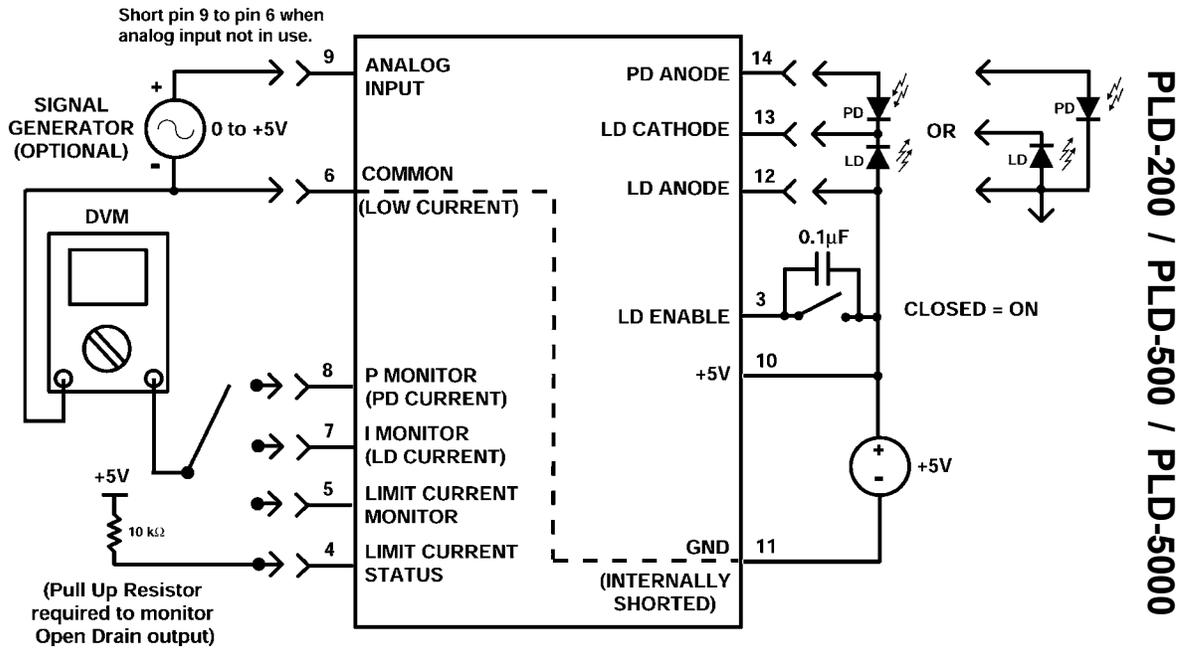
10 kHz square wave response



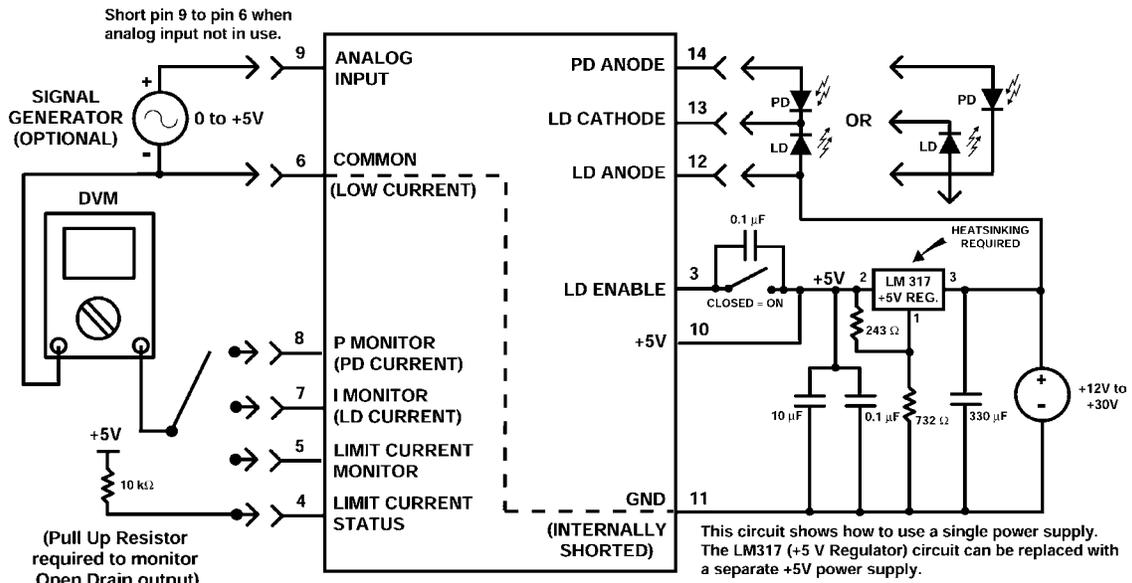
Current Limit Operation



Typical Setup for Type A or B laser diode +5V operation



Typical Setup for Type A or B laser diode High Compliance Voltage operation



Operating Procedures for Type A or B laser diodes +5V operation

Constant Current Mode

Constant Power Mode

With the Output Disabled:

- (1) **Configure Mode Switch to I.** [switch on top of PLD]
- (2) **Set Limit Current:** Monitor pins 5 & 6, adjust Current Limit trimpot clockwise until the voltage at pin 5 corresponds to the desired voltage.

NOTE: Current limit needs to be set 0.2 V above desired limit level.

| Limit Current and I Monitor Transfer Functions | |
|--|------------|
| PLD-200 | 80mA/Volt |
| PLD-500 | 200mA/Volt |
| PLD-5000 | 2 Amp/Volt |

Once Current Limit is detected, the output will turn off and the LIM I led will illuminate red. The LIM I Status voltage and LIM I LED will stay on until the LD Enable is toggled off then on, and the error no longer exists.

- (3) **Set Operating Current.** Use the transfer function from step 2 to calculate the desired current. Monitor pins 7 & 6. With the OUTPUT ADJUST trimpot fully CCW, enable the output. Slowly adjust the OUTPUT ADJUST trimpot CW until the desired voltage is measured at pin 7.

- (4) **Monitor the Photodiode (optional).** If the Photodiode is connected to the laser diode, monitor pins 8 & 6. The PD switch on top of the PLD will determine the output transfer voltage by the position of the switch:

$$L = 200 \mu\text{A} / \text{V} \quad H = 2 \text{ mA} / \text{V}$$

(15 - 500 μA range) (50 - 5000 μA range)

- (5) **Analog Input:** This input is designed for analog signals only and should not be used with TTL signals. You can either input a DC voltage for remote current setpoint control or use this input to modulate the laser diode. This input sums directly with the output adjust trimpot. The input transfer function will depend on the PLD model in use.

| Model | Transfer Function |
|----------|-------------------|
| PLD-200 | 40 mA / Volt |
| PLD-500 | 100 mA / Volt |
| PLD-5000 | 1 Amp / Volt |

With the Output Disabled:

- (1) **Configure Mode Switch to P.** [switch on top of PLD]
- (2) **Set Limit Current:** Monitor pins 5 & 6, adjust Current Limit trimpot clockwise until the voltage at pin 5 corresponds to the desired voltage.

NOTE: Current limit needs to be set 0.2 V above desired limit level.

| Limit Current and I Monitor Transfer Functions | |
|--|------------|
| PLD-200 | 80mA/Volt |
| PLD-500 | 200mA/Volt |
| PLD-5000 | 2 Amp/Volt |

Once Current Limit is detected, the output will turn off and the LIM I led will illuminate red. The LIM I Status voltage and LIM I LED will stay on until the LD Enable is toggled off then on and the error no longer exists.

- (3) **Set the output power.**

Determine the photodiode current (I_m at operating current I_{op}) from data provided with your laser diode. Monitor pins 8 & 6. Set the **PD Range Switch** for the appropriate photodiode current

$$L = 15 - 500 \mu\text{A} \quad H = 50 - 5000 \mu\text{A}$$

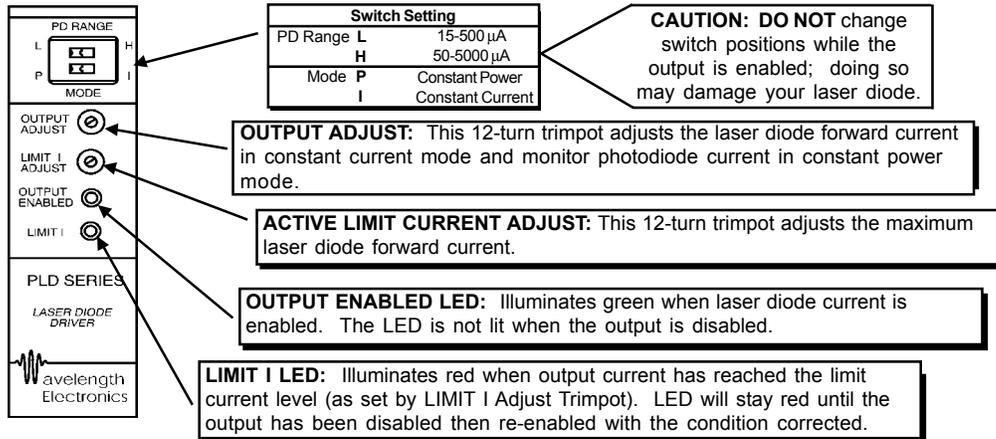
With the OUTPUT ADJUST trimpot fully CCW, enable the output. When the laser reaches threshold, the photodiode current changes abruptly and rises quickly. Adjust the **OUTPUT ADJUST** trimpot slowly until the voltage at pin 8 corresponds to the desired photodiode current. Transfer functions for Low and High Photodiode mode are:

$$L = 200 \mu\text{A} / \text{V} \quad H = 2 \text{ mA} / \text{V}$$

- (4) **Analog Input** This input is designed for analog signals only and should not be used with TTL signals. You can either input a DC voltage for remote power setpoint or use this input to modulate the laser diode. This input sums directly with the output adjust trimpot. The input transfer function is the same for all models and depends on the PD RANGE switch setting.

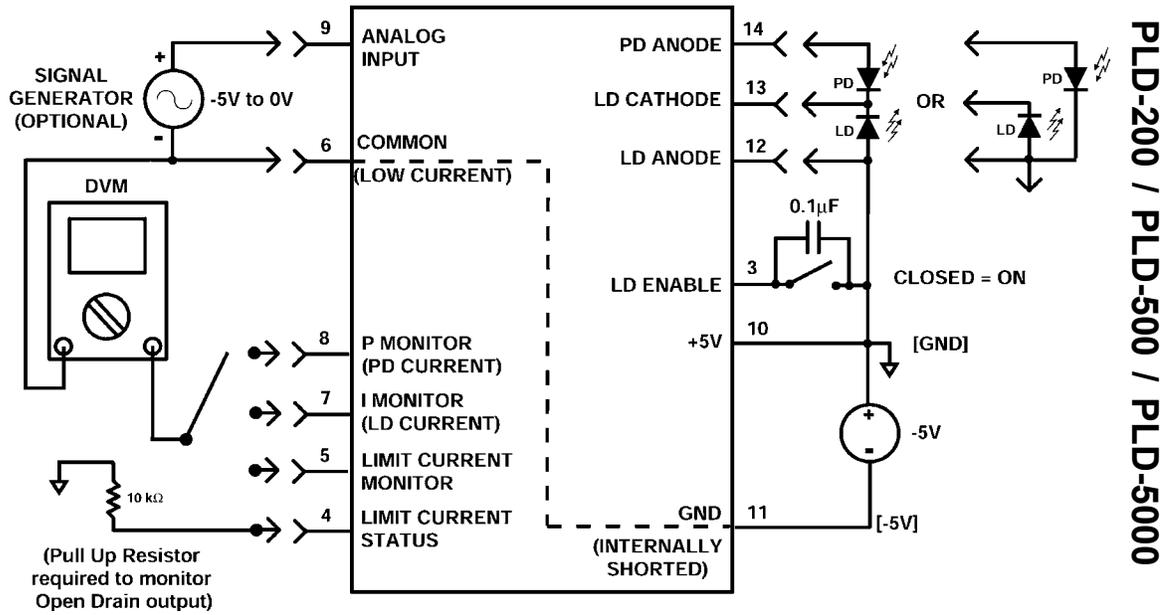
$$L = 100 \mu\text{A} / \text{V} \quad H = 1 \text{ mA} / \text{V}$$

External Adjustments

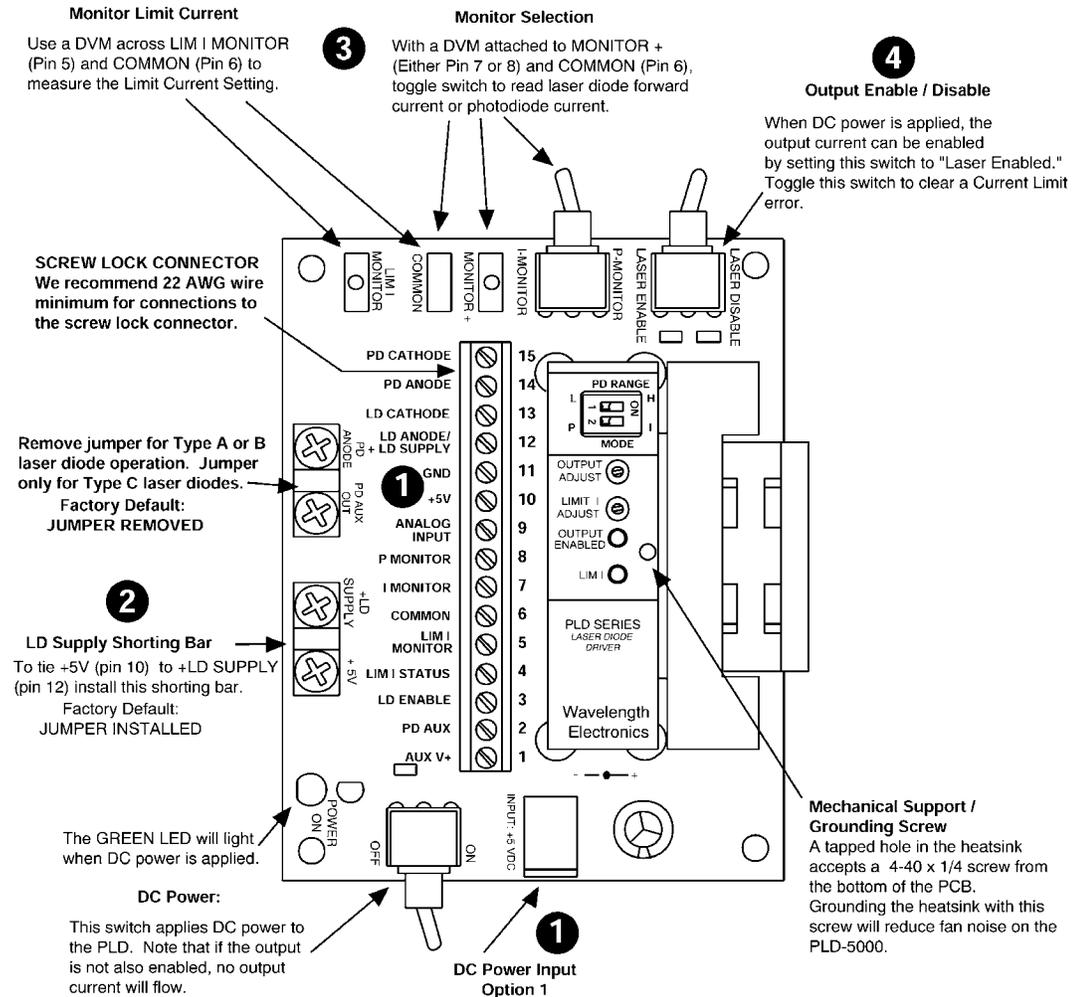


PLD-200 / PLD-500 / PLD-5000

Typical Setup for Type A or B laser diode Negative Supply operation



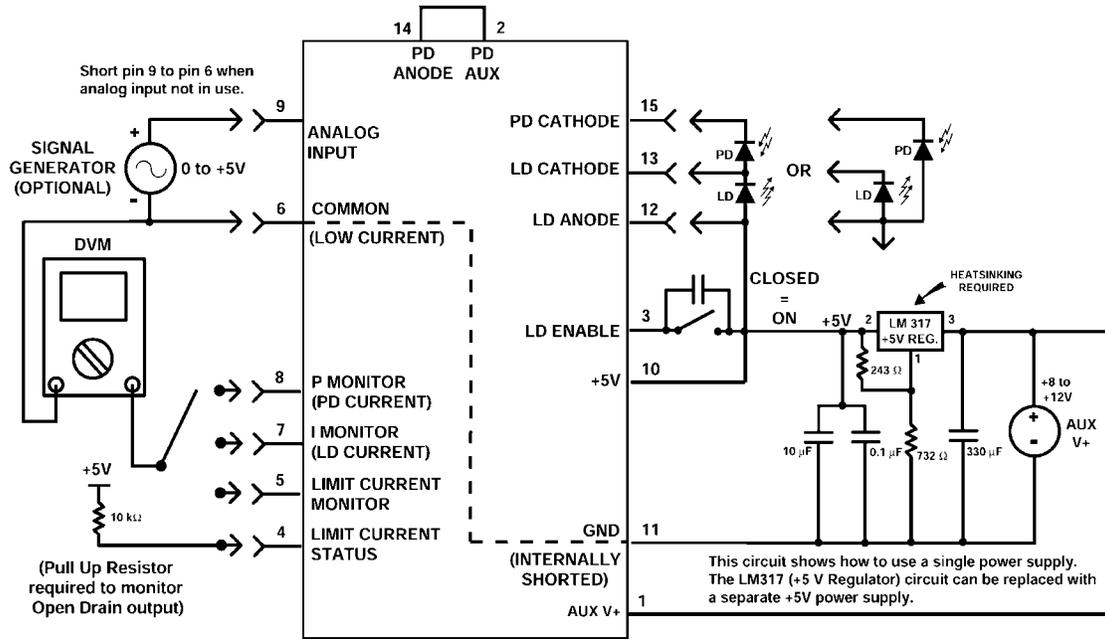
Operating the PLDPCB with Type A & B Laser Diodes



PLD-200 / PLD-500 / PLD-5000

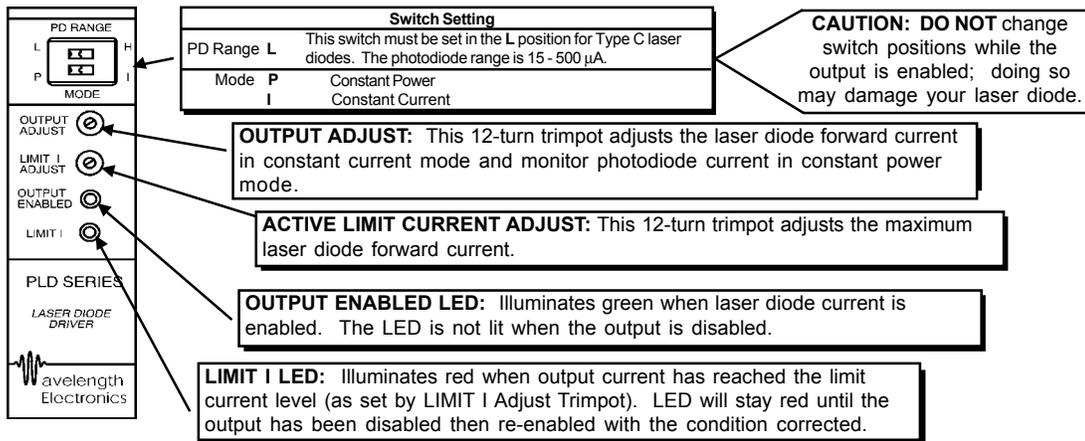
- | | |
|---|---|
| <p>1 DC Power Input Two inputs are available. If using a 2.5 mm circular connector (such as provided with the POWERPAK-5V) use the DC input next to the power switch. Otherwise, use the screw-lock connector, pins 10 & 11.</p> <p>2 Compliance Voltage If a single laser diode is being used, install the jumper on the bar to short +LD SUPPLY with +5V. For higher compliance voltage, remove the jumper and provide voltage to pin 12 via the screw lock connector. See High Compliance Voltage Operation on page 8.</p> | <p>3 Monitors To monitor Limit Current, Laser Diode or Photodiode Current, use COMMON for the negative input of the DVM and either LIM I MONITOR or MONITOR + for the positive input. The switch set to P-MONITOR measures photodiode current. I-MONITOR measures laser diode current.</p> <p>4 LD ENABLE The switch enables and disables output current to the laser diode. Toggle this switch to clear a Current Limit error.</p> |
|---|---|

Typical Setup for Type C laser diodes



PLD-200 / PLD-500 / PLD-5000

External Adjustments



Operating Procedures for Type C laser diodes

Constant Current Mode

With the Output Disabled:

- (1) **Configure Mode Switch to I.** [switch on top of PLD]
- (2) **Set Limit Current:** Monitor pins 5 & 6, adjust Current Limit trimpot clockwise until the voltage at pin 5 corresponds to the desired voltage.

NOTE: Current limit needs to be set 0.2 V above desired limit level.

| Limit Current and I Monitor Transfer Functions | |
|--|-------------|
| PLD-200 | 80 mA/Volt |
| PLD-500 | 200 mA/Volt |
| PLD-5000 | 2 Amp/Volt |

Once Current Limit is detected, the output will turn off and the LIM I led will illuminate red. The LIM I Status voltage and LIM I LED will stay on until the LD Enable is toggled off then on, and the error no longer exists.

- (3) **Set Operating Current.** Use the transfer function from step 2 to calculate the desired current. Monitor pins 7 & 6. With the OUTPUT ADJUST trimpot fully CCW, enable the output. Slowly adjust the OUTPUT ADJUST trimpot CW until the desired voltage is measured at pin 7.

- (4) **Monitor the Photodiode (optional).** If the Photodiode is connected to the laser diode, monitor pins 8 & 6. The PD switch on top of the PLD should be set to L:

$$L = 200 \mu\text{A} / \text{V}$$

- (5) **Analog Input:** This input is designed for analog signals only and should not be used with TTL signals. You can either input a DC voltage for remote current setpoint control or use this input to modulate the laser diode. This input sums directly with the output adjust trimpot. The input transfer function will depend on the PLD model in use.

| Model | Transfer Function |
|----------|-------------------|
| PLD-200 | 40 mA / Volt |
| PLD-500 | 100 mA / Volt |
| PLD-5000 | 1 Amp / Volt |

Constant Power Mode

With the Output Disabled:

- (1) **Configure Mode Switch to P.** [switch on top of PLD]
- (2) **Set Limit Current:** Monitor pins 5 & 6, adjust Current Limit trimpot clockwise until the voltage at pin 5 corresponds to the desired voltage.

NOTE: Current limit needs to be set 0.2 V above desired limit level.

| Limit Current and I Monitor Transfer Functions | |
|--|------------|
| PLD-200 | 80mA/Volt |
| PLD-500 | 200mA/Volt |
| PLD-5000 | 2 Amp/Volt |

Once Current Limit is detected, the output will turn off and the LIM I led will illuminate red. The LIM I Status voltage and LIM I LED will stay on until the LD Enable is toggled off then on and the error no longer exists.

- (3) **Set the output power.**

Determine the photodiode current (I_m at operating current I_{OP}) from data provided with your laser diode. Monitor pins 8 & 6. One photodiode range is available. Set the PD Range Switch to L.

$$L \text{ Range} = 15 - 500 \mu\text{A}$$

With the OUTPUT ADJUST trimpot fully CCW, enable the output. When the laser reaches threshold, the photodiode current changes abruptly and rises quickly. Adjust the **OUTPUT ADJUST** trimpot slowly until the voltage at pin 8 corresponds to the desired photodiode current. The transfer function is:

$$L = 200 \mu\text{A} / \text{V}$$

This can be adjusted with a resistor (R) connected between PD Cathode (Pin 15) and AUX V+ (Pin 1). The new range can be calculated with:

$$\text{RANGE} = 2.5 \text{ V} / (R \parallel 5 \text{ k}\Omega) \text{ } [\mu\text{A}]$$

The new transfer function is:

$$1 / (R \parallel 5 \text{ k}\Omega) \text{ } [\mu\text{A} / \text{V}]$$

For example, a 500 Ω resistor across pins 15 and 2 converts the RANGE to:

$$2.5 / (500 * 5000 / (500 + 5000)) = 5500 \mu\text{A max}$$

and the transfer function to:

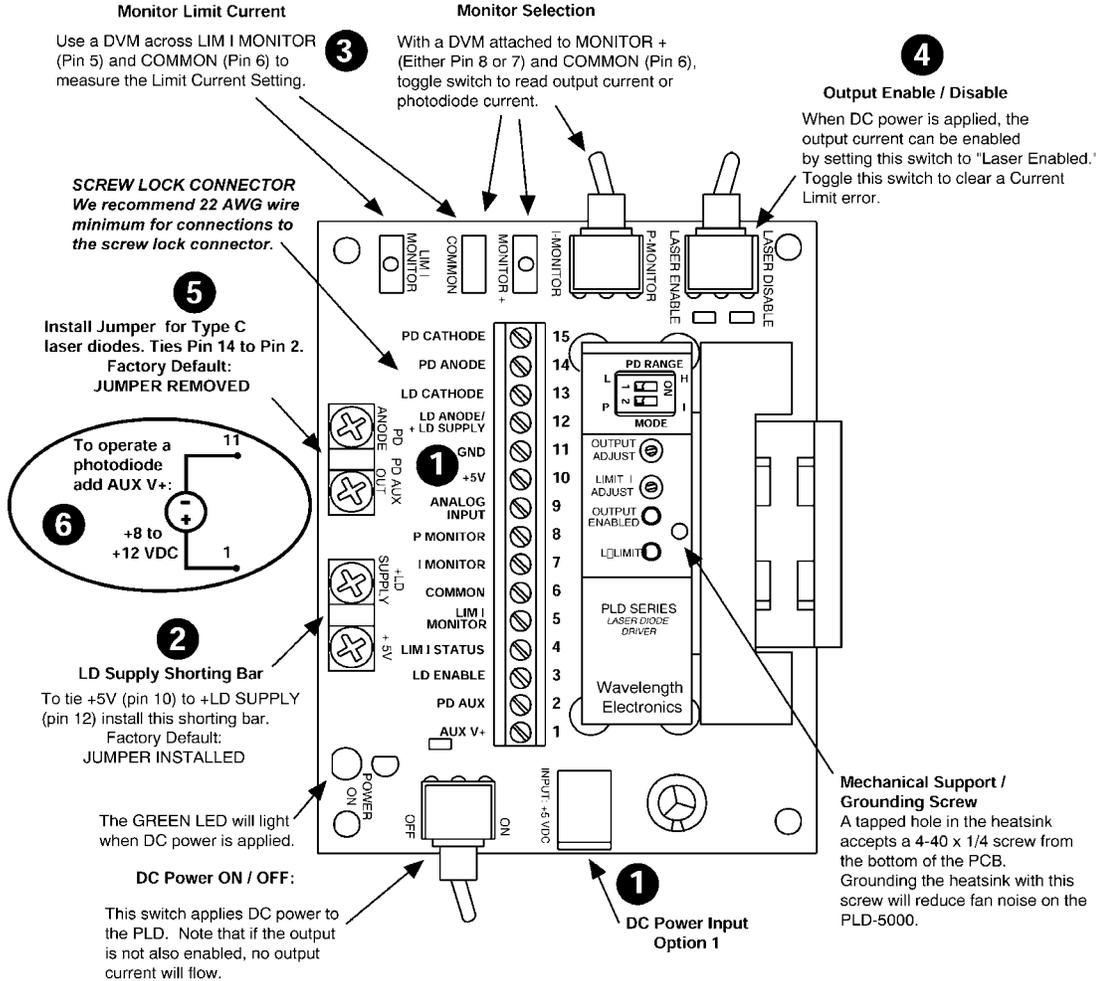
$$1 / (500 * 5000 / (500 + 5000)) = 2.2 \text{ mA} / \text{V}$$

- (4) **Analog Input** This input is designed for analog signals only and should not be used with TTL signals. You can either input a DC voltage for remote power setpoint or use this input to modulate the laser diode. This input sums directly with the output adjust trimpot. The input transfer function is **100 $\mu\text{A} / \text{V}$** for all models. Note that the transfer function will change if you change the photodiode RANGE. The new transfer function is $\text{RANGE} / 5 \text{ V}$

PLD-200 / PLD-500 / PLD-5000



Operating the PLDPCB with Type C Laser Diodes



PLD-200 / PLD-500 / PLD-5000

- | | |
|--|--|
| <p>1 DC Power Input Two inputs are available. If using a 2.5 mm circular connector (such as provided with the POWERPAK-5V) use the DC input next to the power switch. Otherwise, use the screw-lock connector, pins 10 & 11.</p> <p>2 Compliance Voltage If a single laser diode is to be operated, install the jumper on the bar to short +LD SUPPLY with +5V. For higher compliance voltage, remove the jumper and provide voltage to pin 12 via the screw lock connector.</p> <p>3 Monitors To monitor Limit Current, Laser Diode or Photodiode Current, use COMMON for the negative input of the DVM and either LIM I MONITOR or MONITOR + for the positive input. The switch set to P-MONITOR measures photodiode current. I-MONITOR measures laser diode current.</p> | <p>4 LD ENABLE The switch enables and disables output current to the laser diode. Toggle this switch to clear a Current Limit error.</p> <p>5 Photodiode Feedback To use photodiode feedback, you must jumper PD AUX to PD ANODE. A jumper is provided.</p> <p>6 To Operate a Photodiode To use photodiode feedback, you must provide AUX V+ of +8V to +12V across pins 1 & 11 of the screw lock connector.</p> |
|--|--|

Remote Status LED circuit

A 332 Ω resistor is in series with the open drain output of the LIM I Status pin, so an external LED can be connected directly to pin 4 as shown.

External Trimpot Circuit

Recommended circuit when an external trimpot is used to control the PLD output current.

Bandgap Reference (4.096 V maximum from +5V) [LM335 or LM4040]
R1 = 10k to 100 kΩ

Monitor Calibration Circuit

A small offset may be present when measuring pin 5, 7, or 8 with respect to the actual output. Add this circuit to remove any offset.

COMMON (6)
MONITORS (Pins 5, 7, or 8)
CALIBRATED CURRENT SETPOINT

Change PD Range for TYPE A or B laser diodes

Put a resistor across pins 14 (PD Anode) and 6 (Common) to modify the PD range of the PLD.

PD Range = L PD Range = H

$$\text{Range} = \frac{2.5 \text{ V} \cdot 10^6}{R \parallel 5 \text{ k}\Omega} \text{ } [\mu\text{A}] \quad \text{Range} = \frac{2.5 \text{ V} \cdot 10^6}{R \parallel 500 \Omega} \text{ } [\mu\text{A}]$$

$$\text{Transfer Function} = \frac{10^6}{R \parallel 5 \text{ k}\Omega} \text{ } [\mu\text{A} / \text{V}] \quad \text{Transfer Function} = \frac{10^6}{R \parallel 500 \Omega} \text{ } [\mu\text{A} / \text{V}]$$

$$R \parallel 5 \text{ k}\Omega = \frac{R \cdot 5000}{R + 5000} \quad R \parallel 5 \text{ k}\Omega = \frac{R \cdot 500}{R + 500}$$

Laser Diode Protection when using a long cable

With a cable longer than two feet, add a Schottky diode across the laser diode.

LD Anode 12
LD Cathode 13
Schottky Diode (1N5818)
Laser Diode

Filter the PLD Output

If you don't need to modulate, you can reduce the noise by filtering the output current.

LD Anode 12
LD Cathode 13
Schottky Diode (1N5818)
Laser Diode
10 μF Tantalum
0.1 μF

Change the Modulation Transfer Function

Keep R1 and R2 below 100 kΩ for maximum accuracy.

$$\text{New Transfer Function} = \frac{R_2}{R_2 \pm R_1} * \text{Old Transfer Function}$$

Example: (for PLD-200) R1 = 9 kΩ, R2 = 1 kΩ

$$\text{New Transfer Function} = \frac{1}{1 + 9} * 40 \text{ mA} / \text{V} = 4 \text{ mA} / \text{V}$$

Parallel multiple PLD-5000s for higher current outputs

Constant Current Mode: Each current source will independently control the current through the laser.

Constant Power Mode: One current source acts as a bias and the other controls the power stability.

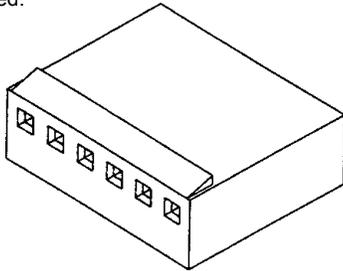


USING THE PLD WITH A CONNECTOR

The PLD leads are meant to solder into a circuit board. If you want to use a connector, we recommend the following:

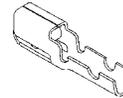
| | | |
|-----|--|-------------------------|
| Qty | | |
| 1 | Molex Crimp Terminal Housing 15 pin 7880 (High Pressure) | Part Number: 10-11-2153 |
| 15 | Molex Crimp Terminal 7879 (High Pressure) | Part Number: 08-55-0129 |

It is important to maintain contact between the PLD and laser diode at all times. If the connection to the laser diode breaks and re-connects quickly, the circuitry cannot prevent transient spikes and the laser diode likely will be damaged.



Molex Crimp Terminal Housing 7880 (High Pressure)
(only 6 pins shown)

15 pin Molex Part Number: **10-11-2153**
L x W = 0.51" x 1.52" (12.9 mm x 38.6 mm)



Molex Crimp Terminal 7879 (High Pressure)
for wire size 22 - 30 AWG, Select Gold Plating

Molex Part Number: **08-55-0129**
L x W = 0.44" x 0.76" (11.2 mm x 1.93 mm)

PLD-200 / PLD-500 / PLD-5000

CUSTOMER SERVICE & WARRANTY

If you have any questions or comments, please call our technical staff at (406) 587-4910. Our hours are 8:00 a.m. to 5:00 p.m. MT.

Wavelength Electronics warrants this product for 90 days against defects in materials and workmanship when used within published specifications. This warranty extends only to purchaser and not to users of purchaser's products. If Wavelength receives written notice of such defects during the warranty period, we will either repair or replace products which prove to be defective. Wavelength makes no warranty concerning the fitness or suitability of its products for a particular use or purpose; therefore, it is purchaser's responsibility to thoroughly test any product and independently conclude its satisfactory performance in purchaser's application. No other warranty exists either expressed or implied, and consequential damages are specifically excluded. Wavelength Electronics reserves the right to change circuitry and specifications without notification at any time.

All products returned must be accompanied by a Return Material Authorization (RMA) number obtained from the Customer Service Department. Returned product will not be accepted for credit or replacement without our permission. Transportation charges or postage must be prepaid. All returned products must show invoice number and date and reason for return.

In the United States, the Food & Drug Administration is responsible for monitoring laser products. These products must comply with certain requirements in order to be sold to an end user. The PLD series has been registered as an OEM product. It does not comply with regulations. You must incorporate it into your system and that system must comply with federal regulations. Wavelength Electronics has experience with the government requirements. We can help you ensure that your device is compliant. Please contact us if you have any questions.

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