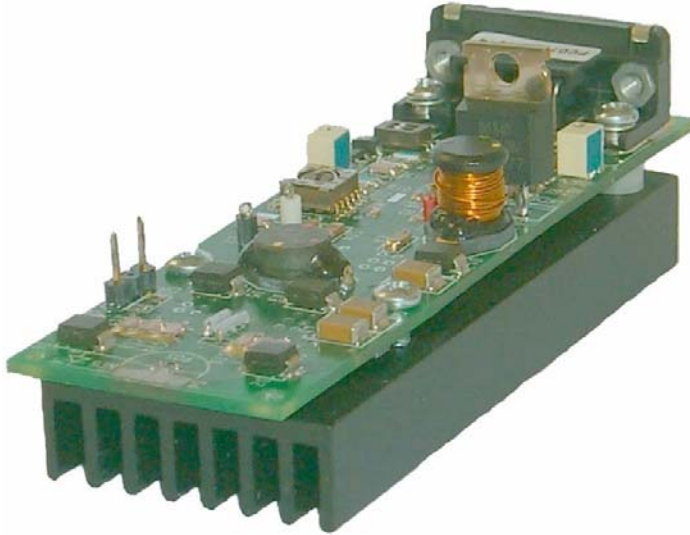


# PCO-7810 PULSED LASER DIODE DRIVER MODULE



- **Compact, Economical OEM Module**
- **Fully Self-contained: Internal HV DC Power Supply & Trigger Generator**
- **4A To 100A Output**
- **4ns To 12ns Pulse Width**
- **Repetition Frequency Single-Shot To 200KHz**
- **Laser Diode May Be Mounted Directly On The PCO-7810, Eliminating The Need For Interconnect Cables Or Striplines**
- **Pulsed Current Monitor Output**

The PCO-7810 is a compact, economical OEM laser diode driver module designed to provide extremely fast, high current pulses to drive laser diodes in range finder, LIDAR, atmospheric communications and other applications requiring high current, nanosecond pulses.

The PCO-7810 features an internal high voltage DC power supply to support the high current output, and an internal trigger generator. With the supplied heatsink, the PCO-7810-40-4 can operate at pulse repetition frequencies up to 200KHz at 40A output current.

Three standard models are offered in the PCO-7810 product line, providing pulse currents ranging from 4A to 100A, and pulse widths from 4 nanoseconds to 12 nanoseconds, at frequencies as high as 200KHz. The PCO-7810 is designed to be an Original Equipment Manufacturer (OEM) style product in which the current pulse may be easily tailored to the diode type and application – contact DEI for more information.

Mounting pads are provided to mount the laser diode directly to the driver, eliminating the need for interconnect cables or striplines. The four-hole mounting pattern accepts TO-18, TO-5, TO-52, 5.6MM, and 9MM packages (PerkinElmer Optoelectronics R, S, T and U packages), as well as other packages of similar dimensions and lead spacing, mounted perpendicular to the driver circuit board. To facilitate different packages and mounting preferences, there are two solder pads on the end of the board to accept various laser diode packages mounted on axis to the driver. Furthermore, the diode can be connected remotely from the driver using a low-impedance stripline interconnection between the mounting pads and the leads of the laser diode.

A current monitor output may be viewed with an oscilloscope, providing a straight-forward means to observe the diode current waveform in real-time.

The PCO-7810 driver provides high-speed performance, a robust design, flexible mounting configurations and the ability to drive a wide range of laser diodes in a small package. These features provide the user with an economical OEM module with the flexibility to be readily designed into a wide range of products.

## Technical Overview

The PCO-7810 uses IXYSRF high speed MOSFET transistors as the main switching element. Unlike avalanche transistor drivers, neither the power MOSFET or the gate drive transistor of the PCO-7810 are operated in breakdown, but instead are controlled via their gates. This design provides a high degree of reliability, excellent switching performance, and superior amplitude and temporal stability over a broad operating temperature range.

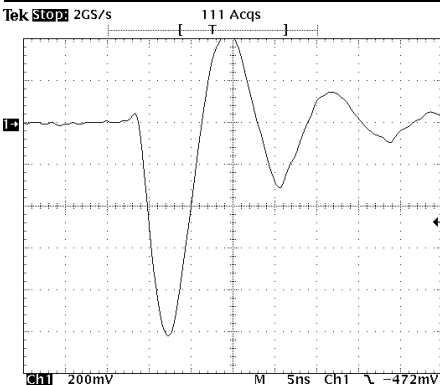
The driver requires +24VDC support power. The output current pulse repetition frequency is controlled by a range selector switch, used to vary the internal trigger generator's range, and an on-board potentiometer to precisely control the frequency within each range setting. Alternately, if the pulse timing needs to be externally controlled, an optional CMOS trigger input can be used to trigger the output pulse. The output current is varied with an on-board potentiometer, and can be varied over a large range with little variation in pulse width.

Protection circuitry is designed into the PCO-7810 to protect the driver against excessively long input trigger signals and support power supply transients and over-voltage conditions. Additionally, high speed clamp diodes are incorporated into the output network to protect the laser diode against reverse voltage conditions.

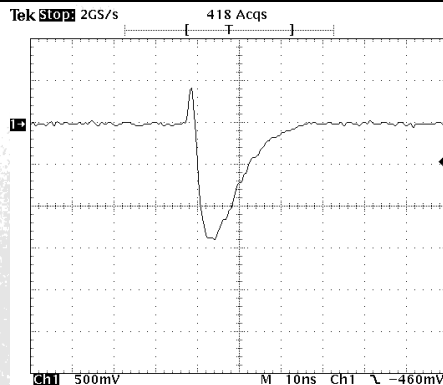


**DIRECTED  
ENERGY  
INCORPORATED**

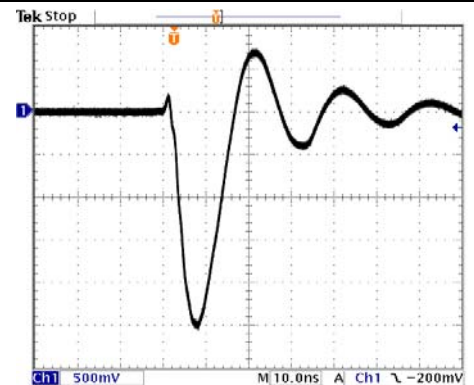
| SPECIFICATIONS (Test conditions @25C, +24VDC input)   | MODEL   |           |             |
|---|---|-----------|-------------|
|   | 40-4  | 50-12     | 100-9       |
| <b>PCO-7810 MODEL</b>   |   |           |             |
| Pulse Output Current Range (Controlled by HV adjust potentiometer mounted on board. Clock-wise rotation increases output current)   | 4A to 40A   | 5A to 50A | 13A to 100A |
| Pulse Width (FWHM at maximum output current)  | 4ns ±1ns  | 12ns ±2ns | 9ns ±1ns    |
| Rise Time (10% - 90%, Typical)  | <2ns  | 2.5ns     | 3.5ns       |
| Maximum PRF (Pulse Recurrence Frequency) at maximum output current  | 200KHz  | 67KHz     | 25KHz       |
| Maximum Duty Cycle (CW at maximum output current)   | 0.1%  |           |             |
| Jitter (1st Sigma)  | <1ns  |           |             |
| Throughput Delay (Delay from external input trigger to output pulse)  | 33ns Typical  |           |             |
| Maximum Overshoot at maximum output current   | 5%  |           |             |
| Output Current Monitor (Into 50 Ohms)   | 40A/V   |           |             |
| Trigger In (Optional)   | CMOS into 1K Ohm, 50-100ns pulse width, <10ns rise time |           |             |
| HV Boost Disable Input (The disable input is connected to CMOS +5V to disable the HV power supply. If it is grounded or not connected, the power supply is enabled)             | CMOS into 1K Ohm  |           |             |
| Oscillator Enable Input (The enable input is connected to ground to disable the Oscillation function. If it is not connected or connected to CMOS +5V, the function is enabled) | CMOS into 1K Ohm  |           |             |
| Support Power   | +24VDC  |           |             |
| <b>MECHANICAL</b>   |   |           |             |
| Input Connector (For +24VDC, HV disable input, Oscillator disable input and Ext. pulse input)   | DSUB 9 pin (AMP 747250-4 or equivalent)                 |           |             |
| Length  | 4.00 in. (10.16cm)                                      |           |             |
| Width   | 1.25 in. (3.18cm)                                       |           |             |
| Height (including heatsink)   | 1.4 in. (3.56cm)  |           |             |
| Weight (Approximate, including heatsink)  | 2.9 oz (82 grams)                                       |           |             |
| Operating Temperature   | -20°C to +85°C  |           |             |
| ALL SPECIFICATIONS MEASURED INTO A SHORTED OUTPUT AND MEASURED WITH THE INTERNAL CURRENT MONITOR<br>SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE LASER DIODE NOT INCLUDED    |   |           |             |



**Model 40-4 Typical Output Waveform**  
4ns Pulse Width, 40A Output  
5ns/Div horizontal scale, 10A/Div vertical



**Model 50-12 Typical Output Waveform**  
12ns Pulse Width, 50A Output  
5ns/Div horizontal scale, 10A/Div vertical



**Model 100-9 Typical Output Waveform**  
9ns Pulse Width, 100A Output  
5ns/Div horizontal scale, 10A/Div vertical

**Ordering Information:**

**PCO-7810-40-5:** 40A maximum, 5ns output pulse  
**PCO-7810-50-15:** 50A maximum, 15ns output pulse  
**PCO-7810-100-9:** 100A maximum, 9ns output pulse  
 Contact DEI for custom current/pulse width configurations.  
 All models provided with mating DSUB connector

**Optional Accessories:**

- PCA-9145 Current Monitor Cable Assembly  
50 Ohm cable with connectors to connect current monitor to an oscilloscope, 3 feet in length
- 1820-0030 Low-Impedance Stripline  
To remotely connect PCO-7810 to the laser diode



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