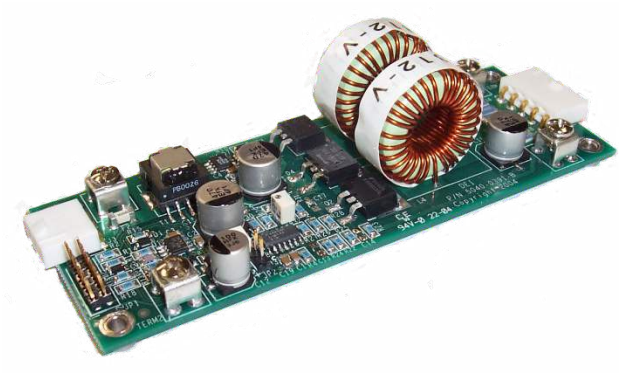
PCO-6511 CW Laser Diode Driver Datasheet



Precision CW Control

The PCO-6511 is a compact and economical CW current source designed to drive laser diodes. It features an adjustable output current of 3.0 A to 10.0 A and a compliance voltage of 10 V.

Ease of Setup and Operation

Output current is set by an on-board trim potentiometer or by an external voltage (jumper selectable). Connector JP1, a 2x6 male header, is used for all control signals.

Power Input Connections

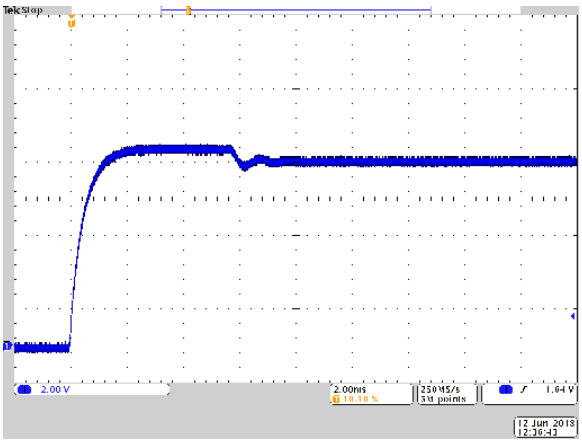
Input power is connected via two #6 screw terminals, TERM1 (+) and TERM2 (–), 18 AWG, or via J3, a 3-pin Molex connector. The compatible Molex part numbers are 39-01-4030 (housing) and 5556 (female terminals).

Power Output Connections

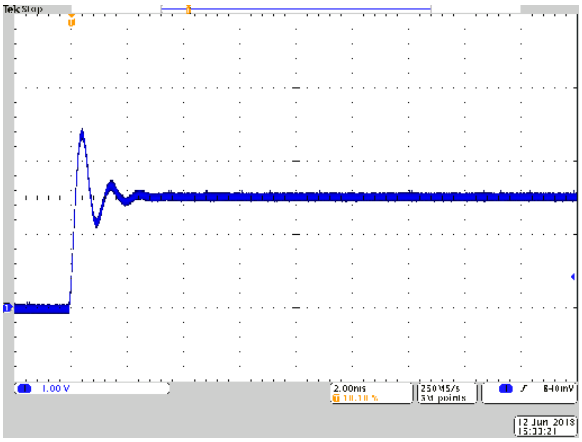
The load is connected via two #6 screw terminals, TERM3 (+) and TERM4 (–), 18 AWG, or via J4, a 5-pin Molex connector. The compatible Molex part numbers are 39-01-4050 (housing) and 5556 (female terminals). **NOTE: Do not operate the PCO-6511 without a load unless the crowbar is activated.**

Ordering Information

PCO-6511 CW Current Source



Zero to 10 A power ON curve using pin 8 to control the output.



Zero to 3 A power ON curve using pin 8 to control the output.

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Amplitude

Current output range	3.0 A to 10.0 A
Setpoint resolution	1 mA
• Trim potentiometer	JP2 in place
• External voltage control	JP2 removed
• External setpoint	0 V to 4.095 V
• 5.0 V reference output current	5 mA maximum
Diode forward voltage	10 V maximum
Maximum output power	100 W

Output Parameters

Ripple current	< 70 mA @ 10 A
Polarity	Positive
Crowbar (hold low for output)	0 V = operate

Current Monitor

Current monitor scale factor	4.06 V = 10 A
Connector	JP1 (+ pin 10) (ground pin 9)

Input Parameters

DC input voltage (V_{CC})	12 V to 16 V DC
Shutdown	0 V to 5.5 V

General

Size (H x W x D)	3.56 cm x 5.08 cm x 13.97 cm
Weight	136.1 g
Operating temperature	15° C to 40° C

(Operation above 8 A requires forced air cooling)

Notes

Warranty: One-year parts and labor on defects in materials and workmanship.
The PCO-6511 current source meets or exceeds these specifications. All specifications are measured with a low inductance twisted pair interconnect cable to a 1.016 Ω load. Laser diode not included. Specifications information subject to change without notice.

Theory of Operation

The heart of the PCO-6511 is a step-down DC/DC converter, consisting of a MOSFET, a diode, an inductor and an output filter. The input/output current ratio is the inverse of the input/output voltage ratio. If losses are disregarded, the input power in watts equals the output power in watts.

A safety feature referred to as a “crowbar” circuit is added in the form of a power MOSFET in parallel with the load. When the crowbar is on the laser diode is bypassed through the MOSFET.

Signal-to-Noise Ratio

The signal-to-noise ratio is defined as ($V_{PEAK\text{-}TO\text{-}PEAK}$) / ($V_{AVERAGE}$). It is the maximum peak-to-peak voltage of each spike divided by the average voltage.

Signal-to-Noise Ratio, 3A	≤ 3.2%
Signal-to-Noise Ratio, 4 A to 10 A	≤ 2.0%

JP1 Control Connector

2x6 female header socket. Use FCI 65043-031LF housing and FCI 48236-000LF contacts, 22 AWG.

- Pins 1, 3, 5, 7, 9, 11: Ground
- Pin 2: Reference voltage output (5 V ±0.5 V)
- Pin 4: External Control (analog input). If JP2 is removed, 0 V to 4.095 V applied to this input sets the output current amplitude.
- Pin 6: V_{CC} output
- Pin 8: Shutdown
  - No connect = operate
  - 5 V (connect pins 8 and 2) = OFF
- Pin 10: Current Monitor (I_{MON})
  - Analog output: 4.06 V = 10 A
- Pin 12: Crowbar
  - No connect = output load bypassed
  - 0 V (connect pins 12 and 11) = operate