

DLD-127A

40A CW & QUASI-CW LASER DIODE DRIVER/CURRENT SOURCE



- Output Current 4A To 40A
- Output Voltage Up To 10V
- Pulse Width <math>< 50\mu\text{s}</math> to DC
- Rise Time $\leq 25\mu\text{s}$
- Analog Modulation to 10KHz
- Constant Current Or Constant Power Control
- High Efficiency
- OEM Module

The DLD-127A is a 400 watt laser diode driver/current source designed to drive laser diodes and other low-impedance loads at up to 10 volts and 40 amps. It is optimized for diode pumping of solid state lasers, illumination, and other high power applications.

The DLD-127A can be operated continuously (CW), pulsed (Quasi-CW) or can be analog modulated by an external analog modulation input. It can generate output pulse widths of $\leq 50\mu\text{s}$ to DC at up to 10KHz, with an analog modulation bandwidth of 10KHz.

The DLD-127A can be operated in either laser current (constant current) or optical power (constant power) control modes. The control mode is user-selectable, and signals to monitor the output current are available through the user interface connector. In constant power control mode, a user-supplied photodiode may be connected to the DLD-127A to provide optical feedback to control the current source through the on-board photodiode amplifier. In constant current control mode, the laser current is monitored, and controls the driver output. The output

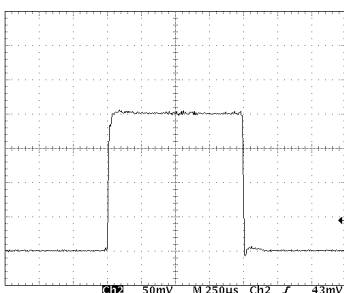
current and voltage are also compared to the internal and external over-current setpoints, and to the internal over-voltage setpoint, to determine an over-current or over-voltage fault.

Designed for OEM applications, the DLD-127A derives its high current output from a 24VDC to 48VDC input DC power supply, and +5VDC and $\pm 15\text{VDC}$ support power. The analog modulation and output current setpoints are controlled by 0-10V analog inputs.

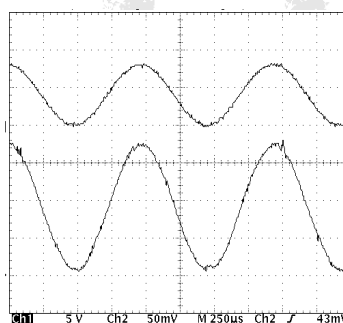
The driver is a high efficiency switch-mode current source. This architecture provides an efficiency greater than 75%, minimizing power dissipation and cooling requirements.

Safety features include a power up reset hardware delay, driver power-on indicator, laser over-voltage and over-current faults, and a driver over-temperature fault.

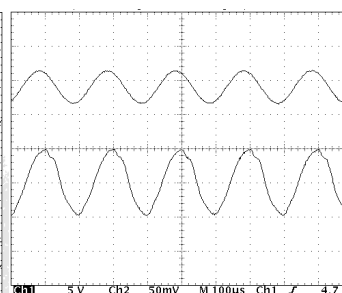
The DLD-127A is provided on an air-cooled heatsink, ready for installation and assembly in OEM applications.



40A Output Waveform
250µs/Div Horizontal Scale, 10A/Div Vertical Scale



34A Analog Modulation @ 1KHz (18A Bias, $\pm 17\text{A}$ Modulation)
Top Trace = Input Signal
Bottom Trace = Output Current
250µs/Div Horizontal Scale, 10A/Div Vertical Scale (Bottom Trace)



20A Analog Modulation @ 5KHz (20A Bias, $\pm 10\text{A}$ Modulation)
Top Trace = Input Signal
Bottom Trace = Output Current
100µs/Div Horizontal Scale, 10A/Div Vertical Scale (Bottom Trace)



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SPECIFICATIONS (Measured at 40A, 10V output)

PARAMETER	VALUE
Laser Diode Controller	
Voltage Polarity	Positive with respect to ground
Maximum Output Voltage	10V @ 40A
Current Range	0A to 40A
Maximum Duty Cycle	100%
Pulse Width	50µs to DC, controlled by modulation input
Pulse Rise Time/Fall Time	Controlled by modulation input, minimum rise and fall time is 25µs, maximum bandwidth is ≥10KHz
Depth Of Modulation	90% @ 1KHz, 50% @ 5KHz, 20% @ 10KHz
Droop	<1%
Overshoot	<5% maximum, typically <2%
Undershoot	<2%
Ringing (Pulse Mode)	<5%
Noise and Ripple (After initial edge, steady state)	≤1%
Output Power Stability	≤0.5% over 24 hours at full power, measured at 25°C with temperature variation <±0.5°C into a resistive load
Temperature Coefficient	≤250ppm/°C from 0°C to 40°C
Efficiency	>75%
External Modulation Input	
Input Signal	0 to +10V
Bandwidth	DC to 10KHz
Transfer Function	4000mA/V
Control And Monitor Inputs	
Reset	TTL into 50Ω to reset driver faults
Current Limit	0-10V Analog Voltage Setting, range of 4A to 40A
Laser Diode Enable	TTL into 1k Ohm, High=Enabled
Control And Monitor Outputs	
Output Current Monitor	4A/V into 1MΩ
Laser Over Current Fault	Open collector output, 50mA max current sink, Low=Fault, I _{max} + 10% latches off driver
Laser Over Voltage Fault	Open collector output, 50mA max current sink, Low=Fault, V _{max} + 10% latches off driver
Over Temperature Fault	Open collector output, 50mA max current sink, latches off driver
Driver Power On	Driver Power Indicator, Open collector output, 50mA max current sink, Low=Fault
Driver Fault	Open collector output, 50mA max current sink, Low=Fault, latches off driver
Photodiode Amplifier	
Photodiode Amplifier Output	0 to 10V output
Photodiode amplifier gain	Adjustable
Photodiode bias voltage	10V
Bandwidth Limit	100KHz
General	
Operating Temperature Range	0°C to +40°C
Power Requirements	48VDC @ 12A ⁽¹⁾ ; ±15VDC @ 0.25A; +5VDC @ 0.5A
Cooling Requirements	Forced Air, 100 CFM, max air temperature 40°C
Dimensions (W x L x H, including heatsink)	4" x 12" x 3" (102mm x 305mm x 76mm)
Weight (Including Heatsink)	51 Ounces (1.45 Kilograms)

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

9200-0206 REV 1

(1) The DLD-127A will operate on any voltage from 24VDC to 48VDC, however the maximum output voltage with 24VDC input is 5V. To obtain the full 10V output, 48V input is required.



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