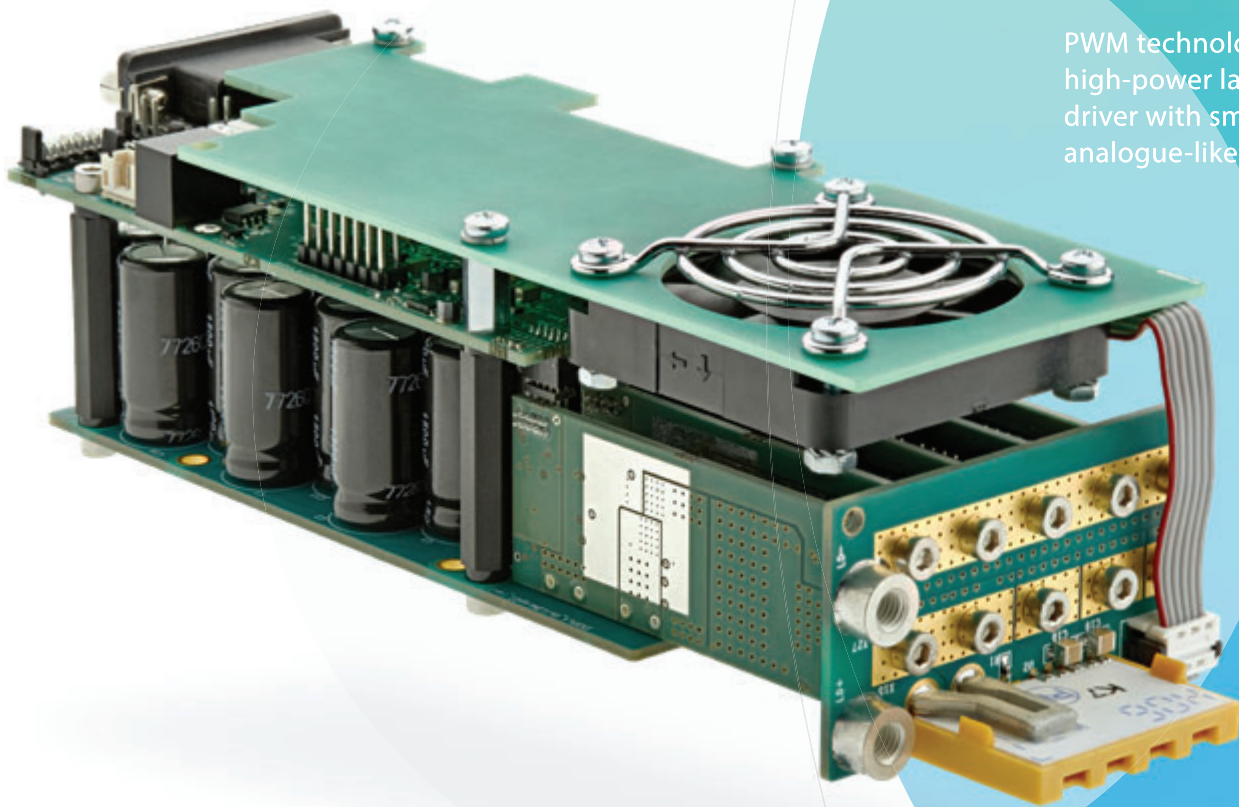




uniLDD CW and QCW laser diode drivers

MADE BY EXPERTS IN ELECTRONICS AND LASERS



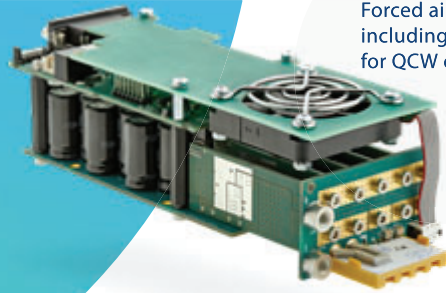
PWM technology-based
high-power laser diode
driver with smooth
analogue-like output.

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Features

- Latest DSP based control technology
- Designed for high power applications
- Max 100A & 27V in CW mode
- Max 360A & 80V in QCW mode
- Low current ripple
- Low current drift
- High precision and stability
- Optional integrated TEC controller
- Analog and digital control interfaces



Forced air cooling driver version including capacitor battery board for QCW operation



Conductive cooling driver version for CW operation

uniLDD is a DC input power converter designed to supply CW up to 100 A or pulsed (QCW) up to 360 A current for the single emitter, bar, stacked laser diode or high power VCSEL in constant current mode. Using different software versions and minor hardware modifications, the uniLDD driver is adapted for different types of laser diodes and modes of operation.

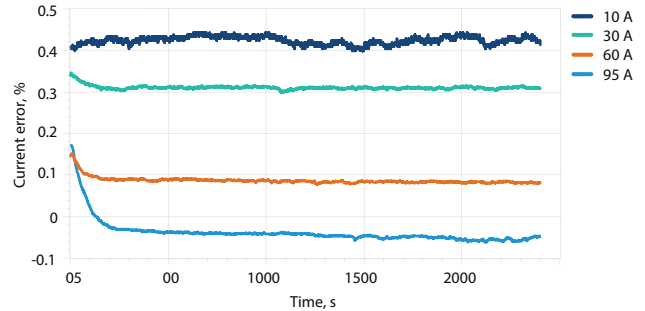
The driver is based on DSP technology. At the factory done frequency response analysis based on customer's requirements allows achieving stable operation with any load and connection cables combination in both CW and QCW operation modes. Besides, this lets to shorten rise time in QCW mode if necessary. To fulfill all those features and deliver the driver with the best performance, we ask to fill in the questionnaire.

High efficiency PWM-based converter with up to 4-phases output provides around 90% efficiency and gives very smooth, low noise and high precision output to the laser diode. Below the given charts are the performance results on the test bench. The uniLDD driver is the most effective if used for diode currents above 10 A. Depending on the configuration, uniLDD driver control is done by analog, CAN and RS232 interfaces.

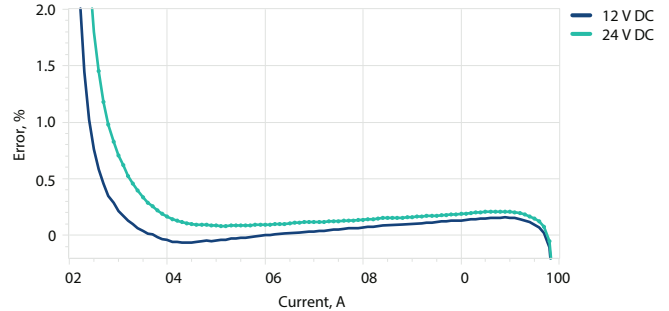
The driver can be delivered in two possible design shapes. The first one is an internal fan cooled set of screwed together set of boards. This is a general, most flexible design allowing easy customization and implementing most of the possible features. The second one, the conductive cooling driver is specifically adapted for CW operation and lets to save design space. No fan is required. Cooling is done by attaching the board to a massive enough heatsink or cold plate.

Optionally, uniLDD allows bidirectional control (active heating and cooling) of one or two TEC's with the same driver providing current up to 25 A and voltage up to 28 V.

uniLDD current drift.
From cold start for different currents

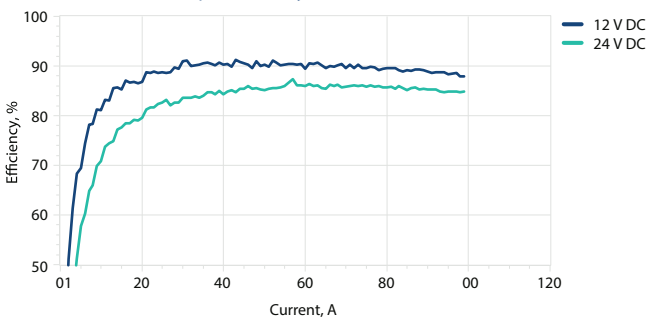


uniLDD current error.
12 V and 24 V DC power, 2 V junction + 10 MΩ series R load



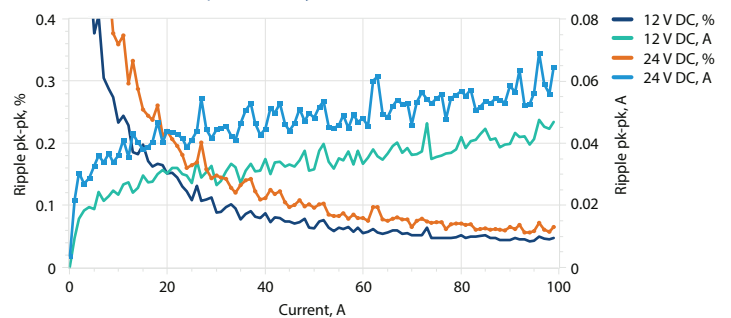
uniLDD efficiency.

12 V and 24 V DC power, 2 V junction + 10 MΩ series R load



uniLDD ripple current.

12 V and 24 V DC power, 2 V junction + 10 MΩ series R load



General specifications

PARAMETER	VALUE	NOTES
INPUT		
Voltage, power stage	12 ... 90 V DC	Control and power stage may share single supply 12...30 V
Voltage, control stage	12 ... 30 V DC	
OUTPUT, CW mode		
Diode compliance voltage	1 ... 27 V	Up to 95% of power stage supply voltage
Max current	50 – 100 A	See SUGGESTED CONFIGURATION for max current values
Current ripple	0.1 % pk-pk	DC ... 100 kHz bandwidth, in $\times 0.5$... $\times 1$ of max current range
Current drift	< 0.2 %	Cold start, 8 h period, after 5 min warm up
Bandwidth of I_{programm} control input frequency	> 10 kHz	At minimal connection cable inductance
OUTPUT, QCW (Pulse mode)		
Diode compliance voltage	1 ... 80 V	See SUGGESTED CONFIGURATION for max current values
Max pulse current	160 – 360 A	
Current pulse raise	> 5 μ s	At minimal connection cable inductance and sufficient power stage voltage
Max RMS current	80 A	80 A for diode compliance voltage >28 V
Current pulse amplitude stability	0.1% pk-pk	In $\times 0.5$... $\times 1$ of max current range
Current drift	< 0.2 %	Cold start, 8 h period, after 5 min warm up
ENVIRONMENT		
Operating temperature	0 to 40 °C	De-rate current at higher temperature
Cooling	Forced air, installed or external shared fan	Inquire for conduction cooled version
PROTECTIONS		
Current transient protection and shut-down		
Open circuit shut-down		
Power voltage brownout shut-down		
Over temperature shut-down		
Interlock shut-down		
AUXILIARY OUTPUTS		
+5 V @ 200 mA		
+15 V @ 100 mA		
-15 V @ 100 mA		
CONFIGURATIONS		
Operation mode	CW, QCW (pulse)	
Max current, CW mode	50 A, 80 A, 100 A	
Max current, pulse mode	160 A, 360 A	$I_{\text{RMS}} \leq 100$ A, duty factor ≤ 20 %
Max power stage voltage	28 V (CW, QCW) and 90 V (QCW)	
TEC CONTROL (if equipped)		
Quantity of outputs to control	0, 1 or 2	
Maximal output current to TEC	25 A	
Maximal output voltage to TEC	28 V	
PHYSICAL CHARACTERISTICS		
Assembly size (LxWxH)	190 x 68 x 55 mm	15 mm fan included
Conductive cooled assembly size (LxWxH)	117 x 90 x 27 mm	
Connectors	Analog control – DSUB-15	
	Digital control – Molex Picoflex	6 pin and 10 pin connectors
	DC power input – Multiple	
DIGITAL CONTROL INTERFACE		
CAN bus	Proprietary EK SMA Optics protocol	Protocol description, control application, libraries and programming samples are provided on request
	"CAN Open" stack	May be added on request
RS232 port	ASCII text command protocol	
	Proprietary EK SMA Optics CAN messages tunnel over RS232 protocol	Control application, libraries and programming samples are provided

Notes:

- Max current is transient protection upper setting. Laser diode EOL nominal current should be 95% or less of this value.
- Parallel connection of several drivers can be used above 100 A in CW and 400 A in QCW.
- Specifications are subject to change without prior notice. Not all combinations of parameters are possible at the same time. See configuration samples for suggested configurations or send a request with your requirements.

Samples of suggested uniLDD driver configurations

CW mode preconfigured drivers

ORDER CODE	NO OF TEC CHANNELS	DIODE COMPLIANCE VOLTAGE UP TO	OUTPUT CURRENT UP TO	POWER SUPPLY VOLTAGE
uniLDD-CW-30-50	n/a	27 V	50 A	≤ 29 V DC *
uniLDD-CW-30-80	n/a	27 V	80 A	
uniLDD-CW-30-100	n/a	26 V	100 A	
uniLDD-CW-TEC-30-50	1	27 V	50 A	

* Power stage supply voltage need to be at least 2V above diode compliance voltage.

CW mode conductive cooling preconfigured drivers

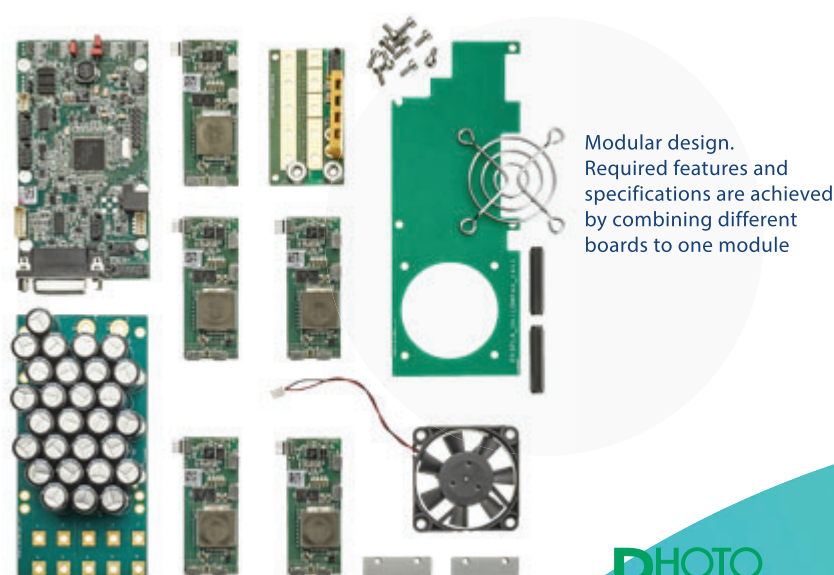
ORDER CODE	NO OF TEC CHANNELS	DIODE COMPLIANCE VOLTAGE UP TO	OUTPUT CURRENT UP TO	POWER SUPPLY VOLTAGE
uniLDD-C-CW-30-50	n/a	27 V	50 A	≤ 29 V DC *
uniLDD-C-CW-30-80	n/a	27 V	80 A	

* Power stage supply voltage need to be at least 2V above diode compliance voltage.

QCW mode preconfigured drivers

ORDER CODE	NO OF TEC CHANNELS	DIODE COMPLIANCE VOLTAGE UP TO	OUTPUT CURRENT UP TO	POWER SUPPLY VOLTAGE	REPETITION RATE	PULSE DURATION	RISE TIME
uniLDD-QCW-30-120	n/a	6 V	120 A	24 V	2000 Hz	300 μs	30 μs
uniLDD-QCW-30-100	n/a	22 V	100 A	28 V	10 Hz	450 ms	1 ms
uniLDD-QCW-100-360	n/a	70 V	360 A	90 V	20Hz	500 μs	50 μs
uniLDD-QCW-2TEC-30-220	2	5 V	220 A	12 V	100 Hz	300 μs	30 μs
uniLDD-QCW-1TEC-100-150	1	70 V	150 A	90 V	20 Hz	250 μs	40 μs

Above tables are just for illustration of versatility of uniLDD driver. Drivers are ready to be preconfigured at the factory for specific requirements.



Modular design.
Required features and specifications are achieved by combining different boards to one module

ORDERING INFORMATION

Please send filled in Questionnaire for Quotation with every inquiry. The Questionnaire for Quotation can be downloaded from our website Brochures section of UniLDD laser diode drivers.



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