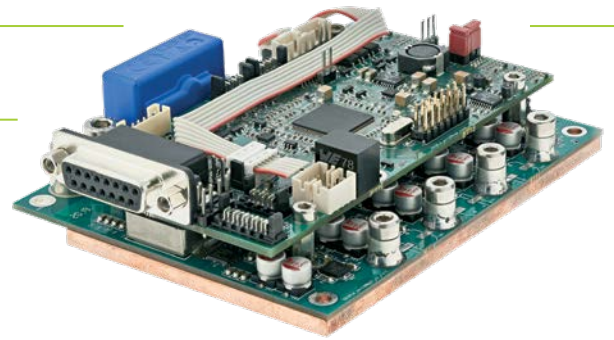


# Laser Diode Drivers

**uniLDD**

Made By  
Laser Electronics Experts

Driver that can supply almost any middle- and high-power laser diode in continuous or pulsed operation mode.



uniLDD is a DC input power converter designed to supply CW or pulsed (QCW) current for the single emitter, bar, stacked laser diode or high power VCSEL in constant current mode. Using different software versions together with specific hardware sets, the uniLDD driver is adapted for different types of laser diodes and modes of operation. The driver is based on DSP technology assuring high specifications. Typical performance is presented in below illustrations.

Next optimizations are done while adapting according to customer requirements (current, voltage, cables...):

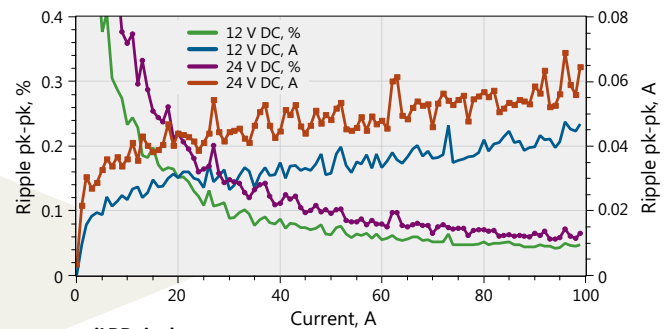
- Firmware version (chosen from different 5 ready versions)
- Hardware components set
- Regulation loop frequency response analysis and PID constants defining
- Hardware and software settings

One or two TEC control channels can be added as option. However, the price for the feature is reduction of maximal possible output current to laser diode since 2 or 3 output stages of total 5 are utilized for TEC supply.

## uniLDD Main Features

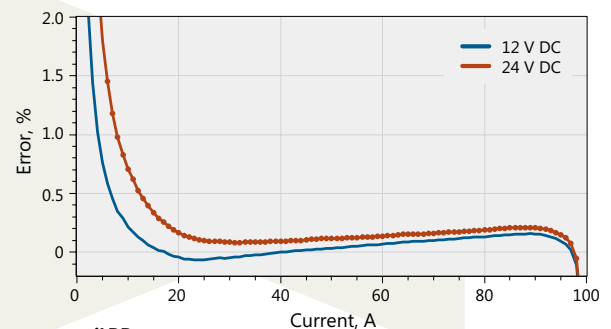
- Best suitable for high-current and high-power applications
- Different firmware versions featuring CW, QCW, TEC control operation
- Hardware versions for CW, QCW, TEC control, Conductive cooling options
- At factory frequency response analysis is used to optimize performance to achieve stable operation with particular laser diode and connection cables combination
- High efficiency switching mode converter
- Multi-phase power stage for low current ripple
- Low current drift
- Parallel operation of two or more drivers to multiply output voltage
- "Voltage booster" layout option to extend output voltage to 200 V and more
- External storage capacitor option for long-pulse QCW operation
- Analog and digital (CAN\*, RS232) control interfaces

\* For CAN communication at evaluation stage Ekspla's CAN-USB adapter is required.



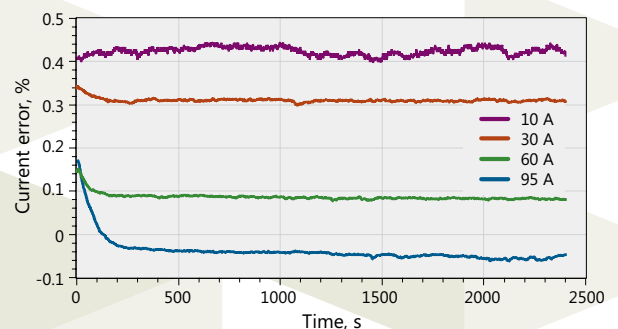
**uniLDD ripple current.**

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



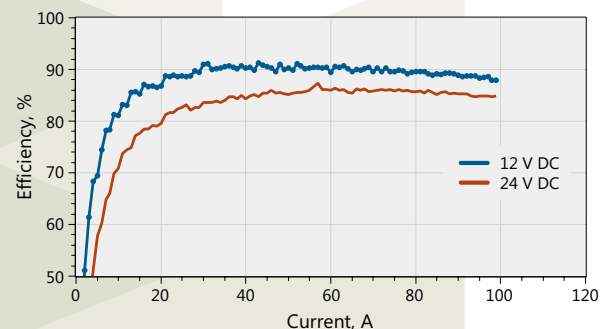
**uniLDD current error.**

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



**uniLDD current drift.**

From cold start for different currents



**uniLDD efficiency.**

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

# uniLDD General Specifications

## INPUT

Supply voltage, power stage  
**12...90 VDC**

Supply voltage, control stage  
**12...30 VDC**

## PHYSICAL CHARACTERISTICS

Assembly dimensions  
(L × W × H)

**190 × 68 × 55 mm**  
(air cooled version)

**130 × 90 × 30 mm**  
(conductively cooled version)

## PROTECTIONS

**Current transient** protection  
and shut-down

**Open circuit** shut-down

**Over temperature**  
shut-down

Power **voltage brownout**  
shut-down

**Interlock** shut-down

## AUXILIARY OUTPUTS

**+5 V @ 200 mA**

**+15 V @ 100 mA**

**-15 V @ 100 mA**

## OUTPUT, CW mode

Diode compliance voltage	<b>1...55 V</b>	Up to 95% of power stage supply voltage. Can be extended using voltage booster layout
Max current	<b>50 – 120 A</b>	Can be extended above 120 A using parallel connection of several drivers
Current ripple	<b>0.1% pk-pk</b>	DC...100 kHz bandwidth, in ×0.5...×1 of max current range
Current drift	<b>&lt; 0.2%</b>	Cold start, 8 h period, after 5 min. warm up
Bandwidth of I <sub>programm</sub> control input frequency	<b>&gt; 10 kHz</b>	At minimal connection cable inductance

## OUTPUT, OCW (Pulse mode)

Diode compliance voltage	<b>1...80 V</b>	Can be extended using voltage booster layout
Max pulse current	<b>160 – 360 A</b>	Can be extended above 360A using parallel connection of the drivers
Duty cycle	<b>≤ 20%</b>	
Current pulse raise, typical range	<b>10...50 μs</b>	@ minimal connection cable inductance and sufficient power stage voltage
Max RMS current	<b>100 A</b>	80 A for diode compliance voltage >28 V
Current pulse amplitude stability	<b>0.1% pk-pk</b>	In ×0.5...×1 of max current range
Current drift	<b>&lt; 0.2%</b>	Cold start, 8 h period, after 5 min. warm up

## OUTPUT, TEC control (if equipped)

Quantity of output channels	<b>1 or 2</b>	
Maximal output current	<b>25 A</b>	
Maximal output voltage	<b>25 V</b>	

## ENVIRONMENT

Operating temperature	<b>0 to 40 °C</b>	De-rate current at higher temperature
Cooling	<b>Forced air or conductive</b>	Installed or external shared fan. Conductively cooled version available as option

## NOTES:

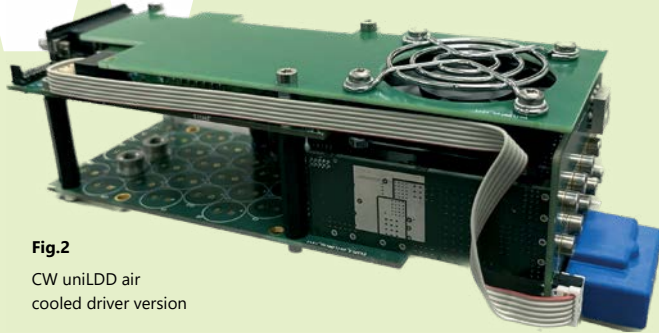
Specifications are subject to change without prior notice.

Not all combinations of parameters are possible at the same time.

# uniLDD Configuration Examples

# CW

**Fig.1**  
CW uniLDD conductively cooled driver version



**Fig.2**  
CW uniLDD air cooled driver version

## uniLDD-C-CW-30-100

Driver for CW mode operation (conductively cooled)

Maximum current to laser diode **100 A**

Maximum compliance voltage **30 V**

*Voltage extension possible by customization and current reduction.*

## uniLDD-A-CW-25-75-1TEC

Driver for CW mode operation and one stage bidirectional TEC control (air-cooled)

Maximum current to laser diode **75 A**

Maximum compliance voltage **25 V**

Maximum current to TEC **25 A**

Maximum TEC voltage **25 V**

## uniLDD-A-CW-25-100

Driver for CW mode operation (air-cooled)

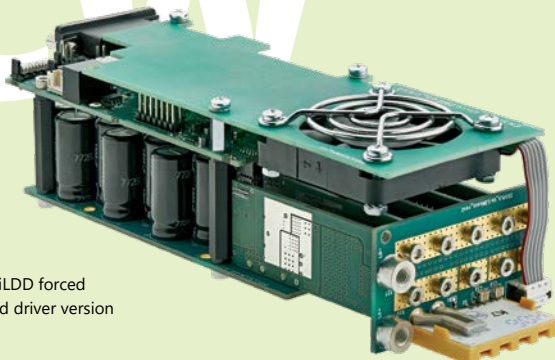
Maximum current to laser diode **100 A**

Maximum compliance voltage **25 V**

*Voltage extension possible by customization and current reduction.*

# QCW

**Fig.3**  
QCW uniLDD forced air cooled driver version



## uniLDD-A-QCW-80-360

Driver for QCW mode operation (air-cooled)

Maximum current to laser diode **360 A**

Maximum compliance voltage **80 V**

**Hardware options rated 30, 60, 100 V**

## uniLDD-A-QCW-80-270-1TEC

Driver for QCW mode operation and one channel bidirectional TEC control (air-cooled)

Maximum current to laser diode **270 A**

Maximum compliance voltage **80 V**

**Hardware options rated 30, 60, 100 V**

## uniLDD-A-QCW-80-180-2TEC

Driver for QCW mode operation and two channels bidirectional TEC control (air-cooled)

Maximum current to laser diode **180 A**

Maximum compliance voltage **80 V**

**Hardware options rated 30, 60, 100 V**



東京インスツルメンツ  
TOKYO INSTRUMENTS

本社：〒134-0088 東京都江戸川区西葛西6-18-14 T.I.ビル Tel. 03-3686-4711

営業所：〒532-0003 大阪府大阪市淀川区宮原4-1-46 新大阪北ビル Tel. 06-6393-7411

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超高真空・極低温走査型プローブ顕微鏡  
高速分光測定装置、クライオスタット



Nd:YAGレーザー、Ti:Sレーザー  
OPOレーザー