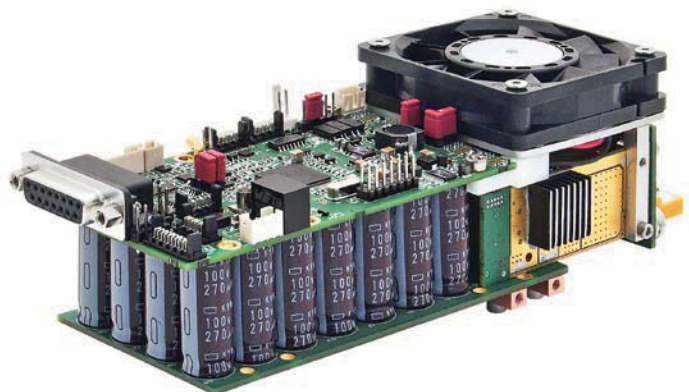# Laser Diode Drivers

## UNIVERSAL LASER DIODE DRIVER uniLDD

uniLDD is DC input power converter designed to supply CW or pulsed current for single emitter, bar or stacked laser diode in Constant Current Mode (or CC mode). It can be installed either as unit assembled either as set of open PCB boards or as standalone unit. The standalone unit is uniLDD enclosed together with the power supply.

FEATURES

▶ *Economical OEM module*

▶ *Wide current range*

▶ *Wide diode compliance voltage range*

▶ *Storage capacitor option for pulse mode*

▶ *Storage capacitor charger (current limit) option pulse mode*

▶ *Latest DSP based control technology*

▶ *Frequency response analysis feature allows easy compensation to achieve stable operation with any load and connection cables combination in both CW and QCW modes.*

▶ *High efficiency switching mode converter*

▶ *Multi-phase low ripple power stage*

▶ *Board fan and unit fan PWM controllers*

▶ *Low current ripple*

▶ *Low current drift*

▶ *TEC controller option*

▶ *Analog and digital control interfaces*
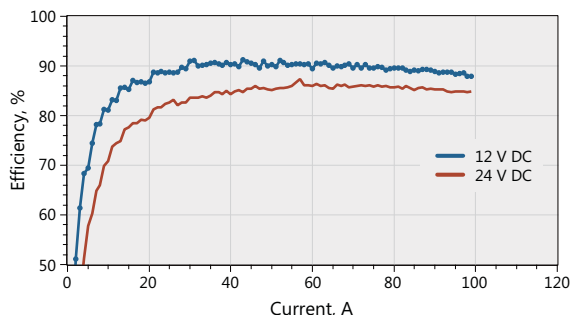
▶ *Easy configuration*

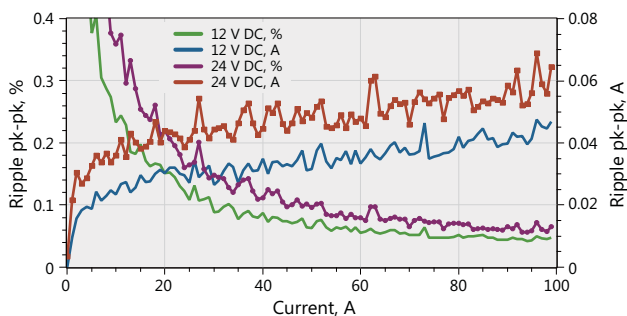uniLDD current drift. From cold start for different currents
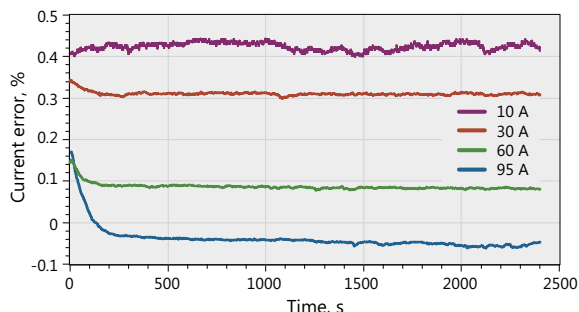
uniLDD current error. 12 V and 24 V DC power, 2 V junction + 10 MΩ series R load
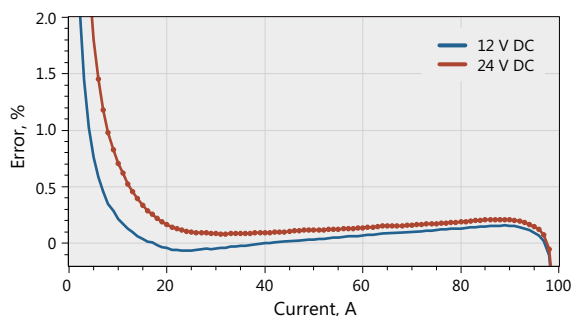
uniLDD efficiency. 12 V and 24 V DC power, 2 V junction + 10 MΩ series R load

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

Drivers for Pockels Cells

Laser Synchronization Modules

Laser Diode Drivers

Laser Power Supplies

Laser Cooling Units

Pump Chambers

Ovens for Nonlinear Crystals

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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 ... 28 V	Up to 95% of power stage supply voltage
Max current	15 A – 100 A	See CONFIGURATION for max current values
Current ripple	0.1 % pk-pk	DC ... 100 kHz bandwidth, in ×0.5 ... ×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, OCW (Pulse mode)		
Diode compliance voltage	1 ... 80 V	
Max pulse current	60 A – 400 A	See CONFIGURATION for max current values
Current pulse raise	< 5 µs	At minimal connection cable inductance and sufficient power stage voltage
Max RMS current	100 A	80 A for diode compliance voltage >28 V
Current pulse amplitude stability	0.1% pk-pk	In ×0.5 ... ×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	15 A, 25 A, 50 A, 100 A	
Max current, pulse mode	60 A, 100 A, 200 A, 400 A	$I_{RMS} \leq 100$ A, duty factor ≤ 20 %
Max power stage voltage	28 V (CW, QCW) and 90 V (QCW)	
PHYSICAL CHARACTERISTICS		
Assembly size long version (L×W×H)	190 × 68 × 55 mm	15 mm fan included
Assembly size short version (L×W×H)	120 × 63 × 50 mm	for currents < 50 A, fan excluded
Connectors	Analog control – DSUB-15	Pin-out resembles standard interface of LDN series diode drivers from Lumina Power
	Digital control – Molex Picoflex	6 pin and 10 pin connectors
	DC power input – Multiple	
DIGITAL CONTROL INTERFACE		
CAN bus	Proprietary Ekspla 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 Ekspla 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.

ANALOG INTERFACE PINOUT, 15-PIN D-SUB, FEMALE

Pin	Signal name	Direction	Voltage level	Description
1	Enable	Input	TTL, LVTTL	The enable function pulls the RTO signal high
2	Ready to Operate (RTO)	Input/Output through 330 Ω resistor	>2.4 V driver output is active, <0.5 V output is clamped	RTO is tied to "High" by the driver when "Enable" input is High. Alarms clamp RTO low and disable driver output. External device may clamp RTO to GND and disable driver output. RTO allows to join fault circuits of several drivers connected in parallel
3	Interlock	Input	10 kΩ pull up to 3.3 V, LOW ≤ 0.4 V	The Interlock function can be connected to external safety or machine protection switches such as door or temperature switches. Open = OFF Connect to GND = RUN
4	GND			
5	V_{out} monitor	Output	Vout, driver output voltage	The output voltage monitor. V_{out} = Diode compliance voltage + voltage drop on connection wires
6	I_{out} monitor	Output	$0-12$ V * = $0 - I_{out}$ max	The output current monitor
7	$I_{program}$	Input	$0-9$ V * = $0 - I_{out}$ max	Output current setting or modulating by applying a voltage, CW and Pulse mode
8	Pulse control	Input	TTL, LVTTL positive pulse	Trigger input for pulse mode. Pulse rise will trigger current pulse of preset width
9	GND			
15	GND			
10, 11	+5V	Output	+5V	Auxiliary, 200 mA
12	-15V	Output	-15V	Auxiliary, 100 mA
13, 14	+15V	Output	+15V	Auxiliary, 200 mA

* Subject to change.

CW version. Capacitors bank is excluded
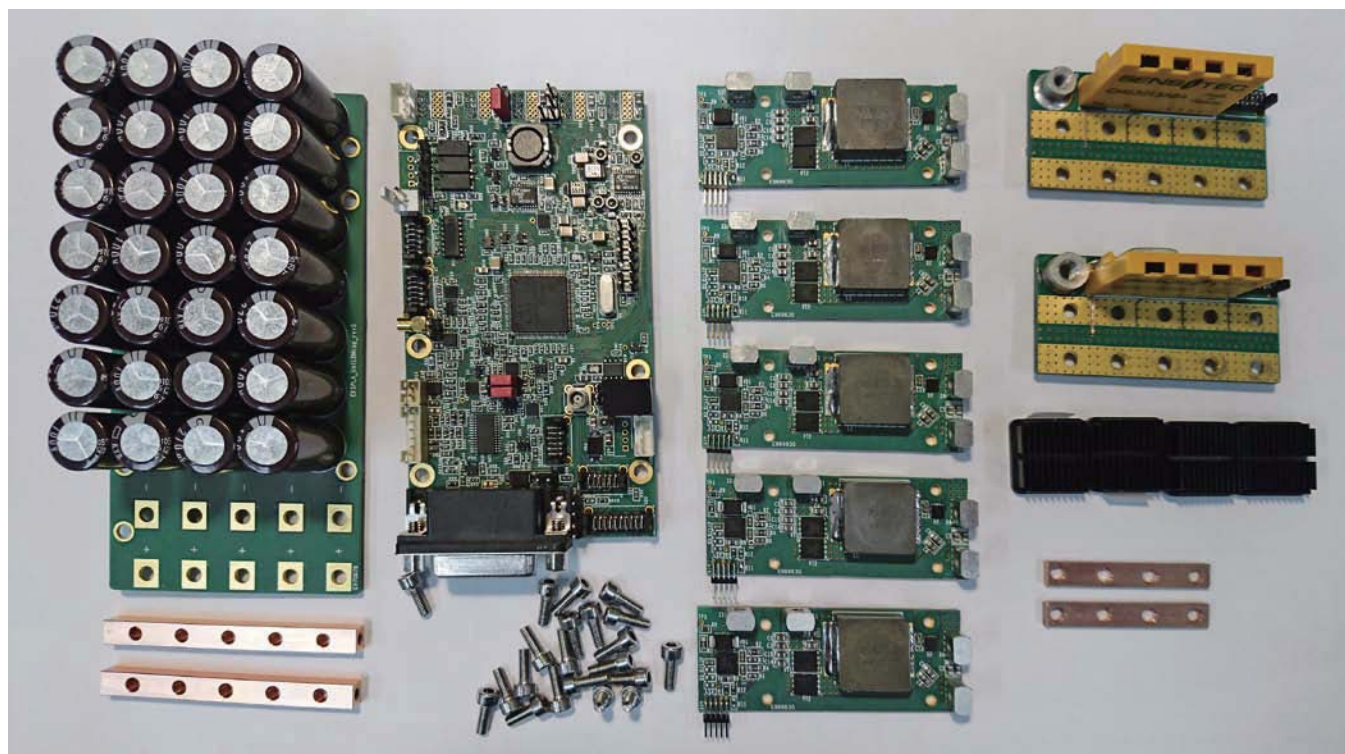
Modular design. Required features and specifications are achieved by combining different boards to one module

EKSPLA

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