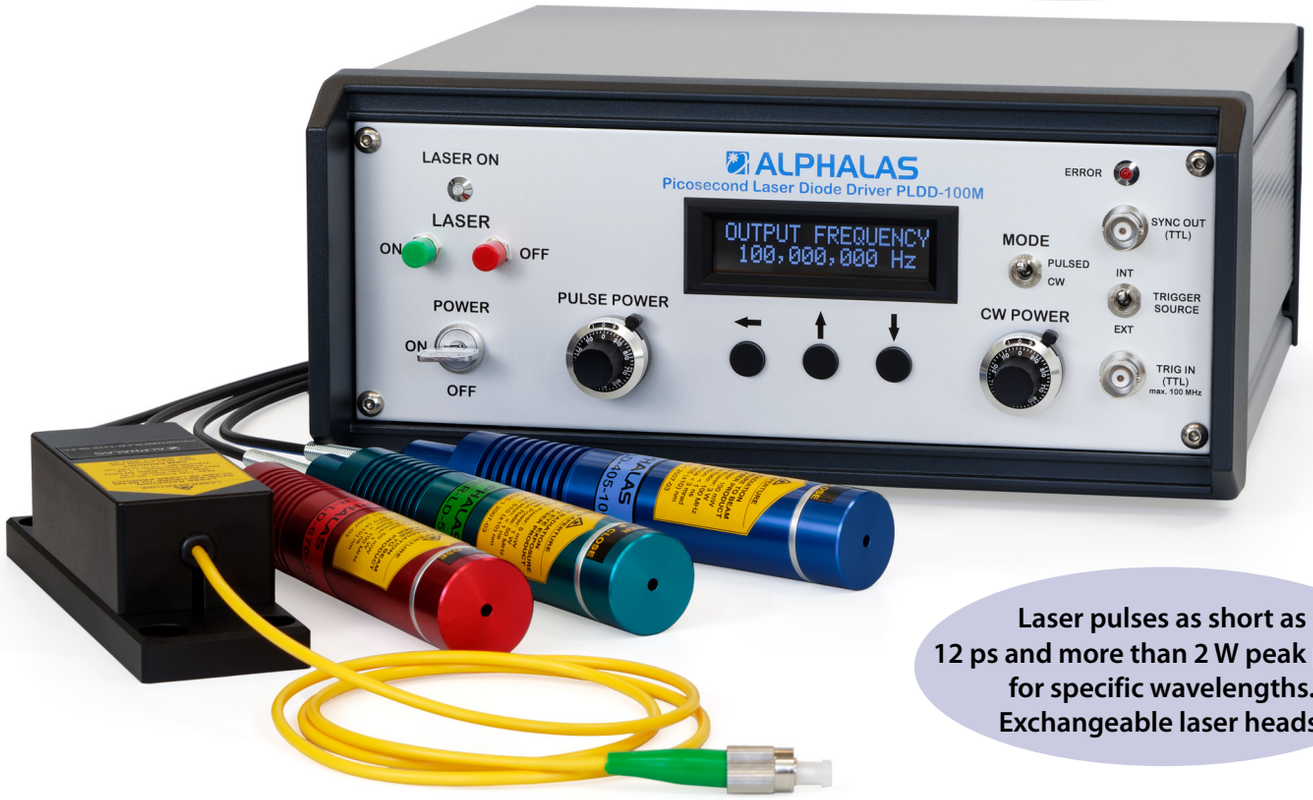
Picosecond Diode Lasers with Driver

PICOPOWER™-LD Series

Standard wavelengths:
375, 405, 450, 488, 510, 635, 670, 785, 850, 976, 1030, 1047, 1053, 1064, 1310, 1550 nm.
More than 60 other customer-specific wavelengths in the range 375 nm - 2300 nm.



Laser pulses as short as 12 ps and more than 2 W peak power for specific wavelengths. Exchangeable laser heads.

Features

- Laser pulses as short as 12 ps for specific wavelengths
- More than 2 W peak power for specific wavelengths
- Proprietary high-frequency design for the shortest & highest peak power diode laser pulses available on the market
- Collimated free-space output or fiber-coupled
- Exchangeable laser heads with different wavelengths for greatest flexibility
- Single-, dual and multi-channel driver models
- Proprietary diode laser driver generating picosecond high-current pulses
- Built-in superior performance frequency generators for repetition rate adjustment from 1 Hz to 20, 50 or 100 MHz with a step of 1 Hz
- External TTL trigger capability and synchronized output TTL or NIM

Applications

- Microscopy
  - Confocal Laser Scanning Microscopy (CLSM)
  - Fluorescence / Phosphorescence Lifetime Imaging Microscopy (FLIM / PLIM)
  - Stimulated Emission Depletion Microscopy (STED)
  - Fluorescence Recovery After Photobleaching (FRAP)
  - Total Internal Reflection Fluorescence Microscopy (TIRFM)
  - Time-Resolved Photoluminescence (TRPL)
- Spectroscopy
  - Fluorescence (Lifetime) Correlation Spectroscopy (FCS / FLCS)
  - Fluorescence Lifetime Measurements and Time-Resolved Spectroscopy
  - Single Molecule Spectroscopy / Detection
  - Time-Correlated Single Photon Counting (TCSPC)
- Laser Physics
  - Single Photon Generation
  - Seeding of Fiber Lasers and MOPA Systems
- Other
  - Laser Imaging and 3-D Laser Scanning
  - Time-Response Characterization of Opto-Electronic Devices
  - Diffuse Optical Tomography and Imaging
  - Time of Flight (TOF) Experiments
  - Optical Time Domain Reflectometry (OTDR)

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Picosecond Diode Laser Heads: Typical Performance for STANDARD MODELS

Models with Free-Space Beam [1]	Wavelength (nm) [2]	Spectral Width (nm) [3]	Pulse Width (ps) @ 50 MHz	Peak Power (mW)	Average Power (mW) @ 50 MHz [4]	Maximum Repetition Rate (MHz) [5]
FABRY-PÉROT LASER TYPE						
PICOPOWER-LD-375	**375** ±5	< 1.5	30	1000	1.5	50
PICOPOWER-LD-405-L	**405** ±5	< 3	25	> 1000	1.3	100
PICOPOWER-LD-405-H	**405** ±5	< 3	25	> 2000	2.5	100
PICOPOWER-LD-450	**450** ±10	< 4	50	750	1.9	100
PICOPOWER-LD-488	**488** ±10	< 6	70	350	1.3	70
PICOPOWER-LD-510	**510** ±10	< 5	75	300	1.1	50
PICOPOWER-LD-635	**635** ±5	< 2	65	1300	4.3	80
PICOPOWER-LD-660	**660** ±5	< 2	60	600	1.9	50
PICOPOWER-LD-670	**670** ±10	< 5	40	400	0.8	100
PICOPOWER-LD-785	**785** ±10	< 4	60	220	0.7	90
PICOPOWER-LD-810	**810** ±5	< 8	50	400	1	100
PICOPOWER-LD-850	**850** ±10	< 4	80	350	1.4	100
PICOPOWER-LD-900	**900** ±10	< 7	45	100	0.3	100
PICOPOWER-LD-976	**976** ±10	< 10	45	1100	2.5	50
PICOPOWER-LD-1053 [6]	**1053** ±5	< 25	25	1200	1.5	70
PICOPOWER-LD-1550 [6]	**1550** ±20	< 2	25	80	0.1	100
DFB LASER TYPE (Narrow Linewidth) [7]						
PICOPOWER-LD-532	**532** ±2	< 0.2	40	20	0.04	50
PICOPOWER-LD-561	**561** ±2	< 0.2	40	20	0.04	50
PICOPOWER-LD-594	**594** ±2	< 0.2	40	20	0.04	50
PICOPOWER-LD-1030 [6]	**1030** ±2	< 0.2	30	350	0.5	100
PICOPOWER-LD-1047 [6]	**1047** ±2	< 0.1	40	100	0.2	50
PICOPOWER-LD-1053 [6]	**1053** ±2	< 0.1	40	100	0.2	50
PICOPOWER-LD-1064 [6]	**1064** ±2	< 0.2	30	350	0.5	100
PICOPOWER-LD-1310 [6]	**1310** ±2	< 1.5	20	150	0.15	100
PICOPOWER-LD-1550 [6]	**1550** ±2	< 0.3	12	130	0.08	100

Notes:

[1] All wavelengths are available with fiber-coupling in single-mode SM or PM fibers with typical efficiency of 25% - 30% (exception: 375 nm is with multi-mode fiber).

[2] More than 60 customer-specific wavelengths in the range 375 nm - 2300 nm are available.

[3] Spectral width is larger for fiber-coupled diode lasers.

[4] Higher average powers are available for longer pulse durations.

[5] All diode lasers can be operated up to 100 MHz or even higher with lower peak powers and larger pulse widths on a special order.

[6] These diode lasers can be used for seeding of fiber and bulk amplifiers.

[7] Customer-specific wavelengths in the range 760 nm - 2300 nm are also available.

Beam profile is TEM_{00}, but slightly elliptical.
Laser class is typically 3B to 1M depending on the wavelength.

Picosecond Diode Laser Heads: Mechanical Specifications

Dimensions and Weight	**Ø 25 × 155 mm, 140 g** **or** **40 × 37 ×144 mm³, 250 g**	• Customer-specific housing is also available. • Fiber-coupled diode lasers are integrated in the driver, but optionally they can have a stand-alone laser head.

Picosecond Diode Laser Drivers: Typical Specifications

Parameters	Specifications			Comments
MECHANICAL				
Dimensions and Weight	255 × 118 × 270 mm, 2.6 kg			19″ rack, OEM and customer-specific options are available
ELECTRICAL				
Models	**PLDD-20M**	**PLDD-50M**	**PLDD-100M**	
Frequency Range	1 Hz - 20 MHz	1 Hz - 50 MHz	1 Hz - 100 MHz	
Step	1 Hz	1 Hz	1 Hz	
Frequency Generator	Built-in superior performance frequency generator			Period jitter: < 10 ps
Pulse-to-Pulse Amplitude Instability [1]	< 1% rms			
External TRIG IN	TTL into 50 Ω, rising edge			Duty cycle: 50%
Delay Laser Output to TRIG IN (TTL)	43 ns (typ.)			
Delay Laser Output to SYNC OUT (TTL)	34 ns (typ.)			
SYNC OUT (TTL)	+3.5 V into 50 Ω			
SYNC OUT (NIM), optional	-800 mV into 50 Ω			Pulse width is typically 5 ns
Delay Laser Output to SYNC OUT (NIM)	30 ns (typ.)			
Jitter [1] : Laser Pulse to External Trigger	< 4 ps			External trigger with rise time < 0.2 ns and amplitude 5 V ± 0.5 V
Jitter [1] : Laser Pulse to SYNC OUT (TTL)	< 4 ps			External trigger with rise time < 0.2 ns and amplitude 5 V ± 0.5 V or internal trigger
GENERAL				
Voltage / Current Requirements	100 V AC / 0.2 A, 230 V AC / 0.1 A			12 V DC supply input is optionally available
Power Consumption	20 W (typ.)			
Operating Temperature	15°C to 35°C (59°F to 95°F)			

Note: *[1] These values are valid up to 30 MHz and for amplitudes not less than 50% of the maximum ones.*

Picosecond Diode Laser Drivers: Options

Optional Features	Comments
• CW Mode	The optional CW mode (in addition to the pulsed mode operation) provides much higher output power which is very useful e.g. for alignment purposes [1]
• Variable Amplitude	Provides easy control of the peak and average power [2]
• Additional Laser Heads	Allows use of a single diode laser driver to drive more than one laser head [3]
• Wavelength TEC Tuning	Wavelength TEC tuning is recommended for red or infrared diode lasers
• NIM Sync Output	Some signal processing devices may require NIM sync input -800 mV by default / optionally: variable 5 ns pulse width FWHM
• Multiple Independent Channels	Allows to drive two diode laser heads simultaneously. Two channels are available in the standard housing. More than two channels are possible with 19″ rack housing.

Notes:

[1] CW mode may reduce the peak or average power for frequencies > 50 MHz.

[2] Amplitudes lower than 50% from the maximum amplitude may have larger instability or larger pulse width.

[3] Some combinations of different diode laser heads may reduce the maximum operating frequency.

Customer-specific parameters are available upon request. Please contact us for further information.
Specifications are subject to change without prior notice.

Picosecond Diode Lasers with Driver: PICOPOWER ™-LD Series

Ordering Information for Picosecond Diode Laser Driver

PLDD - 100M - CW - V - xLH - TEC - NIM - xCH

- **Ch**annels: **x** = 2, 3 or more (optional) — *Only required when ordering more than one channel*
- **NIM** Sync Output (optional)
- Wavelength **TEC** Tuning (optional)
- Number of **L**aser **H**eads: **x** = 2, 3 or more (optional) — *Only required when ordering more than one laser head*
- **V**ariable Amplitude (optional)
- **C**ontinuous **W**ave (**CW**) Mode (optional) — *In addition to the standard pulsed mode operation*
- **M**aximum Operating Frequency: **20** MHz, **50** MHz or **100** MHz
- **P**icosecond **D**iode **L**aser **D**river

Ordering Information for Picosecond Diode Laser Heads

PICOPOWER-LD - 405 - H - FSB

- Type of Output:
  FSB = Free-Space Beam
  FCP = Fiber-Coupled with Connector FC/PC
  FCA = Fiber-Coupled with Connector FC/APC
- Power Option: Applies to **405 nm only**
  H = High Power
  L = Low Power
- Wavelength in the range **375** nm - **2300** nm
- Picosecond Diode Laser Head

Note: *Pink color marks the optional parameters which are available to be ordered.*

Ordering Example: Picosecond Diode Laser with Driver and Additional Laser Head

Picosecond Diode Laser Driver: **PLDD-50M-V-2LH-NIM**	This driver has a max. frequency of **50 M**Hz and includes the following options: • **V**ariable amplitude • More than one laser head: **2 L**aser **H**eads • **NIM** sync output
First Diode Laser Head: **PICOPOWER-LD-1064-FC/APC**	Picosecond Diode Laser Head • Wavelength: **1064** nm • **F**iber-**C**oupled with **FC/APC** connector
Second Diode Laser Head: **PICOPOWER-LD-635-FSB**	Picosecond Diode Laser Head • Wavelength: **635** nm • **F**ree-**S**pace **B**eam

**WARNING – VISIBLE AND INVISIBLE LASER RADIATION
AVOID EXPOSURE TO BEAM
CLASS 3B LASER PRODUCT
IEC / EN 60825-1**

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