

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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MADE IN GERMANY
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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 TEM₀₀, 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 mm ³ , 250 g	<ul style="list-style-type: none"> 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.
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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:

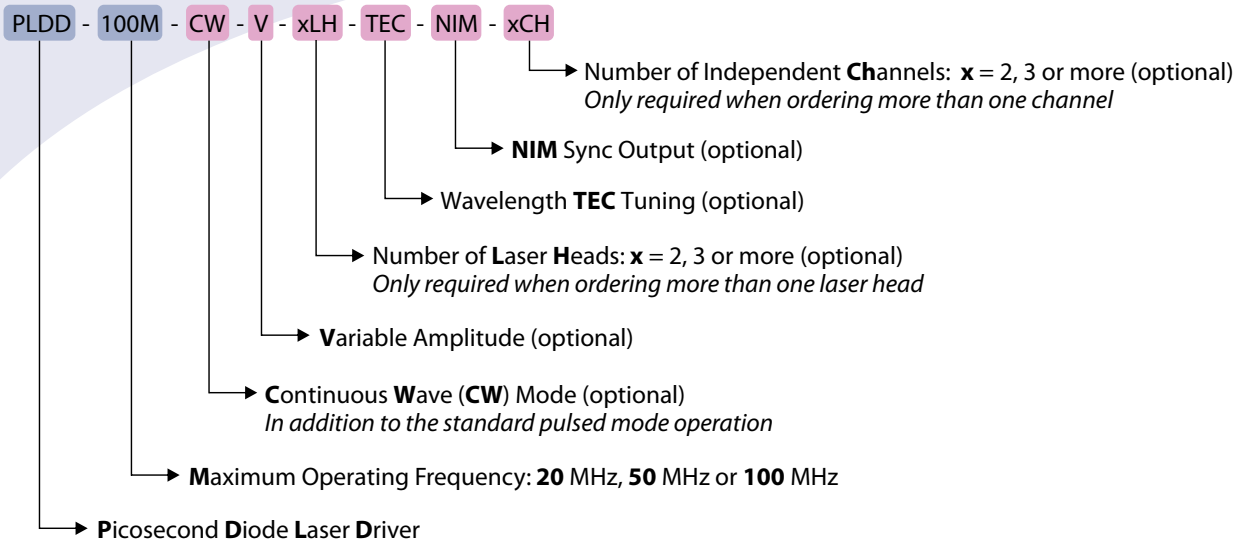
¹⁾ CW mode may reduce the peak or average power for frequencies > 50 MHz.

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

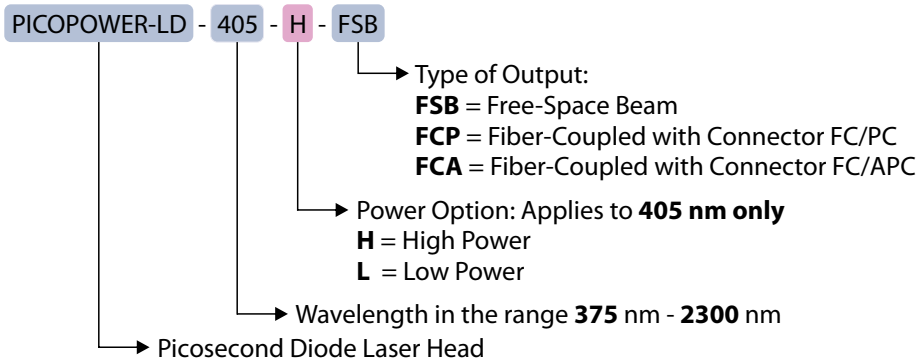
³⁾ Some combinations of different diode laser heads may reduce the maximum operating frequency.

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

Ordering Information for Picosecond Diode Laser Driver



Ordering Information for Picosecond Diode Laser Heads



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 MHz and includes the following options: <ul style="list-style-type: none"> • Variable amplitude • More than one laser head: 2 Laser Heads • NIM sync output
First Diode Laser Head: PICOPOWER-LD-1064-FC/APC	Picosecond Diode Laser Head <ul style="list-style-type: none"> • Wavelength: 1064 nm • Fiber-Coupled with FC/APC connector
Second Diode Laser Head: PICOPOWER-LD-635-FSB	Picosecond Diode Laser Head <ul style="list-style-type: none"> • Wavelength: 635 nm • Free-Space Beam



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

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