



# Sub-ns Passively Q-Switched Microchip Solid-State Lasers

*PULSELAS®-P Series*



A wide range of passively Q-switched lasers with pulse durations below 1 ns and extremely high peak powers at 1064 nm with excellent TEM<sub>00</sub> beam profile are offered by ALPHALAS. The PULSELAS®-P lasers feature proprietary microchip design. The monolithic laser cavity is permanently aligned and therefore extremely stable.

The high-energy models deliver more than 1.5 mJ pulses with pulse duration of 1 ns, resulting in the highest peak power >1.5 MW commercially available directly from an oscillator (without amplifiers) for microchip lasers. Various models operate with repetition rates up to 100 kHz and the average power ranges from 100 mW to 1 W.

Built-in frequency generator and external TTL triggering are standard features for most models. Optional conversion to green (532 nm) and ultraviolet (355 nm, 266 nm) is also available.

The extremely reliable and robust microchip design is perfect for advanced OEM industrial applications. The compact design is best suited for almost any system integration. Fiber-pumped options offer even more compactness and flexibility.

These unique lasers have an extremely broad spectrum of applications ranging from supercontinuum generation in photonic crystal fibers to ignition of combustion engines and micromachining.



## Features

- Passively Q-Switched
- Extremely Compact
- Proprietary Microchip Design
- Subnanosecond Pulses at 1064 nm
- The Highest Peak Power (>1.5 MW) & Pulse Energy (>1.5 mJ) Commercially Available, Directly from an Oscillator
- Repetition Rates up to 100 kHz
- Average Powers up to 1 W
- Externally Triggerable with Low Jitter
- Frequency Conversion to 532, 355 and 266 nm (Options)
- Other Wavelengths (e.g. 946 nm, 1342 nm) with ns Pulses on Request

## Applications

- Material Processing
- Micromachining
- Marking & Cutting of Extremely Hard Materials (e.g. Diamonds)
- Nonlinear Optics
- Supercontinuum Generation
- Time-Resolved Fluorescence Measurements
- DNA-Analysis
- LIDAR & Laser Ranging
- Pollution Monitoring
- Laser-Induced Breakdown-Spectroscopy (LIBS)
- Ignition of Explosives, Combustion Engines & Gas Mixtures



Subnanosecond Passively Q-Switched Microchip Solid-State Lasers

PULSELAS®-P Series • Passively Q-Switched Lasers @ 1064 nm							
Model	PULSELAS-P-1064-100 <sup>1)</sup>	PULSELAS-P-1064-200 <sup>1)</sup>	PULSELAS-P-1064-300-FC <sup>1)</sup>	PULSELAS-P-1064-100-HP <sup>3)</sup>	PULSELAS-P-1064-400-HP <sup>3)</sup>	PULSELAS-P-1064-100-HE <sup>3)</sup>	PULSELAS-P-1064-150-HE <sup>3)</sup>
Wavelength (nm)	1064	1064	1064	1064	1064	1064	1064
Energy / Pulse (µJ, ± 10%)	6 - 10 @ 5 kHz	6 - 10 @ 5 kHz	15 - 20 @ 5 kHz	120 @ 1 kHz	400 @ 100 Hz	1000 @ 100 Hz	1500 @ 100 Hz
Average Power (mW)	typ. 100 @ 10 kHz	typ. 200 @ 20 kHz	typ. 300 @ 20 kHz	typ. 150 @ 1 kHz	typ. 40 @ 100 Hz	typ. 100 @ 100 Hz	typ. 150 @ 100 Hz
Pulse Width (ps)	typ. 800	typ. 800	typ. 800	typ. 900	typ. 1000	typ. 900	typ. 1100
Repetition Rate (kHz)	typ. 10 <sup>1)</sup>	typ. 20 <sup>1)</sup>	typ. 15 <sup>1)</sup>	max. 2 <sup>2)</sup>	max. 0.15 <sup>2)</sup>	0 - 0.1 <sup>2)</sup>	0 - 0.1 <sup>2)</sup>
Beam Profile	TEM <sub>00</sub>	TEM <sub>00</sub>	TEM <sub>00</sub>	TEM <sub>00</sub>	TEM <sub>00</sub>	TEM <sub>00</sub>	TEM <sub>00</sub>
Polarization Ratio	> 100 : 1	> 100 : 1	> 100 : 1	> 100 : 1	> 100 : 1	> 100 : 1	> 100 : 1
Beam Diameter (mm)	0.3	0.3	0.3	0.4	0.4	0.3	0.3
Beam Divergence (mrad Full Angle)	typ. 6	typ. 6	typ. 6	typ. 6	typ. 6	typ. 6	typ. 6
Power Instability (% rms, 1 hour)	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Heatsink Operating Temperature (°C)	+18° ... +30°	+18° ... +30°	+18° ... +30°	+18° ... +30°	+18° ... +30°	+18° ... +30°	+18° ... +30°
Laser Head Dimensions (W×H×L, mm <sup>3</sup> )	40×52×90 <sup>4)</sup>	40×52×90 <sup>4)</sup>	40×52×90 <sup>4)</sup>	40×52×140	40×52×140	40×52×140	40×52×140
Included LD & TEC Driver (W×H×L, mm <sup>3</sup> )	LDD1-1T-D 105×65×100	LDD1-1T-D 105×65×100	LDD1-1T-D 105×65×200	LDF-30-P 360×160×375	LDF-30-P 360×160×375	LDF-30-P 360×160×375	LDF-30-P 360×160×375
Operating Temperature (°C)	+18° ... +30°	+18° ... +30°	+18° ... +30°	+18° ... +30°	+18° ... +30°	+18° ... +30°	+18° ... +30°
Storage Temperature Without Humidity (°C)	-10° ... +50°	-10° ... +50°	-10° ... +50°	-10° ... +50°	-10° ... +50°	-10° ... +50°	-10° ... +50°

**Notes:**  
Above 3 - 5 kHz dual / multiple amplitude feature due to intrinsic laser dynamics may appear. Alternating amplitudes with 10 - 20% jumps. Each pulse type is stable better than 1% rms.

<sup>1)</sup> Externally triggerable options and internal frequency generator options available for up to 5 kHz.  
<sup>2)</sup> Both internal and external trigger are standard features.  
<sup>3)</sup> High-energy & high-power models. Laser head is fiber-pumped. Laser diode is installed in the LDF-30-P model fiber-coupled laser diode with driver.  
<sup>4)</sup> Fiber-pumped laser heads available with Ø 20×40 mm dimensions.

All models are available with options for frequency doubling, tripling and quadrupling to 532, 355 and 266 nm.

Customer specific parameters are available upon request. Please contact us for further information. Specifications for customer specific products are subject to change.



Regulatory Requirements Compliance

The PULSELAS® series diode-pumped solid-state lasers are OEM products intended for integration into other systems. They do not comply with CDRH requirements. The customer is responsible for CDRH certification of the system incorporating the PULSELAS® lasers.

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