High-Energy Picosecond Laser *PICOPOWER™-RG1-1064-10K*

Diode-Pumped High Energy Picosecond Laser 1064 nm, 100 µJ, 20 ps, 10 kHz PICOPOWER[®] - RG1-1064-10K





•he **PICOPOWER™- RG1-1064-10K**

picosecond laser delivers ultrashort pulses with high energy, high peak and average power at 1064 nm wavelength with variable repetition rates from single shot to 10 kHz. It features a unique synchronization capability with unsurpassed 3.5 ps jitter for pulses on demand. Optional wavelengths at 532 nm, 355 nm and 266 nm are available collinearly or as multiple output beams. The distinctive features of this laser are excellent power, pulse-to-pulse and beam pointing stability, diffraction-limited output beam, pulse-on-demand triggering and peak power of more than 2 MW with less than 30 W electrical power consumption. It is an ideal choice for numerous applications, including micro-machining of metal and nonmetal materials, semiconductor wafer inspection, carving, nonlinear optics, ultrafast spectroscopy and many others.

Features

- Single or multiple outputs at **1064 nm, 532 nm, 355 nm or 266 nm** wavelengths
- Unsurpassed 3.5 ps rms jitter to external trigger
- Less than 30 ps pulse width
- 50 µJ pulse energy at 1064 nm
- More than **2 MW** peak power at 1064 nm
- Internal and external trigger
- Air-cooled, compact and cost effective
- Excellent Gaussian TEM₀₀ beam profile
- Variable repetition rate

Applications

- High-speed and precision micro-machining (glass, silicon, plastics, etc.)
- Fluorescence lifetime measurements
- Multi-photon non-linear microscopy
- Marking, carving and 3D engraving
- Time-resolved spectroscopy
- Terahertz imaging
- Nonlinear optics



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| Technical Specifications: 1 | Турі |
|------------------------------------|------|
| OPTICAL and ELECTRICAL CHA | RAC |
| Parameter | U |
| Wavelength | n |
| Pulse Energy, single shot to 5 kHz | ł |
| Pulse Energy @ 10 kHz | ł |
| Pulse Width, single shot to 10 kHz | F |

| Technical Specifications: Typical Values | | | | | | | | | |
|--|---------|---|-----------------------|-----------------------|----------|--|--|--|--|
| OPTICAL and ELECTRICAL CHARACTERISTICS | | | | | | | | | |
| Parameter | Unit | Fundamental | Harmonics (optional) | | | | | | |
| Wavelength | nm | 1064 | 532 | 355 | 266 | | | | |
| Pulse Energy, single shot to 5 kHz | μJ | 55 | 33 | 16 | 12 | | | | |
| Pulse Energy @ 10 kHz | μJ | 50 | 29 | 13.5 | 10 | | | | |
| Pulse Width, single shot to 10 kHz | ps | < 30 | < 30 | < 25 | < 25 | | | | |
| Peak Power, single shot to 5 kHz | MW | 2.3 | 1.7 | 0.9 | 0.7 | | | | |
| Peak Power @ 10 kHz | MW | 2.1 | 1.4 | 0.8 | 0.6 | | | | |
| Average Power @ 10 kHz | mW | 500 | 290 | 135 | 100 | | | | |
| Long Term Power Stability (8 hrs) | %, rms | < 1.0 | < 2.0 | < 3.0 | < 4.0 | | | | |
| Pulse-to-Pulse Energy Stability | %, rms | < 1.0 | < 2.0 | < 3.0 | < 4.0 | | | | |
| Beam Diameter, 1/e ² | mm | 1.4 Available on request | | | | | | | |
| Polarization (linear) | % | > 99.5 | > 99.9 | > 99.9 | > 99.9 | | | | |
| Beam Divergence | mrad | < 1.2 | < 2.0 | < 3.0 | < 3.0 | | | | |
| Beam Pointing Stability (rms) | µrad | < 30 | < 30 | < 30 | < 30 | | | | |
| Pre-Pulse Contrast Ratio ¹⁾ | | > 10 ³ : 1 | > 10 ⁵ : 1 | > 10 ⁷ : 1 | > 109: 1 | | | | |
| Post-Pulse Contrast Ratio ¹⁾ | | $> 10^2:1$ $> 10^3:1$ $> 10^5:1$ > 10 | | | | | | | |
| Spatial Mode / M ² | | $TEM_{00} / M^2 < 1.2$ $TEM_{00} / M^2 < 1.5$ | | | | | | | |
| Repetition Rate | kHz | Single shot to 10 kHz | | | | | | | |
| Internal Trigger Repetition Rate | kHz | 0.1 10 | | | | | | | |
| External Trigger Repetition Rate | kHz | Single shot to 10 kHz | | | | | | | |
| External Trigger Specifications | | TTL (4.5 5.5 V on 50 Ω load) Rising edge: < 10 ns; Pulse width: min. 250 ns, max. 1.3 μ s | | | | | | | |
| Delay of Laser Pulse to TRIG IN | ns | ~ 500 | | | | | | | |
| Optical SYNC OUT Pulse | ps | Optional, jitter < 1 ps, rise time < 50 ps | | | | | | | |
| Electrical SYNC OUT Pulse | | +5 V on 50 Ω load | | | | | | | |
| Jitter of Laser Pulse to External Trigger | ps, rms | 3.5 | | | | | | | |
| Delay SYNC OUT to Laser Pulse | ns | Adjustable from -100 to +1000 | | | | | | | |
| Jitter of Electrical SYNC OUT Pulse | ps | 50 | | | | | | | |

MECHANICAL CHARACTERISTICS

| | Dimensions | Weight | | |
|-----------------------------|---|--------|--|--|
| Laser Head | 165 x 95 x 700 mm ³ | 10 kg | | |
| Laser Diode Driver | 130 x 65 x 105 mm ³ | 1 kg | | |
| Control Unit | 105 x 65 x 105 mm ³ | 1 kg | | |
| GENERAL CHARACTERISTICS | | | | |
| Power Requirements | +12 V DC, 5 A or 100 240 VAC with AC/DC adapter | | | |
| Power Consumption | < 30 W | | | |
| Operating Temperature Range | 15°C – 35°C | | | |
| Cooling | Passive (convection) | | | |
| Typical warm-up time | < 15 min | | | |
| Beam height | Min. 93 mm, max. 103 mm, adjustable | | | |

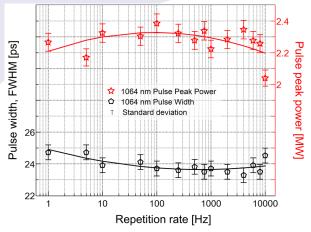
Note: ¹⁾ Peak-to-peak with respect to residual pulses.

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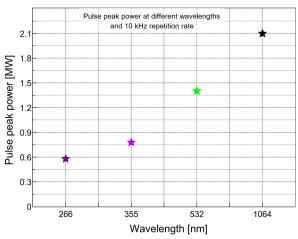


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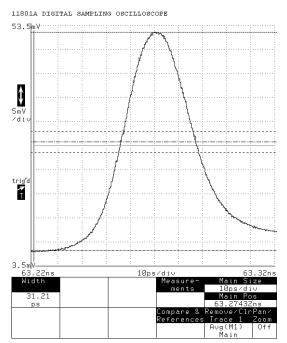
Performance of PICOPOWER[™]-RG1-1064-10K: Typical Values



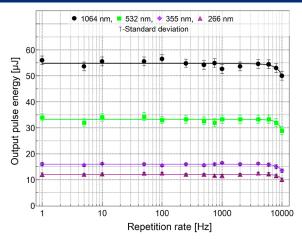
Pulse width and peak power at different repetition rates for 1064 nm wavelength.



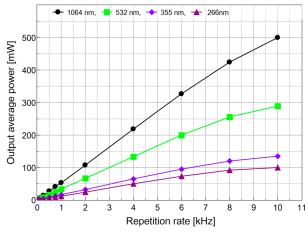
Peak power at 1064 nm and its harmonic wavelengths at 10 kHz repetition rate.



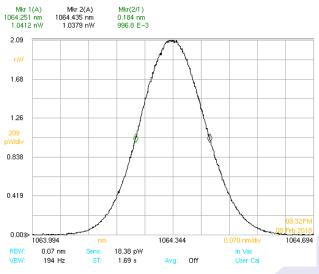
Pulse width at 1064 nm wavelength before deconvolution measured with 30 GHz photodetector.



Pulse energy at different repetition rates for 1064, 532, 355 and 266 nm wavelengths.



Average power at different repetition rates for 1064, 532, 355 and 266 nm wavelengths.



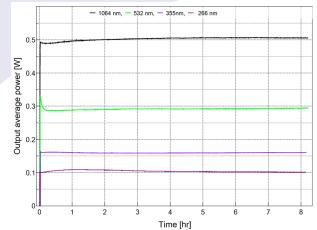
Spectral bandwidth at 1064 nm wavelength.

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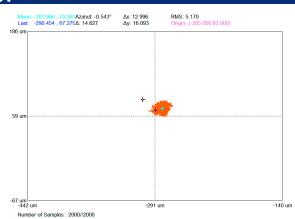


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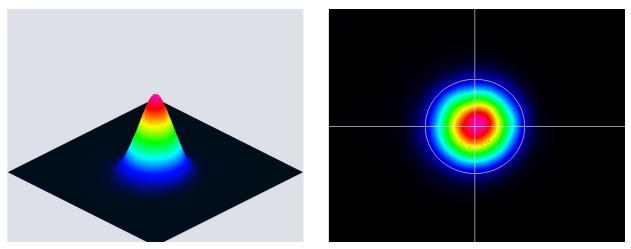
Performance of PICOPOWER[™]-RG1-1064-10K: Typical Values



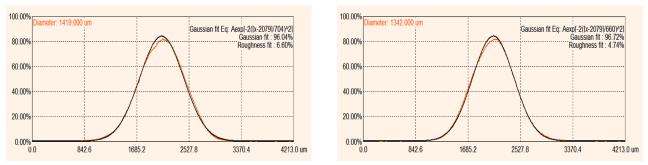
Long-term power stability at 1064 nm wavelength.



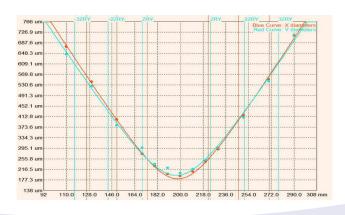
Beam pointing stability at 10 kHz repetition rate.



3D and 2D far-field beam profile measured at 540 mm distance from laser head for 1064 nm wavelength.



1D cross section and Gaussian fit showing nearly 95% overlap.

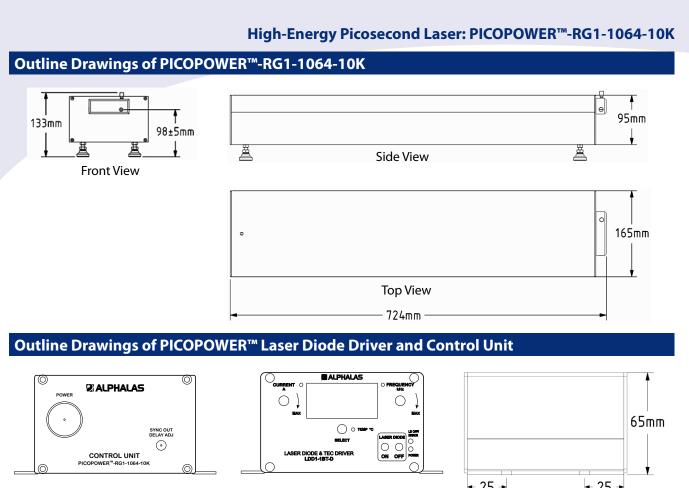


Beam quality measured at maximum output power according to ISO 11146 standard (\pm 5%).

 $M_{eff}^{2} = 1.02$ Div_{eff} = 0.93 mrad BPP_{eff} = 0.34 mrad*mm $z0_{eff} = 1551 \text{ mm}$

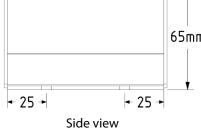
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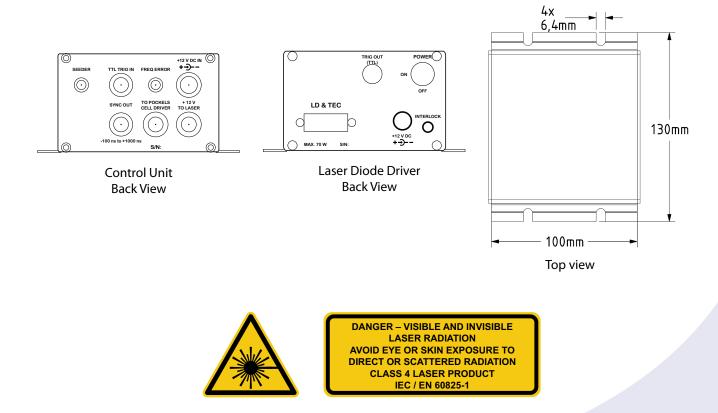




Control Unit Front View

Laser Diode Driver **Front View**





| ALPHALAS GMBH | TEL | +49 - 551 - 77 06 147 | | ГТИ |
|--|---------------------------|---|--|--------------------------------|
| Bertha-von-Suttner-Str. 5 | FAX | +49 - 551 - 77 06 146 | Lasers, Optics, Electronics | |
| D-37085 Goettingen | E-MAIL | sales@alphalas.com | Made in Germany | |
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