

# SIERRA SUPERPULSE®

Excellence Through Innovation

## Advanced Pulse Format Solid-State IR, Green, UV Laser System

The Sierra SuperPulse laser was created to offer our customers high-speed precision machining with the quality of femtosecond processing but without the complexity and cost. SuperPulse refers to the patented pulse format that enables a plasma machining technique similar to that utilized by femtosecond lasers.

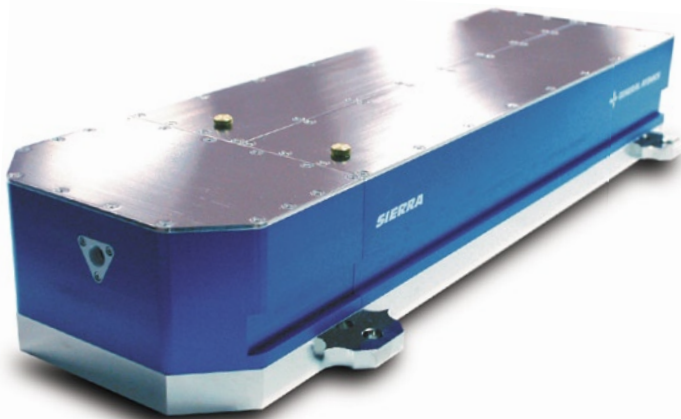
With the Sierra SuperPulse format, material is vaporized and removed before significant thermal diffusion can occur, minimizing heat affected zones. This proprietary pulse format also minimized the effects of nonlinear interaction with the atmosphere near the laser focus, resulting in clean machining features, which causes strong deformation of the laser beam and irregular shaped features often observed in femtosecond laser machining.

Another remarkable feature of the Sierra SuperPulse laser is its ability to machine semiconductors, plastics, dielectrics, and a variety of metals and alloys at rates many orders of magnitude greater than is achievable with femtosecond lasers and at a comparable quality.

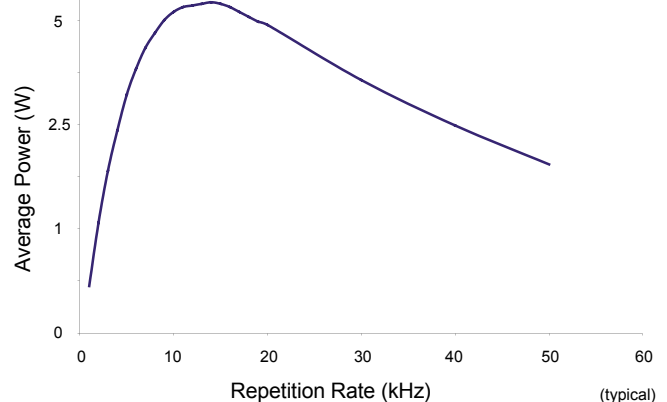
All Sierra SuperPulse lasers are manufactured in a clean room environment, which ensures proper alignment and unit to unit consistency. This allows users to achieve the same results from the first set of pulses to the last. SuperPulse lasers have been used in many micromachining applications such as: drilling, scribing, masking, cutting, and etching.

### FEATURES

- High performance: 80 kW peak power
- Pulse-to-pulse separation range of 0-250 ns
- 1 to 100 kHz repetition rates
- Rugged, compact industrial design
- Long diode lifetime
- Simple field replacement of fiber-coupled pump diodes
- System control through RS-232 interface; Lab View drivers and GUI program included



**Sierra SuperPulse 532**  
Average Power vs. Repetition Rate



### Sierra SuperPulse® System Specifications<sup>3</sup>

	Sierra SuperPulse 1064	Sierra SuperPulse 532	Sierra SuperPulse 355
Wavelength (nm)	1064	532	355
Energy (both pulses combined) <sup>1</sup>	0.7 mJ	0.4 mJ	0.18 mJ
Pulsewidth (FWHM) <sup>1</sup>	4 ± 1 ns	4 ± 1 ns	4 ± 1 ns
Repetition Rate (kHz)	1 to 100	1 to 100	1 to 50
Peak Power (both pulses combined) <sup>1</sup>	170 kW	100 kW	45 kW
Average Power (both pulses combined) <sup>1</sup>	7 W	4 W	1.8 W
Beam Diameter, @ 1/e <sup>2</sup> , (mm)	1	1	1
Beam Profile	TEM <sub>00</sub>	TEM <sub>00</sub>	TEM <sub>00</sub>
Spatial Mode (M <sup>2</sup> )	< 1.3	< 1.3	< 1.3
Polarization (>100:1) (pulse 1, pulse 2)	Horizontal, Vertical	Horizontal, Vertical	Horizontal, Vertical
Beam Pointing Stability (µrad)	< 75	< 75	< 75
Pulse-to-Pulse Stability <sup>2</sup>	< 2%	< 2%	< 2%
Beam Divergence (mrad)	< 3.5	< 1.5	< 1.5

### Sierra SuperPulse Utility and Environmental Specifications<sup>3</sup>

Operating Voltage	120 VAC/220 VAC
Power Consumption	720 W/660 W
Line Frequency	50 – 60 Hz
Weight Laser Head Power Supply	9.07 kg (20 lbs) 15.88 kg (35 lbs)
Temperature Operating	18 – 35 °C
Humidity Operating	8 – 35 %
Umbilical Cord Length	10 m

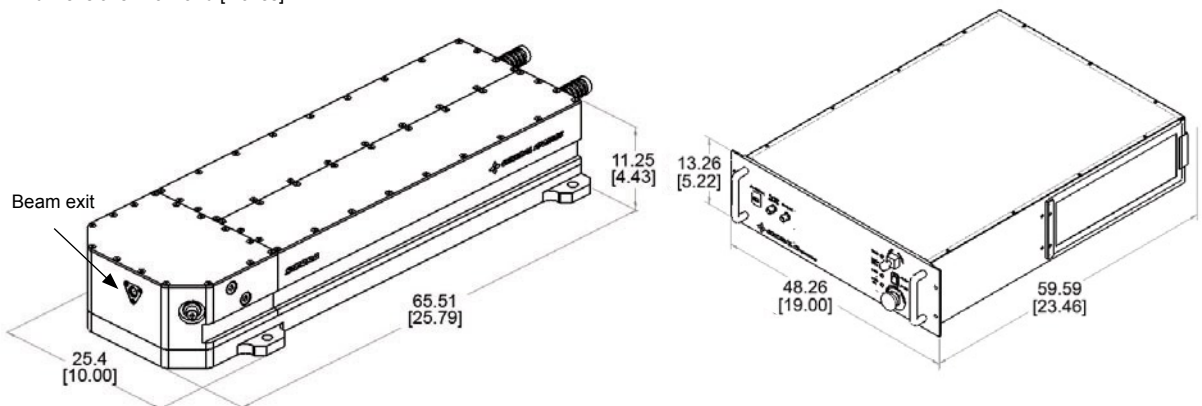
<sup>1</sup> Measured at 10 kHz

<sup>2</sup> rms up to 10 kHz

<sup>3</sup> General Atomics follows a policy of continuous product improvement. Specifications are subject to change without notice.

## Mechanical Specifications

All dimensions in cm and [inches]



For more information please visit  
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General Atomics' scientific and industrial lasers comply with the US standards established by the Center for Devices and Radiological Health (CDRH) for a class IV laser device. Complies with CFR 1040.10 and 1040.11 as applicable.

