Vanguard™

MODE-LOCKED QUASI-CW LASERS

The Vanguard Advantage

- *Rugged industrial platform*
- *Outstanding beam characteristics and power stability*
- *Near diffraction-limited TEM_{00} output*
- *Closed-loop power control*
- *Extremely long-lived diodes with low cost of ownership*

The Spectra-Physics® Vanguard™ lasers are state-of-the-art DPSS lasers specifically designed to produce exceptionally reliable quasi-CW output at 355 nm or 532 nm. This family of rugged OEM lasers use advanced mode-locking technology to deliver picosecond pulses with low noise and excellent TEM_{00} mode quality. Vanguard lasers are available with 350 mW at 355 nm, 2.5 W at 355 nm, or 2 W at 532 nm, each providing ultrafast pulse trains with outstanding long-term stability.

The Vanguard lasers were developed for demanding 24x7 OEM applications, emphasizing consistency and uptime, low cost of ownership, and ease of integration. Designed for the stringent requirements of semiconductor wafer processing, it has found ready acceptance in cell-sorting flow cytometry, synchronous dye-laser pumping, and micro-material processing applications where its superb reliability and dependability are similarly appreciated.

The Vanguard series of lasers are field proven with over 1,000 systems installed. Every feature of the Vanguard is designed for continuous and consistent operation for in demanding applications. The system can be remotely controlled via an RS-232 interface, and incorporates extensive on-board data logging of key parameters. Closed-loop power control ensures consistent output power to less than 2% variation from the specified level. Designed for convenient preventative maintenance, adjustment of the THG crystal (for the UV systems) and the Saturable Absorber Mirror (SAM) optimizes performance and extends the Vanguard laser's operational life. The diode module has demonstrated exceptionally long life, and being remotely located in the power supply enables easy replacement without impacting the laser head alignment.

Spectra-Physics' patented technology establishes the system reliability. Our proprietary manufacturing technology ensures product quality. Our tightly controlled supply chain makes for consistency. World-class service and expert technical support are provided as standard from the global leader in photonics.

Applications

- *Wafer inspection*
- *LED processing*
- *Photovoltaic scribing*
- *Cell sorting*
- *Laser direct imaging*
- *Micro-material processing*
- *Solar cell processing*
- *Polyimide cutting and drilling*

Spectra-Physics®
A Newport Company

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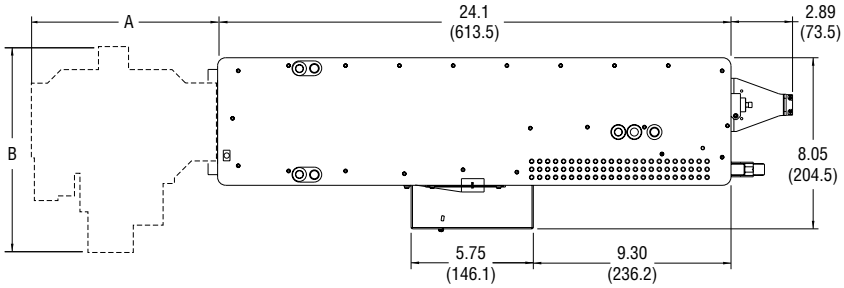
Specifications[1,2]

	Vanguard 355-2500	Vanguard 355-350	Vanguard 532-2000
Output Characteristics			
Wavelength	355 nm	355 nm	532 nm
Power	2.5 W	350 mW	2 W
Repetition Rate	80 MHz ±2 MHz		
Spatial Mode	TEM_{00}		
M^2	<1.2	<1.2	<1.3
Far Field Divergence, full angle	<1 mrad		
Beam Diameter ($1/e^2$)	1.0 mm nominal	1.0 mm nominal	1.4 mm nominal
Beam Pointing Stability	<25 µrad/°C		
Beam Ellipticity	<20% far field		
Average Power Stability	<2%		
Amplitude Noise	<1% rms, 10 Hz to 2 MHz		
Polarization Ratio	>100:1 vertical		
Cold Turn-on Time (AC off to full power)	<30 min		
Cold Turn-on Time (AC off to full specs)	<1 hr		
Temperature Range	20–27°C		
Laser Head Cooling	Water cooled	Air cooled	

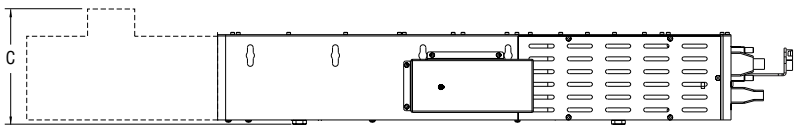
1. Due to our continuous product improvement program, specifications are subject to change without notice.
2. Vanguard is a Class IV – High-Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.

Vanguard Dimensions

Model	Vanguard 355-350	Vanguard 355-2500	Vanguard 532-2000
A Length	10 in (254 mm)	10.35 in (262.9 mm)	7.56 in (192 mm)
B Width	9.51 in (241.6 mm)	9.6 in (243.8 mm)	6 in (152.4
C Height	4.33 in (109.9 mm)	6.33 in (160.7 mm)	4.21 in (106.9 mm)



Top View



Side View

Dimensions in inch (mm)

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