

# Pulseo® Laser Family

## HIGH POWER Q-SWITCHED LASERS



### The Pulseo Advantage

- Short pulse width for higher peak power
- Industry leading diode life
- Lower cost of ownership
- High uptime and field serviceable design
- Excellent near and far field pointing stability
- Excellent pulse-to-pulse stability
- Active Laser Purification System™ for longer life
- Compact and user friendly

The Pulseo® family of high power Q-switched lasers is designed for micromachining applications in a 24/7 manufacturing environment. Pulseo lasers lead the industry in product reliability and system uptime, and have the lowest cost of ownership.

The Pulseo is smaller than comparable products, ensuring simple integration into any machine tool. With its intuitive GUI, comprehensive data log, automated command set, and superior design, the Pulseo Q-switched DPSS laser is nearly maintenance free, requiring little human intervention to keep constant power, beam quality, and throughput.

### OUTSTANDING PERFORMANCE

Pulseo lasers also lead the industry in performance. With their shorter pulse widths, Pulseo lasers have higher peak powers resulting in cleaner scribing, and less thermal damage to your parts. And, exceptional near and far field beam pointing stability, coupled with superior pulse-to-pulse stability translate to better processing accuracy, more consistent results, and higher yields.

The integrated E-Pulse™ feature allows users to tailor the overall pulse energy to the specific job on hand. To ensure consistent machining quality and dependability over the lifetime of the laser, we've also integrated an automatic crystal shifter which keeps the output power constant.

### HIGH RELIABILITY

Pulseo lasers have a number of unique design features that significantly increase the both laser life and uptime. Our diodes typically last twice the industry average. The Pulseo laser is designed for field service, should it be necessary, resulting in improved tool uptime. Known wear components (such as diodes, fibers, output window, and shutter) are easy to change in the field without costly tool realignment. This lowers service inventory holding costs while shortening Mean Time to Repair (MTTR).

Our proprietary optical alignment system (EternAlign™) and rugged I-beam laser housing virtually eliminate alignment failures that can occur with vibration and shock during shipping. The sealed laser resonator and unique filtration system (ALPS) significantly extends the life of the laser by keeping the air inside the laser clean, dry, and free of volatile organic compounds.

And finally, the Pulseo lasers' automatic data logging software monitors all key laser performance parameters over the life of the laser, providing a powerful service feature and product reliability tool.



# Pulseo<sup>®</sup> Laser Family

## APPLICATIONS

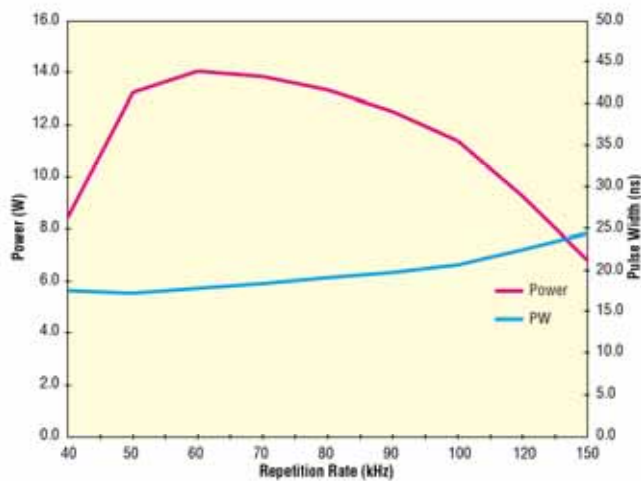
### Pulseo 355

- Via hole drilling
- c-Si solar cell manufacturing
- Flex circuit cutting and drilling
- Flat panel manufacturing
- ITO patterning for touch screen displays
- LED substrate scribing
- Silicon wafer dicing/scrubing (including low K)

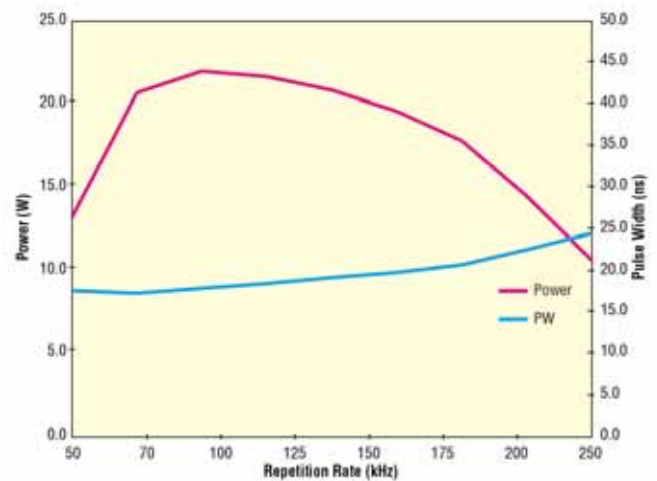
### Pulseo 532

- Electronic package singulation (micro-SD, QFN, FBGA, and Direct Chip Attach (DCA) type packages)
- PCB material ablation / PCB structuring
- PCB singulation
- Ceramic scribing
- Silicon wafer marking
- Solar cell edge isolation and thin film patterning

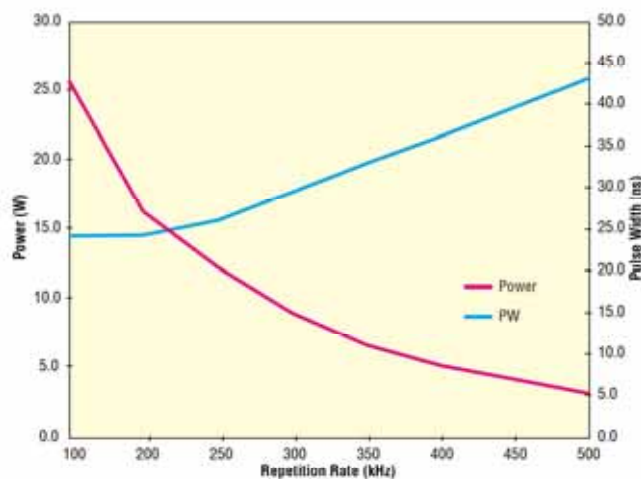
Pulseo 355-10 Performance



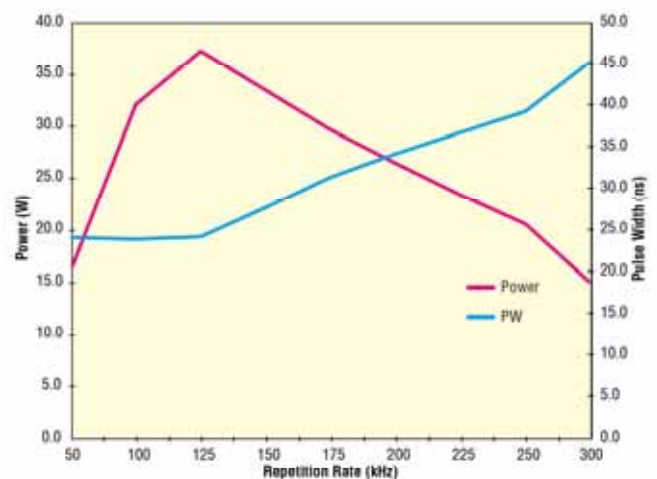
Pulseo 355-20 Performance



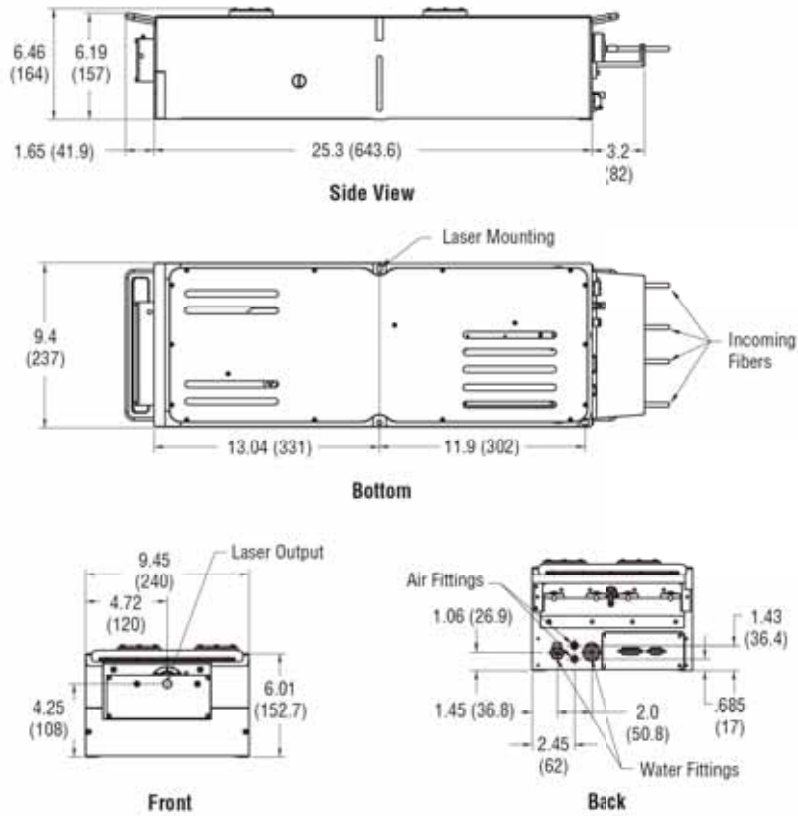
Pulseo 355-Turbo Performance



Pulseo 532-34 Performance

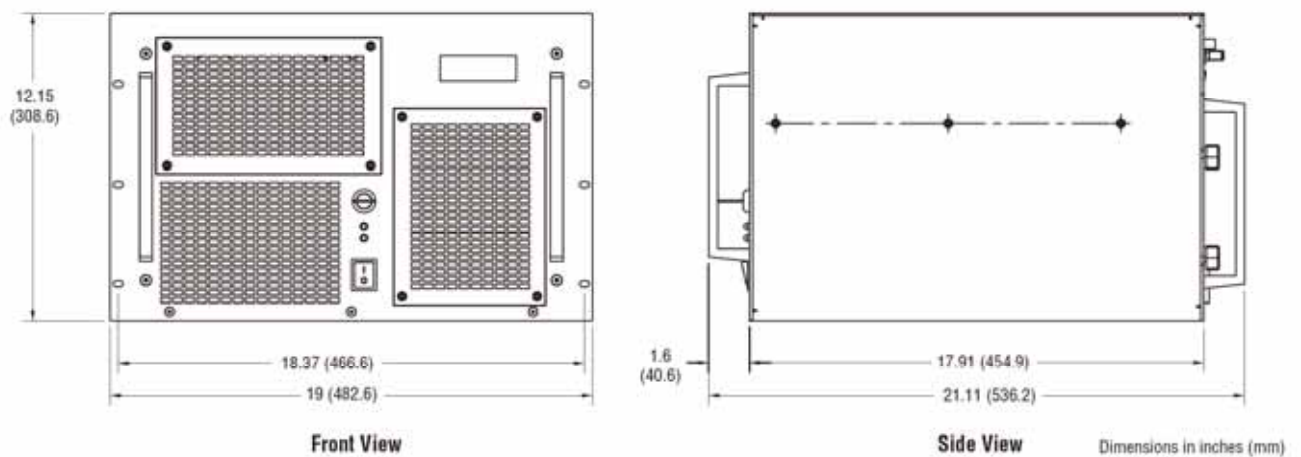


### Pulse Laser Head Dimensions



Dimensions in inches (mm)

### Power Supply Dimensions



# Pulseo<sup>®</sup> Laser Family

## Specifications

General Characteristics	Pulseo 532-34	Pulseo 355-10	Pulseo 355-20	Pulseo 355-Turbo
Wavelength	532 nm	355 nm	355 nm	355 nm
Peak Power	~13.5 kW	~5 kW	~10 kW	~2.3 kW
Average Power	>34 W at 100 kHz	>10 W at 90 kHz	>20 W at 100 kHz	>8 W at 300 kHz
Repetition Rate Range	0-300 kHz	0-300 kHz	0-300 kHz	0-500 kHz
Pulse Width	<30 ns at 100 kHz	<23 ns at 90 kHz	<23 ns at 100 kHz	<35 ns at 300 kHz
<b>Beam Characteristics</b>				
Spatial Mode	TEM <sub>00</sub>			
M <sup>2</sup>	<1.3			
Polarization	100:1, vertical			
Beam Diameter, at waist	3.6 mm ±10%	1.75 mm ±1%	3.6 mm ±10%	3.6 mm ±10%
Waist Location, nominal	At output ±25% of Rayleigh range			
Beam Divergence, full angle	<0.3 mrad			
Beam Ellipticity	<15%	<10%	<10%	<10%
Boresight Tolerance	n/a	±1 mm position at output ±3.5 mrad angle	±1 mm position at output (positional) ±3.5 mrad (angular)	±1 mm position at output (positional) ±3.5 mrad (angular)
Pulse-to-Pulse Stability	<3% rms 1σ at 100 kHz	<4% rms 1σ at 100 kHz	<4% rms 1σ at 100 kHz	<10% rms 1σ at 300 kHz
Power Stability (over 8 hours at constant temperature)	±2% peak-to-peak			
<b>Operating Conditions</b>				
Warm-up Time, from cold start	<40 min			
Temperature Range	18-35°C			
Altitude	0-3000 m			
Humidity	8-95%, non-condensing (for temperatures up to 35°C)			
<b>Non-Operating Conditions</b>				
Temperature Range	0-40 °C	0-50 °C	0-50 °C	0-50 °C
Altitude	0-12,000 m			
Humidity	8-95%, non-condensing			
<b>Physical Characteristics</b>				
Laser Head Dimensions	9.49 x 3.90 x 25.35 in (240 x 266 x 644 mm)			
Laser Head Weight	60 lbs (27 kg)			
Power Supply Dimensions	19 x 12.15 x 21.11 in (483 x 309 x 536 mm)			
Power Supply Weight	69 lbs (31 kg)			
Fiber Length	5 m	5 m	5 m or 10 m	5 m or 10 m
<b>Electrical and Chiller Requirements</b>				
Power Input	200-240 VAC 50/60 Hz, auto ranging	110-240 VAC 50/60 Hz, auto ranging	100-240 VAC 50/60 Hz, auto ranging	100-240 VAC 50/60 Hz, auto ranging
Power Consumption	1.1 kW	1.1 kW	750 W	750 W
Water Temperature (laser inlet)	20°C			
Water Pressure (laser inlet)	30 psi			
Water Flow Rate	6 liter/min @ 50 psi	1.5 liter/min @ 3 psi	3.8 l/min	3.8 l/min
Heat Load	800 W (typical), 12500 W (max)	170 W (typical), 500 W (max)	300 W (typical), 500 W (max)	300 W (typical), 500 W (max)
Water Temperature Stability	±0.5°C			



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DS-011208