

# Talon®

## DISRUPTIVE COST-PERFORMANCE UV AND GREEN LASERS

### The Talon Advantage

- Superior combination of performance, reliability and cost
- 10 interchangeable models with identical footprint and interfaces for wide breadth of process coverage
- Rugged industrial platform
- Outstanding beam parameters, performance, and stability
- ALPS cavity cleanliness control system for reliable operation
- Long-life diodes and minimal interventions over the life of the laser
- Easy-to-integrate compact laser head includes the diodes and control electronics, with simple utility hookups



Talon® is an exciting family of UV and green diode-pumped solid state (DPSS) Q-switched lasers that delivers an unprecedented combination of performance, reliability, and cost. With the new additions to this versatile product, Talon is ideal for a remarkable range of processes and applications with a single, identical footprint and interfaces for easy interchangeability. Based on Spectra-Physics' It's in the Box™ design, with the laser and controller combined in a single, compact package, Talon lasers use field-proven technology to output >30 W or >500 μJ per pulse of UV, and in green models >40 W or 1000 μJ, with a wide repetition rate range of 0 to 500 kHz, high pulse-to-pulse stability and excellent TEM<sub>00</sub> mode quality for tens of thousands of operating hours.

Talon is a rugged industrial laser capable of supplying the long-term performance and low cost of ownership necessary for a 24/7 precision manufacturing tool. Talon lasers are ideal for a wide range of micromachining applications where extended production cycles rely on stable beam quality and high uptime. Features such as E-Pulse™, which holds pulse energy and pulse width constant over wide repetition rate ranges, ensure superb process control. For fast processing speeds, its performance at high repetition rates is ideal.

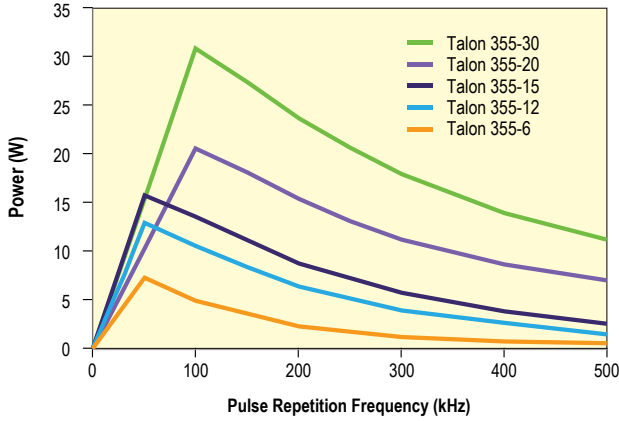
Talon is a flexible platform that allows matching the right laser to the process requirements and budget. The same features, characteristics and benefits are available in models producing from 6 to 30 W of UV and 15 to 40 W of green output. Where short pulse widths are preferred, Talon excels with its high peak power and short pulse widths. Should higher pulse energies and longer pulse widths be desired, the Talon HE models provide 3 to 6 times the pulse width with high pulse energies. Each of these lasers features the same interface, footprint and ease of use, making scaling existing processes or bringing up a new one straightforward and convenient.

The laser can be remotely controlled via RS 232 or USB interface, and incorporates extensive on-board data logging of key parameters. Mode quality remains stable over the operating range, up to 500 kHz. The long life diodes, innovative optical and electronics design, and Spectra-Physics' experience in producing UV lasers for 24/7 applications make Talon a highly reliable laser for demanding applications.

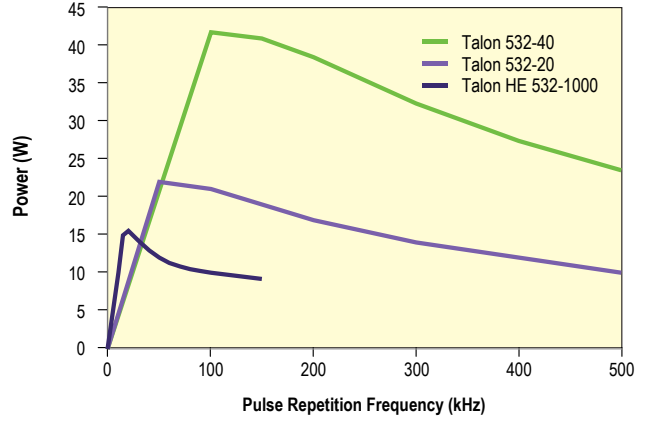
### Applications

- PCB de-paneling, cutting, and drilling
- Solar cell processing
- Silicon scribing
- Ceramic scribing, cutting, and drilling
- ITO patterning
- Glass cutting and drilling
- Metal foil cutting

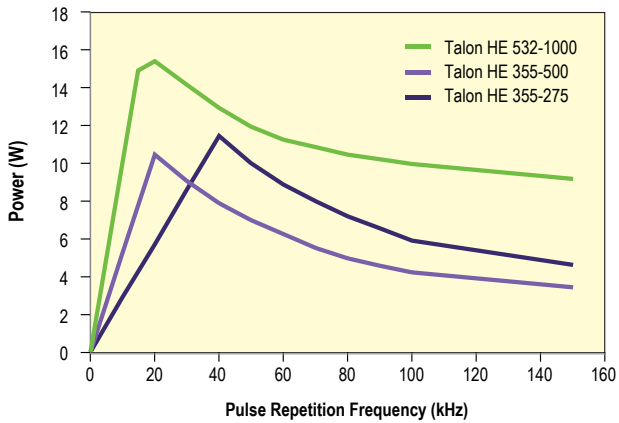
Typical Power Talon UV Models<sup>1</sup>



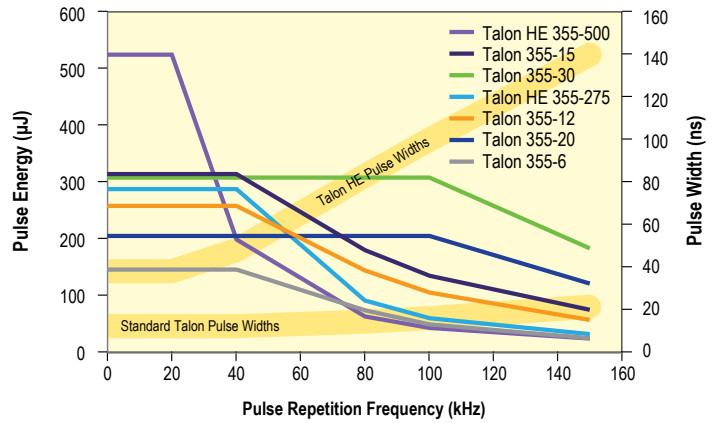
Typical Power Talon 532 nm Models<sup>1</sup>



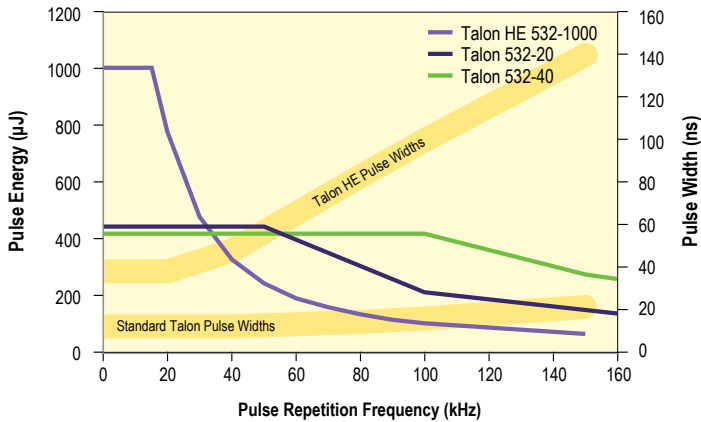
Typical Power Talon HE Models<sup>1</sup>



Talon UV Family Pulse Energy and Pulse Width<sup>1</sup>



Talon 532 Family Pulse Energy and Pulse Width<sup>1</sup>



1. Typically measured performance; not a guaranteed or warranted specification.

## Talon Specifications<sup>1,2,6</sup>

	Talon 355-30	Talon 355-20	Talon 355-15	Talon 355-12	Talon 355-6	Talon 532-40	Talon 532-20
<b>Output Characteristics</b>							
Wavelength	355 nm	355 nm	355 nm	355 nm	355 nm	532 nm	532 nm
Power <sup>2,3</sup>	15 W @ 50 kHz, typical	10W @ 50 kHz	15 W @ 50 kHz	12 W @ 50 kHz	6 W @ 50 kHz	20 W @ 50 kHz, typical	20 W @ 50 kHz
	30 W @ 100 kHz	20 W @ 100 kHz	13 W @ 100 kHz	10 W @ 100 kHz	4 W @ 100 kHz	40 W @ 100 kHz	18 W @ 100 kHz
	21 W @ 200 kHz, typical	11 W @ 300 kHz, typical	4 W @ 300 kHz, typical	3 W @ 300 kHz, typical	1 W @ 300 kHz, typical	36 W @ 200 kHz, typical	13 W @ 300 kHz, typical
Repetition Rate	0 to 500 kHz						
Pulse Width	<25 nsec @ 100 kHz						
Pulse-to-Pulse Energy Stability	<2% rms @ 100 kHz, typical				<2% rms @ 50 kHz, typical	<2% rms @ 100 kHz, typical	
	<3% rms up to 300 kHz				<3% rms up to 150 kHz	<3% rms up to 300 kHz	
	<5% rms above 300 kHz				<5% rms above 300 kHz, typical	<5% rms above 300 kHz	
<b>Beam Characteristics</b>							
Spatial Mode	TEM <sub>00</sub>						
M <sup>2</sup>	<1.2						
Polarization Ratio	100:1 vertical						
Beam Diameter, at waist	3.5 mm ±10%	1.0 mm ±10% <sup>5</sup>	1.0 mm ±10%				
Beam Divergence (full angle)	<0.3 mrad	<0.6 mrad				<0.9 mrad	
Beam Asymmetry (circularity)	<1.1 ( >90%)						
Boresighting Tolerance	<1mm, <1mrad						
Beam Pointing Stability <sup>4</sup>	< ±25 μrad/°C	< ±10 μrad/°C				< ±25 μrad/°C	< ±10 μrad/°C
<b>Operating Conditions / Environmental Range</b>							
AC Input	110/220 ±10% VAC, 50-60 Hz						
Warm-up Time	<20 min from standby; <40 min from cold start						
Temperature Range	18 to 35°C operating; -20 to 50°C non-operating						
Altitude	0–3,000 m operating; 0–12,000 m non-operating						
Humidity	8–95%, non-condensing						
Water Cooling Requirements	20°C ±1°C, stable to ±0.2°C, 1.5 liter/minute minimum, 20 psi						
Thermal Load (to water)	<350 W	<300 W				<350 W	<300 W
Total Power Consumption	<400 W	<300 W				<400 W	<300 W
<b>Physical Characteristics</b>							
Dimensions (Laser) (L x W x H)	25 x 6 x 4.5 in (635 x 153 x 115 mm)						
Weight (Laser)	28 lbs (12.7 kg)						
Dimensions (Utility Module) (L x W x H)	19.6 x 19 x 3.5 in (498 x 482 x 88 mm)						
Weight (Utility Module)	22 lbs (10 kg)						
<b>Features</b>							
Optional Safety Shutter	Externally mounted for easy field service and customer replaceable						
Internal Power Monitor	May be calibrated against an external power meter						
E-Pulse Pulse Energy Control	Keeps pulse energy, pulse width and beam parameters held constant over a wide range of repetition rates						
Data Log	Long-term and short-term recording for diagnostics and equipment maintenance						
CW Alignment Beam Mode	Lower power CW UV beam for installation and alignment in a tool						
Sacrificial Window	Customer replaceable to maintain power in harsh environments						
ALPS Optics Protection System	Maintains internal optics cleanliness for long term, reliable operation						
Precision Position Registration	Hardened steel receptacles for indexing pins for repeatable, precision alignment from unit to unit						

**Notes:**

1. Due to our continuous product improvement, all specifications are subject to change without notice.
2. All specifications, except power, are at 100 kHz, unless otherwise noted.
3. Power specification and warranty is at 50 kHz and 100 kHz, except where identified as "typical". Other values are for reference.
4. Pointing stability applies after 2 hour warm-up.
5. Talon 355-15 is available with a 3.5 mm beam diameter upon request
6. The Talon is a Class IV – High Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to the direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.

## Talon HE Specifications<sup>1,2,5</sup>

		Talon HE 355-500	Talon HE 355-275	Talon HE 532-1000
<b>Output Characteristics</b>				
Wavelength		355 nm	355 nm	532 nm
Pulse Energy <sup>2,3</sup>	15 kHz	500 µJ typical	275 µJ typical	1000 µJ typical
	20 kHz	500 µJ	275 µJ typical	750 µJ
	40 kHz	192 µJ typical	275 µJ	325 µJ typical
	100 kHz	42 µJ typical	59 µJ typical	100 µJ typical
Power <sup>2,3</sup>	15 kHz	—	—	15 W typical
	20 kHz	10 W	5.7 W typical	15 W
	40 kHz	7.7 W typical	11 W	13 W typical
	100 kHz	4.2 W typical	5.9 W typical	10 W typical
Frequency <sup>2,3</sup>		20 kHz	40 kHz	20 kHz
Repetition Rate		0 to 150 kHz		
Pulse Width		25–40 nsec @ 20 kHz	45–60 nsec @ 40 kHz	25–40 nsec @ 20 kHz
Pulse-to-Pulse Energy Stability		<3% rms		
<b>Beam Characteristics</b>				
Spatial Mode		TEM <sub>00</sub>		
M <sup>2</sup>		<1.2		
Polarization Ratio		100:1 vertical		
Beam Diameter, at waist		3.5 mm ±10%		1.0 mm ±10%
Beam Divergence (full angle)		<0.3 mrad		< 0.9 mrad
Beam Asymmetry (circularity)		<1.1 (>90%)		
Boresighting Tolerance		<1 mm, <1 mrad		
Beam Pointing Stability <sup>4</sup>		<±10 µrad/°C		
<b>Operating Conditions / Environmental Range</b>				
AC Input		110/220 ±10% VAC, 50-60 Hz		
Warm-up Time		<20 min from standby; <40 min from cold start		
Temperature Range		18 to 35°C operating; -20 to 50°C non-operating		
Altitude		0–3,000 m operating; 0–12,000 m non-operating		
Humidity		8–95%, non-condensing		
Water Cooling Requirements		20°C ±1°C, stable to ±0.2°C, 1.5 liter/minute minimum, 20 psi		
Thermal Load (to water)		<350 W		
Total Power Consumption		<400 W		
<b>Physical Characteristics</b>				
Dimensions (Laser) (L x W x H)		25 x 6 x 4.5 in (635 x 153 x 115 mm)		
Weight (Laser)		28 lbs (12.7 kg)		
Dimensions (Utility Module) (x W x H)		19.6 x 19 x 3.5 in (498 x 482 x 88 mm)		
Weight (Utility Module)		22 lbs (10 kg)		
<b>Features</b>				
Optional Safety Shutter		Externally mounted for easy field service and customer replaceable		
Internal Power Monitor		May be calibrated against an external power meter		
E-Pulse Pulse Energy Control		Keeps pulse energy, pulse width and beam parameters held constant over a wide range of repetition rates		
Data Log		Long-term and short-term recording for diagnostics and equipment maintenance		
CW Alignment Beam Mode		Lower power CW UV beam for installation and alignment in a tool		
Sacrificial Window		Customer replaceable to maintain power in harsh environments		
ALPS Optics Protection System		Maintains internal optics cleanliness for long term, reliable operation		
Precision Position Registration		Hardened steel receptacles for indexing pins for repeatable, precision alignment from unit to unit		

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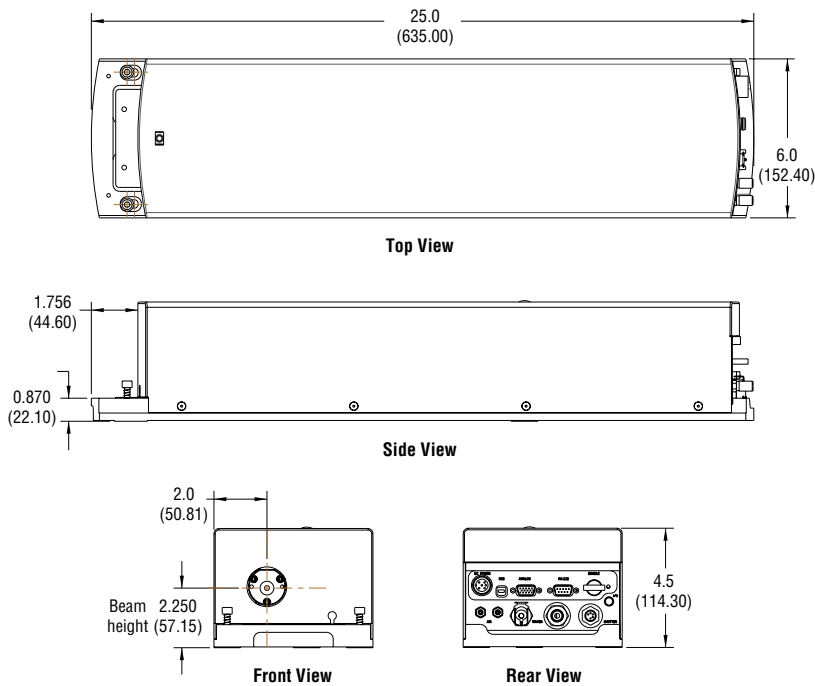
2. All specifications taken at the frequency indicated, unless otherwise noted.

3. Power specification and warranty at the repetition rate frequency indicated. Other values are for reference.

4. Pointing stability applies after 2 hour warm-up.

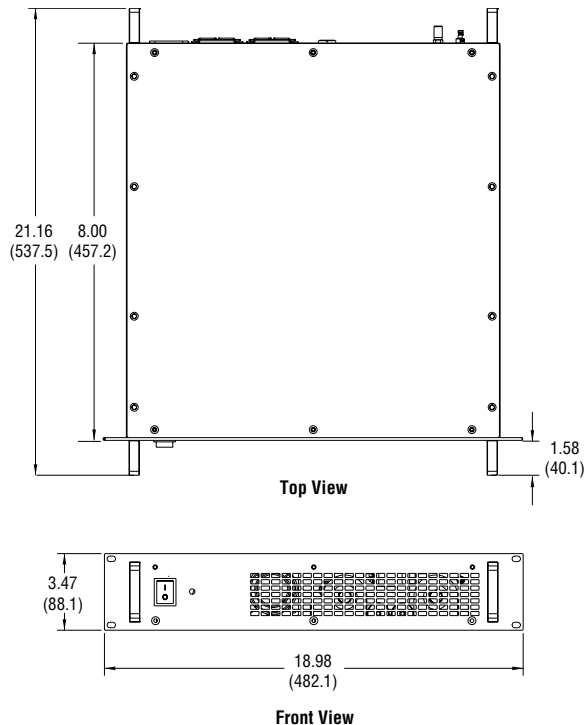
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## Talon Laser Dimensions



Dimensions in inch (mm)

## Utility Module Dimensions



Dimensions in inch (mm)