

SAPPHIRE XT

Sapphire XT is the next generation of mid-power lasers with emission in the visible spectral region. This new platform relies on Coherent's unique Optically Pumped Semiconductor Laser technology (OPSL). The Sapphire XT delivers 1 W of laser output power in an impressively compact box. The innovative electronic design enables a significant reduction of the footprint compared to previous laser models by integrating the controller into the laser box. The new generation of OPSL lasers also introduces an interface for direct power modulation which is often a critical performance factor for cutting edge laser applications. The electronic design enables very short rise times while reducing overshoot effects to a minimum level at the same time.

Sapphire lasers are manufactured using Coherent's patented PermAlign™ technology for optimal aligning and solder-bonding the optics to provide the best beam quality, power stability, and lowest noise over the complete lifetime of the laser. Sapphire lasers deliver superior performance, proven reliability, and low-cost of ownership making them the ideal laser solution for a multitude of applications.



FEATURES

- Integrated Controller
- 1 W of output power
- 488 nm, 532 nm and 561 nm
- Direct Power Modulation Interface
- Ultra-low Noise

APPLICATIONS

- Super-resolution Imaging
- DNA Sequencing
- Semiconductor Inspection and Metrology
- Quantum Sensing
- Holography

Specifications	Sapphire XT 488	Sapphire XT 532	Sapphire XT 561
Wavelength ¹	488 \pm 2 nm	532 \pm 2 nm	561 \pm 2 nm
Output Power ²		1000 mW	
Power Set Range		2 – 110 %	
Spatial Mode		TEM ₀₀	
M2 (Beam Quality)		\leq 1.1	
Beam Asymmetry		0.9 – 1.1	
Beam Diameter at 1/e ²		0.7 \pm 0.05 mm	
Beam Divergence (Full Angle)	< 1.1 mrad	< 1.2 mrad	< 1.3 mrad
Pointing Stability (over 2 hours after warm-up and \pm 3°C)		<30 μ rad	
Pointing Stability Over Temperature		<5 μ rad/°C	
Beam Waist Location		\pm 200 mm from front	
RMS Noise (20 Hz to 2 MHz)		\leq 0.25 %	
Peak-to-Peak Noise (20 Hz to 20 kHz)		\leq 1 %	
Long-Term Power Stability (2 hours, \pm 5°C)		< 2 %	
Warm-Up Time (from Cold Start) ³		< 5 minutes	
Emission ready time from standby (warm start)		< 10 s	
Polarization Ratio		Minimum 100:1, Vertical \pm 5°	
Laser Drive Modes		CW, Analog Modulation, Digital Modulation	
Laser Safety Classification		4	
Modulation Properties			
Digital Modulation			
Rise Time		\leq 80 μ s	
Fall Time		\leq 20 μ s	
Power Modulation Frequency		10 Hz to 10 kHz	
Overshoot		< 5% (constant over set-power range)	
Analog Modulation			
Rise Time		\leq 20 μ s	
Fall Time		\leq 20 μ s	
Power Modulation Frequency		10 Hz to 20 kHz	
Modulation Depth		\geq 50:1	
Overshoot		< 5% (constant over set-power range)	
Static Alignment Tolerances			
Beam Position from Reference ⁴ (mm)		\pm 0.25	
Beam Angle (mrad)		< 2.5	
Electrical Interface			
Power Supply Voltage		12 V +/- 10%	
Power Supply		4-Pin Molex	
Power Consumption		< 63 W (startphase), < 42 W in normal operating condition	

Ambient Temperature	
Ambient Operating Temperature ⁵	10 to 40 °C
Non-Operating Temperature ⁶	- 20 to + 60 °C
Laser Head Baseplate Temperature	15 - 45 °C
Heat Dissipation of Laser Head	< 43 W (worst case), < 36 W (typical)
Shock Tolerance (6 ms)	7g laterally, 15g vertically
Utility and Environmental Requirements	
Dimensions (L x W x H)	125 x 70 x 40 mm
Weight	450 g
Orientation to Gravity	any

Footnotes:

1 Laser-to-laser tolerance, wavelength in air, all Sapphire XT versions \pm 2 nm.

2 All specifications are valid for 100% power.

3 Typical warm-up time 1 minute at 25 °C ambient temperature

4 See mechanical drawing for exit beam location.

5 Non-condensing with Sapphire XT heat sink or other equivalent heat sink.

6 Non-condensing

