

QTekLaser™ 522 nm Fiber Laser

Product Description

The QTekLaser™ 522 nm Fiber Laser is a state-of-the-art green-wavelength system using robust second-harmonic generation (SHG) to deliver stable, narrow-linewidth (<10 kHz), polarization-maintaining light with output power up to 1.5 W. It offers excellent power stability ($<1\%$) and incorporates a user-friendly, IoT-enabled interface. The compact, industrial-grade 4U, 19" rack-mount chassis ensures easy integration and deployment.



Features

- Wavelength: 522 nm
- High output power: up to 1.5 W
- High reliability with all-fiber design
- Narrow linewidth: <10 kHz
- Power stability: $<1\%$
- IoT-enabled interface for intuitive control
- Compact 4U, 19" rack-mount chassis
- Certified to IEC 60825-1:2014 safety standards

Applications

- Quantum computing
- Optical tweezer arrays
- Dynamic atom rearrangement
- Optical lattice and dipole trapping
- Light-shift engineering and species- or state-selective trapping
- Two-photon and specialized entanglement schemes
- Research

Second-Harmonic Generation (SHG) Technology

QTekLaser™ offers laser systems with extended wavelength range by combining nonlinear frequency conversion technologies. Through second-harmonic generation (SHG) we achieve significant laser power in the visible and NIR regime (figure 2; red-shaded cells of table 1). With periodically poled crystal technology and the associated waveguide technology, nonlinear frequency conversion has become a powerful tool to extend the application scope of fiber lasers. The max power of the converted laser light is constrained by the damage threshold of commercially available nonlinear crystals, which is typically several tens of watts.

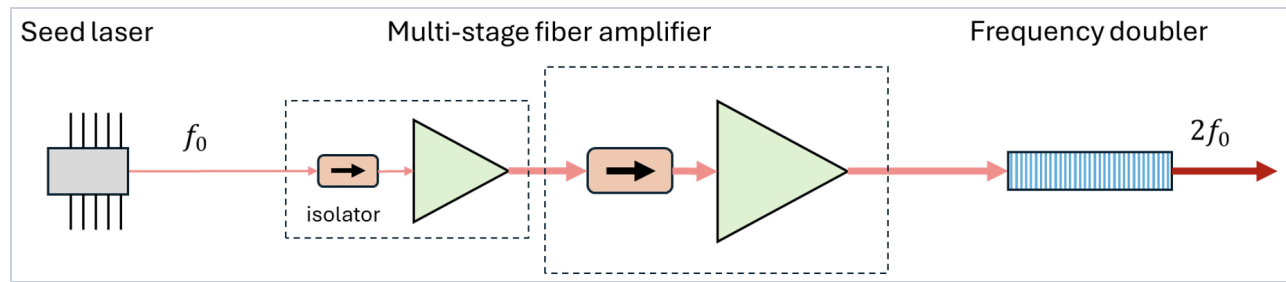


Figure 2 – Laser system with integrated frequency doubler.

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Wavelength Extension

	SF-AMP-Yb (1012 – 1080 nm)	SF-AMP-Er (1530 – 1610 nm)	SF-AMP-Tm (1776 – 2040 nm)
SF-AMP-Yb (1012 – 1080 nm)	506 – 540 nm		
SF-AMP-Er (1530 – 1610 nm)	609 – 646 nm	765 – 805 nm	
SF-AMP-Tm (1776 – 2040 nm)	645 – 706 nm	822 – 900 nm	888 – 1020 nm

Table 1 – Wavelength extension of QTekLaser™ products using nonlinear frequency conversion (522 nm: Yb×Yb SHG, 506–540 nm cell).

Specifications

Category	Parameter	Value	Unit
Laser	Wavelength	522	nm
	Operation mode	CW	/
	Max output power	1.5	W
	Linewidth	<10	kHz
	Output 1/e ² beam diameter	1–2	mm
	Beam quality (M ²)	<1.1	/
	Relative intensity noise (RIN) for freq. >10 kHz	<-125	dBc/Hz
	Polarization direction	Vertical	/
	Polarization extinction ratio (PER)	>20	dB
	Optical signal-to-noise ratio (OSNR)	>45	dB
Electrical / Cooling	Warm-up time	20	min
	Max power consumption	200	W
	AC power supply voltage	110	V
	Fuse	6.3A, 250VAC, 5×20mm	/
	Remote interlock voltage	3.3	V
	Cooling	Chilled water	/
Environmental	Room humidity	30–60	%
	Room temperature	17–25	°C

Category	Parameter	Value	Unit
	Weight	25 (55)	Kg (lbs)

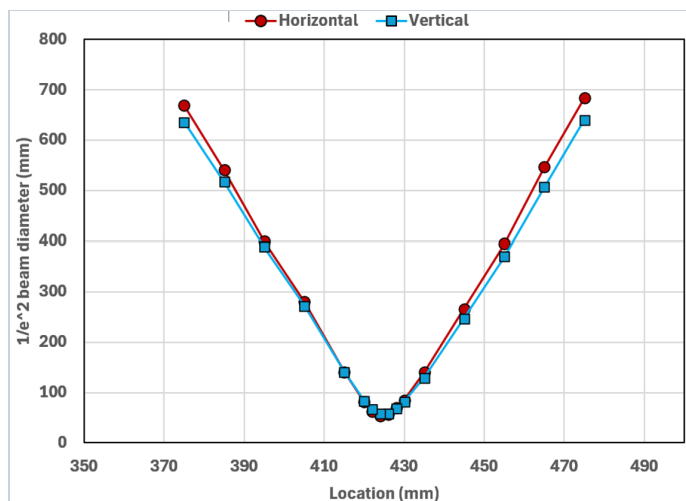
Safety & Retro-Reflection Advisory

The 522 nm laser system complies with 21 CFR Subchapter J, Part 1040 (as enforced by FDA) and IEC 60825-1:2014 safety standards. Users must ensure that significant light is not retroreflected into the system —doing so may harm performance or damage the laser. Use of an external optical isolator is strongly recommended. Damage from retroreflected light is not covered under warranty.

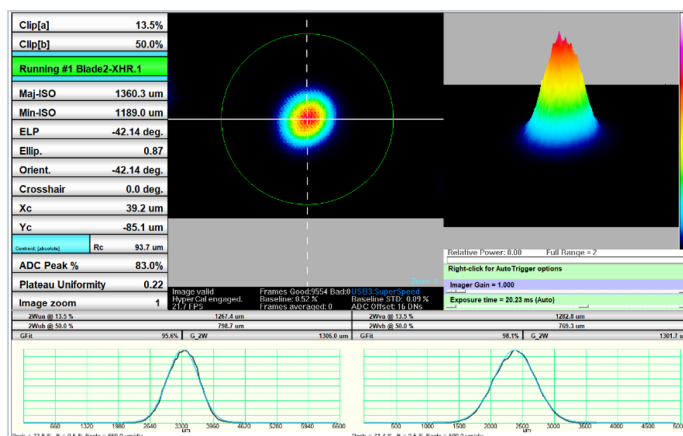
Ordering Information

Part Number: QT-LASR-BSHG-522-1.5-W-2
Configuration: Seed laser + Yb-doped fiber amplifier + SHG stage

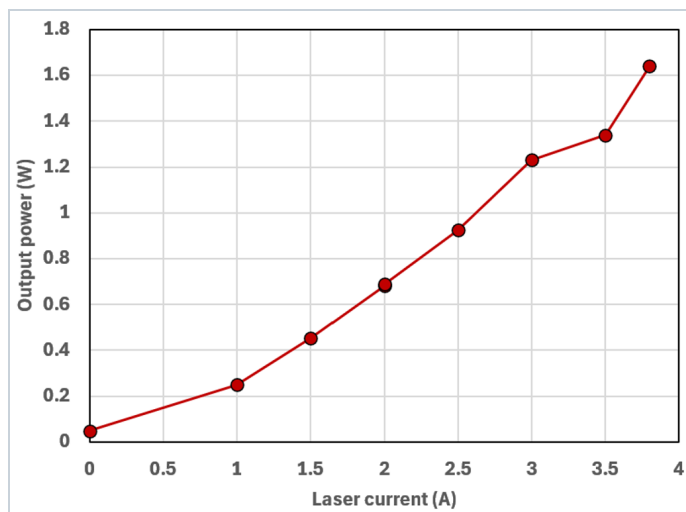
Performance Figures



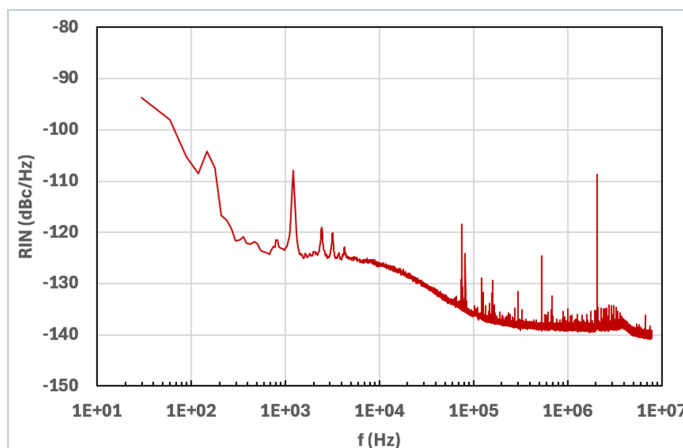
Beam Quality: $M^2 < 1.1$.



Beam Profile.



Laser Power vs. Current.



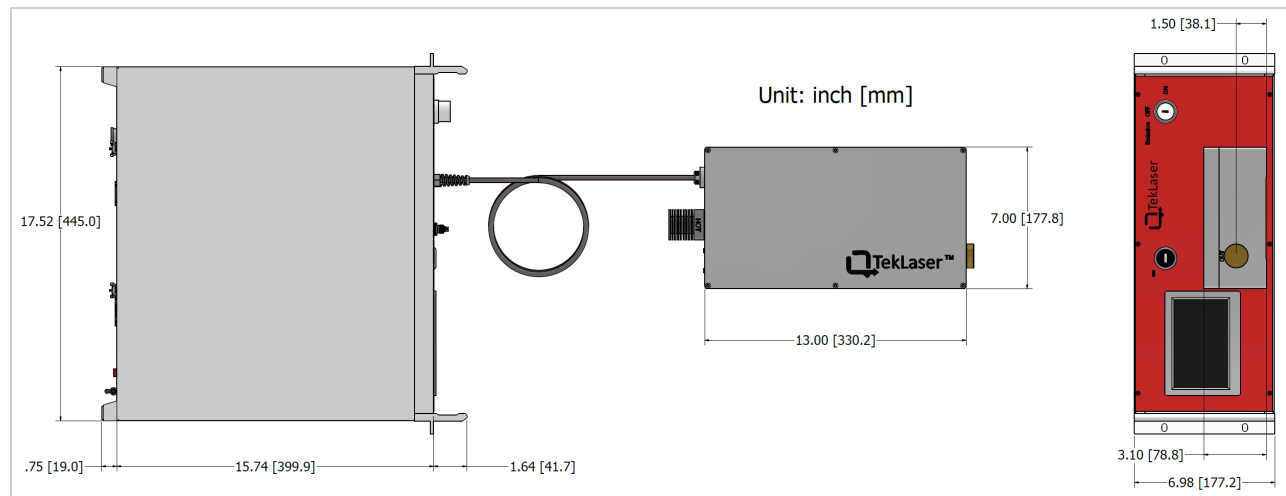
Relative Intensity Noise (RIN): < -125 dBc/Hz @ >10 kHz.



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Mechanical Details



Mechanical dimensions of the 522 nm fiber-laser system.

Product Photographs



Front view – 522 nm fiber laser in 4U chassis.



Rear panel – 4U water-cooled chassis.

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