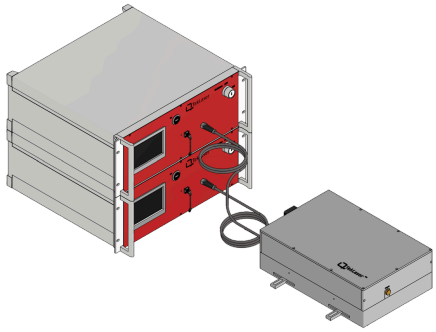
TekLaser™

QTekLaser™ 609 – 658 nm Fiber Laser

Product Description

The QTekLaser™ 609 – 658 nm Fiber Laser class utilizes sum-frequency generation (SFG) to deliver stable, narrow-linewidth (<10 kHz), polarization-maintaining light up to 6 W. With <1% power stability and an IoT-enabled interface in a compact 4U 19" rack-mount chassis, it is easily integrated into neutral-atom quantum machines.



Up to 6 W Power | M^2 <1.1 | <-130 dBc/Hz Relative Intensity Noise (RIN)

Features

- High output power up to 6 W
- High reliability
- Excellent power stability (<1%)
- User-friendly interface via IoT technology
- 4U 19" Rack mount
- Certified to IEC 60825-1:2014 safety standards

Applications

- Quantum computing
- Gate operations
- Signal readout
- Repumping
- Mid-circuit measurement
- Research

Sum-Frequency Generation (SFG)

The wavelength range of QTekLaser™ products can be further extended using the nonlinear process of sum-frequency generation (SFG). This architecture is illustrated in figure 1. The two fundamental lasers are usually made of different gain fiber amplifiers. The extended wavelength values are summarized in the blue-shaded cells of table 1. This method achieves high power at certain wavelengths.

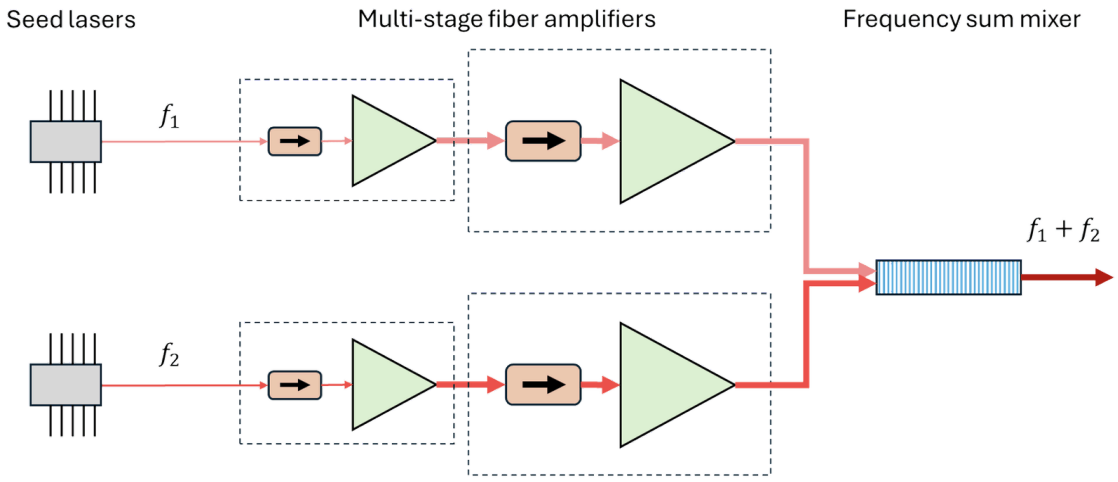


Figure 1. QTekLaser™ sum-frequency generation (SFG) fiber laser system. The frequency sum mixer is integrated into the product.

QTEK LASER, LLC
411 Waverley Oaks Road, Suite 111, Waltham, MA 02452 USA
+1 781-373-1446 | sales@qteklaser.com | www.qteklaser.com

	SF-AMP-Yb^2 (506 – 556 nm)	SF-AMP-Tm^2 (865 – 1030 nm)	SF-AMP-Yb (1012 – 1112 nm)	SF-AMP-Er (1530 – 1610 nm)	SF-AMP-Tm (1730 – 2060 nm)
SF-AMP-Yb^2 (506 – 556 nm)	253 – 278 nm				
SF-AMP-Tm^2 (865 – 1030 nm)	319 – 361 nm	432 – 515 nm			
SF-AMP-Yb (1012 – 1112 nm)	304 – 371 nm	466 – 535 nm	506 – 556 nm		
SF-AMP-Er (1530 – 1610 nm)	380 – 413 nm	553 – 628 nm	609 – 658 nm	765 – 805 nm	
SF-AMP-Tm (1730 – 2060 nm)	391 – 438 nm	576 – 687 nm	638 – 722 nm	812 – 904 nm	865 – 1030 nm

Table 1. Wavelength extension of QTekLaser™ products via nonlinear frequency conversion. Yb² and Tm² denote frequency-doubled Yb and Tm amplifiers. Red: harmonic generation (SHG, or FHG via two cascaded SHG stages). Blue: sum-frequency generation (SFG), including cascaded SHG+SFG.

Safety & Retro-Reflection Advisory



QTekLaser™ lasers comply with Federal Regulations (21 CFR Subchapter J, Part 1040) as administered by the Center for Devices and Radiological Health and are certified to IEC 60825-1:2014 standards.

It is the end user's responsibility to ensure that no significant light is retroreflected back into QTekLaser™ systems as this can degrade performance and potentially damage the lasers. To prevent this, the use of an external optical isolator is strongly recommended. Damage due to retroreflected light is not covered under warranty.

Ordering Information

Part Number: QT-LASR-SFG-(609 – 658)-6-W-2-2.0-2
Laser Type: Seed laser + YDFA + EDFA + SFG

Specifications

Category	Parameter	Value	Unit
Laser	Wavelength	609 – 658	nm
	Operation mode	CW	/
	Max output power	6	W
	Output $1/e^2$ beam diameter	1-2	mm
	Beam quality (M^2)	<1.1	/
	Relative intensity noise (RIN) for freq. >10 kHz	<-130	dBc/Hz
	Fiber length to chassis	2	m
	Polarization direction	Vertical	/
	Polarization extinction ratio (PER)	>20	dB
	Optical signal-to-noise ratio (OSNR)	60	dB
Electrical	Fuse	6.3 A, 250 VAC, 5×20 mm	/
	Remote interlock voltage	3.3	V
	Max power consumption	350	W
	AC power supply voltage	110	V
General	Warm-up time	30	min
	Cooling	Chilled water	/
	Room temperature	17 – 25	℃
	Room humidity	30 – 60	%
	Weight	~54 (120)	kg (lbs)

Performance

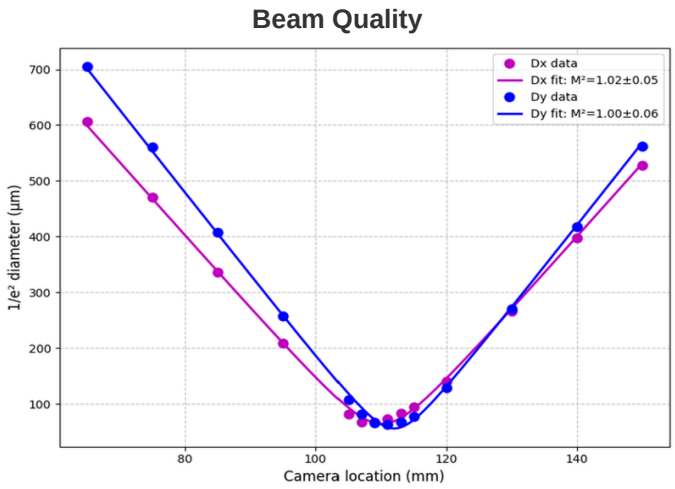


Figure 2. Beam quality: M^2 <1.1.

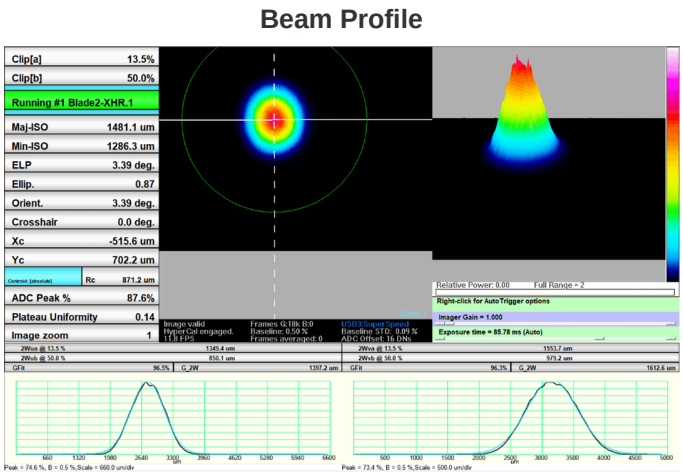


Figure 3. Beam profile. 1/e² beam diameter of 1.35 mm horizontally and 1.55 mm vertically.

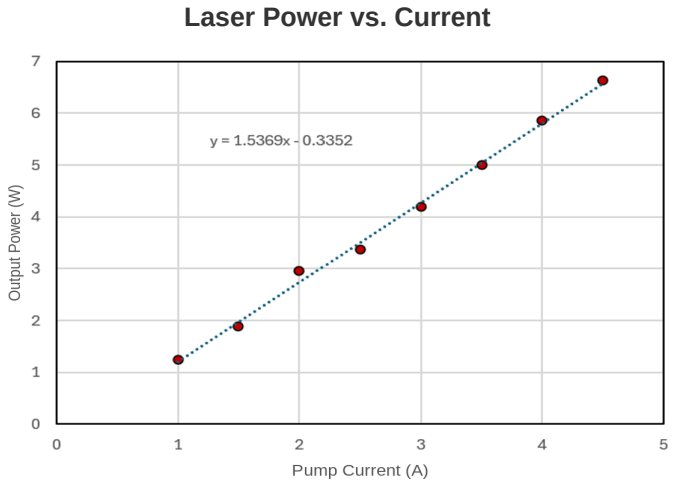


Figure 4. Laser power vs. current.

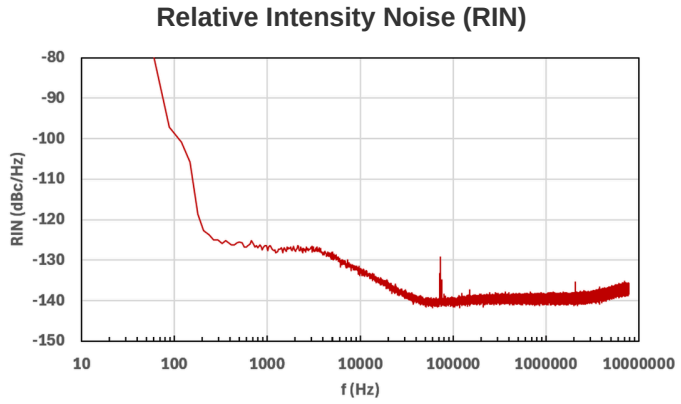


Figure 5. Relative intensity noise (RIN): <-130 dBc/Hz >10 kHz.

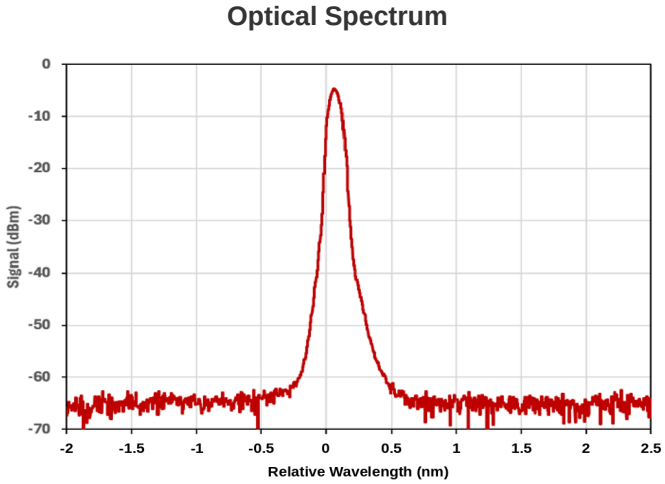


Figure 6. OSNR 60 dB.

Mechanical Dimensions

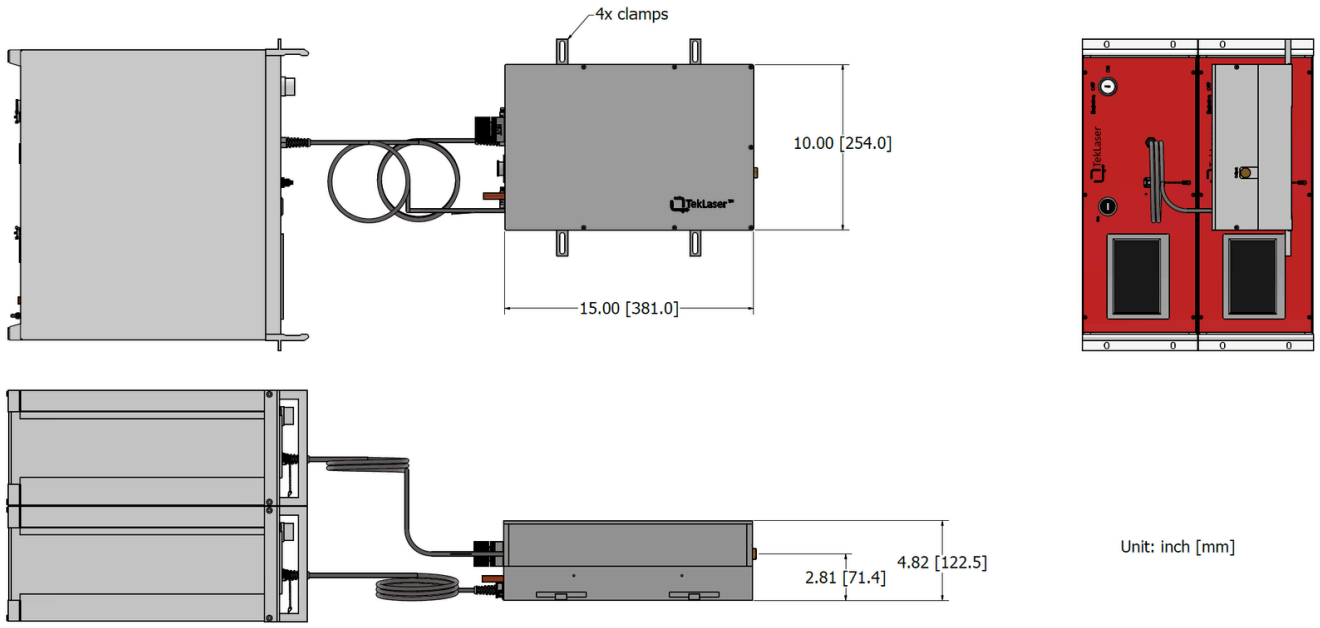


Figure 7. 609 – 658 nm fiber laser mechanical dimensions.

Product Images

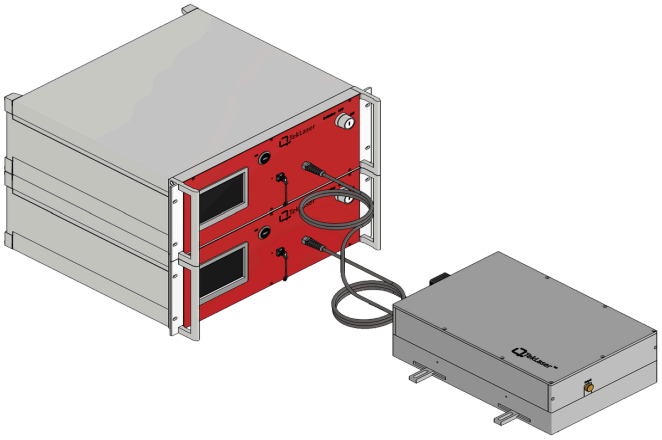


Figure 8. 609 – 658 nm fiber laser, 2×4U chassis + laser head, water cooled.



Figure 9. 609 – 658 nm fiber laser, 4U chassis back panel, water cooled.