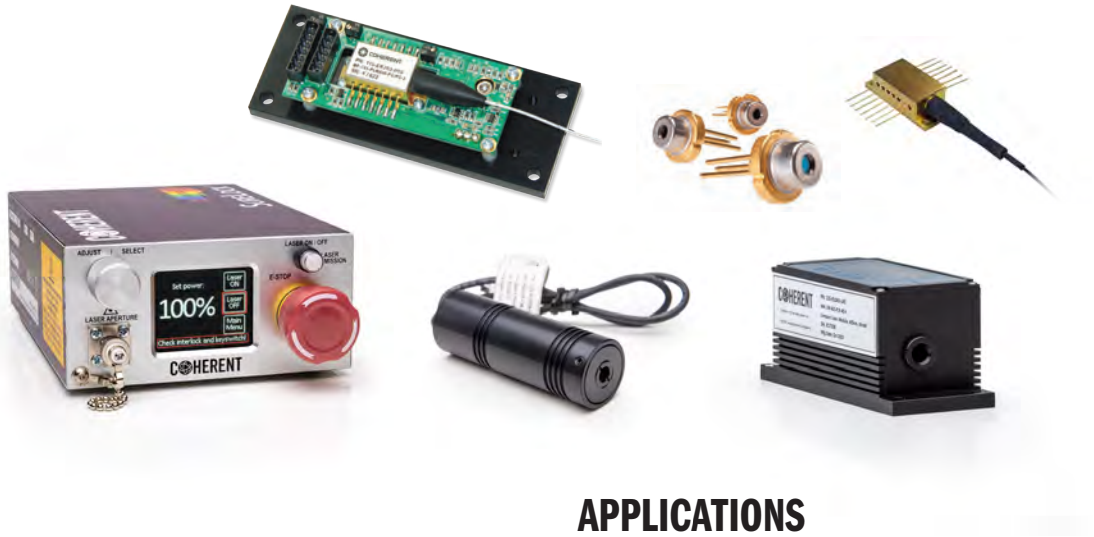
Diode Laser Modules

SureLock™

Wavelength Stabilized Lasers for Spectroscopy and Analytical Instrumentation

SureLock™ Wavelength Stabilized Laser Diodes and Modules incorporate Coherent's PowerLocker® VHG, an advanced ultra-narrowband Volume Holographic Grating (VHG) that forms an external cavity to precisely "lock" the laser's wavelength into a narrowed optical spectrum. This results in enhanced spectral brightness and stable optical performance across the entire power range (0-100%) and extended temperature conditions. The extremely short external cavity offers superior mode selection, and a smaller footprint compared to Littrow or Littman cavity designs, while reducing the spectral bandwidth of a typical laser by an order of magnitude. With fast warm-up times, flexible power options, and consistent performance, these lasers are ideal for demanding applications such as analytical instruments.



FEATURES

- Stabilized wavelength over a broad temperature and operating power (0to 100%) range
- Single frequency or spectrum-narrowed operation.
- Free-space and fiber-coupled options.
- Ultra-compact footprints
- Laser components to turnkey modules with temperature and current controls
- Available computer and onboard user interfaces
- Different wavelength and power configurations available beyond standard listings
- CDRH configurations available for meeting regulatory requirements

APPLICATIONS

- Raman Spectroscopy
- Holography
- HeNe Replacement
- Particle Characterization
- Analytical Instrumentation
- Speckle interferometry
- Metrology and Inspection

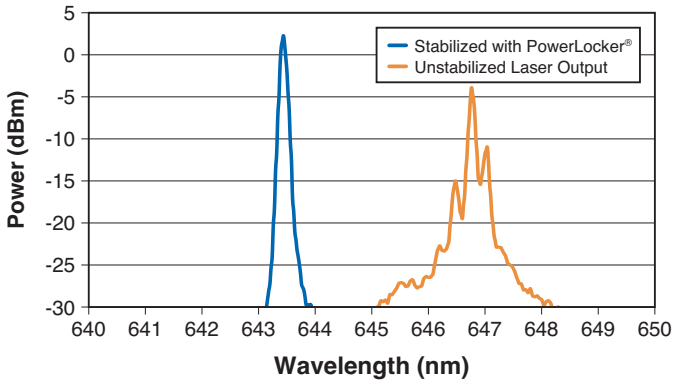
COHERENT

Laser Components	
TO Series • Stabilized, single-frequency performance in an ultra-compact package • Features PowerLocker® VHGs directly inside the can for optimal stability • Designed with shortest cavity length to maintain separation between mode hops Available in wavelengths from 653 nm to 830 nm	
CP Series • Collimated Beam Output: Equipped with both a PowerLocker® and a collimating lens simplifying system integration Available in wavelengths from 405 nm to 785 nm	
BF Series • Narrowed spectrum for multi transverse mode diodes • Integrated TEC and Photodiode: Includes a thermoelectric cooler (TEC) and photodiode within a standard 14-pin butterfly package for enhanced stability and added value • Fiber-coupled 100 µm 0.22NA FC/PC fiber or Free-Space collimated configurations • High Power Output: Power levels ranging from 250 to 1000 mW Available in wavelengths from 638 nm to 1064 nm	
OEM Module Series • Cost effective design combining laser with temperature and current control onto an ultra-compact and flexible solution, providing excellent value • Multiple Configurations: Available with either fiber coupled or collimated free space lasers • Designed for seamless OEM integration, simplifying integration Available in wavelengths from 638 nm to 1064 nm	

PRINCIPLE OF OPERATION

The PowerLocker® functions as an ultra-narrowband, wavelength-selective filter that delivers stable and controlled optical feedback to the laser. This enhances power in the desired mode while suppressing unwanted spectral components, effectively narrowing the linewidth of multimode lasers or ensuring single-frequency operation in single-mode lasers.

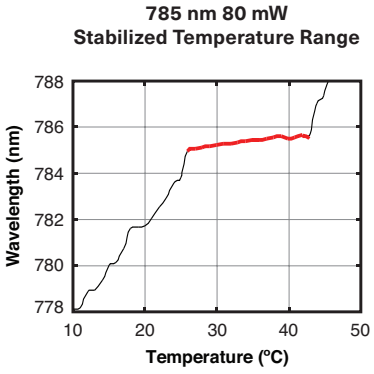
Standard wavelength tolerance is typically ±0.5 to 1.0 nm, with custom options available down to ±0.1 nm upon request. Single-frequency lasers generally have linewidths around 50 MHz, while spectrum-narrowed lasers achieve nominal linewidths of ~0.1 nm. Actual performance may vary by product and can be influenced by additional optics used in the end application.



Laser Components	
ROUSB Module Series • Incorporates TO or CP stabilized laser diodes into a compact cylindrical footprint with collimated output beam • USB connectivity with simple serial commands for automated environments • Ideal for HeNe replacement or OEM instrument integrations • Optical Isolator configurations available • CDRH key switch for regulatory requirements available Available in wavelengths from 633 nm to 808 nm	
LM and LMFC Module Series • Incorporates any TO or CP stabilized laser diode into a user-friendly, compact footprint with temperature and current controls • Single Frequency or Narrowed Spectrum multimode output • Offers both RS-232 computer and integrated user keypad controls • Optical Isolator configurations available to simplify integration • Fiber output configurations available. • Under 1 minute warm-up • CDRH key switch for regulatory requirements available Available in wavelengths from 405 nm to 1064 nm	
BT Module Series • Delivers high-power, spectrum-narrowed performance in a compact benchtop format, perfect for laboratory • Features both manual power controls and a digital touchscreen interface for easy operation • USB connectivity with simple serial commands for automated environments • FC/PC front panel connector • CDRH safety requirements compliant Available in wavelengths from 405 nm to 1064 nm	

COMPREHENSIVE PERFORMANCE AND CHARACTERIZATION TESTING

All SureLock™ lasers undergo comprehensive characterization using proprietary automated test stations, providing detailed data on wavelength, temperature stability range, and mode hop behavior. Our unique "3D" color plots display wavelength as a function of both temperature and current, offering an integrated view of laser performance. This enables users to easily identify and select the optimal operating point for their specific application



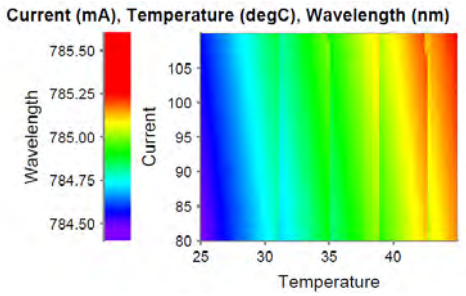


Chart of Common Wavelength Stabilized Products[1]								
								
Wavelength (nm)	TO (TO CAN Package)	CP (Collimated Package)	BF (Butterly Fiber/Free Space)	OEM (OEM Module)	ROUSB (Round Module)	LM (Compact Module)	LMFC (Compact Module with Fiber Output	BT (Benchtop)
SINGLE LONGITUDINAL / FREQUENCY								
405		25 to 40 mW				12 to 40 mW		
633		40 to 70 mW			40 to 70 mW FS 60 mW ISO	40 to 70 mW 60 mW ISO	25 mW PM	
638	32 mW	120 mW			120 mW FS 110 mW ISO	40 to 120 mW 110 mW ISO	25 mW PM	
640	20 to 32 mW							
658	40 mW				35 mW			
660	40 mW				35 mW			
685 to 693	45 mW				45 mW	40 mW		
785	80 to 100 mW				80 to 100 mW	100 mW 150 mW ISO	30 mW PM	
NARROW BAND MULTI TRANSVERSE MODE								
405		250 mW						150 mW NB
532		COMING SOON		COMING SOON		COMING SOON	COMING SOON	COMING SOON
638			350 mW FB 380 mW FS	250 mW FB			300 mW FB	300 mW
785			600 mW FB 800 mW FS	600 mW FB			500 mW FB	500 mW
830			600 mW FB 800 mW FS	600 mW FB			500 mW FB	500 mW
976			1000 mW FB 800 mW FS	1000 mW FB			500 mW FB	
1064			600 mW FB 800 mW FS	600 mW FB				500 mW

Notes:
1. Contact Coherent for availability of other wavelength and power options
FS = Free Space Beam output.
FB = Fiber Output. Typically, 0.22 NA 100 µm core.
ISO = Optical Isolator Free Space output, >25 dB rejection.
PM = Single Mode Polarization Maintaining Fiber Coupled with FC/APC Connector.