Diode Laser Modules

SureLock™

RO-USB Series Collimated Single Frequency Laser Modules

The Ondax RO-USB Series Single Frequency Collimated Laser Module combines SureLock™ wavelength-stabilized lasers with TEC cooling and precise constant current control circuitry in a compact, cylindrical design with USB connectivity. Engineered for straightforward mounting and integration, this durable, self-contained module is perfect for use in precision instrumentation and laboratory settings. The integrated temperature controller ensures outstanding wavelength and power stability.

The RO-USB Module is offered in a variety of wavelengths and configurations to suit any application.



FEATURES

- Single frequency performance
- Precision cooling and current control via USB interface
- Stabilized wavelength performance from 0% to 100% operating power to handle application requirements
- Simplify setup complexity and insure consistent results with integrated drive electronics and temperature control
- Available with collimated or single mode fiber coupled configuration
- Plug and play integration with compact cylindrical housing and power supply included
- Customization options available including wavelength and tolerance
- Optional built-in isolator
- Optional single mode fiber

APPLICATIONS

- Spectroscopy
- Interferometry
- Metrology
- HeNe Replacement
- Bioinstrumentation
- Particle Characterization
- Graphic Arts
- Sensing
- Analytical Instrumentation

ONDAX

Specifications	633 nm 40 mW	633 nm 70 mW	638 nm 120 mW	658 nm 35 mW
SKU (OEM)	115-81059-055	115-81059-054	115-81059-072	115-81059-061
SKU (Non-OEM w/ keyswitch)	115-81059-155	115-81059-154	115-81059-172	115-81059-161
Output Power, Maximum (mW)	40	70	120	35
Center Wavelength[1] (nm) Minimum Typical Maximum	 632.5 633 633.5	 632.5 633 633.5	 637.5 638 638.5	 657 658 659
Beam Size, Typical (mm)	0.6x0.9	0.6x0.9	0.6x0.9	0.7x1.1
Linewidth, Typical (MHz)	150	150	300	300
Spatial Mode	Single Transverse Mode			
Polarization, Minimum	Option for 100:1			
Polarization, Typical	100:1	100:1	100:1	100:1
Beam Divergence (mrad) Typical Maximum	 1 3	 1 3	 1 3	 1 3
Noise (%) (RMS, 0-20MHz) Typical Maximum	 0.25 0.5	 0.25 0.5	 0.25 0.5	 0.25 0.5
Power Stability, Typical (%) (5 hour)	3	3	3	3
Operating Requirements				
Operating Current, Maximum	3	3	3	3
Operating Voltage (VDC) Minimum Maximum	 3.1 5.1	 3.1 5.1	 3.1 5.1	 3.1 5.1
Modulation Input Voltage (V) (TTL) Minimum Maximum	 0 5	 0 5	 0 5	 0 5
Modulation Speed (KHz) Minimum Maximum	 0 3	 0 3	 0 3	 0 3
Storage Temperature (°C) Minimum Maximum	 -10 50	 -10 50	 -10 50	 -10 50
Operating Temperature (°C) Minimum Typical Maximum	 10 25 40	 10 25 40	 10 25 40	 10 25 40
Operation Humidity	Non-Condensing			

All specifications are at rated power with a case temperature within stabilized temperature range unless otherwise noted.

[1] Wavelengths specified are vacuum referenced. Ex 632.991nm vacuum referenced is equivalent to 632.816nm standard air referenced for HeNe

Specifications	660 nm 35 mW	785 nm 80 mW	785 nm 100 mW
SKU (OEM)	115-81059-063	115-81059-074	115-81059-073
SKU (Non-OEM w/ keyswitch)	115-81059-163	115-81059-174	115-81059-173
Output Power, Maximum (mW)	35	80	100
Center Wavelength[1] (nm) Minimum Typical Maximum	 659 660 661	 784.5 785 785.5	 784.5 785 785.5
Beam Size, Typical (mm)	0.7x1.1	0.9x1.7	0.9x1.7
Linewidth, Typical (MHz)	300	300	300
Spatial Mode	Single Transverse Mode		
Polarization, Minimum	Option for 100:1		
Polarization, Typical	100:1	100:1	100:1
Beam Divergence (mrad) Typical Maximum	 1 3	 1 3	 1 3
Noise (%) (RMS, 0-20MHz) Typical Maximum	 0.25 0.5	 0.25 0.5	 0.25 0.5
Power Stability, Typical (%) (5 hour)	3	3	3
Operating Requirements			
Operating Current, Maximum	3	3	3
Operating Voltage (VDC) Minimum Maximum	 3.1 5.1	 3.1 5.1	 3.1 5.1
Modulation Input Voltage (V) (TTL) Minimum Maximum	 0 5	 0 5	 0 5
Modulation Speed (KHz) Minimum Maximum	 0 3	 0 3	 0 3
Storage Temperature (°C) Minimum Maximum	 -10 50	 -10 50	 -10 50
Operating Temperature (°C) Minimum Typical Maximum	 10 25 40	 10 25 40	 10 25 40
Operating Humidity	Non-Condensing		

All specifications are at rated power with a case temperature within stabilized temperature range unless otherwise noted.

[1] Wavelengths specified are vacuum referenced. Ex 632.991nm vacuum referenced is equivalent to 632.816nm standard air referenced for HeNe

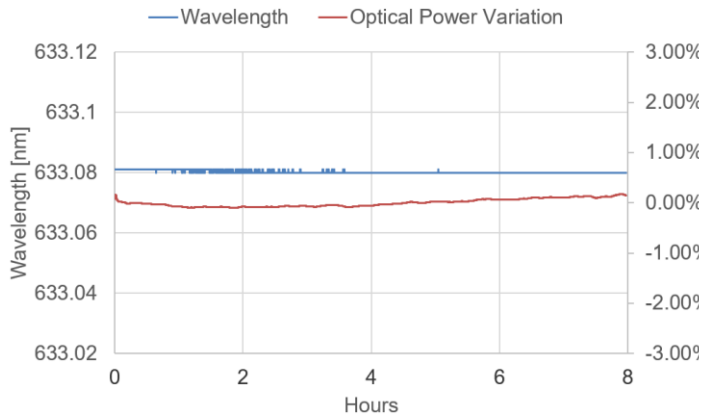
Specifications	With Isolator		With Fiber	
	633 nm w/Isolator	638 nm Isolator	633 nm FC/APC	638 nm FC/APC
SKU (OEM)	115-81070-054	115-81070-072	115-81059-071	115-81059-076
SKU (Non-OEM w/ keyswitch)	115-81070-154	115-81070-172	115-81059-171	115-81059-176
Output Power, Maximum (mW)	60	110	25	25
Center Wavelength[1] (nm) Minimum Typical Maximum	 632.5 633 633.5	 637.5 638 638.5	 632.5 633 633.5	 637.5 638 638.5
Beam Size, Typical (mm)	0.6x0.9	0.6x0.9	N/A	N/A
Linewidth, Typical (MHz)	150	300	150	300
Spatial Mode	Single Transverse Mode		PM Fiber 1m Long FC/APC	
Polarization Minimum Typical	 100:1 -	 100:1 -	 - 100:1	 - 100:1
Beam Divergence (mrad) Typical Maximum	 1 3	 1 3		
Noise (%) (RMS, 0-20MHz) Typical Maximum	 0.25 0.5	 0.25 0.5	 0.25 0.5	 0.25 0.5
Power Stability, Typical (%) (5 hour)	3	3	3	3
Operating Requirements				
Operating Current, Maximum	3	3	3	3
Operating Voltage (VDC) Minimum Maximum	 3.1 5.1	 3.1 5.1	 3.1 5.1	 3.1 5.1
Modulation Input Voltage (V) (TTL) Minimum Maximum	 0 5	 0 5	 0 5	 0 5
Modulation Speed (KHz) Minimum Maximum	 0 3	 0 3	 0 3	 0 3
Storage Temperature (°C) Minimum Maximum	 -10 50	 -10 50	 -10 50	 -10 50
Operating Temperature (°C) Minimum Typical Maximum	 10 25 40	 10 25 40	 10 25 40	 10 25 40
Operating Humidity	Non-Condensing			

All specifications are at rated power with a case temperature within stabilized temperature range unless otherwise noted.

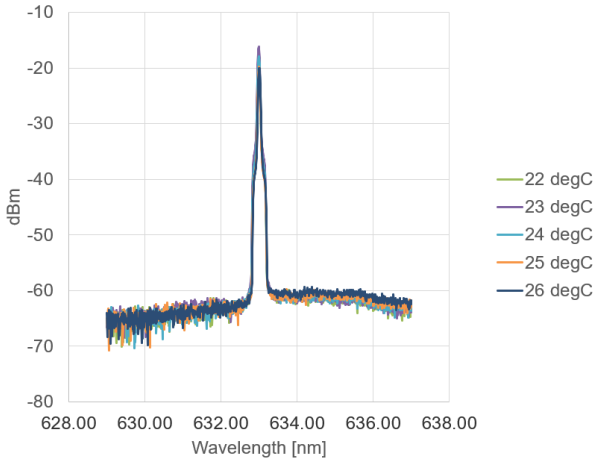
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Typical Performance Data

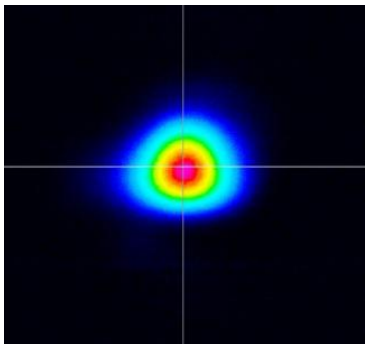
Typical Wavelength Stability



Optical Spectrum Example



Example Beam Profile for Single Transverse Mode Diode



Accessories
Keyswitch (-K): This option is required for all non-OEM customers within the United States.

Keyswitch



Mechanical Specifications

RO-USB Series Laser Module

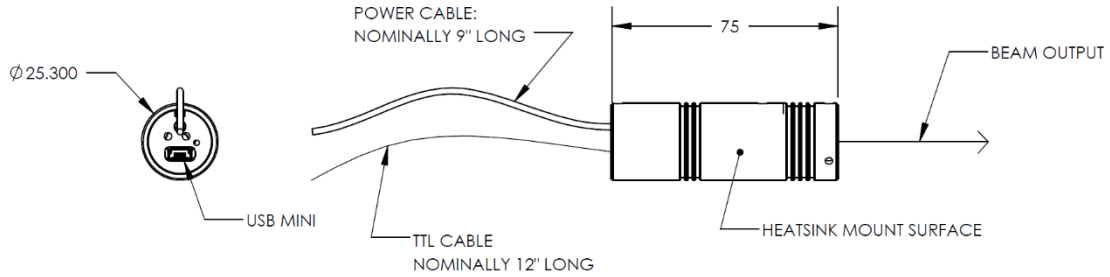


Figure 1: Standard Configuration

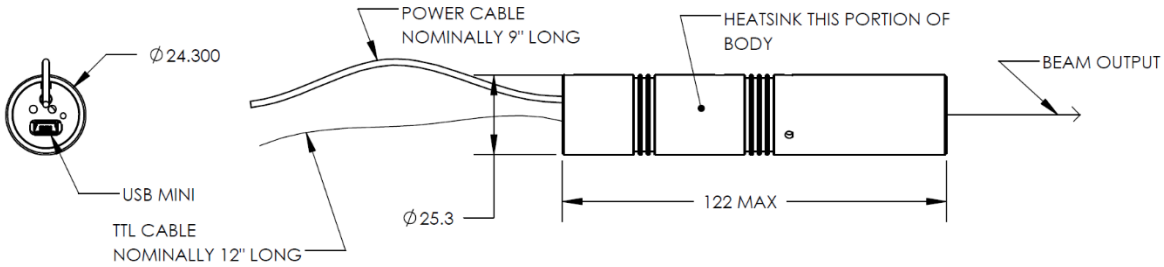


Figure 2: Isolator Configuration

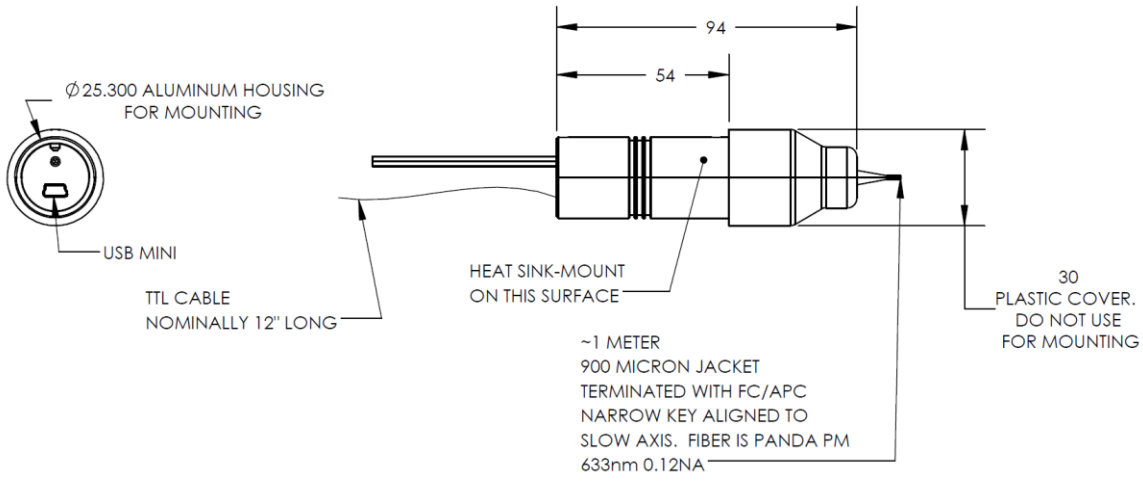


Figure 3: Fiber Pigtail Configuration

Warnings:

Laser Eye Safety: Use protective eyewear and follow local regulatory requirements for use of laser diodes.

Remote Control Limitations: Values entered via RS232 are not limit or type checked. Improper use may result in permanent damage to the laser diode.

Environmental Conditions: Units are designed to be mounted on a heat sink. Improper mounting can lead to permanent damage due to overheating or thermal runaway. For airflow based thermal dissipation, ensure there is sufficient clearance around heatsink. Please note that damage resulting from improper use is not covered under warranty.

To enhance optical stability, minimize airflow around the unit, particularly near the optical aperture. Although the internal external cavity laser is temperature stabilized, ambient conditions can impact performance. Reducing air currents will further improve stability. Covering of the laser and beam path may improve performance in conditions where there are rapid changes in the environment.

Optical Feedback (for single mode units without optical isolators): Semiconductor laser diodes are highly sensitive to optical feedback, which can cause latent damage that may not be immediately apparent. Wavelength-stabilized laser diodes are particularly vulnerable and may lose their spectral characteristics, such as center wavelength and linewidth, when exposed to sufficient optical feedback.

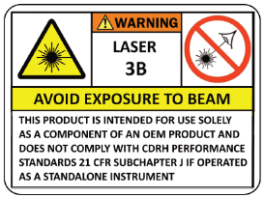
To prevent these issues, optical isolators must be used in applications where optical feedback is intrinsic. Avoid focusing the light output on highly reflective surfaces, as this generates optical feedback to the laser diode. For fiber-coupled applications, angled and anti-reflective (AR) coated fiber tips are recommended. All reflective surfaces in the optical path should be angled to prevent reflections from being directed back to the laser diode.

During optical alignments near normal incidence, use an optical isolator or optical density (OD) filter to eliminate the risk of brief high-intensity optical feedback. Be cautious with wavelength-sensitive elements such as narrow bandpass filters. Angularly sweeping the alignment of such elements can cause sufficient feedback to briefly unlock the diodes which would generate high-intensity reflected off-wavelength light, significantly increasing the risk of damage to the laser diode.

Fiber Tip Cleanliness: Inspect and clean all fiber tips before mate. Dirty or contaminated fiber tips could cause permanent damage to fiber connector. Cover all fiber tips when not in use. Damage to fiber or fiber connector is not covered by warranty







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