ExOptronics, Inc
www.exoptronics.com
Phone: 1-310-9286368
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EX-UNL938-XX-XX-X-X 1550nm Ultra Narrow Linewidth Laser Module

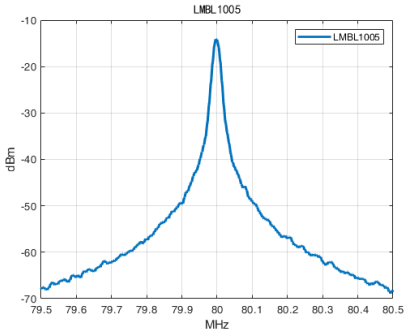
REV 001

Description

The **EX-UNL938-XX-XX-X-X** laser module consists the ultra narrow linewidth optical assembly (UNL-OA) and compact low noise current & temperature controlling circuitry. The UNL-OA by high power CW DFB laser & external SiN waveguide features high frequency stability, low phase/frequency noise, fast frequency modulation and good frequency tuning efficiency. With a single 5 V DC power supply and RS232 interface, it provides the flexible setting change and powerful monitoring.

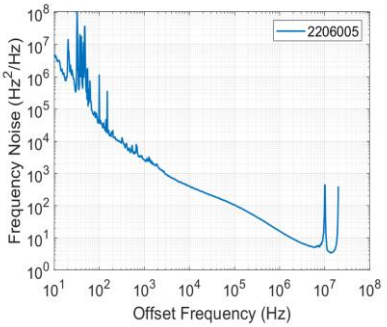
Applications

- Coherent Doppler Lidar
- Acoustic & seismic interferometric fiber optic sensing
- Brillouin DTSS system for Oil & gas
- Coherent & Heterodyne metrology
- Photonic velocimetry and vibrometry
- RF photonics and coherent communications



Key feature

- High output power (>20mW)
- Narrow linewidth (lower < 3 KHz)
- Low Phase noise and low RIN
- Low noise current/temperature controller board
- High stability over temperature and life time
- Telcordia GR-468 compliant
- RoHS compliancy



Absolute Maximum Rating:

Parameter	Symbol	Condition	Min	Max	Unit
Storage Temperature	T_{stg}	--	-40	85	°C
Operating Temperature (case)	T_c	-	0	70	°C
Voltage Supply	Vcc	--	-	5.5	V

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Electro-Optical Characteristics (Tc=25° C, unless stated otherwise)

Parameter	Sym	Condition	Min	Typ	Max	Units
Output Optical Power	P_f	CW	See options			mW
Power stability over case temperature	dP_f	0 to 70 ºC	-	±10	-	%
		10 to 55 ºC	-	±5	-	
		< ±1 ºC	-	-	±0.5	
Center Wavelength	λ_c	± 40 pm standard	See options			nm
Wavelength tuning by Temp	$\Delta\lambda_T$	via TEC temperature change	80	-	100	pm
Wavelength tuning by Volt apply to waveguide	$\Delta\lambda_V$	via voltage change (nonlinear)	8	-	-	pm
Side-mode Suppression ratio	SMSR	CW, at specified P_f	40	50	-	dB
Wavelength stability over case temperature range	dλc	0 to 70 ºC	-	±10	-	pm
		10 to 55 ºC	-	±5	-	
		< ±1 ºC			±0.5	
Optical S/N Ratio	S/N	spontaneous noise levels at λc+/-1 nm	60	-	-	dB
Relative intensity noise	RIN	> 1kHz	-	-	-140	dB/Hz
		>500KHz	short noise limited			
Linewidth by Self-heterodyne Lorentzian linewidth model	υ	CW, at specified P_f	See options			KHz
Frequency Noise	FrN	@1 MHz offset freq	-	20	100	Hz^2/Hz
Optical Isolation	ISO	-	40	-	-	dB
Polarization Extinction Ratio	PER	E-field slow axis(aligned to connector key)	18	23	-	dB
Operating temperature range (case)	Tc		0		70	ºC

Controller board Specs:

PARAMETERS	Min	Typical	Max	Unit
Current Range		0.4	1.00	A
Frequency Modulation bandwidth			1.0	GHz
Power Supplies DC voltage	-		5.5	V

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Module Frequency stability and Modulation Specs:

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Frequency stability	ν_{t1}	Free running, over 1 hour	-	±15	±25	MHz
	ν_{t8}	Free running, over 8 hour	-	±20	±50	
Fast frequency modulation bandwidth	f_m	Sinusoidal modulation	DC	-	900	kHz
Frequency fast tuning range	$\Delta\nu$	Sinusoidal modulation at 100 kHz; input voltage +/10 V	800	1000	-	MHz p-p
Frequency fast tuning efficiency	η_m	Sinusoidal modulation at 100 kHz	40	50	-	MHz/V
Tuning voltage magnitude	V_{tune}	Sinusoidal modulation at 100kHz; wavelength tuning 100MHz pp	-1	-	+ 1	V
Output power modulation index	M		-	1	2	%

Ordering Options:

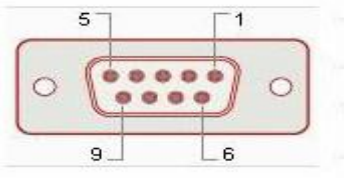
EX-UNL938-XX-XX-X-X

- **Power**
  - 20: > 20 mW
  - 30: > 30 mW
- **Wavelength**
  - 55N: Non-ITU (1545-1555nm)
  - ITU: (1530-1560nm)
- **Linewidth**[1)]
  - 1: < 3 KHz
  - 2: < 10 KHz
- **Modulation**
  - 1: CW
  - 2: 0.1-1GHz

1) Linewidth is measured by Self-heterodyne

Connectors/control interfacing:

Interface D-9 Female connector Pin assignment



Pin number	Pin function
1	+5V DC Power
5	Ground & Tune -
4	Tune +
2, 3, 6, 7,8, 9	NC (or 2-TX,3-RX,6-RDY)

The module is preset to customer needs, can be operated without control software. RS232 communication code and controller software can be provided upon the request.

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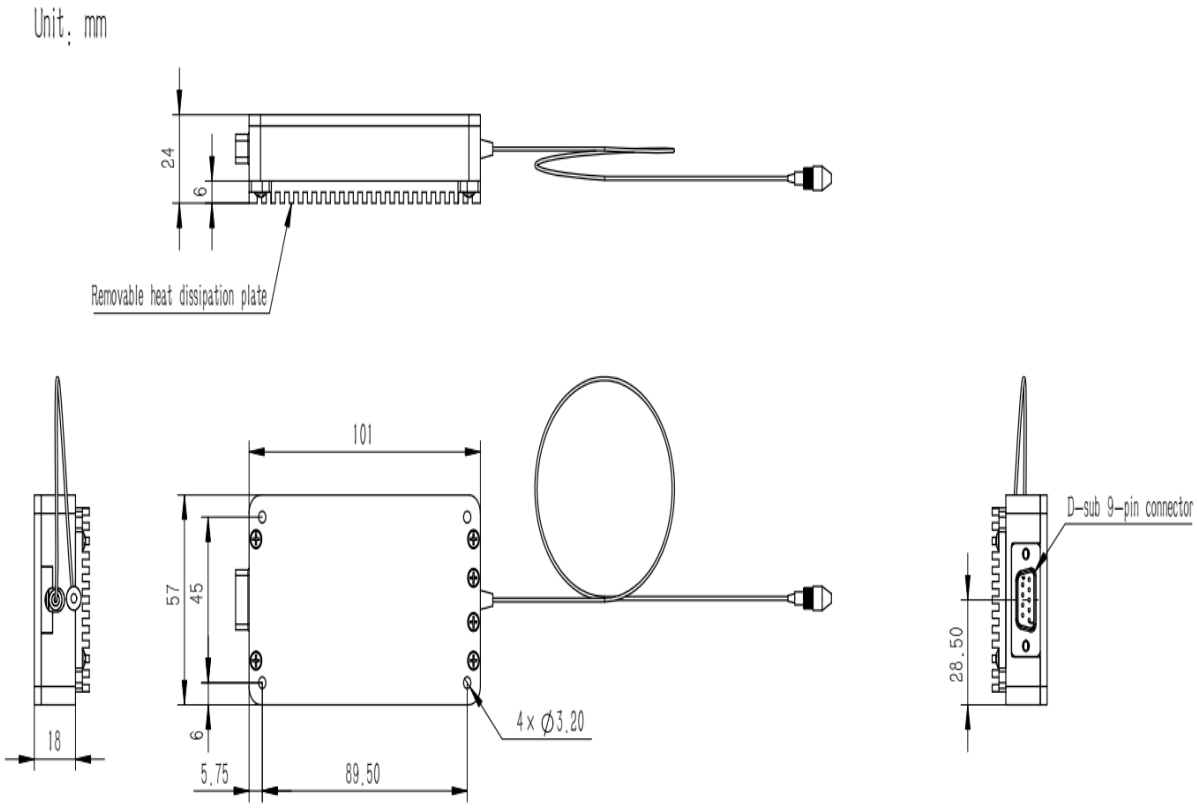
Outline Drawing - Unit: mm



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Safety Information

This product is Class 1M laser products, complies with 21 CFR 1040.10 and 1040.11 with the IEC/EN 60825-1 and IEC/EN 60601-2-22 standards by The Food and Drug Administration's Center for Devices and Radiological Health (FDA/CDRH) on 2017.

All Versions of this product are tested according to IEC 60825-1:2014/EN 60825-1:2014 Single-mode fiber pigtail with FC/APC connectors (standard), categorized into Class 1M.

Wavelength =1530 – 1570 nm
Maximum Power = 100 mW
Single-mode fiber pigtail Fiber
Numerical Aperture = 0.14

Labeling is not affixed to the laser module due to size constraints; rather, labeling is placed on the outside of the shipping box. This product is shipped without power supply (i.e. the laser doesn't work with power supply)

Class 1M laser is safe for all conditions of use except when passed through magnifying optics such as microscopes and telescopes. Class 1M lasers produce large-diameter beams, or beams that are divergent. The MPE for a Class 1M laser cannot normally be exceeded unless focusing or imaging optics are used to narrow the beam. If the beam is refocused, the hazard of Class 1M lasers may be increased and the product class may be changed. A laser can be classified as Class 1M if the total output power is below (IEC/EN) class 3B but the power that can pass through the pupil of the eye is within Class 1.

Users should observe safety precautions such as those recommended by ANSI3 Z136.1-2000, ANSI Z36.2-1997 and IEC 60825- 1:2001-08. Caution: use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.