

# NLL – NARROW LINEWIDTH LASER

The PureSpectrum™ - NLL is a compact, ultra low-noise distributed feedback (DFB) semiconductor laser module.



TeraXion's PureSpectrum™ Narrow Linewidth Laser is offered in a compact package suitable for integration in embedded designs / OEM instrumentation.

This fully integrated module uses state-of-the-art frequency noise control technology. It significantly reduces the optical linewidth of a DFB laser diode while preserving the benefits of the semiconductor diode.

The PureSpectrum™ NLL offers fast frequency tuning options for frequency-modulated continuous-wave (FMCW) sensing or other advanced sensing schemes.

## Features

- Linewidth below 5 kHz
- Output power up to 70 mW
- Low phase noise
- High reliability
- Fast frequency modulation options

## Applications

- Test and measurement
- Coherent OTDR
- Pipeline and bridge monitoring
- Perimeter detection in security applications
- LIDAR
- Quantum Key Distribution (QKD)

Available Configurations						Units
Wavelength Option <sup>(1)</sup>		1535 – 1565 (ITU grid)				nm
Output Power Option		30 or 70				mW
Fast Frequency Modulation Option		No Modulation	Option 1	Option 2	Option 3	
Fast Frequency Modulation Range		N/A	± 12	± 100	± 200	± MHz
Optical Parameters <sup>(2)</sup>		No Fast Tuning	Option 1	Option 2	Option 3	Units
Linewidth <sup>(3)</sup>		< 5		< 10	< 20	kHz
Max Frequency Noise	1 kHz – 100 kHz	< 5x10 <sup>3</sup>		< 2x10 <sup>4</sup>	< 5x10 <sup>4</sup>	Hz <sup>2</sup> /Hz
	100 kHz – 3 MHz	< 5x10 <sup>5</sup>		< 5x10 <sup>5</sup>	< 5x10 <sup>5</sup>	
	3 MHz–100 MHz	< 3x10 <sup>5</sup>		< 3x10 <sup>5</sup>	< 3x10 <sup>5</sup>	
Frequency Stability		< 5x10 <sup>-10</sup> at 1 s, < 5x10 <sup>-9</sup> at 100 s		< 5x10 <sup>-9</sup> at 1 s, < 5x10 <sup>-9</sup> at 100 s		Allan Std. Dev.
Side Mode Suppression Ratio		> 30				dB
Polarization Extinction Ratio		> 17				dB
Relative Intensity Noise		< -130 (1 kHz - 10 kHz) < -140 (10 kHz - 1 MHz) < -150 (1 MHz - 1 GHz)				dBc/Hz
Output Type		CW				

Slow Frequency Tuning	Units	Fast Frequency Modulation (Option 1, 2 or 3)		Units
Frequency Tuning Method	Thermal Control Via Software Command	Modulation Method		Through External Modulation Input
Frequency Tuning Range	± 10	Modulation Voltage Magnitude <sup>(4)</sup>		-2 to +2
Frequency Tuning Resolution	5	Modulation Repetition Rate <sup>(5)</sup>		Up to 0.5
Slow Tuning Speed	0.5 (average)			MHz

Electrical Parameters	Units
Power Supply	+ 9 to + 36
Power Consumption <sup>(6)</sup>	< 4.5

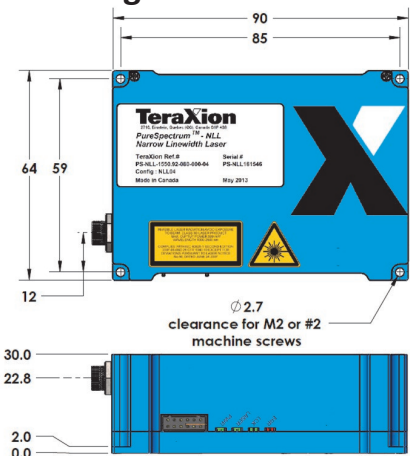
Mechanical Parameters	Units
Operating Temperature	- 5 to + 55
Storage Temperature	- 40 to + 85
Humidity Level	95, Non-Condensing
Dimensions (L x W x H)	90 x 64 x 30
Fiber Type	PM Panda
Optical Connector Type	FC / APC (Narrow Key), Key Aligned to Slow Axis

Computer Interface	
Interface	RS-232
Connector	Hirose DF11-12DP-2DS
PC-Side Software <sup>(7)</sup>	TeraXion's PureSpectrum™ Control and Monitoring Software
Power and Communication Module	TeraXion's 12 V PS-PU (Optional)

Typical specifications may vary depending upon user's requirements

- (1) In vacuum. Contact TeraXion for specific wavelength/channel.
- (2) At nominal wavelength
- (3) Linewidth is computed from the power spectral density of frequency noise (PSDFN) with 1 ms observation time. FWHM, Voigt profile.
- (4) Voltage must be fixed at 0V at turn-on and resets
- (5) Fast frequency modulation range is guaranteed up to specified repetition rate.
- (6) Typical at 25 °C for 70 mW output power
- (7) Windows compatible

## Outline diagram



MKT-FTECH-PS-NLL 3.9

## Laser safety information

