Product Specification

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Ultra Low Noise, High Power DFB Laser

Part #LN-1550-RINxx-Pxx

PRODUCT FEATURES

- Ultra-low RIN, operation at shot noise limit
- High Power
- Narrow Linewidth
- Very High Side Mode Suppression (SMSR)
- Integrated with low noise laser driver and TEC temperature controller
- Ruggedized packaging—tested to MIL-STD-810G

APPLICATIONS

- RF over fiber interconnects requiring high gain, high dynamic range and low noise figure
- Remote modulator RF over fiber links
- Sensing applications requiring high power, low noise, and narrow linewidth sources

DESCRIPTION

The ultra-low noise, high power laser is a DFB laser based on proprietary epitaxy and laser design optimized for elimination of the relaxation oscillations in the laser. Once biased at nominal current the laser exhibits no measurable RIN and operates in the shot noise limit. It is mounted on a thermo-electric cooler (TEC) and hermetically sealed in a package. To eliminate electronics induced noise, the drive circuitry is entirely analog. The laser is driven with linear regulators and stabilized with a linear TEC controller. The carefully designed electronics eliminate any switching noise or spurious peaks to reduce any additional line broadening beyond the intrinsic linewidth of the laser. This allows the laser to be an exceptional choice for a very broad spectrum of RF over Fiber applications. This unmatched performance is paired with very high optical power that translates directly into increased gain for RF over Fiber without the need for noisy optical amplifiers.

Laser output power and TEC set points can be externally adjusted.

ABSOLUTE MAXIMUM RATINGS

Parameter	Minimum	Maximum	Units	Condition/Comments
Storage Temperature	-55	115	°C	
Operating Temperature	-20	75	°C	
ESD		±500	V	

OPTICAL AND ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition/Comments
Operational Wavelength	λ	1530		1565	nm	Factory set
Continuous Wavelength Optical Power	P_{out}	75	80	85	mW	550 mA drive current
		95	100	105	mW	600 mA drive current
Output Power Flatness	P_{flat}	-1		1	dB	Over full temperature range
Power Stability	ΔP			0.1	dB	Measured over 12 hour period
Linewidth	Δλ		250	500	KHz	At operating drive current; dependent on clean input power
Relative Intensity Noise	RIN		-168	-165	dB/Hz	From 500 MHz to 20 GHz at factory set operating point
Threshold Current	I_{th}		15	20	mA	
Optical Isolation	Iso	50	55		dB	
Side Mode Suppression Rato	SMSR	45	55		dB	At Factory Set Point
Monitor PD	V_{PD}	0	2	2.5	V	
TEC Set Temp	T_{set}	15	20	25	°C	Factory Set Point (typical)
TEC Adjust Voltage	V_{Tset}	0	2.2	4.5	V	Factory Set Point (typical)
Laser Current Adjust Voltage	V_{Lset}	0	2	2.2	V	Factory Set Point
Supply Voltage	V_{drive}	4.75	5	5.25	V	
Current Draw	I_{drive}			2.8	A	Maximum draw at 65° C

MECHANICAL SPECIFICATIONS

Parameter	Symbol	Minimum	Maximum	Units	Condition/Comments
Height	H		22	mm	
Area	A		87 x 75	mm^2	
Electrical Connector					9 Pin D-Sub female connector
Package Heat Flow					Heat sink on bottom surface
Fiber Pigtail Length		0.5	2	m	PM Panda fiber
Pigtail Termination					FC/PC/APC PM panda fiber, Slow Axis aligned

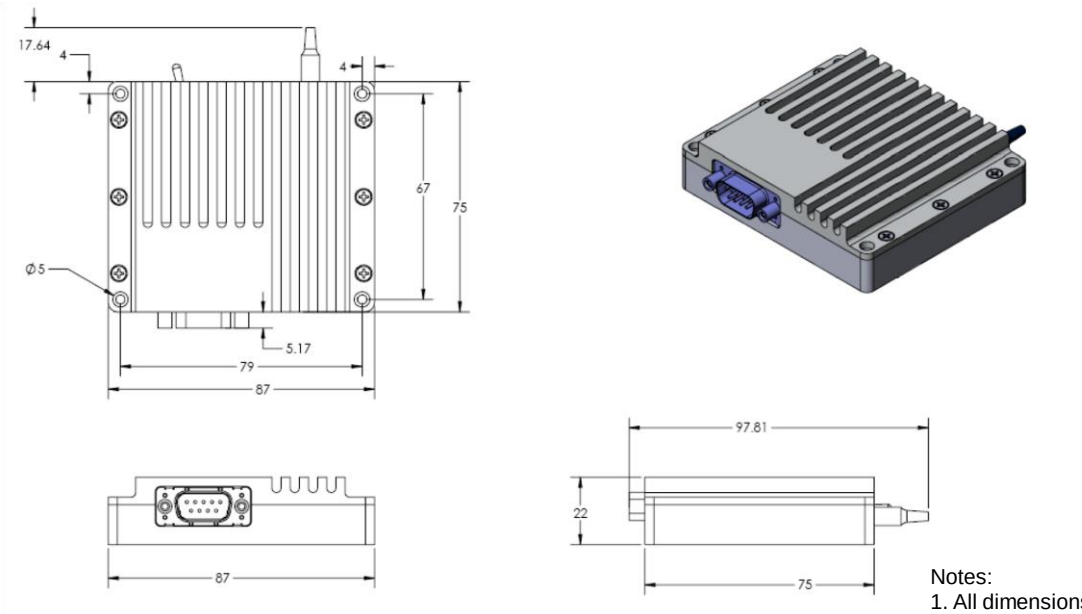
ENVIRONMENTAL SPECIFICATIONS (Preliminary, Qualification in Progress)

Parameter	Minimum	Maximum	Units	Condition/Comments
Operating Temperature	-20	+75	°C	Case temperature
Storage Temperature	-55	+95	°C	
Operating Humidity	0	90	% RH	
Shock	20 g amplitude and 11 ms duration, three shocks each axis, each direction			MIL-STD-810 Method 516, Procedure I. Non-operational
Operational Vibration	3.56 Grms one hour each axis			MIL-STD-810 Method 514, Procedure IV.
Endurance Vibration	8.25 Grms one hour each axis			MIL-STD-810 Method 514, Procedure IV.
Reliability Performance	40,000		hours	

PIN DESCRIPTION OF D-SUB 9 CONNECTOR

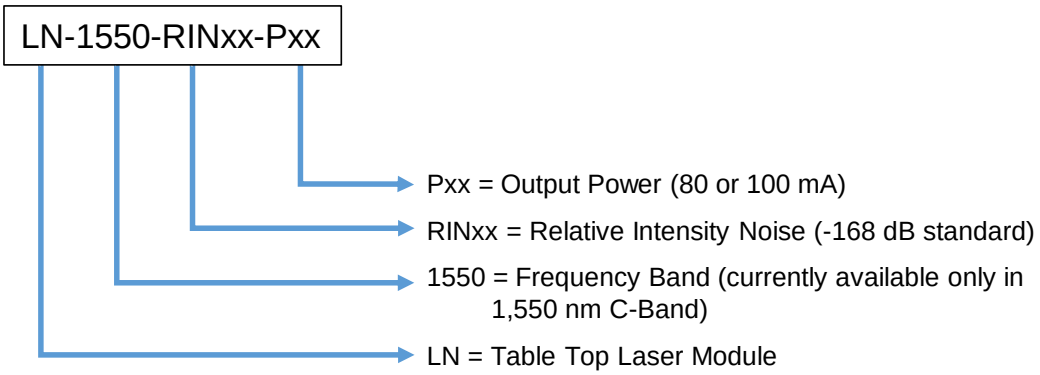
Pin #	Symbol	Description
1-2	V_{CC}	Drive Voltage – 5V
3-4	GND	Ground
5	LSR_mon	Laser current monitor (0-1V: 0-1A laser drive current)
6	Temp_adj	TEC Temp adjust (0-4.5V: 10-30°C TEC temp)
7	PD_mon	Laser PD monitor (0-1V: 0-100 µA PD current)
8	Enable	External voltage laser enable (>2V = ON)
9	LSR_adj	Laser set point adjust (0-2.5V: 0-1A Laser Set current)

MECHANICAL DRAWING



Notes:
1. All dimensions in mm

ORDERING INFORMATION



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