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Ultra Low Noise, High Power DFB Laser

Part # LN-1550-168-100

PRODUCT FEATURES

- Ultra Low RIN, shot noise operation
- High Power
- Narrow Linewidth
- Very High SMSR
- Low noise linear laser driver
- Thermo Electric Cooler with linear driver
- Ruggedized Packaging



APPLICATIONS

- RF over fiber interconnects requiring low noise figure, high dynamic range and high gain
- Sensing applications requiring high power and low noise

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.

ORDERING INFORMATION

LN-1550-168-100-*FL-FC*

FL = Fiber length (in meters)
FC = Fiber connector type FC/PC; FC/APC

ABSOLUTE MAXIMUM RATINGS

Parameter	Minimum	Maximum	Units	Condition/Comments
Storage Temperature	-55	115	°C	
Operating Temperature	0	65	°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}	95	100	105	mW	700 mA drive current.
Output power flatness	P_{flat}	-1		1	dB	Over full temperature range
Power Stability	ΔP			.1	dB	Measured over 12 hour period
Line Width	$\Delta\lambda$		250	500	KHz	At operating drive current. Is dependent on clean input power.
Relative Intensity Noise	RIN		-168	-165	dB/Hz	From 500MHz to 20GHz at factory operating set point.
Threshold current	I_{th}		15	20	mA	
Optical Isolation	Iso	50	55		dB	
Side Mode Suppression Ratio	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	(Typ) Factory Set Point
Tec adjust voltage	V_{Tset}	0	2.2	4.5	V	(Typ) Factory Set Point
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		87x75	mm ²	
Electrical Connector					9 Pin DSub female connector
Package Heat Flow					Heat sink on bottom surface
Fiber Pigtail Length		0.5	2	m	PM Panda fiber. Custom lengths available
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	0	+65	°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 DSUB 9

Pin #	Symbol	Description
1-2	Vcc	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: 0-100uA 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

