

Applications

- FMCW LiDAR
- Coherent Communications
- Free Space Optics
- Test & Measurement

Features

- 19 dBm Optical Output Power
- OC-48 Pinout Compatible
- Telecordia Technologies® GR-468 Compliant
- PM Fiber
- -10 °C to +65 °C Operating Temperature Range
- Monitor Photodiode
- RoHS

Ortel's 1693 O-Band DFB laser module is an ideal source laser for a variety of sensing, communication and test & measurement applications. It is characterized for use as a CW coherent optical source laser for FMCW LiDAR and coherent communications. The high power and narrow line width characteristics of the laser also make it an ideal choice as an O-band Coherent source in fiberoptic or free space communications links. The 1693 is DC-coupled with a built-in TEC, thermistor, and monitor photodiode. The device is mounted in a 14-pin, OC-48 pinout compatible hermetic butterfly package with the optical isolator mounted on the TEC. The 1693 incorporates a high efficiency coupling scheme to deliver 80 mW of CW optical power. The laser module has multiple connector options, including no connector.

Performance Highlights

Parameter	Min	Typ	Max	Units
Operating Case Temperature	-10	25	+65	°C
Wavelength	O-Band contact Ortel for availability			nm
Optical Output Power	18.3	19	-	dBm
Threshold Current	-	-	20	mA
Operating Current	-	-	400	mA
Linewidth ¹	-	50	100	KHz
Optical Isolation	-	50	-	dB
Maximum Laser Output Power (Eye Safety)	-	-	27	dBm
SMSR ²	50		-	dB
Polarization Extinction Ratio (PMF pigtail)	17	-	-	dB
Optical Return Loss	40	-	-	dB

1. Linewidth defined as Pi times the single-sided spectral density of the frequency noise at 100 KHz measurement frequency. Linewidth to be achieved with a laser driver with current noise density of 500 pA/√Hz.
2. @ operating current

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

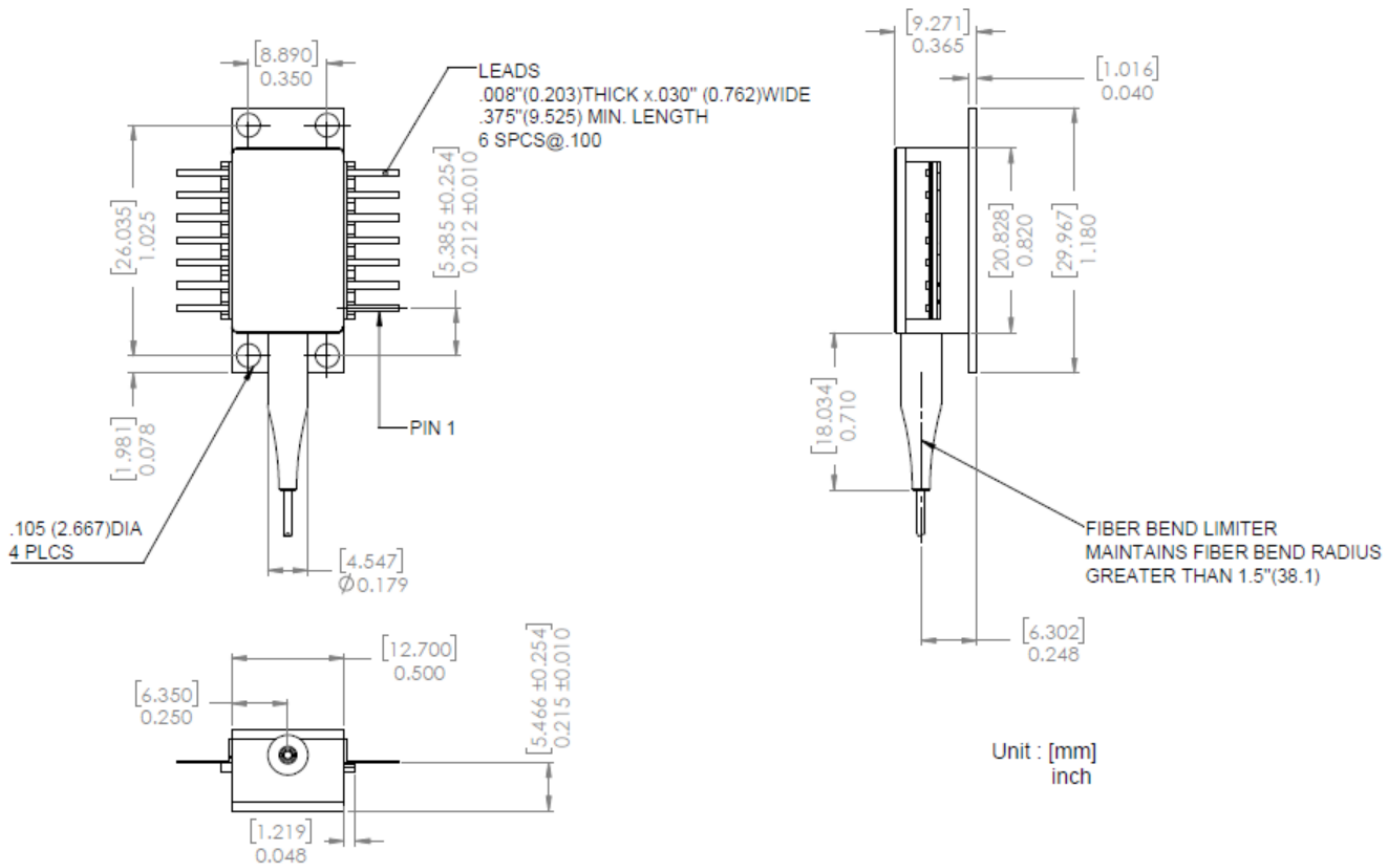
Parameter	Symbol	Condition	Min	Max	Units
Operating Case Temperature	T_{OP}	continuous	-10	+65	°C
Reduced Performance Operating Case Temperature	T_{ROP}	continuous	-15	+70	°C
Storage and Non-Operating Temperature	T_{STG}	continuous	-40	+85	°C
Laser Forward dc Current	-	continuous	-	750	mA
Photodiode Reverse Voltage	$V_{R,MPD}$	continuous	-	10	V
Laser Reverse Voltage	-	continuous	-	2	V
TEC Current	I_{TEC}	continuous	-	1.7	A
Maximum Laser Output Power	P_{max}	Continuous	-	27	dBm
ESD	-	HBM: R = 1500 Ω , C = 100 pF	-500	500	V
Relative Humidity	RH	Non condensing			

Electrical/Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating Case Temperature	T_c	-	-10	25	65	°C
Optical Output Power	P_O	$T = T_{OP}, I_F = I_{OP}$	18.3	19	-	dBm
Threshold Current	I_{TH}		-		20	mA
Operating Current	I_{OP}	$T=T_{OP}, @ 18.3 \text{ dBm}$	-	-	400	mA
Operating Laser Temperature	T_{OP}		-	25	-	°C
Laser Bias Forward Voltage	V_{OP}	$I_F = I_{OP}$	-	-	2.5	V
Wavelength	λ_{OP}	$T = T_{OP}, I_F = I_{OP}$	O-Band			nm
Linewidth ¹	$\Delta\nu$	$T = T_{OP}, I_F = I_{OP}$	-	-	100	KHz
Optical Isolation	ISO	-	-	50	-	dB
Optical Return Loss	ORL	-	40	-	-	dB
Sidemode Suppression Ratio	SMSR	$T = T_{OP}, I_F = I_{OP}$	50	-	-	dB
Polarization Extinction Ratio	PER	$I_F = I_{OP}$	17	-	-	dB
Bias Current with 5 GHz Wavelength Tuning	I_T	P-P bias current modulation amplitude of triangle wave @100KHz, $T = T_{OP}, I_F = I_{OP}$	15	-	50	mA
Monitor PD Current	I_{MPD}	$I_F = I_{OP}, V_{MPD} = -5 \text{ V}$	100	-	2500	μA
Monitor PD Dark Current	I_D	$I_{OP} = 0 \text{ mA}, V_{MPD} = -5 \text{ V}$	-	-	0.2	μA
Thermistor Resistance ²	R_{TH}	$T_{OP} = 25 \text{ }^\circ\text{C}$	9.5	10.0	10.5	K Ω
Thermistor Temp. Coefficients	TC_{TH}	$T_{OP} = 25 \text{ }^\circ\text{C}$	-	-4.4	-	%/ $^\circ\text{C}$
TEC Current	I_{TEC}	$-10^\circ\text{C} < T_c < +65^\circ\text{C}$	-1.0	-	+1.5	A
TEC Voltage	V_{TEC}	$-10^\circ\text{C} < T_c < +65^\circ\text{C}$	-2.0	-	+3.0	V
Fiber pigtail ³ length	L_f		0.5			m

1. Linewidth defined as Pi times the single-sided spectral density of the frequency noise at 100 KHz measurement frequency. Linewidth to be achieved with a laser driver with current noise density of 500 pA/ $\sqrt{\text{Hz}}$.
2. Thermistor temperature-resistance formula: $1/T = A + B \cdot \ln(R) + C \cdot (\ln(R))^3$ where T is temperature in Kelvin, R is resistance in Ohm, $A=1.129 \times 10^{-3}$, $B=2.341 \times 10^{-4}$, $C=8.775 \times 10^{-8}$.
3. PANDA 1310 nm polarization maintaining fiber or compatible, 400 μm buffer.

Outline Drawing

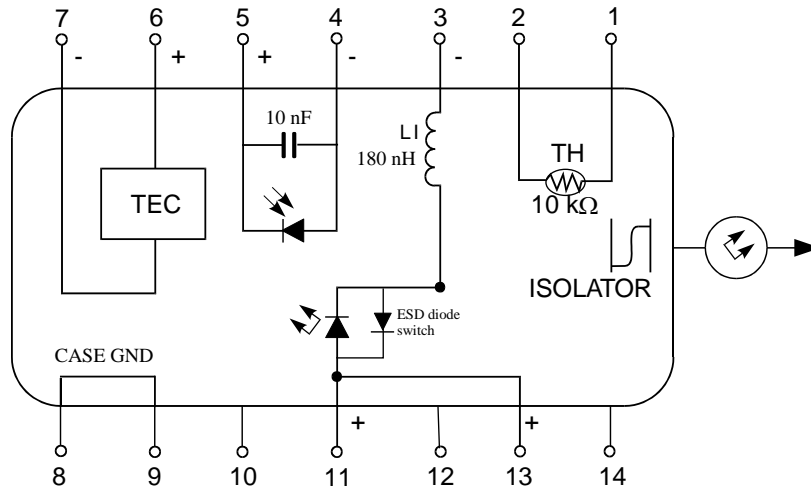


Note

[1] The global common tolerance for measurements is 0.005"

[2] The module base plane material is Cu-W with min. 0.7µm gold finish. Base flatness specification = 0.003"

Electrical Schematics



Pin Assignments

Pin	Description
1	Thermistor
2	Thermistor
3	Laser Cathode (-)
4	MPD Anode (-)
5	MPD Cathode (+)
6	Thermo-electric Cooler (+)
7	Thermo-electric Cooler (-)
8	Case Ground
9	Case Ground
10	NC
11	Laser Anode (+)
12	NC
13	Laser Anode (+)
14	NC

Ordering Code Definitions

1693A– 080 – 001 – FA – PM

O-Band Laser Module, 19 dBm, FC/APC, PM fiber

- Other connector options and DWDM wavelengths possible – contact your Ortel sales representatives to learn more.

Product Label

Product model number, serial number and manufacturing date (month and year) are on both the module and package box. The serial number starts with three letters, and then followed by numbers and letters. For example: BHG1234.