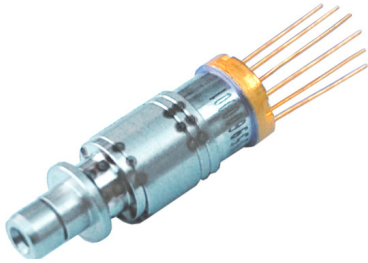


Model 1995 1550 nm High Power CW Source DFB Laser for LiDAR



Applications

- LiDAR
- Free Space Optics
- Frequency Modulated Continuous Wavelength Sensing

Features

- 15 dBm Optical Output Power
- Monitor Photodiode
- Double Optical Isolator
- Telcordia Technologies® GR-468 Compliant
- RoHS

EMCORE's 1995 cooled TOSA laser module is characterized for use as a CW coherent optical source laser for LiDAR technology. The 1995 is DC-coupled with a built-in TEC, thermistor, and monitor photodiode. The device is in hermetic TO56 package with 6+1 pins. The 1995 incorporates a high-efficiency coupling scheme to deliver 15 dBm of CW optical power.

EMCORE's design provides a compact, robust solution for Frequency Modulation Continuous Wavelength (FMCW) sensing for autonomous vehicles and wide variety of other optical sensing applications. It is highly immune to mode or optical frequency hopping typically found with single isolator, external cavity designs. Mode or optical frequency hopping causes false readings in FMCW LiDAR, whereas EMCORE's laser technology maintains optical frequency stability over temperature suppressing false readings.

Performance Highlights

Parameter	Min	Typ	Max	Units
Operating Case Temperature	20		+60	°C
Wavelength	1550 +/- 10			nm
Optical Output Power	14	15	-	dBm
Threshold Current	-	-	40	mA
Operating Current	-	-	250	mA
Frequency Noise @ 100 kHz ¹	-		32	kHz ² /Hz
Optical Isolation	40	50	-	dB
Maximum Laser Output Power (Eye Safety)	-	-	27	dBm
SMSR ¹	50		-	dB
Polarization Extinction Ratio (PMF pigtail)	17	-	-	dB
Optical Return Loss	40	-	-	dB

1. @ 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	Symb	Condition	Min	Max	Units
Operating Case Temperature	T_C	continuous	20	+60	°C
Storage Case Temperature	T_{STG}	continuous	-40	+85	°C
Laser Forward dc Current	-	continuous	-	600	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

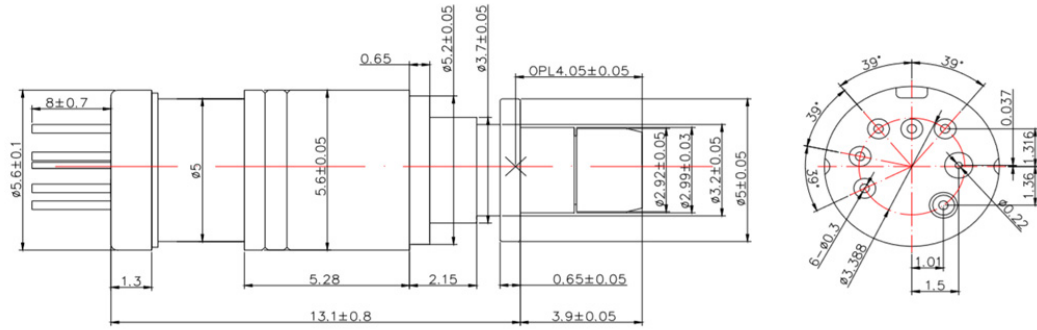
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating Case Temperature	T_C	Measured at the bottom of the package	20		+60	°C
Optical Output Power	P_O	$T_{OP}, I_{OP} = 200$ mA	14	15	-	dBm
Operating Current	I_{OP}	-	-	200	250	mA
Operating Laser Temperature	T_{OP}	Laser temperature setpoint (thermistor reading) to align λ_{OP} with a designated wavelength channel, for $I_{OP} = 200$ mA	37		53	°C
Laser Bias Forward Voltage	V_{OP}	$T_{OP}, I_{OP} = 250$ mA	1.0	-	1.8	V
Wavelength	λ_{OP}	$T_{OP}, I_{OP} = 200$ mA	1550 \pm 10			nm
Wavelength change over life	$\Delta\lambda$	$T_{OP}, I_{OP} = 200$ mA, 10,000 hours	-0.1		+0.1	nm
Frequency Noise @ 100 kHz	$\Delta\nu$	$T = T_{OP}, I_F = I_{OP}$	-	-	32	kHz ² /Hz
Optical Isolation	ISO	-	40	50	-	dB
Threshold Current	I_{TH}	T_{OP}	-		40	mA
Sidemode Suppression Ratio	SMSR	$T_{OP}, I_{OP} = 200$ mA	50	-	-	dB
Polarization Extinction Ratio	PER	$T_{OP}, I_{OP} = 200$ mA	17	-	-	dB
Wavelength Tuning with Bias Current	$d\nu/dI$	$T_{OP}, I_{OP} = 200$ mA, bias current modulation with a triangle wave @50KHz, for >1 GHz tuning	100	-	350	MHz/mA
Wavelength thermal tuning coefficient	$d\lambda/dT$			0.08		nm/°C
Monitor PD Current	I_{MPD}	$I_{OP} = 200$ mA, $V_{MPD} = -5$ V	100	-	2500	μ A
Monitor PD Dark Current	I_D	$I_{OP} = 0$ mA, $V_{MPD} = -5$ V	-	-	0.2	μ A
Thermistor Resistance ¹	R_{TH}	$T_{OP} = 25$ °C	9.0	10.0	11.0	K Ω
TEC Current ²	I_{TEC}	$T_{OP}, I_{OP} = 200$ mA	-1.0	-	+0.8	A
TEC Voltage ²	V_{TEC}	$T_{OP}, I_{OP} = 200$ mA	-2.5	-	+2.2	V

1. 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, $A=1.129 \times 10^{-3}$, $B=2.341 \times 10^{-4}$, $C=8.775 \times 10^{-8}$.
2. Values for steady state operation. Maximum cooling $\Delta T < 30$ C, Maximum heating $\Delta T < 40$ C

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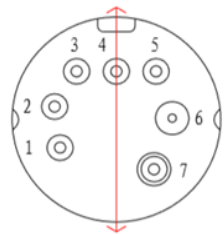


Outline Drawing



Pin Assignments

TOSA output polarization direction



Pin	Description
1	Laser Cathode (-)
2	Thermistor
3	MPD Cathode (+)
4	Thermo-electric Cooler (-)
5	Thermo-electric Cooler (+)
6	Laser Anode (+)
7	Case Ground/MPD Anode (-)/Thermistor

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