

Applications

- 1310 nm Forward Path/Return Path
- Broadcast and Narrowcast Networks
- Long Distances
- High Optical Splits

Features

- OC-48 Pinout Compatible
- Negative Bias
- *Telcordia Technologies™* 468 Compliant
- Cooled
- Up to 31 mW
- Wide Temperature Range, Stable Even in Harsh Environments
- RoHS Compliant

The 1688 1310 nm DFB laser modules are designed for both broadcast and narrowcast analog applications. The linear, OC-48 pinout compatible devices feature up to 31 mW of output power.

The 1688 module is intended for OEM 1310 nm CATV transmitter designs optimizing cost-effectiveness and performance simultaneously.

Performance Highlights

Parameters	Min	Typical	Max	Units
Wavelength	1300	-	1320	nm
Optical Output Power	6	-	31	mW
Operating Current	35	-	100	mA
Temperature Range	-40	-	+85	°C
Frequency Range	5	-	1002	MHz
Carrier to Noise Ratio (79 ch., NTSC)	50	51	-	dB
Composite Second Order (79 ch., NTSC)	57	-	-	dB
Composite Triple Beat (79 ch., NTSC)	65	-	-	dB

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	Unit
Operating Case Temperature	T_C	Continuous	-40	+85	°C
Storage Temperature Range	T_{stg}	-	-40	85	°C
Laser Forward dc Current	-	-	-	150	mA
Photodiode Reverse Voltage	V_{RPD}	-	-	10	V
Laser Reverse Voltage	-	-	-	1	V
ESD	-	HMB: R = 1500 Ohm, C = 100 pF	-500	500	V
TEC Current	I_{TEC}	Continuous	-1.9	1.9	A

Electrical/Optical Characteristics

Laser Temperature (T_L) = 25°C, $I_F = I_{OP}$, Beginning of Life (BOL)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Wavelength	-	-	1300	-	1320	nm
Optical Power Range	-	-	6	-	31	mW
Optical Power Options	I _{OP}	6 mW option	6.5	-	7.9	mW
		8 mW option	8.5	-	9.9	
		10 mW option	10.5	-	11.9	
		12 mW option	12.5	-	13.9	
		14 mW option	14.5	-	15.9	
		16 mW option	16.5	-	-	
		20 mW option	20.5	-	-	
		25 mW option	25.3	-	-	
		28 mW option	28.3	-	-	
31 mW option	31	-	-			
Slope Efficiency	-	-	0.25	-	-	mW/mA
Optical Isolation	ISO	-	30	-	-	dB
Sidemode Suppression Ratio	SMSR	-	35	-	-	dB
Threshold Current	I_{TH}	-	-	-	20	mA
Operating Current	I_{OP}	-	I _{th}	-	100	mA
Monitor PD Responsivity	r_{PD}	$V_{RM}=5V$	10	-	300	μA/mW
Thermistor Resistance	R_{TH}	$T_{OP}=25\text{ °C}$	9.5	10	10.5	KOhm
Thermistor Temp. Coefficient	TC_{TH}	$T_{OP}=25\text{ °C}$	-	-4.4	-	%/°C
TEC Current	I_{TEC}	$-40 < T_C < +85\text{ °C}$, $I_F = 100\text{ mA}$	-1.5	-	1.6	A
Fiber Length	-	May include optical splice.	1.0	1.5	-	meter
Fiber Buffer	-	-	-	900	-	μm
Fiber Core / Cladding	-	-	-	9 / 125	-	μm

RF Characteristic

Laser Temperature (T_L) = 25°C, I_F = I_{OP}, Beginning of Life (BOL)

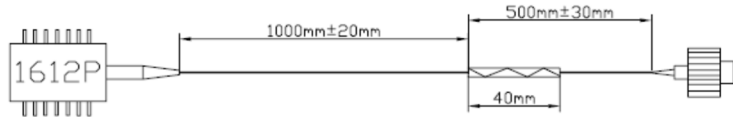
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Frequency Range	F	-	5	-	1002	MHz
Frequency Response	S21	I _F = 60 mA, 5 MHz-1002 MHz	-	±0.5	-	dB
Carrier-to-Noise Ratio	CNR	OMI = 3.7%, 79 ch., NTSC	50	51	-	dB
Composite Second Order	CSO	OMI = 3.7%, 79 ch., NTSC	57	-	-	dB
Composite Triple Beat	CTB	OMI = 3.7%, 79 ch., NTSC	65	-	-	dB
Relative Intensity Noise	RIN	-	-150	-155	-	dB/Hz

In order to prevent reflection-induced distortion, the laser must be connected to an optical cable having a return loss of at least 55 dB for discrete reflections and 30 dB for distributed reflections.

Fiber Characteristics

- SC/APC Connector: Standard
- Fiber Length: > 1.0 meter (1.5 meter typical), with respect to end of package wall.
- Fiber Type: Single Mode Fiber, SMF-28 or compatible, 900 micron buffer, up to one splice allowed for optical Power models <16mW. The lossy splice location is defined as below.

Total fiber length is 1500mm-/+50mm,
 pyrocondensation tube is 40mm long,
 pyrocondensation tube should be 1000mm-/+20mm
 before glued joint, the others should be
 500mm-/+30mm.



Electrical Schematics

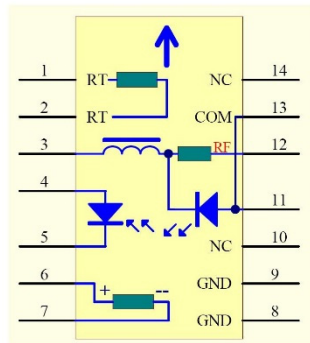


Figure 1. 1688 Laser Schematic

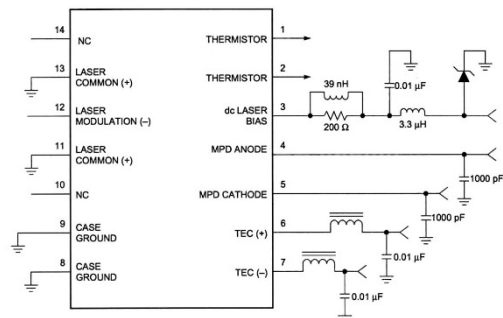
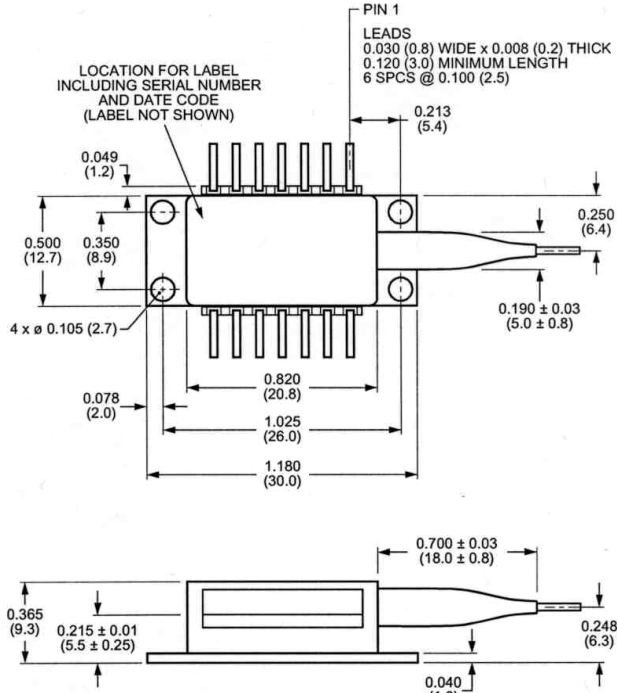


Figure 2. 1688 Circuit Schematic

Outline Diagram (Dimensions are in inches and mm)



Pin	Function
1	Thermistor
2	Thermistor
3	DC Laser Bias (-)
4	MPD Anode (-)
5	MPD Cathode (+)
6	Thermal Electric Cooler (+)
7	Thermal Electric Cooler (-)
8	Case Ground
9	Case Ground
10	NC
11	Laser Common (+)
12	Laser Modulation (-)
13	Laser Common (+)
14	NC

Ordering Information

1688-xx

		<p>Family Name Analog 1310 nm, DFB, Laser</p>
		<p>Optical Connector 06 = 6 mW 08 = 8 mW 10 = 10 mW 12 = 12 mW 14 = 14 mW 16 = 16 mW 20 = 20 mW 25 = 25 mW 28 = 28 mW 31 = 31 mW</p>

Example:

1688-10, DFB 1310nm Laser, 10 mW, SC/APC Connector.

Laser Safety

This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class 1 laser product. This device has been classified with the FDA/CDRH under accession number 0220191.

All Versions of this laser are Class 1 laser product, tested according to IEC 60825-1:2014/EN 60825-1:2014 Single-mode fiber pigtail with SC/APC connectors (standard).

Wavelength = 1.3 μm.

Maximum power = 50 mW.

Because of size constraints, laser safety labeling (including an FDA class 1 label) is not affixed to the module, but attached to the outside of the shipping carton.

Product is not shipped with power supply.

Caution: Use of controls, adjustments and procedures other than those specified herein may result in hazardous laser radiation exposure.

