

DFB-1310-BF-xx-2.5-xx

**Description**

The DFB-1310-BF-xx-2.5-xx series of Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically to satisfy the requirements of SONET transmission.

The devices feature high output power and wide operating temperature range.

Their 14-pin butterfly packages are pin-compatible with standard SONET OC-48 devices.

Features

- ❑ Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design
- ❑ High-speed up to 2.5 Gbps
- ❑ Engineered Specifically for SONET transmitter applications
- ❑ Industry-standard 14-pin Butterfly package
- ❑ 1-meter SMF-28 Fiber Pigtail

Applications

- ❑ SONET 2.5 Gbps transmitter
- ❑ Intermediate and long-distance fiber-optic transmitter





DFB-1310-BF-xx-2.5-xx

Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max	Unit
Operating Case Temperature	T _c	I=I _{op}	-20	65	°C
Storage Temperature	T _{stg}	--	-40	85	°C
Laser Forward Current	I _f	--	--	120	mA
Laser Reverse Bias	V _r	--	--	2	V
Photodiode Reverse Bias	V _{rpd}	--	--	10	V
TEC Current	I _{TEC}	-20 °C < T _c < 65 °C, T _{op} =25 °C, I _f =100 mA	--	1.5	A

Electrical and Optical Characteristics

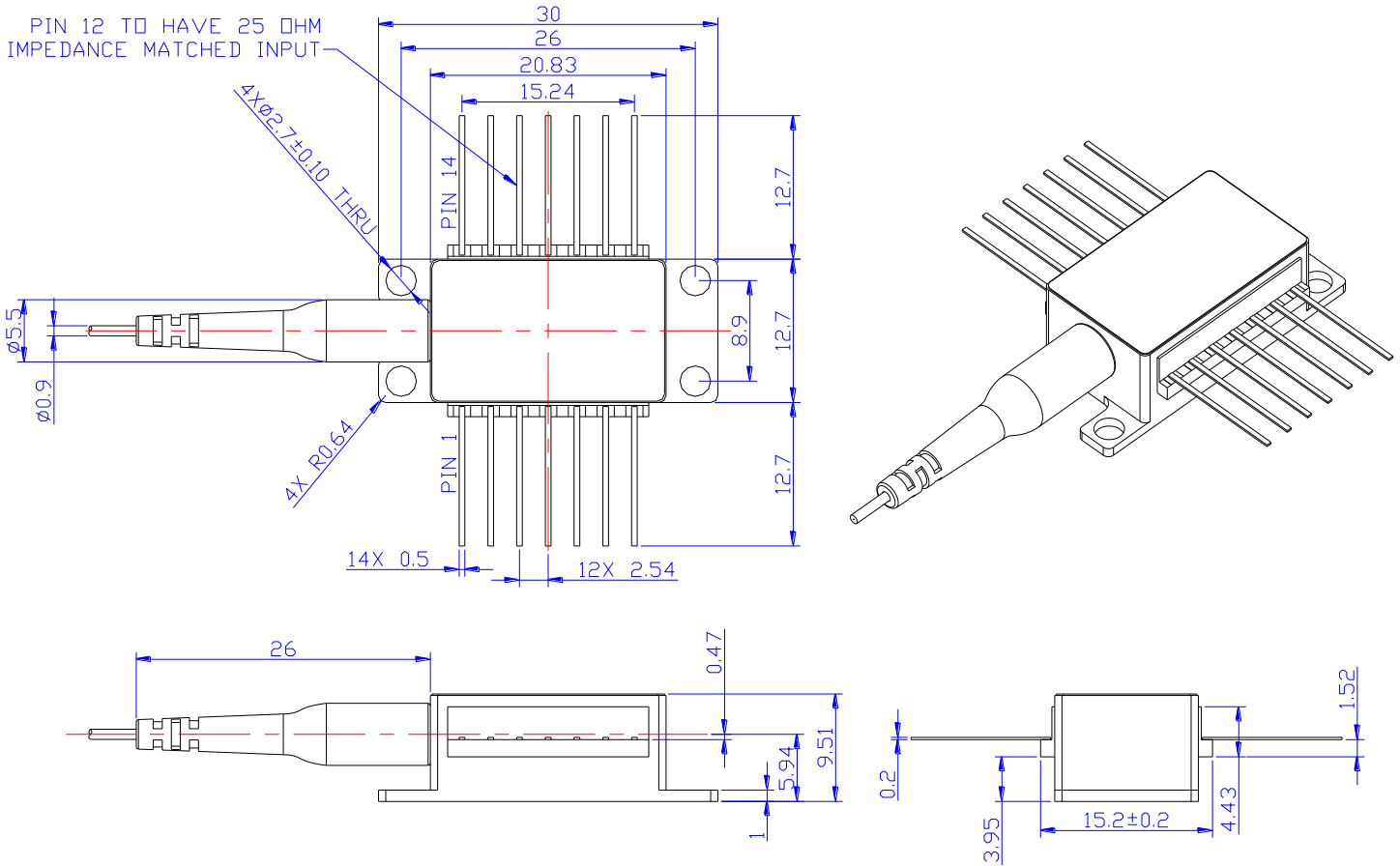
Parameters are over operating temperature range unless otherwise noted.

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Operating Temperature	T	-20	--	65	°C	
Optical Output Power*	P _o	4.0	--	31.0	mW	CW
Threshold Current	I _{th}	--	12	18	mA	T _i =25 °C
Forward Voltage	V _F	--	1.2	1.7	V	P _o =P _r
Modulation Current	I _{mod}	13	--	100	mA	P _o =P _r
Slope Efficiency	SE	200	--	450	μW/mA	CW, P _o =P _r , P _o ≥ 6 mW
		70	--	--	μW/mA	CW, P _o =P _r , P _o = 4 mW
Center Wavelength	λ _c	1300	1310	1320	nm	P _o =P _r , CW
Spectral Width (-20 dB)	Δλ	--	0.1	1.0	nm	P _o =P _r
Side-mode Suppression Ratio	SMSR	30	40	--	dB	P _o =P _r
Rise/Fall Times	t _r , t _f	--	--	0.1	ns	P _o =P _r , Peak, 20% to 80%
Relaxation Oscillation Frequency	f _R	--	4.5	--	GHz	P _o =P _r
Monitor Current	I _{mon}	10	--	100	μA/mW	V _{rpd} =5 V
Monitor Dark Current	I _d	--	--	200	nA	V _{rpd} =5 V
Optical Isolation	ISO	30	--	--	dB	CW
Relative Intensity Noise	RIN	--	-140	-130	dB/Hz	P _o =P _r , at 2200 MHz
Tracking Error	γ	-0.5	--	0.5	dB	I _{mon} =const, γ=10 log (P _o /P _r) [dB]
Thermistor Resistance	R _t	9.5	--	10.5	kΩ	T=25 °C
Thermistor B Constant	B	--	3900	--	K	T=25 °C
TEC Current	I _C	--	--	1.0	A	ΔT=40°C
TEC Voltage	V _C	--	--	2.0	V	ΔT=40°C

* See Ordering Options for output power ratings available.

DFB-1310-BF-xx-2.5-xx

Outline Diagram (for $P_o \geq 6$ mW)
Dimensions are in millimeters

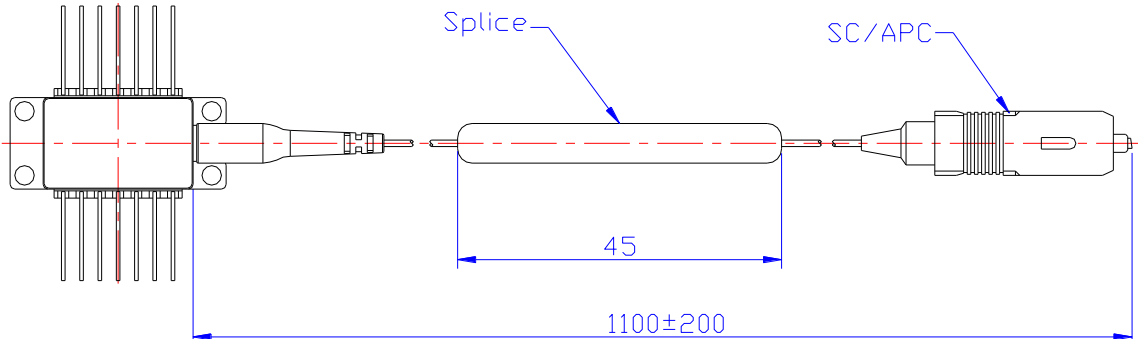
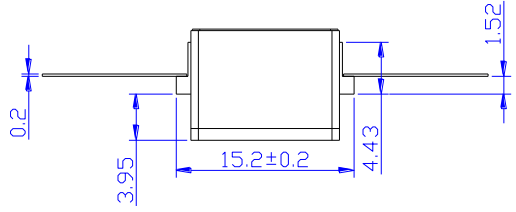
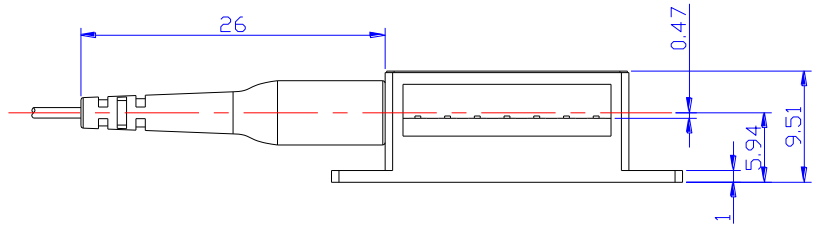
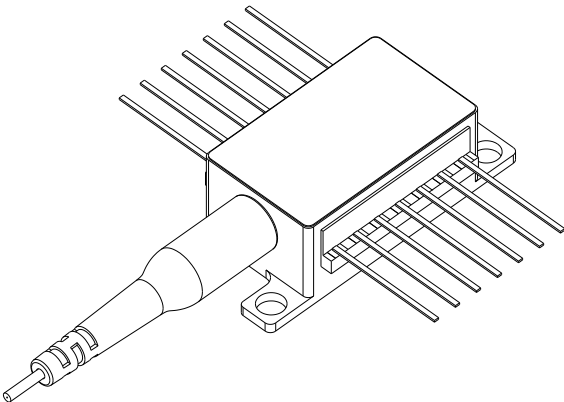
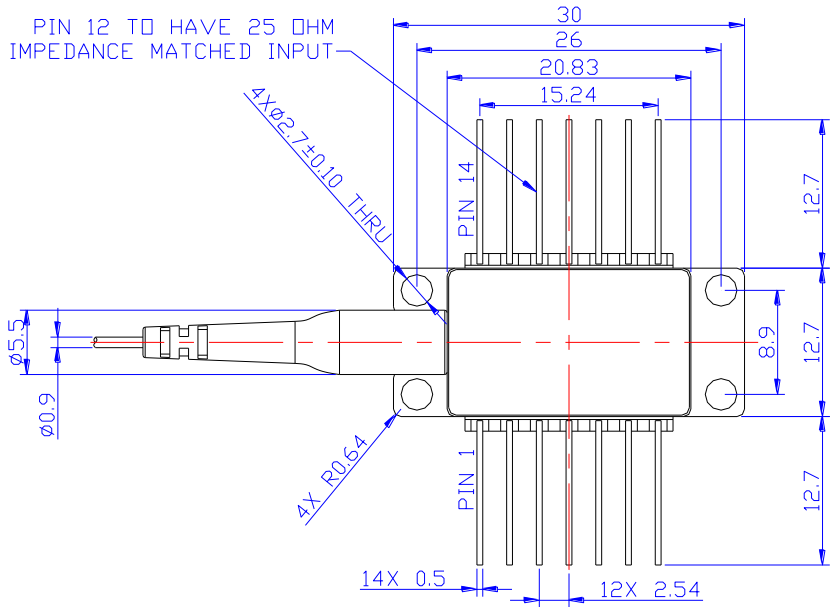




DFB-1310-BF-xx-2.5-xx

Outline Diagram including splice (for $P_o < 6$ mW)

Dimensions are in millimeters



Unit: mm

DFB-1310-BF-xx-2.5-xx

Electrical Schematics

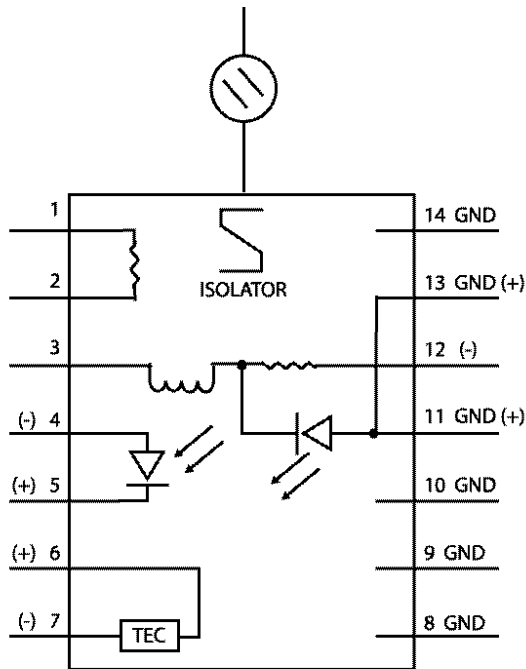


Figure 1. Laser Schematic

Pin Information

Pin No.	Description
1	Thermistor
2	Thermistor
3	Dc Laser Bias (-)
4	MPD Anode (-)
5	MPD Cathode (+)
6	Thermoelectric Cooler (+)
7	Thermoelectric Cooler (-)
8	Case Ground
9	Case Ground
10	Case Ground
11	Laser Common (+), Case Ground
12	Laser Modulation (-)
13	Laser Common (+), Case Ground
14	Case Ground

Ordering Options

DFB-1310-BF-xx-2.5-xx

P_r
 04=4 mW
 06= 6 mW
 08= 8 mW
 10= 10 mW
 13=13 mW
 19=19 mW
 20=20mW
 25=25 mW
 31=31 mW

SC=SC/PC
 FC=FC/PC
 SA=SC/APC
 FA=FC/APC
 NC=No Connector

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Safety Information

All versions of this laser are Class 1M laser products per IEC¹/EN² 60825-1:2001-08. Users should observe safety precautions such as those recommended by ANSI³ Z136.1-2000, ANSI Z36.2-1997 and IEC 60825-1:2001-08.

Notes about Laser Safety Class:

The Food and Drug Administration's Center for Devices and Radiological Health (FDA/CDRH) in the USA has decided to harmonize their requirements with 21 CFR 1040.10 and 1040.11 with the IEC/EN 60825-1 and IEC/EN 60601-2-22 standards. This process has not yet happened and in the interim, the CDRH agency has released '[Laser Notice No.50](#)' to reduce the regulatory burden. This notice allows IEC/EN classification and labeling of lasers within the USA.

IEC¹/EN² 60825-1 Laser Class

Class 1M: laser is safe for all conditions of use except when passed through magnifying optics such as microscopes and telescopes. Class 1M lasers produce large-diameter beams, or beams that are divergent. The MPE for a Class 1M laser cannot normally be exceeded unless focusing or imaging optics are used to narrow the beam. If the beam is refocused, the hazard of Class 1M lasers may be increased and the product class may be changed. A laser can be classified as Class 1M if the total output power is below (IEC/EN) class 3B but the power that can pass through the pupil of the eye is within Class 1.

FDA Laser Class

Class IIIB: moderate power lasers (cw: 5-500 mW, pulsed: 10 J/cm² or the diffuse reflection limit, whichever is lower). In general Class IIIB lasers will not be a fire hazard, nor are they generally capable of producing a hazardous diffuse reflection. Specific controls are recommended.

This product does not conform to 21 CFR 1040.10 and 1040.11. Consequently, this laser module is only intended for use as a component by manufacturers of electronic products and equipment.

Wavelength = 1270 – 1610 nm
 Maximum Power = 75mW
 Single-mode fiber pigtail
 Fiber Numerical Aperture = 0.14

Labeling is not affixed to the laser module due to size constraints; rather, labeling is placed on the outside of the shipping box.

This product is not shipped with a power supply.

Caution: use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



classified in accordance with IEC 60825-1: 2001-08

(1) IEC is a registered trademark of the International Electrotechnical Commission

(2) Within Europe the IEC standard has been adopted as a European Normative standard known as EN 60825, and each European country will have its own version of this standard, for example, the British Standards version known as BS EN 60825. There can be small differences between the different countries versions of EN 60825, and these are in part caused by the process of translating the standard into the native language of that country.

(3) ANSI is a registered trademark of the American National Standards Institute.