

**DFB-1310-C5-x-A3(x)-xx-A-x**

---



## Description

The DFB-1310-C5-x-A3(x)-xx-A-x series of Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically for analog applications, especially for CATV forward-path. The devices feature high output power, wide operating temperature range, low distortion characteristics, low RIN noise, and high side mode suppression.

These uncooled, hermetically sealed, coaxial fiber-pigtailed packages are a cost-effective means of providing a highly linear light source for intermediate-reach and long-reach analog transmission applications.

## Features

- ❑ Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design
- ❑ Low Distortion
- ❑ RIN < -145 dB/Hz
- ❑ Cost-effective Uncooled Laser Technology
- ❑ SMSR typ. 40 dB
- ❑ 5.6-mm TO-style package with SMF pigtail
- ❑ Available with integrated thermistor for temperature feedback

## Applications

- ❑ CATV Forward-path
- ❑ Analog transmission





**DFB-1310-C5-x-A3(x)-xx-A-x**

**Absolute Maximum Ratings**

Parameter	Symbol	Condition	Min	Max	Unit
Operating Case Temperature	T <sub>c</sub>	I=I <sub>op</sub>	0	45	°C
Storage Temperature	T <sub>stg</sub>	--	-40	100	°C
Laser Forward Current	I <sub>f</sub>	--	--	120	mA
Laser Reverse Bias	V <sub>r</sub>	--	--	2	V
Photodiode Reverse Bias	V <sub>rpd</sub>	--	--	10	V

**Electrical and Optical Characteristics**

Parameters are over operating temperature range unless otherwise noted.

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Operating Temperature	T	0	--	45	°C	
Optical Output Power*	P <sub>o</sub>	2.0	--	8.0	mW	CW
Threshold Current	I <sub>th</sub>	--	12 20	18 30	mA	T=25 °C T=45 °C
Operating Current	I <sub>op</sub>	--	65	85	mA	T=45 °C
Forward Voltage	V <sub>f</sub>	--	1.1	1.6	V	I <sub>f</sub> =I <sub>op</sub>
Center Wavelength	λ <sub>c</sub>	1300	1310	1320	nm	I <sub>f</sub> =I <sub>op</sub> , CW
Spectral Width (-20 dB)	Δλ	--	0.1	1.0	nm	I <sub>f</sub> =I <sub>op</sub>
Wavelength temperature coefficient	Δλ/ΔT	--	0.09	--	nm/°C	
Side-mode Suppression Ratio	SMSR	30	40	--	dB	I <sub>f</sub> =I <sub>op</sub>
Monitor Current	I <sub>mon</sub>	25	--	375	μA/mW	V <sub>rpd</sub> =5 V
Monitor Dark Current	I <sub>o</sub>	--	--	200	nA	V <sub>rpd</sub> =5 V
Tracking Error	γ	-1	--	1	dB	I <sub>mon</sub> =const, γ=10 log (P <sub>o</sub> /P <sub>r</sub> ) [dB]
Thermistor B Constant**	B	--	3900	--	K	T=25 °C
Thermistor Resistance**	R <sub>t</sub>	9.5	--	10.5	KΩ	T=25 °C
Optical Isolation	ISO	20	--	--	dB	

\* See Ordering options for available operating powers.

\*\* For Type-T Option only, see ordering options.

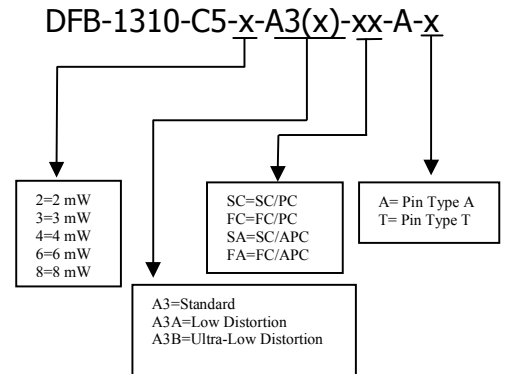
**RF Characteristics**

At 25°C, unless otherwise noted.

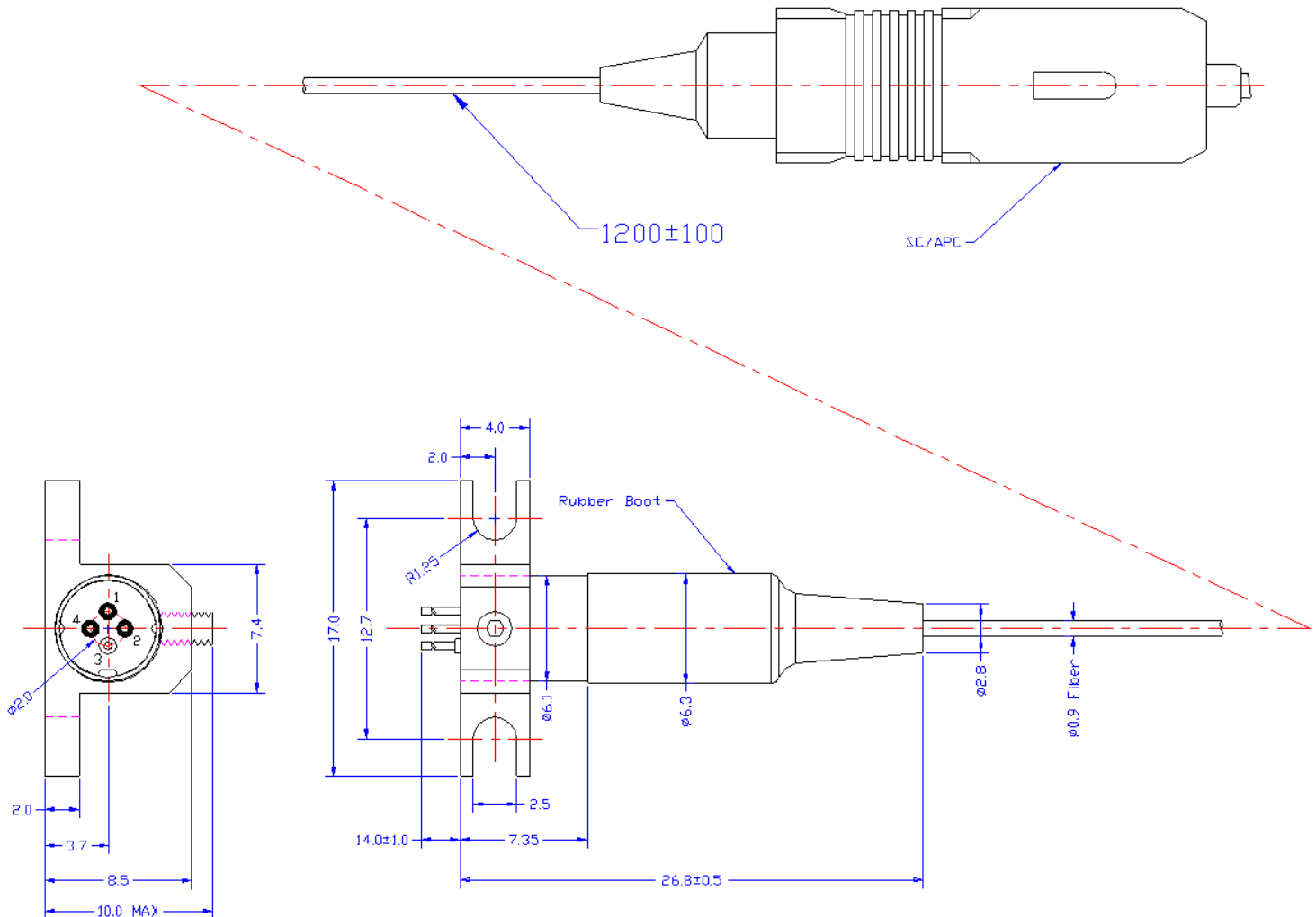
Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Relative Intensity Noise	RIN	--	--	-145	dB/Hz	CW, I <sub>f</sub> =I <sub>op</sub> , f=50 MHz to 550 MHz
Modulation Bandwidth	BW	1.0	--	--	GHz	-3 dB, I <sub>f</sub> =I <sub>op</sub>
Composite Second Order	CSO	--	--	-53	dBc	Note 1
				-57	dBc	Low Distortion Version
				-60	dBc	Ultra Low Distortion
Composite Triple Beat	CTB	--	--	-63	dBc	Note 1
				-65	dBc	Low Distortion Version
				-65	dBc	Ultra Low Distortion
Carrier-to Noise ratio	CNR	51	--	--	dB	Note 1
RF Bandpass Flatness	BF	--	--	1.0	dB	Peak to valley, 50 MHz to 550 MHz

Note 1: Test condition: I<sub>f</sub>=I<sub>op</sub>, OMI 3.2%, 77 unmodulated carriers (50 to 550 MHz), Received Power= 0 dBm.

**Ordering Options:**



**Dimensions**



**TYPE A  
PIN ASSIGN:**

1	PD Cathode
2	PD Anode
3	LD Anode, GND
4	LD Cathode

**TYPE T  
PIN ASSIGN:**

1	PD Cathode
2	LD Cathode
3	LD Anode, PD Anode, Thermistor, GND
4	Thermistor

## DFB-1310-C5-x-A3(x)-xx-A-x

---

### Safety Information

All versions of this laser are Class 1M laser products per IEC<sup>1</sup>/EN<sup>2</sup> 60825-1:2001-08. Users should observe safety precautions such as those recommended by ANSI<sup>3</sup> 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.

#### IEC<sup>1</sup>/EN<sup>2</sup> 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/cm<sup>2</sup> 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.