



Description

The DFB-1310-DP-XX-5P-AAF-SA-X-X-183 series of Bi-Directional modules have been designed specifically for full-duplex communication over a single fiber.

The devices are particularly suited for ONU application, with 1310-nm DFB transmit and 1550-nm receive functionality.

The modules are designed to be compliant with FSAN PON applications.

Features

- ❑ 1310-nm DFB Laser Diode with Multi-Quantum Well structure, suitable for burst-mode transmission
- ❑ 1550-nm PIN Photodiode
- ❑ Operation in wide temperature range
- ❑ Cost-effective Uncooled Laser Technology

Applications

- ❑ 1.25 Gbps upstream and 2.5 Gbps analog downstream reception





DFB-1310-DP-XX-5P-AAF-SA-X-X-183

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Condition
Module					
Operating Case Temperature	Top	-20	+85	°C	
Storage Temperature	Tstg	-40	+85	°C	
Solderability	Stemp	--	350°C for 5+/-0.5s	°C, s	ANSI/J-STD-002
			260(<10s)	°C	
Laser diode					
Forward Current	If	--	120	mA	CW
Reverse Voltage	Vf	--	2	V	
Output Power	Po	--	10	mW	CW
Monitor PD Forward Current	Imf	--	2	mA	
Monitor PD Reverse Voltage	Vmf	--	10	V	
Reverse Voltage (Analog PD)	VfAP	--	25	V	
Reverse Current (Analog PD)	IfAP	--	4	mA	

**Electrical and Optical Characteristics
1550nm Analog Receiver**

Parameters are at 25 °C unless otherwise noted.

Parameter	Symbol	Condition	Min	Typ.	Max.	Unit
Input Wavelength	λ_{pd}		1540	1550	1565	nm
Responsivity	R	CW, $\lambda=1540-1545\text{nm}$	0.80	--	--	A/W
		CW, $\lambda=1550\text{nm}$	0.85	--	--	
		CW, $\lambda=1555-1560\text{nm}$	0.80	--	--	
		CW, $\lambda=1565\text{nm}$	0.70	--	--	
Bandwidth(-3dB)	BW		2.5	--	--	GHz
Capacitance	Cpd	$V_r=5\text{V}$, $f=1\text{MHz}$, $P_{opt}=0\mu\text{W}$	--	--	0.8	pF
Dark Current	I_d	$V_r=5\text{V}$	--	--	5	nA
Optical Return Loss	ORL	$\lambda=1550\text{nm}$	35	--	--	dB
Second Order Inter-Modulation Distortion	IMD2	Note 1*	--	--	-70	dBc
Composite Triple Beat	IMD3	Note 1**	--	--	-80	dBc
Optical Isolation from External Source	ISO1	$\lambda=1480\text{nm}-1500\text{nm}$	30	--	--	dB
Optical Crosstalk from Internal LASER	Xopt	Note 2	--	--	-30	dB

Note: 1. Two tone two laser test ($f_1=109.25\text{MHz}$, $f_2=349.25\text{MHz}$, $f_3=439.25\text{MHz}$), OMI=40%, 0.5mW per laser.

* $f_m=548.5\text{MHz}$, $f_1=109.25$, $f_2=439.25$

** $f_m=529.25\text{MHz}$, $f_1=349.25$, $f_2=439.25$

2. $X_{opt}=10 \times \log\{(I_{xopt}/R)/P_f\}$. I_{xopt} is photo current at $P_f=3\text{dBm}$.


DFB-1310-DP-XX-5P-AAF-SA-X-X-183
1310nm DFB Laser Transmitter

Parameters are at 25 °C unless otherwise noted.

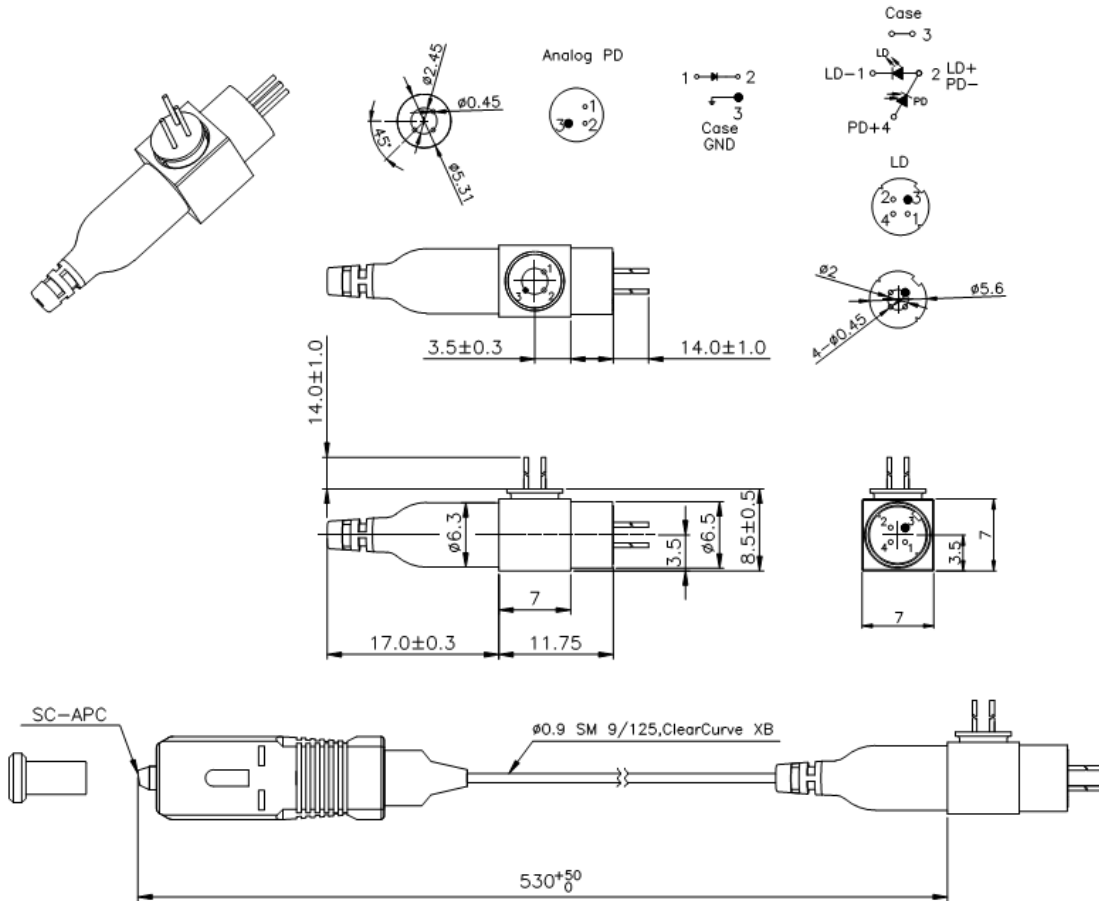
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	λ	1307	1310	1313	nm	T=25 °C Po=2mW
Side-mode Suppression Ratio	SMSR	30	40	--	dB	Po=2mW
Spectral Width(-20dB)	$\Delta\lambda$	--	--	1	nm	Po=2mW
Output Power	Po	2	--	--	mW	I _{op} ≤ 40mA at 25 °C I _{op} ≤ 85mA at 85 °C
Slope Efficiency	SE	0.08	--	--	W/A	
Output Power Tracking Error	TE	-1.5	--	1.5	dB	Over temperature range
Operation Voltage, BOL to EOL	Vop	--	1.2	1.6	V	Measured at maximum Po
Threshold Current, BOL to EOL	I _{th}	0.5	--	60	mA	Over temperature range
Monitor Diode Current	I _m	100	--	1000	uA	P _{opt} =2mW, V _r =5V
Monitor Dark Current	I _{md}	--	--	200	nA	P _{opt} =0mW, V _r =5V
Monitor PD Terminal Capacitance	C _t	--	--	20	pF	At V _r =5V at f=1MHz

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Dimensions and Pin assignment

Unit: mm

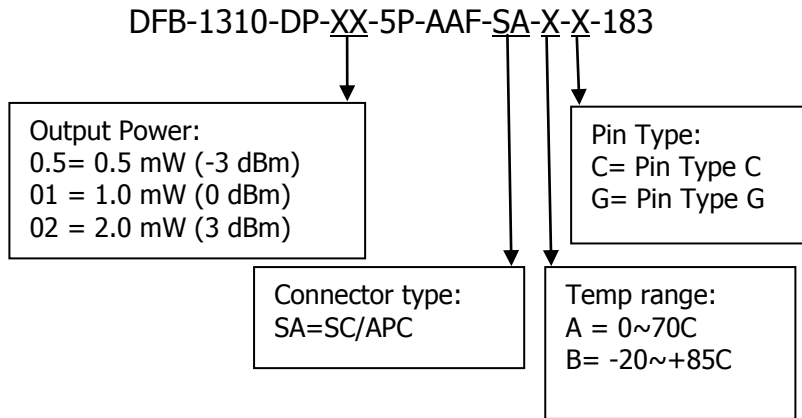
Tolerance: +/-0.3 mm





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Ordering Options



DFB-1310-DP-XX-5P-AAF-SA-X-X-183

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