

## 1310nmTx/1550nmRx FP Bi-Directional Optical Subassembly

### Description

LB3F12 series is a 1310(TX)/1550nm(RX) Bi-direction Optical Subassembly (BOSA) for RFOG transmission application .

This module contains a 1310nm MQW FP laser diode as transmitter, an InGaAs/InP PIN as receiver, an edge filter (1310nm transmit / 1550nm reflect) to separate 1310nm and 1550nm wavelength.

The FP laser integrated an InGaAs monitor PD, it can be used with appropriate feedback control circuitry to set optical power level for the FP laser, As the current changed above the threshold, the optical power will change accordingly.

The PIN transduces incident light into optical current with high efficiency. The PIN chip has a photosensitivity area diameter of 80um with a InGaAs planar structure.

The product has single mode type fiber with a FC/APC or SC/APC optical connector.



### Features

- 1310 nm transmitter with uncooled FP-LD
- Low noise, low distortion, Low threshold current
- 1550nm PIN diode receiver
- Low optical crosstalk
- operating temperature range: -40°C to 85°C

### Application

- RFOG system application
- Suitable for CATV/CDMA application

**Absolute Maximum Ratings<sup>[1]</sup>**

Parameter	Symbol	Min	Max	Units	Notes
Reverse Voltage(LD)	$V_{RL}$	---	2	V	
Forward Current(LD)	IFL	---	120	mA	
Reverse Voltage(MPD)	VRMP	---	15	V	
Forward Current(MPD)	IFMP	---	2	mA	
Reverse Voltage(PIN)	VRP	---	20	V	
Forward Current(PIN)	IR	---	5	mA	
Fiber Input Power	Pin	---	10	dBm	
Operating Temperature <sup>[1]</sup>	$T_c$	-40	+85	°C	Case temperature
Storage Temperature	$T_{STG}$	-40	+85	□	Ambient temperature
Relative Humidity	RH	---	80	%	
Lead Soldering Temperature/Time	$T_s$	---	260/10	□/S	
Fiber bend radius		30	---	mm	
Fiber yield strength		---	1	kgf	

**Note 1:** Beyond the scope of absolute maximum ratings can cause permanent damage to the device. If it has been a long time to use the device in the absolute maximum ratings may affect device reliability.

**Electric and Optical Characteristics**

(All measurements are at Case temperature of  $25 \pm 3 \square$ , @1310±10nm unless stated otherwise.)

Transmitter Operating Characteristic-Optical, Electrical						
Parameter	Symbol	Min	Typical	Max	Units	Notes
Fiber Output Power	$P_o$	1.0	1.4	---	mW	CW, If=Ith+20mA
Slope Efficiency	$\eta$	0.05	0.07	---	W/A	CW
Center Wavelength	$\lambda$	1290	1310	1330	nm	CW, If=Ith+20mA
Spectral Width(-20dB)	$\Delta\lambda$	---	2	5	nm	CW, If=Ith+20mA
Modulation Bandwidth	BW	3	---	---	GHz	-3dB
Tracking Error	$TE^{[1]}$	-1.5	---	1.5	dB	$I_M$ hold@ $P_o=1.5mW, 25^\circ C$ CW, $T_c = -40 \sim +85^\circ C$
Threshold Current	$I_{th}$	---	8	15	mA	CW
		---	30	45	mA	CW, $T_c = +85^\circ C$
Operating Voltage	$V_F$	---	1.2	1.7	V	CW
Monitor Current	$I_M$	100	---	1300	μA	CW, If=Ith+20mA, $V_{RMP}=1V$
Monitor Dark Current	$I_D$	---	---	100	nA	CW, $V_{RMP}=5V$
Photodiode Capacitance	C	---	---	10	pF	$V_{RMP}=5V, f=1MHz$
Rise time	$T_r$	---	---	150	Ps	Unfilter 20%~80%
Fall time	$T_f$	---	---	150	Ps	Unfilter 20%~80%
Relative Intensity Noise	RIN	---	---	-125	dB/Hz	CW, If=Ith+20mA

Receiver Operating Characteristic-Optical, Electrical						
Parameter	Symbol	Min	Typical	Max	Units	Notes
Operating Wavelength	$\lambda$	1480	1550	1600	nm	
Saturation Power	Psat	3	---	---	dBm	Pin=-30dBm,VRP=5V, $\lambda$ =1550nm
Responsivity	R	0.75	0.9	---	A/W	
Small Signal Bandwidth	BW	3.0	---	---	GHz	-3dB, VRP=12V
Dark Current	$I_D$	---	---	1	nA	VRP = 5 V
Composite Second Order beat	CSO <sup>[2]</sup>	---	---	-70	dBc	
Composite Third Order beat	CTB <sup>[2]</sup>	---	---	-80	dBc	
Capacitance	C	---	---	0.8	PF	VRP=5V,f=1MHz
Other Characteristic-Optical, Electrical						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Crosstalk	CRT	---	---	-40	dB	
Return Loss	RL	12	---	---	dB	$\lambda$ =1310nm
		35	---	---	dB	$\lambda$ =1550nm
Optical Isolation	Iso	30			dB	$\lambda$ =1260nm~1360nm
Exterior fiber diameter		0.8	0.9	1.0	mm	70 ° max temperature
Pigtail Length	L	900	1000	1100	mm	Outline Dimensions[L]
Optical Connector Return loss	ORL	45	---	---	dB	

Notes1:TE=10\*log(Pf(Tc)/Pf(25 °)) @ APC with monitor current is constant.

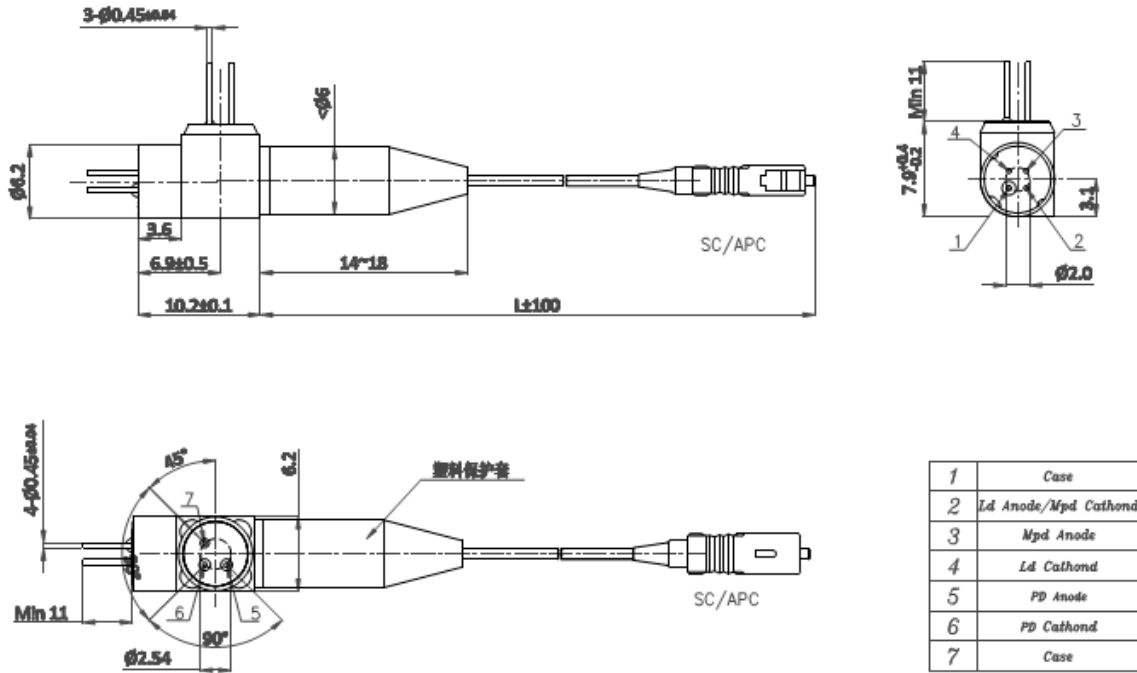
Notes2:Two-tone test condition : f1=50MHz, f2=505MHz, f1±f2, VRP=-12V,Pavg=0dBm,MI=0.4,Rload=75Ω.

### Pigtail parameters

Parameter	Symbol
Optical connector	SC/APC (IEC874/7)
Mode field diameter	9.5±1um
Cladding diameter	125±2um
Outermost Jacket	900±100um
Jacket color	Yellow or White
Pigtail Length	1.0±0.1m

**Outline Dimensions**

All dimensions are ±0.1mm unless otherwise specified (Unit: mm). For detail information please contact LinkPhotonic.



**Precautions**

Semiconductor chips are sensitive to electro-static damage. The module shall be packed with antistatic material for transportation. The working station and operators shall be grounded. Switching transients can cause electrical overstress (EOS) damage to the chips. EOS be may resulted from improper ESD handling, improper power sequencing, a faulty power supply or an intermittent connection.

- a. Operators should always use antistatic bands and clothing, electric conductive shoes, and other safety appliances while at work are highly recommended.
- b. Humidity in working environment should be controlled equal or above 40 percent RH.
- c. It is recommended that grounding mats be placed on the surfaces of assembly line workbench and the surrounding floor in working area, etc.
- d. When mounting this product in other parts or materials which can be electrically charged (printed wiring boards, plastic products, etc.), pay close attention to the static electricity in those parts.ESD may damage the product.

**Ordering Information**

**LB3F12 - xxx**

- Customer Information
- Operating Temperature:  
C:0-70℃ E:-20-80℃ I:-40-85℃
- Optical Connector Type:  
A: FC/UPC-SM-0.9-1.0M  
B: FC/APC-SM-0.9-1.0M  
C: SC/UPC-SM-0.9-1.0M  
D: SC/APC-SM-0.9-1.0M

**Statement**

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