

C-13/15-FXXM-PX-XXXX/XXX-XX



**Features**

- Single fiber bi-directional operation
- Laser diode with multi-quantum- well structure
- Low threshold current
- InGaAs/InP PIN Photodiode with trans-impedance amplifier
- High sensitivity with AGC\*
- Differential ended output
- Single +3.3V Power Supply
- Integrated WDM coupler
- Un-cooled operation from -40°C to +85°C
- Hermetically sealed active component
- SM/MM fiber pigtailed packaging with optional FC/ST/SC/MU/LC- connector
- Design for fiber optic networks application
- RoHS Compliant available

**Absolute Maximum Rating (Tc=25°C)**

Parameter	Symbol	Value	Unit
Fiber Output Power L/M/H	$P_f$	1(L)/1.5(M)/2.5(H)	mW
LD Reverse Voltage	$V_{RLD}$	2	V
PIN-TIA Voltage	$V_{CC}$	4.5	V
Operating Temperature	$T_{opr}$	-40 to +85	°C
Storage Temperature	$T_{stg}$	-40 to +85	°C

(All optical data refer to a coupled 9/125µm SM fiber & 50/125µm MM fiber)

**Optical and Electrical Characteristics (Tc=25°C)**

Parameter	Symbol	Min	Typical	Max	Unit	Test Condition
<b>Laser Diode</b>						
Optical Output Power	L	0.2	0.35	0.5	mW	CW, $I_{th}+ 20mA$ , kink free
	M	0.5	0.75	1		
	H	1	1.6	-		
Peak Wavelength	$\lambda$	1290	1310	1330	nm	CW, $P_f=P_f(\text{Min})$
Spectrum Width (RMS)	$\Delta\lambda$	-	-	5	nm	CW, $P_f=P_f(\text{Min})$
Threshold Current	$I_{th}$	-	10	15	mA	CW
Forward Voltage	$V_f$	-	1.2	1.5	V	CW, $P_f=P_f(\text{Min})$
Rise/Fall Time	$t_r/t_f$	-	-	0.5	ns	$I_{bias}=I_{th}$ , 10% to 90%
<b>Monitor Diode</b>						
Monitor Current	$I_m$	100	-	-	µA	CW, $P_f=P_f(\text{Min})$ , $V_{RPD}=2V$
Dark Current	$I_{DARK}$	-	-	0.1	µA	$V_{RPD}=5V$
Capacitance	$C_t$	-	6	15	pF	$V_{RPD}=5V$ , $f=1MHz$
<b>Module</b>						
Tracking Error	$\Delta P_f/P_f$	-1.5	-	1.5	dB	APC, -40 to +85°C
Optical Crosstalk	CRT		< -40		dB	

**Note:**

- 1.Pin assignment can be customized.
- 2.Specifications subject to change without notice.

### Detector $\lambda=1480-1600\text{nm}$

#### DC Electrical Characteristics (Tc=25°C)

Parameter	Symbol		Min	Typical	Max	Unit	Test Condition
Power Supply	V <sub>CC</sub>		3.0	3.3	3.6	V	
Differential Output Voltage	V <sub>d</sub>	F02	-	-	1000	mV	
		F04	-	260	450		
		F06	185	250	415		
Supply Current (no load)	I <sub>CC</sub>	F02	-	-	35	mA	
		F04	-	21	30		
		F06	-	26	50		

#### AC/Optical and Electrical Characteristics (Tc=25°C)

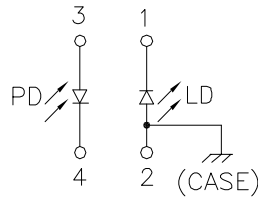
Parameter	Symbol		Min	Typical	Max	Unit	Test Condition
Detection Range			1480	1550	1600	nm	-
Gain @ 10 Mbps Differential	G	F02	52	-	70	V/mW	Measure differentially, AC coupled, R <sub>L</sub> =50Ω
		F04	6	7	-		Measure differentially, AC coupled, R <sub>L</sub> =50Ω
		F06	1.92	2.5	3.4		Measure differentially with 30uAp-p signal
Bandwidth	BW	F02	120	140	-	MHz	
		F04	404	470	-		
		F06	700	920	1100		
Saturation Power	P <sub>sat</sub>	F02	-3	0	-	dBm	BER<10 <sup>-10</sup> @155Mbps PRBS 2 <sup>23</sup> -1, Er=10dB
		F04	-7	-6	-		BER<10 <sup>-10</sup> @622Mbps PRBS 2 <sup>23</sup> -1, Er=10dB
		F06	-3	-	-		BER<10 <sup>-12</sup> @1.25Gbps PRBS 2 <sup>7</sup> -1, Er=10dB
Sensitivity	Sens.	F02	-	-38	-35	dBm	BER<10 <sup>-10</sup> @155Mbps PRBS 2 <sup>23</sup> -1, Er=10dB
		F04	-	-33	-30		BER<10 <sup>-10</sup> @622Mbps PRBS 2 <sup>23</sup> -1, Er=10dB
		F06	-	-26	-23		BER<10 <sup>-12</sup> @1.25Gbps PRBS 2 <sup>7</sup> -1, Er=10dB
Output Resistance	R <sub>out</sub>	F02	-	50	-	ohm	
		F04	48	50	52		
		F06	48	50	62		

Pin Assignment

### LD Pin Assignment

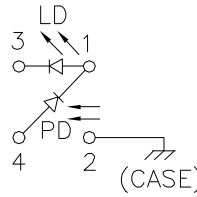
#### A Type

- Pin 1 : Laser Cathode
- Pin 2 : Laser Anode and Case Gnd
- Pin 3 : Monitor Diode Anode
- Pin 4 : Monitor Diode Cathode

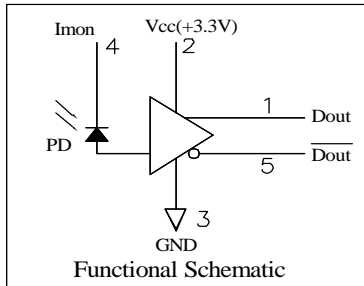


#### D Type

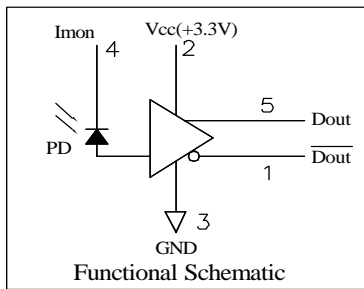
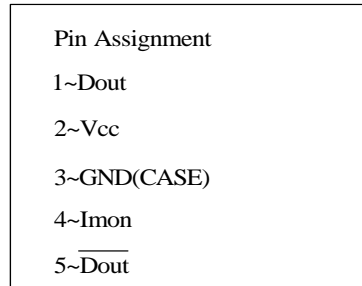
- Pin 1 : Laser Anode and Monitor Diode Cathode
- Pin 2 : Case Gnd
- Pin 3 : Laser Cathode
- Pin 4 : Monitor Diode Anode



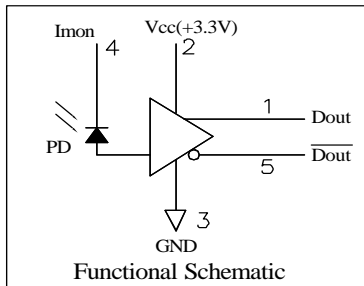
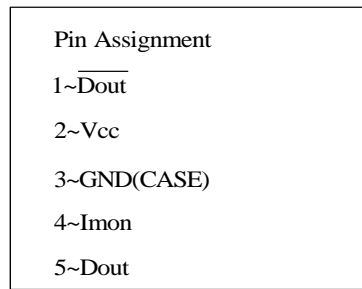
### PIN-TIA Pin Assignment



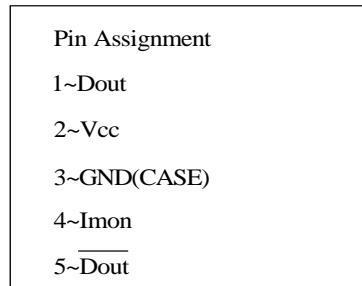
F02



F04



F06

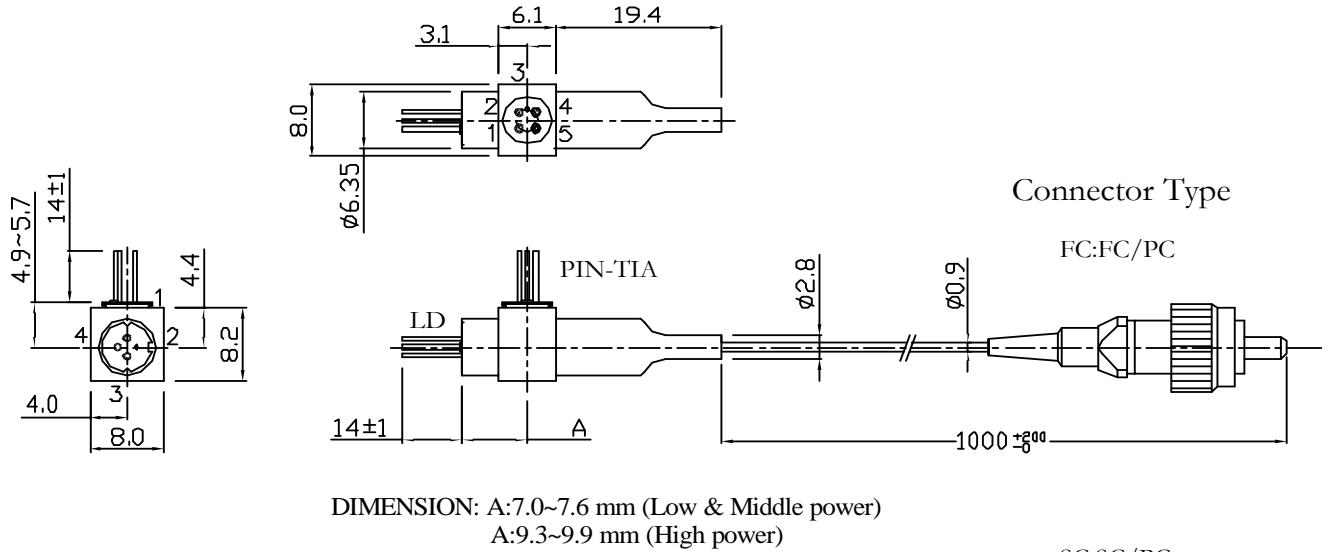


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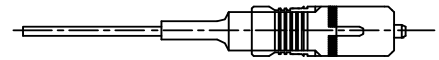
Outline Dimensions

Units in mm.

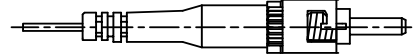
### C-13/15-FXXM-PX-SXXX/XXX-XX



SC:SC/PC



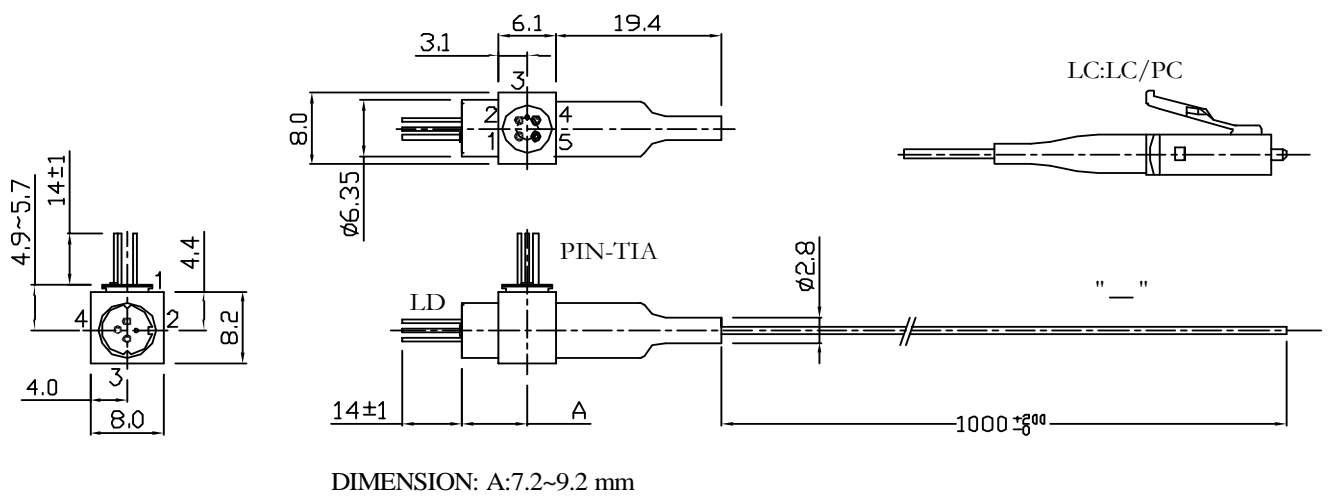
ST:ST/PC



MU:MU/PC



### C-13/15-FXXM-PX-MXXX/XXX-XX



Ordering Information

## C-13/15-FXXM-PX-XXXX/XXX-XX

1310nm Transmitter  
1550nm Receiver

M = with 5 pinout

Pin Assignment  
"." = A Type  
D = D Type

Connector  
FC/ST/SC/MU/LC/-

Fiber Output Power  
L/M/H

" - " = PC Fiber  
APC = APC Fiber  
(for single mode)

02: 155 Mb/s PIN-TIA+3.3V  
04: 622 Mb/s PIN-TIA+3.3V  
06: 1250 Mb/s PIN-TIA+3.3V

Fiber Application  
S=SM 9/125µm  
M=MM 50/125µm

RoHS Compliant  
-/G5/GR  
Blank = RoHS non-compliant product  
G5 = RoHS 5/6-compliant product (lead exemption)  
GR = Full RoHS compliant product (no exemption)

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.  
Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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