

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<br>M<br>H        | 0.2<br>0.5<br>1 | 0.35<br>0.75<br>1.6 | 0.5<br>1<br>- | mW   | CW, $I_{th} + 20mA$ , kink free              |
| 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( $T_c=25^\circ\text{C}$ )

| Parameter                   | Symbol   |     | Min | Typical | Max  | Unit | Test Condition |
|-----------------------------|----------|-----|-----|---------|------|------|----------------|
| Power Supply                | $V_{CC}$ |     | 3.0 | 3.3     | 3.6  | V    |                |
| Differential Output Voltage | $V_d$    | F02 | -   | -       | 1000 | mV   |                |
|                             |          | F04 | -   | 260     | 450  |      |                |
|                             |          | F06 | 185 | 250     | 415  |      |                |
| Supply Current (no load)    | $I_{CC}$ | F02 | -   | -       | 35   | mA   |                |
|                             |          | F04 | -   | 21      | 30   |      |                |
|                             |          | F06 | -   | 26      | 50   |      |                |

### AC/Optical and Electrical Characteristics( $T_c=25^\circ\text{C}$ )

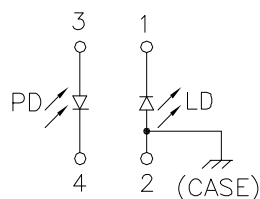
| Parameter                   | Symbol |     | Min  | Typical | Max  | Unit | Test Condition                                                  |
|-----------------------------|--------|-----|------|---------|------|------|-----------------------------------------------------------------|
| Detection Range             |        |     | 1480 | 1550    | 1600 | nm   | -                                                               |
| Gain @ 10 Mbps Differential | G      | F02 | 52   | -       | 70   | V/mW | Measure differentially, AC coupled, $R_L=50\Omega$              |
|                             |        | F04 | 6    | 7       | -    |      | Measure differentially, AC coupled, $R_L=50\Omega$              |
|                             |        | 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            | Psat   | 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           | Rout   | F02 | -    | 50      | -    | ohm  |                                                                 |
|                             |        | F04 | 48   | 50      | 52   |      |                                                                 |
|                             |        | F06 | 48   | 50      | 62   |      |                                                                 |

## Pin Assignment

### LD Pin Assignment

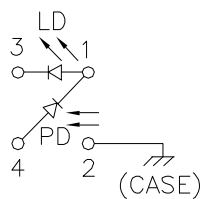
#### A Type

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

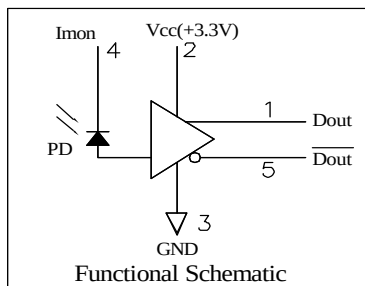


#### D Type

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



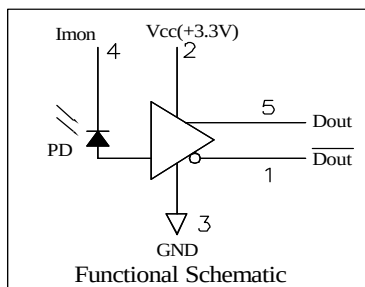
### PIN-TIA Pin Assignment



F02

#### Pin Assignment

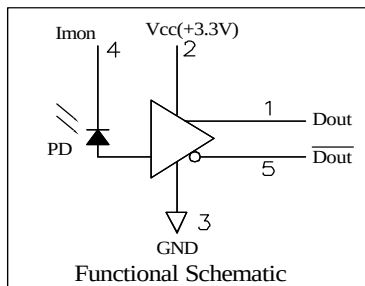
1~Dout  
2~Vcc  
3~GND(CASE)  
4~Imon  
5~Dout



F04

#### Pin Assignment

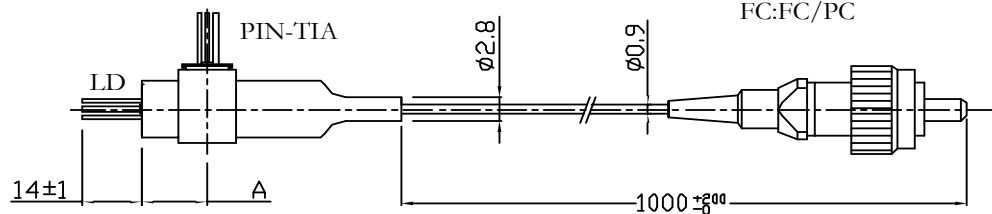
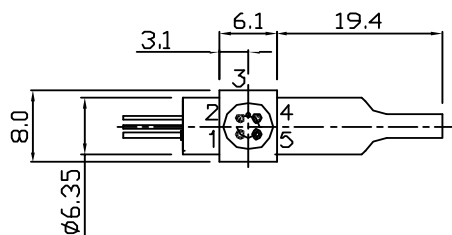
1~Dout  
2~Vcc  
3~GND(CASE)  
4~Imon  
5~Dout



F06

#### Pin Assignment

1~Dout  
2~Vcc  
3~GND(CASE)  
4~Imon  
5~Dout

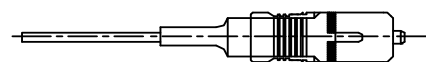


DIMENSION: A:7.0~7.6 mm (Low & Middle power)  
A:9.3~9.9 mm (High power)

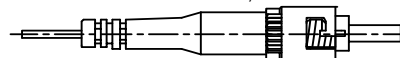
Connector Type

FC:FC/PC

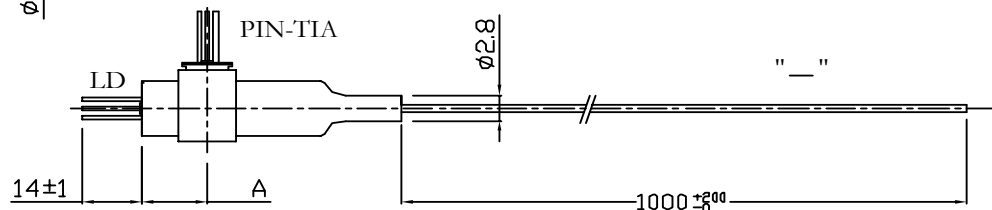
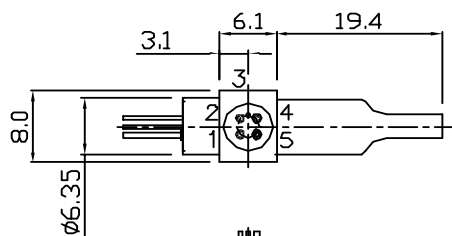
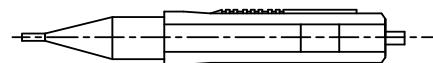
SC:SC/PC



ST:ST/PC



MU:MU/PC



DIMENSION: A:7.2~9.2 mm

LC:LC/PC



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