

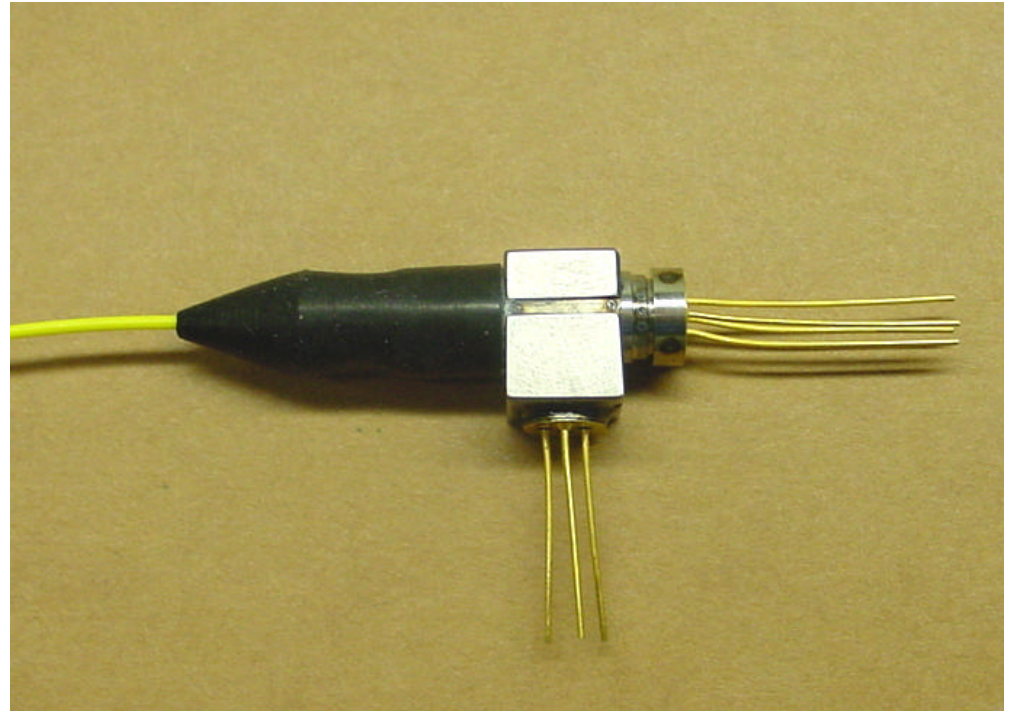
## Applications

- Passive Optical Networks
- FTTH/FTTC
- Full Duplex Communications
- Single Wavelength Bidirectional
- CATV
- Digital or Analog Operation

## Features

- Output Power up to 2 mW CW
- -40 to +85° Operating Temperature
- 1310 FP MQW Laser Diode
- Low Noise InGaAs PIN Photodiode
- Compact, rugged construction
- Low Threshold Current Laser
- Low Power Consumption
- Available with optical connectors
- Replaces Discreet Lasers and Optical Couplers
- Class 1 Eye Safe Device
- Low Optical Cross Talk, <-24dB

PD-LD Inc. offers its next generation of Single Wavelength BiDirectional transmitter and receiver modules operating in the 1310 or the 1550nm optical windows. These devices are designed to simultaneously transmit and receive over a single optical fiber at frequencies from DC to 1.5 GHz. Single wavelength bi-directional modules replace the need for a single mode fiber coupled laser diode, a fiber coupled InGaAs PIN photodiode, a discreet fiber optic coupler and a second stage optical isolator. The BiDirectional Modules combine all of these optical functions and relieve the user of having to fusion splice several discreet units together and then squeeze them onto their PCB.



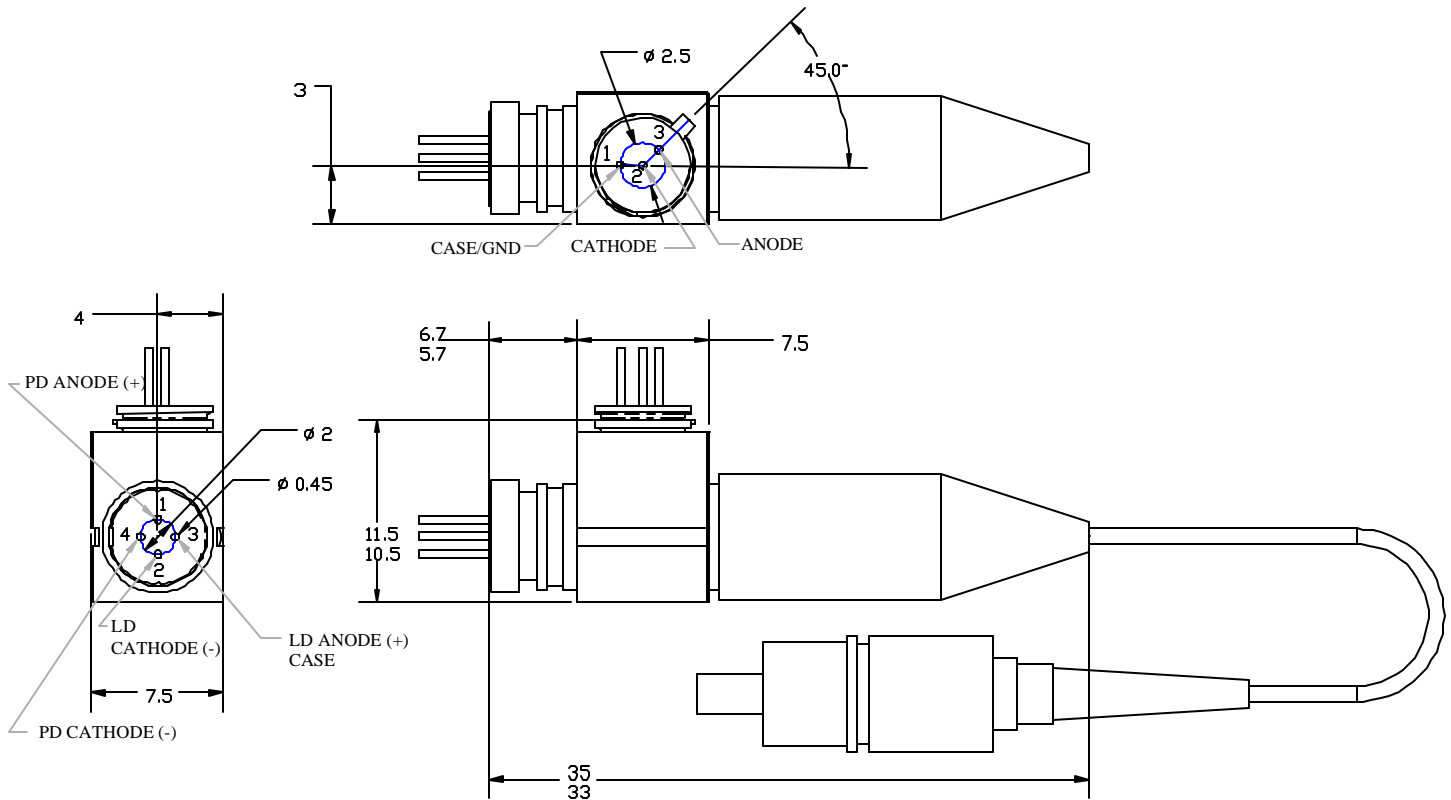
These small, compact modules require minimal board real estate and when used in pairs deliver full duplex operation of a single 9/125um optical fiber. The use of high performance optical filters maintains an optical cross talk between the channels <-24dB.

The PD-LD product incorporates low threshold current, high differential quantum efficiency MQW(Multiple Quantum Well) FP semiconductor lasers whose typical total operating currents are less than 30mA. The receiver section offers a discreet 75um diameter InGaAs PIN photodiode of planar semiconductor design that has dielectric passivation for very low noise performance. (Modules with PIN TIA receiver sections are also available in a variety of standard bandwidths). PD-LD's BiDirectional WDM modules are built to meet the demanding requirements for ATM-PON ONU and LTU applications.

These units combine the electro optic performance and robust mechanical integrity necessary to meet the demands of passive optical networks outlined in FSAN, ITU-G1983.

The PD-LD BiDirectional modules are assembled using laser welding processes. This technique guarantees a semiconductor to optical fiber interface that remains stable over mechanical and environmental extremes. The optical semiconductor die are mounted within hermetically sealed TO can subassemblies making them impervious to contaminants and moisture.

WDM BiDirectional modules are built with 1 meter long 9/125/900 um SMF28 fiber optic pigtailed. These fibers may be terminated with most standard fiber optic connectors including FC, SC, ST and LC.



**Absolute  
Maximum Ratings  
Parameters**

Module	Symbol	Rating	Units
Operating Temp	$T_{OP}$	-40 to 85	°C
Storage Temp	$T_{STG}$	-40 to 85	°C
Soldering Temp	$T_{SLD}$	250	°C
<b>Laser Diode</b>			
Forward Current	$I_{F(LD)}$	100	mA
Reverse Voltage	$V_{R(LD)}$	2	V
<b>Monitor Diode</b>			
Forward Current	$I_{F(MD)}$	2	mA
Reverse Voltage	$V_{R(MD)}$	20	V
<b>PIN Photodiode</b>			
Forward Current	$I_{F(PD)}$	10	mA
Reverse Current	$I_{R(PD)}$	5	mA
Reverse Voltage	$V_{R(PD)}$	30	V
Max Optical Input Power	P	1.5	mW

BiDirectional Module Characteristics and Parameters						
	Symbol	MIN.	TYP.	MAX	Units	Test Condition
<b>Laser Diode</b>						
Power Low	P <sub>O</sub>	0.5	0.9		mW	CW
Power Medium	P <sub>O</sub>	1.0	1.5		mW	CW
Power High	P <sub>O</sub>	2.0	2.5		mW	CW
Threshold Current 1310nm	I <sub>TH</sub>	-	5	15	mA	CW
Threshold Current 1550nm	I <sub>TH</sub>	-	10	20	mA	CW
Operating Current	I <sub>OP</sub>	-	20	35	mA	I <sub>F</sub> = I <sub>OP</sub>
Operating Voltage	V <sub>OP</sub>	-	1.1	1.5	V	I <sub>F</sub> = I <sub>OP</sub>
Peak Wavelength 1310nm	Lambda	1290	1310	1330	nm	25°C
Peak Wavelength 1550nm	Lambda	1520	1550	1580	nm	25°C
Spectral Width	Delta Lambda	-	1	2	nm	RMS
Temp. Coefficient		-	-	<0.5	nm/°C	-40 to 85°C
Rise/Fall Time	t <sub>r</sub> , t <sub>f</sub>	-	0.3	0.7	nsec	10~90%
<b>Monitor Diode</b>						
Output	I <sub>MD</sub>	0.1	0.5		mA	I <sub>F</sub> = I <sub>OP</sub> , P <sub>O</sub>
Dark Current	I <sub>D(MD)</sub>	-	0.01	0.1	µA	V <sub>R(MD)</sub> = 10V
Capacitance	C <sub>(MD)</sub>	-	10	20	pF	V <sub>R(MD)</sub> = 10V, f = 1MHz
Tracking Error		-1		+1	dB	-40 to 85°C
<b>PIN Photodiode</b>						
Active Area			75		µm	Diameter
Spectral Sensitivity	S	0.6	0.7		A/W	V <sub>R(PD)</sub> = 5V @ 1550nm
Dark Current	I <sub>D(PD)</sub>	-	0.4	0.8	nA	V <sub>R(PD)</sub> = 5V @ 25°C
Dark Current	I <sub>D(PD)</sub>	-		40	nA	V <sub>R(PD)</sub> = 5V @ 85°C
Capacitance	C <sub>(PD)</sub>		0.7	0.9	pF	V <sub>R(PD)</sub> = 5V, f = 1MHz
Rise/Fall Time	t <sub>r</sub> , t <sub>f</sub>	-	-	0.3	nsec	V <sub>R(PD)</sub> = 5V, 10~90%
<b>Module</b>						
Bandwidth	f <sub>C</sub>			1.5GHz		
Optical Crosstalk	X <sub>TALK</sub>			-24	dB	

PD-LD Inc. reserves the right to make modifications to or discontinue products without prior notice.

10-01 BiDi Rev.0

## Ordering Information

