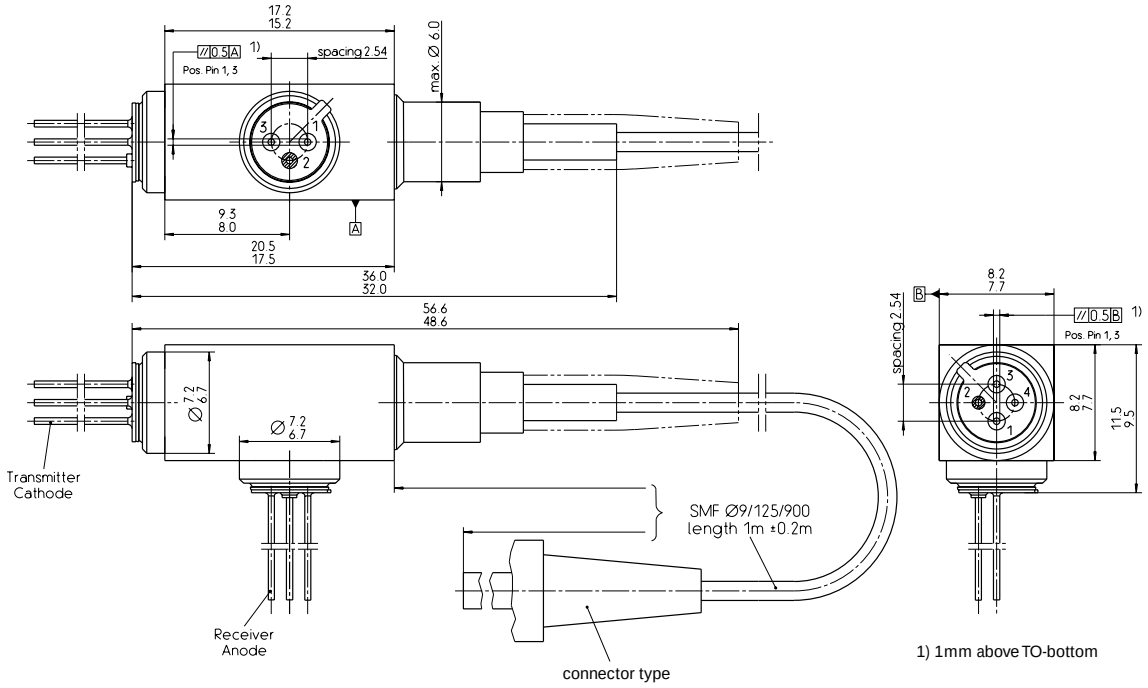
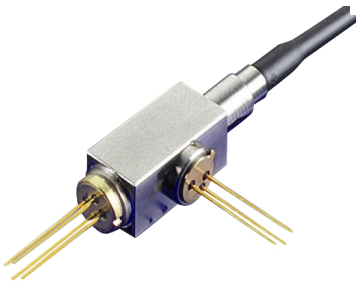
LOW POWER SBL82314x

BIDI® Optical Standard Module
1550 nm Emitting, 1300 nm Receiving

Dimensions in mm





FEATURES

- **Designed for application in passive-optical networks**
- **Integrated Wavelength Division Multiplexer (WDM) or Beam Splitter**
- **Bi-Directional Transmission in 2nd and 3rd optical window**
- **Single fiber solution**
- **FP-Laser Diode with Multi-Quantum Well structure**
- **Class 3B Laser Product**
- **Suitable for bit rates up to 1.25 Gbit/s**
- **Ternary Photodiode at rear mirror for monitoring and control of radiant power**
- **Low noise / high bandwidth PIN diode**
- **Hermetically sealed subcomponents, similar to TO 46**
- **With singlemode fiber pigtail**

Absolute Maximum Ratings

Module

Operating temperature range at case, T_C ..... –40 °C to 85°C
Storage temperature range, T_{stg} ..... –40 °C to 85°C
Soldering temperature t_{max}=10 s,
2 mm distance from bottom edge of case, T_S.....260°C

Laser Diode

Direct forward current, $I_{F\ max}$ ..... 120 mA
Radiant power CW, $P_{F,\ rad}$.....1 mW
Reverse Voltage, V_R..... 2 V

Monitor Diode

Reverse Voltage, V_R.....10 V
Forward Current, I_F.....2 mA

Receiver Diode

Reverse Voltage, V_R.....10 V
Forward Current, I_F .....2 mA
Optical power into the optical port, P_{port} ..... 15 mW

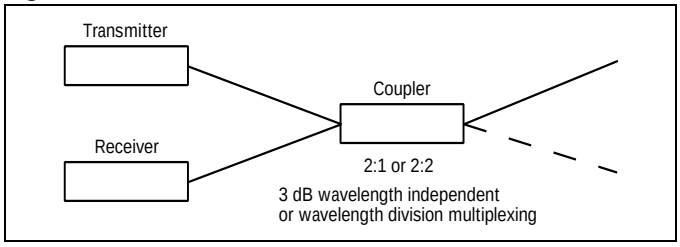
DESCRIPTION

The Infineon module for bidirectional optical transmission has been designed for different optical networks structures:

In the last few years the structure has changed from point to point planned for Broad band ISDN to a point to multipoint passive optical network (PON) architecture for the optical network in the subscriber loop.

A transceiver can be realized with discrete elements (Fig. 1). Transmitter and receiver with pigtails are connected with a fiber-coupler (2:1 or 2:2, wavelength independent or WDM).

Figure 1. Realization with discrete elements

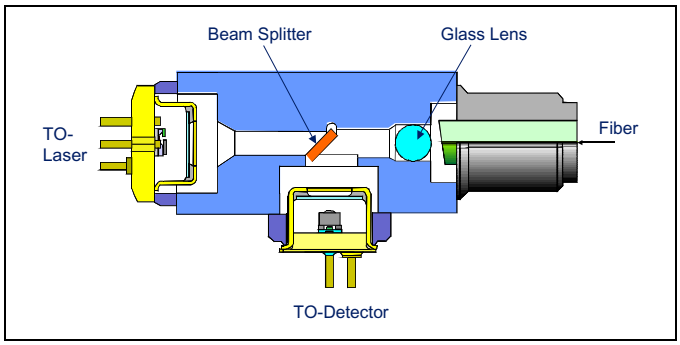


Infineon has realized this transceiver configuration in a compact module called a BIDI® (Fig. 2).

This module is especially suitable for separating the opposing signals at the ends of a link. It replaces a discrete solution with a transmitter, receiver and coupler.

The basic devices are a laser diode and a photodiode, each in a TO package, plus the filter in the beam path. A lens in the TO laser concentrates the light and enables it to be launched into the single-mode fiber of the module. In the same way the light from the fiber is focused onto the small, light-sensitive area of the photodiode to produce a high photo current. The mirror for coupling out the received signal is arranged in the beam so that the transmitter and receiver are at right angles to each other. This means the greatest possible degree of freedom in the layout of the electric circuit.

Figure 2. Compact realization of the transceiver in one module



A decisive advantage of the module is its use of standard TO components. These devices, produced in large quantities, are hermetically sealed and tested before they are built in. This makes a very substantial contribution to the excellent reliability of the module. The solid metal package of the module serves the same purpose. It allows the use of modern laser welding techniques for reliable fixing of the different elements and the fiber holder.

TECHNICAL DATA

The electro-optical characteristics described in the following tables are only valid for use within the specified maximum ratings or under the recommended operating conditions.

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Optical output power (maximum)	$P_{F,\,max}$	0.4			mW
Emission wavelength center of range P_F=0.5 $P_{F,\,max.}$	λ_{trans}	1510		1590	nm
Spectral width (RMS)	σ_λ			5	
Temperature coefficient of wavelength	TC			0.5	nm/K
Threshold current (whole temperature range)	I_{th}	2		55	mA
Forward voltage P_F=0.5 $P_{F,\,max.}$	V_F			1.5	V
Radiant power at I_{th}	P_{th}			20	µW
Slope efficiency (–40...85°C)	η	8		60	mW/A
Variation of 1st derivative of P/I (0.05 to 0.4 mW)	S_{var}	–30		30	%
Differential series resistance	R_S			8	Ω
Rise time (10%–90%)	t_r		100	200	ps
Fall time (10%–90%)	t_f		270	500	

Monitor Diode Electro-Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Dark current, V_R=5 V, P_F=0, T=T_{max}	I_R			200	nA
Photocurrent, V_R=5 V, P_F=0.5 $P_{F,\,max.}$	I_P	50		1500	µA
Capacitance, V_R=5 V, f=1 MHz	C_5			10	pF
Tracking error(1), V_R=5 V	TE	–1		1	dB

Note

1. The tracking error TE is the maximum deviation of P_F at constant current I_{mon} over a specified temperature range and relative to the reference point: $I_{mon,ref}$=I_{mon} (T=25°C, P_F=0.5 $P_{F,\,max.}$). Thus, TE is given by:

$$TE\ [dB]\ =\ 10 \times \log \frac{P_F\ [Tc]}{P_F\ [25^oC]}$$

Receiver Diode Electro-Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Spectral sensitivity V_R=5 V, λ=1300 nm	S_{rec}	0.65		1	A/W
Rise and fall time (10%–90%) R_L=50 Ω, V_R=5 V	t_r; t_f			1	ns
Total capacitance V_R=5 V, P_{opt}=0, f=1 MHz	C			1.5	pF
Dark current V_R=5 V, P_{opt}=0	I_D			50	nA

Module Electro-Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Optical Crosstalk(1)	|CRT|			–47	dB

Note

1 Optical Crosstalk is defined as

$$CRT\ [dB] = 10 \times \log \frac{I_{Det.o}}{I_{Det.1}}$$

with:

$I_{Det,0}$: the photocurrent with P_F=0.5 $P_{F,\ max.}$, without optical input, CW laser operation, V_R=2 V and

$I_{Det,1}$: the photocurrent without P_F but 0.5 $P_{F,\ max.}$ optical input power, λ=1300 nm.

End of Life Time Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Threshold current at T=T_{max}	I_{th}			60	mA
Current above threshold, over full temperature range, at $I_{mon,ref}$=I_{mon} (T=25°C, P_F=0.5 $P_{F,\ max.}$, BOL)	ΔI_F	7		70	
Tracking Error	TE	–1.5		1.5	dB
Detector Dark Current, V_R=2 V, T=T_{max}	I_R			400	nA
Monitor Dark Current, V_R=2 V, T=T_{max}	I_R			1	µA

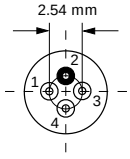
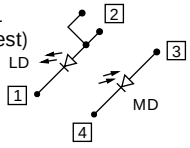
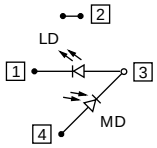
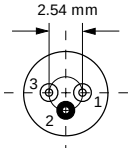
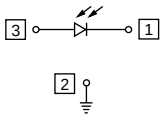
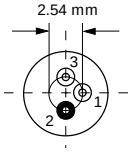
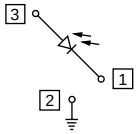
FIBER DATA

The mechanical fiber characteristics are described in the following table.

Fiber Characteristics

Parameter	Min.	Typ.	Max.	Units
Mode Field Diameter	8	9	10	µm
Cladding Diameter	123	125	127	
Mode Field/Cladding Concentricity Error			1	
Cladding Non-circularity			2	%
Mode Field Non-circularity			6	
Cut off Wavelength	1270			nm
Jacket Diameter	0.8		1	mm
Bending Radius	30			
Tensile Strength Fiber Case	5			N
Length	0.8		1.2	m

Pin Description

	Pinning (bottom view)	Pin Description
Transmitter		
		Pinning 1 (on request)  Pinning 2 (Standard) 
Receiver		
		Pinning 1 (Standard) 
		Pinning 2 (on request) 

Available Pinnings

Type	Transmitter	Receiver
SBL82314x	2	1
SBL81314x	1 (on request)	1 (on request)
	Other Pinnings on request	

Regulatory Compliance

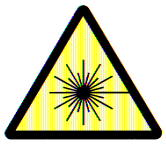
Feature	Standard	Comments
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD 883D Method 3015.7	Class 1 (<500 V)

EYE SAFETY

Ensure to avoid exposure of human eyes to high power laser diode emitted laser beams. Especially do not look directly into the laser diode or the collimated laser beam when the diode is activated.

CLASS 3B LASER PRODUCT according to IEC 60825-1

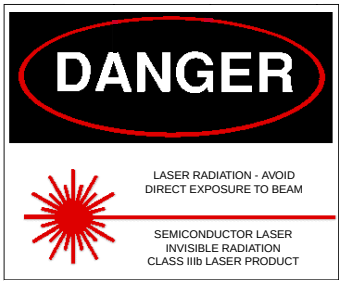
Required Labels



INVISIBLE LASER RADIATION
AVOID EXPOSURE TO BEAM
Class 3B Laser Product

Class IIIb LASER PRODUCT according to FDA Regulations complies with 21 CFR 1040.10 and 1040.11

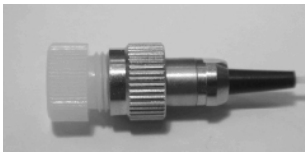
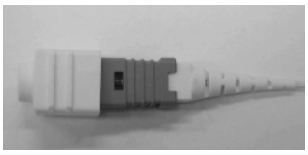
Required Label



Laser Data

Wavelength	1550 nm
Maximum total output power	less than 50 mW
Beam divergence ($1/e^2$)	10°

CONNECTOR OPTIONS

Model	Connector	Type
SBL82314G SBL81314G		SM FC/PC
SBL82314N SBL81314N		SM SC/PC 0°
SBL82314Z SBL81314Z		without connector

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www.infineon.com/fiberoptics

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