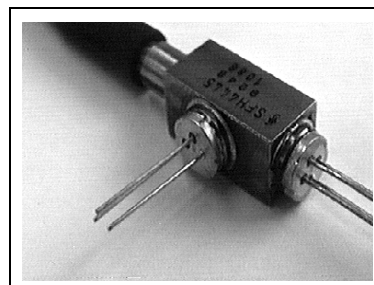


BIDI™ Transceiver Optical Module for ATM-PON OLT Applications, 1550 nm Emitting-/1300 nm Receiving Function, High Power DFB-Laser, InGaAs/InP-PIN Photodiode

- Designed for applications in passive-optical networks according FSAN, ITU-G.983
- **Suitable for OLT applications, 155 Mbit/s and 622 Mbit/s downstream bitrate, Class B and Class C**
- Uncooled 1550 nm DFB Laser Diode with Multi-Quantum Well structure
- Ternary Moniodiode at rear laser mirror for monitoring and control of radiant power
- Integrated Wavelength Division Multiplexer
- InGaAs/InP-PIN-photodiode with 1550 nm blocking filter
- Hermetically sealed subcomponents, similar to TO 18
- With singlemode fiber pigtail



Maximum Ratings

Output power ratings refer to the optical port. The operating temperature of the submount is identical to the case temperature

Module	Symbol	Value	Unit
Operating temperature range at case	T_C	- 20 ... + 70	°C
Storage temperature range	T_{stg}	- 40 ... + 85	°C
Soldering temperature $t_{max} = 10$ s, 2 mm distance from bottom edge of case	T_S	260	°C

Laser Diode	Symbol	Value	Unit
Direct forward current	$I_{F \max}$	120	mA
Radiant power CW	$P_{opt \max}$	4	mW
Reverse Voltage	$V_{R \max}$	2	V

Monitor Diode	Symbol	Value	Unit
Reverse Voltage	$V_{R \max}$	10	V
Forward Current	$I_{F \max}$	2	mA

PIN Photodiode	Symbol	Value	Unit
Forward current	$I_{F \max}$	2	mA
Reverse voltage	V_R	10	V
Maximum optical power into the optical port	$P_{\text{port max}}$	3	mW

Characteristics:

All optical data refer to the optical port at – 20 to + 70 °C Package-Temperature.

Laser Diode	Symbol	Min	Max	Unit
Optical output power (average)	$P_{\text{opt av}}$	1	–	mW
Optical output power (peak)	$P_{\text{opt peak}}$	2	–	mW
Emission wavelength center of range ($P_{\text{opt}} = 1 \text{ mW}$)	λ	1480	1580	nm
Side mode suppression ratio ($P_{\text{opt}} = 1 \text{ mW}$)	$SMSR$	–	30	dB
Threshold current	I_{th}	2	55	mA
Forward voltage ($P_{\text{opt}} = 1 \text{ mW}$)	V_F	–	1.5	V
Radiant power at I_{th}	P_{th}	–	50	μW
Slope efficiency	S	35	150	mW/A
Variation of 1st derivative of P/I (0.1 to 2.0 mW)	dP/dI	– 30	30	%
Differential series resistance ($P_{\text{opt}} = 1 \text{ mW}$)	r_S	–	8	Ω
Rise and fall time (10% - 90%)	t_r, t_f	–	0.5	ns
Temperature coefficient of wavelength	TC_λ	–	0.1	nm/K

Monitor-Diode	Symbol	Min	Max	Unit
Dark current, $V_R = 5\text{ V}$, $P_{\text{opt}} = 0$	I_R	–	0.5	μA
Photocurrent, $P_{\text{opt}} = 1\text{ mW}$	I_P	100	1000	μA
Capacitance, $V_R = 5\text{ V}$, $f = 1\text{ MHz}$	C_5	–	10	pF
Tracking error, $V_R = 5\text{ V}$, (see note 1)	TE	– 1	1	dB

Receiver-Diode	Symbol	Min	Max	Unit
Spectral sensitivity $\lambda = 1310\text{ nm}$, $V_R = 5\text{ V}$	$S_{\lambda 1310}$	0.65	1.0	A/W
Rise and fall time (10% - 90%) $R_L = 50\ \Omega$, $V_R = 5\text{ V}$, $\lambda = 1310\text{ nm}$, $P_{\text{opt}} = 100\ \mu\text{W}$	t_r ; t_f	–	0.5	ns
Total capacitance $V_R = 5\text{ V}$, $f = 1\text{ MHz}$	C_2	–	1.5	pF
Dark current $V_R = 5\text{ V}$, $P_{\text{opt}} = 0$	I_D	–	50	nA

Module	Symbol	Value	Unit
Optical Crosstalk (see note 2)	CRT	< -47	dB
Backreflection (Return Loss) @ $\lambda_{\text{in}} = 1310\text{nm}$	–	< -20	dB

Note 1: The tracking error TE is the variation rate of P_{opt} at constant current I_{mon} over a specified temperature range and relative to the reference point:
 $I_{\text{mon,ref}} = I_{\text{mon}} (T = 25\text{ }^\circ\text{C}, P_{\text{opt}} = 1\text{ mW})$. Thus, TE is given by:

$$TE[\text{dB}] = 10 \times \log \frac{P_{\text{opt}}[T_c] - P_{\text{opt}}[25^\circ\text{C}]}{P_{\text{opt}}[25^\circ\text{C}]}$$

Note 2: Optical Crosstalk is defined as $CRT = 10 \times \log(P_2/P_1)$ with: $P_1 = P_{opt} = 1 \text{ mW}$ with no optical input power P_{port} and P_2 the necessary optical input power P_{port} at $\lambda = 1300 \text{ nm}$ to get for $P_{opt} = 0$ the same receiver signal level as before ($V_R = 2 \text{ V}$).

Accompanying Information

T = 25 °C: Threshold current, slope efficiency, monitor current for 1 mW output power, peak wavelength for 1 mW output power.
T = 70 °C: Threshold current, slope efficiency

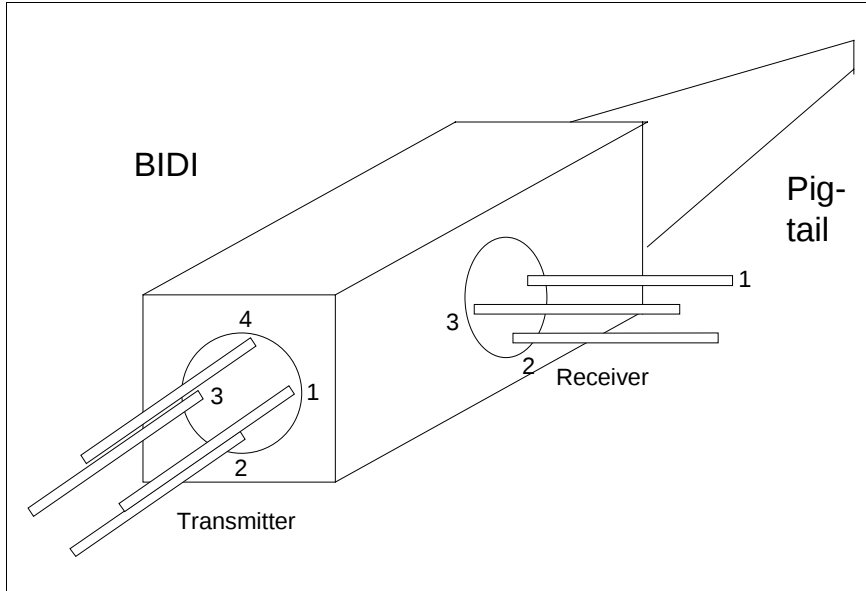
Pigtail

Fiber Pigtail, Single Mode, Silica	Min	Max	Unit
Mode field diameter	8	10	μm
Cladding diameter	123	127	μm
Mode field/cladding concentricity error	–	1	μm
Cladding non-circularity	–	2	%
Mode field non-circularity	–	6	%
Cut-off wavelength	1250	–	nm
Jacket diameter	0.8	1.0	mm
Bending radius	30	–	mm
Tensile strength fiber/case	5	–	N
Length	0.8	1.2	m

Connector

all standard connectors like FC/PC, SC, SC APC, available

Schematic Package Outline and Pinning:



Transmitter

- 1 LK
- 2 Case
- 3 MK, LA
- 4 MA

Receiver

- 1 Photodiode K
- 2 Gnd, Case
- 3 Photodiode A