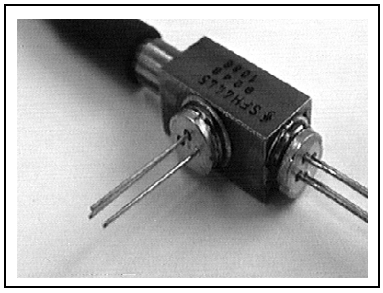
BIDI™ Transceiver Optical Module for ATM-PON ONU Applications, 1300 nm Emitting-/1550 nm Receiving Function, High Power FP-Laser, InGaAs/InP-PIN Photodiode with 622 Mbit/s Transimpedance Amplifier



- Designed for applications in passive-optical networks according FSAN, ITU-G.983
- **Suitable for ONU applications, 622 Mbit/s downstream bitrate, Class B**
- Uncooled 1300 nm FPLaser Diode with Multi-Quantum Well structure
- Ternary Moniordiode at rear laser mirror for monitoring and control of radiant power
- Integrated Wavelength Division Multiplexer
- InGaAs/InP-PIN-photodiode with 1300 nm blocking filter and integrated 622 Mbit/s transimpedance amplifier
- 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	– 40 … + 85	°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 with Preamplifier	Symbol	Value	Unit
Maximum Voltage	$V_{CC\ max}$	6	V
Maximum optical power (average)	$P_{port\ max}$	1	mW

Characteristics

All optical data refer to the optical port at – 40 to + 85 °C Package-Temperature.

Laser Diode	Symbol	Min	Max	Unit
Optical output power (average)	$P_{opt\ av}$	1	–	mW
Optical output power (peak)	$P_{opt\ peak}$	2	–	mW
Emission wavelength center of range (P_{opt} = 1 mW)	λ	1260	1360	nm
Spectral Width (RMS, P_{opt} = 1 mW)	$\Delta\lambda$	–	5.8	nm
Threshold current	I_{th}	2	45	mA
Forward voltage (P_{opt} = 1 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_{opt} = 1 mW)	r_S	–	8	Ω
Rise and fall time (10% - 90%)	t_r, t_f	–	0.5	ns
Temperature coefficient of wavelength	TC_λ	–	0.5	nm/K

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

PIN Photodiode with Preamplifier	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	4.5	5.5	V
Supply Current	I_{CC}	–	47	mA
Optical Sesitivity (BER ≤ 10^{-10})	S	– 28	–	dBm
Linear Bandwidth (– 3 dB)	BW	400	–	MHz
Optical Overload (average)	P_{max}	– 8	–	dBm
Transimpedance (differential)	R_T	80	120	kΩ
Gain (differential)	G	70	175	mV/µW

Module	Symbol	Value	Unit
Optical Crosstalk (see note 2)	CRT	< – 47	dB
Backreflection (Return Loss) @ λ_{in} = 1310 nm	–	< – 6	dB
Backreflection (Return Loss) @ λ_{in} = 1550 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: $I_{mon,ref}$ = I_{mon}(T = 25 °C, P_{opt} = 1 mW). Thus, TE is given by:

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

Note 2: Optical Crosstalk is defined as CRT = 10 × log(P_2/P_1) with: $P_1 = P_{opt}$ = 1 mW with no optical input power P_{port} and P_2 the necessary optical input power P_{port} at λ = 1550 nm to get for P_{opt} = 0 the same receiver signal level as before.

Accompanying Information

T = 25 °C: Threshold current, slope eficiency, monitor current for 1 mW output power, peak wavelength for 1 mW output power.
T = 85 °C: Threshold current, slope efficiency

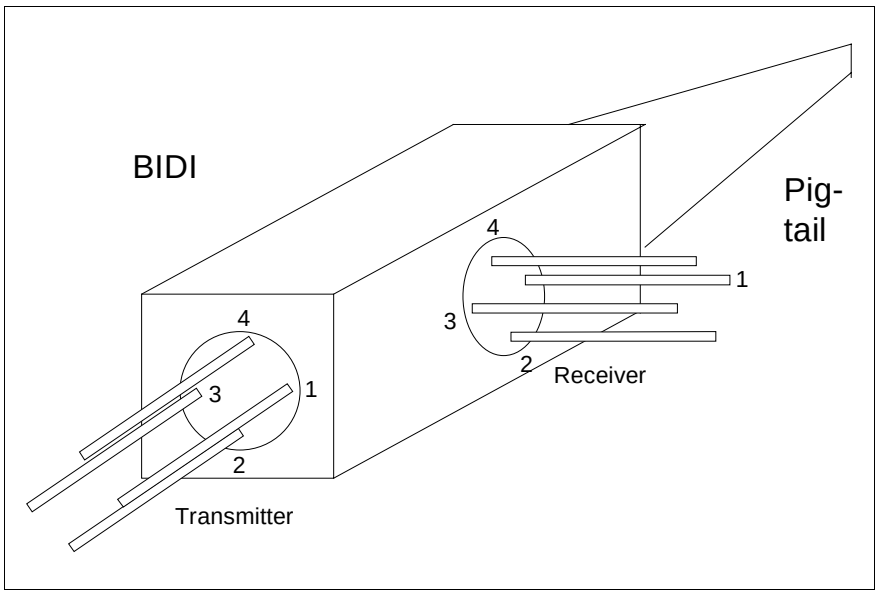
Pigtail

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	**Receiver**
1 LK	1 Out +
2 Case	2 Gnd, Case
3 MK, LA	3 Out -
4 MA	4 V_{CC}