

BIDI_ Transceiver Optical Module 1300/1300nm, Medium Power

- Designed for application in passive-optical networks
- Integrated beam splitter
- Bidirectional Transmission in one optical window
- Laser Diode with Multi-Quantum Well structure
- Suitable for bit rates up to 1 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 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	Values	Unit
Operating temperature range at case	T_C	- 40... +85	°C
Storage temperature range	T_{stg}	- 40... +85	°C
Soldering temperature $t_{max} = 30$ s, 2 mm distance from bottom edge of case	T_S	260	°C

Laserdiode	Symbol	Values	Unit
Forward Current	$I_{F\ max}$	150	mA
Radiant Power CW	Φ_e	2	mW
Reverse Voltage	$V_{R\ max}$	2	V

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

PIN Photodiode	Symbol	Values	Unit
Forward Current	$I_{F\ max}$	2	mA
Reverse Voltage	V_{BR}	10	V
Maximum optical power into the optical port	$\Phi_{port\ max}$	1,5	mW

Characteristics

All optical data refer to the optical port.

Laser Diode	Symbol	Values	Unit
Optical Output Power	Φ_e	>1,2	mW
Emission Wavelength center of range $\Phi_e = 0,5 \text{ mW}$	λ	1270...1350	nm
Spectral Bandwidth $\Phi_e = 0,5 \text{ mW}$ (RMS)	$\Delta\lambda$	5	nm
Threshold Current (-40...+85°C)	I_{th}	2...45	mA
Forward Voltage $\Phi_e = 0,5 \text{ mW}$	V_F	< 1,5	V
Radiant Power at I_{th}	Φ_{eth}	< 50	μW
Slope Efficiency $T_c=25^\circ\text{C}$	η	20...100	mW/A
Variation of 1st derivative of P/I (0,1...1mW)	dP/dI	-30...30	%
Differential Series Resistance	r_S	< 8	Ω
Rise and Fall Time (10%-90%)	t_r, t_f	< 1	ns
Temperature Coefficient of Wavelength	TC	< 0,5	nm / K

Monitor Diode	Symbol	Values	Unit
Dark Current, $V_R = 2\text{V}$, $\Phi_e = 0$	I_R	200	nA
Photocurrent, $V_R = 2\text{V}$, $\Phi_e = 0,5 \text{ mW}$	I_P	100...1000	μA
Capacitance, $V_R = 2\text{V}$, $f = 1\text{MHz}$	C_2	<10	pF
Tracking Error, $V_R = 2\text{V}$ (see note 1)	TE	-1...1	dB

Detector	Symbol	Values	Unit
Dark Current, $V_R = 2\text{V}$, $\Phi_e = 0$	I_R	< 50	nA
Spectral Sensitivity, $V_R = 2\text{V}$, $\lambda = 1300 \text{ nm}$,	S	> 0,30	A / W
Capacitance, $V_R = 2 \text{ V}$, $f = 1\text{MHz}$	C_2	<1,5	pF
Rise and Fall Time, $V_R = 2\text{V}$, 10%-90%	t_r, t_f	< 1	ns

Module	Symbol	Values	Unit
Optical Crosstalk (see note 2)	CRT	<-22	dB

Note 1: The tracking error TE is the variation rate of ϕ_e at constant current I_{mon} over a specified temperature range and relative to the reference point: $I_{mon,ref}=I_{mon}(T=25^{\circ}C, \phi_e = 0,5mW)$. Thus, TE is given by:

$$TE [dB] = 10 \log \frac{\phi_e [T_c] - \phi_e [25^{\circ}C]}{\phi_e [25^{\circ}C]}$$

Note 2: Optical Crosstalk is defined as $CRT=10*\log(I_{Det,0}/I_{Det,1})$ with: $I_{Det,0}$ the photo-current with $\phi_e=0,5mW$, CW laser operation, $V_R=2V$, with minimum optical return loss from fiber end and $I_{Det,1}$ the photocurrent without ϕ_e , but 0,5mW optical input power, $\lambda = 1300nm$.

Accompanying Information

T=25°C: Threshold current, current above threshold for 1mW output power, monitor current for 0,5mW output power, peak wavelength.

T=85°C: Threshold current, current above threshold for 1mW output power, monitor current for 0,5mW output power.

End of Life Values

Threshold current at T=85°C	I_{th}	< 60	mA
Current above threshold, over full temperature range, at $I_{mon,ref}=I_{mon}(T=25^{\circ}C, \phi_e = 1mW, BOL)$	ΔI_F	7...70	mA
Tracking Error (see note 1)	TE	-1,5...1,5	dB
Detector Dark Current, $V_R=2V$, T=85°C	I_R	< 200	nA
Monitor Dark Current, $V_R=2V$, T=85°C	I_R	< 1	μA

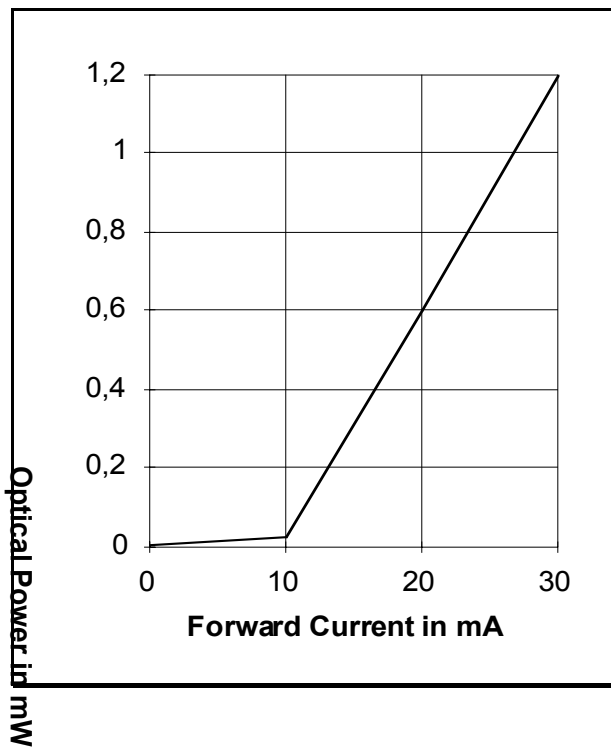
Fibre Pigtail

Type: Single Mode, silica

Mode Field Diameter	9 ₁	μm
Cladding Diameter	125 ₂	μm
Mode Field/Cladding Concentricity Error	< 1	μm
Cladding Non-circularity	< 2	%
Mode Field Non-circularity	< 6	%
Cut-Off Wavelength	> 1270	nm
Jacket Diameter	0,9 _{0,1}	mm
Bending Radius	> 30	mm
Tensile Strength Fibre/Case	> 5	N
Length	1 _{0,2}	m

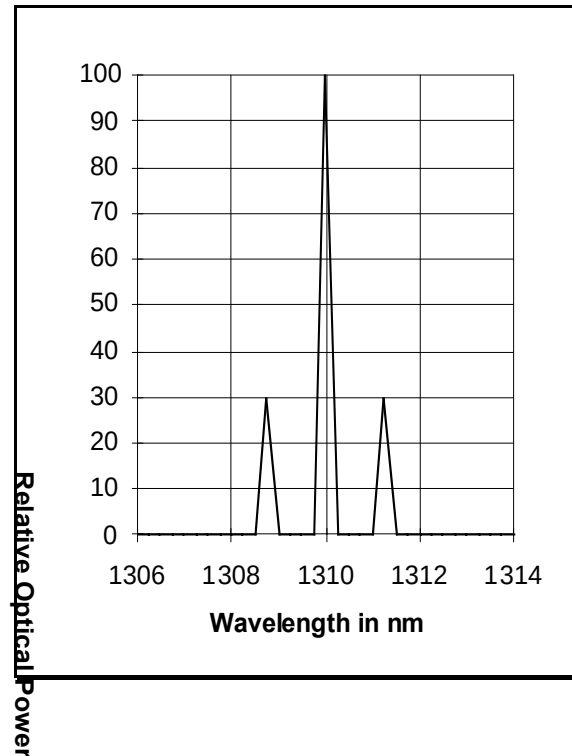
Laser Diode

Radiant Power in Singlemode Fibre



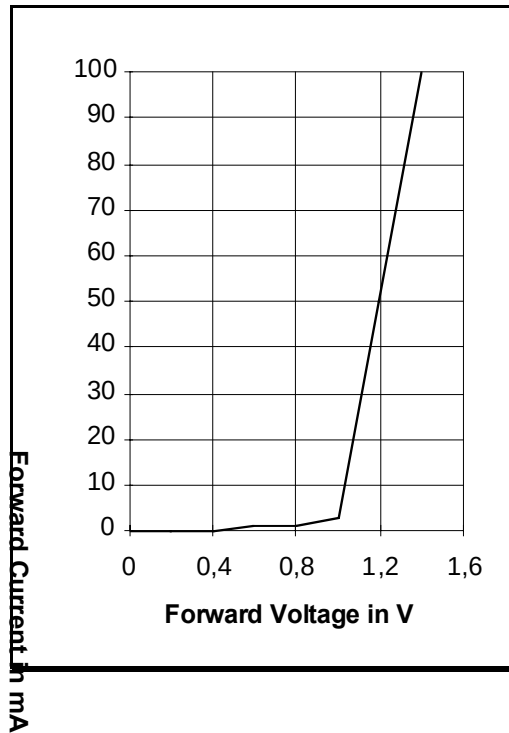
Relative Radiant Power

$P_e = f(\lambda)$



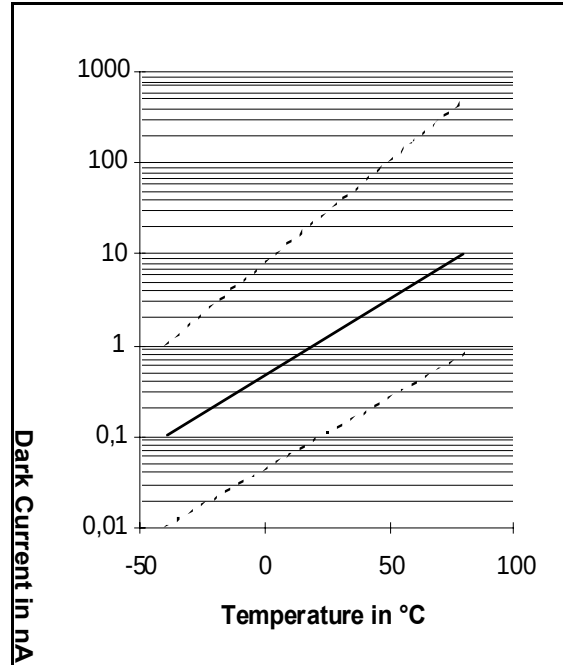
Laser Forward Current

$$I_F = f(V_F)$$



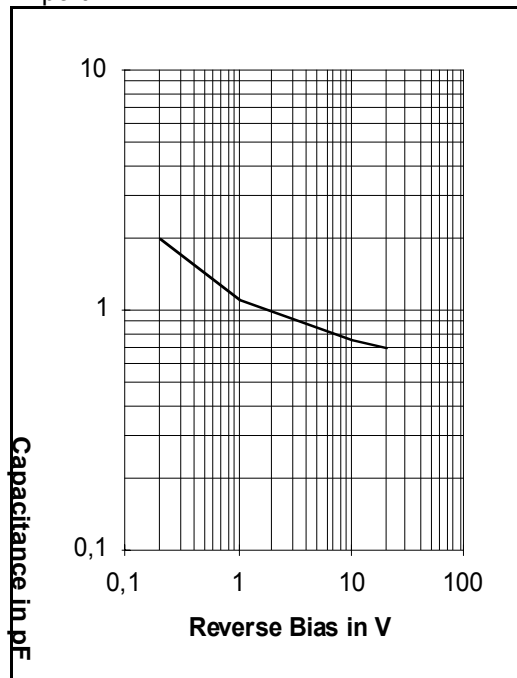
Monitor Diode Dark Current $I_R = f(T_A)$

$$-port = 0, V_R = 5V$$



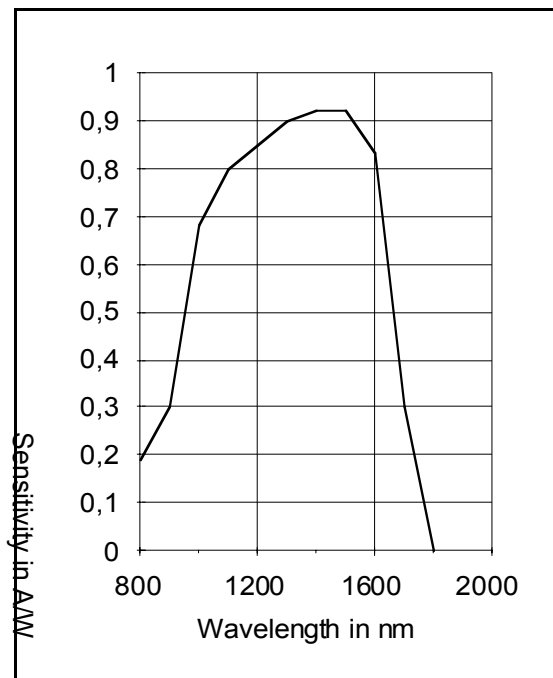
Capacitance of PIN Diode $C = f(V_R)$

$$\Phi_{port} = 0, f = 1MHz$$

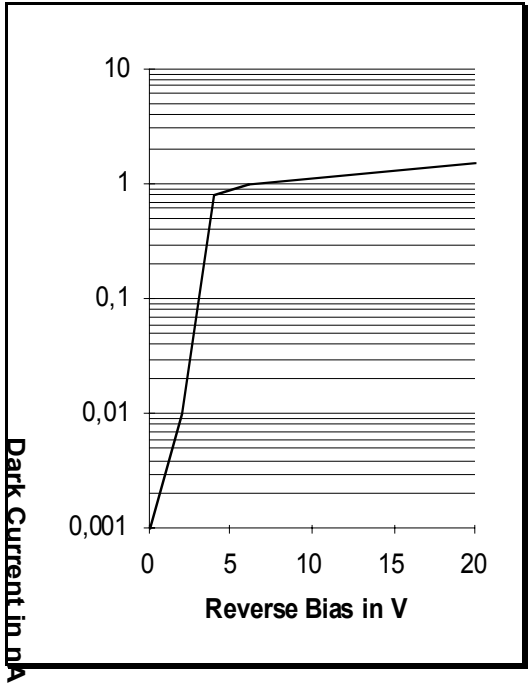


Rel. Spectral Sensitivity of PIN Diode

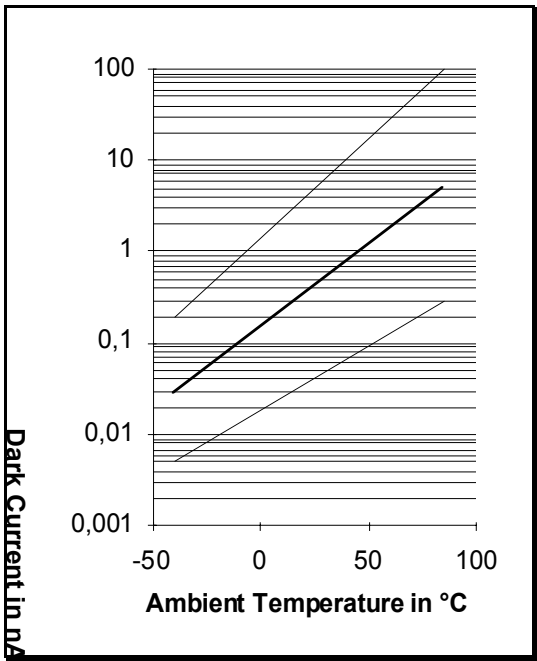
$$V_R = 5V$$



Dark Current of PIN Diode $I_R=f(V_R)$
 $I_F=f(V_F)$



Dark Current of PIN Diode $I_R=f(T_A)$
 $I_F=f(V_F)$, $V_R = 5V$



Ordering Information:

Type	Ordering Code	Connector
SBM51214A	Q62702-Pxxxx	DIN
SBM51214G	Q62702-Pxxxx	FC / PC

Component with other connector types on request

Package Dimension:

SBM51214x