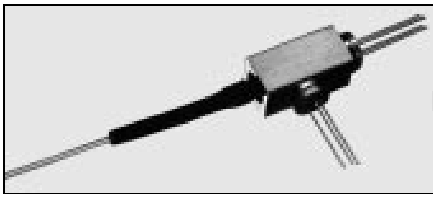
BIDI™ Transceiver Optical Module 1300 nm Emitting-/1550 nm Receiving Function, High Power

SBH 51414X

- Designed for application in passive-optical networks
- Integrated Wavelength Division Multiplexer
- Bidirectional Transmission in 2nd and 3rd 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



Type	Ordering Code	Connector
SBH 51414A	Q62702-Pxxxx	DIN
SBH 51414G	Q62702-Pxxxx	FC / PC

Component with other connector types on request.

Maximum Ratings

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

Parameter	Symbol	Values	Unit
Module			
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
Laser Diode			
Forward current	$I_{F\,max}$	150	mA
Radiant power CW	Φ_e	4	mW
Reverse voltage	$V_{R\,max}$	2	V

Maximum Ratings (cont'd)

Parameter	Symbol	Values	Unit
Monitor Diode			
Forward current	$I_{F\ max}$	2	mA
Reverse voltage	$V_{R\ max}$	10	V
PIN Photodiode			
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, T_C = 25 °C.

Parameter	Symbol	Values	Unit
Laser Diode			
Optical output power	Φ_e	> 2.4	mW
Emission wavelength center of range Φ_e = 1 mW	λ	1270 ... 1350	nm
Spectral bandwidth Φ_e = 1 mW (RMS)	$\Delta\lambda$	5	nm
Threshold current (– 40 ... + 85 °C)	I_{th}	2 ... 45	mA
Forward voltage Φ_e = 1 mW	V_F	< 1.5	V
Radiant power at I_{th}	Φ_{eth}	< 80	µW
Current above threshold at 25 °C, Φ_e = 2 mW	ΔI_F	10 ... 35	mA
Current above threshold, Φ_e = 2 mW	ΔI_F	7 ... 50	mA
Variation of 1st derivative of P/I (0.2 ... 2.0 mW)	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_λ	< 0.5	nm / K

Characteristics

Parameter	Symbol	Values	Unit
Monitor Diode			
Dark current, V_R = 2 V, Φ_e = 0, T_C = 85 °C	I_R	200	nA
Photocurrent, V_R = 2 V, Φ_e = 1 mW	I_P	100 ... 1000	µA
Capacitance, V_R = 2 V, f = 1 MHz	C_2	< 10	pF
Tracking error, V_R = 2 V (**see note 1**)	TE	– 1 ... 1	dB
Detector			
Dark current, V_R = 2 V, Φ_e = 0, T_C = 85 °C	I_R	< 50	nA
Spectral sensitivity, V_R = 2 V, λ = 1550 nm	S_λ	> 0.65	A / W
Capacitance, V_R = 2 V, f = 1 MHz	C_2	< 1.5	pF
Rise and fall time, V_R = 2 V, 10 % - 90 %	t_r, t_f	< 1	ns
Module			
Optical crosstalk (**see note 2**)	CRT	< – 47	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: $I_{mon,re} = I_{mon}(T = 25\text{ °C}, \Phi_e = 1\text{mW})$. Thus, TE is given by:

$$TE[\text{dB}] = 10 \times \log \frac{\Phi_e[T_C] - \Phi_e[25\text{ °C}]}{\Phi_e[25\text{ °C}]}$$

Note 2: Optical Crosstalk is defined as $CRT = 10 \times \log(I_{Det,0}/I_{Det,1})$ with: $I_{Det,0}$ the photocurrent with Φ_e = 1 mW CW laser operation, V_R = 2 V and $I_{Det,1}$ the photocurrent without Φ_e, but 1 mW optical input power, λ = 1550 nm.

Accompanying Information

T = 25 °C: Threshold current, current above threshold for 2 mW output power, monitor current for 1 mW output power, peak wavelength.

T = 85 °C: Threshold current, current above threshold for 2 mW output power, monitor current for 1 mW output power.

End of Life Values

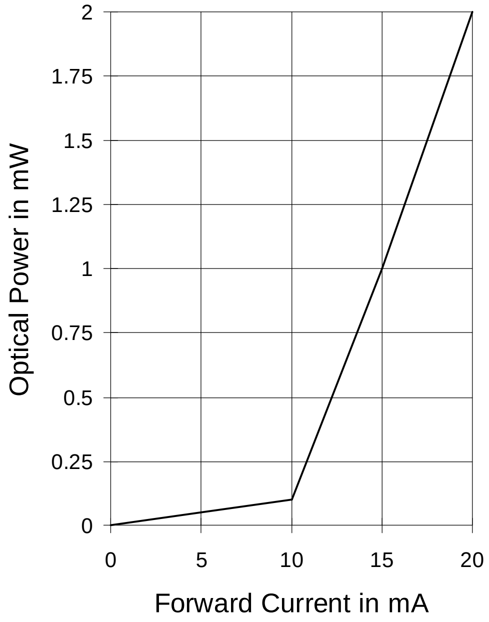
Parameter	Symbol	Values	Unit
Threshold current at T = 85 °C	I_{th}	< 60	mA
Current above threshold, over full temperature range, at $I_{mon,ref} = I_{mon}(T = 25\ °C, \Phi_e = 2\ mW$, BOL)	ΔI_F	7 ... 70	mA
Tracking error (**see note 1**)	TE	– 1.5 ... 1.5	dB
Detector dark current, V_R = 2 V, T = 85 °C	I_R	< 400	nA
Monitor dark current, V_R = 2 V, T = 85 °C	I_R	< 1	µA

Fiber Pigtail

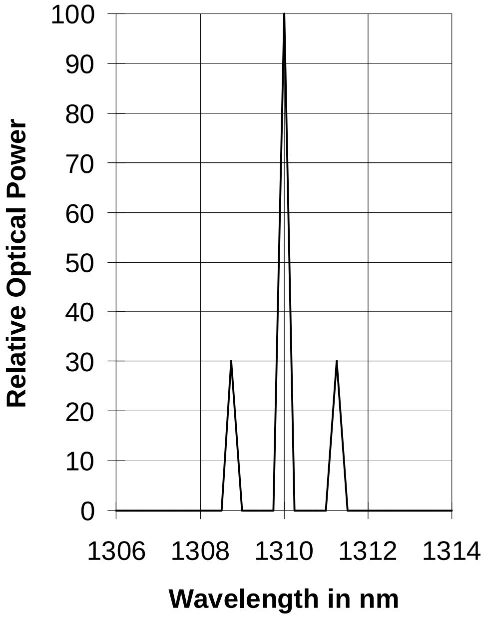
Type: single mode, silica

Parameter	Values	Unit
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 fiber/case	> 5	N
Length	1 ± 0.2	m

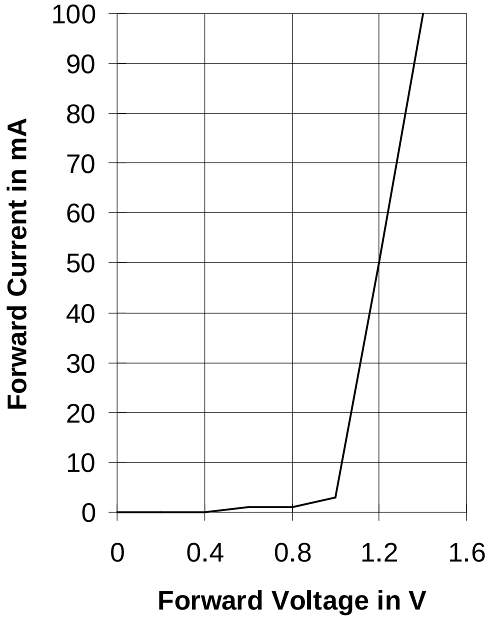
Laser Diode
Radiant Power in Singlemode Fiber



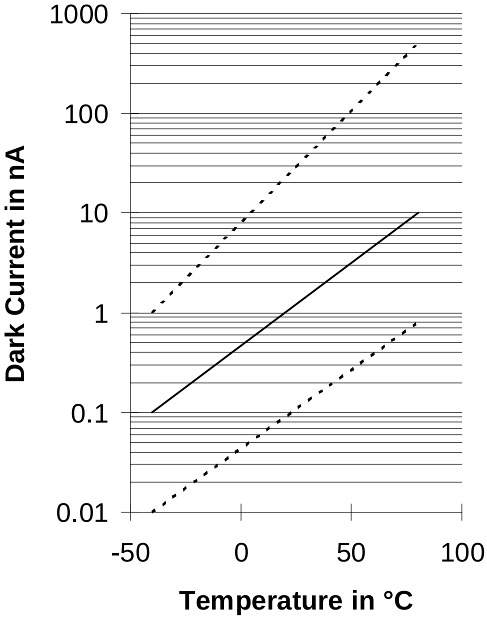
Relative Radiant Power
$\Phi_e = f(\lambda)$



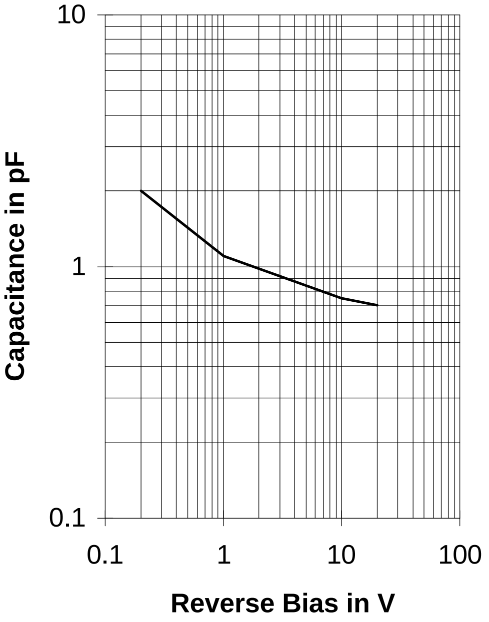
Laser Forward Current
$I_F = f(V_F)$



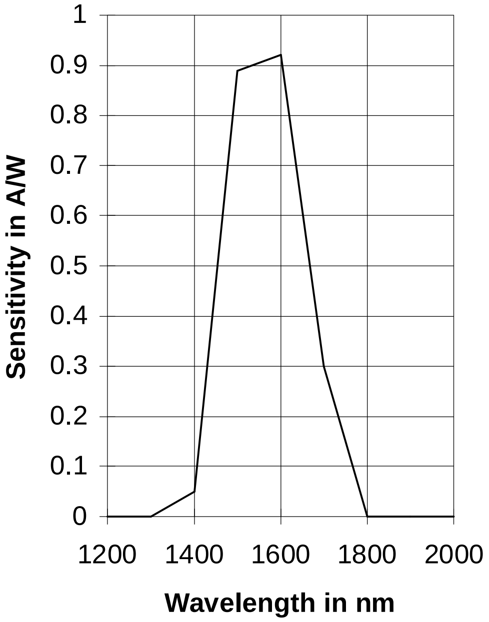
Monitor Diode Dark Current $I_R = f(T_A)$
$\Phi_{port} = 0$, $V_R = 5$ V



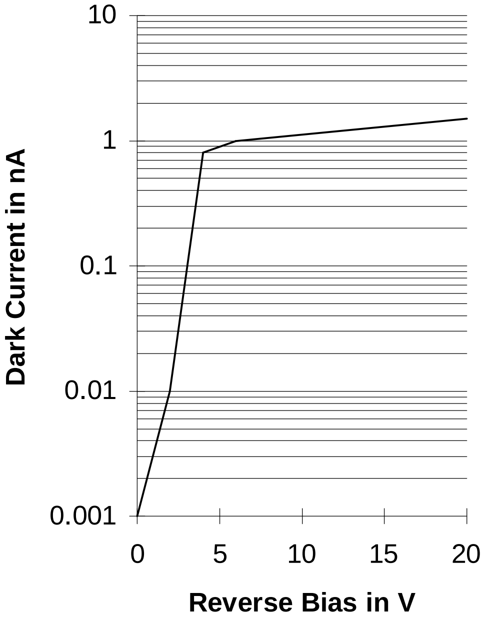
Capacitance of PIN Diode $C = f(V_R)$
$\Phi_{port} = 0$, $f = 1$ MHz



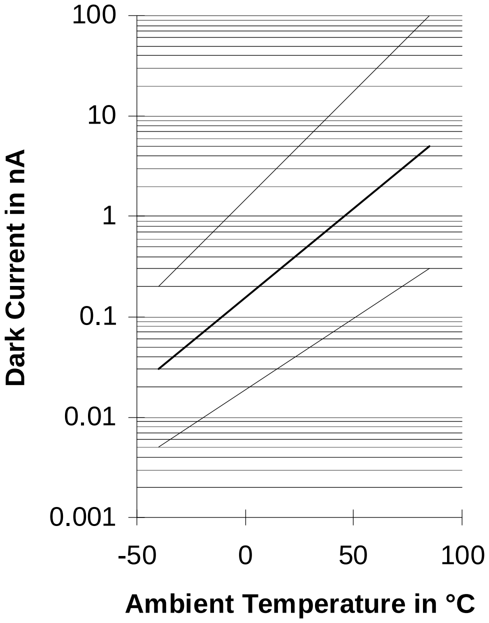
Rel. Spectral Sensitivity of PIN Diode
$V_R = 5$ V



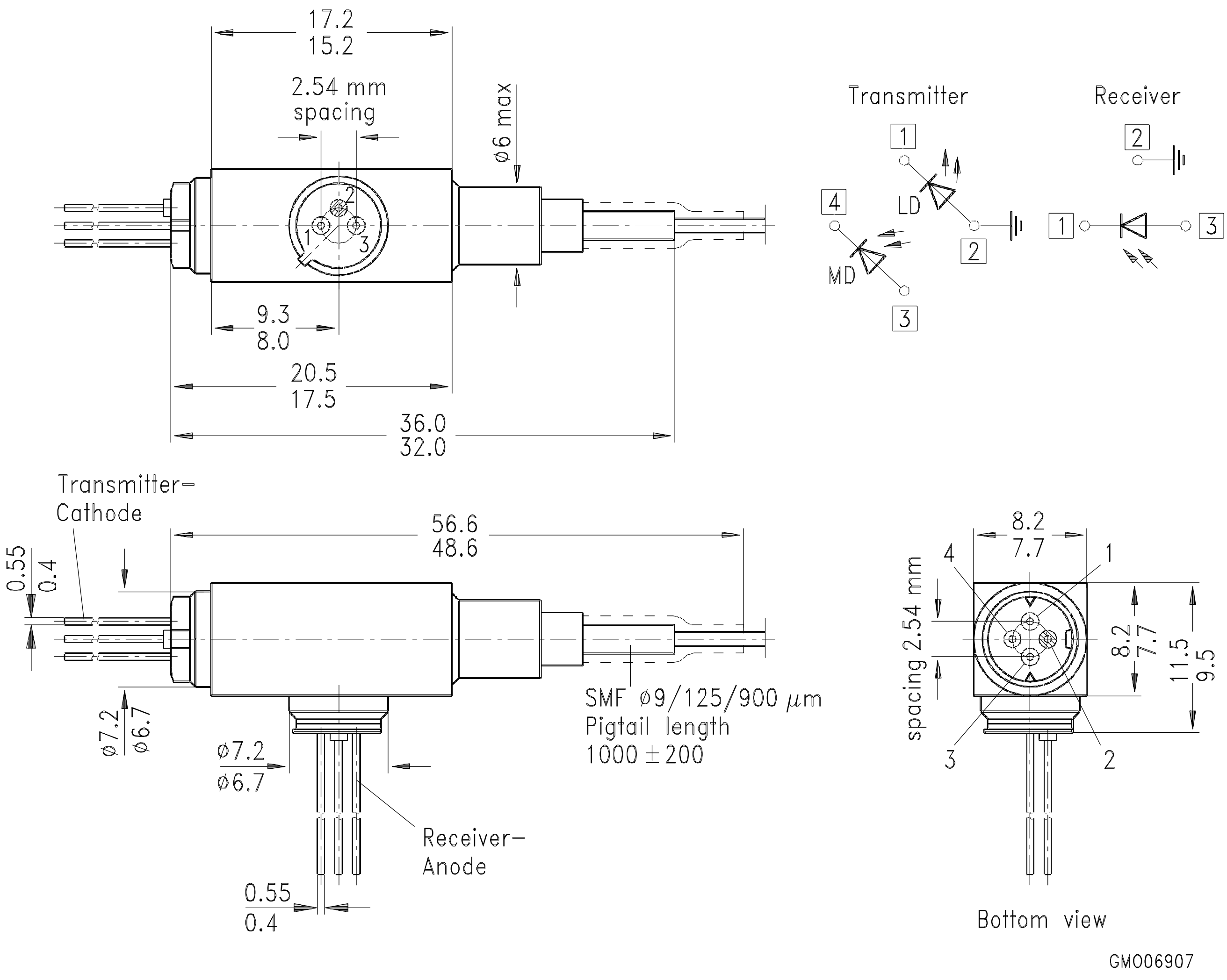
Dark Current of PIN Diode $I_R = f(V_R)$
$I_F = f(V_F)$



Dark Current of PIN Diode $I_R = f(T_A)$
$\Phi_{port} = 0$, $V_R = 5$ V



Package Outlines (Dimensions in mm)



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