



# XTBxxA-60LY

10 Gbps SFP+ Bi-Directional Transceiver, 60 km Reach 1270/1330 nm TX/1330/1270 nm RX

10 Gbps SFP+ Bi-DI Transceiver, 60 km Reach 1270/1330nm TX / 1330/1270 nm RX

## Applications

- 10GBASE-LR at 10.3125 Gbps
- 10GBASE-LW at 9.953 Gbps
- Other Optical Links

## Product Description

The XTBxxA-60LY series single mode transceiver is small form factor pluggable module for duplex optical data communications such as 10GBASE-ER/LW defined by IEEE 802.3ae. It is with the SFP+ 20-pin connector to allow hot plug capability.

The XTBxxA-60LY module is designed for single mode fiber and operates at a nominal wavelength of 1270 nm or 1330 nm; The transmitter section uses a multiple quantum well DFB, which is class 1 laser compliant according to International Safety Standard IEC-60825.

The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

## Absolute maximum rating

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	V <sub>CC</sub>	-0.5	3.6	V
Storage Temperature	T <sub>st</sub>	-40	85	°C
Operating Case Temperature	T <sub>c</sub>	0	70	°C
Relative Humidity	RH	0	85	%

## Product Highlights

- Supports 9.95 Gb/s to 10.3 Gb/s data rates
- Simplex LC Connector Bi-Directional SFP+ Optical Transceiver
- Single 3.3 V Supply
- Up to 60 km on 9/125 um SMF
- A: 1270 nm DFB Laser transmitter, 1330 nm receiver
- B: 1330 nm DFB Laser transmitter, 1270 nm receiver
- Compliant with IEEE 802.3ae 10GBASE-LR and 10GBASE-LW
- SFP+ MSA SFF-8431 Compliant
- Digital Diagnostic SFF-8472 Compliant
- RoHS compliant and Lead Free
- Operating case temperature: Standard: 0 °C ~ 70 °C

**Recommended Operating Environment**

Parameters	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	V <sub>cc</sub>	3.0	3.3	3.6	V
Power Supply Current	I <sub>cc</sub>		200	300	mA
Operating Case temperature	T <sub>ca</sub>	0	25	70	°C
Module Power Dissipation	P <sub>m</sub>	-	0.7	1.1	W

**Electrical Characteristics (TOP = 0 to 70°C , VCC = 3.0 to 3.60 Volts)**

Parameters	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	V <sub>CC</sub>	3.00		3.60	V	1
Supply Current	I <sub>cc</sub>			300	mA	1
<b>Transmitter</b>						
Input differential impedance	R <sub>in</sub>		100		Ω	2
Single ended data input swing	V <sub>in,pp</sub>	150		1200	mVpp	
Transmit Disable Voltage	V <sub>D</sub>	2		V <sub>CC</sub>	V	
Transmit Enable Voltage	V <sub>EN</sub>	V <sub>ee</sub>		V <sub>ee</sub> +0.8	V	3
<b>Receiver</b>						
Output differential impedance	R <sub>out</sub>		100		Ω	2
Single ended data output swing	V <sub>out,pp</sub>	300		700	mV	4
LOS Fault	V <sub>LOS fault</sub>	2		V <sub>CC_HOST</sub>	V	5
LOS Normal	V <sub>LOS norm</sub>	V <sub>ee</sub>		V <sub>ee</sub> +0.8	V	5

**Notes:**

1. Module power consumption never exceeds 1W.
2. AC coupled.
3. Or open circuit.
4. Into 100 ohm differential termination.
5. LOS is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

**Optical Characteristics (TOP = 0 °C to 70 °C, VCC = 3.0 to 3.60 Volts)**  
**XTB23A-60LY, 1270 DFB & PIN/TIA)**

Parameters	Symbol	Min.	Typical	Max.	Unit	Notes
<b>Transmitter</b>						
Center Wavelength	$\lambda_t$	1260	1270	1280	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Spectral Width(-20dB)	$\Delta\lambda$			1	nm	
Average Optical Power	Pop	-8.2		0.5	dBm	1
Extinction Ratio	ER	3.5	-	-	dB	
Eye Mask		Compliant with IEEE 802.3				
Transmitter Dispersion Penalty	TDP			3.2	dB	
Average Power of OFF Transmitter				-30	dBm	
Relative Intensity Noise	Rin			-128	dB/Hz	
<b>Receiver</b>						
Receiver Sensitivity in average power	Psens	-	-	-10.4	dBm	1
Receiver Sensitivity in OMA	Psens	-	-	-8.6	dBm	2
Stressed Sensitivity (OMA)		-	-	-6.8	dBm	2
Stressed eye jitter		-			Ulp-p	TBD
Receive electrical 3dB upper cutoff frequency					GHz	TBD
LOS Assert	LOSA	-	-	-	dBm	TBD

**Notes:**

1. Average Receiver Power (Min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant.
2. Measured with a PRBS<sup>231</sup>-1 test pattern @10.3125Gbps, BER $\leq 10^{-12}$

**XTB32A-60LY, 1330 DFB & PIN/TIA)**

Parameters	Symbol	Min.	Typical	Max.	Unit	Notes
<b>Transmitter</b>						
Center Wavelength	$\lambda_t$	1320	1330	1340	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Spectral Width (-20 dB)	$\Delta\lambda$			1	nm	
Average Optical Power	Pop	-8.2		0.5	dBm	1,2
Extinction Ratio	ER	3.5	-	-	dB	
Eye Mask		Compliant with IEEE 802.3				
Transmitter Dispersion Penalty	TDP			3.2	dB	
Average Power of OFF Transmitter				-30	dBm	
Relative Intensity Noise	Rin			-128	dB/Hz	
<b>Receiver</b>						
Average Receiver Power	RSENS			-14.1	dBm	2,3
Receiver Overload	P <sub>MAX</sub>			+0.5	dBm	
Centre Wavelength	$\lambda_C$	1260		1270	nm	
LOS De-Assert	LOS <sub>D</sub>			-15	dBm	
LOS Assert	LOS <sub>A</sub>	-30			dBm	
LOS Hysteresis		0.5			dB	

**Notes:**

- Output is coupled into a 9/125um SMF.
- Average Receiver Power (Min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant.
- Measured with a PRBS<sup>31</sup>-1 test pattern @10.3125Gbps, BER $\leq 10^{-12}$

Pin Definition

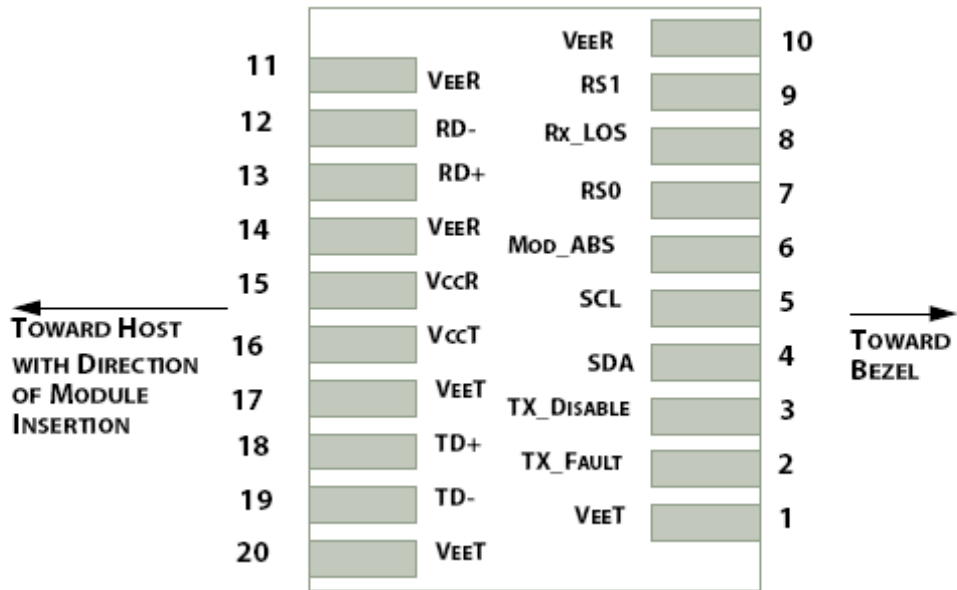


Figure 1: Electrical Pin-out Details

### PIN description

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	2
3	LVTTL-I	TX_Dis	Transmitter Disable; Turns off transmitter laser output	3
4	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
5	LVTTL-I	SCL	2-Wire Serial Interface Clock	2
6		MOD_DEF0	Module Definition, Grounded in the module	4
7	LVTTL-I	RS0	Receiver Rate Select	5
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication Active LOW	2
9	LVTTL-I	RS1	Transmitter Rate Select (not used)	5
10		VeeR	Module Receiver Ground	1
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Data Output	
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	
16		VccT	Module Receiver 3.3 V Supply	
17		VeeT	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	1

#### Notes:

- [1] Module circuit ground is isolated from module chassis ground within the module.
- [2] Should be pulled up with 4.7 k – 10 k ohms on host board to a voltage between 3.15 Vand 3.6 V.
- [3] Tx\_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.
- [4] Mod\_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc\_Host with a resistor in the range 4.7 kΩ to 10 kΩ. Mod\_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.
- [5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

Circuit Diagram

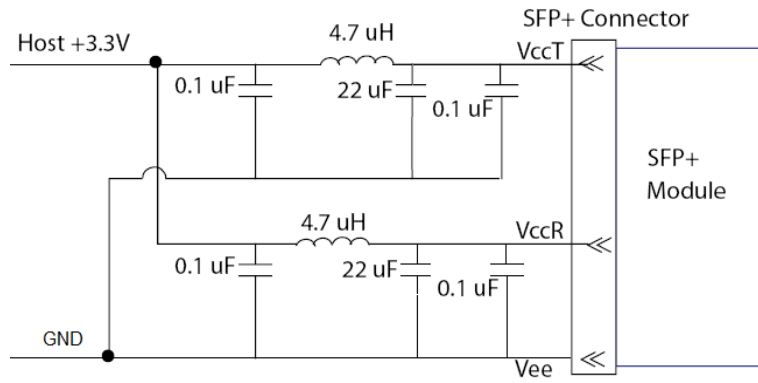


Figure 2. Host Board Power Supply Filters Circuit

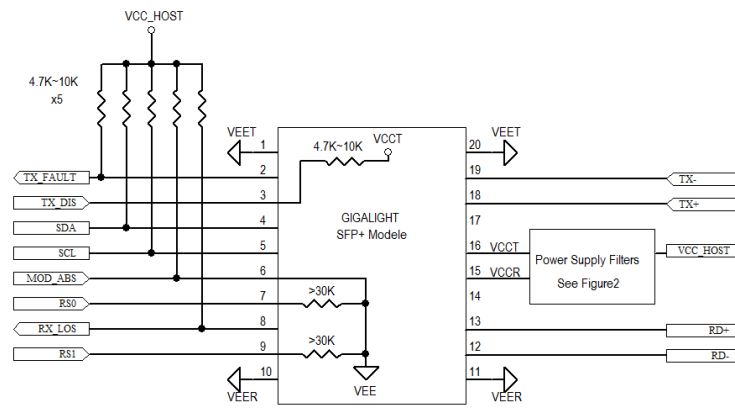


Figure 3. Host-Module Interface

Mechanical Dimensions

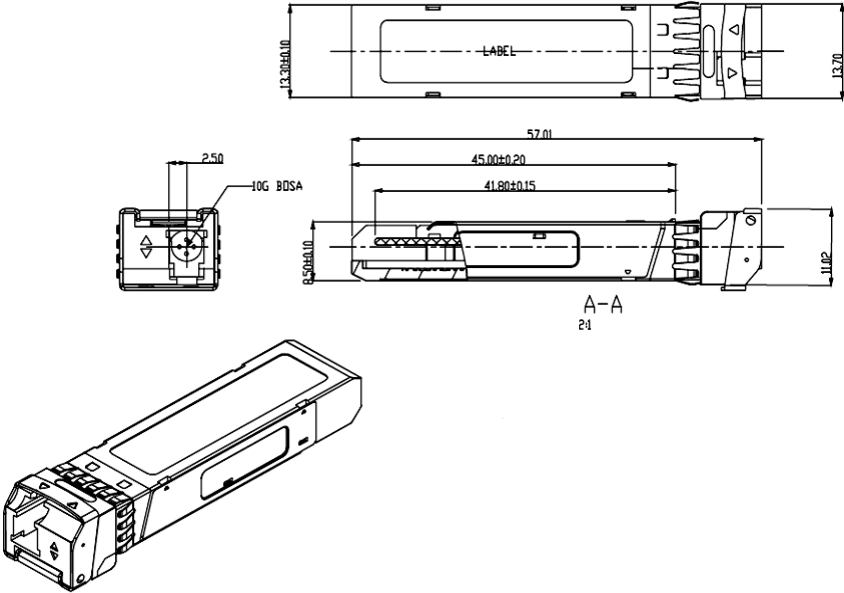


Figure 4. Key Mechanical Dimensions



**Ordering information<sup>1</sup>**

Part Number	Product Description
XTB23A-60LY	SFP+ BIDI 1270 nm/1330 nm, 10 Gbps, 60 km, LC, 0 °C ~ +70 °C, DDM
XTB32A-60LY	SFP+ BIDI 1330 nm/1270 nm, 10 Gbps, 60 km, LC, 0 °C ~ +70 °C, DDM

## Notes.

<sup>1</sup> For accurate order specification please contact Xenopt reseller before placing an order. The content of this document is subject to change without notice. Xenopt does not guarantee errorless or outdated information. Please specify any compatibility requirements at time of ordering.

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