

**10G EPON Symmetric ONU SFP+ Transceiver**  
**PXS96-B5220**

## Features

- Single fiber bi-directional data links with downstream 9.953Gbps and 9.953Gbps/2.488Gbps(compatible) upstream
- 0 to 70°C operating case temperature
- 3.3V power supply
- SFP+ package with SC Receptacle connector
- Hot-pluggable capability
- High power 1577nm EML transmitter
- High sensitivity 1270nm APD-TIA
- Support 20km transmission distance with SMF
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- RoHS compliance

## Applications

XGS-COMBO PON OLT SFP+ N1

## Standards

- Complies with INF-8472
- Complies with ITU G.9807.1
- Complies with FCC 47 CFR Part 15, Class B
- Complies with FDA 21 CFR 1040.10 and 1040.11

**ABSOLUTE MAXIMUM RATINGS**

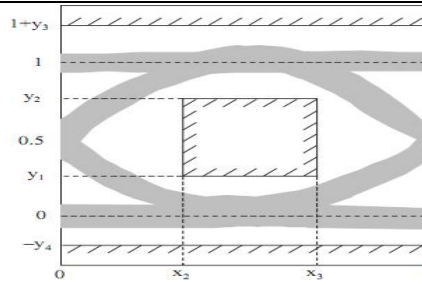
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	$T_{stg}$	-40	85	°C	Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.
Operating Case Temperature	$T_{case}$	0	70	°C	
DC Supply Voltage	$V_{cc}$	0	3.6	V	
Relative Humidity - Operating	$RH_o$	5	85	%	
Receiver Damaged Threshold			-3	dBm	

**RECOMMENDED OPERATING CONDITION**

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating Case Temperature	$T_c$	0		70	°C	
Power Supply Voltage	$V_{cc}$	3.13	3.3	3.47	V	
Power Supply Current				800	mA	
Operating Relative Humidity		5		85	%	
Data Rate(TX/RX)	TX		9.953		Gbps	
	RX		9.953 2.488			
Data Rate Drift		-100		+100	ppm	

**TRANSMITTER OPTICAL SEPCIFICATION**

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter Type		1577nm EML Continuous Mode				
Data Rate	Tx		9.953		Gbps	
Centre Wavelength	$\lambda_c$	1575	1577	1580	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launched Power	$P_{out}$	2		5	dBm	
Mean Launched Power (TX Off)	$P_{off}$			-39	dBm	
Extinction Ratio	ER	8.2			dB	PRBS2 <sup>31</sup> -1 @9.953Gbps
Transmitter dispersion Penalty	TDP			1	dB	Transmit on 20km SMF
Eye Diagram		Compliant with ITU G.9807.1				Figure 1,Mask Margin>5%



X3-X2	Y1	Y2	Y3	Y4	Unit
0.2	0.25	0.75	0.25	0.25	UI

Figure 1 XGSPON Transmitter Eye Mask Definitions

**TRANSMITTER ELECTRICAL CHARACTERISTICS**

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Data Input Differential Swing	$V_{IH}-V_{IL}$	100		850	mV	CML input, AC coupled
Input Differential Impedance		90	100	110	$\Omega$	
Tx Disable-Low		0		0.4	V	
Tx Disable-High		2.4		Vcc	V	

**9.953Gbps RECEIVER OPTICAL SPECIFICATIONS**

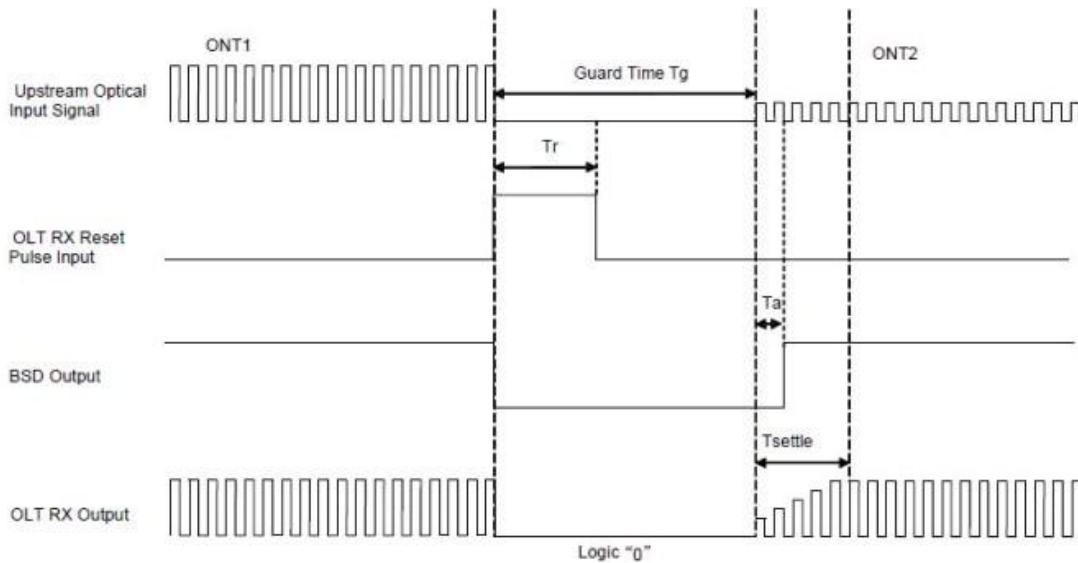
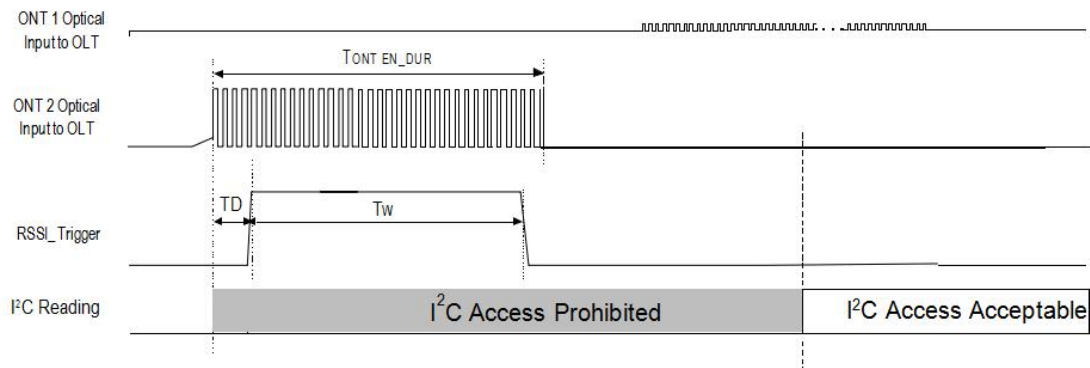
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Receiver Type		1270nm Burst-mode APD/TIA				
Data Rate	Rx		9.953		Gbps	
Receive Wavelength	$\lambda_c$	1260	1270	1280	nm	
Sensitivity	SEN			-26	dBm	PRBS $2^{31}-1$ @9.953Gbps BER $\leq 1 \times 10^{-3}$
Overload	SAT	-5			dBm	
RX Loss of Signal De-assert level				-29	dBm	
RX Loss of Signal Assert level		-44			dBm	

**2.488Gbps RECEIVER OPTICAL SPECIFICATIONS**

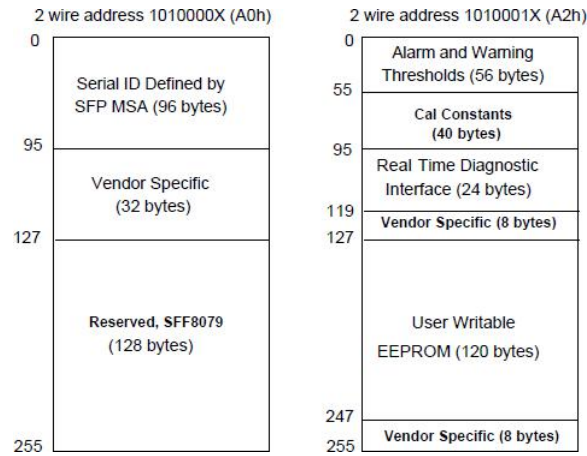
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Receiver Type		1270nm Burst-mode APD/TIA				
Data Rate	Rx		2.488		Gbps	
Receive Wavelength	$\lambda_c$	1260	1270	1280	nm	
Sensitivity	SEN			-27.5	dBm	PRBS $2^{23}-1$ test pattern @2.488Gbps and ER=8.2dB, BER = $10^{-4}$
Overload	SAT	-7			dBm	
RX Loss of Signal De-assert level				-29	dBm	
RX Loss of Signal Assert level		-44			dBm	

**RECEIVER ELECTRICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit.	Notes
Data Output Differential Swing		300		800	mV	CML output, AC coupled
Signal Detect Voltage-Low		0		0.4	V	
Signal Detect Voltage-High		2.4		V <sub>cc</sub>	V	
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		V <sub>cc</sub>	V	
Reset Width	T <sub>r</sub>	25.6			ns	
SD Assert Time	T <sub>a</sub>			50	ns	Figure 2
Data Recovery Time	T <sub>Settling</sub>			80	ns	Figure 2
Optical input signal length for RSSI	T <sub>ONT</sub>	375			ns	Figure 3
RSSI Trigger Delay	T <sub>D</sub>	0	10		ns	Figure 3
RSSI Trigger Width	T <sub>w</sub>	350	600	T <sub>ONT</sub> -T <sub>D</sub>	ns	Figure 3
I <sup>2</sup> C Access Prohibited Time	T <sub>P</sub>	500			μs	Figure 3


**Figure 2 Timing Parameter Definitions in Burst Mode Sequence**

**Figure 3 RSSI Timing Diagram**

## EEPROM INFORMATION



## DIGITAL DIAGNOSTIC MONITORING INTERFACE

Parameter	Range	Accuracy	Calibration	Notes
Temperature	0 to 70°C	±3°C	Internal	1LSB = 1/256°C
Voltage	3.0 to 3.6V	±3%	Internal	1LSB = 0.1mV
Bias Current	0 to 131mA	±10%	Internal	1LSB = 4uA
TX Power	2 to 5dBm	±3dB	Internal	1LSB = 0.2uW
RX Power monitor	-28 to -5dBm	±3dB	Internal	1LSB = 0.1uW

## PXS96-B5220PIN ASSIGNMENT

PIN	Name	Description	Notes
1	NC	NC	
2	NC	NC	
3	TX Disable	Transmitter Disable	Low: Transmitter On
4	SDA	2-Wire Serial Interface Data	Pull Up With a 4.7K-10KΩ Resistor On The Host Board
5	SCL	2-Wire Serial Interface Data	
6	NC	NC	
7	Reset/Rate select	Reset or Rate select Input	3-Level Rx Reset or Rate select Mode Reset Signal: >1.9V; Rx Rate select =2.488G 0.9<&<1.9V; Rx Rate select =9.95G &<0.9V;
8	SD	Signal Detect	
9	RSSI Trigger	RSSI Trigger	
10	NC	NC	
11	GND	Module Ground	
12	XGSPON RD-	Inverted 10G/2.5G Received Data Out	DC coupled, CML output
13	XGSPON RD+	10G/2.5G Received Data Out	DC coupled, CML output
14	Tx-Fault	Transmitter Fault	

15	VCC3_RX	Receiver 3.3V Power Supply	
16	VCC3_TX	Transmitter 3.3V Power Supply	
17	NC	NC	
18	XGSPON TD+	Transmit Data in	AC coupled ,CML input
19	XGSPON TD-	Inverted Transmit Data in	AC coupled ,CML input
20	GND	Module Ground	

**MECHANICAL SPECIFICATIONS(Unit: mm)**

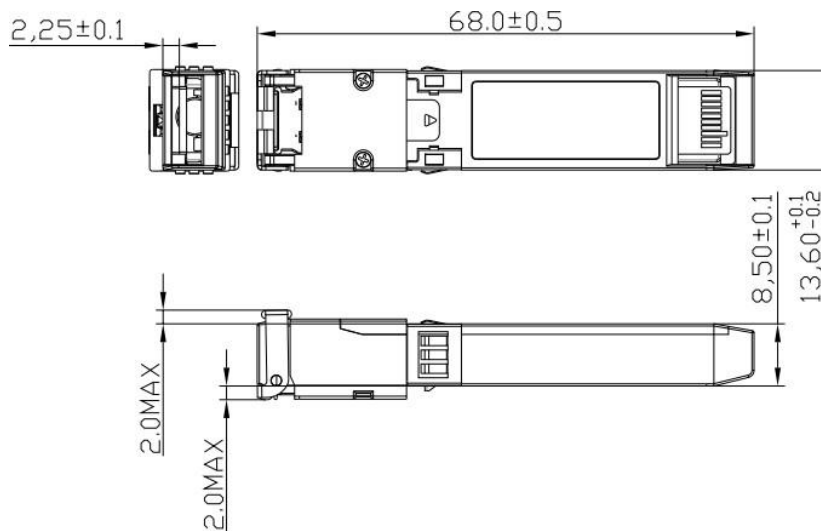


Figure 4 Mechanical Outline Drawing

**ORDER INFORMATION**

Part Number	Product Description
PXS96-B5220	XGSPON OLT SFP+ N1, Tx 1577nm&9.953G, Rx 1270nm&9.953G/2.488G SFP+ form-factor, SC/UPC receptacle connector, 0~70 °C

**REMARK**

1.This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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