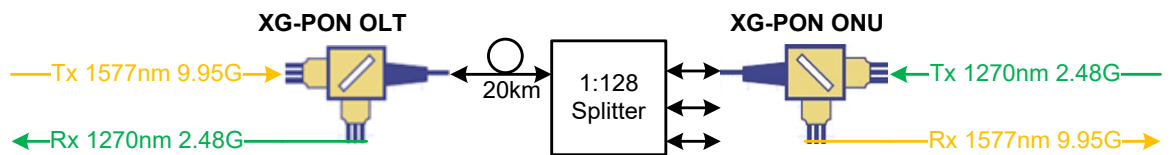


## XG-PON OLT N1/N2a SFP+

### Optical Transceiver

#### Product Features

- Support ITU-T G.987.2 application
- Single fiber Quad-directional data links
- 1577nm 9.953G continuous-mode transmitter with EML laser, 1270nm 2.488G burst-mode receiver with APD-TIA
- 2-wire interface for integrated digital diagnostic monitoring
- Digital receiving signal strength indication (RSSI)
- SFP+ MSA package with longer header SC/UPC receptacle optical interface
- +3.3V power supply
- Operating case temperature: 0~70°C
- RoHS compliance, and Class 1 laser safety



#### Operating Conditions

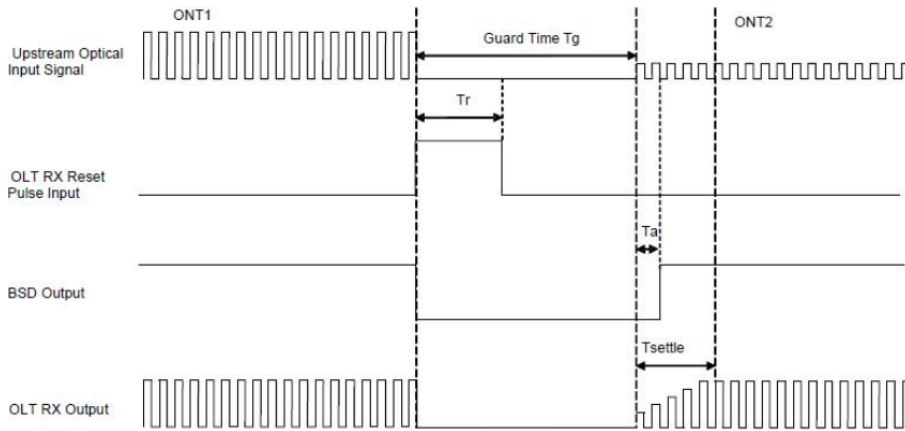
Parameter	Unit	Min.	Typical	Max.
Storage Temperature	°C	-40		85
Operating Case Temp	°C	0		70
Storage Humidity	%	5		90
Operating Relative Humidity	%	5		85
Power Supply Voltage (3.3V)	V	3.135	3.3	3.465
Power Consumption	W			2
Bit Rate for Tx 1577nm	Gbps		9.953	
Bit Rate for Rx 1270nm	Gbps		2.488	

### Characteristics

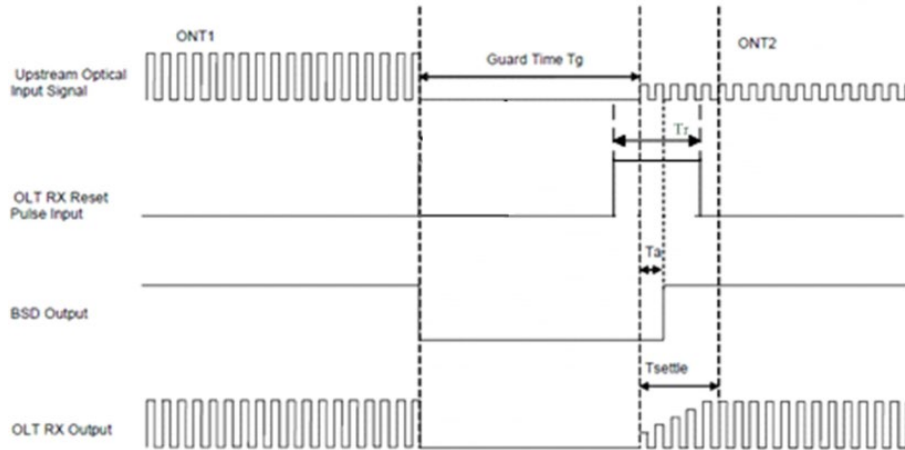
All performance is specified at whole working temperature and conditions

Parameter	Unit	Min.	Typical	Max.
<b>XG-PON 1577nm 9.953G Transmitter</b>				
TX Central Wavelength	nm	1575	1577	1580
Spectral Width (-20dB)	nm			1
SMSR	dB	30		
Mean Launched Power (N1)	dBm	2		6
Mean Launched Power (N2a)	dBm	4		8
Mean Launched Power (TX Off)	dBm			-39
Extinction Ratio	dB	8.2		
Optical Return Loss Tolerance	dB	-15		
Transmitter Mask (PRBS2 <sup>31</sup> -1@9.953G)	Compliant With ITU-T G.987.2			
<b>XG-PON 1270nm 2.488G Receiver</b>				
Receive Wavelength	nm	1260	1270	1280
Sensitivity (PRBS2 <sup>23</sup> -1@2.488G, ER=8.2, BER<10 <sup>-4</sup> ) (N1)	dBm			-27.5
Sensitivity (PRBS2 <sup>23</sup> -1@2.488G, ER=8.2, BER<10 <sup>-4</sup> ) (N2a)	dBm			-29.5
Overload (N1)	dBm	-7		
Overload (N2a)	dBm	-8		
SD Assert Level	dBm			-31
SD De-assert Level	dBm	-45		
SD Hysteresis	dB	0.5		6
Parameter	Unit	Min.	Typical	Max.
<b>Electrical Interface Characteristics</b>				
Data Input Swing Differential/TX	mV	120		850
Data Output Swing Differential/RX for XG-PON 2.488G CML	mV	340		850
Data Output Swing Differential/RX for XG-PON 1.244G LVPECL	mV	340		1800
Data Differential Impedance	Ω	90	100	110
LVTTTL Output High	V	2.4		V <sub>cc</sub>
LVTTTL Output Low	V	0		0.4
LVTTTL Input High	V	2.0		V <sub>cc</sub> +0.3
LVTTTL Input Low	V	0		0.8

**Timing Sequence for Burst Receiver**



Notice, the RxRESET pulse should work well when it is in the guard time or preamble time.

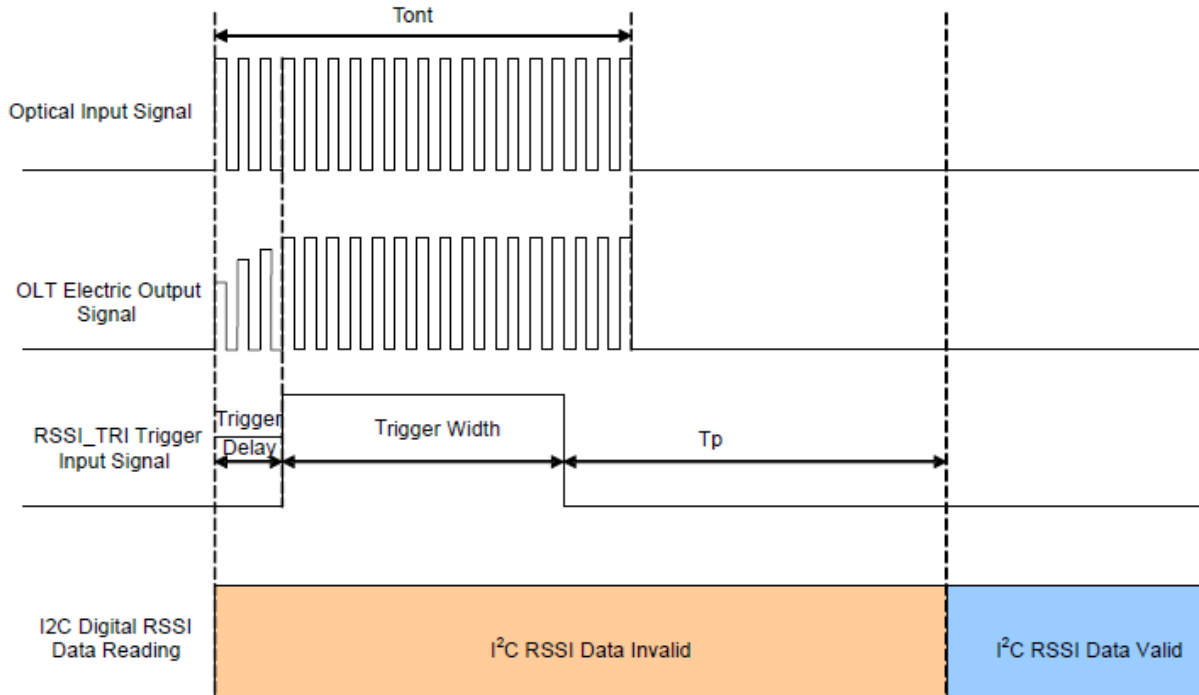


Parameter	Unit	Min.	Typical	Max.
<b>Burst Timing Characteristics</b>				
XG-PON Guard Time ( $T_g$ )	ns		12.8 (4Byte)	
XG-PON Settling Time ( $T_s$ )	ns		9.6 (3Byte)	
Reset Pulse Width ( $T_r$ )	ns		12.8 (4Byte)	
SD De-assert Time ( $T_{SD0}$ )	ns			10
SD Assert Time ( $T_{SD1}$ )	ns			25

Note1, the OLT RxRESET signal can be effective when in the Guard Time duration (Ranging Mode) or in the Preamble Time duration (Working Mode).

Note2, the OLT RxSD signal will be level '0' when the RxRESET signal equals to '1', and it will be level '1' after the input ONU optical signal detected, and its level will be held before the next RxRESET pulse coming.

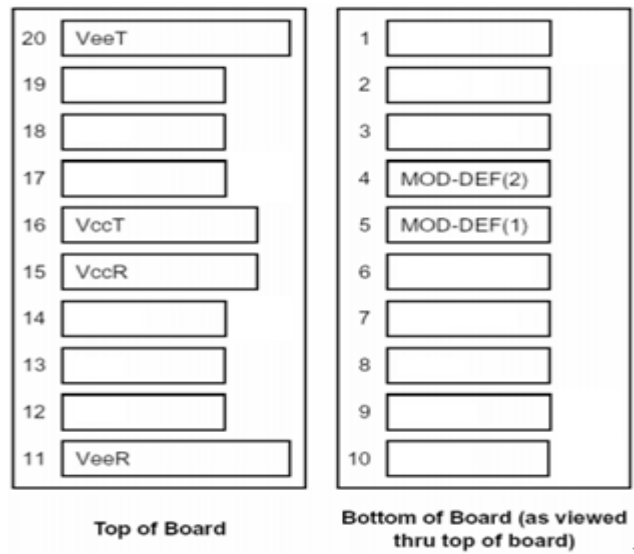
**Timing Sequence for RSSI**



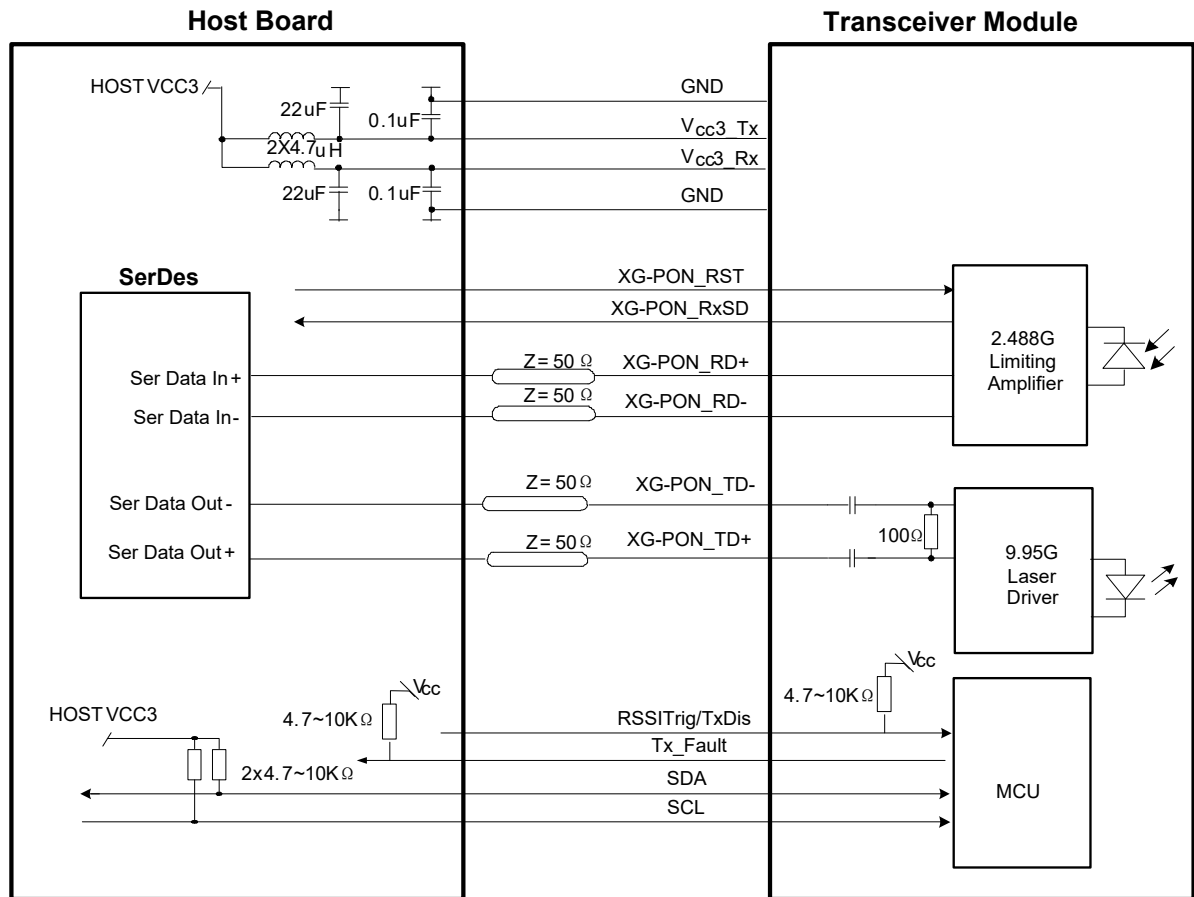
Parameter	Unit	Min.	Typical	Max.
<b>RSSI Timing Characteristics</b>				
ONU Package Length ( $T_{ont}$ )	ns	500		
RSSI Trigger Delay ( $T_{td}$ )	ns	500		3000
RSSI Trigger Pulse Width ( $T_w$ )	ns	600		$T_{ont} - T_{td}$
Internal I <sup>2</sup> C Delay ( $T_p$ )	us	500		
GPON ONU Power Range ( $P_{mon}$ )	dBm	-32		-7
XG-PON ONU Power Range ( $P_{mon}$ )	dBm	-31		-7
RSSI Monitoring Error	dB	+/-3		

**PIN Definition**

Pin No.	Symbol	Level / Logic	Description
1	NC		Reserved for GPON OLT Transmitter Non-Inverted Data Input, 2.488Gbps, AC-coupled
2	NC		Reserved for GPON OLT Transmitter Inverted Data Input, 2.488Gbps, AC-coupled
3	GND		Module Ground
4	SDA	LVTTTL-I/O	2-Wire Serial Interface Data Line
5	SCL	LVTTTL-I	2-Wire Serial Interface Clock
6	NC		Reserved for GPON Receiver Inverted Data Output, 1.244Gbps, DC-coupled
7	XG-PON_RST	LVTTTL-I	XG-PON Receiver Reset, high active
8	XG-PON_RxSD	LVTTTL-O	XG-PON Receiver Signal Detected Indicator
9	RSSITrig/TxDis	LVTTTL-I	according to the relative control register, to act as RSSITrig or TxDis input PIN. When acting as RSSITrig, active high to trigger the RSSI sampling. When acting as TxDis, active high to turn off transmitter laser output.
10	NC		Reserved for GPON Receiver Non-Inverted Data Output, 1.244Gbps, DC-coupled
11	GND		Module Ground
12	XG-PON_RD-	CML-O	XG-PON Receiver Inverted Data Output, 2.488Gbps, DC-coupled
13	XG-PON_RD+	CML-O	XG-PON Receiver Non-Inverted Data Output, 2.488Gbps, DC-coupled
14	Tx_Falut	LVTTTL-O	XG-PON Transmitter Faliure Indicator
15	V <sub>CC3_RX</sub>		+3.3V Tx Power Supply
16	V <sub>CC3_TX</sub>		+3.3V Rx Power Supply
17	NC		Reserved for GPON Receiver Reset, high active
18	XG-PON_TD+	CML-I	XG-PON Transmitter Non-Inverted Data Input, 9.95Gbps, AC-coupled
19	XG-PON_TD-	CML-I	XG-PON Transmitter Inverted Data Input, 9.95Gbps, AC-coupled
20	GND		Module Ground

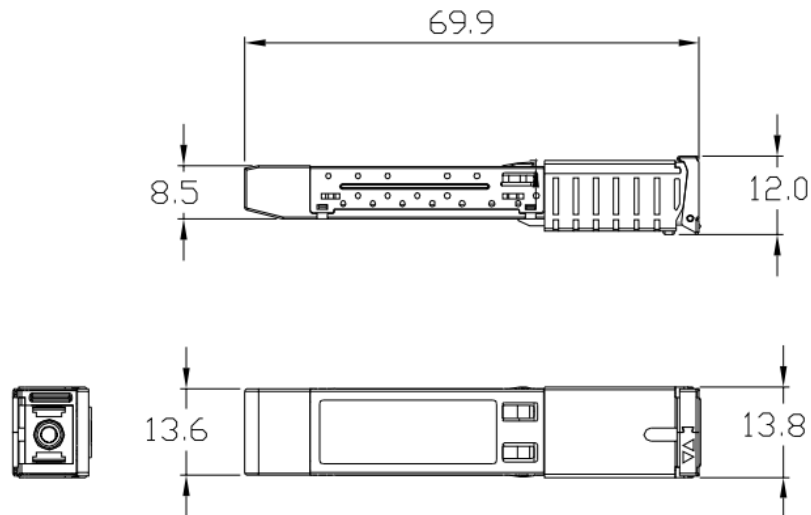


**Typical Interface Circuit**



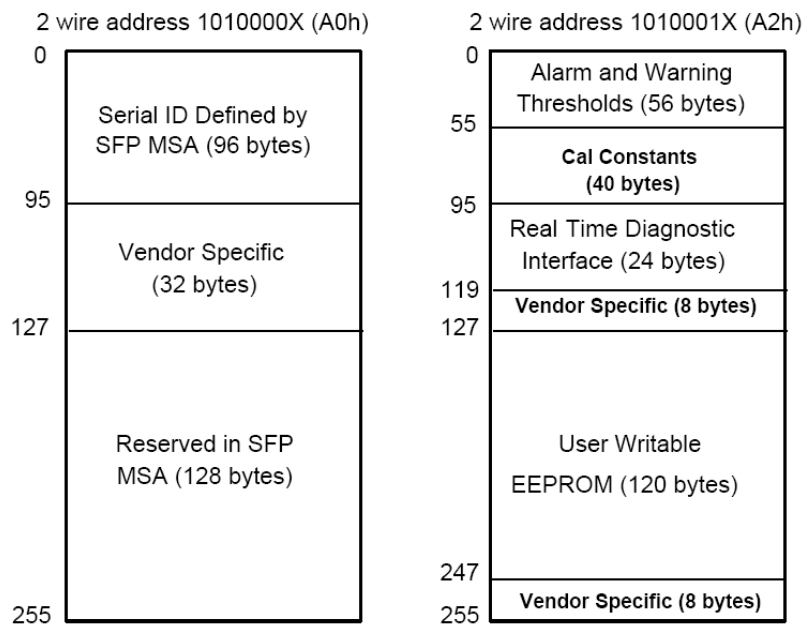
**Mechanical Diagram**

For detail mechanical information, please refer to the related document of SFF-8432



**EEPROM Memory Map**

The digital diagnostic memory map specific data field define as following. For detail EEPROM information, please refer to the related document of SFF 8472 Rev 12.0.



## ESD

The SFP+ module and host SFI contacts (High Speed Contacts) shall withstand 1kV electrostatic discharge based on Human Body Model and all host contacts with exception of the SFI contacts (High Speed Contacts) shall withstand 2kV electrostatic discharge based on Human Body Model. The SFP+ module shall meet ESD requirements given in EN61000-4-2, criterion B test specification such that units are subjected to 15kV air discharges during operation and 8kV direct contact discharges to the case per section 2.9 in SFF-8431 REV4.1. However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

## Laser Safety

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

## Ordering Information

Ordering P/Ns	Description
D272R6-SSCA	XG-PON OLT, compatible with GPON OLT B+ and XG-PON N1 OLT, TX 1577nm 9.95Gbps, Burst RX 1270nm 2.488Gbps, SFP+ form-factor, BIDI SC/UPC Receptacle, 0~70°C Commercial Temperature
D372R6-SSCA	XG-PON OLT, compatible with GPON OLT C+ and XG-PON N2a OLT, TX 1577nm 9.95Gbps, Burst RX 1270nm 2.488Gbps, SFP+ form-factor, BIDI SC/UPC Receptacle, 0~70°C Commercial Temperature

## Contact Us

### International Sales

Email: [Sales@broadex-tech.co.uk](mailto:Sales@broadex-tech.co.uk)

Tel: +44-1506-426021

Mobile: +44-7968-854124

### China Sales

Tel: +86-573-82585881

Email: [Sales@broadex-tech.com](mailto:Sales@broadex-tech.com)

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