

XGSPON OLT SFP+ 1577nm-TX/1270nm-RX 9.953G-TX/9.953G-RX & 9.953G-TX/2.488G-RX Class N2 20km DOM SC SMF Optical Transceiver Module

XGS-SFP-52-20N2I



Application

- XGSPON Access Network

Features

- Support ITU-T G.9807.1 XGS-PON OLT N2 Application
- Single fiber bi-directional data links with 9.953Gbps downstream and 9.953Gbps /2.488Gbps (compatible) upstream
- 1577nm continuous-mode transmitter with EML laser
- 1270nm burst-mode receiver with APD-TIA
- 2-wire interface for integrated digital diagnostic Monitoring
- SFP+ package with SC/UPC receptacle optical interface
- +3.3V power supplies
- RoHS With Exemptions
- 20Km Reach
- Operating case temperature
Industry temp: -40~+85° C
Commercial temp: 0~70° C

Description

The XGSPON OLT SFP+ transceiver provides a symmetric 9.953Gbps & 2.488G upstream and 9.953G downstream, reaching a link up to 20km over SMF via SC/UPC connector. It is fully compliant with ITU-T G9807.1 and is ideal for symmetric 10Gigabit capable passive optical network (XGS-PON) system.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Ambient Temperature	Ts	-40	-	+85	°C	
Operating Case Temperature	Tc	0	-	70	°C	C-Temp
	Tc	-40	-	+85	°C	I-Temp
Supply Voltage	V _{CC3}	0	-	3.6	V	
Operating Relative Humidity	RH	5	-	+85	%	

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	Tc	0	-	70	°C	C-Temp
	Tc	-40	-	85	°C	I-Temp
Power Supply Voltage	V _{CC3}	3.13	3.3	3.47	V	
Supply current	I _{cc}			796	mA	1
Power Consumption				2.5	W	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmission Distance				20	km	
Rx Optical Isolation (From External Below 1260nm)	ISO	-32			dB	
Rx Optical Isolation (From External Above 1280nm)	ISO	-32			dB	

Notes:

- Base on 3.14V

III. Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter (9.953G)						
Centre Wavelength	λ_C	1575	1577	1580	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power	POUT	4		7	dBm	1
Average Launch Power-OFF	POFF			-39	dBm	
Extinction Ratio	EX	8.2			dB	
Maximum Optical Path Penalty				1	dBm	2
Transmitter Eye Diagram		Comply with ITU-T G.9807.1				

Receiver (9.953G)						
Operating Wavelength	λ_C	1260	1270	1280	nm	
Sensitivity	PSEN			-28	dBm	3

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Saturation	PSAT	-7			dBm	3
Signal Detected De-assert Level	Psdd	-42			dBm	
Signal Detected Assert Level	Psda			-30	dBm	
Receiver (2.488G)						
Operating Wavelength	λC	1260	1270	1280	nm	
Sensitivity	PSEN			-29.5	dBm	
Saturation	PSAT	-9			dBm	
Signal Detected De-assert Level	Psdd	-42			dBm	
Signal Detected Assert Level	Psda			-30	dBm	

- Notes:
1. The optical power is launched into 9/125um SMF.
 2. 20KM transmission (DD20)
 3. Measured with PRBS 2^31- 1 test pattern @9.953Gbps and ER=6dB BER =10^-3
 4. Measured with PRBS 2^23- 1 test pattern @2.488Gbps and ER=8.2dB, BER =10^-4

IV. Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter (9.953G)						
Data Input Differential Swing	VIN	200	-	850	mVp-p	
Input Differential Impedance	ZIN		100		Q	
Tx_Disable Voltage	VIL	0	-	0.8	V	
	VIH	2.4		3.3	V	
Receiver (9.953G)						
Data Output Differential Swing	VOUT	300		800	mVP-P	
Signal Detected Voltage_low	VSD, L	0		0.8	V	
Signal Detected Voltage_high	VSD, H	2		VCC3	V	
Signal Detected Assert Time	TSDA			100	ns	
Signal Detected Deassert Time	TSDD			50	ns	
Data Recovery Time	Trec			200	ns	
Receiver (2.488G)						
Data Output Differential Swing	VOUT	300		800	mVP-P	
Signal Detected Voltage_low	VSD, L	0		0.8	V	
Signal Detected Voltage_high	VSD,H	2		VCC3	V	
Signal Detected Assert Time	TSDA			100	ns	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Signal Detected Deassert Time	TSDD			50	ns	
Data Recovery Time	Trec			200	ns	

V. RSSI Timing

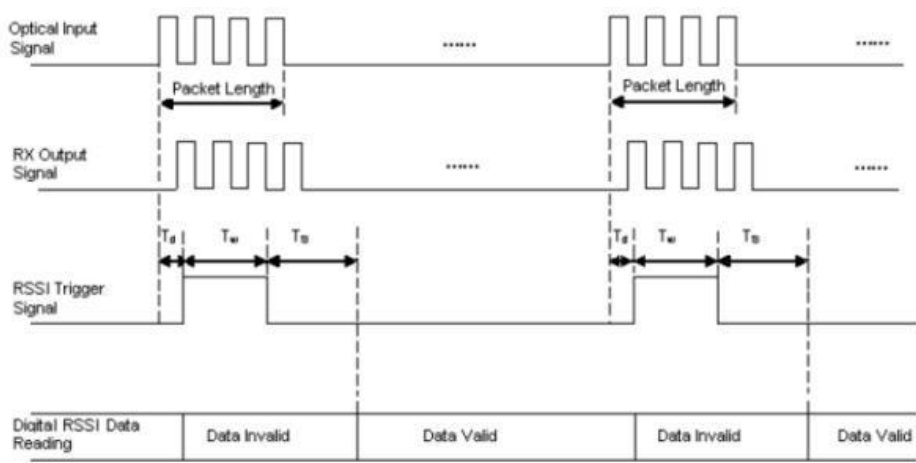


Figure 1, RSSI Timing Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Packet Length		575			ns	
RSSI Trigger Delay	Td	25			ns	
RSSI Trigger Width	Tw	500			ns	
RSSI Sampling Time	T _{SAMPLE}	500			ns	
Delay Before Read	Ts	500			us	

VI. XGSPON Rx Burst Timing

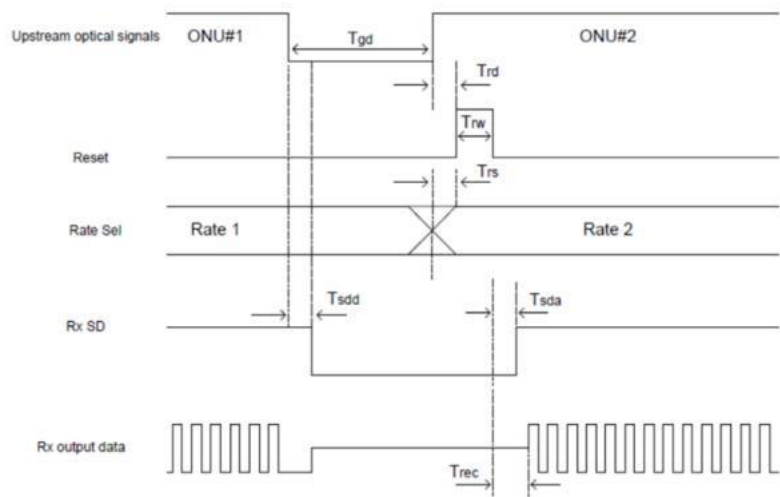


Figure 2, XGSPON RX Burst Timing

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Guard Time	Tgd	51.2	-	-	ns	
Reset Delay	Trd	0	-	-	ns	1
Reset Width	Trw	25.6	-	-	ns	
RateSel Setup Time	Trs	5	-	-	ns	2
SD Assert Time	Tsda	0	-	51.2	ns	
SD De-assert Time	Tsdd	-	100	-	ns	3
Data Recovery Time	Trec	0	51.2	100	ns	

Notes:

- Reset pulse is suggested to be fully inside the preamble.
- The polarity of RateSel signal could be customized, high = 10G rate, low = 2.5G rate by default.
- Signal detect auto reset function is applied. The signal detect de-assert time forced by auto reset is typically 100ns, and could short to about 12.8ns with additional reset pulse.

VII. Recommended Host Board Power Supply Circuit

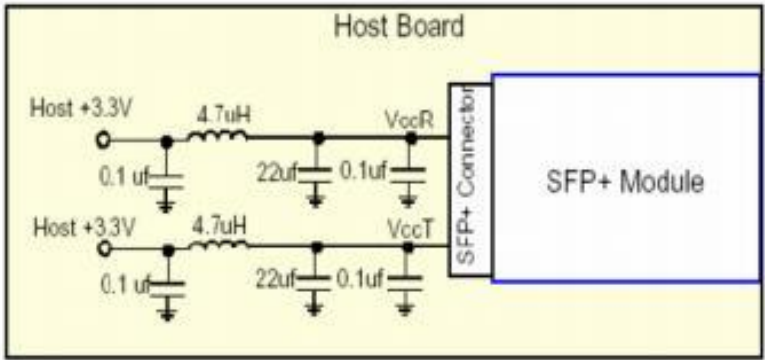


Figure 3, Recommended Host Board Power Supply Filtering Network

VIII. Recommended Interface Circuit

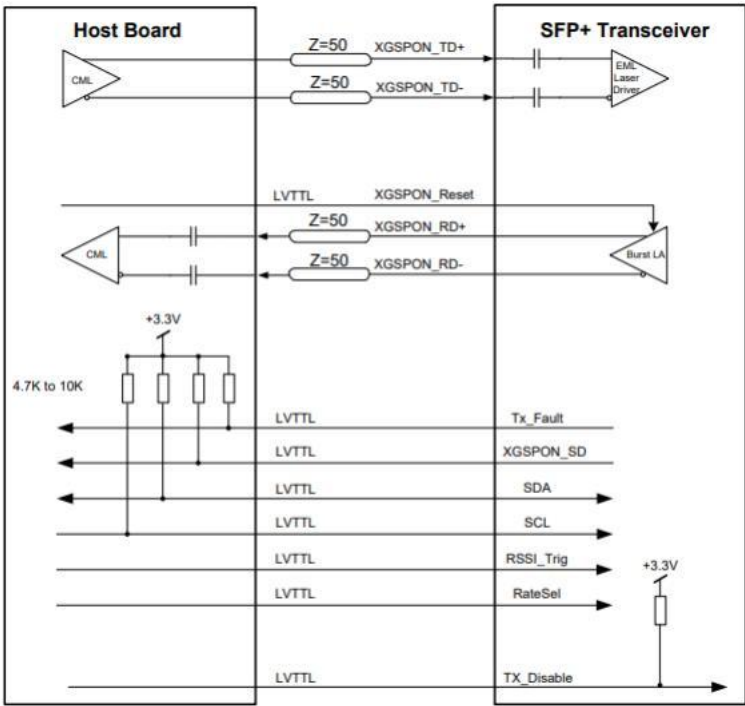


Figure 4, Recommended Interface Circuit

IX. Diagnostics

Address	Parameter	Range	Accuracy	Unit	Notes	Calibration
96	Temperature	0 to 70	± 3	°C	LSB equal to 1/256c	Internal
		-40 to 85	± 3	°C	LSB equal to 1/256c	Internal
98	Voltage	3.15 to 3.45	± 3%	V	LSB equal to 100uV	Internal
100	Bias Current	0 to 130	± 10%	mA	LSB equal to 4uA	Internal
102	Tx Power	4 to 7	± 3dB	dBm	LSB equal to 0.2uW	Internal
104	Rx Power	-28 to -7	± 3dB	dBm	LSB equal to 0.1uW	Internal

X. Pin Function Definitions

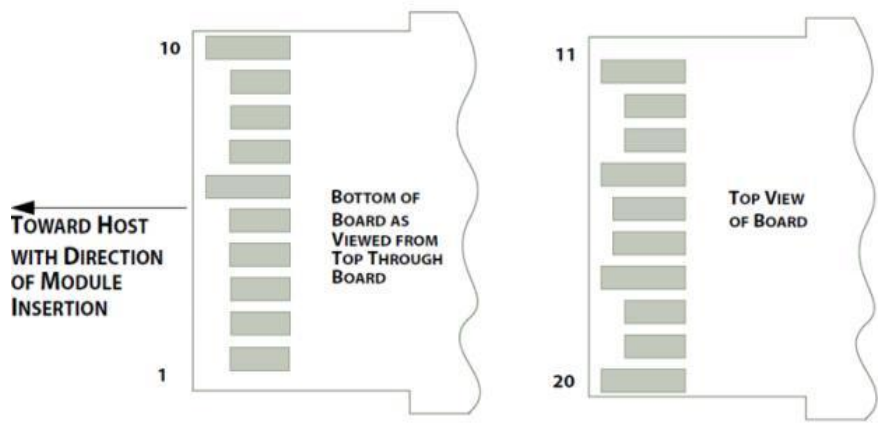


Figure 5, pin layout

Pin	Logic	Name	Description	Notes
1	LVTTTL	Rate_Sel	2.5G= Low, 10G= High	
2	LVTTTL-O	TX_Fault	High Voltage: TX Laser Fault or Safety Low Voltage: Normal Operation	
3	LVTTTL-I	Tx_Disable	Active High to Disable Laser	

Pin	Logic	Name	Description	Notes
4		SDA	2-Wire Serial Interface SDA	
5		SCL	2-Wire Serial Interface SCL	
6		MOB_ABS	Module Ground	
7		RESET	Reset for TIA/LIA, Active High	
8	LVTTL	Rx_SD	Receiver Signal Detect, Logic1 Indicates Normal Operation	
9	LVTTL	RSSI_Trigger	RSSI Trigger Input, Active High	
10		GND	Module Ground	
11		GND	Module Ground	
12	CML	RD-	2.5/10G CML Output with DC Coupling	
13	CML	RD+	2.5/10G CML Output with DC Coupling	
14		GND	Module Ground	
15		VCC	+3.3V Power Supply	
16		VCC	+3.3V Power Supply	
17		GND	Module Ground	
18	CML	TD+	10G CML Input with AC Coupling	
19	CML	TD-	10G CML Input with AC Coupling	
20		GND	Module Ground	

XI. Mechanical Diagram

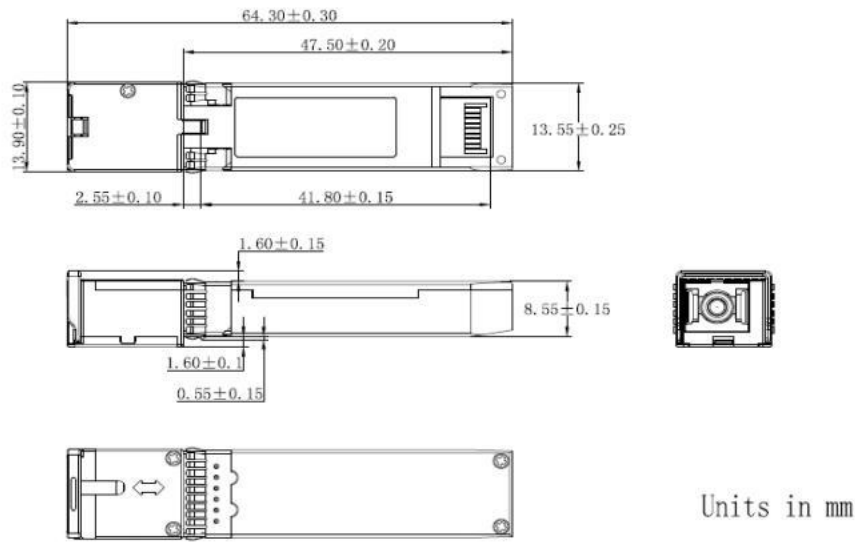


Figure 6, outline drawing

Ordering Information

Part Number	Description
XGS-SFP-52-20N2I	XGSPON OLT SFP+ 1577nm-TX/1270nm-RX 9.953G-TX/9.953G-RX & 9.953G-TX/2.488G-RX Class N2 20km DOM SC SMF Optical Transceiver Module (Industrial)
XGS-SFP-52-20E1I	XGSPON OLT SFP+ 1577nm-TX/1270nm-RX 9.953G-TX/9.953G-RX & 9.953G-TX/2.488G-RX Class E1 20km DOM SC SMF Optical Transceiver Module (Industrial)
XGS-SFP-52-20N1	XGSPON OLT SFP+ 1577nm-TX/1270nm-RX 9.953G-TX/9.953G-RX Class N1 20km DOM SC SMF Optical Transceiver Module
XGS-SFP-25-20N2	XGSPON ONU SFP+ 1270nm-TX/1577nm-RX 9.953G-TX/9.953G-RX Class N2 20km DOM SC SMF Optical Transceiver Module
XGS-ONU-25-20N1	XGSPON Stick ONU with MAC SFP+ 1270nm-TX/1577nm-RX 10G-TX/10G-RX Class N1 20km IND DDM SC SMF Optical Transceiver Module
XGS-SFP-52-20N1I	XGSPON OLT SFP+ 1577nm-TX/1270nm-RX 9.953G-TX/9.953G-RX & 9.953G-TX/2.488G-RX Class N1 20km DOM SC SMF Optical Transceiver Module (Industrial)