

XGS-PON&GPON Combo OLT SFP+ 1577nm-Tx /1270nm-Rx and 1490nm-Tx/1310nm-Rx Class C+ 20km DOM SC SMF Optical Transceiver Module (Industrial)

XSG-SFP-C+L-I



Application

XGSPON&GPON Combo OLT C+, SFP+, -40~85°C

Features

- Combination of XGS-PON OLT and GPON
- OLT optical transceiver in a SFP+ package
- Comply ITU-T G.984.5 (2014)/Amd.2 (10/2020)GPON & XGS-PON OPL Class C+
- +3.3V power supply, 3W Power Consumption
- 20km Reach
- Single fiber bi-directional data links with
Tx1: 9.953Gbps, Rx1: 9.953Gbps/2.488Gbps
Tx2: 2.488Gbps, Rx2: 1.244Gbps
- 1577nm continuous-mode transmitter with EML laser
- 1490nm continuous-mode transmitter with DFB laser
- 1270nm burst-mode receiver with APD-TIA
- 1310nm burst-mode receiver with APD-TIA
- Two-Wire-Interface for integrated digital diagnostic monitoring
- RoHS With Exemptions 7C(I)
- Operating temp support:
Industry Temp: -40~85°C
Support Pin-out: 22 pins、20 pins

Description

Over the years, fiber-based access has proven to be a cost-effective way to reach customer premises to deliver managed business and residential services. Ethernet or Passive Optical Network (PON) technologies such as Gigabit PON (GPON) are supported by FS OLT/ONU. PON modules support fiber-based (FTTx) access scenarios, including Fiber To The Home (FTTH), Fiber To The Building (FTTB), Fiber To The Curb (FTTC), Fiber To The cell (FTTc), and Fiber To The business (FTTb).

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Storage Temperature Range	Ts	-40	85	°C	
Operating Temperature	Tc	-40	85	°C	I-Temp
Relative Humidity	RH	5	85	%	
Supply Voltage	VCC	0	3.6	V	

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	Tc	-40	-	85	°C	I-Temp
Power Supply Voltage	VCC	3.14	3.3	3.47	V	
Supply Current	Icc			955	mA	1
Power Consumption			3		W	

XGS Rx Optical Isolation (From external 1290- 1650nm)	ISO	-30				dB	
Reflectance of XGS Rx (1260- 1280nm)					-12	dB	
GPON Rx Optical Isolation (From external 1260- 1280nm)	ISO	-30				dB	
GPON Rx Optical Isolation (From external 1342- 1650nm)	ISO	-30				dB	
Reflectance of GPON Rx (1290- 1330 nm)					-20	dB	
Differential Power Range					20	dB	2

Notes:

- 1. Base on 3.14V
- 2. Power differential between sequential ONU bursts

III. Optical Characteristics

Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
Transmitter (9.953G)						
Centre Wavelength	λ_C	nm	1575	1577	1580	
Side Mode Suppression Ratio	SMSR	dB	30			
Average Launch Power	Aop	dBm	5		8	
Average Launch Power-OFF	POFF	dBm			-39	
Extinction Ratio	ER	dB	8.2			
Transmitter tolerance to reflected power		dB	- 15			
Eye Diagram			ITU-T G.9807. 1 Compliant			
Transmitter (2.488G)						
Centre Wavelength	λ_C	nm	1480	1490	1500	
Side Mode Suppression Ratio	SMSR	dB	30			
Average Launch Power	Aop	dBm	3		7	
Average Launch Power-OFF	POFF	dBm			-40	
Extinction Ratio	ER	dB	8.2			

Transmitter tolerance to reflected power ER dB - 15

Eye Diagram		dB	ITU-TG.984.2 Compliant			
Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
Receiver (9.953G)						
Operating Wavelength	λC	nm	1260	1270	1280	
Sensitivity	PSEN	dBm			-29	1
Saturation	PSAT	dBm	-8			
Signal Detected De-assert Level	Psdd	dBm	-45			
Signal Detected Assert Level	Psda	dBm			-30	
Max Optical input Power	Pdamage	dBm			0	
Receiver (2.488G)						
Operating Wavelength	λC	nm	1260	1270	1280	
Sensitivity	PSEN	dBm			-30.5	2
Saturation	PSAT	dBm	-10			
Signal Detected De-assert Level	Psdd	dBm	-45			
Signal Detected Assert Level	Psda	dBm			-31	
Max Optical input Power	Pdamage	dBm			0	
Receiver (1.244G)						
Operating Wavelength	λC	nm	1290	1310	1330	
Sensitivity	PSEN	dBm			-32	3
Saturation	PSAT	dBm	-12			
Signal Detected De-assert Level	Psdd	dBm	-45			
Signal Detected Assert Level	Psda	dBm			-33	
Max Optical input Power	Pdamage	dBm			0	

- Notes:
- 1. Measured with PRBS 2³¹- 1 test pattern @9.953Gbps and ER=6dB BER = 10⁻³
 - 2. Measured with PRBS 2²³- 1 test pattern @2.488Gbps and ER=8.2dB, BER = 10⁻⁴
 - 3. Measured with PRBS 2²³- 1 test pattern @1.244Gbps and ER=8.2dB, BER = 10⁻⁴

IV. Optical Characteristics

Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
Transmitter (9.953G)						
Data Input Differential ISwing	VIN	mVp-p	150	-	850	
Input Differential Impedance	ZIN	Ω		100		
Tx_Disable Voltage	VIL	V	0	-	0.8	
	VIH	V	2		3.3	
Transmitter Fault Voltage-Low	VTFI,L	V	0		0.4	
Transmitter Fault Voltage-High	VTFI,H	V	2.4		VCC	
Transmitter (2.488G)						
Data Input Differential Swing	VIN	mVp-p	200	-	1600	
Input Differential Impedance	ZIN	Ω		100		
Tx_Disable Voltage	VIL	V	0	-	0.8	
	VIH	V	2		3.3	
Transmitter Fault Voltage-Low	VTFI,L	V	0		0.4	
Transmitter Fault Voltage-High	VTFI,H	V	2.4		VCC	
Receiver(9.953G)						
Data Output Differential Swing	VOUT	mVP-P	300		800	
Signal Detected Voltage_ low	VSD,L	V	0		0.4	
Signal Detected Voltage_ high	VSD,H	V	2.4		VCC	
Signal Detected Assert Time	TSDA	ns			100	
Signal Detected Deassert Time	TSDD	ns			50	
Data Recovery Time	Trec	ns			100	
Receiver (2.488G)						
Data Output Differential Swing	VOUT	mVP-P	300		800	
Signal Detected Voltage_ low	VSD,L	V	0		0.4	
Signal Detected Voltage_ high	VSD,H	V	2.4		VCC	
Signal Detected Assert Time	TSDA	ns			50	
Signal Detected Deassert Time	TSDD	ns			12.8	
Data Recovery Time	Trec	ns			25.6	

Receiver (1.244G)						
Data Output Differential Swing	VOUT	mVP-P	600		1600	
Signal Detected Voltage_ low	VSD,L	V	0		0.4	
Signal Detected Voltage_ high	VSD,H	V	2.4		VCC	
Signal Detected Assert Time	TSDA	ns			50	
Signal Detected Deassert Time	TSDD	ns			12.8	
Data Recovery Time	Trec	ns			25.6	

RSSI Timing

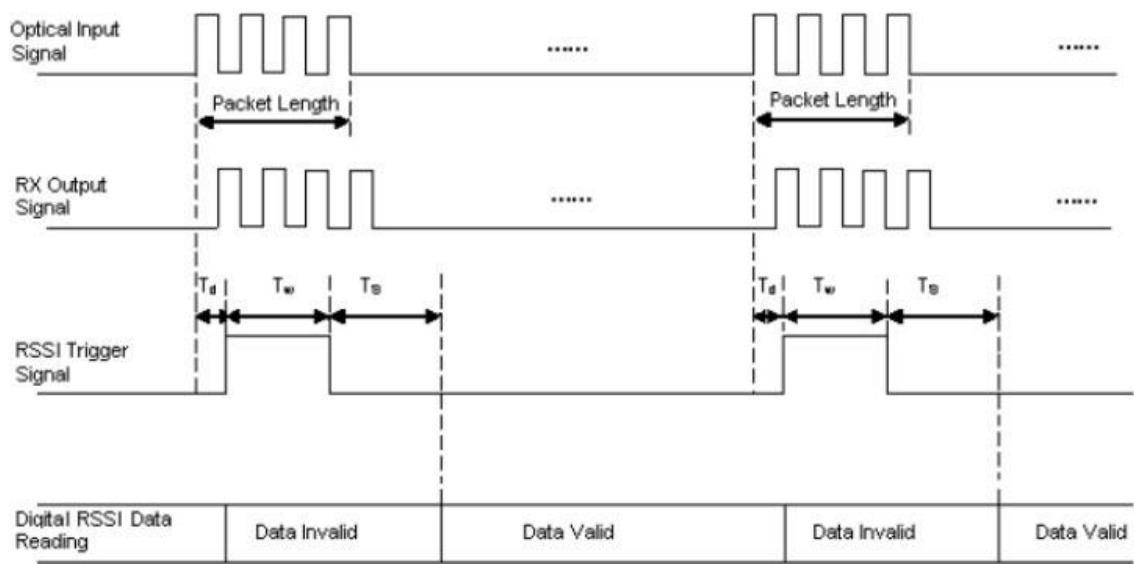


Figure 1. RSSI Timing Specification

V. RSSI Timing Spec

Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
Packet Length		ns	575			
RSSI Trigger Delay	T_d	ns	100			
RSSI Trigger Width	T_w	ns	500			
RSSI Sampling Time	T_{SAMPLE}	ns	500			
Delay before Read	T_s	us	500			

Recommended Host Board Power Supply Circuit

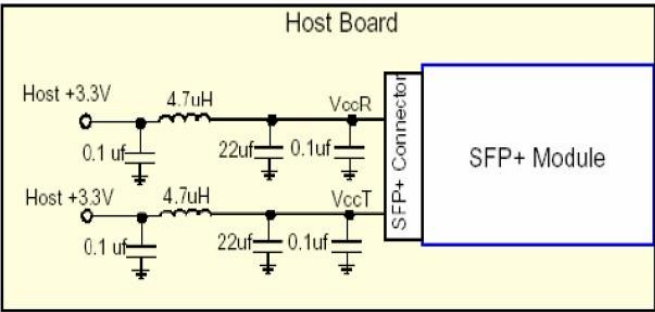


Figure 2. Recommended Host Board Power Supply Filtering

Recommended Interface Circuit

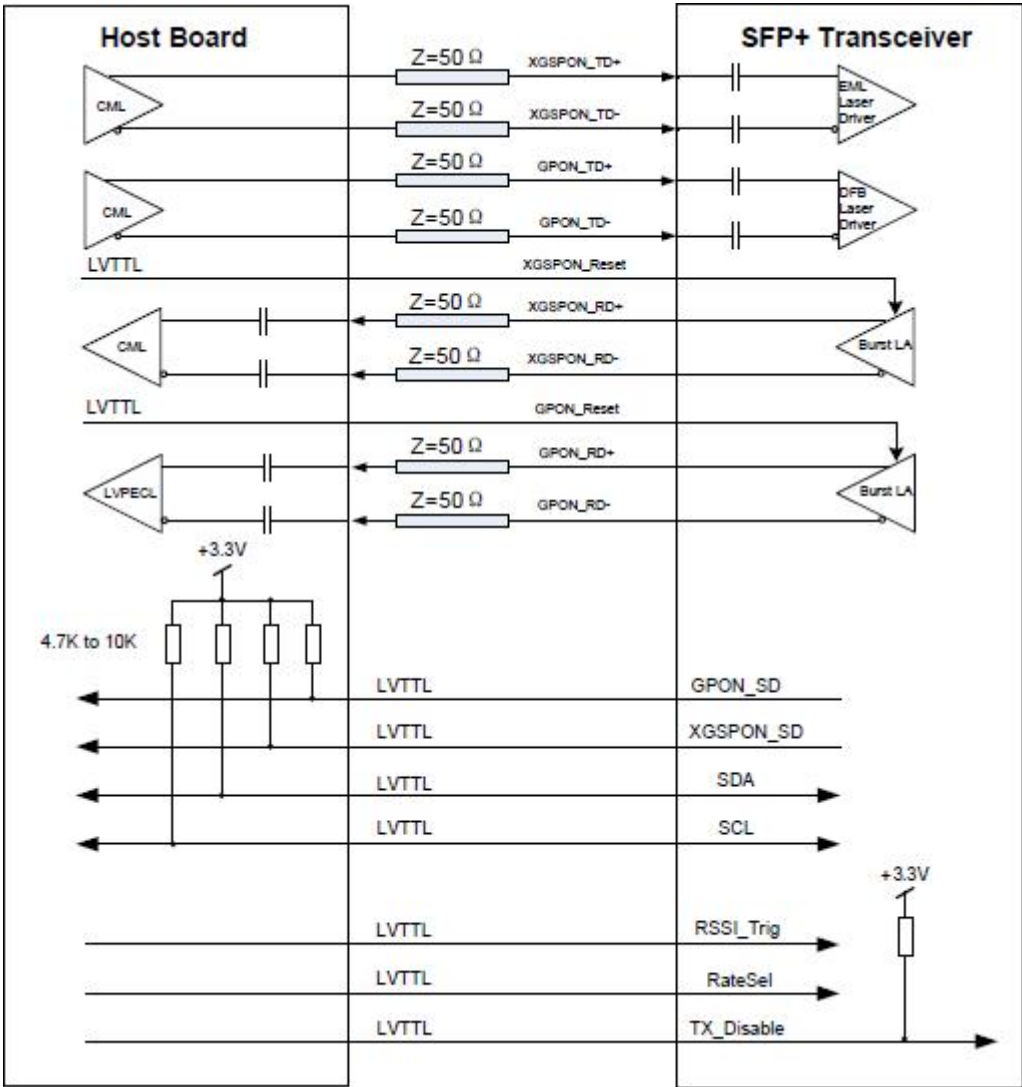


Figure 3. Recommended interface Circuit.

VI. Diagnostics

Parameter	Range	Accuracy	Unit	Notes	Calibration
Temperature	0 to 70	±3	°C	LSB equal to 1/256°C	Internal
Voltage	3.14 to 3.47	±3%	V	LSB equal to 100µV	Internal
Bias Current	0 to 130	±10%	mA	LSB equal to 4µA	Internal
Tx Power(9.953G)	5 to 8	±2dB	dBm	LSB equal to 0.2µW	Internal
Tx Power(2.488G)	3 to 7	±2dB	dBm	LSB equal to 0.2µW	Internal
Rx Power(9.953G)	-31 to -10	±3dB	dBm	LSB equal to 0.1µW	Internal
Rx Power(1.244G)	-32 to -12	±3dB	dBm	LSB equal to 0.1µW	Internal

VII. Pin Definitions (22 PINs)

Pin	Logic	Name	Description	Notes
1	CML-I	GPON_TD+	GPON transmit data input, AC coupling	
2	CML-I	GPON_TD-	Inverted GPON transmit data input, AC coupling	
3		GND	Ground	
4	LVTTL-I	TXDisable	Active high, TX Disable control both XGS-PON and GPON transmitter, and can be separately disable GPON or XGS-PON by IIC programming.	
5	LVTTL-I/O	SDA	2-Wire serial interface SDA	
6	LVTTL-I	SCL	2-Wire serial interface SCL	
7	LVPECL-O	GPON_RD-	Inverted GPON received data output, DC coupling	
8	LVTTL-I	XGS-PONReset	Reset for XGSPON LA, active high	
9	LVTTL-O	XGS-PONSD	XGS Receiver signal detect, logic 1 indicates normal operation	
10	LVTTL-I	RSSI_Trigger	RSSI trigger input, active high. RSSI trigger control both XGS-PON and GPON receiver, and select GPON or XGS-PON channel by IIC programming	
11	LVPECL-O	GPON_RD+	GPON received data output, DC coupling	
12	LVTTL-I	Rate_Sel	2.488G=Low, 9.953G=High	
13		GND	Ground	
14	CML-O	XGS-PONRD-	Inverted XGSPON received data output, DC coupling	



Pin	Logic	Name	Description	Notes
15	CML-O	XGS-PONRD+	XGSPON receive ddata output,DCcoupling	
16	LVTTL-O	GPONSD	GPON Receiver signal detect,logic1 indicates normal operation	
17		VCC	+3.3V Powersupply	
18		VCC	+3.3V Powersupply	
19	LVTTL-I	GPONReset	Reset for GPON LA,active high	
20	CML-I	XGS-PONTD+	XGS transmit data input, AC coupling	
21	CML-I	XGS-PONTD-	Inverted XGS transmit data input,AC coupling	
22		GND	Module Ground	

VIII. Pin Definitions (20 PINs)

Pin	Logic	Name	Description	Notes
1	CML-I	GPON_TD+	GPON transmit data input,AC coupling	
2	CML-I	GPON_TD-	Inverted GPON transmit datainput,AC coupling	
3		GND	Ground	
4	LVTTL	SDA	2-Wireserial interface SDA	
5	LVTTL	SCL	2-Wireserial interface SCL	
6	LVPECL-O	GPON_RD-	Inverted GPON received data output,DC coupling	
7	LVTTL	XGSPON_Reset/Ra te_select	Highlevel(>1.9V)for the RESET function,Low level (<0.9V) for 10G Rate selection signal,Intermediate level(0.9V~1.9V)for 2.5g Rateselect signal	
8	LVTTL-O	XGSPON_SD	XGS Receiver signal detect,logic1 indicates normal operation	
9	LVTTL	Trig/Tx_disable	Signal pins are multiplexed through register,when useasTx disable,active high.	
10	LVPECL-O	GPON_RD+	GPON received data output,DC coupling	
11		GND	Ground	
12	CML-O	XGS-PONRD-	Inverted XGSPON received data output,DC coupling	
13	CML-O	XGS-PONRD+	XGSPON received data output, DCcoupling	
14	LVTTL-O	GPONSD	GPON Receiver signal detect,logic1 indicates normal operation	
15		VCCRx	+3.3V Powersupply	
16		VCCTx	+3.3V Powersupply	
17	LVTTL-I	GPONReset	Reset for GPON LA,active high	
18	CML-I	XGS-PONTD+	XGS transmit data input, AC coupling	
19	CML-I	XGS-PONTD-	Inverted XGS transmit data input,AC coupling	
20		GND	Module Ground	

Outline Drawing

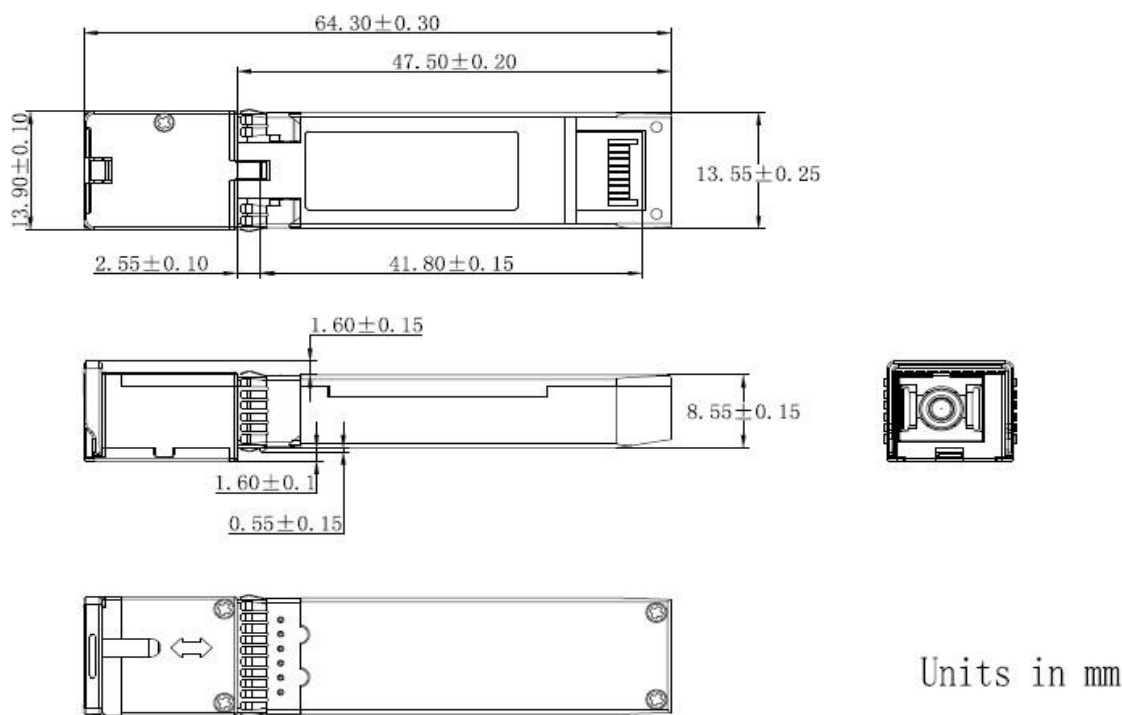


Figure 4. Draft outline drawing, not a final version

Order Information

Part Number	Description
XSG-SFP-C+L-I	XGS- PON&GPON Combo OLT SFP+ 1 577nm-Tx/ 1 270nm-Rx and 1 490nm-Tx/ 1 310nm-Rx Class C+ 20km DOM SC SMF Optical Transceiver Module (Industrial)