

XGSPON ONU SFP+ 1270nm-TX/1577nm-RX 9.953G-TX/9.953G-RX 20km DOM SC SMF Optical Transceiver Module (Industrial)

XGS-SFP-25-20I



Application

- XGSPON Access Network

Features

- Compliant with ITU-T G.9807.1 XGSPON N1/N2/E1 class
- 1270nm Burst-Mode Transmitter with DFB Laser
- 1577nm Continuous-Mode Receiver with APD-TIA
- Sleep Mode for Power Consumption
- SFP+ Form factor compliant with SFF-8432/SFF-8431
- Compliant Digital Diagnostic SFF-8472 Rev 11.0
- Single 3.3V Power Supply
- SC/APC or SC/APC Connector Bi-directional
- Telcordia GR-468 Compliant
- RoHS With Exemptions
- Operating case temperature: Industrial temp: -40~+85° C

Description

The 9.953G-TX/ 9.953G-RX Optical module is specifically designed for 10-Gigabit-capable Passive Optical Network system. It integrates bidirectional data transmission over one single-mode optical fiber. The XGSPON ONU Small Form-Factor Pluggable Plus (SFP+) transceiver can provide a symmetrical bandwidth with a maximum uplink and downlink rate of 10G via SC/APC connector, reaching a link up to 20km. It can operate at temperature between -40~85 C. Digital optical monitoring (DOM) allows access to real-time operating parameters. It is fully compliant with G.9807. 1.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Ambient Temperature	Ts	-40	-	85	°C	
Operating Case Temperature	Ts	-40	-	85	°C	I-Temp
Maximum Reach			-	20	km	
Power Supply Voltage	V _{CC}	0	-	4	V	
Operating Relative Humidity	RH	5	-	+85	%	

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	V _{CC3}	3.13	3.3	3.47	V	
Supply Current	I _{CC}			550	mA	
Inrush Current	IN-RUSH			600	mA	
Data Rate	DR	9.95328			Gbit/s	

III. Optical Characteristics

Parameter	Symbol	Unit	Min.	Typ.	Max	Note
Transmitter						
Centre Wavelength Range Special Width(-20dB)	λ_C $\Delta\lambda$	nm nm	1260	1270	1280 1	
Side Mode Suppression Ratio	SMSR	dB	30			
Average Launch Power	POUT	dBm	4		9	1
Average Launch Power-OFF	POFF	dBm			-45	1
Extinction Ratio	EX	dB	6			2
Tx Reflectance		dB	- 10			
Tolerance to reflected optical power		dB	-15			
ORL of ODN at Oru and Ord			32			
Optical Eye Mask		dB	Compliant with G.9807.1			2.3

Receiver						
Operating Wavelength	λ_C	nm	1575	1577	1580	
Sensitivity	PSEN1	dBm			-28	4
WDM Filter Isolation	ISO (1260-1560nm)	dBm	35			
	ISO(1600-1675nm)	dBm	35			



Saturation	PSAT	dBm	-9			4
Damage power		dBm				0
Bit Error Ratio	10E-3					
Rx Reflectance		dBm				-20
Receiver tolerance to reflected Optical Power		dBm				10
Signal Detected Assert Level	Psda	dBm				
Loss of Signal Deaseert Level	PLOSD	dBm				-29
Loss of Signal Assert Level	PLOSA	dBm	-45			
Cross talk (1270 to1577nm	dB					-40

Notes:

1. The optical power is launched into 9/125um SMF.
2. Measured with PRBS 2^31- 1 test pattern @10.3125Gbps.
3. Transmitter eye mask definition {0.25,0.40,0.45,0.25,0.28,0.40}.
4. Measured with a PRBS 231- 1 test pattern @10.3125Gbps and ER=8.2dB, BER ≤10-3.
5. An increase in optical power above the specified level will cause Los of Signal (LOS) output to switch from a low state to a high state.
6. A decrease in optical power below the specified level will cause Los of Signal (LOS) output to switch from a high state to a low state.

IV. Electrical Specifications and Timing

Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
Time to Initialize	t-start-up	ms			300	
Transmitter						
Data Input Differential Swing	VIN	mVp-p	200	-	1000	2
Input Differential Impedance	ZIN	Ω	80	100	120	
Power Down Voltage_Low	V_PDL	V	0	-	0.8	
Power Down Voltage_High	V_PDH	V	2.0		Vcc	
Tx_Disable Voltage Low	VTDIS,L	V	0	-	0.8	
Tx_Disable Voltage High	VTDIS,H	V	2.0		Vcc	
TX Fault Assert Time	T_FAULT_on	ms		-	50	
TX Fault Reset Time	TX_FAULT_RESET	μs	10			
Burst Turn On Time	TBURST-ON	ns			100	
Burst Turn Off Time	TBURST-OFF	ns			100	
TX Power Down Assert Time	T_PD assert				512	3
TX Power Down De-assert Time	T_PD recover				512	4

Receiver

Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
Data Output Differential Swing	VOUT	mVP-P	600		850	5
Loss of Signal (LOS)Assert Time	TLOSA	μs			100	
Loss of Signal(LOS) Deassert Time	TLOSD	μs			100	
Output Differentia Impedance	ROUT	Ω	80	100	120	
RX-LOS	VOL	V	0		0.4	
	VOH	V	2.4		Vcc	

Notes:

- Compatible with CML input, AC coupled internally.
- TX_nBRST
- Measured to 10% of final supply current.
- Measured to 90% of final supply current.
- CML output, AC coupled internally.

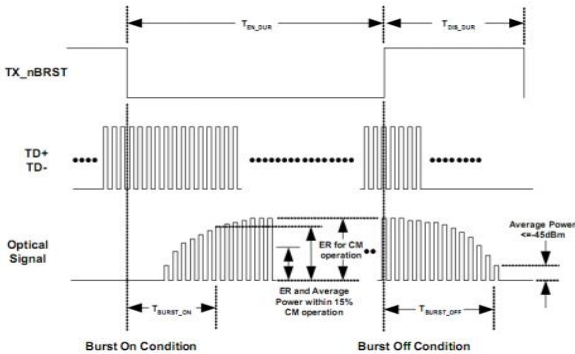


Figure 1, Timing Parameter Definition in Burst Mode Sequence

V. Diagnostic

Address	Parameter	Range	Accuracy	Unit	Calibration	Note
96	Temperature	-40~85 C	±3	°C	Internal	LSB equal to 1/ 256C
98	Voltage	2.97 ~ 3.63	±3%	v	Internal	LSB equal to 100uV
100	Bias Current	0 ~ 150	±10%	mA	Internal	LSB equal to 4uA
102	Tx Power	4 ~ 9	±3	dB	Internal	LSB equal to 0. 2uW
104	Rx Power	-28 ~ -9	±3	dB	Internal	LSB equal to 0. 1uW

VI. Pin Function Definitions

Pin	Logic	Symbol	Name/Description	Note
1		VEET(1)	Module Ground	
2	LVTTTL-O	TX_Fault(2)	Module Transmitter Fault	
3	LVTTTL-I	Tx_nBRST	Transmitter Burst Control	
4	LVTTTL-I/O	SDA	2-Wire serial interface Data line	
5		SCL	2-Wire serial interface Clock	
6		MOB_ABS	Connect to VEET OR VEER in the Module	
7	LVTTTL-O	Tx_SD	TX Signal detected	
8	LVTTTL-O	RX_LOS(3)	Receiver Loss of Signal Indication	
9	LVTTTL-I	PDWN_TX (4)	Power saving of Tx side, On/off time less than 1ms, high active, if not use this feature, main board connection should be NC.	
10		VEER	Module Receiver Ground	
11		VEER	Module Receiver Ground	
12	CML-O	RD-	Receiver inverted Data Output	
13	CML-O	RD+	Receiver Non-inverted Data Output	
14		VEER	Module Receiver Ground	
15		VCCR	Module Receiver 3.3 Supply	
16		VCCT	Module Transmitter 3.3 Supply	
17		VEET	Module Transmitter Ground	

Pin	Logic	Symbol	Name/Description	Note
18	CML-I	TD+	Transmitter Non-inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VEET	Module Transmitter Ground	

Notes:

1. The module ground pin, VeeT and VeeR,shall be isolated from the module case.
2. Shall pulled up with 4.7K- 10K ohm to a VccT in the module.
3. This pin is an open collector/drain output pin and shall pulled up with 4.7K- 10K ohm to a Host-Vcc on the host board.
4. Tx Power saving function timing: Tx_Sleep

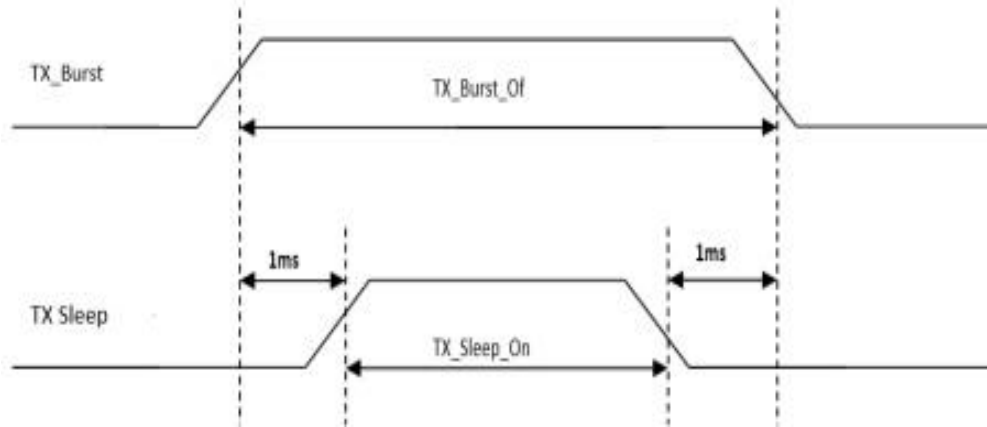


Figure 2, Tx Power saving function timing

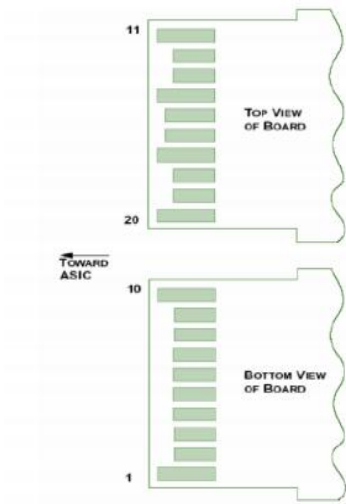


Figure 3, SPF+ Module PCB Pinout

VII. Recommended Host Board Power Supply Circuit

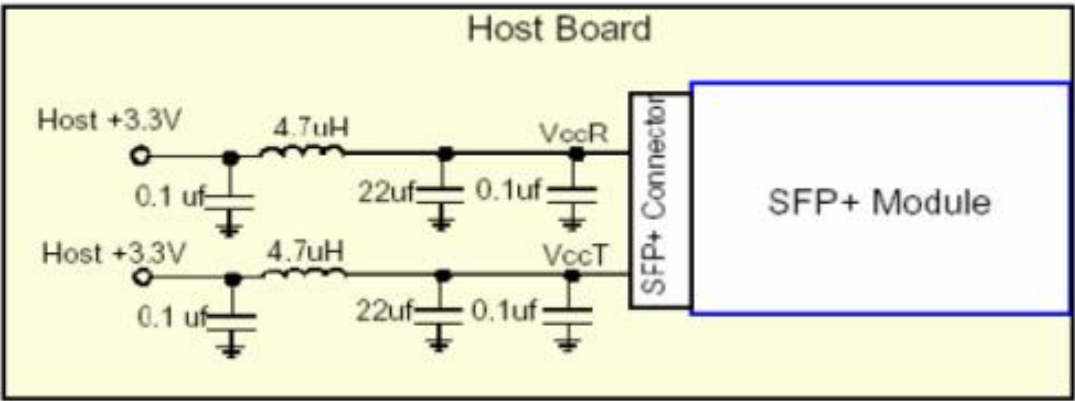


Figure 4, Recommended Host Board Power Supply Circuit

VIII. Circuit Recommended Interface Circuit

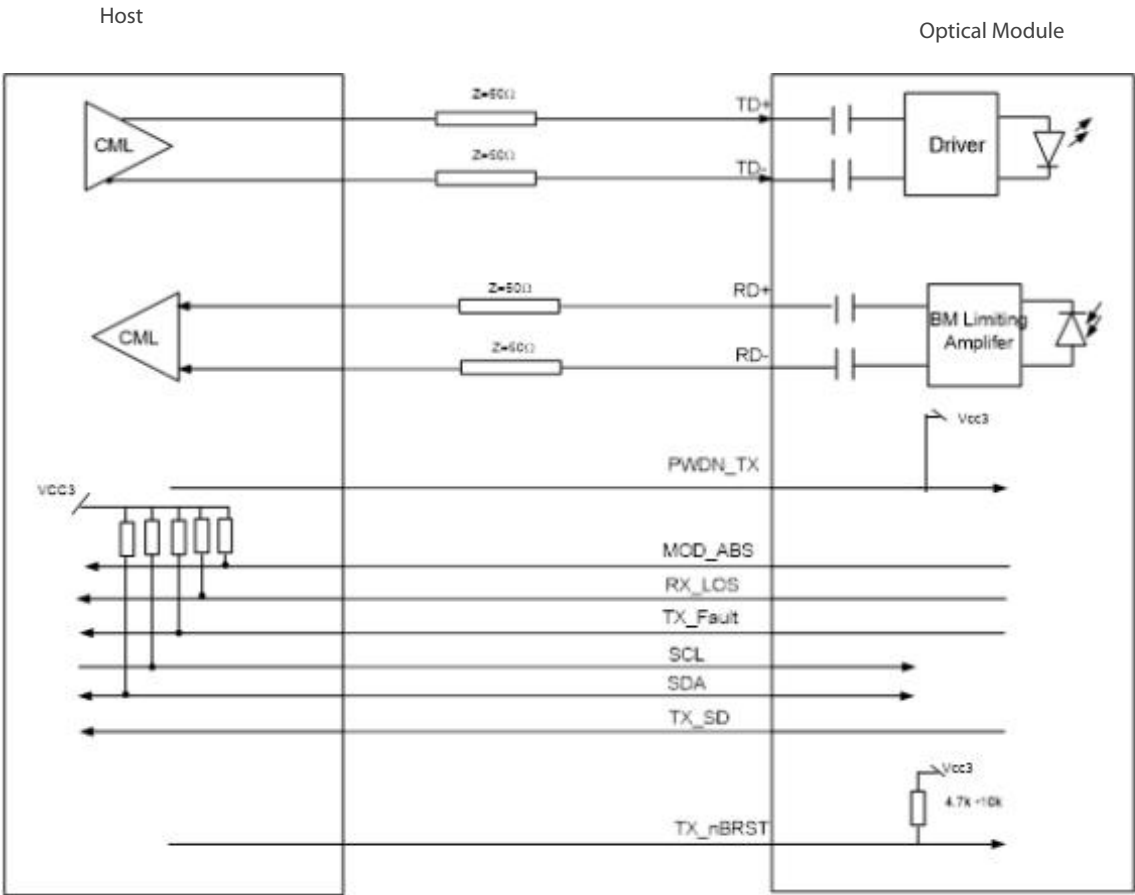


Figure 5, Recommended Interface Circuit

IX. EEPROM Mapping

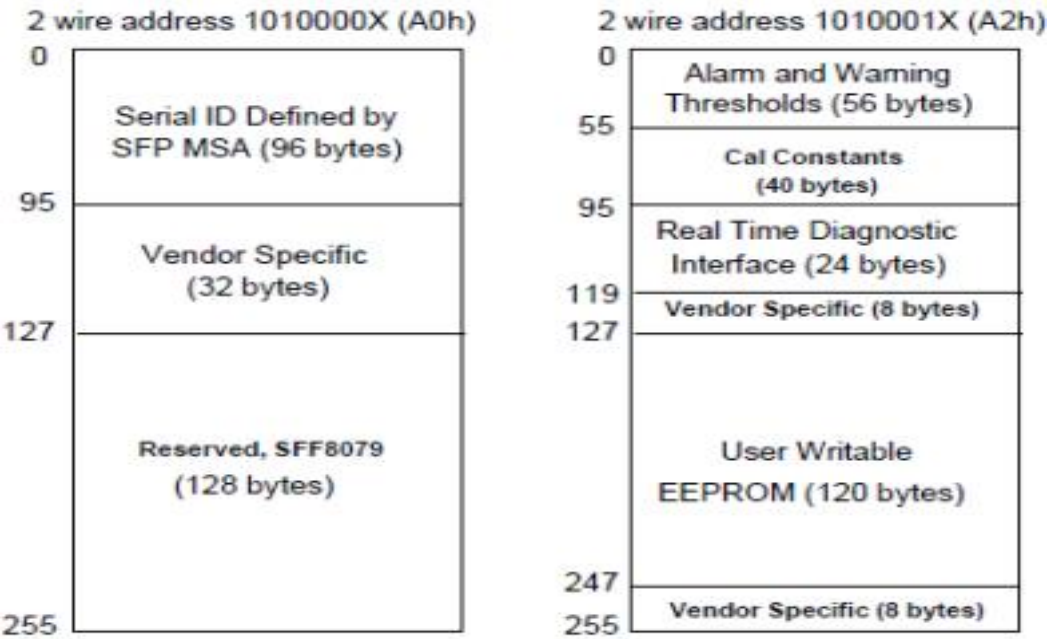


Figure 6, Mechanical Diagram

X. Mechanical Diagram

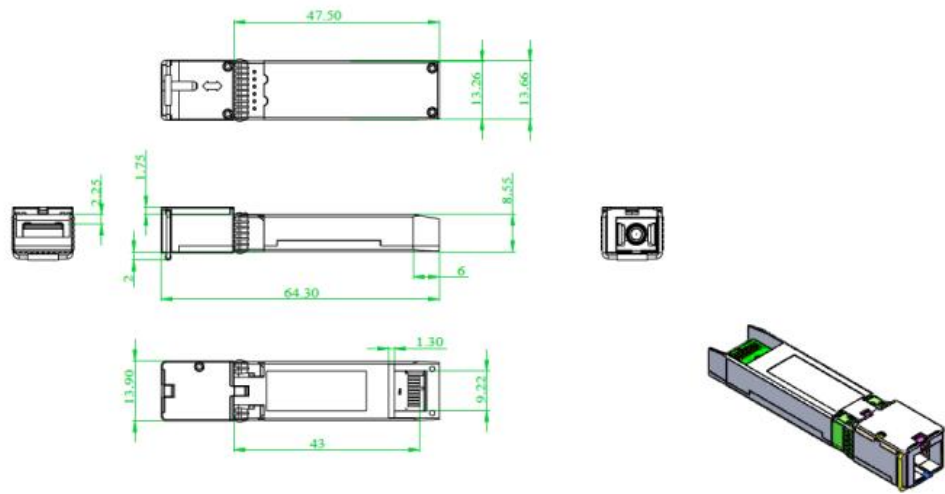


Figure7, outline drawing

Regulatory Compliance

Feature	Standard	Peformance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>500 V)
ESD	IEC 61000-4-2	Compatible with Standards 8kV contact discharge, 15 kV air discharge
EMI	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825- 1,2	Compatible with Class1 laser product
RoHS	2011/65/EU	Compatible with Standards With exemption:7C(I)

Order Information

Part Number	Description
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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