

10G SFP+ XGSPON ONU TX-1270nm/RX-1577nm 20km Optical Transceiver

Features

- Integrated Single fiber bi-directional optical subassembly
- Symmetric 9.953Gb/s upstream and downstream bit rate
- SFP+ metallic package, SC/UPC connector
- +3.3V single power supply
- Low power consumption
- - 40 to 85°C operating case temperature
- Burst enable :H-active
- Class 1 Laser eye safety
- Excellent EMI and EMC characteristics
- Compliant with RoHS & WEEE

Applications

- symmetric 10Gigabit capable passive optical network (XGS-PON) system.

Description

The SFP-XGSP25-20N1 Transceiver is designed for 10G XGSPON transmission. The module incorporates 10Gb/s 1270nm burst-mode transmitter and 10Gb/s 1577nm continuous-mode receiver. An integrated WDM coupler can separate 1577nm input light and 1270nm output light. The metallic package guarantees excellent EMI and EMC characteristics, which totally comply with international relevant standards.

Absolute Maximum Ratings

Parameter	Symbols	Unit.	Max.	Min	Notes
Storage Temperature Range	TS	°C	+85	-40	
Relative Humidity	RH	%	5	95	
Power Supply Voltage	Vcc	V	0	+4	
Receiver Damage Threshold		dBm	-5		

Recommended Operating Conditions

Parameter	Symbols	Unit.	Min	Typ.	Max	Notes
Supply Voltage	Tc	°C	-40		85	
Supply Voltage Noise Tolerance	Vcc	V	3.135	3.3	3.465	

Optical Characteristics

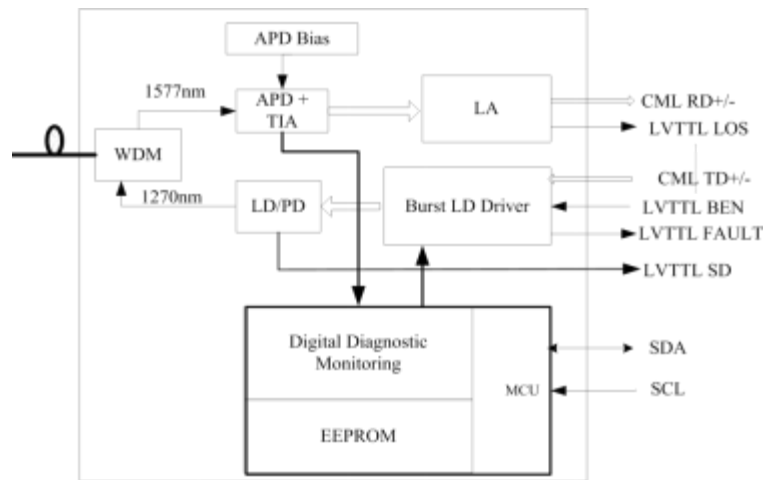
Parameter	Symbols	Unit.	Min	Typ.	Max	Notes
Electrical Characteristics						
Power Consumption		W			1.5	
LVPECL Single Ended Data Input Swing		mV	100		800	
CML Single Ended Data Output Swing		mV	300		500	
Differential Data input impedance		Ω		100		
Signal Level(LVTTL)	VOH	V	2.4		Vcc	
	VOL	V	0		0.8	
Optical Transmitter Characteristics						

Data Rate		Mbps		9.953		
Center Wavelength Range	λ_c	nm	1260		1280	
Spectral Width(@-20dB)	DL	nm			1	
Side Mode Suppression Ratio	SMSR	dB	30			
Launch Optical Power	Po	dBm	+4.0		+9.0	
Off level light		dBm			-45	
Burst turn on/off time	Ton/Toff	bit			128	
TXSD delay time1		ns			1000	
Extinction Ratio2	EX	dB	6			
Transmitter Dispersion Penalty3	TDP	dB			1.5	
Transmitter tolerance to reflected optical power		dB	-15			
Total jitter	TJ	UI			0.35	
Eye Diagram	Compliant with ITU-T G.9807.1					
Optical Receiver Characteristics						
Data Rate		Gbps		9.953		
Center Wavelength Range	λ_c	nm	1575		1580	
Receiver Sensitivity3	S	dBm			-28	
WDM filter isolation		dB	35			
Overload Input Optical Power	Pin	dBm	-8			
LOS	Optical Dessert	dBm			-29	
	Optical Assert	dBm	-44			
LOS Hysteresis		dB	0.5		6	

Note:

1. Measured with PRBS 223- 1 test pattern @9.953Gbps.
2. Transmit on 20km G.657 SMF.
3. Measured with PRBS 223- 1 test pattern @9.953Gbps with Tx on ER=8.2dB, BER= 10^{-3}

Principle diagram



Optic Ports Definition

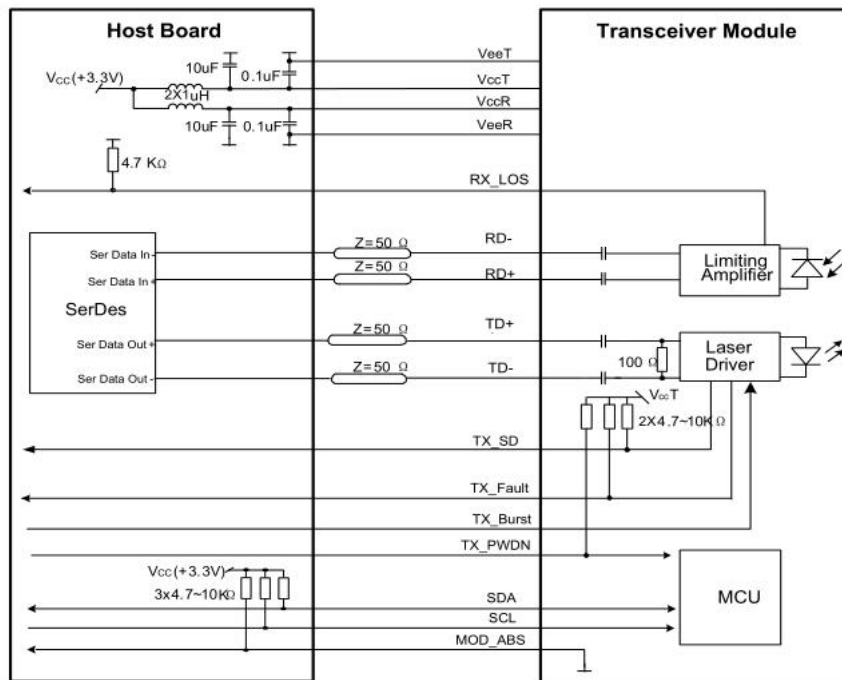
Single SC/UPC receptacle optical interface

Electric Ports Definition

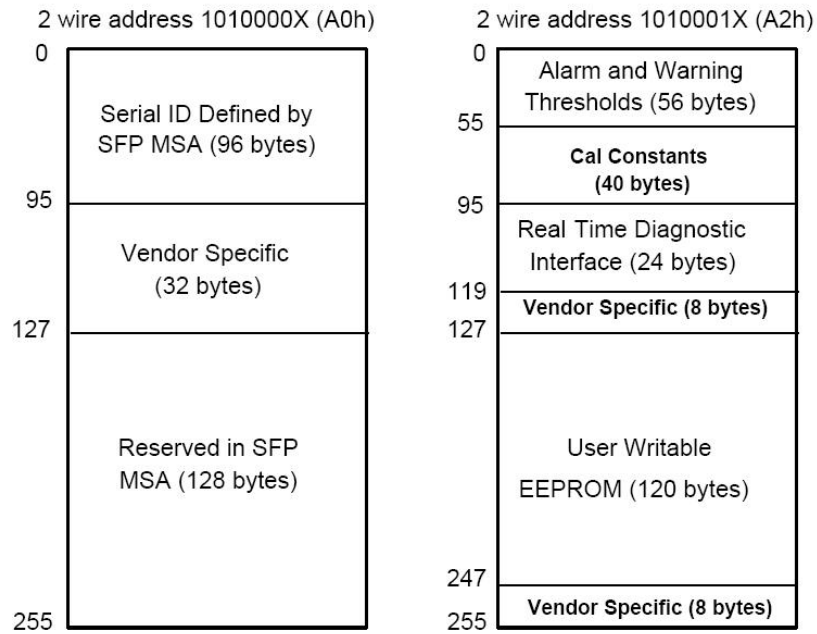
Parameter	Description
GND_T	Transmitter ground
TX_FAULT	LVTTTL Transmitter fault indication output, internally pulled up to VccR. High: indicates transmitter fault(When Laser bias current, Laser PD current or Laser forward voltage exceed the thresholds) Low : indicates normal operation.
TX_BEN	LVTTTL Transmitter burst enable input, internally pulled up to VccR. Low :Tx ON. High: Tx OFF
SDA	I2C Serial Data, NO PU/PD internally Need be pulled up on the Host board
SCL	I2C Serial Clock, NO PU/PD internally Need be pulled up on the Host board
MOS_ABS	Internally connected GND
TX-SD	LVTTTL TX Signal Detect output, internally pulled up to VccR High : indicates transmitter optical ON Low :indicates transmitter optical OFF
RX_LOS	LVTTTL RX LOS Of Signal output, internally pulled up to VccR High: indicates the received optical power is below the worst-case receiver sensitivity Low : indicates normal operation
NC	No Connected internally. No definition
GND_R	Receiver ground
GND_R	Receiver ground

RD-(10G)	CML data output-(AC coupled internally)
RD+(10G)	CML data output+(AC coupled internally)
GND_R	Receiver ground
VCC_R	Receiver power supply
VCC_T	Transmitter power supply
GND_T	Transmitter ground
TD+(2G)	LVPECL Data input+(AC coupled and internal terminated)
TD-(2G)	LVPECL Data input-(AC coupled and internal terminated)
GND_T	Transmitter ground

Typical Application Circuit

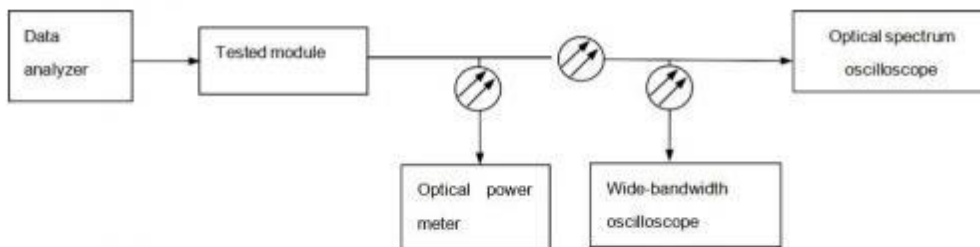


Digital Diagnostic Memory Map

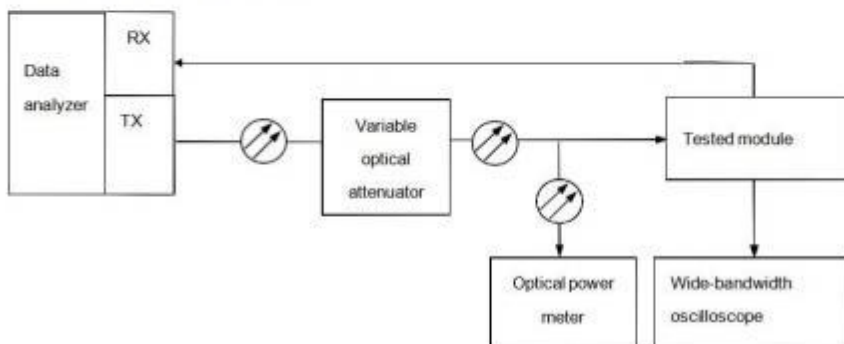


Test Requirement

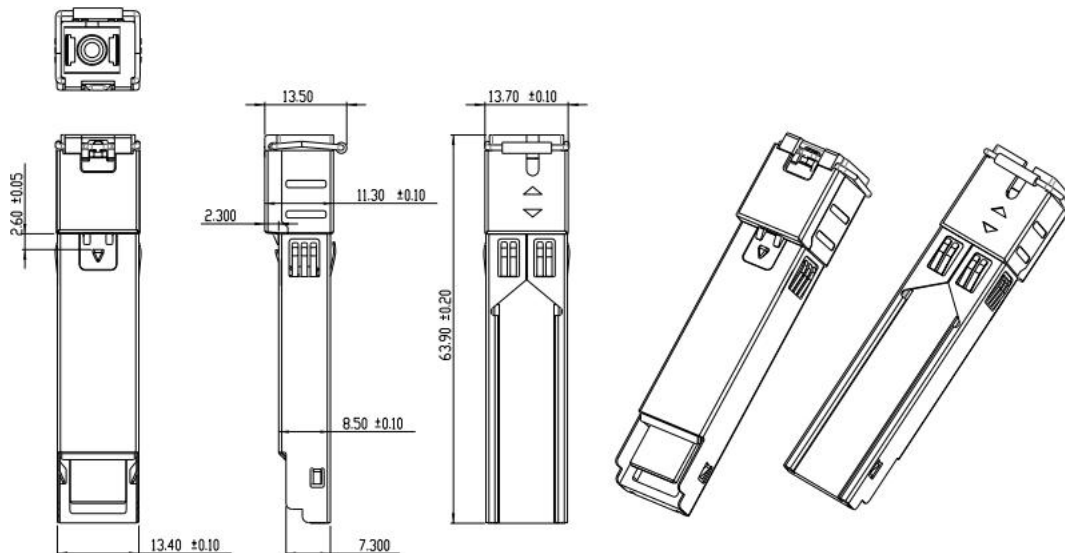
a. TX characteristic test



b. RX characteristic test



Mechanical Dimensions



Regulatory Compliance

Parameter	Test Method	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1 (>1.5kV) – Human Body Model
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	LV4(Air discharge 15kV,Contact discharge 8kV) Performance criterion B
Electromagnetic Interference (EMI)	CISPR22 ITE Class B EN55022 Class B	Compliant with standards
Immunity	IEC61000-4-3 Class 2 EN55024	Typically show no measurable effect from a 3V/m field swept from 80 to 1000MHz applied to the transceiver without a chassis enclosure.
Eye Safety	FDA 21 CFR 1040. 10 and 1040. 1 1 UL TUV EN 60825- 1	Compliant with Class 1 laser product

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