

XGPON1-ONU-I

XGPON ONU SFP+ N1/N2a Transceiver



Product Features

- ❖ Single fiber bi-directional data links asymmetric TX 2.488Gbps/RX9.953Gbps application
- ❖ Single 3.3V power supply
- ❖ SFP+ package with SC/UPC Receptacle connector
- ❖ Hot-pluggable capability
- ❖ High power 1270nm DML DFB LD and high sensitivity 1577nm APD
- ❖ Support 20km transmission distance with SMF
- ❖ CML compatible data input/output interface

- ❖ Low power dissipation
- ❖ Low EMI and excellent ESD protection
- ❖ Digital diagnostic monitor interface
- ❖ RoHS-6 compliance
- ❖ -40 to 85°C operating case temperature

Applications

- ❖ 10-Gigabit-capable passive optical networks (XG-PON1) ONU (ODN: N1 or N2a class)

Standards

- ❖ Complies with SFP+ MSA (SFF-8431)
- ❖ Complies with ITU-T G.987.2
- ❖ Complies with SFF-8472
- ❖ Complies with FCC 47 CFR Part 15, Class B
- ❖ Complies with FDA 21 CFR 1040.10 and 1040.11, Class I
- ❖ Complies with FDA 21 CFR 1040.10 and 1040.11

Absolute Maximum Rating

Parameter	Symbol	Min	Max	Unit	Notes
Storage Ambient Temperature	T _{STG}	-40	85	°C	
Operating Case Temperature	T _C	-40	85	°C	
Operating Humidity	OH	5	95	%	
Power Supply Voltage	V _{CC}	0	3.6	V	

Recommended Operating Condition

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T _c	-40		+85	°C
Power Supply Voltage	V _{CC}	3.15	3.3	3.45	V
Power Supply Current	I _{CC}			450	mA
Nominal Upstream Line Rate			2.48832		Gbps
Nominal Downstream Line Rate			9.95328		Gbps

Transmitter Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Average Launch Optical Power	P _{OUT}	2		7	dBm	EOL, Launched into 9/125μm Single Mode Fiber
Extinction Ratio	ER	8.2	-	-	dB	
Center Wavelength	λ	1260	1270	1280	nm	
Spectrum Width (-20dB)	Δλ	-	-	1	nm	
Side Mode Suppression Mode	SMSR	30			dB	
Burst on Time	T-on			32	bits	
Burst off Time	T-off			32	bits	
Tx-SD Assert	SD-on			100	ns	
Tx-SD De-Assert	SD-off			100	ns	
Transmitter and Dispersion Penalty	TDP			0.5	dB	Transmit on 20km SMF
Transmitter Tolerance To Reflected Optical Power		-15			dB	
Transmitter Reflectance Of Tx, Measured At Tx Wavelength				-6	dB	
Eye Diagram	Compliant With ITU-T G.987.2					PRBS 2 ³¹ -1 test pattern @2.48832Gbit/s

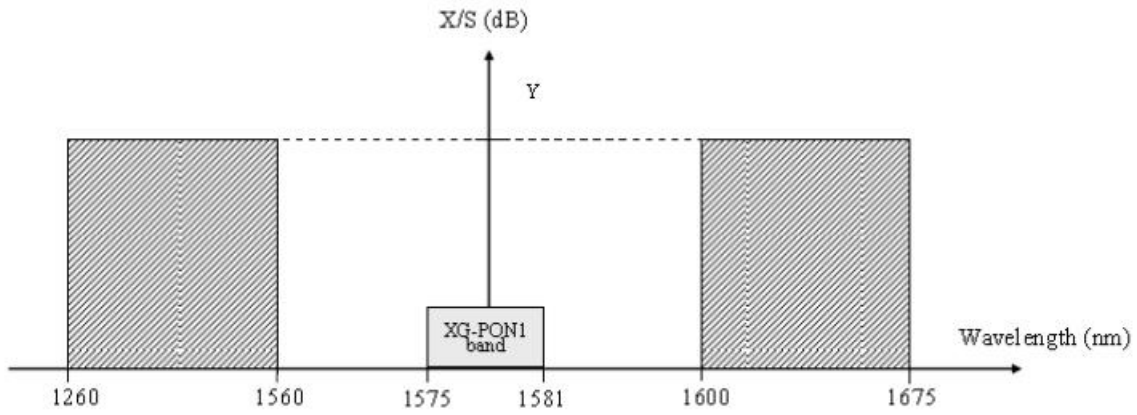
Transmitter Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Input Differential Impedance	ZIN	90	100	110	Ω	
Data Input Swing Differential	VIN	200	-	1600	mV	
Burst Disable		2.0	-	V _{CC}	V	
Burst Enable		0	-	0.8	V	
Tx-Fault Voltage - Low		0		0.4	V	
Tx-Fault Voltage - High		2.4		V _{CC}	V	

Receiver Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Center Wavelength	λ_c	1575		1580	nm	
Receiver Sensitivity				-28	dBm	Measured with PRBS 2 ³¹ -1 test pattern @9.953Gbit/s, BER $\leq 1 \times 10^{-3}$
Receiver Overload		-8			dBm	Measured with PRBS 2 ³¹ -1 test pattern @9.953Gbit/s, BER $\leq 1 \times 10^{-3}$
Receiver Reflectance				-20	dB	
LOS Assert		-44			dBm	
LOS De-Assert				-29	dBm	
LOS Hysteresis		0.5		5	dB	
Data Output Swing Differential	V _{OUT}	340		850	mV	
LOS	High	2.4		V _{CC}	V	
	Low	0		0.4	V	

Versatile WDM Configuration



Class	Y
N1	FFS
N2a	FFS
N2b	FFS
E1	FFS
E2a	FFS
E2b	FFS

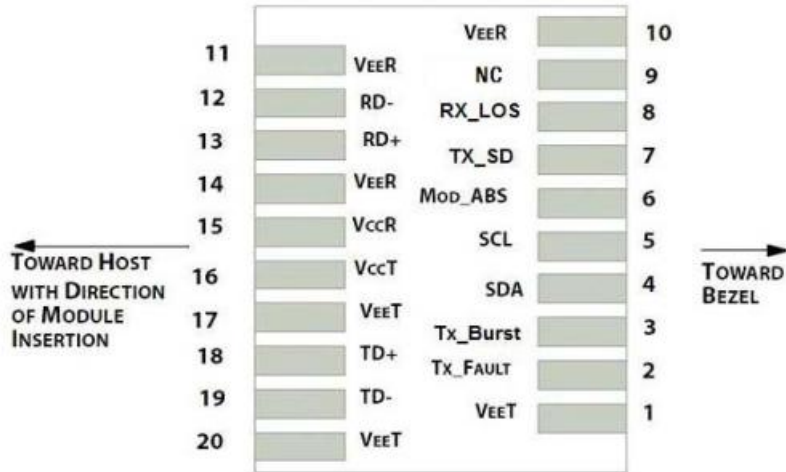
X/S tolerance mask for ONU

Note: X/S: In the mask (hatching area) should not cause the XG-PON receiver to fail to meet its sensitivity requirements.

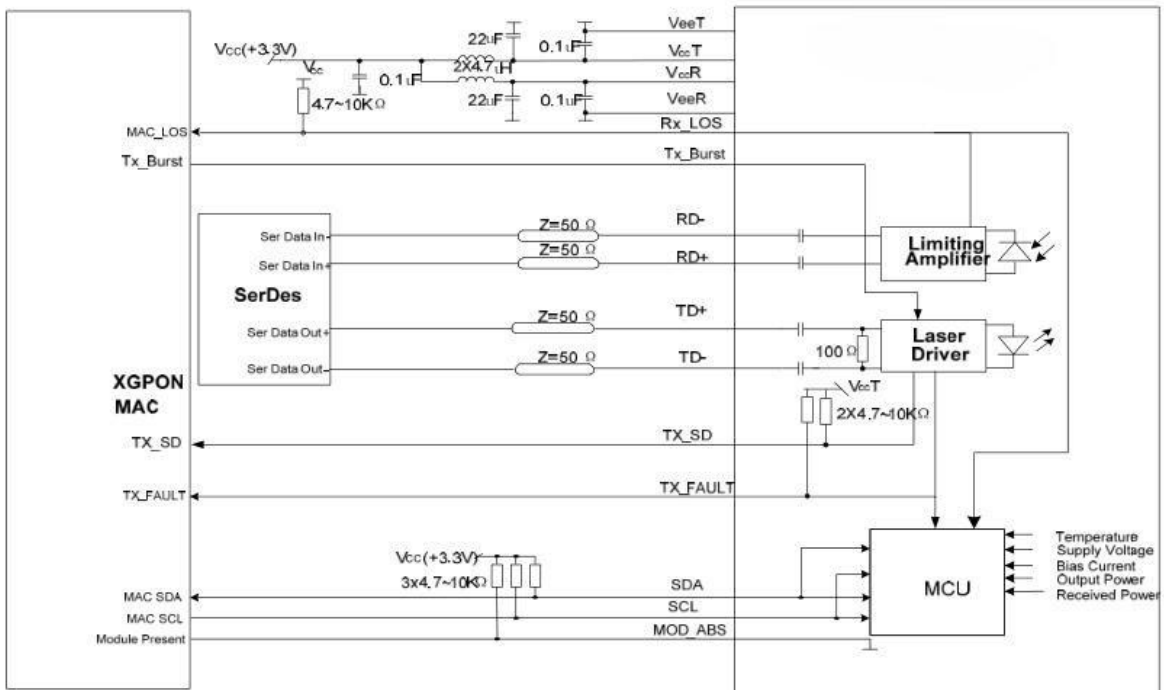
Pin Description

PIN	Name	Description	Notes
1	V _{EE} T	Module Transmitter Ground	
2	Tx_Fault	Module Transmitter Fault	Low: normal; High: abnormal
3	Tx_BURST	Transmitter Burst Enable	TTL Input, Low: transmitter on
4	SDA	Module Definition 2	2 wire serial ID interface, SDA
5	SCL	Module Definition 1	2 wire serial ID interface, SCL
6	Mod_ABS	Module Absent	Connected to V _{ee} T or V _{ee} R in the module
7	TX_SD	Tx Transmitter State Indication	TX_Indication Assert When Transmitter on
8	Rx_LOS	Receiver Signal Indication	Low: signal detected; High: loss of signal
9	NC	NC Connect	NC
10	V _{EE} R	Module Receiver Ground	
11	V _{EE} R	Module Receiver Ground	
12	RD-	Inverted Received Data Out	AC-coupled
13	RD+	Non-inverted Received Data Out	AC-coupled
14	V _{EE} R	Module Receiver Ground	
15	VCCR	Module Receiver 3.3 V Supply	
16	VCCT	Module Transmitter 3.3 V Supply	
17	V _{EE} T	Module Transmitter Ground	
18	TD+	Non-inverted Transmit Data in	AC-coupled
19	TD-	Inverted Transmit Data in	AC-coupled
20	V _{EE} T	Module Transmitter Ground	

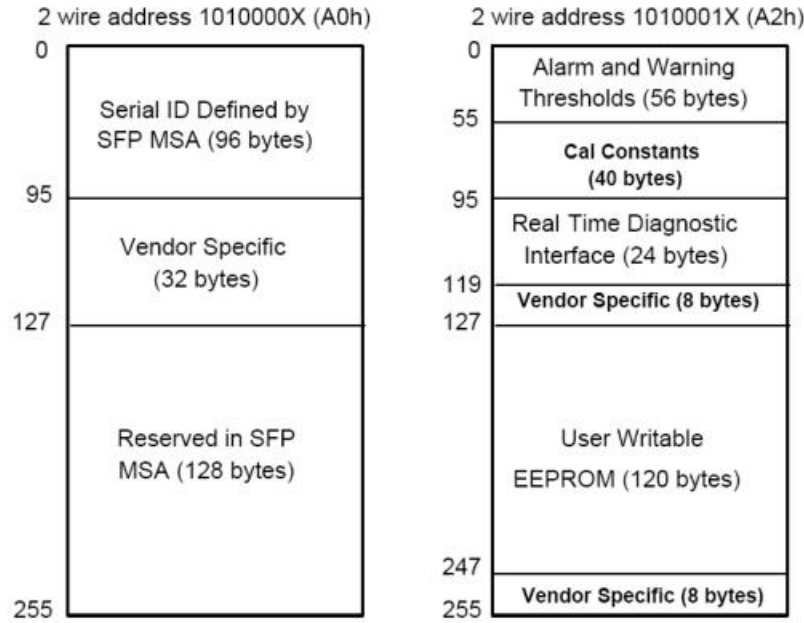
Pin Out Drawing



Typical Interface Circuit



EEPROM Information

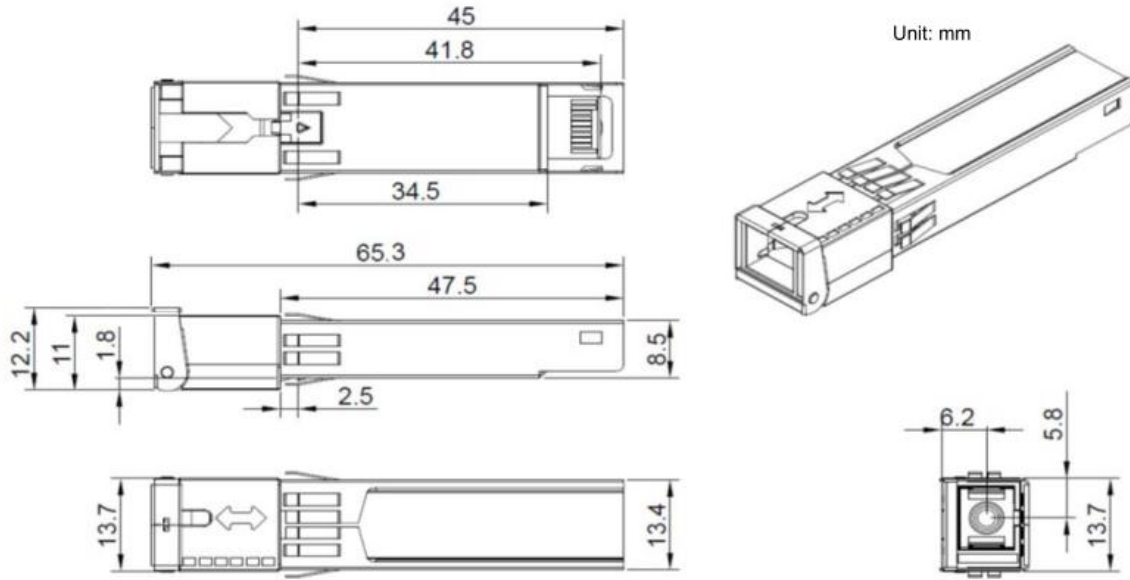


EEPROM Memory Map Specific Data Field Descriptions

Digital Diagnostic Monitoring Interface

Parameter	Range	Accuracy	Calibration	Notes
Temperature	-40 to 85°C	±3°C	Internal	1LSB = 1/256° C
Voltage	3.0 to 3.6 V	±3%	Internal	1LSB = 0.1mV
Bias Current	0 to 131mA	±10%	Internal	1LSB = 2uA
TX Power	0 to 9dBm	±3dB	Internal	1LSB = 0.1uW
RX Power Monitor	-30 to -8dBm	±3dB	Internal	1LSB = 0.1uW

Package Outline



Ordering Information

Part Number	XGPON1-ONU-I
Application	XG-PON1 ONU, -40°C~+85°C
Wavelength (nm)	1270T/1577R
Data Rate (Gb/s)	2.5T/9.95R
ODN Class	N1/N2a
Package	SFP+
Connector	SC