



# XGSPON-ONU-C

## XGSPON ONU SFP+ N1/N2 Transceiver

### Product Features

- ❖ Single fiber bi-directional data links asymmetric TX 9.953Gbps/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
- ❖ 0 to 70°C operating case temperature

### Applications

- ❖ 10-Gigabit-capable passive optical networks

### Standards

- ❖ Complies with SFP+ MSA (SFF-8431)
- ❖ Complies with ITU-T G.9807
- ❖ 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 <sub>STG</sub>	-40	85	°C	
Operating Case Temperature	T <sub>C</sub>	0	70	°C	
Operating Humidity	OH	5	95	%	
Power Supply Voltage	V <sub>CC</sub>	0	3.6	V	

## Recommended Operating Condition

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T <sub>C</sub>	0		70	°C
Power Supply Voltage	V <sub>CC</sub>	3.15	3.3	3.45	V
Power Supply Current	I <sub>CC</sub>			600	mA
Nominal Upstream Line Rate			9.953		Gbps
Nominal Downstream Line Rate			9.953		Gbps
Max Input Power					dBm

## Transmitter Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Average Launch Optical Power	P <sub>OUT</sub>	4		9	dBm	EOL, ver temperature, Launched into 9/125µm single mode fiber

		5		9	dBm	BOL, Room temperature, Launched into 9/125 $\mu$ m single mode fiber
Extinction Ratio	ER	6	-	-	dB	
Center Wavelength	$\lambda$	1260	1270	1280	nm	
Spectrum Width (-20dB)	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Mode	SMSR	30			dB	
Burst on Time	T-on			50	ns	
Burst off Time	T-off			50	ns	
Tx-SD Assert	SD-on			350	ns	
Tx-SD De-Assert	SD-off			350	ns	
Transmitter and Dispersion Penalty	TDP			3	dB	Transmit on 20km SMF
Transmitter Tolerance To Reflected Optical Power		-15			dB	
Eye Diagram	Compliant with ITU-T G.987.2					PRBS 2 <sup>31</sup> -1 test pattern @9.953Gbit/s

## Transmitter Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Input Differential Impedance	ZIN	90	100	110	$\Omega$	
Data Input Swing Differential	VIN	200	-	1600	mV	
Burst Disable		2.0	-	V <sub>CC</sub>	V	
Burst Enable		0	-	0.8	V	
Tx-Fault Voltage - Low		0		0.4	V	
Tx-Fault Voltage - High		2.4		V <sub>CC</sub>	V	

## Receiver Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Center Wavelength	$\lambda_c$	1575	1577	1580	nm	

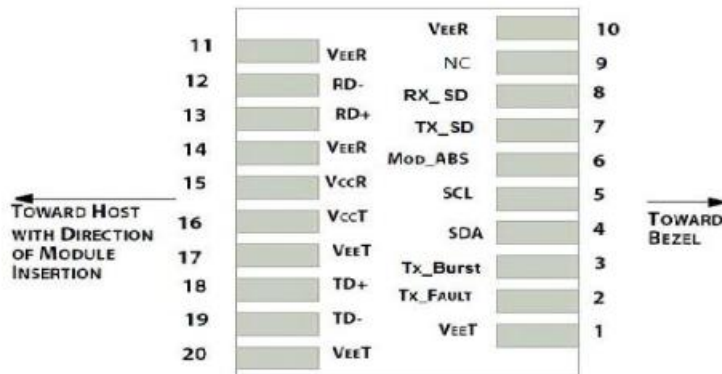
Receiver Sensitivity (EOL, Over Temperature)	SEN			-28	dBm	Measured with PRBS 2 <sup>31</sup> -1 test pattern @9.953Gbit/s, BER ≤ 1 × 10 <sup>-3</sup>
Receiver Sensitivity (BOL, Room Temperature)	SEN			-29	dBm	
Receiver Overload		-8			dBm	Measured with PRBS 2 <sup>31</sup> -1 test pattern @9.953Gbit/s, BER ≤ 1 × 10 <sup>-3</sup>
Receiver Reflectance				-12	dB	
Optical Return Loss Tolerance				-15	dB	
SD Assert	SDA			-29	dBm	
SD De-Assert	SDD	-45			dBm	
SD Hysteresis		0.5		5	dB	
Data Output Swing Differential	V <sub>OUT</sub>	340	-	850	mV	
SD	High	2.4	-	V <sub>cc</sub>	V	
	Low	0	-	0.4	V	

## Pin Description

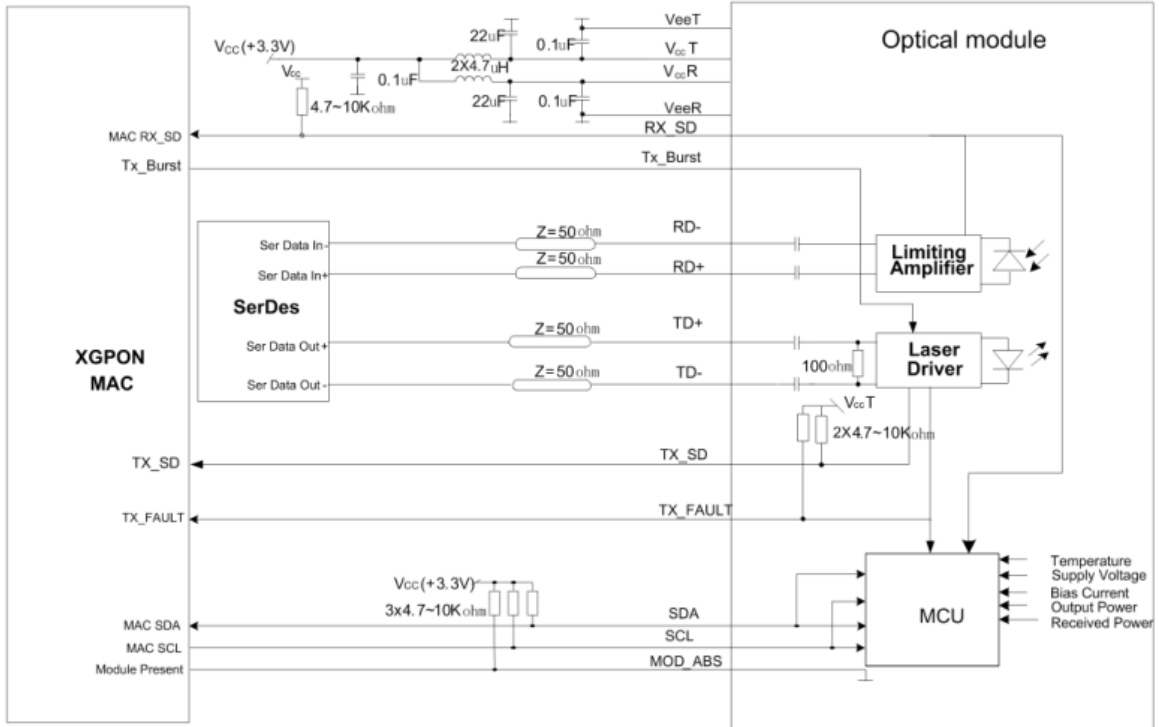
PIN	Name	Description	Notes
1	V <sub>EE</sub> T	Module Transmitter Ground	
2	Tx_Fault	Module Transmitter Fault	Low: normal; High: abnormal
3	Tx_BURST	Transmitter Burst Enable	TTL Input, Low: transmitter on
4	SDA	Module Definition 2	2 wire serial ID interface, SDA
5	SCL	Module Definition 1	2 wire serial ID interface, SCL
6	Mod_ABS	Module Absent	Connected to V <sub>ee</sub> T or V <sub>ee</sub> R in the module
7	TX_SD	Tx Transmitter State Indication	TX_Indication Assert When Transmitter on
8	Rx_SD	Receiver Signal Indication	Low: signal detected; High: loss of signal
9	NC	NC Connect	NC
10	V <sub>ee</sub> R	Module Receiver Ground	
11	V <sub>ee</sub> R	Module Receiver Ground	

12	RD-	Inverted Received Data Out	AC-coupled
13	RD+	Non-inverted Received Data Out	AC-coupled
14	V <sub>ee</sub> R	Module Receiver Ground	
15	VCCR	Module Receiver 3.3 V Supply	
16	VCCT	Module Transmitter 3.3 V Supply	
17	V <sub>ee</sub> T	Module Transmitter Ground	
18	TD+	Non-inverted Transmit Data in	AC-coupled
19	TD-	Inverted Transmit Data in	AC-coupled
20	V <sub>ee</sub> T	Module Transmitter Ground	

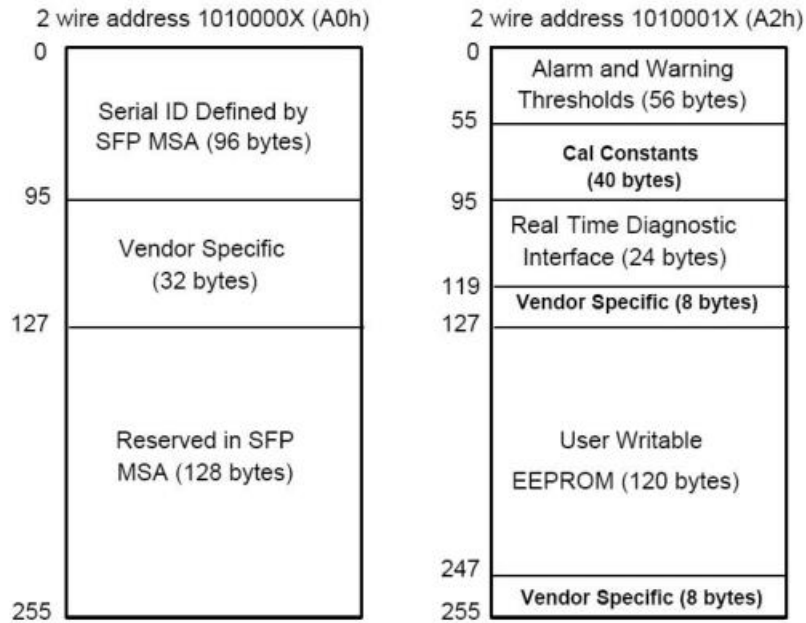
## Pin Out Drawing



## Typical Interface Circuit



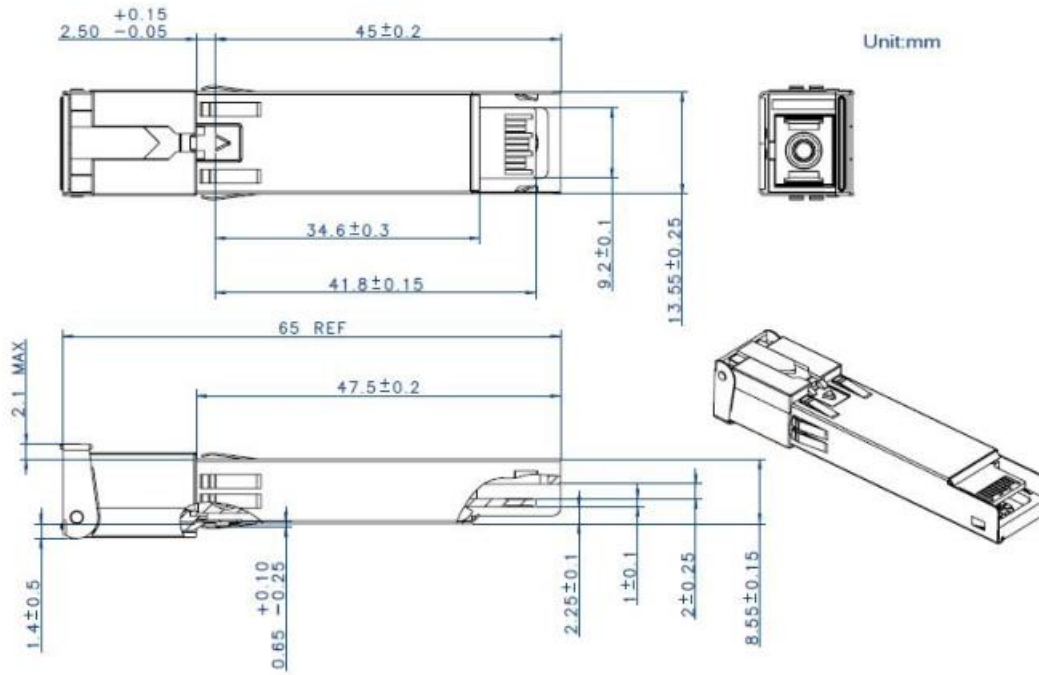
## EEPROM Information



## Digital Diagnostic Monitoring Interface

Parameter	Range	Accuracy	Calibration	Notes
Temperature	0 to 70°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 = 4uA
TX Power	4 to 9dBm	±2dB	Internal	1LSB = 0.2uW
RX Power Monitor	-29 to -8dBm	±3dB	Internal	1LSB = 0.1uW

## Package Outline



## Ordering Information

<b>Part Number</b>	XGSPON-ONU-C
<b>Application</b>	XGSPON ONU, 0°C~+70°C
<b>Wavelength (nm)</b>	1270T/1577R
<b>Data Rate (Gb/s)</b>	9.95T/9.95R
<b>ODN Class</b>	N1/N2
<b>Package</b>	SFP+
<b>Connector</b>	SC