

XSPU-P9T9R-NxC

XGS-PON ONU SFP+ Transceiver

Features

- Single fiber bi-directional data links asymmetric TX 9.953Gbps/RX9.953Gbps application
- 0 to 70°C operating case temperature
- 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



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 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Storage Ambient Temperature	T _{STG}	-40	85	°C	
Operating Case Temperature	T _C	0	70	°C	
Operating Humidity	OH	5	95	%	
Power Supply Voltage	V _{CC}	0	3.6	V	

Recommended Operating Environment

Table 2 - Recommended Operating Environment

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T _C	0		70	°C	
Power Supply Voltage	V _{CC}	3.15	3.3	3.45	V	
Power Supply Current	I _{CC}			600	mA	
Nominal upstream line rate			9.953		Gbps	
Nominal downstream line rate			9.953		Gbps	
Max Input power				3	dBm	

Transmitter Optical Characteristics

Table 3-Transmitter Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Average Launch Optical Power	P _{OUT}	4	-	9	dBm	EOL, over temperature, Launched into 9/125μm single mode fiber
		5	-	9	dBm	BOL, Room temperature, Launched into 9/125μm single mode fiber

Extinction Ratio	ER	6	-	-	dB	
Centre Wavelength	λ	1260	1270	1280	nm	
Spectral 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 ³¹ -1 test pattern @9.953Gbit/s	

Transmitter Electrical Characteristics

Table 4-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		Vcc	V	
Burst Enable		0		0.8	V	
Tx-Fault Voltage - Low		0		0.4	V	
Tx-Fault Voltage - High		2.4		Vcc	V	

Receiver Characteristics

Table 5-Receiver Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Center Wavelength	λ_c	1575	1577	1580	nm	
Receiver Sensitivity (EOL, overtemperature)	SEN			-28	dBm	Measured with PRBS 2 ³¹ -1 test pattern @9.953Gbit/s, BER $\leq 1 \times 10^{-3}$
Receiver Sensitivity (BOL Room temperature)	SEN			-29	dBm	
Receiver Overload		-8			dBm	Measured with PRBS 2 ³¹ -1 test pattern @9.953Gbit/s, BER $\leq 1 \times 10^{-3}$
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	VOUT	300	-	850	mV	
SD	High	2.4	-	V _{cc}	V	
	Low	0	-	0.4	V	

Pin Descriptions

Table 6-Pin Descriptions

Pin	Name	Description	Notes
1	VeeT	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 VeeT or VeeR in the module
7	TX_SD	Tx Transmitter State Indication	TX_Indication Assert When Transmitter ON
8	Rx_SD	Receiver Signal Indication	High: signal detected; Low: loss of signal
9	NC	Not Connect	NC
10	VeeR	Module Receiver Ground	
11	VeeR	Module Receiver Ground	
12	RD-	Inverted Received Data Out	AC-coupled,
13	RD+	Non-inverted Received Data Out	AC-coupled,
14	VeeR	Module Receiver Ground	
15	VCCR	Module Receiver 3.3 V Supply	
16	VCCT	Module Transmitter 3.3 V Supply	
17	VeeT	Module Transmitter Ground	
18	TD+	Non-Inverted Transmit Data in	AC-coupled
19	TD-	Inverted Transmit Data in	AC-coupled
20	VeeT	Module Transmitter Ground	

Pin Out Drawing

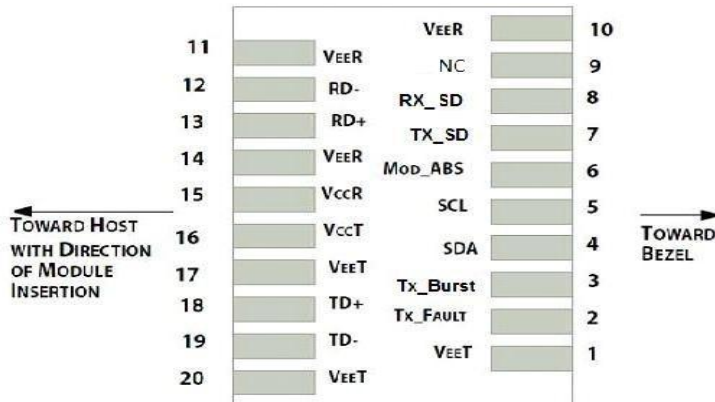


Figure 1 Pin out Drawing

Typical Interface Circuit

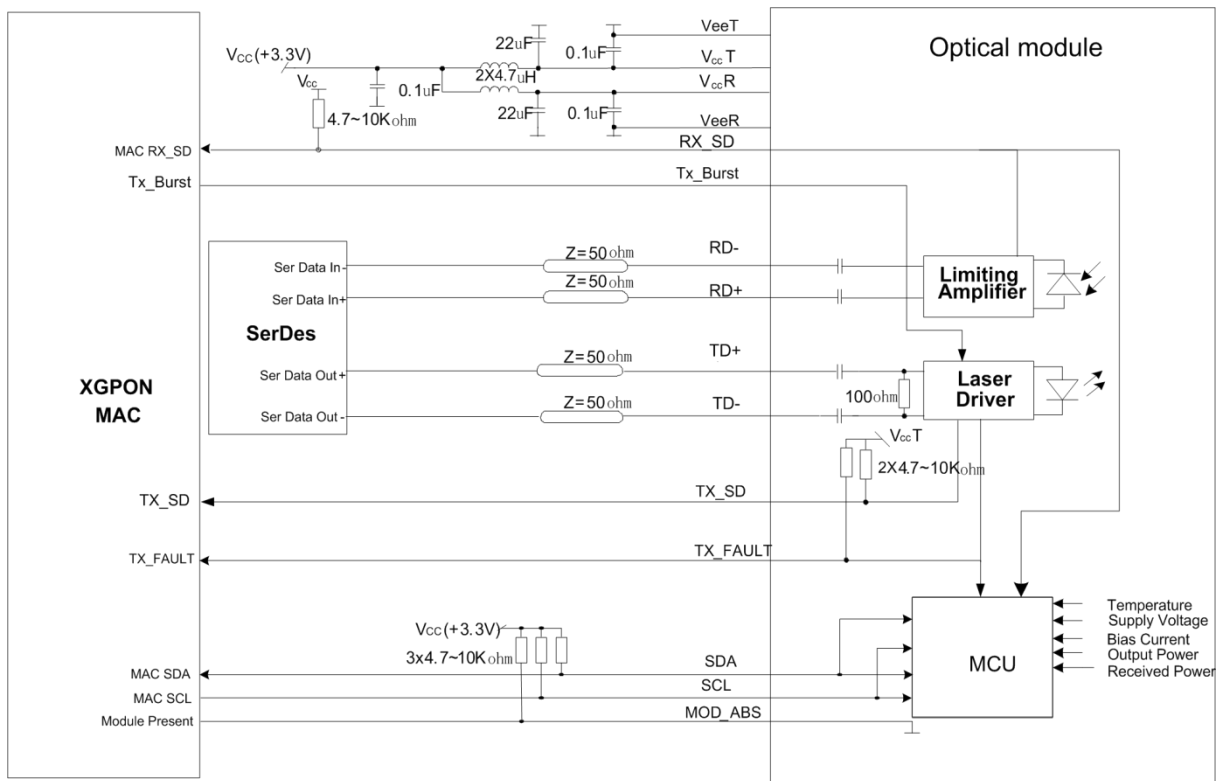


Figure 2 Typical Interface Circuit

Package Outline

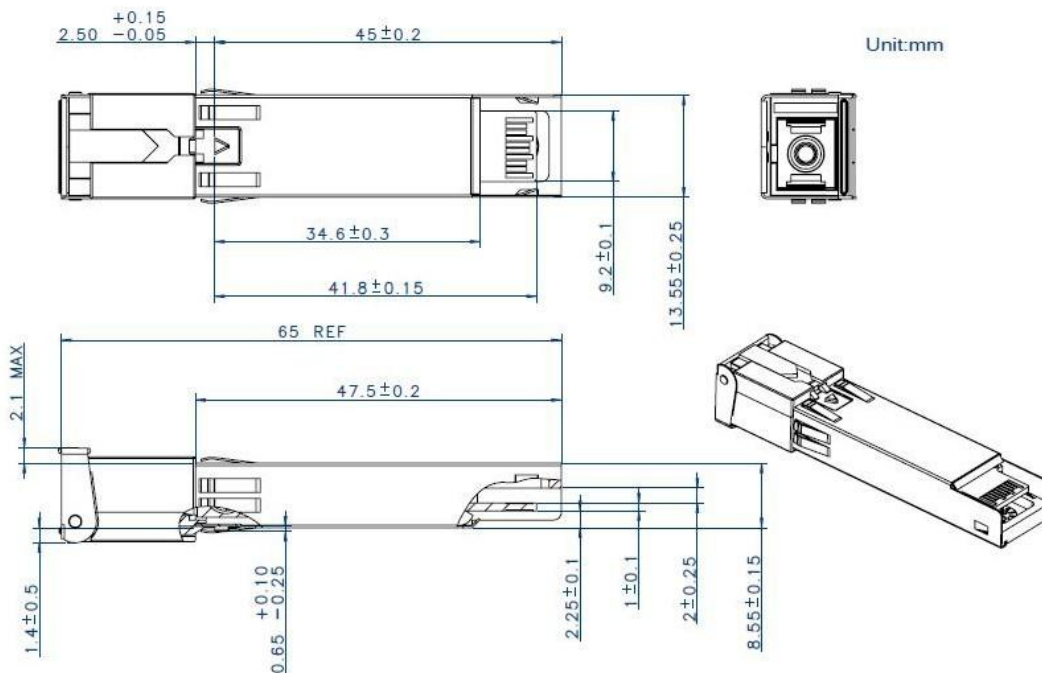


Figure 3 Package Outline

EEPROM Information

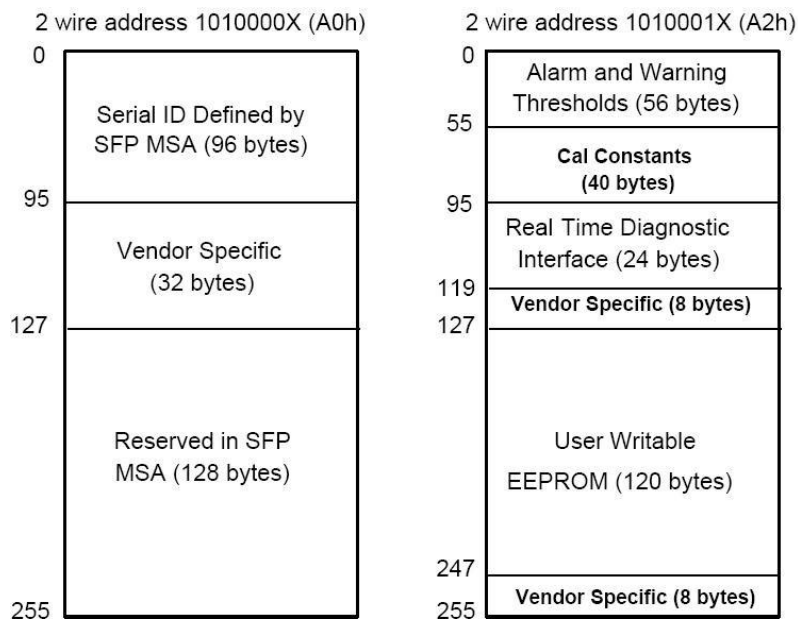


Figure 4 EEPROM Memory Map Specific Data Field Descriptions

Digital Diagnostic Monitoring Interface

Table 7- Digital Diagnostic Monitoring Interface

Parameter	Range	Accuracy	Calibration	Notes
Temperature	0 to70°C	±3°C	Internal	1LSB = 1/256°C
Voltage	3 to3.6V	±3%	Internal	1LSB = 0.1mV
Bias Current	0 to131mA	±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

Ordering information

Table 8- Ordering information

Part Number	Product Description
XSPU-P9T9R-NxC	XGSPON ONU SFP+, SC, Nx, 1270T/1577R, 0 ~ +70°C, with DDM

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