

XSPT-P9T9R-N1C(I)

SFP+ XGS-PON N1 Transceiver

Features

- Single fiber bi-directional data links TX 9.95Gbps, Burst Mode RX 9.95G/2.488Gbps application
- 0 to 70°C operating case temperature
- 3.3V power supply
- SFP+ package with SC Receptacle connector
- Hot-pluggable capability
- High power 1577nm EML LD
- High sensitivity 1270nm APD
- Support 20km transmission distance with SMF
- RX_SD indication
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- RoHS6 compliance



Applications

- XGS-PON N1 OLT

Standards

- Complies with SFF-8472
- Complies with ITU G.987.2
- Complies with ITU G.9807.1
- Complies with FCC 47 CFR Part 15, Class B
- Complies with FDA 21 CFR 1040.10 and 1040.11

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 _A	0	70	°C	
Relative Storage Humidity	RHs	5	95	%	
VCC3 Power Supply Voltage	VCC3	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}	3.13	3.3	3.47	V	
Power Supply Consumption	P			2.4	W	
TX Data Rate			9.95		Gbps	
RX Data Rate			9.95 2.488		Gbps Gbps	

XGSPON Transmitter Optical Characteristics

Table 3-XGSPON Transmitter Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Center Wavelength	λ_C	1575		1580	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF

Average Launch Optical Power (EOL)	AOP	+2		+5	dBm	Launched into SMF
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	8.2			dB	PRBS2 ³¹ -1 @9.95Gbps
Optical Waveform Diagram	Compliant with ITU G.9807.1					Figure 1, Mask Margin>5%

XGSPON Transmitter Electrical Characteristics

Table 4-XGSPON Transmitter Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Input Differential Swing		120		820	mV	CML input, AC coupled
Input Differential Impedance		90	100	110	Ω	
TX Disable	Disable	2		VCC+0.3	V	
	Enable	-0.3		0.8	V	
Transmitter Disable Time	T _{off}			100	uS	
Transmitter Enable Time	T _{on}			2	mS	

XGS PON Transmitter Eye Mask Definitions And Test Procedures

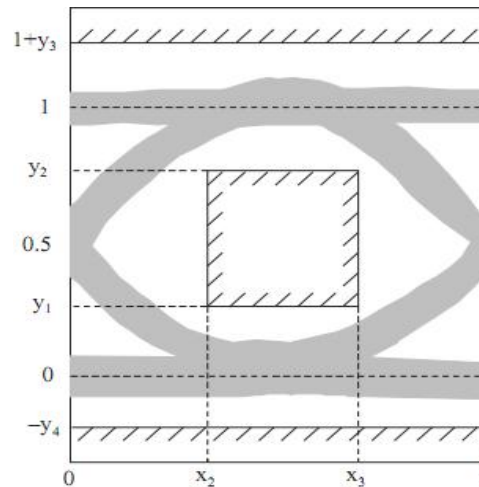


Figure 1 XGSPON Transmitter Eye Mask Definitions

X3-X2	Y1	Y2	Y3	Y4	Unit
0.2	0.25	0.75	0.25	0.25	UI

XGS PON Receiver Optical Characteristics

Table 5-XGS PON Receiver Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			-26	dBm	PRBS ²³¹ - 1@9.95Gbps BER ≤1×10 ⁻³
Saturation Optical Power	SAT	-5			dBm	
Max Input power		-3			dBm	
SD Assert Level				-27	dBm	
SD De-Assert Level		-45			dBm	
Hysteresis		0.5		6	dB	

XGPON Receiver Optical Characteristics

Table 6-XGPON Receiver Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			-27.5	dBm	PRBS ²²³ - 1@2.488Gbps BER ≤1×10 ⁻⁴
Saturation Optical Power	SAT	-7			dBm	
Max Input power		-3			dBm	
SD Assert Level				-29	dBm	
SD De-Assert Level		-45			dBm	
Hysteresis		0.5		6	dB	

XGS/XGPON Receiver Electrical Characteristics

Table 7-XGS/XGPON Receiver Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver Threshold Settling Time	$T_{SETTLING}$			400	ns	Figure 3
Data Output Differential Swing		400		1000	mV	CML output, DC coupled
Input Differential Impedance	Z_{in}	90	100	110	Ω	
SD Assert Level Time				512	ns	
SD De-Assert Level Time				2048	ns	
SD Voltage - Low		-0.3		0.4	V	
SD Voltage - High		2.4		VCC+0.3	V	
RSSI Trigger-Low		-0.3		0.8	V	
RSSI Trigger-High		2.0		VCC+0.3	V	
CID		72			Bit	

Timing Parameter Definitions In Burst Mode Sequence

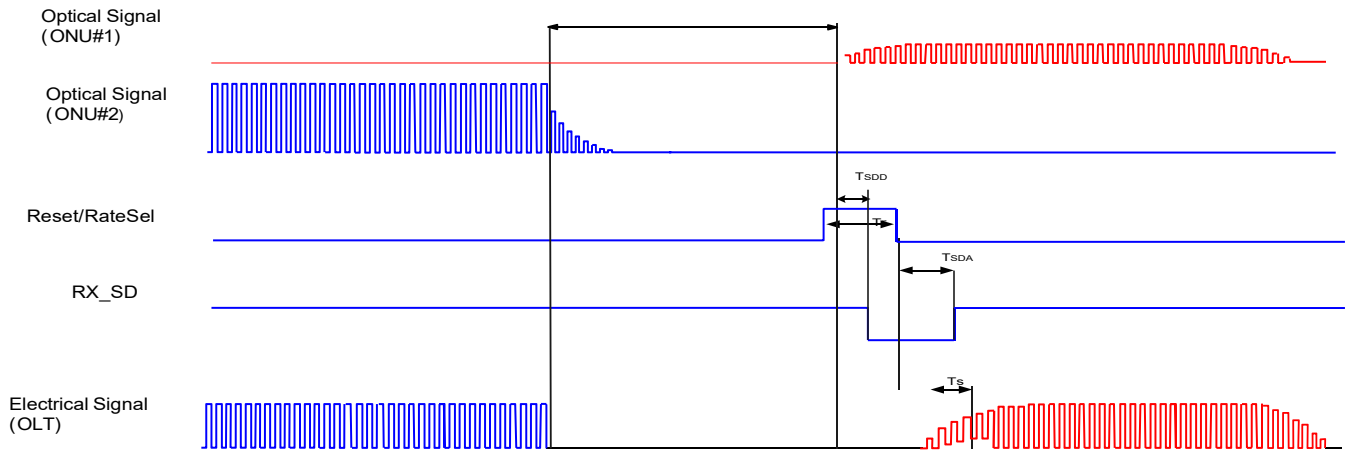


Figure 2 Timing Parameter Definitions in XGS PON Burst Mode Sequence

RSSI Timing Sequence

Table 8-RSSI Timing Sequence

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Signal During Time	T_{opt}	1500			ns	
RSSI Trigger width	T_w	450	500	550	ns	
RSSI Trigger Delay	T_D	250	300	350	ns	
I ² C Access Prohibited Time	T_s			500	μ s	
I ² C Bus Frequency			100		KHz	

Digital RSSI Sample/Hold Timing Specification

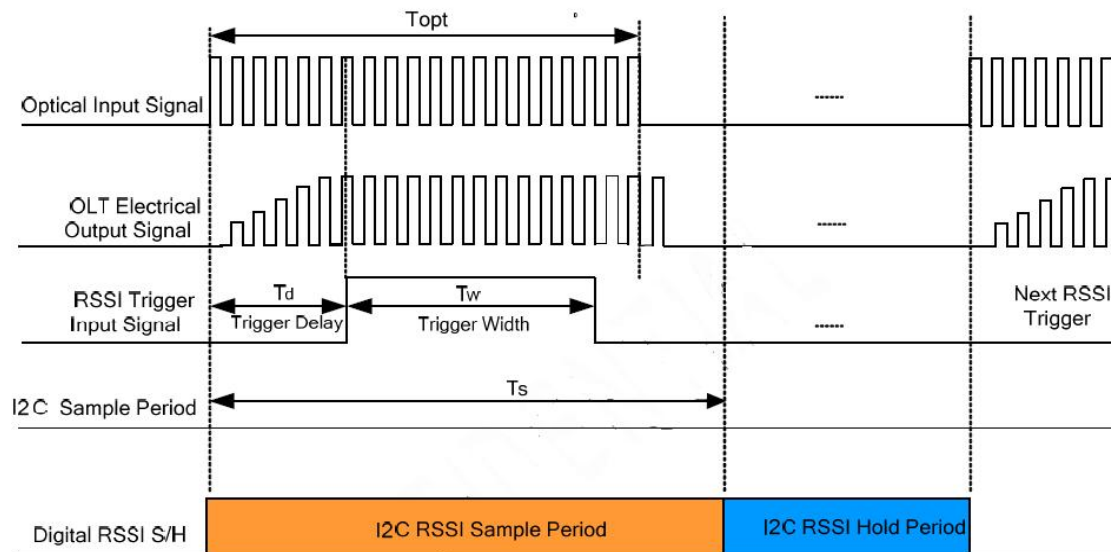


Figure 3 Timing Parameter Definitions in RSSI Trigger

Pin Out Drawing

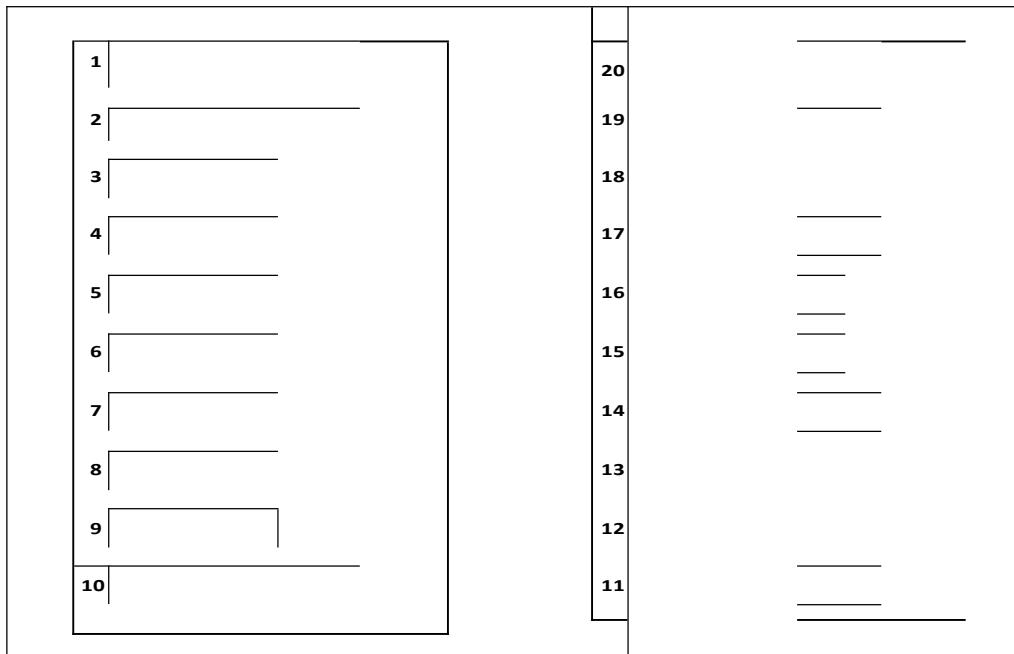


Figure 4 Pin Out Drawing

Pin Descriptions

Table 9-Pin Descriptions

Pin	Name	Description	Notes
1	GND	GND.	
2	TX_Fault	TX fault out	
3	TX_Disable	TX disable in	
4	SDA	I2C Data in/out	
5	SCL	I2C Clock in	
6	MOD_ABS	Module absent	
7	RX_Reset	No connect	
8	RX_SD	Signal detect out	

9	RSSI_Trigger	RSSI trigger in	
10	GND	GND.	
11	GND	GND.	
12	XGS_RD-	XGSPON data out, CML	AC coupling
13	XGS_RD+	XGSPON data out, CML	AC coupling
14	GND	GND.	
15	VCCR	Module power	
16	VCCT	Module power	
17	GND	GND.	
18	XGS_TD+	XGSPON data in, CML	
19	XGS_TD-	XGSPON data in, CML	
20	GND	GND.	

Package Outline

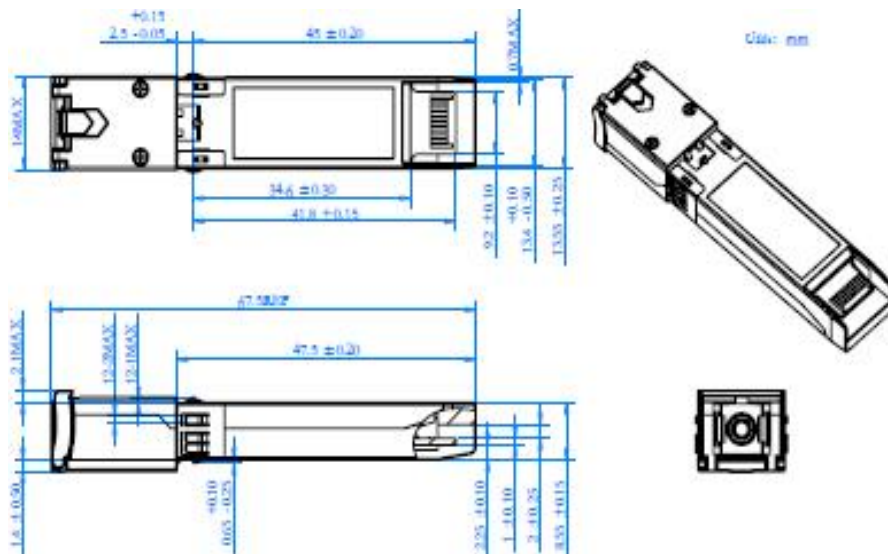


Figure 5 Package Outline

Note: The SFP+ 10G OLT package is preliminary version.

EEPROM Information

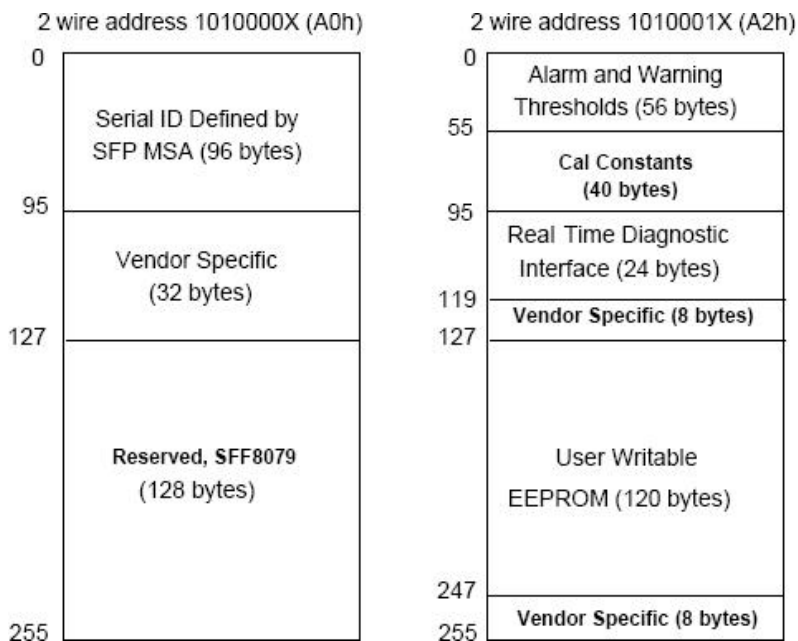


Figure 6 EEPROM Memory Map Specific Data Field Descriptions

Digital Diagnostic Monitoring Interface

Table 10- Digital Diagnostic Monitoring Interface

Parameter	Range	Accuracy	Calibration	Notes
Temperature	0 to 70°C	±3°C	Internal	LSB: 1/256C
Voltage	2.97 to 3.63V	±5%	Internal	LSB: 0.1mV
Bias Current	0 to 262mA	±10%	Internal	LSB: 4uA
TX Power	1 to 6dBm	±3dB	Internal	LSB: 0.2uW
RX Power Monitor	-29 to -5dBm	±3dB	Internal	LSB: 0.1uW

Ordering information**Table 11- Ordering information**

Part Number	Product Description
XSPT-P9T9R-N1C(I)	XGSPON OLT SFP+ N1, SC, N1, 1577T/1270R , 0 ~ +70°C, with DDM

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