FEATURES

- Single fiber bi-directional data links TX 9.953Gbps, Burst Mode RX 9.953Gbps/2.488Gbps application
- 3.3V power supply
- SFP+ package with SC Receptacle connector
- Hot-pluggable capability
- High power 1577nm EML LD and high sensitivity 1270nm APD
- Support 20km transmission distance with SMF
- SD indication
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- RoHS10 compliance

APPLICATIONS

- SFP+ XGS-PON OLT

STANDARDS

- Complies with SFP+ MSA
- Complies with SFF-8472
- Complies with ITU-T G.9807.1
- Complies with FCC 47 CFR Part 15, Class B
- 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	℃	
Operating Case Temperature	Tc	0 -40	70 85	℃	Commercial Industrial
Operating Humidity	OH	5	85	%	
VCC3 Power Supply Voltage	VCC3	-0.5	3.6	V	

RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	Tc	0 -40		70 85	℃	Commercial Industrial
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Consumption	P			3.0	W	
TX Data Rate			9.953		Gbps	
RX Data Rate			9.953/2.488		Gbps	

TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	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	
Average Launch Optical Power	AOP	2 4 6 +8		5 7 9 11	dBm	Class N1 Class N2 Class E1 Class E2
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	8.2			dB	PRBS2^{31}-1 @9.953Gbps
Optical Waveform Diagram	Compliant with ITU-T G.9807.1					Figure 1, Mask Margin>5%
Transmitter and Dispersion Penalty	TDP			1.0	dB	Transmit on 20km SMF

TRANSMITTER ELECTRICAL CHARACTERISTICS

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Data Input Differential Swing			100		850	mV	AC coupled, CML input
Input Differential Impedance		Zin	90	100	110	Ω	
TX Disable	Disable		2		VCC	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.4		VCC+0.3	V	
	Normal		0		0.4	V	

TRANSMITTER EYE MASK DEFINITIONS AND TEST PROCEDURE

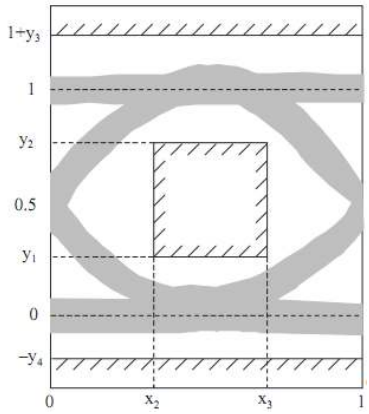

Figure 1 XGS-PON OLT Transmitter Eye Mask Definitions

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

XGSPON RECEIVER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			N1: -26 N2: -28 E1: -30 E2: -32	dBm	ER≥6dB PRBS2^{31}-1@9.953Gbps BER ≤1×10^{-3}
Overload	OL	N1: -5 N2: -7 E1: -9 E2: -11			dBm	ER≥6dB PRBS2^{31}-1@9.953Gbps BER ≤1×10^{-3}
SD Assert Level				SEN-0.5	dBm	
SD De-Assert Level		-43			dBm	
Signal Detected Hysteresis		0.5		6	dB	
CID		72			Bit	

XGPON RECEIVER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			N1: -27.5 N2: -29.5 E1: -31.5 E2: -33.5	dBm	ER≥8.2dB PRBS2^{23}-1@2.488Gbps BER ≤1×10^{-4}
Overload	OL	N1: -7 N2: -9 E1: -11 E2: -13			dBm	ER≥8.2dB PRBS2^{23}-1@2.488Gbps BER ≤1×10^{-4}
SD Assert Level				SEN-0.5	dBm	
SD De-Assert Level		-43			dBm	
Signal Detected Hysteresis		0.5		6	dB	
CID		72			Bit	

RECOMMENDED XGS/XGPON Receiver Timing Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit.	Notes
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		Vcc	V	
Data Output Differential Swing		400		850	mV	CML output, DC coupled
Output Differential Impedance	Zout	90	100	110	Ω	
Reset-Low		0		0.8	V	
Reset-High		2.0		Vcc	V	
SD Voltage-Low		0		0.4	V	
SD Voltage-High		2.4		Vcc	V	
Reset Width	Tr		25.6		ns	Suggest the first Reset location is partial in preamble of the optical packet.
Data Recovery Time	Ts		50	100	ns	
SD De-Assert Time	T_{SDD}			50	ns	
SD Assert Time	T_{SDA}			50	ns	
Guard time	Tg		50		ns	

TIMING PARAMETER DEFINITIONS IN BURST MODE SEQUENCE

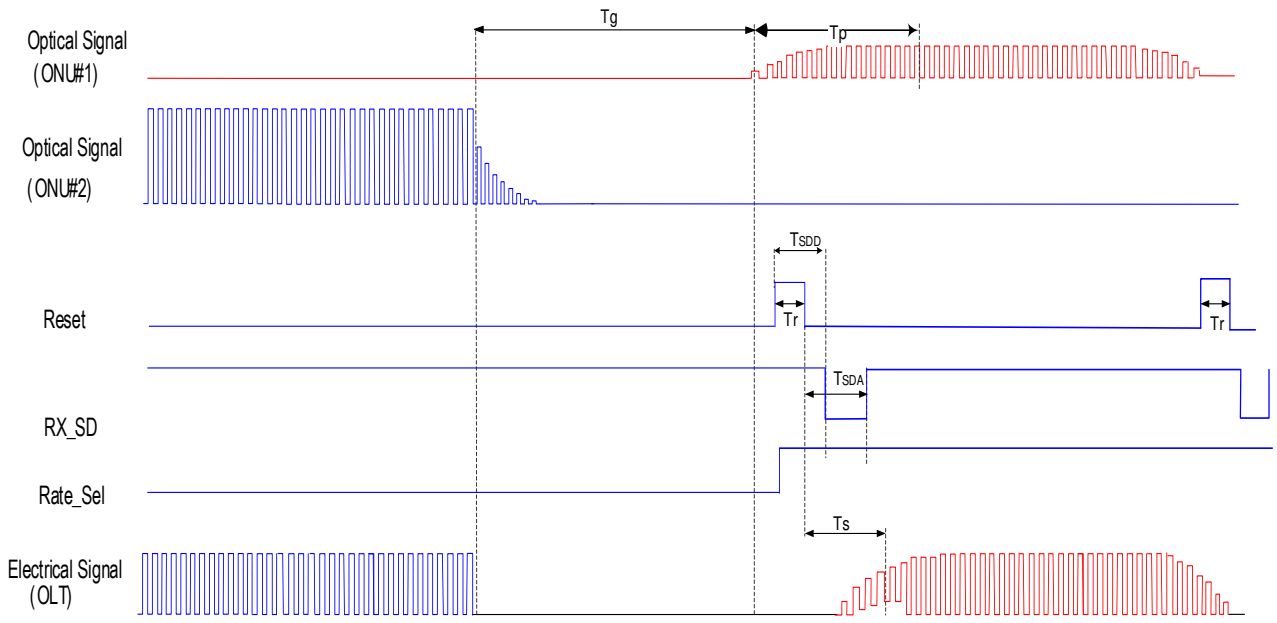

Figure 2 Timing Parameter Definitions in Burst Mode Sequence

RSSI TIMING SEQUENCE

Parameter	Symbol	Min.	Typ.	Max.	Unit.	Notes
Optical Signal Duration	T_{opt}	1200			ns	
RSSI Trigger w idth	T_W	500			ns	
RSSI Trigger Delay	T_D	150			ns	
RSSI Trigger-High		2.0		Vcc	V	
RSSI Trigger-High		2.0		Vcc	V	
I^2C Access Prohibited Time	Ts	500			μs	
I^2C BUS Frequency			100	200	KHz	
I^2C - High		2.4		3.6	V	
I^2C - Low		0		1	V	

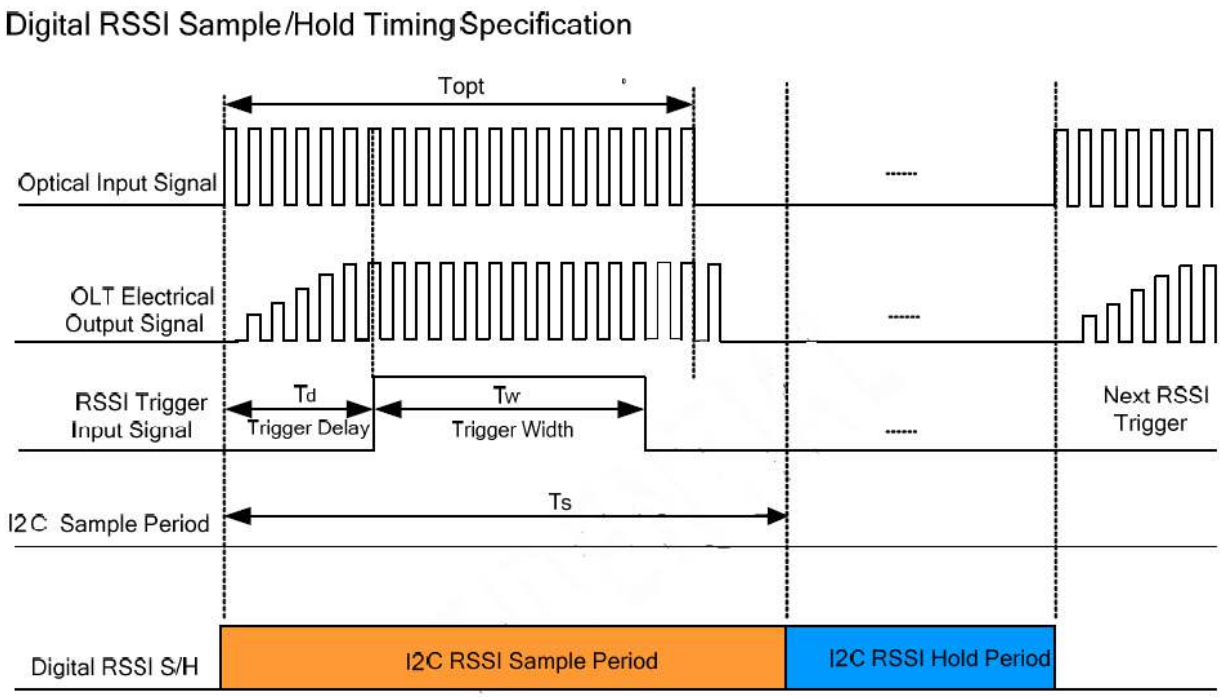

Figure 3 Timing Parameter Definitions in RSSI Trigger

PIN OUT DRAWING

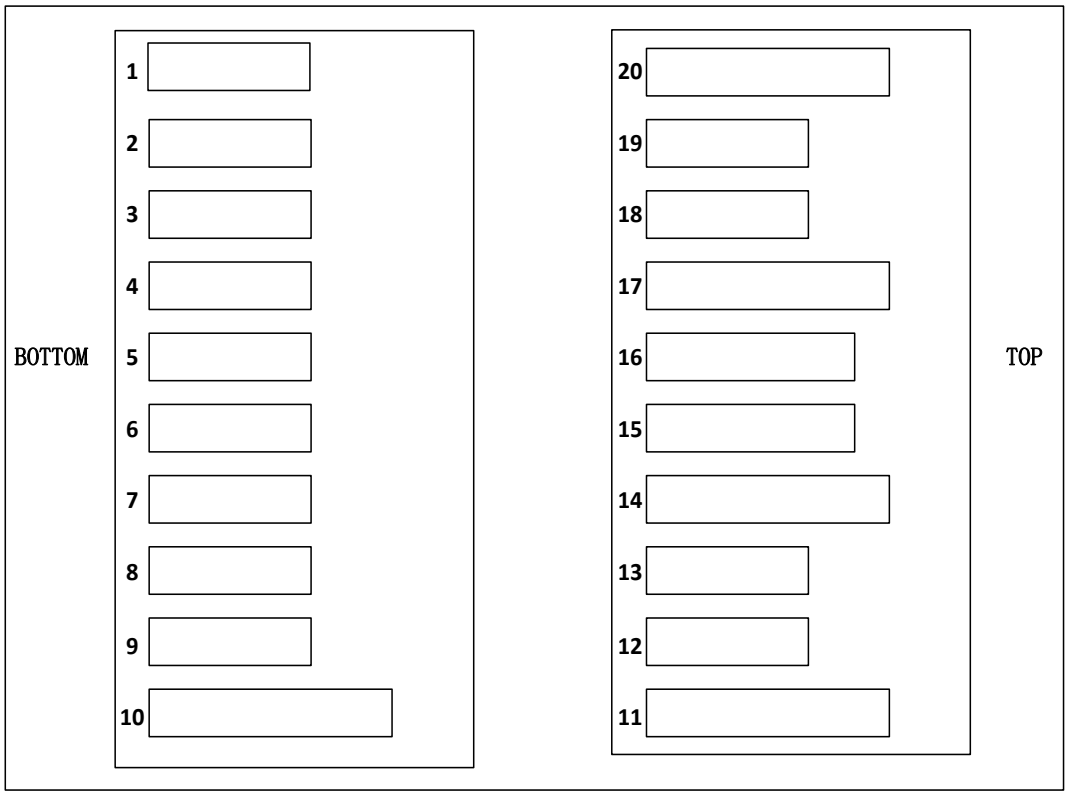

Figure 4 Pin Out Drawing

PIN DESCRIPTION

PIN	Name	Description	Notes
1	Rate_Select	Rate select	High = 9.953Gbps, Low = 2.488Gbps
2	TX_Fault	TX fault out	Low = Normal, High = Fault
3	TX_Disable	TX disable in	Low = Normal, High = Disable
4	SDA	I2C Data in/out	
5	SCL	I2C Clock in	
6	MOD_ABS	Module absent	
7	RX_Reset	Reset	Active High
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	CML output, DC coupled; squelch function
13	XGS_RD+	XGSPON data out, CML	CML output, DC coupled; squelch function
14	GND	GND.	
15	VCCR	Module power	
16	VCCT	Module power	
17	GND	GND.	
18	XGS_TD+	XGSPON data in, CML	AC coupled, CML input
19	XGS_TD-	XGSPON data in, CML	AC coupled, CML input
20	GND	GND.	

PACKAGE OUTLINE

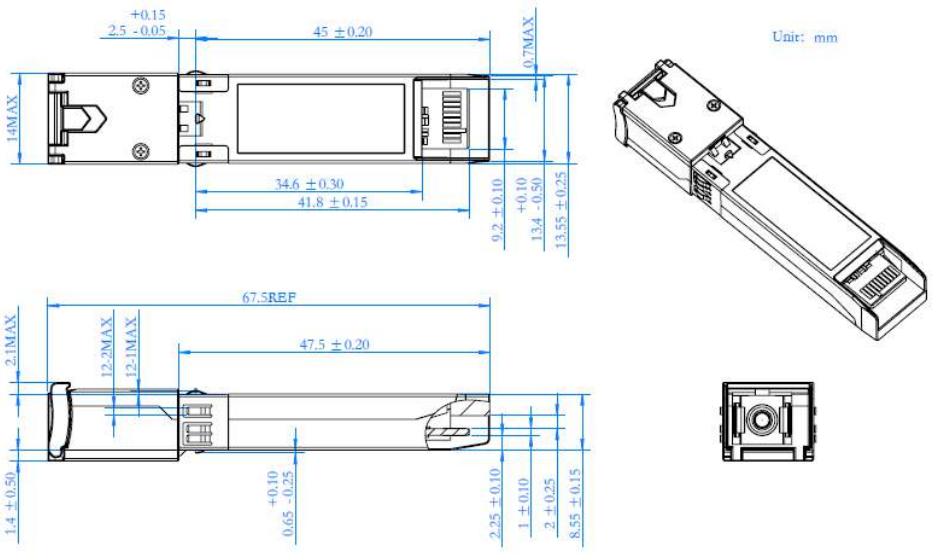

Figure 5 Package Outline

EEPROM INFORMATION

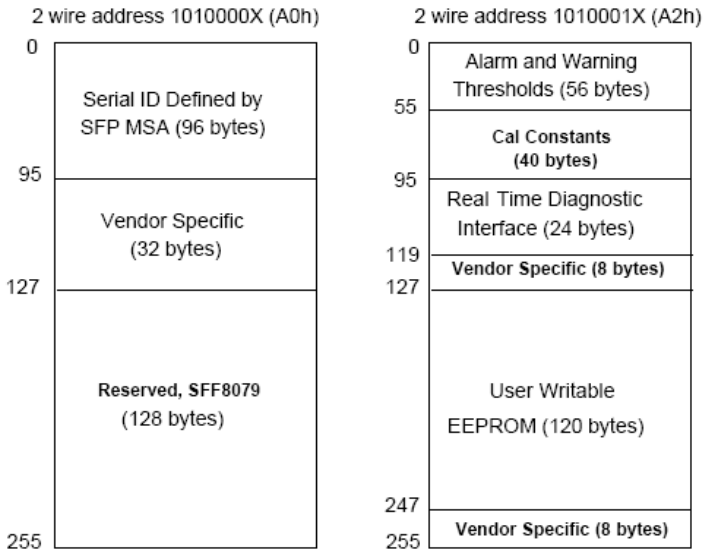

Figure 6 EEPROM Memory Map Specific Data Field Descriptions

DIGITAL DIAGNOSTIC MONITORING INTERFACE

Parameter	Range	Accuracy	Calibration	Page	Address	NOTES
Temperature	0 to 70°C -40 to 85°C	±3°C	Internal	A2	Byte 96~97, Byte96 is MSB	LSB: 1/256C
Voltage	2.97 to 3.63V	±5%	Internal	A2	Byte 98~99, Byte98 is MSB	LSB: 0.1mV
Bias Current	0 to 262mA	±10%	Internal	A2	Byte 100~101, Byte100 is MSB	LSB: 4uA
TX Power	2 to 11dBm	±3dB	Internal	A2	Byte 102~103, Byte102 is MSB	LSB: 0.2uW
RX Power	Sensitivity to Overload	±3dB	Internal	A2	Byte 104~105, Byte104 is MSB	LSB: 0.1uW

ORDERING INFORMATION

PN	Temperature Rating ℃	ODN Class	Fiber Termination
SOGX6299-PSGA SOGX6299-PSIGA	0 ~ 70 -40~85	N1	SC UPC
SOGX6299-PSGB SOGX6299-PSIGB	0 ~ 70 -40~85	N2	SC UPC
SOGX6299-PSGG SOGX6299-PSIGG	0 ~ 70 -40~85	E1	SC UPC
SOGX6299-PSGS	0 ~ 70	E2	SC UPC

WARNINGS

- Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.
- Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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