

10PT-PXTXR-P4C-W

10G EPON OLT Symmetric SFP+ PR40 Transceiver

Features

- Single fiber bi-directional data links TX 10.3125Gbps, Burst Mode RX 10.3125Gbps application
- Single fiber bi-directional data links TX 1.25Gbps, Burst Mode RX 1.25Gbps application
- 3.3V power supply
- SFP+ package with SC Receptacle connector
- Hot-pluggable capability
- High power 1577nm EML LD and 1490nm DFB LD
- High sensitivity 1270/1310nm APD
- Support 20km transmission distance with SMF
- RX_SD indication
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- 0 to 70°C operating case temperature



Applications

- Symmetric 10GEPON OLT
- GEAPON OLT PR40

Standards

- Complies with SFF-8472
- Complies with IEEE-802.3bk
- 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	RH _s	5	95	%	
Relative Operating Humidity	RH _o	0	85	%	
VCC3 Power Supply Voltage	VCC	0	3.6	V	

Recommended Operating Environment

Table 2 - Recommended Operating Environment

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T _c	0		70	°C
Power Supply Voltage	V _{CC}	3.13	3.3	3.47	V
Power Supply Consumption	P		-	2.5	W
TX Data Rate			10.3125 1.25		Gbps Gbps
RX Data Rate			10.3125 1.25		Gbps Gbps
Operating Current				1000	mA

10GEPON Transmitter Optical Characteristics

Table 3-10GEPON 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	+5		+9	dBm	Launched into SMF
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	6			dB	PRBS2 ³¹ -1 @10.3125Gbps
Optical Waveform Diagram	Compliant with IEEE Std 802.3bk					Figure 1, Mask Margin>5%

10GEPON Transmitter Electrical Characteristics

Table 4-10GEPON 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	
TX Fault	Fault	2.4		VCC+0.3	V	
	Normal	-0.3		0.4	V	
Transmitter Disable Time	T _{off}			10	us	
Transmitter Enable Time	T _{on}			2	ms	

10G EPON Transmitter Eye Mask Definitions and Test Procedure

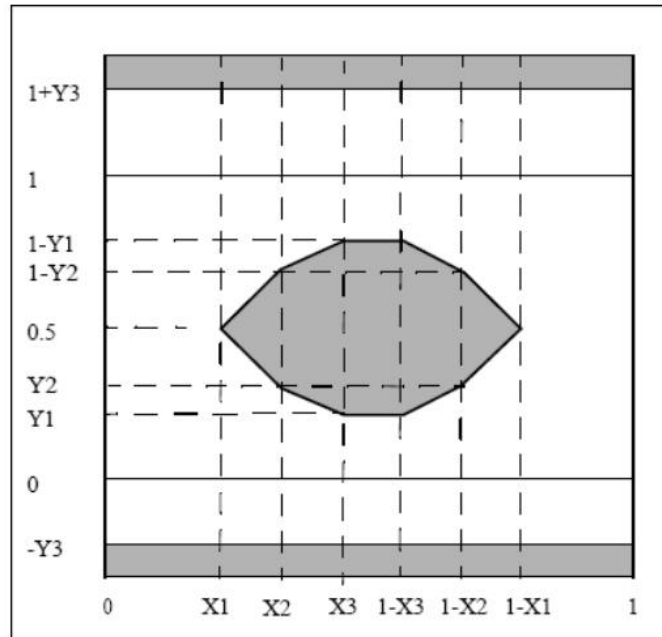


Figure 1: 10G EPON Transmitter Eye Mask Definitions

X3-X2	Y1	Y2	Y3	Y4	Unit
0.2	0.40	0.45	0.25	0.28	UI

GEPON Transmitter Optical Characteristics

Table 5- GEPON Transmitter Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Center Wavelength	λ_C	1480		1500	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power (EOL)	AOP	+4		+10	dBm	Launched into SMF
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF

Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	6			dB	PRBS 2 ⁷ -1 @1.25Gbps
Optical Waveform Diagram	Compliant with IEEE Std 802.3bkdB					Figure 2, Mask Margin>5%

GEPON Transmitter Electrical Characteristics

Table 6- GEPON Transmitter Electrical Characteristics

Parameter		Symbol	Min	Typical	Max	Unit	Notes
Data Input Differential Swing			120		800	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	
TX Fault	Fault		2.4		VCC+0.3	V	
	Normal		-0.3		0.4	V	
Transmitter Disable Time		T _{off}			10	us	
Transmitter Enable Time		T _{on}			2	ms	

GEAPON Transmitter Eye Mask Definitions and Test Procedure

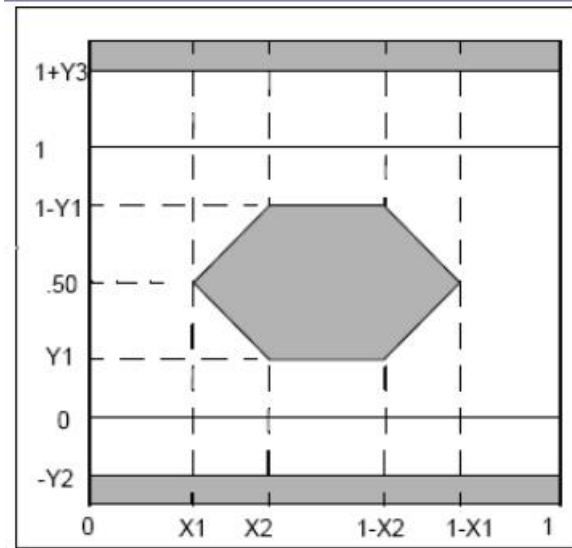


Figure 2: GEAPON Transmitter Eye Mask Definitions

X1	X2	Y1	Y2	Y3	Unit
0.22	0.375	0.20	0.20	0.30	UI

10GEAPON Receiver Optical Characteristics

Table 7-10GEAPON Receiver Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			-29	dBm	PRBS2 ³¹ -1 @10.312 5Gbps BER ≤1×10 ⁻³
Saturation Optical Power	SAT	-9			dBm	
Max Input power		-8			dBm	
LOS Assert Level				-30	dBm	
LOS De-Assert Level		-45			dBm	
Hysteresis		0.5		6	dB	

10GEPON Receiver Electrical Characteristics

Table 8-10GEPON Receiver Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver Threshold Settling Time	T _{SETTLING}		300	800	ns	Figure 3
Data Output Differential Swing		400		1000	mV	DC coupled, CML output
Input Differential Impedance	Z _{in}	90	100	110	Ω	
LOS Assert Level Time				1024	ns	
LOS De-Assert Level Time				512	ns	
LOS Voltage - Low		-0.3		0.4	V	
LOS 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	

GEPON Receiver Optical Characteristics

Table 9-GEPON Receiver Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1290	1310	1330	nm	
Sensitivity	SEN			-32	dBm	PRBS 2 ⁷ -1 @1.25Gbps BER ≤1×10 ⁻¹²
Max Input Power		-6			dBm	
Saturation Optical Power	SAT	-12			dBm	
LOS Assert Level				-32.5	dBm	
LOS De-Assert Level		-45			dBm	
Hysteresis		0.5		6	dB	

GEPON Receiver Electrical Characteristics

Table 10-GEPON Receiver Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver Threshold Settling Time	$T_{SETTLING}$			300	ns	Figure 3
Data Output Differential Swing		600		1600	mV	DC coupled, LVPECL output
Input Differential Impedance	Z_{in}	90	100	110	Ω	
LOS Assert Level Time				1024	ns	
LOS De-Assert Level Time				512	ns	
LOS Voltage - Low		-0.3		0.4	V	
LOS 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	

Timing Parameter Definitions in Burst Mode Sequence

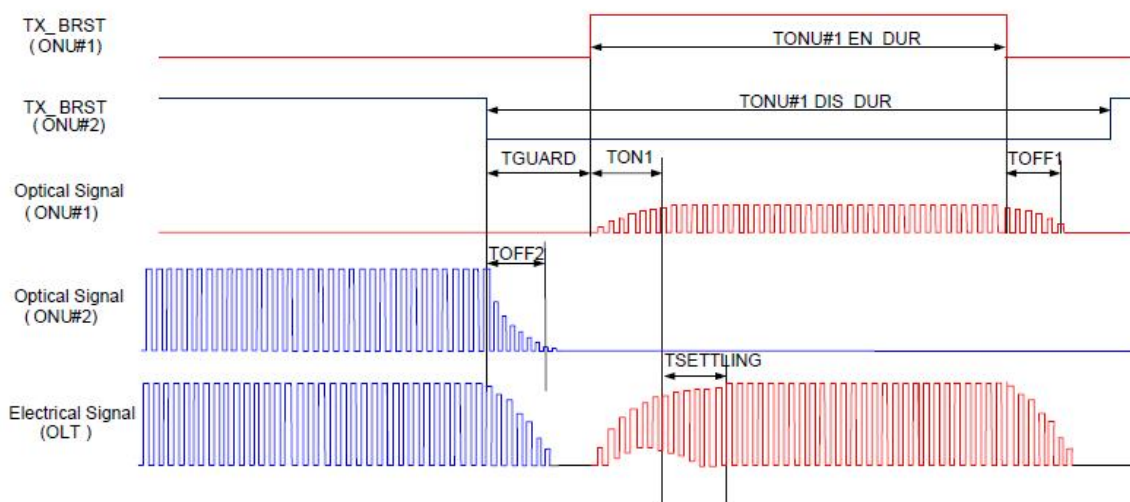


Figure 3: Timing Parameter Definitions in Burst Mode Sequence

RSSI Timing Sequence

Table 11-RSSI Timing Sequence

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Signal During Time	T_{opt}	1500			ns	
RSSI Trigger width	T_w		500		ns	
RSSI Trigger Delay	T_D		300		ns	
I ² C Access Prohibited Time	T_s			500	μ s	
I ² C Bus Frequency			100	200	KHz	

Timing Parameter Definitions in RSSI Trigger

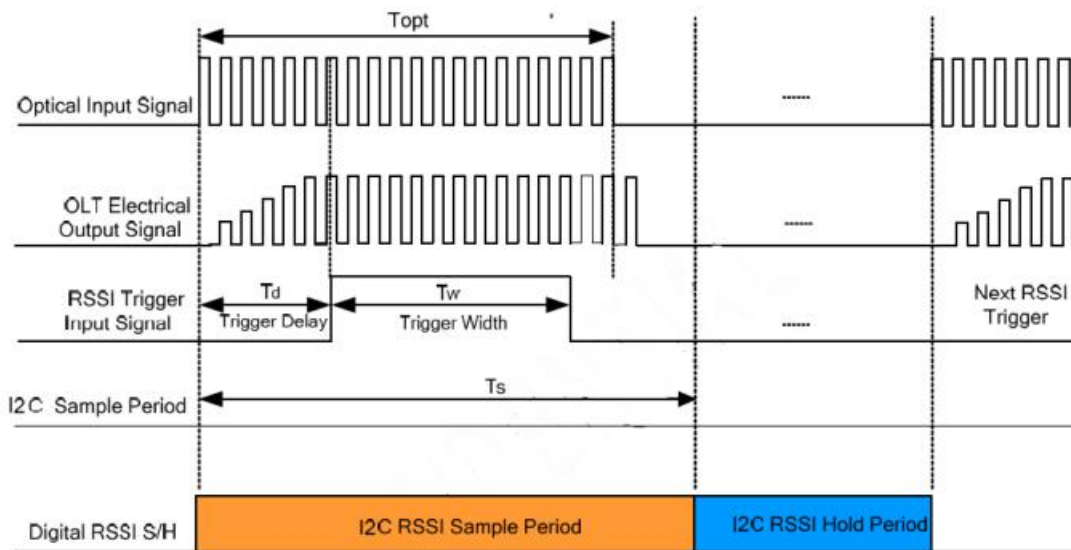


Figure 4 Timing Parameter Definitions in RSSI Trigger

Pin Assignment

Pin Out Drawing

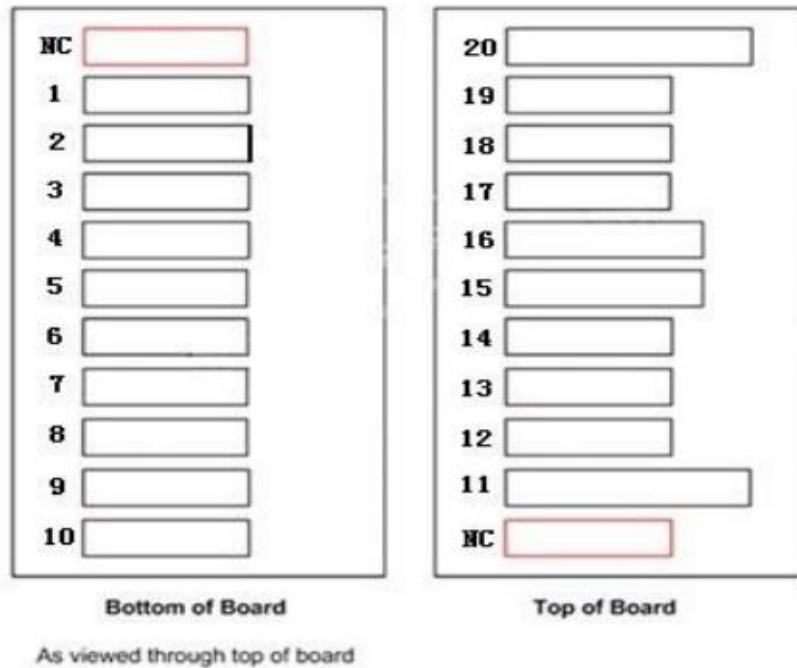


Figure 5: Pin Out Drawing

Pin Descriptions

Table 12-Pin Descriptions

Pin	Name	Description	Notes
N/C	N/C		
1	EPON_TD+	1G Transmit Data In	AC coupled, CML input
2	EPON_TD-	Inv. 1G Transmit Data In	AC coupled, CML input
3	MOD_ABS	Indicates Module is not present.	Grounded in the Module
4	SDA	2-Wire Serial Interface Data	The data line of two wire serial interface
5	SCL	2-Wire Serial Interface Clock	The clock line of two wire serial interface
6	EPON_RD-	Inv. Received 1G Data Out	DC coupled, LVPECL output
7	N/C		

8	RX_LOS	RX_LOS Indicator	High: lost signal
9	Trig	Receiver RSSI trigger input	
10	EPON_RD+	Received 1G Data Out	DC coupled, LVPECL output
N/C	N/C		
11	GND	Module Ground	
12	10GEPON_RD-	Inv. Received 10G Data Out	DC coupled, CML output
13	10GEPON_RD+	Received 10G Data Out	DC coupled, CML output
14	TX_Fault	Indication of Transmitter Fault	
15	VCCR	3.3V DC Power Input	
16	VCCT	3.3V DC Power Input	
17	N/C		
18	10GEPON_TD+	Differential 10G Transmit Data In	AC coupled, CML input
19	10GEPON_TD-	Inv. differential 10G Transmit Data In	AC coupled, CML input
20	GND	Module Ground	

EEPROM Information

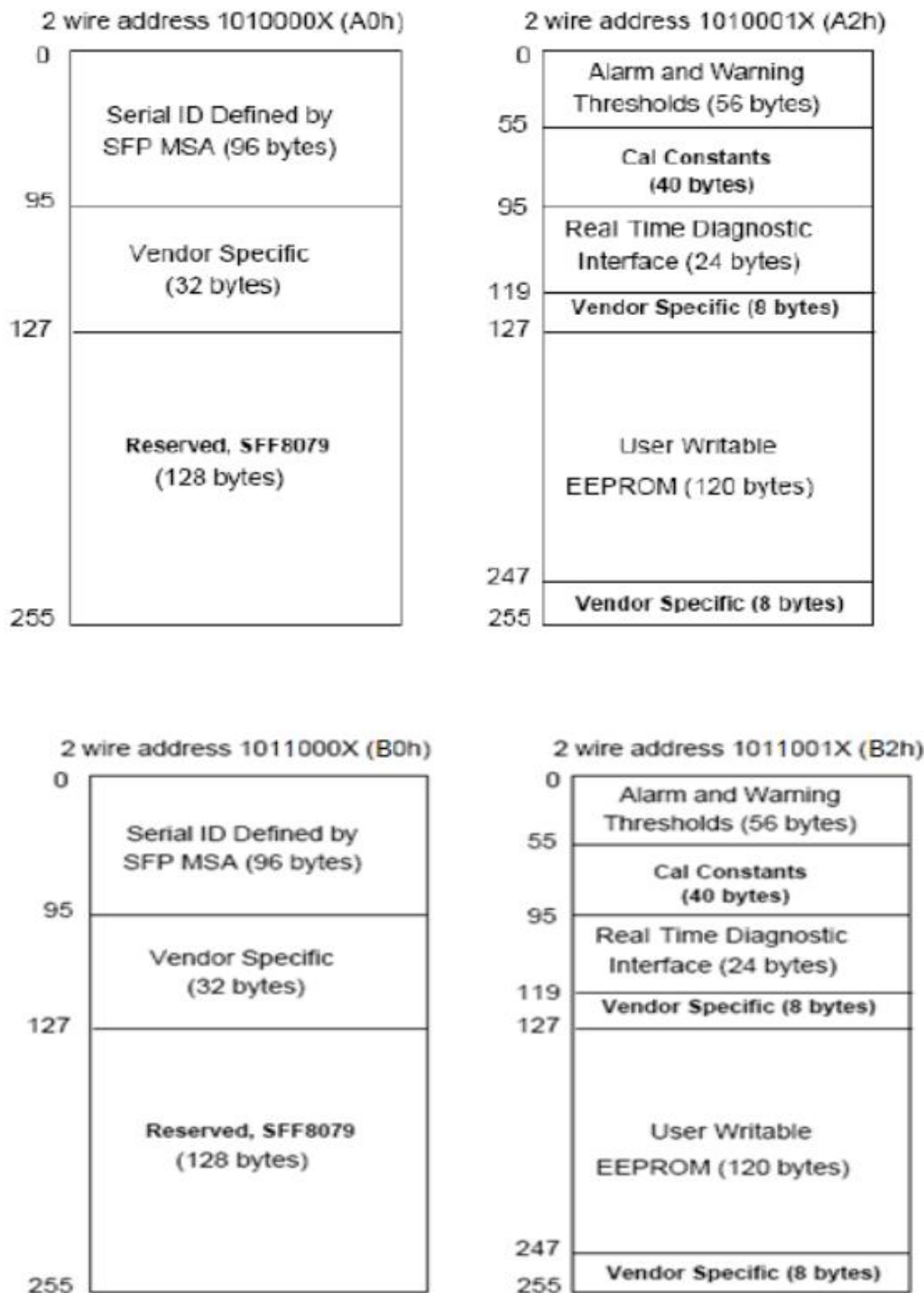


Figure 6: EEPROM Memory Map Specific Data Field Description

Digital Diagnostic Monitoring Interface

Table -13 Digital Diagnostic Monitoring Interface

Parameter	Range	Accuracy	Calibration	Note
Temperature	0 to 70° C	±3°C	Internal	LSB: 1/256°C
Voltage	2.97 to 3.63V	±5%	Internal	LSB: 0.1mV
Bias Current_10G	0 to 262mA	±10%	Internal	LSB: 4uA
TX Power_10G	5 to 9 dBm	±2dB	Internal	LSB: 0.2uW
Bias Current_1G	0 to 262mA	±10%	Internal	LSB: 4uA
TX Power_1G	4 to 10dBm	±2dB	Internal	LSB: 0.2uW
RX Power Monitor	-32 to -6dBm	±3dB	Internal	LSB: 0.1uW

Package Outline

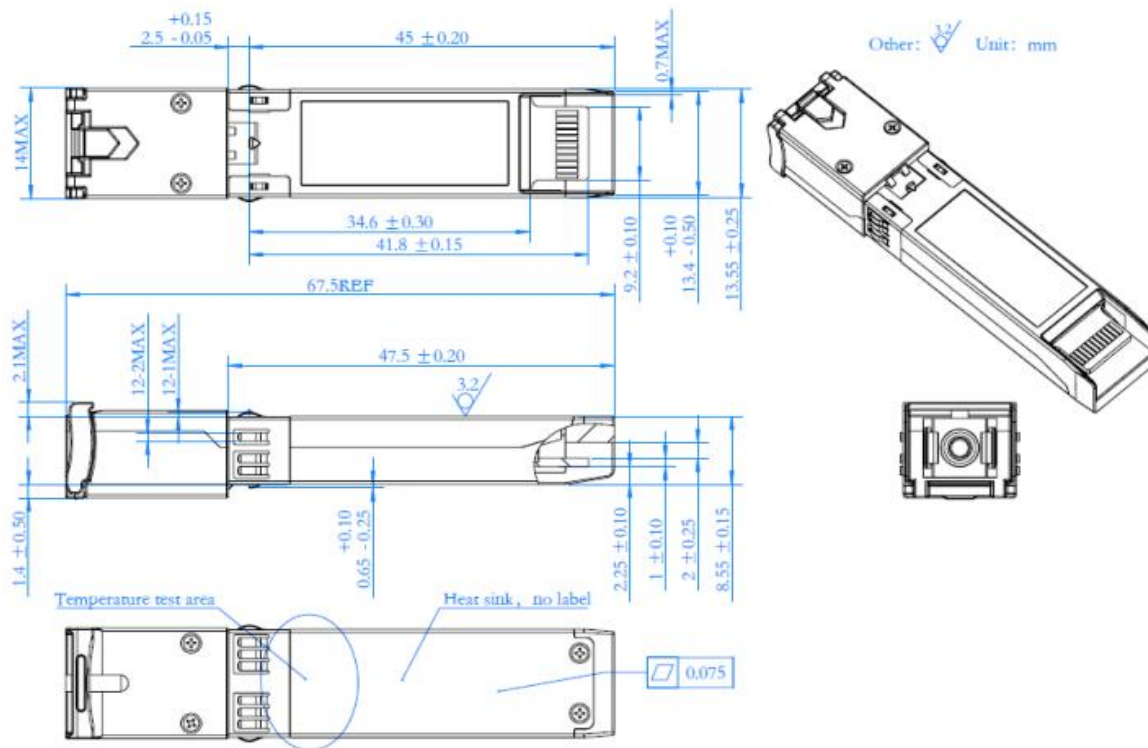


Figure 7-Package Outline

Ordering information**Table 14- Ordering information**

Part Number	10PT-PXTXR-P4C-W
Application	Symmetric 10GE PON OLT, with 1.25G TX/RX, 0°C~+70°C
Wavelength (nm)	1577T/1270R 1490T/1310R
Data Rate (Gb/s)	10.3T/10.3R 1.25T/1.25R
ODN Class	PR40
Package	SFP+
Connector	SC

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