

10PT-XXTXR-P4C-W

10GEPON Symmetric OLT PR40 XFP 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
- 0 to 70°C operating case temperature
- 3.3V, 5V power supply
- XFP package with SC Receptacle connector
- Hot-pluggable capability
- High power 1577nm EML LD and High power 1490nm DFB LD
- High sensitivity 1270nm and 1310nm APD Support 20km transmission distance with SMF
- RX_LOS indication
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- RoHS6 compliance



Applications

- Symmetric 10GEPON OLT

Standards

- Complies with INF-8077i
- 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	TSTG	-40	85	°C	
Operating Case Temperature	T _c	0	70	°C	
Operating Humidity	OH	5	95	%	
VCC3 Power Supply Voltage	VCC3	-0.5	3.6	V	
VCC5 Power Supply Voltage	VCC5	-0.5	5.5	V	

Recommended Operating Environment

Table 2 - Recommended Operating Environment

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T _c	0		+70	°C	
VCC3 Power Supply Voltage	VCC3	3.13	3.3	3.47	V	
VCC5 Power Supply Voltage	VCC5	4.75	5	5.25	V	
VCC3 Power Supply Current	ICC3		-	500	mA	VCC3_T X or VCC3_R X
VCC5 Power Supply Current	ICC5		-	500	mA	
Date Rate			10.3125		Gbps	
Date Rate Drift		-100		+100	PPM	

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)	Δλ	-	-	1	nm	

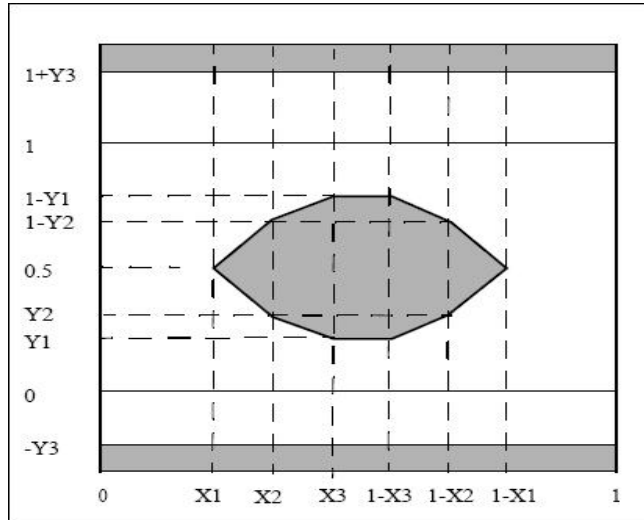
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power	AOP2	+5		+9	dBm	Launched into SMF
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	6			dB	PRBS2 ³¹ -1 @10.31 25Gbps
Total Jitter	TJ			0.39	UI	PRBS2 ³¹ -1 @10.31 25Gbps
RIN ₁₅ OMA				-128	dB/Hz	
Transmitter Reflectance				-10	dB	
Transmitter and Dispersion Penalty	TDP			1.5	dB	Transmit on 20km SMF
Optical Waveform Diagram	Compliant with IEEE Std 802.3av					Figure 1, Mask Margin > 5%

Transmitter Electrical Characteristics

Table 4-10GEPON Transmitter Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Input Differential Swing		120		850	mV	CML input, AC coupled
Input Differential Impedance		90	100	110	Ω	
Transmitter Enable Voltage - Low		0		0.8	V	
Transmitter Disable Voltage - High		2.0		VCC	V	

Transmitter Eye Mask Definitions and Test Procedure



Transmitter Eye Mask Definitions and Test Procedure

X1	X2	X3	Y1	Y2	Y3	Unit
0.25	0.40	0.45	0.25	0.28	0.40	UI

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	AOP	+4		+10	dBm	Launched into SMF
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF

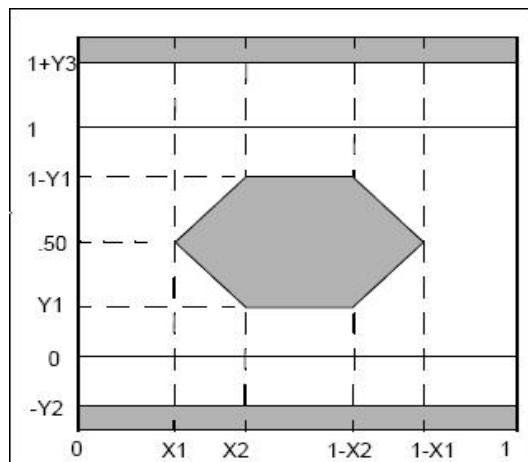
Extinction Ratio	ER	6			dB	PRBS 2 ⁷ -1 test pattern @1.25Gbit/s
Total Jitter	TJ			0.43	UI	PRBS 2 ⁷ -1 test pattern @1.25Gbit/s
Rise/Fall Time (20%-80%)	T _R /T _F			260	ps	Bessel-Thompson Filter OFF.
Optical Return Loss Tolerance				15	dB	
Transmitter Reflectance				-10	dB	
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF
Optical Waveform Diagram	Compliant with IEEE Std 802.3bk					Figure 2, Mask Margin>5%

Transmitter Electrical Characteristics

Table 6-GEPON Transmitter Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Input Differential Swing		200		1200	mV	LVPE CL input, AC coupled
Input Differential Impedance		90	100	110	Ω	
Transmitter Enable Voltage - Low		0		0.8	V	
Transmitter Disable Voltage - High		2.0		VCC	V	

GEAPON Transmitter Eye Mask Definitions and Test Procedure



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

GEAPON Transmitter Eye Mask Definitions

Receiver Optical Characteristics

Table 7-10 GEAPON Receiver Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			-29	dBm	PRBS ²³¹ -1@10.3125Gbps BER $\leq 1 \times 10^{-3}$
Saturation Optical Power	SAT	-9			dBm	PRBS ²³¹ -1@10.3125Gbps BER $\leq 1 \times 10^{-3}$
Damage Threshold		-8			dBm	
LOS De-assert Level				-30	dBm	
LOS Assert Level		-45			dBm	
LOS Hysteresis		0.5		6	dB	
Receiver Reflectance				-12	dB	

Receiver Electrical Characteristics

Table 8-10GEAPON Receiver Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver Threshold Settling Time	T_{SETTLING}			800	ns	
Data Output Differential Swing		400		850	mV	CML output, DC coupled
LOS Assert Time				1024	ns	
LOS De-assert Time				512	ns	

Receiver Optical Characteristics

Table 9- Receiver Optical Characteristics

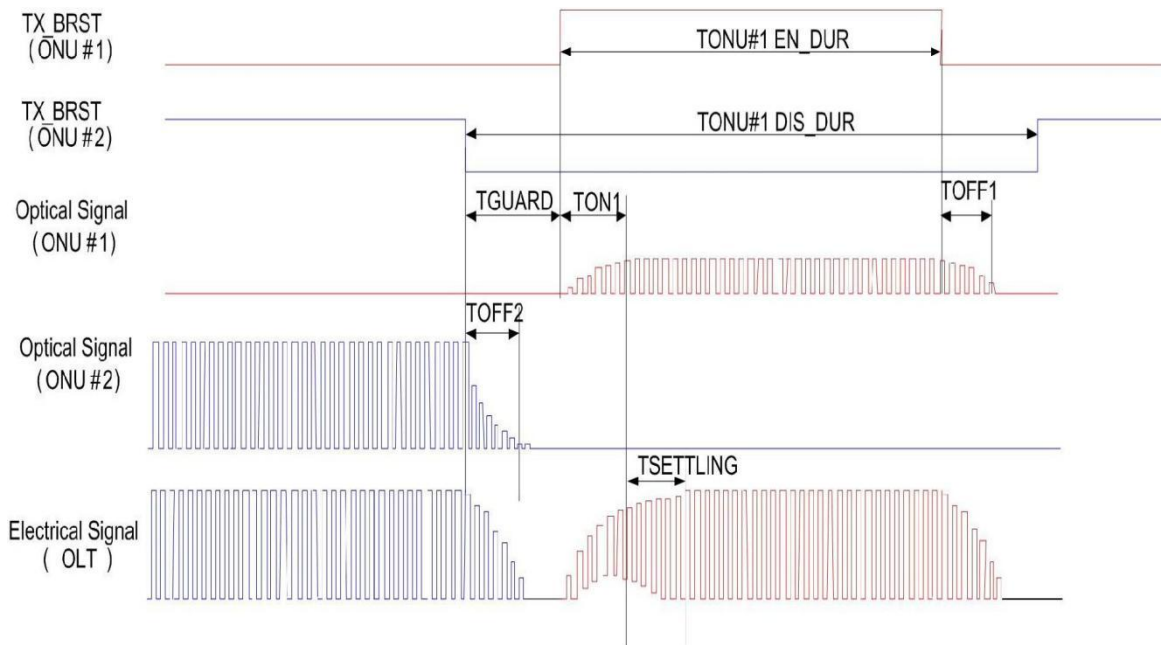
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1260		1360	nm	
Sensitivity	SEN			-32	dBm	PRBS 2 ⁷ -1@1.25G bps BER $\leq 1 \times 10^{-12}$
Saturation Optical Power	SAT	-12			dBm	PRBS 2 ⁷ -1@1.25G bps BER $\leq 1 \times 10^{-12}$
Damage Threshold		-6			dBm	
Loss Of Signal De-assert Level				-33	dBm	
Loss Of Signal Assert Level		-45			dBm	
Loss Of Signal Hysteresis		0.5		6	dBm	
Receiver Reflectance				-12	dB	

Receiver Electrical Characteristics

Table 10- Receiver Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver Threshold Settling Time	TSETTLING			400	ns	
Data Output Differential Swing		400		1600	mV	LVPECL output, DC coupled
Loss Of Signal Voltage - Low		0		0.4	V	
Loss Of Signal Voltage - High		2.4		VCC	V	
LOS Assert Time				0.8	μs	Optical input power > -19dBm
LOS Assert Time				0.5	μs	Optical input power < -19dBm
LOS De-assert Time				0.5	μs	

Timing Parameter Definitions in Burst More Sequence



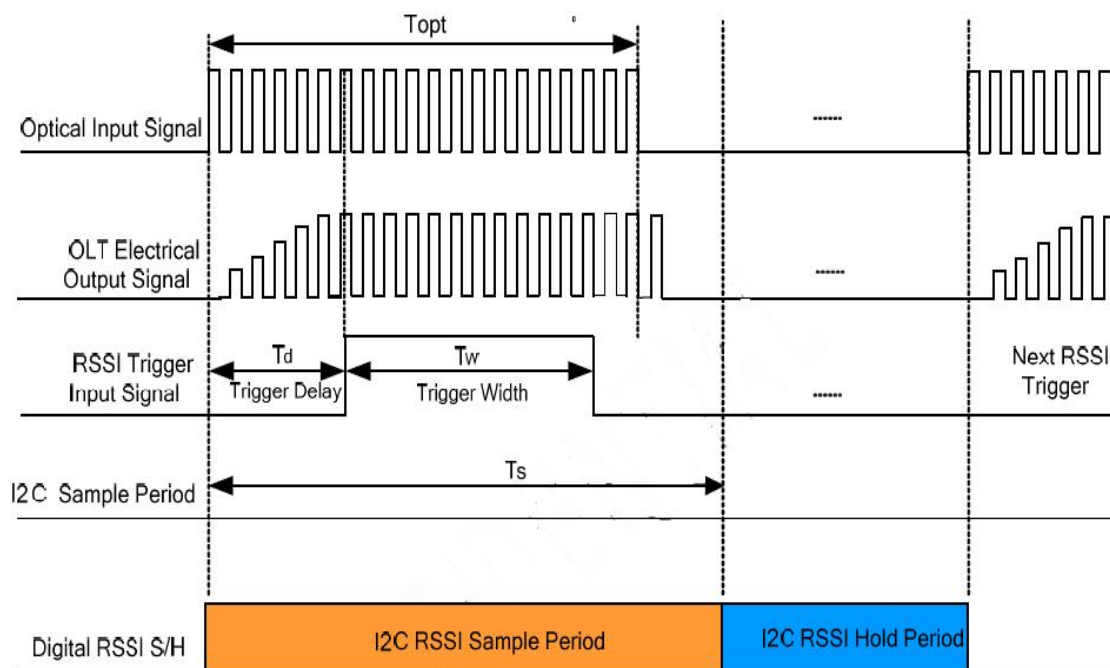
Timing Parameter Definitions in Burst Mode Sequence

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	584	600	616	ns	
RSSI Trigger Delay	T_D	250	300	350	ns	
I ² C Access Prohibited Time		500			μ s	

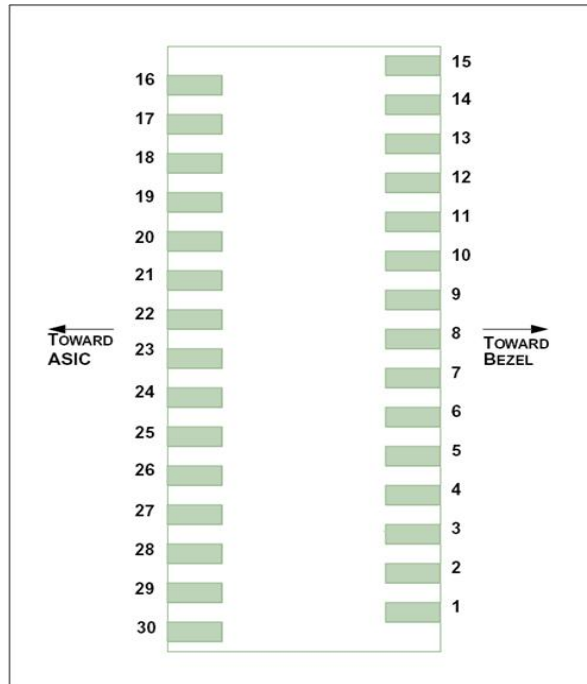
Digital RSSI Sample/Hold Timing Specification



Timing Parameter Definitions in RSSI Trigger

Pin Assignment

Pin Out Drawing



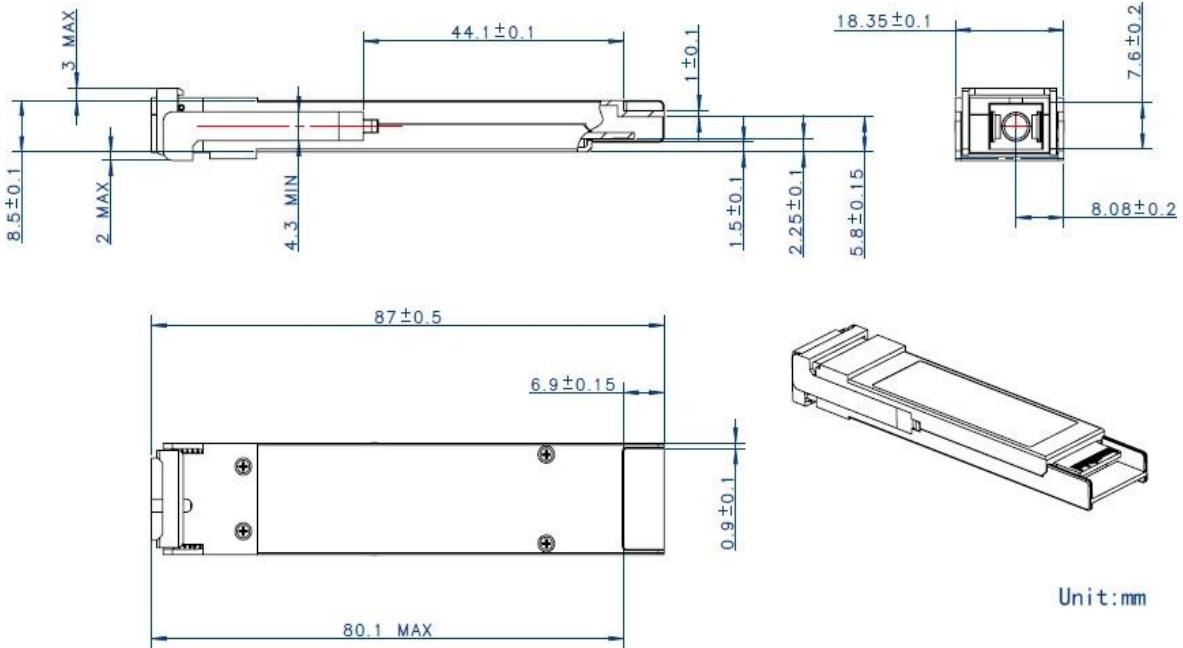
Pin Descriptions

Table 12-Pin Descriptions

Pin	Name	Description	Notes
1	GND	Module Ground	
2	TX_1G_P	Non-Inverted Transmit Data in	LVPECL input, AC coupled
3	TX_1G_N	Inverted Transmit Data in	LVPECL input, AC coupled
4	GND	Module Ground	
5	TX_DI_S	Transmitter Disable	LVTTL Input, Low: transmitter on
6	VCC5	+5V Power Supply	
7	GND	Module Ground	
8	VCC3_TX	Transmitter 3.3V Power Supply	
9	VCC3_RX	Receiver 3.3V Power Supply	

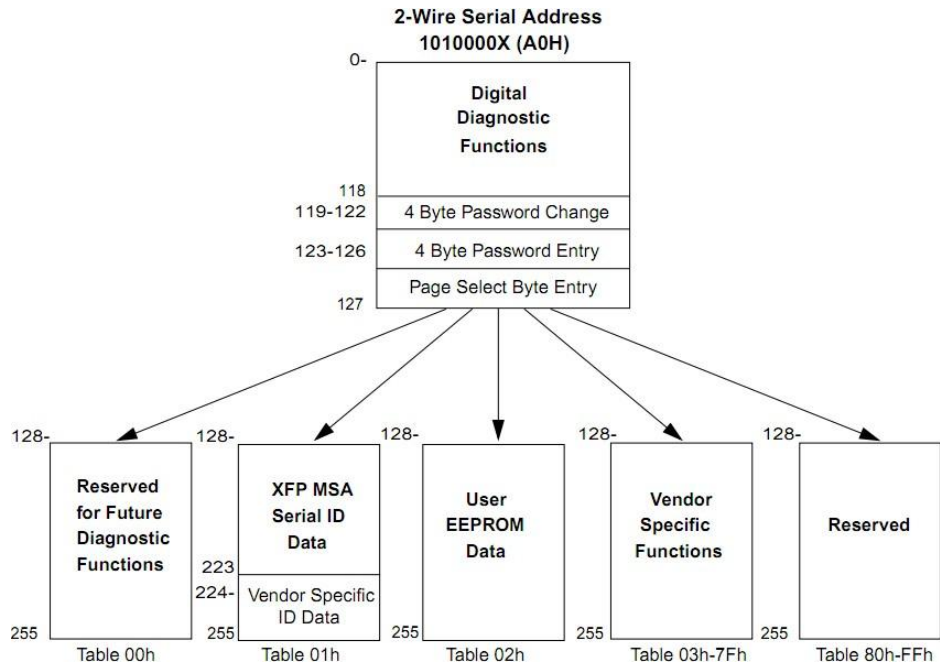
10	SCL	The clock line	The clock line of two wire serial interface
11	SDA	The data line	The data line of two wire serial interface
12	MOD_ABS	Indicates Module is not present.	Grounded in the Module
13	NC	Not connect	
14	Rx_LOS	Rx_LOS Indication	LVTTTL output, active low when the receiver lost signal
15	GND	Module Ground	
16	GND	Module Ground	
17	RD_10G_N	Inverted 10G Received Data Out	CML Output, DC coupled
18	RD_10G_P	Non-inverted 10G Received Data Out	CML Output, DC coupled
19	GND	Module Ground	
20	RD_1G_N	Inverted Received Data Out	LVPECL Output, DC coupled
21	RD_1G_P	Non-inverted Received Data Out	LVPECL Output, DC coupled
22	NC	Not connect	
23	RSSI_TRIG	RSSI Trigger for Transceiver	RSSI Trigger
24	NC	Not connect	
25	NC	Not connect	
26	NC	Not connect	
27	GND	Module Ground	
28	TX_10G_N	Inverted Transmit Data in	CML input, AC coupled
29	TX_10G_P	Non-Inverted Transmit Data in	CML input, AC coupled
30	GND	Module Ground	

Package Outline



Package Outline

EEPROM Information



EEPROM Memory Map Specific Data Field Descriptions

Digital Diagnostic Monitoring

Table 13- Digital Diagnostic Monitoring

Parameter	Range	Accuracy	Calibration	Note
Temperature	0 to 70°C	±3°C	Internal	LSB: 1/256C
Voltage	2.97 to 3.63V	±10%	Internal	LSB: 0.1mV
Bias Current_10G	0 to 130mA	±10%	Internal	LSB: 2uA
TX Power_10G	5 to 9dBm	±3dB	Internal	LSB: 0.1uW
Bias Current_1G	0 to 130mA	±10%	Internal	LSB: 2uA
TX Power_1G	4 to 10dBm	±3dB	Internal	LSB: 0.1uW
RX Power monitor	-32 to -8dBm	±3dB	Internal	LSB: 0.1uW

Ordering information

Table 14- Ordering information

Part Number	Product Description
10PT-XXTXR-P4C-W	Symmetric 10GEPON OLT XFP with 1G, SC, PR40, 0 ~ +70°C, with DDM

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