



PICadvanced

SFP+ Combo PON OLT

PA-GXS-OLT-QUAD-SFP+-N2aC+-CT

Revision 1

Revision History

Revision nr.	Description	Date
1	Initial release	May 2019

Features:

- Support both ITU-T G9807.1&G.987.2 XGSPON&XGPON OLT
 - N2/N2a and ITU-T G.984.2 GPON OLT C+ application
- Single fiber Quad-directional data links, and the four wavelengths can work simultaneously
- XGSPON&XGPON 1577nm 9.953G continuous-mode transmitter with EML laser, 1270nm 9.953G&2.488G burst-mode receiver with APD-TIA (with RESET), with GPON 1490nm 2.488G continuous-mode transmitter with DFB laser, 1310nm 1.244G burst-mode receiver with APD-TIA (with RESET)
- 2-wire interface for integrated digital diagnostic monitoring
- Digital receiving signal strength indication (RSSI)
- SFP+ MSA package with SC/UPC receptacle optical interface
- +3.3V power supply
- Operating case temperature: 0~70°C
- RoHS6 compliance

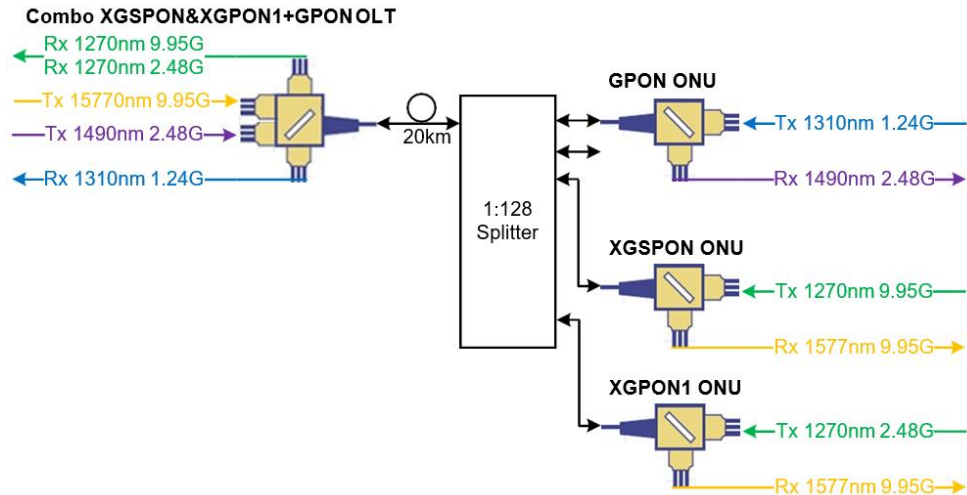


Figure 1. Diagram

Operating Condition

Parameter	Unit	Min.	Typical	Max.
Storage Temperature	°C	-40		85
Operating Case Temp for C-temp	°C	0		70
Storage Humidity	%	5		90
Operating Relative Humidity	%	5		85
Power Supply Voltage (3.3V)	V	3.15	3.3	3.45
Total Power Consumption	W			4
Damage Threshold for Receiver	dBm	-3		
Bit Rate for Tx 1577nm	Gbps		9.953	
Bit Rate for Rx 1270nm	Gbps	2.488	9.953	
Bit Rate for Tx 1490nm	Gbps		2.488	
Bit Rate for Rx 1310nm	Gbps		1.244	

Characteristics

All performance is specified at whole working temperature and conditions

Parameter	Unit	Min.	Typical	Max.
XGSPON&XGPON 1577nm 9.953G Transmitter				
TX Central Wavelength	nm	1575	1577	1580
Spectral Width (-20dB)	nm			1
SMSR	dB	30		
Mean Launched Power (N2/C+ BOL)	dBm	4.5		7
Mean Launched Power (N2/C+ EOL)	dBm	4		7
Mean Launched Power (TX Off)	dBm			-45
Extinction Ratio	dB	8.2		
Optical Return Loss Tolerance	dB	-15		
Transmitter Mask (PRBS2 ³¹ -1@9.953G)	Compliant With ITU-T G.9807.1&G.987.2			

XGSPON 1270nm 9.953G Receiver					
Receive Wavelength		nm	1260	1270	1280
Sensitivity (N2/C+ EOL) (PRBS2 ³¹ -1@9.953G, BER<10 ⁻³)	ER=8.2	dBm			-28.5
Overload (N2/C+)		dBm	-6.5		
Settling time		ns			100
SD Assert Level		dBm			-29
SD De-assert Level		dBm	-45		
SD Hysteresis		dB	0.5		6
XGPON 1270nm 2.488G Receiver					
Receive Wavelength		nm	1260	1270	1280
Sensitivity (N2a/C+ EOL) (PRBS2 ²³ -1@2.488G, BER<10 ⁻⁴)	ER=8.2	dBm			-30.5
Overload (N2a/C+)		dBm	-8		
SD Assert Level		dBm			-31
SD De-assert Level		dBm	-45		
SD Hysteresis		dB	0.5		6

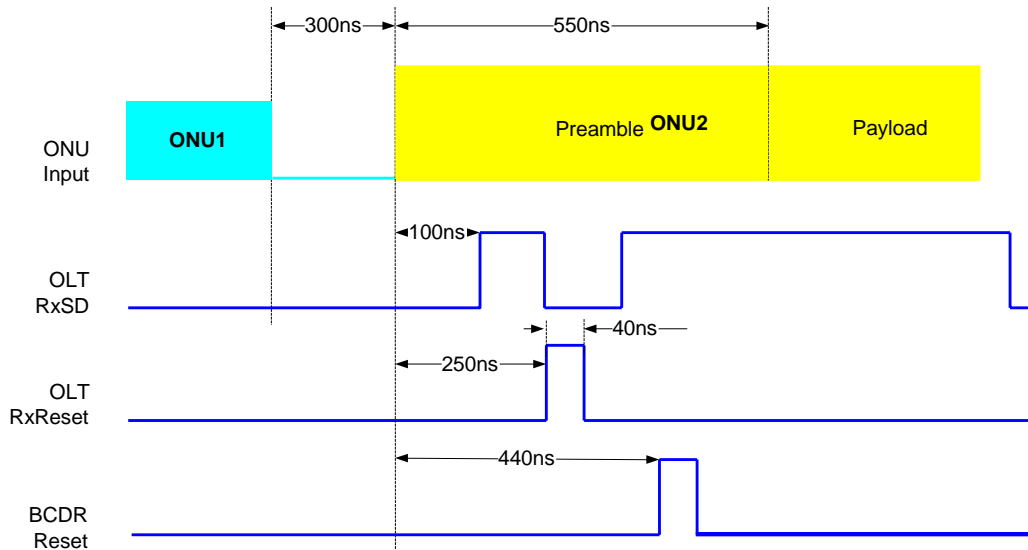
Parameter	Unit	Min.	Typical	Max.
GPON 1490nm 2.488G Transmitter				
TX Central Wavelength	nm	1480	1490	1500
Spectral Width (-20dB)	nm			1
Side Mode Suppression Ratio (SMSR)	dB	30		
Mean Launched Power (C+ BOL)	dBm	4		7
Mean Launched Power (C+ EOL)	dBm	3		7
Mean Launched Power (TX Off)	dBm			-45
Extinction Ratio	dB	8.2		
Optical Return Loss Tolerance	dB	-15		
Transmitter and dispersion Penalty	dB			1
Transmitter Mask (PRBS2 ²³ -1@2.488G)	Compliant With ITU-T G.984.2			

GPON 1310nm 1.244G Receiver				
Receive Wavelength	nm	1290	1310	1330
Sensitivity (C+ BOL) (PRBS ²³ -1 @1.244G, ER=10, BER< 10 ⁻⁴)	dBm			-33
Sensitivity (C+ EOL) (PRBS ²³ -1 @1.244G, ER=10, BER< 10 ⁻⁴)	dBm			-32
Overload (C+)	dBm	-11		
Receiver Range Burst Mode Dynamic	dB	15		
SD Assert Level	dBm			-33
SD De-assert Level	dBm	-45		
SD Hysteresis	dB	0.5		6

Parameter	Unit	Min.	Typical	Max.
Electrical Interface Characteristics				
Data Input Swing Differential/TX	mV	120		800
XGSPON&XGPON Data Output Swing Differential/RX	mV	400		800
GPON Data Output Swing Differential/RX	mV	600		1600
Data Differential Impedance	Ω	90	100	110
LVTTTL Output High	V	2.4		V _{cc}
LVTTTL Output Low	V	0		0.4
LVTTTL Input High	V	2.0		V _{cc} +0.3
LVTTTL Input Low	V	0		0.8

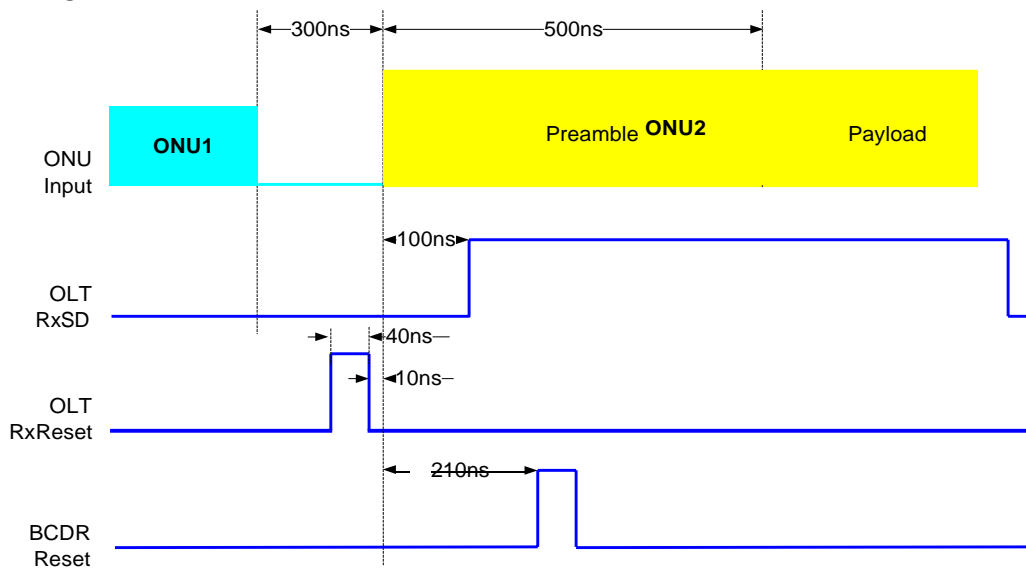
Timing Sequence for XGSPON&XGPON Burst Receiver

Ranging mode:



Notice, the RxRESET pulse should be both works well when it is in the guard time or preamble time.

working mode:



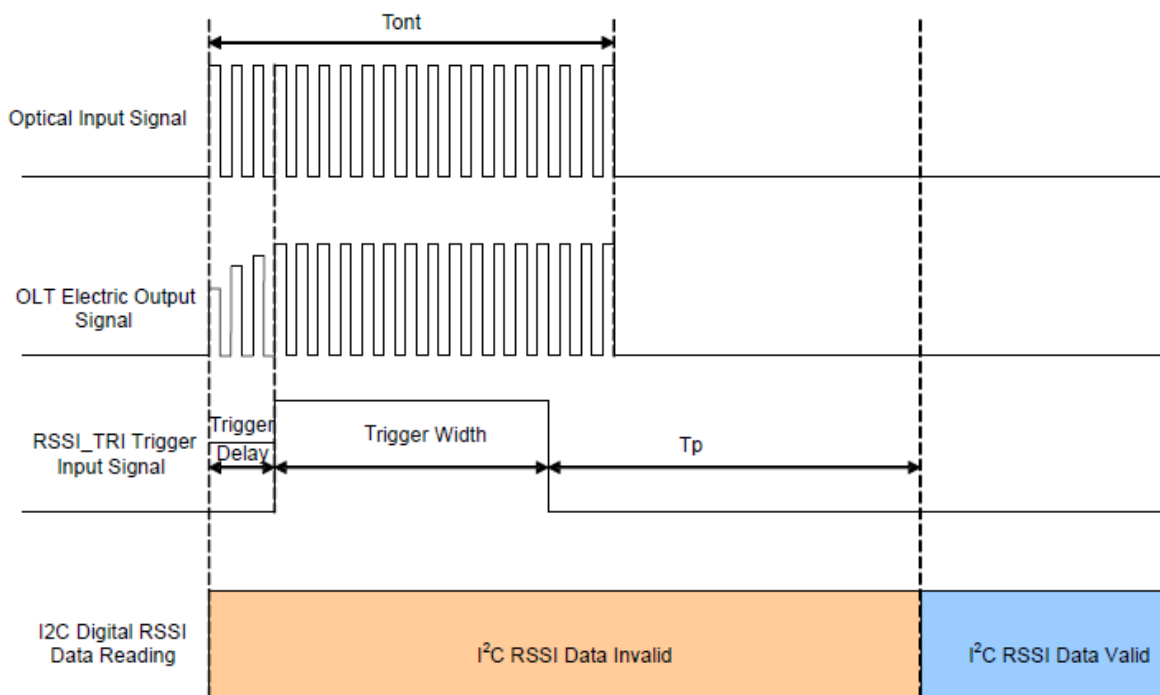
Parameter	Unit	Min.	Typical	Max.
Burst Timing Characteristics				
XGSPON Guard Time (T _g)	ns		TBD (32Byte?)	
XGSPON Settling Time (T _s)	ns		100	
XGPON Guard Time (T _g)	ns		25.6 (8Byte)	

XGPON Settling Time (T_s)	ns	100		
GPON Guard Time (T_g)	ns	25.6 (4Byte)		
GPON Settling Time (T_s)	ns	19.2 (3Byte)		
GPON Reset Pulse Width (T_r)	ns	12.8		
GPON SD Assert Time (T_{SDA})	ns			24
GPON SD De-assert Time (T_{SDD})	ns			10

Note1: the OLT GPON RxRESET signal can be effective when in the Guard Time duration (Ranging Mode) or in the Preamble Time duration (Working Mode).

Note2: the OLT GPON RxSD signal will be level '0' when the RxRESET signal equals to '1', and it will be level '1' after the input ONU optical signal detected, and its level will be held before the next RxRESET pulse coming.

Timing Sequence for RSSI



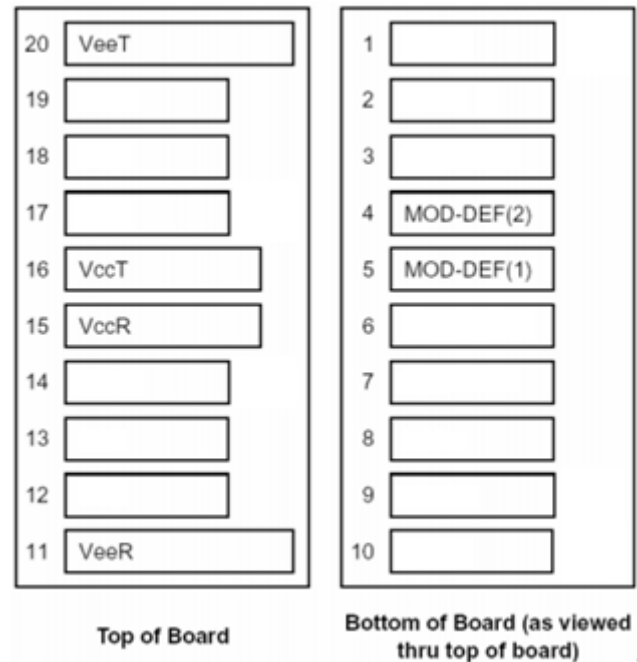
Parameter	Unit	Min.	Typical	Max.
RSSI Timing Characteristics				
ONU Package Length (T_{ont})	ns	1000	1200	1700
RSSI Trigger Delay (T_{td})	ns	100	300	400
RSSI Trigger Pulse Width (T_w)	ns	600		$T_{ont} - T_{td}$
Internal I ² C Delay (T_p)	us			500

XGSPON ONU Power Range (Pmon)	dBm	-30		-10
XGPON ONU Power Range (Pmon)	dBm	-31		-11
GPON ONU Power Range (Pmon)	dBm	-32		-10
RSSI Monitoring Error	dB	+/-2		

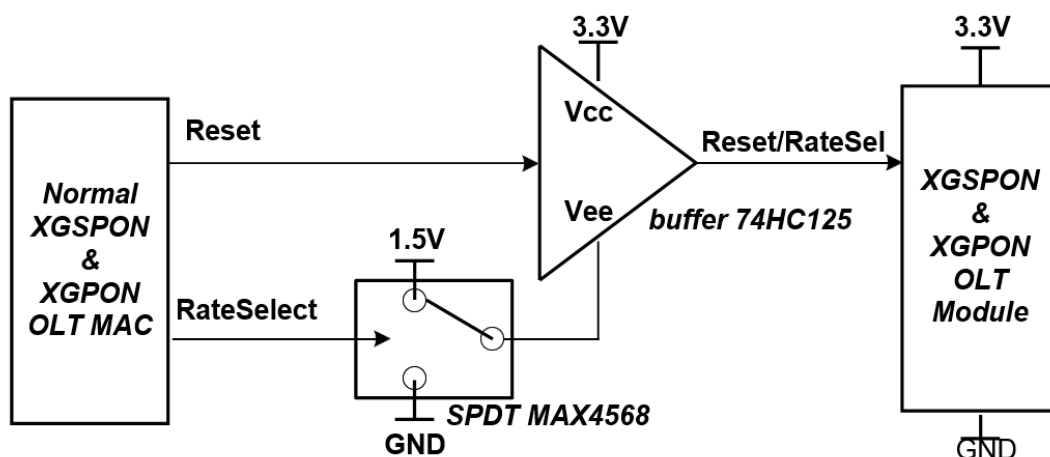
PIN Definition

Pin No.	Symbol	Level /Logic	Description
1	GPON_TD+	CML-I	GPON OLT Transmitter Non-Inverted Data Input, 2.488Gbps, AC-coupled
2	GPON_TD-	CML-I	GPON OLT Transmitter Inverted Data Input, 2.488Gbps, AC-coupled
3	GND		Module Ground
4	SDA	LVTTTL-I/O	2-Wire Serial Interface Data Line
5	SCL	LVTTTL-I	2-Wire Serial Interface Clock
6	GPON_RD-	LVPECL-O	GPON Receiver Inverted Data Output, 1.244Gbps, DC-coupled.
7	Reset/Rateselect (*Note1)	LVTTTL-I	When act as the Rateselect PIN, for selecting 9.953Gbps, this signal is in standard LVTTTL level, that is, Low level < 0.4V and high level > 2V, but for selecting 2.488Gbps, this signal is in not standard LVTTTL level, that is, Low level >0.9V and < 1.9V, and high level > 2V.
8	XGSPON&XGPO N_RxSD	LVTTTL-O	XGSPON&XGPON Receiver Signal Detected Indicator
9	RSSITrig/TxDis	LVTTTL-I	according to the relative control register, to act as RSSITrig or TxDis input PIN. When acting as RSSITrig, active high to trigger the RSSI sampling. When acting as TxDis, active high to turn off transmitter laser output.
10	GPON_RD+	LVPECL-O	GPON Receiver Non-Inverted Data Output, 1.244Gbps, DC-coupled.
11	GND		Module Ground
12	XGSPON&XGPO N_RD-	CML-O	XGSPON&XGPON Receiver Inverted Data Output, 9.95/2.488Gbps, DC-coupled
13	XGSPON&XGPO N_RD+	CML-O	XGSPON&XGPON Receiver Non-Inverted Data Output, 9.95/2.488Gbps, DC-coupled
14	GPON_RxSD	LVTTTL-O	GPON Receiver Signal Detected Indicator
15	VCC3_RX		+3.3V Tx Power Supply
16	VCC3_TX		+3.3V Rx Power Supply
17	GPON_RST	LVTTTL-I	GPON Receiver Reset, high active
18	XGSPON&XGPO N_TD+	CML-I	XGSPON Transmitter Non-Inverted Data Input, 9.95Gbps, AC-coupled

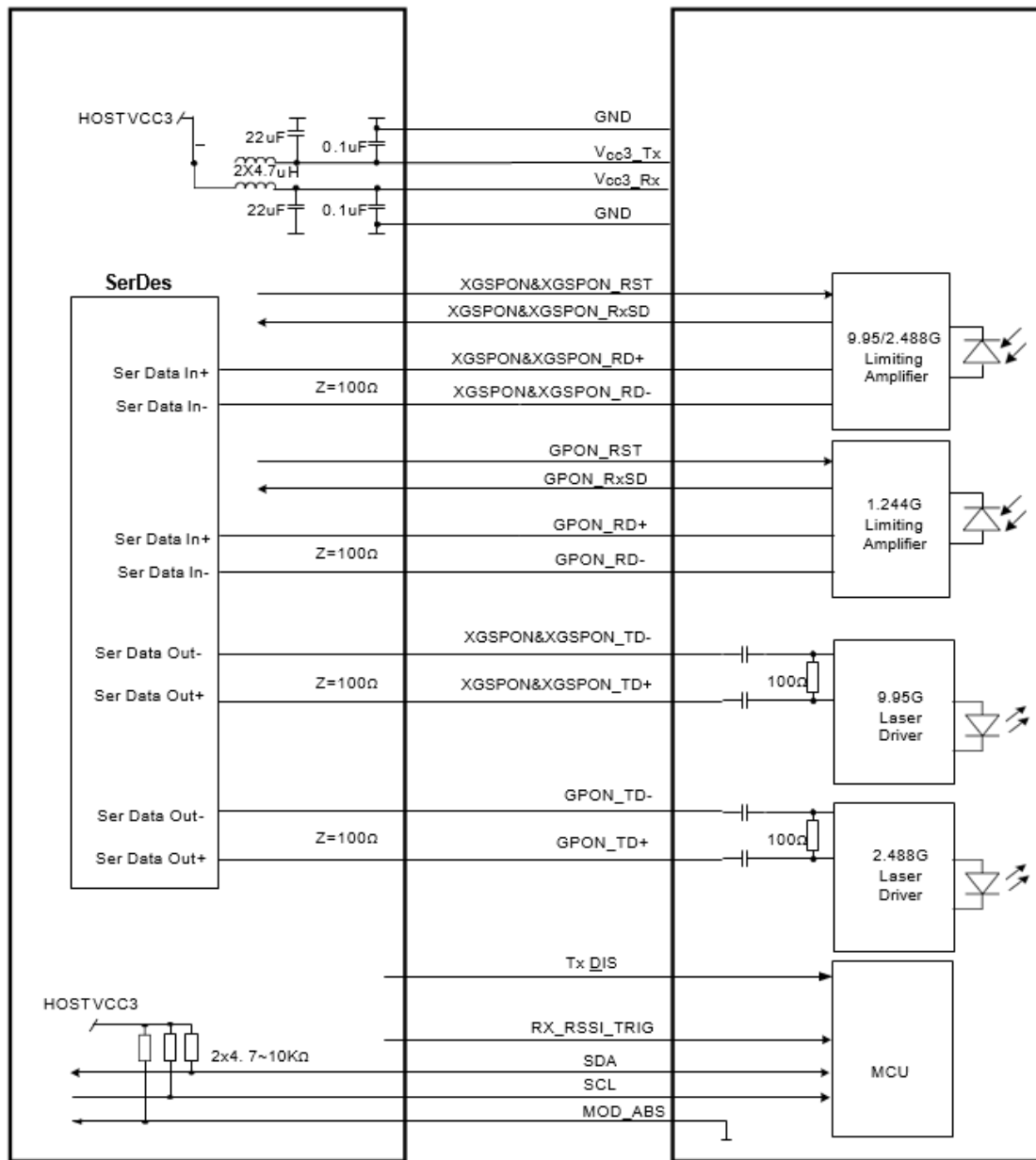
19	XGSPON&XGPO N_TD-	CML-I	XGSPON Transmitter Inverted Data Input, 9.95Gbps, AC-coupled
20	GND		Module Ground



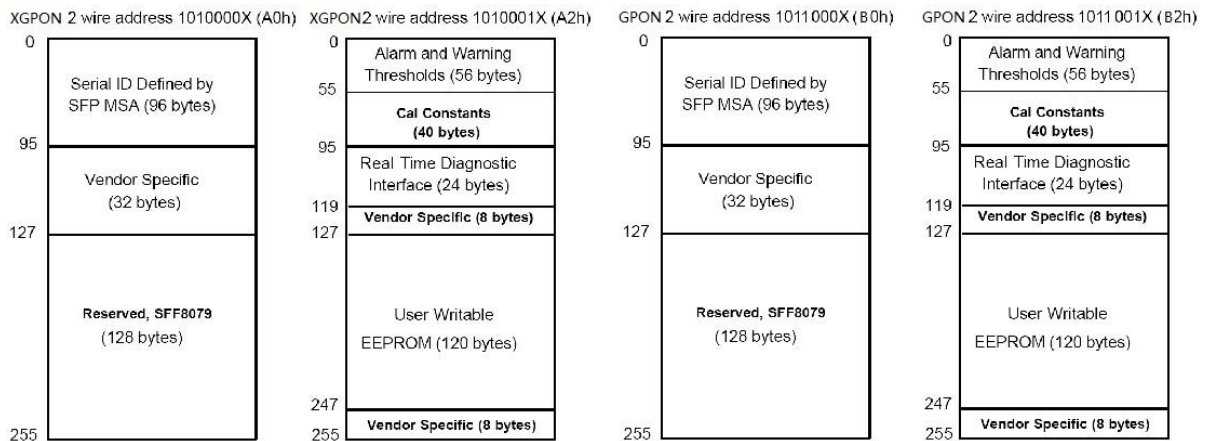
Note1: the OLT Reset/Rateselect signal is 3-level signal, that is, the Reset/Rateselect for selecting 2.488Gbps, it's low level should be in the range of [0.9V..1.9V] but not the normal LVTTTL range [0..0.4V], and the Reset/Rateselect for selecting 9.95Gbps, it's low level should be in the range of the normal LVTTTL range [0..0.4V]. For the normal OLT MAC Chip, some additional circuit (something like the following diagram) should be added to make the individual Reset and RateSelect LVTTTL signals into the multiplexed Reset/Rateselect 3-level signal.



Typical Interface Circuit



EEPROM Memory Map



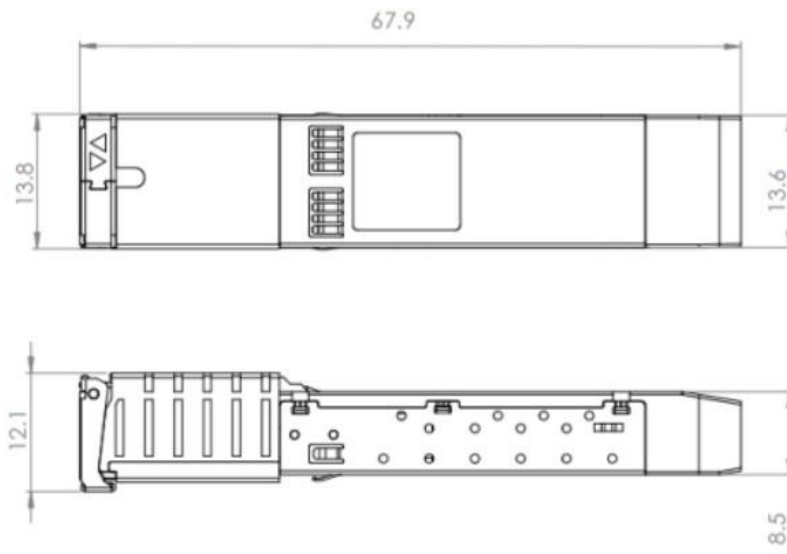
Address	Parameter	Range	NOTES
96-97	Temperature	-40 to 125°C	1LSB=1/256°C
98-99	Vcc Voltage	0V to 6.55V	1LSB=0.1mV
100-101	10G TX Bias Current	0 to 262mA	1LSB=4uA
102-103	10G TX Power	-37 to 11.2 dBm	1LSB=0.2uW
104-105	10G/2G RX Power	-40 to 8.2 dBm	1LSB=0.1uW
106-107	2G TX bias current	0 to 262mA	1LSB=4uA
108-109	2G TX Power	-37 to 11.2 dBm	1LSB=0.2uW

EEPROM (0xA2) RSSI selection

Address	Bit	Name	Description
118	7	RSSI Select	Writing "0" for XGPON RSSI Monitor; Writing "1" for GPON RSSI Monitor. Default power-up value is "0".
118	6	RSSI/TX_disable Select	When set "0", PIN9 input as TX_Disable input; When set "1", PIN9 as RSSI input. Default power-up value is "0".
118	5	XGSPON&XGPON TX_disable Selection	When set "0", PIN9 input as XGSPON&XGPON TX_Disable input; Default power-up value is "0".
118	4	GPON TX_disable Selection	When set "0", PIN9 input as GPON TX_Disable input; Default power-up value is "0".

Note: the Tx_XGSPON&XGPON and Tx_GPON can be disabled simultaneously or individually

Mechanical Diagram



Order information

Please contact PICadvanced for ordering and quotation: global@picadvanced.com