EPON-ONU-PX20+

GEPON SFP ONU Optical Module

Product Features

- Support IEEE802.3-ah PX20+ 20km application
- Single fiber bi-directional data links with symmetric 1.25Gbps Tx and 1.25Gbps Rx
- 1310nm burst-mode transmitter with FP laser
- 1490nm continuous-mode receiver with PIN-TIA
- 2-wire interface for integrated digital diagnostic Monitoring
- Transmitter state indication (TX_SD)
- SFP package with SC/UPC receptacle optical interface
- Single +3.3V power supply
- Operation case temperature -40~85°C for industrial and -10~70°C for commercial
- RoHS6 compliance

Operating Condition

Parameter	Unit	Min.	Typical	Max.
Storage Temperature	°C	-40		85
Operating Case Temp for C-temp	°C	-10		70
Operating Case Temp for I-temp	°C	-40		85
Power Supply Voltage	V	3.15	3.3	3.45
Supply Current	mA		200	350
Bit Rate for Tx	Gbps		1.25	
Bit Rate for Rx	Gbps		1.25	

Characteristics

All performance is specified at whole working temperature and conditions

Parameter	Unit	Min.	Typical	Max.
Transmitter				
TX Central Wavelength	nm	1260	1310	1360
Spectral Width (RMS)	nm			2.8
Mean Launched Power	dBm	0		4
Mean Launched Power (TX Off)	dBm			-45
Extinction Ratio	dB	9		
Optical Return Loss Tolerance	dB	-15		
Transmitter and dispersion Penalty	dB			2
Transmitter Mask(PRBS2^7-1@1.25G)	Compliant With IEEE Std 802.3 ah			

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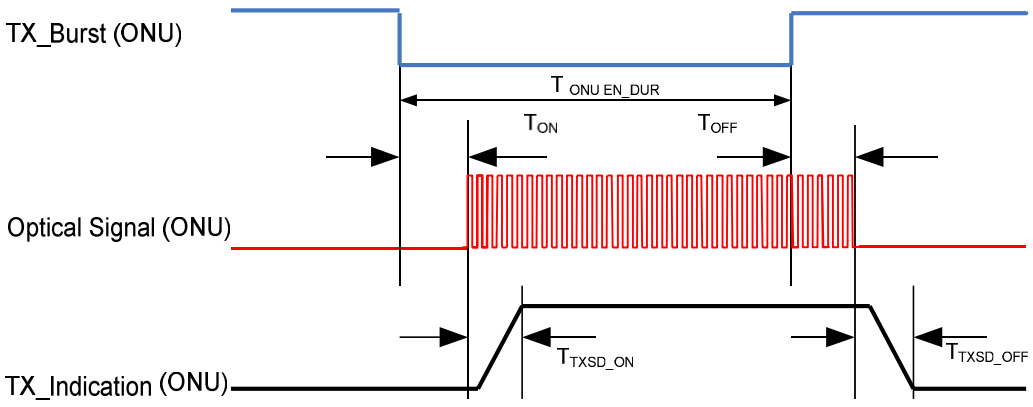
Receiver				
Receive Wavelength	nm	1480	1490	1500
Sensitivity (PRBS2^7-1@1.25G,ER=9,BER<10^{-12})	dBm			-27
Overload (PRBS2^7-1@1.25G,ER=9,BER<10^{-12})	dBm	-3		
Loss of signal De-assert Level	dBm			-28
Loss of signal assert Level	dBm	-39		
LOS Hysteresis	dB	0.5		6
WDM Filter isolation to 1550nm	dB	38		
WDM Filter isolation to 1650nm	dB	35		
Electrical Interface Characteristics				
Data Input Swing Differential/TX	mV	200	-	2000
Data Output Swing Differential/RX	mV	400		1600
Date Differential Impedance	Ω	90	100	110
LVTTL Output High	V	2.4		Vcc
LVTTL Output Low	V	0		0.4
LVTTL Input High	V	2.0		Vcc+0.3
LVTTL Input Low	V	0		0.8
Timing Characteristics				
Turn On Time at Burst mode (T_{ON})	ns			30
Turn Off Time at Burst mode (T_{OFF})	ns			30
TX-SD Assert Time (T_{TXSD_ON})	ns			100
TX-SD De-assert Time (T_{TXSD_OFF})	ns			100
LOS Assert Time (T_{LOSA})	us			100
LOS De-assert Time (T_{LOSD})	us			100

Burst Mode Transmitter Timing (TS23455-SSCA, TX_Burst signal low active transmitter on)



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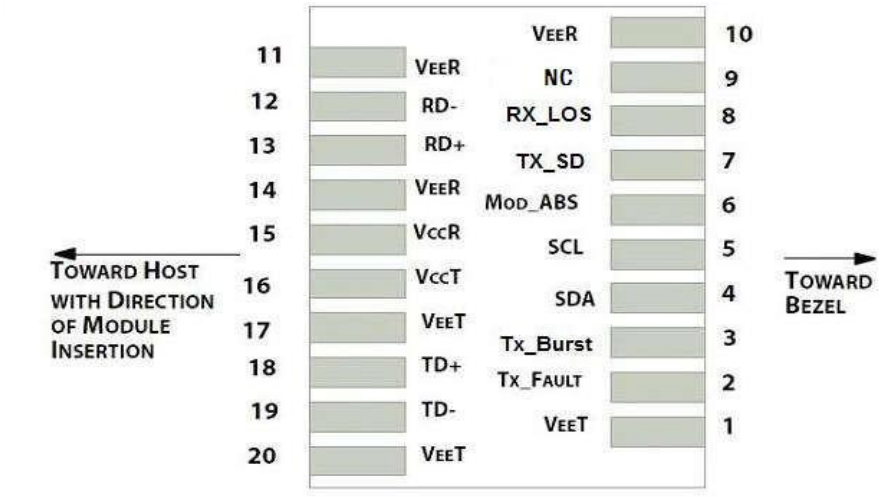
PIN Definition

Pin No.	Symbol	Level / Logic	Description
1	VeeT		Module Transmitter Ground
2	Tx_Fault	LVTTL-O	Module Transmitter Fault
3	Tx_Burst	LVTTL-I	Transmitter Burst Control, D23455-SSCA active low for transmitter on D23455-SSCB active high for transmitter on
4	SDA	LVTTL-I	2-Wire Serial Interface Data Line
5	SCL	LVTTL-I/O	2-Wire Serial Interface Clock
6	MOD_ABS	LVTTL-O	Module Absent, connected to ground in the module
7	TX_SD	LVTTL-O	Tx Signal Detect, active high when transmitter on
8	RX_LOS	LVTTL-O	Loss of Receiver Signal Indication
9	NC		
10	VeeR		Module Receiver Ground
11	VeeR		Module Receiver Ground
12	RD-	CML-O	Receiver Inverted Data Output
13	RD+	CML-O	Receiver Non-Inverted Data Output
14	VeeR		Module Receiver Ground
15	VccR		Module Receiver 3.3V Supply
16	VccT		Module Transmitter 3.3V Supply
17	VeeT		Module Transmitter Ground
18	TD+	LVPECL-I	Transmitter Non-Inverted Data Input
19	TD-	LVPECL-I	Transmitter Inverted Data Input
20	VeeT		Module Transmitter Ground



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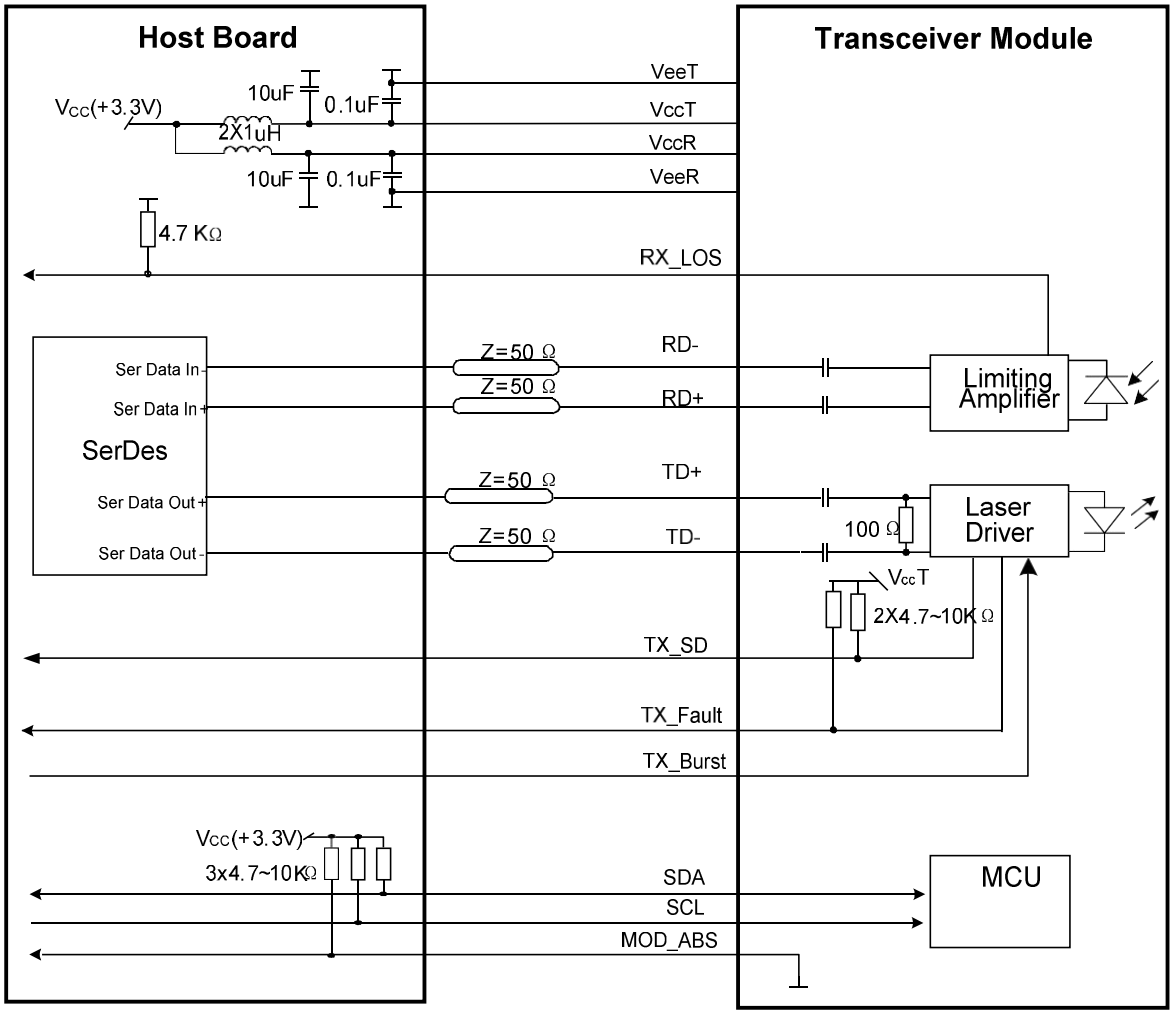
Typical Interface Circuit



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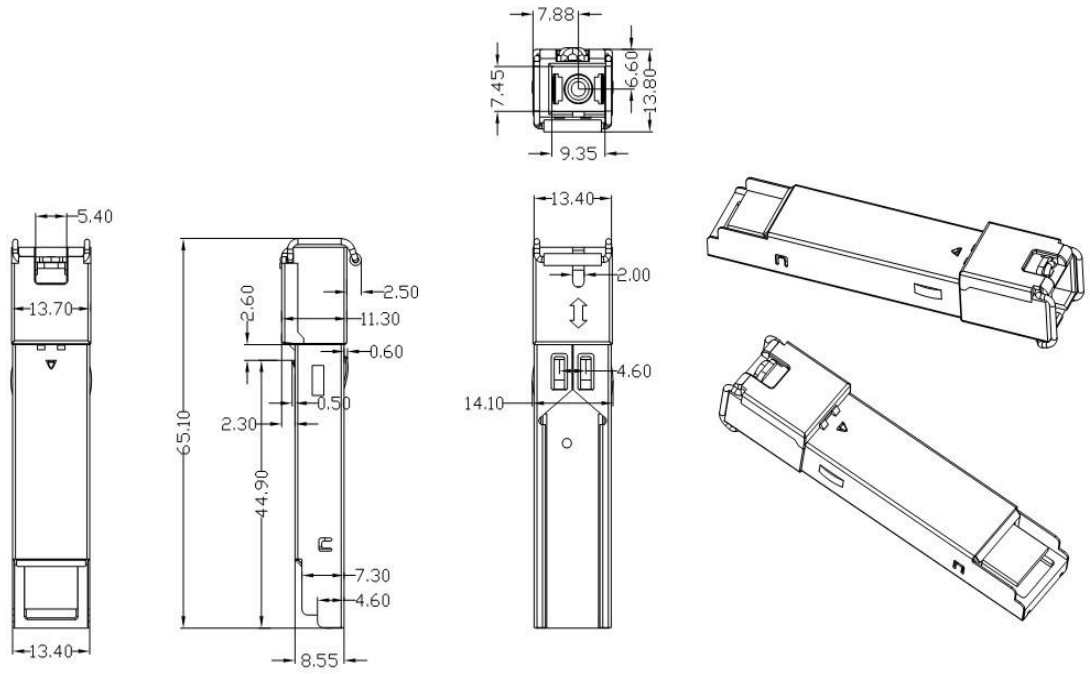
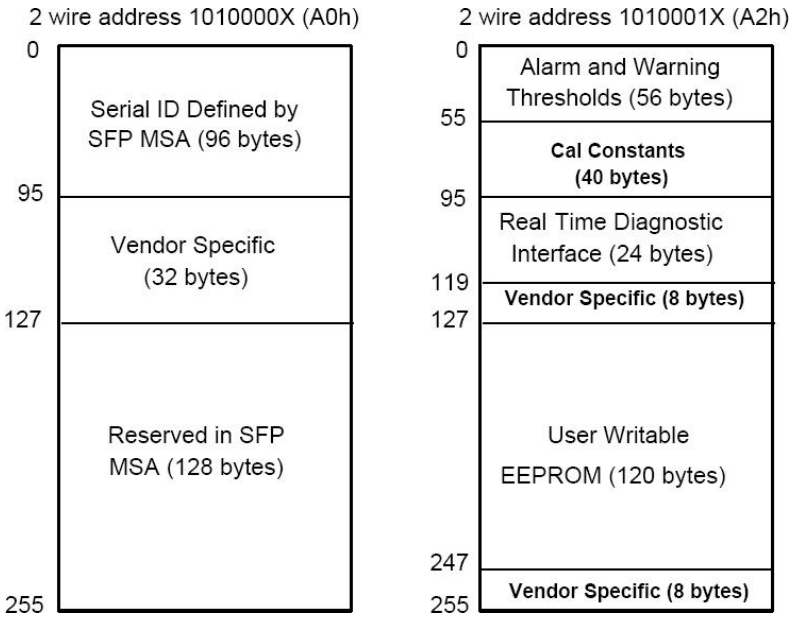
Mechanical Diagram



EEPROM Memory Map



A0 Reg(DEC)	Name of Field	Hex	Description
00	Identifier	03	SFP physical device
01	Ext. Identifier	04	Serial ID module supported
02	Connector	0B	Optical pigtail

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03-10	Transceiver Codes	00	Undefined for GEPON
11	Encoding	03	Compatible with NRZ encoding code
12	BR, Nominal	0C	Nominal 1250Mbps (indicate transmitter data rate)
13	Reserved	00	
14	Length (9um)-km	14	20km @9/125um fiber
15	Length (9um)-100m	C8	20000m @9/125um fiber
16-18	Length for MMF	00	Undefined for GEPON
19	Reserved	00	
20-35	Vendor Name		(ASCII character)
36	Channel Spacing	00	Undefined
37-39	Vendor OUI	00	Undefined
40-55	Vendor P/N		(ASCII character)
56-59	Vendor P/N Rev.		(ASCII character)
60-61	Laser Wavelength	05 1E	1310nm in Hex byte
62	DWDM Wavelength Fraction	00	Undefined
63	CC_BASE	XX	Check sum of bytes 0-62
64-65	Options	00 04	Signal Detect is implemented
66	BR, Max.	00	Undefined
67	BR, Min.	00	Undefined
68-83	Vendor SN		Vendor serial number in ASCII character
84-91	Date Code		Vendor date code in ASCII character
92	Diagnostic Monitoring Type	28	Implemented with internal calibration and received power measurement type by Avg. power
93	Enhanced options	F0	Alarm/Warning flags monitor are implemented
94	SFF-8472 compliant	02	SFF-8472 compliant with revision 9.5
95	CC_EXT	XX	Check sum of bytes 64-94

A2 Reg(HEX)	**Name of Field**	**HEX**	**Real Value**
A2.00	Temp High Alarm	0x5A	90
A2.01		0x00	
A2.02	Temp Low Alarm	0xD3	-45
A2.03		0x00	
A2.04	Temp High Warning	0x55	85
A2.05		0x00	
A2.06	Temp Low Warning	0xD8	-40

A2.07		0x00	
A2.08	Voltage High Alarm	0x94	3.8
A2.09		0x70	
A2.0A	Voltage Low Alarm	0x6D	2.8
A2.0B		0x60	
A2.0C	Voltage High Warning	0x87	3.47
A2.0D		0x8C	
A2.0E	Voltage Low Warning	0x7A	3.13
A2.0F		0x44	
A2.10	Bias High Alarm	0xC3	100
A2.11		0x50	
A2.12	Bias Low Alarm	0x05	3
A2.13		0xDC	
A2.14	Bias High Warning	0xAF	90
A2.15		0xC8	
A2.16	Bias Low Warning	0x07	4
A2.17		0xD0	
A2.18	TX Power High Alarm	0x9B	6
A2.19		0x82	
A2.1A	TX Power Low Alarm	0x22	-0.5
A2.1B		0xD0	
A2.1C	TX Power High Warning	0x8A	5.5
A2.1D		0x99	
A2.1E	TX Power Low Warning	0x27	0
A2.1F		0x10	
A2.20	RX Power High Alarm	0xC5	-5
A2.21		0x5A	
A2.22	RX PowerLow Alarm	0x00	-31
A2.23		0x07	
A2.24	RX Power High Warning	0x63	-8
A2.25		0x30	
A2.26	RX Power Low Warning	0x00	-28
A2.27		0x0F	
A2.28	reserved	0xFF	
A2.29		0xFF	
A2.2A	reserved	0xFF	
A2.2B		0xFF	
A2.2C	reserved	0xFF	
A2.2D		0xFF	
A2.2E	reserved	0xFF	
A2.2F		0xFF	

A2.30	reserved	0xFF	
A2.31		0xFF	
A2.32	reserved	0xFF	
A2.33		0xFF	
A2.34	reserved	0xFF	
A2.35		0xFF	
A2.36	reserved	0xFF	
A2.37		0xFF	
A2.38	Rx_PWR(4)	0x00	0
A2.39		0x00	
A2.3A		0x00	
A2.3B		0x00	
A2.3C	Rx_PWR(3)	0x00	0
A2.3D		0x00	
A2.3E		0x00	
A2.3F		0x00	
A2.40	Rx_PWR(2)	0x00	0
A2.41		0x00	
A2.42		0x00	
A2.43		0x00	
A2.44	Rx_PWR(1)	0x3F	1
A2.45		0x80	
A2.46		0x00	
A2.47		0x00	
A2.48	Rx_PWR(0)	0x00	0
A2.49		0x00	
A2.4A		0x00	
A2.4B		0x00	
A2.4C	Tx_I(Slope)	0x01	1
A2.4D		0x00	
A2.4E	Tx_I(Offset)	0x00	0
A2.4F		0x00	
A2.50	Tx_PWR(Slope)	0x01	1
A2.51		0x00	
A2.52	Tx_PWR(Offset)	0x00	0
A2.53		0x00	
A2.54	T (Slope)	0x01	1
A2.55		0x00	
A2.56	T (Offset)	0x00	0
A2.57		0x00	
A2.58	V (Slope)	0x01	1

A2.59		0x00	
A2.5A	V (Offset)	0x00	0
A2.5B		0x00	
A2.5C	reserved	0x00	
A2.5D	reserved	0x00	
A2.5E	reserved	0x00	
A2.5F	CC_EXT	XX	
A2.60	RT_TEMP	0xFF	DDM (°C) = (A2[60]*256+A2[61])/256.0
A2.61		0xFF	
A2.62	RT_VCC	0xFF	DDM (V) = (A2[62]*256+A2[63])*100E-6
A2.63		0xFF	
A2.64	RT_TXBIAS	0xFF	DDM (mA) = (A2[64]*256+A2[65])*2E-3
A2.65		0xFF	
A2.66	RT_TXPWR	0xFF	DDM (mW) = (A2[66]*256+A2[67])*0.1E-3
A2.67		0xFF	
A2.68	RT_RXPWR	0xFF	DDM (mW) = (A2[68]*256+A2[69])*0.1E-3
A2.69		0xFF	
A2.6A	reserved	0xFF	
A2.6B		0xFF	
A2.6C	reserved	0xFF	
A2.6D		0xFF	
A2.6E	status/control	0xFF	bit7: TX Disable State, Digital state of Tx disable (1) and enabled (0). bit6: Reserved bit5: Reserved bit4: Reserved bit3: Reserved bit2: TX_fault status, high indicate the Tx fault bit1: RX_SD status, high indicate the receiver signal detected bit0: Reserved
A2.6F	reserved	0xFF	
A2.70	alarm bit	0xFF	bit7: Temp High Alarm Set when internal temperature exceeds high alarm level. bit6: Temp Low Alarm Set when internal temperature is below low alarm level. bit5: Vcc High Alarm Set when internal supply voltage exceeds high alarm level. bit4: Vcc Low Alarm Set when internal supply voltage is below low alarm level.

			bit3: TX Bias High Alarm Set when TX Bias current exceeds high alarm level. bit2: TX Bias Low Alarm Set when TX Bias current is below low alarm level. bit1: TX Power High Alarm Set when TX Power exceeds high alarm level. bit0: TX Power Low Alarm Set when TX Power is below low alarm level.
A2.71	alarm bit	0xFF	bit7: RX Power High Alarm Set when Received Power exceeds high alarm level. Bit6: RX Power Low Alarm Set when Received Power is below low alarm level. bit5-0: Reserved Alarm
A2.72	reserved	0xFF	
A2.73	reserved	0xFF	
A2.74	warning bit	0xFF	bit7: Temp High Warning Set when internal temperature exceeds high warning level. bit6: Temp Low Warning Set when internal temperature is below low warning level. bit5: Vcc High Warning Set when internal supply voltage >high warning level. bit4: Vcc Low Warning Set when internal supply voltage < low warning level. bit3: TX Bias High Warning Set when TX Bias current exceeds high warning level. bit2: TX Bias Low Warning Set when TX Bias current is below low warning level. bit1: TX Power High Alarm Set when TX Power exceeds high warning level bit0: TX Power Low Alarm Set when TX Power is below low warning level.
A2.75	warning bit	0xFF	bit7: RX Power High Alarm Set when Received Power exceeds high warning level. Bit6: RX Power Low Alarm Set when Received Power is below low warning level. bit5-0: Reserved Alarm
A2.76	reserved	0xFF	
A2.77	reserved	0xFF	
A2.78	reserved	0xFF	

A2.79	reserved	0xFF	
A2.7A	reserved	0xFF	
A2.7B	Password	0xFF	
A2.7C	Password	0xFF	
A2.7D	Password	0xFF	
A2.7E	Password	0xFF	
A2.7F	table index	0x00	

Ordering Information

Ordering P/Ns	Description
EPON-ONU-PX20+LC	GEPON SFP ONU, PX20+,1.25Gbps Tx 1310nm, 1.25Gbps Rx 1490nm, TX_Burst signal low active transmitter on, SFP form-factor, SC/UPC receptacle connector, -10~70°C Commercial temperature
EPON-ONU-PX20+LI	GEPON SFP ONU, PX20+,1.25Gbps Tx 1310nm, 1.25Gbps Rx 1490nm, TX_Burst signal low active transmitter on, SFP form-factor, SC/UPC receptacle connector, -40~85°C Industrial temperature
EPON-ONU-PX20+HC	GEPON SFP ONU, PX20+,1.25Gbps Tx 1310nm, 1.25Gbps Rx 1490nm, TX_Burst signal high active transmitter on, SFP form-factor, SC/UPC receptacle connector, -10~70°C Commercial temperature
EPON-ONU-PX20+HI	GEPON SFP ONU, PX20+,1.25Gbps Tx 1310nm, 1.25Gbps Rx 1490nm, TX_Burst signal high active transmitter on, SFP form-factor, SC/UPC receptacle connector, -40~85°C Industrial temperature

Version	Date	Description
V0	May-07-2014	New release
V1	Jan-11-2016	Add the EEPROM definition sheet