

ETP-NS11-20CP0

EPON OLT T1490nm/R1310nm PX20+, SFP Transceiver

Features

- Single fiber bi-directional data links symmetric 1.25Gbps application
- 1490nm continuous-mode DFB laser transmitter and 1310nm burst-mode APD-TIA receiver
- Reset-less burst-mode receiver simplify the system design
- More than 24dB wide dynamic range
- 0 to 70° C operating case temperature,
- Single 3.3V power supply
- Digital diagnostic monitoring interface
- Digital burst RSSI function to monitor the input optical power level
- LVPECL compatible data input/output interface
- LVTTTL transmitter disable control
- LVTTTL transmitter laser fault alarm
- LVTTTL receiver loss of signal indication
- Low EMI and excellent ESD protection
- Class I laser safety standard IEC-60825 compliant
- RoHS-6 compliance



Applications

- Gigabit Ethernet Passive Optical Networks (GEPON) 20Km 1:32 application or 10Km 1:64 application.

Standards

- Complies with SFP Multi-Source Agreement (MSA) SFF-8074i
- Complies with SFF-8472
- Complies with IEEE 802.3ah™-2004
- Complies with FCC 47 CFR Part 15, Class B
- Complies with FDA 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50.

Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Note
Storage Ambient Temperature	T _{STG}	-40	85	°C	
Operating Case Temperature	T _c	0	70	°C	
Operating Humidity	OH	5	90	%	
Power Supply Voltage	V _{cc}	0	3.6	V	
Receiver Damaged Threshold		+4		dBm	

Recommended Operating Environment

Table 2 - Recommended Operating Environment

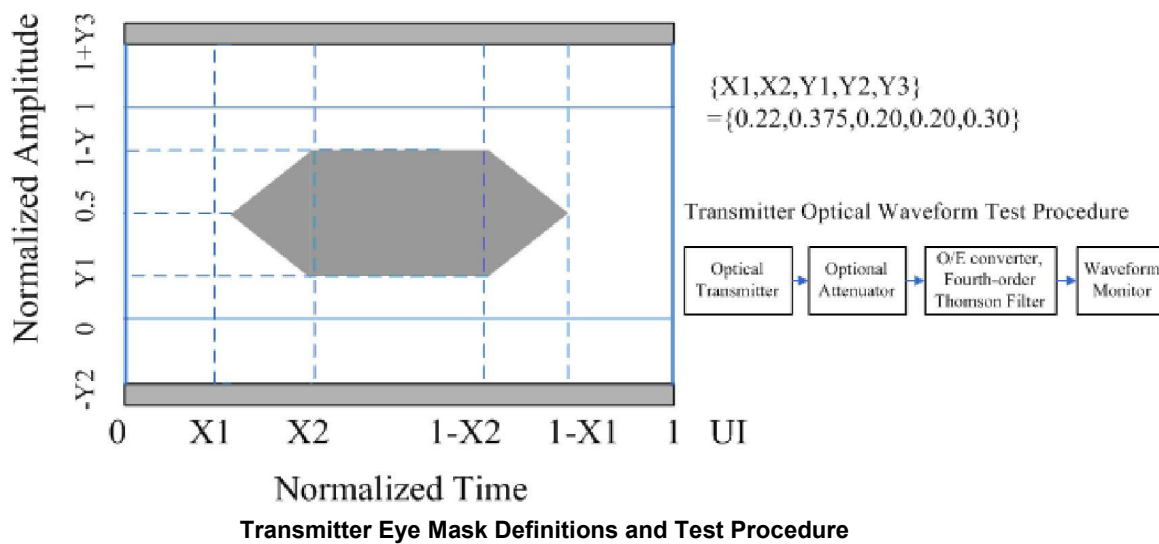
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T _c	0		70	°C	
Power Supply Voltage	V _{cc}	3.13	3.3	3.47	V	
Operating Humidity Range	OH	5		90	%	
Data Rate			1.25		Gbit/s	
Data Rate Drift		-100		+100	PPM	

Transmitter Optical Characteristics

Table 3- Transmitter Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Center Wavelength	λ_c	1480	1490	1500	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power	AOP	+2		+7	dBm	EOL, Over Temperature
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	9			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
RIN_{15OMA}			-115	dB/Hz	
Optical Return Loss Tolerance			15	dB	
Transmitter Reflectance			-10	dB	
Transmitter and Dispersion Penalty	TDP		2.3	dB	Transmit on 20km SMF
Optical Waveform Diagram	Compliant with IEEE Std 802.3ah™-2004				See the figure below



Digital Diagnostic Monitoring

Table 4- Digital Diagnostic Monitoring

Parameter	Range	Accuracy	Calibration	Note
Temperature	0 to +70 °C	±3°C	Internal	LSB: 1/256° C
Voltage	2.97 to 3.63 V	±3%	Internal	LSB: 0.1mV
Bias Current	0 to 100 mA	±10%	Internal	LSB: 2uA
TX Power	-2 to 8 dBm	±3dB	Internal	LSB: 0.1uW
RX Power Monitor	-30 to -6 dBm	±3dB	Internal	LSB: 0.1uW

Transmitter Electrical Characteristics

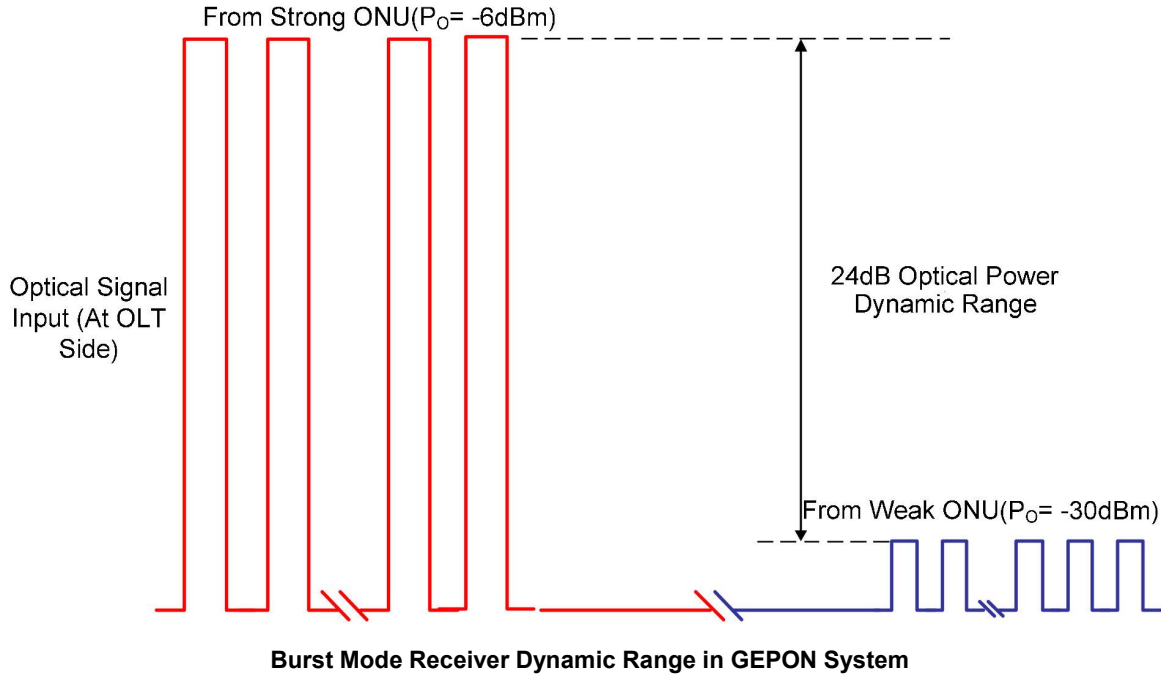
Table 5- Transmitter Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Input Differential Swing		200		1600	mV	LVPECL input, AC coupled
Input Differential Impedance		90	100	110	Ω	
Power Supply Current				220	mA	Load free
Transmitter Disable Voltage - Low		0		0.8	V	
Transmitter Disable Voltage - High		2.0		V _{CC}	V	
Transmitter Fault Alarm Voltage - Low		0		0.4	V	
Transmitter Fault Alarm Voltage - High		2.4		V _{CC}	V	

Receiver Optical Characteristics

Table 6- Receiver Optical Characteristics

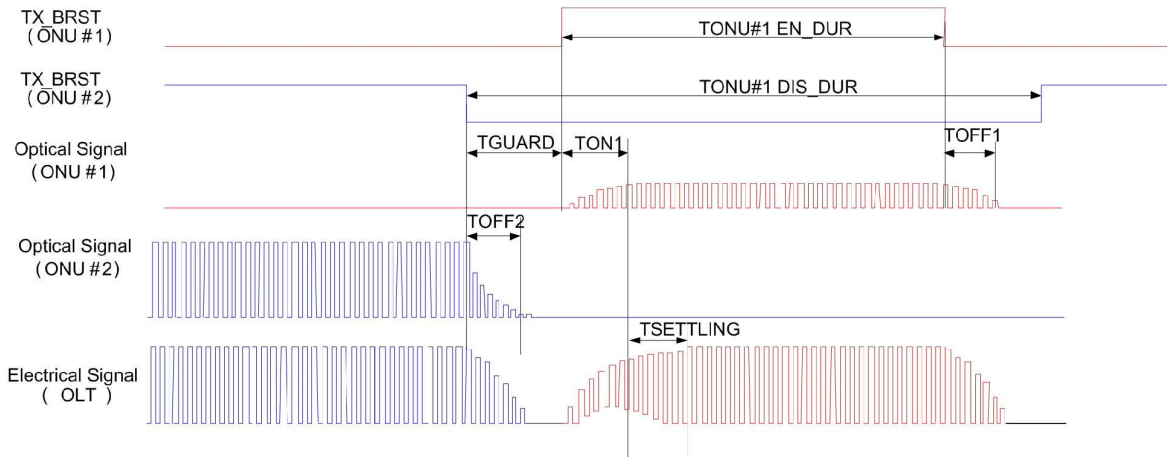
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1260		1360	nm	
Sensitivity	SEN			-30	dBm	PRBS 2 ²³ -1+72CID@124 4Mbps BER $\leq 1 \times 10^{-10}$
Saturation Optical Power	SAT	-6			dBm	
Loss Of Signal De-assert Level	LOSD			-31	dBm	
Loss Of Signal Assert Level	LOSA	-45			dBm	
Loss Of Signal Hysteresis		0.5		6	dB	
Receiver Reflectance				-12	dB	
Dynamic Range		30		-6	dBm	See the figure below



Receiver Electrical Characteristics

Table 7- Receiver Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Power Supply Current				160	mA	Load free
Data Output Voltage - Low (-V _{cc})		-1.81		-1.62	V	
Data Output Voltage - High (-V _{cc})		-1.02		-0.88	V	
Data Output Differential Swing		400		1600	mV	LVPECL output, DC coupled
Loss Of Signal Assert Time			0.5		μs	
Loss Of Signal Deassert Time			0.5		μs	
Loss Of Signal Voltage - Low		0		0.4	V	
Loss Of Signal Voltage - High		2.4		V _{cc}	V	
Receiver Threshold Settling Time	T _{SETTLING}			250	ns	See the figure below

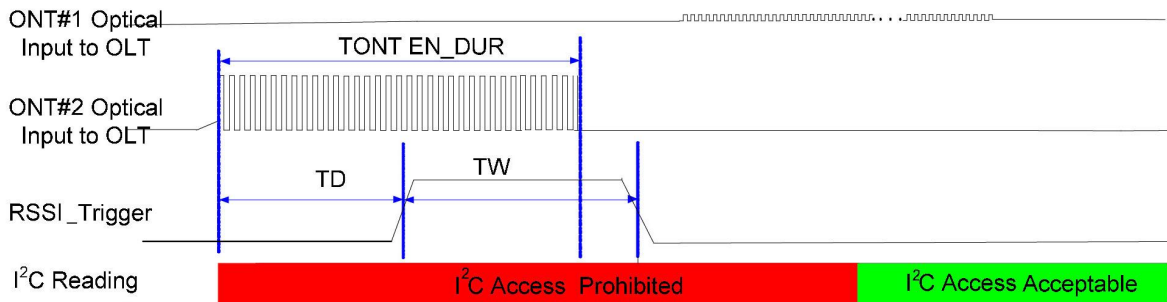


Timing Parameter Definitions in Burst More Sequence

Receiver Electrical Characteristics

Table 8- Receiver Electrical Characteristics

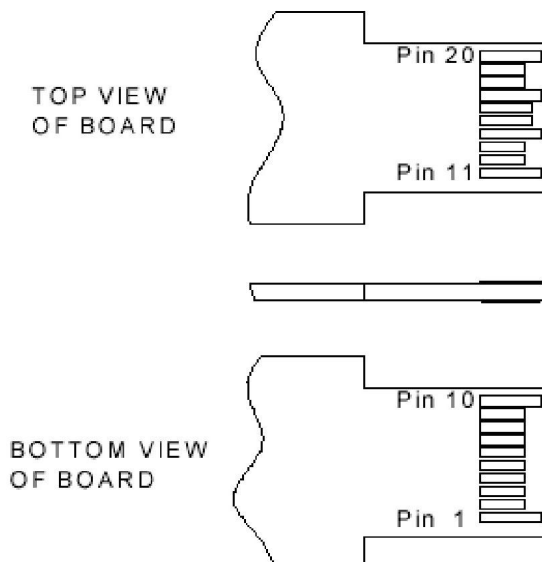
Parameter	Symbol	Min	Typical	Max	Unit	Notes
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		Vcc	V	
RSSI Trigger width	T _w	10			us	
RSSI Trigger Delay	T _D		950		ns	Refer to first bit of the preamble
I2C Access Prohibited Time		150	200		μ s	
Optical Signal During Time	TONU EN_DUR	1000	1200		ns	400ns CDR time



RSSI Timing Sequence

Pin Assignment

Pin Diagram



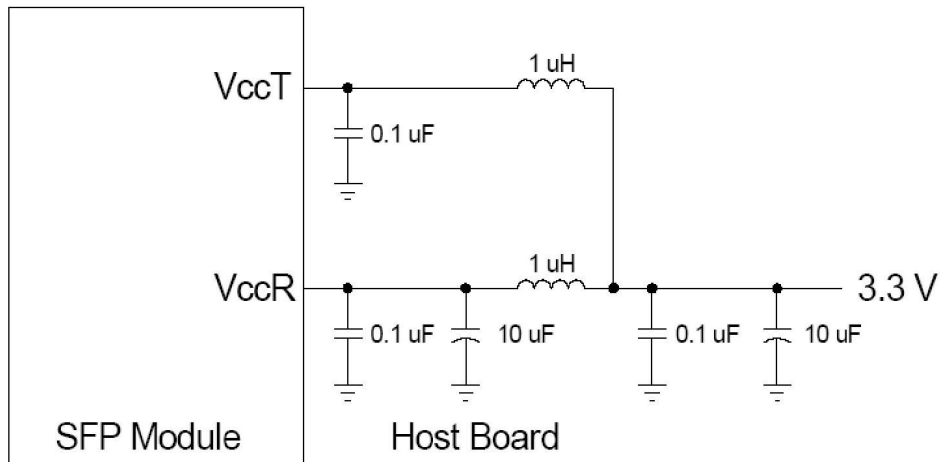
Pin Descriptions

Table 9-Pin Descriptions

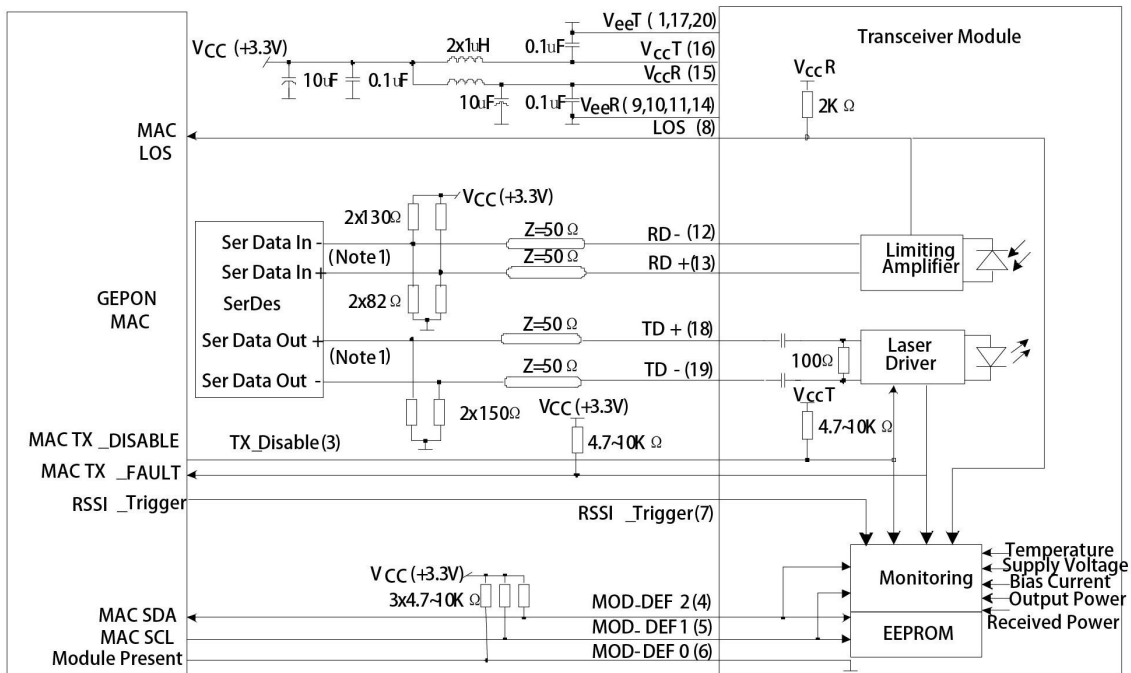
Pin	Name	Description	Note
1	V _{EE} T	Transmitter Ground	
2	TX Fault	Transmitter Fault Indication	High: abnormal; Low: normal
3	TX Disable	Transmitter Disable	High: transmitter disable; Low: transmitter enable
4	MOD-DEF2	Module Definition 2	The data line of two wire serial interface
5	MOD-DEF1	Module Definition 1	The clock line of two wire serial interface
6	MOD-DEF0	Module Definition 0	Connected to Ground in the transceiver
7	RSSI Trigger	RSSI Trigger for Transceiver A/D Conversion	High: enable RSSI A/D conversion
8	LOS	Loss of Signal	High: Loss of signal Low: Signal Detected
9	V _{EE} R	Receiver Ground	
10	V _{EE} R	Receiver Ground	
11	V _{EE} R	Receiver Ground	
12	RD-	Inv. Receiver Data Out	LVPECL logic output, DC coupled
13	RD+	Receiver Data Out	LVPECL logic output, DC coupled

14	V _{EE} R	Receiver Ground	
15	V _{CC} R	Receiver Power	
16	V _{CC} T	Transmitter Power	
17	V _{EE} T	Transmitter Ground	
18	TD+	Transmit Data In	LVPECL logic input, AC coupled
19	TD-	Inv. Transmit Data In	LVPECL logic input, AC coupled
20	V _{EE} T	Transmitter Ground	

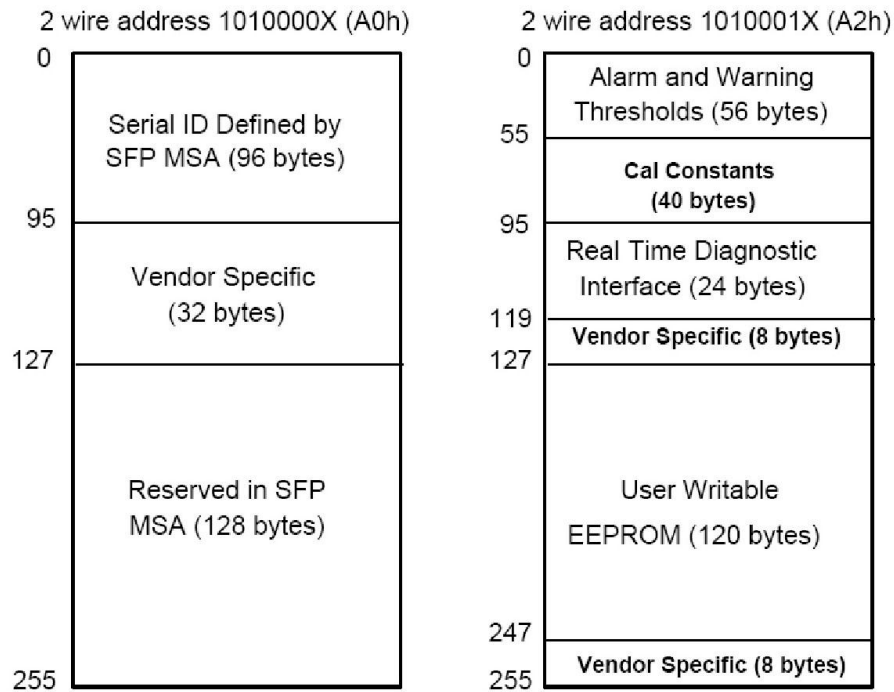
SFP Recommended Host Board Power Supply Filtering Network



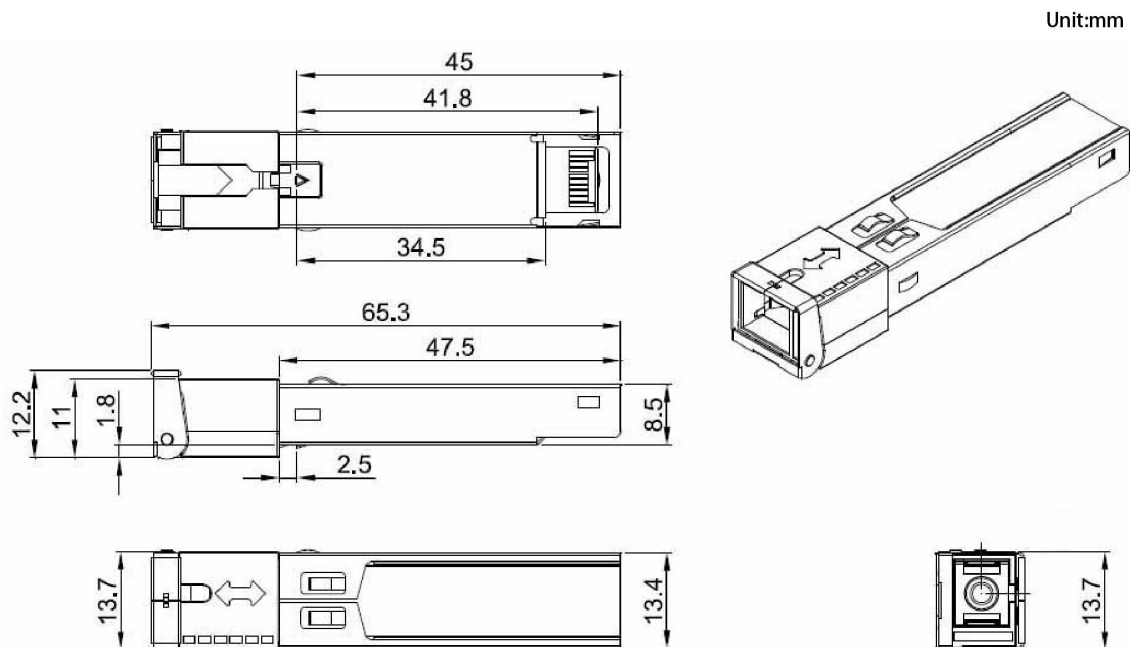
Typical Interface Circuit



EEPROM Information



Mechanical Specifications



Ordering information**Table 10- Ordering information**

Part Number	Product Description
ETP-NS11-20CP0	1.25G/1.25G - EPON OLT SFP Tx 1490nm/ Rx 1310nm SC PX20+ 0 ~ +70°C, with DDM

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