

XGS-PON SFP+ OLT Transceiver

Product Features

- Single Fiber Transceiver with single mode SC/UPC receptacle
- 1577nm continuous-mode 9.953Gb/s EML transmitter
- 1270nm burst-mode 9.953Gb/s&2.488Gb/s APD receiver
- Complies with ITU-T G.9807.1 Class N1
- Digital Diagnostic Monitoring (DDM) with external calibrations
- LVTTTL for Tx disable input and Tx_fault output
- Burst mode received signal strength indication (RSSI) function
- Complies with RoHS directive (2002/95/EC)

This is a high performance transceiver module for single fiber communications. It is designed to meet ITU G.9807.1 Class N1 requirements for optical line terminal applications.

The 1577nm EML transmitter has automatic power control (APC) function and temperature compensation circuitry to ensure stable optical power and extinction ratio over all operating temperature range. The transmitter meets Class 1 eye safety per IEC60825 and CDRH standards.

The receiver has a hermetically packaged APD-TIA (trans-impedance amplifier) pre-amplifier and a limiting amplifier with CML compatible differential outputs. It features a Burst Packet Detect (SD) output which is LVTTTL compatible. The SD output will come high after receiving the burst packet.

The module provides digital diagnostic information of its operating conditions and status, including transmitting power, laser bias current, module temperature, and supply voltage.

Applications

- 10-Gigabit Symmetric Passive Optical Network (XGS-PON) OLT

Ordering Information

Part Number	Description
AC-E-SFPPXSTU-xx	XGS-PON SFP+ OLT Class N1 Transceiver

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	Tst	-40	+85	°C	Storage Temperature
Operating relative humidity (Non- condensing)	RH	5	90	%	Operating relative humidity (Non- condensing)
Case Temperature (Operating)	TC	0	70	°C	Case Temperature (Operating)
Input Voltage	-	GND	Vcc	V	Input Voltage

Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Power Supply Voltage	Vcc	+3.14	+3.3	+3.46	V	Power Supply Voltage
Power Supply Current	Icc	-		720	mA	Power Supply Current
Operating relative humidity (Non- condensing)	RH	5		85	%	Operating relative humidity (Non- condensing)
Case Temperature (Operating)	TC	0	-	70	°C	Case Temperature (Operating)
I2C clock frequency		-	100	400	KHz	I2C clock frequency

Optical Characteristics

All parameters are specified under the recommended operating conditions unless otherwise specified..

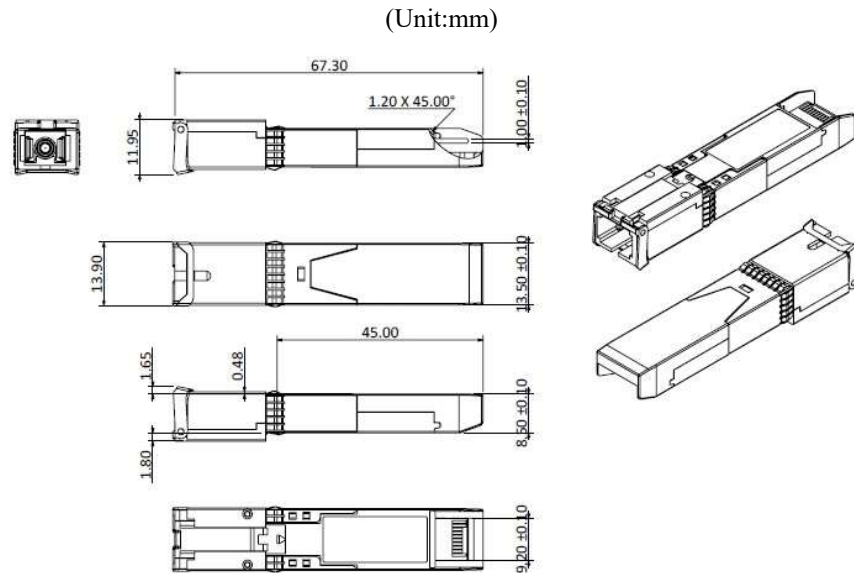
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Support data rate	-		9.953		Gb/s	
Center Wavelength	λ	1575	1577	1580	nm	
Spectral Width (-20dB)	Δλ	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Output Power (EOL)	Po	2	-	5	dBm	
Extinction Ratio	Er	8.2	-	-	dB	
Output Power with Transmitter Disabled	Poff			-39	dBm	
Output Eye Diagram	Compliant with ITU-T G.9807.1 Mask					
Differential Input Voltage	VID	190		850	mV	
Differential Input Impedance	-	80	100	120	Ω	
Receiver(9.953Gbps)						
Wavelength of Operation	-	1260	1270	1280	nm	
Receiver Sensitivity(BOL)	Sen	-	-	-26	dBm	
Saturation Optical Power	Sat	-5	-	-	dBm	
Setting time	Tsetting			400	ns	
Differential Data Output Voltage		300	-	850	mV	
Receiver(2.488Gbps)						
Support data rate			2.488		Gb/s	

Wavelength of Operation	-	1260	1270	1280	nm	
Receiver Sensitivity(BOL)	Sen.	-	-	-27.5	dBm	
Saturation Optical Power	Sat	-8	-	-	dBm	
Setting time	Tsetting			400	ns	
Differential Data Output Voltage		300	-	850	mV	

Digital Diagnostic Functions

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	+3	°C	
Supply voltage monitor absolute error	DMI_VCC	-3%	+3%	V	
TX power monitor absolute error	DMI_RX	-3	+3	dB	
RX power monitor absolute error	DMI_RX	-3	+3	dB	
Bias current monitor	DMI_Ibias	-10%	+10%	mA	

Mechanical Dimensions



Pin Assignment

PIN #	Symbol	Description	Notes
1	VeeT	Transmitter Ground	Note 6
2	TX_Fault	Transmitter Fault Indication	Note 1
3	TX_Disable	Transmitter Disable	Note 2
4	SDA	I2C Data	Note 3
5	SCL	I2C Clock	Note 3
6	MOD-DEF(0)	Internally grounded	
7	NC	Not connected	
8	SD	Burst Packet Detect	Note 4
9	RSSI_Trigger	RSSI Trigger Signal from Host	Note 5

10	VeeR	Receiver Ground	Note 6
11	VeeR	Receiver Ground	Note 6
12	RD-	Inv. Received Data Out	Note 7
13	RD+	Received Data Out	Note 7
14	VeeR	Receiver Ground	Note 6
15	VccR	Receiver Power	Note 8
16	VccT	Transmitter Power	Note 8
17	VeeT	Transmitter Ground	Note 6
18	TD+	Transmit Data In	Note 9
19	TD-	Inv. Transmit Data In	Note 9
20	VeeT	Transmitter Ground	Note 6

Notes:

1. TX Fault is an open collector output, which should be pulled up with a $4.7k \sim 10k \Omega$ resistor on the hostboard to a voltage between 2.0V and $V_{cc}+0.3V$. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.

2. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a $4.7 - 10 K \Omega$ resistor. It's states are:

Low (0 – 0.8V): Transmitter on

(>0.8, < 2.0V): Undefined

High (2.0 – 3.465V): Transmitter Disabled

Open: Transmitter Disabled

3. SDA and SCL is communication interface for I2C . They should be pulled up with a $4.7K - 10K \Omega$ resistor on the host board. The pull-up voltage should be V_{cc} .

4. SD is a LVTTTL output. High level indicates that burst packet is detected by the receiver.

5. RSSI_Trigger is a LVTTTL input from host for starting ADC of digital RSSI circuit to sample the analog RSSI signal.

6. Vee is connected inside the SFP+ OLT transceiver.

7. RD- and RD+ are CML differential outputs of the receiver, and are DC coupled in the module.

8. V_{cc} is the receiver and transmitter power supply, respectively. They are defined as 3.3V 5% at the SFP+ connector pin. voltage at the SFP+ input pin with 3.3V supply voltage. V_{cc} is internally connected inside the SFP+ OLT transceiver.

9. TD- and TD+ are the differential transmitter inputs. They are AC coupled differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.