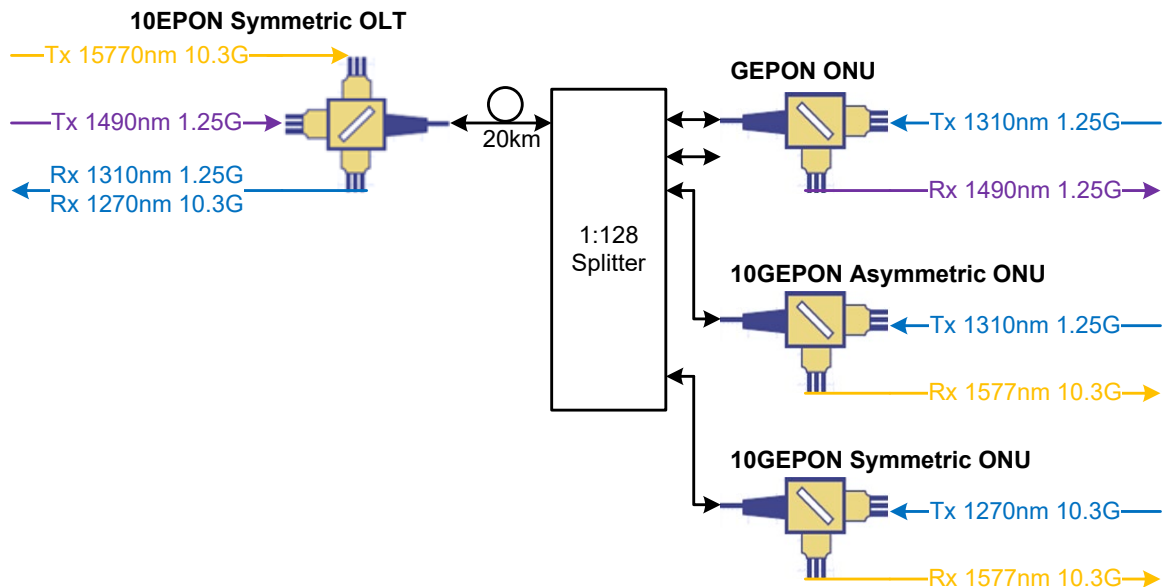


## 10GEPON Sym OLT PR30/PR40 XFP

### Optical Transceiver

#### Product Features

- Support IEEE802.3av & IEEE802.3bk PR30 and PR40 application
- 1577nm 10.3125G continuous-mode transmitter with EML laser, 1270nm 10.3125G & 1310nm 1.25G burst-mode receiver with APD-TIA, and 1490nm 1.25G continuous-mode transmitter with DFB laser
- 2-wire interface for integrated digital diagnostic monitoring
- Digital receiving signal strength indication (RSSI)
- XFP MSA package with SC/UPC receptacle optical interface
- +3.3V and +5V power supply
- Operating case temperature: 0~70°C
- RoHS compliance, and Class 1 laser safety



**Operating Condition**

Parameter	Unit	Min.	Typical	Max.
Storage Temperature	°C	-40		85
Operating Case Temp	°C	0		70
Operating Relative Humidity	%	5		85
Power Supply Voltage(3.3V)	V	3.135	3.3	3.465
Supply Current(3.3V)	mA			1000
Power Supply Voltage(5V)	V	4.75	5	5.25
Supply Current(5V)	mA			300
Bit Rate for Tx 1577nm	Gbps		10.3125	
Bit Rate for Rx 1270nm	Gbps		10.3125	
Bit Rate for Rx 1310nm	Gbps		1.25	
Bit Rate for Tx 1490nm	Gbps		1.25	

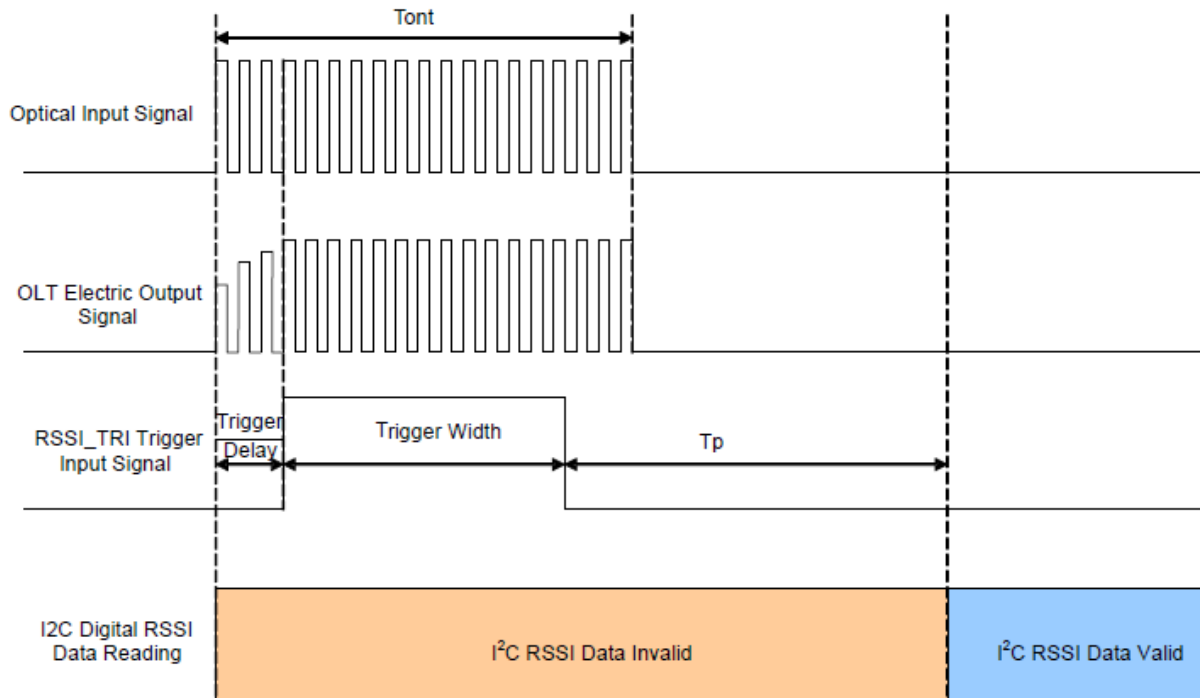
**Characteristics**

All performance is specified at whole working temperature and conditions

Parameter	Unit	Min.	Typical	Max.
<b>1577nm 10Gbps Transmitter</b>				
TX Central Wavelength	nm	1575	1577	1580
Spectral Width (-20dB)	nm			1
SMSR	dB	30		
Mean Launched Power (PR30, BOL)	dBm	2.5		5
Mean Launched Power (PR30, EOL)	dBm	2		5
Mean Launched Power (PR40, BOL)	dBm	5.3		9
Mean Launched Power (PR40, EOL)	dBm	5		9
Mean Launched Power (TX Off)	dBm			-39
Extinction Ratio	dB	6		
Optical Return Loss Tolerance	dB	-15		
Transmitter and dispersion Penalty	dB			1.5
Transmitter Mask (PRBS2 <sup>31</sup> -1@10.3125G)	Compliant with IEEE Std 802.3av			
<b>1270nm 10.3125G Receiver</b>				
Receive Wavelength	nm	1260	1270	1280
Sensitivity (PR30) (PRBS2 <sup>31</sup> -1@10.3125G, BER<10 <sup>-3</sup> )	ER=6, dBm			-28.5
Sensitivity (PR40) (PRBS2 <sup>31</sup> -1@10.3125G, BER<10 <sup>-3</sup> )	ER=6, dBm			-29
Overload (PR30)	dBm	-6		
Overload (PR40)	dBm	-9		

Parameter	Unit	Min.	Typical	Max.
<b>1490nm 1.25Gbps Transmitter</b>				
TX Central Wavelength	nm	1480	1490	1500
Spectral Width (-20dB)	nm			1
Side Mode Suppression Ratio (SMSR)	dB	30		
Mean Launched Power (PR30, BOL)	dBm	3		7
Mean Launched Power (PR30, EOL)	dBm	3		7
Mean Launched Power (PR40, BOL)	dBm	5.3		9
Mean Launched Power (PR40, EOL)	dBm	5		9
Mean Launched Power (TX Off)	dBm			-45
Extinction Ratio	dB	9		
Optical Return Loss Tolerance	dB	-15		
Transmitter and dispersion Penalty	dB			1
Transmitter Mask(PRBS2 <sup>23</sup> -1@10.3125G)	Compliant With IEEE 802.3ah			
<b>1310nm 1.25G Receiver</b>				
Receive Wavelength	nm	1260	1310	1360
Sensitivity (PR30) (PRBS2 <sup>7</sup> -1@1.25G, ER=9, BER<10 <sup>-12</sup> )	dBm			-31
Sensitivity (PR40) (PRBS2 <sup>7</sup> -1@1.25G, ER=9, BER<10 <sup>-12</sup> )	dBm			-32
Overload (PR30)	dBm	-6		
Overload (PR40)	dBm	-11		
Receiver Burst Mode Dynamic Range	dB	15		
<b>Electrical Interface Characteristics</b>				
Data Input Swing Differential/TX	mV	120		850
Data Output Swing Differential/RX	mV	400		1200
Data Differential Impedance	Ω	90	100	110
LVTTTL Output High	V	2.4		V <sub>cc</sub>
LVTTTL Output Low	V	0		0.4
LVTTTL Input High	V	2.0		V <sub>cc</sub> +0.3
LVTTTL Input Low	V	0		0.8
<b>Timing Characteristics</b>				
RSSI Trigger Delay (T <sub>td</sub> )	ns	300		
RSSI Trigger Pulse Width (T <sub>w</sub> )	ns		500	
ONU Package Length (T <sub>onu</sub> )	ns		1500	
Internal I <sup>2</sup> C Delay (T <sub>12c</sub> )	us			500

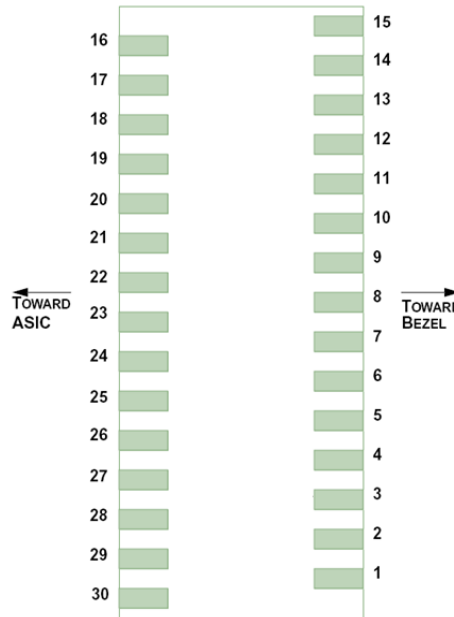
**Timing Sequence for RSSI**



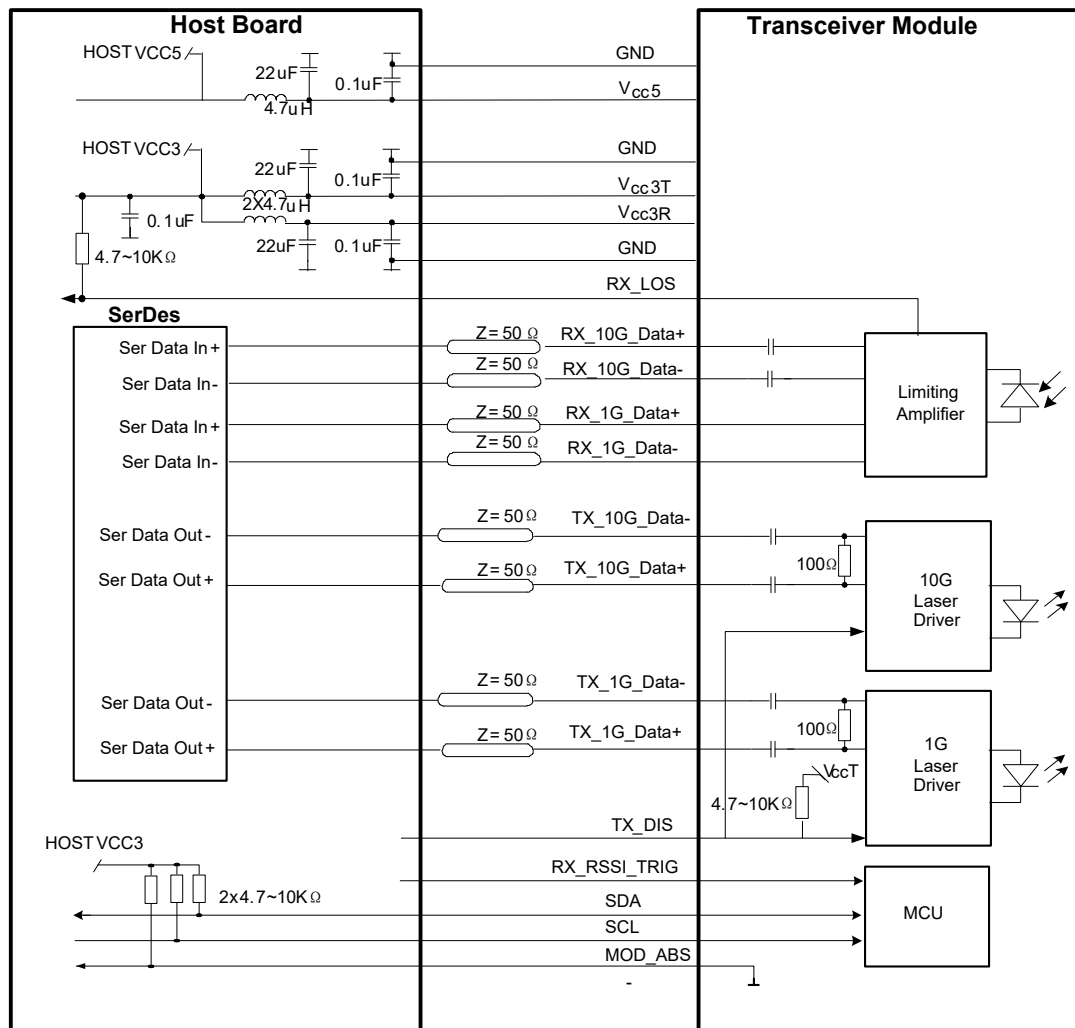
Parameter	Unit	Min.	Typical	Max.
<b>RSSI Timing Characteristics</b>				
ONU Package Length ( $T_{ont}$ )	ns	500	1500	
RSSI Trigger Delay ( $T_{td}$ )	ns	0	300	3000
RSSI Trigger Pulse Width ( $T_w$ )	ns	600		$T_{ont} - T_{td}$
Internal I <sup>2</sup> C Delay ( $T_p$ )	us			500
RSSI Power Range ( $P_{mon}$ )	dBm	-31		-8
RSSI Monitoring Error	dB		+/-3	

**PIN Definition**

Pin No.	Symbol	Level / Logic	Description
1	GND		Module Ground
2	TX_1G_Data+		Transmitter Non-Inverted Data Input for 1G
3	TX_1G_Data-		Transmitter Inverted Data Input for 1G
4	GND		Module Ground
5	TX_DIS	LVTTTL-I	Transmitter Disable; Active High Disable Transmitter Output
6	V <sub>CC5</sub>		+5V Power Supply
7	GND		Module Ground
8	V <sub>CC3</sub>		+3.3V Power Supply
9	V <sub>CC3</sub>		+3.3V Power Supply
10	SCL	LVTTTL-I	2-Wire Serial Interface Clock
11	SDA	LVTTTL-I/O	2-Wire Serial Interface Data Line
12	Mod_Abs	LVTTTL-O	Indicates Module is not present. Grounded in the Module
13	NC		Reserved. Not used
14	RX_LOS	LVTTTL-O	Receiver Loss of Signal Indicator
15	GND		Module Ground
16	GND		Module Ground
17	RX_10G_Data-	CML-O	Receiver Inverted Data Output for 10G
18	RX_10G_Data+	CML-O	Receiver Non-Inverted Data Output for 10G
19	GND		Module Ground
20	RX_1G_Data-		Receiver Inverted Data Output for 1G
21	RX_1G_Data+		Receiver Non-Inverted Data Output for 1G
22	NC		NC
23	RX_RSSI_TRIG		Refer to "Timing Sequence for RSSI"
24	NC		NC
25	NC		NC
26	NC		NC
27	GND		Module Ground
28	TX_10G_Data-	CML-I	Transmitter Inverted Data Input
29	TX_10G_Data+	CML-I	Transmitter Non-Inverted Data Input
30	GND		Module Ground

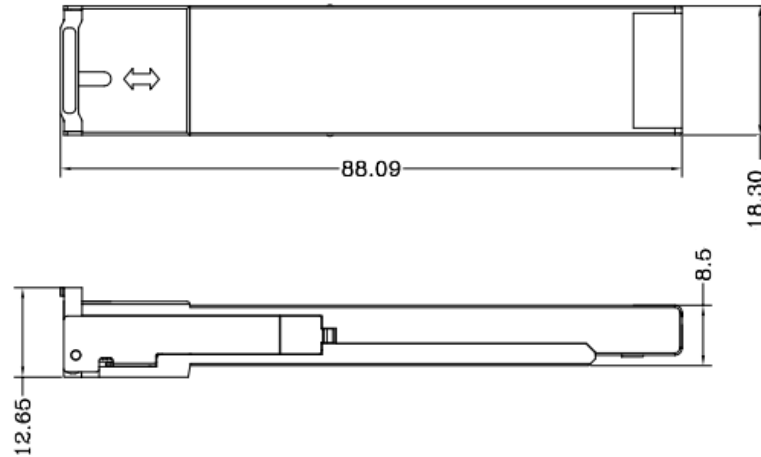


**Typical Interface Circuit**



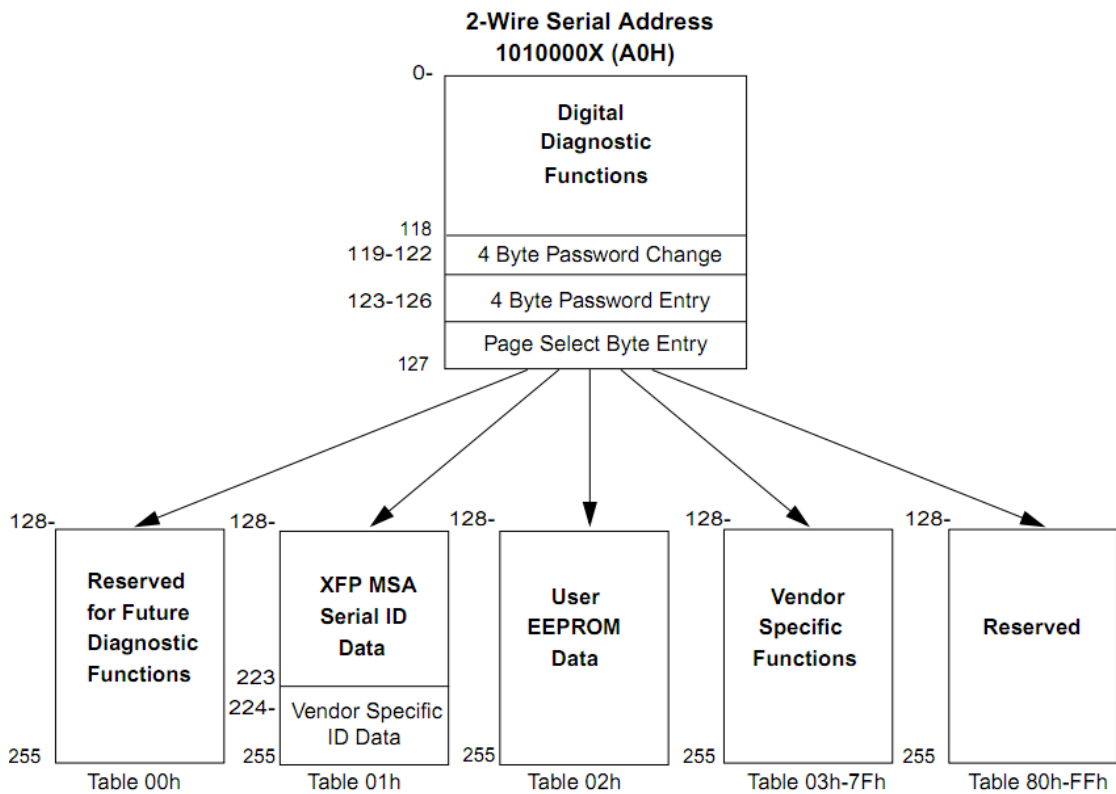
**Mechanical Diagram**

For detail mechanical information, please refer to the related document of XFP MSA



**EEPROM Memory Map**

The digital diagnostic memory map specific data field define as following. For detail EEPROM information, please refer to the related document of INF-8077i



**ESD**

The SFP+ module and host SFI contacts (High Speed Contacts) shall withstand 1kV electrostatic discharge based on Human Body Model and all host contacts with exception of the SFI contacts (High Speed Contacts) shall withstand 2kV electrostatic discharge based on Human Body Model. The SFP+ module shall meet ESD requirements given in EN61000-4-2, criterion B test specification such that units are subjected to 15kV air discharges during operation and 8kV direct contact discharges to the case per section 2.9 in SFF-8431 REV4.1. However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

**Laser Safety**

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

**Ordering Information**

Ordering P/Ns	Description
D27299-XSCB	10GEPON Symmetric OLT, PR30, 20km, TX 1577nm 10.3125Gbps, RX 1270nm 10.3125Gbps & 1310nm 1.25Gbps, TX 1490nm 1.25Gbps, XFP form-factor, BIDI SC/UPC Receptacle, 0~70°C Commercial Temperature
D37299-XSCB	10GEPON Symmetric OLT, PR40, 20km, TX 1577nm 10.3125Gbps, RX 1270nm 10.3125Gbps & 1310nm 1.25Gbps, TX 1490nm 1.25Gbps, XFP form-factor, BIDI SC/UPC Receptacle, 0~70°C Commercial Temperature

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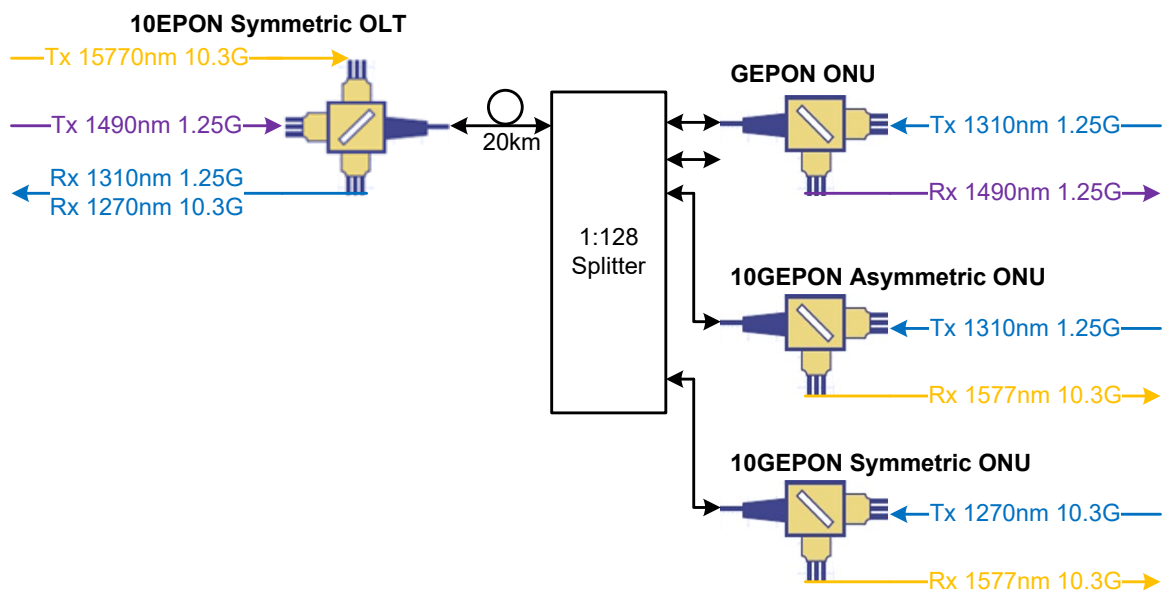


## 10GEPON Sym OLT PR30/PR40 SFP+

### Optical Transceiver

#### Product Features

- Support IEEE802.3av & IEEE802.3bk PR30 and PR40 application
- 10GEPON 1577nm 10.3G continuous-mode transmitter with EML laser, 1270nm 10.3G burst-mode receiver with APD-TIA, and EPON 1490nm 1.25G continuous-mode transmitter with DFB laser, 1310nm 1.25G burst-mode receiver with APD-TIA
- 2-wire interface for integrated digital diagnostic monitoring
- Digital receiving signal strength indication (RSSI)
- SFP+ MSA package with longer header SC/UPC receptacle optical interface
- Single +3.3V power supply
- Operating case temperature: 0~70°C
- RoHS compliance, and Class 1 laser safety



**Operating Condition**

Parameter	Unit	Min.	Typical	Max.
Storage Temperature	°C	-40		85
Operating Case Temp	°C	0		70
Storage Humidity	%	5		90
Operating Relative Humidity	%	5		85
Power Supply Voltage	V	3.135	3.3	3.465
Power Consumption	W			2.5
Bit Rate for Tx 1577nm	Gbps	10.3125		
Bit Rate for Rx 1270nm	Gbps	10.3125		
Bit Rate for Tx 1490nm	Gbps	1.25		
Bit Rate for Rx 1310nm	Gbps	1.25		

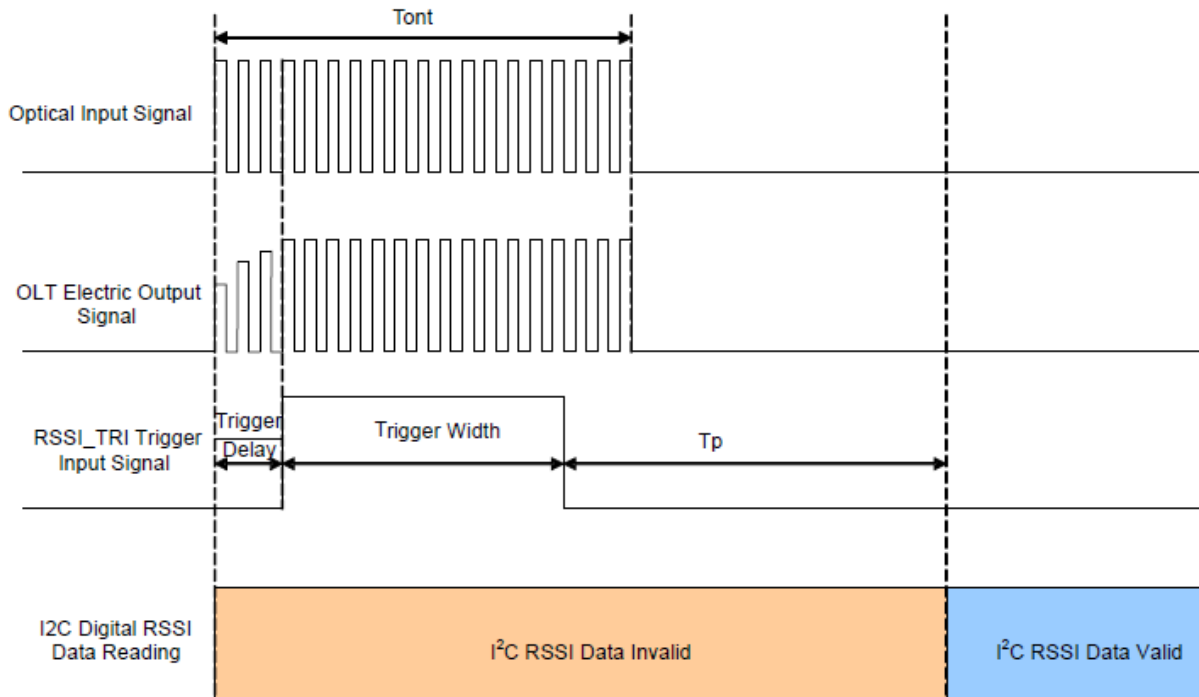
**Characteristics**

All performance is specified at whole working temperature and conditions

Parameter	Unit	Min.	Typical	Max.
<b>10GE PON 1577nm 10.3125G Transmitter</b>				
TX Central Wavelength	nm	1575	1577	1580
Spectral Width (-20dB)	nm			1
SMSR	dB	30		
Mean Launched Power (PR30, BOL)	dBm	2.5		5
Mean Launched Power (PR30, EOL)	dBm	2		5
Mean Launched Power (PR40, BOL)	dBm	5.3		9
Mean Launched Power (PR40, EOL)	dBm	5		9
Mean Launched Power (TX Off)	dBm			-39
Extinction Ratio	dB	6		
Optical Return Loss Tolerance	dB	-15		
Transmitter Mask (PRBS <sup>2<sup>31</sup>-1</sup> @10.3125G)	Compliant with IEEE802.3av			
<b>10GE PON 1270nm 10.3125G Receiver</b>				
Receive Wavelength	nm	1260	1270	1280
Sensitivity (PR30) (PRBS <sup>2<sup>31</sup>-1</sup> @10.3125G, BER<10 <sup>-3</sup> )	ER=6, dBm			-28.5
Sensitivity (PR40) (PRBS <sup>2<sup>31</sup>-1</sup> @10.3125G, BER<10 <sup>-3</sup> )	ER=6, dBm			-29
Overload (PR30)	dBm	-6		
Overload (PR40)	dBm	-9		

Parameter	Unit	Min.	Typical	Max.
<b>EPON 1490nm 1.25G Transmitter</b>				
TX Central Wavelength	nm	1480	1490	1500
Spectral Width (-20dB)	nm			1
Side Mode Suppression Ratio (SMSR)	dB	30		
Mean Launched Power (PR30, BOL)	dBm	3		7
Mean Launched Power (PR30, EOL)	dBm	3		7
Mean Launched Power (PR40, BOL)	dBm	5.3		9
Mean Launched Power (PR40, EOL)	dBm	5		9
Mean Launched Power (TX Off)	dBm			-45
Extinction Ratio	dB	9		
Optical Return Loss Tolerance	dB	-15		
Transmitter and dispersion Penalty	dB			1
Transmitter Mask(PRBS2 <sup>23</sup> -1@10.3125G)	Compliant With IEEE 802.3ah			
<b>EPON 1310nm 1.25G Receiver</b>				
Receive Wavelength	nm	1260	1310	1360
Sensitivity (PR30) (PRBS2 <sup>7</sup> -1@1.25G, ER=9, BER<10 <sup>-12</sup> )	dBm			-31
Sensitivity (PR40) (PRBS2 <sup>7</sup> -1@1.25G, ER=9, BER<10 <sup>-12</sup> )	dBm			-32
Overload (PR30)	dBm	-6		
Overload (PR40)	dBm	-11		
Receiver Burst Mode Dynamic Range	dB	15		
Parameter	Unit	Min.	Typical	Max.
<b>Electrical Interface Characteristics</b>				
Data Input Swing Differential/TX	mV	120		800
10GE PON Data Output Swing Differential/RX 10G CML	mV	340		850
EPON Data Output Swing Differential/RX 1.25G LVPECL	mV	600		1600
Data Differential Impedance	Ω	90	100	110
LVTTL Output High	V	2.4		V <sub>cc</sub>
LVTTL Output Low	V	0		0.4
LVTTL Input High	V	2.0		V <sub>cc</sub> +0.3
LVTTL Input Low	V	0		0.8
LOS De-assert Level	dBm			-29
LOS Assert Level	dBm	-40		
LOS Hysteresis	dB	0.5		6
LOS Assert Time (T <sub>LOSA</sub> )	ns			512
LOS De-assert Time (T <sub>LOSD</sub> )	ns			512

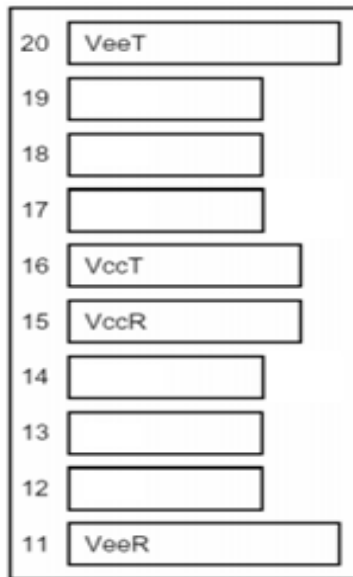
**Timing Sequence for RSSI**



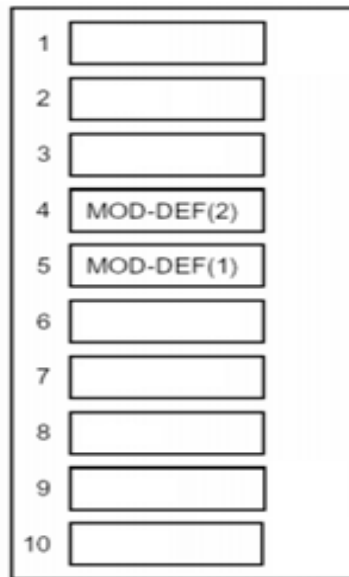
Parameter	Unit	Min.	Typical	Max.
<b>RSSI Timing Characteristics</b>				
ONU Package Length ( $T_{ont}$ )	ns	500	1500	
RSSI Trigger Delay ( $T_{td}$ )	ns	0	300	3000
RSSI Trigger Pulse Width ( $T_w$ )	ns	600		$T_{ont} - T_{td}$
Internal I <sup>2</sup> C Delay ( $T_p$ )	us			500
RSSI Power Range ( $P_{mon}$ )	dBm	-31		-8
RSSI Monitoring Error	dB	+/-3		

**PIN Definition**

Pin No.	Symbol	Level / Logic	Description
1	EPON_TD+	CML-I	EPON OLT Transmitter Non-Inverted Data Input, 1.25Gbps, AC-coupled
2	EPON_TD-	CML-I	EPON OLT Transmitter Inverted Data Input, 1.25Gbps, 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	EPON_RD-	LVPECL-O	EPON Receiver Inverted Data Output, 1.25Gbps, DC-coupled
7	NC		
8	LOS	LVTTTL-O	Receiver Loss of Signal 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	EPON_RD+	LVPECL-O	EPON Receiver Non-Inverted Data Output, 1.25Gbps, DC-coupled
11	GND		Module Ground
12	10GEPON_RD-	CML-O	10GEPON Receiver Inverted Data Output, 10.3125Gbps, DC-coupled
13	10GEPON_RD+	CML-O	10GEPON Receiver Non-Inverted Data Output, 10.3125Gbps, DC-coupled
14	TX_Fault	LVTTTL-O	TX Fault Alarm, TX Fault State: High; TX Normal State: Low
15	V <sub>CC3_RX</sub>		+3.3V Rx Power Supply
16	V <sub>CC3_TX</sub>		+3.3V Tx Power Supply
17	NC		
18	10GEPON_TD+	CML-I	10GEPON Transmitter Non-Inverted Data Input, 10.3125Gbps, AC-coupled
19	10GEPON_TD-	CML-I	10GEPON Transmitter Inverted Data Input, 10.3125Gbps, AC-coupled
20	GND		Module Ground

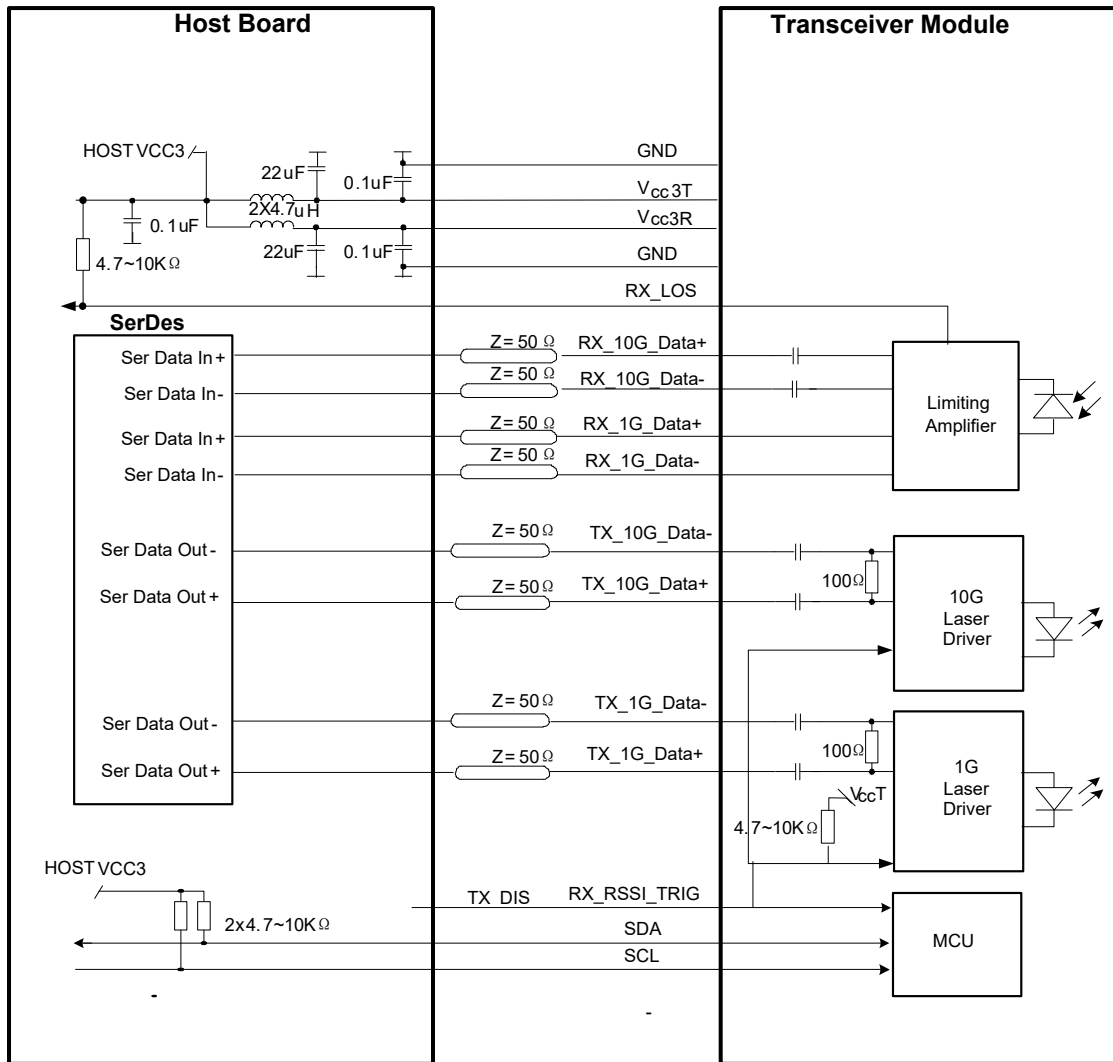


**Top of Board**



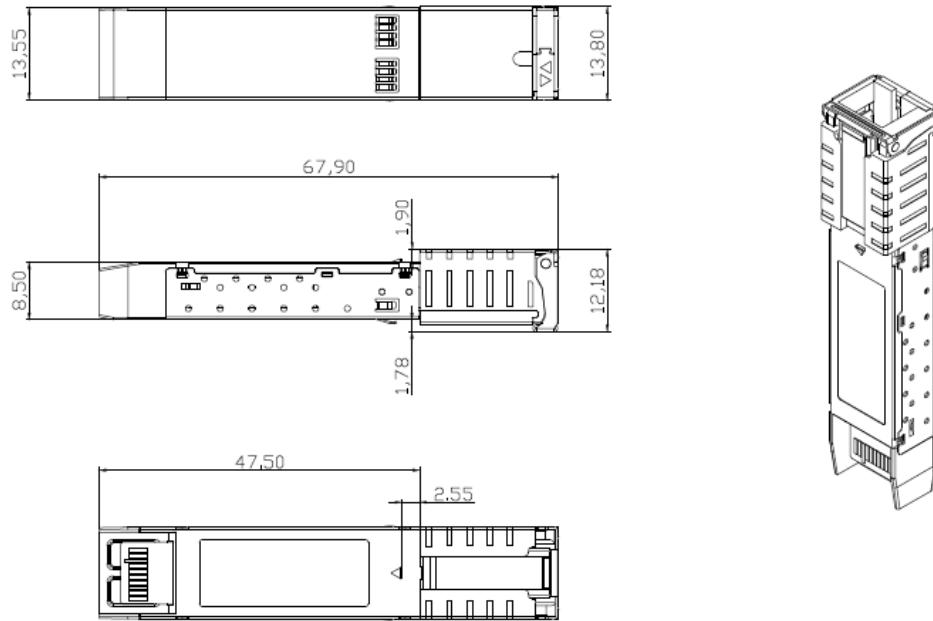
**Bottom of Board (as viewed thru top of board)**

Typical Interface Circuit



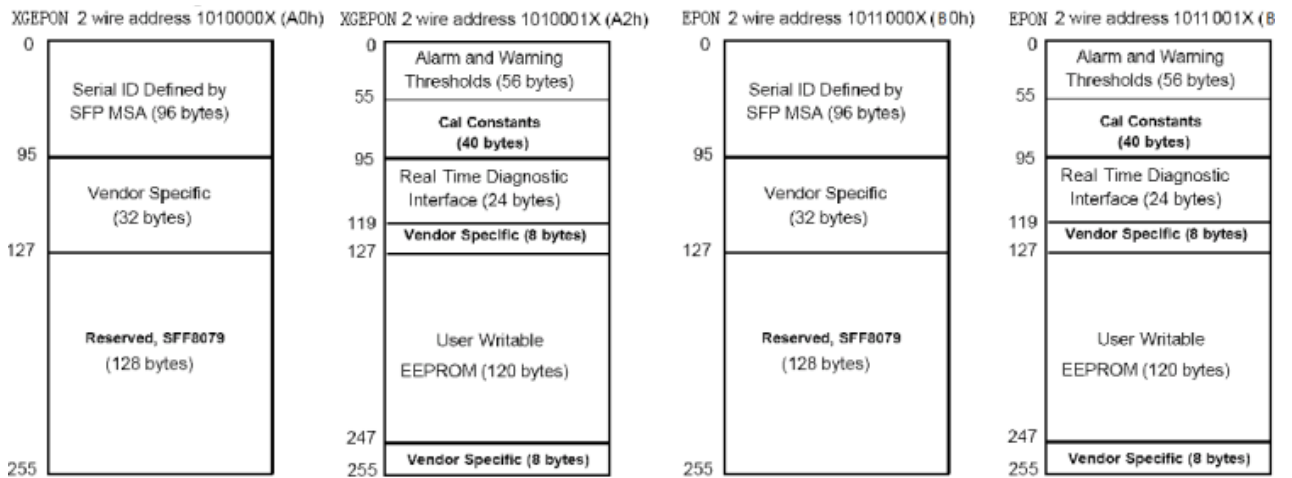
**Mechanical Diagram**

For detail mechanical information, please refer to the related document of SFF-8432



**EEPROM Memory Map**

The digital diagnostic memory map specific data field defines as following. For detail EEPROM information, please refer to the related document of SFF 8472 Rev 12.0.





**ESD**

The SFP+ module and host SFI contacts (High Speed Contacts) shall withstand 1kV electrostatic discharge based on Human Body Model and all host contacts with exception of the SFI contacts (High Speed Contacts) shall withstand 2kV electrostatic discharge based on Human Body Model. The SFP+ module shall meet ESD requirements given in EN61000-4-2, criterion B test specification such that units are subjected to 15kV air discharges during operation and 8kV direct contact discharges to the case per section 2.9 in SFF-8431 REV4.1. However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

**Laser Safety**

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

**Ordering Information**

Ordering P/Ns	Description
D27299-SSCB	10GE PON Symmetric OLT, PR30, 20km, TX 1577nm 10.3125Gbps, RX 1270nm 10.3125Gbps & 1310nm 1.25Gbps, TX 1490nm 1.25Gbps, SFP+ form-factor, BIDI SC/UPC Receptacle, 0~70°C Commercial Temperature
D37299-SSCB	10GE PON Symmetric OLT, PR40, 20km, TX 1577nm 10.3125Gbps, RX 1270nm 10.3125Gbps & 1310nm 1.25Gbps, TX 1490nm 1.25Gbps, SFP+ form-factor, BIDI SC/UPC Receptacle, 0~70°C Commercial Temperature

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