



RoHS Compliant
XGS-PON OLT XFP Transceiver
9.953Gbps 1577nm Continuous Mode EML Transmitter
9.953Gbps/2.488Gbps Dual Rate 1270nm Burst Mode APD Receiver



Features

- Compliant with ITU-T G.9807.1 XGPON-OLT
- Compliant with ITU-T G.9807.1 XGSPON-OLT
- SC/UPC Simplex Receptacle Optical Interface
- 2x15 XFP Die Cast Housing
- Compliant with XFP MSA INF-8077i
- TTL signal detect indicator
- Hot Pluggable
- Power consumption<3.5W

Ordering Information

PART NUMBER	INPUT/OUTPUT	SIGNAL DETECT	VOLTAGE	TEMPERATURE
LS47-H3L-TC-N-N1	AC/DC	TTL	3.3V/5V	0 °C to 70 °C
LS47-H3L-TI-N-N1	AC/DC	TTL	3.3V/5V	-40 °C to 85 °C
LS47-H3L-TC-N-N2	AC/DC	TTL	3.3V/5V	0 °C to 70 °C
LS47-H3L-TI-N-N2	AC/DC	TTL	3.3V/5V	-40 °C to 85 °C

Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Storage Temperature	T_s	-40	85	°C	
Supply Voltage	V_{cc3}	-0.5	3.6	V	



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Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTE
Case operating Temperature	T_c	0 -40		70 85	°C	LS47-H3L-TC-N-Nx LS47-H3L-TI-N-Nx
Supply Voltage	V_{cc3}	3.13	3.3	3.47	V	
Supply Current	I_{cc3}	---	~	1000	mA	

Diagnostics

Data Address	PARAMETER	RANGE	ACCURACY	Calibration
96-97	Temperature	-40 to 85°C	±3°C	
98-99	Vcc3 Voltage	3.13 to 3.47 Volts	±3%	
100-101	Bias Current	0 to 120 mA	±10%	Internal
102-103	TX Power	+2 to +7 dBm	±3dB	
104-105	RX Power	-30 to -5 dBm	±3dB	



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Transmitter Electro-optical Characteristics

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Operating Data Rate		--	9.953	--	Gbps	
Output power	P_{OUT}	+2		+5	dBm	N1
		+4		+7	dBm	N2
Extinction Ratio	ER	8.2			dB	
Center Wavelength	λ_C	1575	1577	1580	nm	
Average Launch Power @ Tx OFF	P_{OFF}			-45	dBm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Sidemode Supression ratio	SMSR	30			dB	
Tolerance to Transmitter Incident Light Power	T_I	-15			dB	
Output Eye						Compliant ITU-T G.9807.1
Differential Input Voltage	V_{DIFF}	120	---	820	mV	



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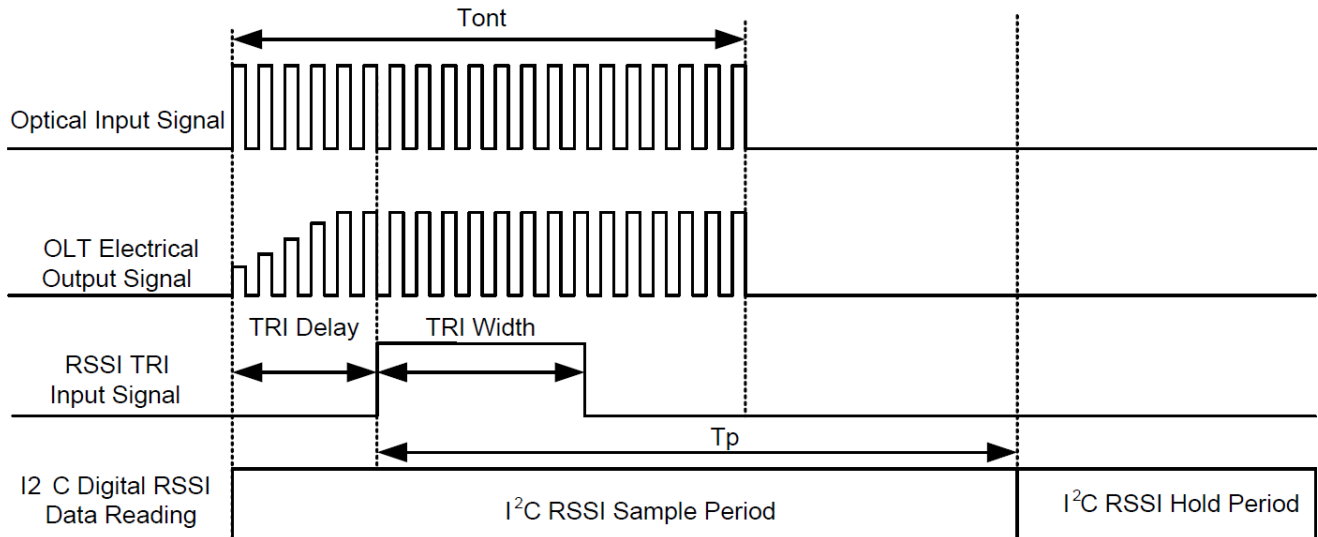
Receiver Electro-optical Characteristics

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Optical Input Power-maximum	P_{IN}	-5			dBm	N1
		-7			dBm	N2
Receiver Sensitivity	P_{IN}			-26	dBm	N1@9.953Gbps
				-28	dBm	N2@9.953Gbps
				-27.5	dBm	N1@2.488Gbps
				-29.5	dBm	N2@2.488Gbps
Operating Center Wavelength	λ_C	1260	---	1280	nm	
Reflectance of Rx	ORL	---	---	-20	dB	
Dynamic Range	DR	15			dB	
Reflected Optical Isolation	ROI	25			dB	
Immunity from Continuous Identical Digits	CID	72			Bits	
Receiver Settling Time	R_C			400	ns	
Loss of Signal-Asserted	P_A	-38	---	---	dBm	
Loss of Signal-Deasserted	P_D	---	---	-30	dBm	
Differential Output Voltage	V_{DIFF}	400		800	mV	



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Digital RSSI Sample/Hold Timing



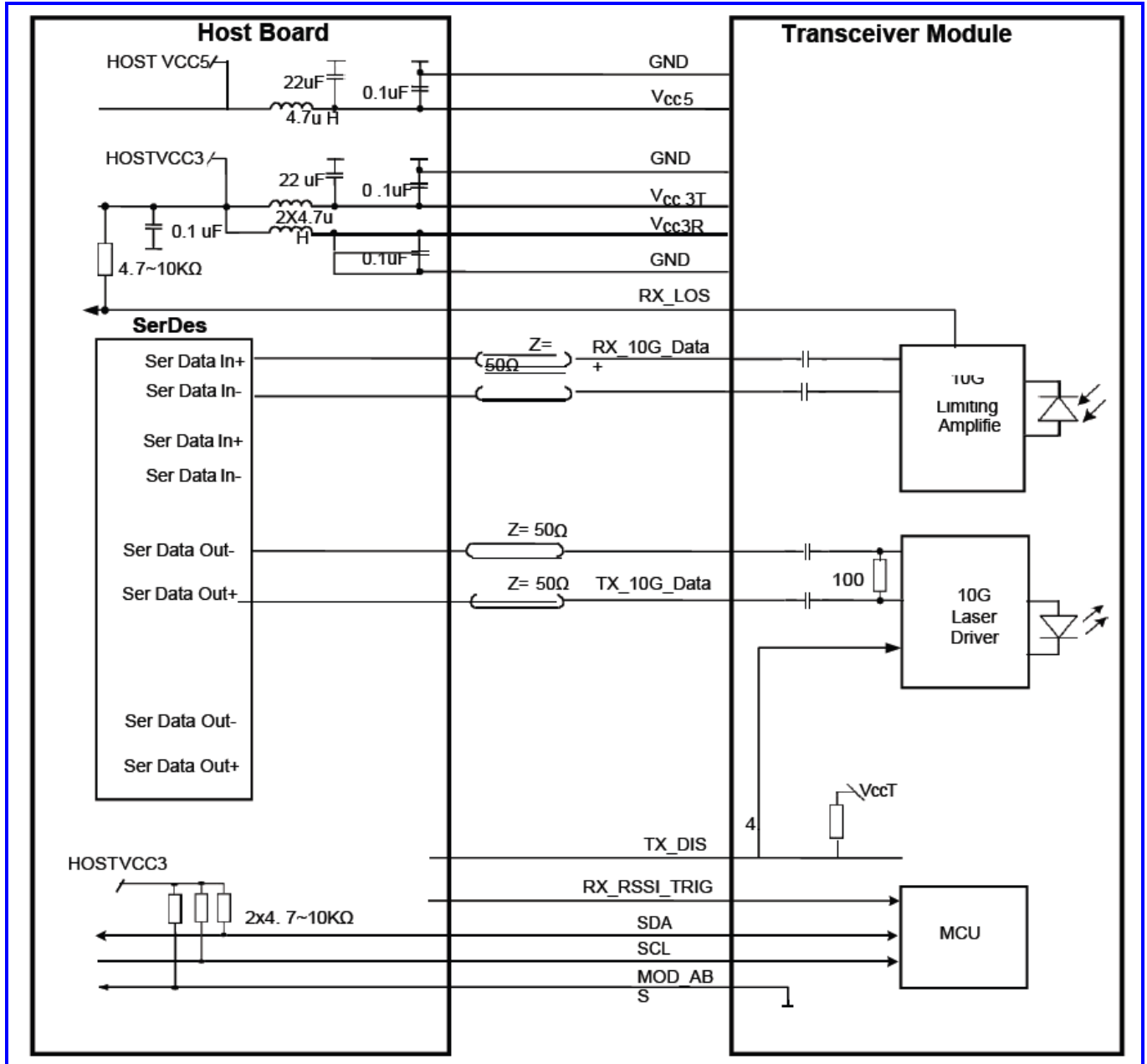
PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Optical Input Signal Width	T_{ont}	800	---	---	ns	
RSSI Trigger Delay	T_{tri}	150	---	---	ns	
RSSI Trigger Width	T_{I2C}	600			ns	
I2C Read Time	T_p	500			μ s	
RSSI Monitor Range	P_{mon}	-28		-7	dBm	
RSSI Precision	P_{rssi}	-3		+3	dB	

Note: $T_{tri} + T_{I2C} < T_{ont}$



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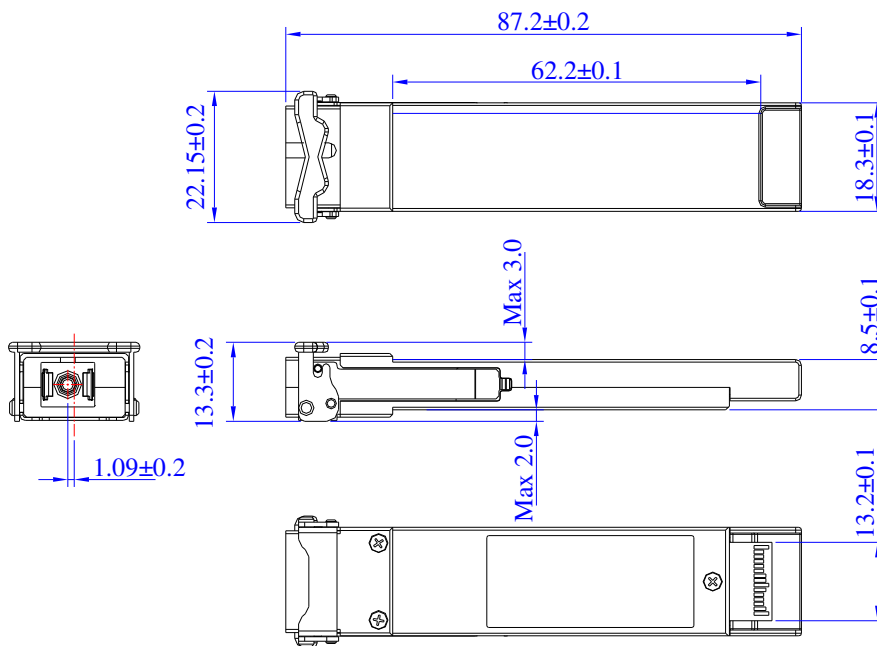
Block Diagram of Transceiver





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Dimensions



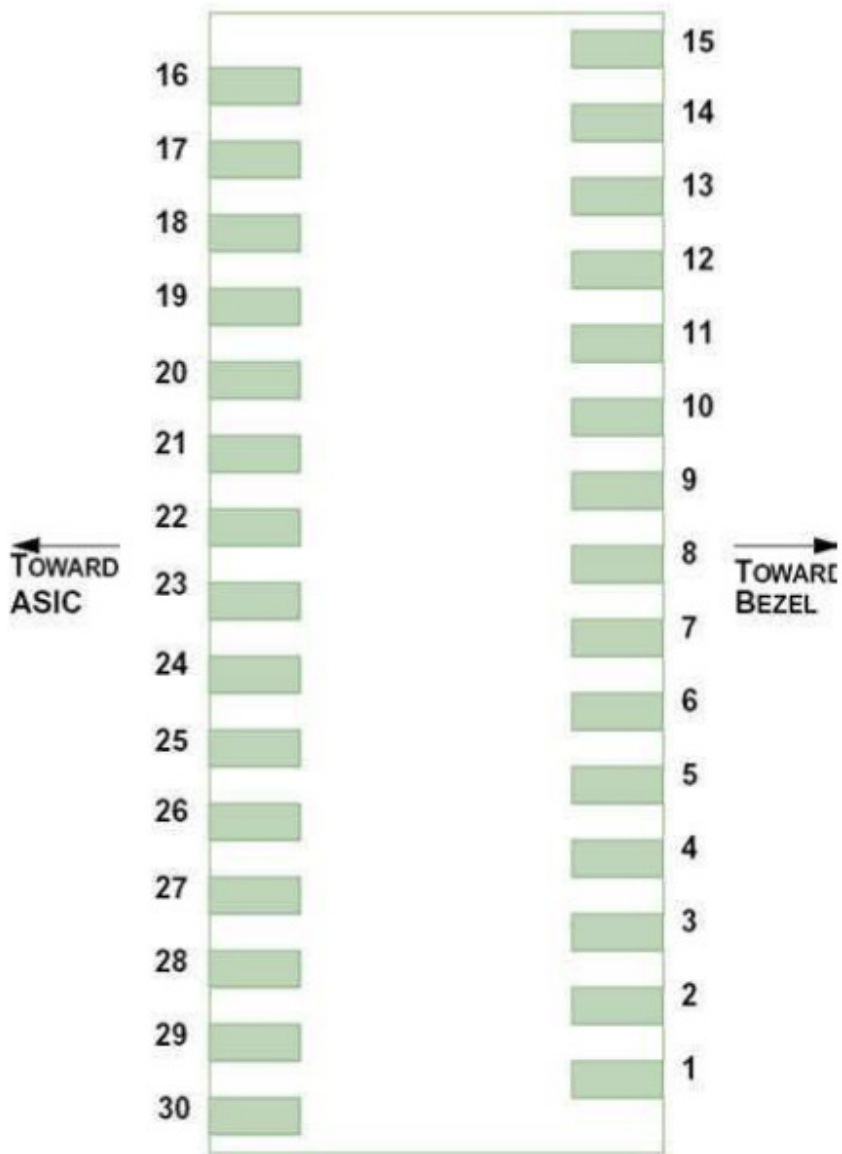
DIMENSIONS ARE IN MILLIMETERS

Latch color is Blue



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Pin Assignment





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Pin	Signal Name	Description
1	<i>GND</i>	Module Ground
2	<i>NC</i>	Not Connected inside the module.
3	<i>NC</i>	Not Connected inside the module.
4	<i>NC</i>	Not Connected inside the module.
5	<i>TX_DISABLE</i>	Transmit Disable
6	<i>NC</i>	Not Connected inside the module.
7	<i>GND</i>	Module Ground
8	<i>VCC3</i>	+3.3V DC Power Supply Input
9	<i>VCC3</i>	+3.3V DC Power Supply Input
10	<i>SCL</i>	SCL Serial Clock Signal
11	<i>SDA</i>	SDA Serial Data Signal
12	<i>Mod_Abs</i>	Module Absent indicate pin. Grounded inside the module.
13	<i>Rx_Reset</i>	Not used
14	<i>Rx_SD</i>	Receiver Signal Detect Indicator.
15	<i>GND</i>	Module Ground
16	<i>GND</i>	Module Ground
17	<i>10G RD-</i>	Receive Data out Bar, DC coupled
18	<i>10G RD+</i>	Receive Data out, DC coupled
19	<i>GND</i>	Module Ground
20	<i>NC</i>	Not Connected inside the module.
21	<i>TRI</i>	Receiver Signal Strength Indicator trigger input
22	<i>NC</i>	Not Connected inside the module.
23	<i>GND</i>	Module Ground
24	<i>NC</i>	Not Connected inside the module.
25	<i>NC</i>	Not Connected inside the module.
26	<i>GND</i>	Module Ground
27	<i>GND</i>	Module Ground
28	<i>TD-</i>	Transmit Data in Bar, ac coupled
29	<i>TD+</i>	Transmit Data in, ac coupled
30	<i>GND</i>	Module Ground



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Eye Safety Mark

<p>The LS4 series single-mode transceiver is a class 1 laser product. It complies with EN 60825-1 and FDA 21 CFR 1040.10 and 1040.11. In order to meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.</p> <p><u>Caution</u> All adjustments have been done at the factory before the shipment of the devices. No maintenance and user serviceable part is required. Tampering with and modifying the performance of the device will result in voided product warranty.</p>	<p><u>Required Mark</u></p> <div data-bbox="798 564 1169 683" style="border: 1px solid black; padding: 5px; text-align: center;"><p>Class 1 Laser Product Complies with 21 CFR 1040.10 and 1040.11</p></div>
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Note : All information contained in this document is subject to change without notice.