



**TX-1310/RX-1490, Bi-directional, Point to Multipoint
2×5 Pigtail SC Connector, 3.3 V
GE-PON Transceiver, 1000BASE-PX10-U**



Features

- Compliant with IEEE 802.3ah 1000BASE-PX10-U
- Industry standard 2×5 footprint
- SC connector
- Single power supply 3.3 V
- Differential inputs and outputs
- Transmitter burst mode and Receiver continuous mode
- Compatible with solder and aqueous wash processes
- Class 1 laser product complies with EN 60825-1
- Compliant with CISPR22-EN55022-CNS13438-VCCI CLASS B - 30MHz to 6GHz

Ordering Information

PART NUMBER	TX	RX	IN/OUT	SD	Burst Control	RX 1550nm Input	TEMPERATURE	LD TYPE
LSF2-C3S-TC-N3-AJ	1310 nm	1490 nm	AC/AC	LVTTL	LVTTL (Enable: Logic "1")	Blocked	0 °C to 70 °C	FP



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Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Storage Temperature	T_S	-40	85	°C	
Operating Temperature	T_a	-40	75	°C	
Optical Input Power (1480 to 1500nm)	-		0	dBm	Average
Optical Input Power (1550 to 1560nm)	-		+10	dBm	Peak
Optical Input Power (1625 to 1655nm)	-		+5	dBm	Peak
Lead Soldering Temperature	T_{SOLD}	---	260	°C	
Lead Soldering Time	t_{SOLD}		10	sec	
Supply Voltage	V_{CC}	0	4.0	V	

Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Ambient Operating Temperature	T_A	0	70	°C	
Supply Voltage	V_{CC}	3.135	3.465	V	
Humidity (without dew)	RH	5	95	% RH	
Signaling Speed		1.25 -100ppm	1.25 +100ppm	Gbps	



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Transmitter Electro-optical Characteristics

$V_{cc} = 3.135 \text{ V to } 3.465 \text{ V}, T_A = 0^\circ\text{C to } 70^\circ\text{C}$

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Center Wavelength	λ_c	1260	1310	1360	nm	
Spectral Width (RMS)	$\Delta\lambda$		Table 1		nm	1.25Gbps, PRBS 2 ⁷ -1
Launched Power 9/125 μm fiber (Average)	P_{out}	-0.5	---	+4	dBm	
Launched Power (peak)	-	---	---	+7.5	dBm	
Average Launched power of OFF transmitter	P_{OFF}	---	---	-45	dBm	Table 2
Extinction Ratio	ER	9	---	---	dB	
$RIN_{15\text{OMA}}$	RIN	---	---	-113	dB/Hz	
Output Eye	Compliant with IEEE802.3z, IEEE802.3ah					
Burst overshoot	-	---	---	15	%	
Laser on time	T_{on}	---	---	96	ns	
Laser off time	T_{off}	---	---	96	ns	
Transmitter reflectance	-	---	---	-6	dB	@ 1310nm
Transmitter and dispersion penalty		---	---	2.8	dB	
Total jitter		---	---	128	ps	



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Table 1

Center Wavelength (nm)	Maximum RMS spectral width (nm)
1260	2.09
1270	2.52
1280	3.13
1286	3.50
1290	
1297	
1329	
1340	
1343	3.06
1350	
1360	2.58

Table 2: Optical output operation

Item	Input		Output
	Tx Enable	DATA*1	Optical output
1	H	Normal Data	ON
2	H	No input	Don't care
3	L	Don't care	OFF

*1:Differential inputs

*2: ON=Optical output, OFF=Less than -45dBm, Don't care = Less than +7.5dBm(peak)



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Receiver Electro-optical Characteristics

$V_{CC} = 3.135 \text{ V to } 3.465 \text{ V}, T_A = 0^\circ \text{C to } 70^\circ \text{C}$

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Operating Center Wavelength	λ_c	1480	1490	1500	nm	
Optical Input Power (Overload)	P_{SAT}	-3	---	---	dBm	BER < 10^{-12}
Receive Sensitivity	P_{in}	---	---	-26.5	dBm	Note1
Signal Detect-Assert	P_A	---	---	-27.0	dBm	
Signal Detect-Deassert	P_D	-44	---	---	dBm	
Receiver reflectance (1480 to 1500nm)		---	---	-12	dB	Note2
Receiver reflectance (1550 to 1560nm)		---	---	-20	dB	Note3
S/X Endurance	1550 to 1560 nm			-21	dB	Note 4
	1625 to 1655nm			-16	dB	Note 5

Note1: a. With BER better than or equal to 1.0×10^{-12} , measured in the center of eye opening with 2^7-1 NRZ PRBS.

b. Sensitivity is measured at Extinction Ratio ≤ 9 dB, and asynchronous 0/1 data flowing out of the optical transmitter of the device under test.

Note2: Measured with 1490nm

Note3: Measured with 1550nm

Note4: When the asynchronous 1.25Gbps 0/1 of 1550 to 1560nm wavelength 21dB higher than downstream optical power(average) is received during communication with OLT, 1×10^{-12} or less bit error rate satisfied.

Note5: When the asynchronous CW light (peak) of 1625 to 1655nm wavelength 16dB higher than downstream optical power(average) is received during communication with OLT, 1×10^{-12} or less bit error rate satisfied.

Interference light is pulse width 1us/500ns/20ns, pulse cycle 100us



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Electric characteristic

Transmitter

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Data Input Differential Voltage	-	0.4	---	1.6	V	AC Coupled
Data input length	-	1	---	---	us	
Data input burst interval	-	0.112		1000000	us	
Tx enable Voltage-Low	V_{IL}	0		0.8	V	LV-TTL
Tx enable Voltage-High	V_{IH}	2.0		VCC	V	

Receiver

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Data Output differential voltage	-	0.5	---	1.2	V	AC Coupled
Signal Detect Output voltage-High	V_{OH}	2.4	---	VCC	V	LV-TTL
Signal Detect Output voltage-Low	V_{OL}	0	---	0.4	V	

Supply Current

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Supply current-TX+RX	-	---	---	350	mA	

Fiber and Connector

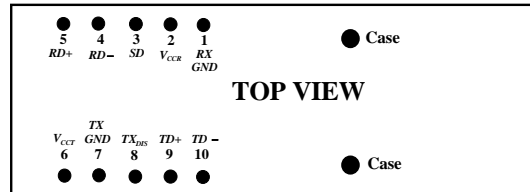
PARAMETER	Mechanical Characteristics	Unit	Reference
Type	<i>SC-Pigtail-</i>	-	-
Core/Cladding diameter	<i>ITU-T G.652</i>	-	-
Jacket diameter	<i>0.9+/-0.1</i>	mm	-
Bending radius (minimum)	<i>30</i>	mm	-
Connector	<i>SC/AdPC</i>	-	-



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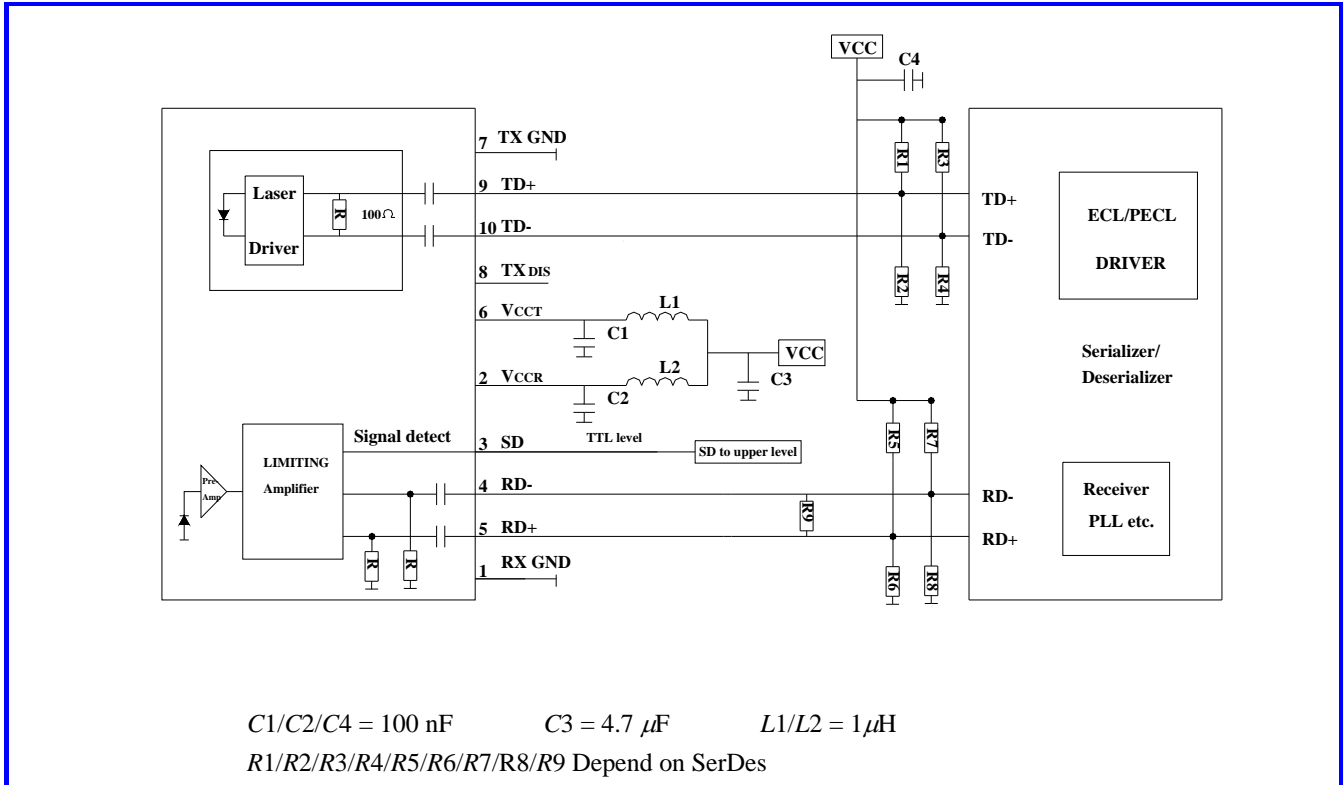
Connection Diagram

Pin-Out

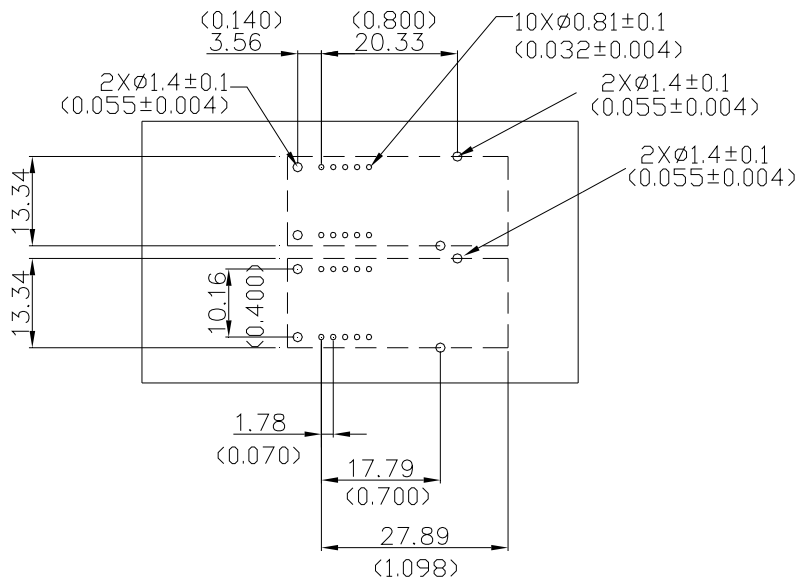


PIN	SYMBOL	DESCRIPTION
1	<i>RX GND</i>	Receiver Signal Ground, Directly connect this pin to the receiver ground plane.
2	<i>VCCR</i>	Receiver Power Supply Provide +3.3 Vdc via the recommended receiver power supply filter circuit. Locate the power supply filter circuit as close as possible to the <i>VCCR</i> pin.
3	<i>SD</i>	Signal Detect. Normal optical input levels to the receiver result in a logic “1” output, <i>VOH</i> , asserted. Low input optical levels to the receiver result in a fault condition indicated by a logic “0” output <i>VOL</i> , de-asserted. Signal Detect is a single-ended LVTTL output. If Signal Detect output is not used, leave it open-circuited.
4	<i>RD-</i>	Receiver data output. AC coupled output
5	<i>RD+</i>	Receiver data output. AC coupled output
6	<i>VCCR</i>	Transmitter Power Supply Provide +3.3 Vdc via the recommended transmitter power supply filter circuit. Locate the power supply filter circuit as close as possible to the <i>VCCR</i> pin.
7	<i>TX GND</i>	Transmitter Signal Ground Directly connect this pin to the transmitter signal ground plane. Directly connect this pin to the transmitter ground plane.
8	<i>TXoff</i>	Transmitter Enable/Burst on Connect this pin to LVTTL logic high “1” to enable transmitter. To disable module connect to LVTTL logic low “0”.
9	<i>TD+</i>	Transmitter Data In Input internally biased and AC coupled
10	<i>TD-</i>	Transmitter Data In-Bar Input internally biased and AC coupled

Recommended Circuit Schematic



Recommended Board Layout Hole Pattern



Top View

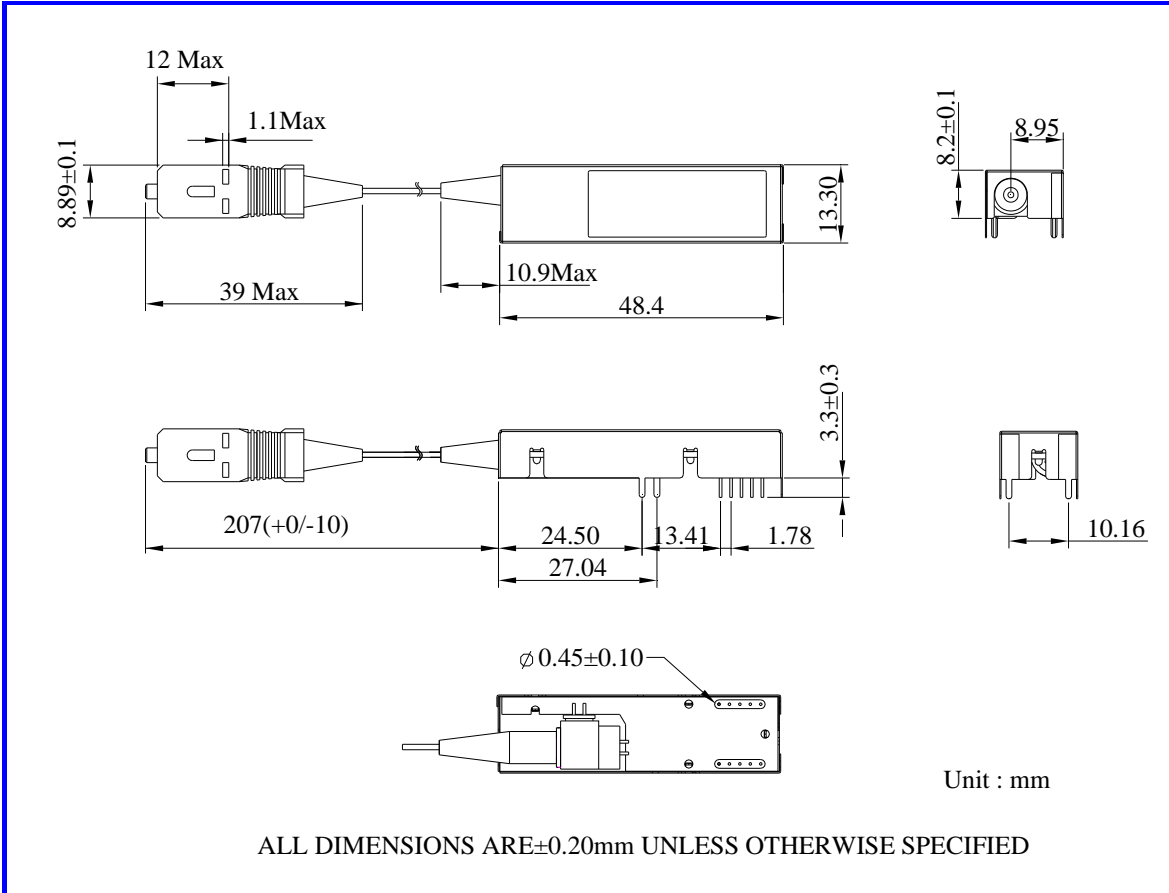
Unit : mm(inches)



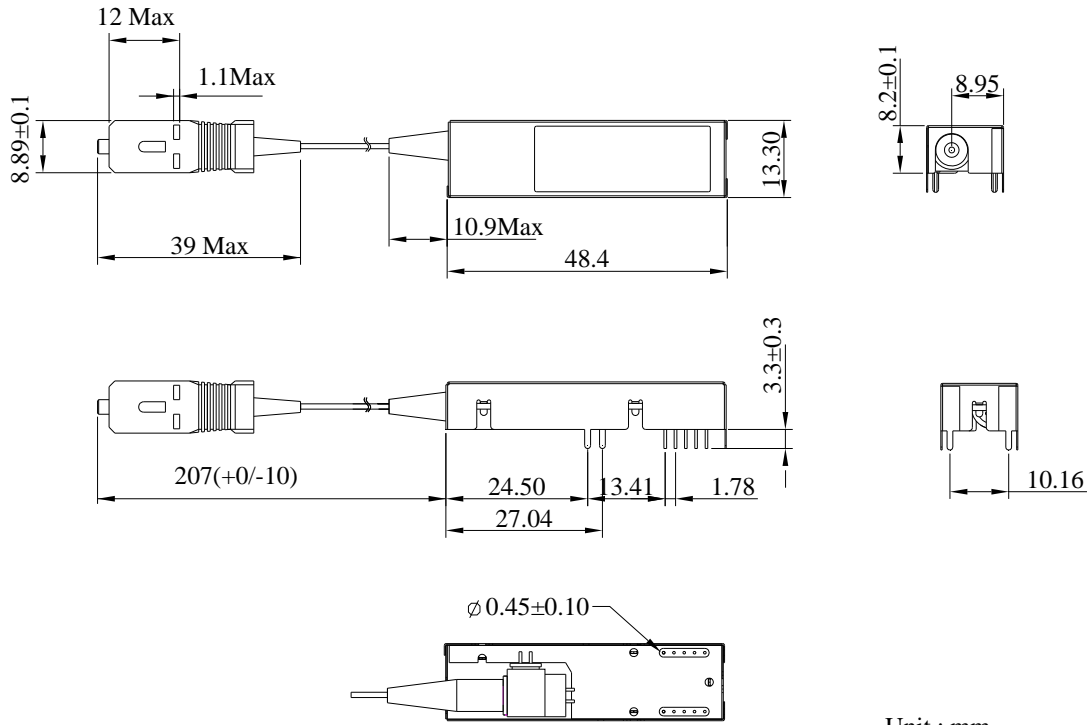
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Drawing Dimensions

A)FOCI



B) GO



Unit : mm

ALL DIMENSIONS ARE ± 0.20 mm UNLESS OTHERWISE SPECIFIED



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Eye Safety Mark

The LSF 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.

Caution

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.

Required Mark

Class 1 Laser Product
Complies with
21 CFR 1040.10 and 1040.11

Note : All information contained in this document is subject to change without notice.