

Gigabit Ethernet 1.25Gbps SFF Transceiver TS8x3xx series



- Maximum 80km Transmission
- 1310nm or 1550nm Transceiver for MM/SM fiber
- 1.25Gbps Gigabit Ethernet (1000Base-LX)
- Single +3.3V Power Supply
- 2X5 or 2X10 Duplex LC Connector

Family Model

TS833LX TS83310 TS83320 TS83330 TS85340 TS85360 TS85380

Features

- Compliant with IEEE 802.3z 1000BASE-LX specifications for Gigabit Ethernet
- Industry standard 2X5 or 2X10 package with duplex LC connector
- 1.3/1.55 μ m uncooled InGaAsP SMQW FP LD / DFB LD with isolator and APC for constant output power
- High sensitive InGaAs PIN photodiode used at wavelengths from 1.1 μ m to 1.6 μ m
- Single +3.3V power supply and PECL interface
- LVPECL differential data inputs and outputs
- Operating temperature ; 0 to +70 $^{\circ}$ C/-40 to +85 $^{\circ}$ C
- Tested by Teradion's Reliability and Qualification Program
- Distance options
550m with 50/125 μ m or 62.5/125 μ m MMF
5km/10km/20km/30km/40km/60km/80km with 9/125 μ m SMF

Description

The TS8x3xx series SFF optical transceivers are designed to meet the Gigabit Ethernet specifications. The transceivers are manufactured in 2x5 or 2x10 Pin Through Hole(PTH) package with duplex LC connector interface and made of metallized housing to obtain excellent EMI shielding.

The transmitter consists of a long wavelength(1.3 μ m or 1.55 μ m) InGaAsP SMQW laser diode (FP- LD or DFB-LD) in an optical subassembly(OSA).

The OSA is driven by a custom IC which converts differential LVPECL logic signals into a laser diode drive current. The receiver includes a planar InGaAs PIN photodiode mounted with a transimpedance preamplifier IC in an OSA. The OSA is mated to a custom limiting-amplifier which provides post-amplification and signal detect function(active high).

The transceivers are designed to used in a single power supply(+3.3V) and an operating

temperature range of 0°C to +70°C or -40°C to +85°C.

Applications

- Gibabit Ethernet / LAN switch
- Metro Ethernet
- High speed digital transmission.
- Storage area network

Absolute Maximum Ratings

Parameters	Symbol	Unit	Min.	Max.	Remarks
Ambient Operating Temperature	T _{op}	°C	0 -40	70 85	Indoor use Outdoor use
Storage Temperature	T _{stg}	°C	-40	85	
Supply Voltage	V _{CC} -V _{EE}	V	-0.5	6.0	
Lead Soldering Temperature/Time		°C/sec		260/10	
Relative Humidity	RH	%	-	95	

Electrical Characteristics

Parameters	Symbol	Unit	Min.	Typ.	Max.	Remarks
DC Power Supply Voltage	V _{CC} -V _{EE}	V	3.1	3.3	3.5	
DC Power Supply Current	I _{CC,TX}	mA	50		120	FP-LD
	I _{CC,RX}	mA	50 60		170 90	DFB-LD
Input Data Voltage Swing (Single-ended)	V _{IH} - V _{IL}	mV	150		800	
Output Data Voltage Swing (Single-ended)	V _{OH} - V _{OL}	mV	590		800	
Transmit Disable Input Voltage	V _{TDIS}	V	2.0		0.8	TTL
Signal Detect Output Voltage	V _{SD}	V	- 2.4		0.4 -	TTL

Eye Diagram

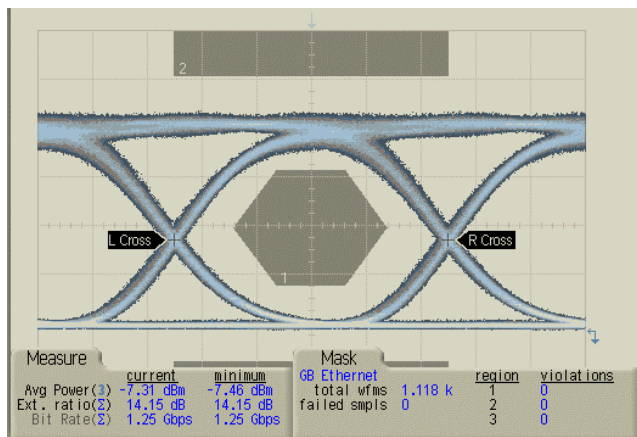


Fig. 1 Back-to-back

Optical Characteristics

(T_{op} = 25°C)

Parameters	Symbol	Condition	Unit	Min.	Typ.	Max.	Remark
Data Bit Rate		NRZ	Gbps		1.25		
Fiber Length 50 or 62.5µm core MMF 9µm core SMF		10 ⁻¹² BER, 1.25Gbps	km	0.55 5		80	*20km-option @1.3µm @1.3/1.5µm
TRANSMITTER							
Average Power Output	P _{OUT}	I _f =I _{BIAS} + I _{mod} /2	dBm	-9.5 -7.0 -4.0 -2.0 -1.0	-7.0 -5.5 -3.0 -1.0 0	-3.0 -3.0 -1.0 1.0 2.0	≤10km - FP 20km - FP 30/40km-DFB 60km - DFB 80km - DFB
Extinction Ratio	ER		dB	9			
Center Wavelength	λ _c	CW, @ P _{OUT}	nm	1285 1300 1280 1480	1310 1310 1310 1550	1355 1320 1335 1580	≤10km - FP 20km - FP 30km - DFB ≥40km - DFB
Spectral Width	Δλ	RMS	nm			2.8 2.0	≤10km 20km
Side Mode Suppression Ratio	SMSR		dB	30			DFB-LD
Optical Rise/Fall Time	t _r /t _f	20 - 80%	nsec			0.26	
Relative Intensity Noise	RIN		dB/Hz			-120	
Total Transmitter Jitter Added at TP2			psec			227	

RECEIVER							
Sensitivity (Average Input Power)	$P_{IN,MIN}$	PRBS 2^7-1 , 10^{-12} BER	dBm		-22 -23 -22 -24 -26	-20 -21 -21 -22 -25	≤ 10 km 20km 30/40km 60km 80km
Receiver Overload	$P_{IN,MAX}$		dBm	-3.0			
Electrical 3dB Upper Cutoff Frequency			MHz			1500	
Signal Detect Threshold Decreasing light input Increasing light input	P_D P_A		dBm dBm	-30		-20	
Signal Detect Hysteresis	$P_A - P_D$		dB	0.5	2.0		

Pin Descriptions

Pin (2×10)	Pin (2×5)	Symbol	Function	Logic Family
1		V_{PD}	Photodetector(PD) Bias; optional feature If not use the input power monitoring function, connect this pin to power supply.	
2		$V_{EE,RX}$	Receiver(RX) Signal Ground	
3		$V_{EE,RX}$	Receiver Signal Ground	
4		N/C		
5		N/C		
6	1	$V_{EE,RX}$	Receiver Signal Ground	
7	2	$V_{CC,RX}$	Receiver Power Supply	
8	3	SD	Signal Detect. (Logic HIGH for normal operation)	TTL
9	4	RD-	Received Data Out Bar	LVPECL
10	5	RD+	Received Data Out	LVPECL
11	6	$V_{CC,TX}$	Transmitter(TX) Power Supply	
12	7	$V_{EE,TX}$	Transmitter Signal Ground	
13	8	TDis	Transmitter Disable (Logic LOW for normal operation)	TTL
14	9	TD+	Transmitter Data In	LVPECL
15	10	TD-	Transmitter Data In Bar	LVPECL
16		$V_{EE,TX}$	Transmitter Signal Ground	
17		Bmon(-)	Laser Diode Bias Current Monitor – Negative End	Analog
18		Bmon(+)	Laser Diode Bias Current Monitor – Positive End	Analog
19		Pmon(-)	Laser Diode Optical Power Monitor – Negative End	Analog
20		Pmon(+)	Laser Diode Optical Power Monitor – Positive End	Analog

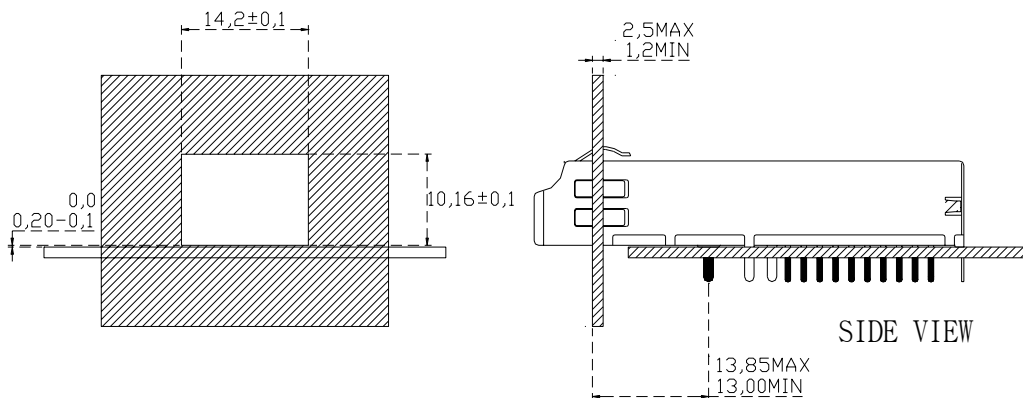


Fig.5 Bezel Opening Dimensions [unit: mm]

! Handling Caution

The transceiver can be damaged by overvoltage and current surges. Precautions should be taken for transient power supply.

This device is susceptible to damage as a result of electrostatic discharge(ESD). Take proper precautions during both handling and testing

Laser Eye Safety

These transceivers have laser semiconductor product and are classified as AEL Class I per U.S. FDA/CDRH 21CFR 1040 and class 1 per EN60825-1. These products comply with 21CFR, Chapter 1, Subchapter J(21CFR 1040.10 and 1040.11 laser safety requirements).

Laser Data

Wavelength : 1310nm (model) / 1550nm(model)

Modulation Frequency : 1.25Gbps (duty cycle : 50 percent)

Measured output power(Aperture Size 7mm) : mW(1310nm) / mW(1550nm)

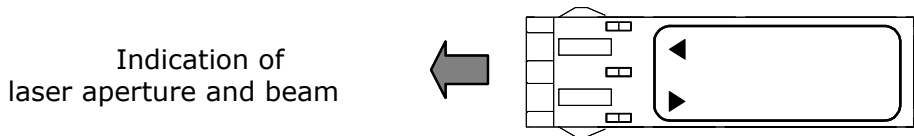
Limit power : mW(1310nm) / mW(1550nm)

! Caution

- All adjustments are made at the factory before shipment to our customers. No maintenance and alteration to device is required.
- Tampering with or modifying the performance of the modules will result in voided product warranty. It may also result in improper operation of the circuitry, and possible overstress of the semiconductor components. Device degradation or product failure may result.
- Use of controls or adjustments or procedures other than those specified herein (ex : Connection of the modules to a non-approved optical source, operating above the recommended absolute maximum conditions, operating in a manner inconsistent with unit design and function) may result in hazardous radiation exposure and may be considered an act of modifying or manufacturing a laser product. The person(s) performing such an act is required by law to recertify the laser product under the provisions of US 21CFR (Subchapter J).
- The use of optical instruments with this product will increase eye hazard.

Notice
On operation, If optical connectors are unterminated, modules can emit invisible laser radiation. Avoided eye exposure to direct or indirect radiation

Laser Emission



Ordering Information

Com-pany	Func-tion	Data Rate	Wavelength	Supply Voltage	Distance	Pin	Temp. Range	Shielding
T	S	8	3	3	20	-	1	N
Tera-dian	V ;TRV S ;SFF F ;SFP B ;Bi-Di TRV. (Recep-tacle) D ;Bi-Di TRV. (Pig-tailed)	1 ;155Mbps 4 ;622Mbps F ;1.06Gbps 8 ;1.25Gbps S ;2.12Gbps G ;2.5Gbps A ;Asy. Bi-Di 622M/155M E ;Asy. Bi-Di 1.25G/155M O ;Order-made	3 ;1.3μm 5 ;1.55μm 6 ;Bi-Di T1.3/R1.5 7 ;Bi-Di T1.5/R1.3 8 ;850nm A ;1470nm B ;1490nm C ;1510nm D ;1530nm E ;1550nm F ;1570nm G ;1590nm H ;1610nm M ;1270nm N ;1290nm O ;1310nm P ;1330nm Q ;1350nm R ;1370nm S ;1390nm T ;1410nm U ;1430nm W ;1450nm	3 ;3.3V	SX ;Note1 02 ;2km LX ;5km 10 ;10km 15 ;15km 20 ;20km 30 ;30km 40 ;40km 60 ;60km 80 ;80km A0 ;100km C0 ;120km	1 ;2X5 (10 pin) 2 ;2X10 (20 pin) 9 ;1X9 (9 pin)	I ;Indoor Use (0~70℃) O ;Outdoor Use (-40~85℃)	N ;No Shield

*Note 1 ;
 - 220m with 62.5/125μm MMF @1.25Gbps
 - 500m with 50/125μm MMF @1.25Gbps
 - 200m with 62.5/125μm MMF @2.125Gbps

*Note 2 ; additional order information
 - Connector type default is SC/PC and the default length of fiber is 1m
 - In case of ordering pigtailed Bi-Di Transceiver, please specify specs. clearly if not default.

More Information

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