

Gigabit Ethernet 1.25Gbps Transceiver TV88xxx



- 850 nm MMF Transceiver
- 1.25Gbps Gigabit Ethernet (1000Base-LX)
- Single +3.3V or +5V Power Supply
- 1X9 Duplex SC Connector

Family Model

TV883SX

TV885SX

Features

- Compliant with IEEE 802.3z 1000BASE-SX specifications for Gigabit Ethernet
- Industry standard 1X9 package with duplex SC connector
- 850nm Vertical Cavity Surface Emitting Laser(VCSEL) and APC for constant output power
- High sensitive GaAs or Si PIN photodiode
- IEC 60825-1 Class 1 Laser Eye Safety
- Dual +3.3V or +5V power supply
- Plastic or metallized housing
- Operating temperature ; 0 to +70°C
- Distance options
 - 500m with 50/125µm
 - 220m with 62.5/125µm MMF

Description

The TV88XSX series transceivers are designed to meet the Gigabit Ethernet SX specifications. The transceivers are manufactured in 1x9 pin package with duplex SC connector interface and made of metallized housing to obtain excellent EMI shielding.

The transmitter consists of a 850nm Vertical Cavity Surface Emitting Laser(VCSEL) in an optical subassembly(OSA). The OSA is driven by a custom IC which converts differential PECL logic signals into a laser diode drive current. The receiver includes a high sensitive GaAs or Si 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 be used in a dual power supply(+5V & +3.3V) and an operating temperature range of 0°C to +70°C.

Applications

The transceiver operates at 1.0625Gbps for Fibre Channel and 1.25Gbps for Gigabit Ethernet on multimode fiber.

- Gigabit Ethernet / LAN switch / Hubs / Routers
- Metro Ethernet
- Storage area network

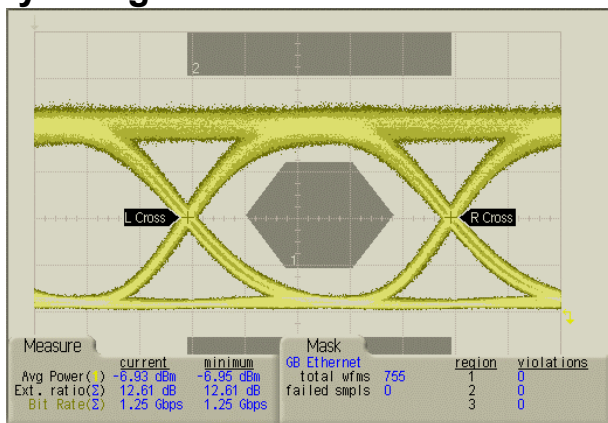
Absolute Maximum Ratings

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	5.5	
Lead Soldering Temperature/Time		°C/sec		260/10	
Relative Humidity	RH	%	-	95	

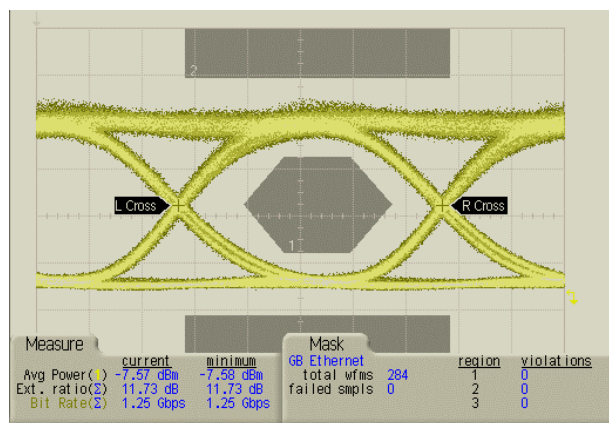
Electrical Characteristics

Parameters		Symbol	Unit	Min.	Typ.	Max.	Remarks
DC Power Supply Voltage		$V_{CC}-V_{EE}$	V	3.1 4.7	3.3 5	3.5 5.3	3.3V 5V
DC Power Supply Current		$I_{CC,TX}$ $I_{CC,RX}$	mA mA		60 90	70 100	
Input Data Voltage	Low	$V_{IL}-V_{CC}$	V	-1.810 -1.165		-1.475 -0.880	3.3V/5V
	High	$V_{IH}-V_{CC}$					
Output Data Voltage	Low	$V_{OL}-V_{CC}$	V	-1.892 -1.051		-1.548 -0.879	3.3V/5V
	High	$V_{OH}-V_{CC}$					
Output SD Voltage	TTL option	Low	V	-		0.8	3.3V
		High					
		Low	V	-		0.8	5V
		High					

Eye Diagram



a. Back-to-back



b. After 220m transmission using 62.5 μm core MMF

Fig. 1 Eye Diagram

Optical Characteristics

(T_{op} = 25°C)

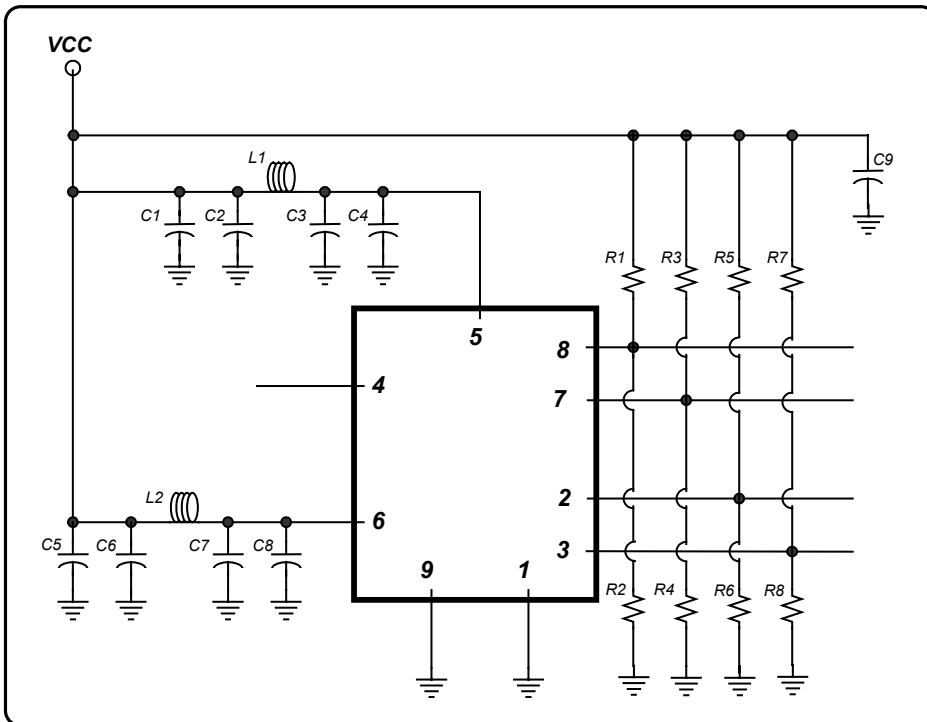
Parameters	Symbol	Condition	Unit	Min.	Typ.	Max.	Remark
Data Bit Rate		NRZ	Gbps		1.25		
Fiber Length		10 ⁻¹² BER, 1.25Gbps	m	500			
50 μm core MMF				220			
62.5μm core MMF							
TRANSMITTER							
Average Power Output	P _{OUT}	I _f =I _{BIAS} + I _{mod} /2	dBm	-9.5		-4.0	
Extinction Ratio	ER		dB	9			
Center Wavelength	λ _C	CW, @ P _{OUT}	nm	840	850	860	
Spectral Width	Δλ	RMS Width	nm			0.85	
Optical Rise/Fall Time	t _r /t _f	20 – 80%	nsec			0.26	
Relative Intensity Noise	RIN		dB /Hz			-117	
Total Transmitter Jitter Added at TP2			psec			227	
RECEIVER							
Sensitivity (Average Input Power)	P _{IN,MIN}	PRBS 2 ⁷ -1, 10 ⁻¹² BER	dBm		-21.0	-17.0	@850nm, 1.25Gbps
Receiver Overload	P _{IN,MAX}		dBm	-3.0			
Electrical 3dB Upper Cutoff Frequency			MHz			1500	
Signal Detect Threshold							
Decreasing light input	P _D		dBm	-30			
Increasing light input	P _A		dBm			-18	
Signal Detect Hysteresis	P _A - P _D		dB	0.5	2.0		

Pin Descriptions

Pin No.	Symbol	Description	Level/Logic
1	V _{EER}	Rx Ground	Power supply
2	RD+	Rx Data out(+)	PECL
3	RD-	Rx Data out(-)	PECL
4	SD	RX Signal detect. (Logic HIGH for normal operation).	TTL output
5	V _{CCR}	Rx Power supply	Power supply
6	V _{CCT}	Tx Power supply	Power supply
7	TD-	Tx Data in(-)	PECL
8	TD+	Tx Data in(+)	PECL
9	V _{EET}	Tx Ground	Power supply

Recommended Interface Circuit

The transceiver can operate with PECL logic level. The interface circuit with direct-coupled PECL interface is shown in Figure 1. When interfacing with non-PECL logic level, AC coupling can be used as shown in Figure 2. The Signal Detect circuit monitors the incoming optical signal and generates a logic LOW signal when the optical signal is lower than a predefined level. The power supply filters are required for good EMI performance and should be as close to the transceiver as possible.

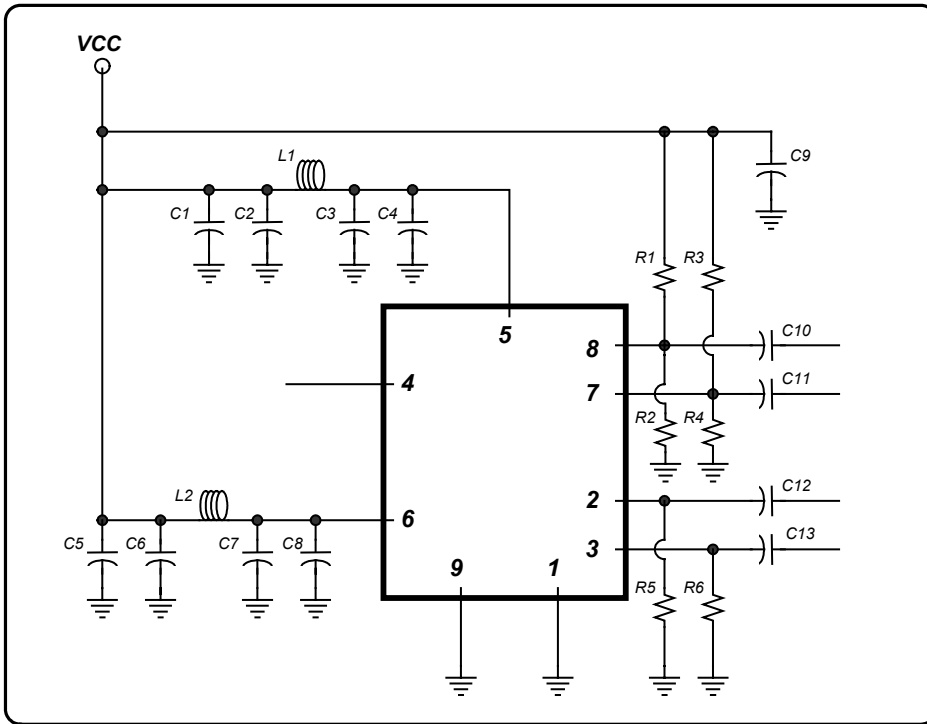


C1=C4=C5=C8=10uF,
C2=C3=C6=C7=0.1uF,
C9=0.1uF,

L1=L2=1.0uH or
Ferrite inductor

R1=R3=R5=R7=82Ω
(5.0V) or 82Ω (3.3V),
R2=R4=R6=R8=130Ω
(5.0V) or 130Ω (3.3V),

Fig. 2 DC-Coupled PECL Interface



$C1=C4=C5=C8=10\mu F$,
 $C2=C3=C6=C7=0.1\mu F$,
 $C9=0.1\mu F$, $R1=R3=68\Omega$
 (5.0V) or 82Ω (3.3V),
 $R2=R4=180\Omega$ (5.0V)
 130Ω (3.3V),
 $R5=R6=270\Omega$ (5.0V)
 or 142Ω (3.3V),
 $C10=C11=C12=C13=0$
 $.1\mu F$,
 $L1=L2=1.0\mu H$
 or Ferrite inductor

Figure 3. AC-Coupled PECL Interface.

Outline Diagram

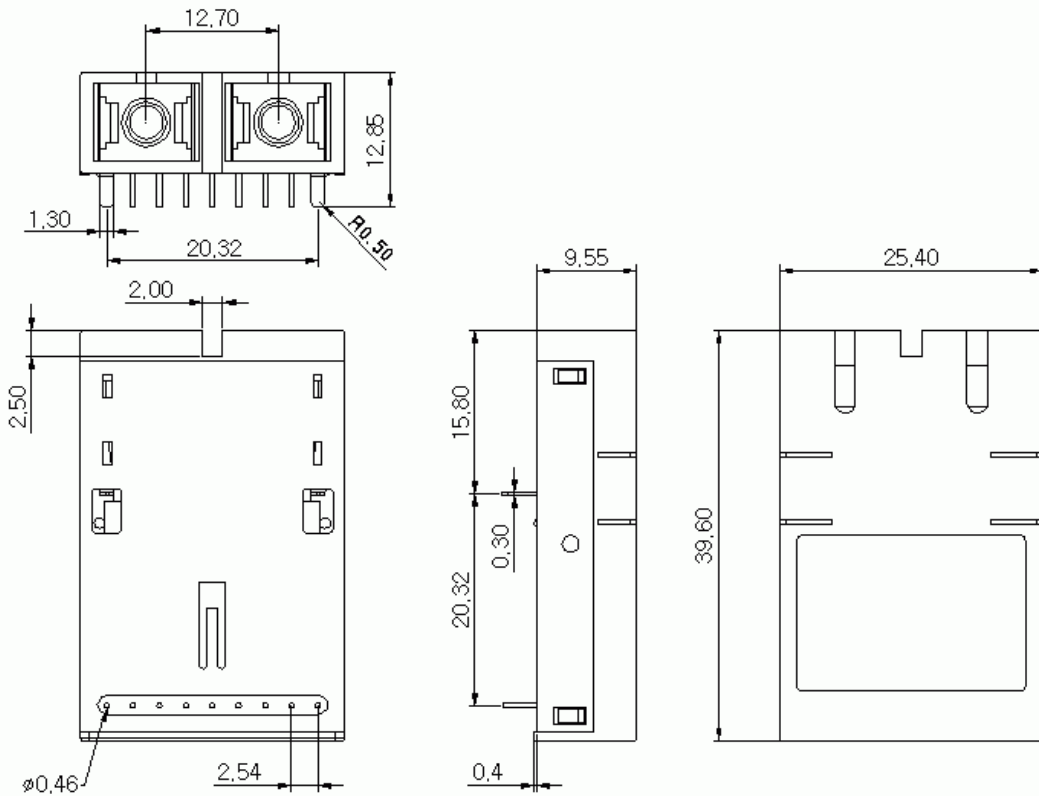


Fig.4 SC duplex Transceiver Package Dimensions [unit: mm]

! 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

! 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 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

Ordering Information

Com pany	Func- tion	Data Rate	Wavelength	Supply Voltage	Distance	Pin	Temp. Range	Shielding	
T	V	8	8	3	20	-	9	I	N
Terad ian	V ;TRV S ;SFF F ;SFP	F ;1.06Gbps 8 ;1.25Gbps S ;2.12Gbps G ;2.5Gbps	8 ;850nm	3 ;3.3V 5 ;5V	SX ;Note1	9 ;1X9 (9 pin)	I ;Indoor Use (0~70℃)	N ;No Shield M ;Metal case	

*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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