

GSFP-TX



10/100/1000Mbps Copper SFP Transceiver

Overview

10/100/1000Base-T Copper Small Form Pluggable (SFP) transceivers is high performance, cost effective module compliant with the Gigabit Ethernet and 10/100/1000BASE-T standards as specified in IEEE 802.3-2002 and IEEE 802.3ab, which supporting 10/100/1000Mbps data-rate up to 100 meters reach over unshielded twisted-pair category 5 cables. The GSFP-TX supports 10/100/1000 Mbps full duplex data-links with 5-level Pulse Amplitude Modulation (PAM) signals. All four pairs in the cable are used with symbol rate at 250Mbps on each pair. The GSFP-TX provides standard serial ID information compliant with SFP MSA, which can be accessed with address of A0h via the 2wire serial CMOS EEPROM protocol. The physical IC can also be accessed via 2wire serial bus at address ACh.

Application

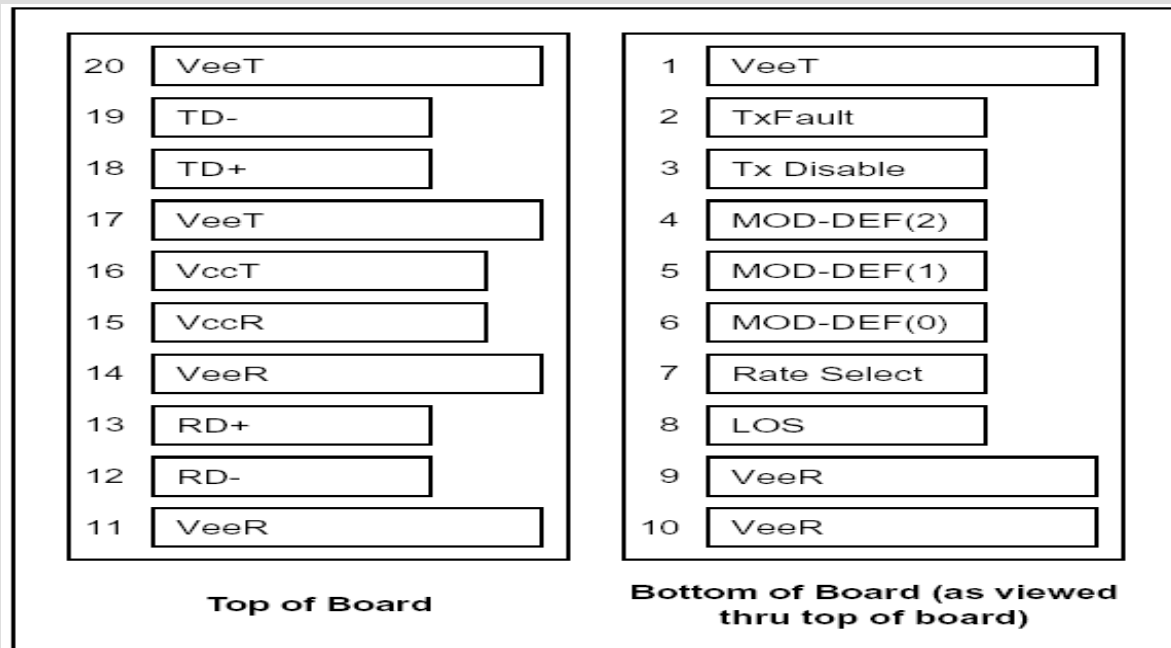
1.25 Gigabit Ethernet over Cat 5 cable
Switch/Router to Switch/Router Link
High level I/O for file servers
Other Optical links

Features

- ❖ Up to 1.25Gb/s bi-directional data links
- ❖ Hot-pluggable SFP footprint
- ❖ Extended case temperature range (0°C to +85°C)
- ❖ Fully metallic enclosure for low EMI
- ❖ Low power dissipation
- ❖ Compact RJ-45 connector assembly
- ❖ Detailed product information in EPROM
- ❖ +3.3V single power supply
- ❖ Access to physical layer IC via 2-wire serial bus
- ❖ 10/100/1000 BASE-T operation in host systems with SGMII interface
- ❖ Compliant with SFP MSA

- ❖ Compliant with IEEE Std 802.3TM-2002
- ❖ Compliant with FCC 47 CFR Part 15, Class B
- ❖ RoHS Compliant Products

Pin Diagram



Pin Description

Pin	Signal Name	Description	Plug Seq.	Notes
1	VEET	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note1
3	TX DISABLE	Transmitter Disable	3	Note2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note3
6	MOD_DEF(0)	TTL Low	3	Note3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	VEER	Receiver ground	1	
10	VEER	Receiver ground	1	
11	VEER	Receiver ground	1	
12	RX-	Inv. Received Data Out	3	Note 5
13	RX+	Received Data Out	3	Note 5
14	VEER	Receiver ground	1	
15	VCCR	Receiver Power Supply	2	

16	VCCT	Transmitter Power Supply	2	
17	VEET	Transmitter Ground	1	
18	TX+	Transmit Data In	3	Note 6
19	TX-	Inv. Transmit Data In	3	Note 6
20	VEET	Transmitter Ground	1	

Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

- 1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- 2) TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 ̄C 10 K resistor. Its states are:
 - Low (0 to 0.8V): Transmitter on
 - (>0.8, < 2.0V): Undefined
 - High (2.0 to 3.465V): Transmitter Disabled
 - Open: Transmitter Disabled
- 3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K to 10K resistor on the host board. The pull-up voltage shall be VccT or VccR
 - Mod-Def 0 is grounded by the module to indicate that the module is present
 - Mod-Def 1 is the clock line of two wire serial interface for serial ID
 - Mod-Def 2 is the data line of two wire serial interface for serial ID
- 4) LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K to 10K resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to <0.8V.
- 5) RD-/+: These are the differential receiver outputs. They are AC coupled 100 differential lines which should be terminated with 100 (differential) at the user SERDES.
- 6) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 differential terminations inside the module.

+3.3V Volt Electrical Power Interface

The SFP-GB-T3 has an input voltage range of +5V +/- 5%. The 3.3V maximum voltage is not allowed for continuous operation.

+3.3V Volt electrical power interface

+3.3V volt Electrical Power Interface						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Supply Current	Is		320	375	mA	1.2W max power over full range of voltage and temperature. See caution note below
Input Voltage	Vcc	3.13	3.3	3.47	V	Referenced to GND
Maximum	Vmax			4	V	

Voltage						
Surge Current	I _{surge}			30	mA	Hot plug above steady state current. See caution note below

Low-speed signals, electronic characteristics

Low-Speed Signals, Electronic Characteristics					
Parameter	Symbol	Min	Max	Units	Notes/Conditions
SFP Output LOW	VOL	0	0.5	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
SFP Output HIGH	VOH	host_Vc c - 0.5	host_Vc c + 0.3	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
SFP Input LOW	VIL	0	0.8	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector
SFP Input HIGH	VIH	2	Vcc + 0.3	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector

High-Speed Electrical Interface

High-Speed Electrical Interface Transmission Line-SFP						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Line Frequency	fL		125		MHz	5-level encoding, per IEEE 802.3
Tx Output Impedance	Z _{out,TX}		100		Ohm	Differential, for all Frequencies between 1MHz and 125MHz
Rx Input Impedance	Z _{in,RX}		100		Ohm	Differential, for all Frequencies between 1MHz and 125MHz

High-speed electrical interface, host-SFP

High-Speed Electrical Interface, Host-SFP						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Single ended data input swing	V _{insing}	250		1200	mV	Single ended
Single ended data output swing	V _{outsing}	350		800	mV	Single ended
Rise/Fall Time	T _r ,T _f		175		psec	20%-80%
Tx Input Impedance	Z _{in}		50		Ohm	Single ended
Rx Output Impedance	Z _{out}		50		Ohm	Single ended

General Specifications

General						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Data Rate	BR	10		1,000	Mb/sec	IEEE 802.3 compatible. See Notes 2 through 4 below
Cable Length	L			100	m	Category 5 UTP. BER <10 ⁻¹²

Notes:

1. Clock tolerance is +/- 50 ppm
2. By default, the GSFP-Tx is a full duplex device in preferred master mode
3. Automatic crossover detection is enabled. External crossover cable is not required
4. 10/100/1000BASE-T operation requires the host system to have an SGMII interface with no clocks

Environmental Specifications

Environmental Specifications						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Operating Temperature	Top	-40		85	°C	Case temperature
Storage Temperature	Tsto	-40		100	°C	Ambient temperature

Mechanical Specifications

The host-side of the SFP-GB-T3 conforms to the mechanical specifications outlined in the SFP MSA1. The front portion of the SFP (part extending beyond the face plate of the host) is larger to accommodate the RJ-45 connector.

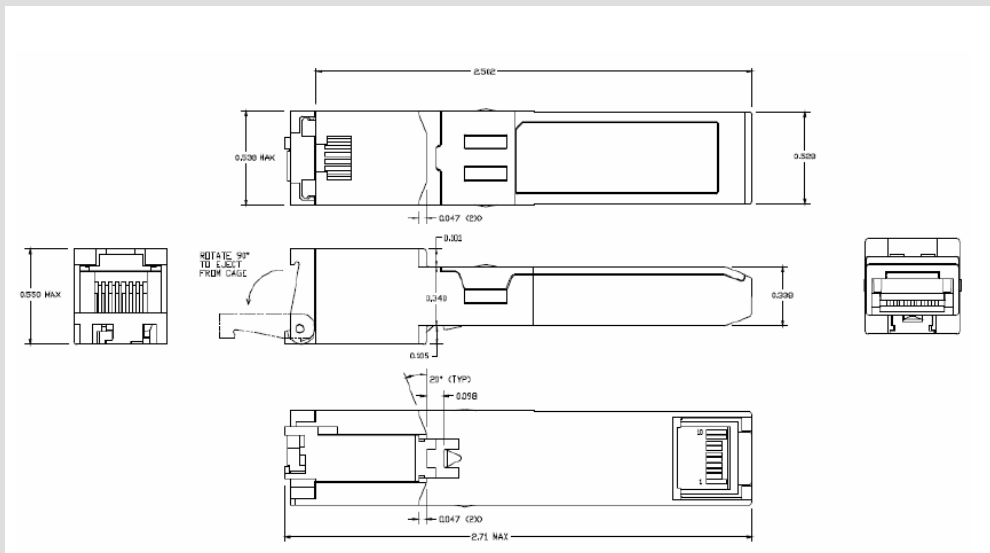


Figure 2. GSFP-TX mechanical dimensions



Ordering information

Make/Model	Description
GSFP-TX	10/100/1000BASE-T SFP Copper Transceiver, Hot Pluggable,Cat-5 UTP Cable, 100m



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