

1000Base-T and 10/100/1000Base-T Copper SFP Transceiver

GS-GE-PXC



Overview

GZ-LINK GS-GE-PXC Copper Small Form Pluggable (SFP) transceiver is high performance, cost effective module compliant with the Gigabit Ethernet and 1000BASE-T standards as specified in IEEE 802.3-2002 and IEEE 802.3ab, which supporting 1000Mbps data-rate up to 100 meters reach over unshielded twisted-pair category 5 cable.

The module supports 1000Mbps 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 module 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.

Ordering information

Part Number	Data rate	MAC interface	TX Disable function	Link Indicator on RX_LOS	Distance	Temp
GS-GE-P1C	1000Mbps	SERDES	YES	YES	100M	0~70°C
GS-GE-P3C	10/100/1000Mbps	GSGMII	YES	YES	100M	0~70°C

Features

- ◆ Up to 1.25Gb/s bi-directional data links
- ◆ Hot-pluggable SFP footprint
- ◆ TX Disable and RX Los/without Los function
- ◆ Fully metallic enclosure for low EMI
- ◆ Low power dissipation (1.05 W typical)
- ◆ Compact RJ-45 connector assembly
- ◆ Access to physical layer IC via 2-wire serial bus
- ◆ 1000 BASE-T operation in host systems with SERDES interface
- ◆ 10/100/1000Mbps compliant in host systems with SGMII interface
- ◆ Operating case temperature range of 0°C to +70°C (Commercial) or -20°C to +85°C (Extend)

Applications

- ◆ 1.25 Gigabit Ethernet over Cat 5 cable

Pin Definitions

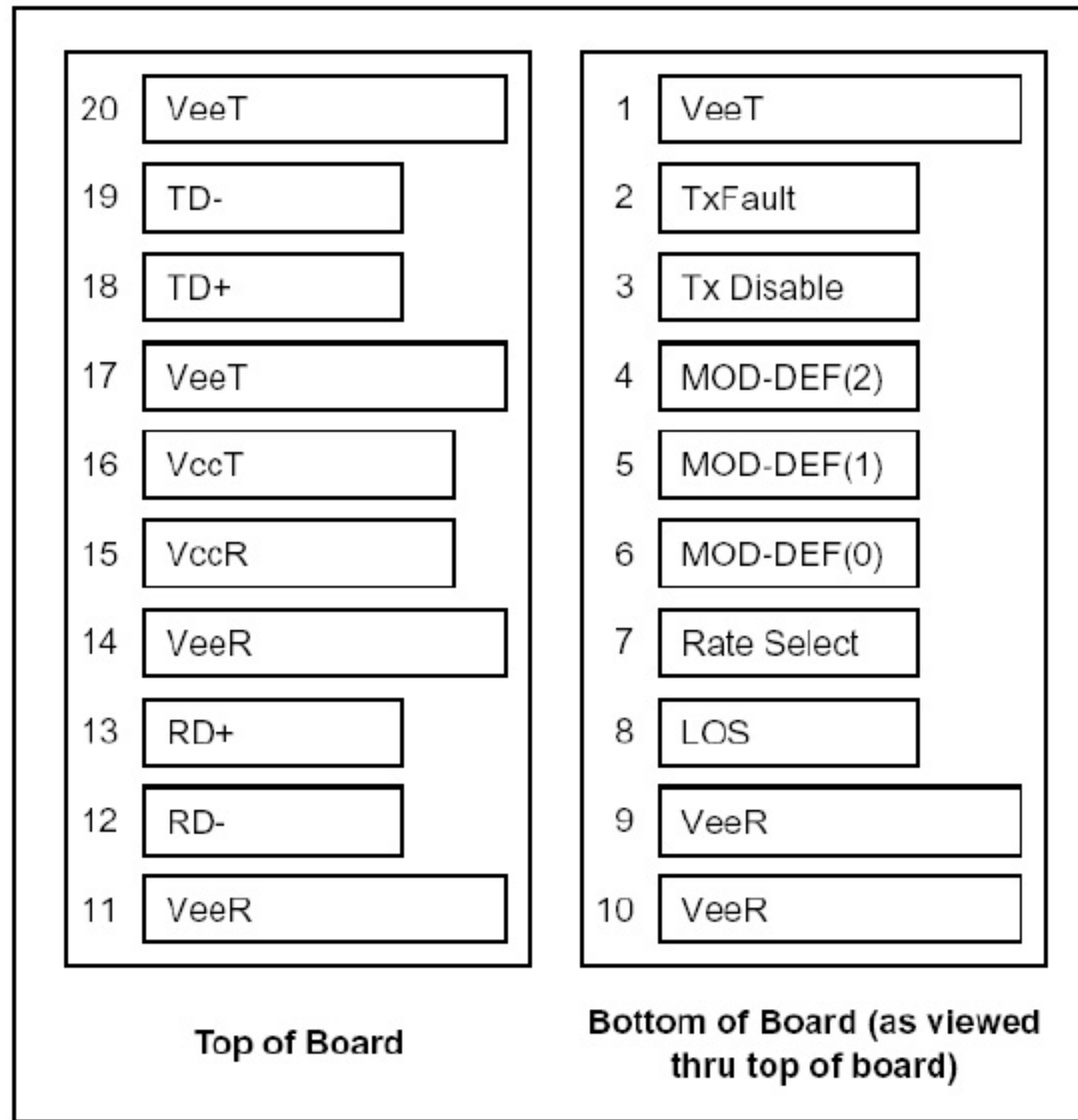


Figure1. Pin Diagram

Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V _{EET}	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	Note4
9	V _{EER}	Receiver ground	1	
10	V _{EER}	Receiver ground	1	
11	V _{EER}	Receiver ground	1	
12	RX-	Inv. Received Data Out	3	Note 5
13	RX+	Received Data Out	3	Note 5
14	V _{EER}	Receiver ground	1	
15	V _{CCR}	Receiver Power Supply	2	
16	V _{CCT}	Transmitter Power Supply	2	

17	V _{EET}	Transmitter Ground	1	
18	TX+	Transmit Data In	3	Note 6
19	TX-	Inv. Transmit Data In	3	Note 6
20	V _{EET}	Transmitter Ground	1	

Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

- 1) TX Fault is not supported and is always connected to ground.
- 2) TX disable, an input used to reset the transceiver module, This pin is pulled up within the module with a 4.7 KΩ resistor.
 Low (0 – 0.8 V) : Transceiver on
 Between (0.8 V and 2.0 V) : Undefined
 High (2.0 – 3.465 V) : Transceiver in reset state
 Open : Transceiver in reset state
- 3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K~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) RX_LOS (Loss of Signal): LVTTTL compatible with a maximum voltage of Host_Vcc. RX_LOS can enabled or disabled (Refer to Ordering information),RX_LOS is not used and is always tied to ground via 100-ohm resistor.
- 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

+3.3V volt Electrical Power Interface						
Parameter	Symbol	Min	Typical	Max	Units	Notes/Conditions
Supply Current	I _s		320	375	mA	1.2W max power over full range of voltage and temperature. See caution note below
Input Voltage	V _{cc}	3.13	3.3	3.47	V	Referenced to GND
Maximum Voltage	V _{max}			3.6	V	

Low-speed signals, electronic characteristics

Low-Speed Signals, Electronic Characteristics					
Parameter	Symbol	Min	Max	Units	Notes/Conditions
SFP Output LOW	V _{OL}	0	0.5	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
SFP Output HIGH	V _{OH}	host_Vcc - 0.5	host_Vcc + 0.3	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
SFP Input LOW	V _{IL}	0	0.8	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector
SFP Input HIGH	V _{IH}	2	Vcc + 0.3	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector

High-Speed Electrical Interface, Transmission Line-SFP

High-Speed Electrical Interface Transmission Line-SFP						
Parameter	Symbol	Min	Typical	Max	Units	Notes/Conditions
Line Frequency	fL		125		MHz	5-level encoding, per IEEE 802.3
Tx Output Impedance	Zout,TX		100		Ohm	Differential, for all Frequencies between 1MHz and 125MHz
Rx Input Impedance	Zin,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	Typical	Max	Units	Notes/Conditions
Single ended data input swing	Vinsing	250		1200	mV	Single ended
Single ended data output swing	Voutsing	350		800	mV	Single ended
Rise/Fall Time	Tr,Tf		175		psec	20%-80%
Tx Input Impedance	Zin		50		Ohm	Single ended
Rx Output Impedance	Zout		50		Ohm	Single ended

General Specifications

General						
Parameter	Symbol	Min	Typical	Max	Units	Notes/Conditions
Data Rate	BR	10		1000	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 GS-GE-PXC is a full duplex device in preferred master mode
3. Automatic crossover detection is enabled. External crossover cable is not required

Environmental Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Commercial		0		°C
	Extend		-20		°C
Storage Temperature			-40		°C

Mechanical Specifications

The host-side of the GS-GE-PXC conforms to the mechanical specifications outlined in the SFP MSA1. The front portion of the SFP is larger to accommodate the RJ-45 connector.

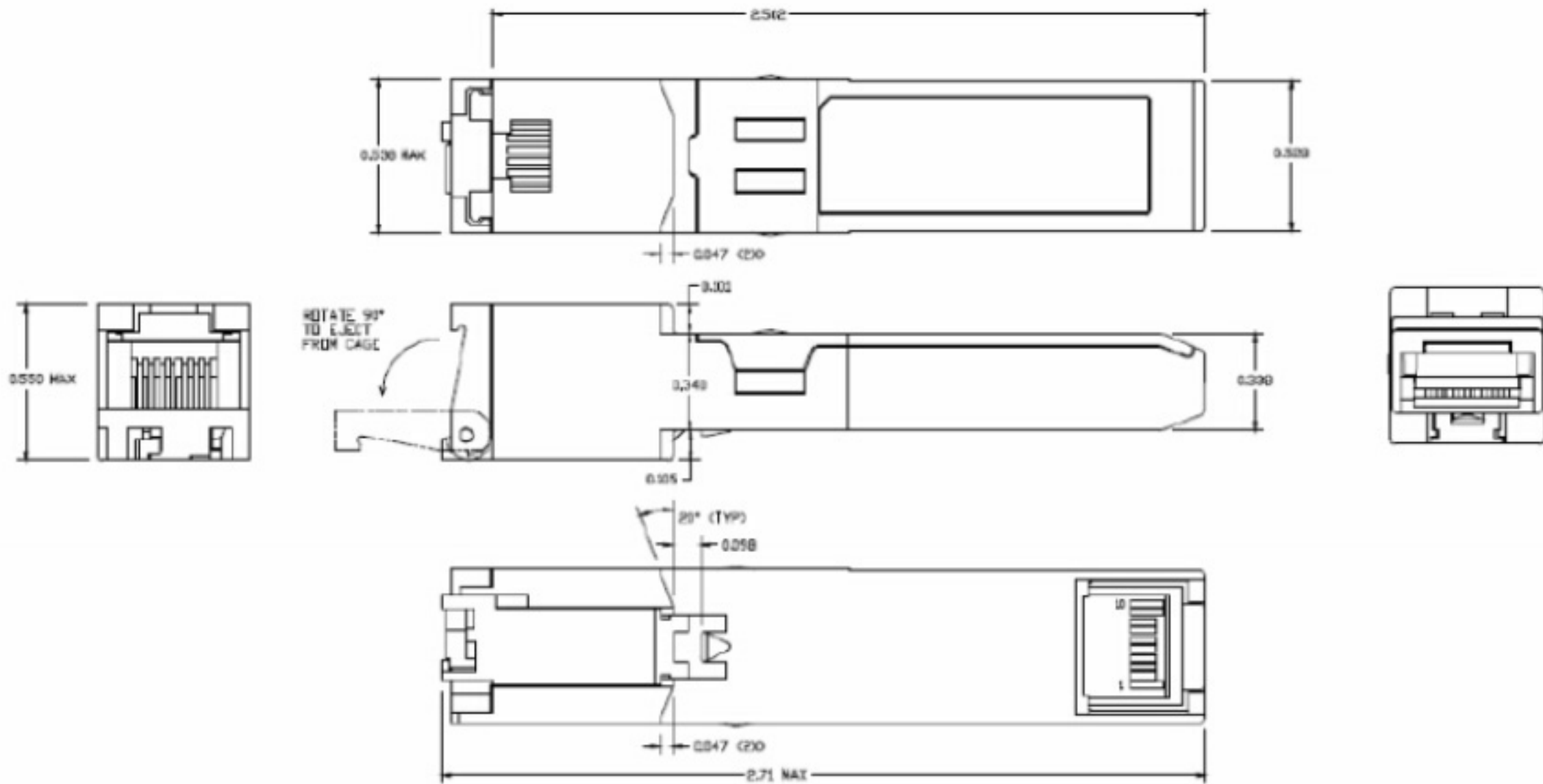


Figure2. Mechanical Specifications

Regulatory Compliance

SFP-Copper transceiver is designed to be Class I Laser safety and is certified per the following standards:

Feature	Agency	Standard	Certificate / Comments
Environmental protection	SGS	RoHS Directive 2011/65/EU	GZ090319751A/CHEM

References

1. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA),September 2000.
2. IEEE802.3 – 2002.
3. “AT24C01A/02/04/08/16 2-Wire Serial CMOS E2PROM”, Atmel Corporation.

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