OT-SFP-GE2-T-X-X

1000 BASE-T Copper SFP Transceiver

1.PRODUCT FEATURES

- Up to 1.25Gb/s bi-directional data links

- Hot-pluggable SFP footprint

- Fully metallic enclosure for low EMI

- Low power dissipation (0.4 W typical)

- Compact RJ-45 connector assembly

- Compatible with RoHS and lead-free

- 1000Mbps compliant in host systems with 1000Base-FX interface

- Case operating temperature:

    Commercial: 0°C to +70°C

    Extended: -10°C to +80°C

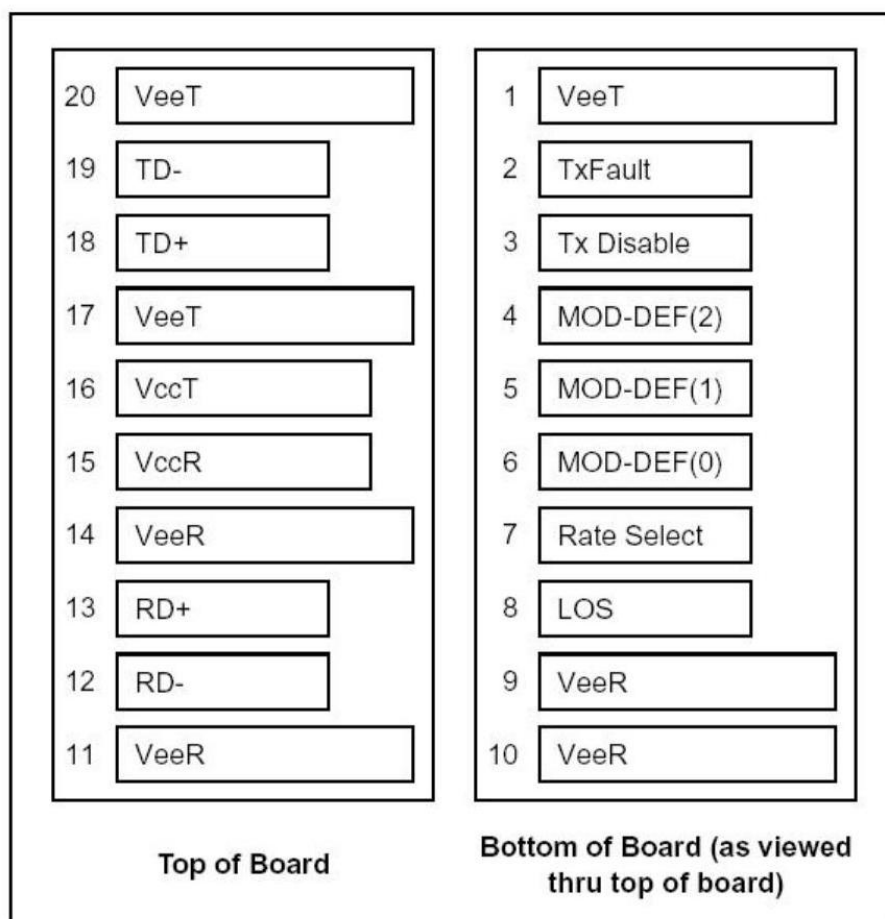   Industrial: -40°C to +85°C

2.Applications

- 1.25 Gigabit Ethernet over Cat 5 cable

3.Product Description

   OT-SFP-GE2-T-X-X CopperSmall Form Pluggable (SFP) transceiversis high performance, costeffective module compliant with the Gigabit Ethernet and 1000- BASE-T standards asspecified in IEEE 802. 3-2002 and IEEE 802.3ab, which supporting 1000Mbps data- rate upto 100meters reach over unshieldedtwisted-pair category 5 cable. The module supports1000Mbps full duplex data-links with 5-level Pulse Amplitude Modulation (PAM) signals. All fourpairs in the cable are used with symbol rate at 250Mbps on   each pair. The module providesstandard serial ID information compliant with SFP MSA, which can be accessed with addressof A0h via the 2wire serial CMOSEEPROM protocol. The physical IC can also be accessedvia 2wire serial bus at address A0h.

3.Pin Definitions

Pin Diagram

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┌──────────────────────────────────────────────────────┐
│   ┌───────────────────────┐   ┌───────────────────────┐ │
│   │ 20 │ VeeT │            │   │ 1 │ VeeT │            │ │
│   │ 19 │ TD- │             │   │ 2 │ TxFault │         │ │
│   │ 18 │ TD+ │             │   │ 3 │ Tx Disable │      │ │
│   │ 17 │ VeeT │            │   │ 4 │ MOD-DEF(2) │      │ │
│   │ 16 │ VccT │            │   │ 5 │ MOD-DEF(1) │      │ │
│   │ 15 │ VccR │            │   │ 6 │ MOD-DEF(0) │      │ │
│   │ 14 │ VeeR │            │   │ 7 │ Rate Select │     │ │
│   │ 13 │ RD+ │             │   │ 8 │ LOS │            │ │
│   │ 12 │ RD- │             │   │ 9 │ VeeR │           │ │
│   │ 11 │ VeeR │            │   │ 10 │ VeeR │          │ │
│   └───────────────────────┘   └───────────────────────┘ │
│       Top of Board              Bottom of Board (as viewed │
│                                   thru top of board)        │
└──────────────────────────────────────────────────────┘
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Pin Descriptions

Pin Descriptions				
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	Note4
9	Veer	Receiver ground	1	

10	Veer	Receiver ground	1	
11	Veer	Receiver ground	1	
12	RX-	Inv. Receiver Date Out	3	Note5
13	RX+	Receiver Date Out	3	Note5
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 Date In	3	Note6
18	TX-	Inv. Transmit Date In	3	Note6
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~10k Ω 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 termination inside the module.

4.+3.3V Volt Electrical Power Interface

The OT-SFP-GE2-T-X-X has an input voltage range of +3.3V +/- 5%. The 3.3V maximum voltage is not allowed for continuous

operation.

+3.3 Volt Electrical PowerInterface						
Parameter	Symbol	Min	Typ	Max	unit	Notes/Conditions
Supply Current	Is		85	120	mA	0.4W max power overfull range of voltageand temperature.See caution note below
Input Voltage	Vcc	3.13	3.3	3.47	V	Referenced to GND
Maximum Voltage	Vmax			4	V	
Surge Current	Isurge			30	mA	Hot plug above steady statecurrent. See caution notebelow

Caution: Power consumption and surge current are higher than the specified values in the SFP MSA

5. Low-Speed Signals

MOD_DEF(1) (SCL) and MOD_DEF(2) (SDA), are open drain CMOS signals (see section VII, "Serial Communication Protocol").

Both MOD_DEF(1) and MOD_DEF(2) must be pulled up to host_Vcc.

Low-Speed Signals, Electronic Characteristics					
Parameter	Symbol	Min	Max	unit	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_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	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

6. High-Speed Electrical Interface

All high-speed signals are AC-coupled internally.

High-Speed Electrical Interface, Transmission Line-SFP						
Parameter	Symbol	Min	Typ	Max	unit	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

7. High-speed electrical interface, host-SFP

High-Speed Electrical Interface, Host-SFP						
Parameter	Symbol	Min	Typ	Max	unit	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	T_r, T_f		175		psec	20%-80%
Tx Input Impedance	Zin		50		Ohm	Single ended
Rx Output Impedance	Zout		50		Ohm	Single ended

8. General Specifications

| General						
Parameter	Symbol	Min	Typ	Max	unit	Notes/Conditions
Data Rate	BR	10		1000	Mb/sec	IEEE 802.3 compatible. See Notes2 through 4 below
Cable Length	L			100	m	Category 5UTP.BER<10-12

Notes:

1. Clock tolerance is +/- 30 ppm

2. By default, the OT-SFP-GE2-T-X-X is a full duplex device in preferred master mode

3. Automatic crossover detection is enabled. External crossover cable is not required

4. OT-SFP-GE2-T -X-X supports 1000Base-FX SERDES interface . With a SERDES the module will operate at 10/100/1000 BASE-TX

or 1000BASE-TX by smart process handle .

9. Environmental Specifications

Environmental Specification						
Parameter	Symbol	Min	Typ	Max	unit	Notes/Conditions
Case Operating Temperature	Tcase	0		70	°C	
		-10		80	°C	
		-40		85	°C	
Storage Temperature	Tsto	-40		85	°C	Ambient temperature

10. Mechanical Specifications(Unit:mm)
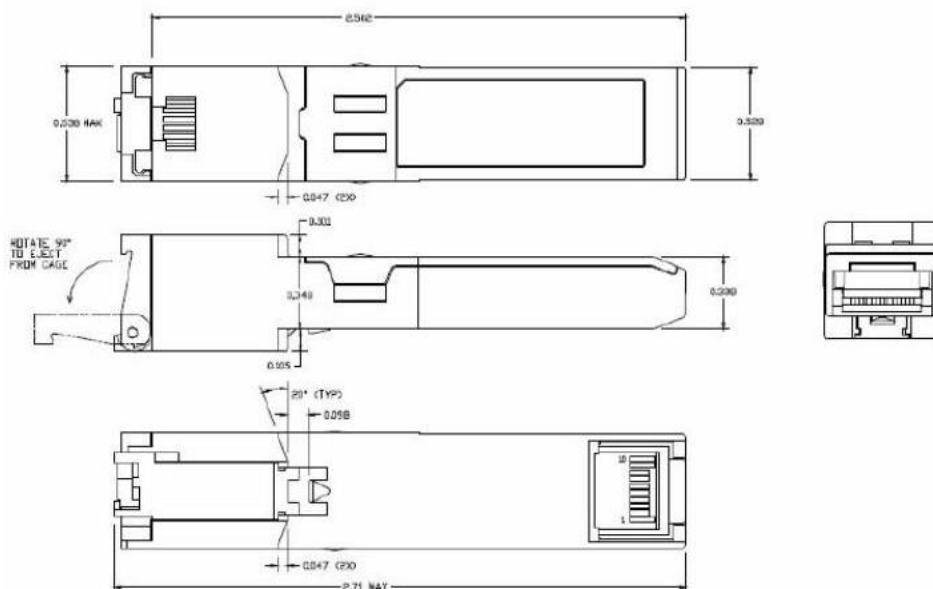
12. Ordering information

Part Number	Speed mode	MAC interface	TX Disable function	Link Indicator on RX_LOS Pin	Temp
OT-SFP-GE2-T-L-C	1000mbps	1000Base-FX	YES	YES	0~70℃
OT-SFP-GE2-T-N-C	1000mbps	1000Base-FX	NO	NO	0~70℃
OT-SFP-GE2-T-L-I	1000mbps	1000Base-FX	YES	YES	-40~85℃
OT-SFP-GE2-T-N-I	1000mbps	1000Base-FX	NO	NO	-40~85℃

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