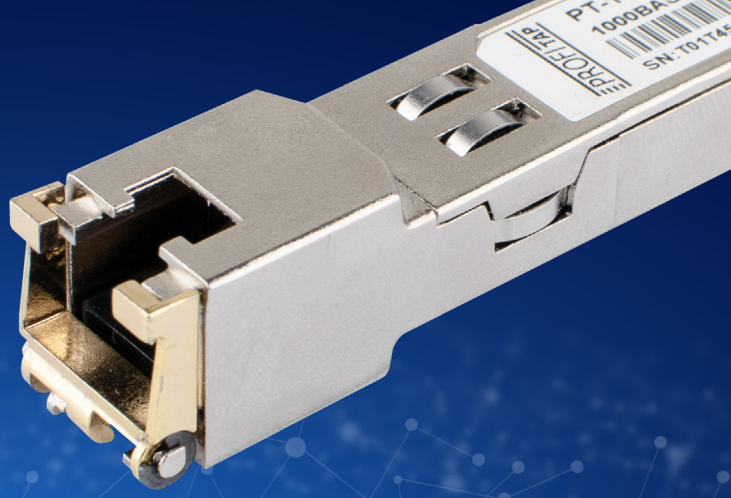
PROFITAP

PT-1G-BT-45

DATASHEET



1. GENERAL DESCRIPTION

Profitap 1000BASE-T Copper Small Form Pluggable (SFP) transceivers are modules of high performance that are compliant with the Gigabit Ethernet and 1000-BASE-T standards as specified in IEEE 802. 3-2002 and IEEE 802.3ab, which supports 1000Mbps data-rate up to 100 meters reach over unshielded twisted-pair CAT 5 cable. This module supports 1000 Mbps (or 10/100/1000Mbps) 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.

Product 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 (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
- 1Gigabit Ethernet over Cat 5 cable

2. SFP TO HOST CONNECTOR PIN OUT

PIN	Symbol	Name/Description	Note
1	VEET	Transmitter ground (common with receiver ground)	1
2	TFAULT	Transmitter Fault. Not supported	
3	TDIS	Transmitter Disable. PHY disabled on high or open	2
4	MOD_DEF(2)	Module Definition 2. Data line for serial ID	3
5	MOD_DEF(1)	Module Definition 1. Clock line for serial ID	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module	3
7	Rate Select	No connection required	
8	LOS	No connection required	4
9	VEER	Receiver ground (common with transmitter ground)	1
10	VEER	Receiver ground (common with transmitter ground)	1
11	VEER	Receiver ground (common with transmitter ground)	1
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	VEER	Receiver ground (common with transmitter ground)	1
15	VCCR	Receiver power supply	
16	VCCT	Transmitter power supply	
17	VEET	Transmitter ground (common with receiver ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD-	Transmitter Inverted DATA in. AC coupled	
20	VEET	Transmitter ground (common with receiver ground)	1

NOTE

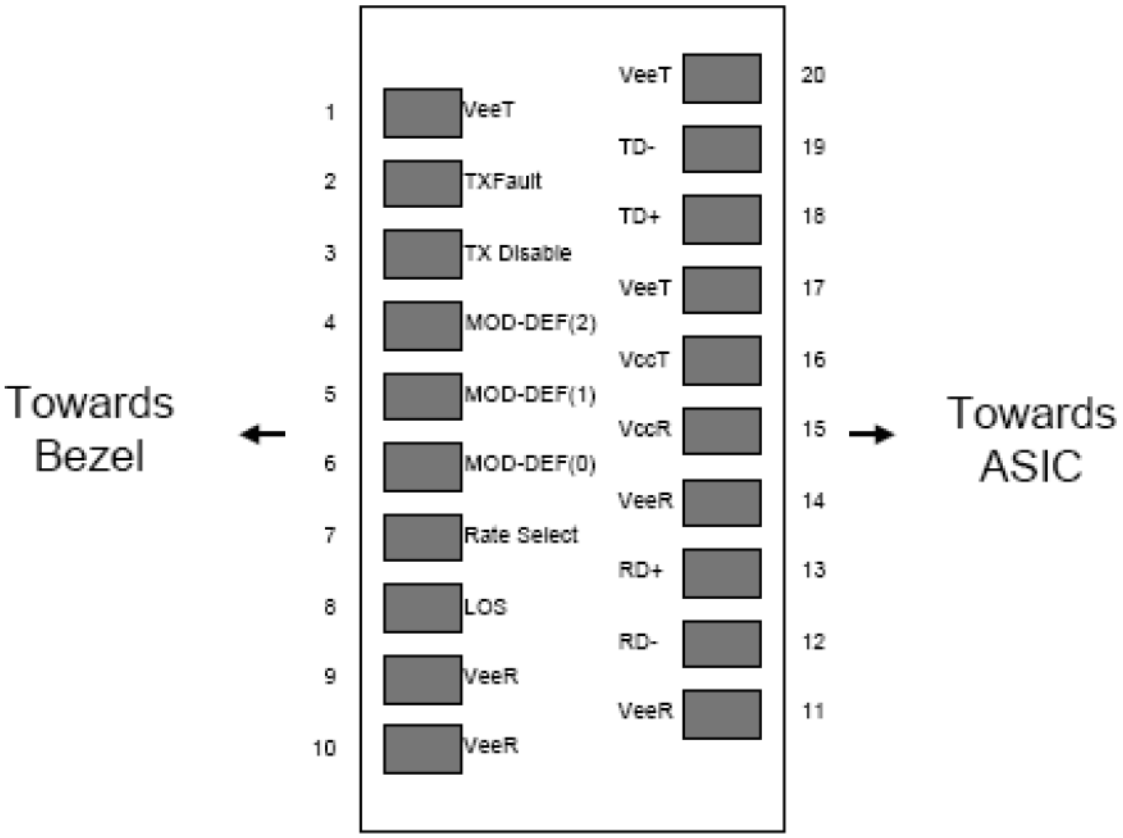
1. Circuit ground is connected to chassis ground

2. PHY disabled on TDIS > 2.0V or open, enabled on TDIS < 0.8V

3. Should be pulled up with 4.7k – 10k Ohms on host board to a voltage between 2.0 V and 3.6 V. MOD_DEF(0) pulls line low to indicate module is plugged in.

4. LVTTL compatible with a maximum voltage of 2.5V. Not supported on GE-GB-P.

TABLE 1. SFP CONNECTOR PIN ASSIGNMENTS AND DESCRIPTIONS



3. +3.3V VOLT ELECTRICAL POWER INTERFACE

The PT-1G-BT-45 has an input voltage range of 3.3 V +/- 5%. The 4 V maximum voltage is not allowed for continuous operation.

Parameter	Symbol	Min	Typical	Max	Unit	Notes
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 Voltage	Vmax			4	V	
Surge Current	Isurge			30	mA	Hot plug above steady state current. See caution note below.

CAUTION

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

4. 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

Parameter	Symbol	Min	Max	Unit	Notes
SFP Output LOW	VOL	3.13	375	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

5. HIGH-SPEED ELECTRICAL INTERFACE

All high-speed signals are AC-coupled internally

Parameter	Symbol	Min	Typical	Max	Unit	Notes
SFP Output LOW	VOL		125		MHz	5-level encoding, per IEEE 802.3
SFP Output HIGH	Zout,TX Zin,RX		100 100		Ohm Ohm	Differential, for all Frequencies between 1MHz and 125MHz Differential, for all Frequencies between 1MHz and 125MHz

6. HIGH-SPEED ELECTRICAL INTERFACE

All high-speed signals are AC-coupled internally

Parameter	Symbol	Min	Typical	Max	Unit	Notes
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

7. GENERAL SPECIFICATIONS

Parameter	Symbol	Min	Typical	Max	Unit	Notes
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

NOTE

1. Clock tolerance is +/- 50 ppm

2. By default, the GE-GB-P is a full duplex device in preferred master mode

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

4. 1000 BASE-T operation requires the host system to have an SGMII interface with no clocks, and the module PHY to be configured per Application Note AN-2036. With a SERDES that does not support SGMII, the module will operate at 1000BASE-T only.

8. ENVIRONMENTAL SPECIFICATIONS

The PT-1G-BT-45 has an extended range from 0°C to +85°C case temperature as specified in this table

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Temperature	Top	0		85	°C	Case temperature
Storage Temperature	Tsto	-40		85	°C	Ambient temperature

9. MECHANICAL SPECIFICATIONS

The host-side of the PT-1G-BT-45 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.