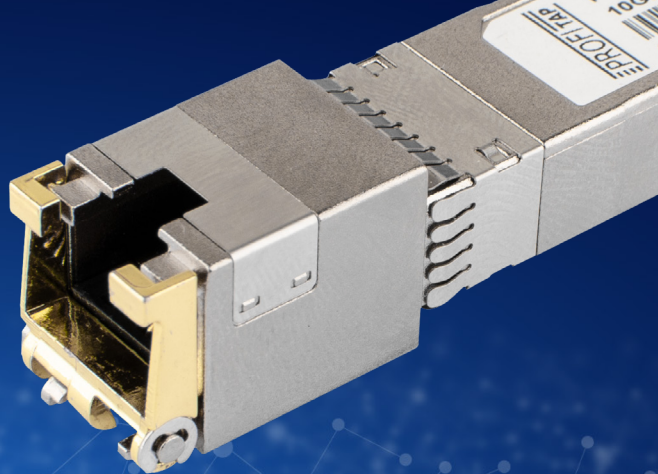# PT-10G-BT-45

DATASHEET

1. GENERAL DESCRIPTION

Profitap's PT-10G-BT-45 is a high performance integrated duplex data link for bidirectional communication over copper cable. It is specifically designed for high speed communication links that require 10 Gigabit Ethernet over Cat 6a/7 cable.

Product features

- ► Supports 10GBASE-T, 5GBASE-T, 2.5GBASE-T, 1000BASE-T, 1000/100/10BASE-T
- ► Hot-pluggable SFP footprint

- ► Compact RJ-45 connector assembly
- ► RoHS compliant and lead-free
- ► Single +3.3V power supply
- ► 10 Gigabit Ethernet over Cat 6a cable
- ► Ambient operating temperature: 0°C to +70°C

2. CABLE LENGTH

Standard	Cable	Reach	Host Port
10GBASE-T	CAT6A	30 m	XFI
5GBASE-T/2.5GBASE-T	CAT5E	50 m	5GBASE-R/2.5GBASE-X
1000BASE-T	CAT5E	100 m	1000BASE-FX
10/100/1000BASE-T	CAT5E	100 m	10/100/1000BASE-FX

3. 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. Laser output 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	High indicates no linked. Low indicates linked.	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 > 2.0 V or open, enabled on TDIS < 0.8 V.

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.

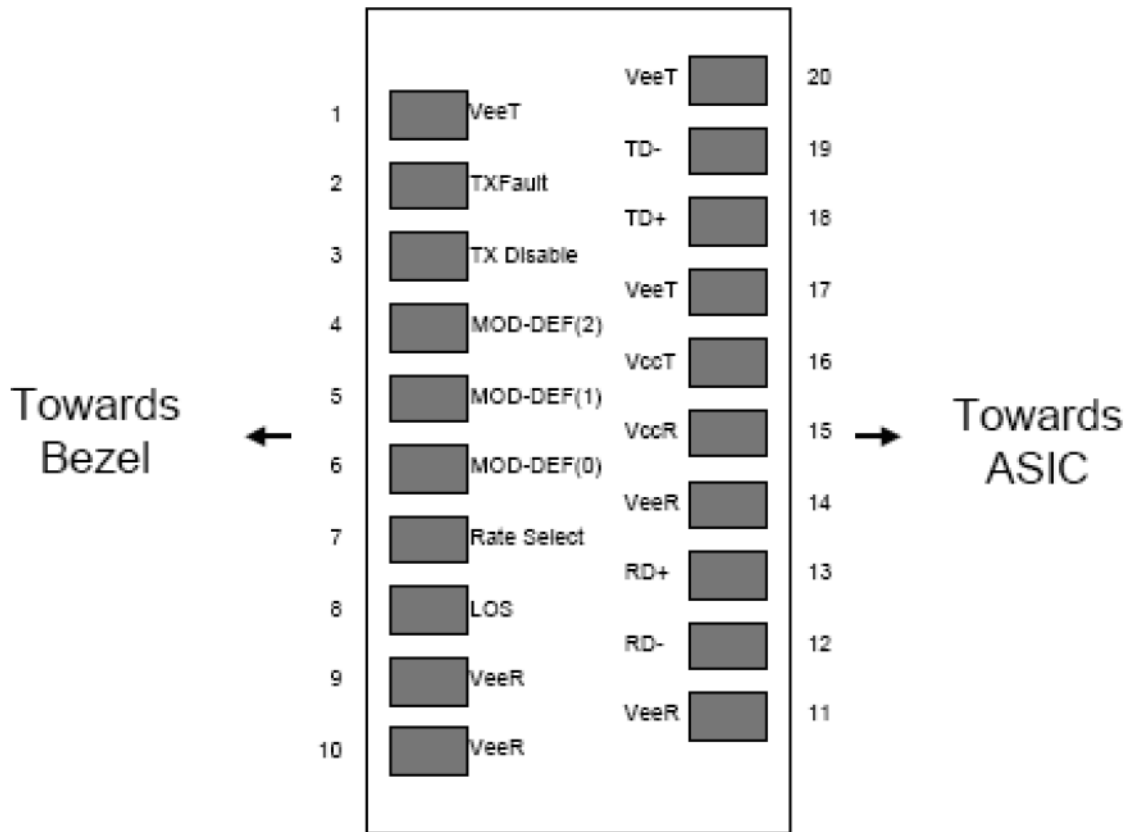**4.** LVTTL compatible with a maximum voltage of 2.5 V.

Figure 1. Diagram of host board connector block pin numbers and names

4. +3.3V ELECTRICAL POWER INTERFACE

The PT-10G-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		700	900	mA	3.0 W 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		TBD		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.

5. LOW-SPEED SIGNALS

MOD_DEF(1) (SCL) and MOD_DEF(2) (SDA) are open drain CMOS signals (see section "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	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, TRANSMISSION LINE-SFP

All high-speed signals are AC-coupled internally.

Parameter	Symbol	Min	Typical	Max	Unit	Notes
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

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

8. GENERAL SPECIFICATIONS

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Rate	BR	1		10	Gb/s	IEEE 802.3 compatible. Clock tolerance is +/- 50 ppm.

9. EEPROM INFORMATION (A0)

Addr	Field Size (Bytes)	Name of Field	HEX	Description
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	MOD4
2	1	Connector	22	RJ45
3-10	8	Transceiver	00 00 00 00 00 00 00 00	Transmitter Code
11	1	Encoding	06	64B66B
12	1	BR, nominal	67	10000M bps
13	1	Reserved	00	
14	1	Length (9um)-km	00	
15	1	Length (9um)	00	
16	1	Length (50um)	00	
17	1	Length (62.5um)	00	
18	1	Length (copper)	1E	30m
19	1	Reserved	00	
20-35	16	Vendor name	57 49 4E 54 4F 50 20 20 20 20 20 20 20 20 20 20	
36	1	Reserved	00	
37-39	3	Vendor OUI	00 00 00	
40-55	16	Vendor PN	xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	ASC II
56-59	4	Vendor rev	31 2E 30 20	V1.0
60-61	2	Wavelength	00 00	850nm
62	1	Reserved	00	
63	1	CC BASE	XX	Check sum of byte 0~62
64-65	2	Options	00 1A	LOS, TX_DISABLE, TX_FAULT
66	1	BR, max	00	
67	1	BR, min	00	
68-83	16	Vendor SN	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	Unspecified
84-91	8	Vendor date code	XX XX XX 20	Year, Month, Day
92-94	3	Reserved	00	
95	1	CC_EXT	XX	Check sum of byte 64~94
96-255	160	Vendor specific		

10. EEPROM INFORMATION (A2), OPTIONAL

2 wire address 1010001x (A2h)

0	
	Alarm and Warning Threshold (56 bytes)
55	
	Cal Constants (40 bytes)
95	
	Real Time Diagnostic Interface (24 bytes)
19	
	Vendor Specific (7 bytes)
26	
	Page Select Byte (Optional)
27	
28	
	User Writable EEPROM (120 bytes)
47	
	Vendor Specific (8 bytes)
55	

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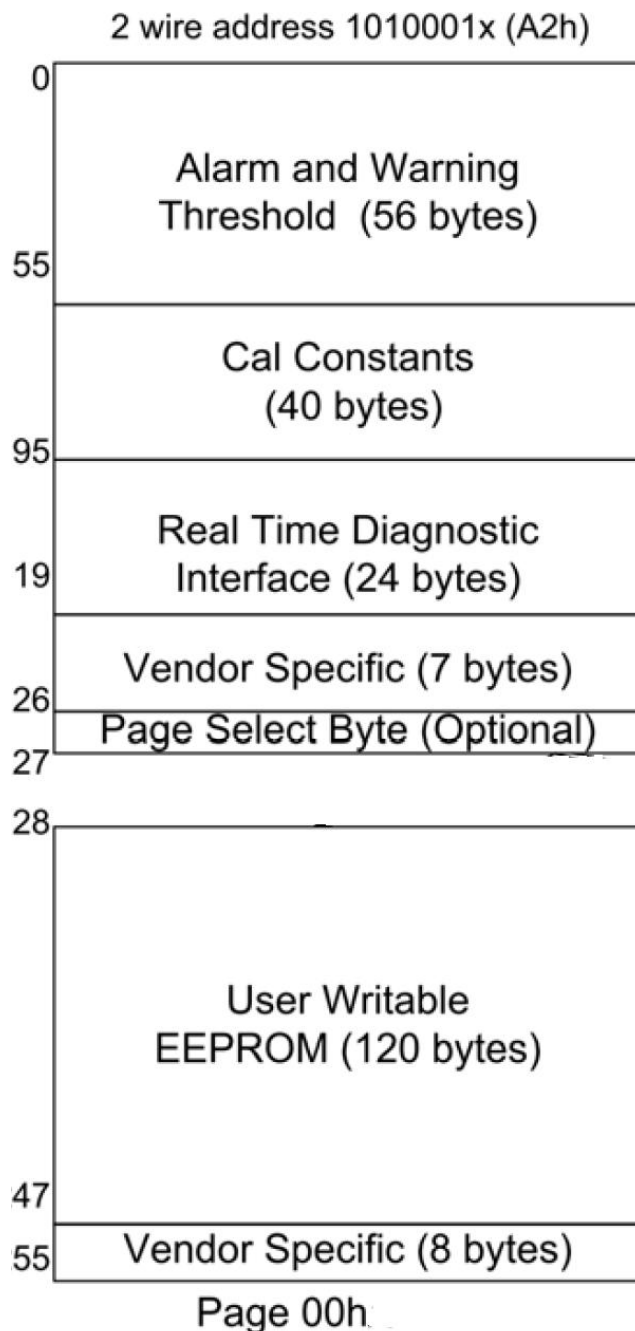
11. ENVIRONMENTAL SPECIFICATIONS

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Temperature	Top	0		65	°C	Case temperature
Storage Temperature	Tsto	-40		85	°C	Ambient temperature

12. SERIAL COMMUNICATION PROTOCOL

Parameter	Symbol	Min	Typical	Max	Unit	Notes
I2C Clock Rate		0		200,000	Hz	

13. RECOMMENDED APPLICATION CIRCUIT
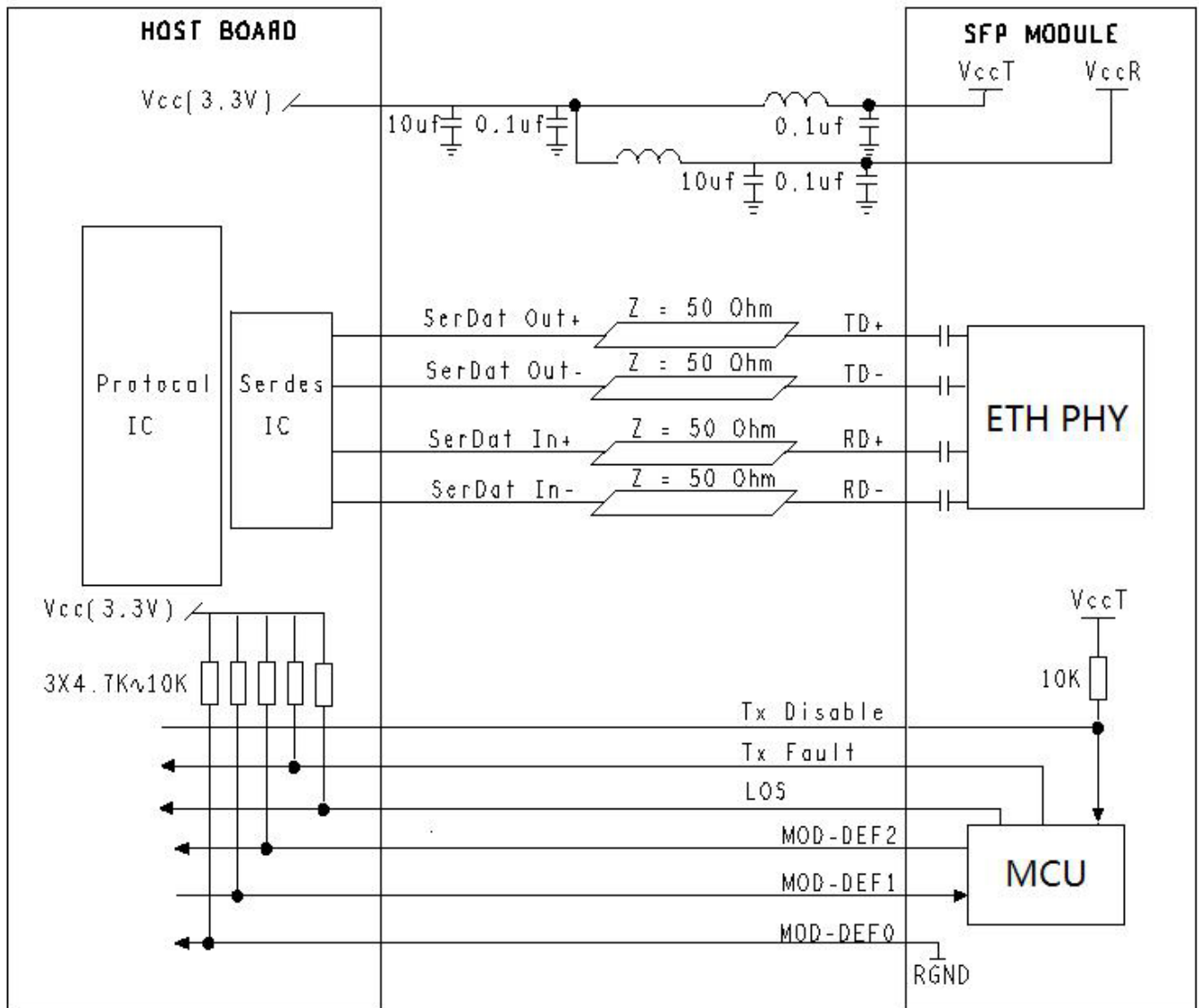
14. MECHANICAL SPECIFICATIONS (UNIT:MM)
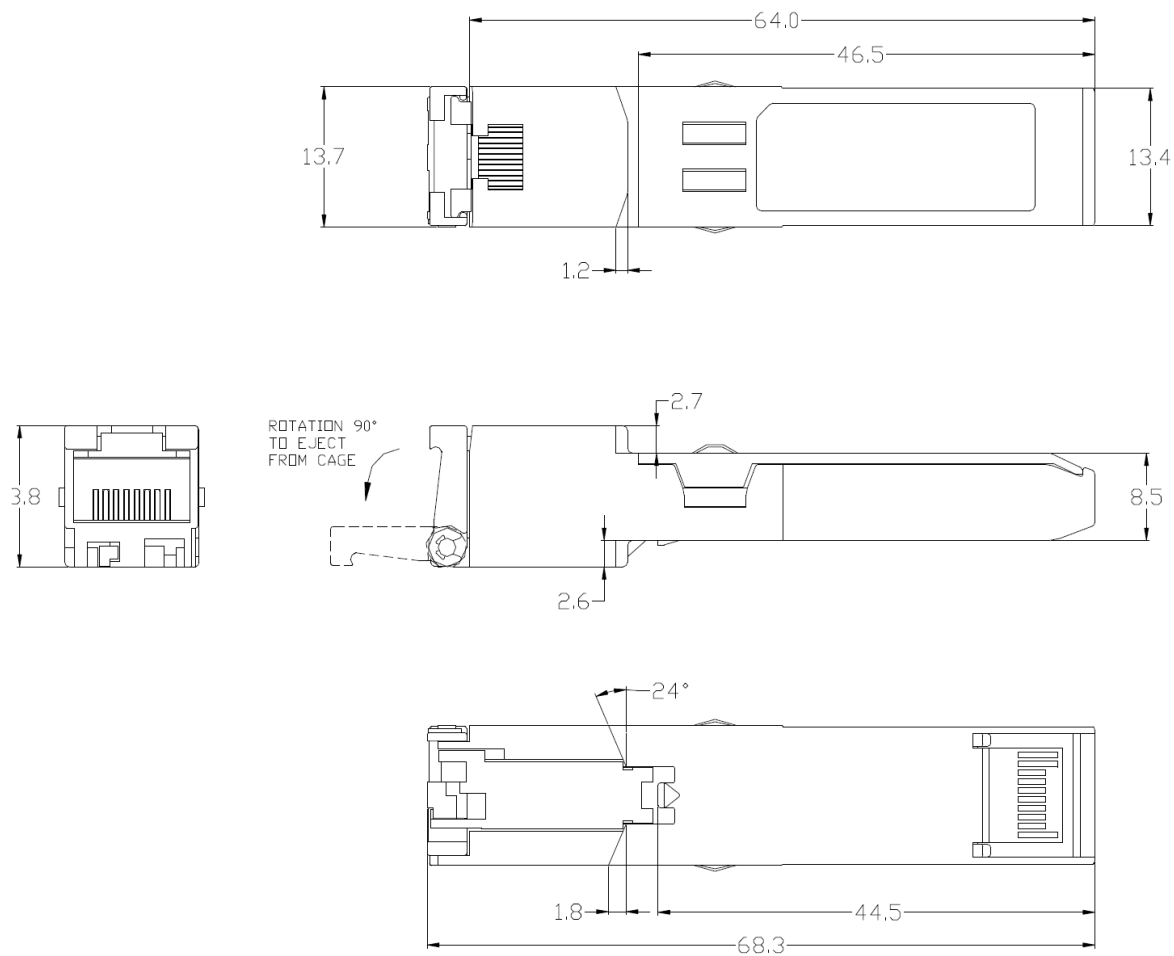
15. ORDERING INFORMATION

Part Number	Product Description
PT-10G-BT-45	10GBASE-T SFP+ 30M

IMPORTANT NOTICE

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