

# 10GBASE-T SFP+ Copper RJ-45 30m Transceiver

MFM1T02A-T-LL



## Application

- 10GBASE-T 10G Ethernet

## Features

- Hot-pluggable SFP footprint
- Support 10GBASE-T
- Compact RJ-45 connector assembly
- Commercial Temperature Range: 0 to 70° C
- Single +3.3V power supply
- 10 Gigabit Ethernet over Cat6a/Cat7 cable
- RoHS compliant and lead-free

## Description

10GBASE-T standards as specified in IEEE Std 802.3. 10GBASE-T SFP+ copper transceivers use the SFP's

RX\_LOS pin for link indication. If pull up SFP's TX\_DISABLE pin, PHY GBASE-T SFP+ copper transceivers are based on the SFP Multi-Source Agreement (MSA). They are compatible with the 10GBASE-T / IC will be reset.

## Product Specifications

### I.General Specifications

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
<b>Bit Rate</b>	BR	1		10	Gb/sec	IEEE 802.3 compatible. See Notes 1 below

**Note:**

1. Clock tolerance is +/- 50 ppm

### II. Environmental Specifications

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
<b>Operating Temperature</b>	Top	0		70	° C	Case temperature
<b>Storage Temperature</b>	Tsto	-40		85	° C	Ambient temperature

**Note:**

1. Automatic crossover detection is enabled. External crossover cable is not require

### III. Transmission Distances

Standard	Cable	Reach	Host Port
<b>10GBASE-T</b>	Cat6a/Cat7	30m	XFI

### IV. Electrical Characteristics

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
<b>SFP Output LOW</b>	VOL	0	0.5	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
<b>SFP Output HIGH</b>	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
<b>SFP Input LOW</b>	VIL	0	0.8	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector
<b>SFP Input HIGH</b>	VIH	2	Vcc + 0.3	mV	4.7k to 10k pull-up to Vcc, measured at SFP side of connector

## V. +3.3V Volt Electrical Power Interface

The SFP-10G-T has an input voltage range of 3.3 V +/- 5%. The 4V maximum voltage is not allowed for continuous operation.

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
<b>Supply Current</b>	I <sub>s</sub>		700	900	mA	3.0W max power over full range of voltage and temperature. See caution note below.
<b>Input Voltage</b>	V <sub>cc</sub>	3.13	3.3	3.47	V	Referenced to GND
<b>Maximum Voltage</b>	V <sub>max</sub>			4	V	1
<b>Surge Current</b>	I <sub>surge</sub>		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.

## VI. High-Speed Electrical Interface

All high-speed signals are AC-coupled internally.

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
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### High-Speed Electrical Interface, Transmission Line-SFP

<b>Line Frequency</b>	fL		125		MHz	5-level encoding, perIEEE 802.3
<b>Tx Output Impedance</b>	Zout,TX		100		Ohm	Differential, for allfrequencies between1MHz and 125MHz
<b>Rx Input Impedance</b>	Zin,RX		100		Ohm	Differential, for allfrequencies between1MHz and 125MHz

### High-Speed Electrical Interface, Host-SFP

<b>Single ended data inputswing</b>	Vinsing	250		1200	mV	Single ended
<b>Single ended data outputswing</b>	Voutsing	350		800	mV	Single ended
<b>Rise/Fall Time</b>	Tr,Tf		175		psec	20%-80%
<b>Tx Input Impedance</b>	Zin		50		Ohm	Single ended
<b>Rx Output Impedance</b>	Zout		50		Ohm	Single ended

## VII. Serial Communication Protocol

All longline.COM SFPs support the 2-wire serial communication protocol outlined in the SFP MSA. These SFPs use an MCU, can be accessed with address of A0h.

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
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### Serial Bus Timing, Requirements

<b>I<sup>2</sup>C Clock Rate</b>		0		200,000	Hz	
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## VIII. Pin Description

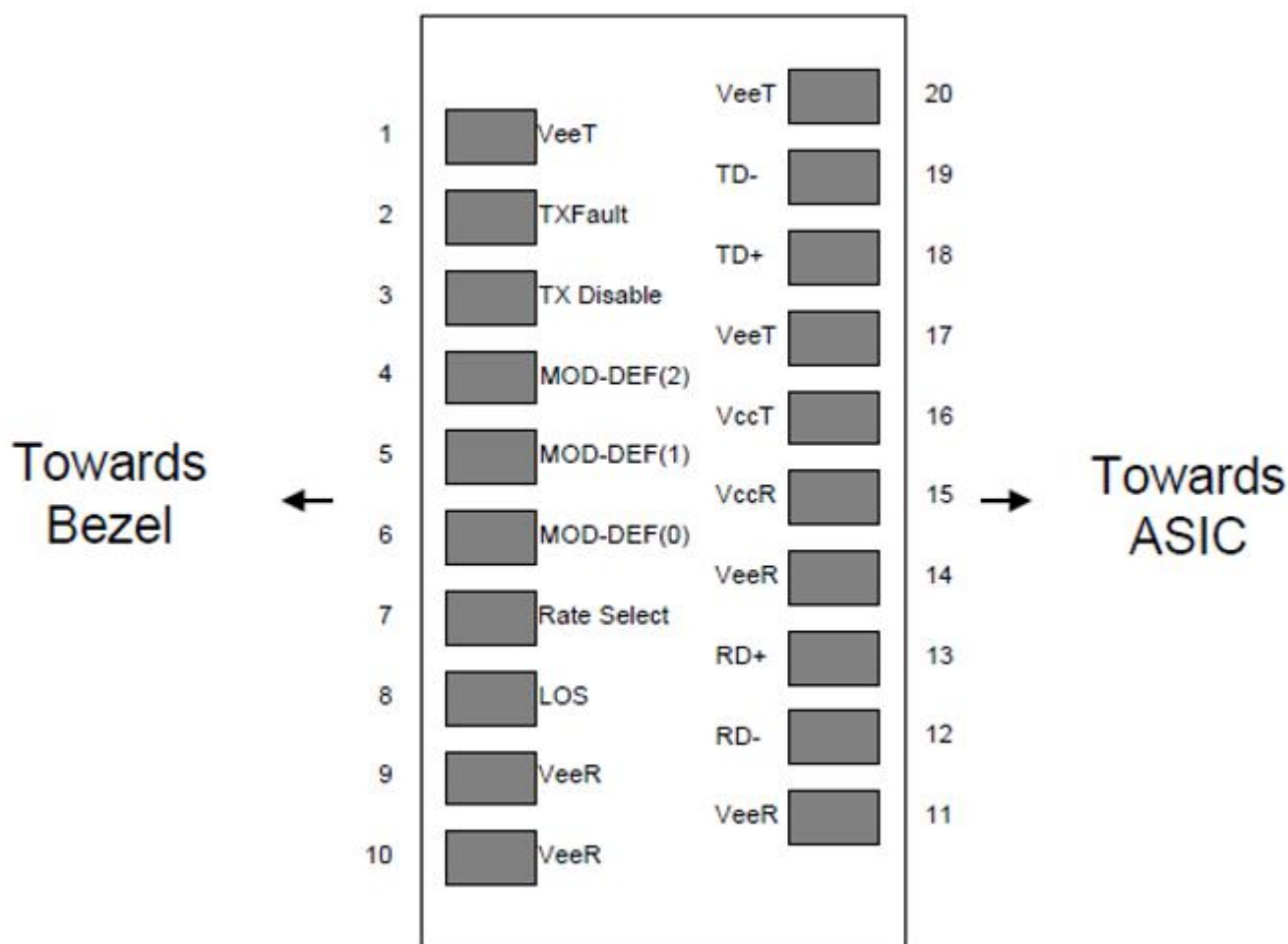


Figure 1. Diagram of Host Board Connector Block Pin Numbers and Names.

Pin	Symbol	Name/Description	Ref.
1	V <sub>EET</sub>	Transmitter Ground(Common with Receiver Ground)	1
2	T <sub>FAULT</sub>	Transmitter Fault. Not supported.	
3	T <sub>DIS</sub>	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	V <sub>EER</sub>	Receiver Ground(Common with Transmitter Ground)	1
10	V <sub>EER</sub>	Receiver Ground(Common with Transmitter Ground)	1
11	V <sub>EER</sub>	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	V <sub>EER</sub>	Receiver Ground(Common with Transmitter Ground)	1
15	V <sub>CCR</sub>	Receiver Power Supply	
16	V <sub>CCT</sub>	Transmitter Power Supply	
17	V <sub>EET</sub>	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	V <sub>EET</sub>	Transmitter Ground(Common with Receiver Ground)	1

**Notes:**

- 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.

## IX. Mechanical Specifications

