COL-SFP-FE-T

Copper SFP 100BASE-T Transceiver

Features

- Hot-pluggable SFP footprint
- Extended case temperature range (0°C to +70°C)
- Fully metallic enclosure for low EMI
- Compact RJ-45 connector assembly
- It supports RX_LOS(Loss of Signal) function
- Compatible with IEEE802.3u
- Access to physical layer IC via 2-wire serial bus
- A 10/100BASE-TX/ 100BASE-FX converter

Applications

- This 100Base-TX Copper SFP Transceiver supports the SFP based switch100Base-FX ports that accept standard 100Base-FX optics SFP.

Description

COPTOLINK`s COL-SFP-FE-T Copper Small Form Pluggable (SFP) transceiver module is specifically designed for converting 100Base-FX NRZI port interface to 10/100Base-TX interface with RJ45 connector. The transceiver module is compliant with the SFP MultiSource Agreement (MSA) and IEEE802.3u. With the hot pluggability, the module offers a flexible and easy way to be installed into SFP MSA compliant ports at any time without the interruption of the host equipments operating online.

The Copper SFP transceivers use an integrated RJ-45 connector with transformer and PHY IC.

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	Note 4
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 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 is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and Vcc+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.

5) RD-/+: These are the differential receiver outputs. They are AC-coupled, differential lines with 100 differential termination inside the module.

6) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 differential termination inside the module.

+3.3V Volt Electrical Power Interface

+3.3V volt Electrical Power Interface						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
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	

Low-speed signals, electronic characteristics

Low-Speed Signals, Electronic Characteristics					
Parameter	**Symbol**	**Min**	**Max**	**Units**	**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

High-speed electrical interface, transmission line-SFP

High-Speed Electrical Interface Transmission Line-SFP						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
Line Frequency	fL		125		MHz	5-level encoding, per IEEE 802.3u
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
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%

General specifications

General						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
Data Rate	BR	10		100	Mb/sec	IEEE802.3u
Cable Length	L			100	m	Category 5 UTP. BER <10^{-12}

Notes:
1. Clock tolerance is +/- 50 ppm
2. By default, the COL-SFP-FE-T is a full duplex device in preferred master mode
3. Automatic crossover detection is enabled. External crossover cable is not required

Environmental specifications

Environmental Specifications						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
Operating Temperature	Top	0		70	°C	Case temperature
Storage Temperature	Tsto	-40		85	°C	Ambient temperature

Regulatory Compliance

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

Feature	Agency	Standard	Certificate / Comments
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ090319751A/CHEM

Ordering information

Part number	Speed mode	MAC interface	TX Disable function	Link Indicator on RX_LOS Pin	Temp
COL-SFP-FE-TA	10/100Mbps	SMII	YES	YES	0~70℃
COL-SFP-FE-TB	100Mbps	SMII	YES	YES	0~70℃

References

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

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