LP-RJ452G-TI
2.5GBASE-T SFP Copper Transceiver

Features

➢ Up to 2.5Gb/s bi-directional data links
➢ Support Links up to 100m using Cat 6a Cable
➢ Compliant with SFF-8431 and SFF-8432 MSA
➢ Compliant with IEEE 802.3az and 802.3an
➢ Compliant with IEEE 802.3bz (2.5GBASE-T)
➢ Hot-pluggable SFP+ footprint
➢ Support TX Disable and RX Los
➢ Fully metallic enclosure for low EMI
➢ +3.3V single power supply
➢ Low power dissipation（max 2.5W）
➢ Compact RJ-45 connector assembly
➢ Access to physical layer IC via 2-wire serial bus
➢ Support 100/1000M Ethernet over Cat 5e cable
➢ Operating temperature range: -40°C to 85°C

Applications

➢ 2.5 Gigabit Ethernet over Cat 6A/7cable
➢ Gigabit Ethernet over Cat 5e cable

Description

2.5GBASE-T Copper Small Form Pluggable transceivers are based on the SFP Multi Source Agreement (MSA). They are compatible with the 2.5Gbase-T and 1000BASE-T standards as specified in IEEE Std 802.3. They are RoHS compliant and per Directive 2011/65/EU.

Pin Definitions

Pin Diagram
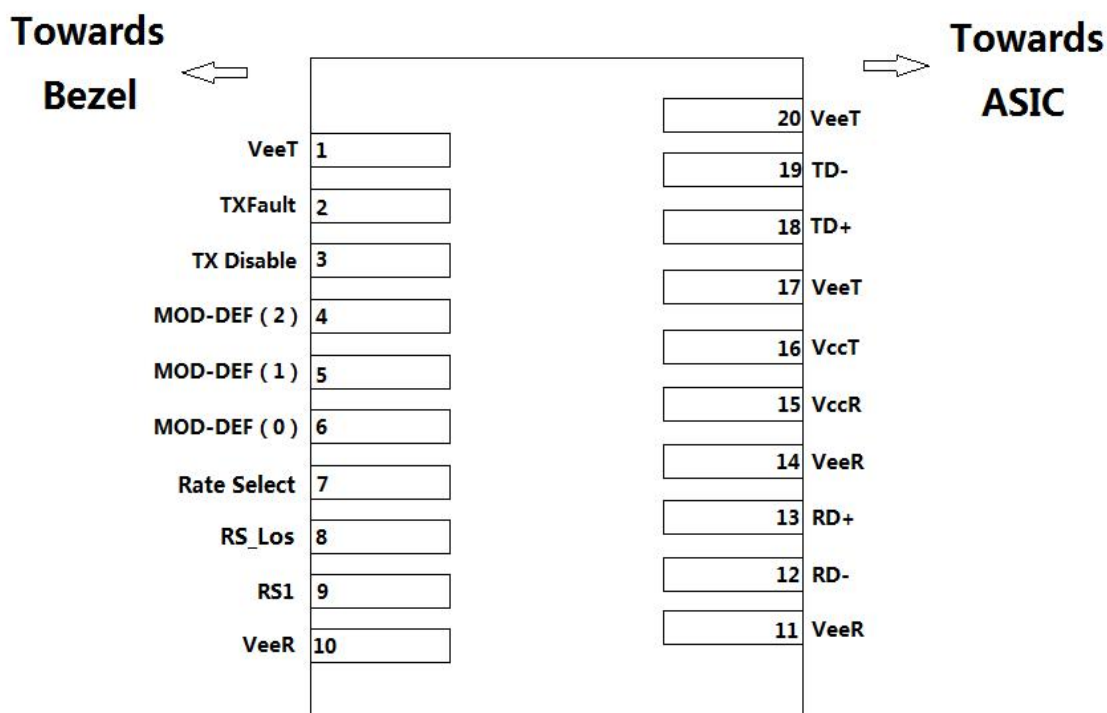
Pin Descriptions

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	Note 4
9	VEER	Receiver ground	1	
10	VEER	Receiver ground	1	
11	VEER	Receiver ground	1	
12	RX-	Inv. Received Data Out	3	Note 5
13	RX+	Received Data Out	3	Note 5

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 Data In	3	Note 6
19	TX-	Inv. Transmit Data In	3	Note 6
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~10kΩ 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.

+3.3V Volt Electrical Power Interface

The LP-RJ452G-TI has an input voltage range of +5V +/- 5%. The 3.3V maximum voltage is not allowed for continuous operation.

Table 1. +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	
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

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

Table 2. 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

All high-speed signals are AC-coupled internally.

Table 3. 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		800		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

High-speed electrical interface, host-SFP

Table 4. High-speed electrical interface, host-SFP

High-Speed Electrical Interface, Host-SFP						
Parameter	Symbol	Min	Typ	Max	Units	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	Tr,Tf	20		47	psec	20%-80%
Tx Input Impedance	Zin		50		Ohm	Single ended
Rx Output Impedance	Zout		50		Ohm	Single ended

General Specifications

Table 5. General specifications

General						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Data Rate	BR	1000		2500	Mb/sec	IEEE 802.3 compatible.
Cable Length	L			100	m	

Notes:

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

Environmental Specifications

Table 6. Environmental specifications

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

Mechanical Specifications

The host-side of the LP-RJ452G-TI 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.
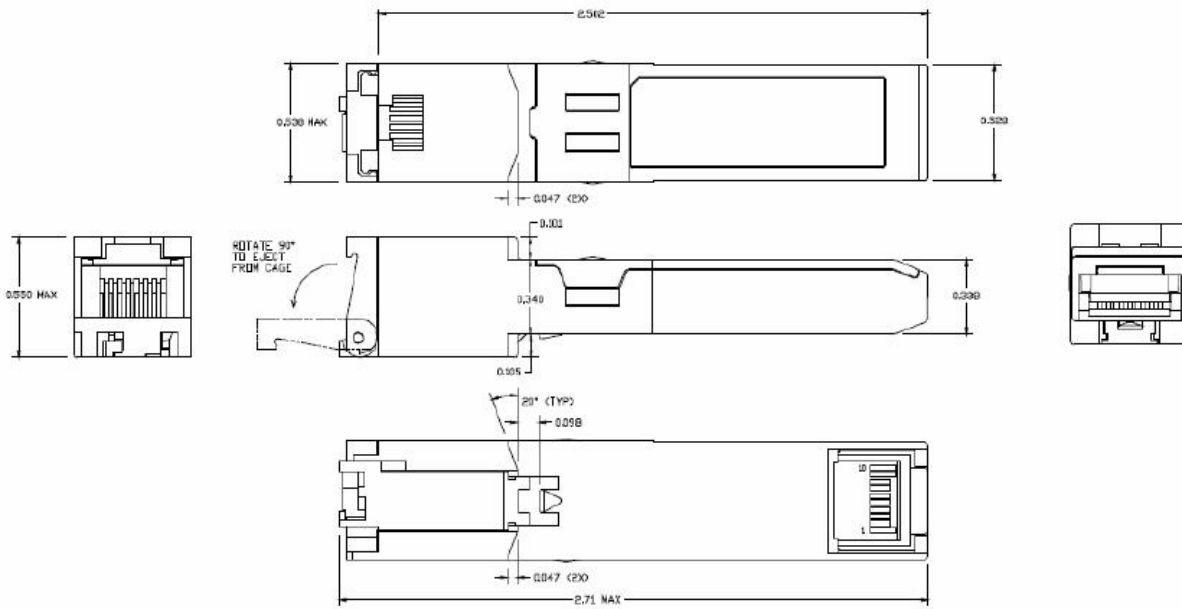

Figure 2. LP-RJ452G-TI mechanical dimensions

References

1. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA),
2. IEEE Std 802.3, 2002 Edition. IEEE Standards Department, 2002.
3. "AT24C01A/02/04/08/16 2-Wire Serial CMOS E2PROM".

Ordering information

Part Number	Description
LP-RJ452G-TI	2.5G BASE-T , Copper SFP with spring latch, -40-85℃