



# SFP2G5RJ-I

## 2.5GBase-X to 10/100/1G/2.5GBase-T SFP Transceiver, Industrial Grade

### Highlights

- Compliant with IEEE 802.3/u/ab/bz Standard
- Compliant with SFP MSA
- Hot Pluggable
- Auto-detect MDI/MDIX
- Compatible with 1000Base-X and 1000Base-T auto-negotiation
- 10/100/1000Base-T(X) operation in host system with SGMII interface
- RJ-45 connector
- Single +3.3V power supply voltage
- Link length up to 100m with four-pair Cat.5 UTP cable
- RoHS compliant



### Introductions

SFP1GRJ series is Small Form Factor Pluggable SFP Copper transceivers are compliant with the current SFP Multi-Source Agreement (MSA) Specification. The high performance designed is integrated full duplex data link at 1.25Gbps over four pair Category 5 UTP cable up to 100m links. User can be accessed SFP serial ID information with address of A0h via the 2-wire serial CMOS EEPROM protocol The PHY IC can also be accessed via 2-wire serial bus at address ACh.

### Application

- Gigabit Ethernet
- Mass storage system I/O
- High speed I/O for file server
- Bus extension application

## Pin-Assignment

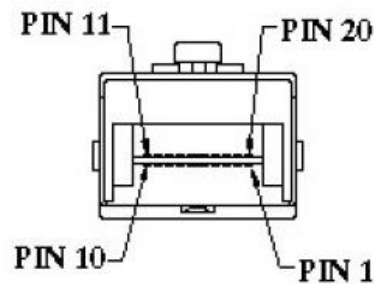


Diagram of Host Board Connector Block Pin Number and Name

Pin	Signal Name	Function	NOTES
1	VeeT	Transmitter Ground	VeeT and VeeR are connected in SFP
2	TX_FAULT	Transmitter Fault Indication	Not Implemented. Tied to VeeT in SFP
3	TX_DISABLE	Transmitter Disable	Not Implemented. Floating in host
4	MOD DEF (2)	Module Definition 2	Data Line for Serial ID
5	MOD DEF (1)	Module Definition 1	Clock Line for Serial ID
6	MOD DEF (0)	Module Definition 0	Tied to Vee in SFP
7	RATE SELECT	Not Implemented	Not implemented
8	LOS	Loss of Signal	See LOS option
9	VeeR	Receiver Ground	VeeT and VeeR are connected in SFP
10	VeeR	Receiver Ground	VeeT and VeeR are connected in SFP
11	VeeR	Receiver Ground	VeeT and VeeR are connected in SFP
12	RD-	Inverted Received Data out	AC coupled 100 ohm differential high speed data
13	RD+	Non-Inverted Received Data out	AC coupled 100 ohm differential high speed data lines
14	VeeR	Receiver Ground	VeeT and VeeR are connected in SFP
15	VccR	Receiver Power	VccR and VccT are connected in SFP.
16	VccT	Transmitter Power	AC coupled 100 ohm differential high speed data lines
17	VeeT	Transmitter Ground	VeeT and VeeR are connected in SFP
18	TD+	Non-inverted Data	VccR and VccT are connected in SFP
19	TD-	Inverted Data In	VccR and VccT are connected in SFP
20	VeeT	Transmitter Ground	VeeT and VeeR are connected in SFP

**Note1:** TX Fault is not used and is always tied to ground.

**Note2:** TX Disable as described in the MSA is not applicable to the copper SFP module.

**Note3:** Mod-Def 0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7-10 K resistor on the host board to a supply less than VCCT + 0.3 V or VCCR + 0.3 V.

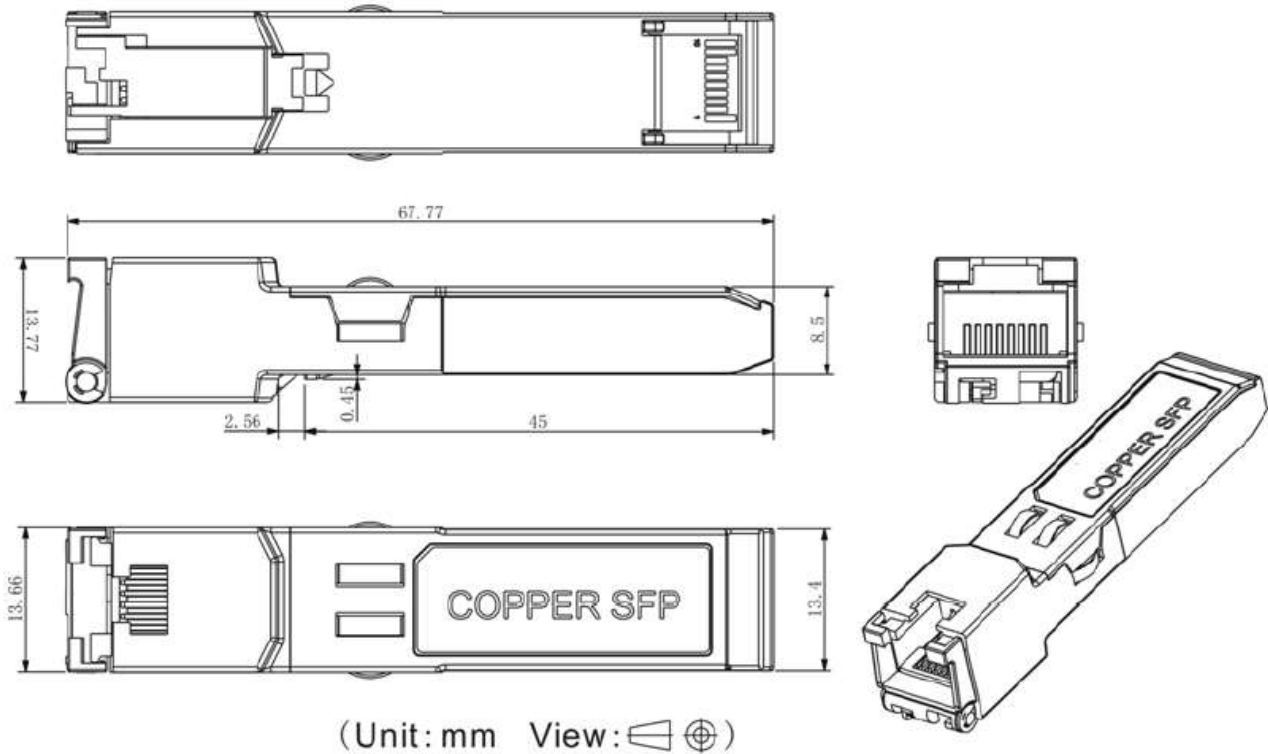
**Note4:** RD-/+: These are the differential receiver outputs. They are AC coupled 100 Ohm differential lines which should be terminated with 100 ohm differential at the user SerDes. The AC coupling is done inside the module and is thus not required on the host board.

**Note5:** VCCR and VCCT are the receiver and transmitter power supplies. They are defined as 3.3 V ± 5% at the SFP connector pin.

**Note4:** TD-/+: These are the differential transmitter inputs. They are AC coupled differential lines with 100 Ohm differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

## Dimension

Unit = mm



## Specifications

### ◆ Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units	Note
Storage Temperature	Ts	-45	90	°C	
Storage Humidity	Hs	5	90	%	

### ◆ Recommended Operating Conditions

Parameter	Symbol	Min	Max	Units	Note
Operating Temperature	T	0	70	°C	C-grade
		-40	85	°C	I-grade
Operating Humidity	Ho	10	85	%	
Supply Voltage	Vcc	3.135	3.465	V	Typ 3.3V
Surge Current	Isurge		30	mA	Hot Plug

### ◆ Electrical Characteristics

Parameter	Symbol	Min	TYP	Max	Units	Note
<b>Transmitter</b>						
Data Input differential Voltage	VD, TX	200		1600	mV	(1)
Differential Input Impedance	ZTX	80	100	120	Ohm	
Transmitter Disable Input-High	VDISH		N/A		V	Not implement
Transmitter Disable Input-Low	VDISL		N/A		V	Not implement
<b>Receiver</b>						
Data Output Differential Voltage	VD, RX	400		1600	mV	(3)
Differential Output Impedance	ZRX	80	100	120	Ohm	
LOS Output Voltage – High	VSDHL	2.4		Vcc	V	(2)
LOS Output Voltage – Low	VSDL	0		0.5	V	(2)

**Note1:** Internally AC coupled to PHY chip

**Note2:** Pull up to VCC with a 4.7K - 10K Ohm resistor on host Board

**Note3:** Internally AC coupled, but requires a 100 Ohm differential termination at MAC side

◆ High-Speed Electrical Interface, Host to SFP

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
TD+, TD- Input Voltage Swing	$V_{IN+} / V_{IN-}$	250		1200	mV	1
RD+, RD- Output Voltage Swing	$V_{out+} / V_{out-}$	250		800	mV	1
Rise Time (Receiver)	$T_r$		180	250	ps	2
Fall Time (Receiver)	$T_f$		180	250	ps	2
Tx Input Impedance	$Z_{in}$		50		Ohm	1
Rx Output Impedance	$Z_{out}$		50		Ohm	1

$V_{cc}=3.1V$  to  $3.5V$ ,  $T_{op}=0^{\circ}C$  to  $70^{\circ}C$  (SFP1GRJ),  $-40^{\circ}C$  to  $85^{\circ}C$  (SFP1GRJ-I)

**Note1** : Single ended

**Note2** : 20% to 80% value

◆ High-Speed Electrical Interface, Cable to SFP

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Transmission Frequency	$F_t$		125		MHz	1
TX Output Impedance	$Z_{out.TX}$		100		Ohm	2
RX Output Impedance	$Z_{in.RX}$		100		Ohm	2

$V_{cc}=3.1V$  to  $3.5V$ ,  $T_{op}=0^{\circ}C$  to  $70^{\circ}C$  (SFP1GRJ),  $-40^{\circ}C$  to  $85^{\circ}C$  (SFP1GRJ-I)

**Note1** : 4D-PAM-5 encoding per IEEE802.3:2002

**Note2** : Differential for frequencies ranging from 1MHz to 125MHz. **For those modules without LOS function, the LOS pin is internally attached to signal ground.**

## Ordering Information

	Model Name	Description	Operating Temperature
Available Model	SFP2G5RJ-I	2.5GBase-X to 10/100/1G/2.5GBase-T SFP Transceiver, Industrial Grade	-40 ~ 85°C