SSF-SFP-UMRJ451G

The SSF-SFP-UMRJ451G Copper Small Form-Factor Pluggable is a high performance, cost effective module compliant with the Gigabit Ethernet and 1000BASE-T standards specified in IEEE 802.3-2002 and IEEE 802.3ab, which supports 1000Mbps data-rate up to 100 meters reach over unshielded twisted-pair category 5 cable.

The module supports 1000Mbps full duplex data-links with 5-level Pulse Amplitude Modulation (PAM) signals.

All four pairs in the cable are used with symbol rate at 250Mbps on each pair. The module provides standard serial ID information compliant with SFP MSA, which can be accesesed with address of A0h via the 2wire serial CMOS EEPROM protocol. The physical IC can also be accessed via 2wire serial bus at address ACh.

FEATURES AND BENEFITS

- Up to 1.25Gb/s bi-directional data links
- Hot-pluggable SFP footprint
- TX Disable and RX Los/without Los function
- Fully metalic enclosure for low EMI
- Low power dissipation (1.05 W typical)
- Compact RJ-45 connector assembly
- Access to physical layer IC via 2-wire serial bus
- 10/100/1000Mbps compliant in host systems with SGMII interface
- Operating case temperature:
  - Standard : 0 to +70°C
  - Extended : -20 to +85°C
  - Industrial : -40 to +85°C

APPLICATIONS

- Gigabit Ethernet
- Switch to Switch interface
- Switched backplane applications
- Router/Server interface

SPECIFICATIONS	
Interface	Gigabit Ethernet
Transceiver Format	SFP
Tx Distance	100m
Connectors	1x RJ45
Cable Type	Category Cable

PART NUMBER	DESCRIPTION
SSF-SFP-UMRJ451G	1.25G SFP Copper transceiver RJ45 1000Base-T, 100m max reach, w/SGMII

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Pin Diagram

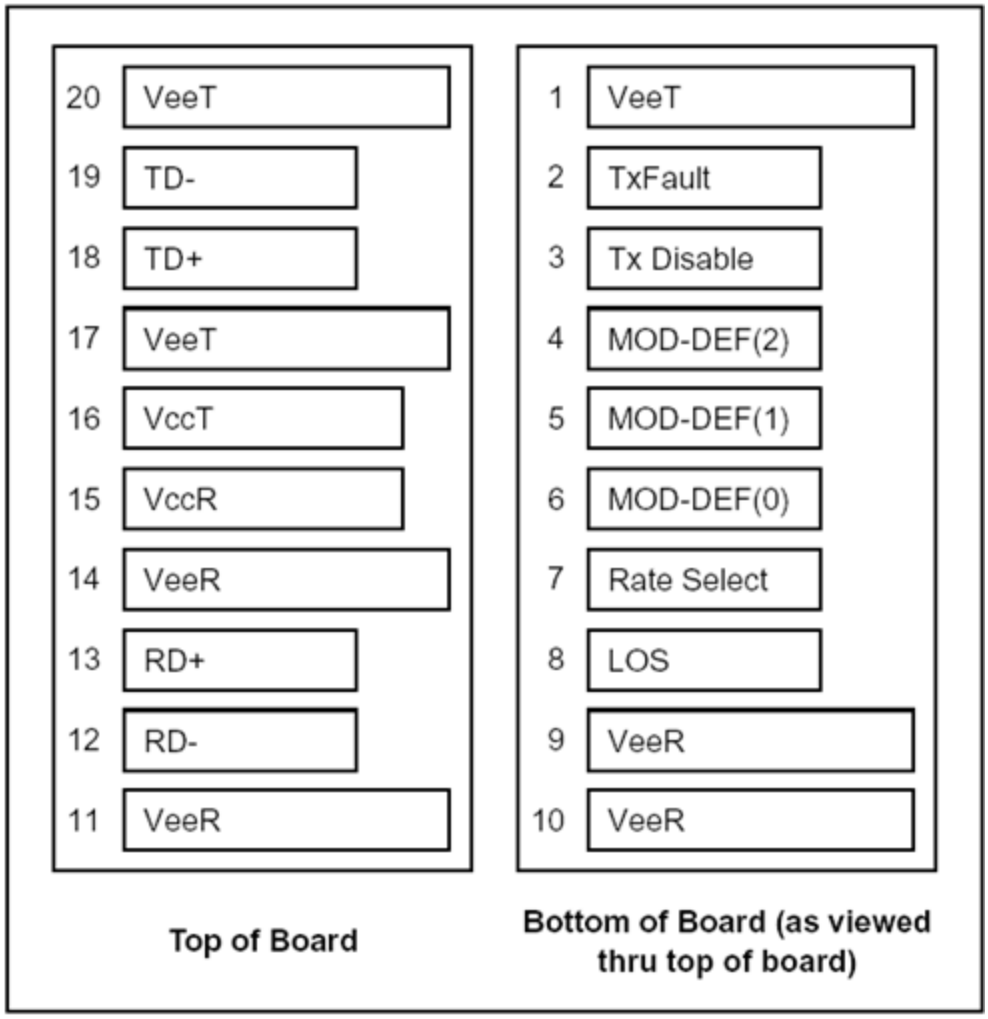

Figure 1. Pin Definitions

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)	TLL Low	3	Note3

PIN DESCRIPTIONS CONT.				
Pin	Signal Name	Description	Plug Seq.	Notes
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note4
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 Suppply	2	
16	VccT	Transmitter Power Supply	2	
17	VeeT	Transmitter Ground	2	
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 not supported and is always connected to ground.
2) TX disable, an input used to reset the transceiver module, This pin is pulled up within the module with a 4.7 KΩ resistor.
Low (0 – 0.8 V): Transceiver on
Between (0.8 V and 2.0 V): Undefined
High (2.0 – 3.465 V): Transceiver in reset state
Open: Transceiver in reset state
3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K~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) RX_LOS (Loss of Signal): LVTTL compatible with a maximum voltage of Host_Vcc. RX_LOS can enabled or disabled (Refer to Ordering information),RX_LOS is not used and is always tied to ground via 100-ohm resistor.
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						
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					
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						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
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

HIGH-SPEED ELECTRICAL INTERFACE TRANSMISSION 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		175		psec	20%-80%
Tx Input Impedance	Zin		50		Ohm	Single ended
Rx Output Impedance	Zout		50		Ohm	Single ended

GENERAL						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Data Rate	BR	10		1000	Mb/sec	IEEE 802.3 compatible.
Cable Length	L			100	m	Category 5 UTP. BER <10-12

NOTES:

Plug Seq: Pin engagement sequence during hot plugging.
1. Clock tolerance is +/- 50 ppm
2. By default, the SFP-7000-RJ45A is a full duplex device in preferred master mode
3. Automatic crossover detection is enabled. External crossover cable is not required

ENVIRONMENTAL SPECIFICATIONS						
Parameter		Symbol	Min	Typ	Max	Units
Operating Case Temperature	Commercial	TC	0		+70	°C
	Extend		-20		+85	°C
Storage Temperature			-40		+85	°C

MECHANICAL SPECIFICATIONS

The host-side of the SFP-7000-RJ45A 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.

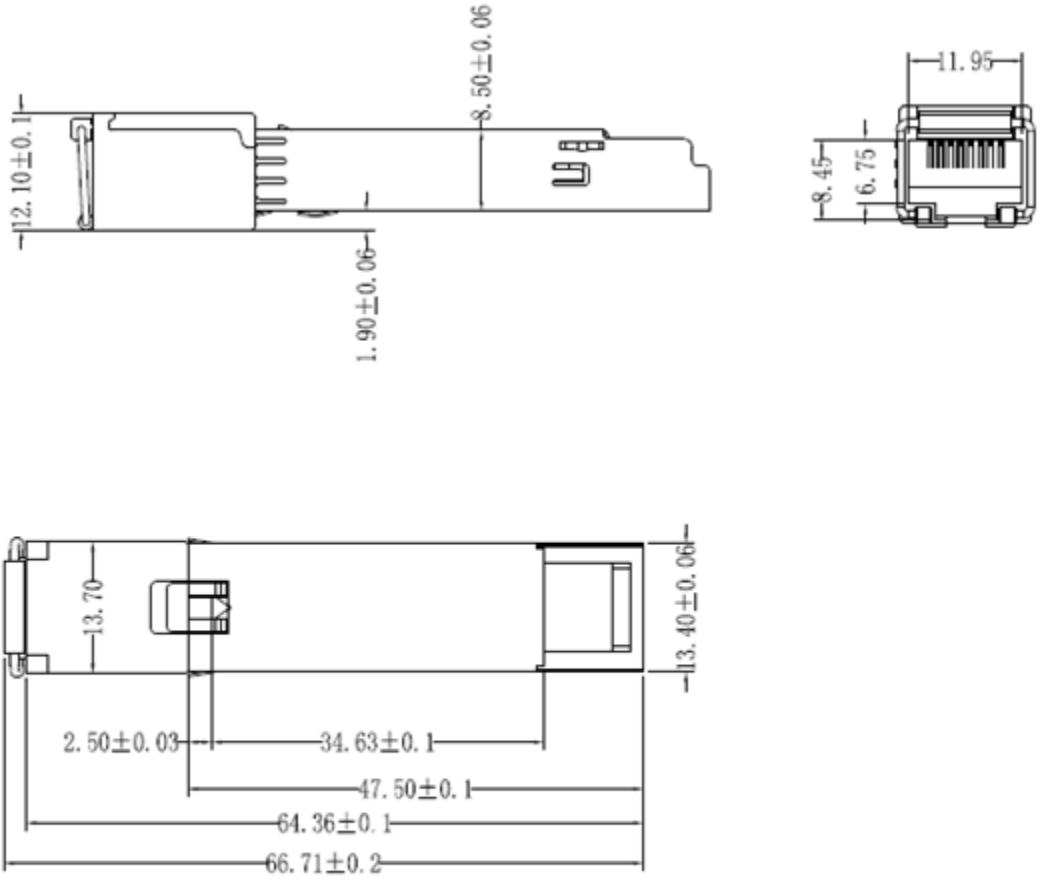

Figure 2. Mechanical dimensions

REGULATORY COMPLIANCE

The 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