Product Features

- Up to 1.25 Gb/s bi-directional data links
- Hot-pluggable SFP footprint
- Low power dissipation(1.05W typical)
- Compact RJ-45 connector assembly
- Fully metal enclosure, for lower EMI
- RoHS compliant
- Single +3.3V power supply
- 1.25 Gigabit Ethernet over Cat 5 cable
- Case operating temperature：
  0°C to +70°C

Product Descriptions

1000BASE-T Copper Small Form Pluggable (SFP) transceivers are based on the SFP Multi Source Agreement (MSA). They are compatible with the Gigabit Ethernet and 1000BASE-T standards as specified in IEEE Std 802.3. The 1000BASE-T physical layer IC (PHY) can be accessed via I2C, allowing access to all PHY settings and features.

The product uses the RX_LOS pin for link indication, and 1000BASE-X auto-negotiation should be disabled on the host system.

Specifications (+3.3V Volt Electrical Power Interface)

The product 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	Note
Supply Current	Is		320	375	mA	1
Input Voltage	Vcc	3.13	3.3	3.47	V	2
Maximum Voltage	Vmax			4	V	
Surge Current	Isurge			30	mA	3

Note:

1. 1.2W max power over full range of voltage and temperature. See caution note 4 below.
2. Referenced to GND.
3. Hot plug above steady state.
4. Power consumption and surge current are higher than the specified values in the SFP MSA.

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Low-Speed Signals and Electronic 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

Parameter	Symbol	Min	Typ	Max	Unit	Note
SFP Output LOW	VOL	0		0.5	V	1
SFP Output HIGH	VOH	Host_Vcc-0.5		Host_Vcc+0.3	V	1
SFP Input LOW	VIL	0		0.8	V	2
SFP Input HIGH	VIH	2		Vcc+0.3	V	2

Note:

1. 4.7k to 10k pull-up to host_Vcc, measured at host side of connector.
2. 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.

Parameter	Symbol	Min	Typ	Max	Unit	Note
Transmission Line-SFP						
Line Frequency	fL		125		MHz	1
Tx Output Impedance	Zout,TX		100		Ohm	2
Rx Input Impedance	Zin,RX		100		Ohm	2
Host-SFP						
Single ended data input swing	Vinsing	250		1200	mV	3
Single ended data output swing	Voutsing	350		800	mV	3
Rise/Fall Time	Tr,Tf		175		psec	4
Tx Input Impedance	Zin		50		Ohm	3
Rx Output Impedance	Zout		50		Ohm	3

Note:

1. 5-level encoding, per IEEE 802.3.
2. Differential, for all frequencies between 1MHz and 125MHz.
3. Single ended.
4. 20% ~ 80%.

General Specifications

| Parameter	Symbol	Min	Typ	Max	Unit	Note
Data Rate	BR	10		1000	Mb/sec	1
Cable Length	L			100	M	2

Note:

1. IEEE 802.3 compatible. Sen Note 4 through 6 below.
2. Category 5 UTP.
3. Clock tolerance is +/-50ppm.
4. By default, the SFP-F12-01 is a full duplex device in preferred master mode.
5. Automatic crossover detection is enabled. External crossover cable is not required.
6. SFP-F21-01 dies not support SGMII. With a SERDES the module operate at 1000BASE-T only.

## Serial Communication Protocol

It supports the 2-wire serial communication protocol outlined in the SFP MSA. It uses an Atmel AT24C02B 256 byte EEPROM with an address of A0h.

Parameter	Symbol	Min	Typ	Max	Unit	Note
I2C Clock Rate			0	100,000	Hz	

SFP to Host Connector Pin Out
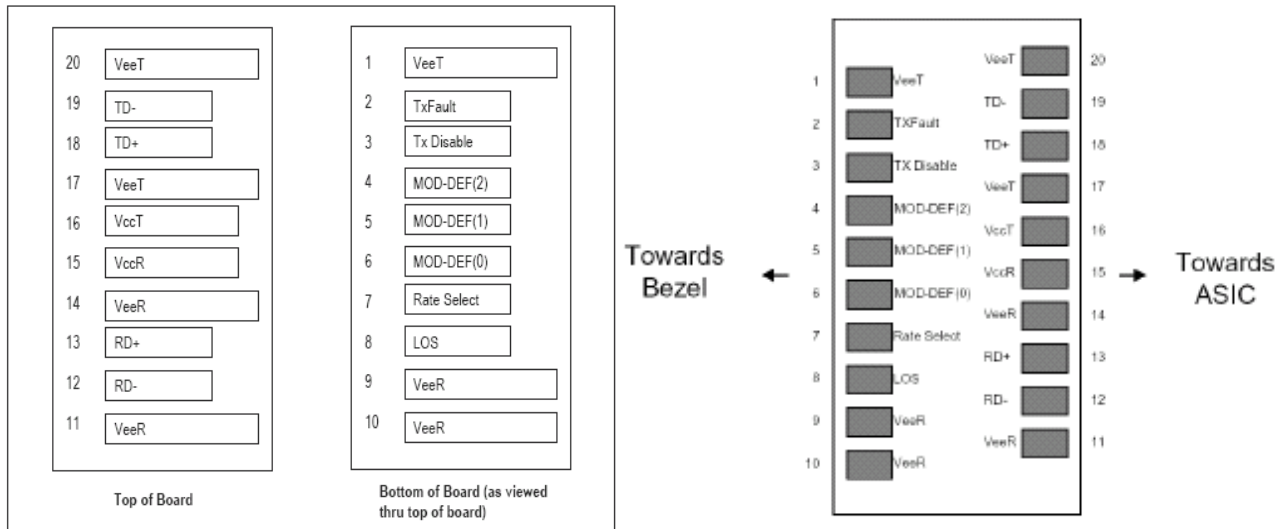
Pin	Name	Input/Output Level	Description
1	VeeT	Input	Transmitter ground
2	TXFault	Output/LVTTL	Laser failure indication. High level indicates "laser failure". Externally pulled up
3	TXDisable	Input/LVTTL	Transmitter disable, High signal/open disables TX laser output. Low level enables TX output, internally pulled up.
4	MOD-DEF(2)	Input/output	Module definition 2, SDA, Data line for I2C bus. Externally pulled up
5	MOD-DEF(1)	Input	Module definition 1, SCL, Clock for I2C bus. Externally pulled up
6	MOD-DEF(0)	Output	Module definition 0, Module present. Ground inside module.
7	Rate Select	-	No connection.
8	LOS	Output/LVTTL	Receiver loss of signal indication. Low signal indicates optical signal is present at RX input. Should be Externally pulled up.
9	VeeR	Input	Receiver ground
10	VeeR	Input	Receiver ground
11	VeeR	Input	Receiver ground
12	RD -	Output/LVPECL	Inverted receiver data output (AC coupled)
13	RD +	Output/LVPECL	Non-inverted receiver data output (AC coupled)
14	VeeR	Input	Receiver ground
15	VccR	Input	Receiver power supply
16	VccT	Input	Transmitter power supply
17	VeeT	Input	Transmitter ground
18	TD +	Input/LVPECL	non-inverted transmitter data input (AC coupled)
19	TD -	Input/LVPECL	Inverted transmitter data input (AC coupled)
20	VeeT	Input	Transmitter ground

Mechanical Specifications (Unit:mm)
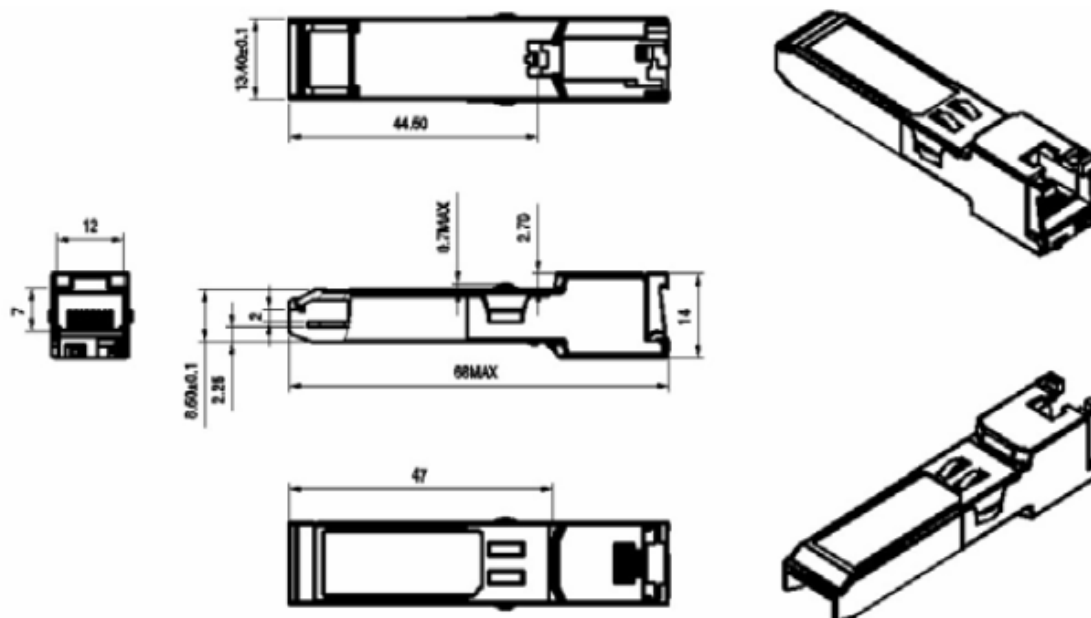
Revision History

Date	Version	Description
06/24/2014	1.0	Initial release
12/04/2018	1.1	Update Formerica Logo.