

### 10/100/1000G RJ45 Optical Transceiver 100m

#### Features:

- Up to 1.25Gb/s bi-directional data links Hot-pluggable SFP footprint
- Operation Temperature range (0°C to +70°C) Fully metallic enclosure for low EMI Low power dissipation
- Compact RJ-45 connector assembly Detailed product information in EEPROM
- +3.3V single power supply
- Access to physical layer IC via 2-wire serial bus
- 10/100/1000 BASE-T operation in host systems with SGMII interface Compliant with SFPMSA
- Compliant with IEEE Std 802.3TM-2002 Compliant with FCC 47 CFR Part 15, Class B RoHS Compliant Products Available

#### Applications:

- 1.25 Gigabit Ethernet over Cat 5 cable Switch/Router to Switch/Router Link High speed I/O for file servers

#### Description:

- ESFP-1.25G-RJ45 copper SFP transceivers high performance, cost effective module compliant with the Gigabit Ethernet and 1000BASE-T standards as specified in IEEE 802.
- 3-2002andIEEE802.3ab, whichsupporting1000Mbpsdata-rateupto100metersreachover unshielded twisted-pair category 5 cable. The Copper SFP supports1000 Mbps full duplex data-linkswith5-levelPulseAmplitudeModulation (PAM)signals. Allfourpairsinthecableare used with symbol rate at 250Mbps on each pair. The Copper SFP provides standard serial ID information compliant with SFP MSA, which can be accessed with address of A0h via the 2-wire serial CMOS EEPROM protocol. The physical IC can also be accessed via 2-wire serial bus at addressAche.

Pin	Signal name	Description	MSA Notes
1	VEET	Transmitter ground (common with receiver ground)	
2	TFAULT	Transmitter Fault. Not supported	Note 1
3	TDIS	Transmitter Disable. PHY disabled on high or open	Note 2
4	MOD_DEF (2)	Module Definition 2. Data line for Serial ID.	Note 3
5	MOD_DEF (1)	Module Definition 1. Clock line for Serial ID.	Note 3
6	MOD_DEF (0)	Module Definition 0. Grounded within the module.	Note 3
7	Rate Select	No connection required	
8	LOS	Loss of Signal - High Indicates Loss of Signal	
9	VEER	Receiver Ground (common with transmitter ground)	
10	VEER	Receiver Ground (common with transmitter ground)	
11	VEER	Receiver Ground (common with transmitter ground)	
12	RD-	Receiver Inverted DATA out. AC Coupled	Note 4
13	RD+	Receiver Non-inverted DATA out. AC Coupled	Note 4
14	VEER	Receiver Ground (common with transmitter ground)	
15	VCCR	Receiver Power Supply	Note 5
16	VCCT	Transmitter Power Supply	Note 5
17	VEET	Transmitter Ground (Common with Receiver Ground)	
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	Note 6
19	TD-	Transmitter Inverted DATA in. AC Coupled.	Note 6
20	VEET	Transmitter Ground (common with receiver ground)	

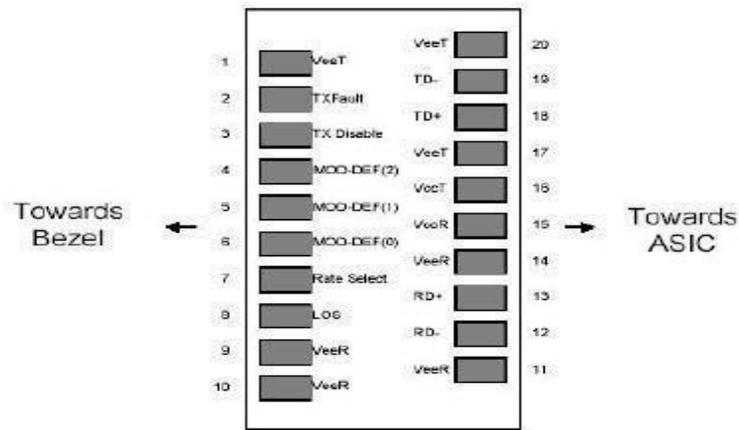
#### SFP to Host Connector Pin Out:

Notes:

- TX Fault is not used and is always tied to ground through a 100ohm resistor.
- TXD is able as described in the MSA is not applicable to the1000BASE-Tmodule, but is used for convenience as an input to resetthe internal ASIC. This pin is pulled up within the module with a 4.7K resistor. Low (0 –0.8 V): Transceiver



- on between (0.8V and 2.0V):
- Undefined High (2.0– 3.465V): Transceiver in reset state Open: Transceiver in reset state Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7-10K resistor on the host board to a supply less than VCC +0.3V or VCCR +0.3V.
- Mod Def 0 is tied to ground through a 100-ohm resistor to indicate that the module is present. Mod-Def1 is clock line of two wireserial interface for optional serial ID Mod-Def 2 is data line of two wire serial interface for optional serial ID
- RD-/+ : These are thief inertial receiver outputs. They are accoupled 100ohm differential lines which should beterminatedwith100ohmdifferentialattheuserSerDes.Theaccouplingisdoneinsidethe module and is thus not required on the host board. The voltages win goes these lines will be between 370 and 2000 mV differential (185 –1000 mV single ended) when properlyterminated. These levels are compatible with CML and LVPECL voltages wings.
- VCC Rand VCC Tare the receiver and transmitter power supplies. They are definedas3.3V± 5%at the SFP connector pin. The maximum supply currents about 300mAand the associated in-rush current will typically be no more than 30mA above steady stateafter 500 nanoseconds.
- TD-/+ : These are the differential transmitter inputs. They are a couple differential lines with 100 W differential termination insidethe module. The accoupling is done inside the modulini’s thus not required on the host board. The inputs will accept differential swing so f 500–2400mV (250–1200mV single ended), though it is recommended that values between 500 and 1200mV differential(250–600mV single ended) be used for best EMI performance. These levels are compatible with CML and LVPECL voltage swings



Parameter	Symbo	Min.	Max.	Unit	Notes/Conditions
SFP Output LO	VOL	0	0.5	V	4.7k to 10k pull-
SFP Output HIG	VOH	host_ Vcc -	host_ Vcc + 0.3	V	4.7k to 10k pull-
SFP Input LOW	VIL	0	0.8	V	4.7k to 10k pull-up to Vcc.
SFP Input HIGH		2	Vcc + 0.3 V	V	4.7k to 10k pull-up to Vcc.

### +3.3 Volt electrical power interface:

- ESF P-1.25G RJ4 5 has an input voltage range of 3.3 V +/- 5%. The 4 V maximum voltage is not allowed for continuous operation. Caution: Power consumption and surge current are higher than the specified vales in the SFPMSA

### Low-Speed Signals:

- MOD\_DEF (1) (SCL) and MOD\_DEF (2) (SDA), are open drain CMOS signals. Both MOD\_DEF (1) and MOD\_DEF (2) must be pulled up to host\_ Vcc.

Parameter	Symbol	Mi	Typical	Ma	Unit	Notes/Conditions
Supply Curre	Is		320	375	mA	1.2W max power over full range of voltage andtemperature. See caution note below
Input Voltage	Vcc	3.1	3.3	3.4	V	Referenced to GND
Surge Current	Isurge		30		mA	Hot plug above steady state current. See caution note



## High-Speed Electrical Interface:

- All high-speed signals are AC-coupled internally.

### Transmission Line-SFP

Parameter	Symbol	Mi	Typical	Max.	Unit	Notes/Conditions
Line Frequency	fL		125		MH	5-level encoding, per IEEE 802.3
Tx Output Impedance	Zout,T X		100		Oh	Differential
Rx Input Impedance	Zin,RX		100		Oh	Differential

### Host-SFP

Parameter	Symbol	Mi	Typical	Ma	Unit	Notes/Conditions
Single ended data input swing	Vinsing	250		1200	mV	Single ended
Single ended data output swing	Voutsin g	350	100	800	mV	Single ended
Rise/Fall Time	Tr,Tf		175		pse	20%-80%
Tx Input Impedance	Zin		50		Oh	Single ended
Rx Output Impedance	Zout		50		Oh	Single ended

Parameter	Symbo	Mi	Typical	Max.	Units	Notes/Conditions
Data Rate	BR	10		1,00	Mb/s	IEEE 802.3 compatible.
Cable Length	L			100	m	Category 5 UTP. BER <10-12

## General Specifications:

Notes:

- Clock tolerance is +/- 50 ppm
- By default, the Copper SFP is a full duplex device in preferred master mode
- Automatic crossover detection is enabled. External crossover cable is not required
- 10/100/1000 BASE-T operation requires the host system to have an SGMII interface with no clocks, with a SERDES that does not support SGMII, the module will operate at 1000BASE-T only.

## Environmental Specifications:

- The XF33A01 has an extended range from 0°C to +70°C case temperature as specified in Table 7.

## Serial ID Memory Contents”:

Data Address	Length	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (22=RJ45)
3-10	8	Transceiver	1000BASE-T
11	1	Encoding	8B10B (01h)
12	1	BR, Nominal	Nominal baud rate, unit of 100Mbps
13	1	Reserved	(0000h)
14	1	Length (9um, k	Link length supported for 9/125um fiber, units of km
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length (62.5u	Link length supported for 62.5/125um fiber, units of 10m

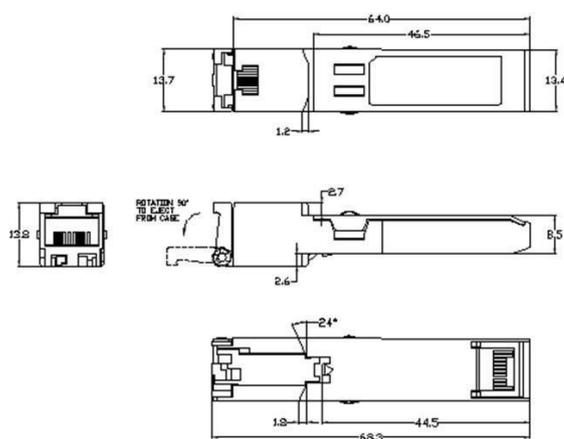


18	1	Length (Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name: Lightens
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: "LSFP-T-M2" (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-61	2	Wavelength	Laser wavelength
62	1	Reserved	

63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented (001Ah =LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	Manufacturing date code
92-94	3	Reserved	
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	Vendor specific date, read only

Parameter	Symbol	Min.	Typic	Max.	Units	Notes/Conditions
Operating Temperature	Top	0		70	°C	Case temperature
Storage Temperature	Tsto	-40		85	°C	Ambient temperature
Maximum Supply Voltage	Vcc	-0.5		4	V	-
Relative Humidity	RH	0		85	%	-

### Mechanical Dimensions:



Mechanical Dimensions of Transceiver

### Order Information:

Part Number	Product Description
SFP1000C-AT	10/100/1000M RJ45 100m

