
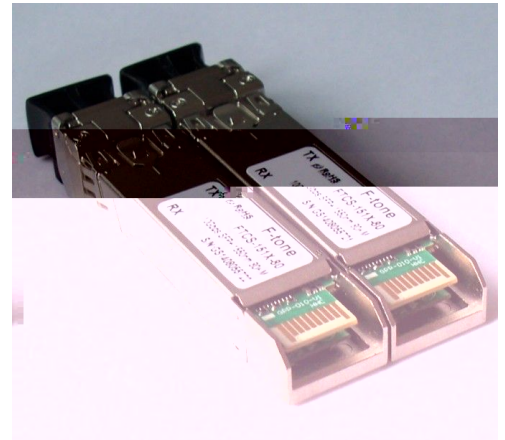


## F-tone Networks 10Gbps 2km SFP+ Optical Transceiver FTCS-131X-02DXX

### Features

- ◆ Optical interface compliant to IEEE 802.3ae 10GBASE-LR
- ◆ Electrical interface compliant to SFF-8431
- ◆ Hot Pluggable
- ◆ Supports rate up to 10.3 Gb/s bit rates
- ◆ 1G/2G/4G/ 8G/10G Fiber Channel applications.
- ◆ 1310nm FP transmitter, PIN photo-detector
- ◆ Low power consumption
- ◆ Applicable for 2km SMF connection
- ◆ All-metal housing for superior EMI performance
- ◆ Advanced firmware allow customer system encryption information to be stored in transceiver
- ◆ Cost effective SFP+ solution, enables higher port densities and greater bandwidth
- ◆ For the OBSAI application, the rates are 6.144Gb/s, 3.072 Gb/s, 1.536 Gb/s and 0.768 Gb/s.
- ◆ For the CPRI application, the rates are 6.144Gb/s, 3.072 Gb/s, 2.4576 Gb/s, 1.2288 Gb/s, 0.6144 Gb/s.
- ◆ RoHS6 compliant (lead free) 
- ◆ Operating case temperature:
  - Standard : 0 to +70°C
  - Industrial : -40 to +85°C



### Applications

- ◆ 10GBASE-LR at 10.3125Gbps
- ◆ Other optical links
- ◆ For the OBSAI application, the rates are 6.144Gb/s, 3.072 Gb/s, 1.536 Gb/s and 0.768 Gb/s.
- ◆ For the CPRI application, the rates are 6.144Gb/s, 3.072 Gb/s, 2.4576 Gb/s, 1.2288 Gb/s, 0.6144 Gb/s.

### Product description

This 1310 nm FP 10Gigabit SFP+ transceiver is designed to transmit and receive optical data over single mode optical fiber for link length 2km.

The SFP+ 2km module electrical interface is compliant to SFI electrical specifications. The transmitter input and receiver output impedance is 100 Ohms differential. Data lines are internally AC coupled.

The module provides differential termination and reduce differential to common mode conversion for quality signal termination and low EMI. SFI typically operates over 200 mm of improved FR4 material or up to about 150mm of standard FR4 with one connector.

## Absolute maximum rating

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	V <sub>CC</sub>	0	+3.6	V
Storage Temperature	T <sub>c</sub>	-40	+85	°C
Operating Case Temperature	T <sub>c</sub>	0	+70	°C
Relative Humidity	RH	5	95	%
RX Input Average Power	P <sub>max</sub>	-	0	dBm

## Recommended operating environment

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

Parameter	Symbol	Min.	Typical	Max	Unit
Power Supply Voltage	V <sub>CC</sub>	3.135	3.300	3.465	V
Operating Case Temperature	T <sub>c</sub>	0	25	70	°C

## Low Speed Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit
Power Consumption				1	W
TX_Fault,RX_LOS	VOL	0		0.4	V
	VOH	Host_Vcc-0.5		Host_Vcc+0.3	V
TX_DIS	VIL	-0.3		0.8	V
	VIH	2.0		VCCT+0.3	V
RS0,RS1	VIL	-0.3		0.8	V
	VIH	2.0		VCCT+0.3	V



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unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Data Rate		-	10.3125	-	Gbps	
Power Consumption		-	1200	1500	mW	
<b>Transmitter</b>						
Single Ended Output Voltage Tolerance		-0.3	-	4.0	V	
C common mode voltage tolerance		15	-	-	mV	
Tx Input Diff Voltage	VI	400		1600	mV	
Tx Fault	VoL	-0.3		0.4	V	At 0.7mA
Data Dependent Input Jitter	DDJ			0.10	UI	
Data Input Total Jitter	TJ			0.28	UI	
<b>Receiver</b>						
Single Ended Output Voltage Tolerance		-0.3	-	4.0	V	
Rx Output Diff Voltage	Vo	300		850	mV	
Rx Output Rise and Fall Time	Tr/Tf	30			ps	20% to 80%
Total Jitter	TJ			0.70	UI	
Deterministic Jitter	DJ			0.42	UI	

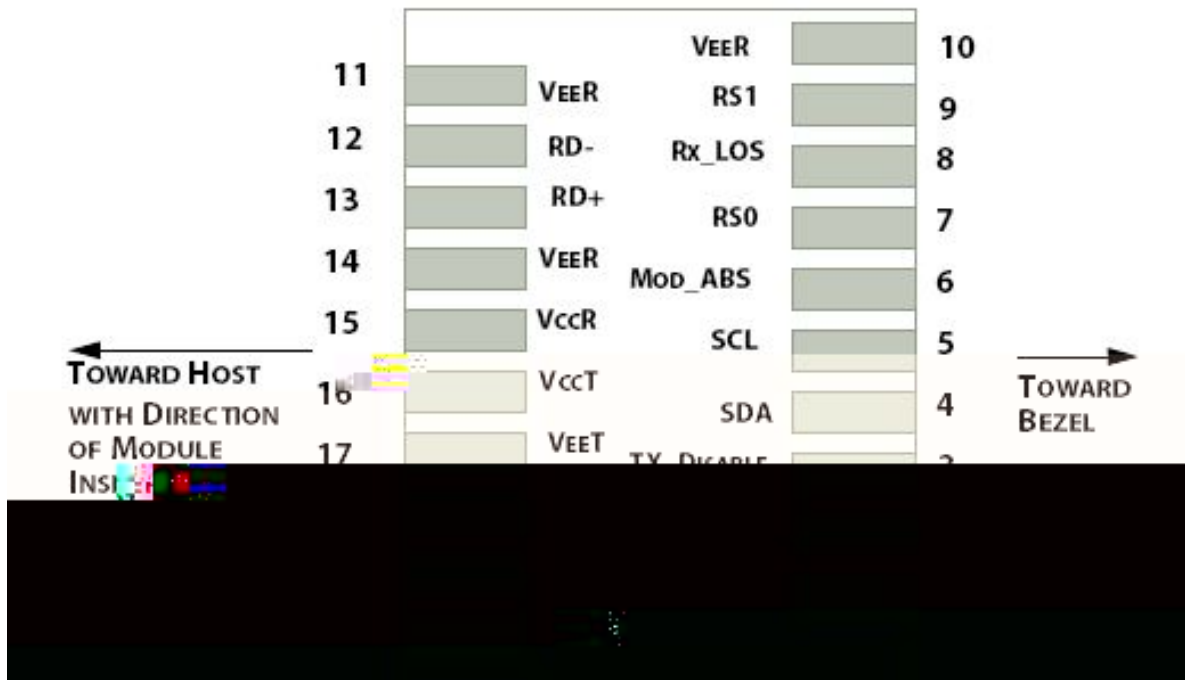


Figure 1: Interface to Host PCB

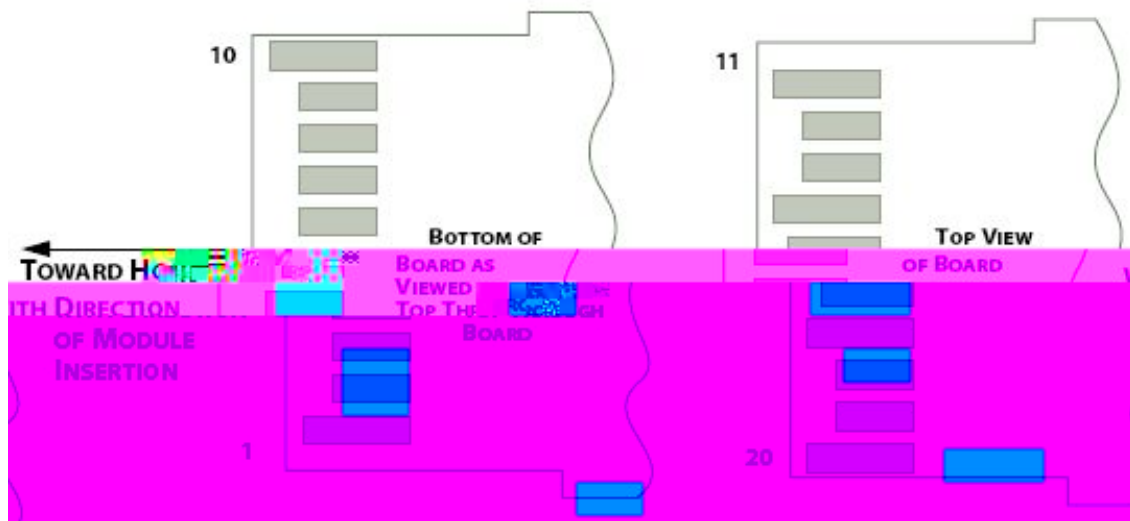


Figure 2: Module Contact Assignment

Pin definition

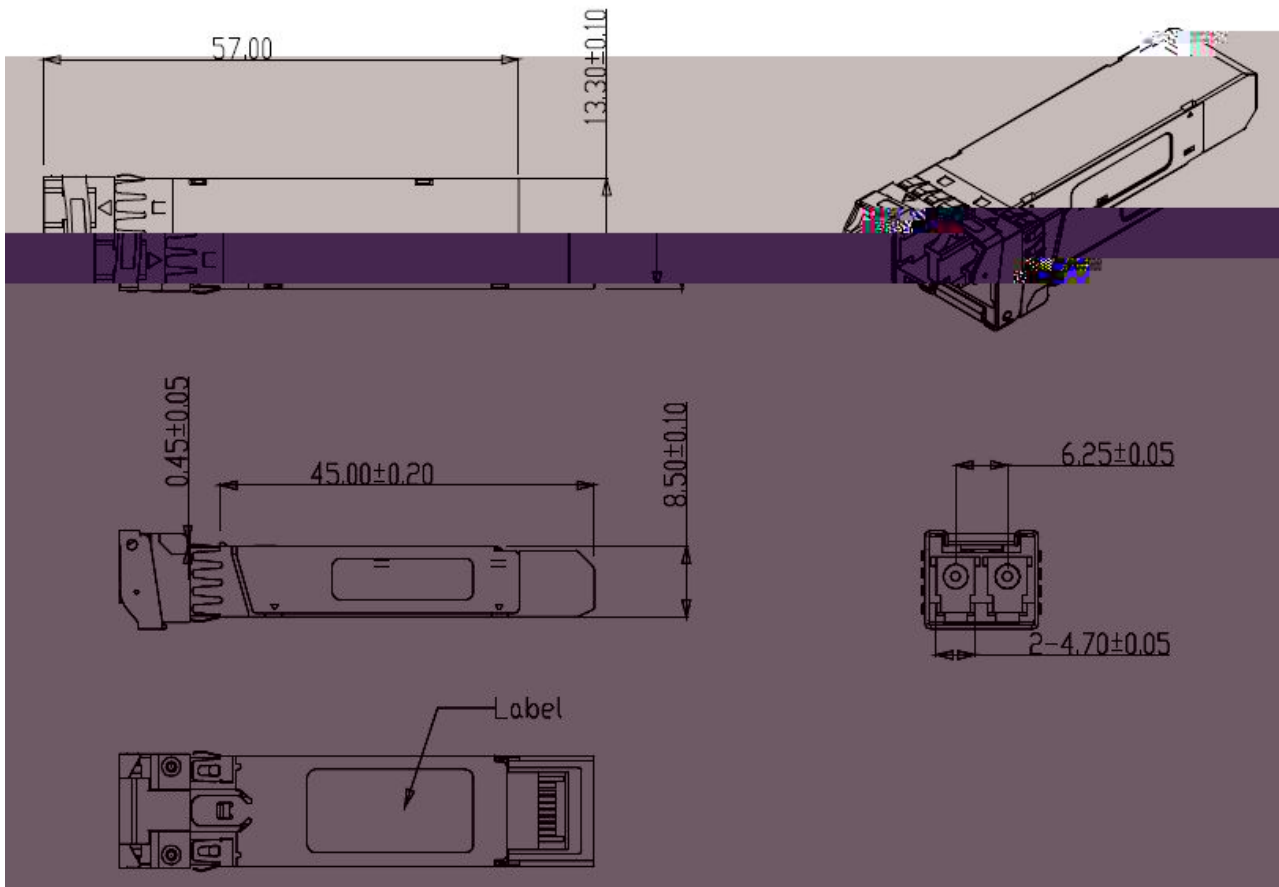


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**Figure5. Mechanical Specifications**

## Regulatory Compliance

F-tone Networks SFP+ transceiver is designed to be Class I Laser safety compliant and is certified per the following standards:

Feature	Agency	Standard
Laser Safety	FDA	CDRH 21 CFR 1040 and Laser Notice No. 50
Product Safety	UL	UL and CUL EN60950-2:2007
Environmental protection	SGS	RoHS Directive 2002/95/EC
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003



## Ordering information

Part Number	Product Description
FTCS-131X-02D	1310nm, 10Gbps, 2km, 0°C ~ +70°C
FTCS-131X-02DI	1310nm, 10Gbps, 2km, -40 to +85°C

## References

1. “Specifications for Enhanced Small Form Factor Pluggable Module SFP+”, SFF-8431, Rev 4.1, July 6, 2009.
2. “Improved Pluggable Formfactor”,SFF-8432, Rev 4.2, Apr 18, 2007
3. IEEE802.3ae – 2002
4. “Diagnostic Monitoring Interface for Optical Transceivers” SFF-8472, Rev 10.3, Dec 1, 2007

## Important Notice

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