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## Optical characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

	Unit	Values
<b>Operating Reach</b>	<b>m</b>	<b>20K</b>
<b>Transmit</b>		
Center wavelength (range)	nm	1260 -1355
Side Mode Suppression Ratio (min)	dB	30
Launched power		
– maximum	dBm	+1
– minimum	dBm	-5 Notes1
– OMA	dBm	-5.2
– OMA-TDP (min)	dBm	-6.2
Transmitter and dispersion penalty	dB	0 Notes4
Average launch power of OFF transmitter (max)	dBm	-30
Extinction ratio (min)	dB	3.5 Notes2
RIN <sub>12</sub> OMA (max)	dB/Hz	-128
Optical Return Loss Tolerance (min)	dB	12
<b>Receiver</b>		
Center wavelength (range)	nm	1260-1355
Receive overload (max) in average power <sup>1</sup>	dBm	0.5
Receive sensitivity (min) in average power <sup>1</sup>	dBm	-14.4 Notes3
Receiver sensitivity (max) in OMA (footnote 2)	dBm	-12.6 Notes3
Receiver Reflectance (max)	dB	-12
Stressed receiver sensitivity (max) in OMA <sup>2</sup>	dBm	-10.3
Vertical eye closure penalty (min) <sup>3</sup>	dB	2.2
Stressed eye jitter (min) <sup>2</sup>	Ulp-p	0.7
Receive electrical 3dB upper cutoff frequency (max)	GHz	12.3
Receiver power (damage, Max)	dBm	1.5
<b>Notes:</b>		
1. The optical power is launched into SMF		
2. Measured with a PRBS 2 <sup>31</sup> -1 test pattern@10.3125Gbps		
3. Measured with a PRBS 2 <sup>31</sup> -1 test pattern@10.3125Gbps BER≤10 <sup>-12</sup>		
4. In G.652 and G.655(NDSF)		

## Electrical characteristics

The following electrical characteristics are defined over the Recommended Operating Environment

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						

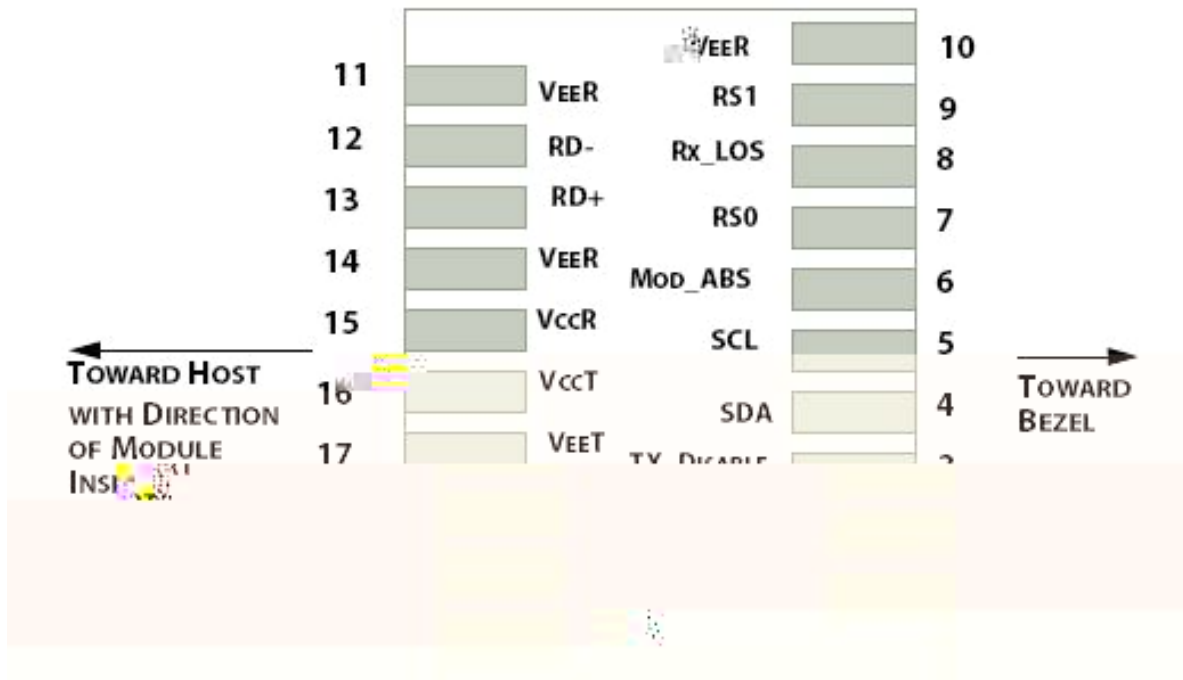


Figure 1: Interface to Host PCB

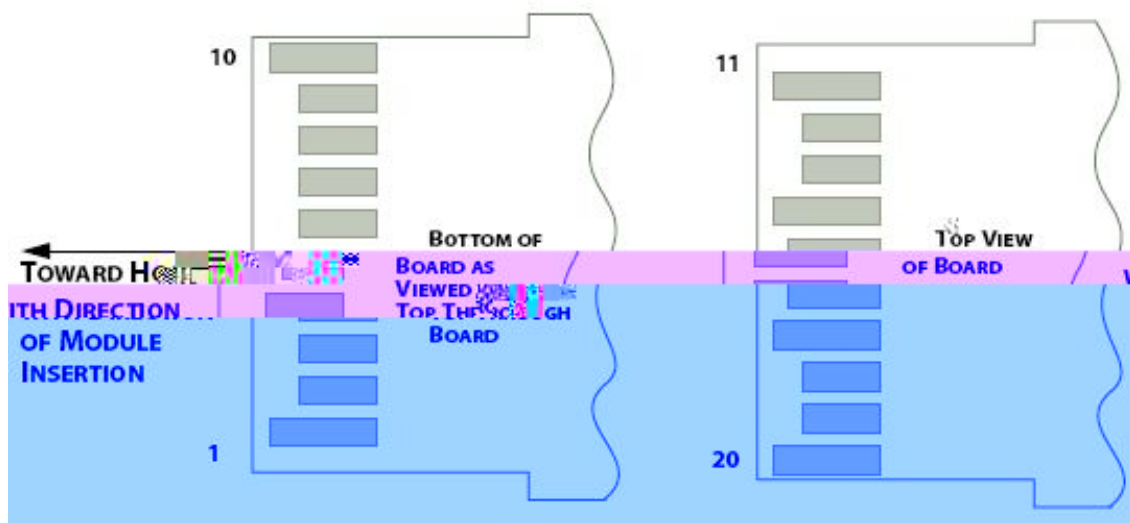


Figure 2: Module Contact Assignment

Pin definition



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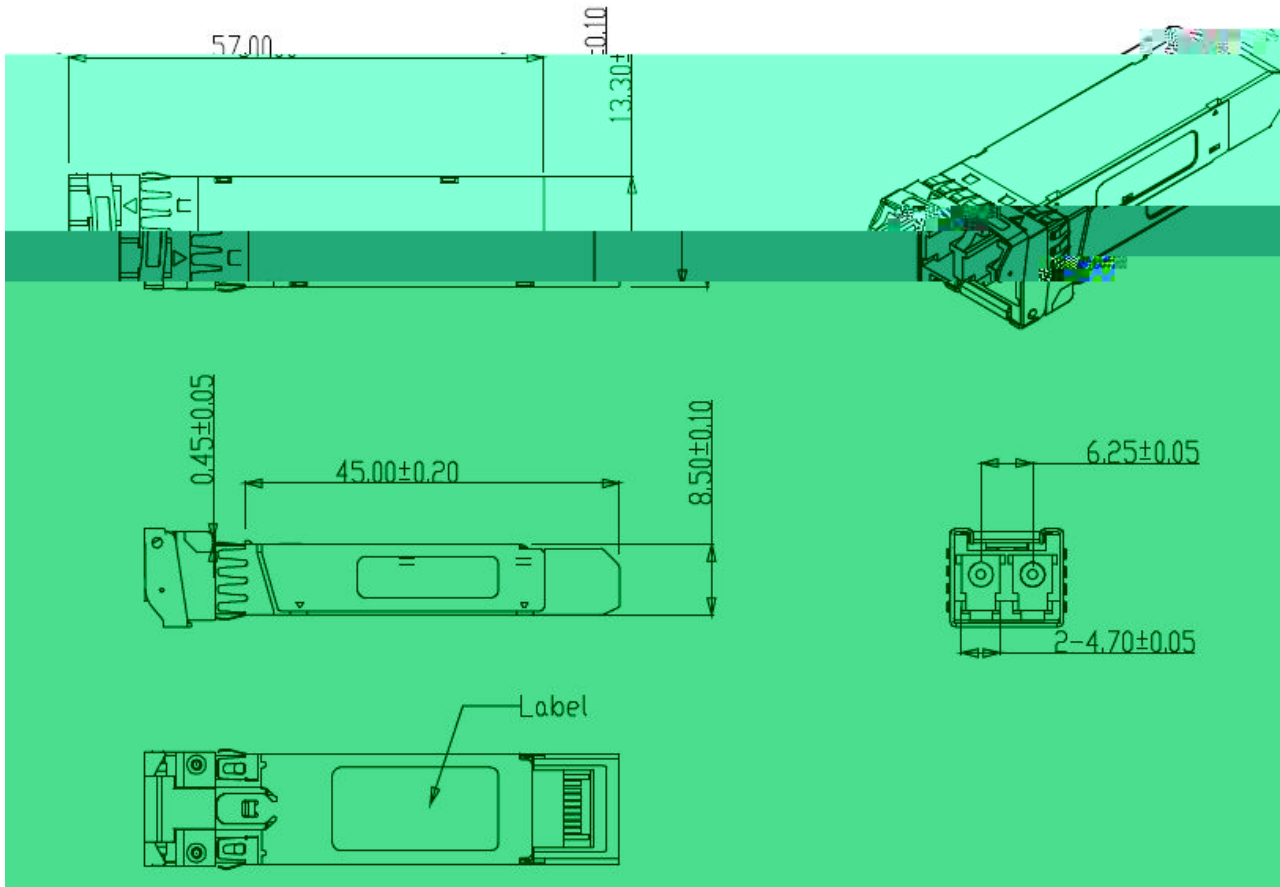
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Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground

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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	



## Ordering information

Part Number	Product Description
FTCS-131X-20D	1310nm, 10Gbps, SFP+ 20km, 0°C ~ +70°C
FTCS-131X-20DI	1310nm, 10Gbps, SFP+ 20km, -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

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by F-tone Networks before they become applicable to any particular order or contract. In accordance with the F-tone Networks policy of continuous improvement specifications may change without notice.

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