

## TITLE

### 10G SFP+ Bidi T1330/R1270 Transceiver

## 1. SCOPE

According to Enhanced 8.5 and 11.3 Gigabit Small Form Factor Pluggable “ SFP+ ” Multi-Sourcing Agreement (MSA) SFF-8431 and SFF-8472, revision 10.4, are designed for 10G Ethernet serial optical data communication up to 20km on single mode fiber. They are compliant with IEEE Std 802.3-2005 10Gb Ethernet 10GBASE-LR/LW.

We offer commercial and industrial operating temperature options

## 2. PRODUCT FEATURES

- Electrical and Management interface specifications are compliant with SFF-8431/ SFF-8432/ SFF-8472
- SFP+ MSA package with duplex LC connector
- Up to 11.3Gb/s bi-directional data links
- Single +3.3V power supply
- Class 1 laser safety certified
- The DDM for Transmitter Output Power and Receiver Average Optical Power are  $\pm 2$ dB
- Operating temperature Options: - (Industrial) -40 to +85°C // (Commercial) 0 to +70°C
- Up to 20km on 9/125 $\mu$ m SMF
- 2011/65/EU RoHS 6/6 Compliant
- Hot-Pluggable SFP+ cable ends
- FCC(Federal Communications Commission) Class A of Subpart B of Part 15 Compliant

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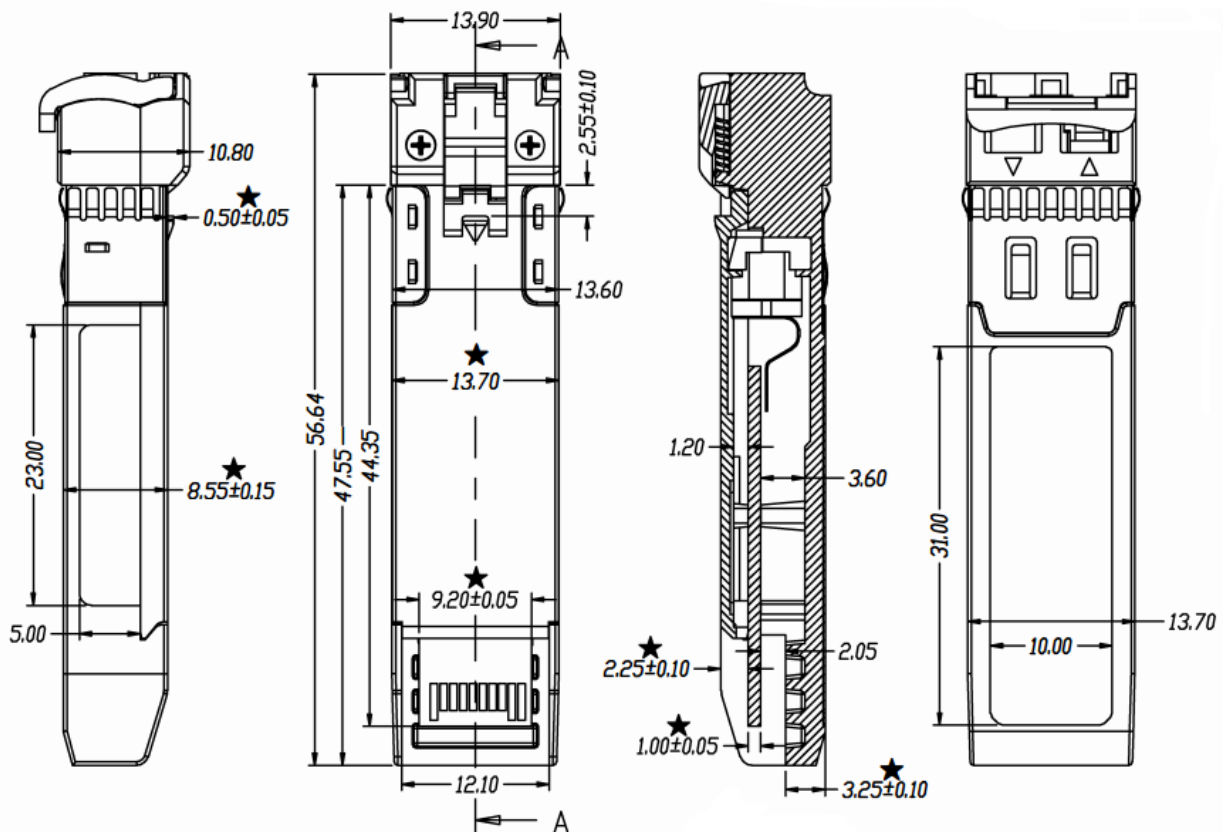
**3. PRODUCT DESCRIPTION**

**3.1 PRODUCT NAME AND SERIES NUMBER(S)**

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Part Number	Data Rate	Wavelength (nm)	Distance	Media	Power (dBm)	Sen. (dBm)	Connector	Temp.
ZFTCBCC3327A2ST	10G	1330	20 km	SMF	0~+6	-14.4	LC	C
ZFTCBDC3327A2ST	10G	1330	40 km	SMF	0~+6	-14.4	LC	C

**3.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKING**



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**4. APPLICABLE DOCUMENTS AND SPECIFICATIONS**

- 10G Ethernet 10GBASE-LR/LW
- Wireless
- 8.5Gb/s Fiber Channel

**5. Absolute Maximum Ratings & Recommended Operating Conditions**

**Absolute Maximum Ratings**

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	TS	-40	+85	°C
Supply Voltage	VCC3	-0.5	4	V
Relative Humidity(Non-condensing)	RH	5	95	%

**Recommended Operating Conditions**

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature(I-temp)	TI	-40	25	85	°C
Power Supply Voltage	VCC3	3.1	3.3	3.5	V
Data Rate		8.5	10.3125	11.3	Gbps

**Transceiver Electrical Characteristics**

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Power Consumption (temp)	PD	-	-	1	W	-
<b>Transmitter</b>						
Input Differential Impedance	ZIN	-	100	--	Ω	-

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Differential Data Input Swing	VIN, P-P	180	-	700	mVP-P	-
TX_FAULT Transmitter Fault Normal Operation	VOH	2.0	-	VCCHOST	V	-
	VOL	0	-	0.8	V	-
TX_DISABLE Transmitter Disable Transmitter Enable	VIH	2.0	-	VCCHOST	V	-
	VIL	0	-	0.8	V	-
<b>Receiver</b>						
Output Differential Impedance	ZO	-	100	-	Ω	-
Differential Data Output Swing	VOUT, P-P	300	-	850	mVP-P	-
Data Output Rise Time, Fall Time	tr, tf	28	-	-	ps	-
RX_LOS Loss of signal (LOS) Normal Operation	VOH	2.0	-	VCCHOST	V	-
	VOL	0	-	0.8	V	-

<b>Transmitter Operating Characteristic-Optical, Electrical</b>						
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Center Wavelength	λC	1320	1330	1340	dBm	-
Launch Optical Power	Po	0	-	+6	dBm	1
Side Mode Suppression Ratio	SMSR	30	-	-	dBm	-
RIN12OMA	RIN	-	-	-128	dB/Hz	-
Extinction Ratio	ER	3.5	-	-	dB	-
Transmitter and Dispersion Penalty	TDP	-	-	3.0	dB	-
Optical Return Loss Tolerance	ORLT	-	-	12	dB	-
Pout @TX-Disable Asserted	Poff	-	-	-30	dBm	1

**Notes:**

1. Average optical power shall be measured using the methods specified in TIA/EIA-455-95.

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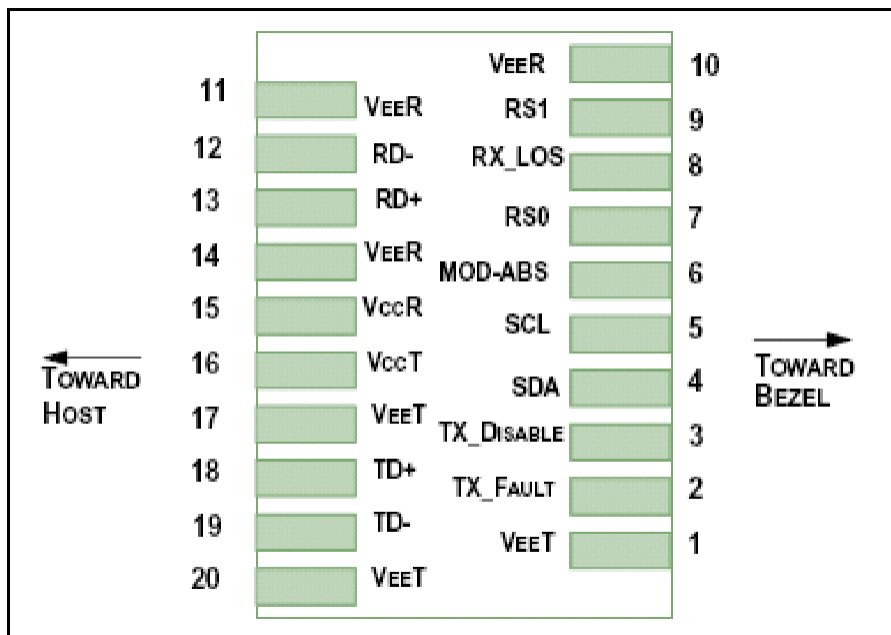
**Receiver Operating Characteristic-Optical, Electrical**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	$\lambda_c$	1260	1270	1280	nm	-
Receiver Sensitivity (Pavg)	S	-	-	-14.4	dBm	1
Receiver Overload (Pavg)	POL	3	-	-	dBm	1
Optical Return Loss	ORL	12	-	-	dBm	-
LOS De-Assert	LOSD	-	-	-15	dBm	-
LOS Assert	LOSA	-30	-	-	dBm	-
LOS Hysteresis	-	0.5	-	6	dB	-

Notes:

- Receiver sensitivity is informative. shall be measured with conformance test signal for BER =  $1 \times 10^{-12}$ .

**6. Pin-out Definition:**



**Pin Definitions**

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**Pin Assignment**

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Module Transmitter Ground	Note1
2	LVTTTL-O	TX_Fault	Module Transmitter Fault	Note2
3	LVTTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	Note3
4	LVTTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	Note4
5	LVTTTL-I/O	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)	Note4
6		MOD_ABS	Module Absent, connected to VeeT or VeeR in the module	Note5
7	LVTTTL-I	RS0	Rate Select 0, optionally controls SFP+ module receiver. When High input data rate GBd and when LOW input data rate 1.25GBd.	Note6
8	LVTTTL-O	RX_LOS	Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect)	Note2
9	LVTTTL-I	RS1	Rate Select 1, optionally controls SFP+ transmitter. When High input data rate 10.3GBd and when LOW input data rate 1.25 GBd.	Note6
10		VeeR	Module Receiver Ground	Note1
11		VeeR	Module Receiver Ground	Note1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Non-Inverted Data Output	
14		VeeR	Module Receiver Ground	Note1
15		VccR	Module Receiver 3.3 V Supply	
16		VccT	Module Transmitter 3.3 V Supply	
17		VeeT	Module Transmitter Ground	Note1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	Note1

**Notes:**

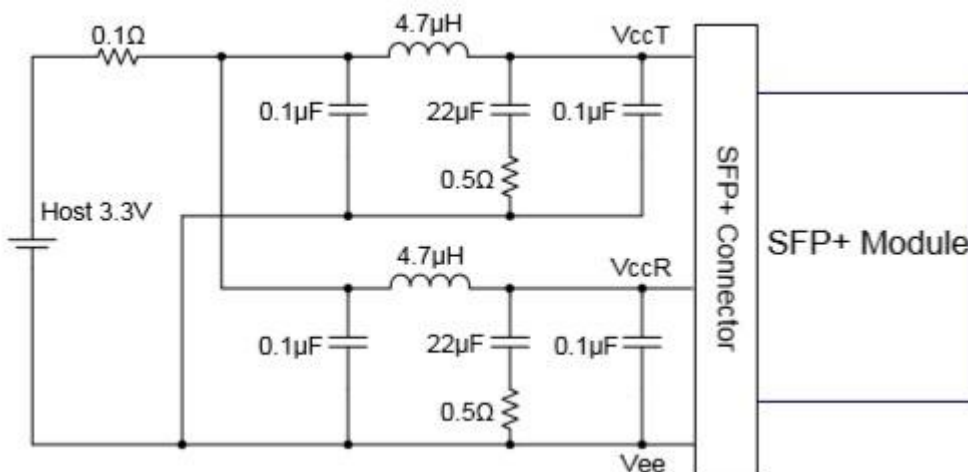
1. The module signal ground pins, VeeR and VeeT, shall be isolated from the module case.

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2. This pin is an open collector/drain output pin and shall be pulled up with 4.7k-10kohms to Host\_Vcc on the host board. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module  $V_{ccT/R} + 0.5 V$ .
3. This pin is an open collector/drain input pin and shall be pulled up with 4.7k-10kohms to  $V_{ccT}$  in the module.
4. See [sff-8431 4.2 2-wire Electrical Specifications](#).
5. This pin shall be pulled up with 4.7k-10kohms to Host\_Vcc on the host board.
6. If implementing SFF-8079 pin 7 and 9 are used for AS0 and AS1 respectively.

**Block Power Supply Filter Network**



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**Recommended Interface Circuit**

