

TITLE**10G SFP+ Bidi T1550/R1490 Transceiver 80km****1. SCOPE**

ZCables' 10G SFP+ transceivers, 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 80km on single mode fiber. They are compliant with IEEE Std 802.3-2005 10Gb Ethernet.

2. PRODUCT FEATURES

- Electrical and Management interface specifications are compliant with SFF-8431/ SFF-8432/ SFF-8472
- SFP+ MSA package with duplex LC connector
- 1490nm EML TX, 1550nm APD RX for C0C
- 1550nm EML TX, 1490nm APD RX for C0C
- Up to 11.3Gb/s bi-directional data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Operating temperature Options: - (Industrial) -40 to +85°C
- Up to 80km on 9/125µm SMF
- RoHS Compliant
- Hot-Pluggable SFP+ cable ends

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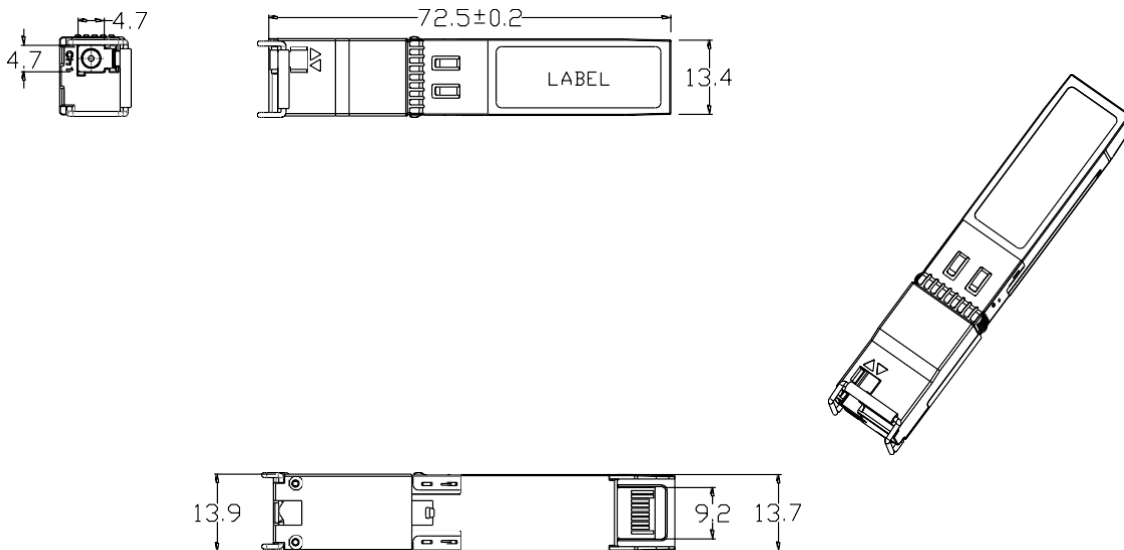
3. PRODUCT DESCRIPTION

3.1 PRODUCT NAME AND SERIES NUMBER(S)

SFP+ 10G Bidi T1550/R1490 Transceiver

Part Number	Data Rate	Wavelength (nm)	Distance	Media	Power (dBm)	Sen. (dBm)	Connector	Temp.
ZFTCBFC5549A2ST	10G	1550	80 km	SMF	0~5	-22	LC	I

3.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKING



Units in mm
Tolerance without indication is ±0.1mm

TITLE**10G SFP+ Bidi T1550/R1490 Transceiver 80km****4. APPLICABLE DOCUMENTS AND SPECIFICATIONS**

- 10G Ethernet 10GBASE-LR/LW
- SONET OC-192, SDH STM-64 and OTN G.959.1 P1L1-2D
- 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)	T _I	-40	25	85	°C
Power Supply Voltage	VCC3	3.1	3.3	3.5	V
Data Rate		8.5	10.3125	11.3	Gbps

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Transceiver Electrical Characteristics						
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Power Consumption (temp)	PD	-	-	2	W	-
Transmitter						
Input Differential Impedance	ZIN	-	100	--	Ω	-
Differential Data Input Swing	VIN, P-P	180	-	900	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	-
Receiver						
Output Differential Impedance	ZO	-	100	-	Ω	-
Differential Data Output Swing	VOUT, P-P	300	-	900	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	-

Transmitter Operating Characteristic-Optical, Electrical						
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Center Wavelength	λ_C	1540	1550	1560	dBm	-
Launch Optical Power	Po	0	-	5	dBm	1
Side Mode Suppression Ratio	SMSR	30	-	-	dBm	-
RIN12OMA	RIN	-	-	-128	dB/Hz	-

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Extinction Ratio	ER	9	-	-	dB	-
Transmitter and Dispersion Penalty	TDP	-	-	3.0	dB	-
Spectrum Bandwidth(-20dB)	RMS			0.4	nm	
Optical Return Loss Tolerance	ORLT	-	-	21	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.

Receiver Operating Characteristic-Optical, Electrical						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	λ_c	1480	1490	1500	nm	-
Receiver Sensitivity (Pavg)	S	-	-	-22	dBm	1
Receiver Overload (Pavg)	POL	-6.0	-	-	dBm	1
Optical Return Loss	ORL	26	-	-	dBm	-
LOS De-Assert	LOSD	-	-	-23	dBm	-
LOS Assert	LOSA	-35	-	-	dBm	-
LOS Hysteresis	-	0.5	-	6	dB	-

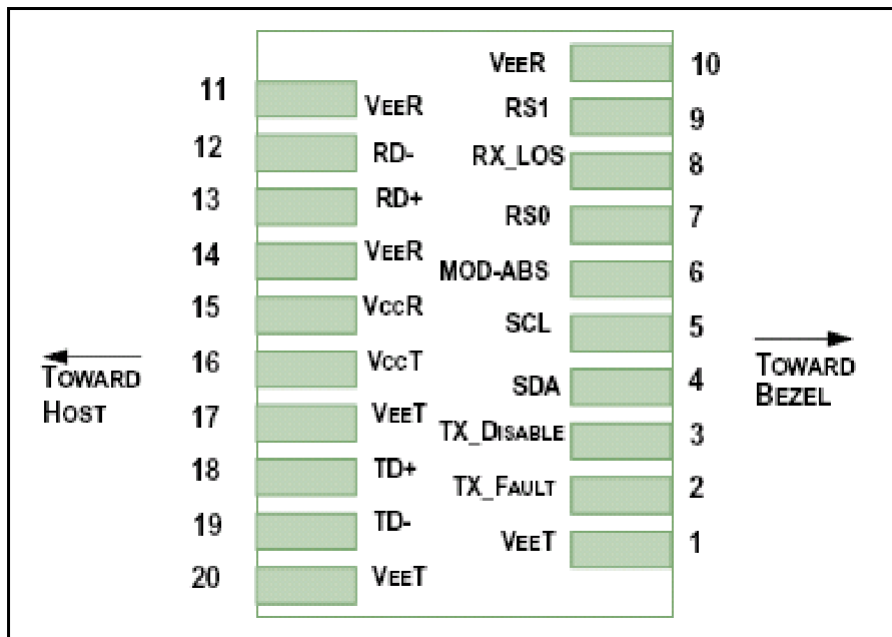
Notes:

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

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6. Pin-out Definition:



Pin Definitions

Pin Assignment

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Module Transmitter Ground	Note1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	Note2
3	LVTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	Note3
4	LVTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	Note4
5	LVTTL-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

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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 10.3 GBd 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

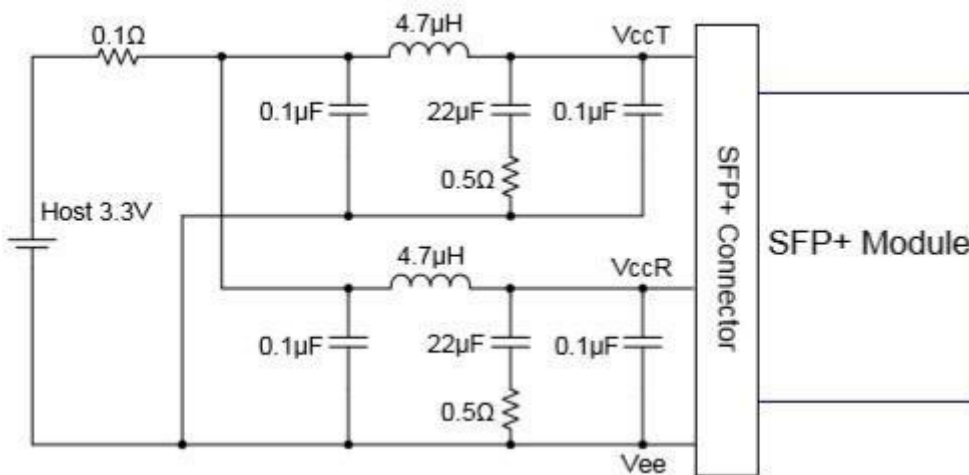
Notes:

1. The module signal ground pins, VeeR and VeeT, shall be isolated from the module case.
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 VccT/R + 0.5 V.
3. This pin is an open collector/drain input pin and shall be pulled up with 4.7k-10kohms to VccT 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 hostboard.
6. If implementing SFF-8079 pin 7 and 9 are used for AS0 and AS1 respectively.

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Block Power Supply Filter Network



Recommended Interface Circuit

