

**TITLE****10G ZR SFP+ Transceiver****1. SCOPE**

ZCables' 10G ZR SFP+ transceiver, 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 10GBase-ZR/ZW.

ZCables' 10G ZR SFP+ transceiver offer commercial and industrial operating temperature options.

**2. PRODUCT FEATURES**

- Compliant With IEEE Std 802.3-2005 10G Ethernet 10GBase-ZR/ZW
- Management interface specifications per SFF-8431 and SFF-8472
- SFP+ MSA Package With Duplex LC Connector
- Up To 11.3Gb/s Data Links
- Single +3.3V Power Supply
- Cooled 1550nm EML Laser
- APD Receiver
- Operating Temperature Options: (Commercial) 0 to 70 °C
- Up To 80km on 9/125µm SMF
- RoHS Compliant

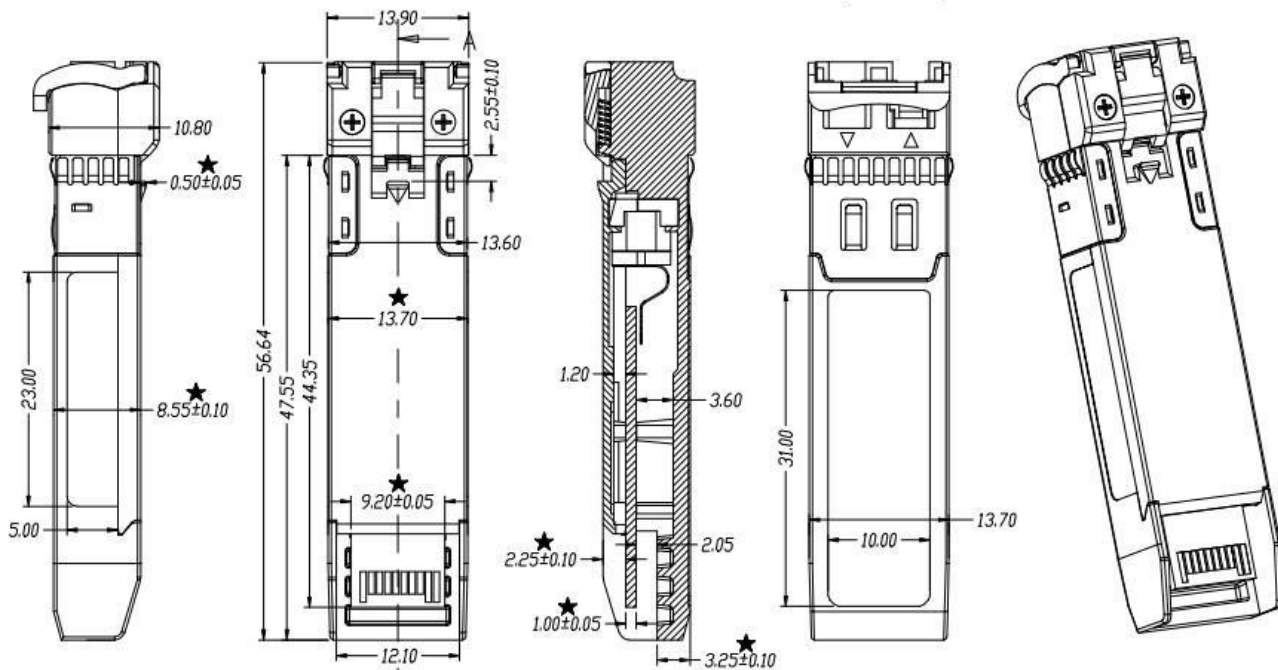
**3. PRODUCT DESCRIPTION****3.1 PRODUCT NAME AND SERIES NUMBER(S)****10G ZR SFP+ Transceiver**

Part Number	Data Rate	Wavelength (nm)	Distance	Media	Power (dBm)	Sen. (dBm)	Connector	Tem.
ZFTCZRC1550A1ST	10G	1550	80km	SMF	0-4	-24	LC	C

**TITLE**

**10G ZR SFP+ Transceiver**

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



Unit is millimeter. All dimensions are  $\pm 0.1\text{mm}$  unless otherwise specified.

**4. APPLICABLES**

- 10G Ethernet 10G Base-ZR/ZW
- SONET OC-192, SDH STM-64 and OTN G.959.1 P1L1-2D
- 8.5Gb/s Fiber Channel

**TITLE**

**10G ZR SFP+ Transceiver**

**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	4.0	V
Relative Humidity(Non-condensing)	RH	5	95	%

**Recommended Operating Conditions**

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	TC	0	25	70	°C
Power Supply Voltage	VCC3	3.135	3.3	3.465	V
Data Rate			10.3125		Gbps

**Transceiver Electrical Characteristics**

Parameter	Symbol	Min.	Typical	Max.	Unit	Note	
Power Dissipation(C-Temp)	PD	-	-	2	W		
Transmitter							
Input Differential Impedance	ZIN	-	100	-	Ω	-	
Differential Data Input Swing	VIN,P-P	180	-	700	mVP-P	-	
TX_Fault	Transmitter Fault	VOH	2.0	-	VCCHOST	V	-
	Normal Operation	VOL	0	-	0.8	V	-
TX_Disable	Transmitter Disable	VIH	2.0	-	VCCHOST	V	-
	Transmitter Enable	VIL	0	-	0.8	V	-
Receiver							
Output Differential Impedance	ZO	-	100	-	Ω	-	
Differential Data Output Swing	VOUT,P-P	300	-	850	mVP-P	1	

<b>TITLE</b>						
<b>10G ZR SFP+ Transceiver</b>						

Data Output Rise Time,Fall Time	Tr,Tf	28	-	-	ps	2
RX_LOS      Loss Of Signal(LOS) Normal Operation	VOH	2.0	-	VCCHOST	V	3
	VOL	0	-	0.8	V	3

<b>Transmitter Operating Characteristic-Optical, Electrical</b>						
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Center Wavelength	$\lambda_c$	1530	1550	1570	dBm	-
Launch Optical Power	Po	0	-	4	dBm	1
Side Mode Suppression Ratio	SMSR	30	-	-	dBm	-
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	-
Extinction Ratio	ER	9	-	-	dB	-
Transmitter Dispersion Penalty	TDP	-	-	3.0	dB	-
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.

<b>Receiver Operating Characteristic-Optical, Electrical</b>						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	$\lambda_c$	1530	1550	1570	nm	-
Receiver Sensitivity (Pavg)	S	-	-	-24	dBm	1
Receiver Overload (Pavg)	POL	-7	-	-	dBm	1
Optical Return Loss	ORL	26	-	-	dBm	-
LOS Dessert	LOS D	-	-	-25	dBm	-
LOS Assert	LOS A	-35	-	-	dBm	-
LOS Hysteresis	LOSH	0.5	-	6	dB	-

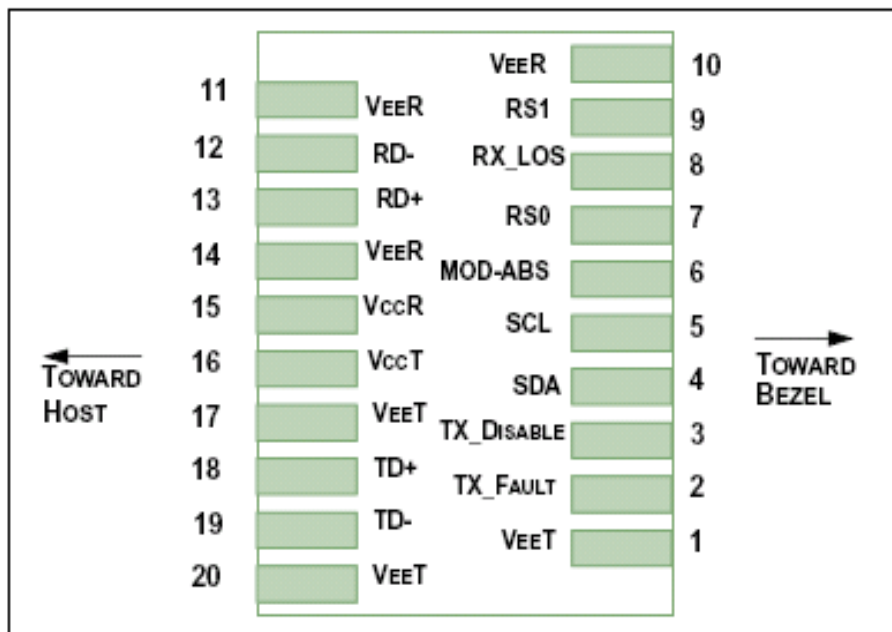
Notes:

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

**TITLE**

**10G ZR SFP+ Transceiver**

**6. Applications Note :**



Pin Definitions

**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 10.3GBd 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

<b>TITLE</b>				
<b>10G ZR SFP+ Transceiver</b>				

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 host board.*
6. *If implementing SFF-8079 pin 7 and 9 are used for AS0 and AS1 respectively.*

**TITLE**  
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**Recommended Interface Circuit**

