

# **ZISA 10Gb/s BIDI SFP+**

**1270nm/1330nm Transceiver(V1.0)**



## **Description**

The 1270nm/1330nm 10Gb/s 20km bidirectional transceiver is designed to transmit and receive serial optical data links up from 2.5 to 10.3 Gb/s data rate over G.652 single mode fiber. The transceiver is compliant with SFF-8432, and applicable portions of SFF-8431.

Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

## **Features**

- Compliant to SFP+ MSA
- Fully RoHS compliant
- Operating data rate 2.5 to 10.3Gb/s
- Transmission distance up to 20km
- 1270nm/1330nm DFB laser
- LC single connector
- Hot pluggable 20pin connector
- Wide temperature range
- Low power consumption <1W
- Single +3.3V±5% power supply
- Digital monitoring SFF-8472 Rev 10 compliant
- IEEE 802.3ae 10GBASE-LR
- SFF-8431 Rev 4
- SFF-8472 Rev 10

## **Applications**

- 10GBASE-LR/LW
- 10G Ethernet
- OBSAI rates 3.072 Gb/s, 6.144Gb/s
- CPRI rates 2.4576 Gb/s, 4.9152Gb/s, 6.144Gb/s, 9.8304 Gb/s

## Specifications

(Tested under recommended operating conditions, unless otherwise noted)

Parameter		Symbol	Unit	Min	Typ	Max	Note
Optical Transmitter Characteristics							
Data Rate		-	Gbps	2.5		10.3	
Transmission Distance		L	km			20	
Center Wavelength		$\lambda$	nm	1260	1270	1280	
				1320	1330	1340	
Spectral Width(-20dB)		$\Delta\lambda_{rms}$	nm			1	1
SMSR		-	dB	30			
Optical Output Power		P <sub>O</sub>	dBm	-2		+5	2
Average Launch Power of OFF Transmitter		P <sub>OFF</sub>	dBm			-30	
Extinction Ratio		ER	dB	3.5			
Relative Intensity Noise		R <sub>IN</sub>	dB/Hz			-128	
Optical Output Eye		-	-	Compliant with IEEE 802.3ae			
Optical Receiver Characteristics							
Data Rate		-	Gbps	2.5		10.3	
Center Wavelength		$\lambda_c$	nm	1320	1330	1340	
				1260	1270	1280	
Receiver Sensitivity		R <sub>SEN</sub>	dBm			-14.4	3
Receiver Overload		-	dBm	0.5			3
Receiver Reflectance		R <sub>REFL</sub>	dB			-12	
LOS	Optical Assert	LOS <sub>A</sub>	dBm	-30			
	Optical Dessert	LOS <sub>D</sub>	dBm			-15	
LOS Hysteresis		-	dB	0.5		6	
Note 1: Spectral width has to be defined over -20dBm.							
Note 2: Minimum output optical level is at end of life.							
Note 3: Sensitivity for PRBS 231-1 and BER better than or equal to 10-12.							

## Ordering Information

Part No.	Specifications									Application
	Package	Data rate	Laser	Optical Power	Detector	Sensitivity	Temp	Reach	Others	
RTXM228-465	SFP+	2.5~10.3Gb/s	1270nm DFB	-2~+5dBm	1330nm PIN	<-14.4dBm	-40~85	20km	DDM	10GBASE-LR/LW OBSAI/CPRI
RTXM228-466	SFP+	2.5~10.3Gb/s	1330nm DFB	-2~+5dBm	1270nm PIN	<-14.4dBm	-40~85	20km	DDM	10GBASE-LR/LW OBSAI/CPRI
RTXM228-467	SFP+	2.5~10.3Gb/s	1270nm DFB	-2~+5dBm	1330nm PIN	<-14.4dBm	0~70	20km	DDM	10GBASE-LR/LW OBSAI/CPRI
RTXM228-468	SFP+	2.5~10.3Gb/s	1330nm DFB	-2~+5dBm	1270nm PIN	<-14.4dBm	0~70	20km	DDM	10GBASE-LR/LW OBSAI/CPRI

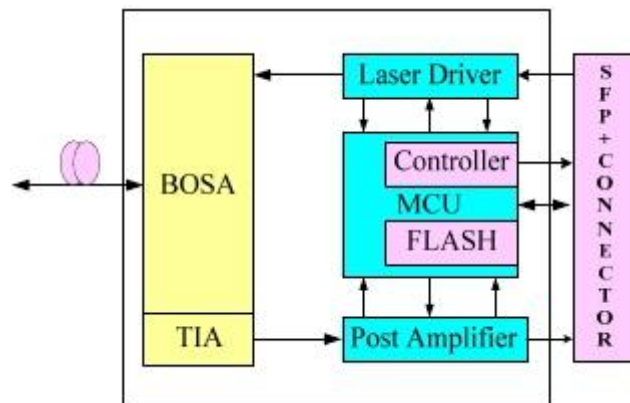
## Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	oC	-40	85
Relative Humidity	RH	%	5	95
Supply Voltage	Vcc	V	-0.3	4.0

## Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Operating Case Temperature Range	Tc	oC	-40		85
			0		70
Power Supply Voltage	Vcc	V	3.14	3.3	3.46
Bit Rate	BR	Gb/s	2.5		10.3
Bit Error Ratio	BER				10 <sup>-12</sup>
Max Supported Link Length	L	km			20

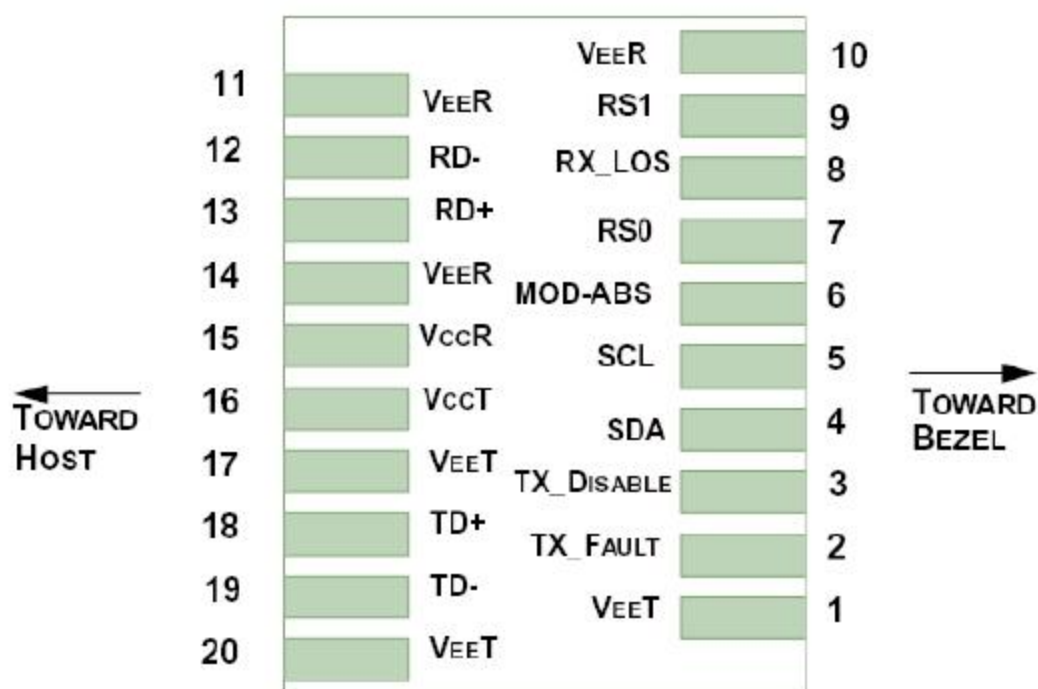
## Principle diagram



## Electric Ports Definition

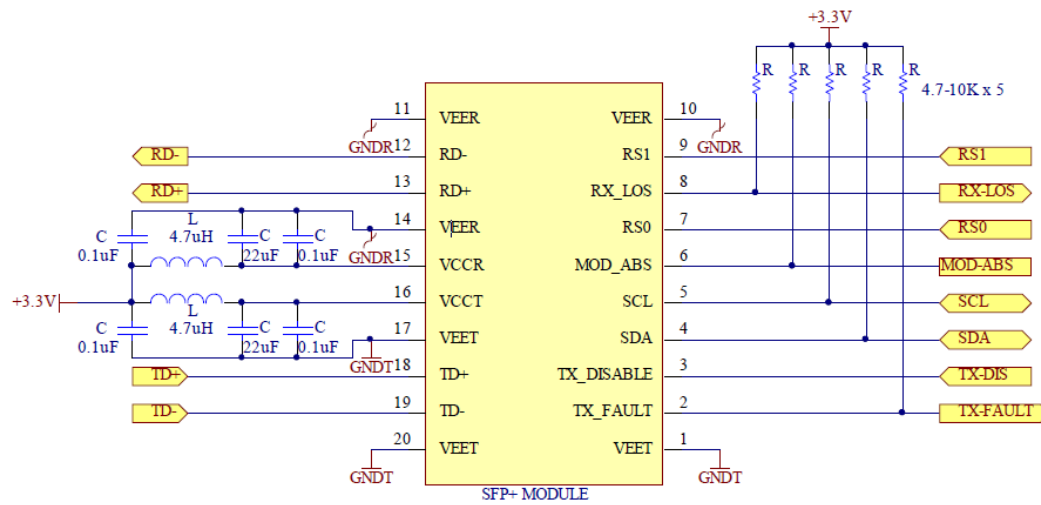
Parameter	Symbol	Unit	Min	Typ	Max	Notes
Supply Voltage	V <sub>CC</sub>	V	3.14	3.3	3.46	
Supply Current	I <sub>CC</sub>	mA			300	
Power Consumption	P <sub>C</sub>	W			1.0	
<b>Transmitter</b>						
Input Differential Impedance	R <sub>IN</sub>	Ω	80	100	120	1
Differential Data Input Swing	V <sub>IN</sub>	mVp-p	180		700	
Transmit Disable Voltage	V <sub>DIS</sub>	V	2		V <sub>CCHOST</sub>	
Transmit Enable Voltage	V <sub>EN</sub>	V	V <sub>EE</sub> -0.3		V <sub>EE</sub> +0.4	
Transmit Fault Assert Voltage	V <sub>FA</sub>	V	2		V <sub>CCHOST</sub>	
Transmit Fault De-Assert Voltage	V <sub>FDA</sub>	V	V <sub>EE</sub>		V <sub>EE</sub> +0.4	
<b>Receiver</b>						
Differential Data Output Swing	V <sub>OD</sub>	mVp-p	450	600	850	
Output Rise Time	t <sub>RISE</sub>	ps	28			
Output Fall Time	t <sub>FALL</sub>	ps	28			
LOS Fault	V <sub>LOSFT</sub>	V	2		V <sub>CCHOST</sub>	
LOS Normal	V <sub>LOSNR</sub>	V	V <sub>EE</sub>		V <sub>EE</sub> +0.8	
NOTE 1: Differential between TD+ / TD-						

## Pin Function Definitions

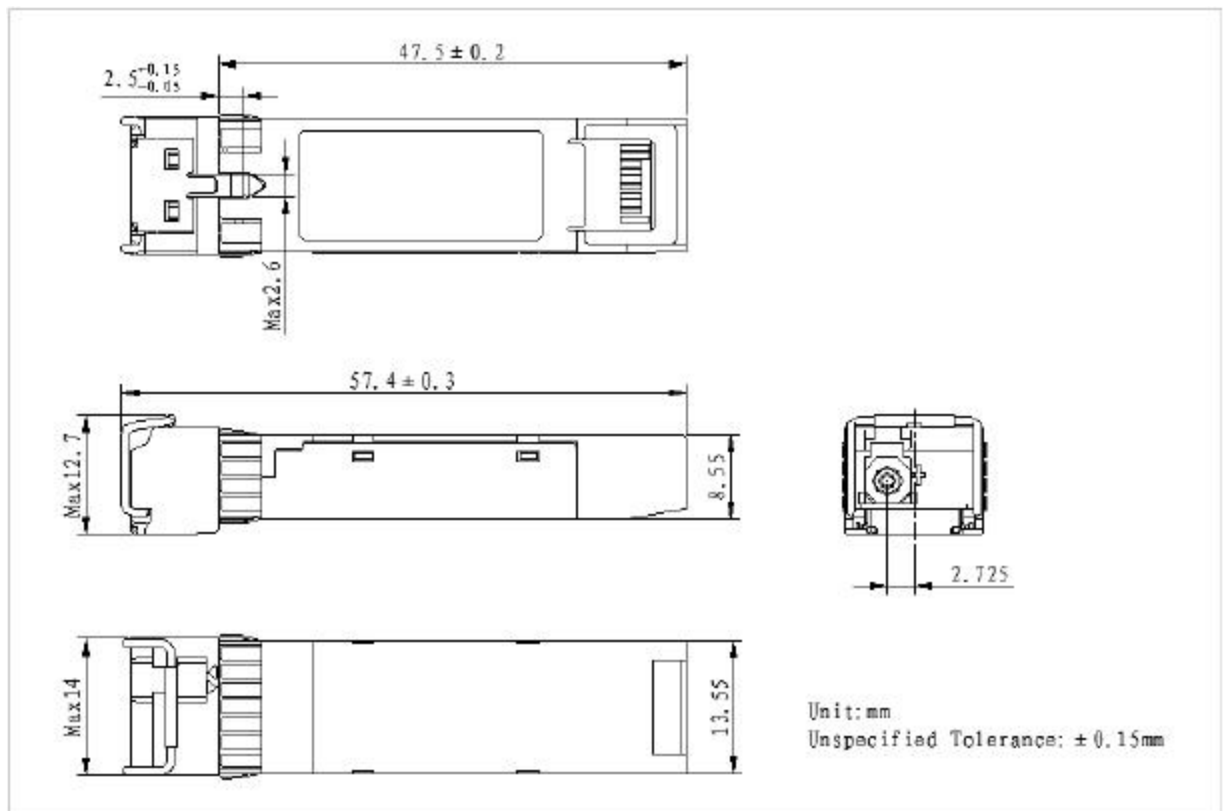


Pin Number	Symbol	Name	Description
1,17,20	VeeT	Transmitter Signal Ground	These pins should be connected to signal ground on the host board.
2	TX Fault	Transmitter Fault Out (OC)	Logic "1" Output = Laser Fault (Laser off before t_fault). Logic "0" Output = Normal Operation This pin is open collector compatible, and should be pulled up to Host Vcc with a 10kΩ resistor.
3	TX Disable	Transmitter Disable In (LVTTTL)	Logic "1" Input (or no connection) = Laser off Logic "0" Input = Laser on. This pin is internally pulled up to VccT with a 10 kΩ resistor.
4	SDA	Module Definition Identifiers	Serial ID with SFF 8472 Diagnostics Module Definition pins should be pulled up to Host Vcc with 10 kΩ resistors.
5	SCL		
6	MOD-ABS		
7	RS0	Receiver Rate Select (LVTTTL)	These pins have an internal 33kΩ pull-down to ground. A signal on either of these pins will not affect module performance.
9	RS1	Transmitter Rate Select (LVTTTL)	
8	LOS	Loss of Signal Out (OC)	Sufficient optical signal for potential BER < 1x10 <sup>-12</sup> = Logic "0" Insufficient optical signal for potential BER < 1x10 <sup>-12</sup> = Logic "1" This pin is open collector compatible, and should be pulled up to Host Vcc with a 10kΩ resistor.
10,11,14	VeeR	Receiver Signal Ground	These pins should be connected to signal ground on the host board.
12	RD-	Receiver Negative DATA Out (CML)	Light on = Logic "0" Output Receiver DATA output is internally AC coupled and series terminated with a 50Ω resistor.
13	RD+	Receiver Positive DATA Out (CML)	Light on = Logic "1" Output Receiver DATA output is internally AC coupled and series terminated with a 50Ω resistor.
15	VccR	Receiver Power Supply	This pin should be connected to a filtered +3.3V power supply on the host board. See Figure 3. Recommended power supply filter.
16	VccT	Transmitter Power Supply	This pin should be connected to a filtered +3.3V power supply on the host board. See Figure 3. Recommended power supply filter.
18	TD+	Transmitter Positive DATA In (CML)	Logic "1" Input = Light on Transmitter DATA inputs are internally AC coupled and terminated with a differential 100Ω resistor.
19	TD-	Transmitter Negative DATA In (CML)	Logic "0" Input = Light on Transmitter DATA inputs are internally AC coupled and terminated with a differential 100Ω resistor.

## Typical Application Circuit



## Package Outline



## Regulatory Compliance

Feature	Test Method	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C Method 3015.4	Class1 (>1KV) for high speed I/O pins Class 1 (> 2KV) for all other pins
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	Variation of IEC 61000-4-2	The BIDI SFP+ modules meet ESD requirements given in EN61000-4-2, criterion B test specification such that units are subjected to 15kV air discharges during operation and 8kV direct contact discharges to the case.
Electromagnetic Interference (EMI)	CISPR22 ITE Class B EN55022 Class B	Compliant with standards
Immunity	IEC61000-4-3 Class 2 EN55024	Typically show no measurable effect from a 3V/m field swept from 80 to 1000MHz applied to the transceiver without a chassis enclosure.
RoHS Compliance		Less than 1000 ppm of cadmium, lead, mercury, hexavalent chromium, polybrominated biphenyls, and polybrominated biphenyl ethers.

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