

## SFP Bi-Di 155Mbps Transceiver

### Model: SFP-BIDI-160



#### Features:

- Fast Ethernet
- SDH/STM-1, SONET/OC-3
- SFP MSA package with Simplex SC connector
- Compliant with IEEE 802.3ah
- Compliant with ITU -T G.957
- Digital diagnostic monitor interface compatible with SFF-8472
- transmission with 9/125  $\mu$ m SMF
- Single 3.3V Power Supply and LVTTTL Logic
- Very low EMI and excellent ESD protection
- Operating Case Temperature: 0°C ~+70°C
- RoHS compliant
- Class 1 laser safety certified

#### Maximum Ratings

Table 1- Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	Vcc	-0.5	-	+3.6	V	
Storage Temperature	TS	-40	-	85	°C	
Operating Relative Humidity	RH	+5	-	+95	%	

#### Recommended Operating Conditions

Table 2- Recommended operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Operating Case Temperature	TC	0	-	70	°C	
Power Supply Voltage	VCC	3.14	3.3	3.46	V	
Power Supply Current	ICC	-	-	300	mA	
Power Dissipation	PD	-	-	1	W	
Data Rate			155	-	Mbps	

### Electrical Characteristics

Table 3- Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Units	Notes
Differential Data Input Swing		Vin p-p	200	-	2400	mV	1
Input Differential Impedance		RIN	80	100	120	$\Omega$	
Tx_Disable	Laser Disable	VD	2.0	-	VCC+0.5	V	
	Normal Operation	VEN	GND	-	GND+0.8	V	
Tx_Fault	Transmitter Fault	VOH	2.0	-	VCC+0.5	V	
	Normal Operation	VOL	GND	-	GND+0.8	V	
Differential Date Output Swing		Vout p-p	1450	1600	1750	mV	2
Rx_LOS	Los Signal	VOH	2.0	-	VCC+0.5	V	
	Normal Operation	VOL	GND	-	GND+0.8	V	

Notes:

Internally AC coupled, input termination may be required for CML or LVPECL applications.

Internally AC coupled, CML differential output stage.

### Optical Characteristics

Table 4-Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Average Output Power	P0UT	-15	-	-8	dBm	5km/20km
		-5	-	0		40km/80km
Mean Wavelength	$\lambda$	1290	1310	1330	nm	SFP-BIDI-xxx
		1480	1490	1500		SHP-BIDI-80x
		1540	1550	1560		SFP-BIDI-xxx SFP-BIDI-80x
Extinction Ratio	ER	9	-	-	dB	
Spectral Width(RMS)	$\Delta\lambda$	-	-	1	nm	
P0ut@TX Disable Asserted	P0UT	-	-	-45	dB	
Rise/Fall Time (20%~80%)	Tr/Tf			260	ps	
Optical Eye Mask	IEEE 802.3ah Compliant					
Receiver						
Receiver Power	Pin		-	-28	dBm	5km
				-34		20km/40km/80km
Centre Wavelength	$\lambda_C$	1290	1310	1330	nm	SFP-BIDI-xxx
		1480	1490	1500		SFP-BIDI-80x
		1530	1550	1570		SFP-BIDI-xxx SFP-BIDI-80x
Receiver Overload	Rsens high	-3	-	-	dBm	
Damage Threshold For Receive	Pin, damage	0				
Receiver Reflectance	RX_r	-	-	-12	dB	
LOS De-Assert	LOSD			-29	dB	5km
				-35		20km/40km/80km
LOS Assert	LOSA	-39	-	-	dB	5km

		-45				20km/40km/80km
LOS Hysteresis		0.5		-	dB	

Note:  
Coupled into 9/125 SMF.  
Measured with PRBS 27-1 test pattern @155Mbps.BER=10E-12

**Recommended Interface Circuit**

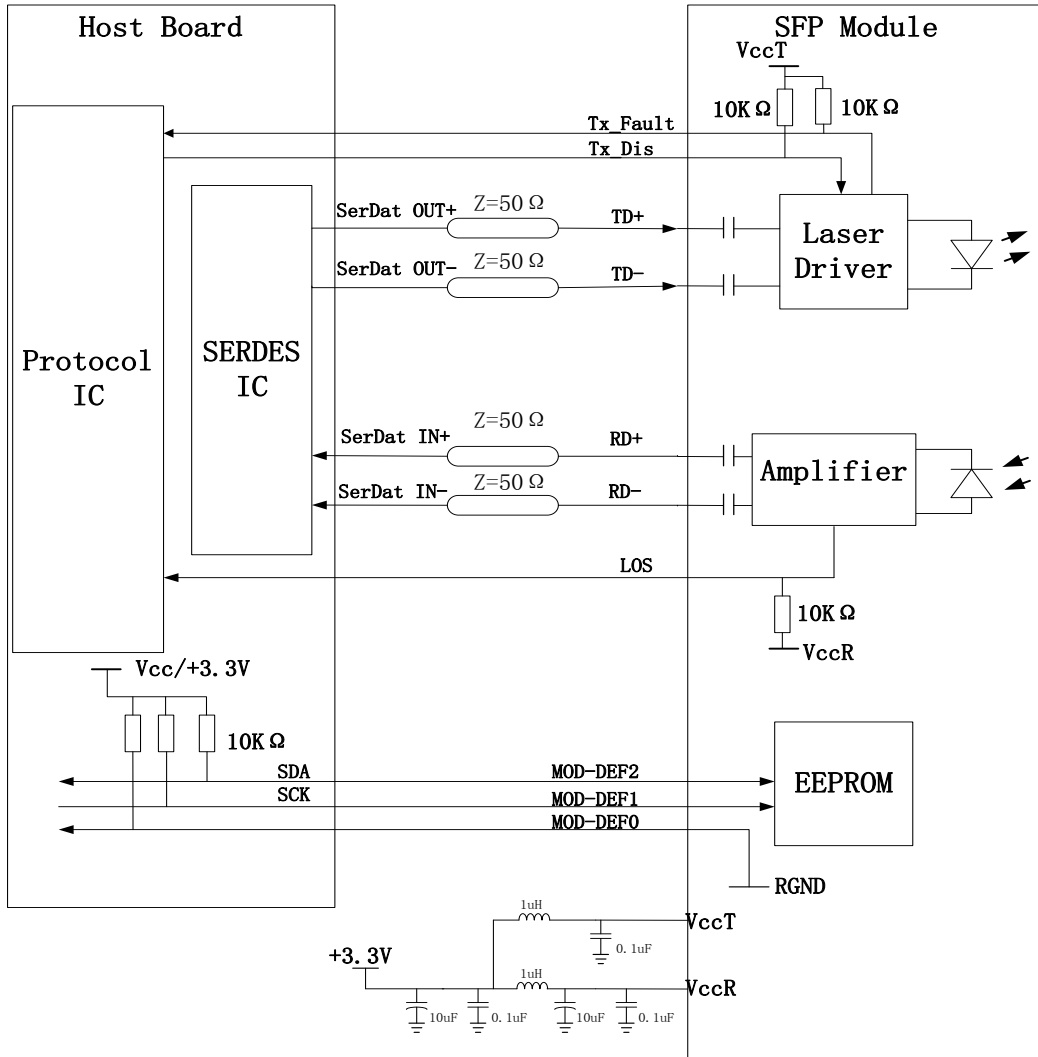


Figure 1, Recommended Interface Circuit

**Pin arrangement**

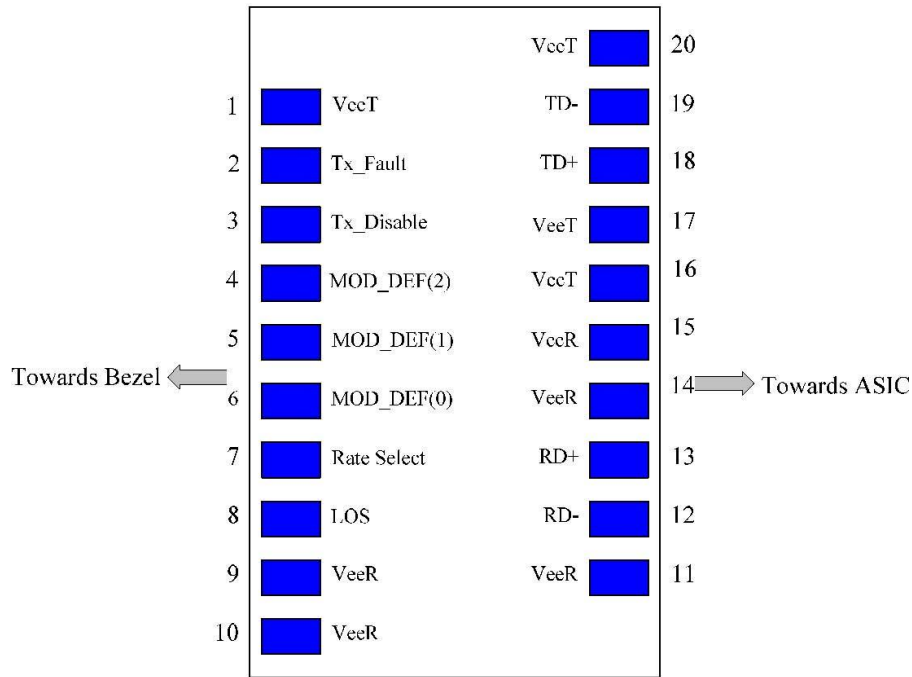


Figure 2, Pin View

**Table 5-Pin Function Definitions**

Pin	Name	FUNCTION	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	1
3	TX Disable	Transmitter Disable	3	2
4	MOD-DEF2	Module Definition 2	3	3
5	MOD-DEF1	Module Definition 1	3	3
6	MOD-DEF0	Module Definition 0	3	3
7	Rate Select	Not Connect	3	
8	LOS	Loss of Signal	3	4
9	VeeR	Receiver Ground	1	5
10	VeeR	Receiver Ground	1	
11	VeeR	Receiver Ground	1	
12	RD-	Inv. Received Data Out	3	
13	RD+	Received Data Out	3	
14	VeeR	Receiver Ground	1	
15	VccR	Receiver Power	2	3.3V ± 5%,
16	VccT	Transmitter Power	2	3.3V ± 5%,
17	VeeT	Transmitter Ground	1	5
18	TD+	Transmit Data In	3	
19	TD-	Inv. Transmit Data In	3	
20	VeeT	Transmitter Ground	1	

Note:

1. TX Fault is open collector output which should be pulled up externally with a 4.7K ~10KΩ resistor on the host board to voltage between 2.0V and VCC+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.

- TX Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7~ 10K resistor.
 

Low (0- 0.8V):	Transmitter on
Between (0.8V and 2V):	Undefined
High (2.0 – VccT):	Transmitter Disabled
Open:	Transmitter Disabled
- MOD-DEF 0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7~10K resistor on the host board to supply less than VccT+0.3V or VccR+0.3V.
  - MOD-DEF 0 is grounded by the module to indicate that the module is present.
  - MOD-DEF 1 is clock line of two wire serial interface for optional serial ID.
  - MOD-DEF 2 is data line of two wire serial interface for optional serial ID.
- LOS (Loss of signal) is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates loss of signal. In the low state, the output will be pulled to less than 0.8V.

### Digital Diagnostic Memory Map

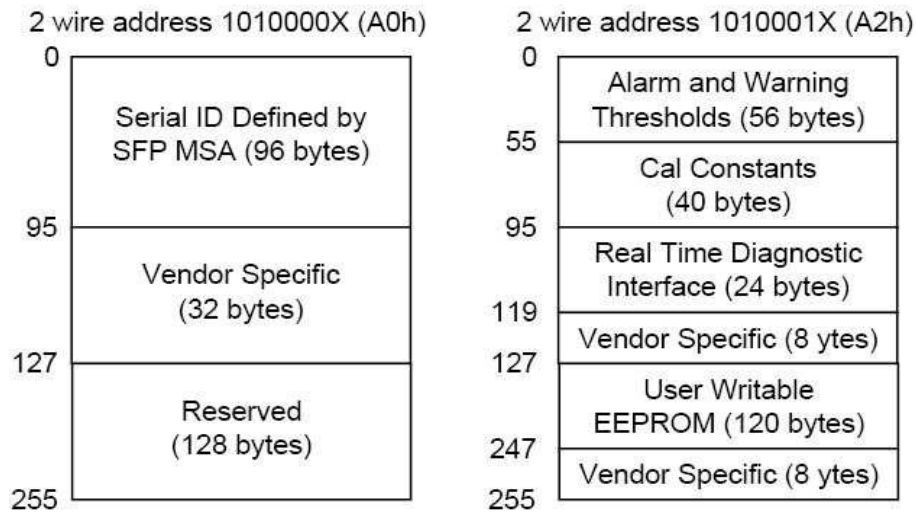


Figure 3, memory map

### Mechanical Diagram

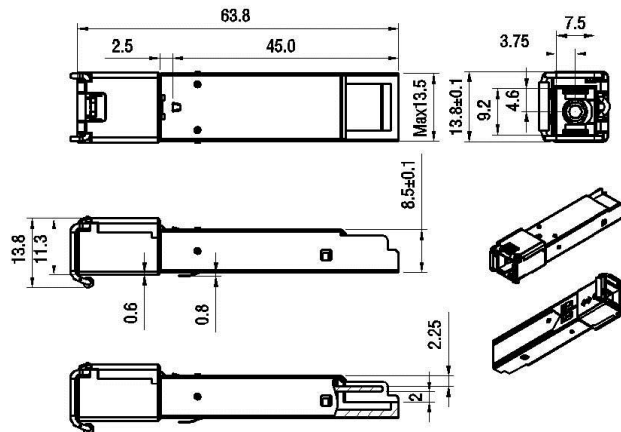


Figure 4, mechanical diagram

**Ordering information**

**Table 6-Pin Function Definitions**

Part No.	DDM	Tx Wavelength	Rx Wavelength	Fiber Type	Optical Interface	Distance
SFP-BIDI-105D	YES	1310nm	1550nm	SMF	SC	5km
SFP-BIDI-105	NO					
SFP-BIDI-120D	YES	1310nm	1550nm	SMF	SC	20km
SFP-BIDI-120	NO					
SFP-BIDI-140D	YES	1310nm	1550nm	SMF	SC	40km
SFP-BIDI-140	NO					
SFP-BIDI-160	YES	1310nm	1550nm	SMF	SC	60Km
SFP-BIDI-160D	NO					
SFP-BIDI-180D	YES	1490nm	1550nm	SMF	SC	80km
SFP-BIDI-180	NO					

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