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 µm SMF
- Single 3.3V Power Supply and LVTTL 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	Ω	
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	1
		-5	-	0		40km/80km	
Mean Wavelength	λ	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)	Δλ	-	-	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	2
				-34		20km/40km/80km	
Centre Wavelength	λC	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

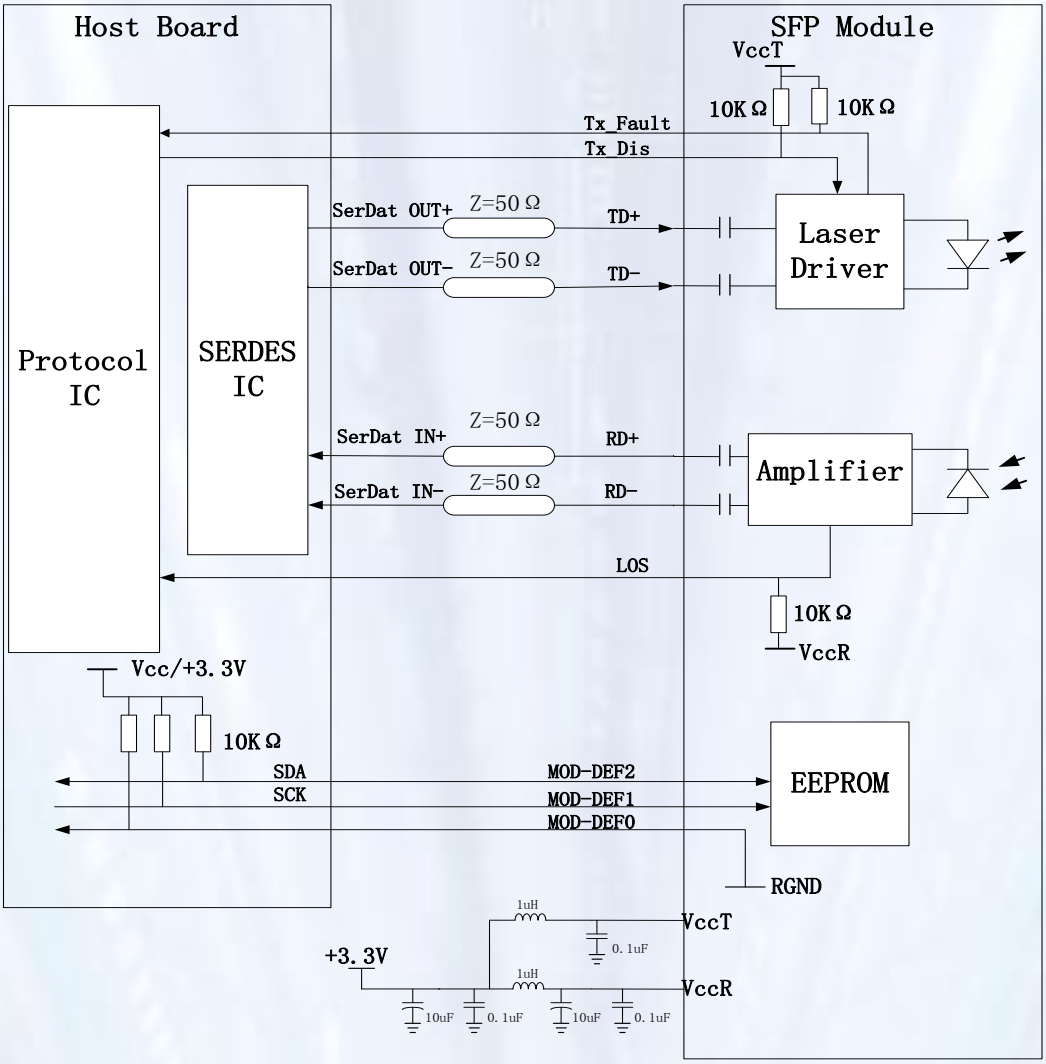

Figure 1, Recommended Interface Circuit

Pin arrangement

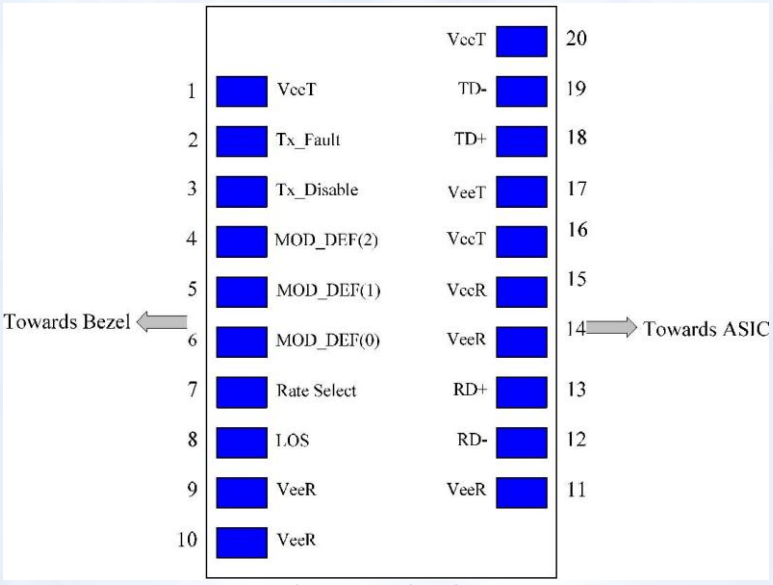

Figure 2, Pin View

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.
2. 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
3. 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.
4. 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

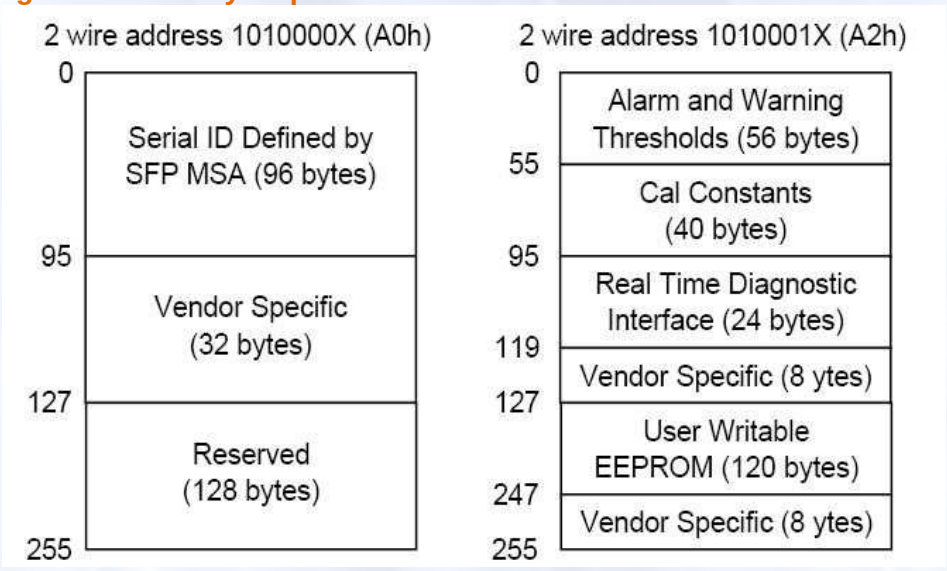

Figure 3, memory map

Mechanical Diagram

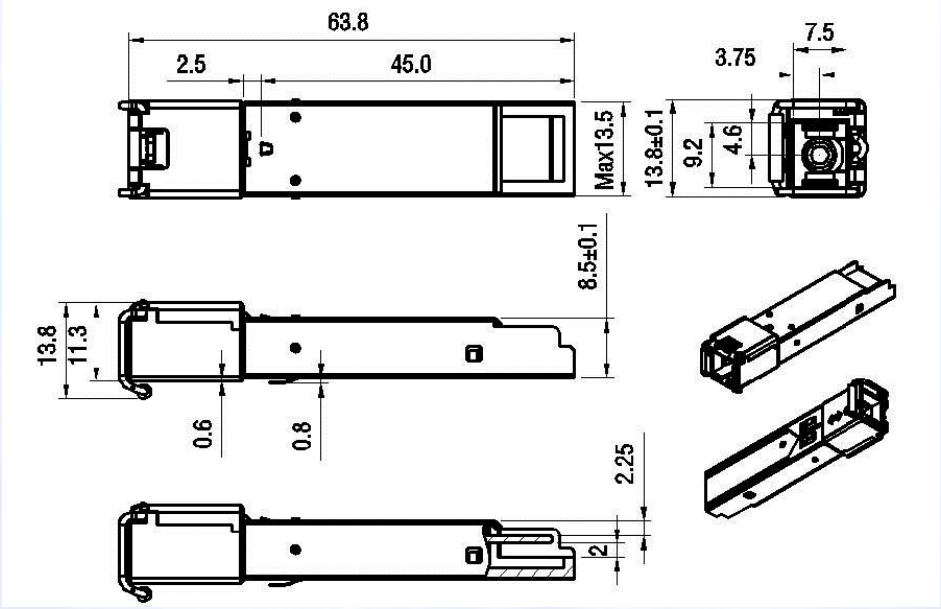

Figure 4, mechanical diagram

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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