SFP BI-DI 155Mbps TRANSCEIVER

MODEL: SFP-BIDI-120DB

Features:

- Fast Ethernet
- SDH/STM-1 155Mbps, SONET/OC-3
- SFP MSA package with Simplex LC/UPC connector
- Compliant with IEEE 802.3ah, ITU_T G.985 class S standard
- Compliant with ITU -T G.957
- Digital diagnostic monitor interface compatible with SFF-8472
- Hot-pluggable SFP footprint
- Transmission with 9/125 μm SMF
- Single 3.3V Power Supply and LVTTL Logic
- Maximum Power at RX: ≥ -5 dBm
- Support Digital Diagnostic Monitoring - DDM
  - Temperature uncertainty ≤ 3%
  - Supply Voltage uncertainty ≤ 3%
  - TX, RX, sensitivity uncertainty ≤ 3 dB
- Compatibility with switches popular brands: Fujitsu, ALU, Huawei, Cisco, VFT,SWL2 …
- Very low EMI and excellent ESD protection
- Operating Case Temperature: -10°C ~+70°C
- In conformity to safety code of FCC and CE MARK, ROHS compliant
- Class 1 laser safety certified
- Metal housing, rugged structure with good anti-magnetic ability

Absolute 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	3.0	3.3	3.6	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	-	-7	dBm	10km/20km	1
		-5	-	0		40km/80km	
Mean Wavelength	λ	1260	1310	1360	nm		
		1480	1490	1500			
		1540	1550	1600			
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 (BER ≤ 10E-7)	Pin	-30	-		dBm	5km	2
				-34		20km/40km/80km	

Centre Wavelength	λC	1260	1310	1360	nm		
		1480	1490	1500			
		1530	1550	1600			
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

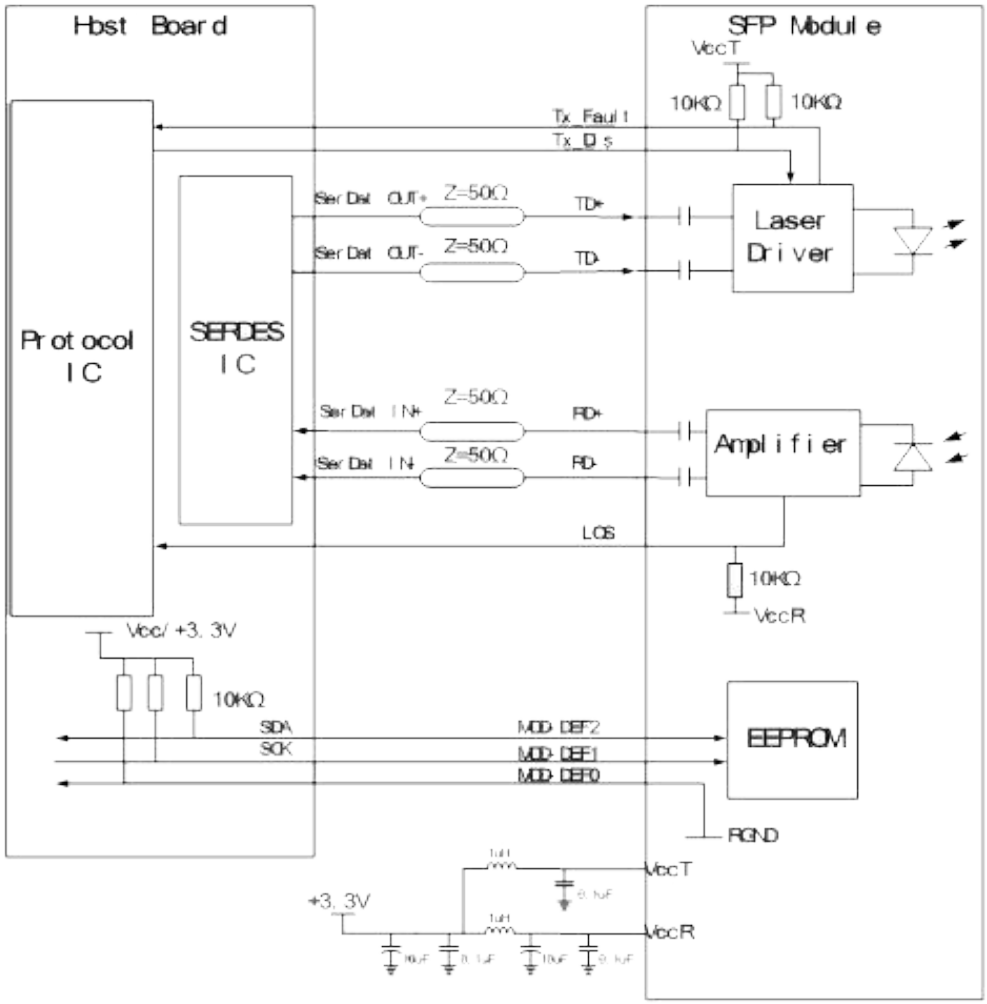

Figure 1, Recommended Interface Circuit

Pin arrangement

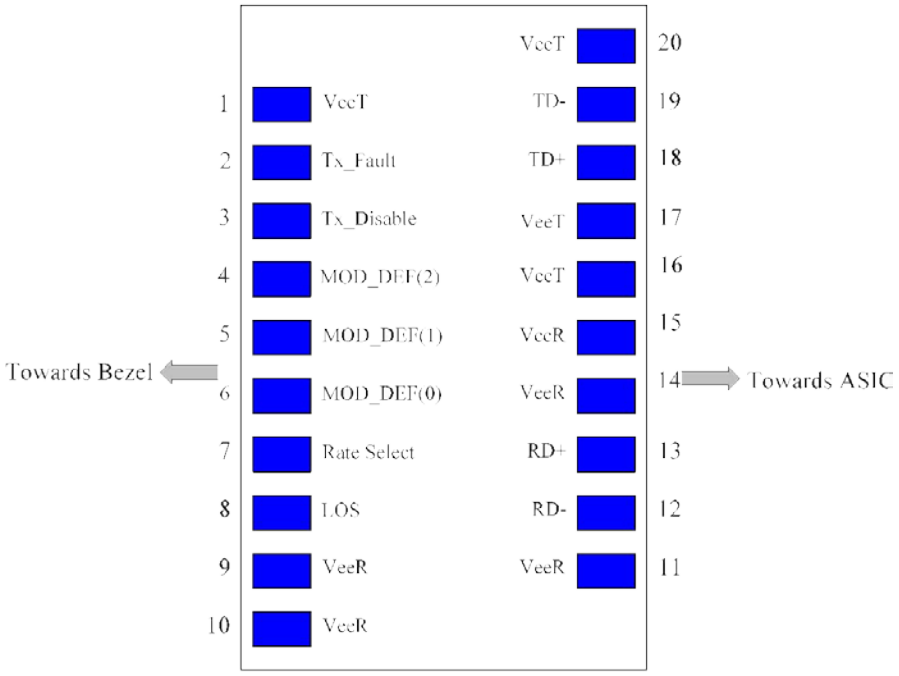

Figure 2, Pin View

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.

Table 6- Stability

Operating in special condition environment	Cold temperature. Profile test: - Temperature: -5^{0}C - Duration: 16h (Reference: ETSI EN 300 019-2-3 T 3.2, IEC 60068-2-1)
	High temperature. Profile test: - Temperature: +55^{0}C - Duration: 16h (Reference: ETSI EN 300 019-2-3 T 3.3, IEC 60068-2-2)
	High relative humidity (Damp heat, steady state). Profile test: - Temperature: +3^0□C, - Relative humidity: 93%RH - Duration: 4 days. (Reference: ETSI EN 300 019-2-3 T 3.3, IEC 60068-2-56)
Working environment	Operating temperature: 0÷40°C Operating humidity: 10÷90% non-condensing (The bidder has to provide test report confirm about environment)

Digital Diagnostic Memory Map

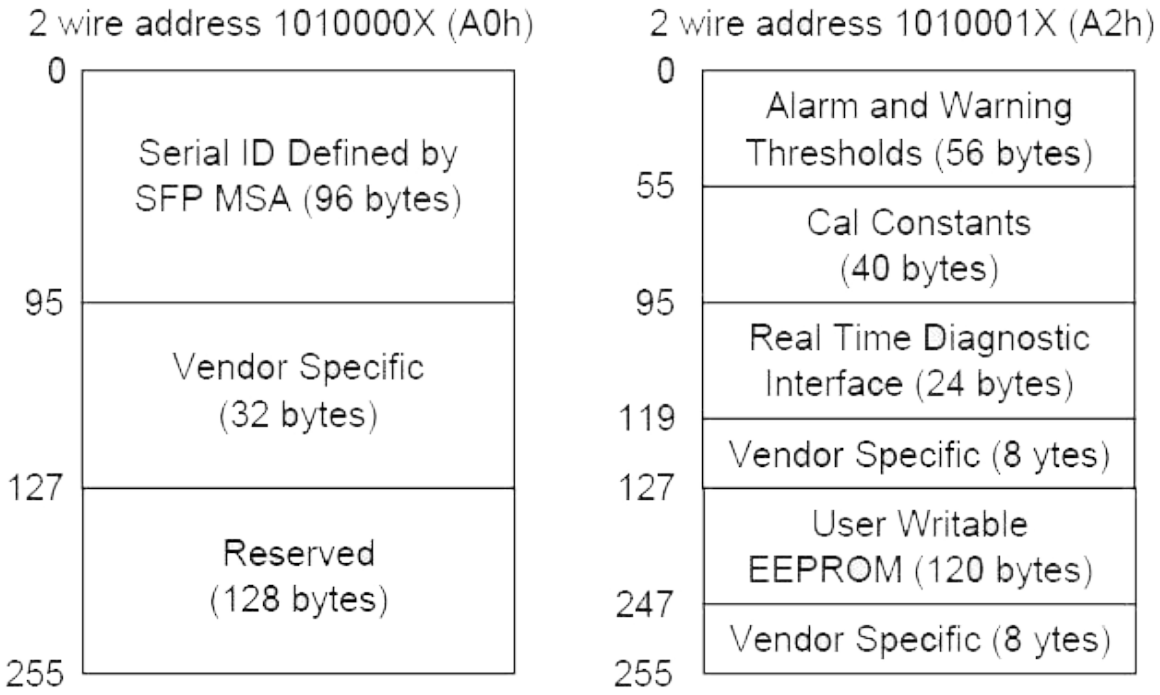

Figure 3, memory map

Mechanical Diagram

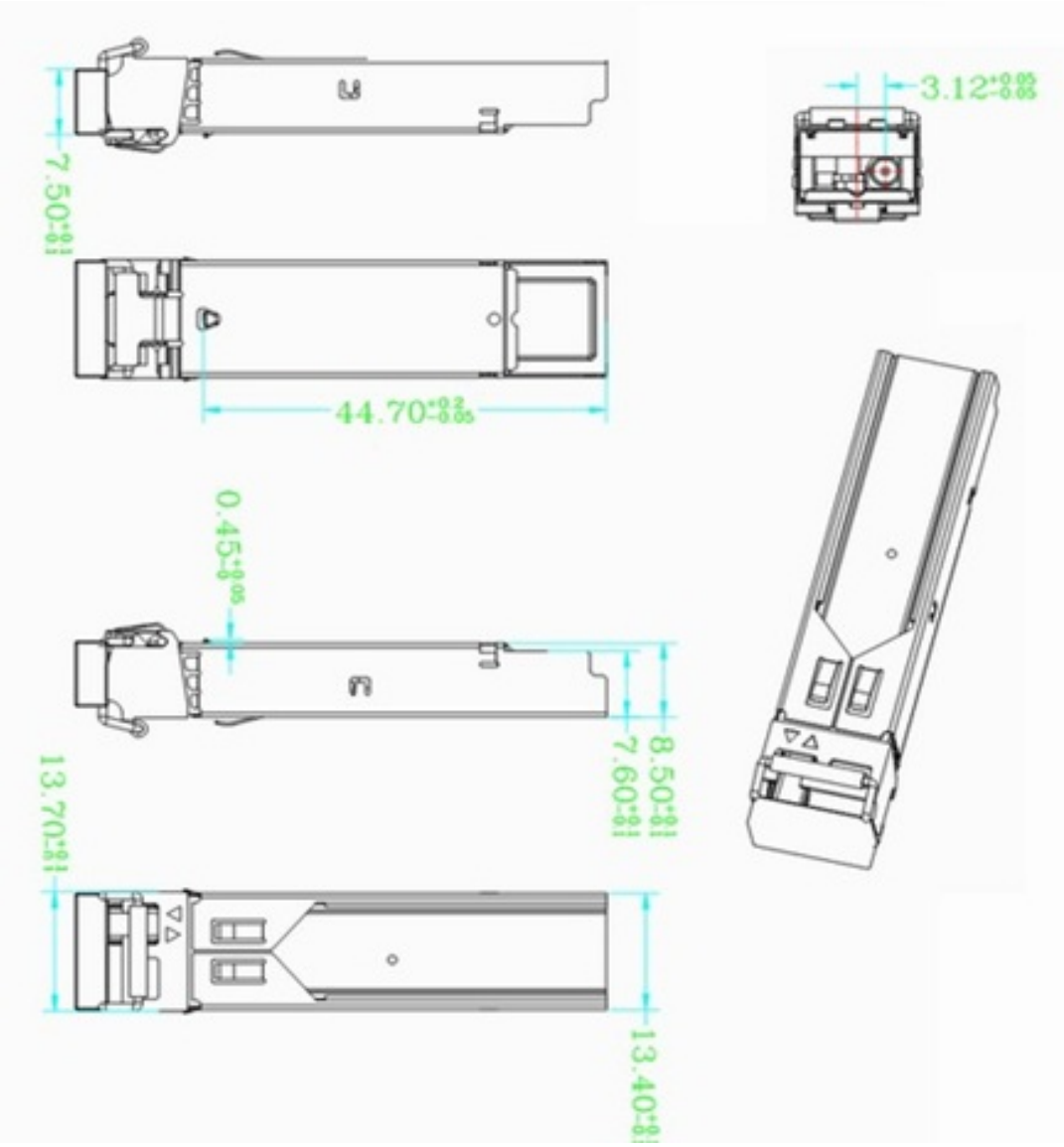

Figure 4, mechanical diagram

Ordering information

Part No.	Data Rate	Wavelength (nm)	Reach	TX	RX	Temperature
SFP-BIDI-120DA	155M	1310/1550	20KM	VCSEL	PIN	-10~70°C
SFP-BIDI-120DB	155M	1550/1310	20M	VCSEL	PIN	-10~70°C
SFP-BIDI-140DA	155M	1310/1550	40KM	FP	PIN	-10~70°C
SFP-BIDI-140DB	155M	1550/1310	40KM	FP	PIN	-10~70°C
SFP-BIDI-160DA	155M	1490/1550	60KM	FP	PIN	-10~70°C
SFP-BIDI-160DB	155M	1550/1490	60KM	FP	PIN	-10~70°C
SFP-BIDI-180DA	155M	1490/1550	80KM	DFB	PIN	-10~70°C
SFP-BIDI-180DB	155M	1550/1490	80KM	DFB	PIN	-10~70°C

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