SFP-BIDI-1020 155M
1310/1550nm BIDI

Features

- Operating data rate up to 155Mbps
- Type A: Tx1310nm FP/Rx1550nm FP
- Type B: Tx1550nm FP/Rx1310nm FP
- Distance up to 20km
- Single 3.3V Power supply and TTL Logic Interface
- Sinplex LC/SC connector interface
- Hot pluggable
- Operating case temperature
Standard: 0℃～+70℃, Industrial: -40℃～+85℃
- Compliant with MSA SFP specification
- Digital diagnostic monitor interface
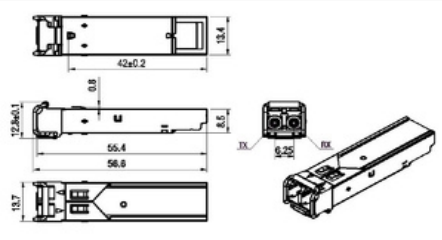
Applications

- WDM Fast Ethernet
- Fiber channel
- SONET/SDH Equipment interface

Product Description

The SFP-BIDI-1xxx series is small form factor pluggable module for IEEE802.3ah Fast Ethernet 100Base-BX and OC-3/STM-1 SONET/SDH single fiber communications by using 1310nm/1550nm transmitter and 1550nm/1310nm receiver. It is with the SFP 20-pin connector to allow hot plug capability. The transmitter section uses a multiple quantum well A type/B tpye laser and is a Class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated B type/A type detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. The SFP-BIDI-1xxx series are designed to be compliant with SFF SFP Multi-source Agreement (MSA).

Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1 ($>$500 V) Isolation with the case
Electromagnetic Interference (EMI)	FCC Part 15 Class B FDA 21CFR	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950.EN(IEC) 60825-1.2	Compatible with Class 1 laser Compatible with TŭV standards
Component Recognition	UL and CUL	UL file E317337
Green Products	RoHS	RoHS6

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Absolute Maximum Ratings

Parameter Storage	Symbol	Min.	Max.	Unit
Temperature Supply	Ts Vcc	-40	+85	°C
Voltage		0.5	3.6	V

Recommended Operating Conditions

Parameter Operating Case	Symbol	Min.	Typical	Max.	Unit
Temperature	TA/1020	0		+70	°C °C
	TA/1020	-40		+85	V mA
Power Supply Voltage	I Vcc	3.15	3.3	3.45	mA
Power Supply Current	Icc			300	Mbaud
Surge Current	Isurge			+30	
Baud Rate			155		

Performance Specifications - Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
LVPECL Inputs(Differential)	Vin	400		2500	mVp	AC coupled inputs
Input Impedance(Differential)	Zin	85	100	115 3.45	ohms	DC
Tx_Disable Input Voltage-High		2 0		0.8	V V	
Tx_Disable Input Voltage-Low		2 0		Vcc+0.3	V V	
Tx_Fault Output Voltage-High				0.5		Io=400µA;Host Vcc
Tx_Fault Output Voltage-Low						Io=-4.0mA
Receiver						
LVPECL Outputs(Differential)	Vout	400	800	1200	mVpp	AC coupled outputs
Output Impedance(Differntial)	Zout	85	100	115	ohms	
Rx_LOS Output Voltage-High		2 0		Vcc+0.3	V V V	Io=400µA;Host Vcc
Rx_LOS Output Voltage-Low		2.5		0.8	V	Io=-4.0mA
MOD_DEF(0:2)	VoH	0				With Serial ID
	VoL			0.5		

Optical and Electrical Characteristics

Parameter 9µm Core Diameter SMF Data Rate		Symbol	Min.	Typical	Max.	Unit
				20 155		km
						Mbps
Transmitter						
Centre Wavelength	Type A	λc	1270	1310	1350	nm
	Type B	λc	1500	1550	1580	nm
Spectral Width	Type A	ó			4 1	nm
	Type B	ó			-8 -8	nm
Average Output Power Extinction Ratio	Type A	Pout	-12			dBm
	Type B	Pout	-12			dBm
Rise/Fall Time(20%～80%)		EX	9			dBm
Output Optical Eye		tr/tf			90	ps
Data Input Swing Differential		IUT-T G.957 Compliant				
Input Differential Impedance		VIN	500		2000	mV
Tx_Disable disable		ZIN	90	100	110	Ω
Tx_Disable enable			2.0		Vcc+0.3	V
Tx_Fault fault			0		0.8	V
Tx_Fault normal			2.0		Vcc+0.3	V
Tx_Disable Assert Time			0		0.8	V
		t off			10	us
Receiver						
Centre Wavelength Receiver Sensitivity	Type A	λc	1500	1550	1580	nm
	Type B	λc	1270	1310	1360	nm
Output Differential Impedance		PIN			-28	dBm
Data Output Swing Differential		PIN	90	100	110	Ω
Rise/Fall Time		Vout	370		2000	mV
LOS De-Assert		Tr/tf			2.2	ns
LOS Assert		LOS			-34	dBm
LOS High			-40			dBm
LOS Low		Ď LOS A	2.0		Vcc+0.3	V
			0		0.8	V
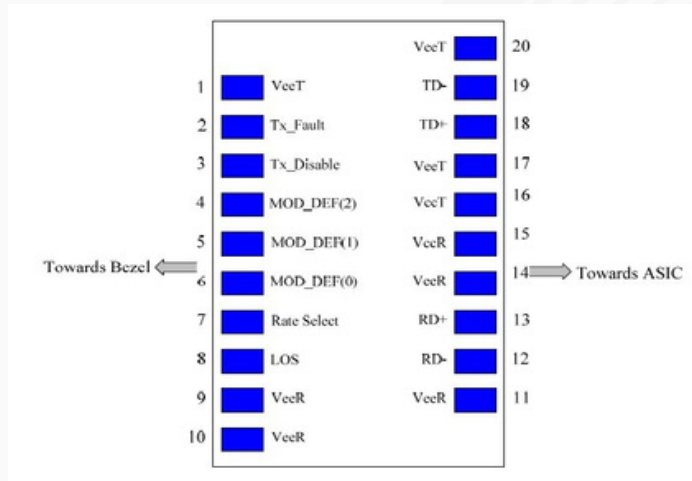
Pin Function Definitions

Num.	Name VeeT	Function Transmitter	Plug Seq	Notes
1	Tx Fault	Ground Transmitter	1	
2	Tx Disable	Fault Indication	3	Note 1
3	MOD-DEF2	Transmitter Disable	3	Note 2,Module disables on high or open
4	MOD-DEF1	Module Definition 2	3	Note 3,Data line for Serial ID.
5	MOD-DEF0	Module Definition 1	3	Note 3,Clock line for Serial ID.
6	Rate Select	Module Definition 0	3	Note 3,Grounded within the module
7	LOS	Not Connect	3	Function not available
8	VeeR	Loss of Signal	3	Note 4
9	VeeR	Receiver Ground	1	Note 5
10	VeeR	Receiver Ground	1	Note 5
11	RD-	Receiver Ground	1	Note 5
12	RD+	Inv. Receiver Data Out	3	Note 6
13	VeeR	Receiver Data Out	3	Note 7
14	VccR	Receiver Ground	1	Note 5
15	VccT	Receiver Power	2	3.3±5%,Note 7
16	VeeT	Transmitter Power	2	3.3±5%,Note 7
17	TD+	Transmitter Ground	1	Note 5
18	TD-	Transmit Data In	3	Note 8
19	VeeT	Inv. Transmit Data In	3	Note 8
20		Transmitter Ground	1	Note 5

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Notes:

1)Tx Fault is an open collector/drain output, which should be pulled up with a 4.7k-10kΩ resistor on the host board. Pull up voltage between 2.0V and VccT,R+.03V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state,the output will be pulled to＜0.8V.

2)Tx Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7-10kΩ resistor. Its states are:

Low (0-0.8V): Transmitter on

(＞0.8,＜2.0V): Undefined

High (2.0-3.465V): Transmitter Disabled

Open: Transmitter Diabled

3)Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k-10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR (see section IV for further details). Mod-Def 0 is grounded by the module to indicate that the module is present Mod-Def 1 is the clock line of two wire serial interface for serial ID Mod-Def 2 is the data line of two wire serial interface for serial ID

4)LOS (Loss of Signal) is an open collector/drain output,which should be pulled up with a 4.7k-10kΩ resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state,the output will be pulled to＜0.8V.

5)VeeR and VeeT may be internally connected within the SFP module.

6)RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differntial lines which should be terminated with 100Ω (differntial) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 370 and 2000 mV differential (185-1000mV single ended) when properly terminated.
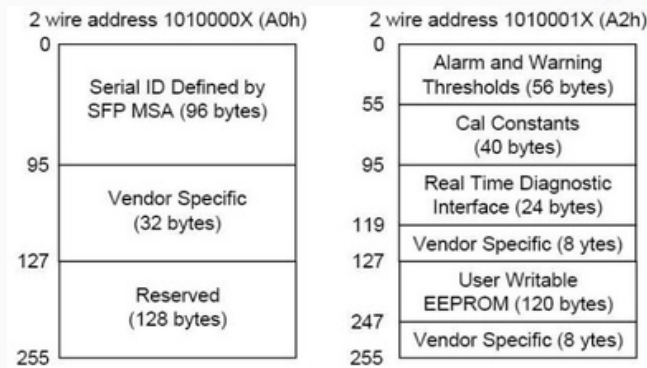
7)VccR and VccT are the receiver and transmitter power suppliers. They are defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply-filtering network is used,hot plugging of the SFP transceiver module will result in an inrushcurrent of no more than 30mA greater than the steady state value.VccR and VccT may be internally connected within the SFP transceiver module.

8)TD-/+: These are the differential transmitter inputs. They are AC-coupled,differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 500-2400mV(250-1200mV single-ended),though it is recommended that values between 500 and 1200 mV differential (250-600mV single-ended) be used for best EMI performance.

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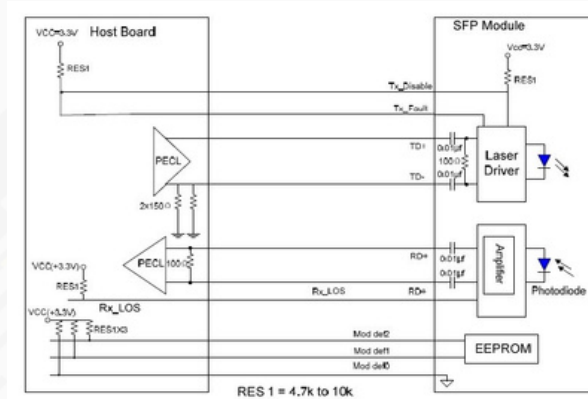Tel. (+52) 558.421.96.12 - E-mail: info@yaxxcom.com

EEPROM

The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C02/04 family of components. When the serial protocol is activated,the host generates the serial clock signal (SCL). The positive edge clocks data into those segments of the EEPROM that are not write protected within the SFP transceiver. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA) is bi- directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation.The memories are organized as a series of 8-bit data words that can be addressed individually or sequestially.
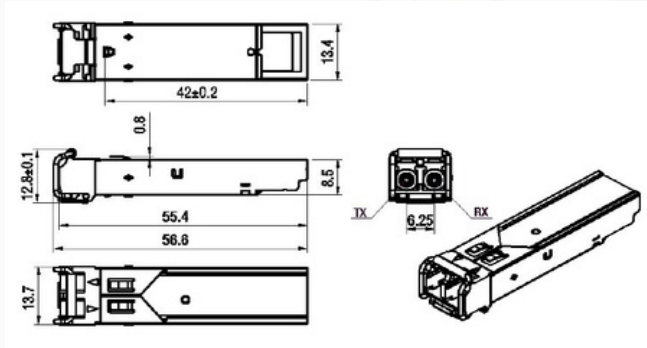
The module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring,transmitted power monitoring,bias current monitoring, supply voltage monitoring and temperatrure monitoring all are implemented. The dagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56-95 at wire serial bus address A2h. The digital diagnostic memory map specific data field define as following. For detail EEPROM information,please refer to the related document of SFF 8472 Rev 9.3.

Recommend Circuit Schematic

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Mechanical Specifications

Ordering information

Part No.	Data Rate	Laser	FibreType	Distance	Optical Interface
SFP-BIDI-1020-A	155Mbps	Tx1310nm	SMF	20km	LC/SC
SFP-BIDI-1020-B	155Mbps	Tx1550nm	SMF	20km	LC/SC
SFP-BIDI-1020I-A	155Mbps	Tx1310nm	SMF	20km	LC/SC
SFP-BIDI-1020I-B	155Mbps	Tx1550nm	SMF	20km	LC/SC
SFP-BIDI-1020ID-A	155Mbps	Tx1310nm	SMF	20km	LC/SC
SFP-BIDI-1020ID-B	155Mbps	Tx1550nm	SMF	20km	LC/SC

I: Industrial operating temperature
D: DDMI