1.25Gbp/s Bi-Di SFP Transceiver Module with DDM function

GSFP-LX-SM1310(1550)-20-BIDI

Features:

- Up to 1.25Gbps data link
- Integrated single fiber bi-di reactional optical subassembly
- Hot- pluggable SFP footprint
- LC pluggable optical interface
- Low power dissipation
- Metal enclosure, for lower EMI
- RoHs compliant and lead-free
- Single +3.3V power supply
- Support Digital Diagnostic Monitoring interface
- Compliant with SFF-8472
- Case operating temperature 0℃ to 70℃

Applications:

- Gigabit Ethernet
- Gigabit Fiber Channel
- Switch to switch interface

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	note
Storage Temperature	Ts	-40		85	°C	
Storage Ambient Humidity	HA	5		95	%	
Power Supply Voltage	VCC	-0.5		4	V	
Signal Input Voltage		-0.3		Vcc+0.3	V	
Receiver Damage Threshold		5			dBm	

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	note
Case Operating Temperature	Tcase	0		70		
Ambient Humidity	HA	5		70	%	Non-condensing
Power Supply Voltage	VCC	3.13	3.3	3.47	V	
Power Supply Current	ICC			280	mA	

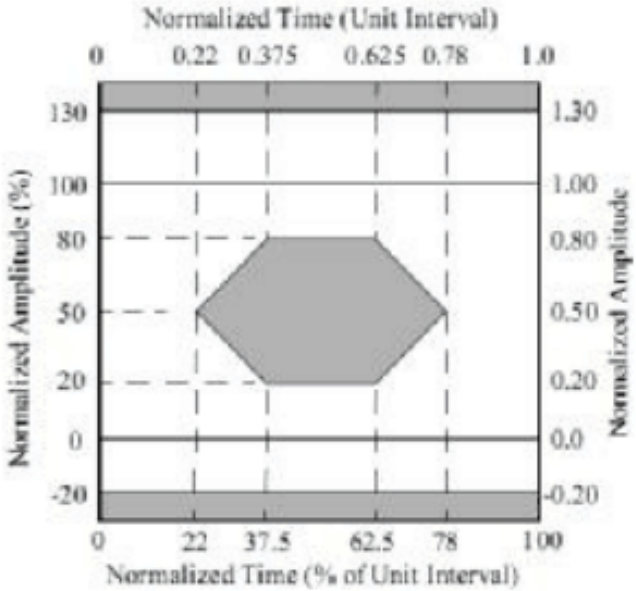
Power Supply Noise Rejection				100	MVP-P	100Hz to 1MHz
Data Rate		1.25			Gbps	TX Rate/RX Rate
Coupled Fiber	Single mode fiber					

Specification of Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	note
Average Output Power	Pout	-9		-3	dBm	20km 1310nm/1550nm
Extinction Ratio	ER	9			dB	
Center Wavelength	λ C	1290	1310	1330	nm	1310nm FP
		1520	1550	1580	nm	1550nm DFB
Spectrum Width (RMS)	σ			4	nm	FP Laser(TX:1310nm)
Spectrum Bandwidth(-20dB)	σ			1	nm	1550nm DFB
				1	nm	1310nm DFB
Transmitter OFF Output Power	P_{Off}			-45	dBm	
Differential Line Input Impedance	Rin	90	100	110	0hm	
Total Jitter (Peak-Peak)	tJ			41	PS	Note (1)
Output Eye Mask	Compliant with IEEE802.3z (class 1 laser safety)					Note (1)

Note (1): Measure at 2^23-1 NRZ PRBS pattern

Note (2): Transmitter eye mask definition



Specification of Receiver

Parameter	Symbol	Min	Typ	Max	Unit	note

Input Optical Wavelength	λ IN	1270		1610	nm	
Receiver Sensitivity	PIN			-24		20km Note (1)
Input Saturation Power (Overload)	PSAT	-3			dBm	
Los Of Signal Assert	PA	-35			dBm	PIN Receiver
Los Of Signal De-assert	PD			-25	dBm	PIN Note (2)
LOS Hysteresis	PA-PD	0.5		6	dB	

Note (1): Measured with Light source 1550nm(1310nm), ER=10dB; BER =<10^-12 @PRBS=2^23-1 NRZ

Note (2): When LOS de-asserted, the RX data+/- output is High-level (fixed)

Electrical Interface Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	note
Transmitter						
Total Supply Current	ICC			A	mA	Note (1)
Transmitter Disable Input-High	VDISH	2		Vcc+0.3	V	
Transmitter Disable Input-Low	VDISL	0		0.8	V	
Transmitter Fault Input-High	VDISH	2		Vcc+0.3	V	
Transmitter Fault Input-Low	VTxFH	0		0.8	V	
Receiver						
Total Supply Current	ICC			B	mA	Note (1)
LOSS Output Voltage-High	VLOSH	2		Vcc+0.3	V	LVTTL
LOSS Output Voltage-Low	VLOSL	0		0.8	V	

Note (1): A (TX) + B (RX) = 280mA (Not include termination circuit)

Pin Descriptions

Pin	Symbol	Name/Description	Ref
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault.	2
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module	3
7	Rate Select	No connection required	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	VEER	Receiver Ground (Common with Transmitter Ground)	1
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	

13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.

2. Laser output disabled on T DIS >2.0V or open, enabled on T DIS <0.8V.

3. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF(0) pulls line low to indicate module is plugged in.

4. This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates). If implemented, the input will be internally pulled down with > 30kΩ resistor. The input states are:

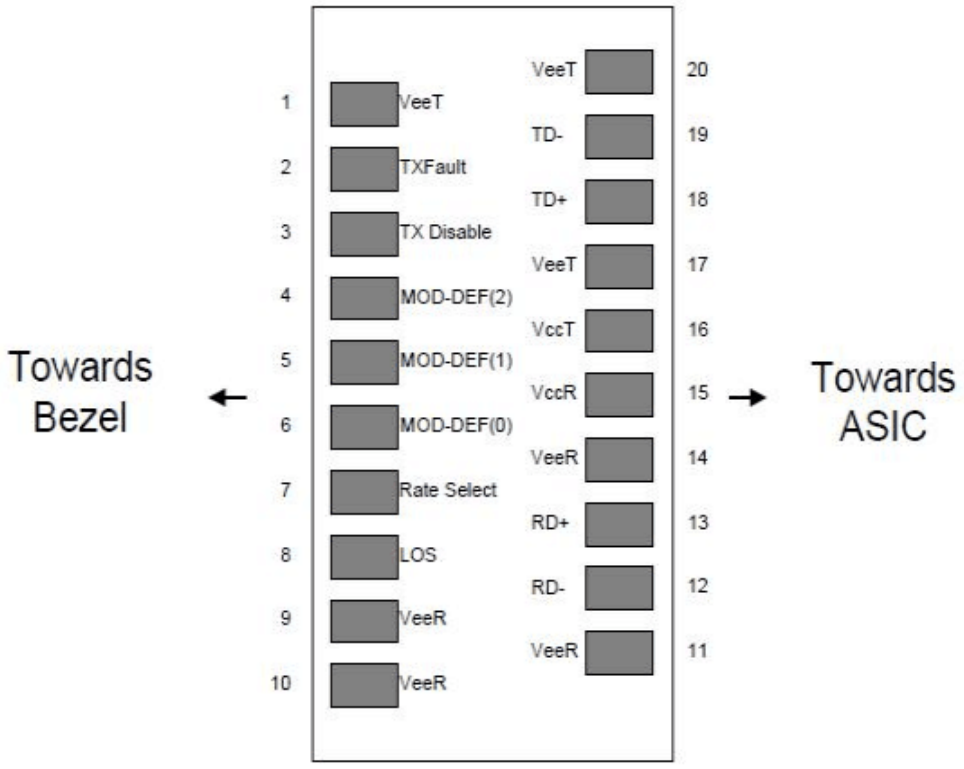
Low (0 – 0.8V): Reduced Bandwidth

(>0.8V, < 2.0V): Undefined

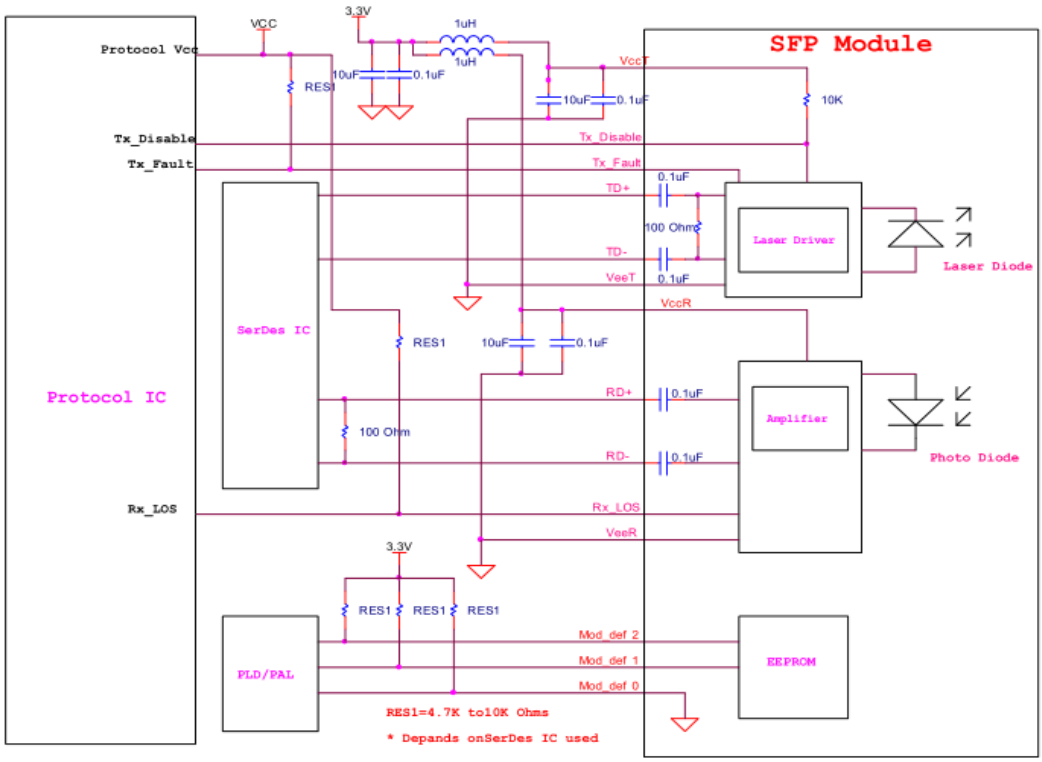
High (2.0 – 3.465V): Full Bandwidth

Open: Reduced Bandwidth

5. LOS is open collector output. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of ignal.



Recommend Circuit Schematic



Digital Diagnostic Functions

GSFP-LX-SM1310(1550)-20-BIDI transceivers support the 2-wire serial communication protocol as defined in the SFP MSA. It is very closely related to the E2PROM defined in the GBIC standard, with the same electrical specifications.

The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

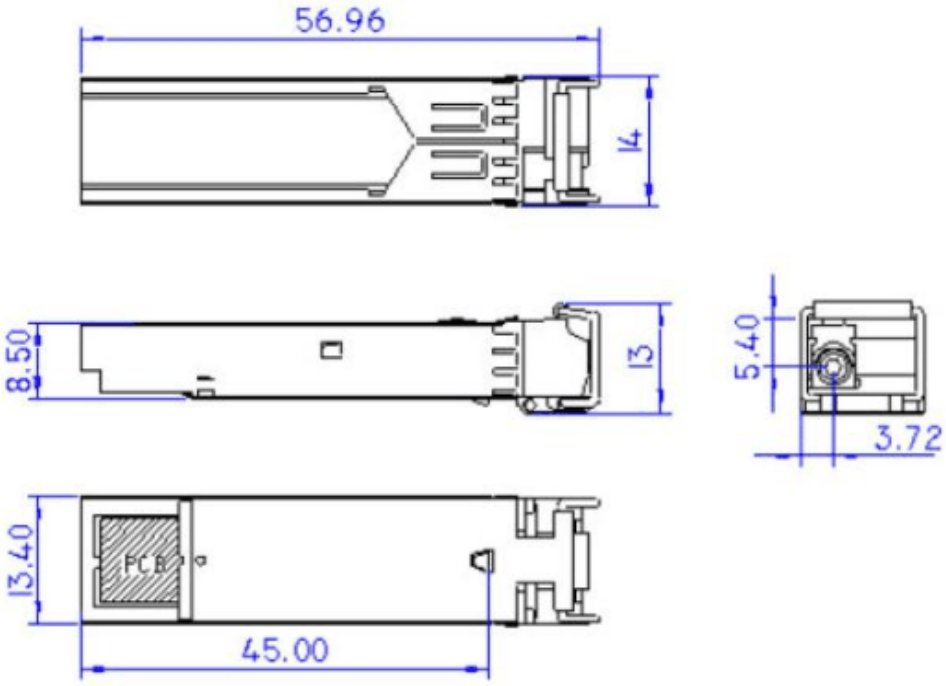
Additionally, SFP transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in E2PROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged. The interface is identical to, and is thus fully backward compatible with both the GBIC Specification and the SFP Multi Source Agreement. The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) 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 sequentially.

Digital diagnostics for the GSFP-LX-SM1310(1550)-20-BIDI are Externally calibrated by default

Mechanical Specifications (Unit: mm)



Ordering Information

Ordering Information	Description
GSFP-LX-SM1310-20-BIDI	20km,1.25Gbps BIDI SFP,Tx1310nm, Rx1550nm, SFP form-factor, LC/UPC receptacle connector, 0~70°C Commercial temperature
GSFP-LX-SM1550-20-BIDI	20km,1.25Gbps BIDI SFP,Tx1550nm, Rx1310nm, SFP form-factor, LC/UPC receptacle connector, 0~70°C Commercial temperature

For More Information

For more information about the GSFP-LX-SM1310(1550)-20-BIDI, please contact your local BDCOM account representative.

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