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

Feature:

Up to 1.25Gbps data link
■Integrated single fiber bi-directional optical subassembly
■Hot- pluggable SFP footprint
■SC 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℃ or -40℃ to 85℃

Applications：

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

Descriptions:

Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA), The transceiver consists of sections: the LD driver, the limiting amplifier, the digital diagnostic monitor.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

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 oropen.	
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 normaloperation.	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.	

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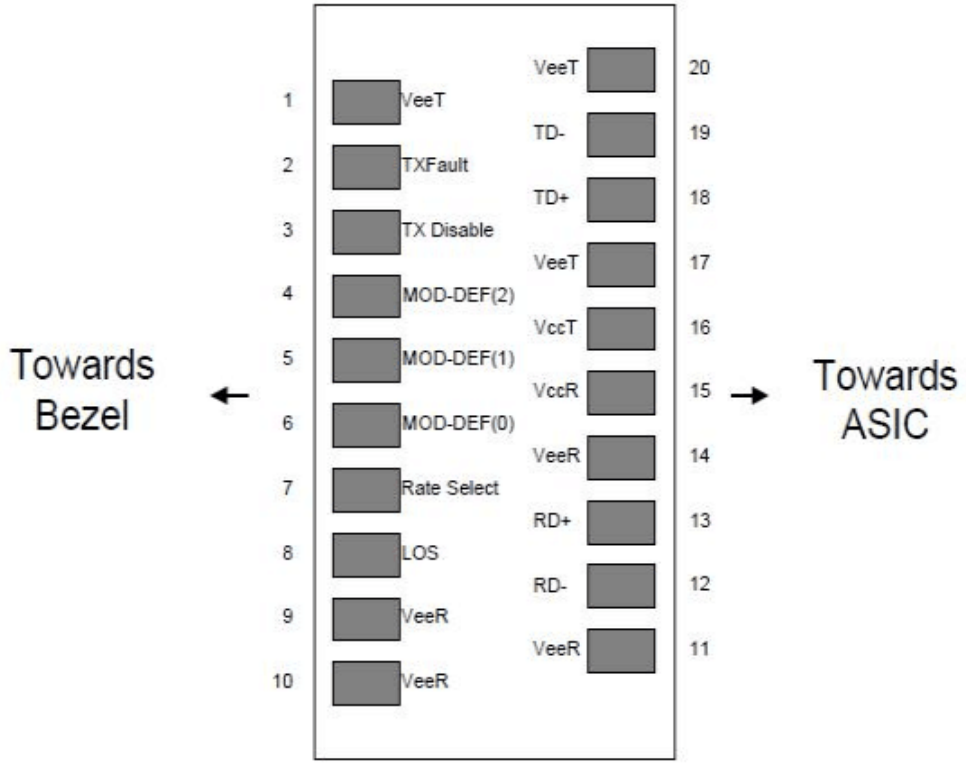
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

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 and3.6V. 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 2x Rates). If implemented, the input and 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 signal.

Absolute Maximum Ratings:

Parameter	Symbol	Min	Typ	Max	Unit	note
Storage Temperature	Ts	-40		85	ºC	
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	Tease	0/-40		70/85		
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
Transmission Distance	0.55			120	KM	
Coupled Fiber	Multi or Single mode fiber					

Specification of Transmitter:

Parameter	Symbol	Min	Typ	Max	Unit	note
Average Output Power	Pout	-9.5		-3	dBm	0.55km 850nm
		-9		-3	dBm	3km 1310nmFP
		-9		-3	dBm	3km 1550nmFP
		-9		-3	dBm	10km 1310nmFP
		-9		-3	dBm	10km 1550nmDFB
		-2		+3	dBm	40km 1310nmDFB
		-5		0	dBm	40km 1490nmDFB
		-5		0	dBm	40km 1550nmDFB
		-2		+3	dBm	80km 1490nmDFB
		-2		+3	dBm	80km 1550nmDFB
Extinction Ratio	ER	9			dB	
Center Wavelength	λC	1270	1310	1360	nm	1310nm FP
		1290	1310	1330	nm	1310nm DFB
		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	1490nm DFB
				1	nm	1310nm DFB
Transmitter OFF Output Power	POff			-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 2^7-1 NRZ PRBS pattern
Note (2): Transmitter eye mask definition

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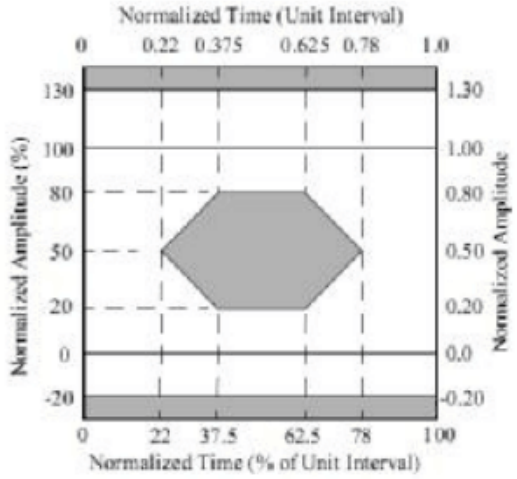


Specification of Receiver:

Parameter	Symbol	Min	Typ	Max	Unit	note
Input Optical Wavelength	λIN	1270	1310	1610	nm	
Receiver Sensitivity	PIN			-22/-24	dBm	15km～80kmNote (1)
				-30		120km 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=2^7-1NRZ
Note (2): When LOS de-asserted, the RX data+/- output is High-level (fixed)

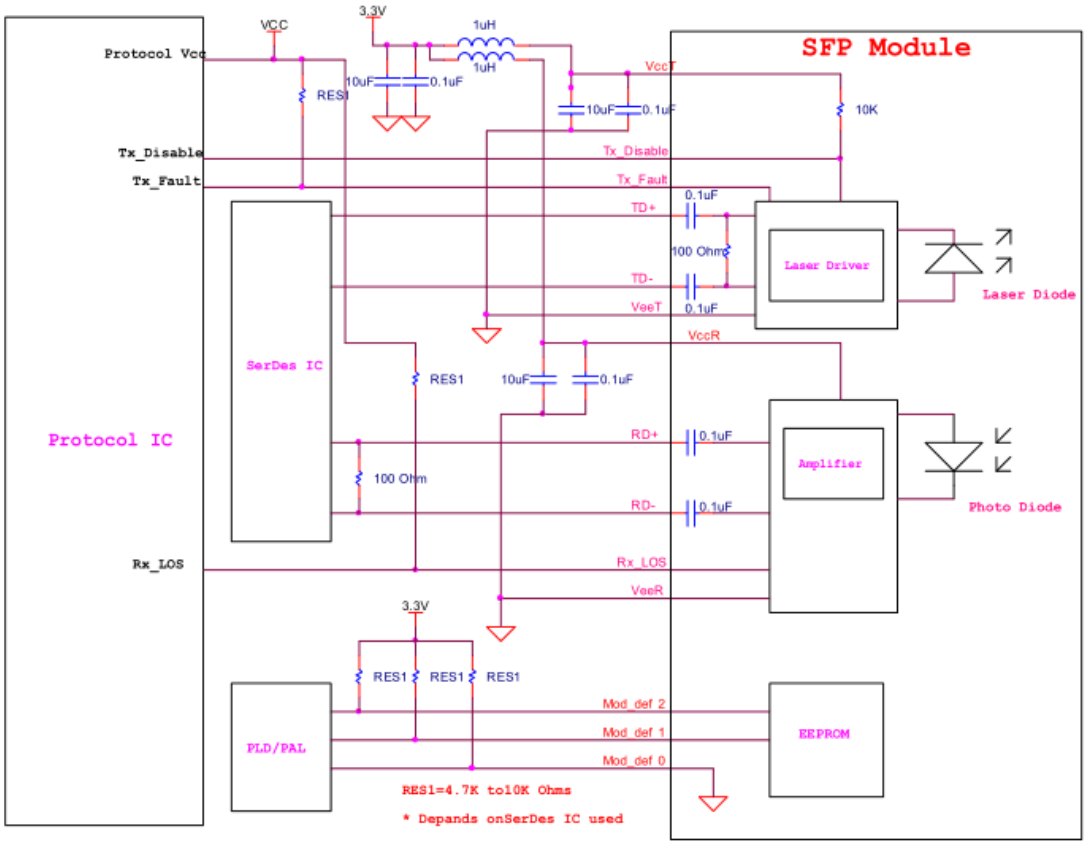
Electrical Interface Characteristics:

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	

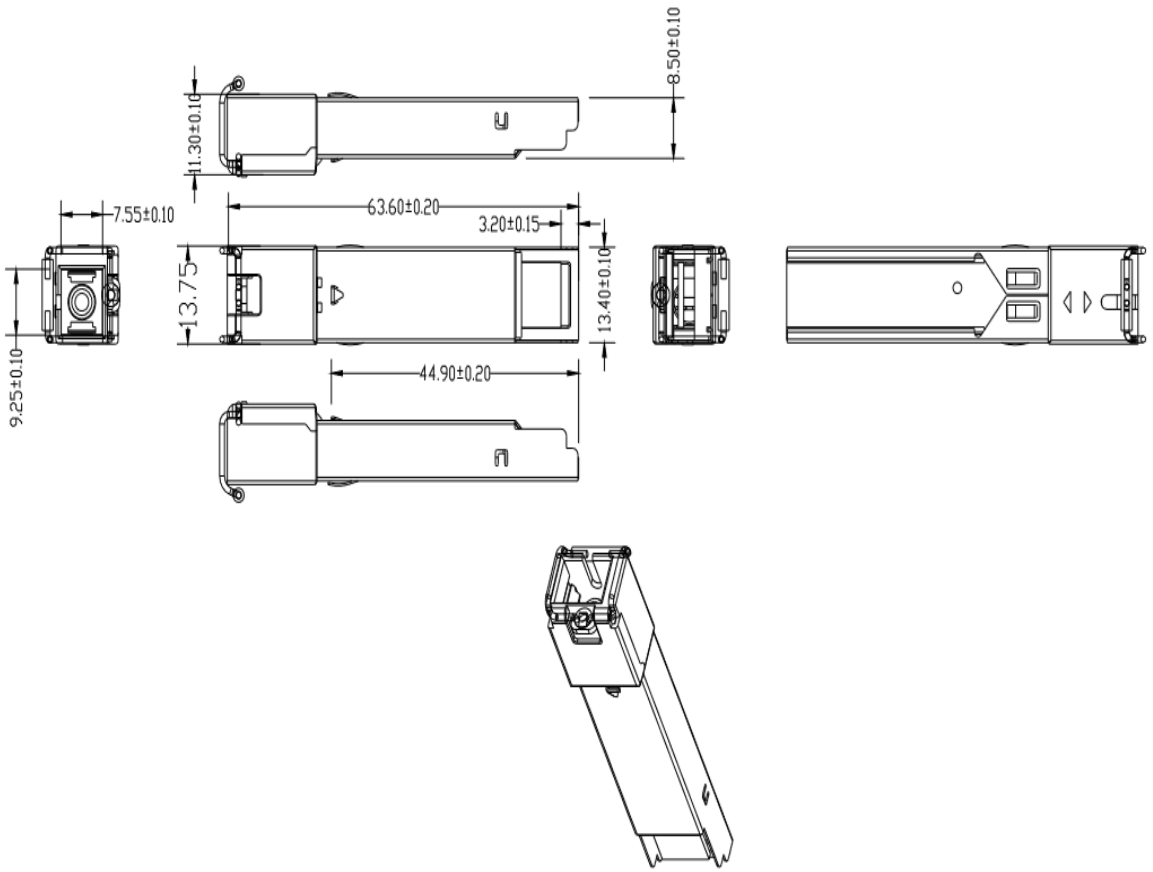
Note (1): A (TX) + B (RX) = 280mA (Not include termination circuit)

Digital Diagnostic Functions
SFP transceivers support the 2-wire serial communication protocol asdefined in the SFP MSA. It is very closely related to the E2PROM defined in the GBICstandard, with the same electrical specifications.
The standard SFP serial ID provides access to identification information that describesthetransceiver's capabilities, standard interfaces, manufacturer, and otherinformation.
Additionally, SFP transceivers provide a unique enhanced digitaldiagnostic monitoring interface, which allows real-time access to device operatingparameters such as transceiver temperature, laser bias current, transmitted opticalpower, received optical power and transceiver supply voltage. It also defines asophisticated system of alarm and warning flags, which alerts end-users when particularoperating 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-wireserial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoringinterface makes use of the 8 bit address 1010001X (A2h), so the originally defined serialID memory map remains unchanged. The interface is identical to, and is thus fullybackward compatible with both the GBIC Specification and the SFP Multi Source Agreement.The operating and diagnostics information is monitored and reported by a DigitalDiagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessedthrough a 2-wire serial interface. When the serial protocol is activated, the serialclock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks datainto the SFP transceiver into those segments of the E2PROM that are notwrite-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 areorganized as a series of 8-bit data words that can be addressed individually orsequentially.
Digital diagnostics for the EBSP- XXXX-XX are Externally calibrated by default

Recommend Circuit Schematic:



Mechanical Specifications (Unit: mm):



Regulatory Compliance:

Feature	Test Method	Performance
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards

Part Number:

Items Name	Part Number
1.25 G SF 1310nm 20 km SC	1.25SF1310-20SAT
1.25 G SF 1550nm 20 km SC	1.25SF1550-20SAT
1.25 G SF 1310nm 40 km SC	1.25SF1310-40SAT
1.25 G SF 1550nm 40 km SC	1.25SF1550-40SAT

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