

1.25Gb/S SFP DDMI LX/EX/ZX

Transceiver

P/N: TSFP-1CxxxA

Product Features

- Compliant with SFP MSA and SFF-8472 with LC receptacle
- Hot-pluggable
- Complies with Telcordia (Bellcore) GR-468-CORE
- Single 3.3V power supply
- SFP mechanical interface
- Maximal reach 10km, 20km, 40km, 80km or 120km are optional
- Digital Diagnostic Monitor Interface
- RoHS-6 Compliant

Application

- Gigabit Ethernet
- Fiber Channel
- Routers, Hubs or Repeaters

Absolute Maximum Rating

Parameter	Min	Max	Unit	Note
Storage Temperature	-40	85	°C	
Input Voltage	GND	V _{cc}	V	
3.3V Power Supply Voltage	-0.5	3.6	V	

Recommended Operating Conditions

Parameter	Min	Typical	Max	Unit	Note
Case Operating Temperature	0		70	°C	
	-40		85		
Power Supply Voltage	3.135	3.3	3.465	V	
Data Rate		1.25		Gbps	
Supply Current			300	mA	

Electrical-Optical Specification

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Center Wavelength	λ	1270	1310	1355	nm	10km
		1270	1310	1355		20km
		1270	1310	1355		40km
		1480	1550	1580		40km
		1480	1550	1580		80km
		1480	1550	1580		120km
Spectral Width – RMS	$\Delta\lambda$			4	nm	10km 20km
Spectral Width – -20dB				1	nm	40km 80km 120km
Average Launch Optical Power		P_o	-9		-3	dBm
	-3			2	dBm	40km
	0			5	dBm	80km 120km

Extinction Ratio	ER	9			dB	
Side Mode Suppression Ratio	SMSR	-30			dB	
Rise/Fall time (20%~80%)				260	ps	
Differential Input Voltage		500		2400	mV	
Output Optical Eye		IEEE802.3Z Compliant				

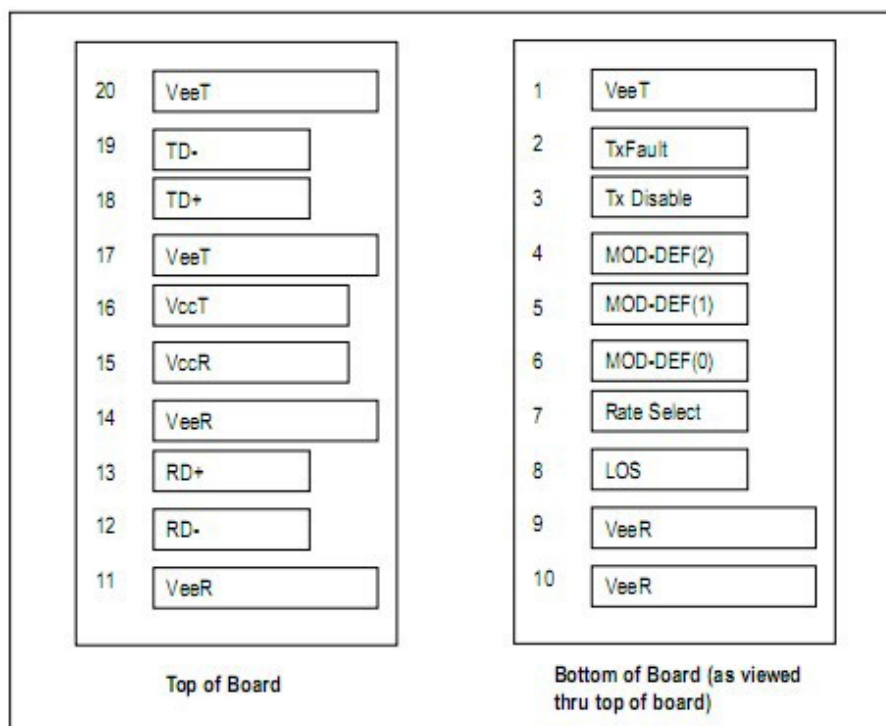
Optical- Electrical Specification

Parameter	Symbol	Min	Typical	Max	Unit	Note
Receiver						
Operate Wavelength		1260		1580	nm	
Sensitivity	Pr			-23	dBm	10km 20km (1)
				-24		40km 80km (1)
				-32		120km (1)
Saturation	Ps	-3			dBm	10,20, 40,80 km
		-9				120km
LOS Assert		-45			dBm	
LOS De-assert				-23	dBm	
				-24		
				-32		
LOS Hysteresis		0.5		5	dB	
Receiver Reflectance				-12	dB	
Differential Data Output Voltage		370		2000	mV	
LOS Output Voltage-Low				0.8	V	
LOS Output Voltage-High		2.0			V	

Notes

1. Minimum Sensitivity and saturation levels for an 8B10B 27-1 PRBS. BER≤10⁻¹², 1.25Gbps, ER=9dB

SFP Module Pad Assignments and Descriptions



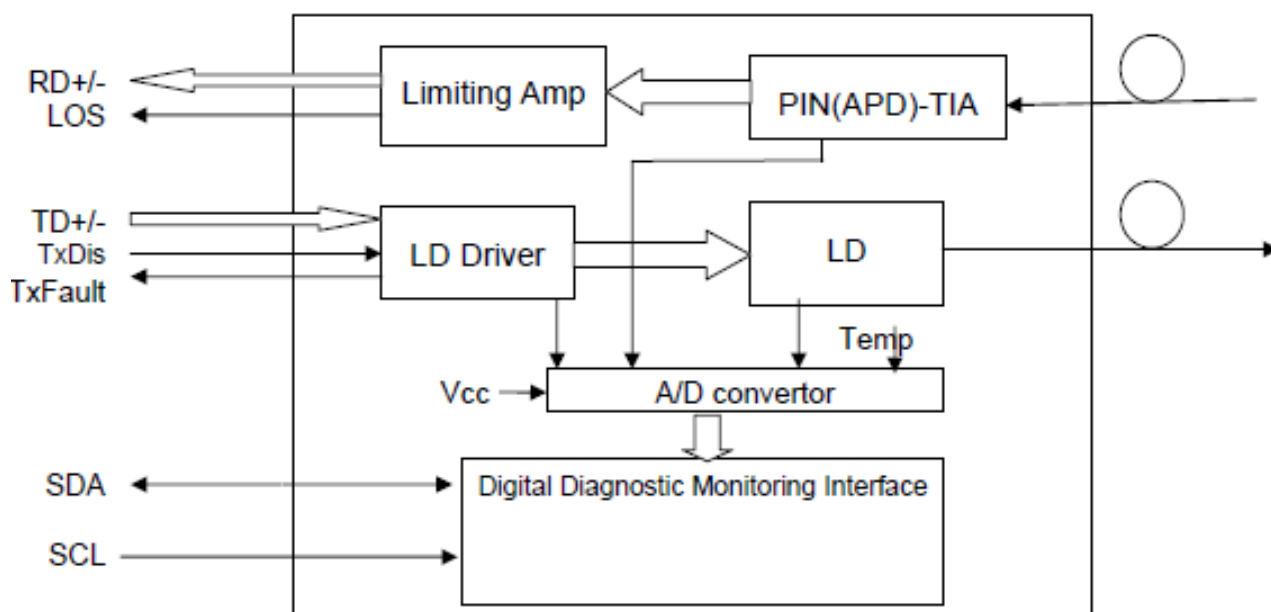
PIN	Symbol	Name / Description	Plug Seq	Note
1	VeeT	Transmitter Ground	1	
2	Tx Fault	Transmitter Fault Indication	3	1
3	Tx Disable	Transmitter Disable	3	2
4	MOD-DEF2	Module Definition 2	3	3
5	MOD-DEF1	Module Definition 1	3	3
6	MOD-DEF0	Module Definition 0	3	3
7	Rate Select	NC	3	
8	LOS	Los Of Signal	3	4
9	VeeR	Receiver Ground	1	5
10	VeeR	Receiver Ground	1	5
11	VeeR	Receiver Ground	1	5
12	RD-	Inv. Receiver Data Out	3	6
13	RD+	Receiver Data Out	3	6
14	VeeR	Receiver Ground	1	5

15	VccR	Receiver Power Supply	2	7,3.3V±5%
16	VccT	Transmitter Power Supply	2	7,3.3V±5%
17	VeeT	Transmitter Ground	1	5
18	TD+	Transmitter Data In	3	8
19	TD-	Inv.Transmitter Data In	3	8
20	VeeT	Transmitter Ground	1	5

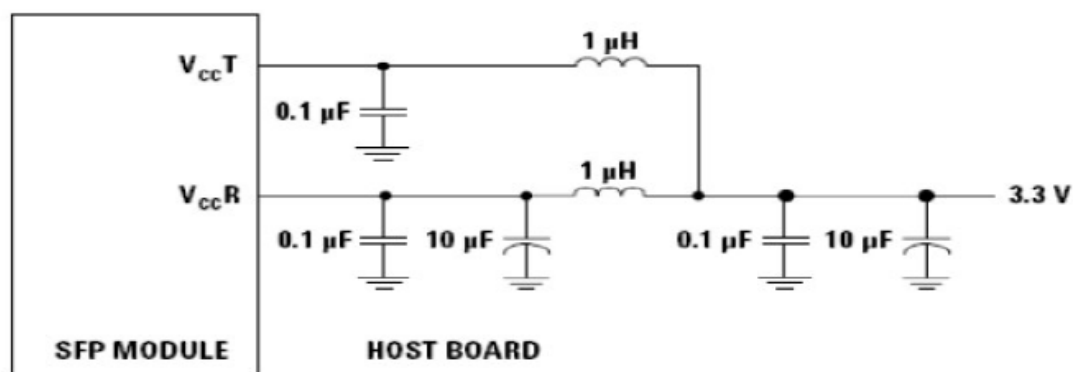
Note:

1. TX Fault is an open collector/drain output, which should be pulled up with a 4.7K–10K Ω resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. 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 4.7–10 K Ω resistor. Its states are
Low (0 – 0.8V): Transmitter on
(>0.8, < 2.0V): Undefined
High (2.0 – 3.465V): Transmitter Disabled
Open: Transmitter Disabled
3. Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10K Ω resistor on the host board. The pull-up voltage shall be VccT or VccR
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 – 10K Ω 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 100 Ω differential lines which should be terminated with 100 Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board
7. VccR and VccT are the receiver and transmitter power supplies. 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 Ω 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 inrush current of no more than 30 mA 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 100 Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board

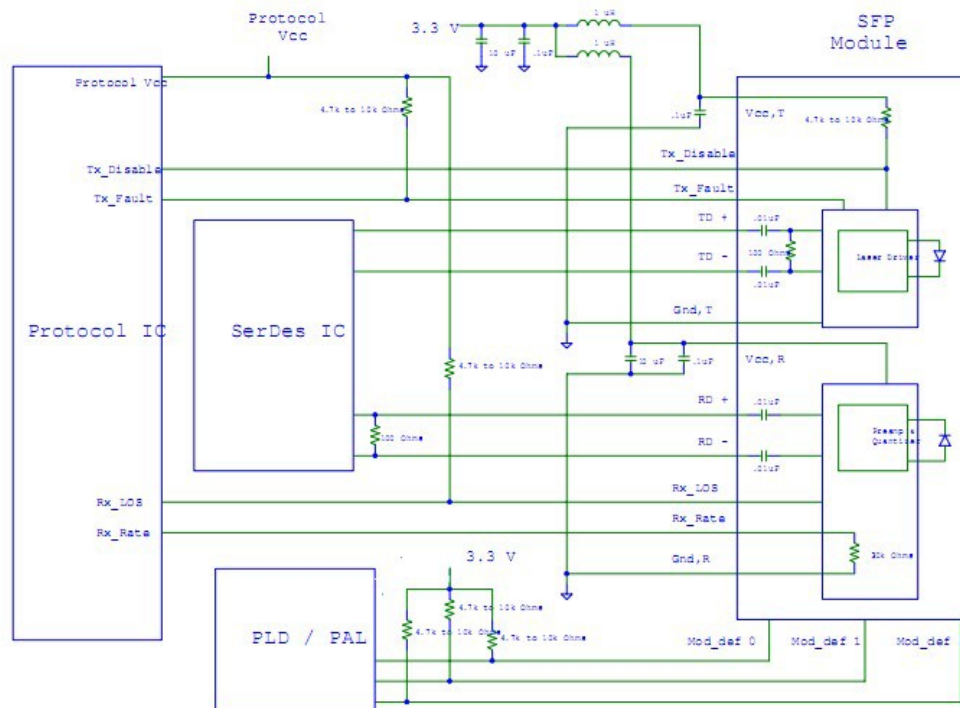
Transceiver Block Diagram



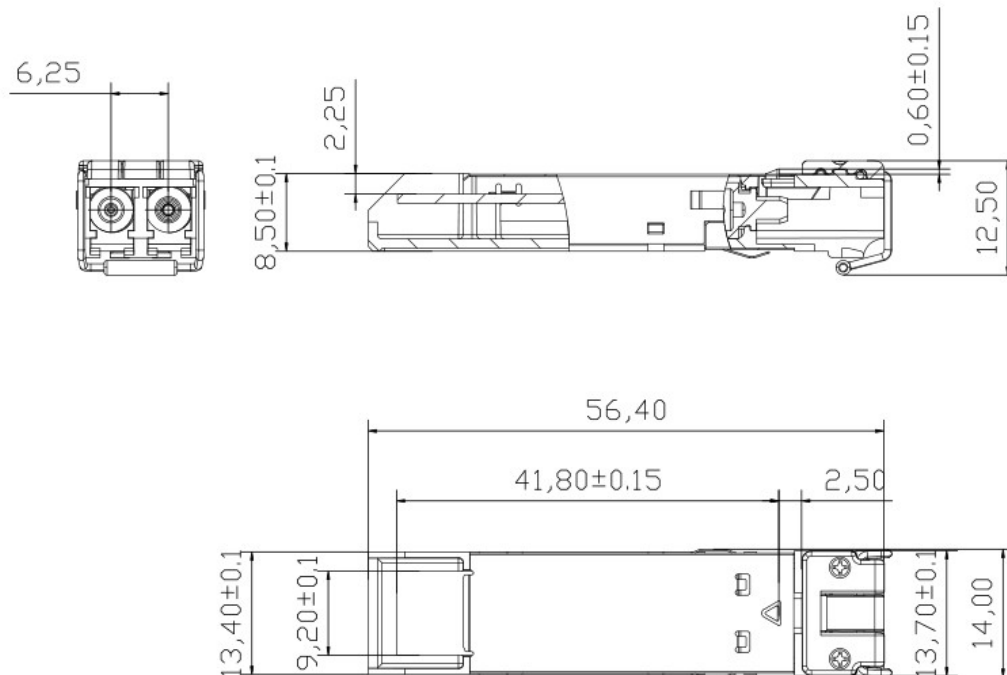
Recommended Host Board Power Supply Circuit



Example SFP Host Board Schematic



Mechanical Design Diagram



Unit: mm

Order Information

Model Name	Module Type	Tempture
TSFP-1C1F13A	1Gb/S SFP 1310nm 10km DDMI	0~70°C
TSFP-1C1G13A	1Gb/S SFP 1310nm 20km DDMI	
TSFP-1C1I13A	1Gb/S SFP 1310nm 40km DDMI	
TSFP-1C1I15A	1Gb/S SFP 1550nm 40km DDMI	
TSFP-1C1K15A	1Gb/S SFP 1550nm 80km DDMI	
TSFP-1C1L15A	1Gb/S SFP 1550nm 120km DDMI	
TSFP-1C5F13A	1Gb/S SFP 1310nm 10km DDMI	-40~85°C
TSFP-1C5G13A	1Gb/S SFP 1310nm 20km DDMI	
TSFP-1C5I13A	1Gb/S SFP 1310nm 40km DDMI	
TSFP-1C5I15A	1Gb/S SFP 1550nm 40km DDMI	
TSFP-1C5K15A	1Gb/S SFP 1550nm 80km DDMI	
TSFP-1C5L15A	1Gb/S SFP 1550nm 120km DDMI	