2.5Gbps SFP Transceiver

MODEL: SFP-SX-3

Product Features

- Operating data rate up to 2.5Gbps
- 850nm VCSEL Laser Transmitter
- 300m with 50/125 μm MMF, 150m on 62.5/125 μm MMF
- Single 3. 3V Power supply and TTL Logic Interface
- Duplex LC Connector Interface
- Hot Pluggable
- Operating Case Temperature
  Standard: 0℃~+70℃
  Industrial:-40℃~+85℃
- Compliant with MSA SFP Specification
- Digital diagnostic monitor interface
- Compatible with SFF-8472

Applications:

- Gigabit Ethernet Switches and Routers
- Fiber Channel Switch Infrastructure
- XDSL Applications
- Metro Edge Switching

Absolute Maximum Ratings

Table 1- Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	T_S	-40	+85	℃
Supply Voltage	Vcc	-0.5	3.6	V

Recommended Operating Conditons

Table 2- Recommended operating Conditons

Parameter	Symbol		Min.	Typical	Max.	Unit
Operating Case Temperature	T_A	SFP-SX-3	0		+75	℃
		SFP-SX-3I	-40		+85	
Power Supply Voltage	Vcc		3.15	3.3	3.45	V
Power Supply Current	I_{CC}				300	mA

Surge Current	I_{Surge}			+30	mA
Baud Rate		1.063		2.5	GBaud

Electrical Characteristics

Table 3- Electrical Characteristics

Transmitter						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
LVPECL Inputs(Differential)	Vin	400		2500	mVp	AC coupled inputs
Input Impedance (Differential)	Z_{IN}	85	100	115	Ω	Rin > 100 kohms @ DC
Tx_DISABLE Input Voltage – High		2		3.45	V	
Tx_DISABLE Input Voltage - Low		0		0.8	V	
Tx_FAULT Output Voltage -- High		2		Vcc+0.3	V	Io = 400μA; Host Vcc
Tx_FAULT Output Voltage – Low		0		0.5	V	Io = -4.0mA
Receiver						
CML Outputs (Differential)	Vout	400	800	1200	mVpp	AC coupled Outputs
Output Impedance (Differential)	Zout	85	100	115	Ohms	
Rx_LOS Output Voltage - High		2		Vcc+0.3	V	Io = 400μA; Host Vcc
Rx_LOS Output Voltage - Low		0		0.8	V	Io = -4.0mA
MOD_DEF (0:2)	VoH	2.5			V	With Serial ID
	VoL	0		0.5		

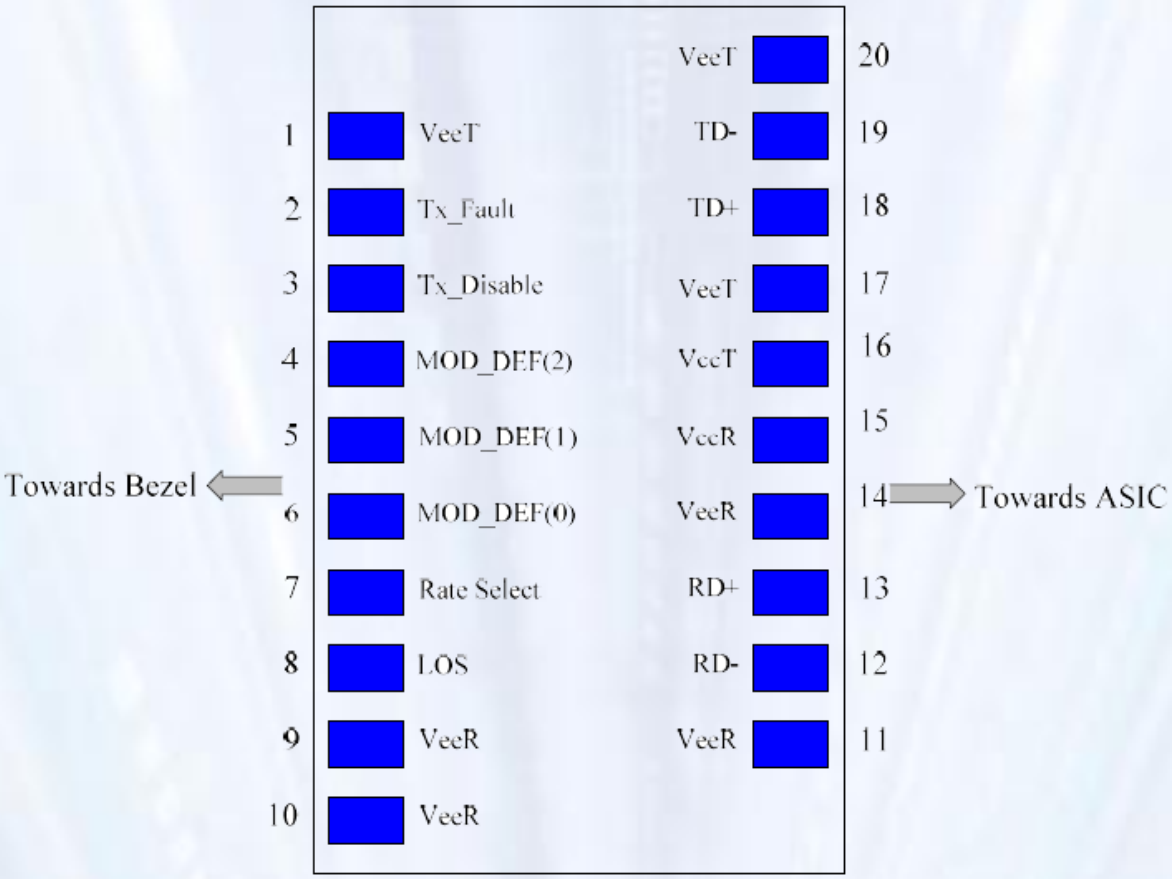
Optical and Electrical Characteristics

Table 4- Optical and Electrical Characteristics

Parameter		Symbol	Min.	Typ	Max.	Unit
50μm Core Diameter MMF	1.063G	L		500		m
	2.125G			300		
62.5μm Core Diameter MMF	1.063G			300		
	2.125G			150		
Data Rate				2.5		Gbps
Transmitter						
Centre Wavelength		Λc	820	850	860	nm
Spectral Width (RMS)		б			0.85	nm
Average Output Power		P_{OUT}	-10		-4	dBm
Extinction Ratio		EX	9			dB
Rise/Fall Time(20%~80%)		tr/tf			160	ps
MOD_DEF (0:2)-High		VH	2		Vcc	V
Output Optical Eye		IUT-T G.957 Compliant				
Data Input Swing Differential		V_{IN}	500		2000	mV
Input Differential Impedance		Z_{IN}	90	100	110	Ω
TX Disable	Disable		2.0		Vcc+0.3	V
	Enable		0		0.8	
TX_Fault	Fault		2.0		VCC+0.3	V
	Normal		0		0.8	
TX_Disable Assert Time		t_off			10	us
Receiver						
Centre Wavelength		Λc	760		860	nm
Sensitivity		PIN			-15	dBm
Output Differential Impedance		PIN	90	100	110	Ω
Data Output Swing Differential		V_{OUT}	370		2000	mV
Rise/Fall Time		Tr/tf			2.2	ns
LOS De-Assert		LOS_D			-16	dBm
LOS Assert		LOS_A	-30			dBm
LOS	High		2.0		VCC+0.3	V

	Low		0		0.8	

SFP Transceiver Electrical Pad Layout



Pin Function Definitions

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

Notes:

1) TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10K_ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser ault 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 _ 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_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 – 10K_ 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_ differential lines which should be terminated with 100_ (differential) 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 –1000 mV single ended) when properly terminated.

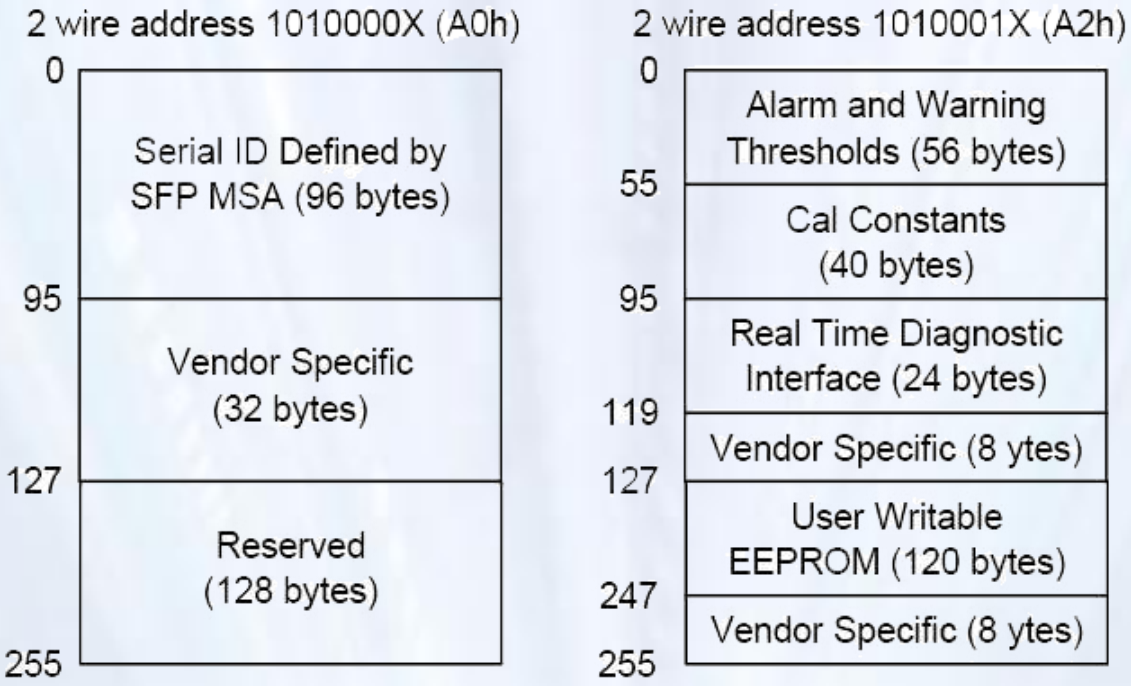
7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the 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 inrush current 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 100_ 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 – 2400 mV (250 –

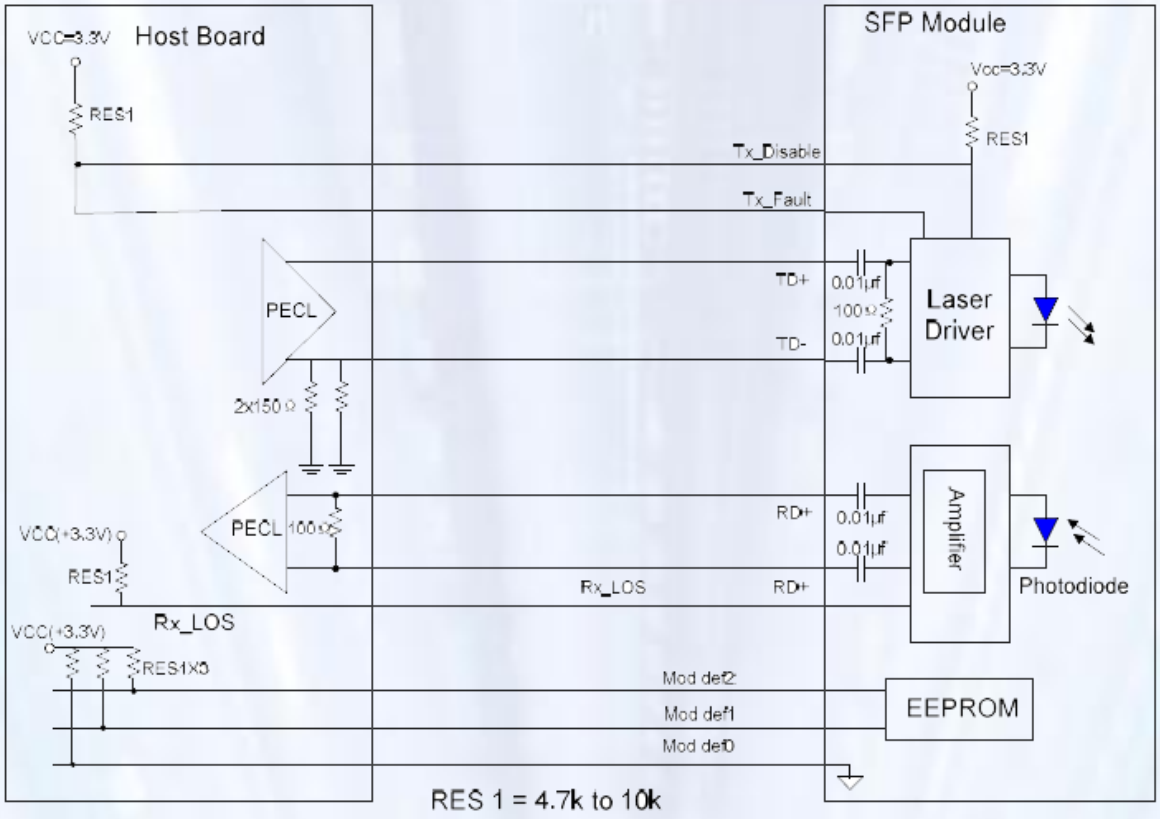
1200mV single-ended), though it is recommended that values between 500 and 1200 mV differential (250 – 600mV single-ended) be used for best EMI performance.

EEPROM

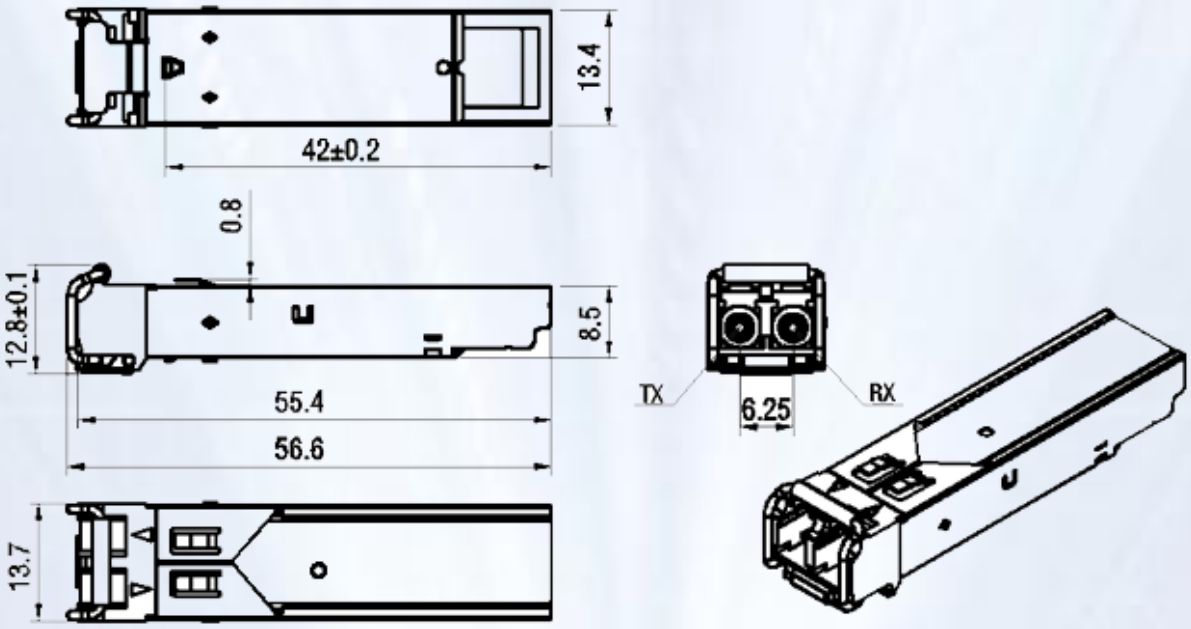
The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C02/04 family of components. When the serial protocol is activated, the host generates the serial clock signal (SCL). The positive edge clocks data into those segments of the EEPROM that are not write protected 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 sequentially. 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 temperature monitoring all are implemented. The diagnostic 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



Mechanical Specifications



Order Information

Table 5-Order Information

Part No.	Data Rate	Laser	Fibre Type	Distance	Optical Interface
SFP-SX-3	2.5Gbps	850nm VCSEL	MMF	300M	LC
SFP-SX-3I	2.5Gbps	850nm VCSEL	MMF	300M	LC
SFP-SX-3D	2.5Gbps	850nm VCSEL	MMF	300M	LC
SFP-SX-3ID	2.5Gbps	850nm VCSEL	MMF	300M	LC

* I--- Industrial operating temperature
* D--- DDMI

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