

## 1.25G SFP Transceiver

### MODEL: SFP-LH-220D



#### Feature:

- Gigabit Ethernet
- Gigabit Fiber Channel
- 1310nm FP laser and PIN photodetector for 2KM,10KM and DFB laser for 40KM transmission
- 1550nm uncooled DFB laser and pin photodetector for 40KM and 80KM
- SFP MSA package with duplex LC connector
- Standards support : IEEE 802.3u, IEEE 802.3z
- Fiber type: Single Mode Fiber
- +3.3V single power supply
- Power consumption less than 1W
- Digital diagnostic monitor interface compatible with SFF-8472
- Standard temp: 0~+70°C
- Industrial temp:-40~+85°C
- Compliant with RoHS
- Use for broadband services on optical switch system, optical transceiver, SFP,GE, module single mode
- Hot-pluggable SFP footprint
- Speed data: 10/100/1000Mbps
- Class 1 laser safety certified
- Metal housing, rugged structure with good anti-magnetic ability
- Compatibility with switches popular brands: Fujitsu, ALU, Huawei, Cisco, VFT, SWL2 ...

#### Absolute Maximum Ratings

Table 1- Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	Vcc3	-0.5	-	+3.6	V	
Storage Temperature	Ts	-40	-	85	°C	
Operating Humidity	RH	+5	-	+95	%	

## Recommended Operating Conditions

Table 2- Recommended operating Conditions

Parameter		Symbol	Min.	Typical	Max.	Unit	Notes
Operating	Standard	TC	0	-	+70	°C	
Case Temperature	Industrial		-40	-	+85	°C	
Power Supply Voltage		Vcc	3.0	3.3	3.6	V	
Power Supply Current		Icc	-	-	300	mA	
Power Dissipation		Pd	-	-	1	W	
Data Rate			-	1250	-	Mbps	

## Electrical Characteristics

Table 3- Electrical Characteristics

Parameter	Symbol	Unit	Min.	Typ.	Max.	Notes
Electrical Characteristics						
Supply Current	ICC	mA	-	-	300	
Differential Data Input Swing		mV	200	-	2400	1
Differential Data Output Swing		mV	600	-	1200	2
Differential Data input impedance		Ω	-	100	-	1
Signal Level(LVTTL H)		V	2.4	-	VCC	
Signal Level(LVTTL L)		V	0	-	0.8	

Note:

1. Internally AC coupled, input termination may be required for CML or LVPECL applications.
2. Internally AC coupled, CML differential output stage.

## Optical Characteristics

Table 4-Optical Characteristics

SFP-LH-220 (1310nm DFB and PIN, 20KM, NO DDMI)

SFP-LH-220D (1310nm DFB and PIN, 20KM, DDMI)

Parameter		Symbol	Unit	Min.	Typ.	Max.	Notes
Optical transmitter Characteristics							
Data Rate			Mbps	-	1250	-	
Center Wavelength Range		$\lambda_C$	nm	1290	1310-	1330	
Average Output Power		P <sub>OUT</sub>	dBm	-4		+1	
Spectral Width(@-20dB)		$\Delta\lambda$	nm	-	-	7.7	
Launch Optical Power		P <sub>0</sub>	dBm	-9	-	-3	1
Extinction Ratio		ER	dB	9	-	-	
Jitter Generation(pK-pK)			UI	-	-	0.1	
Jitter Generation(RMS)			UI	-	-	0.01	
Eye Diagram		Compliant with IEEE802.3ah					
Optical receive Characteristics							
Data Rate			Mbps	-	1250	-	
Receiver Sensitivity			dBm	-25	-	-3	
Overload Input Optical Power		P <sub>IN</sub>	dBm	-3	-	-	
Center Wavelength Range		$\lambda_c$	nm	1290	1310	1330	
LOS	LOSA		dBm	-34	-	-	
	LOSD			-	-	-24	
LOS Hysteresis			dB	0.5	-	-	

Note:

Coupled into 9/125 SMF.

### Recommended Interface Circuit

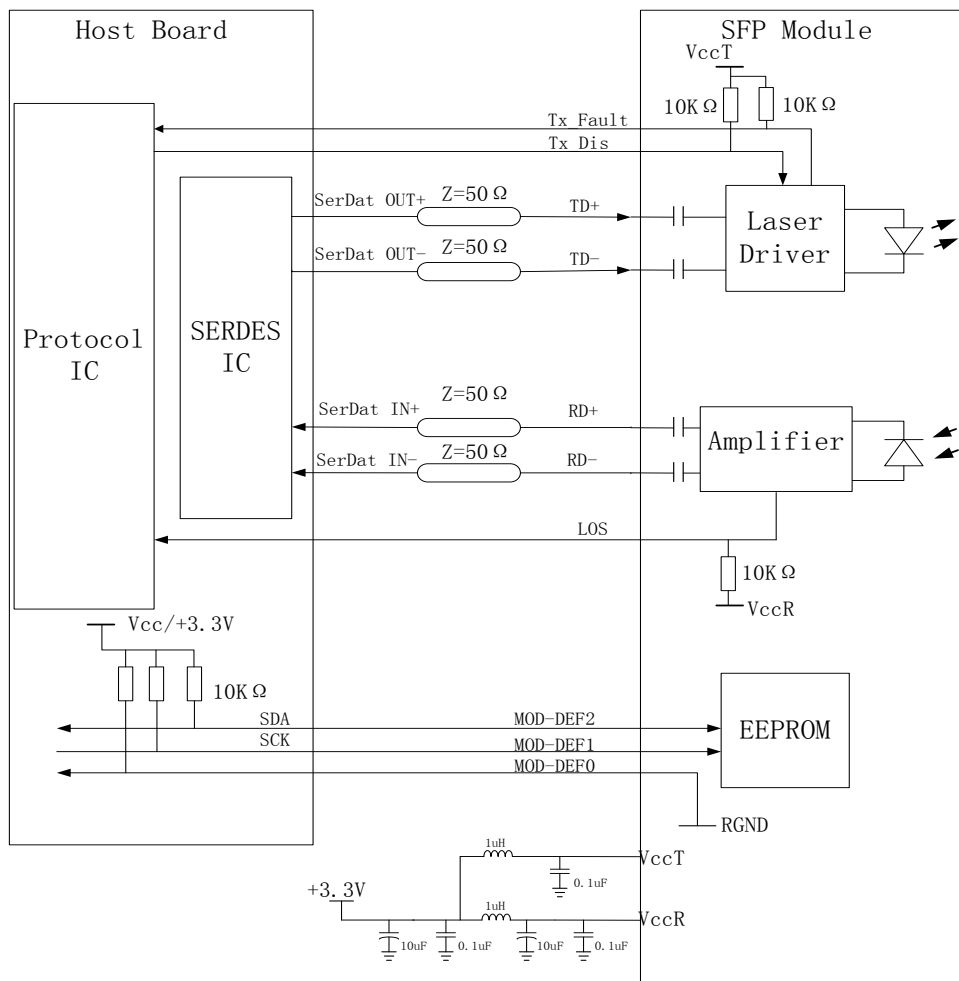


Figure 1, Recommended Interface Circuit

### Recommended Host Board Power Supply Circuit

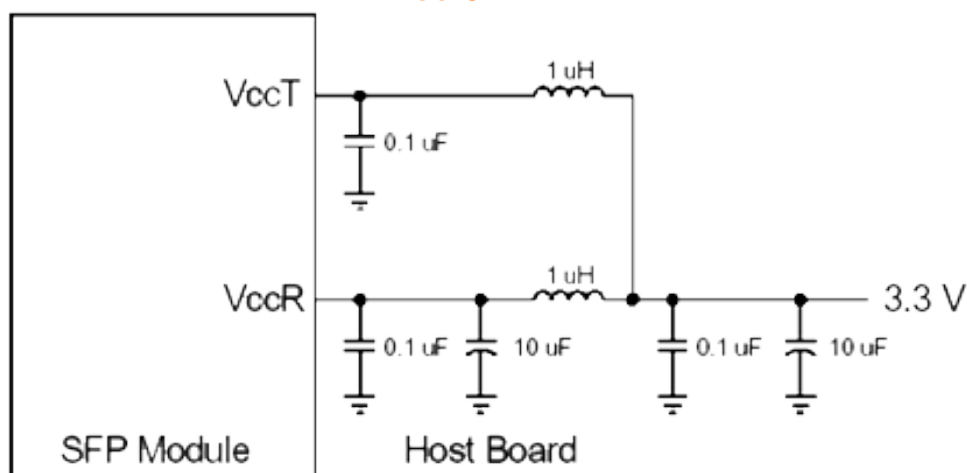


Figure 2, Recommended Host Board Power Supply Circuit

### Pin arrangement

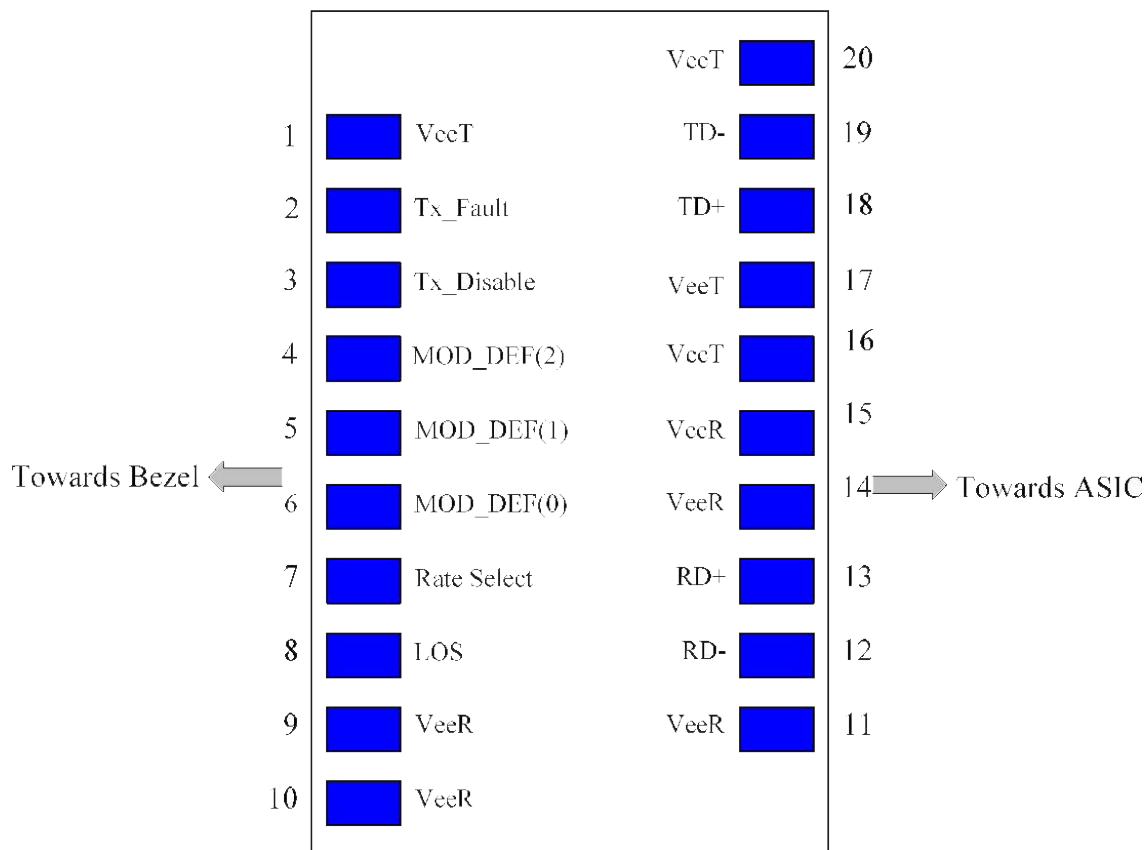


Figure 3, Pin View

Table 5-Pin Function Definitions

Pin	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 Serial ID.
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	
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3 ± 5%,
16	VccT	Transmitter Power	2	3.3 ± 5%

17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	
19	TD-	Inv. Transmit Data In	3	
20	VeeT	Transmitter Ground	1	Note 5

Note:

- TX Fault is open collector output which should be pulled up externally with a 4.7K ~10K $\Omega$  resistor on the host board to voltage between 2.0V and VCC+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- TX Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7~ 10K resistor.  

Low (0- 0.8V):	Transmitter on
Between (0.8V and 2V):	Undefined
High (2.0 – VccT):	Transmitter Disabled
- MOD-DEF 0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7~10K resistor on the host board to supply less than VccT+0.3V or VccR+0.3V.  
MOD-DEF 0 is grounded by the module to indicate that the module is present.  
MOD-DEF 1 is clock line of two wire serial interface for optional serial ID.  
MOD-DEF 2 is data line of two wire serial interface for optional serial ID.
- LOS (Loss of signal) is an open collector output, which should be pulled up with a 4.7k~10k $\Omega$  resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates loss of signal. In the low state, the output will be pulled to less than 0.8V.
- These are the differential receiver outputs. They are AC-coupled 100 $\Omega$  differential lines which should be terminated with 100 $\Omega$  differential at the user SERDES. The AC coupling is done inside the module and thus not required on the host board.
- These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 $\Omega$  differential termination inside the module.

### Digital Diagnostic Memory Map

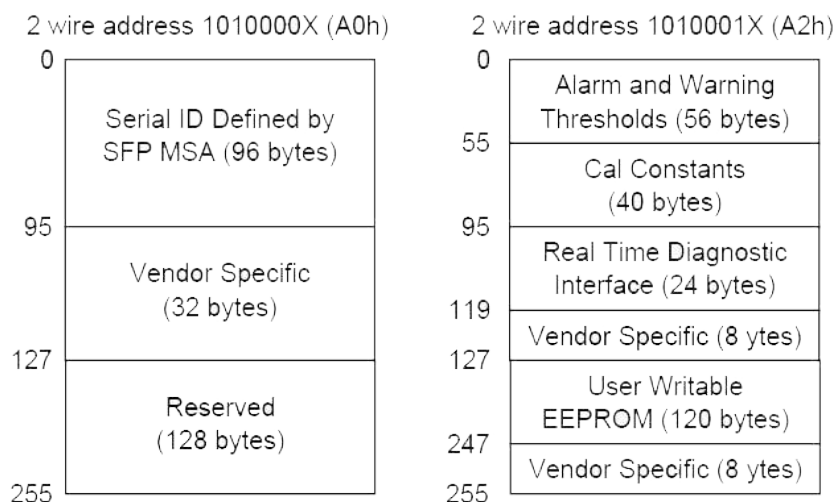


Figure 4, memory map



## Mechanical Diagram

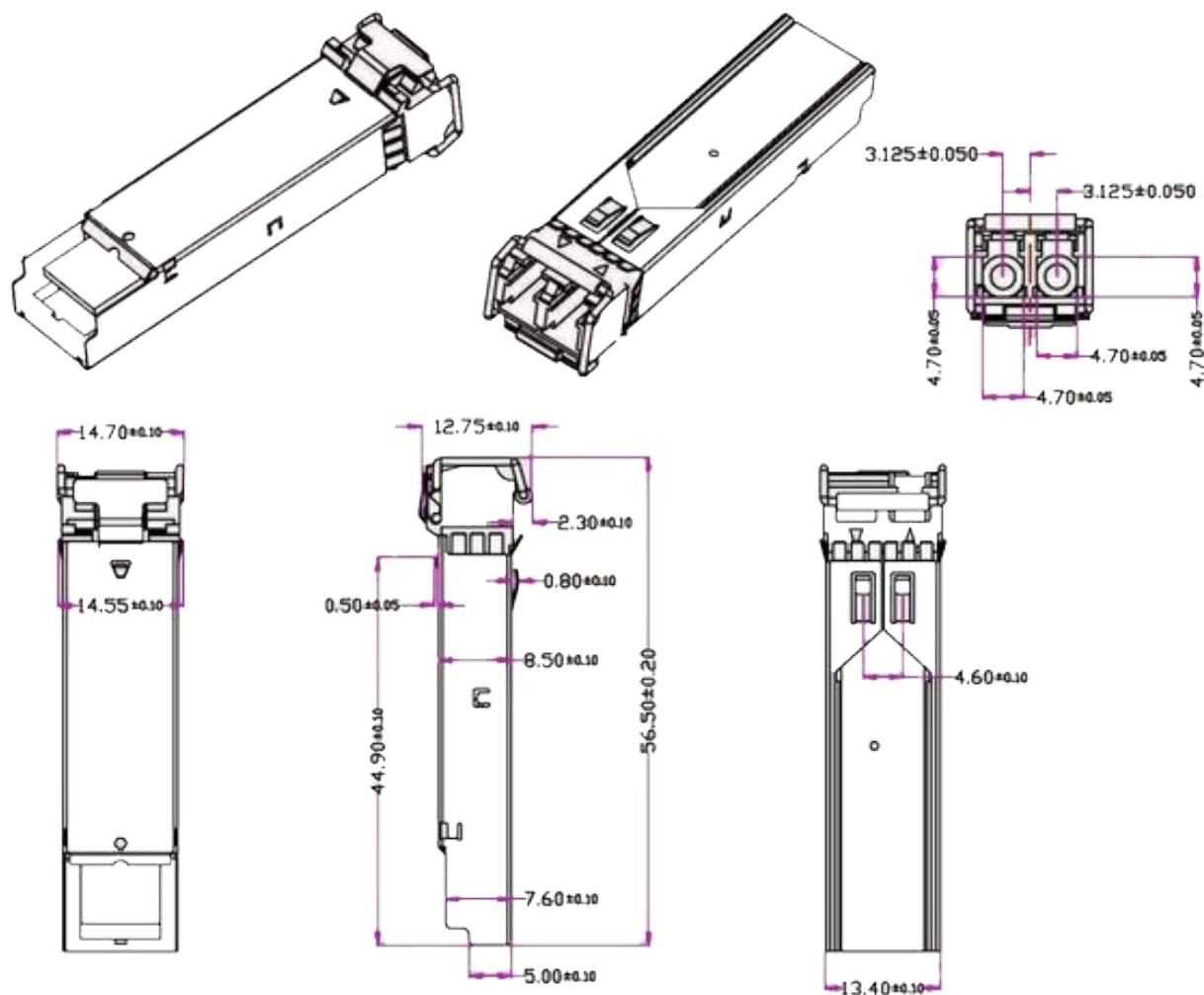


Figure 5, mechanical diagram

## Order Information

Table 6-order information

Part Number	Product Description
SFP-LH-2	SFP 1310nm,1.25G, 2KM, NO DDM ,0°C~70°C
SFP-LH-2I	SFP 1310nm,1.25G, 2KM, NO DDM , -40°C~85°C
SFP-LH-2D	SFP 1310nm,1.25G, 2KM, DDM ,0°C~70°C
SFP-LH-2ID	SFP 1310nm,1.25G, 2KM, DDM , -40°C~85°C
SFP-LH-220	SFP 1310nm,1.25G, 20KM, NO DDM ,0°C~70°C
SFP-LH-220I	SFP 1310nm,1.25G, 20KM, NO DDM , -40°C~85°C
<b>SFP-LH-220D</b>	<b>SFP 1310nm,1.25G, 20KM, DDM ,0°C~70°C</b>
SFP-LH-220ID	SFP 1310nm,1.25G, 20KM, DDM , -40°C~85°C
SFP-LH-240	SFP 1310nm,1.25G, 40KM, NO DDM ,0°C~70°C
SFP-LH-240I	SFP 1310nm,1.25G, 40KM, NO DDM , -40°C~85°C
SFP-LH-240D	SFP 1310nm,1.25G, 40KM, DDM ,0°C~70°C
SFP-LH-240ID	SFP 1310nm,1.25G, 40KM, DDM , -40°C~85°C
SFP-ZX-240	SFP 1550nm,1.25G, 40KM, NO DDM ,0°C~70°C

SFP-ZX-240I	SFP 1550nm,1.25G, 40KM, NO DDM , -40°C~85°C
SFP-ZX-240D	SFP 1550nm,1.25G, 40KM, DDM ,0°C~70°C
SFP-ZX-240ID	SFP 1550nm,1.25G, 40KM, DDM , -40°C~85°C
SFP-ZX-80	SFP 1550nm,1.25G, 80KM, NO DDM ,0°C~70°C
SFP-ZX-280I	SFP 1550nm,1.25G, 80KM, NO DDM , -40°C~85°C
SFP-ZX-280D	SFP 1550nm,1.25G, 80KM, DDM ,0°C~70°C
SFP-ZX-280ID	SFP 1550nm,1.25G, 80KM, DDM , -40°C~85°C
SFP-SX-2	SFP 850nm,1.25G, 550M, NO DDM ,0°C~70°C
SFP-SX-2D	SFP 850nm,1.25G, 550M, DDM ,0°C~70°C

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