155Mbps 1310nm 20km SFP Optical Transceiver Module

S-SP5M31L20-xD

Features

- Hot-pluggable
- 155Mbps operation
- +3.3V single power supply
- High-performance and cost-effective
- 1310nm LD and PIN photodetector for 20km trans-mission
- Compliant with SFP MSAand SFF-8472 with duplex LC receptacle
- Digital Diagnostic Monitoring
- Compatible with SONET OC-3
- Operating case temperature:0 to +70°C
  -40 to +85°C
- RoHS compliant (lead free)

Applications

- Fast Ethernet
- Fiber Channel
- Switch to Switch interface
- Switched backplane applications
- Router/Server interface
- Other optical transmission systems

Description

SFP transceivers are high performance, cost effective modules supporting 155Mbps and 20km transmission distance with SMF.

The transceiver consists of three sections: a 1310nm LD transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA).SFP modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	Vcc	-0.5		4	V
Storage Temperature Range	Ts	-40		85	°C
Relative Humidity - Storage	RH_S	0		95	%
Relative Humidity - Operating	RH_O	0		85	%

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Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature Range	Tc	0	-	70	°C
		-40	-	85	
Power Supply Voltage	V_{cc}	3.14	3.3	3.47	V
Supply Current	I_{cc}	-	-	300	mA
Data Rate	BR	-	155	-	Mbps

Electrical Characteristics

Transmitter Electrical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Differential Input Voltage Swing	V_{IN}	400	-	2000	mV
Tx Differential Input Impendence	Z_{IN}	-	100	-	Ω
Transmitter Disable Voltage	V_{DIS}	2.0	-	V_{CC}+0.3	V
Transmitter Enable Voltage	V_{EN}	0	-	0.8	V
T_{FAULT} Logic High	V_{TFH}	2.4	-	V_{CC}	V
T_{FAULT} Logic Low	V_{TFL}	V_{EE}	-	V_{EE}+0.4	V
Receiver Electrical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Differential output Voltage Swing	V_{OUT}	400	-	1000	mV
Rx Differential Output Impendence	Z_{OUT}	-	100	-	Ω
LOS Assert Voltage	V_{LOSA}	2.4	-	V_{CC}	V
LOS De-assert Voltage	V_{LOSD}	V_{EE}	-	V_{EE}+0.4	V

Optical Characteristics

Transmitter Characteristics						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Notes**
Laser Type			LD			
Data Rate	-	-	155	-	Mb/s	
Center Wavelength Range	λ	1260	1310	1360	nm	
RMS Spectral Width	Δλ	-	-	4	nm	
Average Launch power of OFF transmitter	P_{OFF}	-	-	-40	dBm	
Launch Optical Power	Pout	-15	-	-8	dBm	1
Extinction Ratio	ER	8.2	-	-	dB	

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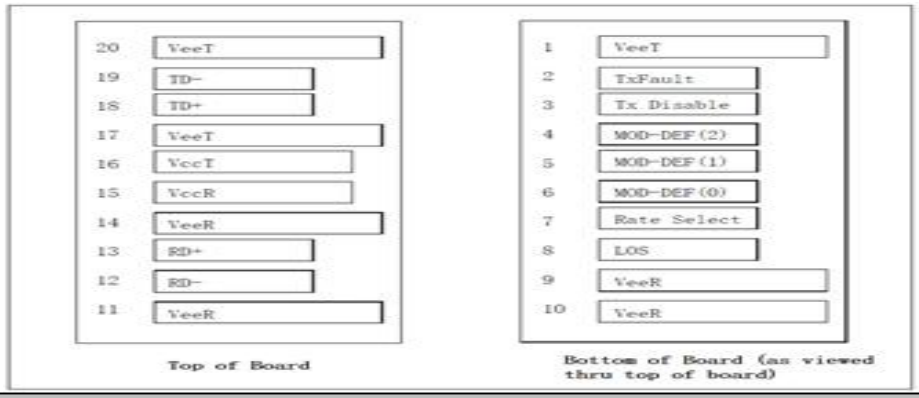
S-SP5M31L20-xD

Receiver Characteristics						
Receiver Type		PIN				
Data Rate	-	-	155	-	Mb/s	
Operating Central Wavelength	λ	1260	-	1610	nm	
Receiver Sensitivity	Sen	-	-	-31	dBm	2
Receiver Overload	P_{SAT}	-8	-	-	dBm	
LOS Assert	LOSA	-45	-	-	dBm	
LOS De-Assert	LOSD	-	-	-31	dBm	
LOS Hysteresis	LOSH	0.5	3	5	dB	
Notes						
1. The optical power is launched into SMF. 2. Measured with 2^{23}-1 PRBS@155Mbps,BER<10^{-10}						

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Bit Rate	BR	-	155	-	Mb/s	
Bit Error Ratio	BER	-	-	10^{-10}		

Pin Definitions



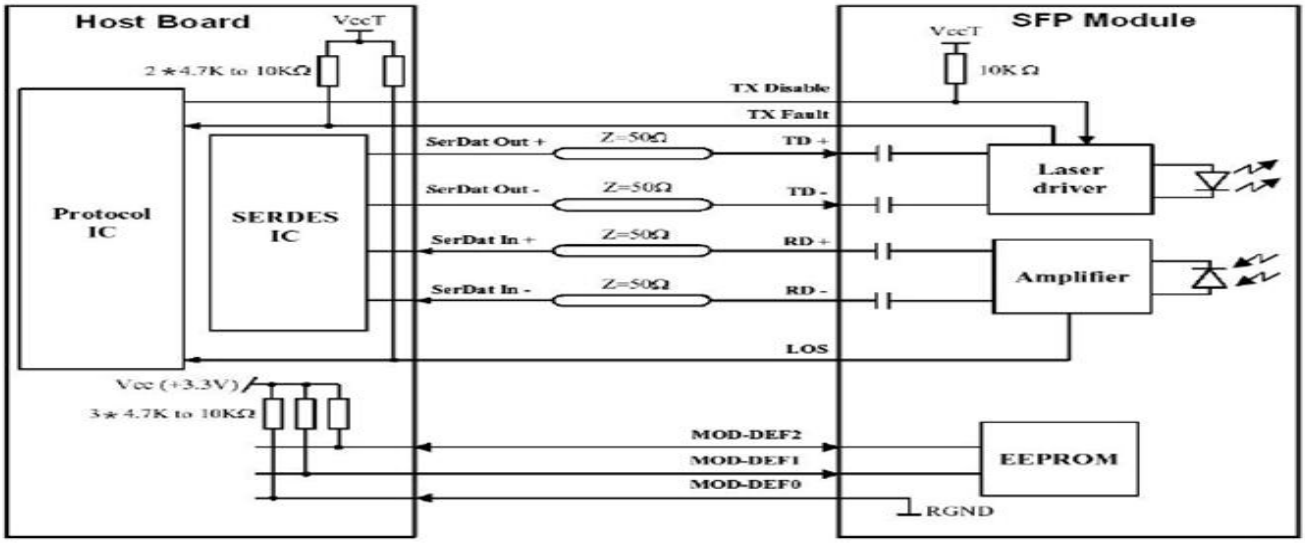
PIN Assignment			
PIN	**Symbol**	**Description**	**Notes**
1	V_{EET}	Transmitter Ground	
2	Tx_FAULT	Transmitter Fault	1
3	Tx_DIS	Transmit Disable	1
4	MOD_DEF 2	Serial Data	1

5	MOD_DEF 1	Clock Signal	1
6	MOD_DEF 0	Interface Digital Ground	
7	Rate Select	Not Connected	
8	Rx_LOS	Receiver Loss of Signal	1
9	V_{EER}	Receiver Ground	
10	V_{EER}	Receiver Ground	
11	V_{EER}	Receiver Ground	
12	RD-	Rx_Data Output (Inverted)	
13	RD+	Rx_Data Output (Non Inverted)	
14	V_{EER}	Receiver Ground	
15	V_{CCR}	Receiver DC Power	
16	V_{CCT}	Transmitter DC Power	
17	V_{EET}	Transmitter Ground	
18	TD+	Tx_Data Input (Non Inverted)	
19	TD-	Tx_Data Input (Inverted)	
20	V_{EET}	Transmitter Ground	

Notes

1. The uncommitted Tx_Fault, Rx_LOS, MOD_DEF 1 and MOD_DEF 2 LVTTL monitor and control pins each require a pull up resistor of 4.7k to 10k Ohms on the host board.

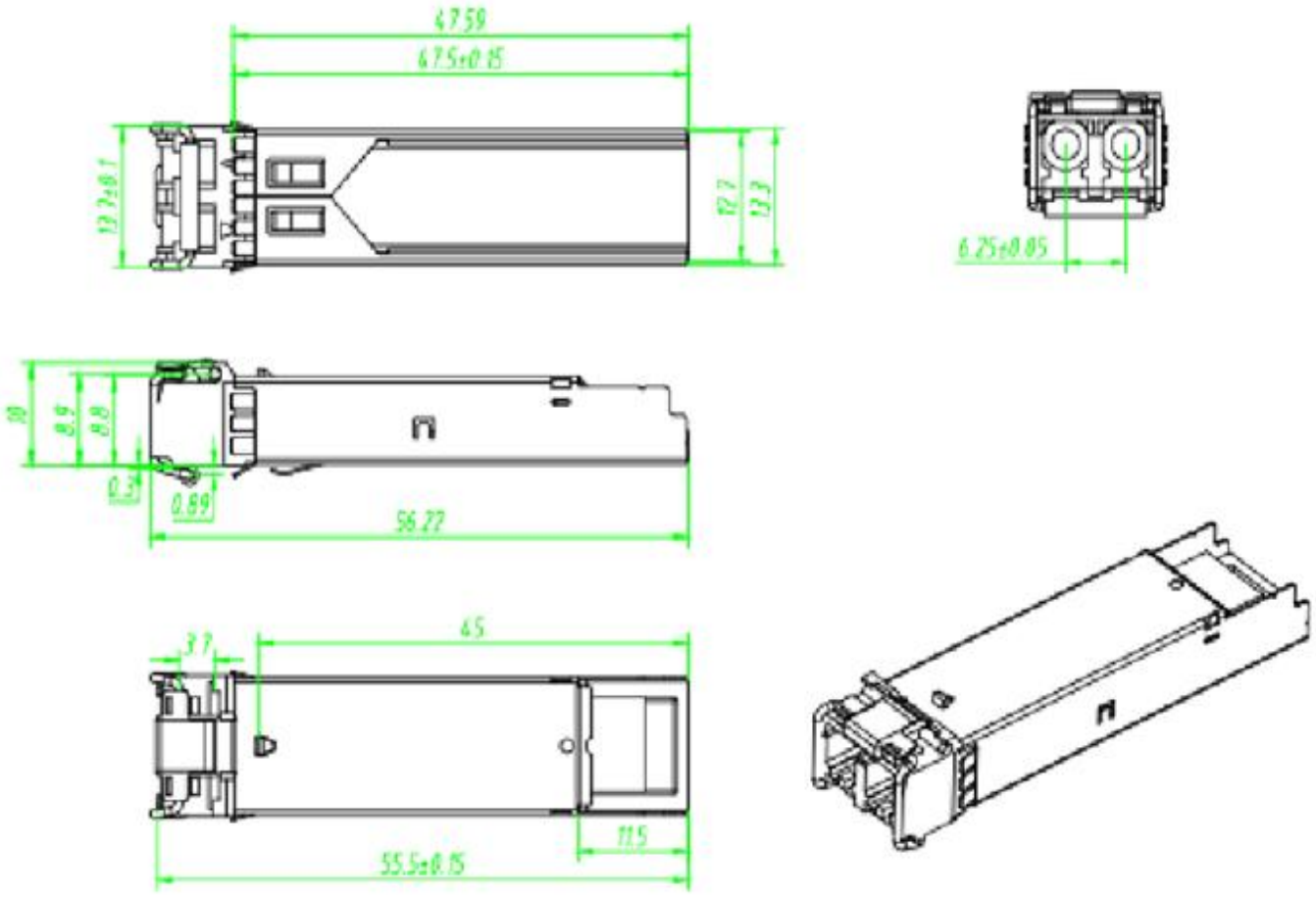
Recommended Interface Circuit



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Mechanical Dimensions



Ordering information

Part Number	Product Description
S-SP5M31L20-CD	SFP, 155Mbps, 1310nm,SM, 20km, 0ºC~+70ºC, With DDM
S-SP5M31L20-ID	SFP, 155Mbps, 1310nm,SM, 20km, -40ºC~+85ºC, With DDM