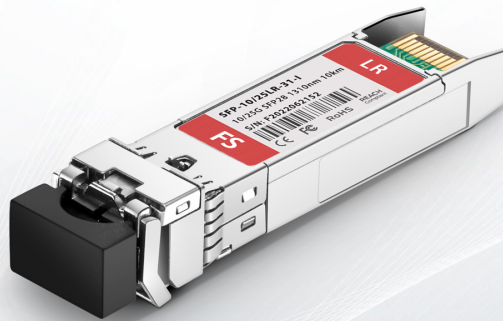


10/25GBASE-LR SFP28 1310nm 10km Duplex LC Transceiver

SFP-25GMLR-31-I



Application

- 25G BASE-LR Ethernet
- 10G Ethernet

Standards

- SFF-8472
- SFF-8402
- SFF-8431
- SFF-8432
- CEI-28G-VSR

Features

- Supports 25.78Gb/s Bit Rate
- 1310nm DFB Transmitter and PIN PD Receiver
- Up to 10 km Transmission Distance
- LC Duplex Connector
- Low Power Consumption < 1.5W
- -45 to 85°C Operating Temperature Range
- Single 3.3V ± 5% Power Supply
- Compliant with SFF-8472

Product Description

10G/25G LR is a 1310nm DFB laser based 25Gb/s SFP28 transceiver. It is designed to transmit and receiver optical data up to 10km over single mode fiber. The transceiver is compliant with SFF-8472, SFF-8402, SFF-8432 and applicable portions of SFF-8431. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

Product Specifications

I. Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device.

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature Range	T_S	-45	85	°C
Relative Humidity	RH	0	85	%
Supply Voltage	V_{CC}	-0.3	3.6	V

II. Recommended Operating Conditions

Parameter	Symbol	Unit	Min.	Typical	Max.
Operating Case Temperature Range	T_C	°C	-45		80
Power Supply Voltage	V_{CC}	V	3.14	3.3	3.46
Bit Rate	BR	Gb/s		25.78	
Max. Supported Link Length	L	km			10

III. Electrical Characteristics

Parameter	Symbol	Unit	Min.	Typical	Max.	Note
Supply Voltage	V _{CC}	V	3.14	3.3	3.46	
Supply Current	I _{CC}	mA			360	@3.3V
Transmitter						
Input Differential Impedance	R _{IN}	Ω		100		
Single Ended Data Input Swing	V _{IN}	mVp-p	90		450	
Transmit Disable Voltage	V _{DIS}	V	2		V _{CC} HOST	
Transmit Enable Voltage	V _{EN}	V	V _{EE}		V _{EE} +0.8	
Transmit Fault Assert Voltage	V _{FA}	V	2.2		V _{CC} HOST	
Transmit Fault De-Assert Voltage	V _{FDA}	V	V _{EE}		V _{EE} +0.4	
Receiver						
Single Ended Data Output Swing	V _{OD}	mVp-p	200		450	
LOS Fault	V _{LOSFT}	V	2.2		V _{CC} HOST	
LOS Normal	V _{L-OSNR}	V	V _{EE}		V _{EE} +0.4	

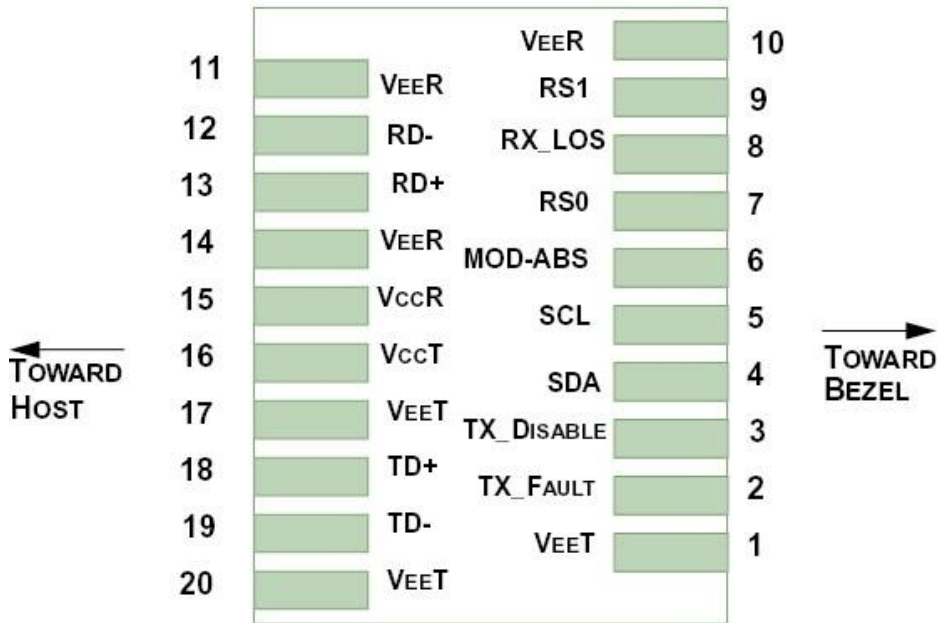
IV. Optical Characteristics

Parameter	Symbol	Unit	Min.	Typical	Max.	Note
Transmitter						
Nominal Wavelength	λ	nm	1295	1310	1325	
Spectral Width	DI	nm			1	
Optical Modulation Amplitude	POMA	dBm			-12	
Optical Output Power	Pav	dBm	-7		2.5	
Extinction Ratio	ER	dB	3			
Transmitter and Dispersion Penalty	TDP	dB			2.7	
Average Launch Power of OFF Transmitter	POFF	dBm			-30	
Receiver						
Center Wavelength	λ	nm	1260	1310	1360	
Average Receiver Power	PAVG	dBm	-7		2.5	1
Stressed Receiver Sensitivity (OMA)	RSENSE	dBm	-8		1	2
Receiver Reflectance	RREFL	dB			-12	
Assert LOS	LOSA	dBm	-30			
De-Assert LOS	LOSD	dBm			-15	
LOS Hysteresis		dB	0.5			

Notes

1. Template: {0.31, 0.40, 0.45, 0.34, 0.38, 0.40}, Hit Ratio: 5E-5.

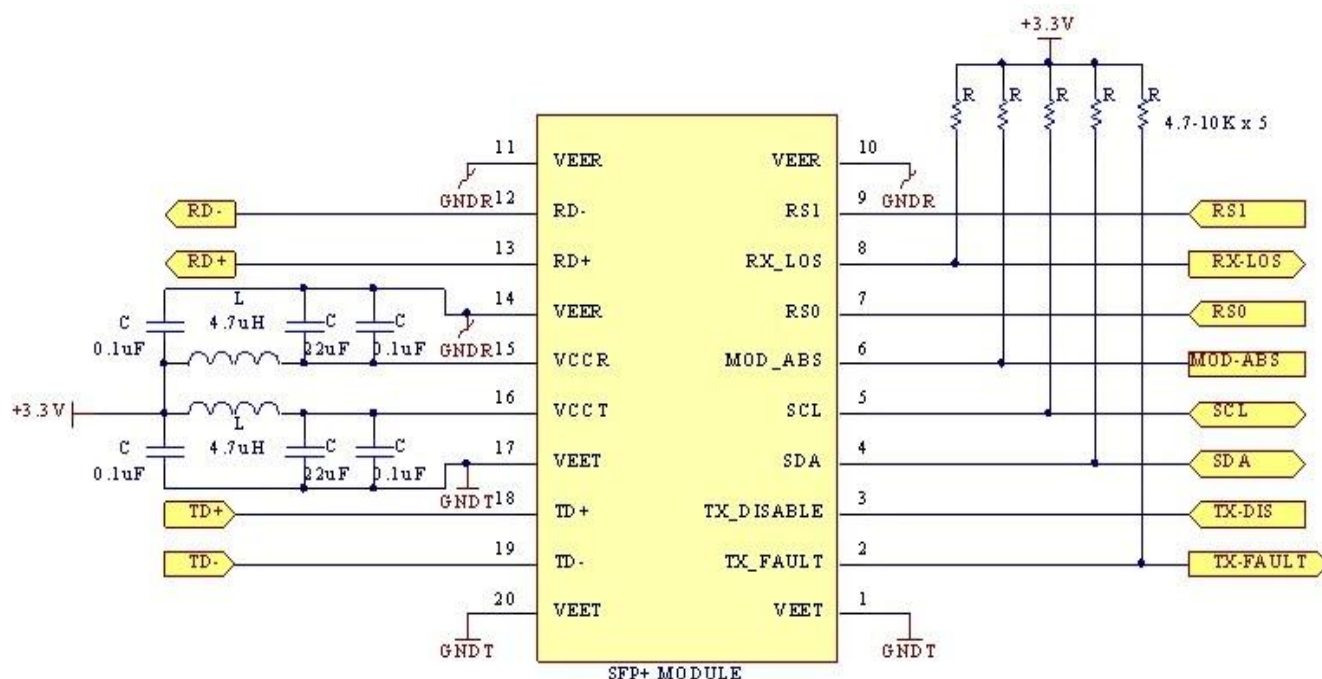
V. Pin Function Description



Pin	Symbol	Name	Description
1,17,20	V _{EE} T	Transmitter Signal Ground	These Pins Should Be Connected to Signal Ground On The Host Board.
2	TX Fault	Transmitter Fault Out (OC)	Logic "1" Output = Transmitter Fault Logic "0" Output = Normal Operation This Pin Is Open Collector Compatible, And Should Be Pull Up To Host V _{CC} with A 10kΩ Resistor.
3	TX Disable	Transmitter Disable In (LVTTTL)	Logic "1" Input (or No Connection) = Laser off Logic "0" Input = Laser on This Pin is Internally Pulled Up to V _{CC} T with a 10kΩ Resistor.
4	SDA		
5	SCL	Module Definition Identifiers	Serial ID With SFF8472 Diagnostics Module Definition Pins Should Be Pulled Up To Host V _{CC} With 10 KΩ Resistors.
6	MOD_ABS		
7	RS0	Receiver Rate Select (LVTTTL) Transmitter Rate Select (LVTTTL)	NA
9	RS1		
8	LOS	NA	5
10,11,14	V _{ee} R	Receiver Signal Ground	These Pins Should Be Connected to Signal Ground on the Host Board.

Pin	Symbol	Name	Description
12	RD-	Receiver Negative DATA Out (CML)	Light On = Logic "0" Output Receiver Data Output Is Internally AC Coupled and Series Terminated With A 50Ω Resistor.
13	RD+	Receiver Positive DATA Out (CML)	Light On = Logic "1" Output Receiver Data Output Is Internally AC Coupled and Series Terminated with A 50Ω Resistor.
15	V _{CC} R	Receiver Power Supply	This Pin Should Be Connected To A Filtered 3.3v Power Supply On The Host Board. See the Recommended Operating Conditions Table.
16	V _{CC} T	Transmitter Power Supply	This Pin Should Be Connected To A Filtered 3.3v Power Supply On The Host Board. See the Recommended Operating Conditions Table.
18	TD+	Transmitter Positive DATA In (CML)	Logic "1" Input = Light On Transmitter Data Inputs Are Internally AC Coupled and Terminated With A Differential 100Ω Resistor.
19	TD-	Transmitter Negative DATA In (CML)	Logic "0" Input = Light On Transmitter Data Inputs Are Internally AC Coupled and Terminated With A Differential 100Ω Resistor.

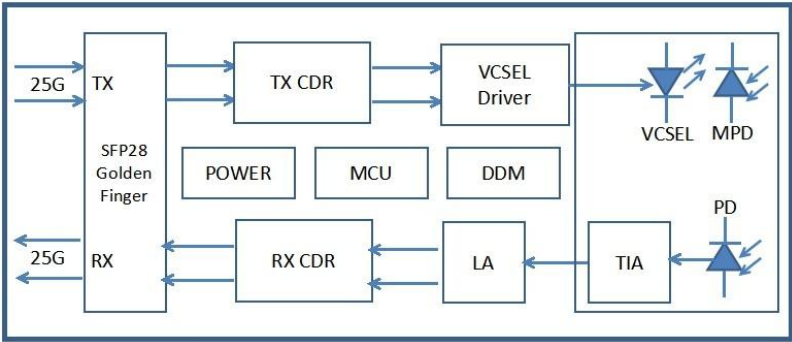
VI. Typical Application Circuit



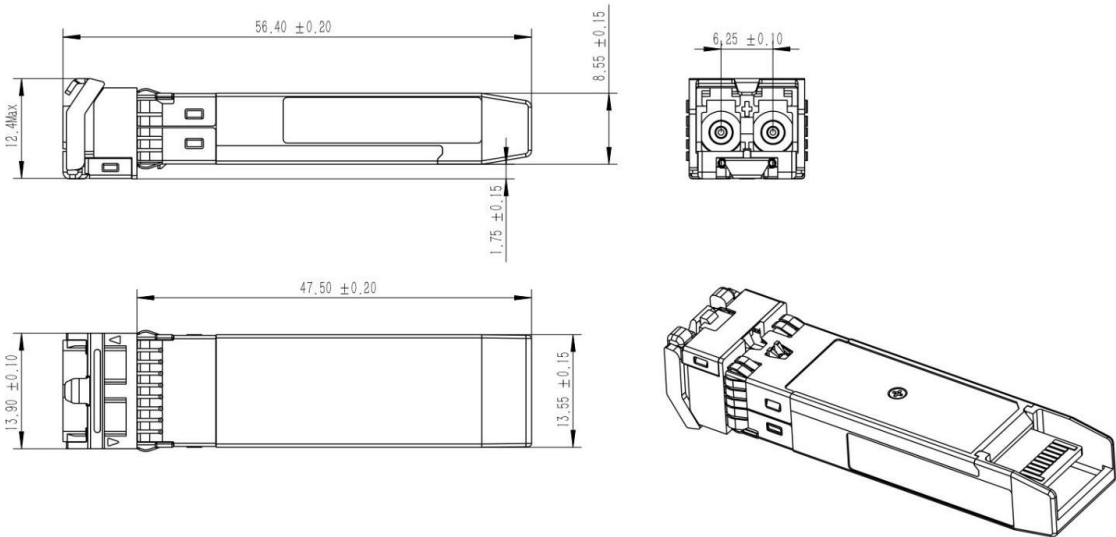
VII. Regulatory Compliance

Feature	Test Method	Performance
Lectrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C Method 3015.7	Class 1 (> 1500 Volts)
Electrostatic Discharge (ESD) Immunity	Variation of IEC 61000-4-2	LV 4(Air discharge :15KV; Contact Discharge:8 KV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B EN55022 Class B FCC Class B	Compliant with Standards
Immunity	IEC61000-4-3 Class 2 EN55024	Typically Show No Measurable Effect From a 3V/m Field Swept From 80 to 1000MHz Applied to the Transceiver without a Chassis Enclosure.

VIII. Principle Diagram



IX. Diagram Mechanical Drawing



Unit: mm
Unspecified Tolerance: ±0.2mm

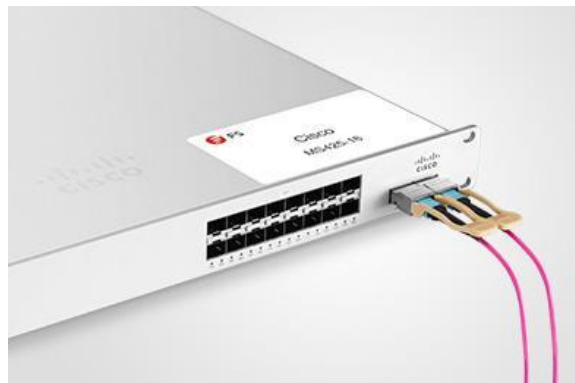
Test Center

I. Compatibility Testing

Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force10 S60-44T

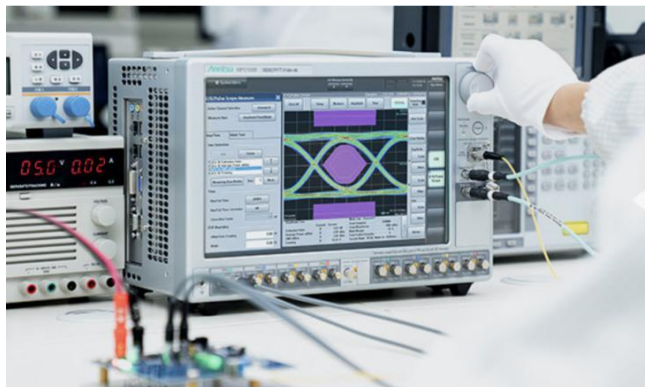


HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the Test Bed PDF. It will be updated in real time as we expand our portfolio.

II. Performance Testing

Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.



1. TX/RX Signal Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator to ensure the input and output signal quality.

- Eye Pattern Measurements: jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve

2. Reliability and Stability Testing

Subject the transceivers to dramatic changes in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0 °C to 70 °C
- Extended: -5 °C to 85 °C
- Industrial: -40 °C to 85 °C



3. Transfer Rate and Protocol Testing

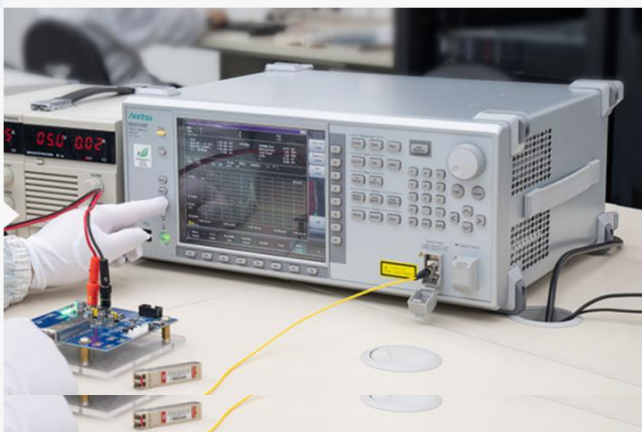
Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI

4. Optical Spectrum Evaluation

Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width



Order Information

Part Number	Description
SFP-25GSR-85	25G SFP28 850nm 100m DOM Transceiver
SFP-25GLR-31	25G SFP28 1310nm 10km DOM Transceiver
SFP-25GERL-31	25G SFP28 1310nm 30km DOM Transceiver
SFP-25GER-31	25G SFP28 1310nm 40km DOM Transceiver
SFP-25GSR-85-I	25G SFP28 850nm 100m Industrial DOM Transceiver
SFP-25GLR-31-I	25G SFP28 1310nm 10km Industrial DOM Transceiver
SFP-25GERL-31-I	25G SFP28 1310nm 30km Industrial DOM Transceiver
SFP-25GER-31-I	25G SFP28 1310nm 40km Industrial DOM Transceiver
SFP-25GMSR-85	10/25GBASE-SR SFP28 850nm 100m Transceiver
SFP-25GESR-85	25GBASE-ESR SFP28 850nm 300m DOM Transceiver
SFP-25GMLR-31	10/25GBASE-LR SFP28 1310nm 10km DOM Transceiver
SFP-25GMLR-31-I	10/25GBASE-LR SFP28 1310nm 10km DOM Transceiver