

25GBASE-LR SFP28 1310nm 20km Industrial DOM Transceiver

SFP-25GELR-31-I



Application

- 25GbE
- CPRI
- Other Optical Links

Standards

- SFF-8402
- SFF-8472
- MSA SFP+

Features

- Compliant with MSA SFP+ Specification SFF-8402
- Monitoring Interface Compliant with SFF-8472
- Single +3.3V Power Supply
- Hot-Pluggable
- Built-in Dual CDR
- Support 25.78 Gb/s Data Links
- Up to 20km on 9/125um SMF
- Operating Case Temperature: -40~+85
- Very Low EMI and Excellent ESD Protection
- Power Dissipation < 1.2W
- RoHS Compliant Products

Description

25G LR 20KM-I is a SFP28 module for duplex optical data communications support 25.78Gb/s data links. It use the SFP+ 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I2C. It has built-in dual clock and data recovery (CDR).This module is designed for single-mode fiber and operates at a nominal wavelength of 1310nm.The transmitter section uses a high performance 1310nm DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector pre-amplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

I. Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	T _S	°C	-40	85
Relative Humidity	RH	%	0	95
Input Voltage	V _{CC}	V	0	4

II. Recommended Operating Conditions

Parameter	Symbol	Unit	Min.	Typ.	Max.
Operating Case Temperature Range	T _C	°C	-40		85
Supply Voltage	V _{CC}	V	3.135	3.3	3.465
Bit Rate	BR	Gb/s		25.78125	
Max Supported Link Length	L	km			20

III. Electrical Characteristics

Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
Power Dissipation		W			1.2	
Transmitter						
Input Differential Impedance	R _{IN}	Ω		100		
Single Ended Data Input Swing	V _{IN}	mVp-p	90		450	
Tx_Disable Input Voltage – Low	V _{IL}	V	-0.3		0.8	
Tx_Disable Input Voltage – High	V _{IH}	V	2.0		V _{CC} +0.3	
Tx_Fault Output Voltage – Low	V _{OL}	V	-0.3		0.8	
Tx_Fault Output Voltage – High	V _{OH}	V	2.0		V _{CC} +0.3	
Receiver						
Output Impedance (Differential)	Z _{out}	V		100		
Rx_LOS Output Voltage- Low	V _{OL}	V	-0.3		0.8	
Rx_LOS Output Voltage- High	V _{OH}	V	2.0		V _{CC} +0.3	

IV. Optical Transmitter/Receiver Characteristics

Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
Transmitter						
Center Wavelength	λ	nm	1295	1310	1325	
Data Rate	B	Gb/s		25.78		
Output Spectral Width	$\lambda(-20\text{dB})$	nm			1	
Average Output Power*Note1	P _o	dBm	-7		2	
Extinction Ratio*Note2	ER	dB	3.5			
Transmitter and Dispersion Penalty	TDP	dB			3.2	
Receiver						
Operating Wavelength	λ	nm	1260		1355	
Overload		dBm	2			
Receiver Sensitivity (OMA)	P _{OMA}	dBm			-11.3	
Optical Return Loss	ORL	dB			-26	
Signal Detect Threshold-De-Assert	S _D	dBm			-14	
LOS Hysteresis		dB	0.5			

Note 1: Measured with 9/125μm single-mode fiber.
Note 2: Measured with a PRBS 2^31-1 test pattern @25.78Gb/s

V. Pin Configuration

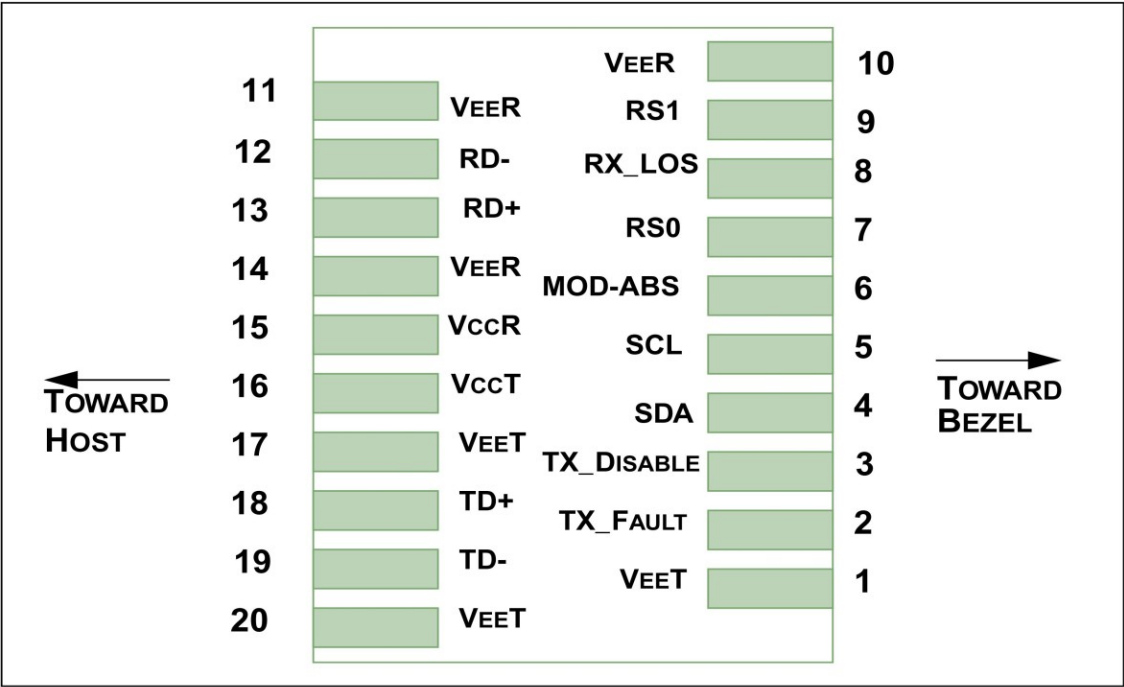


Figure 1 Host PCB SFP+ Pad Pinout Top View

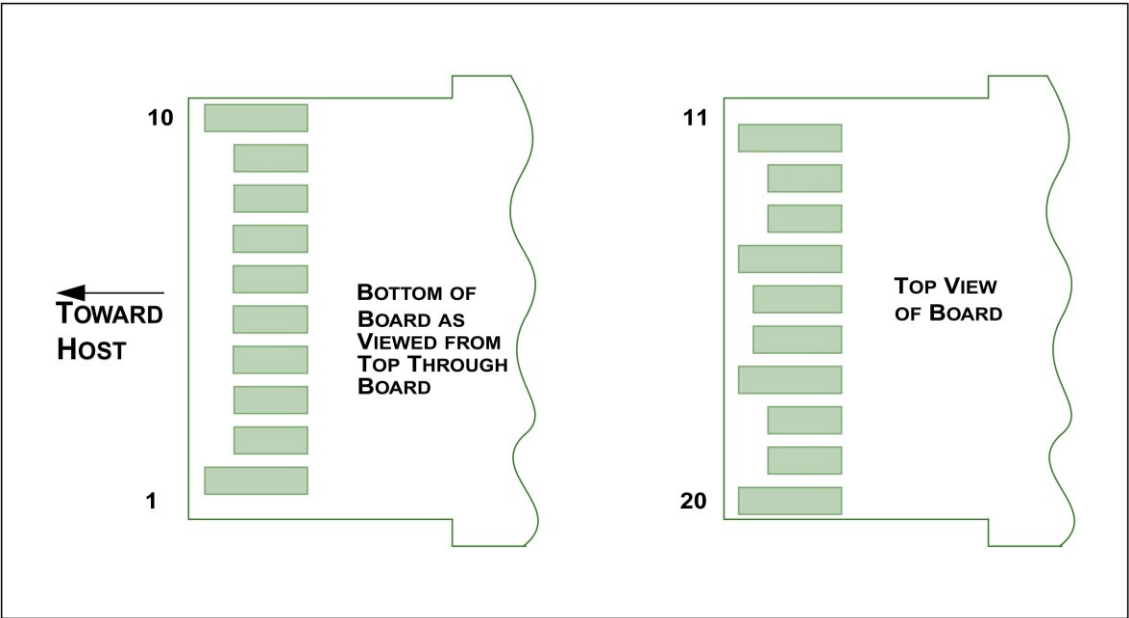
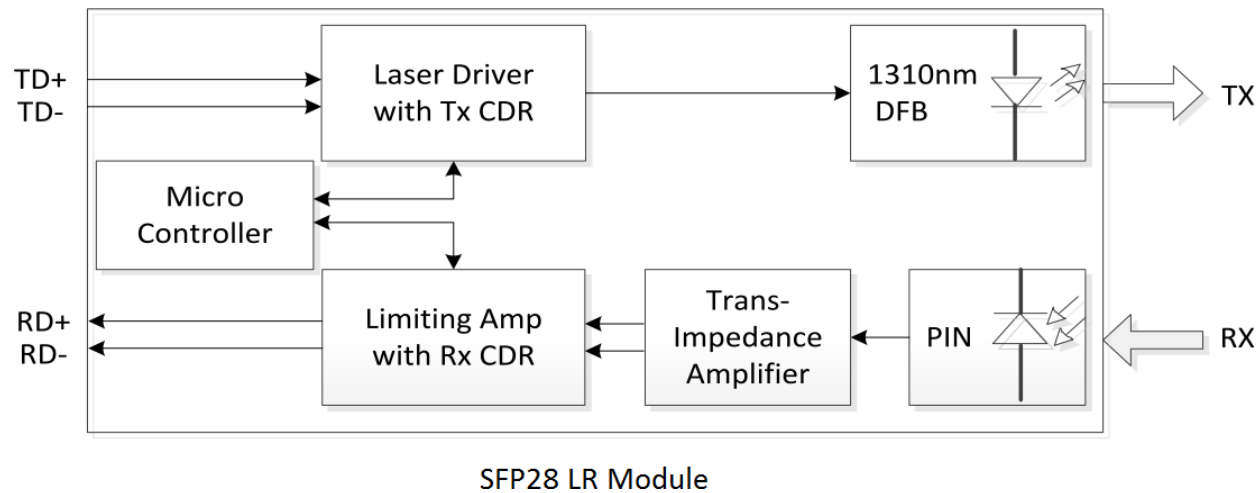


Figure 2 SFP+ Module PCB Pinout

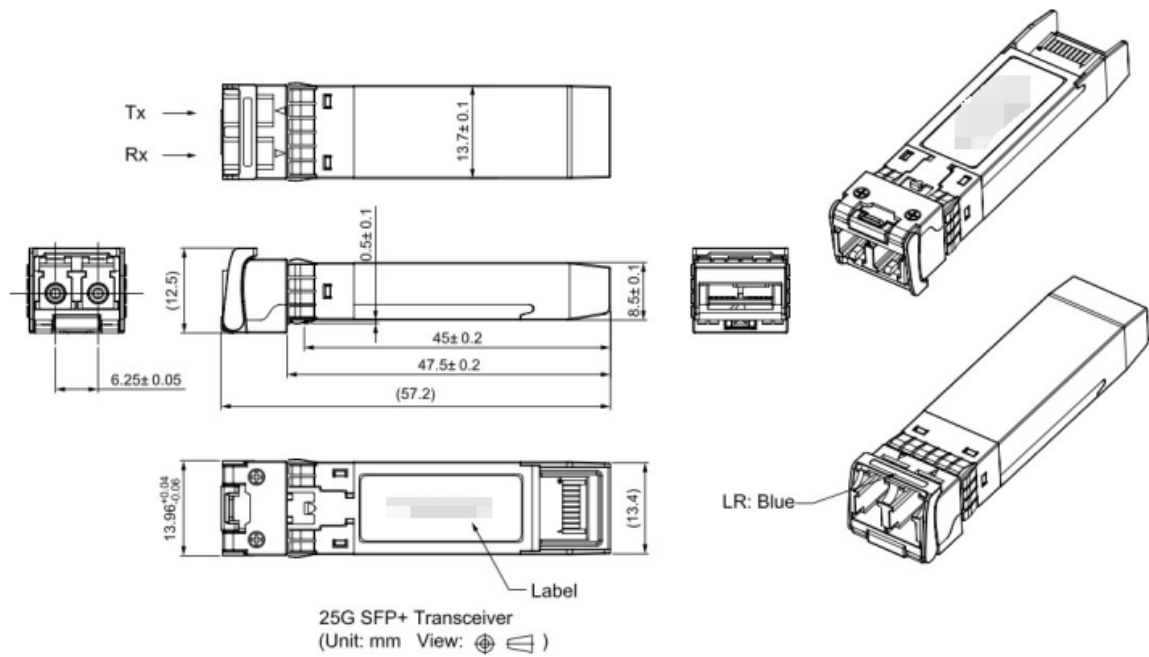
VI. Transceiver Pin Descriptions

Pin No.	Symbol	Logic	Description
1,20	V _{EE} T		Transmitter Ground(Common with Receiver Ground)
2	TX Fault	LVTTTL Output	Transmitter Fault. Low normal operation, High Fault indication
3	TX Disable	LVTTTL Input	Transmitter Disable. Laser output disabled on high or open
4	SDA	LVTTTL Input/Output	Module Definition 2.Data line for Serial ID
5	SCL	LVTTTL Input/Output	Module Definition 1.Clock line for Serial ID
6	MOD-ABS		Module Definition 0.Grounded within the module
7	RS0	LVTTTL Input	Rate Select 0, optionally controls SFP28 module receiver. LVTTTL Logic.
8	LOS	LVTTTL Output	Loss of Signal indication. Logic 0 indicates normal operation.
9	RS1	LVTTTL Input	Rate Select 1, optionally controls SFP28 module transmitter. LVTTTL Logic.
10,11,14	V _{EE} R		Receiver Ground(Common with Transmitter Ground)
12	RD-	CML Output	Receiver Inverted DATA out.AC Coupled
13	RD+	CML Output	Receiver Non-inverted DATA out.AC Coupled
15	V _{CC} R		Receiver Power Supply
16	V _{CC} T		Transmitter Power Supply
18	TD+	CML Input	Transmitter Non-inverted DATA in.AC Coupled
19	TD-	CML Input	Transmitter Inverted DATA in.AC Coupled

VII. Principle Diagram



VIII. Mechanical Dimensions



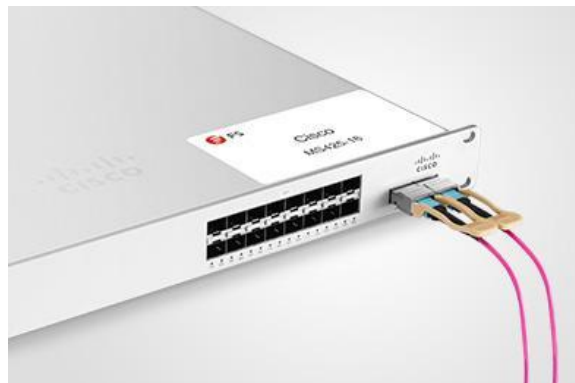
Test Center

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

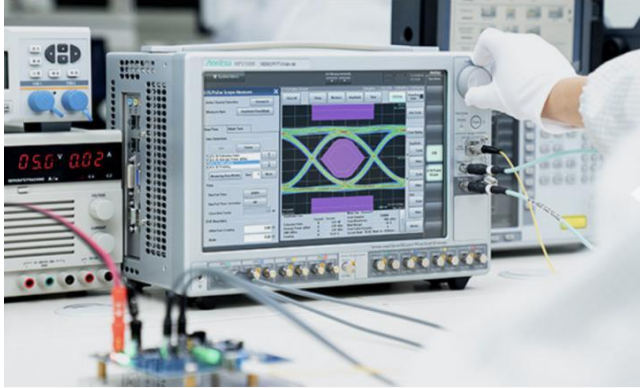


HUAWEI S6720-30L-HI-24S

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.

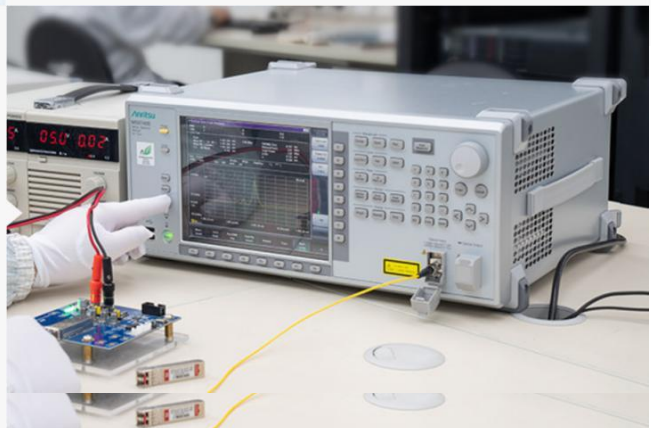
- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI



4. Optical Spectrum Evaluation

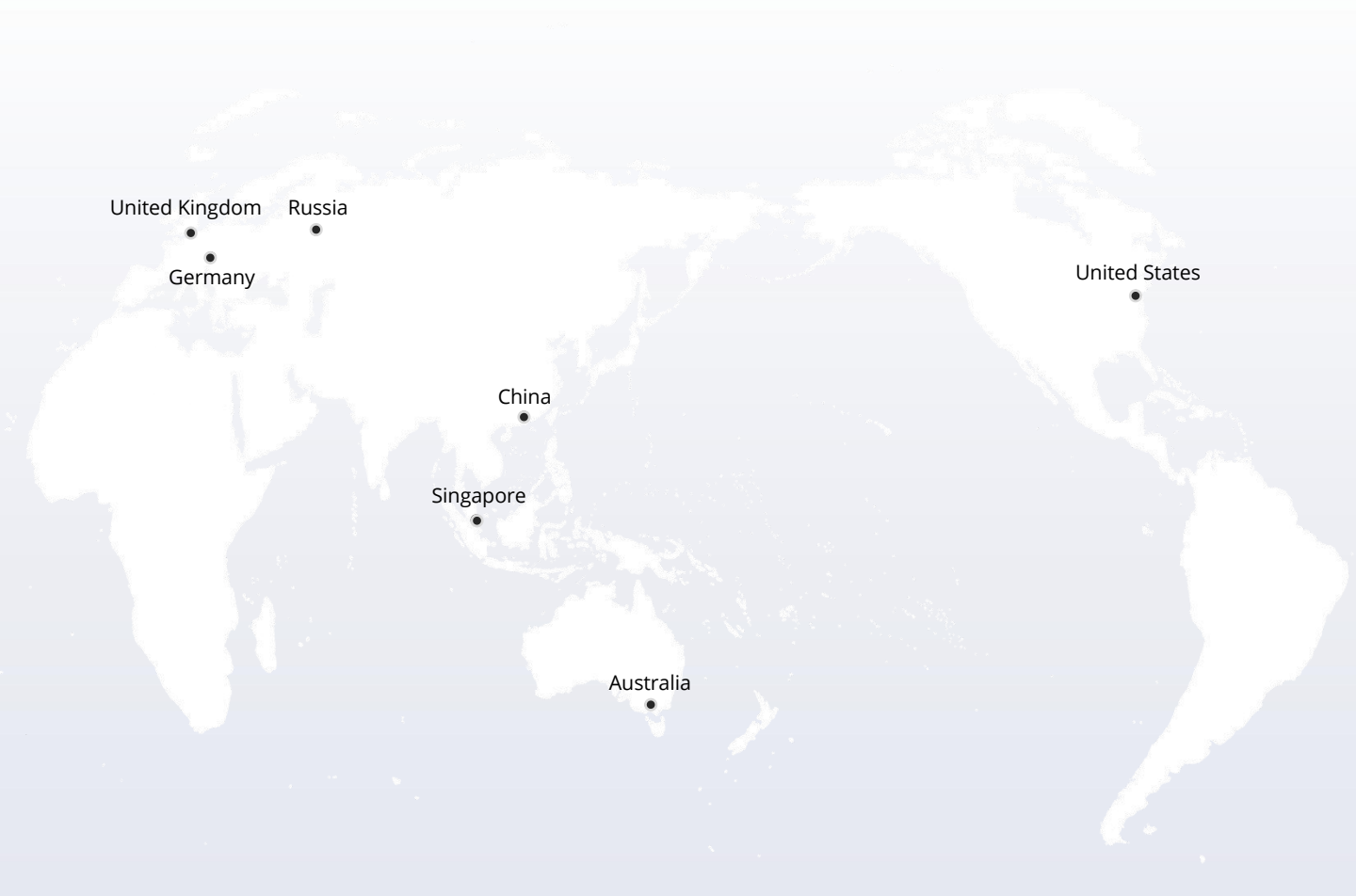
Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

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



Ordering Information

Part Number	Description
SFP-25GSR-85	25G SFP28 850nm 100m DOM TFP28-25GSR-85
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



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