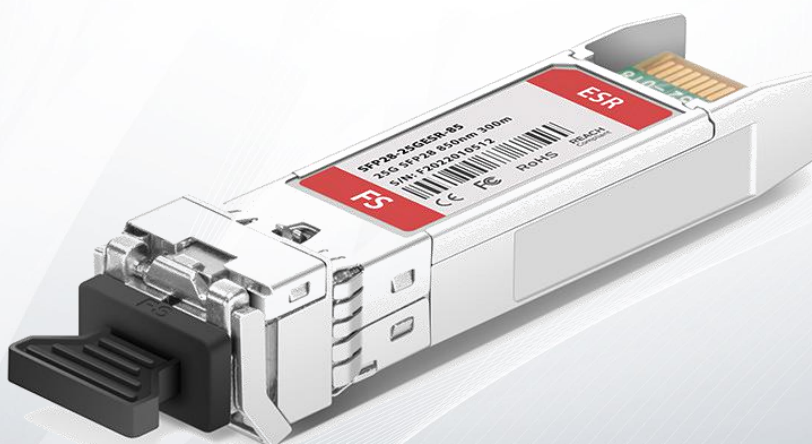


# 25G SFP28 850nm 300m DOM Transceiver

SFP28-25GESR-85



## Application

- Data Center Interconnect
- 25G BASE-ESR Ethernet

## Features

- Supports 25.78Gb/s Bit Rate
- Hot-pluggable SFP28 Footprint
- 850nm VCSEL Laser and PIN Photo-detector
- Internal CDR on Transmitter and Receiver Channel
- Link Lengths at 25.78G 400m over OM4 MMF
- Link Lengths at 25.78G 300m over OM3 MMF
- LC Duplex Connector
- Low Power Consumption < 1W
- RoHS-10 Compliant (lead-free)
- 0°C to 70°C Operating Temperature Range
- Single +3.3V  $\pm$  5% Power Supply
- Programmable TX Input Equalizer
- Programmable RX

Description

The 25G ESR 300M short-wavelength transceiver is designed for using in 25.78Gb/s data rate over multimode fiber. The transceiver is compliant with SFF-8431, and the mechanical SFP28 plug is compatible with SFF-8432. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature Range	T <sub>s</sub>	-40	85	°C
Relative Humidity	RH	0	85	%
Supply Voltage	V <sub>CC</sub>	-0.3	4.0	V

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Case Temperature	T <sub>OPR</sub>	0		70	°C
Power Supply Voltage	V <sub>CC</sub>	3.14	3.3	3.46	V
Bit Rate	BR		25.78		Gb/s
Bit Error Ratio	BER			5*10 <sup>E-5</sup>	
Max Supported Link Length	L			300@OM3 400@OM4	m

III. Electrical Characteristics

Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
Supply Voltage	$V_{CC}$	V	3.14	3.3	3.46	
Supply Current	$I_{CC}$	mA			230	
Transmitter						
Input Differential Impedance	$R_{IN}$	$\Omega$	80	100	120	1
Single Ended Data Input Swing	$V_{IN}$	mVp-p	90		500	
Transmit Disable Voltage	$V_{DIS}$	V	2		$V_{CCHOST}$	
Transmit Enable Voltage	$V_{EN}$	V	$V_{EE}$		$V_{EE}+0.8$	
Transmit Fault Assert Voltage	$V_{FA}$	V	2		$V_{CCHOST}$	
Transmit Fault De-Assert Voltage	$V_{FDA}$	V	$V_{EE}$		$V_{EE}+0.8$	
Receiver						
Single Ended Data Output Swing	$V_{OD}$	mVp-p	200		500	
LOS Fault	$V_{LOSFT}$	V	2		$V_{CCHOST}$	
LOS Normal	$V_{LOSNR}$	V	$V_{EE}$		$V_{EE}+0.8$	

Note:  
1. Differential between TD+ / TD-

IV. Optical Characteristics

Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
Transmitter						
Nominal Wavelength	$\lambda$	nm	840		860	
Spectral Width	DI	nm			0.5	
Optical Modulation Amplitude	P <sub>OMA</sub>	dBm	-4.3		3	
Optical Output Power	P <sub>av</sub>	dBm	-6.4		2.4	
Extinction Ratio	ER	dB	2			
Transmitterand Dispersion Penalty	TDP	dB			5	
Average Launch Power of OFF Transmitter	P <sub>OFF</sub>	dBm			-30	
Receiver						
Center Wavelength	$\lambda$	nm	840		860	
Average Receiver Power	PAVG	dBm	-10.3		2.4	1
Stressed Receiver Sensitivity (OMA)	R <sub>SENSE</sub>	dBm			-5.2	2
Receiver Reflectance	R <sub>REFL</sub>	dB			-12	
Assert LOS	LOS <sub>A</sub>	dBm	-30			
De-Assert LOS	LOS <sub>D</sub>	dBm			-13	
LOS Hysteresis		dB	0.5			

Notes:  
1. Sensitivity for 25.78G PRBS 231-1 and BER better than or equal to 5\*10<sup>-5</sup>.  
2. The stressed sensitivity value in the table is for system level BER measurements which include the effects of CDR circuit.

IV. Pin Function Definitions

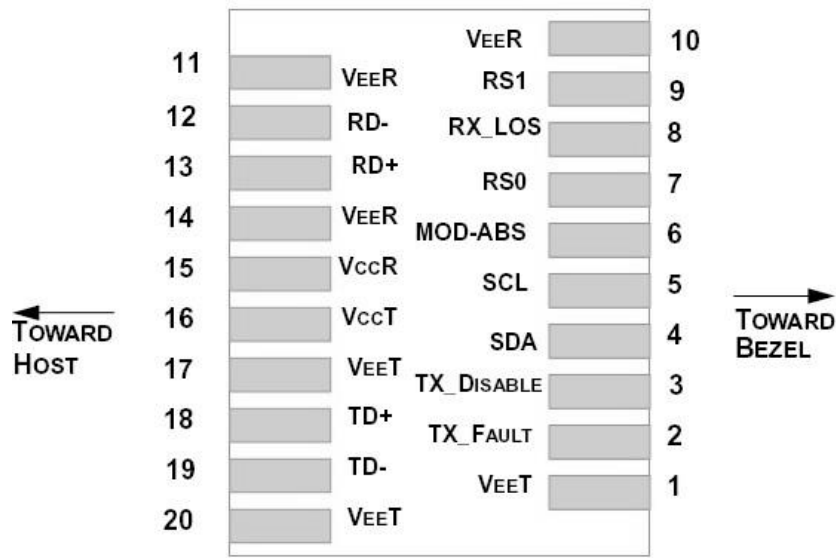


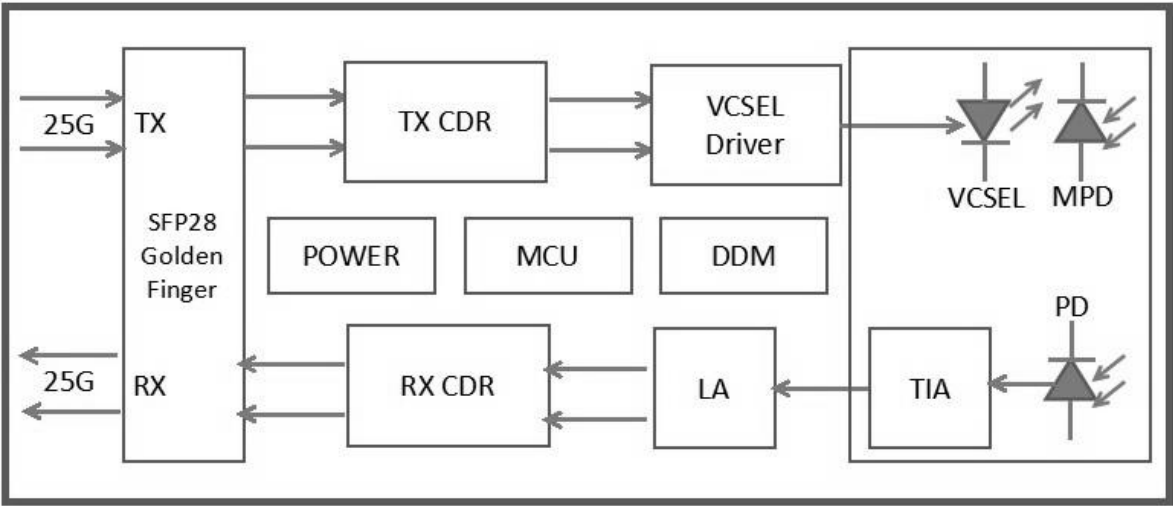
Figure1. Pin Definitions of the Module High Speed Inputs/Outputs

V. Transceiver Pin Descriptions

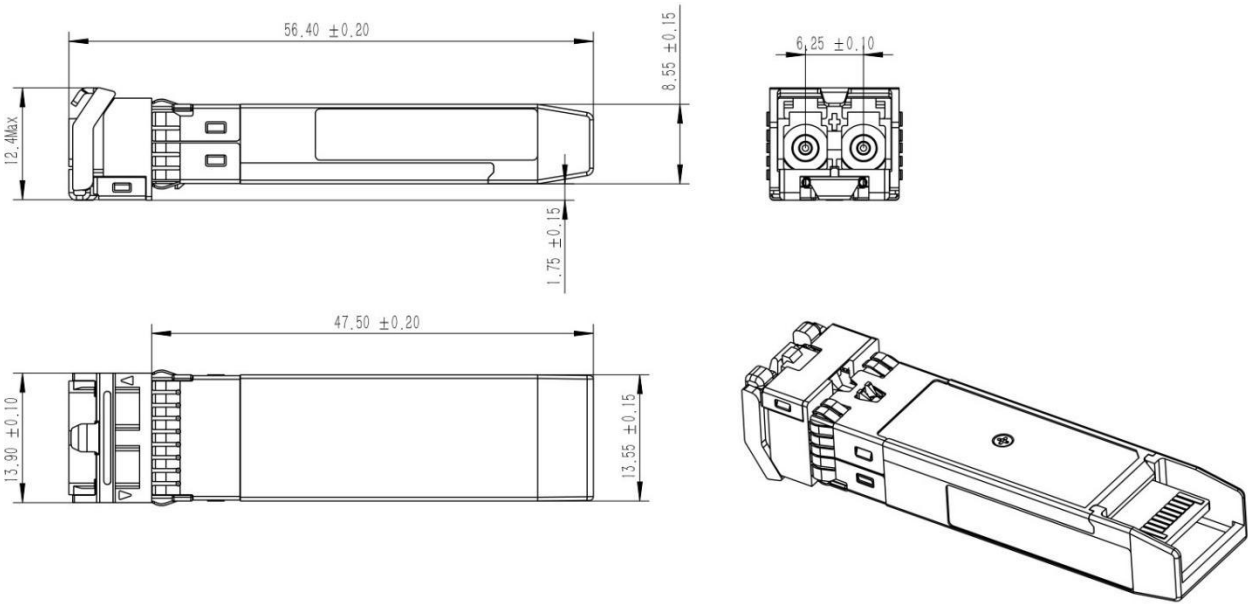
Pin No.	Symbol	Name	Definition
1,17,20	VeeT	Transmitter Signal Ground	These pins should be connected to signal ground on the host board.
2	TX Fault	Transmitter Fault Out (OC)	Logic "1" Output = Transmitter Fault Logic "0" Output = Normal Operation This pin is open collector compatible, and should be pulled up to Host Vcc 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 VccT with a 10kΩ resistor.
4	SDA	Module Definition Identifiers	SerialID with SFF8472 Diagnostics Module Definition pins should be pulled up to Host Vcc with 10kΩ resistors.
5	SCL		
6	MOD-ABS		

Pin No.	Symbol	Name	Definition
7	RS0	Receiver Rate Select (LVTTTL)	NA
9	RS1	Transmitter Rate Select (LVTTTL)	
8	LOS	Loss of Signal Out (OC)	This pin is open collector compatible, and should be pulled up to Host Vcc with a 10kΩ resistor.
10,11,14	VeeR	Receiver Signal Ground	These pins should be connected to signal ground on the host board.
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	VccR	Receiver Power Supply	This pin should be connected to a filtered +3.3V power supply on the host board. See Figure3. Recommended power supply filter
16	VccT	Transmitter Power Supply	This pin should be connected to a filtered +3.3V power supply on the host board. See Figure3. Recommended power supply filter
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. Block Diagram



VII. Diagram Mechanical Drawing



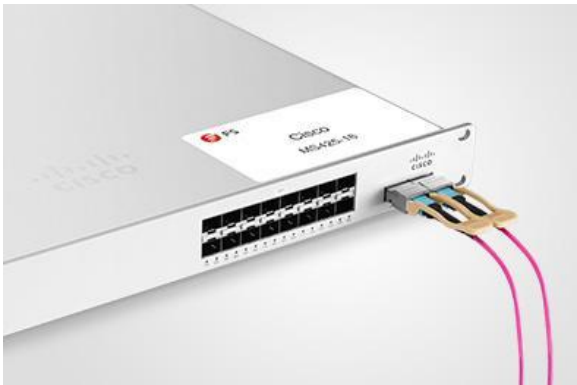
Test Center

I. Compatibility Testing

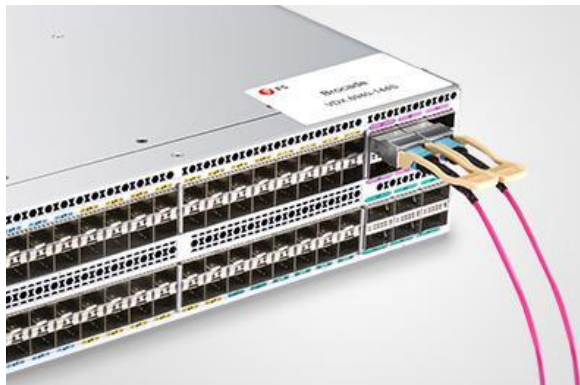
Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force@tm S60-44T



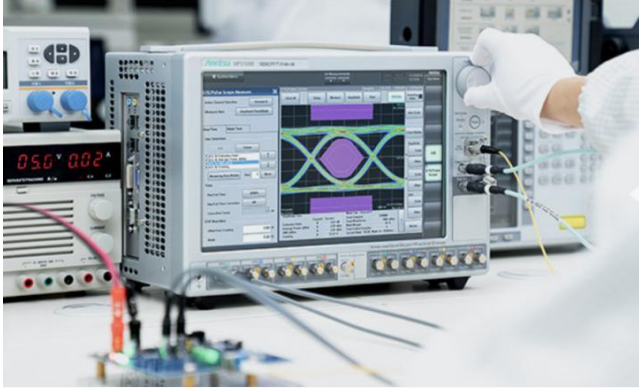
HUAWEI S6720-30L-HI-24S

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.

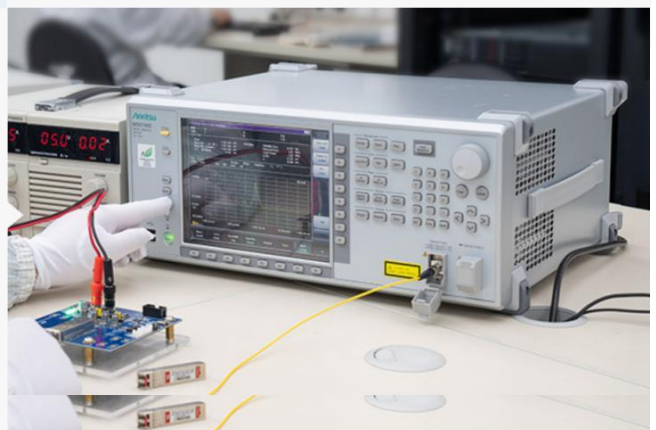
- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI



### 4. Optical Spectrum Evaluation

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

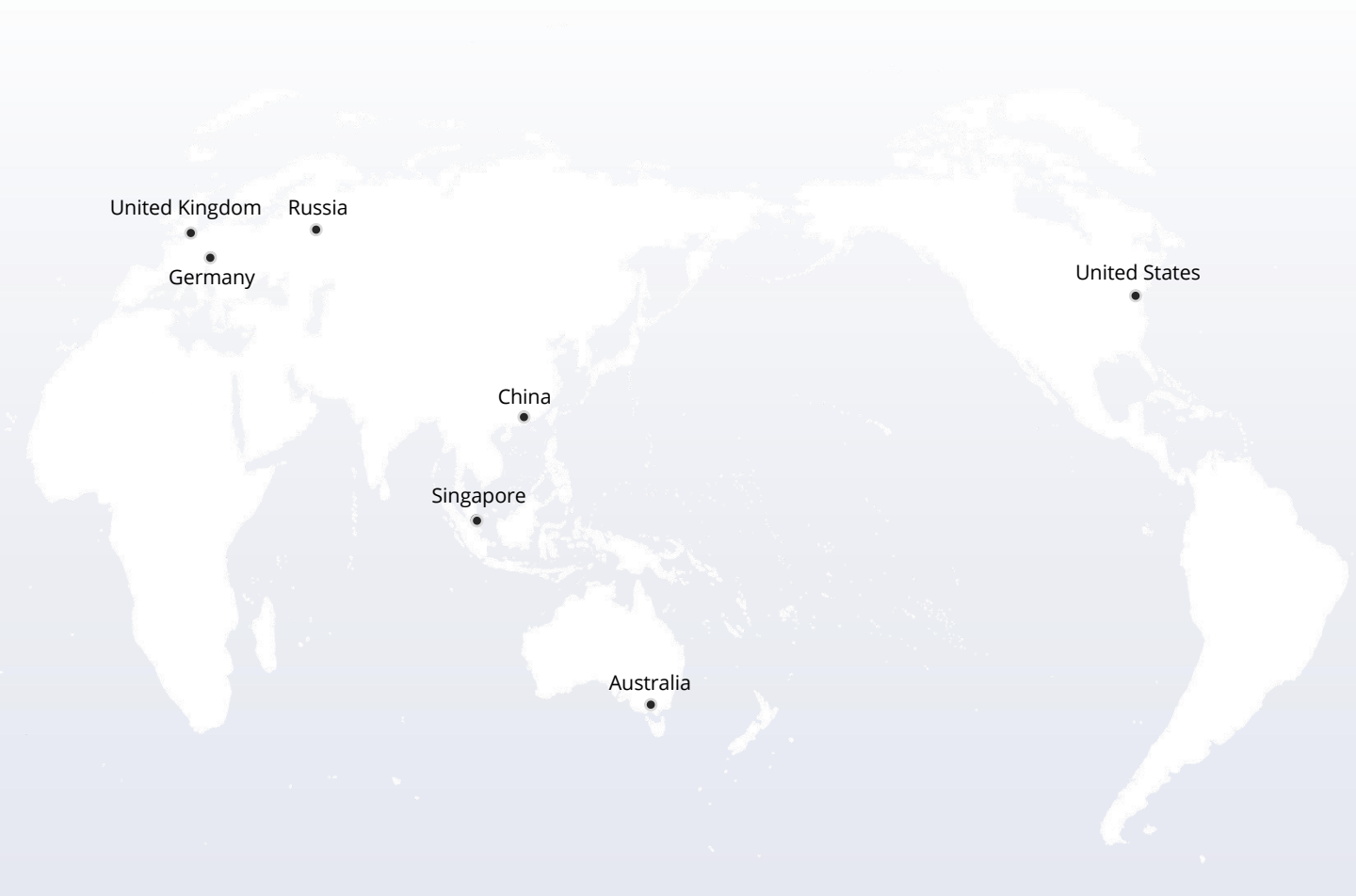
- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width



Order Information

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

**Note:**  
25G SFP28 transceiver module is individually tested on corresponding equipment such as Cisco, Arista, Juniper, Dell, Brocade and other brands, and passes the monitoring of FS.COM intelligent quality control system.



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