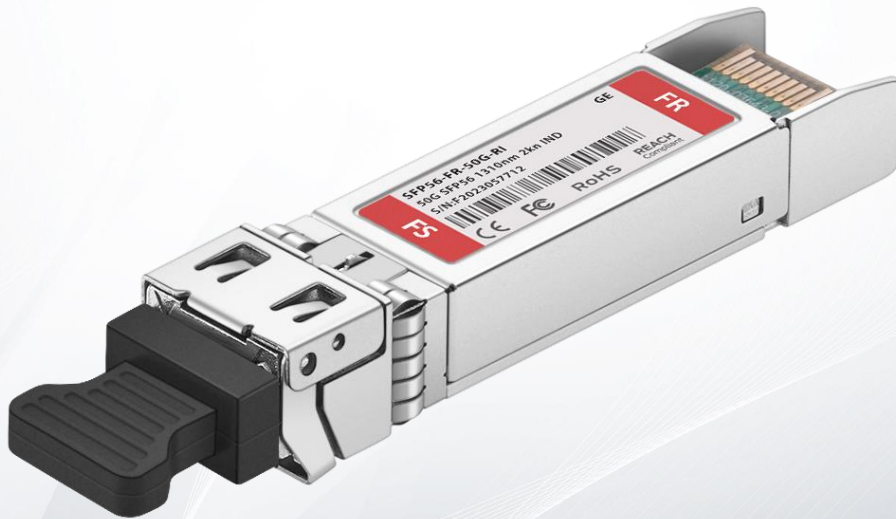


50GBASE-FR SFP56 1310nm 2km DOM Industrial Transceiver

SFP56-FR-50G-RI



Application

- eCPRI
- 50GBASE- FR

Features

- 2-Wire Interface with Integrated Digital Diagnostic Monitoring
- DFB Laser and PIN Receiver
- Single +3.3V Power Supply
- Power Consumption Lower than 2W
- Operating Case Temperature
- Industrial Temperature Range: -40~85°C
- -40°C to 85°C Temperature Range
- Support eCPRI Wireless and 50GBASE- FR Application
- Comply with IEEE 802.3cd 50GBASE-FR•
- Comply with IEEE 802.3 50GAUI-1 C2M Electrical Interface.
- Management Interface Comply with SFF-8472
- Comply with SFF-8432 with Duplex LC Connector
- Up to 2km Transmission on SMF

Description

This Generic Compatible SFP56 transceiver supports up to 2km link lengths over SMF via an Duplex LC connector.This transceiver is compliant with IEEE 802.3cd and SFF-8472 standards. The built-in digital diagnostics monitoring (DDM) allows access to real-time operating parameters via the2-wire interface.It is suitable for 50GBASE Ethernet,eCPRI wireless applications and can work in harsh industrial environments..

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature Range	Ts	-40	85	°C
Operating Relative Humidity	RH	10	85	%

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Case Temperature	TOPR	-40		85	°C
		0		70	
Power Supply Voltage	Vcc	3.135	3.3	3.465	V
Power Dissipation	P			2	W
Data Rate	DR		26.5625		GBd

Transmission Distance	TD			2	km
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III. Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength Range	λ_C	1304.5		1317.5	nm	1
		1300		1320	nm	2
Modulation Format		PAM4				
Average Output Power	P_{OUT}	-4.1		3	dBm	
Optical power OMA	OMA	-2.5		2.8	dBm	
TDECQ	TDECQ			3	dB	
Average Out put Power(LaserOff)	$P_{OUT-OFF}$			-30	dBm	
Extinction Ratio	ER	3.5			dB	
RIN17.1OMA				-132	dB/Hz	
Optical return loss tolerance				17.1	dB	
Transmitter reflectance				-26	dB	

Notes:

- 1.For C temp 0~70°
- 2.For I temp -40~85° C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Receiver						
Center Wavelength Range	λ_c	1295	1310	1325	nm	
Damage threshold				5.2	dBm	1
Average receive power		-8.1		3	dBm	
Receiver Power (OMA _{outer})				2.8	dBm	2
Receiver sensitivity (OMA _{outer})		Max(-6.9, VEC _{stat} -8.3)			dBm	
LOS Assert	LOS _A	-30			dBm	
LOS De-assert	LOS _D			-10	dBm	
LOS Hysteresis	LOS _H	0.5			dB	

Note:
1.The receiver shall be able to tolerate, without damage, continuous exposure to an optical signal having this average power level. The receiver does not have to operate correctly at this input power.
2.Measured with a PRBS31Q test pattern @26.5625 GBd, BER≤2.4X10⁻⁴.

IV. Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit
Transmitter (Module Input)						
Differential Data Input Amplitude		V _{IN,P-P}	180		900	mVpp
Input Differential Impedance		Z _{IN}	90	100	110	Ω
Tx_Fault	Normal Operation	V _{OL}	-0.3		0.4	V
	Transmitter Fault	V _{OH}	2.4		V _{CC}	V
Tx_Disable	Normal Operation	V _{IL}	-0.3		0.8	V
	Laser Disable	V _{IH}	2.0		V _{CC} +0.3	V
Receiver (Module Output)						
Differential Data Output Swing		V _{OUT,P-P}	300		1000	mVpp
Output Differential Impedance		Z _O	90	100	110	Ω
Rx_LOS	Normal Operation	V _{OL}	-0.3		0.4	V
	Lose Signal	V _{OH}	2.4		V _{CC}	V

V. Pin Function Definitions

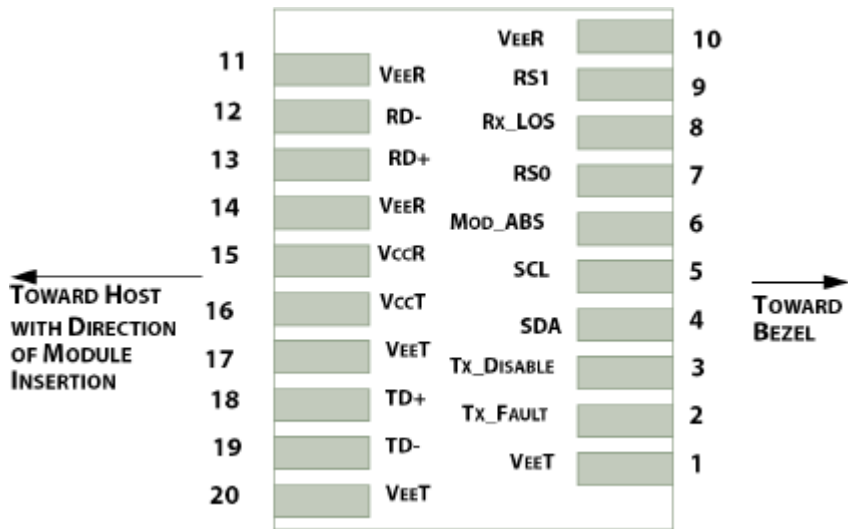


Figure 1. Pin View

VI. Transceiver Pin Descriptions

Contact s	Logic	Symbol	Description	Notes
case		case	Module case	2
1		VEET	Module Transmitter Ground	3
2	LVTTL-O	TX_FAULT	Module Transmitter Fault	4
3	LVTTL-I	TX_DISABLE	Transmitter Disable;Turns off transmitter laser output	5
4	LVTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i)	6
5	LVTTL-I/O	SCL	2-wireSerialInterfaceClock(Same asMOD-DEF1inINF-8074i)	6
6		MOD_ABS	Module Absent,connected to VEET or VEER in the module	7

Contact s	Logic	Symbol	Description	Notes
7	LV TTL-I	RS0	Rx Rate Select	
8	LV TTL-O	RX_LOS	Receiver Loss of Signal Indication (In FC designated as Rx_LOS and in Ethernet designated as Signal Detect)	4
9	LV TTL-I	RS1	Tx Rate Select	
10		VEER	Module Receiver Ground	3
11		VEER	Module Receiver Ground	3
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Non-Inverted Data Output	
14		VEER	Module Receiver Ground	3
15		VccR	Module Receiver 3.3V Supply	
16		VccT	Module Transmitter 3.3V Supply	
17		VEET	Module Transmitter Ground	3
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VEET	Module Transmitter Ground	3

Notes:

- 1.Labeling as inputs (I) and outputs (O) are from the perspective of the module.
- 2.The case makes electrical contact to the cage before any of the board edge contacts are made.
- 3.The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
- 4.This contact is an open collector/drain output contact and shall be pulled up on the host. Pull ups can be connected to one of several power supplies, however the host board design shall ensure that no module contact has voltage exceeding module VccT/R + 0.5 V.
- 5.Tx_Disable is an input contact with a 4.7 kOhms to 10 kOhms pullup to VccT inside the module.

VII. Recommended Host Board Power Supply Circuit

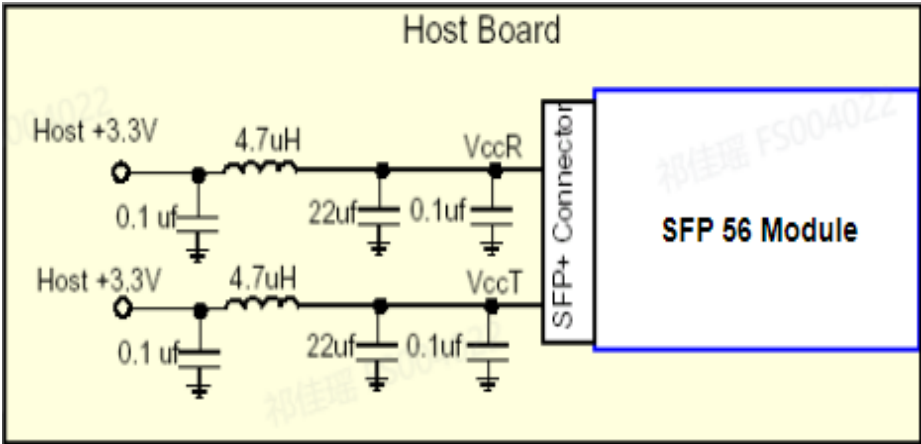


Figure 2.Recommended Host Board Power Supply Circuit

VIII. Recommended Interface Circuit

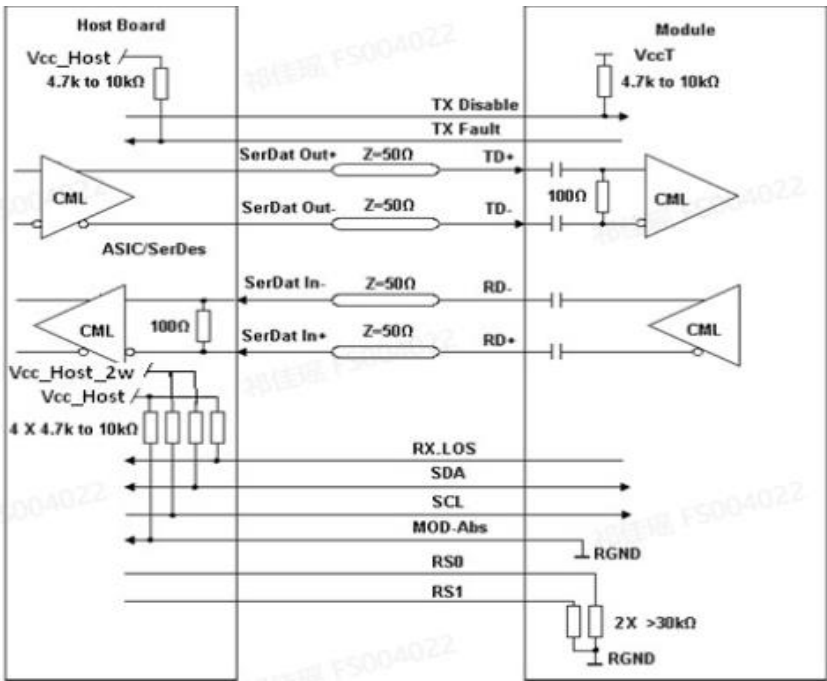


Figure 3. Recommended Interface Circuit

IX. Package Outline

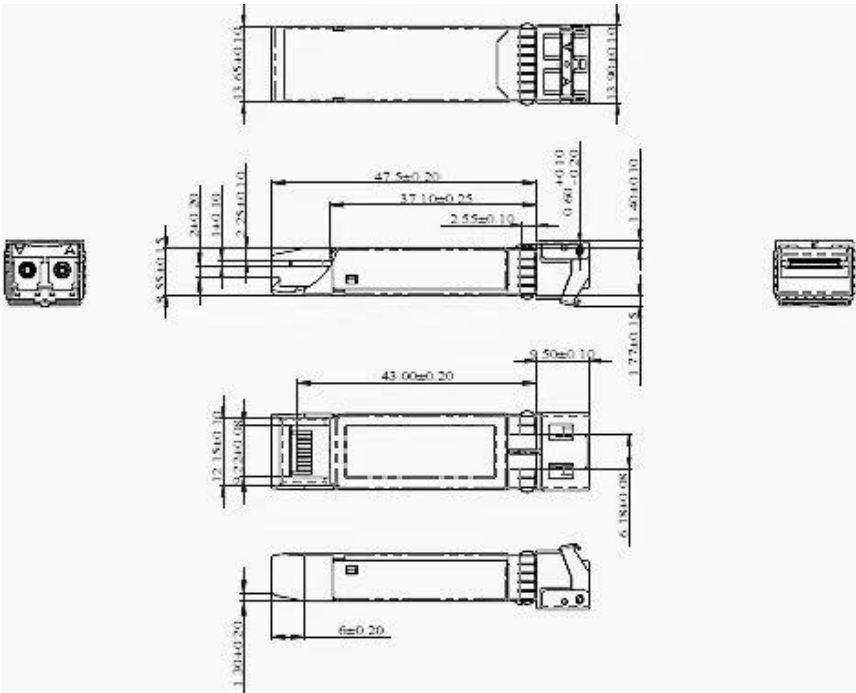


Figure 4. Outline Drawing

X. Rate select logic

50G PMA4 Enable (A2.119.Bit2)	Soft RS0 select (A2.110.bit3)	Soft RS1 select (A2.118.bit3)	Rate (both Tx&Rx)
0	0	x	workon10Gbps
0	1	x	workon25Gbps
1	x	x	workon50Gbps

Notes:
1.A2.73.bit 4 is default to 1b, RS0 and RS1 hardware pins state are ignored, module allows RS0(1) bits for 10G/25G rate selection.

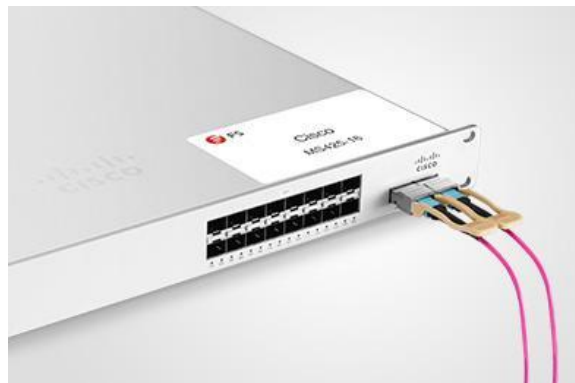
Test Center

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 -144S



Dell EMC Networking Z9100-ON



Force@tm S60-44T

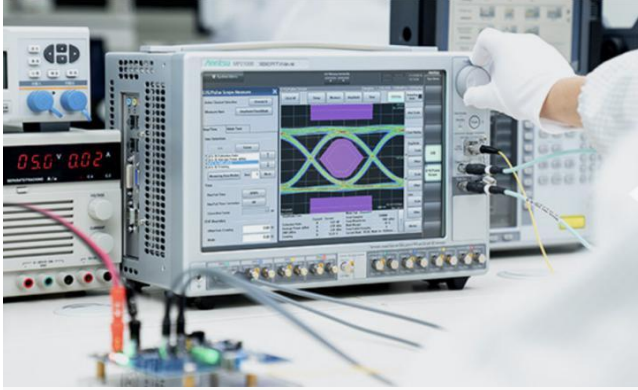


HUAWEI S6720-30L-HI-24S

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.

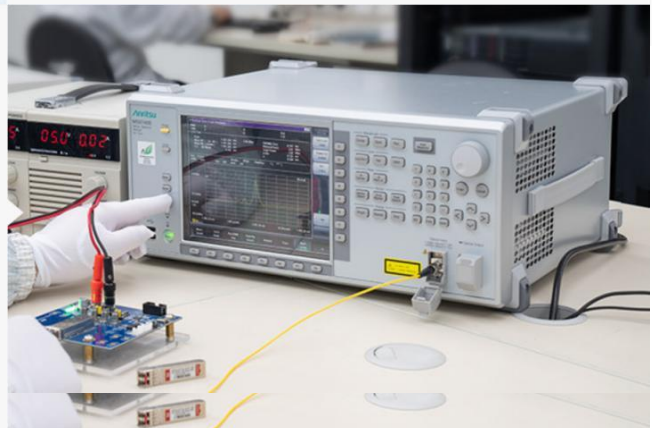
- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI



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
SFP56-SR-50G	50GBASE-SR SFP56 850nm 100m DOM Transceiver
SFP56-LR-50G-I	50GBASE-LR SFP56 1310nm 10km DDM Industrial Transceiver
SFP56 FR-50G-RI	50GBASE-FR SFP56 1310nm 2km DDM Industrial Transceiver
SFP56-LR-50GM-I	50GBASE-LR SFP56 1311nm 10km DDM Industrial Transceiver
QSFP28-LR-50G	50GBASE-LR QSFP28 1310nm 10km Transceiver
QSFP28-ER-50G	50GBASE-ER QSFP28 1310nm 40km Transceiver
QSFP28-50G-BX	50GBASE-BX QSFP28 1331nm-TX/1271nm-RX 10km Transceiver
QSFP28-50G-BX40	50GBASE-BX QSFP28 1295nm-TX/1309nm-RX 40km Transceiver
QSFP28-50G-BX40	50GBASE-BX QSFP28 1309nm-TX/1295nm-RX 40km Transceiver