100G QSFP28 to 4x25G SFP28 Active Direct Attach Copper Breakout Cable



Application

- Data Centre, High Performance Computing(HPC)
- Router, Server, Storage, Switch

Features

- QSFP28 Module Fully Compliant to the Latest SFF-8665 QSFP28 MSA
- SFP28 Module Fully Compliant to the Latest SFF-8402 SFP28 MSA
- Optimized PCB with Auto Soldering Process
- EEPROM in Cable Assembly
- Operating Temperature Range: 0℃ to 70℃
- Enables 100Gb/s to 4X25G Transmission
- Active Capability

Description

The QSFP28 to 4x25G SFP28 Direct Attach Cable operates over active copper, which allows for longer transmission distance and less thickness. This breakout cable is compliant with SFF-8679, SFF-8472, SFF-8402, SFF-8665, QSFP28 MSA and SFP28 MSA standards.

It is suitable for very short distances, and provides a connection of a 100G QSFP28 port on one end and to four 25G SFP28 ports on the other end.

Product Specification

I. Absolute Maximum Ratings

Parameter	Unit	Min.	Typical	Max.	Notes
Storage Temperature	℃	-40		85	
Operating Case Temperature	℃	0		70	
Operating Relative Humidity	%			85	
Power Supply Working Voltage	V	3.135	3.3	3.465	
Bit Rate	Gbps		100		

II. Electrical Characteristics

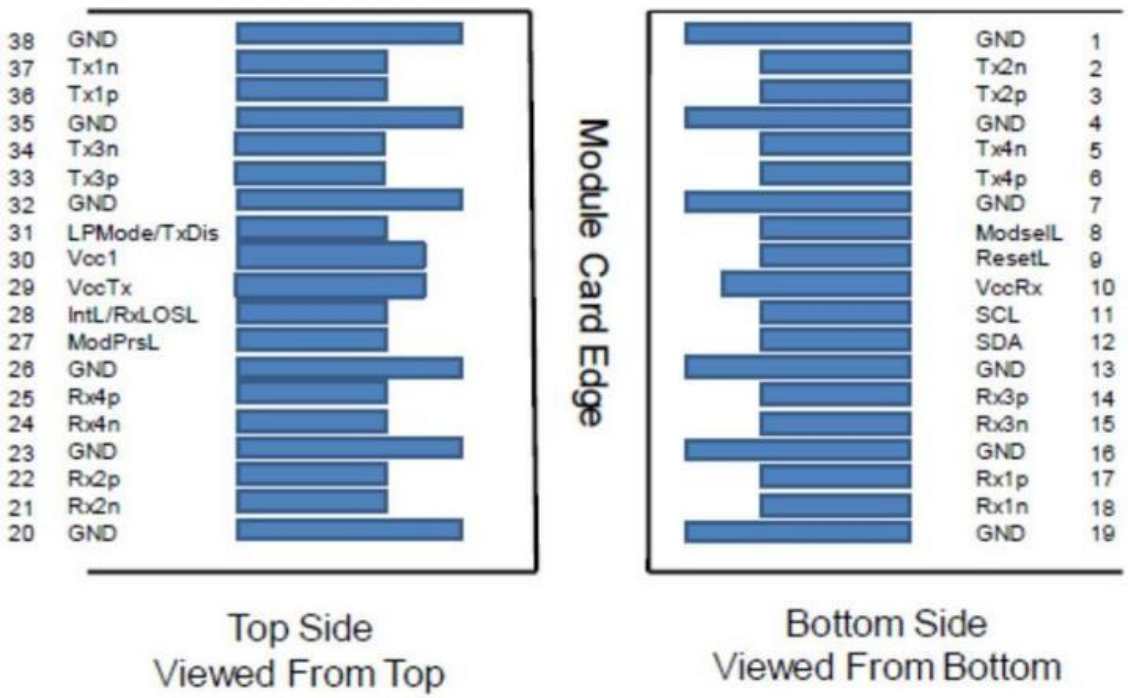
All performance is specified at whole working temperature and conditions

Item		Parameter	Notes
Physical	Length	5m, 6m, 7m, 8m, 9m	
	Cable Colour	Black	
Electrical	Resistance	2 ohm Max.	
	Insulation Resistance	10M ohm Min.	
SI Performance	SDD21	-22.48dB Min.	@12.89GHz
	SDD11/SDD22	-16.5+2*sqrt(f)dB Max.	@0.05GHz-4.1GHz
		-10.66+14*1og(f/5.5)dB Max.	@4.1GHz-19GHz

Item		Parameter	Notes
SI Performance	SCD22	-22+(20/25.78)*f dB Max.	@0.01GHz~12.89GHz
		-15+(6/25.78)*f dB Max.	@12.89GHz~19GHz
	SCC11	-2dB Max.	
	SCD21-SDD21	-10dB Max.	@0.01GHz~12.89GHz
		-27+(29/22)*f dB Max.	@12.89GHz~15.7GHz
		-6.3dB Max.	@15.7GHz~19GHz
	MDNEXT	-30dB Max.	
	COM	3dB Min.	

III. QSFP28 Pin Description

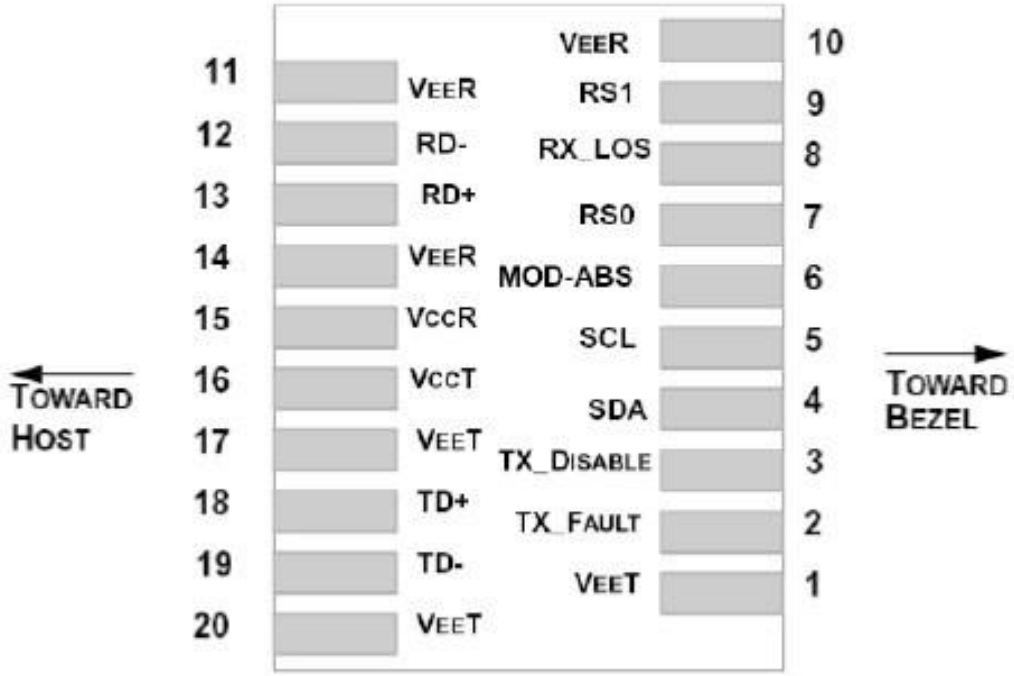
For detail mechanical information, please refer to the related document of SFF-8679.



Pad	Logic	Symbol	Description	Plug Sequence
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3
7		GND	Ground	1
8	LVITL-I	ModSelL	Module Select	3
9	LVITL-I	ResetI	Module Reset	3
10		V_{CC}Rx	+3.3V Power Supply Receiver	2
11	LVCM0S-I/O	SCL	Two-Wire Interface Clock	3
12	LVCM0S-I/O	SDA	Two-Wire Interface Data	3
13		GND	Ground	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3
15	CML-O	Rx3n	Receiver Inverted Data Output	3
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3
18	CML-O	Rx1n	Receiver Inverted Data Output	3
19		GND	Ground	1

Pad	Logic	Symbol	Description	Plug Sequence
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	3
28	LVTTL-O	IntL/RxL0SL	Interrupt. Optionaily configurable as RxL0SL via the Management Interface (SFF-8636).	3
29		V_{CC}Tx	+3.3V Power Supply Transmitter	2
30		V_{CC}1	+3.3V Power Supply	2
31	LVTTL-I	LPMode/TxDis	Low Power Mode. Optionally Configurable as TxDis via the Management Interface (SFF-8636).	3
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3
34	CML-I	Tx3n	Transmitter Inverted Data Input	3
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3
37	CML-I	Tx1n	Transmitter Inverted Data Input	3
38		GND	Ground	1

IV. SFP28 Pin Description



Pin No.	Symbol	Level / Logic	Description
1	$V_{EE}T$		Module Transmitter Ground
2	TX_FAULT	LVTTL-O	Module Transmitter Fault Indication
3	TX_DIS	LVTTL-I	Transmitter Disable; Active High Disable Transmitter Output
4	SDA	LVTTL-I	2-Wire Serial Interface Data Line
5	SCL	LVTTL-I/O	2-Wire Serial Interface Clock
6	MOD_ABS	LVTTL-O	Module Absent. Connected to Ground in the Module
7	RS0		Rate Select 0. Optionally Controls SFP28 Module Receiver
8	RX_LOS	LVTTL-O	Loss of Receiver Signal Indication

Pin No.	Symbol	Level / Logic	Description
9	RS1		Rate Select 1, Optionally Controls SFP28 Module Transmitter
10	$V_{EE}R$		Module Receiver Ground
11	$V_{EE}R$		Module Receiver Ground
12	RD-	CML-O	Receiver Inverted Data Output
13	RD+	CML-O	Receiver Non-Inverted Data Output
14	$V_{EE}R$		Module Receiver Ground
15	$V_{CC}R$		Module Receiver 3.3V Supply
16	$V_{CC}T$		Module Transmitter 3.3V Supply
17	$V_{EE}T$		Module Transmitter Ground
18	TD+	CML-I	Transmitter Non-Inverted Data Input
19	TD-	CML-I	Transmitter Inverted Data Input
20	$V_{EE}T$		Module Transmitter Ground

V. QSFP28 EEPROM Information

The digital diagnostic memory map specific data field define as following. For detail EEPROM information, please refer to the related document of SFF-8636 Rev 2.1.

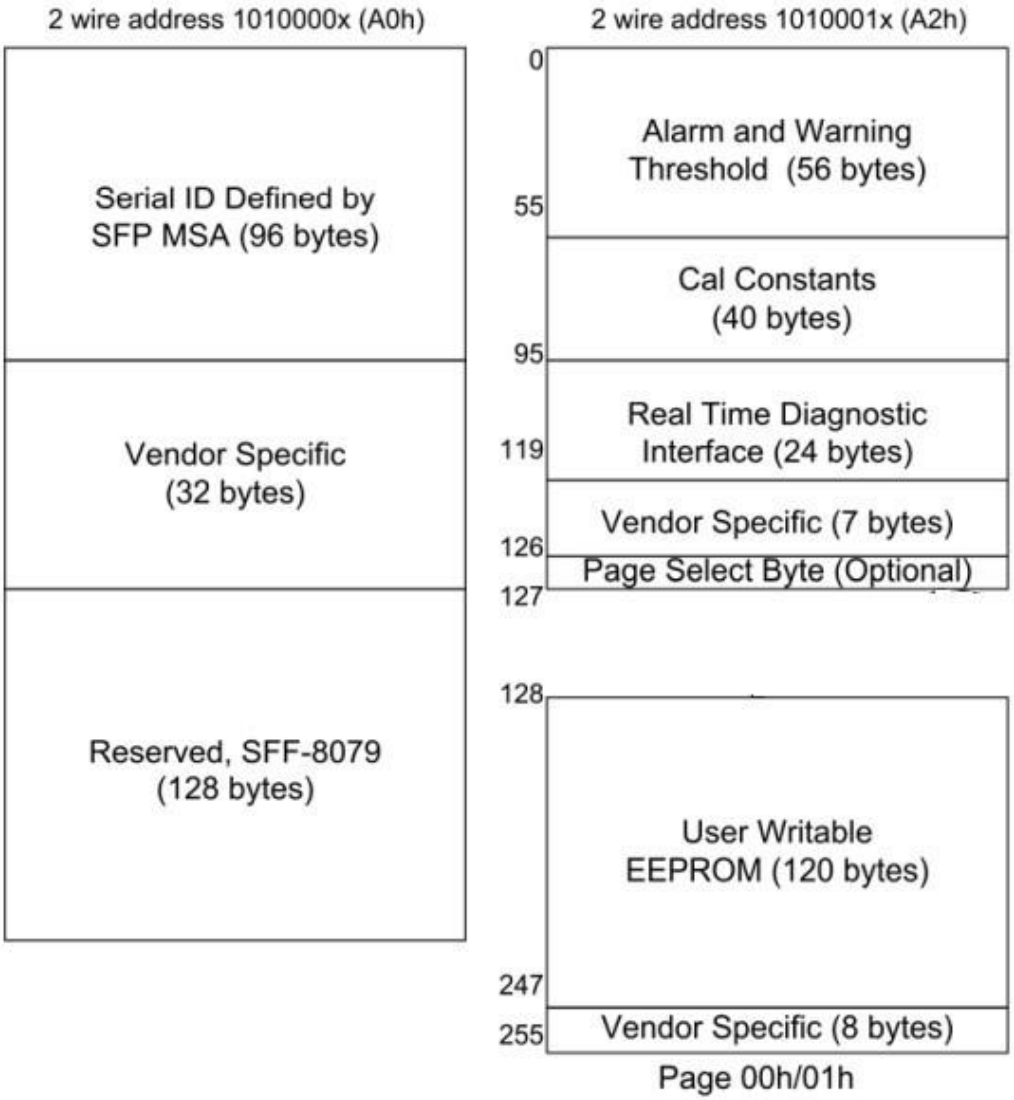
From	To	Content	Nb. of Bytes	Type
2-Wire Serial Address 1010000x				
Lower Page 00h				
0	**2**	ID and Status	3	Read-Only

From	To	Content	Nb. of Bytes	Type
3	**21**	Interrupt Flags (Clear on Read)	19	Read-Only
22	**33**	Free Side Device Monitors	12	Read-Only
34	**81**	Channel Monitors	48	Read-Only
82	**85**	Reserved	4	Read-Only
86	**99**	Control	14	Read/Write
100	**106**	Free Side Interrupt Masks	7	Read/Write
107	**110**	Free Side Device Properties	4	Read-Only
111	**112**	Assigned to PCI Express	2	Read/Write
113	**116**	Free Side Device Properties	4	Read-Only
117	**118**	Reserved	2	Read/Write
119	**122**	Optional Password Change	4	Write-Only
123	**126**	Optional Password Entry	4	Write-Only
127	**127**	Page Select Byte	1	Read/Write
		Upper Page 00h		
128	**128**	Identifier	1	Read-Only
129	**191**	Base ID Fields	63	Read-Only
192	**223**	Extended ID	32	Read-Only
224	**255**	Vendor Specific ID	32	Read-Only

From	To	Content	Nb. of bytes	Type
		Page 01h (Optional)		
128	**255**	Reserved (Previously for SFF-8079 Support)	128	Read-Only
		Page 02h (Optional)		
128	**255**	User EEPROM Data	128	Read/Write
		Page 03h (Optional)		
128	**175**	Free Side Device Thresholds	48	Read-Only
176	**223**	Channel Thresholds	48	Read-Only
224	**229**	Tx EQ, RX Output and TC Support	6	Read-Only
230	**241**	Channel Controls	12	Read/Write
242	**251**	Channel Monitor Masks	10	Read/Write
252	**255**	Reserved	4	Read/Write
		Pages 04h-1Fh (Optional)		
128	**255**	Vendor Specific	128	Read/Write
		Pages 20h-21h (Optional)		
128	**255**	PAM-4 and WDM Features	128	Read/Write
		Pages 22h-7Fh (Optional)		
128	**255**	Reserved	128	Read/Write
		Pages 80h-FFh (Optional)		
128	**255**	Vendor Specific	128	Read/Write

VI. SFP28 EEPROM Information

The digital diagnostic memory map specific data field define as following. For detail EEPROM information, please refer to the related document of SFF 8472 Rev 12.0.



VII. ESD

The SFP+ module and host SFI contacts (High Speed Contacts) shall withstand 1kV electrostatic discharge based on Human Body Model and all host contacts with exception of the SFI contacts (High Speed Contacts) shall withstand 2kV electrostatic discharge based on Human Body Model. The SFP+ module shall meet ESD requirements given in EN61000-4-2, criterion B test specification such that units are subjected to 15kV air discharges during operation and 8kV direct contact discharges to the case per section 2.9 in SFF-8431 REV4.1. However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

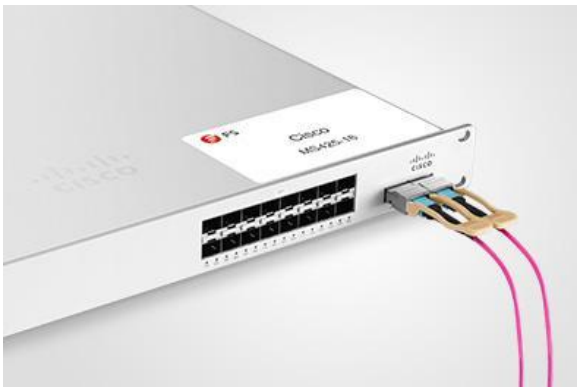
Test Center

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



Force⑩tm S60-44T

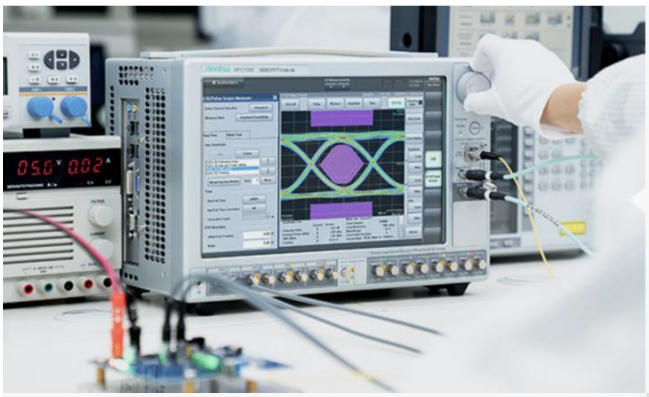


HUAWEI S6720-30L-HI-24S

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	Data Rate	Length	Wire Gauge	Connector Type	Temp. Range	Cable Jacket
Q28-4S28AC01	Up to 100G	1m	AWG30	Active Copper	0-70℃	PVC
Q28-4S28AC03	Up to 100G	3m	AWG30	Active Copper	0-70℃	PVC
Q28-4S28AC05	Up to 100G	5m	AWG28	Active Copper	0-70℃	PVC
Q28-4S28AC07	Up to 100G	7m	AWG26	Active Copper	0-70℃	PVC
Q28-4S28AC09	Up to 100G	9m	AWG26	Active Copper	0-70℃	PVC