

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



Application

- 100/25 Gigabit Ethernet
- Switches, Routers, and HBAs
- Data Centers

Features

- Supporting 100 Gbps to 4 x 25 Gbps
- Support data rates : 25.78Gb/s (per channel)
- IEEE 802.3bj 100GEBASE-CR4 and P802.3by compliant
- Compatible to SFP28 MSA and QSFP28 MSA
- Compatible to SFF-8402, SFF-8432 and SFF8665
- Maximum aggregate data rate: 100 Gb/s (4 x 25Gb/s)
- High-Density QSFP28 38-PIN and 4x SFP28 20-PIN Connector
- Copper link length up to 5m
- Power Supply : +3.3V
- Low crosstalk
- I2C based two-wire serial interface for EEPROM signature which can be customized
- Operating Temperature: 0~ 70 ° C
- ROHS Compliant

Description

FS.COM 100G QSFP28 to 4x25G SFP28 Passive Direct Attach Copper Breakout Cable assemblies are high performance, cost effective for SFP28 and QSFP28 equipment interconnects. The Hybrid cables are compliant with SFF-8402 and SFF-8665 specifications. It is offer a low power consumption, short reach inter connect applications.

The cable each lane is capable of transmitting data at rates up to 25Gb/s, providing an aggregated rate of 100Gb/s.

Products Specifications



I. Absolute Maximum Ratings

Parameter	Min	Max	Unit
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.6	V
Control input voltage	-0.3	3.6	V

II. Recommended Operating Environment

Parameter	Symbol	Min	Typ.	Max	Unit
Case operating Temperature	T_c	0		+70	° C
Supply Voltage	VCCT,R	+3.13	3.3	+3.47	V
Power Dissipation	PD			0.1	W
Operating relative humidity		5	---	85	%

III. Electrical Characteristics

Parameter	Min	Typ.	Max	Unit
Characteristic impedance	90	100	110	Ω
Time delay	---	---	4.5	ns/m
Time delay skew (in the same pair)	---	---	10	ps
Time delay skew (pair to pair)	---	---	50	ps

IV. High Speed Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Note
Differential Impedance	RIN, P-P	90	100	110	Ω	
Insertion loss	SDD21	8		22.48	dB	At 12.8906 GHz
Differential Return Loss	SDD11 SDD22	12.45		See 1	dB	At 0.05 to 4.1 GHz
		3.12		See 2	dB	At 4.1 to 19 GHz
Common-mode to common-mode output return loss	SCC11 SCC22	2			dB	At 0.2 to 19 GHz
Differential to common-mode return loss	SCD11 SCD22	12		See 3	dB	At 0.01 to 12.89
		10.58		See 4		At 12.89 to 19 GHz
Differential to common Mode Conversion Loss	SCD21-IL	10			dB	At 0.01 to 12.89
				See 5		At 12.89 to 15.7
		6.3				At 15.7 to 19 GHz
Channel Operating Margin	COM	3			dB	

Notes:

1. Reflection Coefficient given by equation $SDD11(\text{dB}) < 16.5 - 2 \times \text{SQRT}(f)$, with f in GHz
2. Reflection Coefficient given by equation $SDD11(\text{dB}) < 10.66 - 14 \times \log_{10}(f/5.5)$, with f in GHz
3. Reflection Coefficient given by equation $SCD11(\text{dB}) < 22 - (20/25.78) \times f$, with f in GHz
4. Reflection Coefficient given by equation $SCD11(\text{dB}) < 15 - (6/25.78) \times f$, with f in GHz
5. Reflection Coefficient given by equation $SCD21(\text{dB}) < 27 - (29/22) \times f$, with f in GHz

V. QSFP28 Module Pad Layout

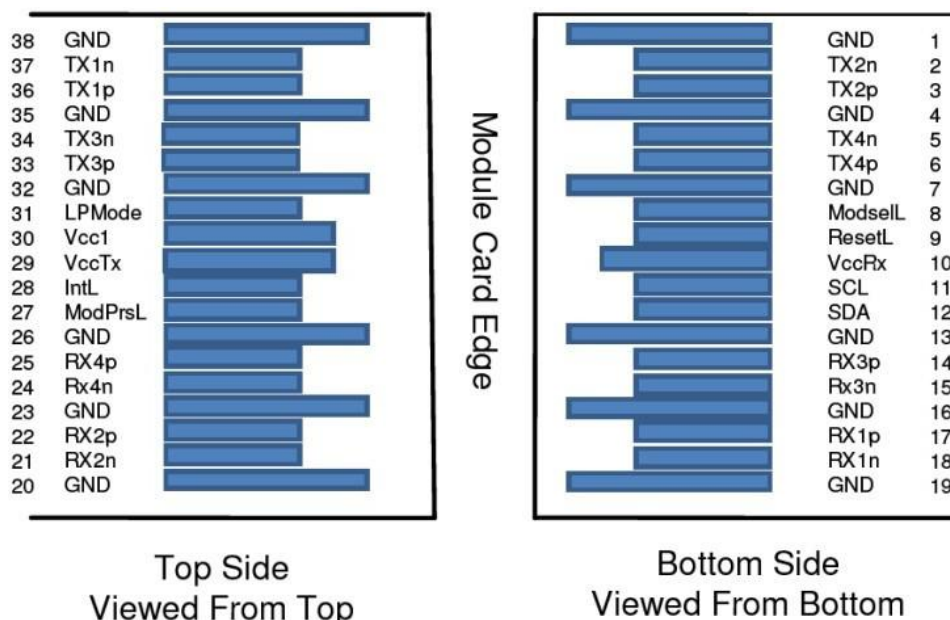


Figure 1.

Pin	Logic	Symbol	Name/Description	Note
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data	
3	CML-I	Tx2p	Transmitter Non-Inverted	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data	
6	CML-I	Tx4p	Transmitter Non-Inverted	
7		GND	Ground	1
8	LVTTL-I	ModSell	Module Select	

9	LVTTTL-I	ResetL	Module Reset	
10		Vcc Rx	+3.3V Power Supply	2
11	LVCMOSI/O	SCL	2-wire serial interface	
12	LVCMOSI/O	SDA	2-wire serial interface data	
13		GND	Ground	1
14	CML-O	Rx3p	Receiver Non-Inverted	
15	CML-O	Rx3n	Receiver Inverted Data	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data	
18	CML-O	Rx1n	Receiver Inverted Data	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data	
22	CML-O	Rx2p	Receiver Non-Inverted Data	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data	
25	CML-O	Rx4p	Receiver Non-Inverted Data	
26		GND	Ground	1
27	LVTTTL-O	ModPrsL	Module Present	
28	LVTTTL-O	IntL	Interrupt	
29		Vcc Tx	+3.3V Power supply	2

30		Vcc1	+3.3V Power supply	2
31	LVTTL-I	LPMode	Low Power Mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted	
34	CML-I	Tx3n	Transmitter Inverted Data	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted	
37	CML-I	Tx1n	Transmitter Inverted Data	
38		GND	Ground	1

Notes:

- 1.GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
- 2.VccRx, Vcc1 and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in Table 6. Recommended host board power supply filtering is shown in Figure4. VccRx, Vcc1 and VccTx may be internally connected within the QSFP28 Module module in any combination. The connector pins are each rated for a maximum current of 500mA.

VI. SFP28 Pin Descriptions

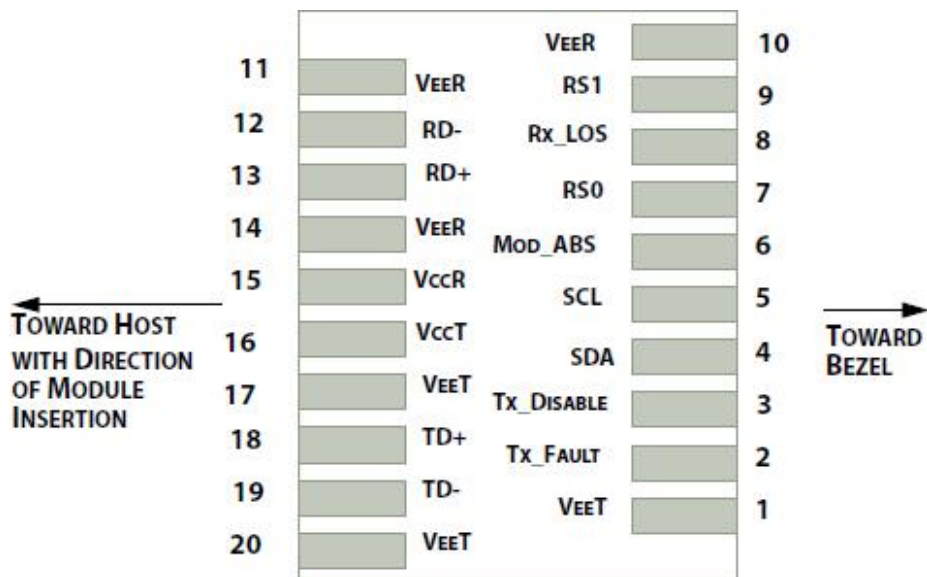


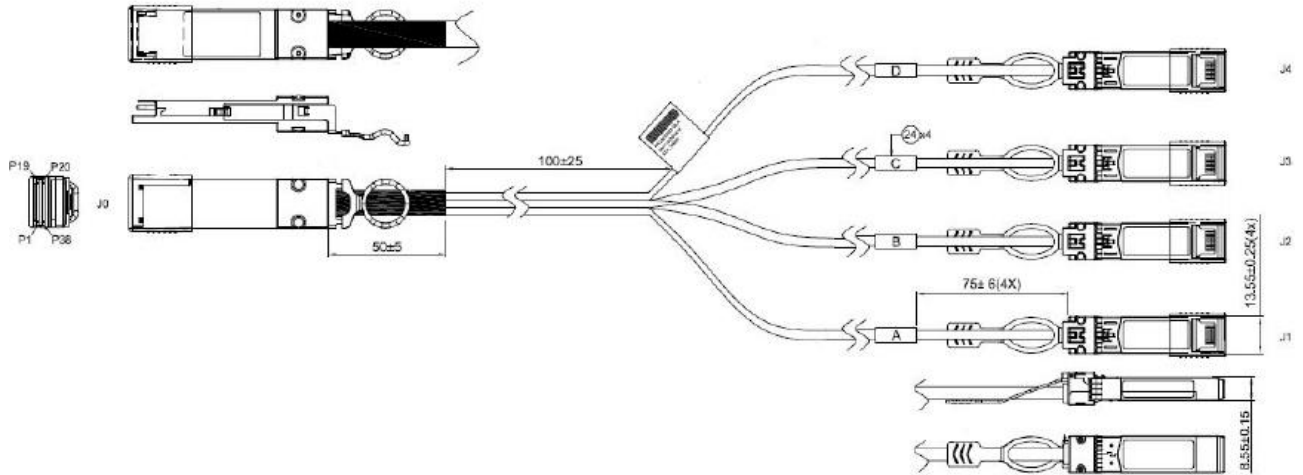
Figure 2. Host PCB SFP28 pad contact assignment

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Transmitter Ground	
2	LV-TTL-O	TX_Fault	N/A	1
3	LV-TTL-I	TX_DIS	Transmitter Disable	2
4	LV-TTL-I/O	SDA	Tow Wire Serial Data	
5	LV-TTL-I	SCL	Tow Wire Serial Clock	
6		MOD_DEF0	Module present, connect	
7	LV-TTL-I	RS0	N/A	1
8	LV-TTL-O	LOS	LOS of Signal	2
9	LV-TTL-I	RS1	N/A	1
10		VeeR	Reciever Ground	
11		VeeR	Reciever Ground	
12	CML-O	RD-	Reciever Data Inverted	
13	CML-O	RD+	Reciever Data	
14		VeeR	Reciever Ground	
15		VccR	Reciever Supply 3.3V	
16		VccT	Transmitter Supply 3.3V	
17		VeeT	Transmitter Ground	
18	CML-I	TD+	Transmitter Data	

Notes:

- 1.Signals not supported in SFP28 Copper pulled-down to VeeT with 30K ohms resistor
- 2.Passive cable assemblies do not support LOS and TX_DIS

VII. Mechanical Specifications



Test Center

FS.COM transceivers are tested to ensure connectivity and compatibility in our test center before shipped out. FS.COM test center is supported by a variety of mainstream original brand switches and groups of professional staff, helping our customers make the most efficient use of our products in their systems, network designs and deployments.

The original switches could be found nowhere but at FS.COM test center, eg: Juniper MX960 & EX 4300 series, Cisco Nexus 9396PX & Cisco ASR 9000 Series, HP 5900 Series & HP 5406R ZL2 V3(J9996A), Arista 7050S-64, Brocade ICX7750-26Q & ICX6610-48, Avaya VSP 7000 MDA 2, etc.



Cisco ASR 9000 Series(A9K-MPA-1X40GE)



ARISTA 7050S-64(DCS-7050S-64)



Juniper MX960



Brocade ICX 7750-26Q



Extreme Networks X670V VIM-40G4X



Mellanox M3601Q



Dell N4032F



HP 5406R ZL2 V3(J9996A)



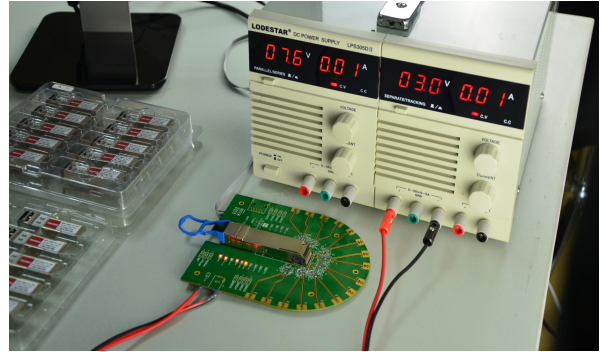
AVAYA 7024XLS(7002QQ-MDA)

Test Assured Program

FS.COM truly understands the value of compatibility and interoperability to each optics. Every module FS.COM provides must run through programming and an extensive series of platform diagnostic tests to prove its performance and compatibility. In our test center, we care of every detail from staff to facilities—professionally trained staff, advanced test facilities and comprehensive original-brand switches, to ensure our customers to receive the optics with superior quality.



Our smart data system allows effective product management and quality control according to the unique serial number, properly tracking the order, shipment and every part.



Our in-house coding facility programs all of our parts to standard OEM specs for compatibility on all major vendors and systems such as Cisco, Juniper, Brocade, HP, Dell, Arista and so on.



With a comprehensive line of original-brand switches, we can recreate an environment and test each optics in practical application to ensure quality and distance.



The last test assured step to ensure our products to be shipped with perfect package.

Order Information

Part Number	Data Rate	Length	Wire Gauge	Connector Type	Temp. Range	Cable Jacket
Q-4S28PC01	Up to 100G	1m	AWG30	Passive Copper	0-70°C	PVC
Q-4S28PC02	Up to 100G	2m	AWG30	Passive Copper	0-70°C	PVC
Q-4S28PC03	Up to 100G	3m	AWG30	Passive Copper	0-70°C	PVC
Q-4S28PC05	Up to 100G	5m	AWG26	Passive Copper	0-70°C	PVC

Notes:

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