

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

Features

- Supporting 100Gbps to 4x25Gbps
- 25.78Gb/s per channel
- High-Density QSFP28 38-PIN and 4xSFP28 20-PIN Connector
- Maximum aggregate data rate: 100Gb/s(4x25Gb/s)
- Power Supply:+3.3V
- Low Crosstalk
- I²C based two-wire series interface for EEPROM signature which can be customized
- 0 to 70°C case temperature operating range
- Copper link length to 5m
- RoHS-6 compliant (lead-free)
- Metal enclosure for low EMI

Applications

- 100/25G Ethernet
- Datacom/Telecom Switch & Router connections
- High speed multi-channel parallel data connections
- High performance computing, server and data storage

Compliance

- Compatible to SFP28 MSA and QSFP28 MSA
- Compatible to SFF-8402 and SFF-8665
- IEEE 802.3bj 100GBASE-CR4 and P802.3by compliant

Description

The Q4SFP-100G-DAC Passive 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 offers a low power consumption, short reach interconnect applications. The cable each lane is capable of transmitting data at rates up to 25Gb/s, providing an aggregated rate of 100Gb/s.

Absolute Maximum Ratings

Table1-Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Storage Temperature	TSTG	-40	-	+85	°C	
Operating Temperature	Top	0		70	°C	
3.3V Supply Voltage	VCC	-0.5	-	+3.6	V	
Relative Humidity	RH	0		85	%	
Power Dissipation	PD			0.1	W	

Electrical Characteristics

Table2- Electrical Characteristics

Parameter	Symbol	Min.	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

High Speed Characteristics

Table3-High Speed Characteristics

Parameter	Symbol	Min.	Typical	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	SDD1	12.45		See 1	dB	At 0.05 to 4.1 GHz
	SDD22	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	SCD11	12		See 3	dB	At 0.01 to 12.89

return loss	SCD22	10.58		See 4		At 12.89 to 19 GHz
Differential to common Mode Conversion Loss	SCD21-IL	10		See5	dB	At 0.01 to 12.89
						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 $SDD11(dB) \leftarrow 16.5 - 2 \times \text{SQRT}(f)$, with f inGHz

[2] Reflection Coefficient given by equation $SDD11(dB) \leftarrow 10.66 - 14 \times \log_{10}(f/5.5)$, with f inGHz

[3] Reflection Coefficient given by equation $SCD11(dB) \leftarrow 22 - (20/25.78)*f$, with f inGHz

[4] Reflection Coefficient given by equation $SCD11(dB) \leftarrow 15 - (6/25.78)*f$, with f inGHz

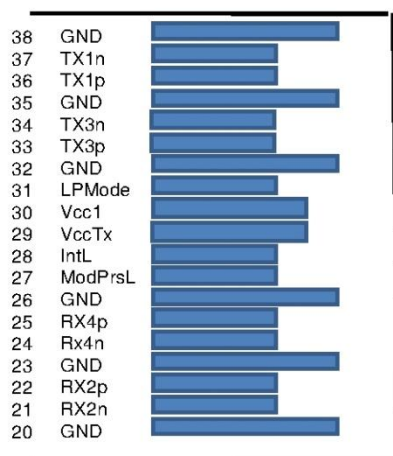
[5] Reflection Coefficient given by equation $SCD21(dB) \leftarrow 27 - (29/22)*f$, with f inGHz

Pin Descriptions

Table4-QSFP28 Pin Function Definition

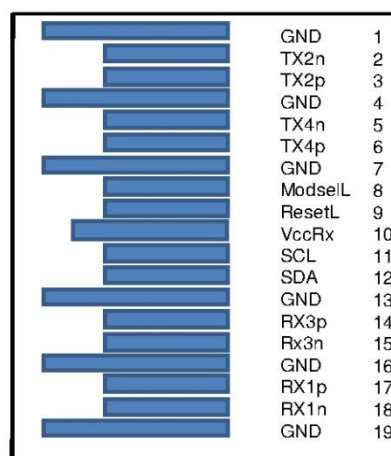
Pin	Logic	Symbol	Description
1		GND	Ground
2	CML-I	Tx2n	Transmitter Inverted Data Input
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input
4		GND	Ground
5	CML-I	Tx4n	Transmitter Inverted Data Input
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input
7		GND	Ground
8	LVTTL-I	ModSelL	Module Select
9	LVTTL-I	ResetL	Module Reset
10		Vcc Rx	+3.3V Power Supply Receiver
11	LVC MOS I/O	SCL	2-wire serial interface clock
12	LVC MOS I/O	SDA	2-wire serial interface data
13		GND	Ground
14	CML-O	Rx3p	Receiver Non-Inverted Data Output
15	CML-O	Rx3n	Receiver Inverted Data Output
16		GND	Ground
17	CML-O	Rx1p	Receiver Non-Inverted Data Output
18	CML-O	Rx1n	Receiver Inverted Data Output

19		GND	Ground
20		GND	Ground
21	CML-O	Rx2n	Receiver Inverted Data Output
22	CML-O	Rx2p	Receiver Non-Inverted Data Output
23		GND	Ground
24	CML-O	Rx4n	Receiver Inverted Data Output
25	CML-O	Rx4p	Receiver Non-Inverted Data Output
26		GND	Ground
27	LVTTL-O	ModPrsL	Module Present
28	LVTTL-O	IntL	Interrupt
29		Vcc Tx	+3.3V Power supply transmitter
30		Vcc1	+3.3V Power supply
31	LVTTL-I	LPMODE	Low Power Mode
32		GND	Ground
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input
34	CML-I	Tx3n	Transmitter Inverted Data Input
35		GND	Ground
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input
37	CML-I	Tx1n	Transmitter Inverted Data Input
38		GND	Ground



Top Side
Viewed From Top

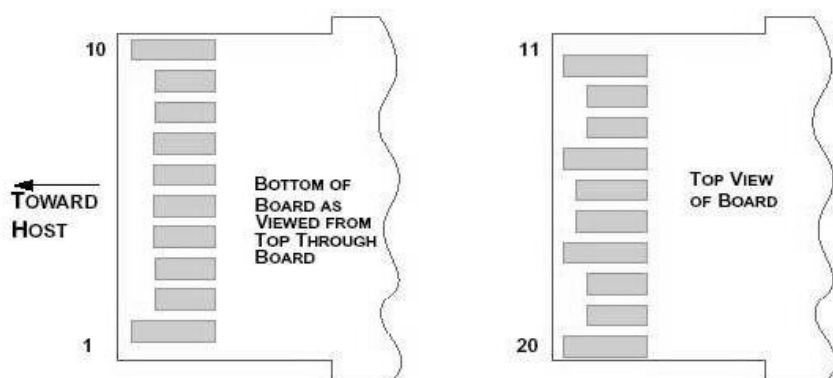
Module Card Edge



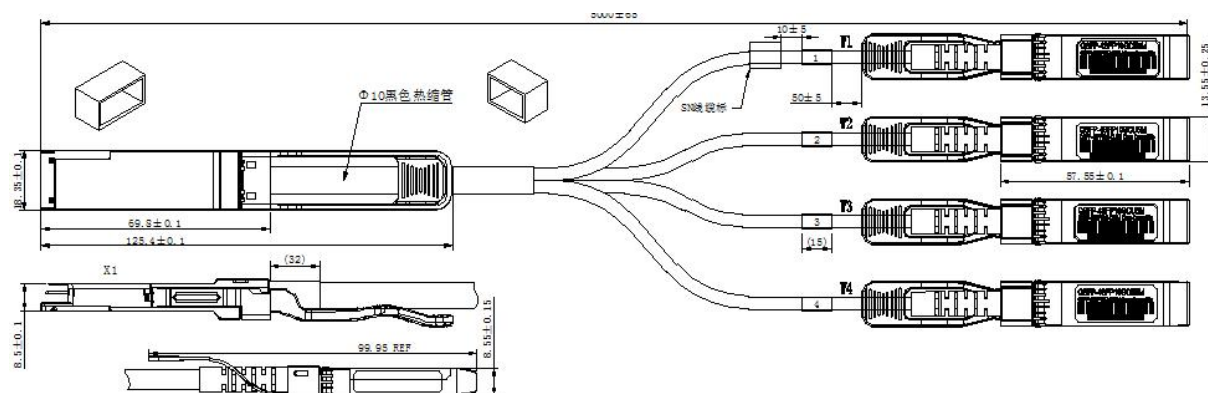
Bottom Side
Viewed From Bottom

Table5-SFP28 Pin Function Definition

Pin	Logic	Symbol	Description	Notes
1		VeeT	Transmitter Ground	
2	LVTTL-0	Tx_Fault	N/A	1
3	LVTTL-I	Tx_Disable	Transmitter Disable	2
4	LVTTLI/O	SDA	Tow Wire Serial Data	
5	LVTTLI/O	SCL	Tow Wire Serial Clock	
6		Mod_ABS	Module present, connect to VeeT	
7	LVTTL-I	RS0	N/A	1
8	LVTTL-0	Rx_LOS	LOS of Signal	2
9	LVTTL-I	RS1	N/A	1
10		VeeR	Reciever Ground	
11		VeeR	Reciever Ground	
12	CML-0	RD-	Reciever Data Inverted	
13	CML-0	RD+	Reciever Data Non-Inverted	
14		VeeR	Reciever Ground	
15		VccR	Reciever Supply 3.3V	
16		VeeT	Transmitter Supply 3.3V	
17		VeeT	Transmitter Ground	
18	CML-I	TD+	Transmitter Data Non-Inverted	
19	CML-I	TD-	Transmitter Data Inverted	
20		VeeT	Transmitter Ground	



Mechanical Specifications



Length (m)	Cable AWG
1	30
3	30
5	26
7	26

Regulatory Compliance

Feature	Test Method	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C Method 3015.7	Class 1(→2000 Volts)
Electromagnetic Interference(EMI)	FCC Class B CENELEC EN55022 Class B CISPR22 ITE Class B	Compliant with Standards
RF Immunity(RFI)	IEC61000-4-3	Typically Show no Measurable Effect from a 10V/m Field Swept from 80 to 1000MHz
RoHS Compliance	RoHS Directive 2011/65/EU and it's Amendment Directives 6/6	RoHS 6/6 compliant