100G QSFP28 to 4×SFP28 25G Direct Attach Cable
TSQSS-PC1HG-xxM

General Description

QSFP28 Direct Attach Cables are compliant with the SFF-8665 specifications. SFP28 Direct Attach Cables are compliant with SFF-8432 and SFF-8402 specifications. Various choices of wire gauge are available from 30 to 26 AWG with various choices of cable length (up to 5m).

Features

- Up to 25.78Gbps data rate per channel
- Up to 5m transmission
- Hot-pluggable QSFP+ 38 PIN footprint
- Compatible to SFF-8665
- Compliant with IEEE 802.3bj
- Single 3.3V power supply
- Temperature Range: 0 °C to 70 °C
- RoHS compliant

Applications

- Low EMI radiation switches, servers and routers
- Data center networks
- Storage area networks
- High performance computing
- Telecommunication and wireless infrastructure
- Medical diagnostics and networking
- Test and measurement equipment

8 Jinxiu Middle Road, Pingshan, Shenzhen, Guangdong, 518118, P. R. China
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Recommended Operation Condition

Parameter	Symbol	Min	Max	Unit
Operating Case Temperature	Topc	0	70	degC
Storage Temperature	Tst	-40	85	degC
Relative Humidity (non-condensation)	RS	35	60	%
Supply Voltage	VCC3	3.135	3.465	V
Voltage on LVTTL Input	Vilvttl	-0.3	VCC3 +0.2	V
Power Supply Current	ICC3	-	15	mA
Total Power Consumption	Pd	-	0.05	W

Notes:

Stress or conditions exceed the above range may cause permanent damage to the device.

This is a stress rating only and functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not applied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Frequency Domain

Item	Test Parameter	IEEE802.3bj Specification
1	Differential Insertion Loss (SDD12)	Maximum insertion loss at 12.8906Ghz @22.48dB Minimum insertion loss at 12.8906Ghz@8dB
2	Differential Insertion Loss (SDD21)	Maximum insertion loss at 12.8906Ghz@22.48dB Minimum insertion loss at 12.8906Ghz@8dB
3	Differential Return Loss (SDD22)	-16.5+2xSQRT(f) @ 0.01 to 4.1GHz $-10.66+14x\log_{10} f/5.5$@4.1 to 19GHz
4	Differential Return Loss (SDD11)	-16.5+2xSQRT(f) @ 0.01 to 4.1GHz $-10.66+14x\log_{10} f/5.5$@4.1 to 19GHz
5	Common Mode Reflection (SCC22)	-2dB @ 0.01 to 19GHz
6	Common Mode Reflection (SCC11)	-2dB @ 0.01 to 19GHz
7	Common Mode Conversion (SCD22)	-22+(20/25.78)*(f) @ 0.01 to 12.89GHz -15+(6/25.78)*(f) @ 12.9 to 19GHz
8	Common Mode Conversion (SCD11)	-22+(20/25.78)*(f) @ 0.01 to 12.89GHz -15+(6/25.78)*(f) @ 12.9 to 19GHz
9	Differential to Common Mode Conversion Loss (SCD12)	-10dB @ 0.01 to 12.89GHz -27+(29/22)*(f) @ 12.9 to 15.7GHz -6.3dB @ 15.71 to 19GHz
10	Differential to Common Mode Conversion Loss (SCD21)	-10dB @ 0.01 to 12.89GHz -27+(29/22)*(f) @ 12.9 to 15.7GHz -6.3dB @ 15.71 to 19GHz

QSFP28 Pin Definition

Pin	Symbol	Name/Description
1	GND	Ground
2	Tx2n	Transmitter Inverted Data Input
3	Tx2p	Transmitter Non-Inverted Data Input
4	GND	Ground
5	Tx4n	Transmitter Inverted Data Input
6	Tx4p	Transmitter Non-Inverted Data Input
7	GND	Ground
8	ModSelL	Module Select
9	ResetL	Module Reset
10	Vcc Rx	+3.3 V Power supply receiver
11	SCL	2-wire serial interface clock
12	SDA	2-wire serial interface data
13	GND	Ground
14	Rx3p	Receiver Non-Inverted Data Output
15	Rx3n	Receiver Inverted Data Output
16	GND	Ground
17	Rx1p	Receiver Non-Inverted Data Output
18	Rx1n	Receiver Inverted Data Output
19	GND	Ground
20	GND	Ground
21	Rx2n	Receiver Inverted Data Output
22	Rx2p	Receiver Non-Inverted Data Output
23	GND	Ground
24	Rx4n	Receiver Inverted Data Output
25	Rx4p	Receiver Non-Inverted Data Output
26	GND	Ground
27	ModPrsL	Module Present
28	IntL	Interrupt
29	Vcc Tx	+3.3 V Power supply transmitter
30	Vcc1	+3.3 V Power Supply
31	LPMode	Low Power Mode

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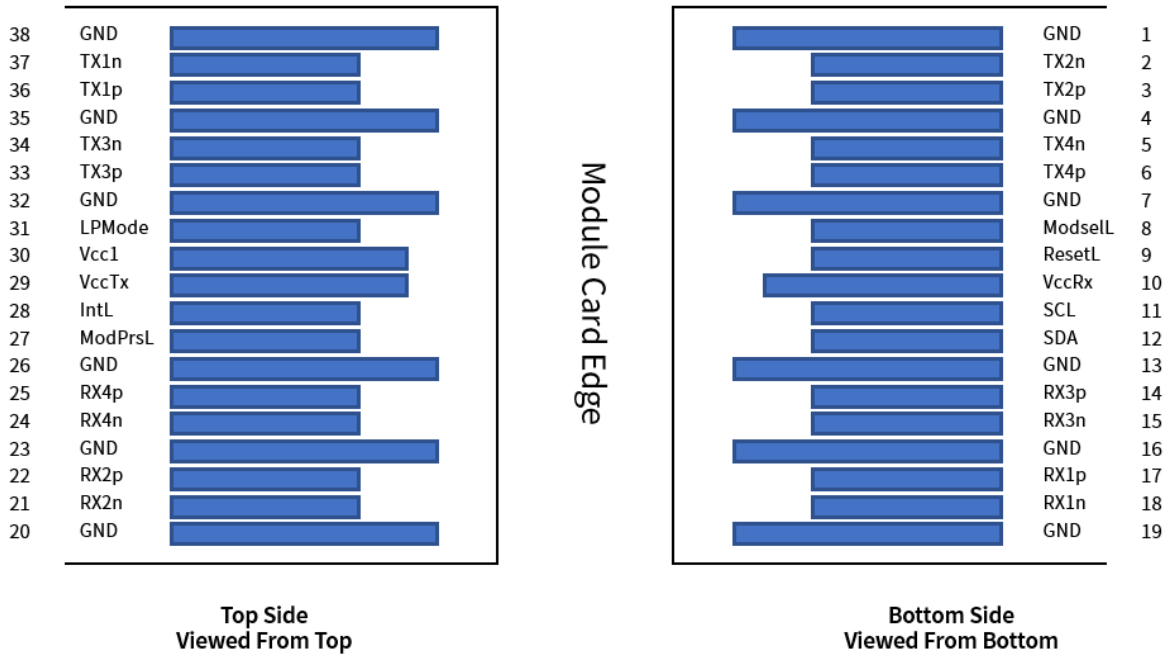
32	GND	Ground
33	Tx3p	Transmitter Non-Inverted Data Input
34	Tx3n	Transmitter Inverted Data Input
35	GND	Ground
36	Tx1p	Transmitter Non-Inverted Data Input
37	Tx1n	Transmitter Inverted Data Input
38	GND	Ground

Pin Descriptions



Top Side Viewed From Top **Bottom Side Viewed From Bottom**

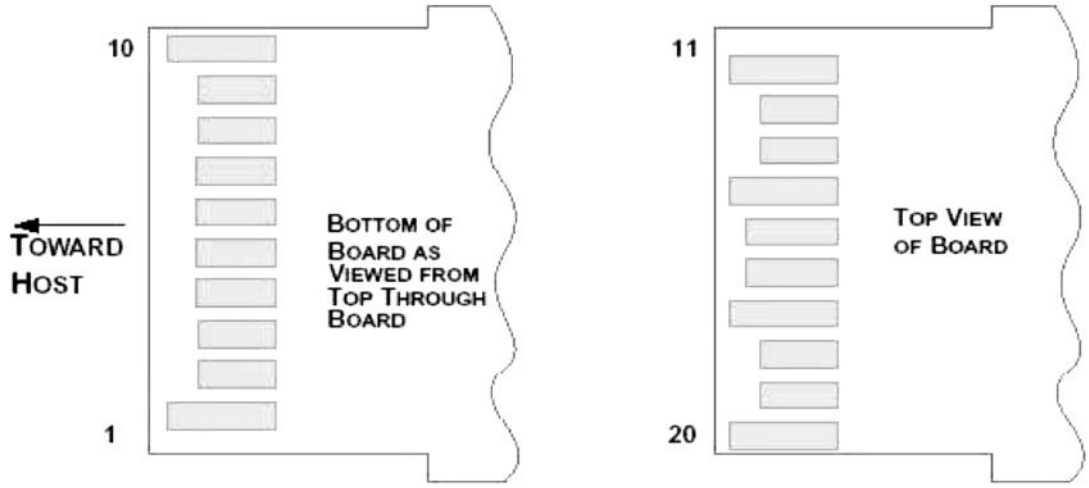
Sfp28 Pin Descriptions

Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Not used
3	Tx_DIS [3]	Not used
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	Not used
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation

9	RS1 [5]	Not used
10	VEER [1]	Receiver Ground
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

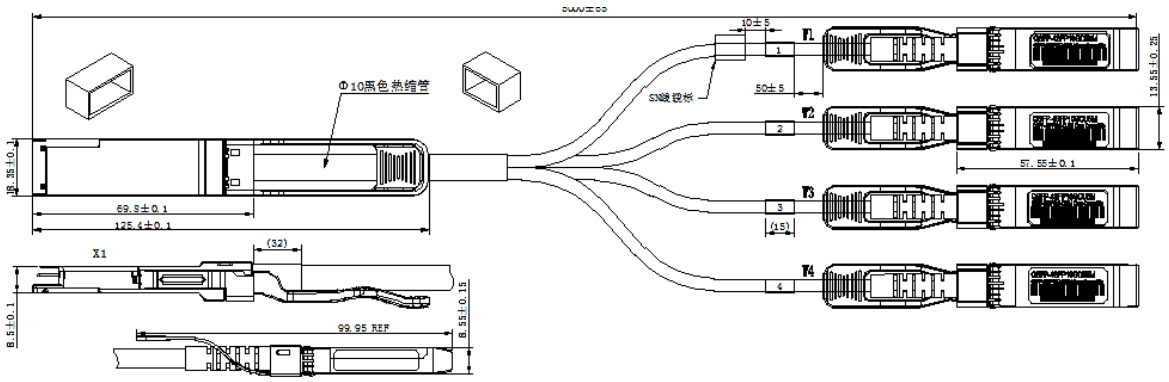
Notes:

1. Module circuit ground is isolated from module chassis ground within the module.
2. should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.
3. Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.
4. Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to10 kΩ.Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.
5. RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.



Mechanical Dimensions

The connector is compatible with the SFF-8432 and SFF-8665 specification.



Mechanical Specifications

Parameter	Minimum	Typical	Maximum	Unit
Cable Diameter (26AWG)	-	0.220	-	Inches
Bend Radius (26AWG)	1.102	-	-	Inches
Cable Diameter (28AWG)	-	0.185	-	Inches
Bend Radius (28AWG)	0.925	-	-	Inches
Cable Diameter (30 AWG)	-	0.181	--	Inches
Bend Radius (30 AWG)	0.906	-	-	Inches
Within Pair Skew	-	-	100	ps/10m
Cable Insertion Loss	-	15.43	-	dB/5m
Bulk Cable Time Delay	-	-	5.2	ns/m
Bulk Cable Impedance	95	100	105	Ohms
Insertion Force	-	-	40	N
Withdrawal Force	-	-	30	N
Retention Force	90	-	-	N
Durability	50 Cycles	-	-	-

Ordering Information

100G QSFP28 4x25G QSFP28 Copper Breakout Cable Assemblies, Passive.

P/N	Length	Data Rate	AWG	Length Tolerance
TSQSS-PC1HG-01M	1M	100G	28 / 30	+3.5/-3.5cm
TSQSS-PC1HG-02M	2M	100G	28 / 30	+3.5/-3.5cm
TSQSS-PC1HG-03M	3M	100G	28 / 30	+4/-4cm

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TSQSS-PC1HG-05M	5M	100G	26	+6/-6cm