

200G QSFP56 Passive Direct Attach Copper Twinax Cable



QSFP56 Series

- 200 Gigabit Ethernet
- Fiber channel over Ethernet
- Data storage and communication industry switch / router / HBA
- Enterprise network SAN
- Data Center Network
- IEEE 802.3bj
- InfiniBand EDR
- QSFP56 MSA
- RoHS Compliant

Ascent's 200GE QSFP56 cable assemblies are high-performance, cost-effective I/O solutions for LAN, HPC and SAN. The high-speed cable assemblies meet and exceed 200 Gigabit Ethernet, InfiniBand EDR and temperature requirements for performance and reliability. The cables are compliant with SFF-8436 specifications and provide connectivity between devices using QSFP ports.

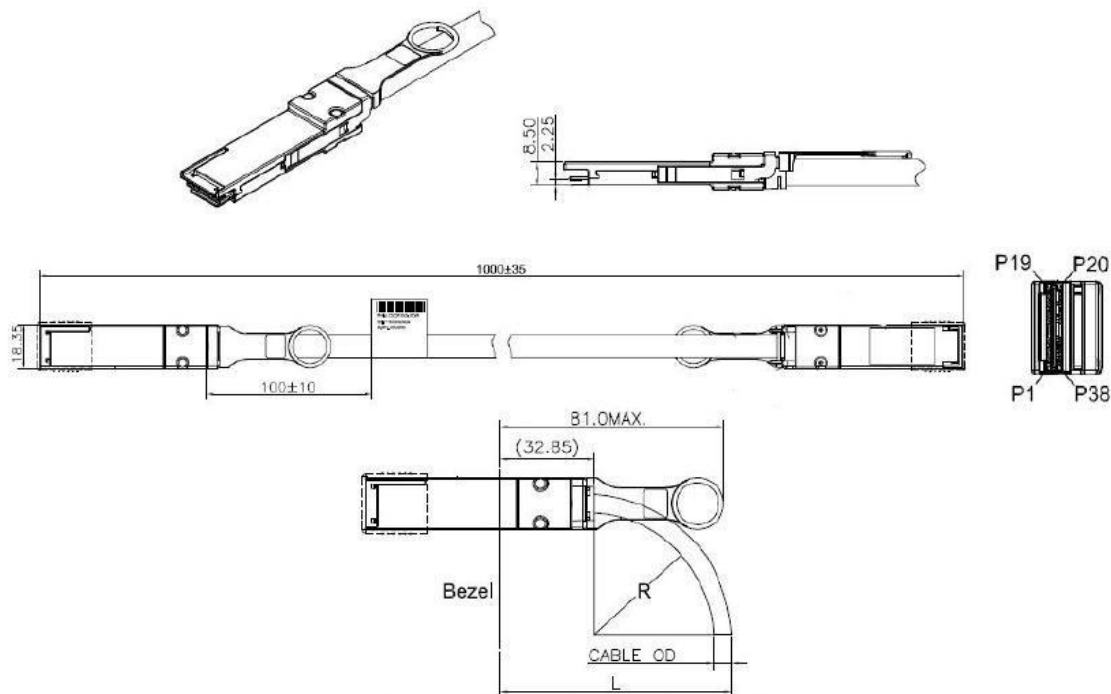
The 200G Interconnect Solution is specifically designed to meet high-density applications with its efficient use of space, power, and port density. QSFP-DD/QSFP+ features high-speed I/O passive cable assemblies that can deliver data rates as high as 400 Gbps with a variety of lengths or customized options for greater design flexibility.

These assemblies are "passive" copper cables because there isn't any signal conditioning circuitry (e.g. crosstalk or echo cancellation) contained within the QSFP56 connector. Sometimes these assemblies are referred to as "DAC" or "Direct Attached Copper" cables.

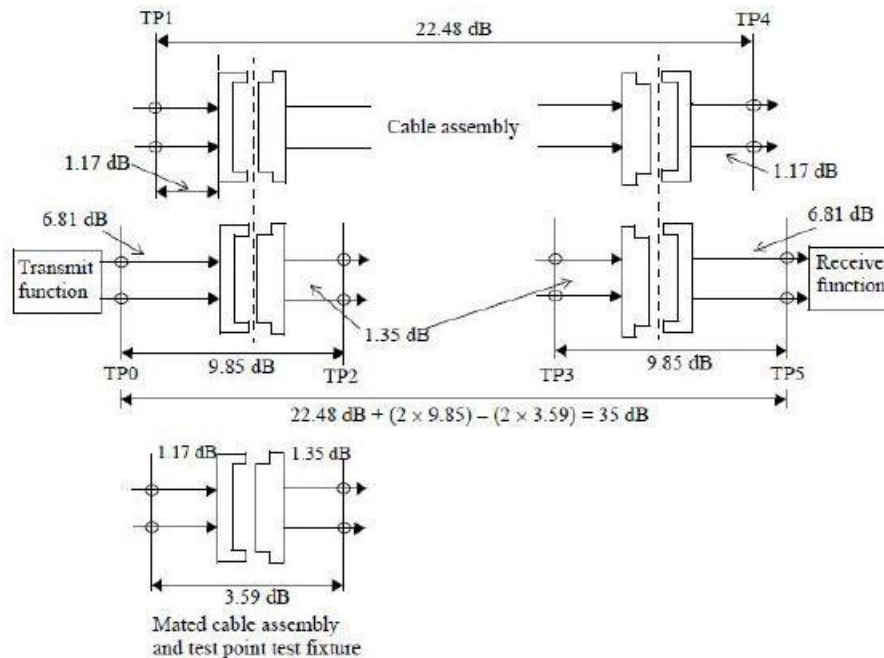
Key Features

- QSFP56 conforms to the small form factor SFF8665
- 4-channel full-duplex passive copper cable transceiver
- Low crosstalk
- Maximum aggregate data rate: 200 Gb/s (4 x 50 Gb/s)
- IEEE 802.3bj 200GEBASE-CR4
- Copper link x (x=1m, 3m, 5m)
- Support data rates: 50Gb/s PAM4 (per channel)
- I2C based two-wire serial interface for EEPROM signature which can be customized
- Power Supply: +3.3 V
- Operating Temperature: 0 to +70 °C
- RoHS Compliant

Outline Diagram



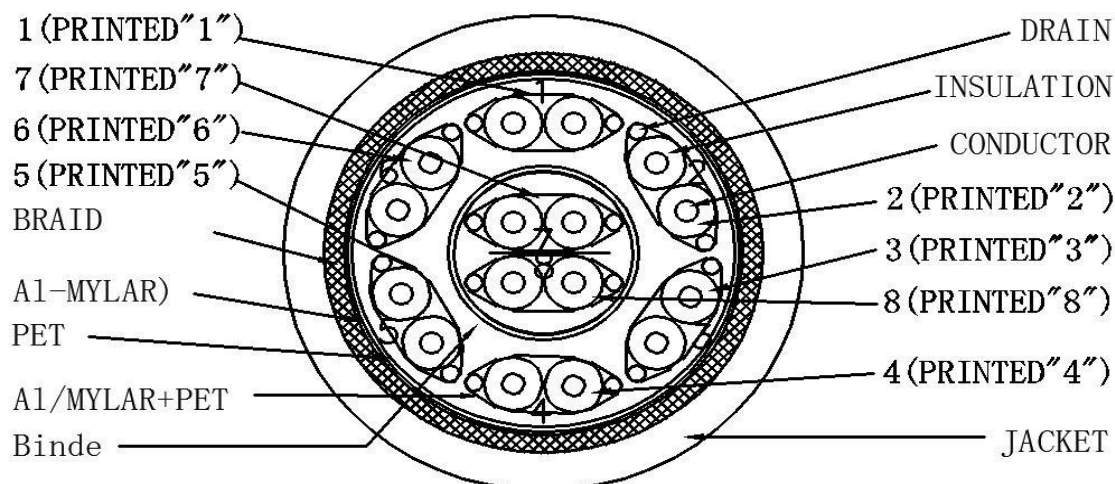
Channel Insertion Loss Budget



NOTE—The connector insertion loss is 1.07 dB for the mated test fixture. The host connector is allocated 0.62 dB of additional margin.

35 dB Channel Insertion Loss Budget at 12.8906 GHz

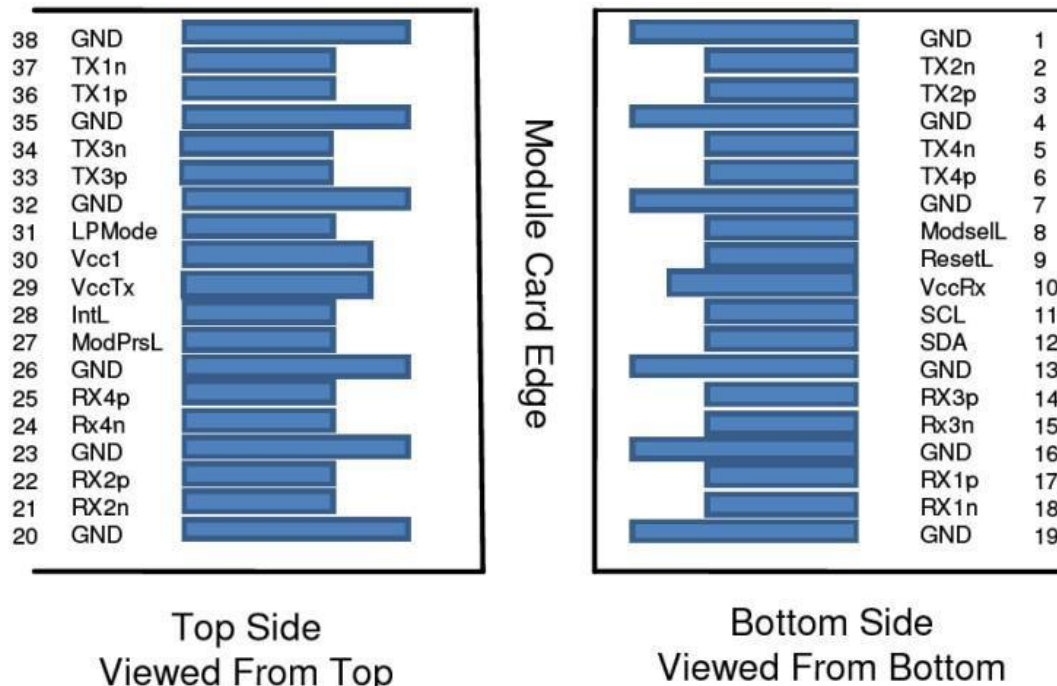
Bulk Cable Characteristics



- 1) Voltage Rating: 30V
- 2) Temperature Rating: 80 °C
- 3) Impedance: differential mode: $200 + 10/-5 \Omega$ @TDR

- 4) Insulation Resistance: 200 MΩ/km min. @ 20°C
- 5) Dielectric Strength: AC 500V/1 minute
- 6) Delay Skew (INTRA-SKEW): 50 ps/5 m max.
- 7) Signal Twin-ax pair cable: Solid Ag plated copper conductor
- 8) Braid shielding coverage 85% min

Pin Assignment



Pin	Symbol	Name/Description	Note
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data output	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data output	
7	GND	Transmitter Ground (Common with Receiver Ground)	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	3.3V Power Supply Receiver	2
11	SCL	2-Wire serial Interface Clock	
12	SDA	2-Wire serial Interface Data	
13	GND	Transmitter Ground (Common with Receiver Ground)	

14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Transmitter Ground (Common with Receiver Ground)	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Transmitter Ground (Common with Receiver Ground)	1
20	GND	Transmitter Ground (Common with Receiver Ground)	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Transmitter Ground (Common with Receiver Ground)	1
24	Rx4n	Receiver Inverted Data Output	1
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Transmitter Ground (Common with Receiver Ground)	1
27	ModPrsl	Module Present	
28	IntL	Interrupt	
29	VccTx	3.3V power supply transmitter	2
30	Vcc1	3.3V power supply	2
31	LPMODE	Low Power Mode, not connect	
32	GND	Transmitter Ground (Common with Receiver Ground)	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Output	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Output	
38	GND	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. GND is the symbol for signal and supply (power) common for QSFP+ modules. All are common within the QSFP+ 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 receiving and transmission power suppliers and shall be applied concurrently. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP+ transceiver module in any combination. The connector pins are each rated for a maximum current of 500 mA.

Specifications

Recommended Operating Environment

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature		-40		+85	°C	
Operating Case Temperature	Tc	0		+70	°C	
Power Supply Voltage	VCC3	3.14	3.3	3.47	V	
Data Rate Per Lane		1		50	Gb/s	

High Speed Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Differential Impedance	RIN, P	90	200	110	Ω	
Insertion Loss	SDD2	8		22.48	dB	
Differential Return Loss	SDD11	12.45		See 1	dB	
	SDD22	3.12		See 2	dB	
Common-Mode to Common-Mode	SCC11,	2			dB	
Output Return Loss	SCC22					
Differential to Common-Mode Return	SCD11	12		See 3	dB	
Loss	SCD22	10.58		See 4	dB	
Differential to Common Mode	SCD21-IL	10			dB	
Conversion Loss	SCD21-IL			See 5	dB	
	SCD21-IL	6.3			dB	
Channel Operating Margin	COM	3			dB	

Notes:

1. Reflection Coefficient given by equation $SDD11(dB) < 16.5 - 2 * \sqrt{f}$, with f in GHz
2. Reflection Coefficient given by equation $SDD11(dB) < 10.66 - 14 * \log_{10}(f/5.5)$, with f in GHz
3. Reflection Coefficient given by equation $SCD11(dB) < 22 - (20/50) * f$, with f in GHz
4. Reflection Coefficient given by equation $SCD11(dB) < 15 - (6/50) * f$, with f in GHz
5. Reflection Coefficient given by equation $SCD21(dB) < 27 - (29/22) * f$, with f in GHz

Ordering Information

Product Name	Product Description
QSFP-200DAC-001	200G QSFP56 to QSFP56 Passive Direct Attach Copper Twinax Cable 1m (3ft), 30AWG
QSFP-200DAC-002	200G QSFP56 to QSFP56 Passive Direct Attach Copper Twinax Cable 2m (6ft), 28AWG

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