

LWO-DAC-B-QSFP28-1M

100G DAC Breakout cable, 1xQSFP28(100G) to 4xSFP28(25G), 1m

Features

- Compatible with IEEE 802.3bj, IEEE 802.3by and InfiniBand EDR
- Supports aggregate data rates of 100Gbps
- Optimized construction to minimize insertion loss and cross talk
- Backward compatible with existing QSFP+ connectors and cages
- Pull-to-release slide latch design
- 26AWG through 30AWG cable
- Straight and break out assembly configurations available
- Customized cable braid termination limits EMI radiation
- Customizable EEPROM mapping for cable signature
- RoHS compliant



Applications

- Switches, servers and routers
- Data Center networks
- Storage area networks
- High performance computing
- Telecommunication and wireless infrastructure

General Description

QSFP28 passive copper cable assembly features eight differential copper pairs, providing four data transmission channels at speeds up to 28Gbps per channel, and meets 100G Ethernet, 25G Ethernet and InfiniBand Enhanced Data Rate (EDR) requirements. Available in a broad range of wire gauges – from 26AWG through 30AWG – this 100G copper cable assembly features low insertion loss and low cross talk.

Designed for applications in the data center, networking and telecommunications markets that require a high speed, reliable cable assembly, this next generation product shares the same mating interface with the QSFP+ form factor, making it backward compatible with existing QSFP ports. QSFP28 can be used with current 10G and 40G applications with substantial signal integrity margin.

QSFP28 Pin Assignment and Description

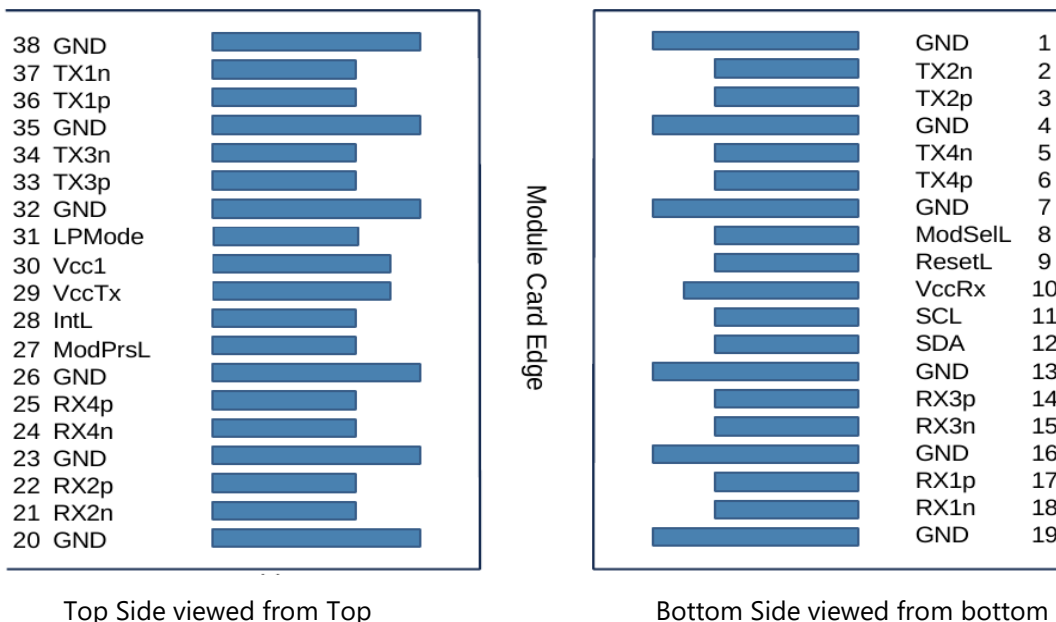


Figure 1: QSFP28 module pad assignment and layout

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PIN Definition

Pad	Logic	Symbol	Description	Plug Sequence	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	1
8	LVTTL-I	ModSelL	Module Select	3	
9	LVTTL-I	ResetL	Module Reset	3	
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVC MOS-I/O	SCL	TWI serial interface clock	3	
12	LVC MOS-I/O	SDA	TWI serial interface data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL/RxLOS	Interrupt/optional RxLOS	3	
29		VccTx	+3.3V Power supply transmitter	2	2
30		Vcc1	+3.3V Power supply	2	2
31	LVTTL-I	LPMode/TxDis	Low Power mode/optional TX Disable	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the 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. VccRx, Vcc1 and VccTx may be internally connected within the module in any combination. The connector pins are each rated for a maximum current of 1000mA.

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SFP28 Pin Assignment and Description

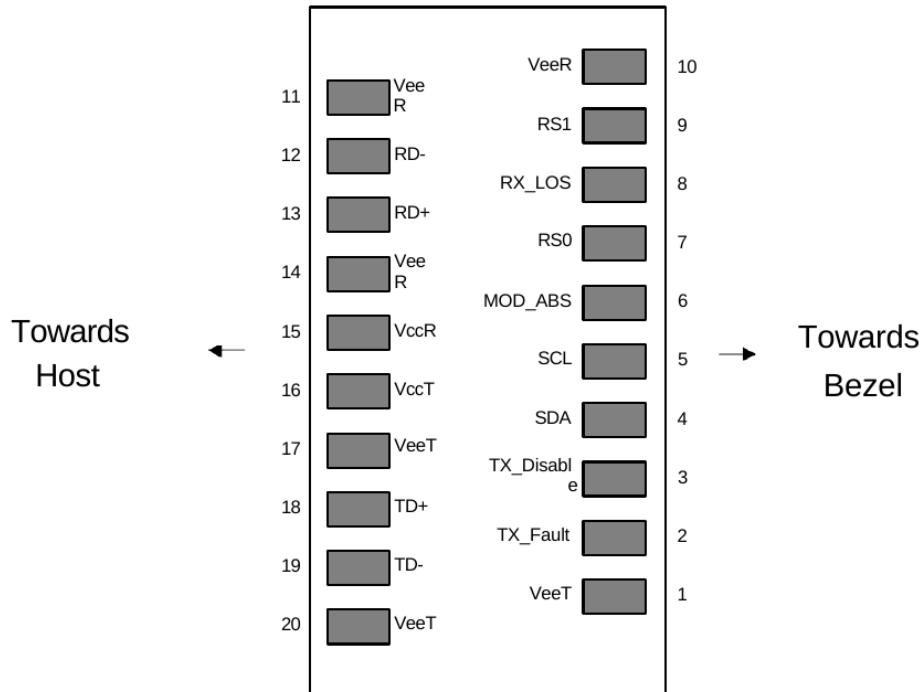


Figure 2: SFP28 module pad assignment and layout

Pad Function Definition

Pin	Logic	Symbol	Name/Description	NOTE
1		VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	LVTTL-O	TX_Fault	Transmitter Fault.	2
3	LVTTL-I	TX_Disable	Transmitter Disable. Laser output disabled on high or open.	3
4	LVTTL-I/O	SDA	2-wire Serial Interface Data Line	4
5	LVTTL-I/O	SCL	2-wire Serial Interface Clock Line	4
6		MOD_ABS	Module Absent. Grounded within the module	4
7	LVTTL-I	RS0	Rate Select 0, internal pull down	5
8	LVTTL-O	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	LVTTL-I	RS1	Rate Select 1, internal pull down	5
10		VeeR	Receiver Ground (Common with Transmitter Ground)	1
11		VeeR	Receiver Ground (Common with Transmitter Ground)	1
12	CML-O	RD-	Receiver Inverted DATA out. AC Coupled	
13	CML-O	RD+	Receiver Non-inverted DATA out. AC Coupled	
14		VeeR	Receiver Ground (Common with Transmitter Ground)	1
15		VccR	Receiver Power Supply	
16		VccT	Transmitter Power Supply	
17		VeeT	Transmitter Ground (Common with Receiver Ground)	1
18	CML-I	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	CML-I	TD-	Transmitter Inverted DATA in. AC Coupled.	
20		VeeT	Transmitter Ground (Common with Receiver Ground)	1

Notes:

- Circuit ground is internally isolated from chassis ground.
- TFAULT is an open collector/drain output, which should be pulled up with a 4.7kΩ ~ 10kΩ resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
- Laser output disabled on TDIS>2.0V or open, enabled on TDIS<0.8V.

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4. Should be pulled up with 4.7kΩ ~ 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.
6. LOS is open collector output. It should be pulled up with 4.7kΩ ~ 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

High Speed Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Note
Differential Impedance	TDR	90	100	110	Ω	
Insertion loss	SDD21	-22.48			dB	At 12.8906 GHz
Differential Return Loss	SDD11			See 1	dB	At 0.05 to 4.1 GHz
Differential Return Loss	SDD22			See 2	dB	At 4.1 to 19 GHz
Common-mode to common-mode output return loss	SCC11			-2	dB	At 0.2 to 19 GHz
Common-mode to common-mode output return loss	SCC22			-2	dB	At 0.2 to 19 GHz
Differential to common-mode return loss	SCD11			See 3	dB	At 0.01 to 12.89 GHz
Differential to common-mode return loss	SCD22			See 4	dB	At 12.89 to 19 GHz
Differential to common Mode Conversion Loss	SCD21-IL			-10	dB	At 0.01 to 12.89 GHz
Differential to common Mode Conversion Loss	SCD21-IL			See 5	dB	At 12.89 to 15.7 GHz
Differential to common Mode Conversion Loss	SCD21-IL			-6.3	dB	At 15.7 to 19 GHz

Notes:

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

Cable Specification

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

Cable AWG

Length (m)	Cable AWG
1	30
2	30
3	26/30
4	26
5	26

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Mechanical Dimensions

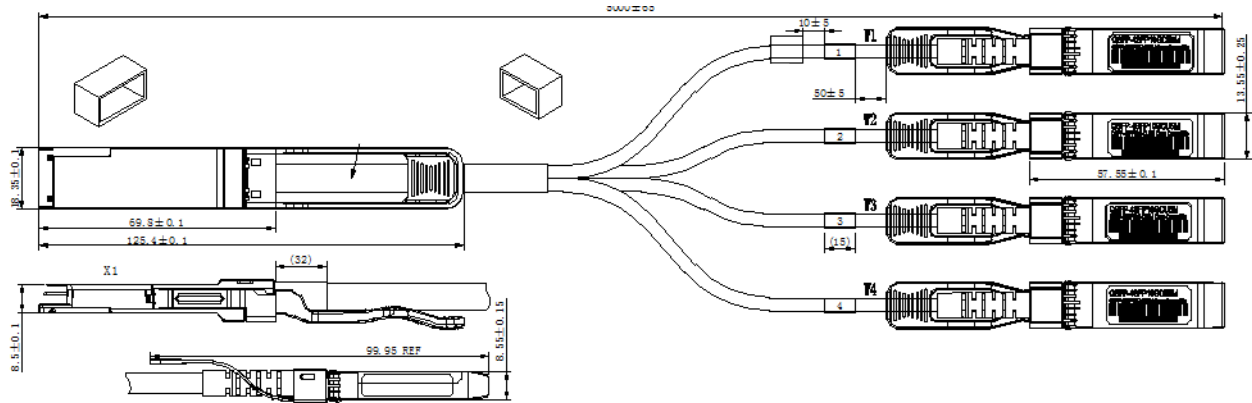


Figure 3. Mechanical Outline

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	Compliant with Standards
Electromagnetic Interference (EMI)	CENELEC EN55022 Class B	Compliant with Standards
Electromagnetic Interference (EMI)	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