

EDQD400-OPxxx

400G QSFP-DD-OSFP Direct Attach Cable (DAC)

PRODUCT FEATURES

- **Compatible with IEEE 802.3cd**
- **Supports aggregate data rates of 400Gbps(PAM4)**
- **Optimized construction to minimize insertion loss and crosstalk**
- **Pull-to-release slide latch design**
- **Straight and break out assembly configurations available**
- **Customized cable braid termination limits EMI radiation**
- **Customizable EEPROM mapping for cable signature**
- **26AWG and 30AWG cable**
- **3.3V Power supply**
- **Temperature Range: 0~ 70 °C**
- **RoHs Compliant**

APPLICATIONS

- **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**

Industry Standards

- 400G Ethernet (IEEE 802.3cd)
- InfiniBand HDR

DESCRIPTIONS

400G QSFP-DD_OSFP passive copper cable assembly feature sixteen differential copper pairs, providing eight data transmission channels at speeds up to 56Gbps(PAM4) per channel, and meets 400G Ethernet and InfiniBand High Data Rate(HDR) requirements. Available in 26AWG and 30AWG wire gauges, this 400G copper cable assembly features low insertion loss and low crosstalk.

400G QSFP-DD_OSFP passive copper cable uses PAM4 signals for transmission, which doubles the rate. However, there are more stringent requirements for cable insertion loss. For detailed requirements, please see High Speed Characteristics.

Ordering Information

Part No.	Description
EDQD400-Op xx -30	400G QSFP-DD-OSFP Direct Attach Cable (DAC) 30AVG 0~1.5M
EDQD400-Op xxx -26	400G QSFP-DD-OSFP Direct Attach Cable (DAC) 26AVG 1.5~3M

Note:

1. where "x" denotes cable length in meters. Examples are as follows:
2. $x = 1$ for 1m, $xx=10$ for 10m

General Product Characteristics

QSFP-DD-OSFP DAC Specifications	
Number of Lanes	Tx8 & Rx8
Channel Data Rate	53.125Gbps
Operating Temperature	0 to + 70°C
Storage Temperature	-40 to + 85°C
Supply Voltage	3.3 V nominal
Electrical Interface	76pins edge connector(QSFP-DD) 60pins edge connector(OSFP)
Management Interface	Serial, I2C

High Speed Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Note
Differential Impedance	TDR	90	100	110	Ω	
Insertion loss	SDD21	-17.16			dB	At 13.28 GHz
Differential Return Loss	SDD11			See 1	dB	At 0.05 to 4.1 GHz

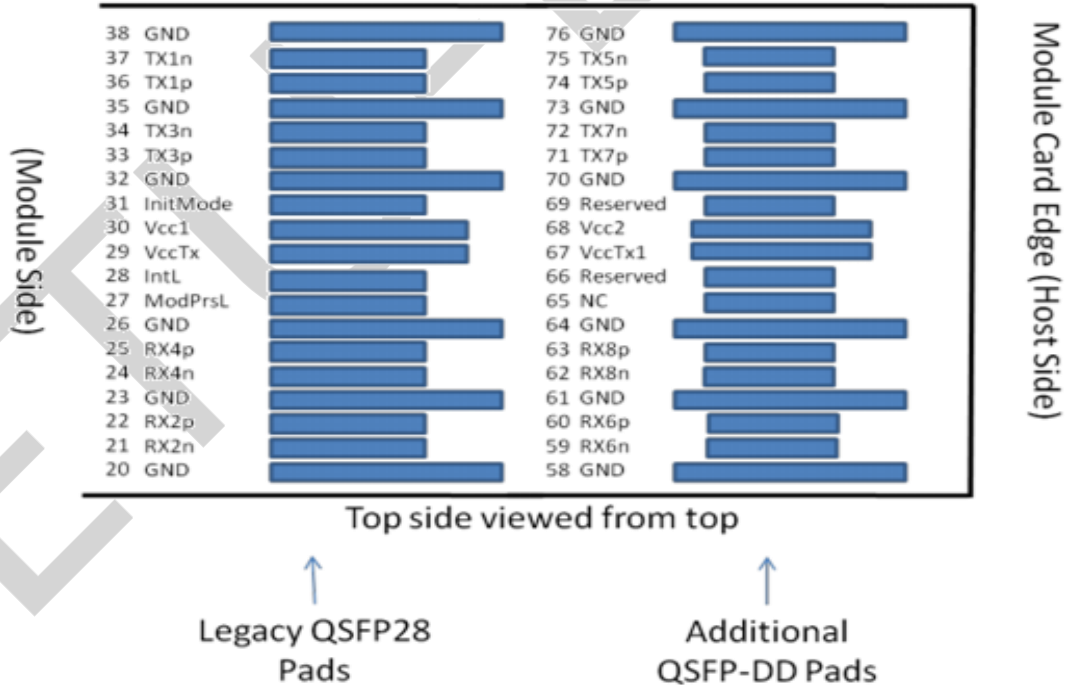
	SDD22			See 2	dB	At 4.1 to 19 GHz
Common-mode to common-mode output return loss	SCC11 SCC22			-2	dB	At 0.2 to 19 GHz
Differential to common-mode return loss	SCD11 SCD22			See 3	dB	At 0.01 to 12.89 GHz
				See 4		At 12.89 to 19 GHz
Differential to common Mode Conversion Loss	SCD21- SDD21			-10	dB	At 0.01 to 12.89 GHz
				See 5		At 12.89 to 15.7 GHz
				-6.3		At 15.7 to 19 GHz

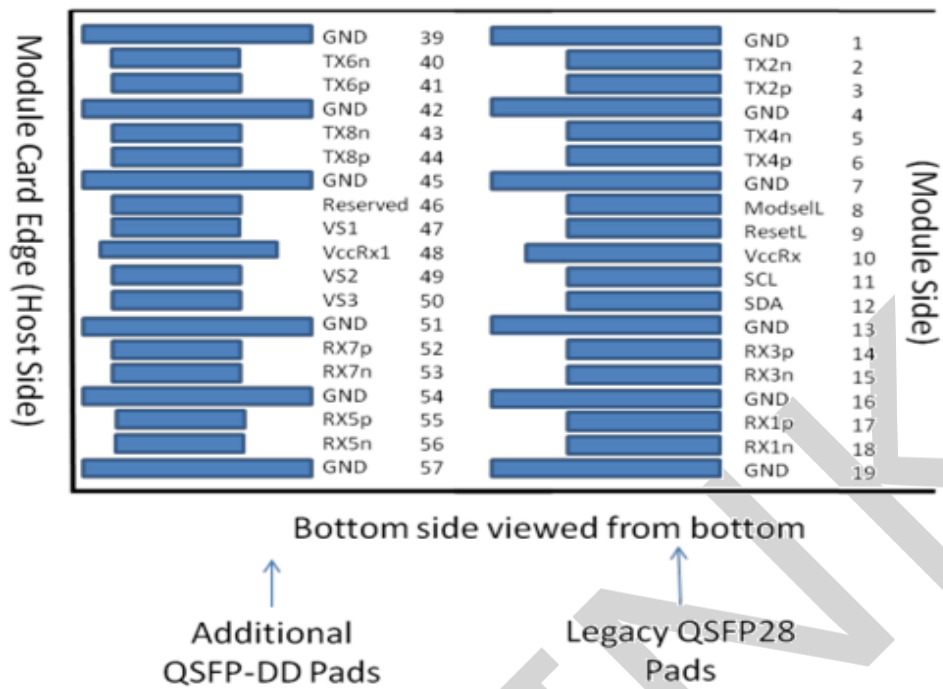
Notes:

- 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

Pin Diagram

QSFP-DD





Pin Descriptions

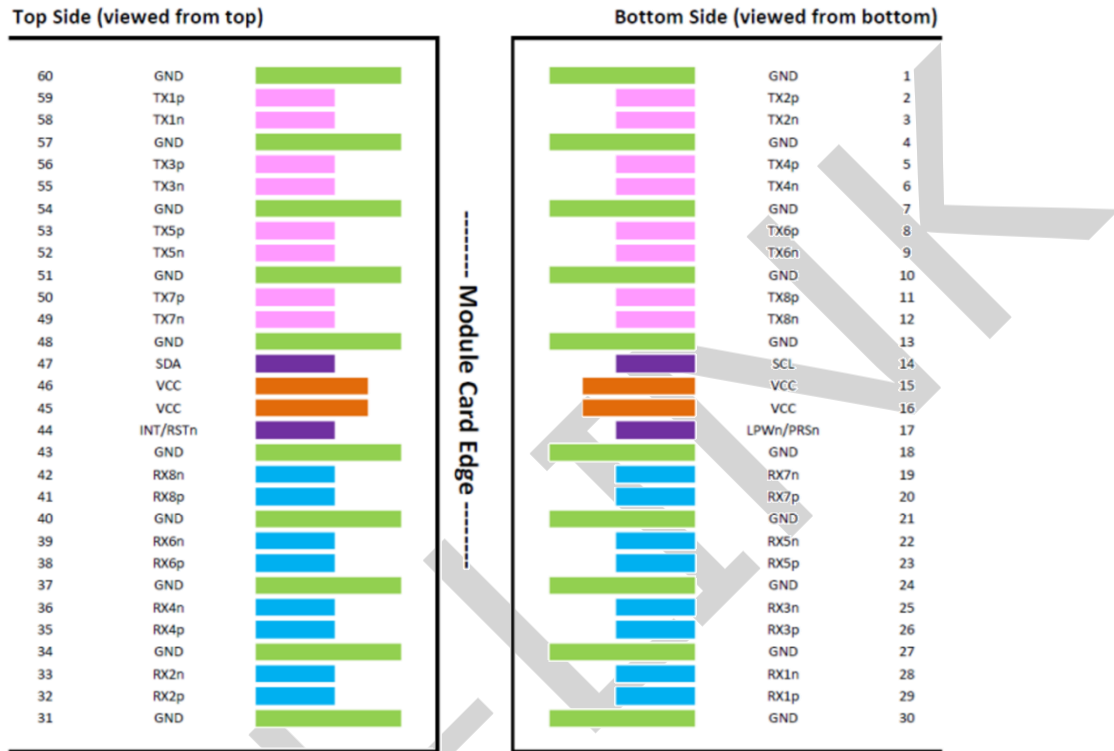
QSFP-DD Pin Function Definition

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
39		GND	Ground
40	CML-I	Tx6n	Transmitter Inverted Data Input
41	CML-I	Tx6p	Transmitter Non-Inverted Data Input
42		GND	Ground
43	CML-I	Tx8n	Transmitter Inverted Data Input
44	CML-I	Tx8p	Transmitter Non-Inverted Data Input
45		GND	Ground
46		Reserved	
47		VS1	
48		VccRx1	+3.3V Power supply
49		VS2	
50		VS3	
51		GND	Ground
52	CML-O	Rx7p	Receiver Non-Inverted Data Output
53	CML-O	Rx7n	Receiver Inverted Data Output
54		GND	Ground
55	CML-O	Rx5p	Receiver Non-Inverted Data Output
56	CML-O	Rx5n	Receiver Inverted Data Output
57		GND	Ground
58		GND	Ground
59	CML-O	Rx6n	Receiver Inverted Data Output
60	CML-O	Rx6p	Receiver Non-Inverted Data Output
61		GND	Ground
62	CML-O	Rx8n	Receiver Inverted Data Output
63	CML-O	Rx8p	Receiver Non-Inverted Data Output
64		GND	Ground
65		NC	
66		Reserved	
67		VccTx1	+3.3V Power supply
68		VCC2	+3.3V Power supply
69		Reserved	
70		GND	Ground
71	CML-I	Tx7p	Transmitter Non-Inverted Data Input
72	CML-I	Tx7n	Transmitter Inverted Data Input

73		GND	Ground
74	CML-I	Tx5p	Transmitter Non-Inverted Data Input
75	CML-I	Tx5n	Transmitter Inverted Data Input
76		GND	Ground

OSFP



OSFP Pin Function Definition

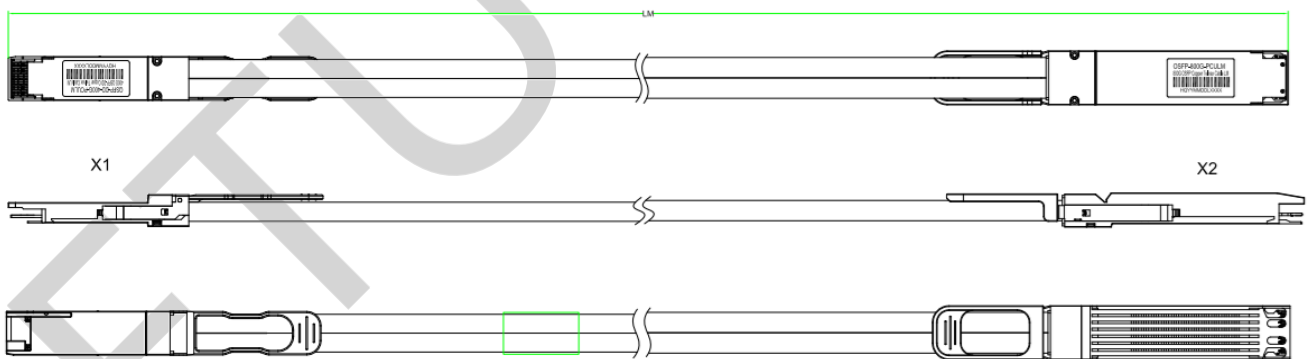
Pin	Logic	Symbol	Description
1		GND	Ground
2	CML-I	Tx2p	Transmitter Non-Inverted Data Input
3	CML-I	Tx2n	Transmitter Inverted Data Input
4		GND	Ground
5	CML-I	Tx4p	Transmitter Non-Inverted Data Input
6	CML-I	Tx4n	Transmitter Inverted Data Input
7		GND	Ground
8	CML-I	Tx6p	Transmitter Non-Inverted Data Input
9	CML-I	Tx6n	Transmitter Inverted Data Input
10		GND	Ground

11	CML-I	Tx6p	Transmitter Non-Inverted Data Input
12	CML-I	Tx6n	Transmitter Inverted Data Input
13		GND	Ground
14	LVC MOS-I/O	SCL	2-wire serial interface clock
15		VCC	+3.3V Power supply
16		VCC	+3.3V Power supply
17		LPWn/PRSn	Low-Power Mode / Module Present
18		GND	Ground
19	CML-O	Rx7n	Receiver Inverted Data Output
20	CML-O	Rx7p	Receiver Non-Inverted Data Output
21		GND	Ground
22	CML-O	Rx5n	Receiver Inverted Data Output
23	CML-O	Rx5p	Receiver Non-Inverted Data Output
24		GND	Ground
25	CML-O	Rx3n	Receiver Inverted Data Output
26	CML-O	Rx3p	Receiver Non-Inverted Data Output
27		GND	Ground
28	CML-O	Rx1n	Receiver Inverted Data Output
29	CML-O	Rx1p	Receiver Non-Inverted Data Output
30		GND	Ground
31		GND	Ground
32	CML-O	Rx2p	Receiver Non-Inverted Data Output
33	CML-O	Rx2n	Receiver Inverted Data Output
34		GND	Ground
35	CML-O	Rx4p	Receiver Non-Inverted Data Output
36	CML-O	Rx4n	Receiver Inverted Data Output
37		GND	Ground
38	CML-O	Rx6p	Receiver Non-Inverted Data Output
39	CML-O	Rx6n	Receiver Inverted Data Output
40		GND	Ground
41	CML-O	Rx8p	Receiver Non-Inverted Data Output
42	CML-O	Rx8n	Receiver Inverted Data Output
43		GND	Ground
44		INT/RSTn	Module Interrupt / Module Reset
45		VCC	+3.3V Power supply

46		VCC	+3.3V Power supply
47	LVC MOS-	SDA	2-wire serial interface data
	I/O		
48		GND	Ground
49	CML-I	Tx7n	Transmitter Inverted Data
50	CML-I	Tx7p	Input Transmitter Non-Inverted Data Input
51		GND	Ground
52	CML-I	Tx5n	Transmitter Inverted Data
53	CML-I	Tx5p	Input Transmitter Non-Inverted Data Input
54		GND	Ground
55	CML-I	Tx3n	Transmitter Inverted Data
56	CML-I	Tx3p	Input Transmitter Non-Inverted Data Input
57		GND	Ground
58	CML-I	Tx1n	Transmitter Inverted Data
59	CML-I	Tx1p	Input Transmitter Non-Inverted Data Input
60		GND	Ground

Mechanical Specifications

The connector is compatible with the QSFP-DD and SFF-8024 (OSFP) specification.



Length (m)	Cable AWG
1	30
1.5	30
2	26
2.5	26
3	26

Revision History

Version No.	Date	Description
1.0	July 25, 2013	Preliminary datasheet
2.0	September 28, 2023	Product upgrades

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