TSD4Q-85M-XXXC Active Optical Cable

Multi-Mode 400G QSFP56-DD to 4 x 100G QSFP56 Active Optical Cable, With Diagnostic Monitoring

Features

- Hot-pluggable QSFP-DD form factor / QSFP form factor
- Transmission data rate up to 53Gbps per channel
- 8x53Gbps PAM4 transmitter and PAM4 receiver at QSFP-DD end
- 2x53Gbps PAM4 transmitter and PAM4 receiver at QSFP end
- 8 channels 850nm VCSEL array at QSFP-DD end
- 2 channels 850nm VCSEL array at QSFP end
- 8 channels PIN array at QSFP-DD end
- 2 channels PIN array at QSFP end
- Internal CDR circuits on both receiver and transmitter channels
- Power consumption < 10W at QSFP-DD end
- Power consumption < 4.5W at QSFP end
- CMIS V5.1 compliant for QSFP-DD
- SFF8636 compliant for QSFP
- Operating case temperature: 0°C~+70°C
- RoHS6 compliant (lead free)

Applications

- 400GBASE SR8 Ethernet
- 100GBASE SR2 Ethernet

Description

The TSD4Q-85M-XXXC is an 8-Channel, Pluggable, Parallel, Fiber-Optic 400G QSFP56-DD to 4 x 100G QSFP56 AOC. It integrates 8 data lanes in each direction at QSFP-DD end and 2 data lanes in each direction at QSFP end. Each lane can operate at 53.125Gbps up to 70 m using OM3 fiber or 100 m using OM4 fiber with FEC.

These modules are designed to operate over multimode fiber systems using a nominal wavelength of 850nm. The electrical interface uses a 76 contacts edge type connector at QSFP-DD end and 38 contacts edge type connectors at QSFP end.

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Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	VCC	-0.5	+3.6	V
Storage Temperature	Tc	-40	+85	°C
Relative Humidity[1]	RH	15	85	%

Notes:

1. Non-condensing.

Recommended Operating Environment

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	VCC	3.15	3.30	3.45	V
Operating Case Temperature	Tca	0	-	70	°C

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit
Differential Input Voltage Amplitude[1]	Vin	300	-	1100	mV
Differential Output Voltage Amplitude[2]	Vout	300	-	900	mV
Signaling rate per lane	DR	26.5625± 100 ppm			GBps
Differential termination mismatch	-	-	-	10	%
Skew	-	-	-	300	ps
Bit Error Rate[3]	BER	-	-	2.4E-4	-
Input Logic Level High	VIH	2.0	-	VCC	V
Input Logic Level Low	VIL	0	-	0.8	V
Output Logic Level High	VOH	VCC-0.5	-	VCC	V
Output Logic Level Low	VOL	0	-	0.4	V

Notes:

1. Differential input voltage amplitude is measured between TxnP and TxnN
2. Differential output voltage amplitude is measured between RxnP and RxnN.
3. BER=2.4E-4; PRBS31Q@26.5625GBd. Pre-FEC

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Transceiver Electrical Pad Layout (QSFP-DD end)

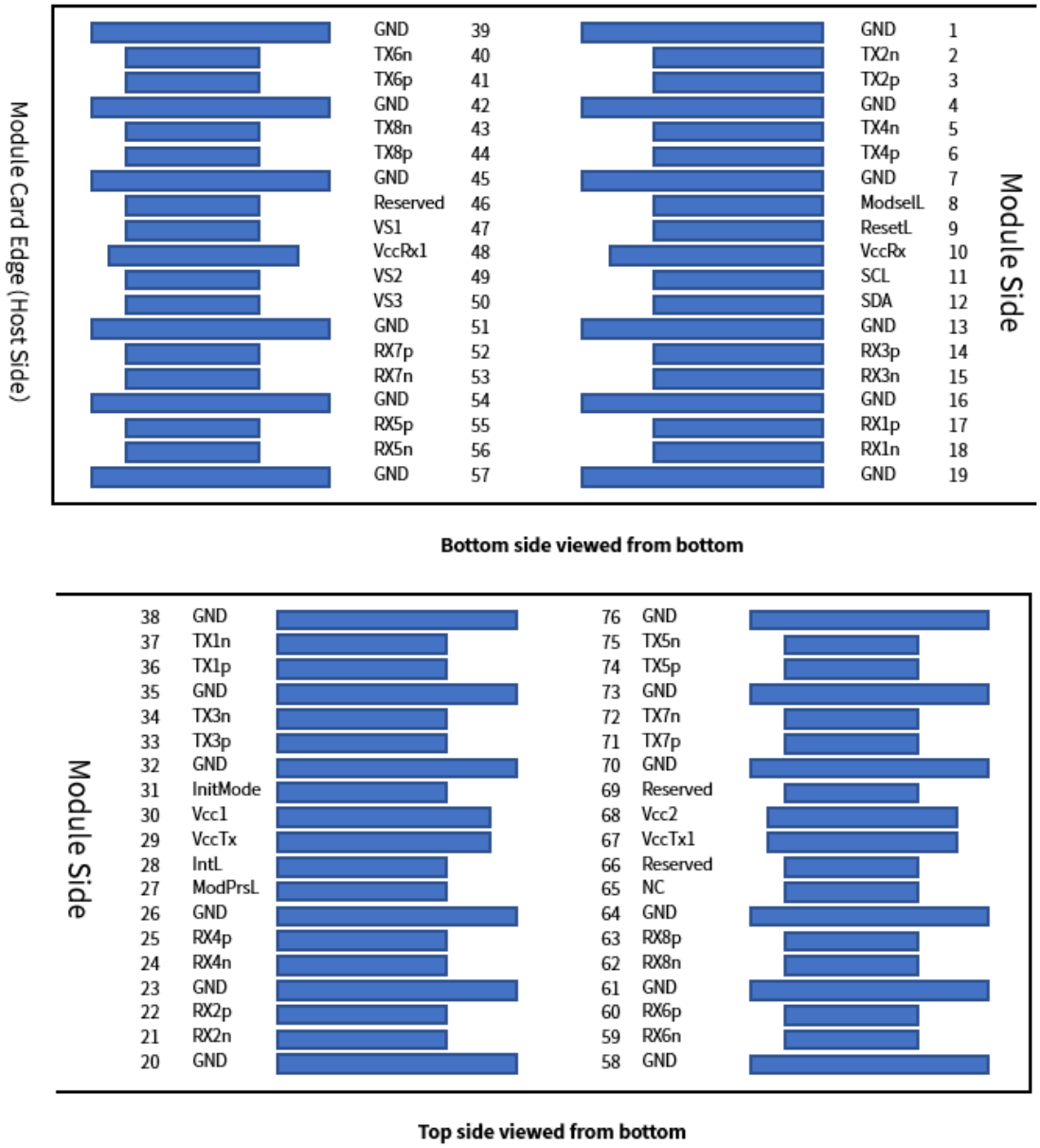


Figure 1 – QSFP-DD Compliant 76-pin connector (per QSFP-DD MSA)

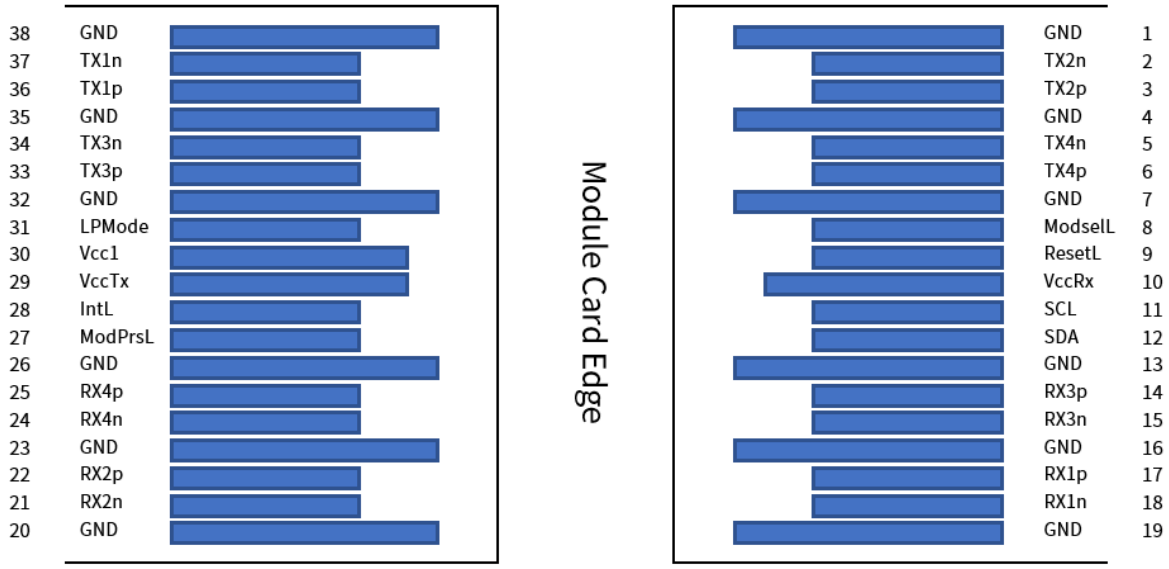
Pin Definition (QSFP-DD end)

Pin	Symbol	Name/Description
1	GND	Module Ground
2	Tx2-	Transmitter inverted data input
3	Tx2+	Transmitter non-inverted data input
4	GND	Module Ground
5	Tx4-	Transmitter inverted data input
6	Tx4+	Transmitter non-inverted data input

7	GND	Module Ground
8	MODSEIL	Module Select
9	ResetL	Module Reset
10	VCCRx	+3.3V Receiver Power Supply
11	SCL	2-wire Serial interface clock
12	sda	2-wire Serial interface data
13	GND	Module Ground
14	RX3+	Receiver non-inverted data output
15	RX3-	Receiver inverted data output
16	GND	Module Ground
17	RX1+	Receiver non-inverted data output
18	RX1-	Receiver inverted data output
19	GND	Module Ground
20	GND	Module Ground
21	RX2-	Receiver inverted data output
22	RX2+	Receiver inverted data output
23	GND	Module Ground
24	RX4-	Receiver inverted data output
25	RX4+	Receiver non-inverted data output
26	GND	Module Ground
27	ModPrsL	Module Present, internal pulled down to GND
28	IntL	Interrupt output, should be pulled up on host board
29	VCCTx	+3.3V Transmitter Power Supply
30	VCC1	+3.3V Power Supply
31	InitMode	Initiallzation mode; In legacy QSFP applications, the InitMode pad is
32	GND	Module Ground
33	Tx3+	Transmitter non-inverted data input
34	Tx3-	Transmitter inverted data input
35	GND	Module Ground
36	Tx1+	Transmitter non-inverted data input
37	Tx1-	Transmitter inverted data input
38	GND	Module Ground
39	GND	Module Ground
40	Tx6-	Transmitter inverted data input
41	Tx6+	Transmitter non-inverted data input
42	GND	Module Ground
43	Tx8-	Transmitter inverted data input
44	Tx8+	Transmitter non-inverted data input
45	GND	Module Ground
46	Reserved	For future use
47	VS1	Module Vender Specific 1

48	VCCRx1	+3.3V Power Supply
49	VS2	Module Vender Specific 2
50	VS3	Module Vender Specific 3
51	GND	Module Ground
52	RX7+	Receiver non-inverted data output
53	RX7-	Receiver inverted data output
54	GND	Module Ground
55	RX5+	Receiver non-inverted data output
56	RX5-	Receiver inverted data output
57	GND	Module Ground
58	GND	Module Ground
59	RX6-	Receiver inverted data output
60	RX6+	Receiver inverted data output
61	GND	Module Ground
62	RX8-	Receiver inverted data output
63	RX8+	Receiver non-inverted data output
64	GND	Module Ground
65	NC	NO Connect
66	Reserved	For future use
67	VCCTx1	+3.3V Power Supply
68	VCC2	+3.3V Power Supply
69	Reserved	For future use
70	GND	Module Ground
71	Tx7+	Transmitter non-inverted data input
72	Tx7-	Transmitter inverted data input
73	GND	Module Ground
74	Tx5+	Transmitter non-inverted data input
75	Tx5-	Transmitter inverted data input
76	GND	Module Ground

Transceiver Electrical Pad Layout (QSFP56 end)



Top Side
Viewed From Top

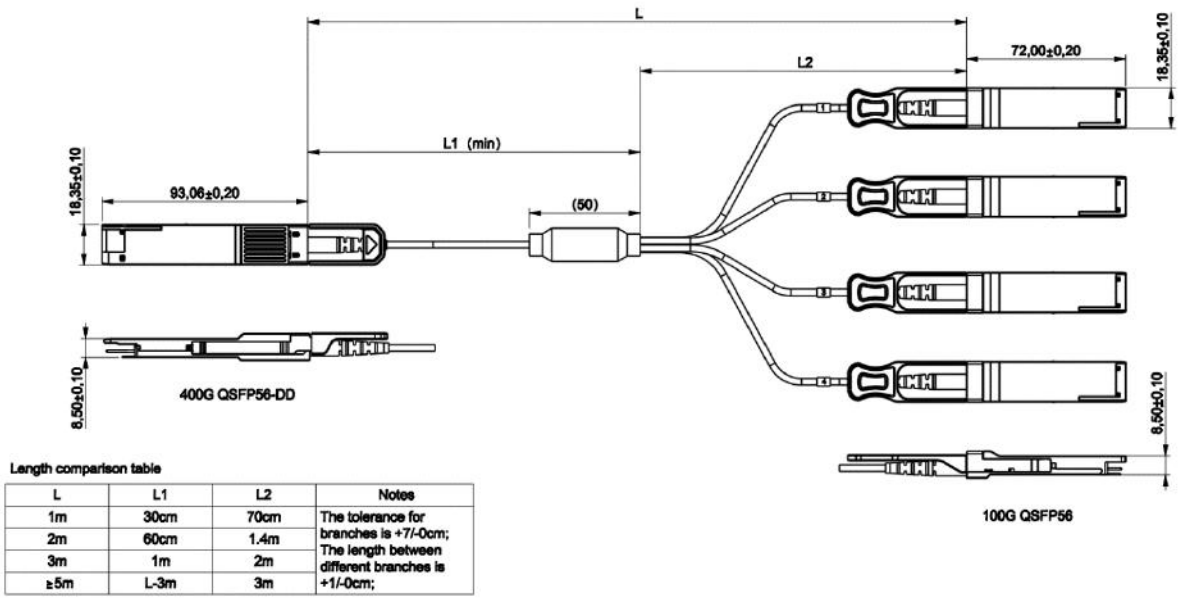
Bottom Side
Viewed From Bottom

Pin Definition (QSFP56 end)

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
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

Mechanical



Length comparison table

L	L1	L2	Notes
1m	30cm	70cm	The tolerance for branches is +7/-0cm; The length between different branches is +1/-0cm;
2m	60cm	1.4m	
3m	1m	2m	
≥5m	L-3m	3m	

AOC product bagging circle size:

L	Disc fiber diameter (mm)
1m≤L≤5m	110≤inner diameter, outer diameter≤160
5m<L≤7m	110≤inner diameter, outer diameter≤170
7m<L≤30m	110≤inner diameter, outer diameter≤180
30m<L≤50m	110≤inner diameter, outer diameter≤210
50m<L≤100m	110≤inner diameter, outer diameter≤250

Length tolerance table:

L	Tolerance (mm)
L≤1 M	+70/-0
1 M<L<7 M	+100/-0
L≥7 M	+2%L/-0

Ordering Information

Part Number	Product Description
TSD4Q-85M-XXXC	400G QSFP56-DD to 4 x 100G QSFP56 AOC 0°C ~ +70°C

XXX :001~070,1~70 Length in meters on OM3 MMF

XXX :001~100,1~100 Length in meters on OM4 MMF

Important Notice

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