

TSD4T-85L-XXXD Active Optical Cables

Multi-Mode 2x100G BASE SR4 QSFP-DD TO 4X2x25G BASE SR SFP-DD Active Optical Cable, With Diagnostic Monitoring

Features

- 8-channel full-duplex active optical cable
- Data rate up to 25.78125 Gbps per lane
- Compliant to the QSFP-DD MSA/SFP-DD MSA and CMIS
- VCSEL Array Transmitter and PIN Array Receiver
- Low Power Dissipation: QSFP-DD <4W; QSFP28 <3.5W
- RoHS compliant

Applications

- 2x100GBASE SR4 Ethernet
- 2x25GBASE SR Ethernet

Description

The TSD4T-85L-XXXD is a 8-Channel, Pluggable, Parallel, Fiber-Optic 200G QSFP-DD to 4X50G SFP-DD AOC. This transceiver is a high performance module for short-range multi-lane data communication and interconnect applications. It integrates 8 data lanes in each direction with 200Gbps bandwidth.

These modules are designed to operate over multimode fiber systems using a nominal wavelength of 850nm. The electrical interface uses a 76@QSFP-DD and 40@SFP-DD contact edge type connector.

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	RH	0	85	%

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
Supply Voltage	VCC	3.15	3.30	3.45	V
Case Operating Temperature	Tca	0	-	70	°C
Data Rate Per Lane	DR	-	25.78125	-	Gbps
Fiber Bend Radius	Rb	3	-	-	cm

Notes:

1. Supply current is shared between VCCTX and VCCR_X.
2. In-rush is defined as current level above steady state current requirements.

Transmitter Specifications

Parameter	Symbol	Min.	Typical	Max	Unit
Input differential impedance	R _{in}	90	100	110	Ω
Differential Input Voltage swing, per lane	V _{in}	300	-	1100	mV
Transmit Disable Voltage	V _D	2.0	-	VCC+0.3	V
Transmit Enable Voltage	V _{en}	V _{ee}	-	V _{ee} +0.8	V

Receiver Specifications

Parameter	Symbol	Min.	Typical	Max	Unit
Differential Output Swing, per lane	V _{out}	300	-	900	mV
Bit Error Rate ¹	BER	-	-	5E-5	-
Output Differential Impedance	R _{out}	90	100	110	Ω
Loss of Signal –Asserted	-	2.0	-	VCC+0.3	V
Loss of Signal –Negated	-	V _{ee}	-	V _{ee} +0.8	V

Notes:

1. BER=5E-5; PRBS 2³¹-1@25.78125Gbps. Pre-FEC

Transceiver Electrical Pad Layout (QSFP-DD end)

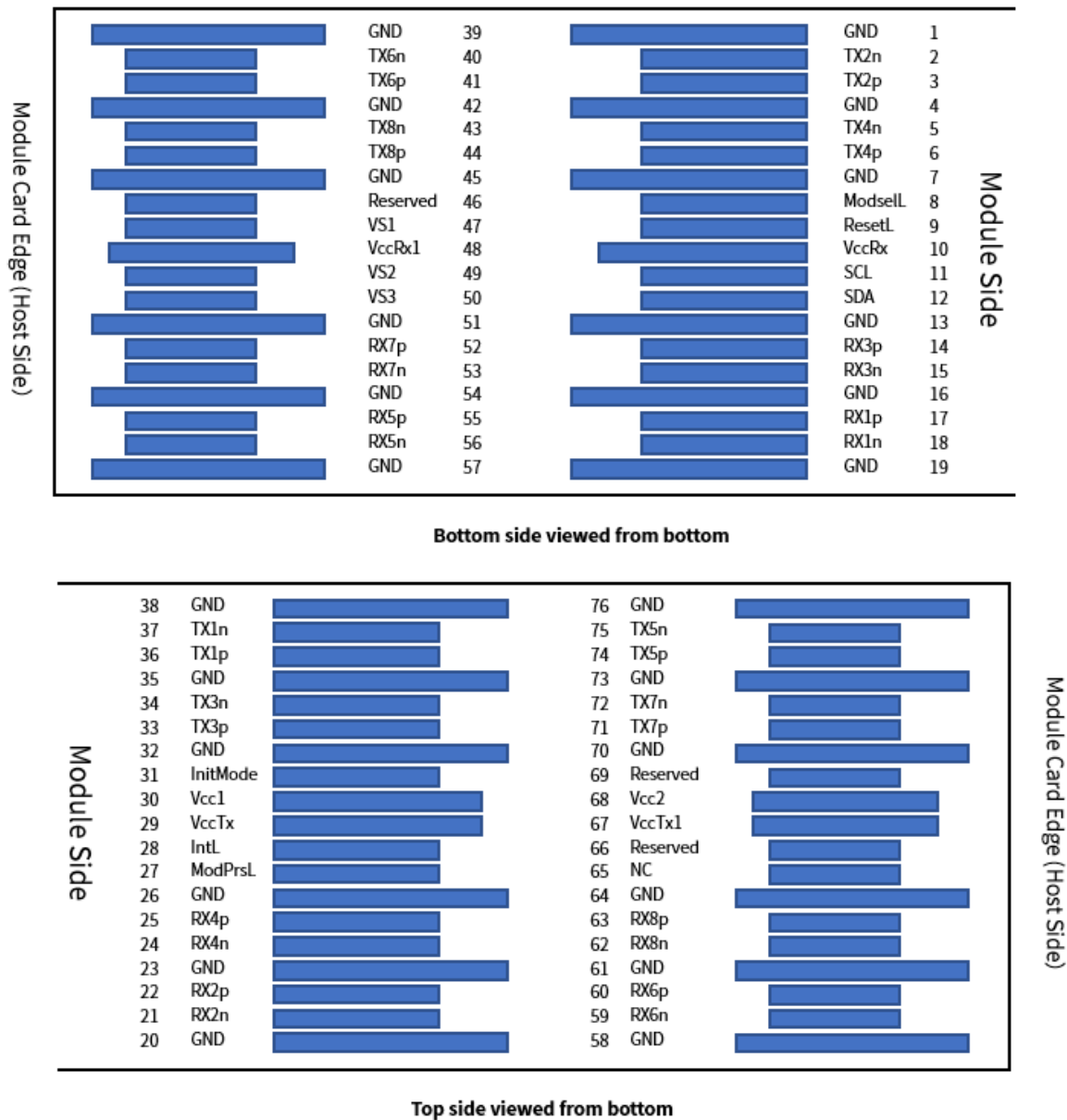


Figure 1 – QSFP-DD Compliant 76-pin connector (per QSFP-DD MSA)

Pin Definition (QSFP-DD end)

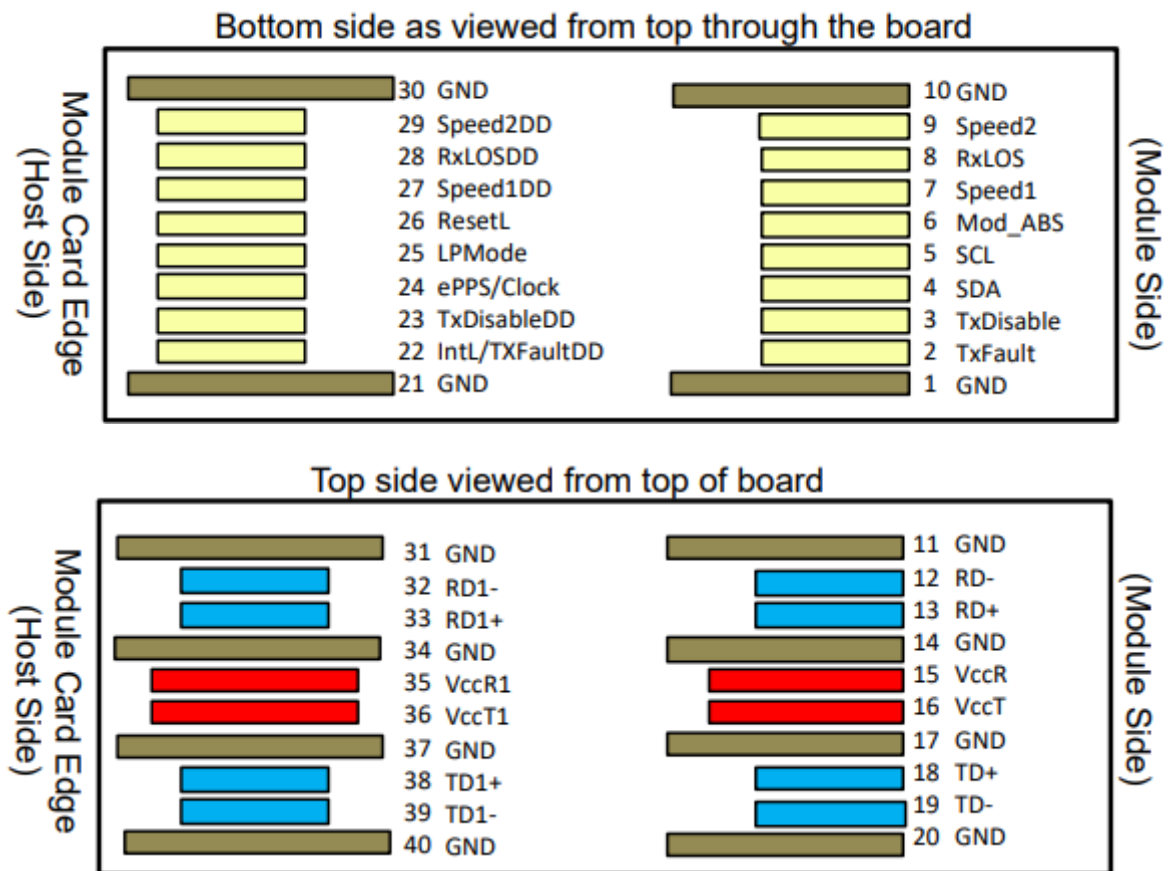
Pin	Symbol	Name/Description
1	GND	Module Ground
2	Tx2-	Transmitter inverted data input
3	Tx2+	Transmitter non-inverted data input
4	GND	Module Ground
5	Tx4-	Transmitter inverted data input

6	Tx4+	Transmitter non-inverted data input
7	GND	Module Ground
8	MODSEIL	Module Select
9	ResetL	Module Reset
10	VCCR _x	+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	VCCT _x	+3.3V Transmitter Power Supply
30	VCC1	+3.3V Power Supply
31	InitMode	Initialization 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

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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 (SFP-DD end)



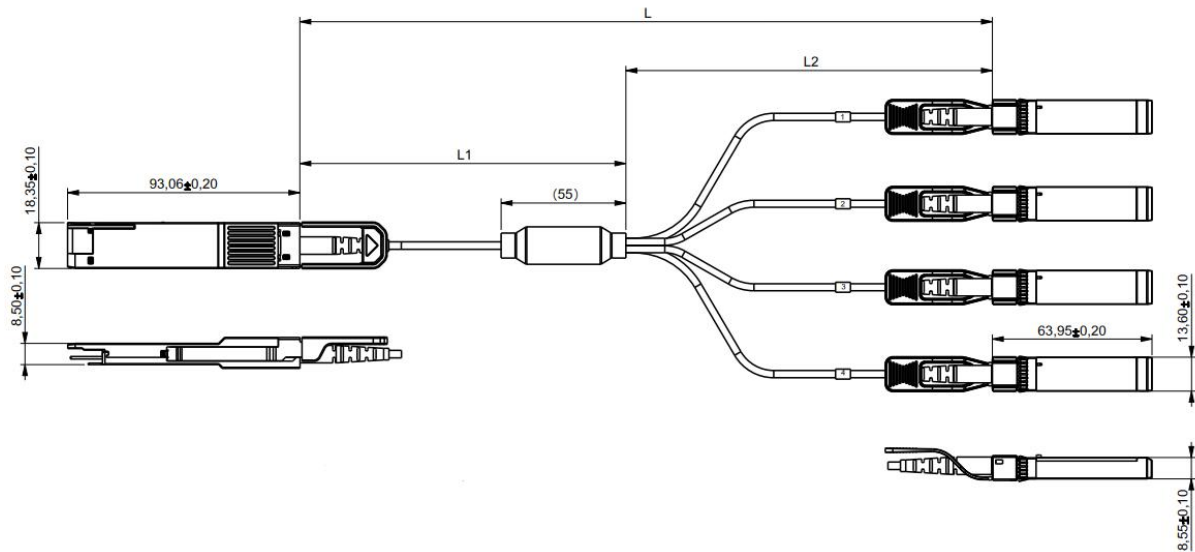
Pin Definition (SFP-DD end)

Pin	Symbol	Name/Description
1	GND	Ground
2	TxFault	Transmitter Fault
3	TxDisable	Transmitter Disable for classic SFP channel
4	SDA	2-wire Serial Interface Data Line
5	SCL	2-wire Serial Interface Clock Line
6	Mod_ABS	Module Absent. Grounded within the module
7	Speed1	Rx Rate Select for classic SFP channel
8	RxLOS	SFP channel Loss of Signal indication. Logic 0 indicates normal operation
9	Speed2	Tx Rate Select for classic SFP channel
10	GND	Ground
11	GND	Ground
12	RD0-	Receiver Inverted DATA out for classic SFP+ channel. AC Coupled
13	RD0+	Receiver DATA out for classic SFP+ channel. AC Coupled
14	GND	Ground
15	VccR	Receiver Power Supply

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16	VccT	Transmitter Power Supply
17	GND	Ground
18	TD0+	Transmitter DATA in for classic SFP+ channel. AC Coupled
19	TD0-	Transmitter Inverted DATA in for classic SFP+ channel. AC Coupled
20	GND	Ground
21	GND	Ground
22	IntL/ TxFaultDD	Interrupt: optionally configured as TxFaultDD via TWI as described in the SFP-DD MIS
23	TxDisableDD	Transmitter Disable for DD channel
24	ePPS/Clock	Precision Time Protocol (PTP) reference clock input
25	LPMode	Low Power Mode Control
26	ResetL	Module Reset
27	Speed1DD	Rx Rate Select for DD channel
28	RxLOSDD	SFP DD channel Loss of Signal indication. Logic 0 indicates normal operation
29	Speed2DD	Tx Rate Select for DD channel
30	GND	Ground
31	GND	Ground
32	RD1-	Receiver Inverted DATA out for DD channel. AC Coupled
33	RD1+	Receiver DATA out for DD channel. AC Coupled
34	GND	Ground
35	VccR1	Receiver Power for DD channel
36	VccT1	Transmitter Power for DD channel
37	GND	Ground
38	TD1+	Transmitter DATA in for DD channel. AC Coupled
39	TD1-	Transmitter Inverted DATA in for DD channel. AC Coupled
40	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	
≥ 5 m	L-3m	3m	

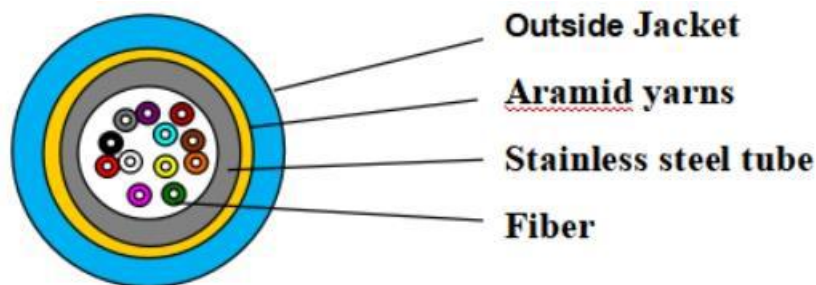
AOC product bagging circle size:

L	Disc fiber diameter (mm)
$1\text{m} \leq L \leq 5\text{m}$	$110 \leq \text{Inner diameter, outer diameter} \leq 160$
$5\text{m} < L \leq 7\text{m}$	$110 \leq \text{Inner diameter, outer diameter} \leq 170$
$7\text{m} < L \leq 30\text{m}$	$110 \leq \text{Inner diameter, outer diameter} \leq 180$
$30\text{m} < L \leq 50\text{m}$	$110 \leq \text{Inner diameter, outer diameter} \leq 210$
$50\text{m} < L \leq 100\text{m}$	$110 \leq \text{Inner diameter, outer diameter} \leq 250$

Length tolerance table:

L	Tolerance (mm)
$L \leq 1\text{ M}$	+70/-0
$1\text{ M} < L < 7\text{ M}$	+100/-0
$L \geq 7\text{ M}$	+2%L/-0

Cable Structure (QSFP-DD end)



(cross-section)

Cable Technical Parameters (QSFP-DD end)

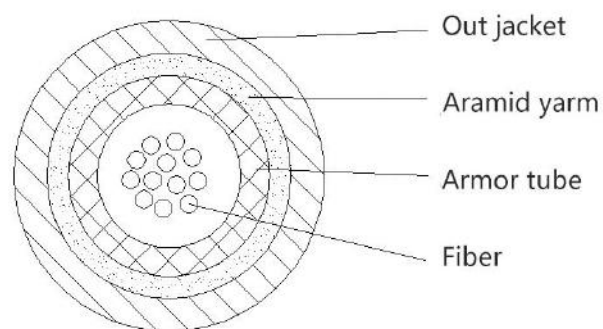
The corresponding dimension of the whole fiber optic cable.

Fiber Count	Fiber type	Cable Diameter (mm)	Stainless steel tube diameter	Tight-buffered fiber diameter (mm)
16	4.0GJFKH-16S	$\Phi 4.0 \pm 0.2$	$\Phi 2.4 \pm 0.1$	$\Phi 0.25$

The corresponding parameters of the whole fiber optic cable.

Cable type	Cable Diameter (mm)	Cable weight KG/KM	Tensile N		Bend radius (mm)*		Crush N/100mm
			Short time	Long time	dynamic	static	
5.0GJFKH-16S	$\Phi 4.0 \pm 0.2$	24	400	200	60	30	3000

Cable Structure (SFP-DD end)



Cable Technical Parameters (SFP-DD end)

Parameter	Symbol	Typical
Model		GJFKV
Fiber	Count	2~12
	Color	Blue, orange, green, blown, gray, white, red, black, yellow, purple, pink, aqua
Cable	OD (mm)	3.0 ± 0.1
	Material	PVC-OFNP
Armored tube	OD (mm)	1.8 ± 0.1
	ID (mm)	1.2 ± 0.1
Max.tensile Strength(N)	Short-term	150
	Long-term	80
Min.Bending Radius(mm)	Dynamic	20D

	Static	10D
Max.Crush Resistance(N/100mm)	Short-term	3000
	Long-term	1000
Strength Members		Aramid yarn
Temperature range	Storage or transportation	-20~70°C
	Operation	-20~60°C
	Installation	-20~60°C

Ordering Information

Part Number	Product Description
TSD4T-85L-XXXD	200G QSFP-DD TO 4x50G SFP-DD Armored 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	

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