

## TSD8S-85L-XXXC Active Optical Cables

Multi-Mode 2x100G BASE SR4 QSFP-DD TO 8X25G BASE SR SFP28 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/SFP28 MSA and CMIS/SFF-8472
- VCSEL Array Transmitter and PIN Array Receiver
- Low Power Dissipation: QSFP-DD <4W; SFP28 <1W
- RoHS compliant

### Applications

- 2x100GBASE SR8 Ethernet
- 25GBASE SR Ethernet

### Description

The TSD8S-85L-XXXC is a 8-Channel, Pluggable, Parallel, Fiber-Optic 200G QSFP-DD to 8X25G SFP28 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 20@SFP 28 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 <sup>1</sup> | 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<sub>X</sub>.
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 <sub>in</sub> | 90              | 100     | 110                  | Ω    |
| Differential Input Voltage swing, per lane | V <sub>in</sub> | 300             | -       | 1100                 | mV   |
| Transmit Disable Voltage                   | V <sub>D</sub>  | 2.0             | -       | VCC+0.3              | V    |
| Transmit Enable Voltage                    | V <sub>en</sub> | V <sub>ee</sub> | -       | V <sub>ee</sub> +0.8 | V    |

## Receiver Specifications

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

### Notes:

1. BER=5E-5; PRBS 2<sup>31</sup>-1@25.78125Gbps. Pre-FEC

## Transceiver Electrical Pad Layout (QSFP-DD end)

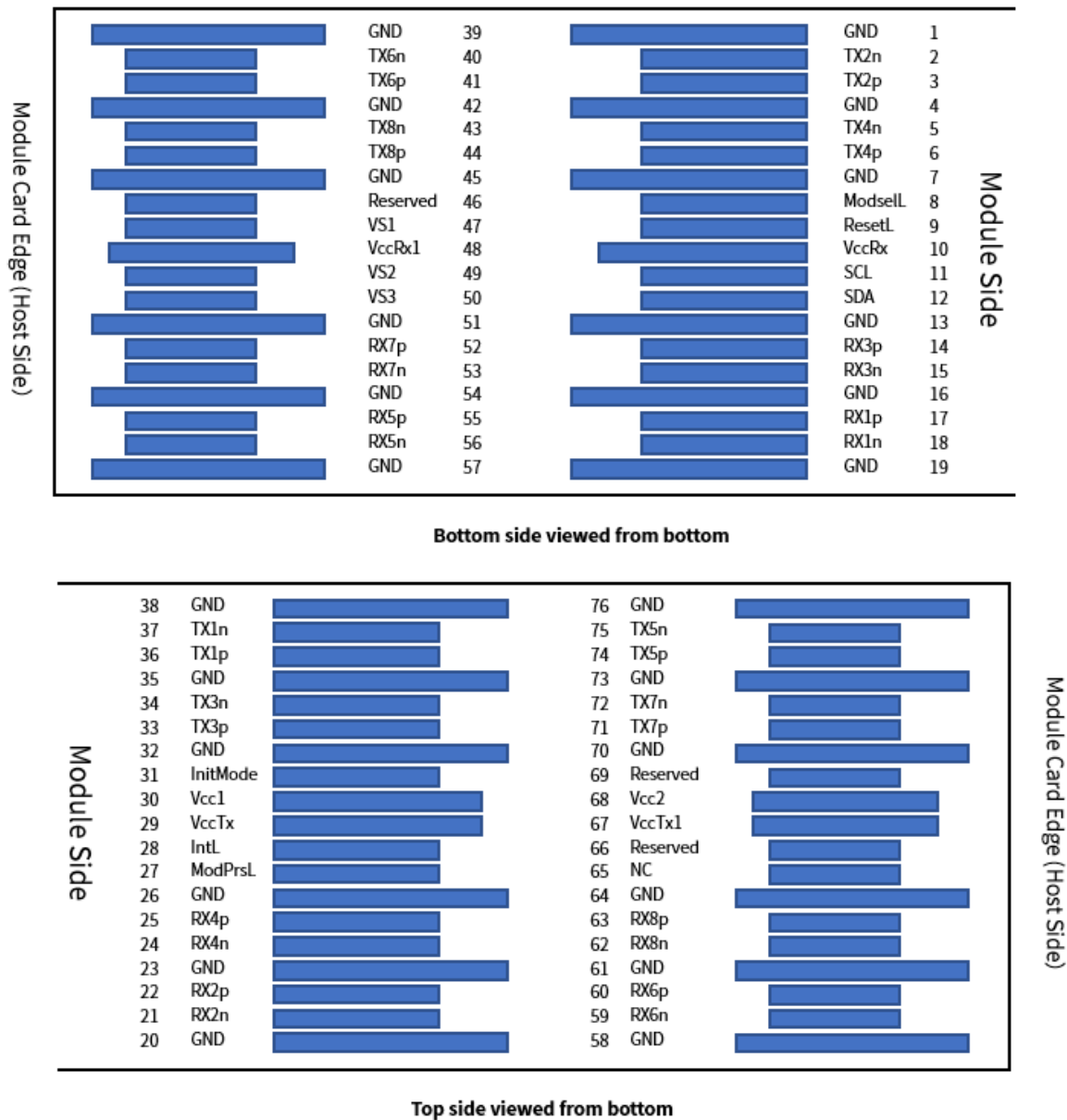


Figure 1 – QSFP-DD Compliant 76-pin connector (per QSFP-DD MSA)

## 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 |

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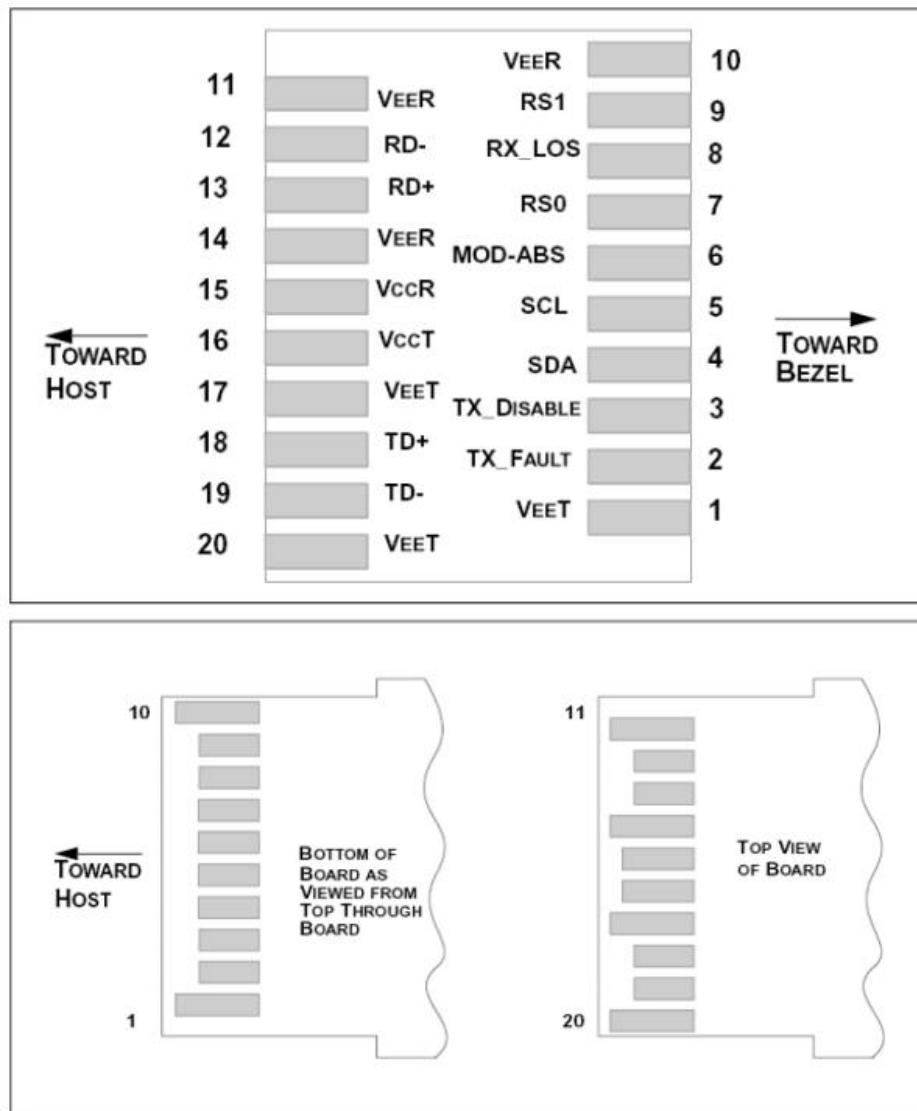


|    |                   |                                                                       |
|----|-------------------|-----------------------------------------------------------------------|
| 7  | GND               | Module Ground                                                         |
| 8  | MODSEIL           | Module Select                                                         |
| 9  | ResetL            | Module Reset                                                          |
| 10 | VCCR <sub>x</sub> | +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 <sub>x</sub> | +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                                                        |
| 47 | VS1               | Module Vender Specific 1                                              |

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|    |          |                                     |
|----|----------|-------------------------------------|
| 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 (SFP28 end)



## Pin Definition (SFP28 end)

| Pin | Symbol   | Name/Description                                              |
|-----|----------|---------------------------------------------------------------|
| 1   | VEET     | Transmitter Ground                                            |
| 2   | Tx_FAULT | Transmitter Fault                                             |
| 3   | Tx_DIS   | Transmitter Disable. Laser output disabled on high or open    |
| 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   | RS0      | Rate Select 0                                                 |
| 8   | RX_LOS   | Loss of Signal indication. Logic 0 indicates normal operation |
| 9   | RS1      | Rate Select 1                                                 |
| 10  | VEER     | Receiver Ground                                               |

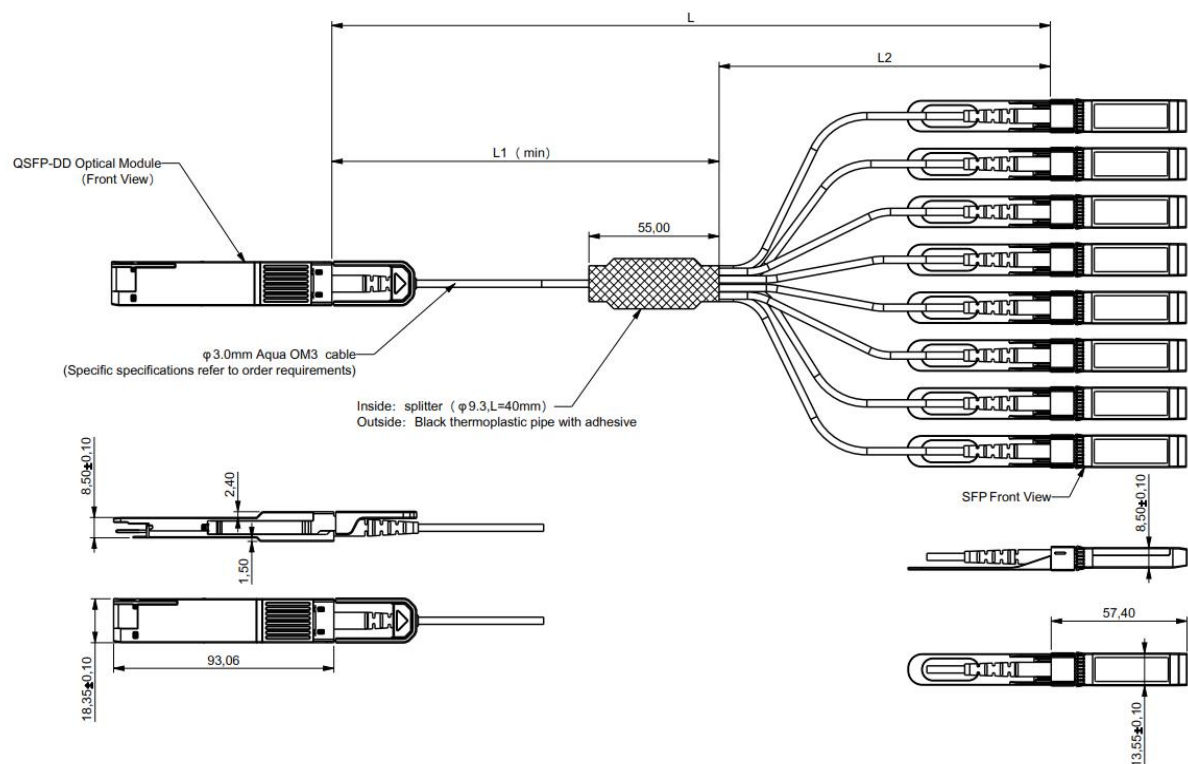
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|    |      |                                          |
|----|------|------------------------------------------|
| 11 | VEER | Receiver Ground                          |
| 12 | RD-  | Receiver Inverted DATA out. AC Coupled   |
| 13 | RD+  | Receiver DATA out. AC Coupled            |
| 14 | VEER | Receiver Ground                          |
| 15 | VCCR | Receiver Power Supply                    |
| 16 | VCCT | Transmitter Power Supply                 |
| 17 | VEET | Transmitter Ground                       |
| 18 | TD+  | Transmitter DATA in. AC Coupled          |
| 19 | TD-  | Transmitter Inverted DATA in. AC Coupled |
| 20 | VEET | Transmitter Ground                       |

## Mechanical



Length comparison table

| L   | L1   | L2   | Notes                                                                                       |
|-----|------|------|---------------------------------------------------------------------------------------------|
| 1m  | 30cm | 70cm | The tolerance for branches is +7/-0cm;<br>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                         |
|------------------------------------------------|---------------------------------------------|
| TSD8S-85L-XXXC                                 | 200G QSFP-DD TO 8x25G SFP28 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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