

QSFP28-IB Active Optical Cable

Key Features

- Up to 25.78 Gbps per channel
- 4-channel full-duplex
- Single 3.3 V power supply
- Low-power consumption: 1.65 W per cable end
- Up to 150 m with OM3 fibers
- Hot pluggable
- Commercial operating case temperature range: 0 to 70° C
- LSZH, LSZH/OFNR or OFNP-rated cables
- RoHS/REACH compliant
- TUV/UL-certified



Applications

- 10/25/40/50/100G Ethernet
- InfiniBand 4×EDR, 4×FDR, 4×QDR
- Proprietary HPC interconnections

Description

QSFP28-IB AOC fully takes advantage of the high transmission bandwidth, low power consumption, and long reach.

1. Absolute Maximum Ratings

| Parameters | Symbol | Min. | Typ. | Max. | Unit | Note |
|---------------------|-----------|------|------|------|------|---------|
| Supply Voltage | V_{IN} | 0 | - | 4.0 | V | |
| Storage Temperature | T_{STG} | -40 | - | 85 | °C | Ambient |
| Relative Humidity | RH | 0 | - | 85 | % | |

2. Operating Specifications

| Parameters | Symbol | Min. | Typ. | Max. | Unit | Note |
|----------------------------|----------|------|------|------|------|---------|
| Operating Case Temperature | T_{OP} | 0 | - | 70 | °C | |
| Power Supply Voltage | V_{CC} | 3.13 | 3.30 | 3.47 | V | |
| Power Supply Current | I_{CC} | - | 500 | - | mA | Per End |
| Power Consumption | | - | 1.65 | 1.73 | W | Per End |

3. Electrical Characteristics

| Parameters | Symbol | Min. | Typ. | Max. | Unit | Note |
|---------------------------------|--------------|------|-------|------------|----------|------|
| Data Rate (Per Channel) | BR | - | 25.78 | - | Gbps | |
| Transmitter | | | | | | |
| Input Differential Impedance | R_{IN} | - | 100 | - | Ω | |
| Differential Data Input Swing | V_{INP-P} | 200 | - | 900 | mV | |
| Receiver | | | | | | |
| Output Differential Impedance | R_{OUT} | - | 100 | - | Ω | |
| Differential Data Output Swing | V_{OUTP-P} | - | - | 800 | mV | |
| Bit Error Ratio (at 25.78 Gbps) | - | - | - | 10^{-12} | - | 1 |

Note

1. Pre-FEC Bit Error Ratio with a PRBS $2^{31} - 1$ test pattern

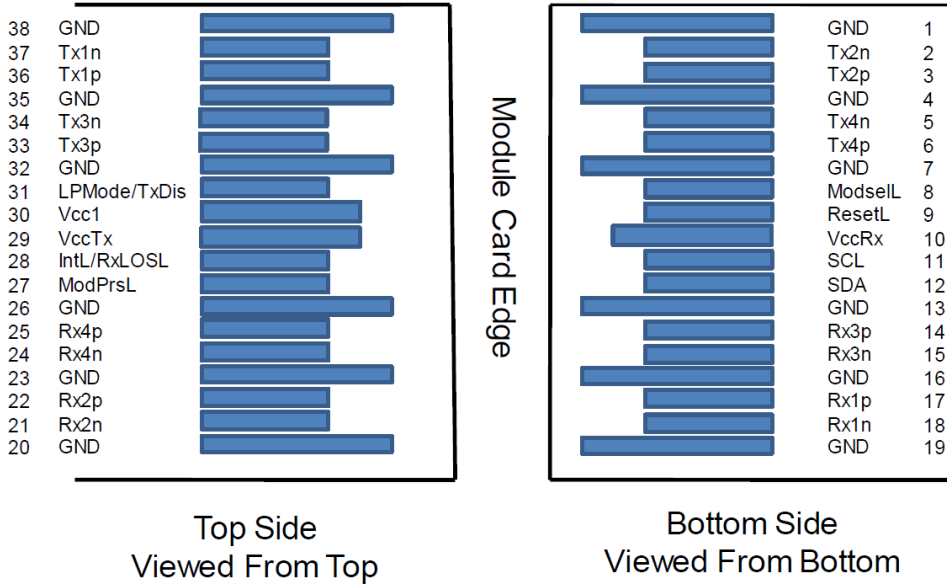
4. Pin Description

| Pin | Name | Description | Note |
|-----|---------|-------------------------------------|------|
| 1 | GND | Ground | 1 |
| 2 | Tx2n | Transmitter Inverted Data Input | |
| 3 | Tx2p | Transmitter Non-Inverted Data Input | |
| 4 | GND | Ground | 1 |
| 5 | Tx4n | Transmitter Inverted Data Input | |
| 6 | Tx4p | Transmitter Non-Inverted Data Input | |
| 7 | GND | Ground | 1 |
| 8 | ModSelL | Module Select | |
| 9 | ResetL | Module Reset | |
| 10 | Vcc Rx | 3.3V Power Supply Receiver | 2 |
| 11 | SCL | 2-wire Serial Interface Clock | |
| 12 | SDA | 2-wire Serial Interface Data | |
| 13 | GND | Ground | 1 |
| 14 | Rx3p | Receiver Non-Inverted Data Output | |
| 15 | Rx3n | Receiver Inverted Data Output | |
| 16 | GND | Ground | 1 |
| 17 | Rx1p | Receiver Non-Inverted Data Output | |
| 18 | Rx1n | Receiver Inverted Data Output | |
| 19 | GND | Ground | 1 |
| 20 | GND | Ground | 1 |
| 21 | Rx2n | Receiver Inverted Data Output | |
| 22 | Rx2p | Receiver Non-Inverted Data Output | |
| 23 | GND | Ground | 1 |
| 24 | Rx4n | Receiver Inverted Data Output | |
| 25 | Rx4p | Receiver Non-Inverted Data Output | |
| 26 | GND | Ground | 1 |
| 27 | ModPrsL | Module Present | |
| 28 | IntL | Interrupt | |
| 29 | Vcc Tx | 3.3V Power Supply Transmitter | 2 |
| 30 | Vcc 1 | 3.3V Power Supply | 2 |
| 31 | LPMODE | Low Power Mode | 3 |
| 32 | GND | Ground | 1 |
| 33 | Tx3p | Transmitter Non-Inverted Data Input | |
| 34 | Tx3n | Transmitter Inverted Data Input | |
| 35 | GND | Ground | 1 |
| 36 | Tx1p | Transmitter Non-Inverted Data Input | |
| 37 | Tx1n | Transmitter Inverted Data Input | |
| 38 | GND | Ground | 1 |

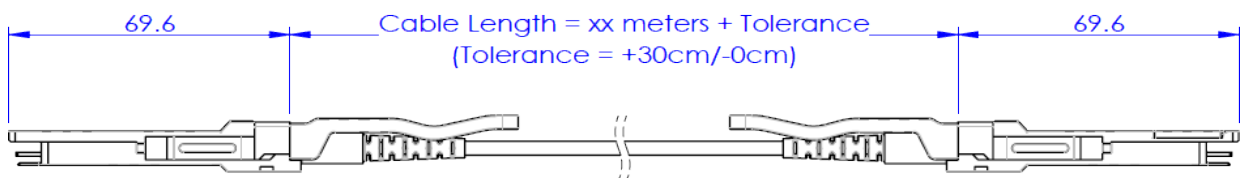
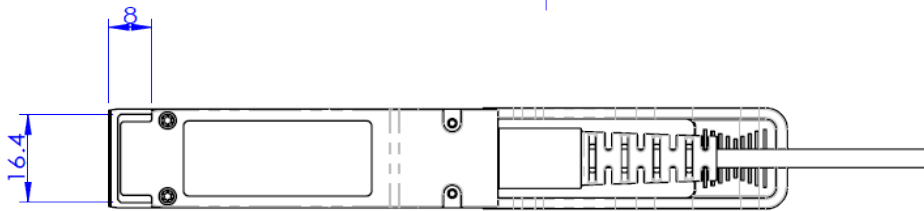
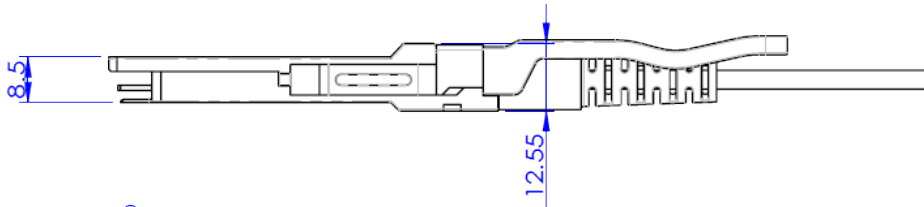
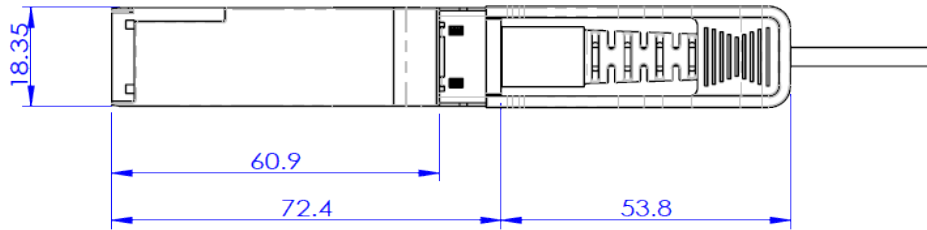
Note

1. GND is the symbol for signal and supply (power) common for the QSFP module. All are common within the QSFP 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. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP transceiver module in any combination. The connector pins are each rated for a maximum current of 500 mA.
3. Not in use.

4. Pin Description



5. Mechanical Specifications



6. Active Optical Cable

| Parameter | Value | Unit | Note |
|---------------------|---|------|------|
| Cable Diameter | <ul style="list-style-type: none"> LSZH, LSZH/OFNR: $\varnothing 3.0 \pm 0.15$ OFNP: $\varnothing 3.0 \pm 0.20$ | mm | |
| Minimum Bend Radius | 30 | mm | |
| Length Tolerance | +300 / -0 | mm | |
| Cable Jacket | LSZH, LSZH/OFNR or OFNP-rated, Aqua | | |

7. Ordering Information

| Part Number | Description | Note |
|----------------------------|---|------|
| MD100EIX _{xyy} ZZ | QSFP28-IB, AOC, LSZH, yyy m, three-digit number yyy for length in meter | |

Note

- The maximum cable length is 150 m.
- The first digit A, B or C of the three-digit number denotes 0.25 m, 0.50 m and 0.75 m, respectively.
- The first digit A, B or C of the three-digit number can be used for the cable length no greater than 10 m.
- Cable jacket XX- GA (LSZH), GB (LSZH/OFNR), GC (OFNP)

Examples

| Part Number | Description |
|----------------|----------------------------------|
| MD100EIGAB00ZZ | QSFP28-IB, AOC, LSZH, 0.5m |
| MD100EIGBA09ZZ | QSFP28-IB, AOC, LSZH/OFNR, 9.25m |
| MD100EIGCC01ZZ | QSFP28-IB, AOC, OFNP, 1.75m |

8. Revision History

| Version | Date | Description |
|---------|---------------|--|
| 1.0 | Apr. 26, 2019 | Initial release |
| 2.0 | Jun. 19, 2020 | Change in power consumption |
| 3.0 | Nov. 12, 2020 | Standardization of format and expression |