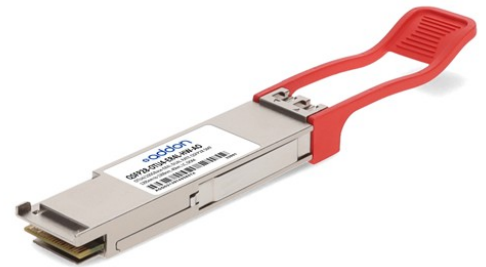


### QSFP28-OTU4-ER4L-HW-AO

Huawei® Compatible TAA Compliant OTU-4-ER4L 100GbE Dual-Rate QSFP28 Transceiver (SMF, 1295nm to 1309nm, 40km w/host FEC, LC, DOM)

#### Features:

- SFF-8665 Compliance
- Duplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



#### Applications:

- OTN OTU4
- 100GBase Ethernet
- Access and Enterprise

#### Product Description

This Huawei® compatible QSFP28 transceiver provides OTU-4-ER4 100GbE Dual-Rate ER4L throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1295nm to 1309nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Huawei® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

AddOn's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products."



## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

## Absolute Maximum Ratings

| Parameter                              | Symbol | Min. | Typ.    | Max. | Unit |
|----------------------------------------|--------|------|---------|------|------|
| Maximum Supply Voltage                 | Vcc    | -0.5 |         | 3.6  | V    |
| Storage Temperature                    | TS     | -40  |         | 85   | °C   |
| Operating Case Temperature             | Tc     | 0    |         | 70   | °C   |
| Operating Relative Humidity            | RH     | 5    |         | 85   | %    |
| Rx Damage Threshold, per Lane          | PRdmg  | -3.0 |         |      | dBm  |
| Data Rate                              | DR     |      | 103.125 |      | Gb/s |
| Link Distance with G.652 (without FEC) | D1     |      |         | 30   | km   |
| Link Distance with G.652 (with FEC)    | D2     |      |         | 40   | km   |

## Electrical Characteristics

| Parameter                      | Symbol     | Min.    | Typ. | Max.     | Unit | Notes |
|--------------------------------|------------|---------|------|----------|------|-------|
| Supply Voltage                 | Vcc        | 3.14    | 3.3  | 3.47     | V    |       |
| Supply Current                 | Icc        |         |      | 1.36     | A    |       |
| Power Consumption              | P          |         |      | 4.5      | W    |       |
| Transmitter                    |            |         |      |          |      |       |
| Input differential impedance   | Rin        |         | 100  |          | Ω    | 1     |
| Differential data input swing  | Vin,pp     | 180     |      | 1000     | mV   |       |
| Transmit Disable Voltage       | VD         | Vcc-1.3 |      | Vcc      | V    |       |
| Transmit Enable Voltage        | VEN        | Vee     |      | Vee+ 0.8 | V    | 2     |
| Receiver                       |            |         |      |          |      |       |
| Differential data output swing | Vout,pp    | 300     |      | 850      | mV   | 3     |
| LOS Fault                      | VLOS fault | Vcc-1.3 |      | VccHOST  | V    | 4     |
| LOS Normal                     | VLOS norm  | Vee     |      | Vee+0.8  | V    | 4     |

## Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.

2. Optional for TX disable
3. Into 100 ohms differential termination
4. Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected

## Optical Characteristics

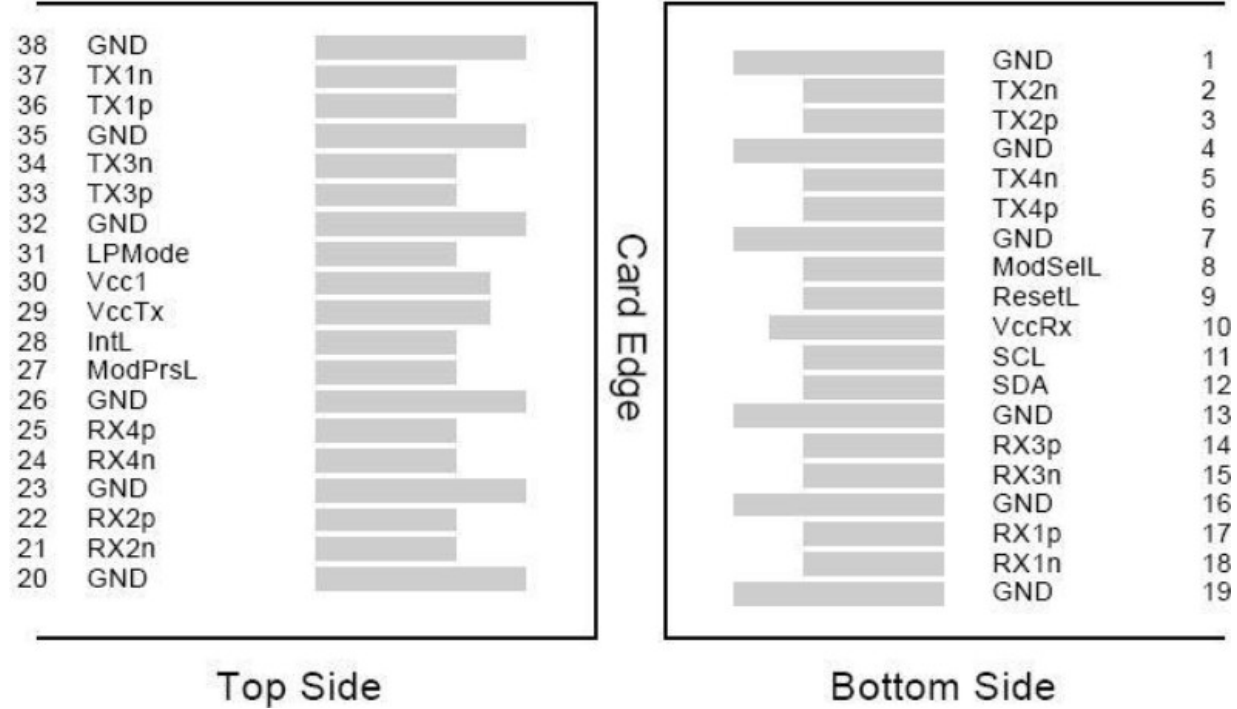
| Parameter                                         | Symbol | Min.                               | Typ.    | Max.    | Unit  | Notes |
|---------------------------------------------------|--------|------------------------------------|---------|---------|-------|-------|
| Transmitter                                       |        |                                    |         |         |       |       |
| Signaling rate, each lane                         | DRPL   | 25.78125 ±100 ppm                  |         |         | Gb/s  |       |
| Four Lane Wavelength Range                        | λ1     | 1294.53                            | 1295.56 | 1296.59 | nm    |       |
|                                                   | λ2     | 1299.02                            | 1300.05 | 1301.09 | nm    |       |
|                                                   | λ3     | 1303.54                            | 1304.58 | 1305.63 | nm    |       |
|                                                   | λ4     | 1308.09                            | 1309.14 | 1310.19 | nm    |       |
| Total launch power                                | Pout   |                                    |         | 12.5    | dBm   |       |
| Average launch power, each lane                   | Pavg   | -2.5                               |         | 6.5     | dBm   |       |
| Optical modulation amplitude, each lane (OMA)     | OMA    | 0.5                                |         | 6.5     | dBm   |       |
| Extinction ratio                                  | ER     | 4.5                                |         |         | dB    |       |
| Side-mode suppression ratio                       | SMSR   | 30                                 |         |         | dB    |       |
| Average launch power of OFF transmitter, per lane | POFF   |                                    |         | -30     | dBm   |       |
| RIN                                               | RIN    |                                    |         | -130    | dB/Hz |       |
| Transmitter reflectance                           | TR     |                                    |         | -12     | dB    |       |
| Transmitter eye mask {X1, X2, X3, Y1, Y2, Y3}     | Mt     | {0.25, 0.4, 0.45, 0.25, 0.28, 0.4} |         |         |       | 1     |
| Receiver                                          |        |                                    |         |         |       |       |
| Four Lane Wavelength Range                        | λ1     | 1294.53                            | 1295.56 | 1296.59 | nm    |       |
|                                                   | λ2     | 1299.02                            | 1300.05 | 1301.09 | nm    |       |
|                                                   | λ3     | 1303.54                            | 1304.58 | 1305.63 | nm    |       |
|                                                   | λ4     | 1308.09                            | 1309.14 | 1310.19 | nm    |       |
| Receive Rate for Each Lane                        | Pavg   | 25.78125 ±100 ppm                  |         |         | Gb/s  |       |
| Damage Threshold, each Lane                       | THd    |                                    |         | -7      | dBm   |       |
| Average receive power, each lane (max)            | PSAT   |                                    |         | -7      | dBm   |       |
| Average receive power, each lane (min)            | Pin    |                                    |         | -18.5   | dBm   | 2     |
| Average receive power, each lane (min)            | Pin    |                                    |         | -14.5   | dBm   | 3     |
| Return Loss                                       | RL     |                                    |         | -26     | dB    |       |
| Los De-Assert                                     | Pd     |                                    |         | -23     | dBm   |       |
| Los Assert                                        | Pa     | -33                                |         |         | dBm   |       |

|                 |       |     |  |   |     |  |
|-----------------|-------|-----|--|---|-----|--|
| Loss Hysteresis | Pd-Pa | 0.5 |  | 6 | dBm |  |
|-----------------|-------|-----|--|---|-----|--|

Notes:

- 1. Hit ratio  $5 \times 10^{-5}$
- 2. BER =  $5 \times 10^{-5,2}$
- 3. BER =  $1 \times 10^{-12,2}$

Electrical Pin-out Details



## Pin Descriptions

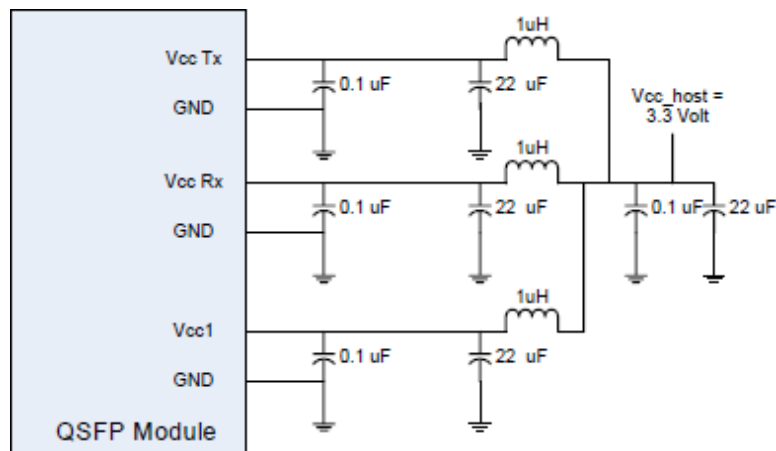
| Pin | Symbol  | Name/Descriptions                                | Ref. |
|-----|---------|--------------------------------------------------|------|
| 1   | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 2   | Tx2-    | Transmitter Inverted Data Input                  |      |
| 3   | Tx2+    | Transmitter Non-Inverted Data output             |      |
| 4   | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 5   | Tx4-    | Transmitter Inverted Data Input                  |      |
| 6   | Tx4+    | Transmitter Non-Inverted Data output             |      |
| 7   | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 8   | ModSelL | Module Select                                    | 2    |
| 9   | ResetL  | Module Reset                                     | 2    |
| 10  | VccRx   | 3.3V Power Supply Receiver                       |      |
| 11  | SCL     | 2-Wire serial Interface Clock                    | 2    |
| 12  | SDA     | 2-Wire serial Interface Data                     | 2    |
| 13  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 14  | Rx3+    | Receiver Non-Inverted Data Output                |      |
| 15  | Rx3-    | Receiver Inverted Data Output                    |      |
| 16  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 17  | Rx1+    | Receiver Non-Inverted Data Output                |      |
| 18  | Rx1-    | Receiver Inverted Data Output                    |      |
| 19  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 20  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 21  | Rx2-    | Receiver Inverted Data Output                    |      |
| 22  | Rx2+    | Receiver Non-Inverted Data Output                |      |
| 23  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 24  | Rx4-    | Receiver Inverted Data Output                    | 1    |
| 25  | Rx4+    | Receiver Non-Inverted Data Output                |      |
| 26  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 27  | ModPrsl | Module Present                                   |      |
| 28  | IntL    | Interrupt                                        | 2    |
| 29  | VccTx   | 3.3V power supply transmitter                    |      |
| 30  | Vcc1    | 3.3V power supply                                |      |
| 31  | LPMode  | Low Power Mode                                   | 2    |
| 32  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 33  | Tx3+    | Transmitter Non-Inverted Data Input              |      |
| 34  | Tx3-    | Transmitter Inverted Data Output                 |      |

|    |      |                                                  |   |
|----|------|--------------------------------------------------|---|
| 35 | GND  | Transmitter Ground (Common with Receiver Ground) | 1 |
| 36 | Tx1+ | Transmitter Non-Inverted Data Input              |   |
| 37 | Tx1- | Transmitter Inverted Data Output                 |   |
| 38 | GND  | Transmitter Ground (Common with Receiver Ground) | 1 |

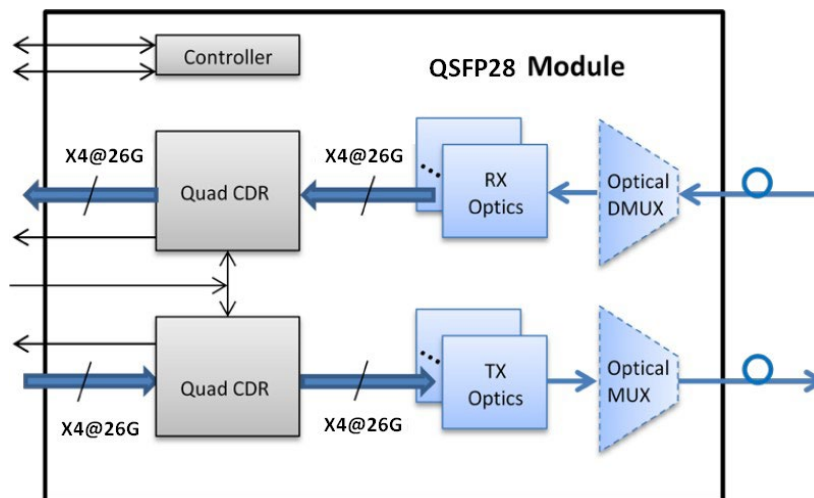
#### Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.

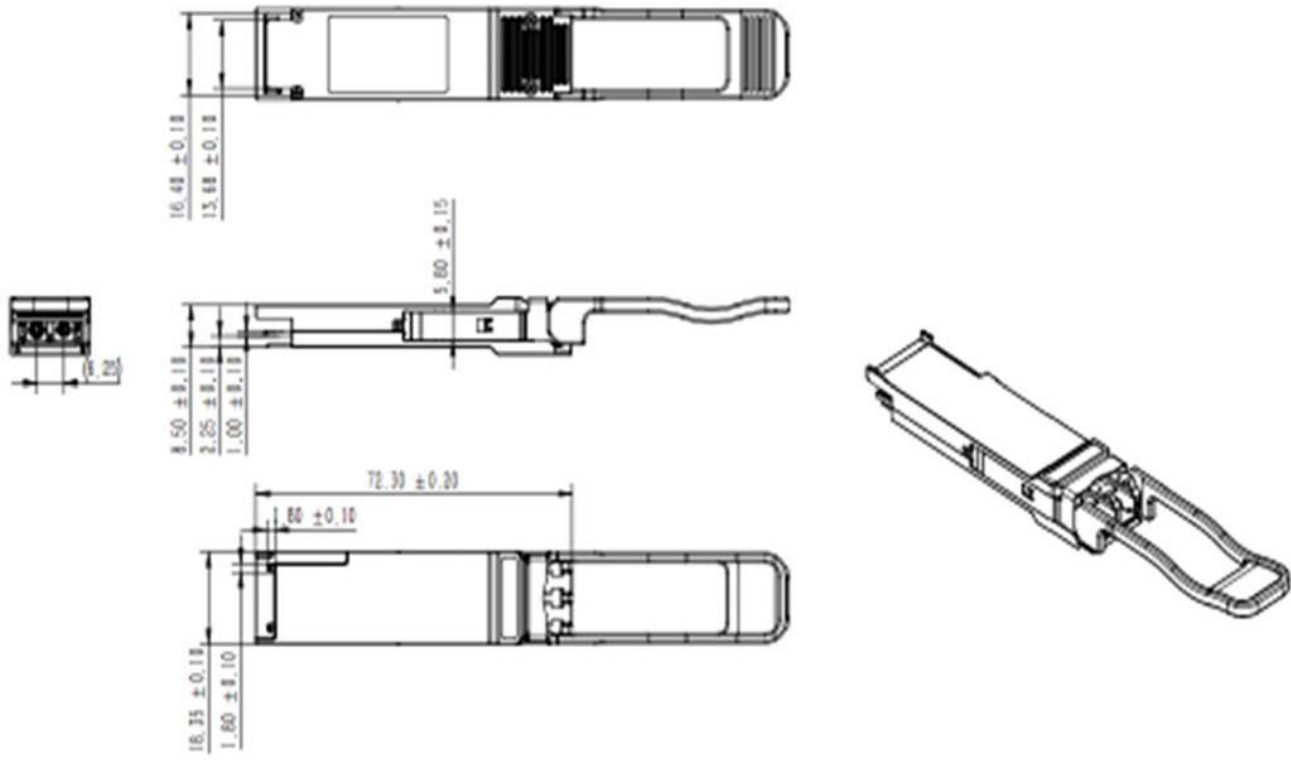
#### Recommended Power Supply Filter Network



#### Functional Diagram



Mechanical Specifications



## About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications ranging from NEBS Level 3 to ISO 9001:2015 with every new development while maintaining the signature reliability of its products.



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