

# PRODUCT SPECIFICATION

|                     |                                   |                                                                                                          |
|---------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Part No.:</b>    | <b>AC-QP-Q3G100-10</b>            |                                                                                                          |
| <b>Description:</b> | 100G QSFP28 Transceiver, LR4 10km |                                                                                                          |
| <b>Release Date</b> | <b>Rev.</b>                       | <b>Revision Change Description</b>                                                                       |
| 2015/06/07          | A0                                | New Release                                                                                              |
| 2020/12/28          | A1                                | Template Update                                                                                          |
| 2021/03/30          | A2                                | BER Spec changed from $BER < 10^{-12}$ to $BER < 5 \times 10^{-5}$ ;<br>Update the Part No from Q1 to Q3 |
| 2022/10/28          | A3                                | Update the Package Outline Mechanical Drawing                                                            |
| 2025/11/14          | A4                                | 1. Update the Package Outline Mechanical Drawing<br>2. Pavg changed from -6.5 to -6.2                    |

## Features

- ✧ Transmission data rate up to 26Gbps per channel
- ✧ 4 channels full-duplex transceiver modules
- ✧ 4 x 25Gb/s DFB-based LWDM uncooled transmitter
- ✧ 4 channels PIN ROSA
- ✧ Internal CDR circuits on both receiver and transmitter channels
- ✧ Duplex LC optical receptacle
- ✧ Built-in digital diagnostic functions
- ✧ Hot Pluggable QSFP28 form factor
- ✧ Up to reach 10km over SMF
- ✧ Compliant with QSFP28 MSA with LC connector
- ✧ Commercial operating case temperature range: 0~70°C
- ✧ RoHS-6 Compliant
- ✧ Power dissipation < 3.5 W

## Application

- ✧ Data Center Interconnect
- ✧ 100G LWDM4 applications
- ✧ Enterprise networking

## Standard

- ✧ IEEE 802.3bm
- ✧ QSFP28 MSA
- ✧ SFF-8636

## Specification:

| Absolute Maximum Ratings    |                  |                      |                      |      |
|-----------------------------|------------------|----------------------|----------------------|------|
| Parameter                   | Symbol           | Min                  | Max                  | Unit |
| Storage Ambient Temperature | T <sub>STG</sub> | -40                  | 85                   | °C   |
| Operating Humidity          | H <sub>O</sub>   | 5                    | 95                   | %    |
| Power Supply Voltage        | V <sub>CC</sub>  | -0.3                 | 4                    | V    |
| Signal Input Voltage        |                  | V <sub>CC</sub> -0.3 | V <sub>CC</sub> +0.3 | V    |
| Damage Threshold, each Lane | TH               |                      | 5.5                  | dBm  |

| Recommended Operating Conditions |                 |       |          |       |      |
|----------------------------------|-----------------|-------|----------|-------|------|
| Parameter                        | Symbol          | Min   | Typical  | Max   | Unit |
| Operating Case Temperature       | T <sub>C</sub>  | 0     |          | 70    | °C   |
| Power Supply Voltage             | V <sub>CC</sub> | 3.135 | 3.3      | 3.465 | V    |
| Power Supply Current             | I <sub>CC</sub> |       |          | 1060  | mA   |
| Data Rate,each Lane              |                 |       | 25.78125 |       | Gbps |
| Link Distance with SMF           | D               |       |          | 10    | km   |

| Optical transmitter Characteristics                    |                                     |         |         |         |      |       |
|--------------------------------------------------------|-------------------------------------|---------|---------|---------|------|-------|
| Parameter                                              | Symbol                              | Min     | Typical | Max     | Unit | Notes |
| Launched Power (avg.)                                  | P <sub>avg</sub>                    | -6.2    |         | 2.5     | dBm  |       |
| Total Output. Power                                    | P <sub>out</sub>                    |         |         | 8.5     | dBm  |       |
| OMA, each Lane                                         | P <sub>OMA</sub>                    | -4      |         | 2.5     | dBm  |       |
| TDP, each Lane                                         | TDP                                 |         |         | 3       | dB   |       |
| Wavelength Assignment                                  | λ <sub>0</sub>                      | 1294.53 | 1295.56 | 1296.59 | nm   |       |
|                                                        | λ <sub>1</sub>                      | 1299.02 | 1300.05 | 1301.09 |      |       |
|                                                        | λ <sub>2</sub>                      | 1303.54 | 1304.58 | 1305.63 |      |       |
|                                                        | λ <sub>3</sub>                      | 1308.09 | 1309.14 | 1310.19 |      |       |
| Spectral Width(-20dB)                                  | Δλ                                  |         |         | 1       | nm   |       |
| Side Mode Suppression Ratio                            | SMSR                                | 30      |         |         | dB   |       |
| Extinction Ratio                                       | ER                                  | 3       |         |         | dB   |       |
| Transmitter OFF Output Power                           | P <sub>Off</sub>                    |         |         | -30     | dBm  |       |
| Differential Line Input Impedance                      | R <sub>IN</sub>                     |         |         | -130    | Ohm  |       |
| Output Eye Mask definition<br>{X1, X2, X3, Y1, Y2, Y3} | {0.31, 0.4, 0.45, 0.34, 0.38, 0.4}  |         |         |         |      |       |
| Output Eye Diagram                                     | Compliant with IEEE802.3ae eye mask |         |         |         |      |       |

| Optical receiver Characteristics                              |                     |       |         |       |      |       |
|---------------------------------------------------------------|---------------------|-------|---------|-------|------|-------|
| Parameter                                                     | Symbol              | Min   | Typical | Max   | Unit | Notes |
| Receiver Sensitivity                                          | S                   |       |         | -11.5 | dBm  | 1     |
| Stressed Receiver Sensitivity (OMA), each Lane                |                     |       |         | -7.3  | dBm  |       |
| Average Receive Power, each lane                              |                     | -11.5 |         | 2.5   | dBm  |       |
| Receive Power (OMA), each lane                                |                     |       |         | 2.5   | dBm  |       |
| Receiver Electrical 3 dB upper Cutoff Frequency, each Fc Lane | FC                  |       |         | 31    | GHz  |       |
| Optical Power Input Overload                                  | P <sub>in-max</sub> | 4.5   |         |       | dBm  |       |
| LOS                                                           | Optical De-assert   | Pd    | -14     |       | dBm  |       |
|                                                               | Optical Assert      | Pa    | -16     |       |      |       |
| LOS Hysteresis                                                | LOSH                | 0.5   |         | 2     | dB   |       |
| Vertical Eye Closure Penalty                                  | VECP                | 1.9   |         |       | dB   |       |
| Stressed Eye J2 Jitter                                        | J2                  | 0.33  |         |       | UI   |       |
| Stressed Eye J4 Jitter                                        | J4                  | 0.48  |         |       | UI   |       |

#### Notes:

1. Measured with a PRBS 2<sup>31</sup>-1 test pattern, @25.78Gb/s, BER<5x10<sup>-5</sup>

## Pin Definition

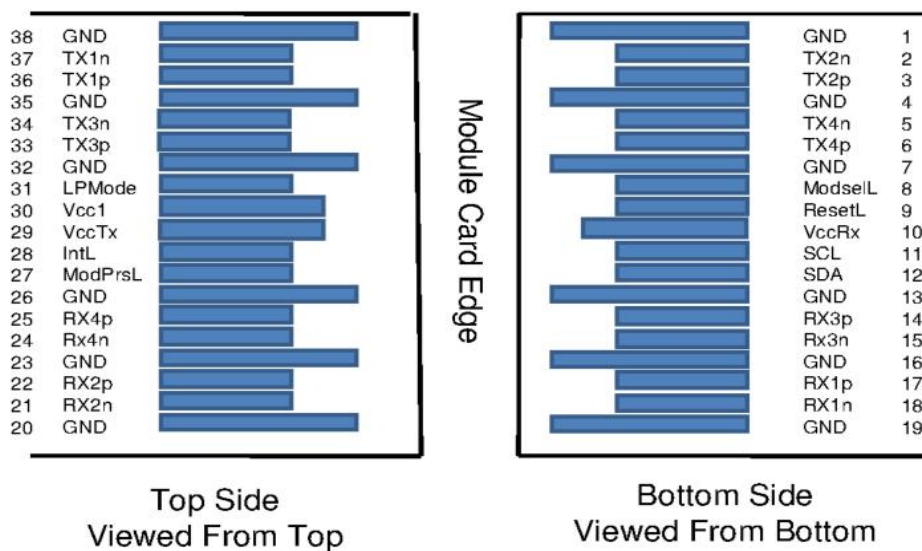


Figure1 QSFP MSA-compliant 38-pin connector

| Pin | Symbol | Name/Description                                 | Notes |
|-----|--------|--------------------------------------------------|-------|
| 1   | GND    | Transmitter Ground (Common with Receiver Ground) | 1     |
| 2   | TX2N   | Transmitter Inverted Data Input                  |       |
| 3   | TX2P   | Transmitter Non-Inverted Data Input              |       |

Add: 2-4# Building, Tongfuyu Industrial Zone, Ai qun Road, Shiyan street, Baoan District, Shen zhen, China.  
 Tel: +86-755-8891 4745 Fax: +86-755-2946 6959 E-mail: [sales@lonte.com.cn](mailto:sales@lonte.com.cn) www. lonte.com.cn

|    |         |                                     |   |
|----|---------|-------------------------------------|---|
| 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  | +3.3 V Power supply receiver        | 2 |
| 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                              | 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       | 1 |
| 25 | RX4P    | Receiver Non-Inverted Data Output   |   |
| 26 | GND     | Ground                              | 1 |
| 27 | ModPrsL | Module Present                      |   |
| 28 | IntL    | Interrupt                           |   |
| 29 | Vcc Tx  | +3.3 V Power supply transmitter     | 2 |
| 30 | Vcc1    | +3.3 V Power Supply                 | 2 |
| 31 | LPMode  | Low Power Mode                      |   |
| 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 |

**Table 1: QSFP Module PIN Definition**

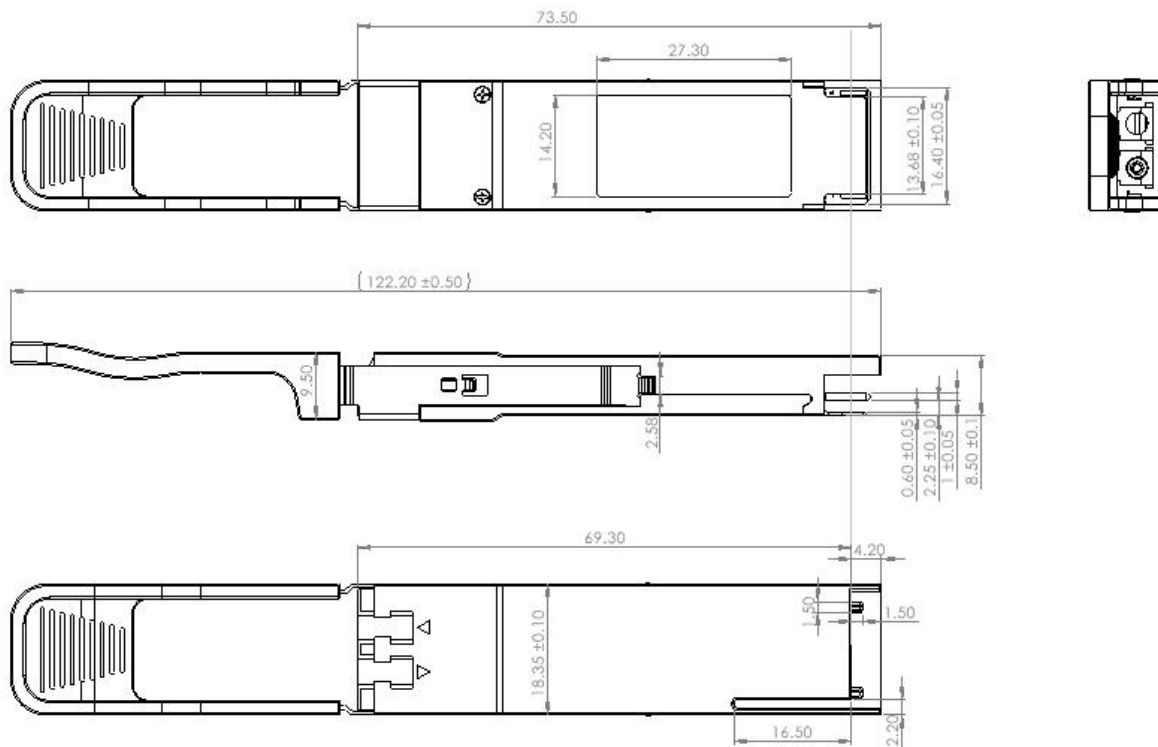
**Notes:**

1. Module circuit ground is isolated from module chassis ground within the module.

2. Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.

## Package Outline

Dimensions are in millimeters. All dimensions are  $\pm 0.2\text{mm}$  unless otherwise specified. (Unit: mm)



## Regulatory Compliance

| Feature                                              | Test                                                                  | Method                                               |
|------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------|
| Electrostatic Discharge (ESD) to the Electrical Pins | MIL-STD-883E<br>Method 3015.7                                         | Class 1(>1000V for SFI pins, >2000V for other pins.) |
| Electrostatic Discharge (ESD) Immunity               | IEC61000-4-2                                                          | Class 2(>4.0kV)                                      |
| Electromagnetic Interference (EMI)                   | CISPR22 ITE Class B<br>FCC Class B<br>CENELEC EN55022<br>VCCI Class 1 | Comply with standard                                 |
| Immunity                                             | IEC61000-4-3                                                          | Comply with standard                                 |
| Eye Safety                                           | FDA 21CFR 1040.10 and 1040.11<br>EN (IEC) 60825-1,2                   | Compatible with Class I laser Product                |

## Ordering Information

| Part. No        | Specifications |                |             |             |     |              |             |               |     |
|-----------------|----------------|----------------|-------------|-------------|-----|--------------|-------------|---------------|-----|
|                 | Pack           | Rate<br>(Gbps) | Tx<br>(nm)  | Po<br>(dBm) | RX  | Sen<br>(dBm) | Temp<br>(℃) | Reach<br>(KM) | DDM |
| AC-QP-Q3G100-10 | QSFP28         | 100G           | DFB<br>LWDM | -6.2~2.5    | PIN | <-11.5       | 0~70        | 10            | Y   |