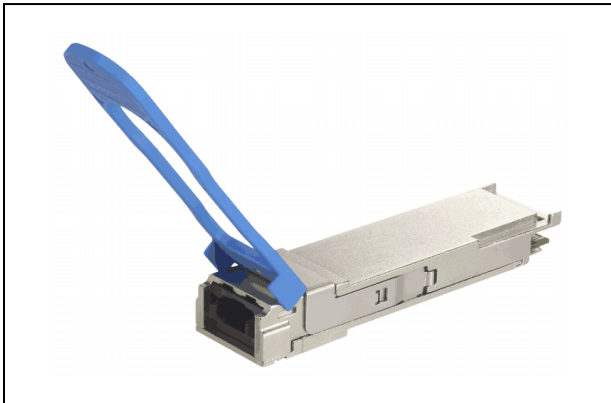


QSFP+ MPO 40G SMF 2km Transceiver

AQOMBBQ4EDMA0694



Features

- ❑ QSFP+ Type MPO Transceiver
- ❑ Uncooled FP Laser (4 x1310 nm)
- ❑ PIN Photo Detector
- ❑ -5°C to +70°C case operating temperature range
- ❑ 2km transmission with SMF
- ❑ 3.3V power supply
- ❑ Power consumption < 3.5W
- ❑ Compliant with QSFP+ MSA SFF-8436
- ❑ Hot pluggable
- ❑ Serial ID information support
- ❑ Digital diagnostic functions (Via I²C)
- ❑ Compliant with RoHS
- ❑ Compliant with UL & TUV

Ordering Information

| Form Factor | Data Rate | Media | Distance | Wavelength (nm) | TX Power (each lane) (dBm) | RX Sensitivity (each lane) (dBm) | Voltage (V) | Coupling | DDM (Y/N) | Temperature (°C) | Part Number |
|-------------|-----------|-------|----------|-----------------|----------------------------|----------------------------------|-------------|----------|-----------|------------------|------------------|
| QSFP+ MPO | 40G | SMF | 2km | 1310 nm | -5 ~ 0.5 | <-10.6 | 3.3 | AC/AC | Y | -5 ~ +70 | AQOMBBQ4EDMA0694 |

Absolute Maximum Ratings

| Parameter | Symbol | Conditions | Min | Max | Unit |
|---------------------------|----------|----------------|-----|-----|------|
| Storage Temperature | T_S | -- | -40 | +85 | °C |
| Storage Relative Humidity | RH | Non condensing | 0 | 85 | % |
| Supply Voltage # 3.3 | V_{CC} | -- | 0 | 3.6 | V |

Recommended Operating Conditions

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|------------------------------|----------|------------|------|-------|------|------|
| Operating Temperature (Case) | T_C | -- | -5 | -- | 70 | °C |
| Supply Voltage | V_{CC} | -- | 3.13 | 3.3 | 3.47 | V |
| Supply Current | I_{CC} | -- | -- | -- | 1000 | mA |
| Data Rate | DR | -- | -- | 41.25 | -- | Gbps |
| Distance | | -- | 0.02 | -- | 2 | km |

Electrical Characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|--|------------------|--------------------------|----------------|-----|----------------|------|
| Transmitter | | | | | | |
| Differential Input Impedance | R_{DI} | -- | -- | 100 | -- | Ohm |
| High speed Differential Input Voltage (CML) | V_{CML_DI} | AC-Coupled, peak to peak | 0.2 | -- | 1.0 | V |
| Low speed Input Voltage - Low (LVCOMS) | V_{LVCMOS_IL} | -- | -0.3 | -- | $V_{CC} * 0.3$ | V |
| Low speed Input Voltage - High (LVCOMS) | V_{LVCMOS_IH} | -- | $V_{CC} * 0.7$ | -- | $V_{CC} + 0.5$ | V |
| Low speed Input Voltage - Low (LVTTTL) | V_{LVTTTL_IL} | -- | -0.3 | -- | 0.8 | V |
| Low speed Input Voltage - High (LVTTTL) | V_{LVTTTL_IH} | -- | 2 | -- | $V_{CC} + 0.3$ | V |
| Receiver | | | | | | |
| Differential Output Impedance | R_{DO} | -- | -- | 100 | -- | Ohm |
| High speed Differential Output Voltage (CML) | V_{CML_DO} | AC-Coupled, peak to peak | 0.3 | -- | 0.8 | V |
| Low speed Output Voltage - Low (LVCOMS) | V_{LVCMOS_OL} | -- | 0 | -- | 0.4 | V |
| Low speed Output Voltage - High (LVCOMS) | V_{LVCMOS_OH} | -- | $V_{CC} - 0.5$ | -- | $V_{CC} + 0.3$ | V |
| Low speed Output Voltage - Low (LVTTTL) | V_{LVTTTL_OL} | -- | 0 | -- | 0.4 | V |
| Low speed Output Voltage - High (LVTTTL) | V_{LVTTTL_OH} | -- | $V_{CC} - 0.5$ | -- | $V_{CC} + 0.3$ | V |



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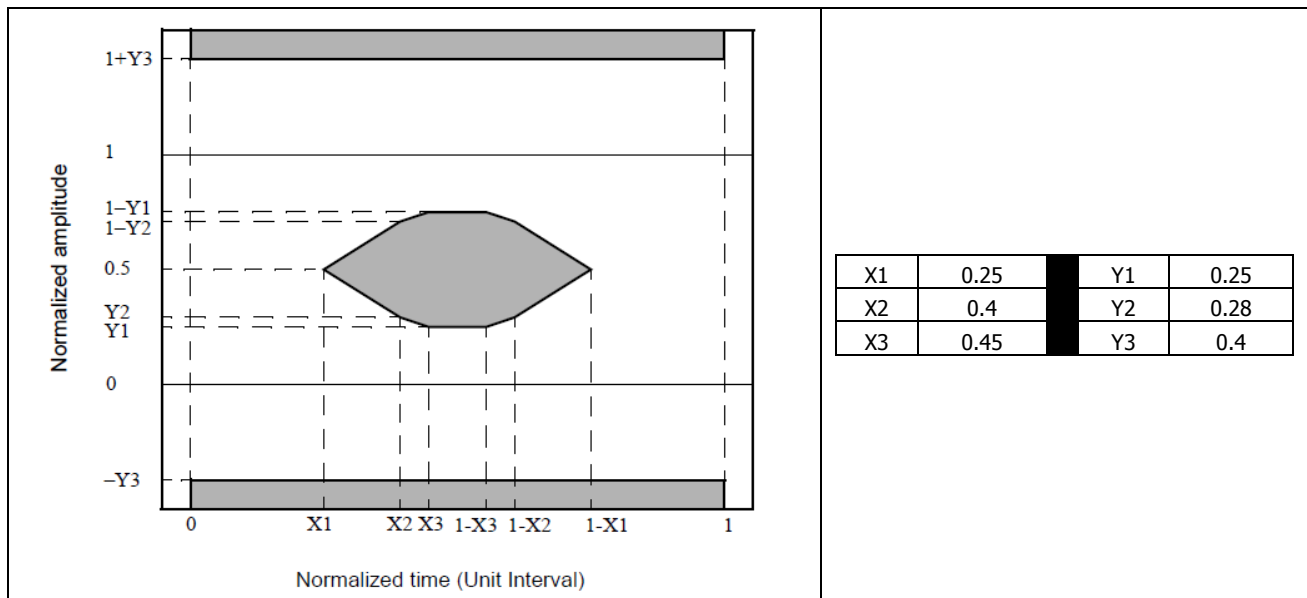
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Optical Characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|--------------------------------|-------------|------------------------|------|-------|------|
| Transmitter | | | | | | |
| Lane wavelengths (Range) | | | 1260 | 1310 | 1355 | nm |
| Average launch power, each lane | P _o | -- | -5 | -- | 0.5 | dBm |
| OMA, each lane | OMA | CW,ER>3.5dB | -4 | -- | 3.5 | dBm |
| Difference in launch power between any two lanes (OMA) | -- | -- | -- | -- | 5 | dB |
| TDP, each lane | TDP | -- | -- | -- | 3.2 | dB |
| Average launch power of OFF transmitter, each lane | P _{off} | -- | -- | -- | -30 | dBm |
| Extinction ratio | ER | -- | 3.5 | -- | -- | dB |
| Eye mask definition | -- | -- | Compliance IEEE802.3ba | | | |
| Receiver | | | | | | |
| Center Wavelength - lane 0- 3 | λ _{c0} | -- | 1260 | 1310 | 1355 | nm |
| Damage threshold | -- | -- | 3.3 | -- | -- | dBm |
| Receiver Power (OMA), each Lane | -- | -- | -- | -- | 3.5 | dBm |
| Receiver Reflectance | -- | -- | -- | -- | -26 | dB |
| Difference in receiver power between any two lanes(OMA) (max) | -- | -- | -- | -- | 7.5 | dB |
| Average receive power, each lane | -- | -- | -11.5 | -- | 2.3 | dBm |
| Receiver sensitivity(OMA), each lane | R _{sens} | 1 | -- | -- | -10.6 | dBm |
| Rx LOS Assert | P _A | -- | -28 | -- | -- | dBm |
| Rx LOS De-Assert | P _D | -- | -- | -- | -12 | dBm |
| Rx LOS Hysteresis | P _A -P _D | -- | 0.5 | -- | -- | dB |

1. asured with PRBS 2³¹ -1 at 10⁻¹² BER, NRZ.

Eye Mask Definition



Pin Descriptions

| | |
|----|---------|
| 38 | GND |
| 37 | TX1n |
| 36 | TX1p |
| 35 | GND |
| 34 | TX3n |
| 33 | TX3p |
| 32 | GND |
| 31 | LPMODE |
| 30 | VCC1 |
| 29 | VCCTX |
| 28 | INTL |
| 27 | MODPRSL |
| 26 | GND |
| 25 | RX4p |
| 24 | Rx4n |
| 23 | GND |
| 22 | RX2p |
| 21 | RX2n |
| 20 | GND |

Module Card Edge

| | |
|---------|----|
| GND | 1 |
| TX2n | 2 |
| TX2p | 3 |
| GND | 4 |
| TX4n | 5 |
| TX4p | 6 |
| GND | 7 |
| ModSelL | 8 |
| ResetL | 9 |
| VCCRX | 10 |
| SCL | 11 |
| SDA | 12 |
| GND | 13 |
| RX3p | 14 |
| Rx3n | 15 |
| GND | 16 |
| RX1p | 17 |
| RX1n | 18 |
| GND | 19 |

Top Side
Viewed From Top

Bottom Side
Viewed From Bottom

QSFP+ MPO 40G SMF 2km Transceiver**AQOMBBQ4EDMA0694****Pin Definition**

| | Logic | Symbol | Description | Notes |
|----|--------------|---------|-------------------------------------|-------|
| 1 | | GND | Ground | 1 |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input | |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data Input | |
| 4 | | GND | Ground | 1 |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input | |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data Input | |
| 7 | | GND | Ground | 1 |
| 8 | LVTTTL-I | ModSelL | Module Select | |
| 9 | LVTTTL-I | ResetL | Module Reset | |
| 10 | | Vcc Rx | +3.3V Power Supply Receiver | 2 |
| 11 | LVCNOS I / O | SCL | 2-wire serial interface clock | |
| 12 | LVCNOS I / O | SDA | 2-wire serial interface data | |
| 13 | | GND | Ground | 1 |
| 14 | CML-O | Rx3p | Receiver Non-Inverted Data Output | |
| 15 | CML-O | Rx3n | Receiver Inverted Data Output | |
| 16 | | GND | Ground | 1 |
| 17 | CML-O | Rx1p | Receiver Non-Inverted Data Output | |
| 18 | CML-O | Rx1n | Receiver Inverted Data Output | |
| 19 | | GND | Ground | 1 |
| 20 | | GND | Ground | 1 |
| 21 | CML-O | Rx2n | Receiver Inverted Data Output | |
| 22 | CML-O | Rx2p | Receiver Non-Inverted Data Output | |
| 23 | | GND | Ground | 1 |
| 24 | CML-O | Rx4n | Receiver Inverted Data Output | |
| 25 | CML-O | Rx4p | Receiver Non-Inverted Data Output | |
| 26 | | GND | Ground | 1 |
| 27 | LVTTTL-O | ModPrsL | Module Present | |
| 28 | LVTTTL-O | IntL | Interrupt | |
| 29 | | Vcc Tx | +3.3V Power supply transmitter | 2 |
| 30 | | Vcc1 | +3.3V Power supply | 2 |
| 31 | LVTTTL-I | LPMode | Low Power Mode | |
| 32 | | GND | Ground | 1 |
| 33 | CML-I | Tx3p | Transmitter Non-Inverted Data Input | |
| 34 | CML-I | Tx3n | Transmitter Inverted Data Input | |
| 35 | | GND | Ground | 1 |
| 36 | CML-I | Tx1p | Transmitter Non-Inverted Data Input | |
| 37 | CML-I | 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.

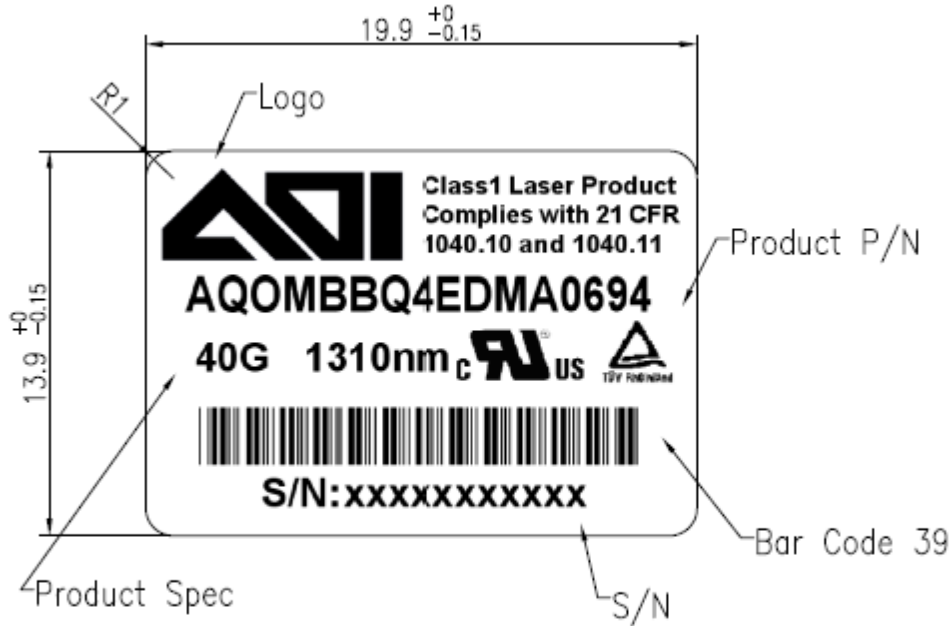
Note 2 :

Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently.

QSFP+ MPO 40G SMF 2km Transceiver

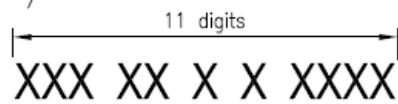
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Label drawing



Unit:mm

S/N



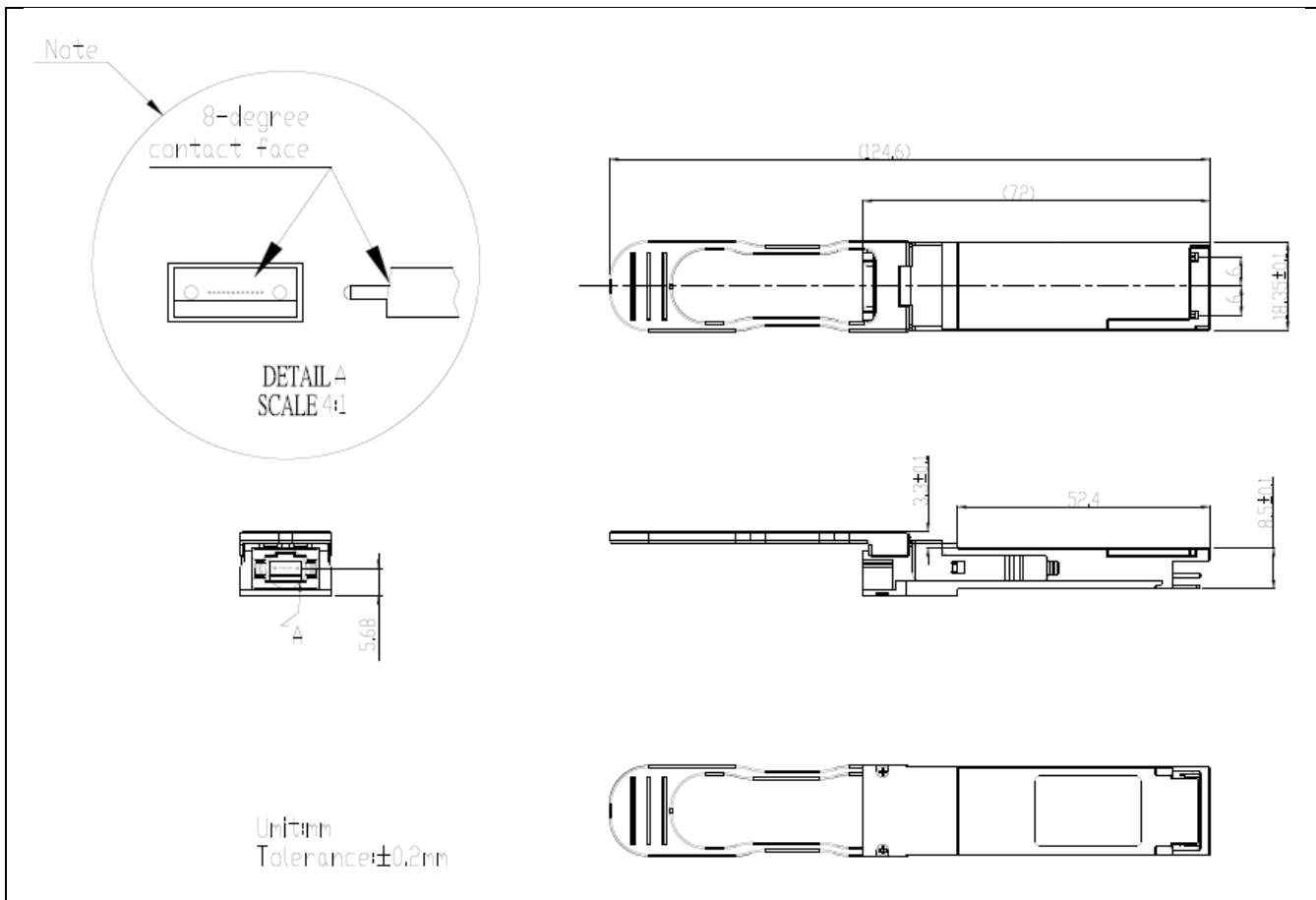
123 12 A 4 0001

- └── S/N :(0001~9999)
- └── Manufacturing order Type
- └── Month:Jan=A~Dec=L
- └── Year:ex:2012=12
- └── Manufacturing order number

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Mechanical Design Diagram (mm)



Note :
To avoid induced reflections , MPO connection using in QSFP+ MPO 40G single mode fiber product is with 8 degree angle polished. As illustrated in Mechanical Design Diagram above, the interface of this product used in MPO male plug connector is with 8 degree end-face.



Regulatory Compliance

| Item | Standard |
|--|--|
| Electromagnetic Interference (EMI) | FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B |
| Electrostatic Discharge to the Electrical Pins (ESD) | MIL-STD-883E Method 3015.7 |
| Electrostatic Discharge to the Receptacle (ESD) | IEC 61000-4-2 |
| RoHS | 2011/65/EU |
| Laser Eye Safety | FDA 21CFR 1040.10 and 1040.11 |
| Component Recognition | UL and TUV |

Laser Safety Information

All versions of this laser are Class 1 laser products per IEC1/EN2 60825-1. Users should observe safety precautions such as those recommended by ANSI³ Z136.1, ANSI Z36.2 and IEC 60825-1.

This product conforms to FDA (CDRH) 21 CFR 1040.10 and 1040.11 except for deviations of laser safety class designation pursuant to ['Laser Notice No.50'](#)

Product labeling:

Class 1 Laser Product
Compliance with 21 CFR
1040.10 and 1040.11

If labeling is not affixed to the module due to size constraints; then rather, labeling is placed on the outside of the shipping box.

This product is not shipped with a power supply.

Caution: use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Certifications

| | |
|------------|--|
| UL | 60950-1 (E243407) |
| TUV | EN60950-1, EN 60825-1, EN 60825-2 |

Documentation is available upon request.

(1) IEC is a registered trademark of the International Electrotechnical Commission

(2) Within Europe the IEC standard has been adopted as a European Normative standard known as EN 60825, and each European country will have its own version of this standard, for example, the British Standards version known as BS EN 60825. There can be small differences between the different countries versions of EN 60825, and these are in part caused by the process of translating the standard into the native language of that country.

(3) ANSI is a registered trademark of the American National Standards Institute

Note : All information contained in this document is subject to change without notice.