



- ✧ High speed I/O electrical interface (CAUI-4)
- ✧ MDIO interface with integrated Digital Diagnostic monitoring
- ✧ CFP2 MSA package with duplex LC connector
- ✧ Single +3.3V power supply
- ✧ Maximum power consumption 9 W
- ✧ Operating case temperature: -5 to +70 °C
- ✧ ROHs compliant

## Features

- ✧ Supports multi-rate (100GBASE-ER4 and OTU4) from 103.1Gb/s to 111.8Gb/s aggregate; Lane bit rate 25.78 Gb/s GbE, 27.95 Gb/s OTU4
- ✧ Up to 40km transmission on SMF
- ✧ LAN WDM EML laser and PIN receiver with SOA

## Application

- ✧ 100GBASE-ER4

## Order Information

| Part No. | Data Rate              | Laser       | Fiber Type | Distance | Optical Interface | Temp  | DDMI |
|----------|------------------------|-------------|------------|----------|-------------------|-------|------|
| OPC2E40  | 103.1Gbps<br>111.8Gbps | LAN WDM EML | SMF        | 40km     | LC                | 5~70C | Y    |

## Absolute Maximum Ratings

| Parameter                   | Symbol | Min. | Typical | Max. | Unit | Notes |
|-----------------------------|--------|------|---------|------|------|-------|
| Storage Temperature         | TS     | -40  | -       | +85  | °C   |       |
| Supply Voltage              | VCC    | -0.5 | -       | +4.0 | V    |       |
| Operating Relative Humidity | RH     | -    | -       | +85  | %    |       |

## Recommended Operating Conditions

| Parameter                  | Symbol | Min. | Typical | Max. | Unit | Notes    |
|----------------------------|--------|------|---------|------|------|----------|
| Operating Case Temperature | TC     | -5   | -       | +70  | °C   |          |
| Power Supply Voltage       | VCC    | 3.2  | 3.3     | 3.4  | V    |          |
| Power Supply Current       | ICC    | -    | -       | 2.81 | A    |          |
| Maximum Power Dissipation  | PD     | -    | -       | 9    | W    |          |
| Aggregate Bit Rate         | BRAVE  | -    | 103.125 | -    | Gb/s |          |
| Lane Bit Rate              | BRLANE | -    | 25.78   | -    | Gb/s |          |
| Transmission Distance      | TD     |      | -       | 40   | km   | Over SMF |

## Optical Characteristics

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| Parameter                                | Symbol                      | Min.    | Typical | Max.    | Unit | Notes |
|--|-----------------------------|---------|---------|---------|------|-------|
| <b>Transmitter</b>                       |                             |         |         |         |      |       |
| Center Wavelength Lane 0                 | $\lambda_0$                 | 1294.53 | 1295.56 | 1296.59 | nm   |       |
| Center Wavelength Lane 1                 | $\lambda_1$                 | 1299.02 | 1300.05 | 1301.09 | nm   |       |
| Center Wavelength Lane 2                 | $\lambda_2$                 | 1303.54 | 1304.58 | 1305.63 | nm   |       |
| Center Wavelength Lane 3                 | $\lambda_3$                 | 1308.09 | 1309.14 | 1310.19 | nm   |       |
| Total Launch Power, 100GE                | PALL                        | -       | -       | 8.9     | dBm  | 1     |
| Average Launch Power per Lane, 100GE     | PTX_LANE                    | -2.9    | -       | 2.9     | dBm  | 1     |
| OMA per Lane, 100GE                      | OMA                         | 0.1     | -       | 4.5     | dBm  | 1     |
| OMA-TDP per Lane, 100GE                  | OMA_TDP                     | -       | -       | -       | dBm  |       |
| Difference in launch power between lanes | PTX_DELTA_LANE              | -       | -       | 3.6     | dB   |       |
| Total Launch Output Power, OTU4          | PALL                        | -       | -       | 8.9     | dBm  | 1     |
| Average Launch Power per Lane, OTU4      | PTX_LANE                    | -2.9    | -       | 2.9     | dBm  | 1     |
| Average Output Power (Laser Turn off)    | P0UT-OFF                    | -       | -       | -30     | dBm  |       |
| Side Mode Suppression Ratio              | SMSR                        | 30      | -       | -       | dB   |       |
| Extinction Ratio, 100GE                  | ER                          | 8       | -       | -       | dB   |       |
| Transmitter and Dispersion Penalty       | TDP                         | -       | -       | 2.5     | dB   | 2     |
| Optical Return Loss Tolerance            | ORLT                        | -       | -       | 20      | dB   |       |
| Optical Eye Mask, 100GE                  | Compliant with IEEE 802.3ba |         |         |         |      | 2     |
| Optical Eye Mask, OTU4                   | Compliant with ITU-T G.695  |         |         |         |      | 2     |
| <b>Receiver</b>                          |                             |         |         |         |      |       |
| Center Wavelength Lane 0                 | $\lambda_0$                 | 1294.53 | 1295.56 | 1296.59 | nm   |       |
| Center Wavelength Lane 1                 | $\lambda_1$                 | 1299.02 | 1300.05 | 1301.09 | nm   |       |
| Center Wavelength Lane 2                 | $\lambda_2$                 | 1303.54 | 1304.58 | 1305.63 | nm   |       |
| Center Wavelength Lane 3                 | $\lambda_3$                 | 1308.09 | 1309.14 | 1310.19 | nm   |       |
| Average Rx Power per Lane, 100GE         | P <sub>RX_LANE</sub>        | -20.9   |         | 4.5     | dBm  | 2     |
| OMA Sensitivity per Lane, 100GE          | P <sub>OMA_LANE</sub>       | -       | -       | -21.4   | dBm  | 2     |
| Average Rx Power per Lane, OTU4          | P <sub>RX_AVE_LANE</sub>    | -20.9   |         | 4.5     | dBm  | 3     |
| Sensitivity per Lane, OTU4               | P <sub>OMA_LANE</sub>       | -       | -       | -21.4   | dBm  | 3     |
| Receiver Overload                        | P <sub>IN-OL</sub>          | 4.5     | -       | -       | dBm  |       |
| Reflectance                              | Ref                         | -       | -       | -26     | dB   |       |
| LOS Assert per lane                      | LOSA                        | -40     | -       | -       | dBm  |       |
| LOS De-assert                            | LOSD                        | -       | -       | -25     | dBm  |       |
| LOS Hysteresis                           | LOSH                        | 0.5     | -       | 6.0     | dB   |       |

Notes:

1. The optical power is launched into SMF.
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78125 Gb/s.

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3. Measured with a PRBS 2<sup>31</sup>-1 test pattern @27.952 Gb/s

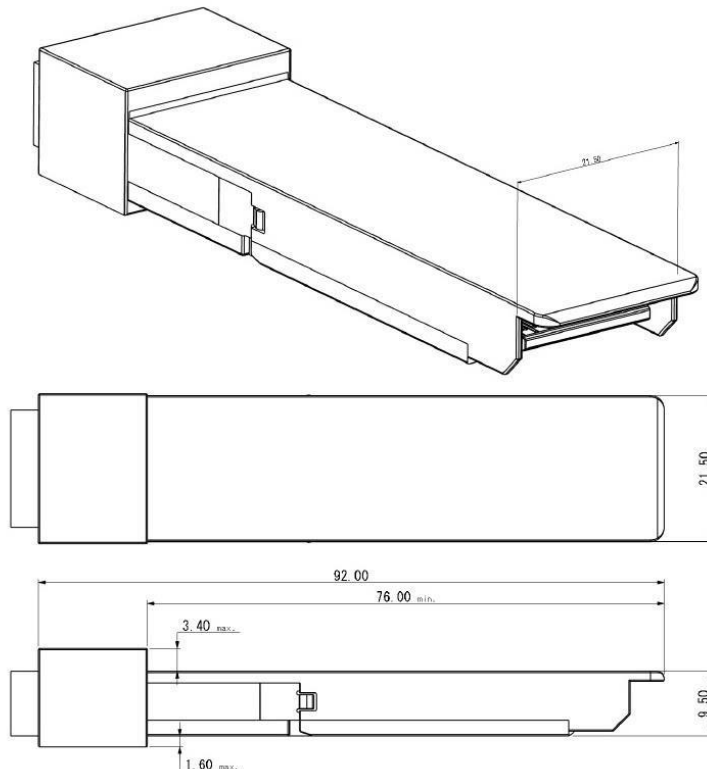
## Electrical Characteristics

**High-Speed Signal: Compliant to CAUI-4 (IEEE 802.3bm)**

**Low-Speed Signal: Compliant to CFP MSA Hardware Specification v1.4**

| Parameter                          | Symbol           | Min. | Typical              | Max.                 | Unit | Notes |
|------------------------------------|------------------|------|----------------------|----------------------|------|-------|
| <b>Transmitter (Module Input)</b>  |                  |      |                      |                      |      |       |
| Differential Data Input Amplitude  | VIN,P-P          | 95   | -                    | 900                  | mVpp |       |
| Differential Termination Mismatch  |                  | -    | -                    | 10                   | %    |       |
| Tx_Disable                         | Normal Operation | VIL  | -0.3                 | 0.8                  | V    |       |
|                                    | Laser Disable    | VIH  | 2.0                  | V <sub>CC</sub> +0.3 | V    |       |
| <b>Receiver (Module Output)</b>    |                  |      |                      |                      |      |       |
| Differential Data Output Amplitude | VOUT,P-P         | 228  | -                    | 900                  | mVpp |       |
| Differential Termination Mismatch  |                  | -    | -                    | 10                   | %    |       |
| Output Rise/Fall Time, 20%~80%     | TR               | 12   | -                    | -                    | ps   |       |
| Rx_LOS                             | Normal Operation | VOL  | -                    | 0.2                  | V    |       |
|                                    | Lose Signal      | VOH  | V <sub>CC</sub> -0.2 | -                    | V    |       |

## Mechanical Dimension



## Digital Diagnostics

### Shenzhen Opway Communication Co., Ltd.

3F, Building 5, Section 2, Baiwangxin High-tech Industrial Park, 1002 Songbai Rd.,  
 Nanshan, Shenzhen, Guangdong, China 518000  
 Tel: +86-755-86000306 Fax: +86-755-86000825  
 E-mail: info@opwaytech.com <http://www.opwaytech.com>

| Parameter                | Range       | Accuracy | Unit | Calibration |
|--------------------------|-------------|----------|------|-------------|
| Temperature              | 0 to 70     | ±3       | °C   | Internal    |
| Voltage                  | 0 to VCC    | 0.1      | V    | Internal    |
| Tx Bias Current Per Lane | 0 to 100    | 10%      | mA   | Internal    |
| Tx Output Power Per Lane | -2.9 to 2.9 | ±3       | dBm  | Internal    |
| Rx Power (Each Lane)     | -21 to 5    | ±3       | dBm  | Internal    |

## Warnings

**Handling Precautions:** This device is susceptible damaged as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

**Laser Safety:** Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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