# 800G Twin-port Flat Top OSFP 2x400Gb/s Multimode 2xSR4 100m Transceiver

## Features

- 800G 2xSR4 multimode transceiver

- 8-channels of 100G-PAM4 electrical modulation

- Two ports of 4-channel 100G-PAM4 optical modulation

- Supports two straight 400Gb/s or two 1:2 splitter fiber cables for 200Gb/s

- Finned-top OSFP for air-cooled switches

- 850nm VCSEL

- Flat-top OSFP

- Maximum reach: 100m using OM4 fiber

- Two MPO-12/APC optical connectors

- 14 Watts max power

- Single 3.3V power supply

- Class 1 laser safety

- Hot pluggable, RoHS compliant

- CMIS 4.0 compliant

- Case temperature range 0°C to +70°C

## Description

OSFP-800G-2xSR4F is an Eight-Channel, Parallel, Pluggable, Fiber-Optic OSFP for 800Gigabit Ethernet applications. This transceiver is a high performance module for shortrange data communication and interconnect application. It integrates eight data lanes in each direction with 8x53.125GBd. The length of OSFP SR8 is up to 70 meters over OM3 MMF or 100 meters over OM4 MMF. This module is designed to operate over multimode fiber systems using a nominal wavelength of 850nm.

The 800G OSFP switches require finned-top OSFP shells for extra transceiver cooling. A flat-top version offered for ConnectX-8 NIC links.

The transceiver combinations guarantee optimal operation. Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

## Absolute Maximum Specifications

Absolute maximum ratings are those beyond which damage to the device may occur.

Prolonged operation between the operational specifications and absolute maximum ratings is not intended and may cause permanent device degradation.

### Table1-Absolute Maximum Specifications

| Parameter | Min. | Typical | Max. | Unit | Note |
|---|---|---|---|---|---|
| Storage Temperature | -40 | | +85 | ºC | |
| Supply voltage | -0.5 | | 3.6 | V | |
| Relative Humidity (non- condensing) | 15 | | 85 | % | |
| Control input voltage | -0.3 | | Vcc+0.5 | V | |
| Operating Case Temperature | 0 | | 70 | ºC | |
| Receiver Damage Threshold, per Lane | 5 | | | dBm | |

## Recommended Operating Conditions

### Table2-Recommended Operating Conditions

| Parameter | Symbol | Min | Typical | Max. | Units | Notes |
|---|---|---|---|---|---|---|
| Operating Case Temperature | TOP | 0 | | 70 | degC | |
| Relative Humidity(non-condensing) | RH | 15 | | 85 | % | |
| Power Supply Voltage | Vcc | 3.135 | | 3.465 | V | |
| Total Power Consumption | Pc | | | 14 | W | 1 |
| Supply Current per end | | | | 5.1 | A | |
| Bit Rate | BR | | | 850 | Gbps | |
| Fiber Length on OM3 MMF | | | | 70 | m | |
| Fiber Length on OM4 MMF | | | | 100 | m | |

| | | | | | | |
|---|---|---|---|---|---|---|
| I²C Clock Frequency | | 0 | | 1000 | kHz | |

**Notes：**

[1]  Under condition of 3.465V operating supply voltage, and 70℃ case temperature.

## Electrical Specifications

### Table3-Electrical Specifications

| Parameter | Test Point | Min. | Typical | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Pre FEC Bit Error Ratio | | | | 2.4E-4 | | |
| Post FEC Bit Error Ratio | Icc | | | 1E-12 | | |
| Transmitter (each Lane) | | | | | | |
| Differential pk-pk Input Voltage tolerance | | 750 | | | mV | |
| Differential Termination Mismatch | | | | 10 | % | |
| Eye height | | 10 | | | mV | |
| Common-mode to differential-mode return loss | | IEEE802.3ck Equation (120G−1) | | | dB | |
| Vertical eye closure | | | | 12 | dB | |
| Effective return loss | | 7.3 | | | dB | |
| Transition Time | | 10 | | | ps | |
| Receiver(each Lane) | | | | | | |
| Differential data output swing | | 300 | | 900 | mVpp | |
| Differential termination mismatch | | | | 10 | % | |
| Eye height | | 15 | | | mV | |
| Vertical eye closure | | | | 12 | dB | |
| Common-mode to differential-mode return loss | | IEEE802.3ck Equation (120G−1) | | | | |
| Effective return loss | | 8.5 | | | dB | |
| Transition time | | 8.5 | | | ps | |

**Notes：**

[1] Under condition of 3.465V operating supply voltage, and 70℃  case temperature.

## Optical Specifications

### Table4-Optical Specifications

| Parameter | Symbol | Min. | Typical | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Transceiver | | | | | | |
| Data rate per lane | DR | | 53.125 | | GBd | |
| Modulation format | | | PAM4 | | | |
| Center Wavelength | λ | 840 | 860 | 868 | nm | 1 |
| RMS spectral width | σ | | | 0.6 | nm | |
| Average Launch power, each lane | $P_{avg}$ | -1 | | 4 | dBm | |
| Optical Power OMA, each Lane，max | $P_{OMA}$ | | 3.5 | | dBm | |
| $OMA_{outer}$，    max (TECQ, TDECQ)＜1.8 dB | | max [-2.6 , max(TECQ,TECQ) | | | dBm | |

| | | | | | | |
|---|---|---|---|---|---|---|
| each lane min | | | | – 4.4] | | |
| | 1.8＜max (TECQ, TDECQ)＜4.4 dB | | | | | |
| Transmitter and dispersion eye closure (TDECQ), each lane | TDECQ | | | 4.4 | dB | |
| Transmitter eye closure for PAM4 (TECQ), each lane | TECQ | | | 4.4 | dB | |
| Extinction ratio | ER | 2.5 | | | dB | |
| Transmitter power excursion, each lane | | | | 2.3 | dBm | |
| Optical Return Loss Tolerance | ORLT | | | 14 | dB | |
| Optical Power for TX DISABLE | | | | -30 | dBm | |
| Encircled fluxb | | ≥86% at 19 um | | | | 2 |
| | | ≤30% at 4.5 um | | | | |
| Receiver | | | | | | |
| Data rate per lane | BR | | 53.125 | | | Gbd |
| Modulation format | | | PAM4 | | | |
| Center Wavelength | λ | 842 | 850 | 863 | nm | |
| Damage threshold | | 5 | | | dBm | |
| Average receive power, each lane | | -6.4 | | 4 | dBm | |
| Receive power, each lane (OMAouter) | | | | 3.5 | dBm | |
| Receiver reflectance | Rr | | | -15 | dB | |
| Receiver sensitivity, each lane | | RS = max (-4.6 , TECQ – 6.4) | | | dBm | 3 |
| Stressed receiver sensitivity, each lane | | | | -2 | dBm | |
| Rx LOS | Assert | -15 | | | dBm | |
| | De-assert | | | -7.5 | dBm | |
| | Hysteresis | 0.5 | | 5 | dB | |

**Notes：**

[1] Defined according to the performance of the laser used.

[2] Measured into type A1a.2 or type A1a.3, or A1a.4, 50 μs fiber, in accordance with IEC 61280-1-4.

[3] Receiver sensitivity is informative and is defined for a transmitter with a value of TECQ. Measured with conformance test signal at TP3 for BER = 2.4E-4 Pre-FEC.

## Pin Description

The device is OSFP MSA Specification for OSFP Octal Small Form Factor Pluggable Module Rev. 1.12 compliant, see www.osfpmsa.org.

| Table5-Pin Description | | | | | |
|---|---|---|---|---|---|
| Pin | Symbol | Description | Pin | Symbol | Description |
| 1 | GND | Ground | 31 | GND | Ground |
| 2 | Tx2p | Transmitter Non-Inverted Data Input | 32 | Rx2p | Receiver Non-Inverted Data Output |
| 3 | Tx2n | Transmitter Inverted Data Input | 33 | Rx2n | Receiver Inverted Data Output |
| 4 | GND | Ground | 34 | GND | Grounds |
| 5 | Tx4p | Transmitter Non-Inverted Data Input | 35 | Rx4p | Receiver Non-Inverted Data |

| | | | | | Output |
|---|---|---|---|---|---|
| 6 | Tx4n | Transmitter Inverted Data Input | 36 | Rx4n | Receiver Inverted Data Output |
| 7 | GND | Ground | 37 | GND | Ground |
| 8 | Tx6p | Transmitter Non-Inverted Data Input | 38 | Rx6p | Receiver Non-Inverted Data Output |
| 9 | Tx6n | Transmitter Inverted Data Input | 39 | Rx6n | Receiver Inverted Data Output |
| 10 | GND | Ground | 40 | GND | Ground |
| 11 | Tx8p | Transmitter  Non- Inverted Data  input | 41 | Rx8p | Receiver Non-Inverted Data Output |
| 12 | Tx8n | Transmitter Inverted Data Input | 42 | Rx8n | Receiver Inverted Data Output |
| 13 | GND | Ground | 43 | GND | Ground |
| 14 | SCL | 2-wire serial interface clock | 44 | INT / RSTn | Module  Interrupt /  Module Reset |
| 15 | VCC | +3.3V Power | 45 | VCC | +3.3V Power |
| 16 | VCC | +3.3V Power | 46 | VCC | +3.3V Power |
| 17 | LPWn / PRSn | Low-Power Mode / Module Present | 47 | SDA | 2-wire Serial interface data |
| 18 | GND | Ground | 48 | GND | Ground |
| 19 | Rx7n | Receiver Inverted Data Output | 49 | Tx7n | Transmitter Inverted Data Input |
| 20 | Rx7p | Receiver Non-Inverted Data Output | 50 | Tx7p | Transmitter Non-Inverted Data Input |
| 21 | GND | Ground | 51 | GND | Ground |
| 22 | Rx5n | Receiver Inverted Data Output | 52 | Tx5n | Transmitter Inverted Data Input |
| 23 | Rx5p | Receiver Non-Inverted Data Output | 53 | Tx5p | Transmitter Non-Inverted Data Input |
| 24 | GND | Ground | 54 | GND | Ground |
| 25 | Rx3n | Receiver Inverted Data Output | 55 | Tx3n | Transmitter Inverted Data Input |
| 26 | Rx3p | Receiver Non-Inverted Data Output | 56 | Tx3p | Transmitter Non-Inverted Data Input |
| 27 | GND | Ground | 57 | GND | Ground |
| 28 | Rx1n | Receiver Inverted Data Output | 58 | Tx1n | Transmitter Inverted Data Input |
| 29 | Rx1p | Receiver Non-Inverted Data Output | 59 | Tx1p | Transmitter Non-Inverted Data Input |
| 30 | GND | Ground | 60 | GND | Ground |

## OSFP Module Pad Layout
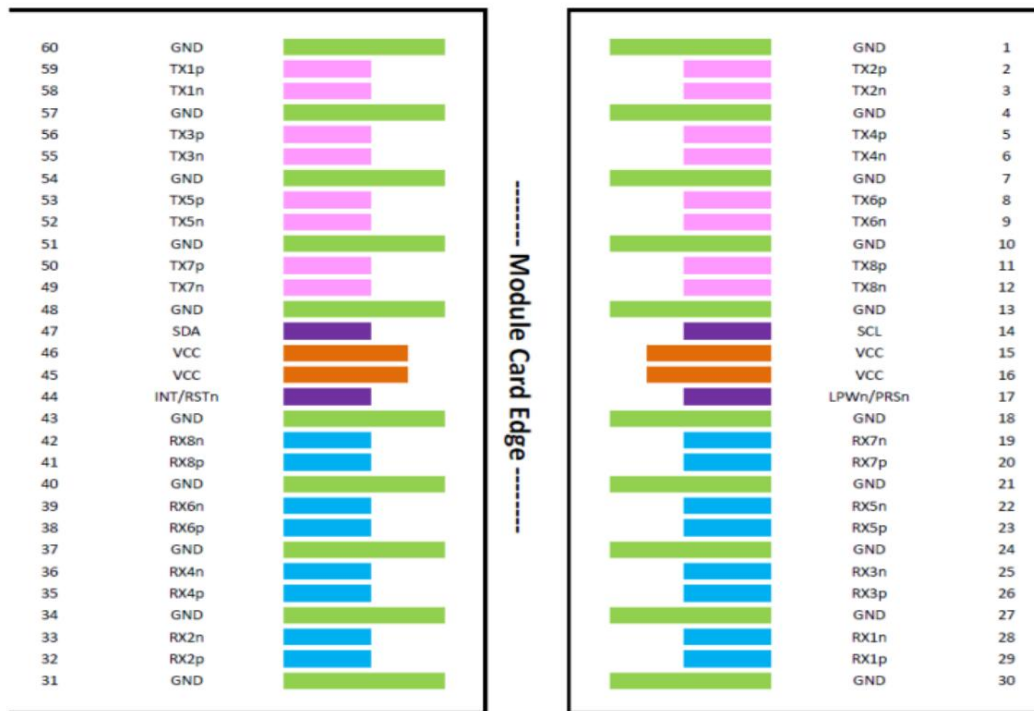


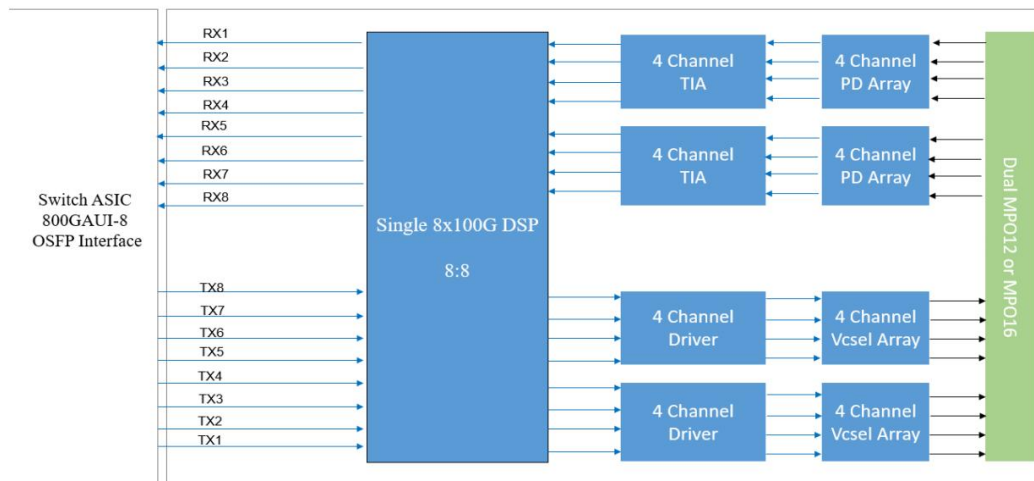Figure 1 MSA Compliant Connector

## Transceiver Block Diagram



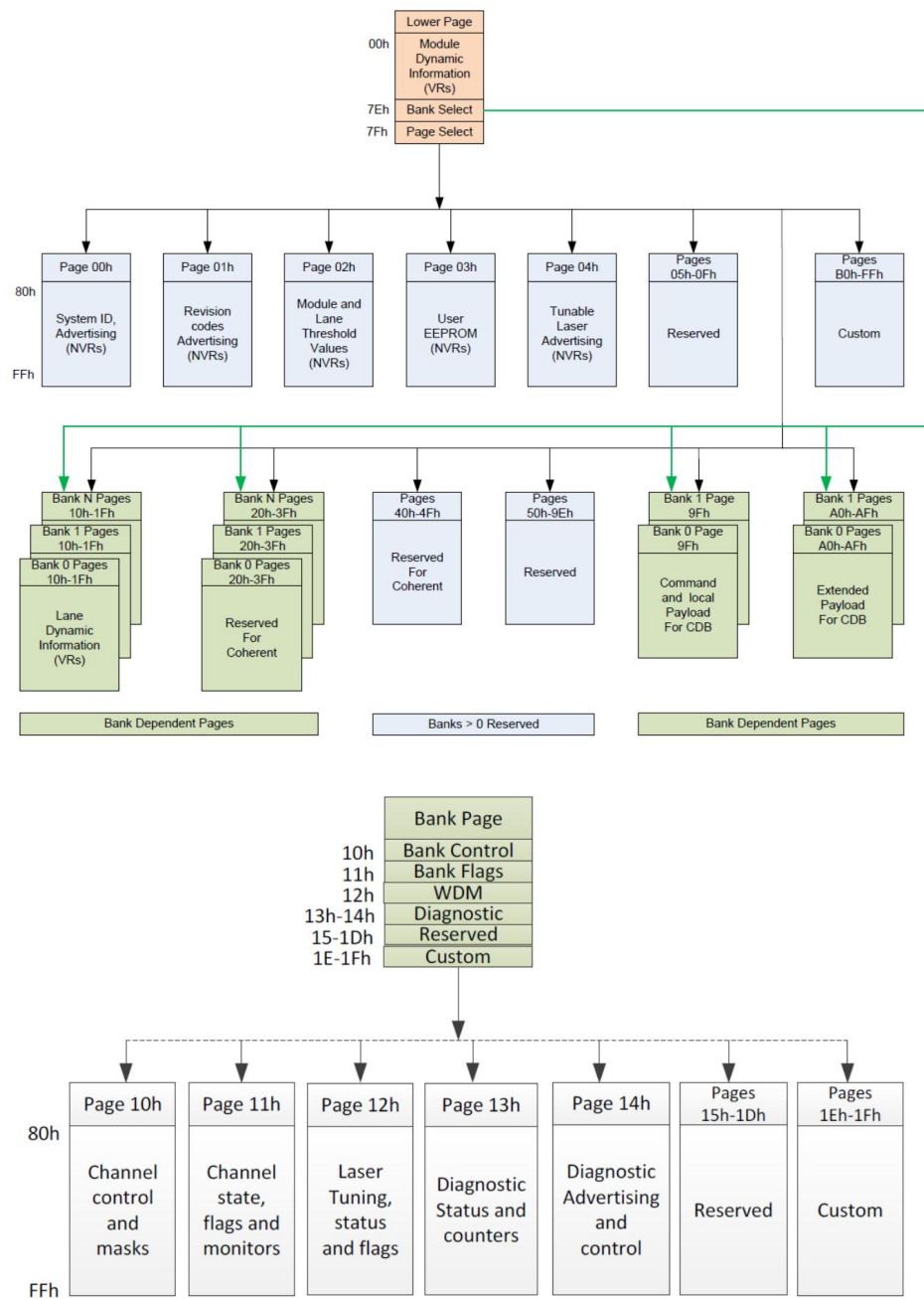Figure 2 Transceiver Block Diagram

## Management Interface



Figure 3 CMIS Module Memory Map

## Optical Port Description

The optical interface port is dual MPO-12 APC receptacle. The transmit and receive optical lanes shall occupy the positions depicted in Figure 4 when looking into the MDI receptacle with the connector keyway feature on top.
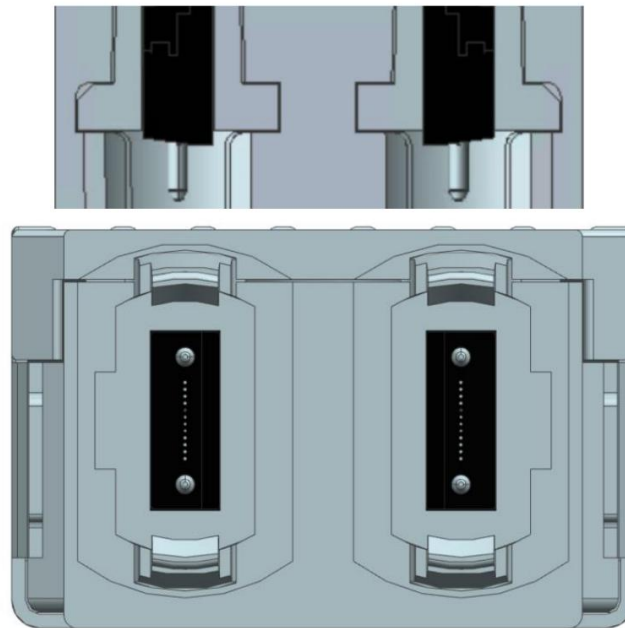


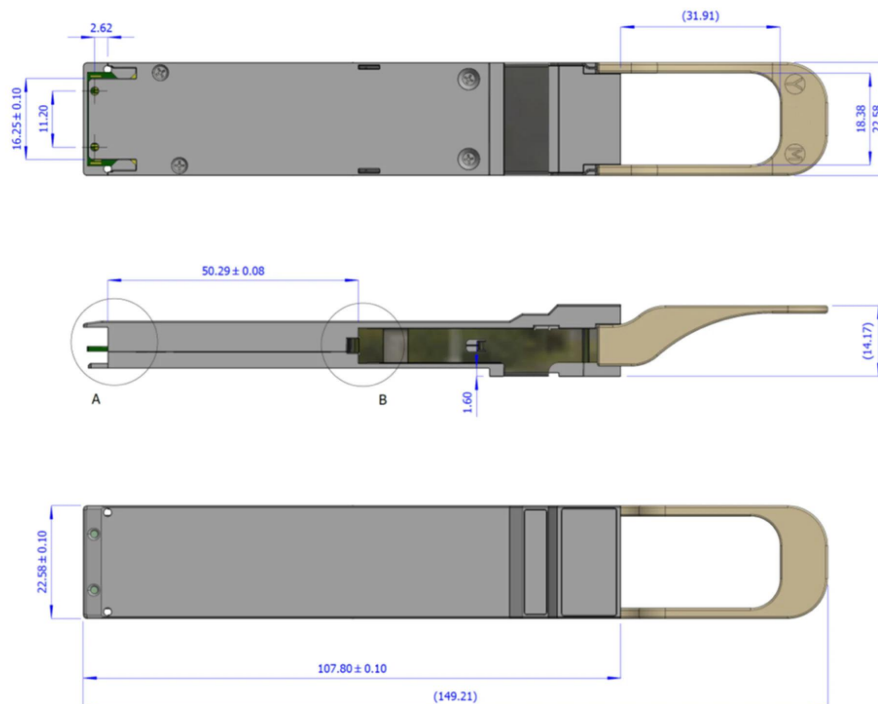Figure 4 Optical Media Dependent Interface port assignments

## Mechanical Drawing



Figure 5 Mechanical Outline

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