**OSFPRHS-800GB-2XSR4-MX-C**

Mellanox® Compatible TAA 800GBase-2xSR4 PAM4 OSFP-RHS Transceiver (MMF, 850nm, 50m, 2xMPO, DOM, CMIS 5.0)

**Features:**

- Compliant with IEEE 802.3-2022: 8x100GBASE-VR1 Optical Interface
- Compliant with IEEE 802.3ck-2022: 8x100GAUI-1 C2M Electrical Interface
- VCSEL Transmitter and PIN PD Receiver
- Supports 850Gbps
- Supports Both Ethernet and InfiniBand NDR
- OSFP MSA Compliant
- Dual MPO-12 Connector APC
- Compliant with CMIS 5.0
- Operating Temperature: 0 to 70 Celsius
- Class 1 Laser
- RoHS Compliant and Lead-Free

**Applications:**

- 800GBase Ethernet

**Product Description**

This Mellanox® compatible OSFP-RHS transceiver provides 800GBase-2xSR4 throughput up to 50m over multi-mode fiber (MMF) PAM4 using a wavelength of 850nm via a 2xMPO connector. It can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Mellanox®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows 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.

ProLabs' 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.")

TAA COMPLIANT

**Rev. 012026**

**Absolute Maximum Ratings**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Storage Temperature** | Tstg | -40 | | 85 | °C | |
| **Operating Case Temperature** | Tc | 0 | | 70 | °C | 1 |
| **Power Supply Voltage** | Vcc | -0.5 | | 3.6 | V | |
| **Relative Humidity (Non-Condensing)** | RH | 5 | | 85 | % | |
| **Data Input Voltage Differential** | $V_{DIP}$-$V_{DIN}$ | | | 1 | V | |
| **Control Input Voltage** | $V_I$ | -0.3 | | Vcc+0.5 | V | |
| **Control Output Current** | $I_O$ | -20 | | 20 | mA | |
| **Signaling Speed Per Lane** | DRL | | 53.125 | | GBd | |
| **Operating Distance** | | 2 | | 50 | m | 1 |
| **Data Rate** | DR | | 850 | | Gbps | |

**Notes:**

1. 0.5m to 30m for OM3, 0.5m to 50m for OM4 and OM5, with FEC.

**Electrical Characteristics**

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|---|
| **Power Supply Voltage** | | Vcc | 3.135 | 3.3 | 3.465 | V | |
| **Instantaneous Peak Current at Hot Plug** | | $I_{CC\_IP}$ | | | 6400 | mA | |
| **Sustained Peak Current at Hot Plug** | | $I_{CC\_SP}$ | | | 5328 | mA | |
| **Maximum Power Dissipation** | | PD | | | 16 | W | |
| **Maximum Power Dissipation (Low-Power Mode)** | | $PD_{LP}$ | | | 2 | W | |
| **Control Input Voltage - High** | | VIH | Vcc*0.7 | | Vcc+0.3 | V | |
| **Control Input Voltage - Low** | | VIL | -0.3 | | Vcc*0.3 | V | |
| **2-Wire Serial Interface Clock Rate** | | | | | 400 | kHz | |
| **Power Supply Noise (1kHz to 1MHz, Pk-Pk)** | | | | | 66 | mVp-p | |
| **Transmitter (Module Input, TP1)** | | | | | | | |
| **Differential Pk-Pk Input Voltage Tolerance** | | | 750 | | | mV | |
| **Pk-Pk AC Common-Mode Voltage Tolerance** | **Low-Frequency ($VCM_{LF}$)** | | 32 | | | mV | |
| | **Full-Band ($VCM_{FB}$)** | | 80 | | | mV | |
| **Differential-Mode to Common-Mode Return Loss** | | RLcd | 802.3ck 120G-2 | | | dB | |
| **Effective Return Loss** | | ERL | 8.5 | | | dB | |
| **Differential Termination Mismatch** | | | | | 10 | % | |
| **Single-Ended Voltage Tolerance Range** | | | -0.4 | | 3.3 | V | |
| **DC Common-Mode Voltage Tolerance** | | | -0.35 | | 2.85 | V | |
| **Receiver (Module Output, TP4)** | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Pk-Pk AC Common-Mode Voltage** | **Low-Frequency ($VCM_{LF}$)** | | | | 32 | mV | |
| | **Full-Band ($VCM_{FB}$)** | | | | 80 | mV | |
| **Differential Pk-Pk Output Voltage** | **Short-Mode** | | | | 600 | mV | |
| | **Long-Mode** | | | | 845 | mV | |
| **Eye Height** | | EH | 15 | | | mV | |
| **Vertical Eye Closure** | | VEC | | | 12 | dB | |
| **Common-Mode to Differential-Mode Return Loss** | | RLDc | 802.3ck 120G-1 | | | dB | |
| **Effective Return Loss** | | ERL | 8.5 | | | dB | |
| **Differential Termination Mismatch** | | | | | 10 | % | |
| **Transition Time** | | | 8.5 | | | ps | |
| **DC Common-Mode Voltage Tolerance** | | | -0.35 | | 2.85 | V | |

### Electrical Low-Speed Control and Sense Signal Specifications

| Parameter | Symbol | Min. | Max. | Unit | Notes |
|---|---|---|---|---|---|
| **Module Output SCL and SDA** | VOL | 0 | 0.4 | V | |
| **Module Input SCL and SDA** | VIL | -0.3 | Vcc*0.3 | V | |
| | VIH | Vcc*0.7 | Vcc+0.5 | V | |
| **InitMode, ResetL, and ModSelL** | VIL | -0.3 | 0.8 | V | |
| | VIH | 2 | Vcc+0.3 | V | |
| **IntL** | VOL | 0 | 0.4 | V | |
| | VOH | Vcc-0.5 | Vcc+0.3 | V | |

**Optical Characteristics**

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | | |
| **Signaling Rate Per Lane (Range)** | | | 53.125 ± 100ppm | | | GBd | |
| **Wavelength** | | λC | 844 | | 860 | nm | |
| **RMS Spectral Width** | | RMS | | | 0.65 | dB | 1 |
| **Average Launch Power Per Lane** | | $AOP_L$ | -4.6 | | 4.0 | dBm | |
| **Outer Optical Modulation Amplitude (OMAouter) Per Lane** | **(TECQ, TDECQ) <= 1.8 dB** | OMAouter | -2.6 | | 3.5 | dBm | |
| | **1.8< (TECQ, TDECQ) <= 4.4 dB** | | -4.4 + Max. (TECQ, TDECQ) | | | | |
| **Transmitter and Dispersion Eye Closure for PAM4 (TDECQ) Per Lane** | | TDECQ | | | 4.4 | dB | |
| **Transmitter Eye Closure for PAM4 (TECQ) Per Lane** | | TECQ | | | 4.4 | dB | |
| **Over/Under-Shoot** | | | | | 29 | % | |
| **Transmitter Power Excursion Per Lane** | | | | | 2.3 | dBm | |
| **Average Launch Power of Off Transmitter Per Lane** | | Toff | | | -30 | dBm | |
| **Extinction Ratio** | | ER | 2.5 | | | dB | |
| **Transmitter Transition Time** | | Tr | | | 17 | ps | |
| **$RIN_{14}OMA$** | | RIN | | | -132 | dB/Hz | |
| **Optical Return Loss Tolerance** | | ORLT | | | 14 | dB | |
| **Encircled Flux** | | | >=86% at 19µm<br><=30% at 4.5µm | | | | |
| **Receiver** | | | | | | | |
| **Signaling Rate Per Lane (Range)** | | | 53.125 ± 100ppm | | | GBd | |
| **Wavelength** | | λC | 840 | | 860 | nm | |
| **Damage Threshold Per Lane** | | $AOP_D$ | 5 | | | dBm | |
| **Average Receive Power Per Lane** | | $AOP_R$ | -6.3 | | 4 | dBm | |
| **Receive Power (OMAouter) Per Lane** | | $OMA_R$ | | | 3.5 | dBm | |
| **Receiver Reflectance** | | RR | | | -15 | dB | |
| **Receiver Sensitivity (OMAouter)** | **TECQ < 1.4 dB** | SOMA | | | -4.4 | dBm | |
| | **1.4 dB <=TECQ<=3.4 dB** | | | | -6.2+TECQ | | |
| **Stressed Receiver Sensitivity (OMAouter) Per Lane** | | SRS | | | -1.8 | dBm | 2 |
| **Conditions of Stressed Receiver Sensitivity Test** | | | | | | | |
| **Stressed Eye Closure for PAM4 (SECQ) Per Lane Under Test** | | SECQ | | 4.4 | | dB | |
| **OMAouter of Each Aggressor Lane** | | | | 3.5 | | dB | |

**Notes:**

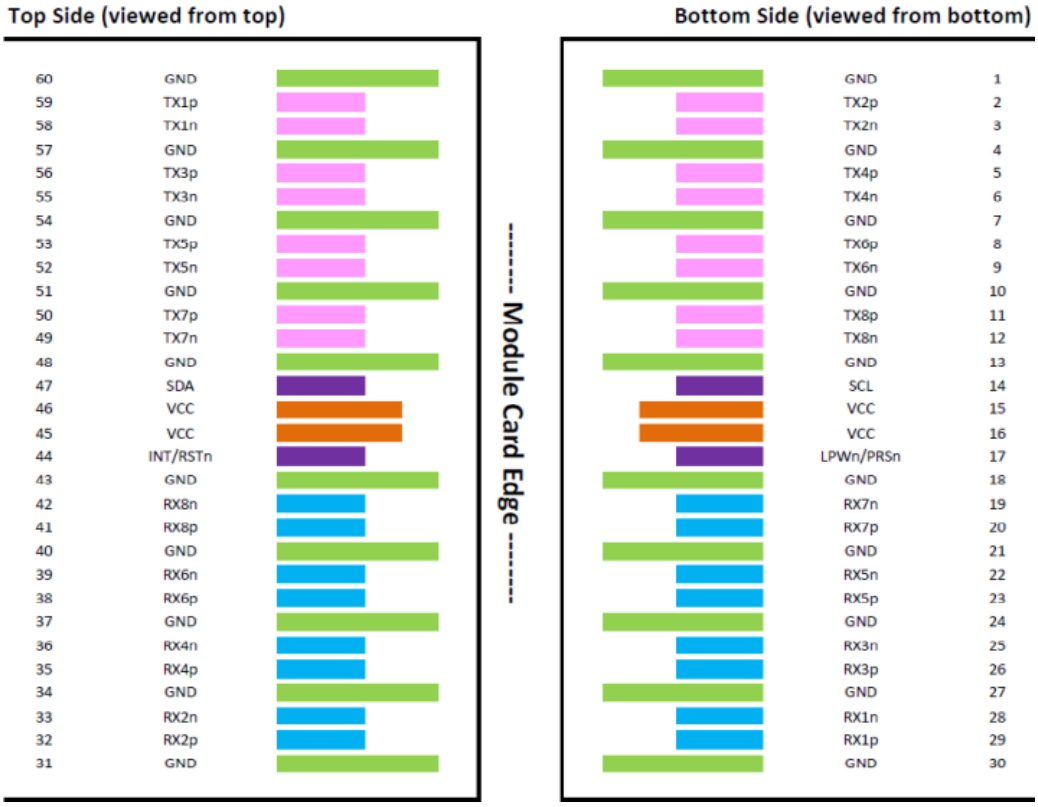
1. RMS spectral width is the standard deviation of the spectrum.
2. Measured with conformance test signal at TP3 for the BER = $2.4x10^{-4}$.

**Pin Descriptions**

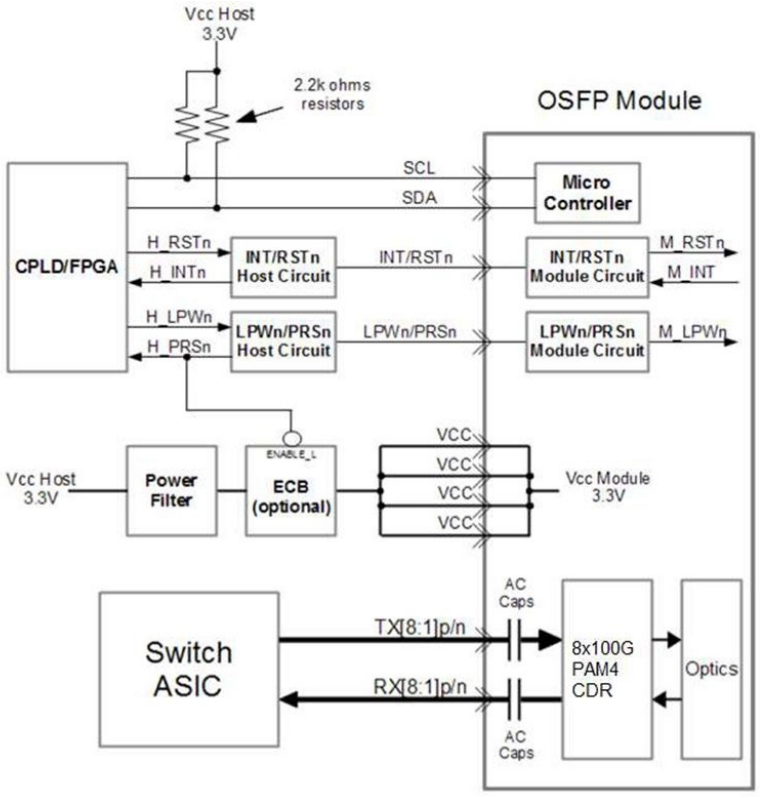
| Pin | Logic | Symbol | Name/Description | Notes |
|---|---|---|---|---|
| **1** | | GND | Module Ground. | |
| **2** | CML-I | Tx2+ | Transmitter Non-Inverted Data. | |
| **3** | CML-I | Tx2- | Transmitter Inverted Data. | |
| **4** | | GND | Module Ground. | |
| **5** | CML-I | Tx4+ | Transmitter Non-Inverted Data. | |
| **6** | CML-I | Tx4- | Transmitter Inverted Data. | |
| **7** | | GND | Module Ground. | |
| **8** | CML-I | Tx6+ | Transmitter Non-Inverted Data. | |
| **9** | CML-I | Tx6- | Transmitter Inverted Data. | |
| **10** | | GND | Module Ground. | |
| **11** | CML-I | Tx8+ | Transmitter Non-Inverted Data. | |
| **12** | CML-I | Tx8- | Transmitter Inverted Data. | |
| **13** | | GND | Module Ground. | |
| **14** | LVCMOS-I/O | SCL | 2-Wire Serial Interface Clock. | |
| **15** | | Vcc | +3.3V Power Supply. | |
| **16** | | Vcc | +3.3V Power Supply. | |
| **17** | Multi-Level | LPWn/PRSn | Low-Power Mode/Module Present. | |
| **18** | | GND | Module Ground. | |
| **19** | CML-O | Rx7- | Receiver Inverted Data. | |
| **20** | CML-O | Rx7+ | Receiver Non-Inverted Data. | |
| **21** | | GND | Module Ground. | |
| **22** | CML-O | Rx5- | Receiver Inverted Data. | |
| **23** | CML-O | Rx5+ | Receiver Non-Inverted Data. | |
| **24** | | GND | Module Ground. | |
| **25** | CML-O | Rx3- | Receiver Inverted Data. | |
| **26** | CML-O | Rx3+ | Receiver Non-Inverted Data. | |
| **27** | | GND | Module Ground. | |
| **28** | CML-O | Rx1- | Receiver Inverted Data. | |
| **29** | CML-O | Rx1+ | Receiver Non-Inverted Data. | |
| **30** | | GND | Module Ground. | |
| **31** | | GND | Module Ground. | |
| **32** | CML-O | Rx2+ | Receiver Non-Inverted Data. | |
| **33** | CML-O | Rx2- | Receiver Inverted Data. | |
| **34** | | GND | Module Ground. | |
| **35** | CML-O | Rx4+ | Receiver Non-Inverted Data. | |
| **36** | CML-O | Rx4- | Receiver Inverted Data. | |

| | | | | |
|---|---|---|---|---|
| **37** | | GND | Module Ground. | |
| **38** | CML-O | Rx6+ | Receiver Non-Inverted Data. | |
| **39** | CML-O | Rx6- | Receiver Inverted Data. | |
| **40** | | GND | Module Ground. | |
| **41** | CML-O | Rx8+ | Receiver Non-Inverted Data. | |
| **42** | CML-O | Rx8- | Receiver Inverted Data. | |
| **43** | | GND | Module Ground. | |
| **44** | Multi-Level | INT/RSTn | Module Input/Module Reset. | |
| **45** | | Vcc | +3.3V Power Supply. | |
| **46** | | Vcc | +3.3V Power Supply. | |
| **47** | LVCMOS-I/O | SDA | 2-Wire Serial Interface Data. | |
| **48** | | GND | Module Ground. | |
| **49** | CML-I | Tx7- | Transmitter Inverted Data. | |
| **50** | CML-I | Tx7+ | Transmitter Non-Inverted Data. | |
| **51** | | GND | Module Ground. | |
| **52** | CML-I | Tx5- | Transmitter Inverted Data. | |
| **53** | CML-I | Tx5+ | Transmitter Non-Inverted Data. | |
| **54** | | GND | Module Ground. | |
| **55** | CML-I | Tx3- | Transmitter Inverted Data. | |
| **56** | CML-I | Tx3+ | Transmitter Non-Inverted Data. | |
| **57** | | GND | Module Ground. | |
| **58** | CML-I | Tx1- | Transmitter Inverted Data. | |
| **59** | CML-I | Tx1+ | Transmitter Non-Inverted Data. | |
| **60** | | GND | Module Ground. | |

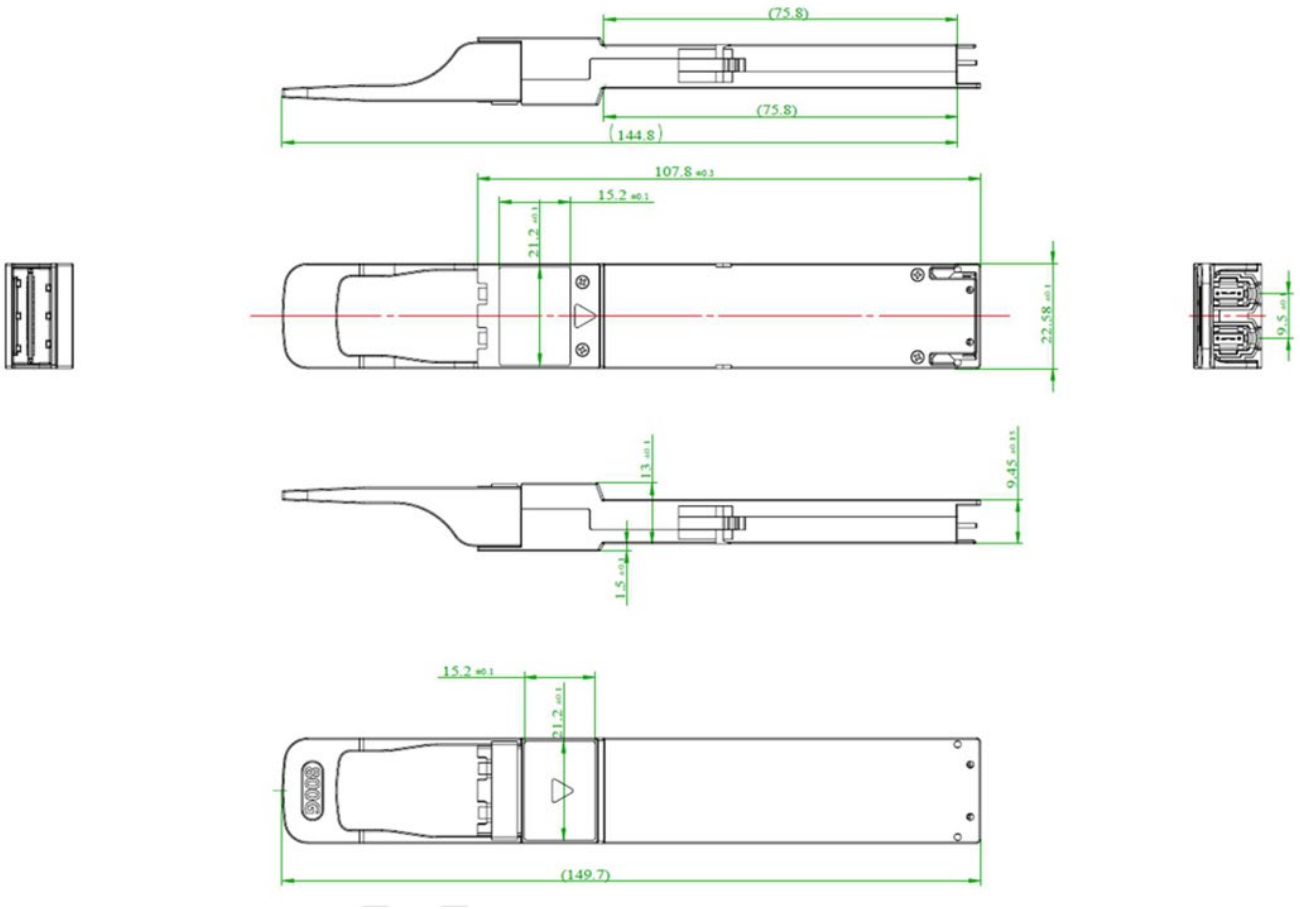
## Electrical Pad Layout




## Recommended OSFP Host Board Schematic



**Mechanical Specifications**



**About ProLabs**

Our extensive experience comes as standard. For over 20 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with more than 100 optical switching and transport platforms.

**A Complete Portfolio of Network Solutions**

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 1.6T while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

**The Trusted Partner**

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.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