Asterfusion 800G OSFP 2xSR4 Dual MPO-12 APC MMF 100m Optical Transceiver

Features

- 8 x 106.25G PAM4 electrical modulation
- Two of 4 x 106.25G PAM4 optical modulation
- Maximum 100m on OM4 and 60m on OM3 with FEC
- Power consumption <13.5W
- Hot Pluggable OSFP form factor
- Dual MPO-12 APC connector receptacle
- 8 channels 850nm VCSEL array
- 8 channels PIN photo detector array
- 7nm Broadcom DSP
- Internal CDR circuits on both receiver and transmitter channels
- Built-in digital diagnostic functions
- Compliant with CMIS V4.0
- Finned-top for air-cooled switches
- Operating case temperature 0°C to +70°C
- 3.3V power supply voltage
- Class 1 laser safety
- RoHS compliant (lead free)

Overview

The Asterfusion OSFP 800G 2xSR4 100m optical transceiver is a low-power, high-density, pluggable OSFP module designed for 800 Gigabit Ethernet applications. This transceiver is a high-performance module for short-range multi-lane interconnection and data transmission. It integrates 8 data lanes in each direction, operating at 8 × 53.125 GBd. Each lane can achieve 106.25 Gbps with FEC, supporting distances up to 60 m over OM3 fiber or 100 m over OM4 fiber. The module supports multimode fiber systems with a nominal wavelength of 850 nm. The optical interface uses dual 12-fiber MTP (MPO) connectors. It supports digital diagnostic functions and is fully compatible with the Common Management Interface Specification (CMIS) 4.0.

Product Applications

- AI Training Fabric
- AI Inference Fabric
- Data Center Fabric
- Ethernet Storage Fabric
- HPC (High Performance Computing)
- Supercomputer
- Telecom Backbone

Block Diagram

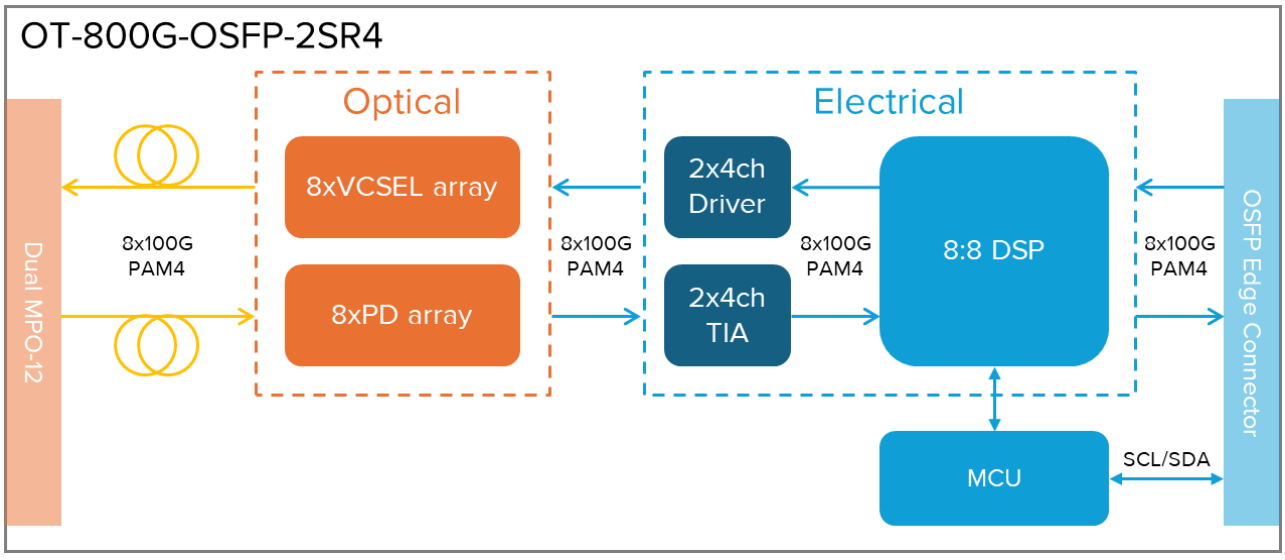

Figure 1 800G OSFP 2xSR4 Optical Transceiver Block Diagram

Networking

Connect 800G-port switches with 2 MPO-12 multimode fiber cable.

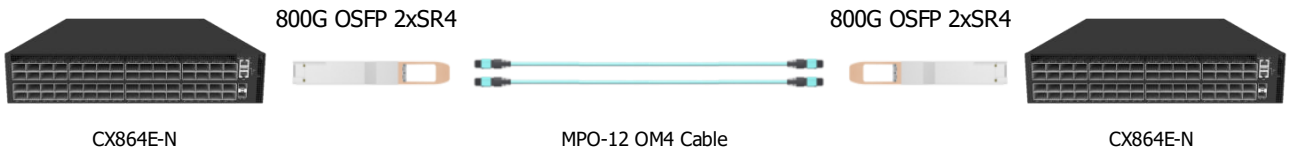

Figure 2 Connect two switches

Connect 400G smartNICs or DPUs to 800G-port switches with MPO-12 multimode fiber cable.

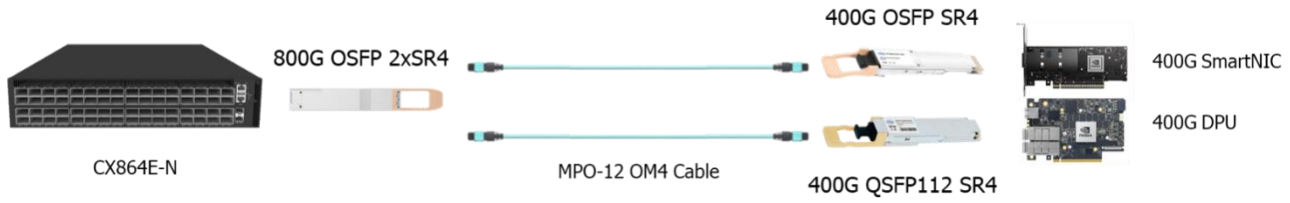

Figure 3 Connect switch to NIC

Specifications

Electrical Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Pre-FEC Bit Error Rate [1]	BER			2.4E-4	
Differential input impedance [2]	Zin	90	100	110	ohm
Differential Output impedance [3]	Zout	90	100	110	ohm
Differential input voltage amplitude	ΔVin	400		900	mVp-p
Differential output voltage	ΔVout			850	mVp-p
Input Logic Level High	V_{IH}	2.0		V_{cc}	V
Input Logic Level Low	V_{IL}	0		0.8	V
Output Logic Level High	V_{OH}	V_{cc}-0.5		V_{cc}	V

Output Logic Level Low	V_{OL}	0		0.4	V
Input Logic Level High	V_{IH}	2.0		V_{cc}	V

Note:

1. BER=2.4E-4, tested under PRBS31Q@53.125GBd, Pre-FEC.
2. Differential input voltage amplitude is measured between TxnP and TxnN.
3. Differential output voltage amplitude is measured between RxnP and RxnN.

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Centre Wavelength	λc	844	850	863	nm
RMS spectral width	Δλ	-	-	0.6	nm
Average launch power, each lane	Pout	-4.6	-	4	dBm
Optical Modulation Amplitude (OMAouter), each lane	OMA	-2.6		3.5	dBm
Transmitter and dispersion eye closure for PAM4(TDECQ), each lane	TDECQ			4.4	dB
Extinction Ratio	ER	2.5	-	-	dB
Average launch power of OFF transmitter, each lane				-30	dB
Receiver					
Centre Wavelength	λc	842	850	948	nm
Receiver Sensitivity in OMAout [1]	RXsen			max (-4.6, TECQ - 6.4)	dBm
Stressed Receiver Sensitivity in OMAout	SRS			-2	dBm
Average Receive power, each lane [2]	Pin	-6.4		4	dBm
Receiver Reflectance				-15	dB

LOS Assert	LOSA	-15		-8.5	dBm
LOS De-Assert	LOSD			-6.5	dBm
LOS Hysteresis	LOSH	0.5			dB

Note:

1. Measured with conformance test signal at TP3 for BER = 2.4E-4 Pre-FEC.
2. These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

Optical Interface Lanes and Assignment

The optical interface port is dual MPO-12 APC receptacle. The transmit and receive optical lanes shall occupy the positions depicted in Figure 4.

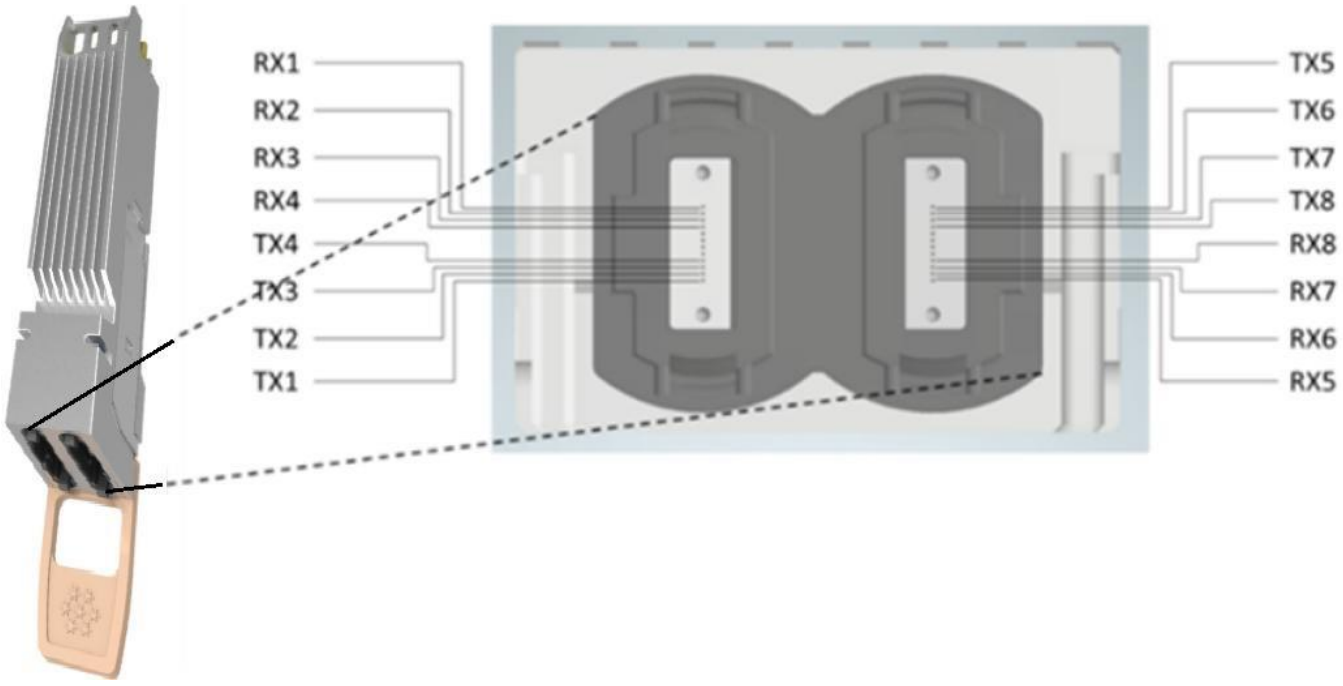

Figure 4 Optical Receptacle and Channel Orientation

Mechanical Dimensions

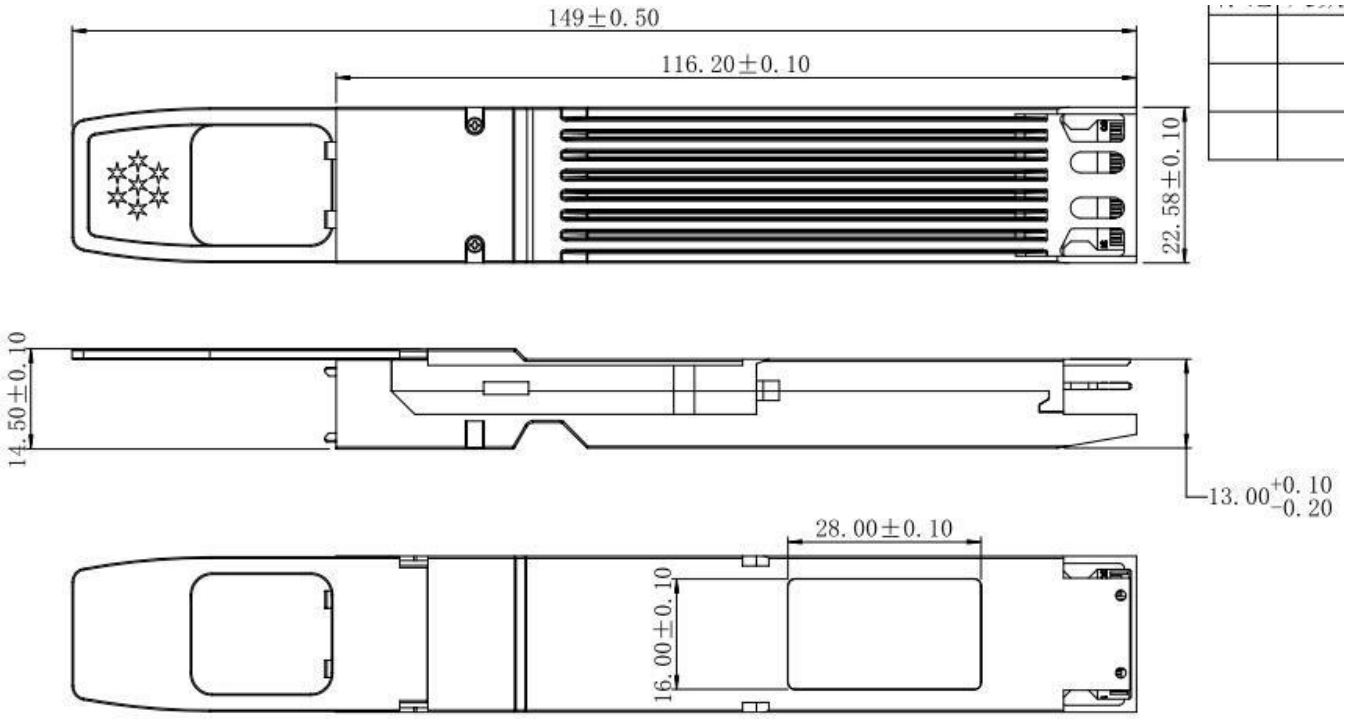

Figure 5 Mechanical Specifications (mm)

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.3	3.6	V
Input Voltage	Vin	-0.3	Vcc+0.3	V
Storage Temperature	Tst	-20	85	ºC
Case Operating Temperature	Top	0	70	ºC
Humidity(non-condensing)	Rh	5	95	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Case temperature	Tca	0		70	ºC
Data Rate Per Lane			106.25		Gbps
Humidity	Rh	5		85	%
Power Dissipation	Pm		13	13.5	W

PIN Description

The optical transceiver complies with the OSFP MSA Specification, see www.osfpmsa.org .

OSFP Pin Description

Pin	Symbol	Description	Logic	Direction
1	GND	Ground		
2	TX2p	Transmitter Data Non- Inverted	CML-I	Input from Host
3	TX2n	Transmitter Data Inverted	CML-I	Input from Host
4	GND	Ground		
5	TX4p	Transmitter Data Non- Inverted	CML-I	Input from Host
6	TX4n	Transmitter Data Inverted	CML-I	Input from Host
7	GND	Ground		
8	TX6p	Transmitter Data Non- Inverted	CML-I	Input from Host
9	TX6n	Transmitter Data Inverted	CML-I	Input from Host
10	GND	Ground		
11	TX8p	Transmitter Data Non- Inverted	CML-I	Input from Host
12	TX8n	Transmitter Data Inverted	CML-I	Input from Host
13	GND	Ground		
14	SCL	2-wire Serial interface clock	LVCMOS-I/O	Bi- directional
15	VCC	+3.3V Power		Power from Host
16	VCC	+3.3V Power		Power from Host
17	LPWn/PRSn	Low-Power Mode / Module Present	Multi-Level	Bi- directional
18	GND	Ground		
19	RX7n	Receiver Data Inverted	CML-O	Output to Host
20	RX7p	Receiver Data Non-Inverted	CML-O	Output to Host
21	GND	Ground		

22	RX5n	Receiver Data Inverted	CML-O	Output to Host
23	RX5p	Receiver Data Non-Inverted	CML-O	Output to Host
24	GND	Ground		
25	RX3n	Receiver Data Inverted	CML-O	Output to Host
26	RX3p	Receiver Data Non-Inverted	CML-O	Output to Host
27	GND	Ground		
28	RX1n	Receiver Data Inverted	CML-O	Output to Host
29	RX1p	Receiver Data Non-Inverted	CML-O	Output to Host
30	GND	Ground		
31	GND	Ground		
32	RX2p	Receiver Data Non-Inverted	CML-O	Output to Host
33	RX2n	Receiver Data Inverted	CML-O	Output to Host
34	GND	Ground		
35	RX4p	Receiver Data Non-Inverted	CML-O	Output to Host
36	RX4n	Receiver Data Inverted	CML-O	Output to Host
37	GND	Ground		
38	RX6p	Receiver Data Non-Inverted	CML-O	Output to Host
39	RX6n	Receiver Data Inverted	CML-O	Output to Host
40	GND	Ground		
41	RX8p	Receiver Data Non-Inverted	CML-O	Output to Host
42	RX8n	Receiver Data Inverted	CML-O	Output to Host
43	GND	Ground		
44	INT/ RSTn	Module Interrupt / Module Reset	Multi-Level	Bi- directional
45	VCC	+3.3V Power		Power from Host
46	VCC	+3.3V Power		Power from Host
47	SDA	2-wire Serial interface data	LVCMOS-I/O	Bi- directional
48	GND	Ground		
49	TX7n	Transmitter Data Inverted	CML-I	Input
50	TX7p	Transmitter Data Non- Inverted	CML-I	Input from Host
51	GND	Ground		
52	TX5n	Transmitter Data Inverted	CML-I	Input from Host
53	TX5p	Transmitter Data Non- Inverted	CML-I	Input from Host
54	GND	Ground		
55	TX3n	Transmitter Data Inverted	CML-I	Input from Host
56	TX3p	Transmitter Data Non- Inverted	CML-I	Input from Host
57	GND	Ground		
58	TX1n	Transmitter Data Inverted	CML-I	Input from Host
59	TX1p	Transmitter Data Non- Inverted	CML-I	Input from Host

60	GND	Ground		

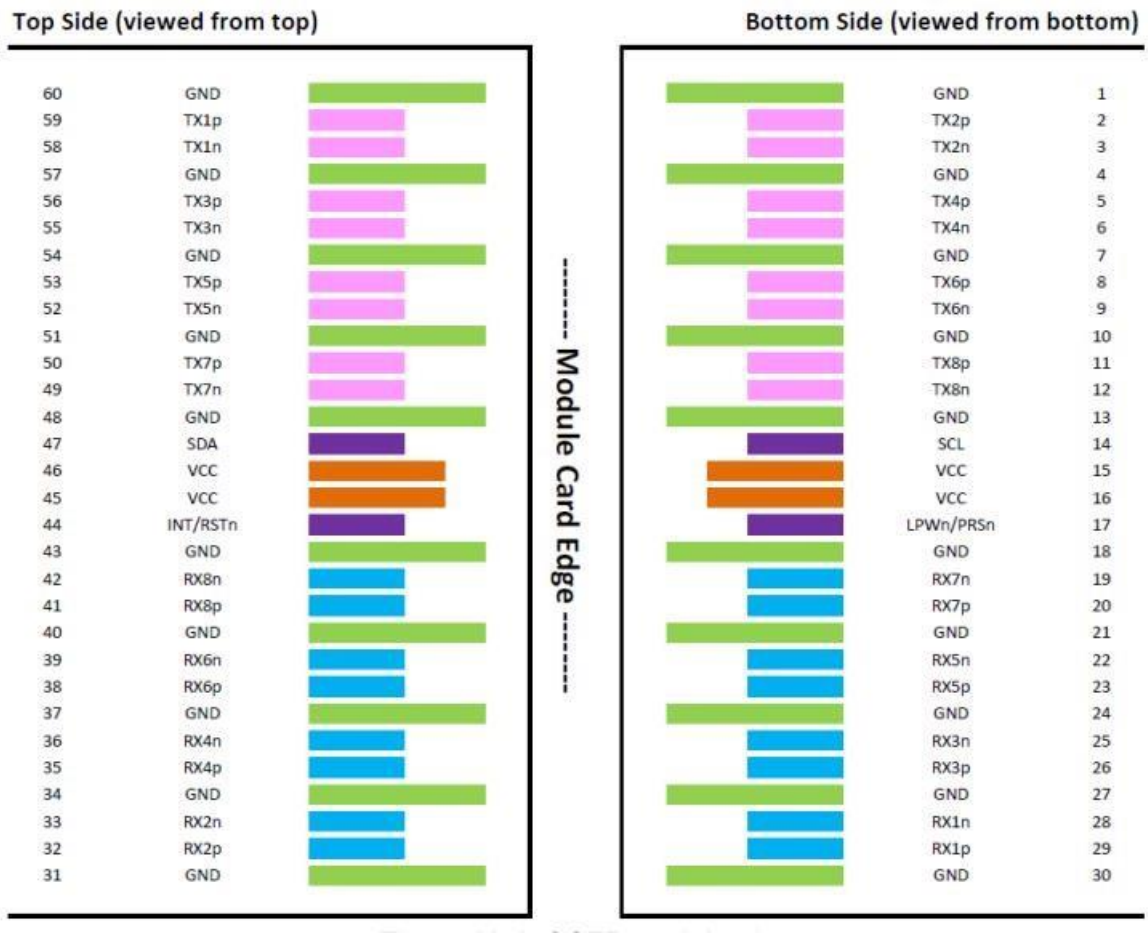

Figure 6 Electrical Pin-out Details

OSFP Control Signals

Name	Function	Description
LPWn/PRSn	Input/output	Multi-level signal for low power control from host to module and module presence indication from module to host. This signal requires the circuit as described in the OSFP Specification.
INT/RSTn	Input/output	Multi-level signal for interrupt request from module to host and reset control from host to module. This signal requires the circuit as described in the OSFP Specification.
SCL	Bidir	2-wire serial clock signal. Requires pull-up resistor to 3.3V on host.

SDA	Bidir	2-wire serial data signal. Requires pull-up resistor to 3.3V on host.

Digital Diagnostic Specification

Parameter	Symbol	Min	Typical	Max	Units	Notes
Transceiver Case Temperature	DMI_Temp	-3		+3	℃	Over operating temp
Supply voltage monitor absolute error	DMI _VCC	-0.1		0.1	V	Full operating range
Channel RX power monitor absolute error	DMI_RX	-2		+2	dB	Per channel
Channel Bias current monitor	DMI_Ibias	-10%		+10%	mA	Per channel
Channel TX power monitor absolute error	DMI_TX	-2		+2	dB	Per channel

Regulatory Compliance

Asterfusion OT-800G-OSFP-2SR4 transceivers are Class 1 Laser Products. They are certified per the following standards:

Feature	Standard
Laser Safety	IEC 60825-1:2014 (3rd Edition) IEC 60825-2:2004/AMD2:2010 EN 60825-1-2014 EN 60825-2:2004+A1+A2
Electrical Safety	EN 62368-1:2014 IEC 62368-1:2014 UL 62368-1:2014
Environmental protection	Directive 2011/65/EU with amendment(EU)2015/863
CE EMC	EN55032:2015 EN55035:2017 EN61000-3-2:2014 EN61000-3-3:2013
FCC	FCC Part 15, Subpart B ANSI C63.4-2014

References

1. OSFP_Module_Specification_Rev5_0
2. CMIS V4.0
3. IEEE 802.3db 400GBASE-SR4 Ethernet (PAM4)
4. IEEE802.3ck

Order Information

Part Number	Description
OT-800G-OSFP-2SR4	800G, OSFP, 2xSR4, Dual MPO-12 APC, 850nm MMF, 100m/OM4, Finned Top, 13.5W

Warranty and Service Support

Asterfusion optical transceivers come with 2-year Basic H/W service and warranty, preloaded perpetual licensed AsterNOS and 1-year AsterNOS upgrade subscription.

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