Asterfusion 800G OSFP 2xDR4 Dual MPO-12 APC SMF 500m Optical Transceiver

Features

- 8 x 106.25G PAM4 electrical modulation
- 8 x 106.25G PAM4 optical modulation
- Maximum link length of 500m SMF
- Power consumption ≤ 18W
- Hot Pluggable OSFP form factor
- Dual MPO-12/APC connector receptacles
- Built-in digital diagnostic functions
- Compliant with CMIS 5.1
- 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

Overview

The Asterfusion OSFP 800G 2xDR4 optical transceiver module is a low-power, high-density, pluggable OSFP module designed for 800 Gigabit Ethernet, data center, breakout 2x400G DR4 or 8x100G DR applications. The transceiver module is compliant with OSFP MSA, 800G Pluggable MSA, CMIS 5.1, IEE 802.3ck and IEEE 802.3df standards. The optical module supports 8×106.25Gbps (total 850Gbps) data rates and achieves a maximum link length of 500 meters over single-mode fiber (SMF).

The module supports single-mode fiber systems with a nominal wavelength of 1310 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) 5.1.

Product Applications

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

Block Diagram

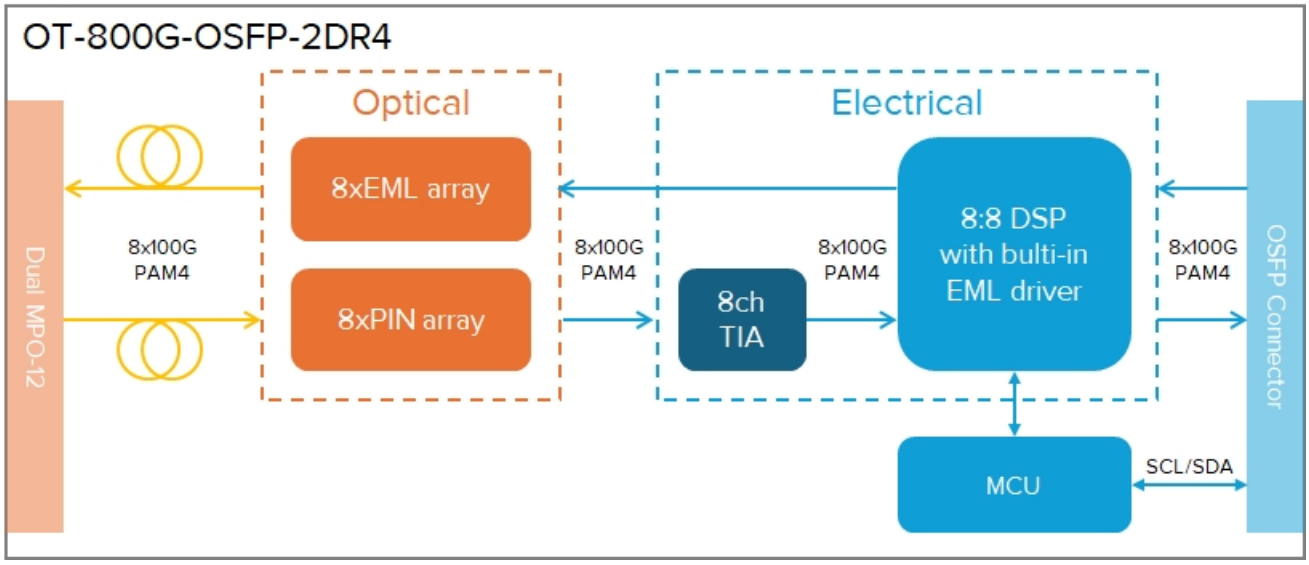

Figure 1 The 800G OSFP 2DR4 Optical Transceiver Block Diagram

Networking

Connect 800G-port switches together.

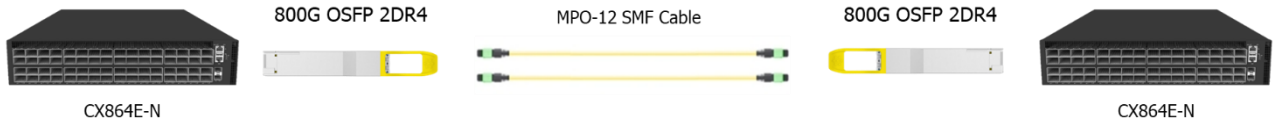

Figure 2 800G Switch to 800G Switch

Connect 1 x 800G-port switch to 2 x 400G-port SmartNICs with 2xMPO-12 SMF cable

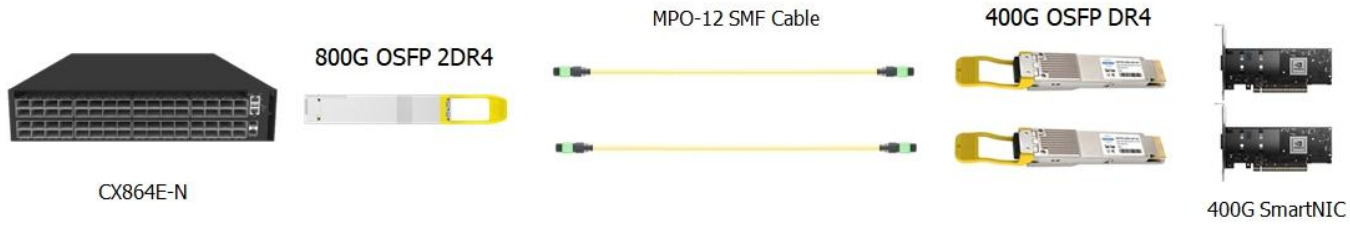

Figure 3 800G Switch to 2x400G SmartNICs

Connect 8x100G smartNICs or DPUs to 800G-port switches with MPO-12 to 4 Duplex LC SMF breakout cable.

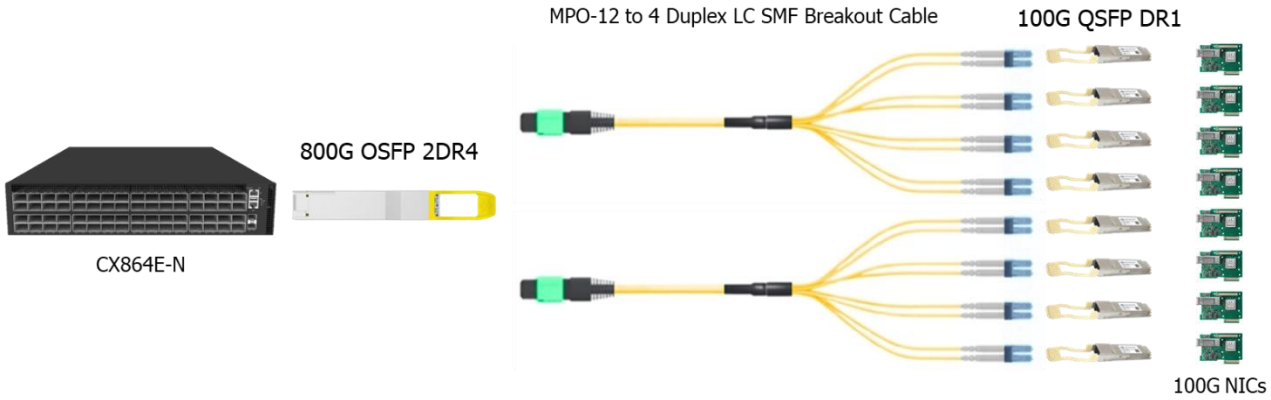

Figure 4 Connect switch to NIC

Specifications

Electrical Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Power On Initialization Time	T_{init}			2000	ms

Transmitter					
Signaling Speed, each lane			53.125		GBd
Signaling Speed Tolerance		-100		+100	ppm
Differential pk-pk input voltage tolerance	$V_{in,pp}$	750			mV
AC common-mode RMS voltage tolerance		25			mV
Differential Input Impedance	Z_{in}	90	100	100	Ohms
Effective return loss	ERL	8.5			dB
Single-ended voltage tolerance range		-0.4		3.3	V
DC Common Mode Voltage		-0.35		2.85	V
Receiver					
Signaling Speed, each lane			53.125		GBd
Signaling Speed Tolerance		-100		+100	ppm
Differential pk-pk output voltage tolerance Short mode Long mode	$V_{out,pp}$			 600 845	mV
Eye Height	EH	15			mV
Differantial Output Impedance	Z_{out}	90	100	110	Ohms
Transition Time, 20% to 80%	T_r,T_f	8.5			ps
DC Common Mode Voltage		-0.35		2.85	V
AC Common Mode output Voltage (RMS)		25			mV

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Centre Wavelength	λc	1304.5		1317.5	nm
Side-mode suppression ratio	SMSR	30	-	-	dB

Average launch power, each lane	Pout	-2.9	-	4.0	dBm
Outer Optical Modulation Amplitude for TECQ < 1.4dB for 1.4dB ≤ TECQ ≤ 3.4dB	OMA_{outer}	-0.8 -2.2+TDECQ		4.2	dBm
Extinction Ratio	ER	3.5	-	-	dB
Average launch power TX Off	P_{off}			-15	dBm
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane	TDECQ			3.4	dB
Transmitter eye closure for PAM4	TECQ			3.4	dB
|TDECQ-TECQ|				2.5	dB
Transmitter transition time				17	ps
Relative Intensity Noise	RIN			-136	dB/Hz
Optical Return Loss	ORTL			21.4	dB
Reflectance				-26	dB
Receiver					
Centre Wavelength	λc	1304.5		1317.5	nm
Damage Threshold		5			dBm
Average Receive power, each lane		-5.9		4	dBm
Receiver Power (OMA_{outer})				4.2	dBm
Receiver Reflectance				-26	dB
Receiver Sensitivity in OMA outer [1] for TECQ < 1.4dB for 1.4dB ≤ TECQ ≤ 3.4dB				-3.9 -5.3+TECQ	dBm
Stressed Receiver Sensitivity (OMA_{outer})				-1.9	dBm
Conditions of Stressed Receiver Sensitivity Test					
Stressed Eye Closure, lane under test	SECQ	3.4			dB
OMA_{outer} of Each Aggressor Lane		4.2			

Note:

[1]. Measured with conformance test signal at TP3 for BER = 2.4E-4.

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 5.

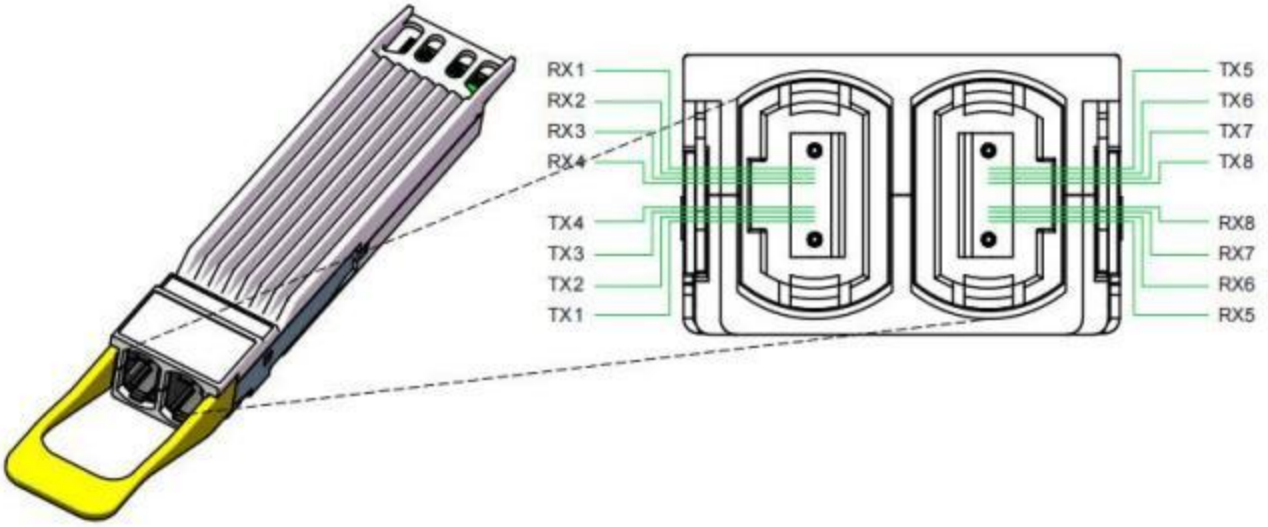

Figure 5 Optical Receptacle and Channel Orientation

Mechanical Dimensions

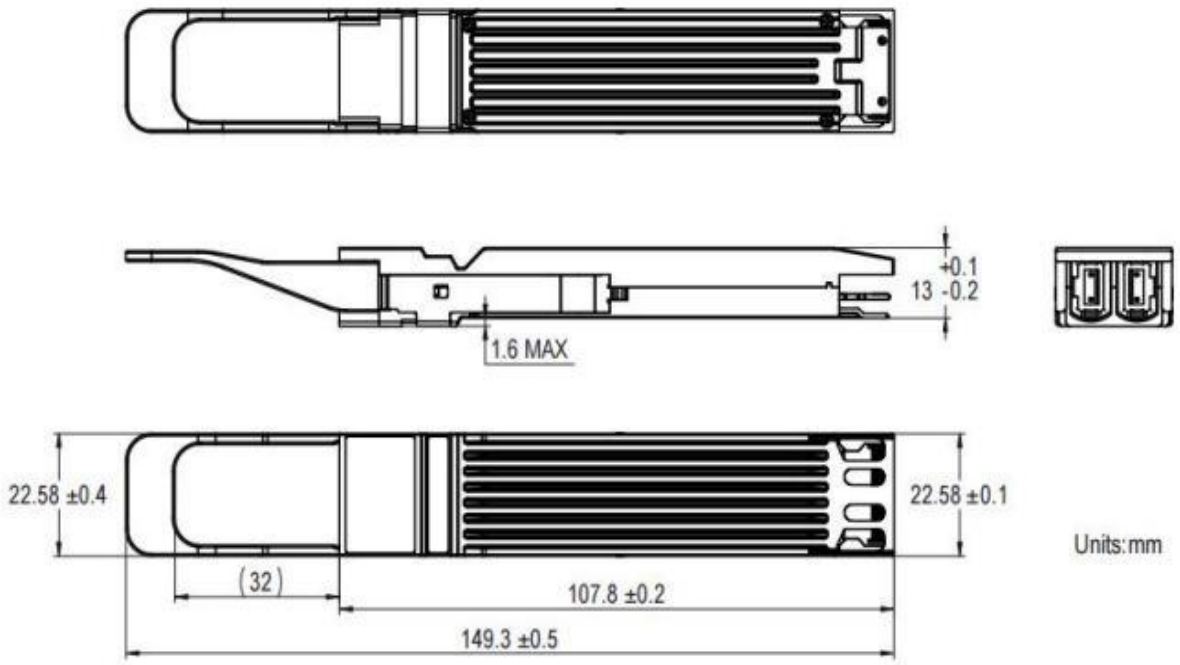

Figure 6 Mechanical Specifications (mm)

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{cc}	-0.5	3.6	V
Input Voltage	V_{in}	-0.3	V_{cc}+0.5	V
Storage Temperature	T_{sto}	-40	85	ºC
Case Operating Temperature	T_{op}	0	70	ºC
Humidity(non-condensing)	Rh	15	85	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	V_{cc}	3.135	3.3	3.465	V
Power Supply Current	I_{cc}			5750	mA
Case Operating temperature	T_{op}	0		70	ºC
Humidity	Rh	15		85	%
Power Dissipation				18	W

I2C Clock Frequency			100	400	kHz

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		

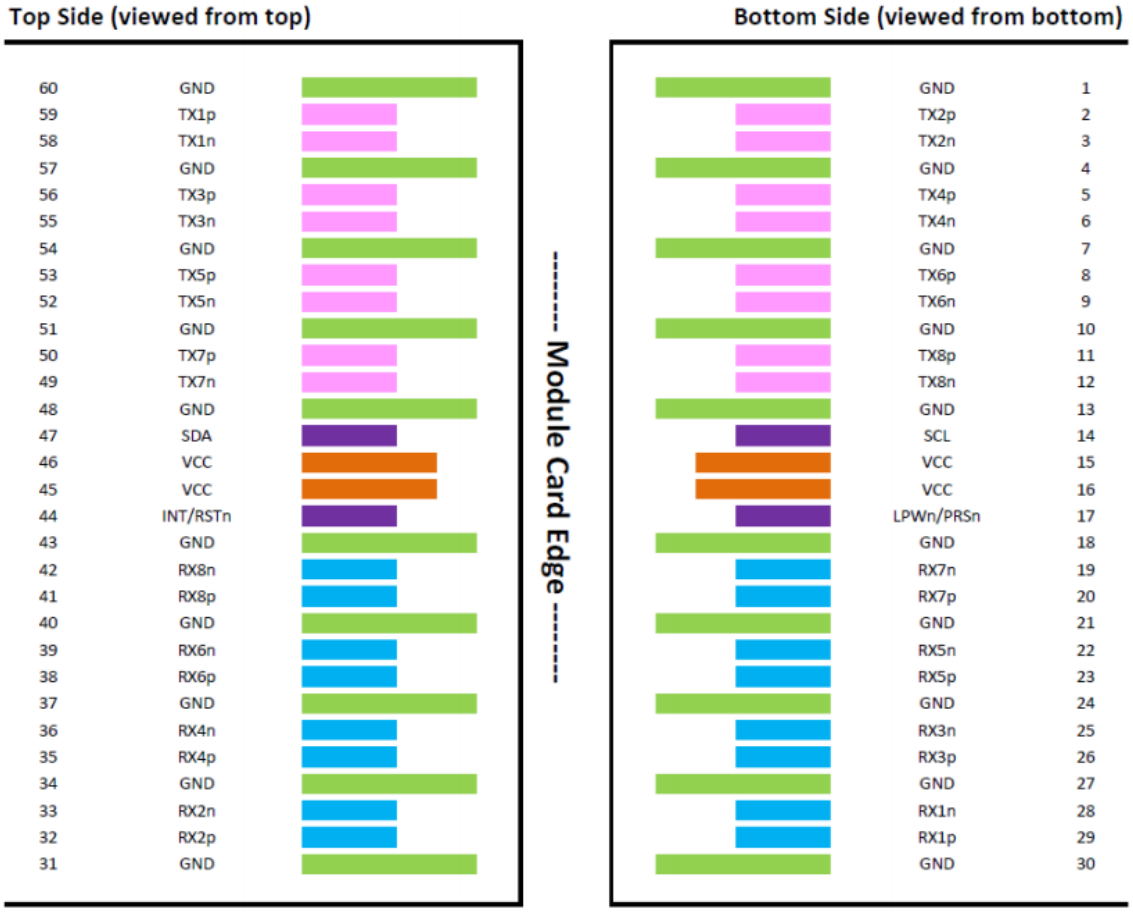

Figure 7 Electrical Pin-out Details

Regulatory Compliance

Asterfusion OT-800G-OSFP-2DR4 transceivers are Class 1 Laser Products as defined by IEC 60825-1:2014.

They are certified per the following standards:

Feature	Standard
Radiated Emissions	EMC Directive 2014/30/EU EN 55032 CISPR 32 FCC rules 47 CFR Part 15 ICES-003

	VCCI-CISPR 32 AS/NZS CISPR 32
Radiated Immunity	EMC Directive2014/30/EU EN 55035 CISPR 35 IEC/EN 61000-4-3
RoHS	EU RoHS (2011/65/ EU & (EU) 2015/863) & UK RoHS EN IEC 63000:2018 & BS EN IEC 63000:2018
Flammability (PCB)	UL Class 94 V-0

Order Information

Part Number	Description
OSFP-800G-2DR4	800G, OSFP, 2DR4, Dual MPO-12 APC, 1310nm SMF, 500m/OS2, Finned Top

Warranty and Service Support

Asterfusion optical transceivers come with 2-year Basic H/W service and warranty.

To acquire more info about company, products, and solutions: *www.cloudswit.ch*
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