800Gb/s Twin-port Flat Top OSFP 2xDR4 1310nm 500m Optical Transceiver

Features

- Compliant with IEEE 802.3cu-2021: -2x400GBASE-DR4 optical interface
- Compliant with IEEE P802.3ck D2.2 -2x400GAUI-4 C2M electrical interface
- Compliant with OSFP MSA HW Rev 4.1 Type 2 housing with Dual MPO-12 connector
- Compliant with CMIS Rev 5.0
- Maximum Power Consumption 16w
- Operating Temperature Range: 0℃ ~ +70 ℃
- Two Wire Serial Interface with Digital Diagnostic Monitoring
- Class 1 Laser Safety

Applications

- 800G Ethernet
- The flat-top version offered for ConnectX-8 systems links
- 2x 400GBASE-DR4
- Data Center
- Cloud Networks

Description

The OSFP-800G-2xDR4F transceiver is a high performance, cost effective module for optical data communication applications supporting 800G Ethernet. The OSFP-800G-2xDR4F is designed to operate in switch and router applications supporting OSFP MSA compliant traffic for up to 500m links. The OSFP-800G-2xDR4F can convert 8-channel 106.25Gb/s electrical data to 8-channel 106.25Gb/s optical signals. Similarly, it optically converts 8-channel 106.25Gb/s optical signals to 8-channel electrical data output on the receiver side. It has been designed to withstand the maximum range of external operating conditions including temperature, humidity and EMI. The module offers very high functionality and feature integration, accessible via a two-wire serial interface.

Absolute Maximum Ratings

Table1-Absolute Maximum Ratings

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TS	-40		+85	°C	
Operating Relative Humidity (non-condensing)	R_H	5		95	%	
Supply Voltage	V_{CC}	-0.5		3.6	V	
Data Input Voltage Differential	IVDIP-VDIN			1	V	
Control Input Voltage	VI	-0.3		V_{CC}+0.5	V	
Control Output Current	IO	-20		20	mA	

Recommended Operating Conditions

Table2-Recommended Operating Conditions

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	Top	0		+70	℃	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Instantaneous peak current at hot plug	ICC_IP				mA	
Sustained peak current at hot plug	ICC_SP				mA	
Maximum Power Dissipation	PD			16	W	
Maximum Power Dissipation, Low Power Mode						
Control Input Voltage High	VIH	VCC*0.7		VCC+0.3	V	
Control Input Voltage High	VIH	VCC*0.7		VCC+0.3	V	
Control Input Voltage Low	VIL	-0.3		VCC*0.3	V	
Two Wire Serial Interface Clock Rate				400	kHz	
Power Supply Noise 1 kHz - 1 MHz (p-p)				66	mVpp	
Operating Distance		2		500	m	

Electrical Characteristic

Table3-Electrical Characteristic

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
AC common-mode output Voltage (RMS)				25	mV	
Differential peak-to-peak output voltage Short mode Long mode				600 900	mV mV	
Eye height, differential	EH	15			mV	
Vertical eye closure	VEC			12	dB	
Common-mode to differential return loss	RLDc		802.3ck 120G- 1		dB	
Effective return loss, ERL	ERL	8.5			dB	
Differential termination mismatch				10	%	
Transition time (20% to 80%)		8.5			ps	
Receiver						
Differential pk-pk input Voltage tolerance		900			mV	
AC common-mode RMSvoltage tolerance (TP1a)		25			mV	
Differential to common-mode return loss	RLcd		802.3ck 120G-2		dB	
Effective return loss, ERL	ERL	8.5			dB	
Differential termination mismatch				10	%	
Single-ended voltage tolerance range		-0.4		3.3	V	
DC common-mode Voltage		-0.35		2.85	V	

Optical Characteristics

Table4-Optical Characteristics

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Wavelength	λ c	1304.5	1311	1317.5	nm	
Transmitter						
Side Mode Suppression Ratio	SMSR	30			dB	

Average Launch Power, each lane	AOPL	-2.9		4.0	dBm	1
Outer Optical Modulation Amplitude (OMA_{outer}), each Lane	TOMA	-0.8		4.2	dBm	
Launch Power in OMA_{outer} minus TDECQ, each lane	TOMA-TDECQ	-2.2			dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ			3.4	dB	
Average Launch Power of OFF Transmitter, each lane	TOFF			- 15	dBm	
Extinction Ratio	ER	3.5			dB	
Transmitter transition time (max)	Tr			17	ps	
RIN21.4OMA (max)	RIN			- 136	dB/Hz	
Optical Return Loss Tolerance	ORL			21.4	dB	
Transmitter Reflectance	TR			-26	dB	2
Receiver						
Wavelength L0	λ C0	1304.5	1311	1317.5	nm	
Damage Threshold, each Lane	AOPD	5			dBm	
Average Receive Power, each Lane	AOPR	-5.9		4	dBm	
Receive Power (OMA_{outer}), each Lane	OMAR			4.2	dBm	
Receiver Reflectance	RR			-26	dB	
Receiver Sensitivity (OMA_{outer}), each Lane	SOMA			Max(–3.9, SECQ – 5.3)	dBm	3
Stressed Receiver Sensitivity (OMA_{outer}), each Lane	SRS			- 1.9	dBm	4
LOS De-assert	LOSD			-12	dBm	
LOS Hysteresis	LOSH	0.5			dB	
Conditions of stressed receiver sensitivity test						
Stressed eye closure for PAM4(SECQ), lane under test	SECQ		3.4		dB	
OMA_{outer} of each aggressor lane			4.2			

Notes:

[1] Average launch power, each lane (min) is informative and not the principal indicator of signal strength

[2] Transmitter reflectance is defined looking into the transmitter

[3]Receiver sensitivity (OMA_{outer}), each lane (max) is informative and is defined for a transmitter with a value of SECQ up to 3.4 dB.

[4] Measured with conformance test signal at TP3 for the BER = $2.4x10^{-4}$

Electrical Specification Low Speed Signal

Parameter	Symbols	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	
LPMode/TxDis,ResetL and ModSelL	VIL	-0.3	0.8	V	
	VIH	2	VCC+0.3	V	
IntL/RxLos	VOL	0	0.4	V	
	VOH	VCC-0.5	VCC+0.3	V	

Pin Description

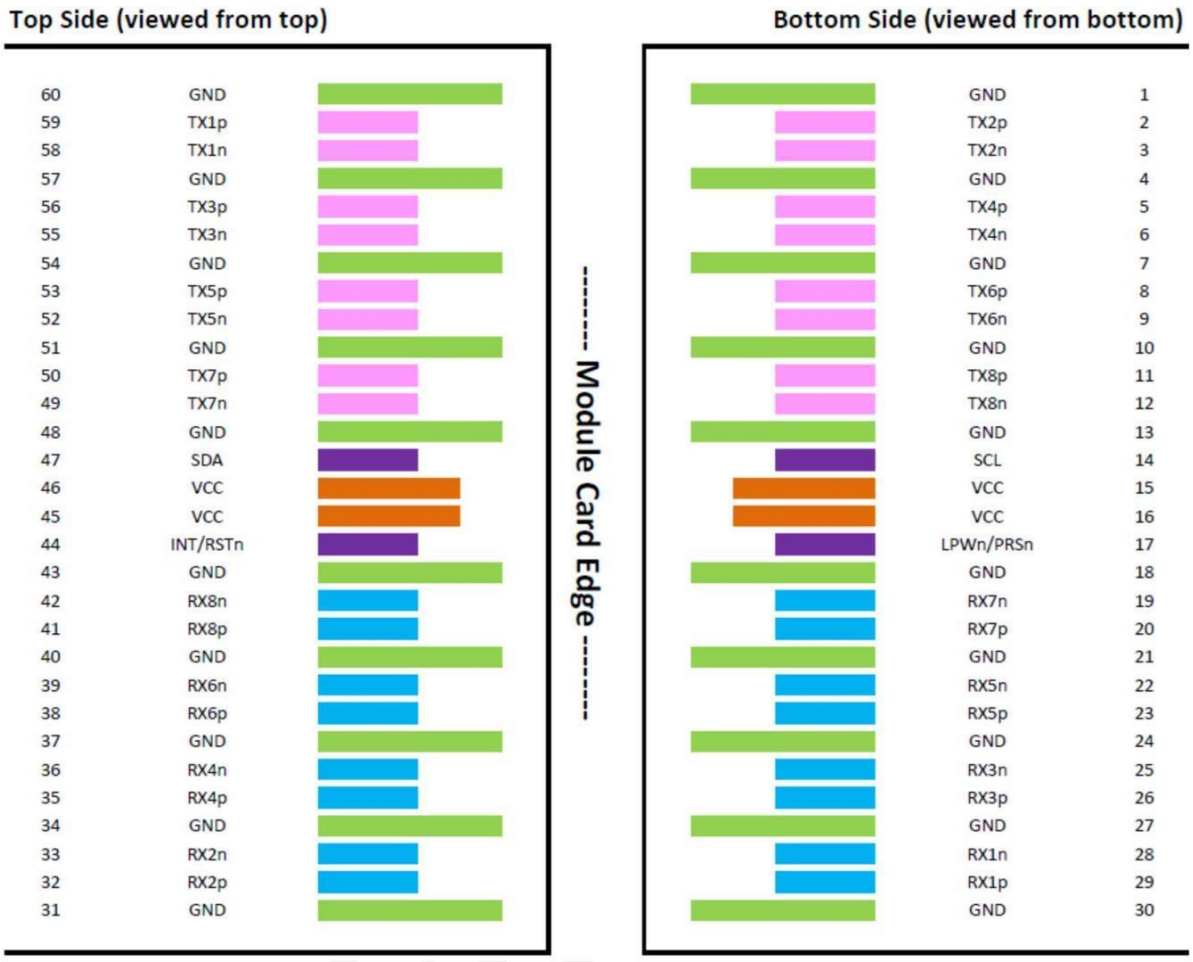

Figure 1 Pinout definitions of OSFP module inputs/outputs

Pin Function Definitions

Table6-Pin Function Definitions

Pin	Symbol	Description	Logic	Notes
1	GND	Ground		
2	TX2p	Transmitter Data Non-Inverted	CML-I	
3	TX2n	Transmitter Data Inverted	CML-I	
4	GND	Ground		
5	TX4p	Transmitter Data Non-Inverted	CML-I	
6	TX4n	Transmitter Data Inverted	CML-I	
7	GND	Ground		
8	TX6p	Transmitter Data Non-Inverted	CML-I	
9	TX6n	Transmitter Data Inverted	CML-I	
10	GND	Ground		
1 1	TX8p	Transmitter Data Non-Inverted	CML-I	
12	TX8n	Transmitter Data Inverted	CML-I	
13	GND	Ground		
14	SCL	2-wire Serial interface clock	LVCMOS-I/O	
15	VCC	+3.3V Power		
16	VCC	+3.3V Power		
17	LPWn/P RSn	Low-Power Mode / Module Present	Multi-Level	
18	GND	Ground		
19	RX7n	Receiver Data Inverted	CML-O	
20	RX7p	Receiver Data Non-Inverted	CML-O	
21	GND	Ground		
22	RX5n	Receiver Data Inverted	CML-O	
23	RX5p	Receiver Data Non-Inverted	CML-O	
24	GND	Ground		
25	RX3n	Receiver Data Inverted	CML-O	
26	RX3p	Receiver Data Non-Inverted	CML-O	
27	GND	Ground		
28	RX1n	Receiver Data Inverted	CML-O	
29	RX1p	Receiver Data Non-Inverted	CML-O	
30	GND	Ground		
31	GND	Ground		
32	RX2p	Receiver Data Non-Inverted	CML-O	
33	RX2n	Receiver Data Inverted	CML-O	
34	GND	Ground		
35	RX4p	Receiver Data Non-Inverted	CML-O	
36	RX4n	Receiver Data Inverted	CML-O	

37	GND	Ground		
38	RX6p	Receiver Data Non-Inverted	CML-O	
39	RX6n	Receiver Data Inverted	CML-O	
40	GND	Ground		
41	RX8p	Receiver Data Non-Inverted	CML-O	
42	RX8n	Receiver Data Inverted	CML-O	
43	GND	Ground		
44	INT/RSTn	Module Interrupt / Module Reset	Multi- Level	
45	VCC	+3.3V Power		
46	VCC	+3.3V Power		
47	SDA	2-wire Serial interface data	LVCM OS-I/O	
48	GND	Ground		
49	TX7n	Transmitter Data Inverted	CML-I	
50	TX7p	Transmitter Data Non-Inverted	CML-I	
51	GND	Ground		
52	TX5n	Transmitter Data Inverted	CML-I	
53	TX5p	Transmitter Data Non-Inverted	CML-I	
54	GND	Ground		
55	TX3n	Transmitter Data Inverted	CML-I	
56	TX3p	Transmitter Data Non-Inverted	CML-I	
57	GND	Ground		
58	TX1n	Transmitter Data Inverted	CML-I	
59	TX1p	Transmitter Data Non-Inverted	CML-I	
60	GND	Ground		

Recommended OSFP Host Board Schematic

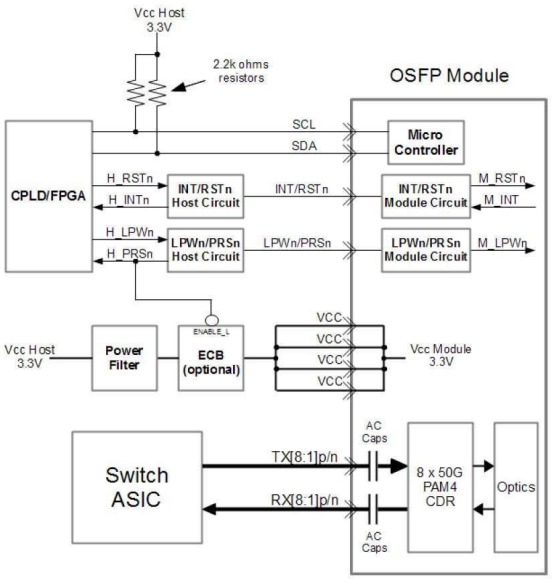

Figure 2 Recommended OSFP Host Board Schematic

Digital Diagnostics

Parameter	Range	Accuracy.	Unit.	Calibration
Temperature	0 to 70	±3	°C	Internal
Voltage	0 to VCC	0.1	V	Internal
Tx Bias Current (Each Lane)	0 to 100	10%	mA	Internal
Tx Output Power (Each Lane)	-2.8 to +5.3	±3	dB	Internal
Rx Receive Power (Each Lane)	-9. 1 to +5.3	±3	dB	Internal

Block Diagram of Transceiver

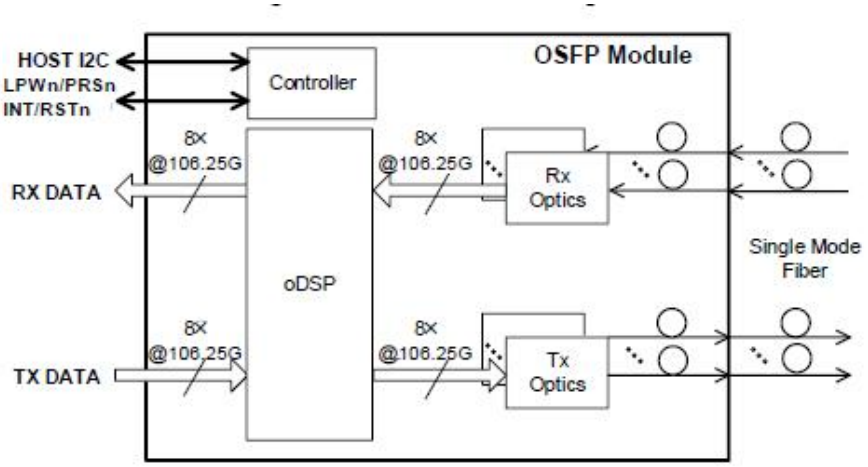

Figure 3 Block Diagram of Transceiver

Recommended Interface Circuit

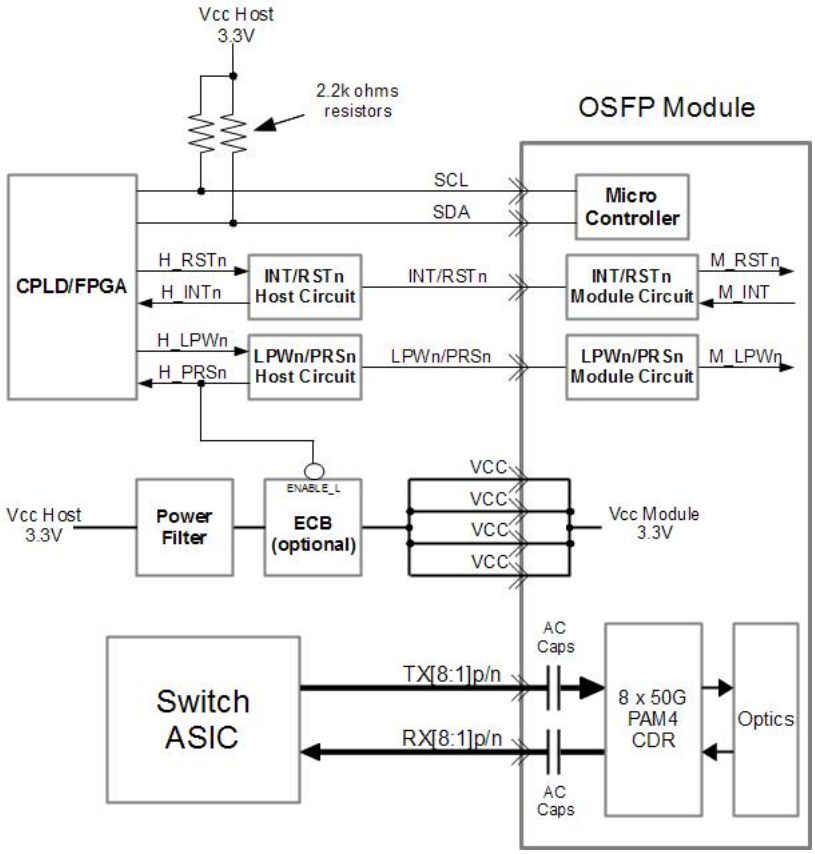

Figure 4 Host board and Module block diagram

Dimensions of Transceiver

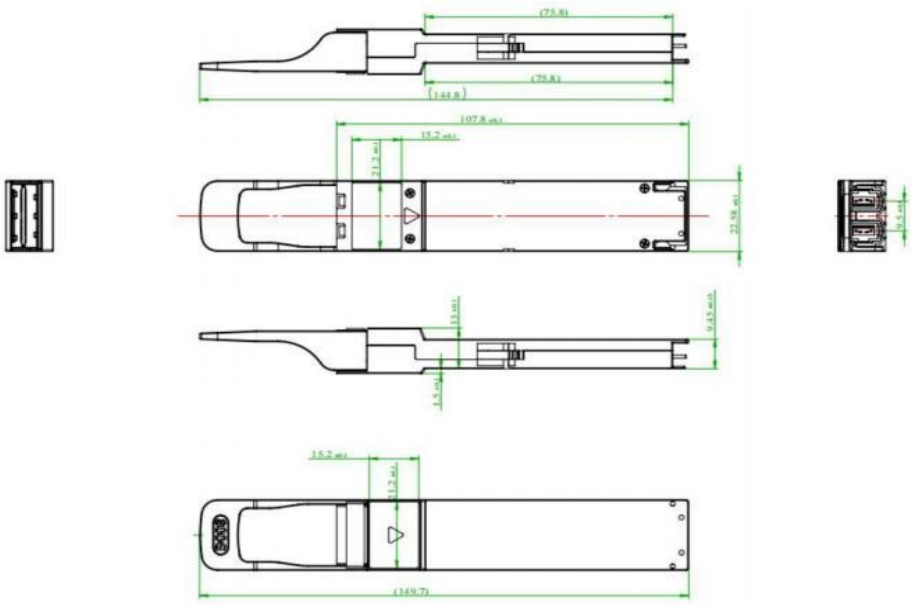

Figure 5 Dimensions of Transceiver

Further Information:

Web www.naddod.com

Email For order requirements: sales@naddod.com

For customer service: support@naddod.com

For technical support: tech@naddod.com

For cooperation: agency@naddod.com

For other information: info@naddod.com

Disclaimer

1. We are committed to continuous product improvement and feature upgrades, and the contents contained in this manual are subject to change without notice.

2. Nothing herein should be construed as constituting an additional warranty.

3. NADDOD assumes no responsibility for the use or reliability of equipment or software not provided by NADDOD.