800Gb/s Single-port XDR OSFP DR4 1310nm 500m Optical Transceiver

Features

- 800G single mode transceiver
- 4-channels and optical modulation
- OSFP Riding Heat Sink, flat top connector
- 1310nm EML single mode laser
- 500m max reach
- 20.5W max power
- 2W low-power mode
- Single 3V power supply
- Class 1 laser safety
- Hot pluggable, RoHS compliant
- OSFPmsa.org compliant
- Supports CMIS 5.3 functions

Applications

- Used in NVL72 GB200 compute trays linking ConnectX-8

Description

The OSFP-800G-DR4H is an 800Gb/s single-mode optical transceiver supporting the XDR 800Gb/s InfiniBand protocol. It is used to link the Quantum-X800 QM3x00 switches using Twin-port OSFP 2x800Gb/s transceivers to the dual 800Gb/s ConnectX-8 mezzanine card located internally in the GB200-based, liquid cooled system. OSFP cages are located in the compute tray front-panel.

The line rate is 200Gb/s using Pulse Amplitude Modulation of 4- channels denoted as 200G-PAM4, enabling two data bits to be transferred per clock pulse. The electrical configuration is 4-channels of 200G-PAM4. The optical configuration has one, 500-meter, Datacenter Reach, 4-channel (DR4), 800Gb/s optical connector, and is a single Multiple Push-On 12-fiber, Angled Polished Connector or MPO-12/APC. One MPO-12/APC optical connector is used per transceiver.

The plug formfactor is a single-port OSFP (Octal Small Formfactor Plug) and uses a Riding Heat Sink (RHS) or flat-top OSFP connector with the cooling fins on top of the ConnectX-8 cage. This can also be used in liquid-cooled Riding Heat Sink (RHS) applications.

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
Storage Temperature	-40		+85	°C
Operating Case Temperature	0		70	°C
Relative Humidity (non- condensing)	5		95	%
Supply Voltage	-0.5	3.3	3.6	V
Control Input Voltage	-0.3		Vcc+0.5	V

Recommended Operating Conditions and Power Supply Requirements

Table 2-Recommended Operating Conditions and Power Supply Requirements

Parameter	Min.	Typical	Max.	Unit
Power Supply Voltage	3.135	3.3	3.465	V
Instantaneous peak current at hot plug			8200	mA
Sustained peak current at hot plug			6827	mA
Maximum Power Dissipation			20.5	W
Maximum Power Dissipation, Low Power Mode			2	W
Signaling Rate per Lane		106.25		GBd
Two Wire Serial Interface Clock Rate	100		1000	kHz

Power Supply Noise Tolerance (10Hz - 10MHz)			25	mV
Rx Differential Data Output Load		100		Ohm
Operating Distance			500	m

Operating Characteristic-Electrical

Table3-Operating Characteristic-Electrical

Parameter	Symbol	Min.	Typical	Max.	Units
Transmitter (Module Input)					
Differential pk-pk input Voltage tolerance		750			mV
Differential termination mismatch				10	%
Single-ended voltage tolerance range		-0.4		3.3	V
DC common mode Voltage		-350		2850	mV
Receiver (Module Output)					
Peak-peak AC common-mode voltage	VCMLF VCMFB			33 80	mV
Differential output Voltage (Long mode)				845	mV
Differential output Voltage (Short mode)				600	mV
Eye height, differential		15			mV
Differential Termination Mismatch				10	%
Transition Time (min, 20% to 80%)		8.5			Ps
DC common mode Voltage		-350		2850	mV

Electrical Specification for Low Speed Signal

Table4-Absolute Maximum Specifications

Parameter	Symbol	Min.	Max.	Unit
Module output SCL and SDA	VOL	0	0.4	V
	VOH	VCC-0.5	VCC+0.3	V
Module Input SCL and SDA	VIL	-0.3		V
	VIH	VCC*0.5	VCC+0.5	V

Operating Characteristic-Optical

Table4-Operating Characteristic-Optical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter						
Wavelength	λ C	1304.5	1311	1317.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power, each lane	AOPL	2.5	3.5	4.0	dBm	1,6
Outer Optical Modulation Amplitude	TOMA	2.0	3.0	5.0	dBm	2,6

(OMA_{outer}), each lane						
Launch Power in terms of OMA_{outer} minus TDECQ, each lane	TOMA-TDECQ				dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ				dB	
Average Launch Power of OFF Transmitter, each lane	TOFF			-15	dBm	
Extinction Ratio, each lane	ER	3.0	3.5	5.0	dB	6
RIN21.40MA	RIN			-139	dB/Hz	
Optical Return Loss Tolerance	ORL			21.4	dB	
Transmitter Reflectance	TR			-26	dB	3
			Receiver			
Wavelength	λ C	1304.5	1311	1317.5	nm	
Damage Threshold, average optical power, each lane	AOPD	5			dBm	
Average Receive Power, each lane	AOPR	-1.0		4.0	dBm	6
Receive Power (OMAouter), each lane	OMA-R			5.0	dBm	
Receiver Reflectance	RR			-32	dB	
Receiver Sensitivity (OMAouter), each lane	SOMA				dBm	4
Stressed Receiver Sensitivity (OMAouter), each lane	SRS				dBm	5
Conditions of stressed receiver sensitivity test						
Stressed eye closure for PAM4 (SECQ)			3.4		dB	
OMAouter of each aggressor lane			4.2		dBm	

Notes:

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

[2] Even if TDECQ ＜ 1.4dB, OMAouter (min) must exceed this value.

[3] Transmitter reflectance is defined looking into the transmitter.

[4] Receiver sensitivity (OMAouter), each lane (max) is informative and is defined for a transmitter with SECQ of 0.9 dB.

[5] Measured with conformance test signal at TP3 for the BER = 2.4x10-4

[6] Measured at BER 1x10-6 and Error free post FEC.

Pin Description

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

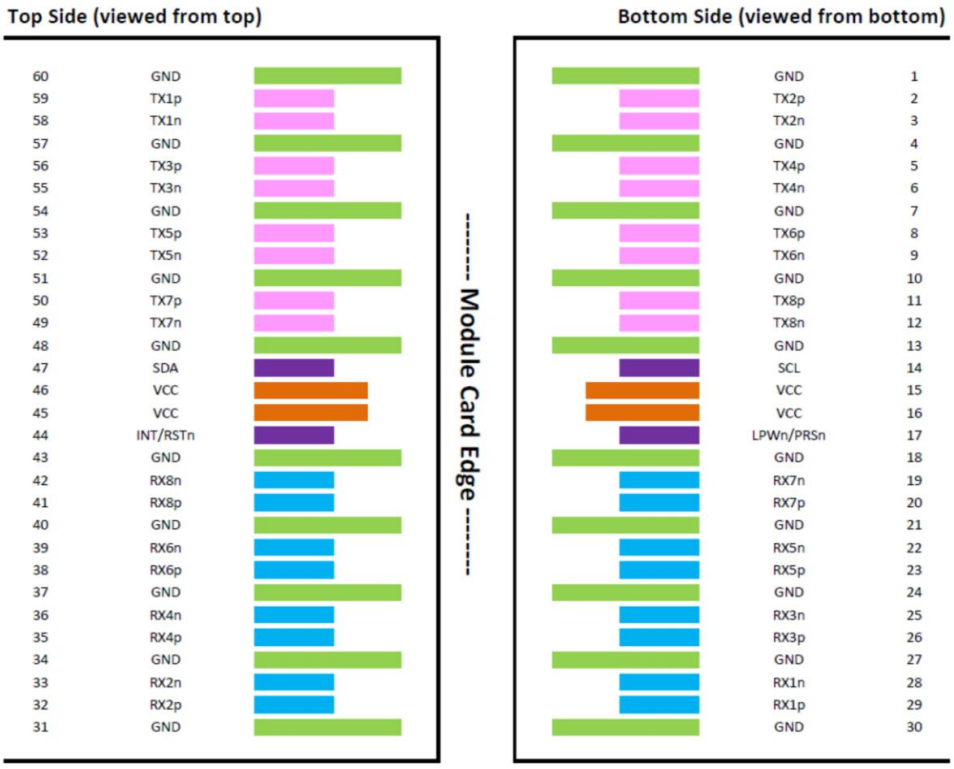

Figure1 OSFP module pin out

Dimensions

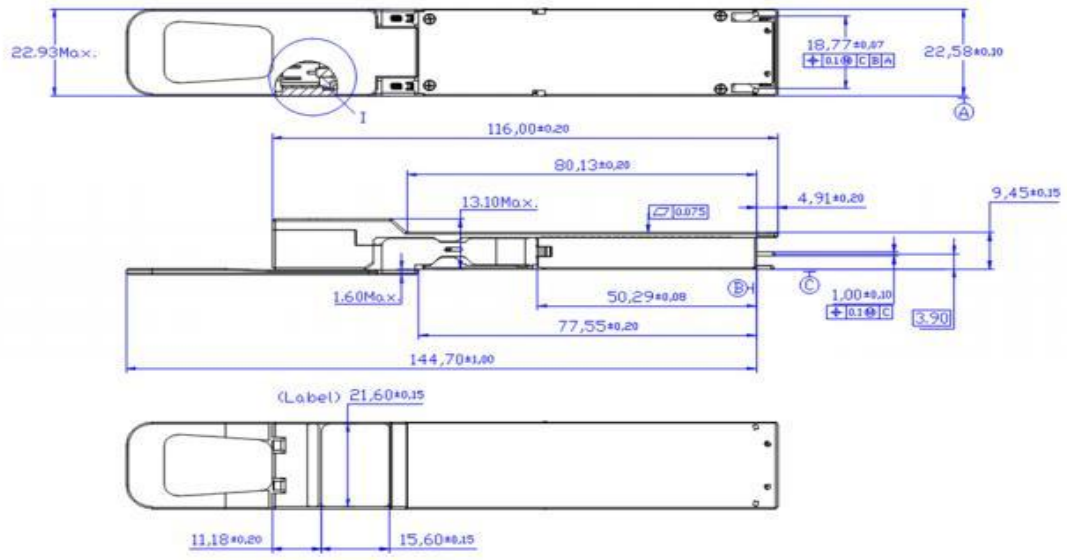

Figure 2 Dimensions of Transceiver

Enlarged view of detail A

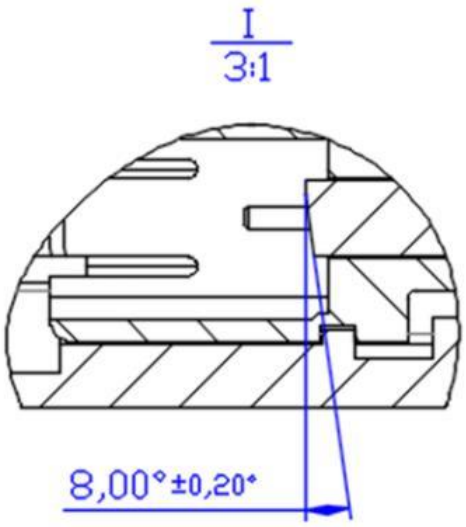

Figure 3 Enlarged view of detail A

Enlarged view of detail B

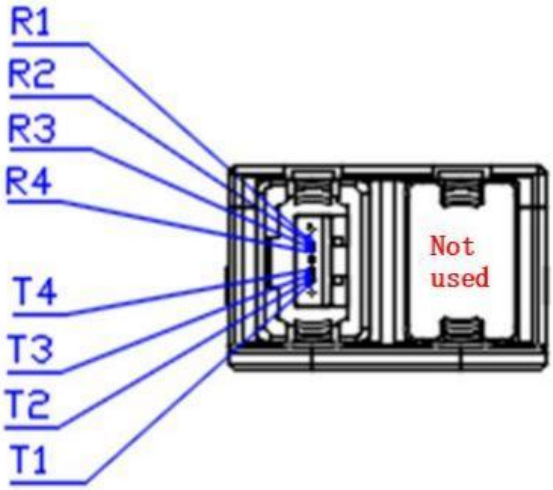

Figure 4 Enlarged view of detail B

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