800G BASE-DR8 OSFP 1310nm 500m Dual MTP/MPO-12/APC DOM Transceiver

Features

- Silicon photonics integrated solution
- Hot-pluggable OSFP
- Dual MPO-12 APC
- Up to 500 meters reach on single-mode fiber
- 8x106.25 Gb/s electrical interface

Description

The 800GBASE-SR8 OSFP Optical Transceiver Module is designed for use in 800Gb/s systems throughput up to 30m over OM3 or 50m over OM4 multimode fiber (MMF) using a wavelength of 850nm via dual MTP/MPO-12 connectors.

800G OSFP DR8 optical transceiver is a full duplex, silicon-photonics-based optic transceiver that provides a high-speed link at an aggregated data rate of 800 Gigabit per second (Gb/s) over 500 meters on parallel single-mode fibers (SMF). This product offers a high-density 800 Gb/s Ethernet connectivity solution for data centers, high-performance computing networks, enterprise core and distribution layers, and service provider transport applications. Our transceiver modules are designed to meet commercial temperature application environments and to be compliant with all applicable standards.

1.1 Overview

Today's hyper-scale data centers require vast amounts of data to be transferred from any point within the data center to another. A significant portion of these connections hyper-scale data centers between racks and servers. Xxx 800G OSFP DR8 Optical transceiver comprises a transmitter and receiver that each transmits 106.25 Gb/s data, for a total of 800Gb/s. The transceiver uses silicon-photonics-based Photonics integrated circuits (PIC) solution to provide up-to 500 meters reach data links.

1.2 General features

1. OSFP MSA Compliance
2. Maximum power consumption 16W
3. Compliant with CMIS 5.1
4. Compliant with IEEE 802.3df/ck
5. Compliant with Laser Class 1
6. Compliant with RoHS 2.0

1.3 Ordering Information

Product	Fiber	Transmitter	Wavelength	Reach	Part Number
800G OSFP DR8	SMF	SiPh	1310 nm	500 m	

Table 1-Order Information

2. functional Description

The 800G OSFP DR8 contains a dual MPO-12 APC connector for the optical interface and a 60-pins connector for the electrical interface. The chart in Figure 2 shows the functional block diagram of this

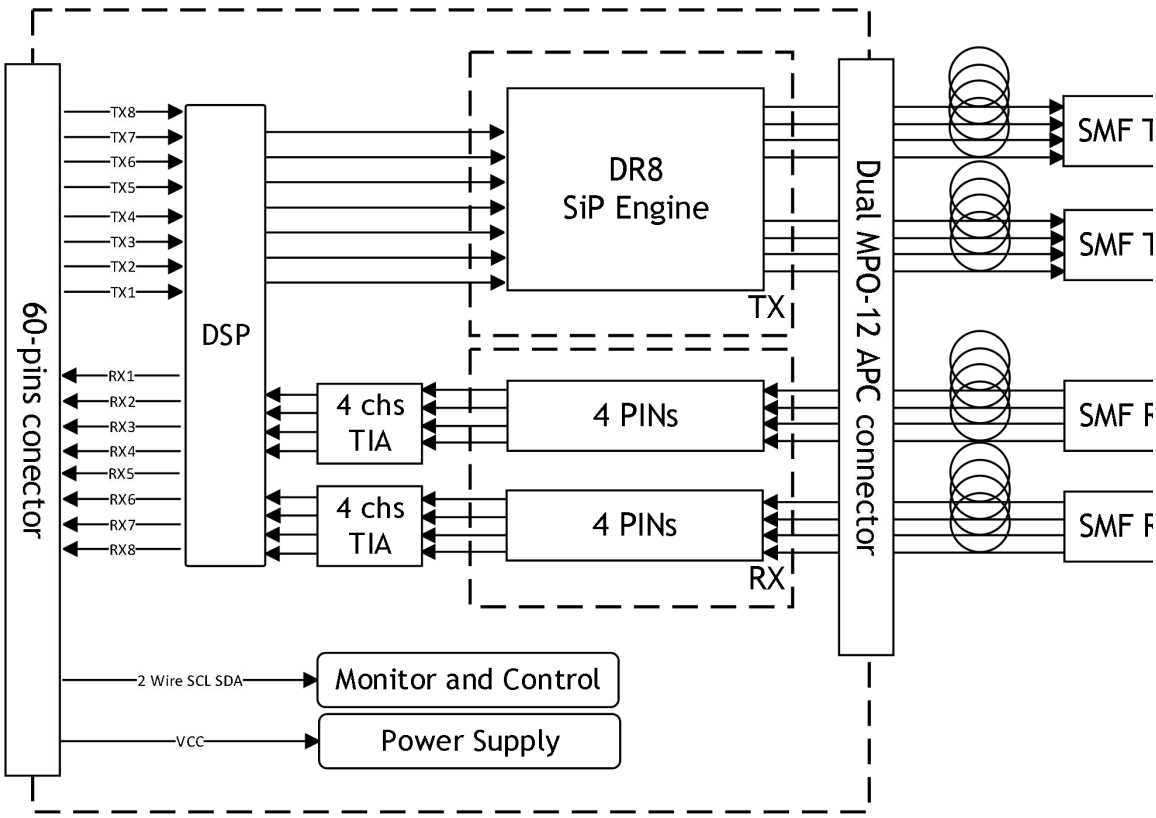

Figure 2 - Xxx 800G OSFP DR8 Block Diagram

2.1 Transmitter Operation

The transceiver module receives 8 channels of 106.25 Gb/s electrical data, which are processed by optical DSP with CDR functions, that reshape and reduce the jitter of each electrical signal. Subsequently, the integrated Xxx silicon photonics engine converts each channel to one of the 8 optical signals. And total outputs deliver a total data rate of 800 Gb/s over 8 parallel single mode fibers.

2.2 Receiver Operation

The receiver section take the optical input of 800Gb/s signals over 8 parallel single mode fibers. Each optical signal is converted to an electrical signal by one of the 8 PIN photodiodes (PINs) followed by trans-impedance amplifiers (TIAs). All 8 electrical signals are fed to the optical DSP with CDR functions to reshape and retime each electrical signal as one of the 8 output channels.

3. Identification of pinout assignment

The transceiver board has 60 pins arranged in the top and bottom rows. The pin map is shown in Table 1 below. The pin orientation is shown below in Figure 3.

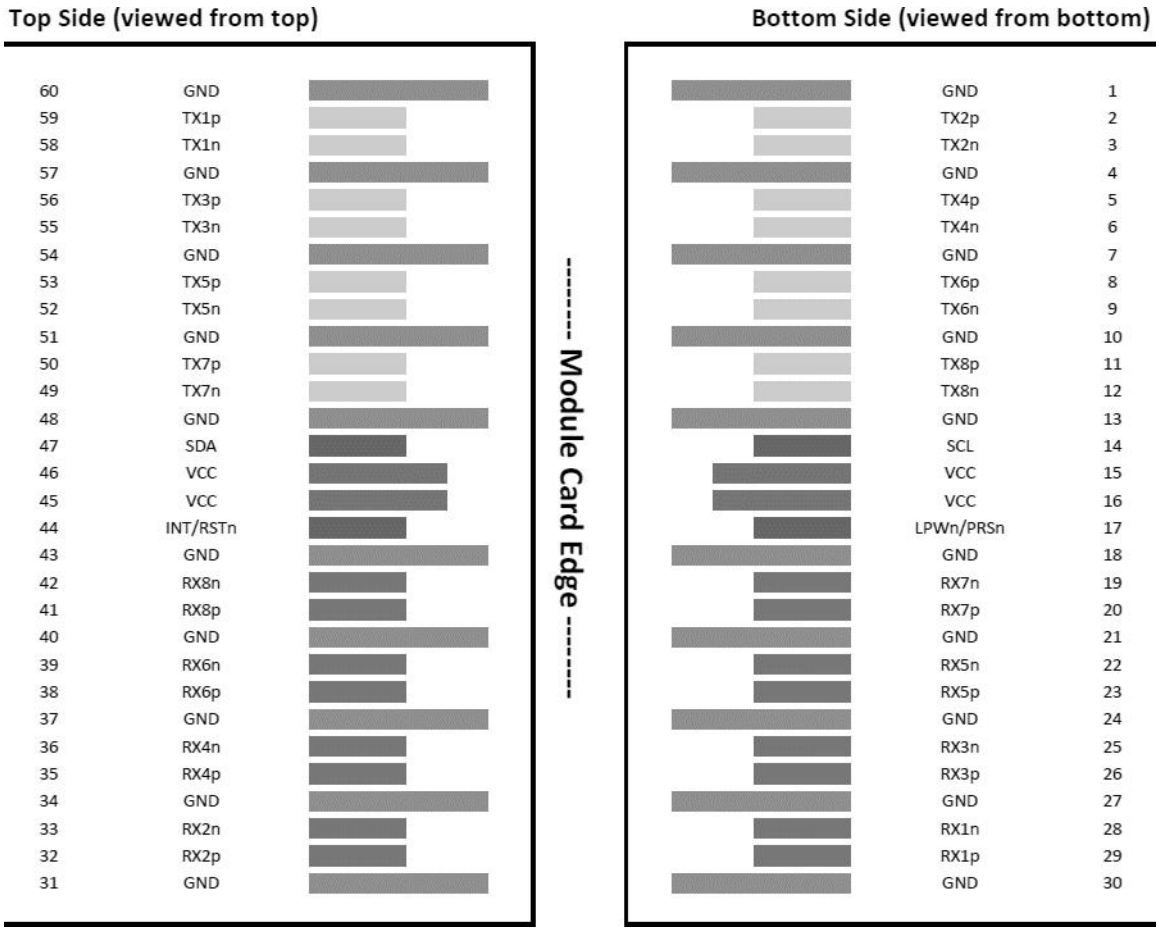

Figure 3 - Pin Orientation and Indication

3.1 Pin map

The following table defines each electrical pin.

Pin	Symbol	Description	Logic	Direction	Plug Sequence	Notes
1	GND	Ground			1	
2	TX2p	Transmitter Data Non-Inverted	CML-I	Input from Host	3	
3	TX2n	Transmitter Data Inverted	CML-I	Input from Host	3	
4	GND	Ground			1	
5	TX4p	Transmitter Data Non-Inverted	CML-I	Input from Host	3	
6	TX4n	Transmitter Data Inverted	CML-I	Input from Host	3	
7	GND	Ground			1	
8	TX6p	Transmitter Data Non-Inverted	CML-I	Input from Host	3	
9	TX6n	Transmitter Data Inverted	CML-I	Input from Host	3	
10	GND	Ground			1	
11	TX8p	Transmitter Data Non-Inverted	CML-I	Input from Host	3	
12	TX8n	Transmitter Data Inverted	CML-I	Input from Host	3	
13	GND	Ground			1	
14	SCL	2-wire Serial interface clock	LVCMOS-I/O	Bi-directional	3	1
15	VCC	+3.3V Power		Power from Host	2	
16	VCC	+3.3V Power		Power from Host	2	
17	LPWn/PRSn	Low-Power Mode / Module Present	Multi-Level	Bi-directional	3	
18	GND	Ground			1	
19	RX7n	Receiver Data Inverted	CML-O	Output to Host	3	
20	RX7p	Receiver Data Non-Inverted	CML-O	Output to Host	3	
21	GND	Ground			1	
22	RX5n	Receiver Data Inverted	CML-O	Output to Host	3	
23	RX5p	Receiver Data Non-Inverted	CML-O	Output to Host	3	
24	GND	Ground			1	
25	RX3n	Receiver Data Inverted	CML-O	Output to Host	3	

26	RX3p	Receiver Data Non-Inverted	CML-O	Output to Host	3	
27	GND	Ground			1	
28	RX1n	Receiver Data Inverted	CML-O	Output to Host	3	
29	RX1p	Receiver Data Non-Inverted	CML-O	Output to Host	3	
30	GND	Ground			1	
31	GND	Ground			1	
32	RX2p	Receiver Data Non-Inverted	CML-O	Output to Host	3	
33	RX2n	Receiver Data Inverted	CML-O	Output to Host	3	
34	GND	Ground			1	
35	RX4p	Receiver Data Non-Inverted	CML-O	Output to Host	3	
36	RX4n	Receiver Data Inverted	CML-O	Output to Host	3	
37	GND	Ground			1	
38	RX6p	Receiver Data Non-Inverted	CML-O	Output to Host	3	
39	RX6n	Receiver Data Inverted	CML-O	Output to Host	3	
40	GND	Ground			1	
41	RX8p	Receiver Data Non-Inverted	CML-O	Output to Host	3	
42	RX8n	Receiver Data Inverted	CML-O	Output to Host	3	
43	GND	Ground			1	
44	INT/RSTn	Module Interrupt / Module Reset	Multi-Level	Bi-directional	3	
45	VCC	+3.3V Power		Power from Host	2	
46	VCC	+3.3V Power		Power from Host	2	
47	SDA	2-wire Serial interface data	LVCMOS-I/O	Bi-directional	3	1
48	GND	Ground			1	
49	TX7n	Transmitter Data Inverted	CML-I	Input from Host	3	
50	TX7p	Transmitter Data Non-Inverted	CML-I	Input from Host	3	
51	GND	Ground			1	
52	TX5n	Transmitter Data Inverted	CML-I	Input from Host	3	
53	TX5p	Transmitter Data Non-Inverted	CML-I	Input from Host	3	
54	GND	Ground			1	
55	TX3n	Transmitter Data Inverted	CML-I	Input from	3	

				Host		
56	TX3p	Transmitter Data Non-Inverted	CML-I	Input from Host	3	
57	GND	Ground			1	
58	TX1n	Transmitter Data Inverted	CML-I	Input from Host	3	
59	TX1p	Transmitter Data Non-Inverted	CML-I	Input from Host	3	
60	GND	Ground			1	

Table 2 - OSFP Pin Map

Note:

Open-Drain with pull-up resistor on host.

4. Absolute maximum ratings

4.1 Environmental

Parameter	Symbol	Min	Max	Unit	Note
Storage and Transportation Temperature	Ts	-40	+85	° C	
Relative Humidity	RH	5	+85	%	1

Table 3 - Maximum Environmental Ratings

Note:

1.Non-condensing.

4.2 Electrical

Parameter	Symbol	Min	Max	Unit	Note
+3.3V Power Supply Voltage		-0.3	+3.465	V	

Table 4 - Maximum Electrical Ratings

4.3 Optical

Parameter	Symbol	Min	Max	Unit	Note
RX damage threshold, per Lane	PRdmg	+5		dBm	1

Table 5 - Maximum Electrical Ratings

Note:

1. The receiver is able to tolerate, without damage, continuous exposure to an optical input signal having this average power level. The receiver might not have to operate correctly at this input power.

5. Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit	Note
Relative Humidity	RH	5	+85	%	1
Operating Case Temperature	Top	0	+70	° C	
Operation Supply Voltage	V	3.135	3.465	V	
Date Rate, Each Lane			53.125	GBd	PAM4
Data Rate Accuracy		-100	100	ppm	
Pre-FEC Bit Error Ratio			2.4E-4		
Link Distance with SMF			500	meters	2

Table 6 - Recommended Operating Conditions

Note:

1.Non-condensing.

2.FEC required on the host system to support maximum distance.

6. Electrical CHARACTERISTICS

Unless otherwise stated the following parameters and performances are over the full range of operating conditions defined in section 5, over the entire wavelength range. The typical values are referenced to case temperature of +35 oC, nominal power supply, and end of life.

Parameter	Symbol	Min.	Typ.	Max.	Units	Ref.
Transmitter						
Signaling Rate per Lane		53.125 ± 100 ppm			GBd	
Receiver						
Signaling Rate per Lane		53.125 ± 100 ppm			GBd	
Operation						
Supply Voltage	Vcc	3.135		3.465	V	
Supply Current	Icc			5.1	A	
Module total power	P			16	W	

Table 7 - Electrical Characteristics

7. OPTICAL CHARACTERISTICS

Unless otherwise stated the following parameters and performances are over the full range of operating conditions defined in section 5, over the full wavelength range. The typical values are referenced to case temperature of +35 oC, nominal power supply, and end of life.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Transmitter						
Signaling Rate per Lane		53.125 ± 100 ppm			GBd	
Center Wavelengths (range)	L	1304.5 to 1317.5 1271			nm	
Modulation Format		PAM4				
Side-mode Suppression ratio (SMSR)	SMSR	30			dB	
Average Launch Power, each Lane		-2.9		4	dBm	1
Outer Optical Modulation Amplitude, (OMAouter), each Lane	OMA	-0.8		4.2	dBm	
Launch power in OMAouter minus TDECQ (min), each Lane		-2.2			dBm	
Transmitter and Dispersion Eye Closure for PAM4, each Lane	TDECQ			3.4	dB	
Average Launch Power of OFF Transmitter, each Lane				-15	dBm	
Transmitter reflectance (max), each Lane				-26	dB	
Optical Extinction Ratio, each Lane	ER	3.5			dB	
Optical Return Loss Tolerance, each Lane				21.4	dB	
Receiver						
Signaling Rate per Lane		53.125 ± 100 ppm			GBd	
Center Wavelengths (Range)	WL	1304.5 to 1317.5			nm	
Modulation Format		PAM4				
Average Receive Power, each Lane		-5.9		4	dBm	2
Receive Power (OMAouter), each Lane				4.2	dBm	3
Receiver Reflectance , each Lane				-26	dB	
Stressed Receiver Sensitivity (OMA outer), each Lane				-1.9	dBm	4
Receiver Sensitivity (OMAouter), each Lane				-3.9	dBm	

Table 8 - Optical Characteristics

Note:
1. Average launch power (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
2. Average receive power (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
3. Receiver sensitivity (OMAouter), each lane (max) is informative and is defined for a transmitter with SECQ of 0.9 dB.
4. Measured with conformance test signal at TP3 for the BER specified in IEEE 802.3bs -2017.

8. Mechanical CHARACTERISTICS

8.1.Module outline drawing

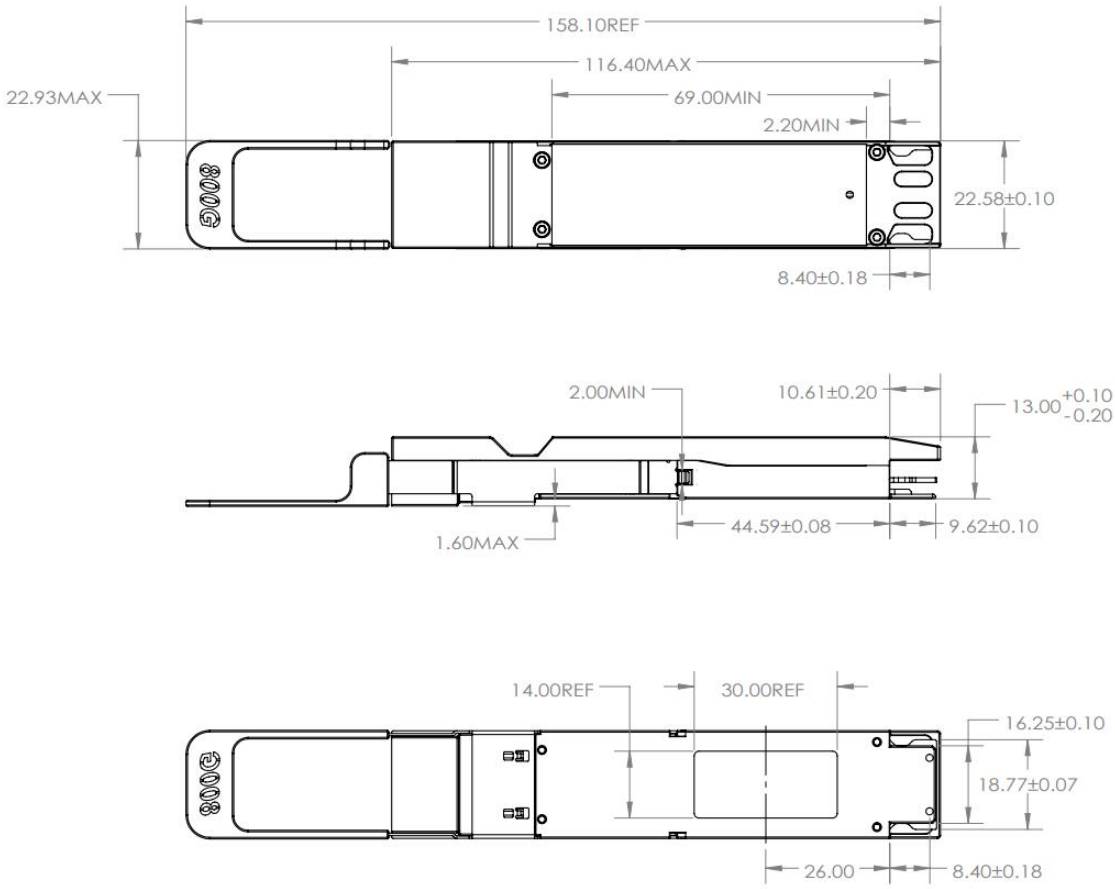

Figure 4 – Mechanical Outline Drawing (Unit: mm)

9. Regulatory specifications.

9.1 Laser Safety

This is a Class 1 Laser product according to IEC 60825-1:1993:+A1:1997+A2:2001. This product complies with 21 CFR 10100.10 and 10100.11 except for deviations pursuant to Laser Notice No. 50 (dated July 26, 2001).

9.2 ESD

This transceiver electrical input pins ESD failure threshold meets classification Class 1. ESD tested per MIL-STD-883, Method 3015.4 / JESD22-A114-A (HBM). However, standard ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD-protected environment.

9.3 Electromagnetic Emission

The module is designed to comply with Class A electromagnetic emission according to GR-1089-CORE Sections 3.2.1.1 and 3.2.1.3.

9.4 RoHS

The module complies with the requirements of the EU directive 2011/65/EU on the Restriction of Hazardous Substances in Electrical and Electronic Equipment and the amendment of Directive 2015/863.

The module is compatible with the current RoHS requirements for the 10 relevant substances (max 0.1% by weight in homogeneous materials for Lead, Mercury, Hexavalent chromium (Cr6+), Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP), Di isobutyl phthalate (DIBP) and max 0.01% for cadmium).