

800G OSFP224 DR4 Closed-top Pluggable Optical Transceiver

Features

- OSFP MSA 5.22 and CMIS 5.3 compliant
- Single MPO-12/APC optical connector
- 4x212.5Gbps (106.25GBd PAM4) electrical interface
- 4x212.5Gbps (106.25GBd PAM4) optical interface
- Up to 500m over SMF
- Power dissipation $\leq 16W$
- Operating case temperature: 0°C to 70°C
- Compliant with IEEE802.3dj : 800GBASE-DR4 and 800GAUI-4 C2M
- Built-in digital diagnostic functions
- 3.3V power supply voltage
- RoHS compliant



Applications

- 800G Ethernet
- Data center networks
- InfiniBand XDR

Product Description

The KTB HSOM-800-DR-C2S9 transceiver is designed for 800G Ethernet and InfiniBand communication application links over 500m of single-mode fiber (SMF), and it is compliant with OSFP MSA, CMIS 5.3, IEEE802.3dj standards. The optical signal is transmitted over four parallel channels at a central wavelength of 1310nm. The module contains 4 parallel channels on the transmitter and receiver, each operating at 212.5Gbps. The optical interface is single MPO-12/APC connector.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{cc}	-0.5	-	3.6	V
Storage Temperature	T_{sto}	-40		85	°C
Relative Humidity (Non-condensing)	RH	5		95	%
Control Input Voltage	V_i	-0.3		$V_{cc}+0.5$	

NOTE: Exceeding these ratings may damage the device permanently.

Specified Operations Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	V_{cc}	3.135	3.3	3.465	V
Power Supply Current	I_{cc}			5111	mA
Power Dissipation				16	W
Case Operating Temperature	T_{op}	0	-	70	°C
Relative Humidity (Non-condensing)	RH	15		85	%
I2C Clock Frequency			100	400	kHz

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Power On Initialization Time	T_{init}			2000	ms
Transmitter(Module Input)					
Signaling Speed, each lane			106.25		GBd
Signaling Speed Tolerance		-50		+50	ppm
Single-ended voltage tolerance	$V_{in,pp}$	-0.4		1400	mV
DC common-mode voltage tolerance		150		1050	mV
Peak-to-peak AC common-mode voltage tolerance Low-frequency, VCMLF Full-band, VCMFB		32 85			mV
Effective return loss	ERL	8.5			dB
Differential Input Impedance	Z_{in}	-10%		10%	
Receiver(Module Output)					
Signaling Speed, each lane			106.25		GBd
Signaling Speed Tolerance		-50		+50	ppm
Differential pk-pk output voltage Output disabled Output enabled	$V_{out,pp}$			30 1000	mV
DC Common-mode Voltage tolerance		0.15		1.05	V
AC Common Mode output Voltage Low-frequency, VCMLF Full-band, VCMFB				15 60	mV
Effective return loss	ERL	8.5			dB
Differential Output Impedance	Z_{out}	-10%		10%	

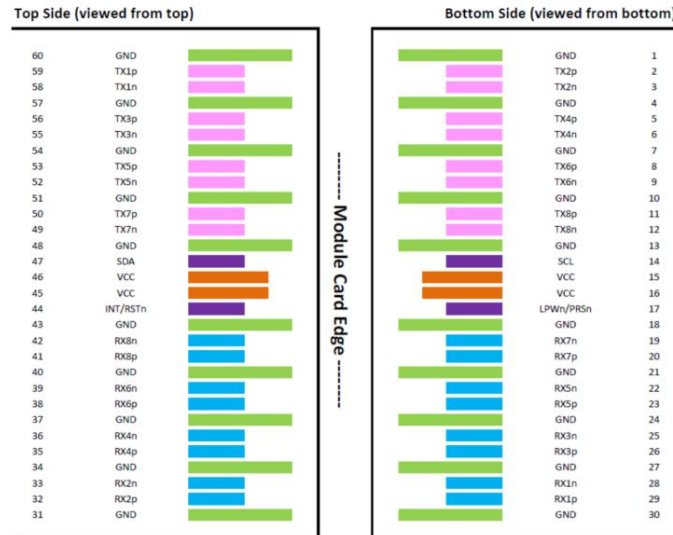
Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter						
Signaling Speed			106.25		GBd	1
Signaling Speed Tolerance		-50		+50	ppm	
Modulation Format		PAM4				
Lane Wavelength	λ	1304.5	1311	1317.5	nm	1
Side Mode Suppression Ratio	SMSR	30			dB	1
Average TX Power	P_{avg}	-3.1		4	dBm	1
Outer Optical Modulation Amplitude for $\max(\text{TECQ}, \text{TDECQ}) < 0.9\text{dB}$ for $0.9\text{dB} \leq \max(\text{TECQ}, \text{TDECQ}) \leq 3.4\text{dB}$	OMA_{outer}	-0.1 -1+ $\max(\text{TECQ}, \text{TDECQ})$		4.2	dBm	1
Extinction Ratio	ER	3.5			dB	1
Avg Launch Power TX Off	P_{off}			-15	dBm	1
Transmitter and dispersion eye closure for PAM4	TDECQ			3.4	dB	1
Transmitter eye closure for PAM4	TECQ			3.4	dB	1
TDECQ - TECQ				2.5	dB	1
Transmitter overshoot and undershoot				22	%	1
Transmitter transition time				8	ps	1
Relative Intensity Noise	RIN			-139	dB/Hz	1
Optical Return Loss	ORTL			21.4	dB	1
Reflectance				-26	dB	1
Receiver						
Signaling Speed			106.25		GBd	1
Signaling Speed Tolerance		-50		+50	ppm	
Modulation Format		PAM4				
Lane Wavelength	λ	1304.5	1311	1317.5	nm	1
Damage Threshold		5			dBm	1
Average RX Power		-6.1		4	dBm	1
RX Power (OMA_{outer})				4.2	dBm	1
RX Reflectance				-26	dBm	1
RX Sensitivity (OMA_{outer}) for $\text{TECQ} < 0.9\text{dB}$ for $0.9\text{dB} \leq \text{TECQ} \leq \text{SECQ}$				-3.4 -4.3+TECQ	dBm	2
Stressed RX Sensitivity (OMA_{outer})				-0.9	dBm	
Conditions of Stressed RX Sensitivity Test						
Stressed Eye Closure, lane under test	SECQ	3.4			dB	
OMA_{outer} of Each Aggressor Lane		4.2			dBm	

1. Each lane.

2. Measured with conformance test signal at TP3 for $\text{BER}=2.4 \times 10^{-4}$.

Electrical Input/Output

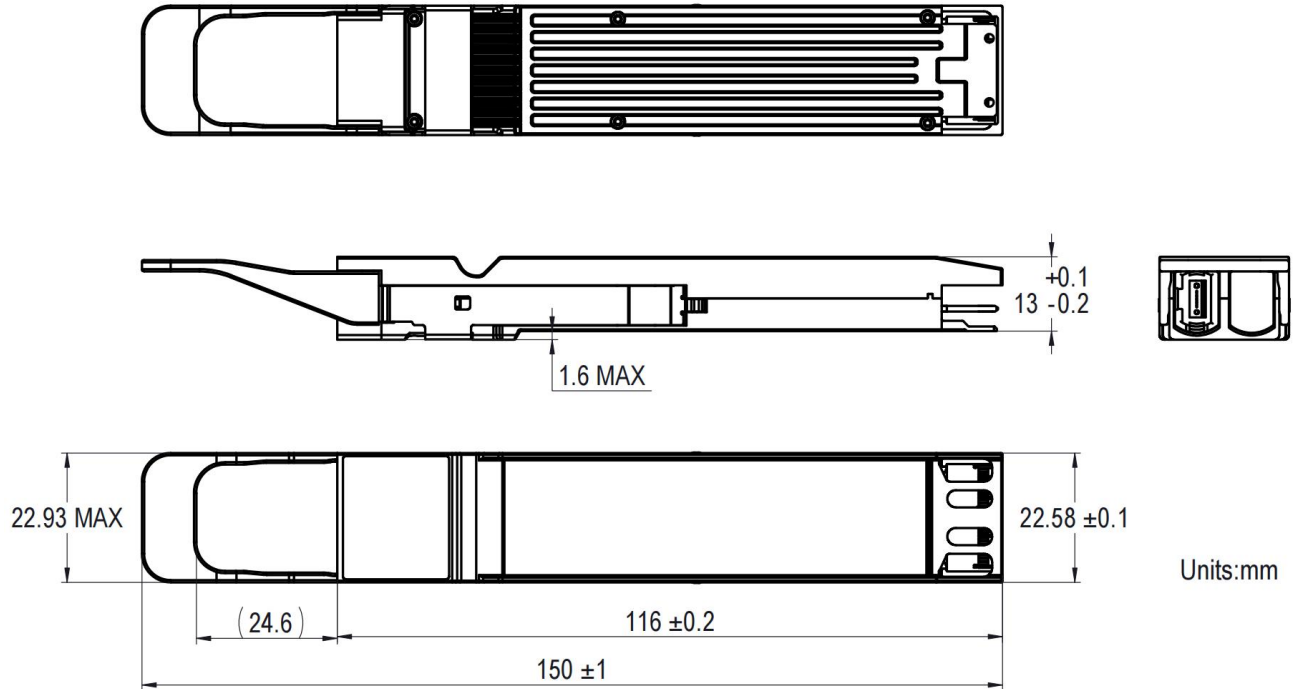


OSFP Module contact pad electrical definition

PIN	Symbol	Logic	Description	Notes
1	GND		Ground	
2	TX2p	CML-I	Transmitter Data Non-Inverted	
3	TX2n	CML-I	Transmitter Data Inverted	
4	GND		Ground	
5	TX4p	CML-I	Transmitter Data Non-Inverted	
6	TX4n	CML-I	Transmitter Data Inverted	
7	GND		Ground	
8	TX6p	CML-I	Transmitter Data Non-Inverted	
9	TX6n	CML-I	Transmitter Data Inverted	
10	GND		Ground	
11	TX8p	CML-I	Transmitter Data Non-Inverted	
12	TX8n	CML-I	Transmitter Data Inverted	
13	GND		Ground	
14	SCL	LVC MOS-I/O	2-wire Serial interface clock	Open-Drain with pull up resistor on Host
15	VCC	Power from Host	+3.3V Power	
16	VCC	Power from Host	+3.3V Power	
17	LPWn/PRSn	Multi-Level	Low-Power Mode / Module Present	See pin description for required circuit
18	GND		Ground	
19	RX7n	CML-O	Receiver Data Inverted	
20	RX7p	CML-O	Receiver Data Non-Inverted	

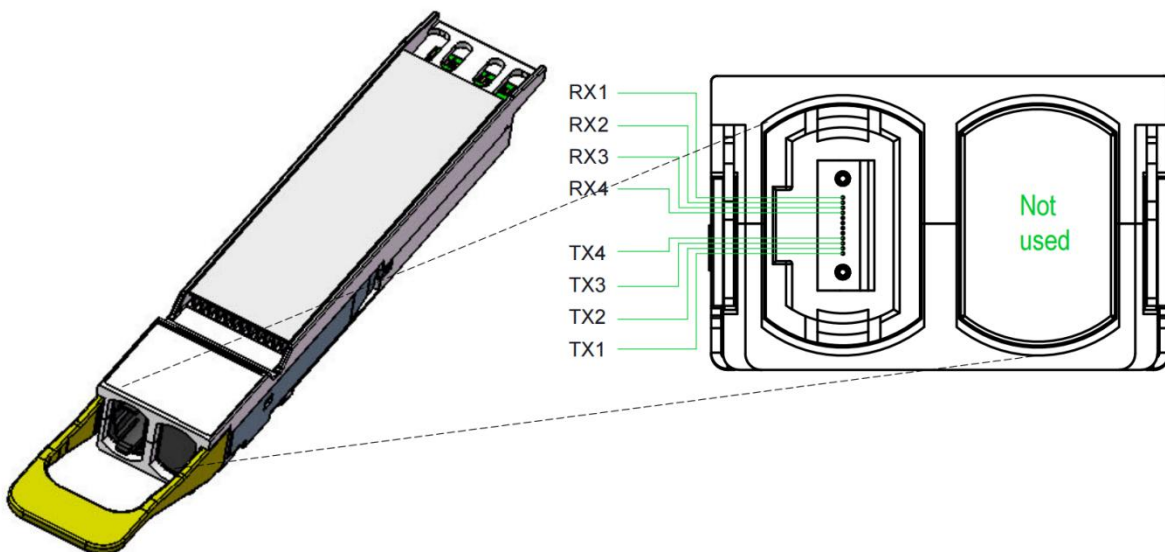
PIN	Symbol	Logic	Description	Notes
21	GND		Ground	
22	RX5n	CML-O	Receiver Data Inverted	
23	RX5p	CML-O	Receiver Data Non-Inverted	
24	GND		Ground	
25	RX3n	CML-O	Receiver Data Inverted	
26	RX3p	CML-O	Receiver Data Non-Inverted	
27	GND		Ground	
28	RX1n	CML-O	Receiver Data Inverted	
29	RX1p	CML-O	Receiver Data Non-Inverted	
30	GND		Ground	
31	GND		Ground	
32	RX2p	CML-O	Receiver Data Non-Inverted	
33	RX2n	CML-O	Receiver Data Inverted	
34	GND		Ground	
35	RX4p	CML-O	Receiver Data Non-Inverted	
36	RX4n	CML-O	Receiver Data Inverted	
37	GND		Ground	
38	RX6p	CML-O	Receiver Data Non-Inverted	
39	RX6n	CML-O	Receiver Data Inverted	
40	GND		Ground	
41	RX8p	CML-O	Receiver Data Non-Inverted	
42	RX8n	CML-O	Receiver Data Inverted	
43	GND		Ground	
44	INT/RSTn	Multi-Level	Module Interrupt / Module Reset	See pin description for required circuit
45	VCC	Power from Host	+3.3V Power	
46	VCC	Power from Host	+3.3V Power	
47	SDA	LVC MOS-I/O	2-wire Serial interface data	Open-Drain with pull up resistor on Host
48	GND		Ground	
49	TX7n	CML-I	Transmitter Data Inverted	
50	TX7p	CML-I	Transmitter Data Non-Inverted	
51	GND		Ground	
52	TX5n	CML-I	Transmitter Data Inverted	
53	TX5p	CML-I	Transmitter Data Non-Inverted	
54	GND		Ground	
55	TX3n	CML-I	Transmitter Data Inverted	
56	TX3p	CML-I	Transmitter Data Non-Inverted	
57	GND		Ground	
58	TX1n	CML-I	Transmitter Data Inverted	
59	TX1p	CML-I	Transmitter Data Non-Inverted	
60	GND		Ground	

Mechanical Specifications



Product shall be of design, construction, and physical dimensions specified on the applicable product drawing.

Optical Interface



Laser Safety

This is a Class 1 Laser Product as defined by IEC 60825-1:2014. When operated within the limits of this specification it is considered non-hazardous. Operating this product in a manner inconsistent with specifications and intended usage may result in hazardous radiation exposure.



Product Label



Regulatory Certifications

This product is certified to the following regulatory standards:

Category	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 Directive 2014/30/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



800G OSFP224 DR4 Closed-top Datasheet

Ordering Information

Part No.	Data Rate	Wavelength	Max Distance	Case Temperature Range
HSOM-800-DR-C2S9	850Gbps	1310nm	500m	0°C to 70°C