

Specification

OSFP 800G (2xDR4+) Transceiver



TES-K18P8-DOJ

Ordering Information:

Model Name	TES-K18P8-DOJ	Note
Voltage	3.3V	
Device type	1310nm DFB	
Temperature	0°C~+70°C	
Distance	2km	
Optical interface	two MPO-12 connector	
Latch Color	Yellow	

■ Features

- Compliant with OSFP MSA HW Rev4.1 Type 2 Housing with 2xMPO-12 Connector
- Compliant with IEEE P802.3cu-2021 100GBASE-FR1 Optical Interface
- Compliant with IEEE P802.3ck D3.0: 8x100GAUI-1 C2M Electrical Interface
- Operation case temperature 0°C to +70°C
- Class 1 Laser Safety
- Compliant with CMIS Rev5.0
- I2C management interface
- RoHS-6 compliant

■ Applications

- 800G Ethernet
- Data Center and Enterprise Networking

■ Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Note
Maximum Supply Voltage	Vcc	0		3.6	V	
Storage Temperature	Ts	-40		85	°C	
Relative Humidity (no-condensation)	RH	0		85	%	
Damage Threshold	THd	5			dBm	

Note: Not necessarily applied together. Exceeding these values may cause permanent damage. Functional operation under these conditions is not implied.

■ Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Note
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Supply Current	Icc			5	A	
Power Consumption			13.5	15	W	
Case Temperature	Top	0		70	°C	
Link Distance	D	2		2	km	

■ **Electrical Characteristics**

Transmitter Electrical Characteristics					
Parameter	Symbol	Min	Typ	Max	Unit
Differential Input Voltage Tolerance (TP1a)		750			mV
AC Common-mode RMS Voltage Tolerance (TP1a)		25			mV
Effective Return Loss	<i>ERL</i>	8.5			dB
Single-ended Voltage Tolerance Range		-0.4		3.3	V
DC Common-mode Voltage Tolerance		-0.35		2.85	V
Differential Termination Mismatch				10	%
Receiver Electrical Characteristics					
Parameter	Symbol	Min	Typ	Max	Unit
AC Common-mode output Voltage (RMS)				25	mV
Differential Output Voltage					
Short Mode				600	mV
Long Mode				845	
Eye Height	<i>EH</i>	15			mV
Vertical Eye Closure	<i>VEC</i>			12	dB
Effective Return Loss	<i>ERL</i>	8.5			dB
DC Common-mode Voltage Tolerance		-0.35		2.85	V
Transition Time		8.5			ps
Differential Termination Mismatch				10	%

■ Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter Optical Characteristics					
Data Rate (each Lane)		53.125 ± 100 ppm			GBd
Modulation Format		PAM4			
Wavelength		1304.5	1310	1317.5	nm
Side-mode Suppression ratio	SMSR	30			dB
Average launch power,each lane ¹	P _{AVG}	-3.1		4	dBm
Outer Optical Modulation Amplitude (OMA _{outer}),each lane TDECQ<1.4dB TDECQ≥1.4dB	P _{OMA}	-0.1 TDECQ-1.5		4.2	dBm
Transmitter and Dispersion penalty,each lane	TDECQ			3.4	dB
Extinction Ratio,each lane		3.5			dB
Transmitter Transition Time	Tr			17	ps
Optical Return Loss Tolerance				17.1	dB
Transmitter Reflectance ²	RL			-26	dB
Average Launch Power OFF Transmitter,each lane	P _{off}			-15	dBm
RIN _{21.4} OMA	RIN			-136	dB/Hz

Notes:

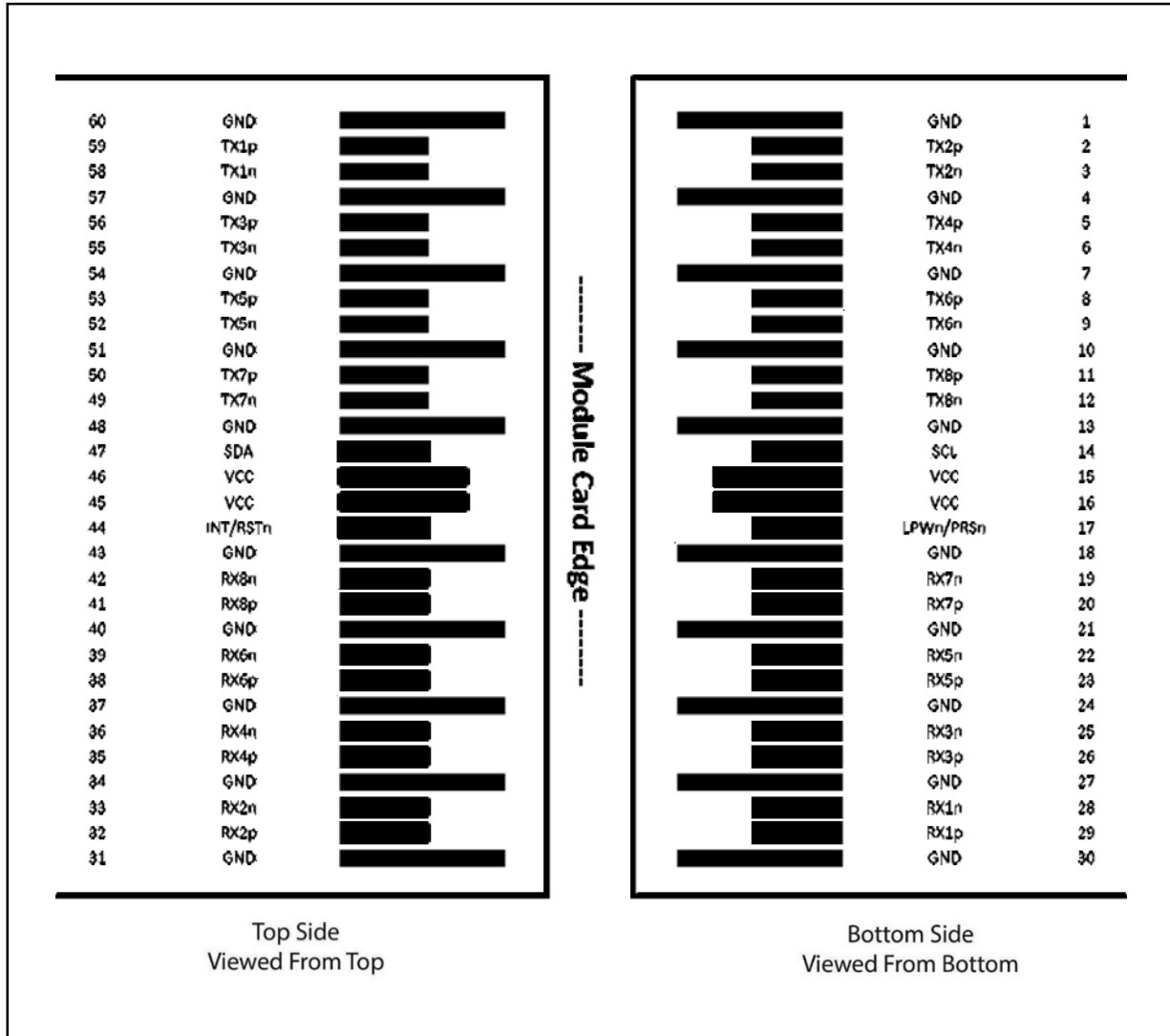
1. Average launch power (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
2. Transmitter Reflectance is defined looking into the transmitter.

Parameter	Symbol	Min	Typical	Max	Unit
Receiver Optical Characteristics					
Data Rate (each Lane)		53.125 ± 100 ppm			GBd
Modulation Format		PAM			
Lane Wavelength	λ	1304.5~1317.5			nm
Damage Threshold ¹		5			dBm
Average receive power, each lane ²		-7.1		4	dBm
Receive Power (OMA _{outer}), each lane				4.2	dBm
Receiver Reflectance				-26	dB
Receiver sensitivity (OMA _{outer}), each lane				Max(-4.5 SECQ-5.9)	dBm
Stressed receiver sensitivity (OMA _{outer}), each lane (max) ³	SRS			-2.5	dBm
Transmitter Reflectance				-26	dB
LOS Assert	LOSA	-30		-12.5	dBm
LOS De-assert	LOSD			-9.5	dBm
LOS Hysteresis	LOSH	0.5			dB
Conditions of Stress Receiver Sensitivity Test					
Stressed eye closure for PAM4 (SECQ), lane under test			3.4		dB
SECQ-10*log ₁₀ (C _{eq}), Lane under Test				3.4	dB
OMA _{outer} of each aggressor lane			4.7		dBm

Notes:

1. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane.
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. Measured with conformance test signal at TP3 for the BER specified in IEEE Std 802.3cd.

■ Module Pad Assignments and Descriptions

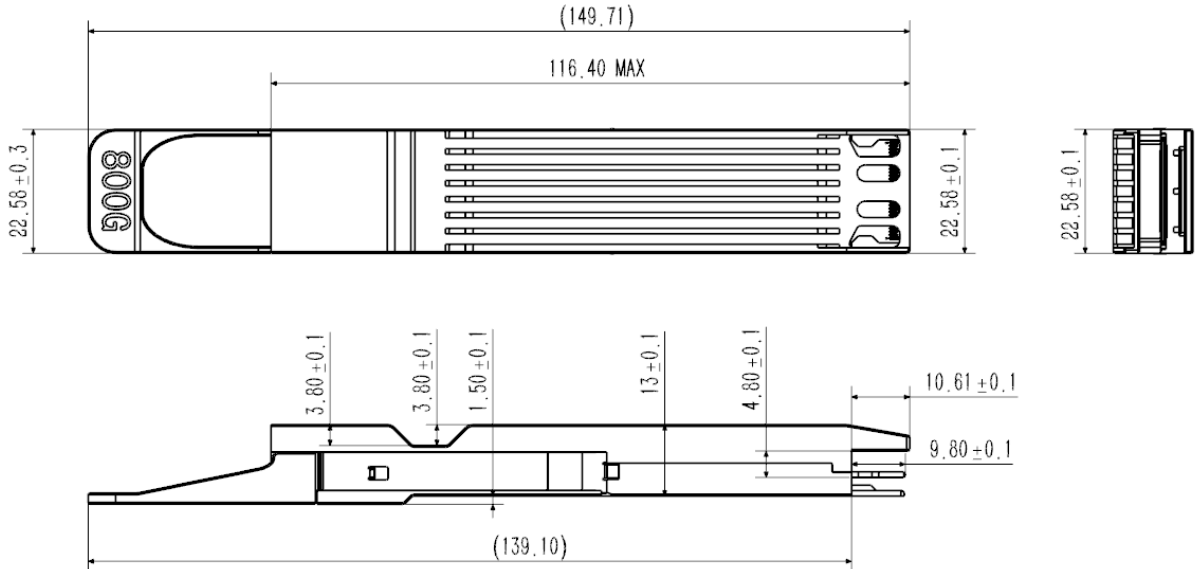


Pin	Logic	Symbol	Description
1	GND	GND	Ground
2	CML-I	Tx2p	Transmitter Non-Inverted Data Input
3	CML-I	Tx2n	Transmitter Inverted Data Input
4	GND	GND	Ground
5	CML-I	Tx4p	Transmitter Non-Inverted Data Input
6	CML-I	Tx4n	Transmitter Inverted Data Input
7	GND	GND	Ground
8	CML-I	Tx6p	Transmitter Non-Inverted Data Input
9	CML-I	Tx6n	Transmitter Inverted Data Input
10	GND	GND	Ground
11	CML-I	Tx8p	Transmitter Non-Inverted Data Input
12	CML-I	Tx8n	Transmitter Inverted Data Input
13	GND	GND	Ground
14	LVCOMS	SCL	2-wire Serial Interface Clock
15	VCC	VCC1	+3.3V Power Supply
16	VCC	VCC1	+3.3V Power Supply
17	Muti-Level	LPWn/PRSn	Low-Power Mode / Module Present
18	GND	GND	Ground
19	CML-O	Rx7n	Receiver Inverted Data Output
20	CML-O	Rx7p	Receiver Non-Inverted Data Output
21	GND	GND	Ground
22	CML-O	Rx5n	Receiver Inverted Data Output
23	CML-O	Rx5p	Receiver Non-Inverted Data Output
24	GND	GND	Ground
25	CML-O	Rx3n	Receiver Inverted Data Output
26	CML-O	Rx3p	Receiver Non-Inverted Data Output
27	GND	GND	Ground
28	CML-O	Rx1n	Receiver Inverted Data Output
29	CML-O	Rx1p	Receiver Non-Inverted Data Output
30	GND	GND	Ground
31	GND	GND	Ground
32	CML-O	Rx2p	Receiver Non-Inverted Data Output
33	CML-O	Rx2n	Receiver Inverted Data Output
34	GND	GND	Ground
35	CML-O	Rx4p	Receiver Non-Inverted Data Output
36	CML-O	Rx4n	Receiver Inverted Data Output
37	GND	GND	Ground
38	CML-O	Rx6p	Receiver Non-Inverted Data Output

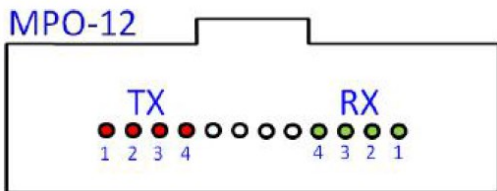
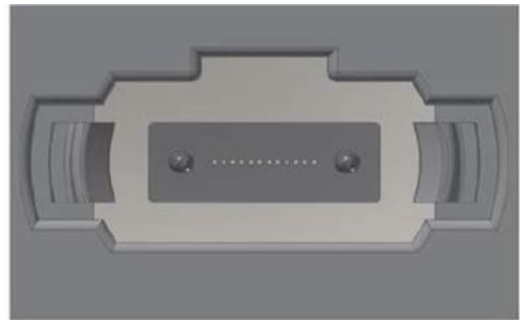
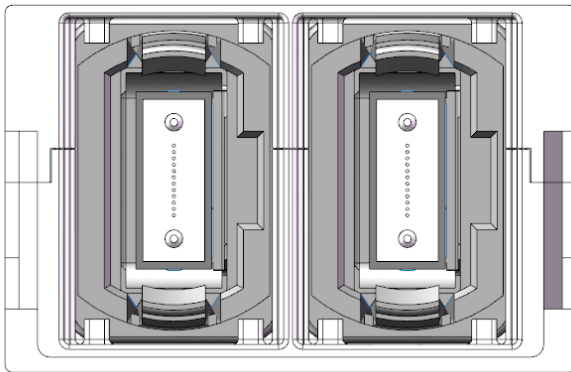
39	CML-O	Rx6n	Receiver Inverted Data Output
40	GND	GND	Ground
41	CML-O	Rx8p	Receiver Non-Inverted Data Output
42	CML-O	Rx8n	Receiver Inverted Data Output
43	GND	GND	Ground
44	Muti-Level	INT/RSTn	Module Interrupt / Module Reset
45	VCC	VCC1	+3.3V Power Supply
46	VCC	VCC1	+3.3V Power Supply
47	LVC MOS	SDA	2-wire Serial Interface Data
48	GND	GND	Ground
49	CML-I	Tx7n	Transmitter Inverted Data Input
50	CML-I	Tx7p	Transmitter Non-Inverted Data Input
51	GND	GND	Ground
52	CML-I	Tx5n	Transmitter Inverted Data Input
53	CML-I	Tx5p	Transmitter Non-Inverted Data Input
54	GND	GND	Ground
55	CML-I	Tx3n	Transmitter Inverted Data Input
56	CML-I	Tx3p	Transmitter Non-Inverted Data Input
57	GND	GND	Ground
58	CML-I	Tx1n	Transmitter Inverted Data Input
59	CML-I	Tx1p	Transmitter Non-Inverted Data Input
60	GND	GND	Ground

■ Mechanical Design Diagram

Unit: mm



■ Optical Interface



■ **ESD**

Normal ESD precautions are 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.

■ **LASER Safety**

This is a Class 1 Laser Product according to IEC/EN60825-1:2014 (Third Edition). This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 56, MAY 8, 2019.

■ **Caution:**

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Attention: L'utilisation de commandes ou de réglages ou l'exécution de procédures autres que celles spécifiées dans le document peut entraîner une exposition à des radiations dangereuses.

■ **Contact Information**

Formerica OptoElectronics Inc. 5F-11, No.38, Taiyuan St., Zhubei City, Hsinchu County 30265, Taiwan Tel: +886-3-5600286 Fax: +886-3-5600239	San Diego, CA Tel: 1-949-466-8069
inquiry@formericaoe.com www.formericaoe.com	

■ **Revision History**

Date	Version	Description
9/30/2023	Preliminary	Initial release