

800GBASE-PLR8 OSFP 1310nm 10km MTP/MPO-16 SMF Transceiver

OSFP800-PLR8-B1



Application

- 800G Ethernet
- Data Center
- Breakout 2x 400G PLR4 or 8x 100G LR

Features

- Typical Power Consumption 16.5W
- 8x106.25 Gb/s PAM4 Modulation
- Single 3.3V Power Supply
- Operating Case Temperature Range: 0 ~ 70°C
- Two Wire Serial Interface with Digital Diagnostic Monitoring
- Class 1 Laser Safety

Standards

- Compliant with IEEE 802.3cu-2021
-8x100GBASE-LR1 Optical Interface
- Compliant with IEEE P802.3ck D3.0
-8x100GAUI-1 C2M Electrical Interface
- Compliant with OSFP MSA HW Rev 4.1
-Type 2 Housing with MPO-16 Connector
- Compliant with CMIS Rev 5.0

Description

FS’s 800GBASE-PLR8 OSFP transceiver supports up to 10km link lengths over single-mode fiber (SMF) with MPO-16 connectors. This transceiver is compliant with IEEE 802.3ck, IEEE 802.3cu-2021 and CMIS Rev 5.0 standards. The built-in digital diagnostics monitoring (DDM) allows access to real-time operating parameters. It is suitable for 800G Ethernet, Data Center, Breakout 2x 400G PLR4 or 8x 100G LR application.

Products Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _S	-40	85	°C
Supply Voltage	V _{CC}	-0.5	3.6	V
Relative Humidity (Non-condensing)	RH	5	95	%
Data Input Voltage Differential	V _{DIP} -V _{DIN}		1	V
Control Input Voltage	V _I	-0.3	V _{CC} +0.5	V
Control Output Current	I _O	-20	20	mA

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T _{OPR}	0		70	°C
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V
Instantaneous Peak Current at Hot Plug	I _{CC_IP}			TBD	mA
Sustained Peak Current at Hot Plug	I _{CC_SP}			TBD	mA

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Dissipation	P_D		16.5		W
Maximum Power Dissipation, Low Power Mode	P_{DLP}			2	W
Signalling Speed per Lane	DRL		53.125		GBd
Control Input Voltage High	V_{IH}	$V_{CC}*0.7$		$V_{CC}+0.3$	V
Control Input Voltage Low	V_{IL}	-0.3		$V_{CC}*0.3$	V
Two Wire Serial Interface Clock Rate				400	kHz
Power Supply Noise 1 kHz -1 MHz (p-p)				66	mVpp
Operating Distance		2		10000	m

III. Optical Characteristics

The following tables list the performance specifications for the various functional blocks of the integrated optical transceiver module.

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Wavelength	λ_C	1304.5	1311	1317.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power, each Lane	AOP_L	-1.9		4.8	dBm	1
Outer Optical Modulation Amplitude (OMA_{outer}), each Lane for TDECQ<1.4dB for 1.4dB<=TDECQ<=3.4dB	OMA_{outer}	$\begin{matrix} 1.1 \\ -0.3+TDECQ \end{matrix}$		5	dBm	
Transmitter and Dispersion Eye Closure for PAM4(TDECQ), each Lane	TDECQ			3.4	dB	

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter Eye Closure for PAM4 (TECQ), each Lane	TECQ			3.4	dB	
TDECQ-TECQ				2.5	dB	
Over/Under-shoot				22	%	
Transmitter Power Excursion				2.8	dBm	
Average Launch Power of OFF Transmitter, each Lane	T _{OFF}			-15	dBm	
Extinction Ratio	ER	3.5			dB	
Transmitter Transition Time	Tr			17	ps	
RIN _{15.6} OMA	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	ORL			15.6	dB	
Transmitter Reflectance	T _R			-26	dB	2
Receiver						
Wavelength	λ _{C0}	1304.5	1311	1317.5	nm	
Damage Threshold, each Lane	AOP _D	5.8			dBm	
Average Receive Power, each Lane	AOP _R	-8.2		4.8	dBm	
Receive Power (OMA _{outer}), each Lane	OMA _R			5	dBm	
Receiver Reflectance	RR			-26	dB	
Receiver Sensitivity (OMA _{outer}) for TECQ<1.4dB for 1.4dB<=TECQ<=3.4dB	S _{OMA}			-6.1 -7.5+TECQ	dBm	3

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Stressed Receiver Sensitivity (OMA _{outer}), each Lane	SRS			-4.1	dBm	4

Conditions of Stressed Receiver Sensitivity Test

Stressed Eye Closure for PAM4(SECQ), Lane Under Test	SECQ		3.4		dB	
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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 3.4dB.
4. Measured with conformance test signal at TP3 for the BER = 2.4x10⁻⁴.

IV. Electrical Characteristics

1. Electrical Specification High Speed Signal (Compliant with IEEE802.3ck C2M)

Parameter	Symbol	Min.	Typical	Max.	Unit
Receiver (Module Output, TP4)					
AC Common-mode Output Voltage (RMS)				25	mV
Differential Peak-to-peak Output Voltage	Short Mode			600	mV
	Long Mode			845	mV
Eye Height		EH	15		mV
Vertical Eye Closure	VEC			12	dB
Common-mode to Differential-mode Return Loss	RLD _c		802.3ck 120G-1		dB
Effective Return Loss	ERL	8.5			dB

Parameter	Symbol	Min.	Typical	Max.	Unit
Differential Termination Mismatch				10	%
Transition Time		8.5			ps
DC Common-mode Voltage Tolerance		-0.35		2.85	V
Transmitter (Module Input, TP1)					
Differential Pk-pk Input Voltage Tolerance (TP1a)		750			mV
AC Common-mode RMS Voltage Tolerance (TP1a)		25			mV
Differential-mode to Common-mode Return Loss	RL _{cd}	802.3ck 120G-2			dB
Effective Return Loss	ERL	8.5			dB
Differential Termination Mismatch				10	%
Single-ended Voltage Tolerance Range		-0.4		3.3	V
DC Common-mode Voltage Tolerance		-0.35		2.85	V

2. Electrical Specification Low Speed Control and Sense Signals (Compliant with QSFP-DD HW Rev6.01 Table 14)

Parameter	Symbol	Min.	Max.	Unit
Module Output SCL and SDA	V _{OL}	0	0.4	V
Module Input SCL and SDA	V _{IL}	-0.3	V _{CC} *0.3	V
	V _{IH}	V _{CC} *0.7	V _{CC} +0.5	V

Parameter	Symbol	Min.	Max.	Unit
InitMode, ResetL and ModSelL	V _{IL}	-0.3	0.8	V
	V _{IH}	2	V _{CC} +0.3	V
IntL	V _{OL}	0	0.4	V
	V _{OH}	V _{CC} -0.5	V _{CC} +0.3	V

V. Pin Description

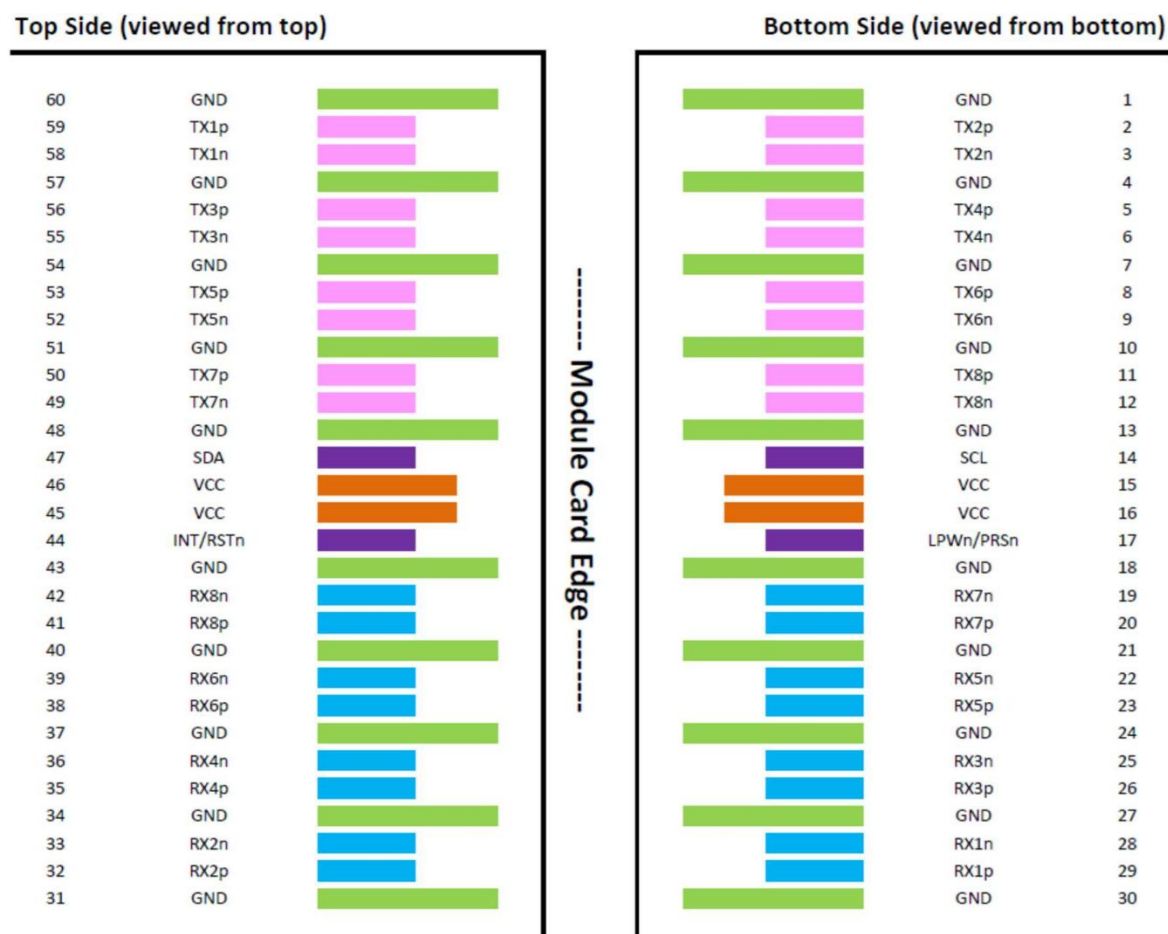


Figure 1 – Pinout definitions of OSFP module inputs/outputs

Pin	Symbol	Description	Logic
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	
11	TX8p	Transmitter Data Non-Inverted	CML-I
12	TX8n	Transmitter Data Inverted	CML-I
13	GND	Ground	
14	SCL	2-wire Serial Interface Clock	LVC MOS-I/O
15	V _{CC}	3.3V Power	
16	V _{CC}	3.3V Power	
17	LPWn/PRSn	Low-Power Mode/Module Present	Multi-Level
18	GND	Ground	

Pin	Symbol	Description	Logic
19	RX7n	Receiver Data Inverted	CML-O
20	RX7p	Transmitter 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

Pin	Symbol	Description	Logic
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	V _{CC}	3.3V Power	
46	V _{CC}	3.3V Power	
47	SDA	2-wire Serial Interface Data	LVC MOS-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	

Pin	Symbol	Description	Logic
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	

VI. Recommended OSFP Host Board Schematic

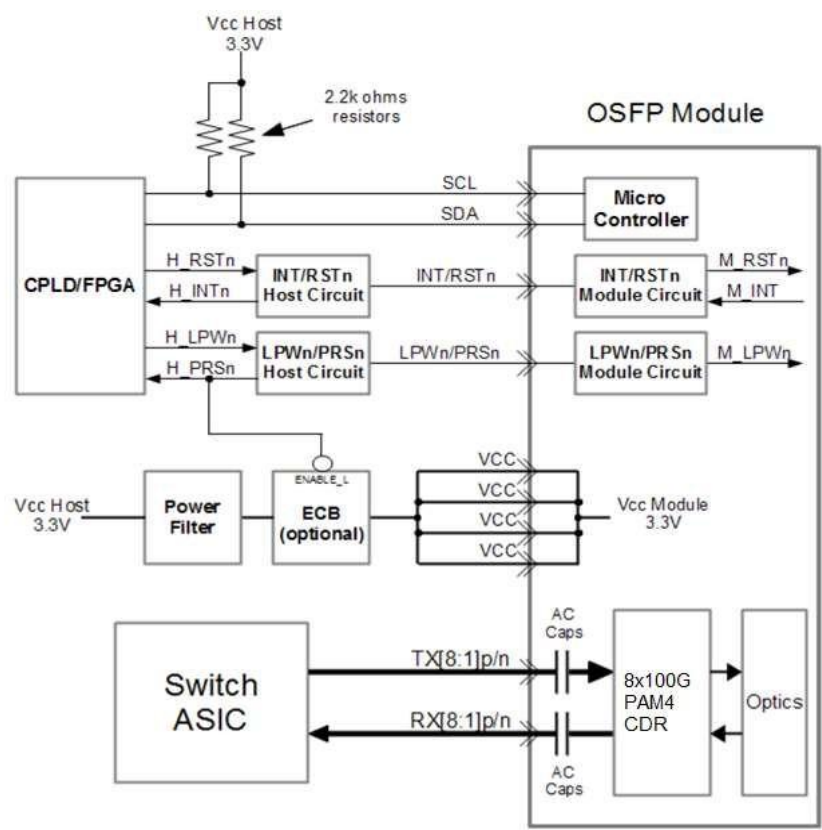
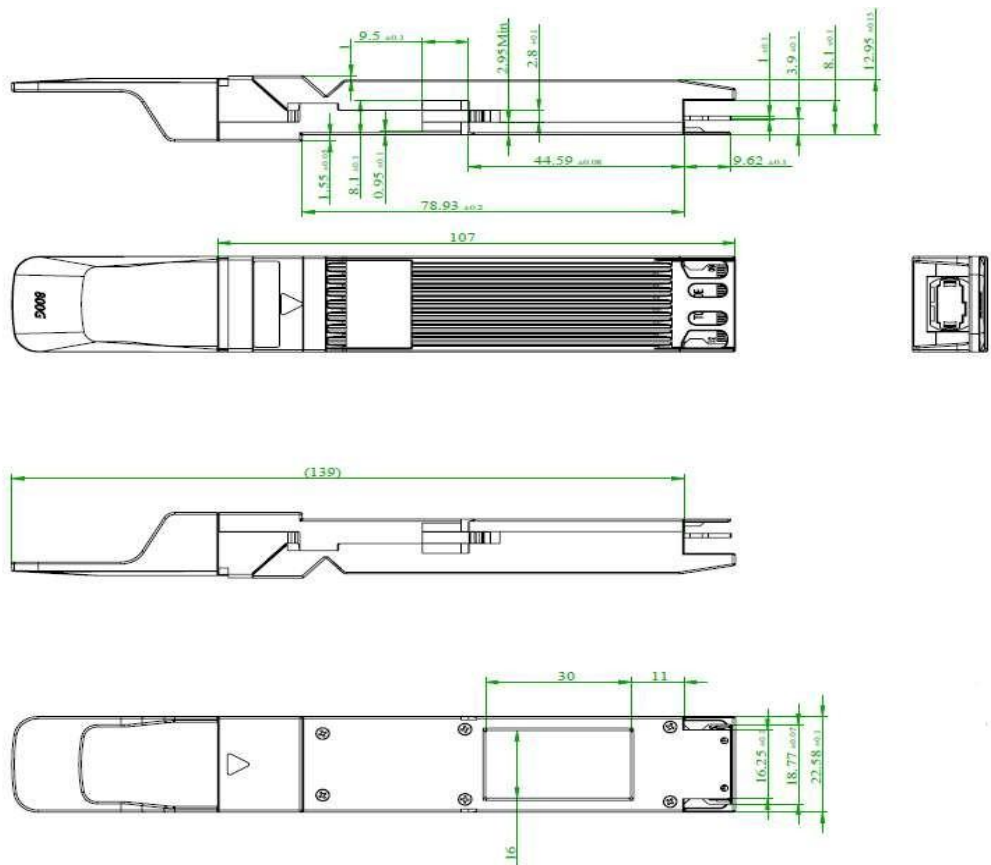


Figure 2 – Recommended OSFP Host Board Schematic

VII. Digital Diagnostic Functions

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	°C	Internal
Voltage	0 to V _{CC}	0.1	V	Internal
Tx Bias Current (each Lane)	0 to 100	10%	mA	Internal
Tx Output Power (each Lane)	-1.9 to +4.8	±3	dB	Internal
Rx Receive Power (each Lane)	-8.2 to +4.8	±3	dB	Internal

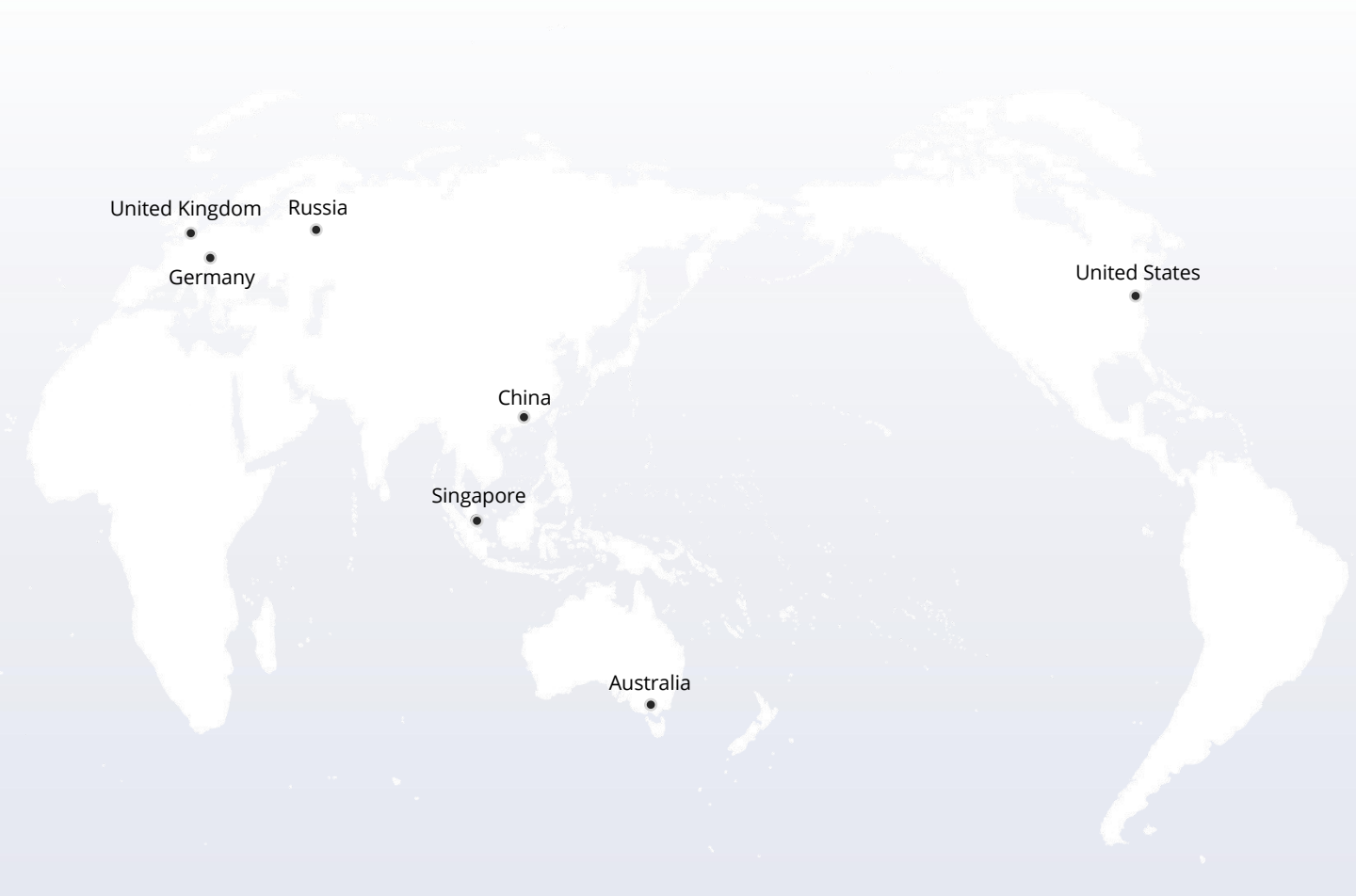
VIII. Diagram Mechanical Drawing



unit: mm

Order Information

Part Number	Description
QDD800-DR8-B1	800GBASE-DR8 QSFP-DD PAM4 1310nm 500m DOM MTP/MPO-16 SMF Optical Transceiver
QDD800-2FR4-C1	800GBASE-2FR4 QSFP-DD PAM4 1310nm 2km DOM Dual CS SMF Optical Transceiver
OSFP800-DR8-B1	800GBASE-DR8 OSFP PAM4 1310nm 500m DOM MTP/MPO-16 SMF Optical Transceiver
OSFP800-DR8-B2	800GBASE-DR8 OSFP PAM4 1310nm 500m DOM MTP/MPO SMF Optical Transceiver
OSFP800-XDR8-B1	800GBASE-XDR8 OSFP PAM4 1310nm 2km DOM MTP/MPO-16 SMF Optical Transceiver
OSFP800-XDR8-B2	800GBASE-XDR8 OSFP PAM4 1310nm 2km DOM Dual MTP/MPO-12 SMF Optical Transceiver
OSFP800-2FR4-A2	800GBASE-2FR4 OSFP PAM4 1310nm 2km DOM LC SMF Optical Transceiver
OSFP800-2LR4-A2	800GBASE-2LR4 OSFP PAM4 1310nm 10km Dual LC SMF Optical Transceiver
OSFP800-PLR8-B2	800GBASE-PLR8 OSFP PAM4 1310nm 10km DOM Dual MTP/MPO-12 SMF Optical Transceiver
OSFP800-PLR8-B1	800GBASE-PLR8 OSFP PAM4 1310nm 10km DOM MTP/MPO-16 SMF Optical Transceiver
QDD800-PLR8-B1	800GBASE-PLR8 QSFP-DD PAM4 1310nm 10km DOM MTP/MPO-16 SMF Optical Transceiver



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