OSFPRHS-800GB-2XDR4P-C

MSA and TAA 800GBase-2xDR4+ PAM4 OSFP112 RHS Transceiver (SMF, 1310nm, 2km, 2xMPO, DOM, CMIS 5.0)

Features:

- Supports Both Ethernet and InfiniBand
- OSFP MSA Compliant
- Dual MPO-12 Connector APC
- Compliant with CMIS 5.0
- 8 Channels of 100G-PAM4 Electrical and Optical Parallel Lanes
- 2km Maximum Reach via Single-Mode Fiber
- Power Consumption: 14.5W
- Operating Temperature: 0 to 70 Celsius
- Class 1 Laser
- RoHS Compliant and Lead-Free

Applications:

- 800GBase Ethernet

Product Description

This MSA compliant OSFP112 RHS transceiver provides 800GBase-2xDR4+ throughput up to 2km over single-mode fiber (SMF) PAM4 using a wavelength of 1310nm via a 2xMPO connector. It can operate at temperatures between 0 and 70C. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products.")

TAA COMPLIANT

Rev. 012026

CMIS Application Advertisements

ApSEL Code	Host Electrical Interface	Module Media Interface	Host and Media Lane Count	Host Lane Assignment
ApSel 1	50 (400GAUI-4-L C2M)	1C (400GBASE-DR4)	44 (4:4)	11 (lanes 1,5)
ApSel 2	32 (IB NDR)	1C (400GBASE-DR4)	44 (4:4)	11 (lanes 1,5)
ApSel 3	F (200GAUI-4 C2M)	17 (200GBASE-DR4)	44 (4:4)	11 (lanes 1,5)
ApSel 4	31 (IB HDR)	17 (200GBASE-DR4)	44 (4:4)	11 (lanes 1,5)
ApSel 5	4C (100GAUI-1-L C2M)	14 (100GBASE-DR)	11 (1:1)	FF (lanes 1,2,3,4,5,6,7,8)
ApSel 6	52 (800GAUI-8-L C2M)	0 (Undefined)	88 (8:8)	01 (lane 1)
ApSel 7	4F (400GAUI-4-S C2M)	1C (400GBASE-DR4)	44 (4:4)	11 (lanes 1,5)
ApSel 8	4B (100GAUI-1-S C2M)	14 (100GBASE-DR)	11 (1:1)	FF (lanes 1,2,3,4,5,6,7,8)
ApSel 9	51 (800GAUI-8-S C2M)	0 (Undefined)	88 (8:8)	01 (lane 1)
ApSel 10	42 (CAUI-4 C2M with RS FEC)	F (100G PSM4 MSA)	44 (4:4)	11 (lanes 1,5)
ApSel 11	30 (IB EDR)	F (100G PSM4 MSA)	44 (4:4)	11 (lanes 1,5)

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	-0.5		3.6	V	
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0		70	°C	
Relative Humidity (Non-Condensing)	RH	0		85	%	
Data Rate Per Lane	DRL		53.125		GBd	PAM4
Data Rate Accuracy		-100		100	ppm	
Pre-FEC Bit Error Ratio				$2.4x10^{-4}$		
Post-FEC Bit Error Ratio				$1x10^{-15}$		1
Link Distance	D	100		2000	m	2

Notes:

1. FEC provided by host system.
2. FEC required on host system to support maximum distance.

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		Vcc	3.135	3.3	3.465	V	
Power Consumption					14.5	W	
Module Input Per Lane							
Signaling Rate Per Lane		TP1	53.125 ± 100ppm			GBd	
DC Common-Mode Input Voltage		TP1	-0.35		2.85	V	
Single-Ended Input Voltage		TP1a	-0.4		3.3	V	
AC Common-Mode RMS Input Voltage	**Low-Frequency (VCMLF)**	TP1a	32			mV	
	Full-Band (VCMFB)		80				
Module Stressed Input Test			IEEE 802.3ck 120G3.4.3				
Differential Peak-to-Peak Input Voltage Tolerance		TP1a	750			mV	
Common to Different Mode Input Return Loss		TP1	IEEE 802.3ck Equation 120G-2				
Effective Input Return Loss		TP1	8.5			dB	
Differential Input Termination Mismatch		TP1			10	%	
Module Output Per Lane							
Signaling Rate Per Lane		TP4	53.125 ± 100ppm			GBd	
Differential Peak-to-Peak Output Voltage	**Short-Mode**	TP4			600	mV	
	Long-Mode				845		
AC Common-Mode Output Voltage, RMS	**Low-Frequency (VCMLF)**	TP4			32	mV	
	Full-Band (VCMFB)				80		
Differential Termination Mismatch		TP4			10	%	
Eye Height		TP4	15			mV	
Vertical Eye Closure (VEC)		TP4			12	dB	
Common-Mode to Differential-Mode Output Return Loss		TP4	IEEE 802.3ck Equation 120G-1			dB	
Effective Return Loss		TP4	8.5			dB	
Output Transition Time (20-80%)		TP4	8.5			ps	
DC Common-Mode Output Voltage		TP4	-350		2850	mV	
Differential Termination Mismatch		TP4			10	%	

Optical Characteristics

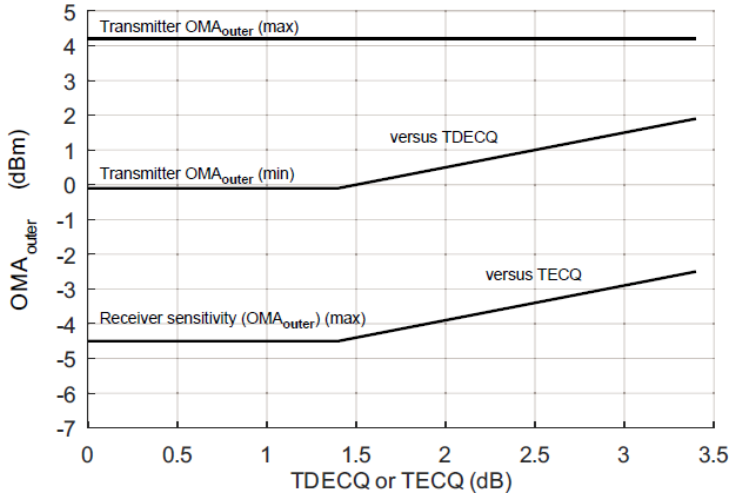
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λC	1304.5	1311	1317.5	nm	
Data Rate Per Lane		53.125 ± 100ppm			GBd	
Modulation Format		PAM4				
Side-Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power Per Lane	Pavg	-3.1		4	dBm	1
Outer Optical Modulation Amplitude (OMAouter) Per Lane	Poma	Max. (-0.1-1.5+TDECQ)		4.2	dBm	2
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ) Per Lane	TDECQ			3.4	dB	
Transmitter Eye Closure for PAM4 (TECQ) Per Lane	TECQ			3.4	dB	
| TDECQ – TECQ |				2.5	dB	
Over-shoot/Under-shoot				22	%	
Transmitter Power Excursion				2	dBm	
Extinction Ratio	ER	3.5			dB	
$RIN_{17.1}OMA$	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	ORL			17.1	dB	
Transmitter Reflectance	T_R			-26	dB	
Transmitter Transition Time	Tr			17	ps	
Average Launch Power of Off Transmitter Per Lane	Toff			-15	dBm	
Receiver						
Center Wavelength	λC	1304.5	1311	1317.5	nm	
Data Rate Per Lane		53.125 ± 100ppm			GBd	
Modulation Format		PAM4				
Damage Threshold Per Lane	THd	5			dBm	3
Average Receive Power Per Lane	AOP_R	-7.1		4	dBm	4
Receive Power (OMAouter) Per Lane				4.2	dBm	
Receiver Sensitivity (OMAouter) Per Lane	SEN			Equation 1	dBm	5
Stressed Receiver Sensitivity (OMAouter) Per Lane	SRS			-2.5	dBm	6
Receiver Reflectance	RR			-26	dB	
LOS Assert	LOSA	-15		-10.5	dBm	
LOS De-Assert	LOSD			-7.5	dBm	
LOS Hysteresis	LOSH	0.5			dBm	
Conditions of Stress Receiver Sensitivity (Note 7)						
Stressed Eyer Closure for PAM4 (SECQ) Per Lane Under Test				3.4	dB	

Notes:

1. Average launch power, per lane (minimum), is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be complaint; however, a value above this does not ensure compliance.
2. The values for OMAouter(minimum) vary with TDECQ. The Illustration of Transmitter OMAouter and Receiver Sensitivity Mask below illustrates this along with values for OMAouter (maximum).
3. The receiver shall be able to tolerate, without damage, continuous exposure to a modulation optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
4. Average receiver power, per lane(minimum), is informative and not the principle indicator of signal strength. A receiver power below this value cannot be compliant; however, a value above this does not ensure compliance.
5. Receiver sensitivity (OMAouter) is informative and is defined for a transmitter with a value of TECQ up ton 3.4 dB. Receiver sensitivity should meet Equation (1), illustrated in the Illustration of Transmitter OMAouter and Receiver Sensitivity Mask below.

   RS=max. (-4.5, TECQ-5.9)dBm
   Where:
   RS is the receiver sensitivity
   TECQ is the TECQ of transmitter used to measure the receiver sensitivity
6. Measured with conformance test signal at TP3 for the BER=2.4×10^{-4}.
7. The test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

Illustration of Transmitter OMAouter and Receiver Sensitivity Mask

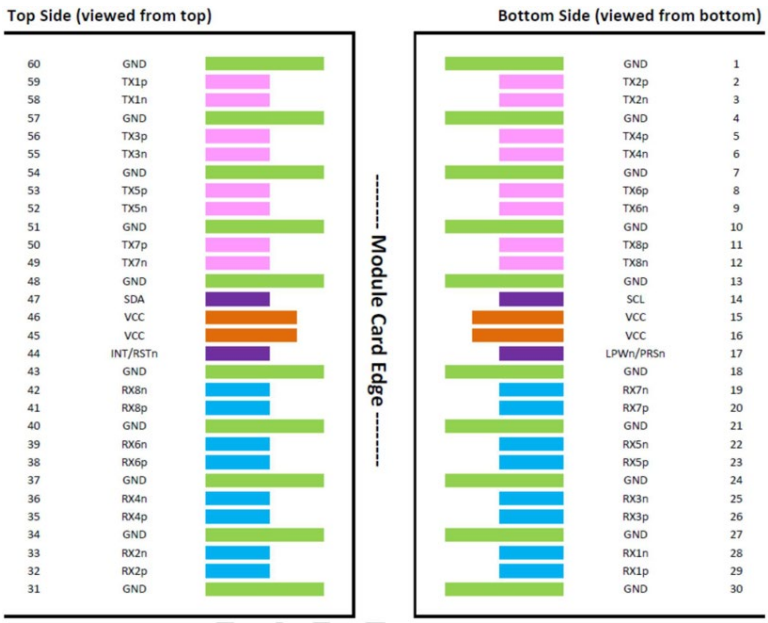


Pin Descriptions

Pin	Logic	Symbol	Name/Description	Direction	Plug Sequence	Notes
1		GND	Module Ground.		1	
2	CML-I	Tx2+	Transmitter Data Non-Inverted.	Input from Host	3	
3	CML-I	Tx2-	Transmitter Data Inverted.	Input from Host	3	
4		GND	Module Ground.		1	
5	CML-I	Tx4+	Transmitter Data Non-Inverted.	Input from Host	3	
6	CML-I	Tx4-	Transmitter Data Inverted.	Input from Host	3	
7		GND	Module Ground.		1	
8	CML-I	Tx6+	Transmitter Data Non-Inverted.	Input from Host	3	
9	CML-I	Tx6-	Transmitter Data Inverted.	Input from Host	3	
10		GND	Module Ground.		1	
11	CML-I	Tx8+	Transmitter Data Non-Inverted.	Input from Host	3	
12	CML-I	Tx8-	Transmitter Data Inverted.	Input from Host	3	
13		GND	Module Ground.		1	
14	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock.	Bi-Directional	3	
15		Vcc	+3.3V Power.	Power from Host	2	
16		Vcc	+3.3V Power.	Power from Host	2	
17	Multi-Level	LPWn/PRSn	Low-Power Mode/Module Present.	Bi-Directional	3	
18		GND	Module Ground.		1	
19	CML-O	Rx7-	Receiver Data Inverted.	Output to Host	3	
20	CML-O	Rx7+	Receiver Data Non-Inverted.	Output to Host	3	
21		GND	Module Ground.		1	
22	CML-O	Rx5-	Receiver Data Inverted.	Output to Host	3	
23	CML-O	Rx5+	Receiver Data Non-Inverted.	Output to Host	3	
24		GND	Module Ground.		1	
25	CML-O	Rx3-	Receiver Data Inverted.	Output to Host	3	
26	CML-O	Rx3+	Receiver Data Non-Inverted.	Output to Host	3	
27		GND	Module Ground.		1	
28	CML-O	Rx1-	Receiver Data Inverted.	Output to Host	3	
29	CML-O	Rx1+	Receiver Data Non-Inverted.	Output to Host	3	
30		GND	Module Ground.		1	
31		GND	Module Ground.		1	
32	CML-O	Rx2+	Receiver Data Non-Inverted.	Output to Host	3	
33	CML-O	Rx2-	Receiver Data Inverted.	Output to Host	3	
34		GND	Module Ground.		1	
35	CML-O	Rx4+	Receiver Data Non-Inverted.	Output to Host	3	
36	CML-O	Rx4-	Receiver Data Inverted.	Output to Host	3	
37		GND	Module Ground.		1	
38	CML-O	Rx6+	Receiver Data Non-Inverted.	Output to Host	3	
39	CML-O	Rx6-	Receiver Data Inverted.	Output to Host	3	

40		GND	Module Ground.		1	
41	CML-O	Rx8+	Receiver Data Non-Inverted.	Output to Host	3	
42	CML-O	Rx8-	Receiver Data Inverted.	Output to Host	3	
43		GND	Module Ground.		1	
44	Multi-Level	INT/RSTn	Module Interrupt/Module Reset.	Bi-Directional	3	
45		Vcc	+3.3V Power.	Power from Host	2	
46		Vcc	+3.3V Power.	Power from Host	2	
47	LVCMOS-I/O	SDA	2-Wire Serial Interface Data.	Bi-Directional	3	
48		GND	Module Ground.		1	
49	CML-I	Tx7-	Transmitter Data Inverted.	Input from Host	3	
50	CML-I	Tx7+	Transmitter Data Non-Inverted.	Input from Host	3	
51		GND	Module Ground.		1	
52	CML-I	Tx5-	Transmitter Data Inverted.	Input from Host	3	
53	CML-I	Tx5+	Transmitter Data Non-Inverted.	Input from Host	3	
54		GND	Module Ground.		1	
55	CML-I	Tx3-	Transmitter Data Inverted.	Input from Host	3	
56	CML-I	Tx3+	Transmitter Data Non-Inverted.	Input from Host	3	
57		GND	Module Ground.		1	
58	CML-I	Tx1-	Transmitter Data Inverted.	Input from Host	3	
59	CML-I	Tx1+	Transmitter Data Non-Inverted.	Input from Host	3	
60		GND	Module Ground.		1	

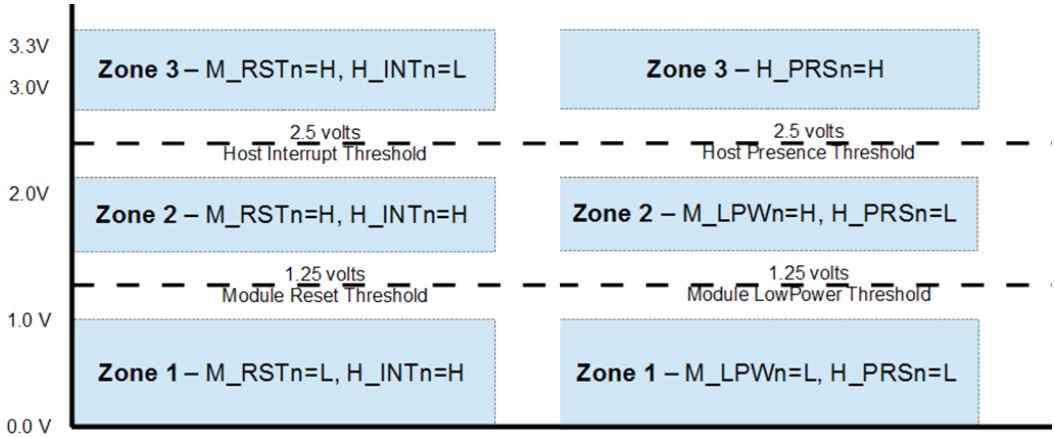
Electrical Pad Layout



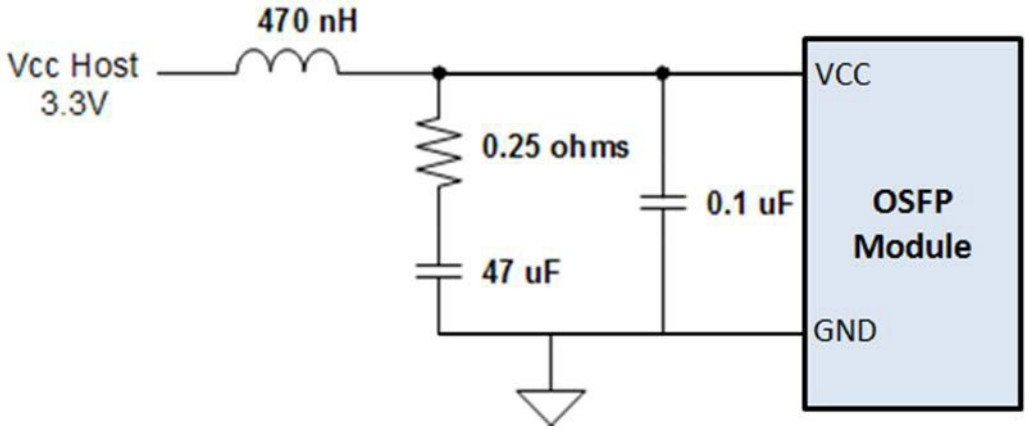
OSFP Control Pins

Name	Direction	Description
SCL	BiDir	2-wire serial clock signal. Requires pull-up resistor to +3.3V on host.
SDA	BiDir	2-wire serial data signal. Requires pull-up resistor to +3.3V on host.
LPWn/PRSn	Input/Output	Dual Function Signal • Low-Power Mode is an active-low input signal. • Module Present is controlled by a pull-down resistor on the module which gets converted to an active-low output logic signal. • Voltage zones is shown in the figure below.
INT/RSTn	Input/Output	Dual Funtion Signal • Reset is an active-low input signal. • Interrupt is an active-high output signal voltage zones is shown in the figure below.

Voltage Zones



Recommended Power Supply Filter

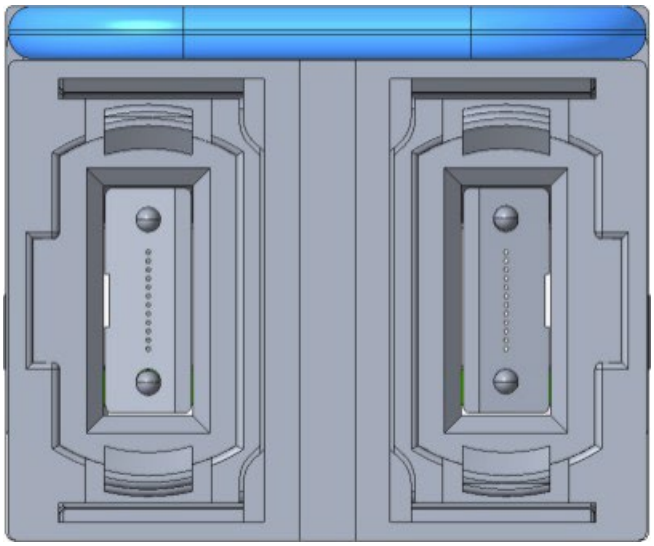


Optical Port Descriptions

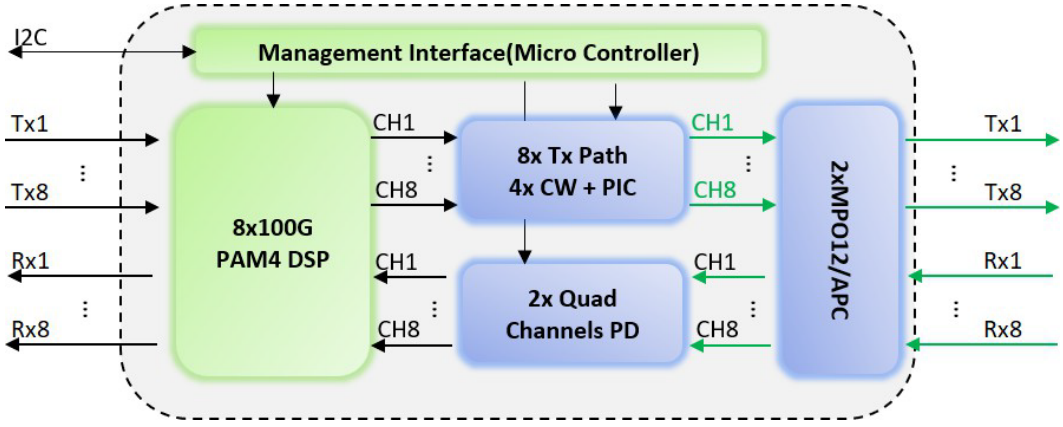
The optical interface port is dual MPO-12 APC receptacle. The transmit and receive optical lanes shall occupy the positions depicted in the figure below when looking into the MDI receptacle with the connector keyway feature on top.

Aligned keys are used to ensure alignment between the modules and the patch cords. The optical connector is orientated such that the keying feature of the MPO receptacle is on the top. **Note:** 2 alignment pins are present in each receptacle.

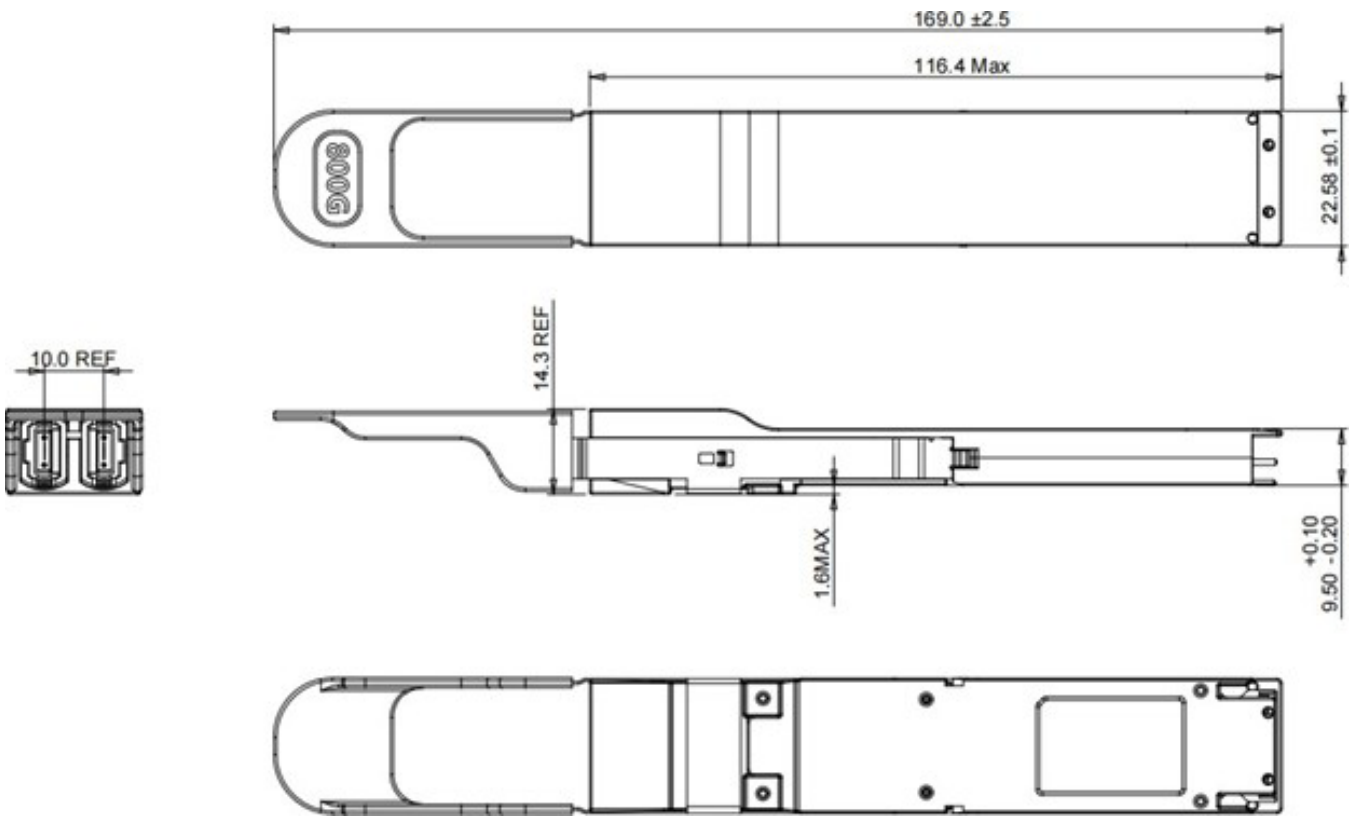
Optical Media-Dependent Interface Port Assignments



Transceiver Block Diagram



Mechanical Specifications



About ProLabs

Our extensive experience comes as standard. For over 20 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with more than 100 optical switching and transport platforms.

A Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 1.6T while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

The Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.

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