Product Description

The **ELOM160T-OSFP-DR8-xS** is a 8x200Gbps optical transceivers in an OSFP housing. It is designed to support the next generation 1.6Tbps application used inside the Datacenter. The module's transmitter is configured with SiPho optics and the receiver uses PIN PDs. It is compliant with the OSFP MSA specifications.

The module complies with the Common Management Interface Specification for 8/16x Pluggable Transceivers,R5.3.



Applications

- High performance computing interconnect
- Data Centers

Features

- OSFP Package
- 3.3V power supply
- Dual MPO-12 or Single MPO16 optical receptacle connector (APC-MPO)
- Hot pluggable
- 2x30 OSFP Electrical Interface
- Refer to OSFP Octal Small From Fac- tor Pluggable Module R5.22
- SMF Fiber

Optical Transmitter

- 1304.5~1317.5nm High power DFB lasers
- SiPho based optic engine

Optical Receiver

- 1304.5~1317.5nm PIN PD Receiver

Control and Monitor Interface

- Low Power Mode
- Module Present
- Module Interrupt
- Module Reset

I2C /I3CSerial Data

- SCL Serial Clock Input
- SDA Serial Data I/O
- Support I3C

Ordering Information			
Part Number	Mechanical Specification	Optical PMD	Distance
ELOM160T-OSFP-DR8-0S	Closed Top	Dual MPO12	500m
ELOM160T-OSFP-DR8-2S	RHS	Dual MPO12	
ELOM160T-OSFP-DR8-4S	Closed Top	MPO-16	
ELOM160T-OSFP-DR8-6S	RHS	MPO-16	
ELOM160T-OSFP-DR8-1S	Closed Top	Dual MPO12	2km
ELOM160T-OSFP-DR8-3S	RHS	Dual MPO12	
ELOM160T-OSFP-DR8-5S	Closed Top	MPO-16	
ELOM160T-OSFP-DR8-7S	RHS	MPO-16	

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Ambient Temperature	T_{stg}	-40	+85	ºC	Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device. RH is Non-condensing condition.
Relative Humidity - Storage	RH_S	0	95	%	
Relative Humidity - Operating	RH_O	0	85	%	
Module Supply Voltage	V_{CC}	-0.5	3.6	V	

Recommended Operating Conditions						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Case Operating Temperature	T_{case}	0	25	70	ºC	Temperature Range = C
Module Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Power Consumption	Pcon	-	24	26	W	OSFP-DR8-0S/2S/4S/6S
Power Consumption	Pcon	-	26	28	W	OSFP-DR8-1S/3S/5S/7S

Transmitter Electrical Interfaces (HOST RX)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Tx_Data Differential Input Voltage	V_{IN}	-	-	880	mV	
Tx_Data Differential Input Impedance	Z_{IN}	-	93	-	Ω	
PAM4 Signaling rate per lane	S	-	106.25	-	GBaud	range：±50ppm

Receiver Electrical Interfaces (HOST TX)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Rx_Data Differential Output Voltage	V_{OUT}	-	-	900	mV	
Rx_Data Differential Output Impedance	Z_{OUT}	-	93	-	Ω	±8%
Signaling rate per lane	S	-	106.25	-	GBaud	range：±50ppm

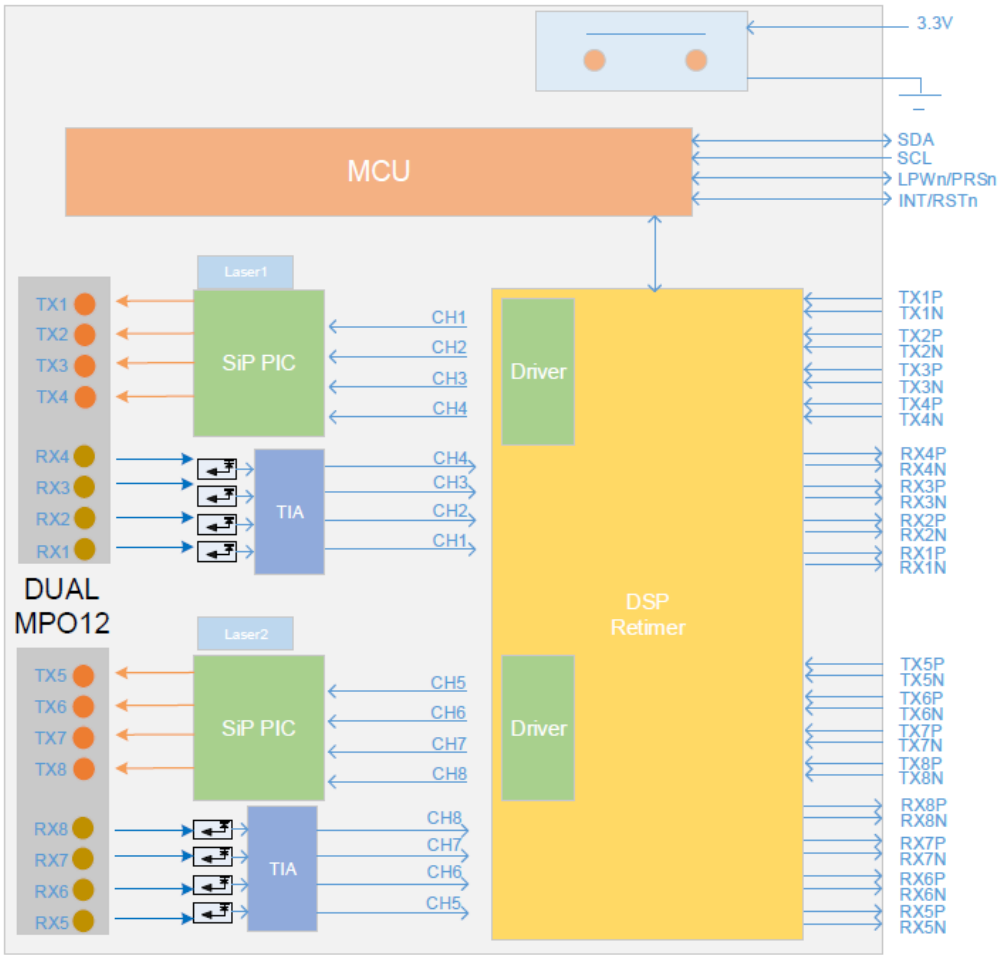
Transmitter Optical Characteristics						
Parameter	Symbol	OSFP-DR8-0S/2S/4S/6S			Units	Notes
		Min	Typ	Max		
PAM4 Signal Rate	Sr	106.25±50ppm			GBd	
Laser Type		DFB+SiPho PIC				
Lane Wavelength	λ	1304.5	-	1317.5	nm	
Side-mode Suppression Ration	SMSR	30dB				
Average Launch Power, each lane	P_{OUT}	-3.1	-	4.0	dBm	
Outer Optical Modulation Amplitude	OMA_{outer}	-0.1	-	4.2	dBm	For TDECQ＜0.9dB
		-1+Max (TECQ,TDECQ)		4.2	dBm	For 0.9dB≤TDECQ≤3.4dB
Transmitter and Dispersion Penalty Eye Closure for PAM4	TDECQ	-	-	3.4	dB	Note 1
Optical Output with Tx OFF, each lane	P_{OFF}	-	-	-15	dBm	
Extinction Ratio	ER	3.5	-	-	dB	Note 1
Transmit Reflectance	RFL	-	-	-26	dB	
Note 1: Test with SSPRQ pattern, the reference equalizer is 15-tap FFE						

Receiver Optical Characteristics						
Parameter	Symbol	OSFP-DR8-0S/2S/4S/6S			Units	Notes
		Min	Typ	Max		
PAM4 Signal Rate	Sr	106.25±50ppm			GBd	
Lane Wavelength	λ	1304.5	-	1317.5	nm	
Receiver Sensitivity (OMA_{outer}) , each lane	SEN	-3.4	-	4.2	dBm	For TECQ＜0.9dB
		-4.3+TECQ	-	4.2	dBm	For 0.9dB≤TECQ≤3.4dB
Average receive power	P_{IN}	-6.3	-	4	dBm	Each Lane (Note1)
Damage threshold		5	-	-	dBm	Each Lane
Receive Reflectance	RFL	-	-	-26	dB	
Note 1: PAM4 Signaling rate (each lane) 106.25GBaud, and PRBS 2^{31}-1,BER < $6.4x10^{-5}$						

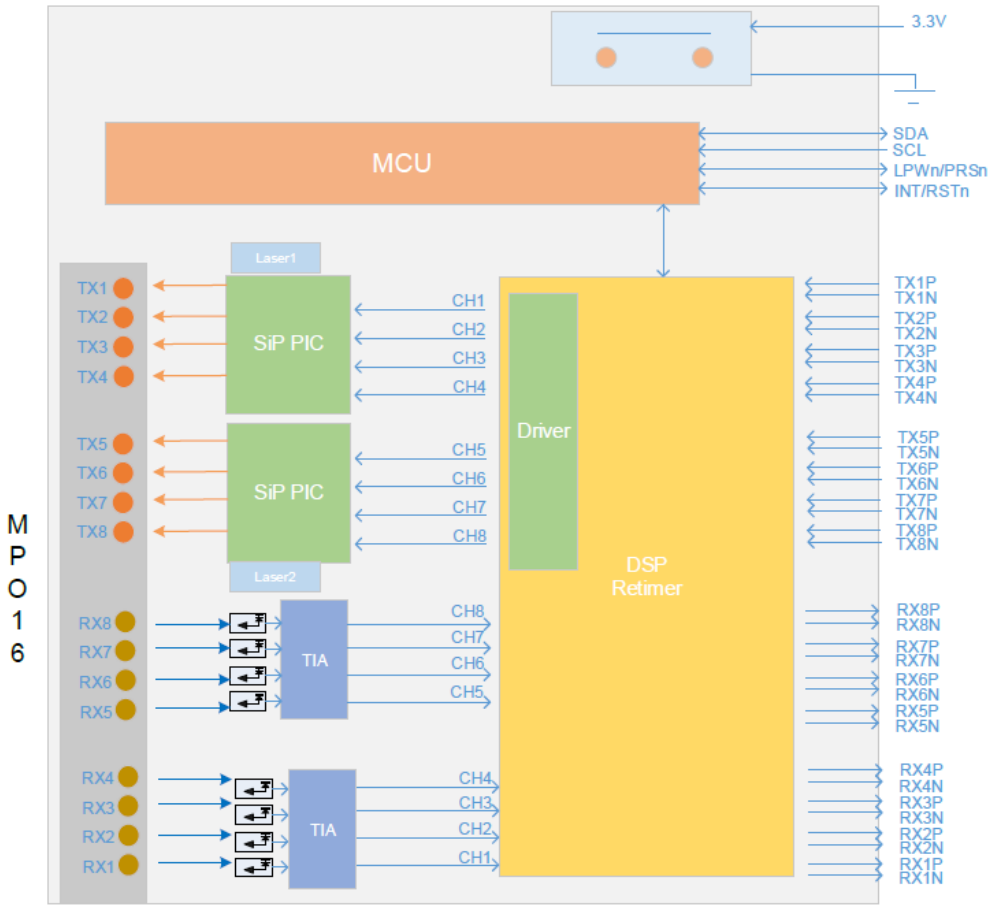
Transmitter Optical Characteristics						
Parameter	Symbol	OSFP-DR8-1S/3S/5S/7S			Units	Notes
		Min	Typ	Max		
PAM4 Signal Rate	Sr	113.4375±50ppm			GBd	
Laser Type		DFB+SiPho PIC				
Lane Wavelength	λ	1304.5	-	1317.5	nm	
Side-mode Suppression Ration	SMSR	30				
Average Launch Power, each lane	P_{OUT}	-3.1	-	4.0	dBm	
Outer Optical Modulation Amplitude	OMA_{outer}	-0.1	-	4.2	dBm	For TDECQ＜0.9dB
		-1+Max (TECQ,TDECQ)		4.2	dBm	For 0.9dB≤TDECQ≤3.4dB
Transmitter and Dispersion Penalty Eye Closure for PAM4	TDECQ	-	-	3.4	dB	Note 1
Optical Output with Tx OFF, each lane	P_{OFF}	-	-	-15	dBm	
Extinction Ratio	ER	3.5	-	-	dB	Note 1
Transmit Reflectance	RFL	-	-	-26	dB	
Note 1: Test with SSPRQ pattern, the reference equalizer is 15-tap FFE						

Receiver Optical Characteristics						
Parameter	Symbol	OSFP-DR8-1S/3S/5S/7S			Units	Notes
		Min	Typ	Max		
PAM4 Signal Rate	Sr	113.4375±50ppm			GBd	
Lane Wavelength	λ	1304.5	-	1317.5	nm	
Receiver Sensitivity (OMA_{outer}) , each lane	SEN	-4.4	-	4.2	dBm	For TECQ＜0.9dB
		-5.3+TECQ	-	4.2	dBm	For 0.9dB≤TECQ≤3.4dB
Average receive power	P_{IN}	-7.1	-	4	dBm	Each Lane (Note1)
Damage threshold		5	-	-	dBm	Each Lane
Receive Reflectance	RFL	-	-	-26	dB	
Note 1: PAM4 Signaling rate (each lane) 113.4375GBaud, and PRBS 2^{31}-1,BER<$6.4x10^{-5}$						

ELOM160T-OSFP-DR8-0S / 2S Block Diagram



ELOM160T-OSFP-DR8-4S / 6S Block Diagram



2-Wire Serial Memory Map

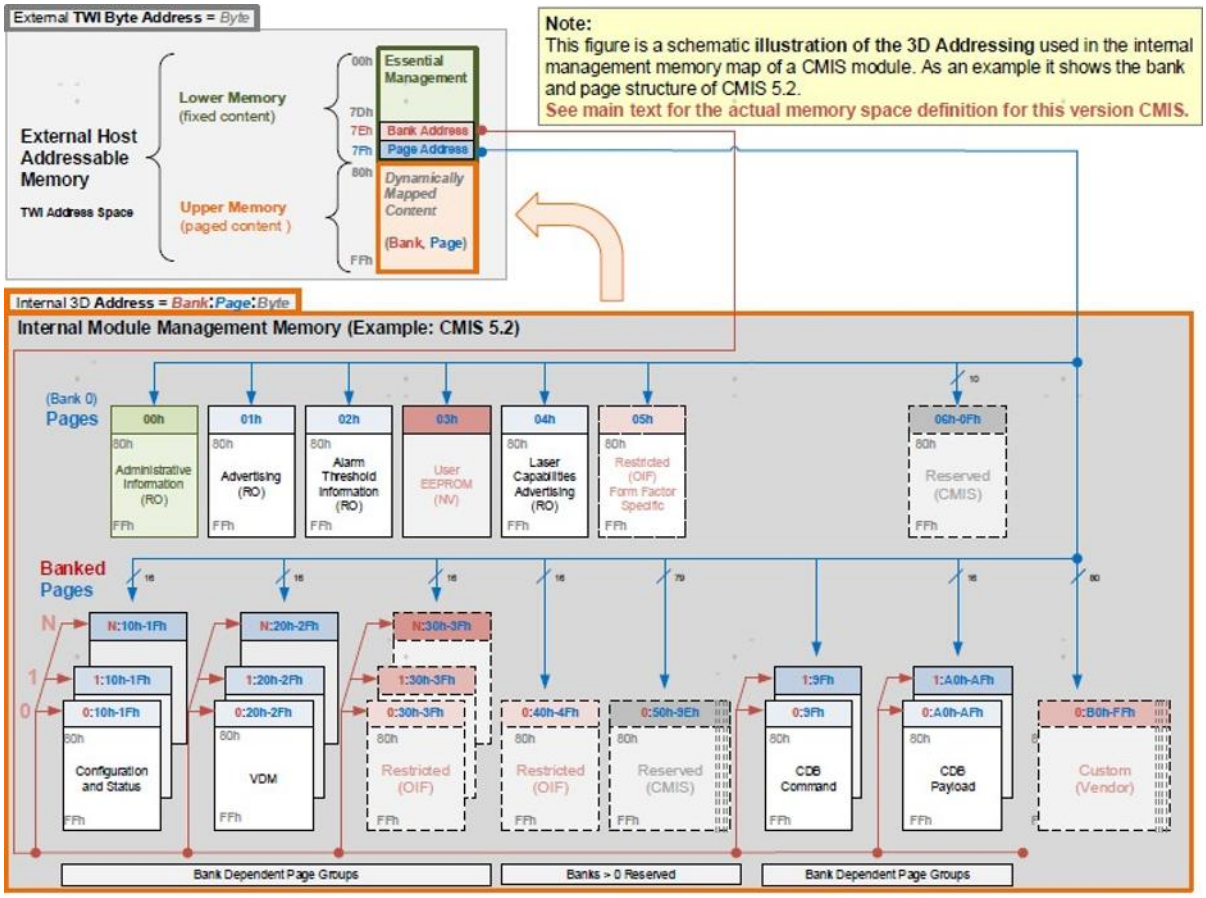


Figure 8-1 CMIS Module Memory Map (Conceptual View)

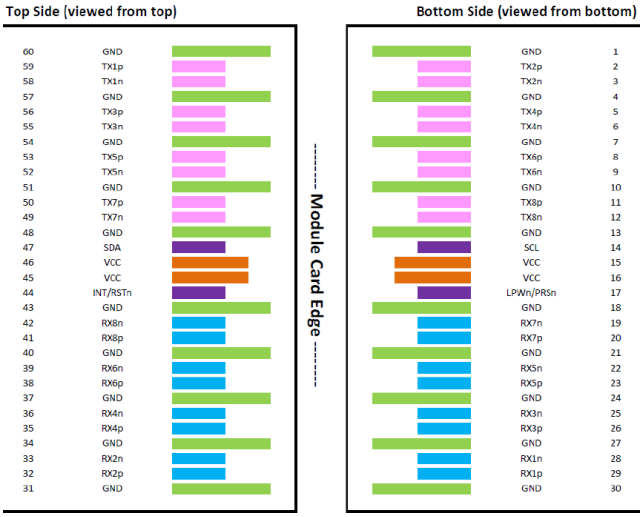
ELOM160T-OSFP-DR8-0S / 2S /4S / 6S

App Code	ID (HEX)	Description	App Code	ID (HEX)	Description
1	82	800GAUI-4 (Annex176E)	2	83	1.6TGAUI-8 (Annex176E)
	77	800GBASE-DR4 (Clause 180)		7F	1.6TBASE-DR8 (Clause 180)
3	81	400GAUI-2 (Annex176E)	4	80	200GAUI-1 (Annex176E)
	75	400GBASE-DR2 (Clause 180)		73	200GBASE-DR1 (Clause 180)

ELOM160T-OSFP-DR8-1S / 3S /5S / 7S

App Code	ID (HEX)	Description	App Code	ID (HEX)	Description
1	82	800GAUI-4 (Annex176E)	2	83	1.6TGAUI-8 (Annex176E)
	78	800GBASE-DR4-2 (Clause 181)		80	1.6TBASE-DR8-2 (Clause 181)
3	81	400GAUI-2 (Annex176E)	4	80	200GAUI-1 (Annex176E)
	76	400GBASE-DR2-2 (Clause 181)		74	200GBASE-DR1-2 (Clause 181)

Pin Assignment

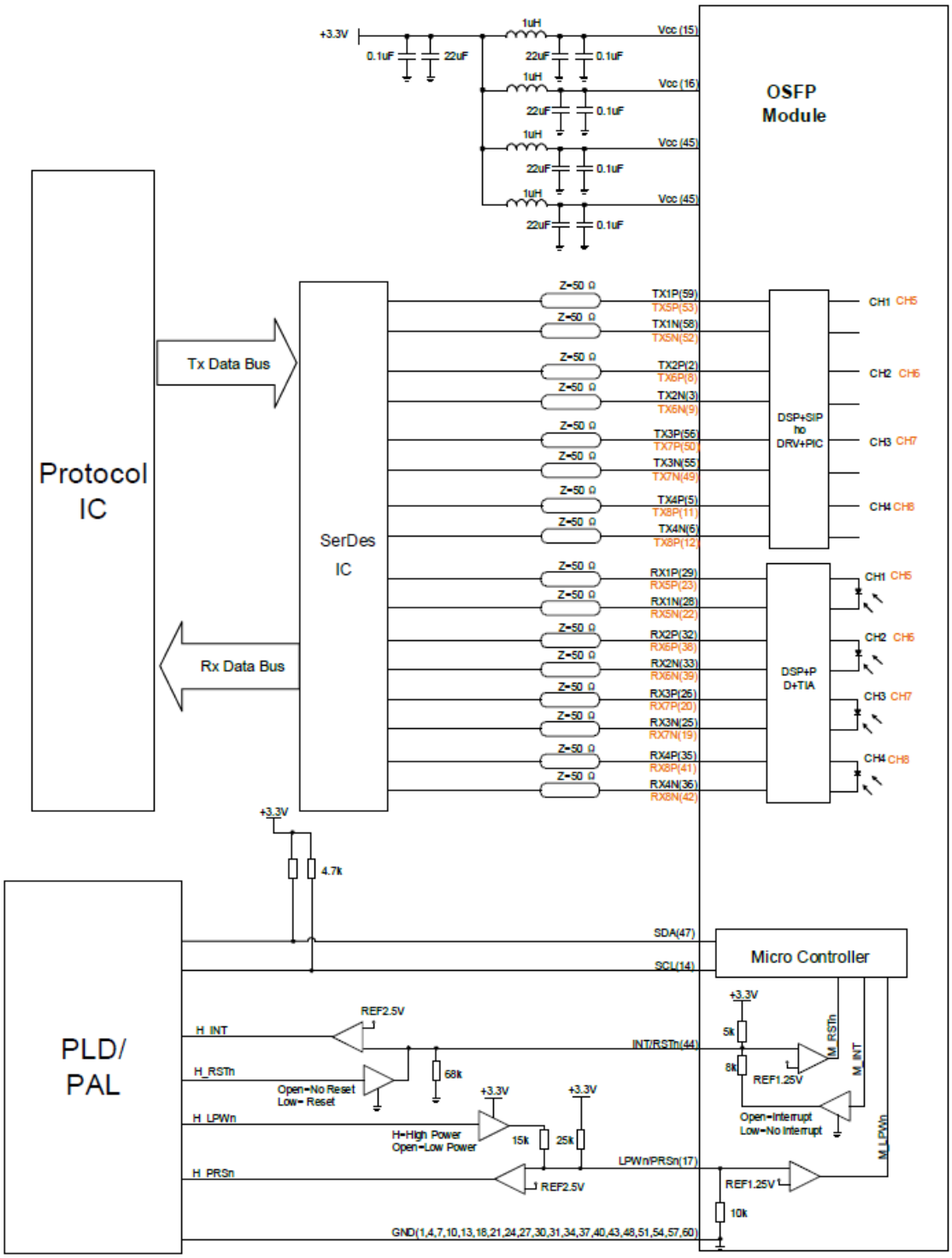


PIN	Symbol	Description	Logic	Direction	Plug Sequence	Notes
1	GND	Module Ground			1	
2	TX2P	CH2 Transmitter Date Non-Inverted	CML-I	Input from Host	3	
3	TX2N	CH2 Transmitter Date Inverted	CML-I	Input from Host	3	
4	GND	Module Ground			1	
5	TX4P	CH4 Transmitter Date Non-Inverted	CML-I	Input from Host	3	
6	TX4N	CH4 Transmitter Date Inverted	CML-I	Input from Host	3	
7	GND	Module Ground			1	
8	TX6P	CH6 Transmitter Date Non-Inverted	CML-I	Input from Host	3	
9	TX6N	CH6 Transmitter Date Inverted	CML-I	Input from Host	3	
10	GND	Module Ground			1	
11	TX8P	CH8 Transmitter Date Non-Inverted	CML-I	Input from Host	3	
12	TX8N	CH8 Transmitter Date Inverted	CML-I	Input from Host	3	
13	GND	Module Ground			1	
14	SCL	2-wire Serial Interface clock	LVCMOS-I/O	Bi-Directional	3	A
15	VCC	+3.3V Power Supply		Power from Host	2	
16	VCC	+3.3V Power Supply		Power from Host	2	
17	LPWn/PRSn	Low-Power Mode/Module Present	Multi-Level	Bi-Directional	3	B
18	GND	Module Ground			1	
19	RX7N	CH7 Receiver Date Inverted	CML-O	Output to Host	3	

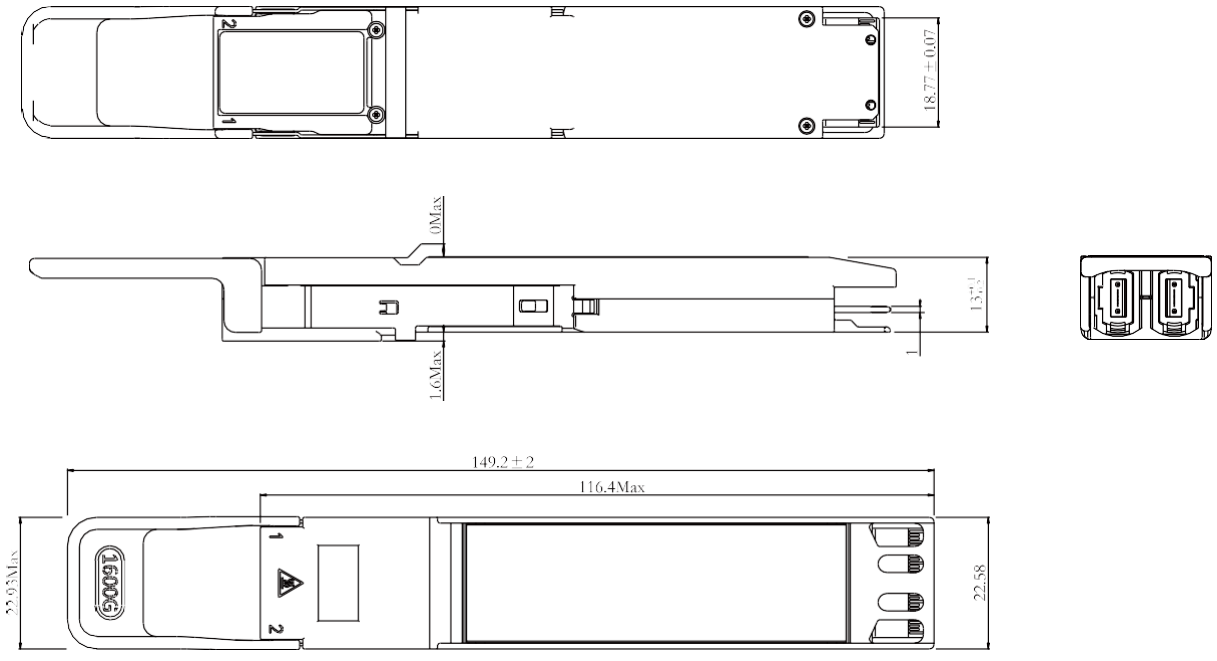
PIN	Symbol	Description	Logic	Direction	Plug Sequence	Notes
20	RX7P	CH7 Receiver Date No-Inverted	CML-O	Output to Host	3	
21	GND	Module Ground			1	
22	RX5N	CH5 Receiver Date Inverted	CML-O	Output to Host	3	
23	RX5P	CH5 Receiver Date No-Inverted	CML-O	Output to Host	3	
24	GND	Module Ground			1	
25	RX3N	CH3 Receiver Date Inverted	CML-O	Output to Host	3	
26	RX3P	CH3 Receiver Date No-Inverted	CML-O	Output to Host	3	
27	GND	Module Ground			1	
28	RX1N	CH1 Receiver Date Inverted	CML-O	Output to Host	3	
29	RX1P	CH1 Receiver Date No-Inverted	CML-O	Output to Host	3	
30	GND	Module Ground			1	
31	GND	Module Ground			1	
32	RX2P	CH2 Receiver Date Non-Inverted	CML-O	Output to Host	3	
33	RX2N	CH2 Receiver Date Inverted	CML-O	Output to Host	3	
34	GND	Module Ground			1	
35	RX4P	CH4 Receiver Date Non-Inverted	CML-O	Output to Host	3	
36	RX4N	CH4 Receiver Date Inverted	CML-O	Output to Host	3	
37	GND	Module Ground			1	
38	RX6P	CH6 Receiver Date Non-Inverted	CML-O	Output to Host	3	
39	RX6N	CH6 Receiver Date Inverted	CML-O	Output to Host	3	
40	GND	Module Ground			1	
41	RX8P	CH8 Receiver Date Non-Inverted	CML-O	Output to Host	3	
42	RX8N	CH8 Receiver Date Inverted	CML-O	Output to Host	3	
43	GND	Module Ground			1	
44	INT/RSTn	Module Interrupt/Module Reset	Multi-Level	Bi-Directional	3	C
45	VCC	+3.3V Power Supply		Power from Host	2	
46	VCC	+3.3V Power Supply		Power from Host	2	
47	SDA	2-wire Serial Interface data	LVCMOS-I/O	Bi-Directional	3	A
48	GND	Module Ground			1	
49	TX7N	CH7 Transmitter Date Inverted	CML-I	Input from Host	3	
50	TX7P	CH7 Transmitter Date Non-Inverted	CML-I	Input from Host	3	

PIN	Symbol	Description	Logic	Direction	Plug Sequence	Notes
51	GND	Module Ground			1	
52	TX5N	CH5 Transmitter Date Inverted	CML-I	Input from Host	3	
53	TX5P	CH5 Transmitter Date Non-Inverted	CML-I	Input from Host	3	
54	GND	Module Ground			1	
55	TX3N	CH3 Transmitter Date Inverted	CML-I	Input from Host	3	
56	TX3P	CH3 Transmitter Date Non-Inverted	CML-I	Input from Host	3	
57	GND	Module Ground			1	
58	TX1N	CH1 Transmitter Date Inverted	CML-I	Input from Host	3	
59	TX1P	CH1 Transmitter Date Non-Inverted	CML-I	Input from Host	3	
60	GND	Module Ground			1	
Note A	Open-Drain with Pull-up resistor on Host					
Note B	LPWn/PRSn is a dual function signal that allows the host to signal Low Power mode and the module to indicate Module Present.					
Note C	INT/RSTn is a dual function signal that allows the module to raise an interrupt to the host and also allows the host to reset the module.					

Host Board and Module Board Diagram



Mechanical Dimensions (ELOM160T-OSFP-DR8-0S /1S)



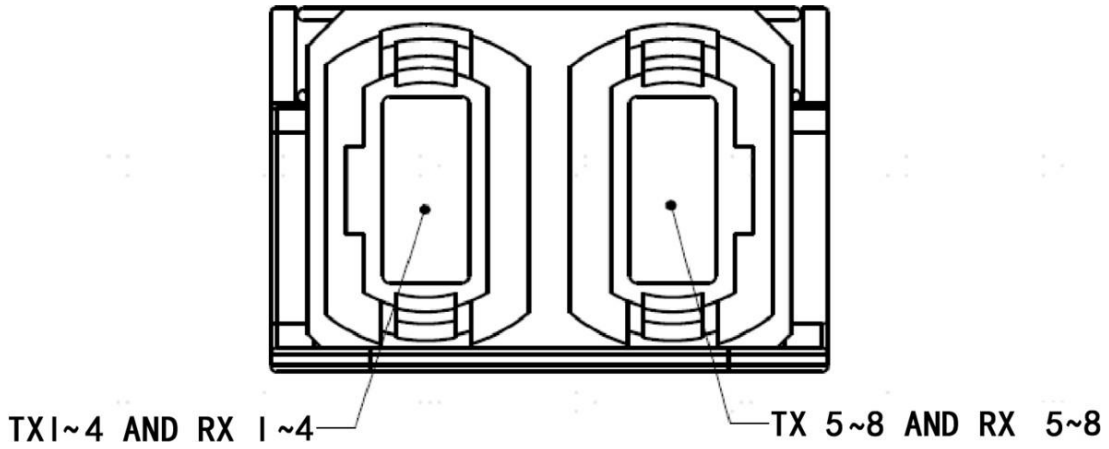
NOTES:

1.TOLERANCE: ± 0.1MM

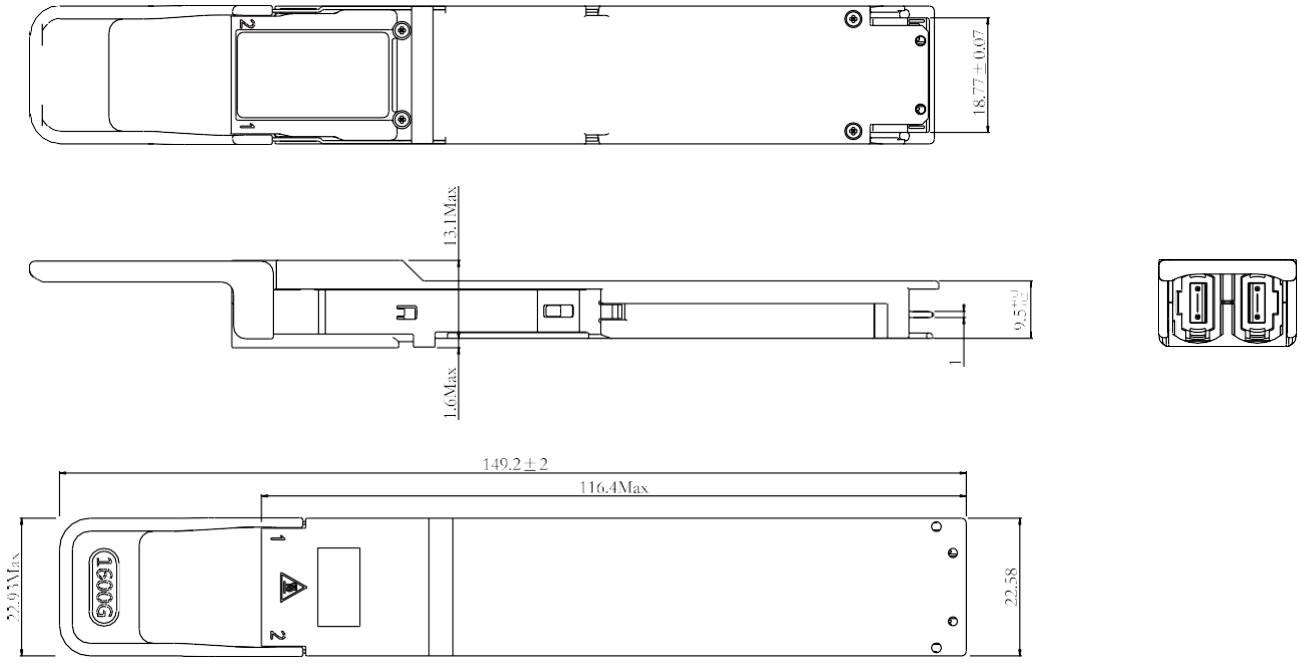
2.OTHERS ACCORDING WITH OSFP MSA OR CUSTOMER SPEC.

3.OPTICAL PORT ACCORDING WITH FIBER CONNECTOR SPEC.

Optical Lane Assignment



Mechanical Dimensions (ELOM160T-OSFP-DR8-2S /3S)



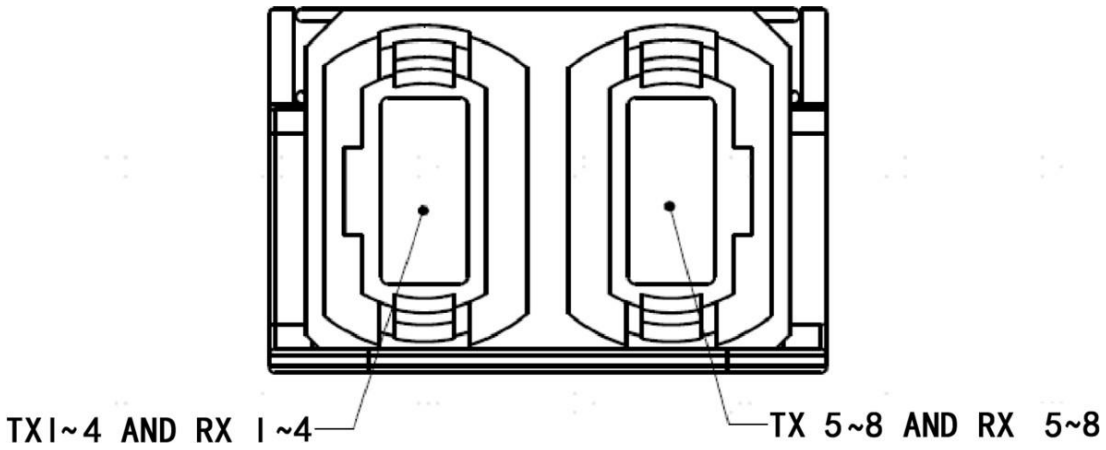
NOTES:

1.TOLERANCE: ± 0.1MM

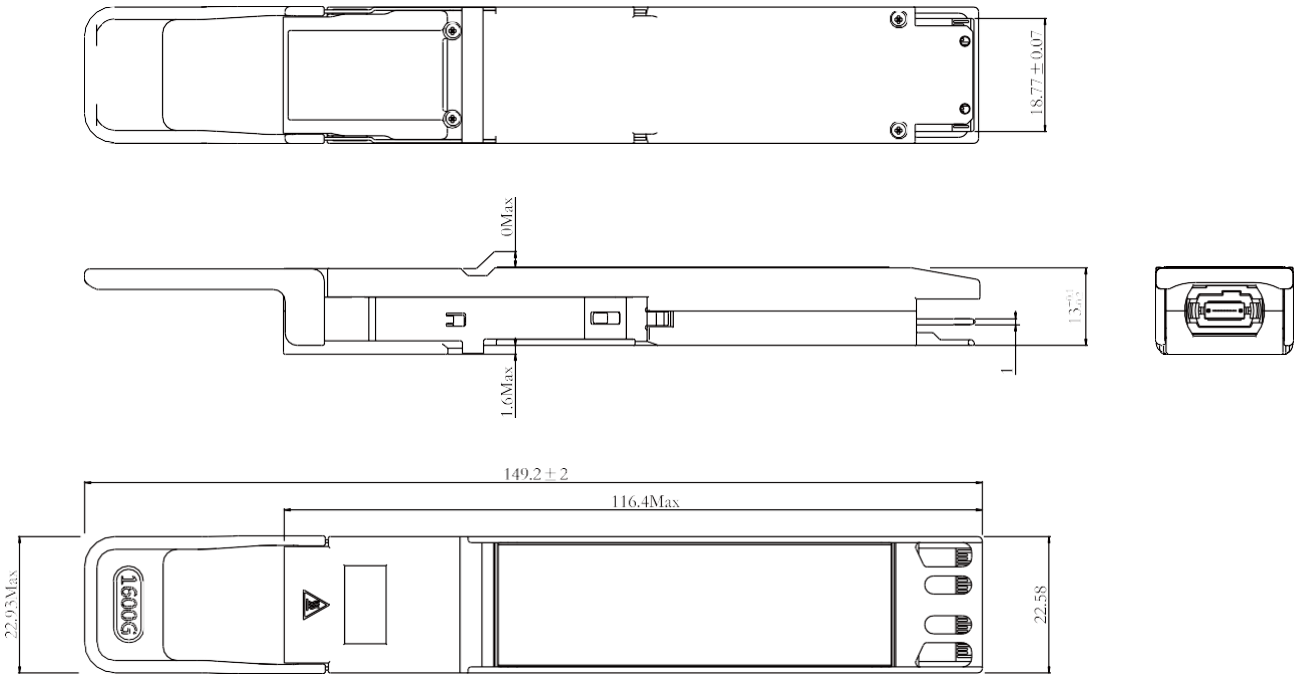
2.OTHERS ACCORDING WITH OSFP MSA OR CUSTOMER SPEC.

3.OPTICAL PORT ACCORDING WITH FIBER CONNECTOR SPEC.

Optical Lane Assignment



Mechanical Dimensions (ELOM160T-OSFP-DR8-4S /5S)



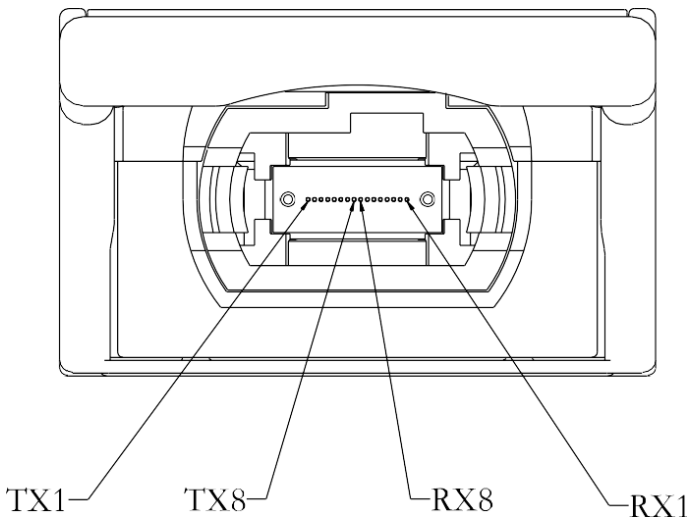
NOTES:

1.TOLERANCE: ± 0.1MM

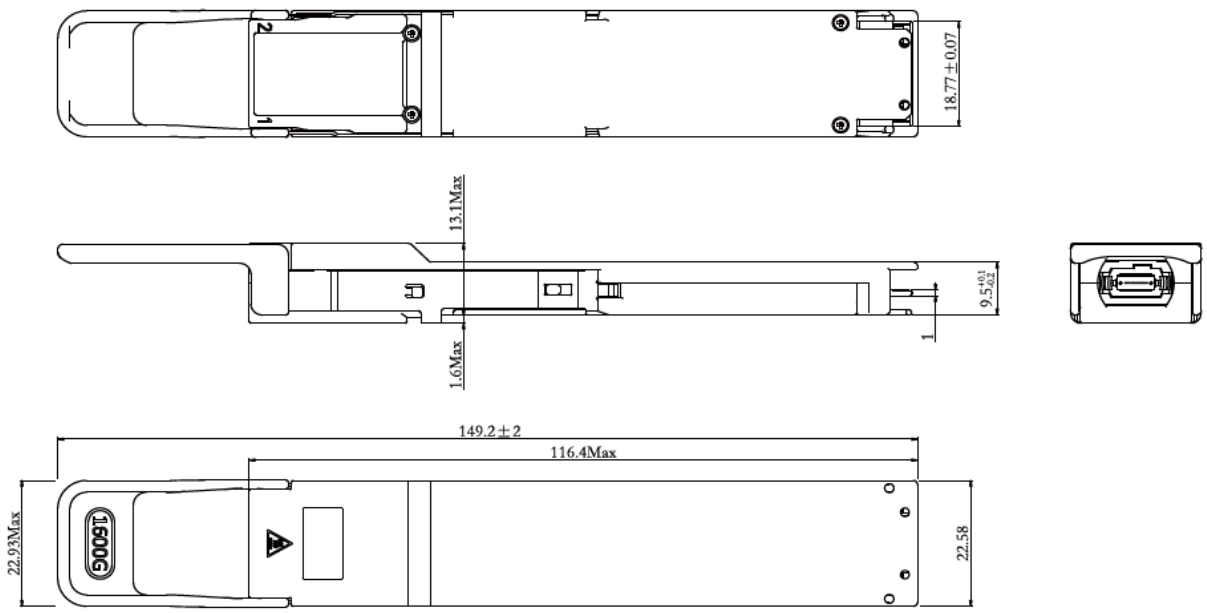
2.OTHERS ACCORDING WITH OSFP MSA OR CUSTOMER SPEC.

3.OPTICAL PORT ACCORDING WITH FIBER CONNECTOR SPEC.

Optical Lane Assignment



Mechanical Dimensions (ELOM160T-OSFP-DR8-6S /7S)



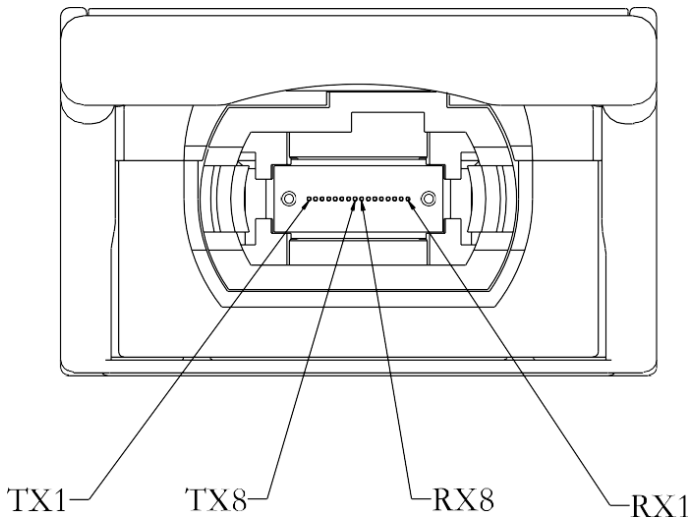
NOTES:

1.TOLERANCE: ± 0.1MM

2.OTHERS ACCORDING WITH OSFP MSA OR CUSTOMER SPEC.

3.OPTICAL PORT ACCORDING WITH FIBER CONNECTOR SPEC.

Optical Lane Assignment



Warnings

Handling Precautions:

This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety:

Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Notice:

The information provided on this page contains the product target specifications which are subject to change without notice. Check with ELLAX teamember for product updates, changes in specifications, sample availability and production release dates.

EYE SAFETY

Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed.3., as described in Laser Notice No. 56, dated May 8, 2019.

Complies with IEC 60825-1:2014, EN 60825-1:2014+A11:2021 and IEC 60825-2: 2021, EN 60825-2:2004+A1:2007+A2:2010.

Class 1 laser safety compliant.

INVISIBLE LASER RADIATION.

CAUTION:

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