DRIVENETS

DATASHEET

OPTICAL TRANSCEIVER · OSFP112 IHS OPEN TOP

DriveNets 800G 2×FR4

OSFP112 transceiver with dual duplex LC interfaces and an open-top integrated heat sink, delivering 8 × 106.25 Gbps PAM4 over four CWDM wavelengths per link, 2 km over single-mode fiber.

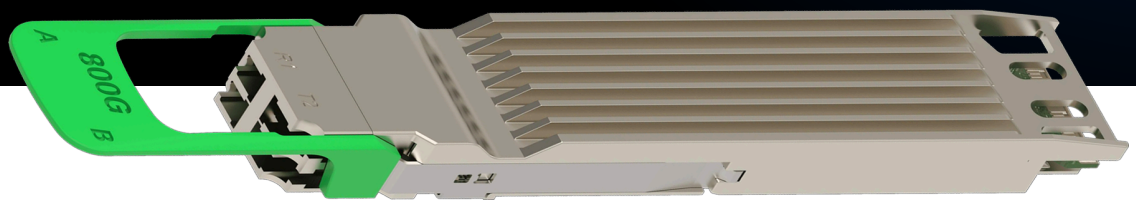
800 Gbps

AGGREGATE LINE RATE

8 × 106.25G PAM4

Dual duplex LC · 2 km

16 W maximum



OVERVIEW

The DriveNets 800G OSFP112 2×FR4 is a small-form-factor, hot-pluggable optical transceiver that transmits and receives serial optical data at up to 106.25 Gbps per channel using PAM4 modulation over single-mode fiber. Eight 53.125 GBd electrical lanes drive eight optical lanes on four CWDM wavelengths (1271, 1291, 1311 and 1331 nm) on each of two duplex LC interfaces, giving 800 Gbps of aggregate capacity at reaches up to 2 km with a 7.8 dB power budget. The module integrates a high-performance silicon-photonics modulator, a PAM4 DSP and an open-top integrated heat sink (IHS) in an OSFP112 form factor, and is compliant with 800G Ethernet specifications - IEEE Std 802.3cu and IEEE Std 802.3ck-2022 - the OSFP MSA rev 5.0 and OIF-CMIS 5.2 management. Maximum power consumption is 16 W across a 0 °C to +70 °C case-temperature range, suiting 800G / 2×400G Ethernet, switch and router connections, datacenter and AI cluster fabrics, and other 800G interconnect.

Optical interface

Dual duplex LC · 8 lanes at 106.25 Gbps PAM4

CWDM 1271 / 1291 / 1311 / 1331 nm · 2 km over SMF

Class 1 laser product per IEC 60825-1

Electrical & management

60-contact edge connector · 8 × 53.125 GBd host lanes

2-wire serial (SCL / SDA) · OIF-CMIS 5.2 memory map

IEEE 802.3ck-2022 host electrical compliance

Power & environmental

16 W maximum power consumption

0 °C to +70 °C case · integrated heat sink, open top

RoHS II 2011/65/EU · digital diagnostics monitoring

HARDWARE SPECIFICATION

Key specifications

Ordering & package

Part number	**DNOT00019**
Form factor	**OSFP112 IHS, open top**
Optical interface	**Dual duplex LC**
Data rate	**800G (8 × 106.25 Gbps PAM4)**
Reach	**2 km single-mode fiber**

Electrical

Supply voltage (VCC)	**3.135 – 3.465 V**
Baud rate per lane	**53.125 GBd ±100 ppm**
Power consumption	**16 W max**
Input voltage tolerance	**750 mVpp**
Output voltage, short mode	**600 mVpp max**
Effective return loss	**8.5 dB min (TP1 / TP4)**

Optical - transmitter

Modulation format	**PAM4, 4 × CWDM per link**
Lane wavelengths	**1271 / 1291 / 1311 / 1331 nm**
Output power (PAVG)	**-3.2 to 4.4 dBm**
OMAouter, TDECQ < 1.4 dB	**-0.2 to 3.7 dBm**
TDECQ / TECQ, max	**3.4 dB**
Side-mode suppression	**30 dB min**
Extinction ratio	**3.5 dB min**

Environmental

Operating case temp	**0 °C – +70 °C**
Storage temperature	**-40 °C – +85 °C**
Relative humidity	**5% – 85%**
VCC absolute maximum	**-0.3 V – +3.6 V**
Cooling	**Integrated heat sink, open top**

Optical - receiver

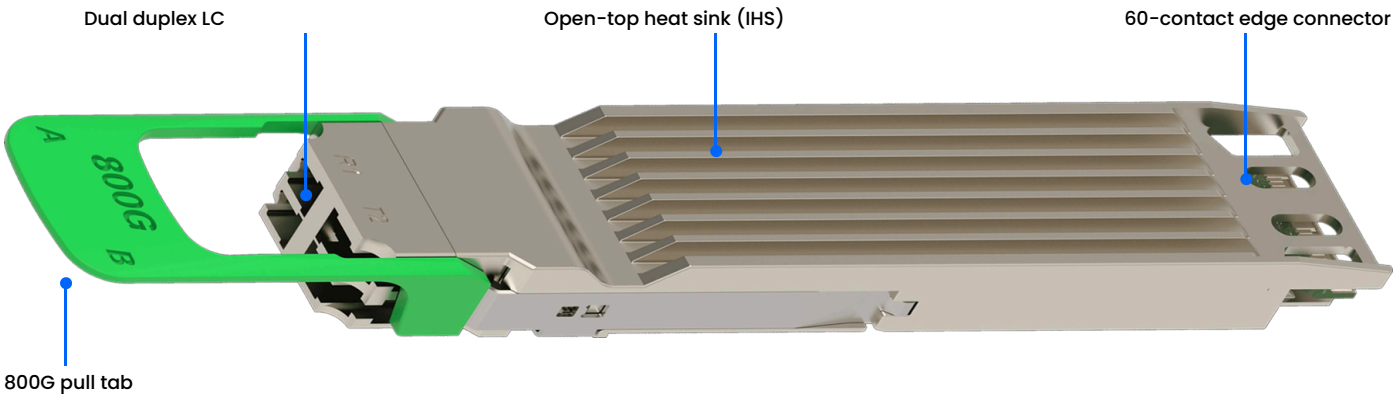
Average receive power	**-7.2 to 4.4 dBm**
Sensitivity (OMAouter)	**-4.6 dBm @ 2.4E-4**
Stressed sensitivity	**-2.6 dBm**
Damage threshold	**5.4 dBm per lane**
Link power budget	**7.8 dB (3.8 dB penalties)**

Management & DDM

Host interface	**60-contact edge connector**
Memory map	**OIF-CMIS 5.2**
Temperature / voltage	**±3 °C / ±0.1 V**
Tx bias current, per lane	**±10%**
Tx / Rx power, per lane	**±3 dB**

INTERFACE OVERVIEW

Module layout



REGULATORY COMPLIANCE

Certifications

EMC

FCC 47 CFR Part 15, Class B

EN 55032:2015+A11:2020+A1:2020

EN 55035:2017+A11:2020

IEC 61000-4-3:2020

IEC EN 61000-4-2:2008

Product safety

CB: IEC 62368-1:2018

TÜV Mark: EN IEC 62368-1:2020+A11

UL Recognized Component: UL 62368-1:2019 R10.21, CSA C22.2 No. 62368-1:19

Optical & environmental

Class 1 laser product

FDA/CDRH

IEC 60825-1:2014

IEC 60825-2:2021

EN 60825-1:2014+A11

Complies with RoHS II Directive 2011/65/EU

800 Gbps
AGGREGATE LINE RATE

8 × 106G
PAM4 LANES

2 km
REACH OVER SMF

16 W
MAXIMUM POWER

APPLICATIONS & STANDARDS

Applications

- 800G / 2×400G Ethernet
- Switch & router connections
- Datacenters & AI clusters
- Other 800G interconnect

Reference documents

- OIF-CMIS-05.2 - common management interface specification (CMIS) rev 5.2
- OSFP MSA specification for OSFP octal small form factor pluggable module rev 5.0
- IEEE Std 802.3cu™
- IEEE Std 802.3ck™-2022

RATINGS

Absolute maximum ratings

PARAMETER	SYMBOL	MIN	MAX	UNIT
Storage temperature range	T_S	**-40**	**+85**	°C
Relative humidity	RH	**5**	**85**	%
Power supply voltage	V_{CC}	**-0.3**	**+3.6**	V
Rx damage threshold, per lane			**5.4**	dBm

1. Absolute maximum ratings: modules operated outside this range may be permanently damaged.

OPERATING CONDITIONS

Recommended operating conditions

PARAMETER	SYMBOL	MIN	TYPICAL	MAX	UNIT
Operating case temperature	T_C	**0**	**-**	**70**	°C
Power supply voltage	V_{CC}	**3.135**	**3.3**	**3.465**	V
Baud rate, per channel	BR	**53.125 -100 ppm**	**53.125**	**53.125 +100 ppm**	GBd

1. Recommended operating conditions: performance is not guaranteed outside this range.

MONITORING

DDM accuracy

PARAMETER	ACCURACY	UNIT	CALIBRATION
Temperature	**±3**	°C	Internal
Voltage	**±0.1**	V	Internal
Tx bias current, each lane	**±10**	%	Internal
Tx output power, each lane	**±3**	dB	Internal
Rx receive power, each lane	**±3**	dB	Internal

MANAGEMENT

Memory map

Refer to OIF-CMIS - common management interface specification (CMIS).

Optical characteristics

The following optical characteristics are defined over the recommended operating conditions unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYPICAL	MAX	UNIT	NOTES
Link power budgets						
Power budget (max TDECQ)				**7.8**	dB	
Operating distance				**2**	km	
Channel insertion loss				**4**	dB	
Allocation for penalties (max TDECQ)				**3.8**	dB	
Transmitter (each lane)						
Signaling speed per lane		**53.125 -100 ppm**	**53.125**	**53.125 +100 ppm**	GBd	
Modulation format	MF		**PAM4**			
Lane wavelength, λ1		**1264.5**	**1271**	**1277.5**	nm	
Lane wavelength, λ2		**1284.5**	**1291**	**1297.5**	nm	
Lane wavelength, λ3		**1304.5**	**1311**	**1317.5**	nm	
Lane wavelength, λ4		**1324.5**	**1331**	**1337.5**	nm	
Side-mode suppression ratio	SMSR	**30**			dB	
Optical output power	P_{AVG}	**-3.2**		**4.4**	dBm	1
Outer optical modulation amplitude, for TDECQ < 1.4 dB	OMA_{outer}	**-0.2**		**3.7**	dBm	
Outer optical modulation amplitude, for 1.4 dB ≤ TDECQ ≤ 3.4 dB	OMA_{outer}	**-1.6 + TDECQ**		**3.7**	dBm	
Transmitter and dispersion eye closure for PAM4	TDECQ			**3.4**	dB	
Transmitter eye closure for PAM4	TECQ			**3.4**	dB	
| TDECQ - TECQ |				**2.5**	dB	
Transmitter overshoot and undershoot				**22**	%	
Extinction ratio, each lane	ER	**3.5**			dB	
Transmitter transition time				**17**	ps	
Average launch power of OFF transmitter				**-16**	dBm	
$RIN_{17.1}OMA$				**-136**	dB/Hz	
Optical return loss tolerance				**17.1**	dB	
Transmitter reflectance				**-26**	dB	2

PARAMETER	SYMBOL	MIN	TYPICAL	MAX	UNIT	NOTES
Receiver (each lane)						
Signaling speed per lane		**53.125 -100 ppm**	**53.125**	**53.125 +100 ppm**	GBd	
Modulation format			**PAM4**			
Lane wavelength, λ1		**1264.5**	**1271**	**1277.5**	nm	
Lane wavelength, λ2		**1284.5**	**1291**	**1297.5**	nm	
Lane wavelength, λ3		**1304.5**	**1311**	**1317.5**	nm	
Lane wavelength, λ4		**1324.5**	**1331**	**1337.5**	nm	
Damage threshold, each lane		**5.4**			dBm	
Average receive power, each lane		**-7.2**		**4.4**	dBm	
Receive power (OMA_{outer}), each lane				**3.7**	dBm	
Receiver sensitivity (OMA_{outer}), for TECQ < 1.4 dB				**-4.6**	dBm	
Receiver sensitivity (OMA_{outer}), for 1.4 dB ≤ TECQ ≤ 3.4 dB				**-6 + TECQ**	dBm	
Receiver reflectance	RR			**-26**	dB	
Stressed receiver sensitivity (OMA_{outer})	SRS			**-2.6**	dBm	3
Conditions of stressed receiver sensitivity test						
Stressed eye closure for PAM4 (SECQ), lane under test			**3.4**		dB	
OMA_{outer} of each aggressor lane			**1.4**		dBm	

1. Optical output power, each lane (min) is informative and not the principal indicator of signal strength.
2. Transmitter reflectance is defined looking into the transmitter.
3. Measured with conformance test signal at TP3 with BER = 2.4E-4.

Electrical characteristics

The following electrical characteristics are defined over the recommended operating conditions unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTES
Supply voltage	V_{CC}	**3.135**		**3.465**	V	
Power consumption	PC			**16**	W	
Module input						
Differential peak-to-peak voltage tolerance		**750**			mV	TP1a
Peak-to-peak AC common-mode voltage tolerance, low-frequency	V_{CMLF}	**32**			mV	TP1a
Peak-to-peak AC common-mode voltage tolerance, full-band	V_{CMFB}	**80**			mV	TP1a
Differential-mode to common-mode return loss	RL_{cd}	See IEEE 802.3ck™-2022, 120G.3.3.3			dB	TP1
Effective return loss	ERL	**8.5**			dB	TP1
Differential termination mismatch				**10**	%	TP1
Module stressed input tolerance		See IEEE 802.3ck™-2022, 120G.3.4.3				TP1a
Single-ended voltage tolerance		**-0.4**		**3.3**	V	TP1a
DC common-mode voltage tolerance		**-0.35**		**2.85**	V	TP1
Module output						
Differential peak-to-peak output voltage, short mode				**600**	mV	TP4
Differential peak-to-peak output voltage, long mode				**845**	mV	TP4
Peak-to-peak AC common-mode voltage, low-frequency	V_{CMLF}			**32**	mV	TP4
Peak-to-peak AC common-mode voltage, full-band	V_{CMFB}			**80**	mV	TP4
Effective return loss	ERL	**8.5**			dB	TP4
Differential termination mismatch				**10**	%	TP4
DC common-mode voltage tolerance	V_{cm}	**-0.35**		**2.85**	V	TP4
Low-speed signals - SCL and SDA (I_{OLmax} = 3 mA)						
Output low voltage	V_{OL}	**0**		**0.4**	V	
Output high voltage	V_{OH}	**V_{CC} - 0.5**		**V_{CC} + 0.3**	V	
Input low voltage	V_{IL}	**-0.3**		**V_{CC} × 0.3**	V	
Input high voltage	V_{IH}	**V_{CC} × 0.7**		**V_{CC} + 0.5**	V	

Pin assignment

The electrical interface of the OSFP module consists of a 60-contact edge connector, as illustrated in the figure below, which is defined in Clause 8.1 of the OSFP MSA Specification.

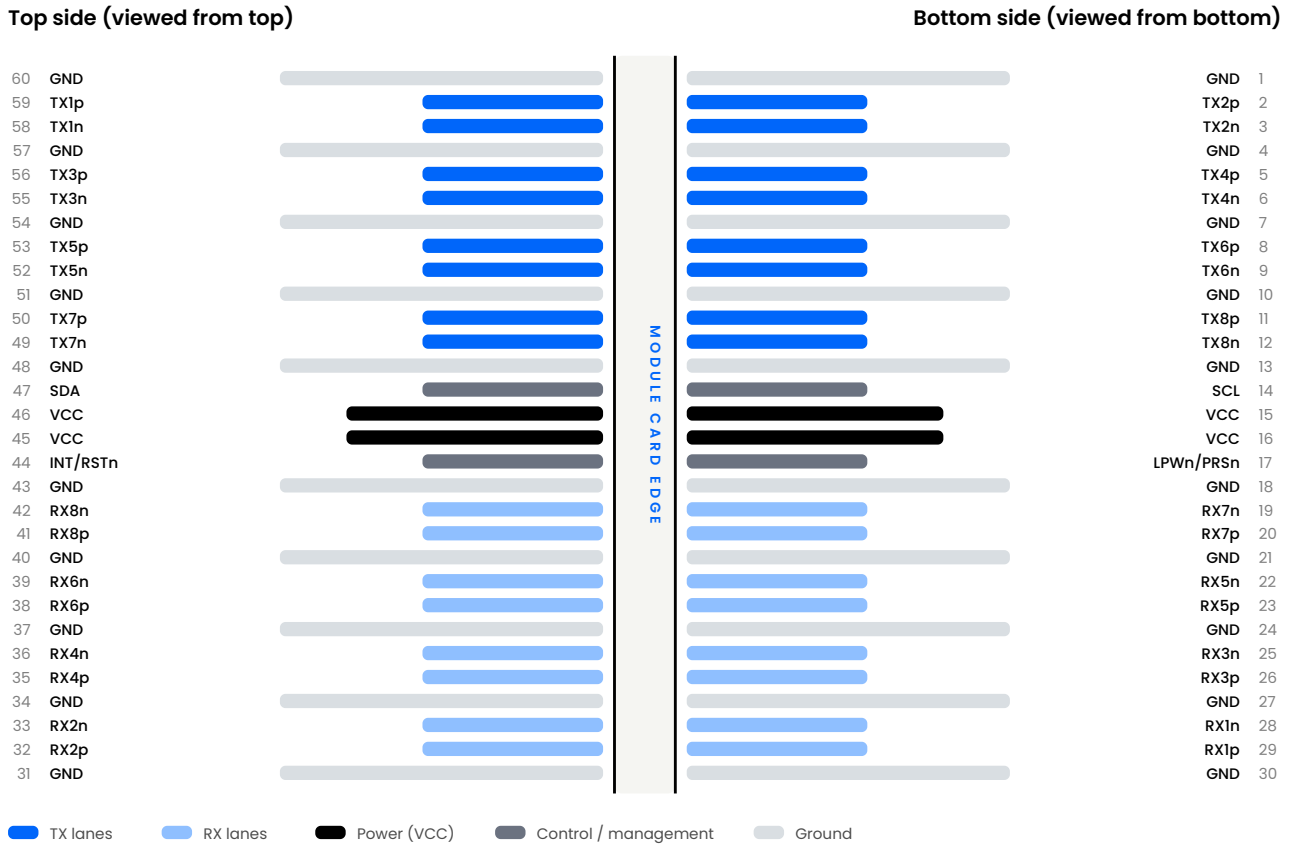


Figure 1. OSFP module pinout

SIGNALS

Pin description

NAME	PIN	DIRECTION	DESCRIPTION
TX[8:1]p / TX[8:1]n		Input	Transmit differential pairs from host to module.
RX[8:1]p / RX[8:1]n		Output	Receive differential pairs from module to host.
SCL	14	Bidirectional	2-wire serial clock signal. Requires pull-up resistor to 3.3 V on host.
SDA	47	Bidirectional	2-wire serial data signal. Requires pull-up resistor to 3.3 V on host.
LPWn/PRSn	17	Bidirectional	Multi-level signal for low-power control from host to module and module-presence indication from module to host.
INT/RSTn	44	Bidirectional	Multi-level signal for interrupt request from module to host and reset control from host to module.
VCC	15, 16, 45, 46	Power	3.3 V power for module.
GND		Ground	Module ground. Logic and power return path.

ARCHITECTURE

Functional block diagram

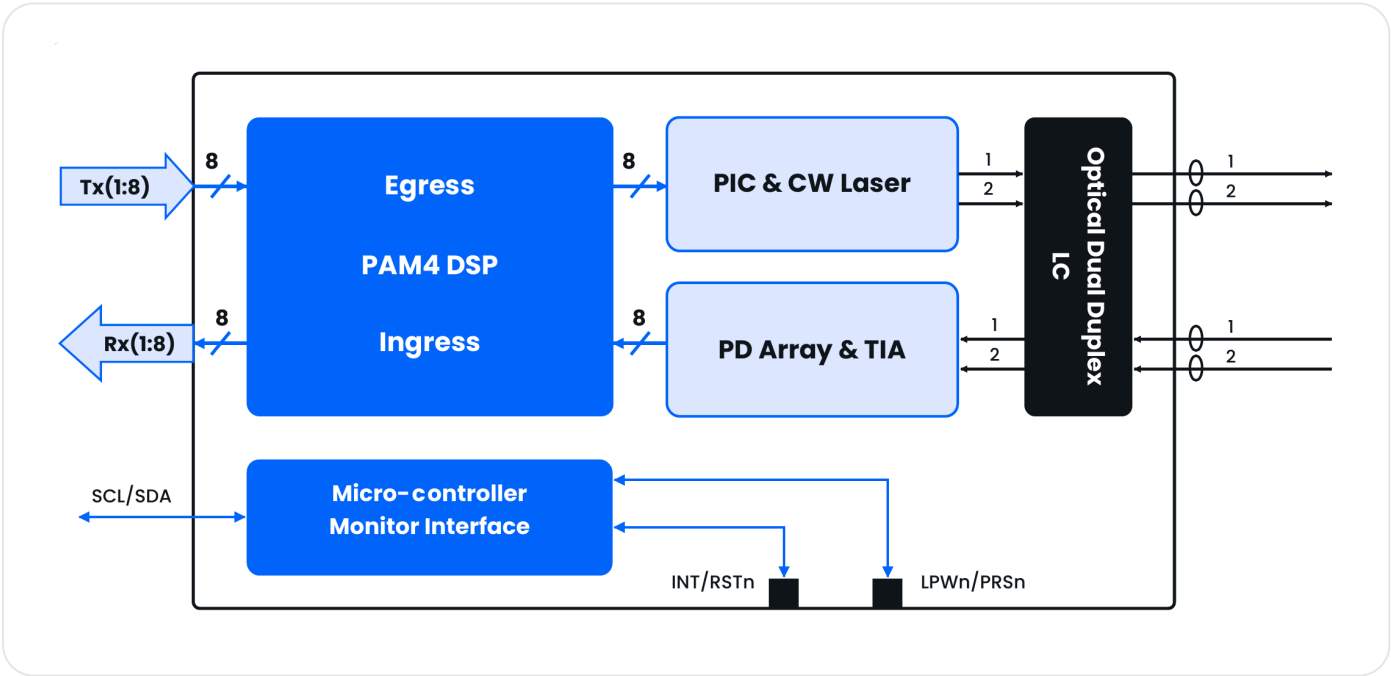


Figure 2. 800G OSFP 2xFR4 functional block diagram

COMPLIANCE

Regulatory and compliance

CATEGORY	STANDARD
EMC - immunity	EN 55035:2017+A11:2020 IEC 61000-4-3:2020
EMC - emission	FCC 47 CFR Part 15, Class B EN 55032:2015+A11:2020+A1:2020
ESD threshold	IEC EN 61000-4-2:2008
Product safety	CB: IEC 62368-1:2018 TÜV Mark: EN IEC 62368-1:2020+A11 UL Recognized Component: UL 62368-1:2019 R10.21, CSA C22.2 No. 62368-1:19
Optical safety	Class 1 laser product FDA/CDRH IEC 60825-1:2014 IEC 60825-2:2021 EN 60825-1:2014+A11
RoHS	Complies with RoHS II Directive 2011/65/EU

MECHANICAL

Mechanical package outline

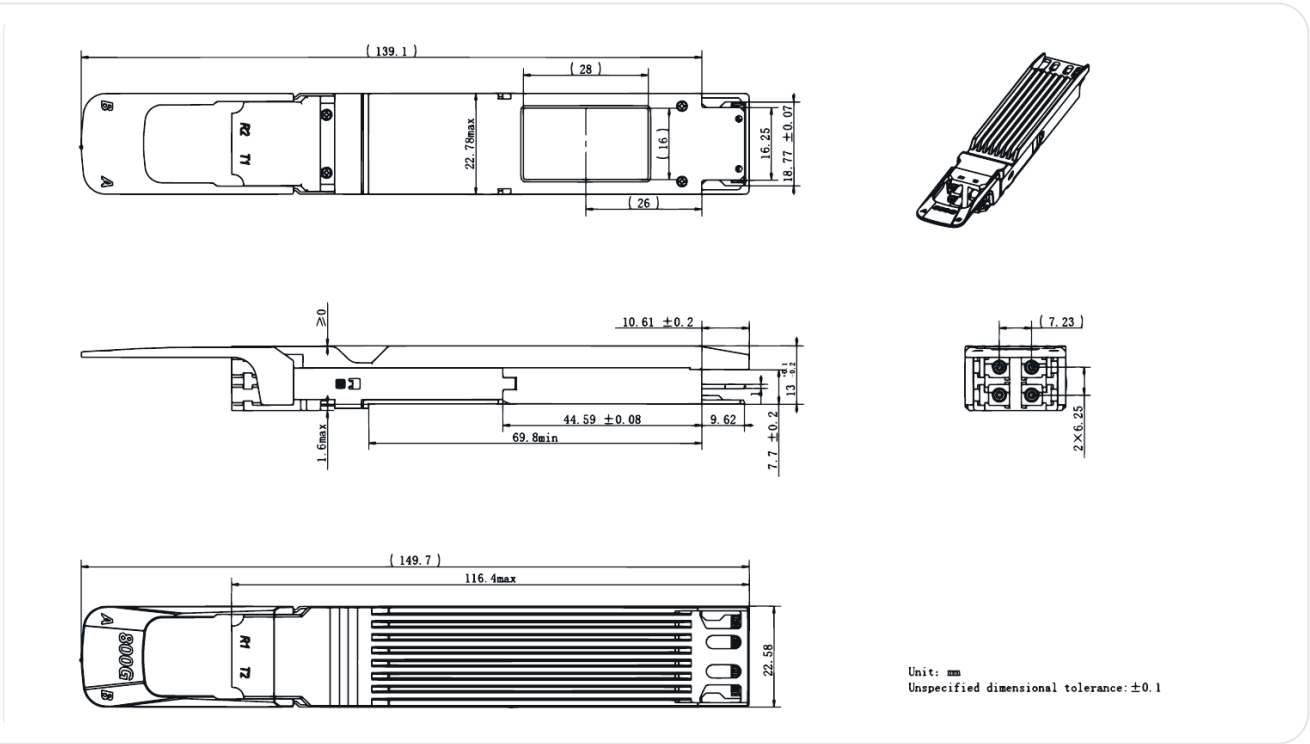


Figure 3. Mechanical package outline (all dimensions are in mm) · Unit: mm. Unspecified dimensional tolerance: ±0.1.

Optical interface

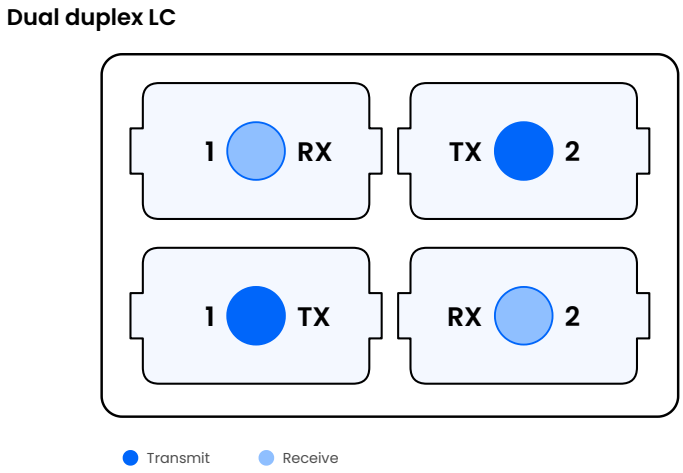


Figure 4. Optical receptacle and channel orientation for the dual duplex LC connector.