

400G OSFP OpenZR+ Coherent

400G Eth, OIF 400ZR / OpenZR+, OSFP, DP-16QAM/DP-8QAM/DP-QPSK, 80-2000km, LC, 191–196THz, SM

COP-4S-ZP-CCH12

OVERVIEW

The COP-4S-ZP-CCH12 is an OSFP form-factor coherent DWDM transceiver designed for high-capacity optical transport using OIF 400ZR and OpenZR+ standards. It supports flexible Ethernet services from 100G to 400G and is optimized for both amplified and unamplified line systems.

The module features a tunable coherent optical engine operating across the DWDM C-band with 6.25 GHz grid spacing. It maps Ethernet client signals into a 400ZR frame structure, applies the selected FEC scheme, and transmits a dual-polarization coherent signal using advanced DSP modulation formats such as DP-16QAM, DP-8QAM, and DP-QPSK.

Multiple application modes are supported through CMIS control, enabling interoperability across different host interfaces and reach targets from metro to long-haul links up to 2000 km depending on mode and modulation.

The transceiver is compliant with OSFP MSA and CMIS 4.1, supports rich diagnostics, and is intended for router, switch, and transport platform deployments with both OIF 400ZR and OpenZR+ MSA profiles.

KEY SPECIFICATIONS

- OSFP coherent DWDM transceiver supporting 400ZR and OpenZR+ modes
- Tunable C-band: 191.275–196.125 THz, 6.25 GHz grid (flex-grid DWDM)
- Reach: from 25–120 km (400ZR) up to 2000 km (OpenZR+ modes)
- Power consumption: ~18-24 W depending on rate and mode
- Interfaces & monitoring: OSFP MSA, CMIS 4.1, DDM, Sync-E, LLDP, RMON, duplex LC SMF

TECHNICAL DATA

Parameter	Value	Parameter	Value
Form Factor	OSFP	Tx In-band OSNR	Min 42dB/0.1nm
Transmission Media	SM (2x LC)	Tx Out-Of Band OSNR	Min 42dB/0.1nm
Nominal Wavelength	191.275 – 196.125 THz (tunable) 6.25GHz	Rx LOS Assert	-28.0dBm ²⁾
Data rate support	100G to 400G	Receiver turn-up	Max 30ms from warm start
Interface Standards	OIF 400ZR / OpenZR+		Max 120s from cold start
Operating Temperature	15°C to 75°C ¹⁾	Absolute max conditions	Rx signal input power: +13dBm
Storage Temperature	-40°C to 85°C		Rx total input power: +15dBm
DDM	Total received power Coherent channel power OSNR, eSNR, PDL, dispersion, DGD Case Temperature	Power Consumption	23.1 ³⁾ /23.6W ⁴⁾ @ 400G 22.3 ³⁾ /22.8W ⁴⁾ @ 300G 21.3 ³⁾ /21.8W ⁴⁾ @ 200G 18.2 ³⁾ /18.7W ⁴⁾ @ 100G

¹⁾ The module will turn up from cold start at ambient temperature as low as -5C and will reach specifications after self-heating up to min temperature.

²⁾ Set to comply with 400G modes. Can be changed on individual modules to fully support other modes.

³⁾ Typical power

⁴⁾ Worst case power

OIF 400ZR

Parameter	Value	Parameter	Value
Typical reach	80-120km app code 0x01 10dB app code 0x02	Transmitter Data:	
Interface standards	OIF 400ZR	Output power 400G ¹⁾	-10dBm to -6dBm ²⁾
Protocol support	400 GbE	Modulation	DP-16QAM
Chromatic dispersion	2400ps/nm	Receiver Data:	
FEC type	CFEC	Input power range	0 to -12dBm ²⁾ app code 0x01
Power budget	0 -10dB app code 0x02	Rx sensitivity	-20dBm app code 0x02
Pre-FEC BER	Max 1.25x10 ⁻²	OSNR tolerance 400G	26dB@-12dBm 26.5dBm@-14dBm & 0.5dB penalty 27dB@-15dB & 1dB penalty

¹⁾ The module transmit power can be provisioned up to maximum available TX power.

²⁾ Average power

The below table lists the OIF 400ZR and OpenZR+ modes supported by COP-4S-ZP-CCH12.

CMIS Application Code	Host format	Electrical Interface	Payload	FEC	Modulation	Operating Reach	MSA format
1	400GBASE-R	1x400GAUI-8 (8x 50G)	400G	CFEC	DP-16QAM	80km	OIF 400ZR app code 0x01
2	400GBASE-R	1x 400GAUI-8 (8x 50G)	400G	CFEC	DP-16QAM	25km	OIF 400ZR app code 0x02
3	4 × 100GBASE-R	4x 100GAUI-2 (2x 50G)	400G	CFEC	DP-16QAM	80km	OIF 400ZR extension
4	400GBASE-R	1x 400GAUI-8 (8x 50G)	400G	oFEC	DP-16QAM	120km	OpenZR+ MSA (small PMD)
5	400GBASE-R	1x 400GAUI-8 (8x 50G)	400G	oFEC	DP-16QAM	450km	OpenZR+ MSA
6	4 × 100GBASE-R	4x 100GAUI-2 (2x 50G)	400G	oFEC	DP-16QAM	450km	OpenZR+ MSA
8	400GBASE-R	1x 400GAUI-8 (8x 50G)	400G	oFEC	DP-16QAM	450km	OpenZR+ MSA Enhanced mode ¹⁾
9	4 × 100GBASE-R	4x 100GAUI-2 (2x 50G)	400G	oFEC	DP-16QAM	450km	OpenZR+ MSA Enhanced mode ¹⁾
11	2x 100GBASE-R	2x 100GAUI-2 (2x 50G)	200G	oFEC	DP-QPSK	1000km	OpenZR+ MSA
12	2x 100GBASE-R	2 x CAUI4 (4x 25G) w/o FEC	200G	oFEC	DP-QPSK	1000km	OpenZR+ MSA
13	1x 100GBASE-R	1x 100GAUI-2 (2x 50G)	100G	oFEC	DP-QPSK	2000km	OpenZR+ MSA
14	1x 100GBASE-R	1x 100GAUI-2 (2x 50G)	100G	oFEC	DP-QPSK	2000km	Open ZR+ MSA

¹⁾ Enhanced mode grants better optical performance but is not fully interoperable with OpenZR+.

OpenZR+

There are 11 OpenZR+ modes that can be set. The table below list the primary optical parameters.

Appl mode	Line rate	Host format	Tx Power ¹⁾	Rx sens @ high OSNR	Rx @ OSNR ²⁾	Rx OSNR @ 0.5dB penalty ²⁾	Rx OSNR @ 1dB penalty ²⁾	CDC range ³⁾
4	400G	1x 400GAUI-8	-10dBm to -6dBm	-20dBm	23.9dB@-12dBm	24.2dB@-14dBm	24.7dB@-16dBm	13,000ps/nm
5	400G	1x 400GAUI-8	-13dBm to -9dBm	-21dBm	23.4dB@-12dBm	23.9dB@-14dBm	24.4dB@-16dBm	13,000ps/nm
6	400G	4x 100GAUI-2	-13dBm to -9dBm	-21dBm	23.4dB@-12dBm	23.9dB@-14dBm	24.4dB@-16dBm	13,000ps/nm
8	400G	1x 400GAUI-8	-13dBm to -9dBm	-21dBm	23.1dB@-12dBm	23.6dB@-14dBm	24.1dB@-16dBm	13,000ps/nm
9	400G	4x 100GAUI-2	-13dBm to -9dBm	-21dBm	23.1dB@-12dBm	23.6dB@-14dBm	24.1dB@-16dBm	13,000ps/nm
11	200G	2x 100GAUI-2	-10.5dBm to -6.5dBm	-29dBm	15dB@-18dBm	15.5dB@-20dBm	16dB@-22dBm	50,000ps/nm
12	200G	2x CAUI4 w/o FEC	-10.5dBm to -6.5dBm	-29dBm	15dB@-18dBm	15.5dB@-20dBm	16dB@-22dBm	50,000ps/nm
13	100G	1x 100GAUI-2	-6dBm to -2dBm	-32dBm	11.8dB@-20dBm	12.3dB@-23dBm	12.8dB@-25dBm	80,000ps/nm
14	100G	1x CAUI4 w/o FEC	-6dBm to -2dBm	-32dBm	11.8dB@-20dBm	12.3dB@-23dBm	12.8dB@-25dBm	80,000ps/nm

¹⁾The module transmit power can be provisioned up to the maximum available TX power. If the TX power is not provisioned by the host, the module TX power will default to the maximum available power, which can be any power level in the specified 4dB range. Based on the maximum available power, the host can attenuate the TX power with up to 10dB.

²⁾Specified as [Min OSNR Value @ Min Rx power for the OSNR value.]

³⁾CD range with less than 0.5dB OSNR penalty.

Maximum Provisionable CD range

400G CFEC DP-16QAM	2,400ps/nm
400G OFEC DP-16QAM	52,000ps/nm
300G OFEC DP-8QAM	100,000ps/nm
200G OFEC DP-QPSK	100,000ps/nm
100G OFEC DPQPSK	160,000ps/nm

Latency

400G CFEC	8us
400G OFEC	5us
300G OFEC	6us
200G OFEC	7us
100G OFEC	11us

Safety/Regulatory Compliance

- Class 1 laser safe
- RoHS Compliance

ABSOLUTE MAX RATING

Exceeding these limits can cause permanent damage to the transceiver

Parameter	Value	Parameter	Value
Supply Voltage	3.3V±5%V	Max Rx Optical Power	+15dBm
Storage Temp	-40°C to 85°C		

ORDERING INFORMATION

Ordering Code	Description
COP-4S-ZP-CCH12	400G OSFP, OIF 400ZR / OpenZR+, DP-16QAM/DP-8QAM/DP-QPSK, 80-2000km, LC, 191–196THz, SM, 15C to 75C

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