

QSFP-DD 400G Multirate Open ZR+ High Power



Product Description

The Q400G-ZRP-DCO-hp is a high-performance 400G QSFP-DD ZR+ Pro coherent transceiver designed for IP-over-DWDM and data center interconnect applications. It supports line rates from 100G to 400G and advanced coherent modulation formats up to DP-16QAM, enabling metro, regional, and long-haul transmission without inline chromatic dispersion compensation.

The module integrates a 7 nm coherent DSP, ultra-narrow linewidth tunable lasers, high-speed modulators, coherent receivers, integrated EDFA and TX VOA, and supports Open ZR+ MSA and OIF 400ZR interoperability. Digital diagnostics and control are provided via CMIS over I²C, fully aligned with the QSFP-DD MSA mechanical and electrical specifications.

Key Features

- QSFP-DD MSA compliant, Type 2B package
- Open ZR+ MSA 2.0 and OIF-400ZR-02.0 compliant
- Line rates: 100G / 200G / 300G / 400G
- Client interfaces: 1×400GbE or 1/2/3/4×100GbE
- Full C-band tunability (191.3–196.1 THz)
- DWDM grid: 100 / 75 / 50 GHz, 0.1 GHz fine tuning
- Integrated EDFA and TX VOA
- High output power: up to +4 dBm (Gray @193.7 THz)
- Typical power consumption 22 W (400GbE)
- Duplex LC connector
- Operating case temperature 0 °C to 75 °C
- Hitless firmware upgrade support
- RoHS 2 compliant

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Compliance

- Open ZR+ MSA 2.0
- OIF-400ZR-02.0
- OIF-CMIS-05.2 / IA OIF-C-CMIS-01.2
- QSFP-DD Hardware Rev 6.3
- IEEE Std 802.3-2018

Recommended Operating Conditions				
Parameter	Min	Typ	Max	Unit
Operating case temperature	0	–	75	°C
Supply voltage (VCC)	3,14	3,3	3,47	V
Supply current (ICC)	–	–	7,2	A
Sustained peak current (<500 ms)	–	–	7,4	A
Instantaneous peak current (<50 µs)	–	–	9	A
Power consumption (400GbE)	22	–	22,5	W
Relative humidity	15	–	85	%
ESD	–	–	1000	V

Client Modes	
Mode	Client Interface
400G (400ZR)	1×400GAUI-8, 4×100GAUI-2
400G (400ZR+)	1×400GAUI-8, 4×100GAUI-2
300G (300ZR+)	3×100GAUI-2
200G (200ZR+)	2×100GAUI-2, 2×CAUI-4*
100G (100ZR+)	1×100GAUI-2, 1×CAUI-4*

Transmission Distance	
Mode	Reach
400G ZR	120 km
400G ZR+	450 km
300G ZR+	600 km
200G ZR+	1000 km
100G ZR+	2000 km

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Optical Characteristics – Transmitter	
Parameter	Value
Frequency range	191.3–196.1 THz (C-Band)
Gray wavelength	193.7 THz (fixed)
Fine tuning	±5 GHz, 0.1 GHz step
Frequency accuracy	±1.8 GHz
Modulation formats	DP-16QAM / DP-8QAM / DP-QPSK
Output power (DWDM)	–10 to +1 dBm (adjustable)
Output power (Gray)	3–5 dBm
Power setting accuracy	±1 dB
Power stability	±0.5 dB (room), ±1 dB (temp)
In-band OSNR	≥38 dB
Laser linewidth	~300 kHz
Tx reflectance	≤ –20 dB

Optical Characteristics – Receiver	
Parameter	Value
Input power (DWDM)	–12 to 0 dBm (400G), down to –18 dBm (100G)
Input power (Gray)	–20 dBm (400ZR), –22 dBm (400ZR+)
OSNR tolerance (0.1 nm)	26 dB (400ZR), 24 dB (400ZR+)
Max pre-FEC BER	0.017–0.020
Chromatic dispersion tolerance	up to 100,000 ps/nm (100ZR+)
DGD tolerance	up to 100 ps
PDL tolerance	up to 3.5 dB
SOP change tolerance	50 krad/s
Service recovery time	≤ 40 ms

Electrical Characteristics (High Speed)	
Parameter	Value
Lane rate	26.5625 GBd ±100 ppm
Differential voltage	750–900 mV
Near-end ESMW	0.265 UI
Far-end ESMW	0.2 UI

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CAUI-4 (NRZ)	
Parameter	Value
Lane rate	25.78125 GBd $\pm$ 100 ppm
Eye width	0.57 UI
Eye height	228 mV
Digital Diagnostics (DDM)	
Parameter	Accuracy
Temperature	$\pm$ 3 °C
TX power	$\pm$ 1 to $\pm$ 1.5 dB
RX power	$\pm$ 1.5 to $\pm$ 2 dB
Voltage	$\pm$ 3 %
Bias current	$\pm$ 10 %
Alarms and Warnings (Default)	
Parameter	Threshold
Rx power low warning	Configurable (-24 dBm default, 400ZR+)
Tx power low alarm	Pset -3 dB
Tx power high alarm	Pset +3 dB
Temperature high alarm	85 °C
Voltage low alarm	2.97 V
Voltage high alarm	3.63 V

Ordering Information

Part Number	Form Factor	Rate	Output Power	Temp	Reach	Application
Q400G-ZRP-DCO-hp	QSFP-DD	400G	-10 to +1 dBm	0-75 °C	>450 km	400G ZR+ Pro