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CISCO

Cisco 400G QSFP-400G-DR4 Transceiver Modules

Contents

Product overview

The Cisco® 400G QSFP-400G-DR4 modules offer customers high-bandwidth transceiver modules targeting network interface cards (NICs) and smart NICs used in data centers, high-performance computing networks, and AI applications. This is Cisco's latest generation of 400 Gigabit Ethernet (400G) transceiver modules and cables based on the Quad Small Form-Factor Pluggable (QSFP112) form factor designed to support four electricial lanes at 112Gbps in the QSFP form factor.

Table 1.   Features and benefits

Feature	Benefit
Hot-swappable	Input/output device that plugs into a 400G Cisco QSFP112-compatible port.
Interoperable	Interoperable with other IEEE-compliant 400G interfaces where applicable.
NIC certified	These modules and cables have been tested and qualified on NICs from Cisco and other manufacturers for guaranteed performance.
Compliant with IEEE 802.3	High-speed electrical and optical interfaces compliant with IEEE 802.3.
Compliant with Multi-Source Agreement (MSA)	Compliant with QSFP112 MSA CMIS Rev 4.1,
Breakout capability	Some QSFP112 modules can be used for 200G and 100G interfaces by reducing the number of optical lanes used while maintaining the electrical lane speed at 100Gbps. A variety of cables are also available for 2x 400G and 4x 200G breakout applications from 800G ports.

Table 2.   Cisco QSFP112 portfolio

Product ID	Description	Max power consumption (W)	Optical Connector
QSFP-400G-DR4	400G QSFP112 Transceiver, 400GBASE-DR4, MPO-12 parallel SMF, 500m	10	MPO-12 SMF APC

Note: For more information and references on Cisco transceiver cables, please visit Cisco Transceiver Modules – Brochures – Cisco.

Figure 1.
QSFP-400G-DR4

The Cisco QDD-400G-DR4-S module (Figure 1) supports 400GBASE-DR4 links and up to four 100G DR1 or two 200G DR2 breakout link lengths of up to 500 m. The module has four pairs of single-mode fiber (SMF) with an MPO-12 connector. It is compliant with the IEEE 802.3 and 400GAUI-4 standards. The 400G signal is carried over four pairs of parallel fibers by one wavelength per fiber. It can be used 200G DR2 link for 200GE ports by using two pairs of fibers. Forward Error Correction (FEC) is performed on the host platform.

Table 3.   QSFP port and cabling specifications

Cisco 400G QSFP112	Nominal wavelength (nm)	Cable type	Core size (microns)	Modal bandwidth	Cable distance	Pull tab color
QSFP-400G-DR4	1310	SMF	G.652	N/A	500 m	Orange

Platform support

Cisco QSFP112 modules are primarily supported on NICs providing Ethernet connectivity to servers for a variety of applications. For more details, refer to the Cisco Transceiver Modules Compatibility Matrix.

Specifications

Table 4.   Electrical specifications

Product	Description	Nominal data rate (Gbps)	High-speed electrical	Link meter
QSFP-400G-DR4	400G QSFP112 Transceiver, 400GBASE-DR4, MPO-12, 500m parallel SMF Can be used for 2X 200G-DR2 and 4x 100G-DR1 breakout	425	400GAUI-4	500 m

Table 5.   Optical specifications

Product	Description	Average transmit power per lane (dBm) min	Average transmit power per lane (dBm) max	Average receive power per lane (dBm) min[1]	Average receive power per lane (dBm) max	Maximum supported insertion loss (IL) (dB)	Wavelength (nm)	Pre-FEC
QSFP-400G-DR4	400G QSFP112 Transceiver, 400GBASE-DR4, MPO-12 APC, 500m parallel SMF.	–2.9	4	–5.9	4	3	1310	2.4x10-4

[1] Average receive power per lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.

Table 6.   Mechanical specifications

Module		Specification
Module dimension with pull tab		(H x W x D) 8.5 x 18.4 x 78.3/93.3 mm (0.3 x 0.7 x 3.1/3.7 in.)
Module weight (max)	**Optical modules**	100 g (3.5 oz)

Table 7.   Temperature range

Module	Specification
QDD-400G module operation temperature	0° to 75°C (32° to 167°F)
Storage temperature	–40° to 85°C (–40° to 185°F)

QSFP112 breakout capability and module interoperation

Some of Cisco's QSFP112 modules have the capability to be operated in breakout mode for lower-speed interfaces, specifically on NICs for 200G. To use the module as a 200G interface, only two optical lanes are used, leaving the remaining two inactive. Electrical interface for products such as the QSFP-400G-DR4 are fixed at 100Gbps per lane. These modules will optically interoperate with Cisco as well as third-party modules that comply with the same standards. The table below provides a brief overview of the various optical breakout options, compatibility, and reach to 100G modules. Module optical interoperability can also be verified with the Cisco Module Interoperability Matrix.

Table 8. QSFP112 SMF PAM4 breakout interoperation and link reach

Standard (PAM4)	400G DR4	100G DR1	100G FR1	100G LR1	200G DR2
Product ID	QDD-400G-DR4-S QDD-8X100G-FR	QSFP- 100G-DR- S	QDD-4X100G- FR-S QSFP-100G-FR- S CPAK-100G-FR QDD-8X100G-FR	QDD-4X100G-LR-S QSFP-100G-LR-S	QDD-400G-DR4-S QDD-8X100G-FR
QSFP-400G-DR4 (4x 100G and 2x 200G-DR2 breakout)	500m SMF (3dB)	500m SMF (3dB)	500m SMF (3dB)	500m SMF (3dB)	500m SMF (3dB)

Table 9. Ordering information

Part ID	Product description
QSFP-400G-DR4	400G QSFP112 Transceiver, 400GBASE-DR4, MPO-12, 500m parallel SMF

Regulatory and standards compliance

Standards

- IEEE 802.3ck
- QSFP112 MSA
- IEEE 802.3 (400GGBASE-DR4) Requirements
- GR-20-CORE: Generic Requirements for Optical Fiber and Optical Fiber Cable
- GR-326-CORE: Generic Requirements for Single-Mode Optical Connectors and Jumper Assemblies
- GR-468-CORE: Generic Requirements for Optoelectronic Devices Used in Telecommunications Equipment
- GR-1435-CORE: Generic Requirements for Multifiber Optical Connectors
- Common Management Specification (CMIS) Rev 4.0
- IEEE Std 802.3 IEEE Standard for Ethernet
- IEEE 802.3ba CL88
- IEEE 802.3ck
- IEEE 802.3cd CL136
- IEEE 802.3cu CL140

Safety

- Laser Class 1 21CFR-1040 LN#50

- Laser Class 1 IEC60825-1

- Compliance with North American (FCC/ICES), European (CENELEC), Japanese (VCCI), and Telcordia NEBS standards

- GR-1089 EMC and Electrical Safety – Generic Criteria for Network Telecommunications Equipment

- EMI compliance on FCC Part 15 (30 MHz to 40 GHz) and CISPR32/CISPR22 (30 to 6000 MHz)

- RFI compliance on EN/IEC 61000-4-3 and GR-1089-CORE (10k to 10 GHz)

- ESD compliance on EN/IEC 61000-4-2 and GR-1089

- Certification to IEC/EN 60825-1 +A2

- RoHS 6 compliance

Table 10. Laser class for QSFP112 modules

Part ID	Laser class
QSFP-400G-DR4	1

Product sustainability

Table 11. Cisco environmental sustainability information

Sustainability topic		Reference
General	Information on product-material-content laws and regulations	Materials
	Information on electronic waste laws and regulations, including our products, batteries and packaging	WEEE Compliance
	Information on product takeback and reuse program	Cisco Takeback and Reuse Program
	Sustainability Inquiries	Contact: csr_inquiries@cisco.com
Material	QSFP112 port cabling specifications	Table 3
Material	Product packaging weight and materials	Contact: environment@cisco.com

Warranty

Standard warranty: 5 years

Expedited replacement available via a Cisco SMARTnet® Service support contract.

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Additional information

For more information about Cisco 400G QSFP112 or other transceiver modules and cables, contact your sales representative or visit https://www.cisco.com/en/US/products/hw/modules/ps5455/prod_module_series_home.html.

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