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Cisco 400G QSFP-DD Cable and Transceiver Modules

Contents

The Cisco® family of QSFP-DD modules provide the industry's highest bandwidth density while leveraging the backward compatibility to lower-speed QSFP pluggable modules and cables.

Product overview

The Cisco 400GBASE Quad Small Form-Factor Pluggable Double Density (QSFP-DD) portfolio offers customers a wide variety of super high-density transceiver modules and the flexibility of 400 Gigabit Ethernet connectivity options for data center, high-performance computing networks, enterprise core and distribution layers, and service provider applications. The QSFP-DD modules are our new generation of 400G transceiver modules based on a QSFP-DD form factor.

Features and benefits of Cisco QSFP-DD modules

Feature	Benefit
Hot-swappable	Input/output device that plugs into 400G Ethernet Cisco QSFP port
Interoperable	Interoperable with other IEEE-compliant 400GBASE interfaces where applicable
Certified on Cisco platform	Certified and tested on Cisco QSFP-DD 400G ports for superior performance, quality, and reliability
Compatible with IEEE 802.3	High-speed electrical compliant to IEEE 802.3cd and IEEE 802.3bs
Compatible with MSA	Optical and coding compliant to QSFP-DD MSA Rev4.1, OIF 56G PAM4, and 100G Lambda-FR4 MSA
Backward compatibility	QSFP-DD port is backward compatible with QSFP+ and QSFP28 modules

Table 1.   Cisco 400G QSFP-DD portfolio

Product ID	Description	Max power consumption (W)
QDD-400-CUxM	400G, QSFP-DD to QSFP-DD, Passive Copper Cable, 1 meter, 2 meters, 2.5 meters, 3 meters	1.5
QDD-400-AOCxM	400G QSFP-DD Transceiver, Active Optical Cable, 1, 2, 3, 5, 7, 10, 15, 20, 25, 30 meters	12
QDD-400G-DR4-S	400G QSFP-DD Transceiver, 400GBASE-DR4, MPO-12, 500m parallel SMF	12
QDD-400G-FR4-S	400G QSFP-DD Transceiver, 400G-FR4, Duplex LC, 2km Duplex SMF	12
QDD-400G-LR8-S	400G QSFP-DD Transceiver, 400GBASE-LR8, Duplex LC, 10km Duplex SMF	13
QDD-2X100G-SR4-S	2x100GBASE-SR4 Transceiver, 100GBASE-SR4, MPO-24, 100m MMF	12W

Product ID	Description	Max power consumption (W)
QDD-2X100G-CWDM4-S	2X 100G-CWDM4 Transceiver, 100G-CWDM4, Dual Duplex CS connector, 2km Duplex SMF	12W

Cisco 400G QSFP-DD transceiver prominent features and differentiators

Cisco QDD-400-CUxM

Figure 1.
QDD-400-CUxM

The Cisco 400G QDD-400-CUxM module (Figure 1) primarily enables high-bandwidth 400G links and supports 400G Ethernet rate. It provides a QSFP-DD-to-QSFP-DD copper direct-attach solution. QDD-400-CuxM cables are suitable for very short links and offer a cost-effective way to establish a 400-Gigabit link between QSFP-400G ports of Cisco switches/routers within racks and across adjacent racks. Cisco currently offers passive copper cables in lengths of x=1, 2, 2.5, and 3 meters.

Cisco QDD-400-AOCxM

Figure 2.
QDD-400-AOCxM

The Cisco QDD-400-AOCxM modules (Figure 2) with AOC cables are suitable for short distances and offer a flexible way to connect within racks and across racks. Active optical cables are much thinner and lighter than copper cables, which makes cable management easier. AOCs enable efficient system airflow, which is critical in high-density racks. Cisco currently offers active optical cables in lengths of x=1, 2, 3, 5, 7, 10, 15, 20, 25, and 30 meters.

QDD-400G-LR8-S

Figure 3.
QDD-400G-LR8-S

The Cisco QDD-400G-LR8-S Module (Figure 3) supports link lengths of up to 10 km over a standard pair of G.652 Single-Mode Fiber (SMF) with duplex LC connectors, and is compliant to IEEE 400GBASE LR8 standard. The 400 Gigabit Ethernet signal is carried over eight wavelengths. Multiplexing and demultiplexing of the eight wavelengths are managed within the device. FEC is performed on the host platform.

QDD-400G-DR4-S

Figure 4.
QDD-400G-DR4-S

The Cisco QDD-400G-DR4-S Module (Figure 4) supports link lengths of up to 500m parallel SMF with MPO-12 connector. It is compliant to IEEE 802.3bs protocol and 400GAUI-8/CEI-56G-VSR-PAM4 standards. The 400 Gigabit Ethernet signal is carried over four parallel lanes by one wavelength per lane. It can be used as 4x100G breakout to QSFP28-100G-FR-S. FEC is performed on the host platform.

QDD-400G-FR4-S

Figure 5.
QDD-400G-FR4-S

The Cisco QDD-400G-FR4-S Module (Figure 5) supports link lengths of up to 2km SMF with duplex LC connector. It is compliant to IEEE 802.3bs, 400GBASE-FR4 Spec of 100G Lambda MSA group, and 400GAUI-8/CEI-56G-VSR-PAM4 standards. The 400 Gigabit Ethernet signal is carried over four CWDM grid optical wavelengths. Multiplexing and demultiplexing of the four wavelengths are managed within the device. FEC is performed on the host platform.
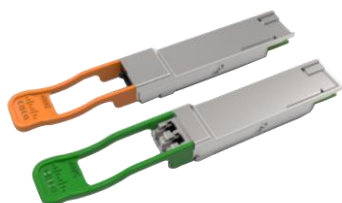
QDD-2X100G-SR4-S

Figure 6.
QDD-2X100-SR4-S

The Cisco QDD-2X100-SR4-S Module (Figure 6) supports link lengths of up to 100m on OM4 MMF. The module uses an MPO-24 MMF connector. It is compliant to IEEE 802.3 100GBASE-SR4 requirements. The module provides backward compatibility to two 100GBASE-SR4 transceivers, improving port efficiency to legacy 100G optical interfaces.

QDD-2X100G-CWDM4-S

Figure 7.
QDD-2X100-CWDM4-S

The Cisco QDD-2X100-CWDM4-S Module (Figure 7) supports link lengths of up to 2km SMF and uses a dual duplex CS connector. It is compliant to 100G-CWDM4 MSA. The 100 Gigabit Ethernet signal is carried over four CWDM grid optical wavelengths at 25Gb/s each. Multiplexing and demultiplexing of the four wavelengths are managed within the device. FEC is performed on the host platform.

QSFP port cabling specifications

Cisco 400G QSFP-DD	Nominal wavelength nm	Cable type	Core size (microns)	Modal bandwidth	Cable distance	Max power consumption (W)	Pull tab color
QDD-400-CU1M		Direct-attach copper cable assembly			1 m	1.5	Tan
QDD-400-CU2M					2 m		Brown
QDD-400-CU2.5M					2.5 m		Yellow
QDD-400-CU3M					3 m		Orange

Cisco 400G QSFP-DD	Nominal wavelength nm	Cable type	Core size (microns)	Modal bandwidth	Cable distance	Max power consumption (W)	Pull tab color
QDD-400-AOC1M		Active Optical Cable Assembly SMF Parallel SMF MPO-12 SMF			1 m	12	Tan
QDD-400-AOC2M					2 m		Brown
QDD-400-AOC3M					3 m		Orange
QDD-400-AOC5M					5 m		Gray
QDD-400-AOC7M					7 m		Blue
QDD-400-AOC10M					10 m		Red
QDD-400-AOC15M					15 m		Black
QDD-400-AOC20M					20 m		Green
QDD-400-AOC25M					25 m		Green
QDD-400-AOC30M					30 m		Green
QDD-400G-LR8-S	1273 1277 1282 1286 1295 1300 1304 1309	Duplex SMF	G.652		10 km		Blue
QDD-400G-DR4-S	1310	Ribbon SMF	G.652		500 m		Orange
QDD-400G-FR4-S	1270,1290 1310,1330	Duplex SMF	G.652		2 km		Green
QDD-2X100-SR4-S	850	Ribbon MMF	50.o		100 m		Beige
QDD-2X100-CWDM4-S	1270,1290 1310,1330	Dual Duplex SMF	G.652		2 km		Green

Platform support

Cisco QSFP-DD modules are supported on Cisco switches and routers. For more details, refer to the **Cisco Transceiver Modules Compatibility Matrix**.

Specifications

Electrical specifications

Product	Description	Nominal rate (Gbs)	High-speed electrical	Link meter
QDD-400-CUxM	400G QSFP-DD Transceiver, Passive Copper Cable	425	400GAUI-8 C2M, OIF CEI-56G-VSR-PAM4	1, 2, 2.5, 3
QDD-400-AOCxM	400G QSFP-DD Transceiver, Active Copper Cable	425	400GAUI-8	1,2,3,5,7,10,15,20,25,30
QDD-400G-LR8-S	400G QSFP-DD Transceiver, 400GBASE-LR8, Duplex LC, 10km Duplex SMF	425	400GAUI-8 / CEI-56G-VSR-PAM4	10km
QDD-400G-DR4-S	400G QSFP-DD Transceiver, 400GBASE-DR4, MPO-12, 500m parallel SMF	425	400GAUI-8/CEI-56G-VSR-PAM4	500m
QDD-400G-FR4-S	400G QSFP-DD Transceiver, 400G-FR4, Duplex LC, 2km Duplex SMF	425	400GAUI-8/CEI-56G-VSR-PAM4	2km
QDD-2X100-SR4-S	2x 100G QSFP-DD Transceiver, 2x 100GBASE-SR4, MPO-24 MMF, 100m OM4	2x100GE	2x 100G CAUI-4	100m
QDD-2X100-CWDM4-S	2x 100G QSFP-DD Transceiver, 2x 100G-CWDM4, Dual Duplex CS connector SMF, 2km SMF	2X 100GE	2x 100G CAUI-4	2km

Optical specifications

Product	Description	Transmit Power per lane (dBm) min	Transmit Power per lane (dBm) max	Receive Power per lane (dBm) Min	Receive Power per lane (dBm) Max	Wavelength (nm)	Pre-FEC
QDD-400G-LR8-S	400G QSFP-DD Transceiver, 400GBASE-LR8, Duplex LC, 10km Duplex SMF	−2.8	5.3	−7.1	5.3	1273,1278,1282,1286, 1295,1299,1304,1309	2.4×10^{-4}
QDD-400G-DR4-S	400G QSFP-DD Transceiver, 400GBASE-DR4, MPO-12, 500m parallel SMF	−2.9	4	−4.4	4	1310	2.4×10^{-4}

Product	Description	Transmit Power per lane (dBm) min	Transmit Power per lane (dBm) max	Receive Power per lane (dBm) Min	Receive Power per lane (dBm) Max	Wavelength (nm)	Pre-FEC
QDD-400G-FR4-S	400G QSFP-DD Transceiver, 400G-FR4, Duplex LC, 2km Duplex SMF	–3.3	3.5	–4.6	3.5	1270,1290,1310,1330	2.4×10^{-4}
QDD-2X100-SR4-S	2x 100G QSFP-DD Transceiver, 2x 100GBASE-SR4, MPO-24 MMF, 100m OM4	+2.4	–8.4	+2.4	–10.3	840 to 860	
QDD-2X100-CWDM4-S	2x 100G QSFP-DD Transceiver, 2x 100G-CWDM4, Dual Duplex CS connector SMF, 2km SMF	+2.5	–6.5	+2.5	–11.5	Four lanes: 1271, 1291, 1311, 1331	

Miscellaneous		
Module dimension with pull tab	(H x W x D) 8.5 x 18.4 x 78.3/93.3 mm	
Module weight (Max)	Optical modules	100 g
	QDD-400-CU1M	250 g
	QDD-400-CU2M	450 g
	QDD-400-CU2.5M	550 g
	QDD-400-CU3M	600 g
Module operation temperature	0 to 75° C	
Active optical cable	0 to 70° C	
Copper cable operation temperature	0 to 70° C	
Storage temperature	–40 to 85° C	

Ordering information

Part ID	Product description
QDD-400-CU1M	400G QSFP-DD Transceiver, Passive Copper Cable, 1 meter
QDD-400-CU2M	400G QSFP-DD Transceiver, Passive Copper Cable, 2 meters
QDD-400-CU2.5M	400G QSFP-DD Transceiver, Passive Copper Cable, 2.5 meters
QDD-400-CU3M	400G QSFP-DD Transceiver, Passive Copper Cable, 3 meters
QDD-400-AOC1M	400G QSFP-DD Transceiver, Active Optical Cable, 1 meter
QDD-400-AOC2M	400G QSFP-DD Transceiver, Active Optical Cable, 2 meters
QDD-400-AOC3M	400G QSFP-DD Transceiver, Active Optical Cable, 3 meters
QDD-400-AOC5M	400G QSFP-DD Transceiver, Active Optical Cable, 5 meters
QDD-400-AOC7M	400G QSFP-DD Transceiver, Active Optical Cable, 7 meters
QDD-400-AOC10M	400G QSFP-DD Transceiver, Active Optical Cable, 10 meters
QDD-400-AOC15M	400G QSFP-DD Transceiver, Active Optical Cable, 15 meters
QDD-400-AOC20M	400G QSFP-DD Transceiver, Active Optical Cable, 20 meters
QDD-400-AOC25M	400G QSFP-DD Transceiver, Active Optical Cable, 25 meters
QDD-400-AOC30M	400G QSFP-DD Transceiver, Active Optical Cable, 30 meters
QDD-400G-LR8-S	400G QSFP-DD Transceiver, 400GBASE-LR8, 10km Duplex SMF, 10km
QDD-400G-DR4-S	400G QSFP-DD Transceiver, 400GBASE-DR4, MPO-12, 500m parallel SMF
QDD-400G-FR4-S	400G QSFP-DD Transceiver, 400G-FR4, Duplex LC, 2km Duplex SMF
QDD-2X100-SR4-S	2x100G QSFP-DD Transceiver, 2X 100GBASE-SR4, MPO-24 MMF, 100m OM4
QDD-2X100-CWDM4-S	2X 100G QSFP-DD Transceiver, 2X 100G-CWDM4, Dual Duplex CS, 2km Duplex SMF

Regulatory and standards compliance

Standards:

- OIF CEI-56G-VSR-PAM4

- QSFP-DD MSA hardware Rev 4.1, QSFP-DD hardware specification for QSFP double-density 8X pluggable transceiver

- 400G-FR4 MSA: 100G Lambda MSA Group

- 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™-2018 IEEE Standard for Ethernet

- IEEE802.3bs 400GAUI-8 Annex 120E

- IEEE 802.3cd CL136

Safety

- Laser Class 1 21CFR-1040 LN#50

- Laser Class 1 IEC60825-1

- Cable jacket can be certified to UL or CSA jacketed appliance wiring material, rated VW-1 or FT-1.

- All cables must be type CM, CMG, CMP, or CMR. If cable is type CL2 (USA type of cable), it must also be type LVT or ELC (Canadian type of cable).

- 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 – 40 GHz) and CISPR32/CISPR22 (30-6000 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

Part ID	Laser Class
QDD-400G-LR8-S	1
QDD-400G-DR4-S	1
QDD-400G-FR4-S	1
QDD-2X100-SR4-S	1
QDD-2X100-CWDM4-S	1

Warranty information

Standard warranty: 1 year

Cisco environmental sustainability

Information about Cisco's environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the "Environment Sustainability" section of Cisco's Corporate Social Responsibility (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the "Environment Sustainability" section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

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Additional information

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