

# Cisco 400G QSFP-DD Cable and Transceiver Modules

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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.

**Table 1.** Feature and Benefits of Cisco QSFP-DD Modules

Feature	Benefit
<b>Hot-swappable</b>	Input/output device that plugs into 400G Ethernet Cisco QSFP-DD port
<b>Interoperable</b>	Interoperable with other IEEE-compliant 400GBASE interfaces where applicable
<b>Certified on Cisco platform</b>	Certified and tested on Cisco QSFP-DD 400G ports for superior performance, quality, and reliability
<b>Compliant with IEEE 802.3</b>	High-speed electrical and optical interfaces compliant to IEEE 802.3
<b>Compliant with MSA</b>	Compliant to QSFP-DD MSA CMIS Rev4.1, OIF 56G PAM4, IEEE 802.3 and 100G Lambda MSA
<b>Backward compatibility</b>	QSFP-DD port is backward compatible with QSFP+, QSFP28 and QSFP56 modules
<b>Breakout capability</b>	Some QSFP-DD modules have the capability to interface to multiple 100G modules when operated in breakout mode, providing higher port density for 100G interfaces, and easing the migration to 400G platforms

**Table 2.** Cisco 400G QSFP-DD portfolio

Product ID	Description	Max power consumption (W)	Optical Connector
<b>QDD-400-CUxM</b>	400G, QSFP-DD to QSFP-DD, Passive Copper Cable, 0.5 meter, 1 meter, 2 meters, 2.5 meters, 3 meters	1.5 per end	N/A
<b>QDD-4ZQ100-CUxM</b>	400G, QSFP-DD to 4x QSFP56 100GBASE-CR2, Passive Copper Cable, 1 meter, 2 meters, 2.5 meters, 3 meters	1.5W per end	N/A
<b>QDD-2Q200-CU3M</b>	400G, QSFP-DD to 2x QSFP56 200GBASE-CR4, Passive Copper Cable, 3 meters	1.5W per end	N/A
<b>QDD-400-AOCxM</b>	400G QSFP-DD Transceiver, Active Optical Cable, 1, 2, 3, 5, 7, 10, 15, 20, 25, 30 meters	12 per end	N/A

Product ID	Description	Max power consumption (W)	Optical Connector
<b>QDD-400G-SR8-S</b>	400G QSFP-DD Transceiver, MPO-16 APC MMF, 100m OM4 MMF, Can be used for 2X 200G-SR4 and 8x 50G-SR breakout	12	MPO-16 MMF APC
<b>QDD-400G-SR4.2-BD</b>	400G QSFP-DD Transceiver, MPO-12, 100m OM4 MMF, 400GBASE-SR4.2 compliant. Can be used for 4X breakout to QSFP-100G-SR1.2	12	MPO-12 MMF UPC
<b>QDD-400G-DR4-S</b>	400G QSFP-DD Transceiver, 400GBASE-DR4, MPO-12 parallel SMF, 500m	12	MPO-12 SMF APC
<b>QDD-4X100G-FR-S</b>	QSFP-DD Transceiver, 4x 100GBASE-FR1, MPO-12, 2km parallel SMF	12	MPO-12 SMF APC
<b>QDD-4X100G-LR-S</b>	QSFP-DD Transceiver, 4x 100GBASE-LR1, MPO-12, 10km parallel SMF	12	MPO-12 SMF APC
<b>QDD-400G-FR4-S</b>	400G QSFP-DD Transceiver, 400G-FR4, 2km Duplex SMF	12	Duplex LC SMF PC/UPC
<b>QDD-400G-LR4-S</b>	400G QSFP-DD Transceiver, 400G-LR4, 10km Duplex SMF, 100% compliant with 400GBASE-LR4-6	12	Duplex LC SMF PC/UPC
<b>QDD-400G-LR8-S</b>	400G QSFP-DD Transceiver, 400GBASE-LR8, 10km Duplex SMF	13	Duplex LC SMF PC/UPC
<b>QDD-2X100-SR4-S</b>	2x100GBASE-SR4 Transceiver, 100GBASE-SR4, MPO-24, 100m MMF	5	MPO-24 MMF UPC
<b>QDD-2X100-CWDM4-S</b>	2X 100G-CWDM4 Transceiver, 100G-CWDM4, Dual Duplex CS connector, 2km Duplex SMF	7	Dual Duplex CS SMF PC/UPC
<b>QDD-2X100-LR4-S</b>	2x100GBASE-LR4 Transceiver, 100GBASE-LR4, Dual Duplex CS connector, 10km SMF	8	Dual Duplex CS SMF PC/UPC

**Note:** Except for QDD-400G-SR8-S, QDD-400G-DR4-S, QDD-4X100G-FR-S, QDD-4X100G-LR-S, only connections with patch cords with PC or Ultra-Physical Contact (UPC) connectors are supported. QDD-400G-SR8-S, QDD-400G-DR4-S, QDD-4X100G-FR-S, QDD-4X100G-LR-S require patch cords with Angled Physical Contact (APC) MPO connectors. QDD-400G-SR8-S requires MPO-16 APC for MMF. All cables and cable assemblies used must be compliant with the standards specified in the standards section of this datasheet. For more information and references on QSFP-DD cable guides, please click on the following link: [Cisco Transceiver Modules – Brochures – Cisco](#).

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## 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-DD 400G ports of switches/routers within racks and across adjacent racks. Cisco currently offers passive copper cables in lengths of x=0.5, 1, 2, 2.5, and 3 meters. FEC is performed on the host platform.

### Cisco QDD-4ZQ100-CUxM



**Figure 2.**  
QDD-4ZQ100-CUxM

The Cisco 400G QDD-4ZQ100-CUxM passive copper cable (Figure 2) enables high-bandwidth breakout from a 400G port to four 100GE links. It provides a QSFP-DD-to-4x QSFP56 100GBASE-CR2 copper direct-attach solution. QDD-4ZQ100-CuxM cables are suitable for very short links and offer a cost-effective way to establish a 4x 100-Gigabit link between QSFP-DD 400G port and four 100GE ports to switch or servers within or to adjacent racks. Cisco currently offers passive copper cables in lengths of x=1, 2, 2.5, and 3 meters. . FEC is performed on the host platform.

### Cisco QDD-2Q200-CU3M



**Figure 3.**  
QDD-2Q200-CU3M

The Cisco QDD-2Q200-CU3M passive copper cable (Figure 3) provides high-bandwidth breakout from a 400G port to two 200GE links. It provides a QSFP-DD-to-2x QSFP56 200GBASE-CR4 copper direct-attach solution. QDD-2Q200-Cu3M cables are suitable for very short links and offer a cost-effective way to establish a 2x 200-

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Gigabit link between QSFP-DD 400G port and two 200GE ports to switches or servers within or to adjacent racks. Cisco currently offers passive copper cables in 3 meters lengths. FEC is perform on the host platform.

#### **Cisco QDD-400-AOCxM**



**Figure 4.**  
QDD- 400-AOCxM

The Cisco QDD-400-AOCxM modules (Figure 4) 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. FEC is perform on the host platform.

#### **Cisco QDD-400G-SR8-S**



**Figure 5.**  
QDD-400G-SR8-S

The Cisco QDD-400G-SR8-S Module (Figure 5) supports 400GE links and up to 8x 50GE breakouts or two 200GE breakout links lengths of up to 100m over OM4 MMF. The module has 8 pairs of MMF with an MPO-16 APC connector. It is compliant to the IEEE 802.3bm protocol and 400GAUI-8/CEI-56G-VSR-PAM4 standards. The 400 Gigabit Ethernet signal is carried over eight parallel pairs of fibers by 50Gbps signals per fiber. It can also be used as 8x 50GE breakout to SFP56-50G-SR modules or 2x QSFP-200G-SR4-S modules. FEC is performed on the host platform.

#### **Cisco QDD-400G-SR4.2-BD**



**Figure 6.**  
QDD-400G-SR4.2-BD

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The Cisco QDD-400G-SR4.2-BD Module (Figure 6) supports 400GE links and up to four 100GE breakout link lengths of up to 100m over OM4 MMF. The module has four pairs of MMF with an MPO-12 UPC connector. It is compliant to the IEEE 802.3bm protocol and 400GAUI-8/CEI-56G-VSR-PAM4 standards. The 400 Gigabit Ethernet signal is carried over four parallel pairs of fibers by two 50Gbps bidirectional wavelength per fiber. It can also be used as 4x100GE breakout to QSFP-100G-SR1.2 modules. FEC is performed on the host platform.

#### **QDD-400G-DR4-S**



**Figure 7.**  
QDD-400G-DR4-S

The Cisco QDD-400G-DR4-S Module (Figure 7) supports 400GE links and up to four 100GE breakout link lengths of up to 500m. The module has four pairs of SMF with an MPO-12 connector. It is compliant to the 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-DR, 100G-FR, and 100G-LR. FEC is performed on the host platform.

#### **QDD-4X100G-FR-S**



**Figure 8.**  
QDD-4X100G-FR-S

The Cisco QDD-4X100G-FR-S Module (Figure 8) supports 100G breakout link lengths of up to 2km. The module has four pairs of SMF with an MPO-12 connector. It is compliant to the IEEE 802.3cu for 100GBASE-FR1, 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-DR (up to 500m), 100G-FR, and 100G-LR. FEC is performed on the host platform.

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## QDD-4X100G-LR-S



**Figure 9.**  
QDD-4X100G-LR-S

The Cisco QDD-4X100G-LR-S Module (Figure 9) supports 100G breakout link lengths of up to 10km. The module has four pairs of SMF with an MPO-12 connector. It is compliant to the IEEE 802.3cu for 100GBASE-LR1, 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-DR (up to 500m), 100G-FR (up to 2km), and 100G-LR (up to 10km). FEC is performed on the host platform.

## QDD-400G-FR4-S



**Figure 10.**  
QDD-400G-FR4-S

The Cisco QDD-400G-FR4-S Module (Figure 10) supports link lengths of up to 2km SMF with duplex LC connector. It is compliant to IEEE 802.3cu for 400GBASE-FR4 requirements and 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.



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## QDD-400G-LR4-S



**Figure 11.**  
QDD-400G-LR4-S

The Cisco QDD-400G-LR4-S Module (Figure 11) supports link lengths of up to 10km SMF with duplex LC connector. It is compliant to IEEE 802.3cu for 400GBASE-LR4-6km requirements but extends the reach to 10km, is compliant to 100G Lambda MSA group 400G-LR4 requirements, 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.



**Figure 12.**  
QDD-2X100-SR4-S

The Cisco QDD-2X100-SR4-S module (Figure 12) 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. FEC is performed on the host platform.

## QDD-2X100-CWDM4-S



**Figure 13.**  
QDD-2X100-CWDM4-S

The Cisco QDD-2X100-CWDM4-S module (Figure 13) supports link lengths of up to 2km over SMF and uses a dual duplex CS connector. It is compliant to the 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.

### QDD-2X100-LR4-S



**Figure 14.**  
QDD-2X100-LR4-S

The Cisco QDD-2X100-LR4-S module (Figure 14) supports link lengths of up to 10km over SMF and uses a dual duplex CS connector. It is compliant to IEEE 802.3 100GBASE-LR4 requirements. The module provides backward compatibility to two 100GBASE-LR4 transceivers, improving port efficiency to legacy 100G optical interfaces.

**Table 3.** QSFP port and cabling specifications

Cisco 400G QSFP-DD	Nominal wavelength (nm)	Cable type	Core size (microns)	Modal bandwidth	Cable distance	Pull tab color
QDD-400-CU0.5M		Passive copper cable assembly			0.5m	Tan
QDD-400-CU1M					1 m	Tan
QDD-400-CU2M					2 m	Brown
QDD-400-CU2.5M					2.5 m	Yellow
QDD-400-CU3M					3 m	Orange
QDD-4ZQ100-CU1M					1m	Tan
QDD-4ZQ100-CU2M					2m	Brown
QDD-4ZQ100-CU2.5M					2.5m	Yellow
QDD-4ZQ100-CU3M					3m	Orange
QDD-2Q200-CU3M					3m	Orange

Cisco 400G QSFP-DD	Nominal wavelength (nm)	Cable type	Core size (microns)	Modal bandwidth	Cable distance	Pull tab color
QDD-400-AOC1M		Active optical cable assembly			1 m	Beige
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-SR8-S	850	MMF	50	2000 (OM3) 4700 (OM4) 4700 (OM5)	70m (OM3) 100m (OM4)	Tan
QDD-400G-SR4.2-BD	850, 908	MMF	50	2000 (OM3) 4700 (OM4) 4700 (OM5)	70m (OM3) 100m (OM4) 150m (OM5)	Gray
QDD-400G-DR4-S	1310	SMF	G.652		500 m	Orange
QDD-4X100G-FR-S	1310	SMF	G.652		2 km	Green
QDD-4X100G-LR-S	1310	SMF	G.652		10 km	Blue
QDD-400G-FR4-S	1270, 1290, 1310, 1330	SMF	G.652		2 km	Green
QDD-400G-LR4-S	1270, 1290, 1310, 1330	SMF	G.652		10 km	Blue
QDD-400G-LR8-S	1273, 1277, 1282, 1286, 1295, 1300, 1304, 1309	SMF	G.652		10 km	Blue
QDD-2X100-SR4-S	850	MMF	50	2000 (OM3) 4700 (OM4)	70m 100m	Beige
QDD-2X100-CWDM4-S	1270, 1290, 1310, 1330	SMF	G.652		2 km	Green
QDD-2X100-LR4-S	1295, 1300, 1304, 1309	SMF	G.652		10 km	Blue

## 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

**Table 4.** Electrical specifications

Product	Description	Nominal Datarate (Gbs)	High-speed electrical	Link meter
<b>QDD-400-CUxM</b>	400G QSFP-DD, Passive Copper Cable	425	400GAUI-8 C2M, OIF CEI-56G-VSR-PAM4	0.5, 1, 2, 2.5, 3
<b>QDD-4ZQ100-CUxM</b>	400G QSFP-DD to 4x QSFP56 100GBASE-CR2, Passive Copper Cable	4x 100GE	4x 100GBASE-CR2, OIF CEI-56G-VSR-PAM4	1,2,2.5,3
<b>QDD-2Q200-CU3M</b>	400G QSFP-DD to 2x QSFP56 200GBASE-CR4, Passive Copper Cable	2x 200GE	4x 100GBASE-CR2, OIF CEI-56G-VSR-PAM4	3
<b>QDD-400-AOCxM</b>	400G QSFP-DD Transceiver, Active Copper Cable	425	400GAUI-8	1,2,3,5,7,10,15, 20,25, 30
<b>QDD-400G-SR8-S</b>	400G QSFP-DD Transceiver, MPO-16 APC MMF, 100m OM4 MMF, Can be used for 2X 200G-SR4 and 8x 50G-SR breakout	425	400GAUI-8/CEI-56G-VSR- PAM4	70m (OM3) 100m (OM4)
<b>QDD-400G-SR4.2-BD</b>	400G QSFP-DD Transceiver, MPO-12 UPC, 100m OM4 MMF, 400GBASE-SR4.2, Can be used for 4X breakout to QSFP-100G-SR1.2	425	400GAUI-8/CEI-56G-VSR- PAM4	70m (OM3) 100m (OM4) 150m (OM5)
<b>QDD-400G-DR4-S</b>	400G QSFP-DD Transceiver, 400GBASE-DR4, MPO-12, 500m parallel SMF	425	400GAUI-8/CEI-56G-VSR- PAM4	500 m
<b>QDD-4X100G-FR-S</b>	QSFP-DD Transceiver, 4X 100GBASE-FR1, MPO-12, 2km parallel SMF	4x 100GE	400GAUI-8/CEI-56G-VSR- PAM4	2 km
<b>QDD-4X100G-LR-S</b>	QSFP-DD Transceiver, 4X 100GBASE-LR1, MPO-12, 10km parallel SMF	4x 100GE	400GAUI-8/CEI-56G-VSR- PAM4	10 km
<b>QDD-400G-FR4-S</b>	400G QSFP-DD Transceiver, 400G- FR4, Duplex LC, 2km Duplex SMF	425	400GAUI-8/CEI-56G-VSR- PAM4	2 km
<b>QDD-400G-LR4-S</b>	400G QSFP-DD Transceiver, 400G- LR4, Duplex LC, 10km Duplex SMF	425	400GAUI-8/CEI-56G-VSR- PAM4	10 km

Product	Description	Nominal Datarate (Gbs)	High-speed electrical	Link meter
<b>QDD-400G-LR8-S</b>	400G QSFP-DD Transceiver, 400GBASE-LR8, Duplex LC, 10km Duplex SMF	425	400GAUI-8/CEI-56G-VSR- PAM4	10 km
<b>QDD-2X100-SR4-S</b>	2x 100G QSFP-DD Transceiver, 2x 100GBASE-SR4, MPO-24 MMF, 100m OM4	2x100GE	2x 100G CAUI-4	100 m
<b>QDD-2X100-CWDM4-S</b>	2x 100G QSFP-DD Transceiver, 2x 100G-CWDM4, Dual Duplex CS connector SMF, 2km SMF	2X 100GE	2x 100G CAUI-4	2 km
<b>QDD-2X100-LR4-S</b>	2x 100G QSFP-DD Transceiver, 2x 100GBASE-LR4, Dual Duplex CS connector, 10km SMF	2X 100GE	2x 100G CAUI-4	10 km

**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 <sup>1</sup>	Average Receive Power per lane (dBm) max	Maximum Supported Insertion Loss (IL) (dB)	Wavelength (nm)	Pre-FEC
<b>QDD-400G-SR8-S</b>	400G QSFP-DD Transceiver, MPO-16 APC MMF, 100m OM4 MMF, Can be used for 2X 200G-SR4 and 8x 50G-SR breakout	-6.5	4	-8.4	4	1.9	840-860	2.4x10 <sup>-4</sup>
<b>QDD-400G-SR4.2-BD</b>	400G QSFP-DD Transceiver, MPO-12 UPC, 100m OM4 MMF, 400GBASE-SR4.2, Can be used for 4X breakout to QSFP-100G- SR1.2	-6.2	4	-8.2	4	1.9	855, 908	2.4x10 <sup>-4</sup>
<b>QDD-400G-DR4-S</b>	400G QSFP-DD Transceiver, 400GBASE-DR4, MPO-12, 500m parallel SMF	-2.9	4	-5.9	4	3	1310	2.4x10 <sup>-4</sup>
<b>QDD-4X100G-FR-S</b>	QSFP-DD Transceiver, 4X 100GBASE-FR1, MPO-12, 2km parallel SMF	-3.1	4	-7.1	4	4	1310	2.4x10 <sup>-4</sup>

Product	Description	Average Transmit Power per lane (dBm) min	Average Transmit Power per lane (dBm) max	Average Receive Power per lane (dBm) min <sup>1</sup>	Average Receive Power per lane (dBm) max	Maximum Supported Insertion Loss (IL) (dB)	Wavelength (nm)	Pre-FEC
<b>QDD-4X100G-LR-S</b>	QSFP-DD Transceiver, 4X 100GBASE-LR1, PO-12, 10km parallel SMF	-1.9	4.8	-8.2	4.8	6.3	1310	2.4x10 <sup>-4</sup>
<b>QDD-400G-FR4-S</b>	400G QSFP-DD Transceiver, 400GBASE-FR4, Duplex LC, 2km Duplex SMF	-3.2	3.5	-7.3	3.5	4	1270, 1290, 1310, 1330	2.4x10 <sup>-4</sup>
<b>QDD-400G-LR4-S</b>	400G QSFP-DD Transceiver, 400GBASE-LR4, Duplex LC, 10km Duplex SMF	-2.7	5.1	-9.0	5.1	6.3	1270, 1290, 1310, 1330	2.4x10 <sup>-4</sup>
<b>QDD-400G-LR8-S</b>	400G QSFP-DD Transceiver, 400GBASE-LR8, Duplex LC, 10km Duplex SMF	-2.8	5.3	-9.1	5.3	6.3	1273, 1277, 1282, 1286, 1295, 1300, 1304, 1309	2.4x10 <sup>-4</sup>
<b>QDD-2X100-SR4-S</b>	2x 100G QSFP-DD Transceiver, 2x 100GBASE-SR4, MPO-24 MMF, 100m OM4	-8.4	2.4	-10.3	2.4	1.9	840 to 860	5x10 <sup>-5</sup>
<b>QDD-2X100-CWDM4-S</b>	2x 100G QSFP-DD Transceiver, 2x 100G-CWDM4, Dual Duplex CS connector SMF, 2km SMF	-6.5	2.5	-11.5	2.5	5	1271, 1291, 1311, 1331	5x10 <sup>-5</sup>

Product	Description	Average Transmit Power per lane (dBm) min	Average Transmit Power per lane (dBm) max	Average Receive Power per lane (dBm) min <sup>1</sup>	Average Receive Power per lane (dBm) max	Maximum Supported Insertion Loss (IL) (dB)	Wavelength (nm)	Pre-FEC
<b>QDD-2X100-LR4-S</b>	2x 100G QSFP-DD Transceiver, 2x 100GBASE-LR4, Dual Duplex CS connector, 10km SMF	-4.3	4.5	-10.6	4.5	6.3	1295, 1300, 1304, 1309	10 <sup>-12</sup> (no FEC)

<sup>1</sup> 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
<b>Module dimension with pull tab</b>		(H x W x D) 8.5 x 18.4 x 78.3/93.3 mm
<b>Module weight (Max)</b>	Optical modules	100 g
	QDD-400-CU0.5M	250 g
	QDD-400-CU1M	250 g
	QDD-400-CU2M	450 g
	QDD-400-CU2.5M	550 g
	QDD-400-CU3M	600 g
	QDD-4ZQ100CU1M	400g
	QDD4ZQ100-CU2M	600 g
	QDD-4ZQ100-CU2.5M	700 g
	QDD-4ZQ100-CU3M	800 g
	QDD-2Q200-CU3M	600 g
	QDD-400-AOC1M	160 g
	QDD-400-AOC2M	180 g
	QDD-400-AOC3M	190 g
	QDD-400-AOC5M	200 g
	QDD-400-AOC7M	230 g
QDD-400-AOC10M	270 g	

Module		Specification
	QDD-400-AOC15M	320 g
	QDD-400-AOC20M	390 g
	QDD-400-AOC25M	430 g
	QDD-400-AOC30M	490 g
<b>QDD-400G Module operation temperature</b>		0 to 75° C
<b>QDD-2X100 Module operation temperature</b>		0 to 70° C
<b>Active optical cable</b>		0 to 70° C
<b>Copper cable operation temperature</b>		0 to 70° C
<b>Storage temperature</b>		-40 to 85° C

## QSFP-DD Breakout Capability and Module Interoperation

Some of Cisco's QSFP-DD modules have the capability to be operated in breakout mode on specific platforms. This allows the QSFP-DD port to be configured as if it were two or four 100GE ports. This function provides users the ability to use the latest platforms with 400G ports with the latest features while still providing connectivity to existing 100G platforms that are already in the network. This eases the migration to 400GE on a port-by-port basis while providing very high density 100GE interfaces. These modules will interoperate with Cisco as well as 3rd party modules that comply with the same standards. [Tables 7-10](#) provides a brief overview of the various optical breakout options, compatibility and reach to 100GE modules. Module optical interoperability can also be verified with the [Cisco Module Interoperability Matrix](#).

**Table 7.** QSFP-DD SMF PAM4 Breakout Interoperation and Link Reach

Standard (PAM4)	400GBASE-DR4	100GBASE-DR1	100GBASE-FR1			100GBASE-LR1		100G-LR1- 20 <sup>2</sup>
Product ID	QDD-400G-DR4	QSFP-100G-DR-S	QDD-4X100G-FR-S	QSFP-100G-FR-S	CPAK-100G-FR	QDD-4X100G-LR-S	QSFP-100G-LR-S	QSFP-100G-ERL-S
<b>QDD-400G-DR4-S (4x 100G Breakout)</b>		500m SMF (3dB)	500m SMF (3dB)			500m SMF (3dB)		
<b>QDD-4X100G-FR-S (4x 100G Breakout)</b>		500m SMF (3dB)	2km SMF (4dB)			2km SMF (4dB)		
<b>QDD-4X100G-LR-S (4x 100G Breakout)</b>		500m SMF (3dB)	2km SMF (4dB)			10 km SMF (6.3dB)		

<sup>2</sup> 100G-LR-20 is a standard of the 100G Lambda MSA ([www.100glambda.com](http://www.100glambda.com))

<sup>3</sup> 100G-CWDM4 is compliant to the requirements from the CWDM4 Group MSA ([CWDM4-MSA Group](#))

<sup>4</sup> QSFP-100G-SM-SR is compatible with 100G-CWDM4 except with 4.2dB link margin



**Table 8.** QSFP-DD SMF PAM4 Duplex Interoperation and Link Reach

Standard (PAM4)	400GBASE-FR4		400G-LR4	400GBASE-LR4-6 <sup>1</sup>
Product ID	QDD-400G-FR4-S	QDD-2X400G-FR4	QDD-400G-LR4-S	
QDD-400G-FR4-S	2km (4dB)	2km (4dB)	2km (4dB)	2km (4dB)
QDD-400G-LR4-S	2km (4dB)	2km (4dB)	10km (6.3dB)	6km (6.3dB)

<sup>1</sup> 400GBASE-LR4-6 is the IEEE requirement is limited to 6km reach, the QDD-400G-LR4 module is 100% compatible with this requirement, but has a reachG of 10km.

**Table 9.** QSFP-DD MMF PAM4 Duplex Interoperation and Link Reach

Standard (PAM4)		50GBASE-SR		200GBASE-SR4	
Product ID	QSFP-100G-SR1.2	SFP-50G-SR	SFP-50G-SL	QSFP-200G-SR4-S	QSFP-200G-SL4-S
QDD-400G-SR4.2-BD (4x 100G Breakout)	70m (OM3) 100m (OM4) 150m (OM5) (1.9dB)				
QDD-400G-SR8-S (2x 200GE and 8x 50G Breakout)		70m (OM3) 100m (OM4) 100m (OM5) (1.9dB)	20m (OM3) 30m (OM4) 30m (OM5) (1.6dB)	70m (OM3) 100m (OM4) 100m (OM5) (1.9dB)	20m (OM3) 30m (OM4) 30m (OM5) (1.6dB)

**Table 10.** QSFP-DD 2x100G NRZ Interoperation and Link Reach

Standard (NRZ)	100GBASE-SR4		100G-CWDM4 <sup>3</sup>		100G-CWDM4	100GBASE-LR4			
Product ID	QSFP-100G-SR4-S	CPAK-100G-SR4	QSFP-100G-CWDM4-S	CPAK-100G-CWDM4	QSFP-100G-SM-SR4	QSFP-100G-LR4-S	CPAK-100G-LR4	CPAK-100GE-LR4	CFP-100G-LR4
QDD-2X100-SR4-S (2x 100G Breakout)	70m (OM3) 100m (OM4) (1.9dB)								
QDD-2X100-CWDM4-S			2km SMF (5dB)		2km SMF (4.2dB)				
QDD-2X100-LR4-S						10km SMF (6.3 dB)			

**Table 11.** Ordering information

Part ID	Product description
QDD-400-CU0.5M	400G QSFP-DD Transceiver, Passive Copper Cable, 0.5 meter
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-4ZQ100-CU1M	QSFP-DD 4x 100GBASE-CR2 Passive Breakout Copper Cable, 1 meter
QDD-4ZQ100-CU2M	QSFP-DD 4x 100GBASE-CR2 Passive Breakout Copper Cable, 2 meters
QDD-4ZQ100-CU2.5M	QSFP-DD 4x 100GBASE-CR2 Passive Breakout Copper Cable, 2.5 meters
QDD-4ZQ100-CU3M	QSFP-DD 4x 100GBASE-CR2 Passive Breakout Copper Cable, 3 meters
QDD-2Q200-CU3M	QSFP-DD 2x 200GBASE-CR4 Passive Breakout 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-SR8-S	400G QSFP-DD Transceiver, 400GBASE-SR8, MPO16 APC MMF 100m
QDD-400G-SR4.2-BD	400G QSFP-DD Transceiver, 400GBASE-SR4.2, MPO-12 MMF, 100m
QDD-400G-DR4-S	400G QSFP-DD Transceiver, 400GBASE-DR4, MPO-12, 500m parallel SMF
QDD-4X100G-FR-S	QSFP-DD Transceiver, 4x 100GBASE-FR1, MPO-12, 2km parallel SMF
QDD-4X100G-LR-S	QSFP-DD Transceiver, 4x 100GBASE-LR1, MPO-12, 10km parallel SMF
QDD-400G-FR4-S	400G QSFP-DD Transceiver, 400G-FR4, Duplex LC, 2km Duplex SMF

Part ID	Product description
<b>QDD-400G-LR4-S</b>	400G QSFP-DD Transceiver, 400G-LR4, Duplex LC, 10km Duplex SMF
<b>QDD-400G-LR8-S</b>	400G QSFP-DD Transceiver, 400GBASE-LR8, 10km Duplex SMF, 10km
<b>QDD-2X100-SR4-S</b>	2x100G QSFP-DD Transceiver, 2X 100GBASE-SR4, MPO-24 MMF, 100m OM4
<b>QDD-2X100-CWDM4-S</b>	2X 100G QSFP-DD Transceiver, 2X 100G-CWDM4, Dual Duplex CS, 2km SMF
<b>QDD-2X100-LR4-S</b>	2x 100G QSFP-DD Transceiver, 2x 100GBASE-LR4, Dual Duplex CS, 10km 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
- 400G-LR4 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
- IEEE 802.3ba CL88
- IEEE 802.3bs 400GAUI-8 Annex 120E
- IEEE 802.3cd CL136
- IEEE 802.3cu CL140

## 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

**Table 12.** Laser class for QSFP-DD modules

Part ID	Laser Class
QDD-400G-SR8-S	1
QDD-400G-SR4.2-BD	1
QDD-400G-DR4-S	1
QDD-4X100G-FR-S	1
QDD-4X100G-LR-S	1
QDD-400G-FR4-S	1
QDD-400G-LR4-S	1
QDD-400G-LR8-S	1
QDD-2X100-SR4-S	1
QDD-2X100-CWDM4-S	1
QDD-2X100-LR4-S	1

## Product sustainability

Information about Cisco's Environmental, Social and Governance (ESG) initiatives and performance is provided in Cisco's CSR and sustainability [reporting](#).

**Table 13.** Cisco environmental sustainability information

Sustainability Topic		Reference
General	Information on product-material-content laws and regulations	<a href="#">Materials</a>
	Information on electronic waste laws and regulations, including our products, batteries and packaging	<a href="#">WEEE Compliance</a>
	Information on product takeback and reuse program	<a href="#">Cisco Takeback and Reuse Program</a>
	Sustainability Inquiries	Contact: <a href="mailto:csr_inquiries@cisco.com">csr_inquiries@cisco.com</a>
Power	QSFP-DD Port cabling specifications	<a href="#">Table 3</a>
Material	Product packaging weight and materials	Contact: <a href="mailto:environment@cisco.com">environment@cisco.com</a>

## Warranty

Standard warranty: 5 years

Expedited replacement available via a Cisco SMARTnet® Service support contract

## Cisco Capital

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## Additional information

For more information about Cisco 400G QSFP-DD copper modules, contact your sales representative or visit [https://www.cisco.com/en/US/products/hw/modules/ps5455/prod\\_module\\_series\\_home.html](https://www.cisco.com/en/US/products/hw/modules/ps5455/prod_module_series_home.html).

## Document history

New or Revised Topic	Described In	Date
<b>Initial Release</b>		Jan 4, 2020
<b>Addition QDD-400G-DR4-S; QDD-400G-FR4-S, QDD-2X100-SR4-S; QDD-2X100-CWDM4-S</b>	<a href="#">Table 2</a>	May 15, 2020
<b>Addition of QDD-400G-LR8-S</b>	<a href="#">Table 2</a>	Oct 15, 202
<b>Addition of QDD-400-AOCxM; QDD-4X100G-FR-S; QDD-4X100G-LR-S; QDD-2X100-LR4-S</b>	<a href="#">Table 2</a>	July 15, 2021
<b>Addition of QDD-400G-LR4-S and QSFP-DD Breakout Interoperation and Link Reach Table</b>	<a href="#">Table 2, 7</a>	Nov 1, 2021
<b>Addition of QDD-400G-SR8-S, QDD-400G-SR4.2-BD, editorial to AOC and table 7</b>	Various	Feb 10, 2023
<b>Addition of QDD-4ZQ100-CUxM and QDD-2Q200-CU3M, editorial</b>	Various	June 22, 2023

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