

A dark, monochromatic photograph of a server room with rows of server racks and overhead lighting. A red circle is positioned above the first '4' in the title text.

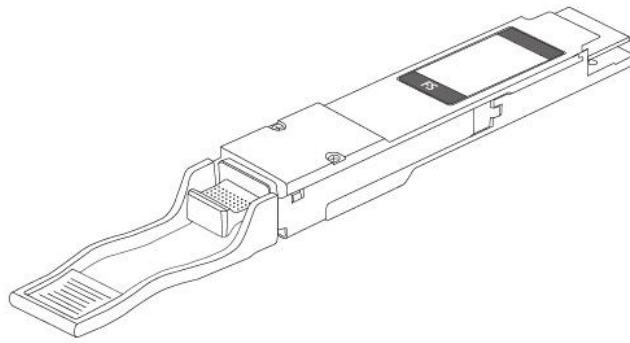
# 400G QSFP-DD Cable and Transceiver Modules Data Sheet

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## Product overview

The FS® 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. (See Figure 1).



- QSPDD-SR8-400G
- QSPDD-FR4-400G
- QDD-DR4-400G-Si
- QSPDD-LR4-400G

**Figure 1.**  
QSFP-DD 400G Optical modules

## Features and benefits

- Hot-swappable input/output device that plugs into 400G Ethernet QSFP port
- Interoperable with other IEEE-compliant 400GBASE interfaces where applicable
- Certified and tested on Cisco, Arista, Juniper, Dell QSFP-DD ports for superior performance, quality, and reliability. For more details, refer to the [FS Assured Program for Transceivers](#)
- High-speed electrical interface compliant to IEEE 802.3bm

Table 1 describes the 400G QSFP-DD portfolio.

**Table 1. 400G QSFP-DD portfolio**

Product	Description	Connector type
QSPDD-SR8-400G	400GBASE SR8 QSFP-DD Transceiver, MTP/MPO, 100m over OM4 MMF	MTP/MPO-16 (16fibers)
QSPDD-FR4-400G	400GBASE FR4 QSFP-DD Transceiver, Duplex LC, 2km over SMF	Duplex LC
QDD-DR4-400G-Si	400GBASE DR4 QSFP-DD Transceiver, MTP/MPO, 500m over SMF	MTP/MPO-12 (12fibers)
QSPDD-LR4-400G	400GBASE LR4 QSFP-DD Transceiver, Duplex LC, 10km over SMF	Duplex LC

Product	Description	Connector type
QSFDD-ER8-400G	400GBASE ER8 QSFP-DD Transceiver, Duplex LC, 40km over SMF	Duplex LC
QSFDD-PLR4-400G	400GBASE PLR4 QSFP-DD Transceiver, MTP/MPO, 10km over SMF	MTP/MPO-12 (12fibers)
QSFDD-LR8-400G	400GBASE LR8 QSFP-DD Transceiver, Duplex LC, 10km over SMF	Duplex LC
QSFDD-XDR4-400G	400GBASE XDR4 QSFP-DD Transceiver, MTP/MPO, 2km over SMF	MTP/MPO-12 (12 fibers)
OSFP-DR4-400G-Si	400GBASE DR4 QSFP-DD Transceiver, MTP/MPO, 500m over SMF	MTP/MPO-12 (12fibers)
OSFP-LR8-400G	400GBASE LR8 QSFP-DD Transceiver, Duplex LC, 10Km over SMF	Duplex LC
OSFP-SR8-400G	400GBASE SR8 QSFP-DD Transceiver, MTP/MPO, 100m over MMF	MTP/MPO-16 (16fibers)
Q112-DR4-400G	400GBASE DR4 QSFP112 Transceiver, MTP/MPO, 500m over SMF	MTP/MPO-12 (12fibers)
Q112-PCxx (0.5M, 1M, 1.5M)	400GBASE QSFP112 Passive Copper Cable	-
QSFP-DD-PCxx (0.5M, 1M, 1.5M, 2M, 2.5M, 3M)	400GBASE QSFP-DD Passive Copper Cable	-
QDD-ACxx (1M, 2M, 3M, 5M, 7M)	400GBASE QSFP-DD Active Copper Cable	-
Q112-ACxx (1M, 2M, 3M, 4M, 5M)	400GBASE QSFP112 Active Copper Cable	-
Q-2Q56PCxx (0.5M, 1M, 1.5M, 2M, 2.5M, 3M)	400GBASE QSFP-DD to 2xQSFP56200G Passive Copper Splitter Cables	-
QDD-2Q56ACxx (1M, 2M, 3M, 5M, 7M)	400GBASE QSFP-DD to 2xQSFP56200G Active Copper Splitter Cables	-
Q-4Q28ACxx (1M, 3M, 5M)	400GBASE QSFP-DD to 4xQSFP28100G Active Copper Splitter Cables	-
Q-4Q56PCxx (0.5M, 1M, 1.5M, 2M, 2.5M, 3M)	400GBASE QSFP-DD to 4xQSFP56100G Passive Copper Splitter Cables	-
Q-8S56PCxx (0.5M, 1M, 1.5M, 2M, 2.5M, 3M)	400GBASE QSFP-DD to 8xSFP5650G Passive Copper Splitter Cables	-
QSFP-DD-AOxx (1M, 2M, 3M, 5M, 7M, 10M, 15M, 20M, 25M, 30M, 50M, 70M, 100M)	400GBASE QSFP-DD Active Optical Cables	-
QDD-2Q56AOxx (1M, 2M, 3M, 5M, 7M, 10M, 15M, 20M, 25M, 30M)	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables	-
QDD-4Q56AOxx (1M, 2M, 3M, 5M, 7M, 10M, 15M, 25M, 30M, 50M)	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables	-

**QSFPDD-SR8-400G**

The QSFPDD-SR8-400G Module supports link lengths of up to 70m (100m) over OM3 (OM4) Multimode Fiber with MTP/ MPO connectors. It is compliant to IEEE 802.3bs protocol and 400GAUI-8/CEI-56G-VSR-PAM4 standard. The 400 Gigabit Ethernet signal is carried over eight wavelengths. Multiplexing and demultiplexing of the eight wavelengths are managed within the device.

**QSFPDD-FR4-400G**

The QSFPDD-FR8-400G Module 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.

**QDD-DR4-400G-Si**

The QDD-DR4-400G-Si Module supports link lengths of up to 500m SMF with MTP/MPO-12 connector. It is compliant with QSFP-DD MSA, IEEE 802.3bs protocol and 400GAUI-8 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-DR-100G.

**QSFPDD-LR4-400G**

The QSFPDD-LR4-400G Module 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.

**QSFPDD-ER8-400G**

The QSFPDD-ER8-400G Module supports link lengths of up to 40km over a standard pair of G.652 single mode fiber (SMF) with duplex LC connectors. It is compliant to IEEE 802.3cn protocol and 400GAUI-8, QSFP-DD HW Rev 5.0 and QSFP-DD CMIS Rev 4.0 standard. The 400 Gigabit Ethernet signal is carried over eight wavelengths. Multiplexing and demultiplexing of the eight wavelengths are managed within the device.

**QSFPDD-PLR4-400G**

The QSFPDD-PLR4-400G Module supports link lengths of up to 10km parallel SMF with MTP/MPO-12 connector. It is compliant to IEEE 802.3bs protocol and 400GAUI-8 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-LR-100G.

**QSFPDD-LR8-400G**

The QSFPDD-LR8-400G Module supports link lengths of up to 10km over a standard pair of G.652 single mode fiber (SMF) with duplex LC connectors. It is compliant to IEEE 802.3bs protocol and 400GAUI-8/CEI-56G-VSR-PAM4 standard. The 400 Gigabit Ethernet signal is carried over eight wavelengths. Multiplexing and demultiplexing of the eight wavelengths are managed within the device.

### QSFPDD-XDR4-400G

The QSFPDD-XDR4-400G Module supports link lengths of up to 2km parallel SMF with MTP/MPO-12 connector. It is compliant to IEEE 802.3bs protocol and 400GAUI-8 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-FR-100G.

### OSFP-DR4-400G-Si

The OSFP-DR4-400G-Si Module supports link lengths of up to 500m SMF with MTP/MPO-12 connector. It is compliant with OSFP MSA, CMIS 4.0 I2C Interface and 400GAUI-8 standards. The 400 Gigabit Ethernet signal is carried over four parallel 1310nm optical lanes by one wavelength per lane. It can be used as 4x100G breakout to QSFP28-DR-100G.

### OSFP-LR8-400G

The OSFP-LR8-400G Module supports link lengths of up to 10km over single mode fiber (SMF) with duplex LC connector. It is compliant to ICMIS Rev 4.0, IEEE 802.3bs and OSFP MSA standard. The 400 Gigabit Ethernet signal is carried over eight wavelengths. Multiplexing and demultiplexing of the eight wavelengths are managed within the device.

### OSFP-SR8-400G

The OSFP-SR8-400G Module supports up to 100m link lengths over multimode fiber (MMF) with MTP/MPO-16 connector. The 400 Gigabit Ethernet signal is carried over eight wavelengths. It is compliant with OSFP MSA, IEEE 802.3bs protocol and 400GAUI-8 standards, and is suitable for 400G Ethernet, Data Center and Cloud Networks.

### Q112-DR4-400G

The 400GBASE-DR4 module supports link lengths of up to 500m SMF fiber (MMF) with MTP/MPO-12 connector. This transceiver is compliant with QSFP112 MSA, CMIS 5.0 Interface and 400GAUI-4 standards. It is suitable for 400G ethernet and data center interconnect applications.

### Q112-PCxx

Q112-PCxx copper direct-attach cables (Figure 2) is a 4-channel parallel copper direct attach cable for storage, data center, and high performance computing connectivity. FS currently offers passive copper cables in lengths of x= 0.5, 1 and 1.5 meters.



**Figure 2.**

Q112-PCxx cables

### QSFP-DD-PCxx

QSFP-DD-PCxx copper direct-attach cables (Figure 3) primarily enables high-bandwidth 400G links and supports 400G Ethernet rate. It provides a QSFP-DD-to-QSFP-DD copper direct-attach solution. They are suitable for very short links and offer a cost-effective way to establish a 400-Gigabit link between QSFP-400G ports of switches/routers within racks and across adjacent racks. FS currently offers passive copper cables in lengths of  $x= 0.5, 1, 1.5, 2, 2.5$  and 3 meters.



**Figure 3.**  
QSFP-DD-PCxx cables

### Q112-ACxx

Q112-ACxx copper direct-attach cables (Figure 4) primarily enables high-bandwidth 400G links and supports 400G Ethernet rate. It provides a QSFP112-to-QSFP112 copper direct-attach solution. They are suitable for very short links and offer a cost-effective way to establish a 400-Gigabit link between QSFP112-400G ports of switches/routers within racks and across adjacent racks. FS currently offers passive copper cables in lengths of  $x= 1, 2, 3, 4$  and 5 meters.



**Figure 4.**  
Q112-ACxx cables

## QDD-ACxx

QDD-ACxx copper direct-attach cables (Figure 5) primarily enables high-bandwidth 400G links and supports 400G Ethernet rate. It provides a QSFP-DD-to-QSFP-DD copper direct-attach solution. They are suitable for very short links and offer a cost-effective way to establish a 400-Gigabit link between QSFP-400G ports of switches/routers within racks and across adjacent racks. FS currently offers passive copper cables in lengths of  $x= 1, 2, 3, 5$  and 7 meters.



**Figure 5.**

QDD-ACxx cables

## Q-2Q56PCxx

400G QSFPDD to two QSFP56-200G copper direct-attach breakout cable (Figure 6) assembly is designed to meet the high density requirements of standard and combo connector configurations. QSFP-DD pluggable solutions enable 400G transmission. It is fully compliant with SFF-8679, QSFP-DD MSA, IEEE802.3bj, and IEEE802.3cd standards. QSFP-DD to two QSFP56-200G QSFP56 cable assemblies are high performance, high bandwidth and cost effective interconnect solutions that support 400G standard applications with different data rates. FS currently offers passive copper cables in lengths of  $x= 0.5, 1, 1.5, 2, 2.5$  and 3 meters.



**Figure 6.**

Q-2Q56PCxx cables

## QDD-2Q56ACxx

400G QSFPDD to two QSFP56-200G copper direct-attach breakout cable (Figure 7) assembly is designed to meet the high density requirements of standard and combo connector configurations. QSFP-DD pluggable solutions enable 400G transmission. It is fully compliant with QSFP-DD MSA, SFF-8636, SFF-8679 standards. QSFP-DD to 2x QSFP56 cable assemblies are high performance, high bandwidth and cost effective interconnect solutions that support 400G standard applications with different data rates. FS currently offers active copper cables in lengths of x=1, 2, 3, 5 and 7 meters.



**Figure 7.**

QDD-2Q56ACxx cables

## Q-4Q28ACxx

400G QSFPDD to four QSFP28-100G AOC cable (Figure 8) assembly is designed to meet the high density requirements of standard and combo connector configurations. QSFP-DD pluggable solutions enable 400G transmission. It is fully compliant with SFF-8636, QSFP-DD MSA standards. QSFP-DD to 4xQSFP28 cable assemblies are high performance, high bandwidth and cost effective interconnect solutions that support 400G standard applications with different data rates. FS currently offers active optical cables in lengths of x=1, 2 and 3 meters.



**Figure 8.**

Q-4Q28ACxx cables

### Q-4Q56PCxx

400G QSFPDD to four QSFP56-100G copper direct-attach breakout cable (Figure 8) assembly is designed to meet the high density requirements of standard and combo connector configurations. QSFP-DD pluggable solutions enable 400G transmission. This hot-swappable transceiver integrates 8 transmit and 8 receive channels. 400G QSFPDD to four QSFP56-100G cable assemblies are high performance, high bandwidth and cost effective interconnect solutions that support 400G standard applications with different data rates. FS currently offers passive copper cables in lengths of  $x= 0.5, 1, 1.5, 2, 2.5$  and 3 meters.



Figure 9.

Q-4Q56PCxx cables

### Q-8S56PCxx

400G QSFPDD to eight QSFP56-50G copper direct-attach breakout cable (Figure 9) assembly is designed to meet the high density requirements of standard and combo connector configurations. QSFP-DD pluggable solutions enable 400G transmission. QSFP-DD to 8xSFP56 cable assemblies are high performance, high bandwidth and cost effective interconnect solutions that support 400G standard applications with different data rates. FS currently offers passive copper cables in lengths of  $x= 0.5, 1, 1.5, 2, 2.5$  and 3 meters.



Figure 10.

Q-8S56PCxx cables

## QSFP-DD-AOxx

400G QSFPDD active optical cables (Figure 10) are designed for use in 400 Gigabit Ethernet links over OM4 multimode fibers, and contain eight multi-mode fibers (MMF) optic transceivers per end, each operating at data rates of up to 53Gb/s. This active optical cable is compliant with IEEE 802.3cd, OIF-CEI-04.0, QSFP-DD MSA and QSFP-DD-CMIS-rev4p0. FS currently offers active optical cables in lengths of x=1, 2, 3, 5, 7, 10, 15, 20, 25, 30,



**Figure 11.**

QSFP-DD-AOxx cables

## QDD-2Q56AOxx

400G QSFPDD to two QSFP56-200G AOC cable (Figure 11) is compliant with IEEE 802.3, QSFP-DD MSA, SFF-8024, SFF-8679, SFF-8665, OIF-CEI-04.0 and CMIS 4.0. The built-in digital diagnostics monitoring (DDM) allows access to real-time operating parameters. It provides connectivity between system units with a 400GbE connector on one side and two separate 200GbE connectors on the other side and is suitable for Data Center Applications. FS currently offers active optical cables in lengths of x=1, 2, 3, 5, 7, 10, 15, 20, 25 and 30 meters.

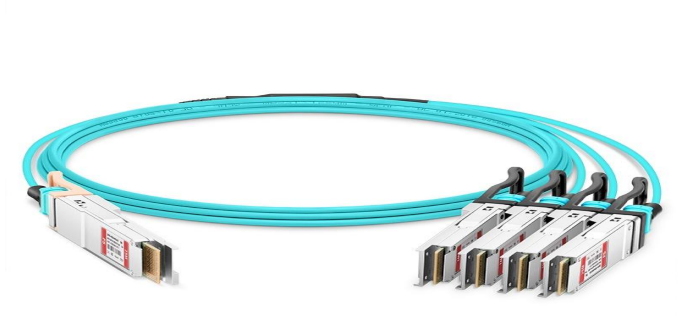


**Figure 12.**

QDD-2Q56AOxx cables

## QDD-4Q56A0xx

400G QSFPDD to four QSFP56-100G AOC cable (Figure 12) is designed for use in 400 Gigabit Ethernet links over OM3 multimode fibers, each operating at data rates of up to 53.125Gbps per channel by PAM4 modulation. This breakout cable is compliant with IEEE 802.3cd, OIF-CEI, QSFP-DD MSA, QSFP-DD-CMIS, IEEE 802.3bs Annex120E SFF-8024, SFF-8679, SFF-8665 standards. FS currently offers active optical cables in lengths of x=1, 2,



**Figure 12.**

QDD-4Q56A0xx cables

## Product Specifications

Table 2 shows the key electrical characteristics for the 400G QSFP-DD modules.

**Table 2. Electrical specifications**

Product	Description	Nominal data rate (Gbs)	High-speed electrical	Link meter
QSFDD-SR8-400G	400GBASE SR8 QSFP-DD Transceiver, MTP/MPO, 100m over OM4 MMF	400Gbps	400G CAUI-8	100m
QSFDD-FR4-400G	400GBASE FR4 QSFP-DD Transceiver, Duplex LC, 2km over SMF	400Gbps	400G CAUI-8	2km
QDD-DR4-400G-Si	400GBASE DR4 QSFP-DD Transceiver, MTP/MPO, 500m over SMF	425Gbps (4x106.25Gb/s)	400G CAUI-8	500m
QSFDD-LR4-400G	400GBASE LR4 QSFP-DD Transceiver, Duplex LC, 10km over SMF	400Gbps	400G CAUI-8	10km
QSFDD-ER8-400G	400GBASE ER4 QSFP-DD Transceiver, Duplex LC, 40km over SMF	425Gbps	400G CAUI-8	40km
QSFDD-PLR4-400G	400GBASE PLR4 QSFP-DD Transceiver, MTP/MPO, 10km over SMF	400Gbps	400G CAUI-8	10km
QSFDD-LR8-400G	400GBASE LR8 QSFP-DD Transceiver, Duplex LC, 10km over SMF	425Gbps	400G CAUI-8	10km
QSFDD-XDR4-400G	400GBASE XDR4 QSFP-DD Transceiver, MTP/MPO, 2km over SMF	400Gbps	400G CAUI-8	2km
OSFP-DR4-400G-Si	400GBASE DR4 QSFP-DD Transceiver, MTP/MPO, 500m over SMF	425Gbps (4x106.25Gb/s)	400G CAUI-8	500m
OSFP-LR8-400G	400GBASE LR4 QSFP-DD Transceiver, Duplex LC, 10Km over SMF	400Gbps	400G CAUI-8	10km
OSFP-SR8-400G	400GBASE SR8 QSFP-DD Transceiver, MTP/MPO, 100m over MMF	425Gbps	400G CAUI-8	100m
Q112-DR4-400G	400GBASE DR4 QSFP112 Transceiver, MTP/MPO, 500m over SMF	425Gbps (4x106.25Gb/s)	400G CAUI-4	500m
Q112-PCxx (0.5M, 1M, 1.5M)	400GBASE QSFP112 Passive Copper Cable	400Gbps	400G CAUI-8	0.5, 1, 1.5
QSFP-DD-PCxx (0.5M, 1M, 1.5M, 2M, 2.5M, 3M)	400GBASE QSFP-DD Passive Copper Cable	400Gbps	400G CAUI-8	0.5, 1, 1.5, 2, 2.5, 3
QDD-ACxx (1M, 2M, 3M, 5M, 7M)	400GBASE QSFP-DD Active Copper Cable	400Gbps	400G CAUI-8	1, 2, 3, 5, 7

Product	Description	Nominal data rate (Gbs)	High-speed electrical	Link meter
Q112-ACxx (1M, 2M, 3M, 4M, 5M)	400GBASE QSFP112 Active Copper Cable	425Gbps (4x106.25Gb/s)	400G CAUI-4	1, 2, 3, 4, 5
Q-2Q56PCxx (0.5M, 1M, 1.5M, 2M, 2.5M, 3M)	400GBASE QSFP-DD to 2xQSFP56200G Passive Copper Splitter Cables	400Gbps	400G CAUI-8	0.5, 1, 1.5, 2, 2.5, 3
QDD-2Q56ACxx (1M, 2M, 3M, 5M, 7M)	400GBASE QSFP-DD to 2xQSFP56200G Active Copper Splitter Cables	400Gbps	400G CAUI-8	1, 2, 3, 5, 7
Q-4Q28ACxx(1M, 3M, 5M)	400GBASE QSFP-DD to 4xQSFP28100G Active Copper Splitter Cables	400Gbps	400G CAUI-8	1, 3, 5
Q-4Q56PCxx (0.5M, 1M, 1.5M, 2M, 2.5M, 3M)	400GBASE QSFP-DD to 4xQSFP56100G Passive Copper Splitter Cables	400Gbps	400G CAUI-8	0.5, 1, 1.5, 2, 2.5, 3
Q-8S56PCxx (0.5M, 1M, 1.5M, 2M, 2.5M, 3M)	400GBASE QSFP-DD to 8xSFP5650G Passive Copper Splitter Cables	400Gbps	400G CAUI-8	0.5, 1, 1.5, 2, 2.5, 3
QSFP-DD-AOxx (1M, 2M, 3M, 5M, 7M, 10M, 15M, 20M, 25M, 30M, 50M, 70M, 100M)	400GBASE QSFP-DD Active Optical Cables	400Gbps	400G CAUI-8	1, 2, 3, 5, 7, 10, 15, 20, 25, 30, 50, 70, 100
QDD-2Q56AOxx (1M, 2M, 3M, 5M, 7M, 10M, 15M, 20M, 25M, 30M)	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables	425Gbps(8x53.125Gb/s)	400G CAUI-8	1, 2, 3, 5, 7, 10, 15, 20, 25, 30
QDD-4Q56AOxx (1M, 2M, 3M, 5M, 7M, 10M, 15M, 25M, 30M, 50M)	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables	400Gbps	400G CAUI-8	1, 2, 3, 5, 7, 10, 15, 25, 30, 50

Table 3 shows the key optical characteristics for the 400G QSFP-DD modules.

**Table 3. Optical specifications**

Product	Description	Transmit Power (dBm) per lane		Receive Power (dBm) per lane		Transmit and Receive Wavelength (nm)
		Minimum	Maximum	Minimum	Maximum	
QSFDD-SR8-400G	400GBASE SR8 QSFP-DD Transceiver, MTP/MPO, 100m over OM4 MMF	-6	6	-7.9	4	850
QSFDD-FR4-400G	400GBASE FR4 QSFP-DD Transceiver, Duplex LC, 2km over SMF	-3.3	3.5	-7.3	3.5	1310
QDD-DR4-400G-Si	400GBASE DR4 QSFP-DD Transceiver, MTP/MPO, 500m over SMF	-2.9	4	-5.9	4	1310
QSFDD-LR4-400G	400GBASE LR4 QSFP-DD Transceiver, Duplex LC, 10km over SMF	-2.8	4	-9.1	4	1310
QSFDD-ER8-400G	400GBASE ER4 QSFP-DD Transceiver, Duplex LC, 40km over SMF	0.6	5.6	-16.1	3.4	1310
QSFDD-PLR4-400G	400GBASE PLR4 QSFP-DD Transceiver, MTP/MPO, 10km over SMF	-1.9	4.8	-8.2	5.8	1310
QSFDD-LR8-400G	400GBASE LR8 QSFP-DD Transceiver, Duplex LC, 10km over SMF	-2.8	5.3	-9.1	5.3	1310
QSFDD-XDR4-400G	400GBASE XDR4 QSFP-DD Transceiver, MTP/MPO, 2km over SMF	-2.4	4	-6.4	3.5	1310
OSFP-DR4-400G-Si	400GBASE DR4 QSFP-DD Transceiver, MTP/MPO, 500m over SMF	-2.9	4	-5.9	5	1310
OSFP-LR8-400G	400GBASE LR4 QSFP-DD Transceiver, Duplex LC, 10Km over SMF	-2.8	5.3	-9.1	6.3	1310
OSFP-SR8-400G	400GBASE SR8 QSFP-DD Transceiver, MTP/MPO, 100m over MMF	-6.5	4	-7.9	5	850
Q112-DR4-400G	400GBASE DR4 QSFP112 Transceiver, MTP/MPO, 500m over SMF	-2.9	4	-5.9	4	1310

Table 4 shows the mechanical characteristics for the 400G QSFP-DD modules.

**Table 4. Mechanical specifications**

Parameter	Product	Weight
Module dimension with pull tab	(H x W x D) 9.3 x 12.95 x 149.71 mm	
Module weight (Max)	QSFPDD-SR8-400G	45 g
	QSFPDD-FR4-400G	45 g
	QDD-DR4-400G-Si	61.5 g
	QSFPDD-LR4-400G	45 g
	QSFPDD-ER8-400G	45 g
	QSFPDD-PLR4-400G	45 g
	QSFPDD-LR8-400G	45 g
	QSFPDD-XDR4-400G	45 g
	OSFP-DR4-400G-Si	61.5 g
	OSFP-LR8-400G	150 g
	OSFP-SR8-400G	105 g
	Q112-DR4-400G	67.1g
	Q112-PC005	135 g
	Q112-PC01	174 g
	Q112-PC015	174 g
	QSFP-DD-PC005	486 g
	QSFP-DD-PC01	666 g
	QSFP-DD-PC015	666 g
	QSFP-DD-PC02	832.5 g
	QSFP-DD-PC025	666 g
QSFP-DD-PC03	1127 g	

Parameter	Product	Weight
Module weight (Max)	QDD-AC01	212 g
	QDD-AC02	344 g
	QDD-AC03	476 g
	QDD-AC05	930 g
	QDD-AC07	1522 g
	Q112-AC01	146 g
	Q112-AC02	212 g
	Q112-AC03	278 g
	Q112-AC04	420 g
	Q112-AC05	590 g
	Q-2Q56PC005	210 g
	Q-2Q56PC01	359.6 g
	Q-2Q56PC015	359.6 g
	Q-2Q56PC02	583.2 g
	Q-2Q56PC025	310 g
	Q-2Q56PC03	777.6 g
	Q-4Q28AC01	400 g
	QDD-2Q56AC01	244 g
	QDD-2Q56AC02	376 g
	QDD-2Q56AC03	508 g
	QDD-2Q56AC05	962 g
	QDD-2Q56AC07	1554 g
	Q-4Q28AC03	720 g
Q-4Q28AC05	1040 g	

Parameter	Product	Weight
Module weight (Max)	Q-4Q56PC005	240 g
	Q-4Q56PC01	368 g
	Q-4Q56PC015	368 g
	Q-4Q56PC02	630 g
	Q-4Q56PC025	504 g
	Q-4Q56PC03	560 g
	Q-8S56PC005	240 g
	Q-8S56PC01	460 g
	Q-8S56PC015	368 g
	Q-8S56PC02	538.4 g
	Q-8S56PC025	538.4 g
	Q-8S56PC03	560 g
	QSFP-DD-AO01	128 g
	QSFP-DD-AO02	160 g
	QSFP-DD-AO03	200 g
	QSFP-DD-AO05	350 g
	QSFP-DD-AO07	600 g
	QSFP-DD-AO10	630 g
	QSFP-DD-AO15	1300 g
	QSFP-DD-AO20	1600 g
	QSFP-DD-AO30	2100 g
	QSFP-DD-AO50	3200 g
	QSFP-DD-AO70	4700 g
	QSFP-DD-AO100	6300 g
QDD-2Q56AO01	160 g	

Parameter	Product	Weight
Module weight (Max)	QDD-2Q56A002	200 g
	QSFP-DD-A030	2100 g
	QDD-2Q56A003	274 g
	QDD-2Q56A005	350 g
	QDD-2Q56A007	600 g
	QDD-2Q56A010	1250 g
	QDD-2Q56A015	1880 g
	QDD-2Q56A020	2510 g
	QDD-2Q56A025	2960 g
	QDD-2Q56A030	3420 g
	QDD-4Q56A001	200 g
	QDD-4Q56A002	300 g
	QDD-4Q56A003	350 g
	QDD-4Q56A005	380 g
	QDD-4Q56A007	530 g
	QDD-4Q56A010	700 g
	QDD-4Q56A015	1050 g
	QDD-4Q56A025	1750 g
	QDD-4Q56A030	3100 g
	QDD-4Q56A050	3200 g
QDD-4Q56A010	700 g	
Q28-100G module operation temperature	0 to 70°C	
Active optical cable	0 to 70°C	
Copper cable operation temperature	0 to 70°C	
Storage temperature	-40 to 85°C	

## Warranty

- Standard warranty: 5 years
- For more information for FS Returns & Refunds policy, visit <https://www.fs.com/policies/warranty.html> or [https://www.fs.com/policies/day\\_return\\_policy.html](https://www.fs.com/policies/day_return_policy.html)

## Ordering information

Table 5 provides the ordering information for QSFP-DD 400G modules and related cables.

Table 5. Ordering information

Part number	Description
<b>QSFP-DD optics modules</b>	
<a href="#">QSFPDD-SR8-400G</a>	400GBASE SR8 QSFP-DD Transceiver, MTP/MPO, 100m over OM4 MMF
<a href="#">QSFPDD-FR4-400G</a>	400GBASE FR4 QSFP-DD Transceiver, Duplex LC, 2km over SMF
<a href="#">QDD-DR4-400G-Si</a>	400GBASE DR4 QSFP-DD Transceiver, MTP/MPO, 500m over SMF
<a href="#">QSFPDD-LR4-400G</a>	400GBASE LR4 QSFP-DD Transceiver, Duplex LC, 10km over SMF
<a href="#">QSFPDD-ER8-400G</a>	400GBASE ER4 QSFP-DD Transceiver, Duplex LC, 40km over SMF
<a href="#">QSFPDD-PLR4-400G</a>	400GBASE PLR4 QSFP-DD Transceiver, MTP/MPO, 10km over SMF
<a href="#">QSFPDD-LR8-400G</a>	400GBASE LR8 QSFP-DD Transceiver, Duplex LC, 10km over SMF
<a href="#">QSFPDD-XDR4-400G</a>	400GBASE XDR4 QSFP-DD Transceiver, MTP/MPO, 2km over SMF
<a href="#">QSFP-DR4-400G-Si</a>	400GBASE DR4 QSFP-DD Transceiver, MTP/MPO, 500m over SMF
<a href="#">QSFP-LR8-400G</a>	400GBASE LR4 QSFP-DD Transceiver, Duplex LC, 10Km over SMF
<a href="#">QSFP-SR8-400G</a>	400GBASE SR8 QSFP-DD Transceiver, MTP/MPO, 100m over MMF
<a href="#">Q112-DR4-400G</a>	400GBASE DR4 QSFP112 Transceiver, MTP/MPO, 500m over SMF
<b>QSFP-DD direct-attach copper modules</b>	
<a href="#">Q112-PC005</a>	400GBASE QSFP112 Passive Copper Cable, 0.5-meter
<a href="#">Q112-PC01</a>	400GBASE QSFP112 Passive Copper Cable, 1-meter

Part number	Description
<a href="#">Q112-PC015</a>	400GBASE QSFP112 Passive Copper Cable, 1.5-meter
<a href="#">QSFP-DD-PC005</a>	400GBASE QSFP-DD Passive Copper Cable,0.5-meter
<a href="#">QSFP-DD-PC01</a>	400GBASE QSFP-DD Passive Copper Cable, 1-meter
<a href="#">QSFP-DD-PC015</a>	400GBASE QSFP-DD Passive Copper Cable, 1.5-meter
<a href="#">QSFP-DD-PC02</a>	400GBASE QSFP-DD Passive Copper Cable, 2-meter
<a href="#">QSFP-DD-PC025</a>	400GBASE QSFP-DD Passive Copper Cable, 2.5-meter
<a href="#">QSFP-DD-PC03</a>	400GBASE QSFP-DD Passive Copper Cable, 3-meter
<a href="#">QDD-AC01</a>	400GBASE QSFP-DD Active Copper Cable, 1-meter
<a href="#">QDD-AC02</a>	400GBASE QSFP-DD Active Copper Cable, 2-meter
<a href="#">QDD-AC03</a>	400GBASE QSFP-DD Active Copper Cable, 3-meter
<a href="#">QDD-AC05</a>	400GBASE QSFP-DD Active Copper Cable, 5-meter
<a href="#">QDD-AC07</a>	400GBASE QSFP-DD Active Copper Cable, 7-meter
<a href="#">Q112-AC01</a>	400GBASE QSFP112 Active Copper Cable, 1-meter
<a href="#">Q112-AC02</a>	400GBASE QSFP112 Active Copper Cable, 2-meter
<a href="#">Q112-AC03</a>	400GBASE QSFP112 Active Copper Cable, 3-meter
<a href="#">Q112-AC04</a>	400GBASE QSFP112 Active Copper Cable, 4-meter
<a href="#">Q112-AC05</a>	400GBASE QSFP112 Active Copper Cable, 5-meter
<a href="#">Q-2Q56PC005</a>	400GBASE QSFP-DD to 2xQSFP56200G Passive Copper Splitter Cables, 0.5-meter
<a href="#">Q-2Q56PC01</a>	400GBASE QSFP-DD to 2xQSFP56200G Passive Copper Splitter Cables, 1-meter
<a href="#">Q-2Q56PC015</a>	400GBASE QSFP-DD to 2xQSFP56200G Passive Copper Splitter Cables, 1.5-meter
<a href="#">Q-2Q56PC02</a>	400GBASE QSFP-DD to 2xQSFP56200G Passive Copper Splitter Cables, 2-meter
<a href="#">Q-2Q56PC025</a>	400GBASE QSFP-DD to 2xQSFP56200G Passive Copper Splitter Cables, 2.5-meter
<a href="#">Q-2Q56PC03</a>	400GBASE QSFP-DD to 2xQSFP56200G Passive Copper Splitter Cables, 3-meter
<a href="#">QDD-2Q56AC01</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Copper Splitter Cables, 1-meter

Part number	Description
<b>QSFP-DD direct-attach copper modules</b>	
<a href="#">QDD-2Q56AC02</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Copper Splitter Cables, 2-meter
<a href="#">QDD-2Q56AC03</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Copper Splitter Cables, 3-meter
<a href="#">QDD-2Q56AC05</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Copper Splitter Cables, 5-meter
<a href="#">QDD-2Q56AC07</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Copper Splitter Cables, 7-meter
<a href="#">Q-4Q28AC01</a>	400GBASE QSFP-DD to 4xQSFP28100G Active Copper Splitter Cables, 1-meter
<a href="#">Q-4Q28AC03</a>	400GBASE QSFP-DD to 4xQSFP28100G Active Copper Splitter Cables, 3-meter
<a href="#">Q-4Q28AC05</a>	400GBASE QSFP-DD to 4xQSFP28100G Active Copper Splitter Cables, 5-meter
<a href="#">Q-4Q56PC005</a>	400GBASE QSFP-DD to 4xQSFP56100G Passive Copper Splitter Cables, 0.5-meter
<a href="#">Q-4Q56PC01</a>	400GBASE QSFP-DD to 4xQSFP56100G Passive Copper Splitter Cables, 1-meter
<a href="#">Q-4Q56PC015</a>	400GBASE QSFP-DD to 4xQSFP56100G Passive Copper Splitter Cables, 1.5-meter
<a href="#">Q-4Q56PC02</a>	400GBASE QSFP-DD to 4xQSFP56100G Passive Copper Splitter Cables, 2-meter
<a href="#">Q-4Q56PC025</a>	400GBASE QSFP-DD to 4xQSFP56100G Passive Copper Splitter Cables, 2.5-meter
<a href="#">Q-4Q56PC03</a>	400GBASE QSFP-DD to 4xQSFP56100G Passive Copper Splitter Cables, 3-meter
<a href="#">Q-8S56PC005</a>	400GBASE QSFP-DD to 8xSFP5650G Passive Copper Splitter Cables, 0.5-meter
<a href="#">Q-8S56PC01</a>	400GBASE QSFP-DD to 8xSFP5650G Passive Copper Splitter Cables, 1-meter
<a href="#">Q-8S56PC015</a>	400GBASE QSFP-DD to 8xSFP5650G Passive Copper Splitter Cables, 1.5-meter
<a href="#">Q-8S56PC02</a>	400GBASE QSFP-DD to 8xSFP5650G Passive Copper Splitter Cables, 2-meter
<a href="#">Q-8S56PC025</a>	400GBASE QSFP-DD to 8xSFP5650G Passive Copper Splitter Cables, 2.5-meter
<a href="#">Q-8S56PC03</a>	400GBASE QSFP-DD to 8xSFP5650G Passive Copper Splitter Cables, 3-meter
<a href="#">QSFP-DD-AO01</a>	400GBASE QSFP-DD Active Optical Cables, 1-meter
<a href="#">QSFP-DD-AO02</a>	400GBASE QSFP-DD Active Optical Cables, 2-meter
<a href="#">QSFP-DD-AO03</a>	400GBASE QSFP-DD Active Optical Cables, 3-meter
<a href="#">QSFP-DD-AO05</a>	400GBASE QSFP-DD Active Optical Cables, 5-meter
<a href="#">QSFP-DD-AO07</a>	400GBASE QSFP-DD Active Optical Cables, 7-meter

Part number	Description
<b>QSFP-DD direct-attach copper modules</b>	
<a href="#">QSFP-DD-AO10</a>	400GBASE QSFP-DD Active Optical Cables, 10-meter
<a href="#">QSFP-DD-AO15</a>	400GBASE QSFP-DD Active Optical Cables, 15-meter
<a href="#">QSFP-DD-AO20</a>	400GBASE QSFP-DD Active Optical Cables, 20-meter
<a href="#">QSFP-DD-AO25</a>	400GBASE QSFP-DD Active Optical Cables, 25-meter
<a href="#">QSFP-DD-AO30</a>	400GBASE QSFP-DD Active Optical Cables, 30-meter
<a href="#">QSFP-DD-AO50</a>	400GBASE QSFP-DD Active Optical Cables, 50-meter
<a href="#">QSFP-DD-AO70</a>	400GBASE QSFP-DD Active Optical Cables, 70-meter
<a href="#">QSFP-DD-AO100</a>	400GBASE QSFP-DD Active Optical Cables, 100-meter
<a href="#">QDD-2Q56AO01</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables, 1-meter
<a href="#">QDD-2Q56AO02</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables, 2-meter
<a href="#">QDD-2Q56AO03</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables, 3-meter
<a href="#">QDD-2Q56AO05</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables, 5-meter
<a href="#">QDD-2Q56AO07</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables, 7-meter
<a href="#">QDD-2Q56AO10</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables, 10-meter
<a href="#">QDD-2Q56AO15</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables, 15-meter
<a href="#">QDD-2Q56AO20</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables, 20-meter
<a href="#">QDD-2Q56AO25</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables, 25-meter
<a href="#">QDD-2Q56AO30</a>	400GBASE QSFP-DD to 2xQSFP56200G Active Optical Cables, 30-meter
<a href="#">QDD-4Q56AO01</a>	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables, 1-meter
<a href="#">QDD-4Q56AO02</a>	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables, 2-meter
<a href="#">QDD-4Q56AO03</a>	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables, 3-meter
<a href="#">QDD-4Q56AO05</a>	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables, 5-meter
<a href="#">QDD-4Q56AO07</a>	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables, 7-meter

Part number	Description
<b>QSFP-DD direct-attach copper modules</b>	
<a href="#">QDD-4Q56A010</a>	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables, 10-meter
<a href="#">QDD-4Q56A015</a>	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables, 15-meter
<a href="#">QDD-4Q56A025</a>	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables, 25-meter
<a href="#">QDD-4Q56A030</a>	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables, 30-meter
<a href="#">QDD-4Q56A050</a>	400GBASE QSFP-DD to 4xQSFP56100G Active Optical Cables, 50-meter

## I 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

- Modules are compliant with Laser Class 1 as defined in IEC 60825-1, IEC 60825-2 and Comply with 21 CFR 1040.10 and 1040.11

**Table 6. Laser class for the QSFP28-100G optical modules**

Product	Laser class
QSFDD-SR8-400G	1
QSFDD-FR4-400G	1
QDD-DR4-400G-Si	1
QSFDD-LR4-400G	1
QSFDD-ER8-400G	1
QSFDD-PLR4-400G	1
QSFDD-LR8-400G	1


Product	Laser class
QSFPDD-LR8-400G	1
QSFPDD-XDR4-400G	1
OSFP-DR4-400G-Si	1
OSFP-LR8-400G	1
OSFP-SR8-400G	1
Q112-DR4-400G	1

## Additional information

For more information about 400GBASE QSFP-DD optics and copper modules, contact your account manager or visit <https://www.fs.com/c/fiber-optic-transceivers-9>

## Document history

New or revised topic	Described in	Date
400GBASE QSFPDD-400G Modules Data Sheet	Updated all	21/12/2022



### Shenzhen (China)

Address: Room 2702, Yisibo Software Building,  
Haitian 2nd Road, Yuehai Street, Nanshan  
District, Shenzhen, 518000, China  
Tel: +86(755)8357 1351  
Email: marketing@fs.com

### Delaware (United States)

Address: 380 Centerpoint Blvd New Castle,  
DE 19720 United States  
Tel: +1 (888) 468 7419  
Email: us@fs.com

### Munich (Germany)

Address: NOVA Gewerbepark Building 7, Am  
Gfild 7, 85375 Neufahrn bei Munich, Germany  
Tel: +49 (0) 8165 80 90 517  
Email: de@fs.com

### Singapore

Address: 71 Robinson Rd, Singapore 068895  
Tel: +65 64437951  
Email: sg@fs.com

### Wuhan (China)

Address: Optical Valley Software Park A6,  
9th - 18th floor, Guanshan Ave, Hongshan District,  
Wuhan, Hubei Province, 430074, China  
Tel: +86 (027) 8808 9195  
Email: marketing@fs.com

### Birmingham (United Kingdom)


Address: Part 7th Floor, 45 CHURCH STREET,  
Birmingham, B3 2RT  
Tel: +44 (020) 3287 6810  
Email: uk@fs.com

### Melbourne (Australia)

Address: 57-59 Edison Rd, Dandenong South,  
VIC 3175, Australia  
Tel: +61 3 9693 3488  
Email: au@fs.com

### Tokyo (Japan)

Address: THT Building,3-11-5 Ueno, Taito-ku,  
Tokyo JAPAN 110-0005  
Tel: 03-5826-8305  
Email: jp@fs.com



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