Cisco 100GBASE QSFP-100G Modules

Product Overview

The Cisco® 100GBASE Quad Small Form-Factor Pluggable (QSFP) portfolio offers customers a wide variety of high-density and low-power 100 Gigabit Ethernet connectivity options for data center, high-performance computing networks, enterprise core and distribution layers, and service provider applications. The QSFP-100G modules are our new generation of 100G transceiver modules solution based on a QSFP form factor. (See Figure 1.)

Figure 1. QSFP-100G Optical Modules

Features and Benefits of Cisco QSFP Modules

- Hot-swappable input/output device that plugs into a 100G Gigabit Ethernet Cisco QSFP port
- Interoperable with other IEEE-compliant 100GBASE interfaces where applicable
- Certified and tested on Cisco QSFP-100G ports for superior performance, quality, and reliability
- High-speed electrical interface compliant to IEEE 802.3bm

Table 1 describes the Cisco QSFP-100G portfolio.

Table 1. Cisco QSFP-100G Portfolio

Product	Description	Connector Type
QSFP-100G-SR4-S	100GBASE SR4 QSFP Transceiver, MPO, 100m over OM4 MMF	MPO-12 (12 fibers)
QSFP-100G-LR4-S	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	LC
QSFP-100G-CWDM4-S	100GBASE CWDM4 QSFP Transceiver, LC, 2km over SMF	LC
QSFP-100G-PSM4-S	100GBASE PSM4 QSFP Transceiver, MPO, 500m over SMF	MPO-12 (12 fibers)
QSFP-100G-SM-SR	100GBASE CWDM4 Lite QSFP Transceiver, 2km over SMF, 0-60C	LC
QSFP-100G-CU(1M, 2M, 3M)	100GBASE-CR4 Passive Copper Cable	
QSFP-4SFP25G-CU(1M, 3M)	100GBASE QSFP to 4xSFP25G Passive Copper Splitter Cables	
QSFP-100G-AOC(1M, 2M, 3M, 5M, 7M, 10M, 15M, 20M, 25M, 30M)	100GBASE QSFP Active Optical Cables	

Cisco QSFP-100G-SR4-S

The Cisco 100GBASE-SR4-S QSFP Module supports link lengths of up to 70m (100m) over OM3 (OM4) Multimode Fiber with MPO connectors. It primarily enables high-bandwidth 100G optical links over 12-fiber parallel fiber terminated with MPO multifiber connectors. QSFP-100G-SR4-S supports 100GBase Ethernet rate.

Cisco QSFP-100G-LR4-S

The Cisco 100GBASE-LR4-S QSFP Module supports link lengths of up to 10km over a standard pair of G.652 single-mode fiber with duplex LC connectors. The 100 Gigabit Ethernet signal is carried over four wavelengths. Multiplexing and demultiplexing of the four wavelengths are managed within the device. QSFP-100GE-LR4-S supports 100GBase Ethernet rate.

Cisco QSFP-100G-CWDM4-S

The Cisco QSFP-100G-CWDM4-S Module supports link lengths of up to 2 km over a standard pair of G.652 single-mode fiber (SMF) with duplex LC connectors. The 100 Gigabit Ethernet signal is carried over four wavelengths. Multiplexing and demultiplexing of the four wavelengths are managed within the device.

Cisco QSFP-100G-PSM4-S

The Cisco QSFP-100G-PSM4-S Module supports link lengths of up to 500 meters over SMF with MPO connectors. The 100 Gigabit Ethernet signal is carried over 12-fiber parallel fiber terminated with MPO multifiber connectors.

Cisco QSFP-100G-SM-SR

The Cisco QSFP-100G-SM-SR QSFP module supports link lengths of up to 2 kilometers over a standard pair of G.652 single-mode fiber (SMF) with duplex LC connectors. The 100 Gigabit Ethernet signal is carried over four wavelengths. Multiplexing and demultiplexing of the four wavelengths are managed within the device. The operating temperature range is from +10 to +60°C with an optical link budget of 4.1 decibels. This 4.1-decibel link budget offers the ability to support the loss from patch panels in the link in a data center environment.

Cisco QSFP-4SFP25G-CUxM

Cisco QSFP-100G to four SFP-25G copper direct-attach breakout cables (Figure 2) are suitable for very short links and offer a cost-effective way to connect within racks and across adjacent racks. These breakout cables connect to a 100G QSFP port of a Cisco switch on one end and to four 25G SFP ports of a Cisco switch/server on the other end. Cisco currently offers passive cables in lengths of x=1 and 3 meters.

Figure 2. QSFP-4SFP25G-CU5M Cables

Cisco QSFP-100G-CUxM

Cisco QSFP to QSFP copper direct-attach 100GBASE-CR4 cables (Figure 3) are suitable for very short links and offer a cost-effective way to establish a 100-Gigabit link between QSFP-100G ports of Cisco switches within racks and across adjacent racks. Cisco currently offers passive copper cables in lengths of x=1, 2 and 3 meters.

Figure 3. QSFP-100G-CU1M Cables

Cisco QSFP-100G-AOCxM

Cisco QSFP-100G to QSFP-100G AOC cables (Figure 4) 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.

Figure 4. QSFP-100G-AOC3M Cables

Technical Specifications

Platform Support

Cisco QSFP modules are supported on Cisco switches and routers. For more details, refer to the Cisco 100 Gigabit Ethernet Transceiver Modules Compatibility Matrix.

Connectors and Cabling

Refer to Table 2 for connector type information and cabling specifications for each QSFP product.

Table 2. QSFP Port Cabling Specifications

Cisco QSFP	Nominal Wavelength (nm)	Cable Type	Core Size (Microns)	Modal Bandwidth (MHz*km)*3	Cable Distance*1	Power Consumption (W)	Pull Tab Color
QSFP-100G-SR4-S	850	MMF	50.0 50.0	2000 (OM3) 4700 (OM4)	70m 100m	3.5	Beige
QSFP-100G-LR4-S	1295, 1300, 1304, 1309	SMF	G.652	-	10km	3.5	Blue

Cisco QSFP	Nominal Wavelength (nm)	Cable Type	Core Size (Microns)	Modal Bandwidth (MHz*km)[*3]	Cable Distance[*1]	Power Consumption (W)	Pull Tab Color
QSFP-100G-CWDM4-S	1271, 1291, 1311, 1331	SMF	G.652	-	2km	3.5	Green
QSFP-100G-PSM4-S	1310	SMF	G.652	-	500m	3.5	Orange
QSFP-100G-SM-SR	1271, 1291, 1311, 1331	SMF	G.652	-	2km	3.5	Green
QSFP-100G-CU1M	-	Direct-attach copper cable assembly	-	-	1m	1.5	
QSFP-100G-CU3M	-		-	-	3m		
QSFP-4SFP25G-CU1M	-		-	-	1m		
QSFP-4SFP25G-CU2M	-		-	-	2m		
QSFP-4SFP25G-CU3M	-		-	-	3m		
QSFP-100G-AOC1M	-	Active optical cable assembly	-	-	1m	3.5	
QSFP-100G-AOC2M	-		-	-	2m		
QSFP-100G-AOC3M	-		-	-	3m		
QSFP-100G-AOC5M	-		-	-	5m		
QSFP-100G-AOC7M	-		-	-	7m		
QSFP-100G-AOC10M	-		-	-	10m		
QSFP-100G-AOC15M	-		-	-	15m		
QSFP-100G-AOC20M	-		-	-	20m		
QSFP-100G-AOC25M	-		-	-	25m		
QSFP-100G-AOC30M	-		-	-	30m		

Table 3 shows the key optical characteristics for the Cisco QSFP modules.

Table 3. Optical Characteristics

Product	Descriptions	Transmit Power (dBm)[**]		Receive Power (dBm)[**]		Transmit and Receive Wavelength (nm)
		Maximum	Minimum	Maximum	Minimum	
QSFP-100G-SR4-S	100GBASE SR4 QSFP Transceiver, MPO, 100m over OM4 MMF	+2.4, per lane	-8.4, per lane	+2.4, per lane	-5.2, per lane	840 to 860
QSFP-100G-LR4-S	100GBASE LR4 QSFP Transceiver, LC, 10km over SMF	+4.5, per lane	-4.3, per lane	4.5, per lane	-8.6, per lane	Four lanes: 1295, 1300, 1304, 1309
QSFP-100G-CWDM4-S	100GBASE CWDM4 QSFP Transceiver, LC, 2km over SMF	+2.5, per lane*6	-6.5, per lane	+2.5, per lane	-10, per lane	Four lanes: 1271, 1291, 1311, 1331
QSFP-100G-PSM4-S	100GBASE PSM4 QSFP Transceiver, MPO, 500m over SMF	+2.0, per lane	-9.4, per lane	+2, per lane	-12.66, per lane	1295 to 1325
QSFP-100G-SM-SR	100GBASE CWDM4 Lite QSFP Transceiver, 2km over SMF, 0-60C	+2.5, per lane*6	-6.9, per lane	+2.5, per lane	-9.6, per lane	Four lanes: 1271, 1291, 1311, 1331

[**] Transmitter and receiver power is average, unless specified.

Dimensions

Maximum outer dimensions for the QSFP connector module are (H x W x D) 13.5 x 18.4 x 72.4 mm.

Cisco QSFP connector modules typically weigh 100 grams or less.

Environmental Conditions

Operating temperature range:

- Commercial temperature range: 0 to 70°C (32 to 158°F). Exceptions are
  - QSFP-100-SM-SR: +10 to 60°C (50 to 140°F)
- Storage temperature range: -40 to 85°C (-40 to 185°F)

Warranty

- Standard warranty: 90 days

Ordering Information

Table 4 provides the ordering information for Cisco QSFP 100G modules and related cables.

Table 4. Ordering Information

Description	Product Number
QSFP Optics Modules	
Cisco 100GBASE-SR4 QSFP Transceiver, MPO-12, 100m over OM4 MMF	QSFP-100G-SR4-S
Cisco 100GBASE-LR4 QSFP Transceiver, LC, 10km over SMF	QSFP-100G-LR4-S
Cisco 100GBASE CWDM4 QSFP Transceiver, LC, 2km over SMF	QSFP-100G-CWDM4-S
Cisco 100GBASE PSM4 QSFP Transceiver, MPO-12, 500m over SMF	QSFP-100G-PSM4-S
Cisco 100GBASE CWDM4 Lite QSFP Transceiver, 2km over SMF, 0-60C	
QSFP Direct-Attach Copper Modules	
Cisco 100GBASE-CR4 QSFP Passive Copper Cable, 1-meter	QSFP-100G-CU1M
Cisco 100GBASE-CR4 QSFP Passive Copper Cable, 3-meter	QSFP-100G-CU3M
Cisco 100GBase QSFP to 4xSFP25G Passive Copper Splitter Cable, 1-meter	QSFP-4SFP25G-CU1M
Cisco 100GBase QSFP to 4xSFP25G Passive Copper Splitter Cable, 2-meter	QSFP-4SFP25G-CU2M
Cisco 100GBase QSFP to 4xSFP25G Passive Copper Splitter Cable, 3-meter	QSFP-4SFP25G-CU3M
Cisco 100GBase QSFP Active Optical Cable, 1-meter	QSFP-100G-AOC1M
Cisco 100GBase QSFP Active Optical Cable, 2-meter	QSFP-100G-AOC2M
Cisco 100GBase QSFP Active Optical Cable, 3-meter	QSFP-100G-AOC3M
Cisco 100GBase QSFP Active Optical Cable, 5-meter	QSFP-100G-AOC5M
Cisco 100GBase QSFP Active Optical Cable, 7-meter	QSFP-100G-AOC7M
Cisco 100GBase QSFP Active Optical Cable, 10-meter	QSFP-100G-AOC10M
Cisco 100GBase QSFP Active Optical Cable, 15-meter	QSFP-100G-AOC15M
Cisco 100GBase QSFP Active Optical Cable, 20-meter	QSFP-100G-AOC20M
Cisco 100GBase QSFP Active Optical Cable, 25-meter	QSFP-100G-AOC25M
Cisco 100GBase QSFP Active Optical Cable, 30-meter	QSFP-100G-AOC30M

Regulatory and Standards Compliance

Standards:

- SFF-8665: QSFP+ 28 Gb/s 4X Pluggable Transceiver Solution (QSFP28) - Rev 1.8 May 10, 2013
- SFF-8636: Common Management Interface - DRAFT Rev 1.9 May 12, 2014
- 802.3™-2012 IEEE Standard for Ethernet

- IEEE 802.3ba Amendment of IEEE Std 802.3-2012
- IEEE 802.3bm Amendment of IEEE Std 802.3-2012 (D3.1, 1st August 2014)
- 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
- RoHS 6

Safety:

- Cable jacket of QSFP copper modules is UL E116441 Compliant
- QSFP copper cables are ELV compliant

Figure 5. Laser Class for the QSFP-100G Optical Modules

Product	Laser Class
Cisco QSFP-100G-SR4-S	1
Cisco QSFP-100G-LR4-S	1
Cisco QSFP-100G-CWDM4-S	1
Cisco QSFP-100G-PSM4-S	1
Cisco QSFP-100G-SM-SR	1

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Additional Information

For more information about Cisco 100GBASE QSFP optics and copper modules, contact your sales representative or visit http://www.cisco.com/en/US/products/hw/modules/ps5455/prod_module_series_home.html.

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