

9 Pluggable Modules for Interfaces

- [9.1 Important Notes About Using Optical Modules Certified for Huawei Switches](#)
- [9.2 Understanding Optical Modules](#)
- [9.3 Understanding Copper Modules](#)
- [9.4 FE SFP/eSFP Optical Modules](#)
- [9.5 GE eSFP Optical Modules](#)
- [9.6 GE-CWDM eSFP Optical Modules](#)
- [9.7 GE-DWDM eSFP Optical Modules](#)
- [9.8 GE SFP Copper Modules](#)
- [9.9 10GE SFP+ Optical Modules](#)
- [9.10 10GE-CWDM SFP+ Optical Modules](#)
- [9.11 10GE-DWDM SFP+ Optical Modules](#)
- [9.12 10GE XFP Optical Modules](#)
- [9.13 10GE-CWDM XFP Optical Modules](#)
- [9.14 10GE-DWDM XFP Optical Modules](#)
- [9.15 40GE CFP Optical Modules](#)
- [9.16 40GE QSFP+ Optical Modules](#)
- [9.17 100GE CFP Optical Modules](#)
- [9.18 100GE QSFP28 Optical Modules](#)

9.1 Important Notes About Using Optical Modules Certified for Huawei Switches

9.1.1 How to Identify Huawei-Certified Switch Optical Modules

NOTICE

- A switch must use optical or copper modules that have been certified for use on Huawei S switches. Non-certified optical or copper modules cannot ensure transmission reliability and may affect service stability. Huawei is not liable for any problem caused by the use of non-certified optical or copper modules and will not fix such problems.
- The methods provided here are only for reference. To confirm whether optical modules you are using have been certified for use on Huawei S switches, contact Huawei technical support.

10GE or Lower Speed Optical Modules

Huawei started certification on 10GE or lower speed optical modules for S switch products on July 1, 2013.

To determine whether optical modules delivered for Huawei S switches before July 1, 2013 are certified ones, contact Huawei technical support.

If your optical modules are delivered after July 1, 2013, use either of the following methods to determine whether they have been certified by Huawei.

Method 1: Check for "HUAWEI" on the label

If an optical module has been certified by Huawei, its label contains "HUAWEI", as shown in [Figure 9-1](#).

Figure 9-1 "HUAWEI" on the label of a Huawei-certified S switch optical module



Method 2: Run the command

An optical module has received Huawei S switch certification if it meets the following conditions:

For a device running V200 version:

- In the **display elabel** command output, the **Manufactured** field displays a date later than 2013-07-01.
- In the **display version** command output, the displayed version is V200R001C00 or later.
- In the **display transceiver** command output, the **Vendor Name** field displays **HUAWEI**.

 NOTE

The SFP-FE-SX-MM1310 (part number: 02315233) is a Huawei-certified 100M optical module. However, the **Vendor Name** field displays the original manufacturer name, instead of **HUAWEI**.

For copper modules, the **Vendor Name** field also displays the original manufacturer name, instead of **HUAWEI**.

25GE, 40GE, and 100GE Optical Modules

Huawei started certification on 25GE, 40GE, and 100GE optical modules for S switch products on January 1, 2016.

To determine whether optical modules delivered for Huawei S switches before January 1, 2016 are certified ones, contact Huawei technical support.

If your optical modules are delivered after January 1, 2016, use either of the following methods to determine whether they have been certified by Huawei.

Method 1: Check for "HUAWEI" on the label

If an optical module has been certified by Huawei, its label contains "HUAWEI", as shown in [Figure 9-1](#).

Method 2: Run the command

A 25GE, 40GE, or 100GE optical module has received Huawei S switch certification if it meets the following conditions:

For a device running V200 version:

- In the **display elabel** command output, the **Manufactured** field displays a date later than 2016-01-01.
- In the **display version** command output, the displayed version is V200R008 or later.
- In the **display transceiver** command output, the **Vendor Name** field displays **HUAWEI**.

 NOTE

For the optical modules connected to high-speed cables or AOC cables, the **Vendor Name** field displays the original manufacturer name, instead of **HUAWEI**. For the methods of checking whether such an optical module has been certified by Huawei, contact Huawei technical support personnel.

9.1.2 Risks of Using Non-Huawei-Certified Switch Optical Modules

During certification of optical modules for Huawei switches, Huawei completes comprehensive functionality verification to ensure quality of optical modules. The verified items include optical module plug/unplug, transmit optical power, receive optical power, signal transmission quality, data reading, error tolerance, compatibility, electromagnetic compatibility (EMC), and environmental parameters.

Non-Huawei-certified switch optical modules may cause the following problems:

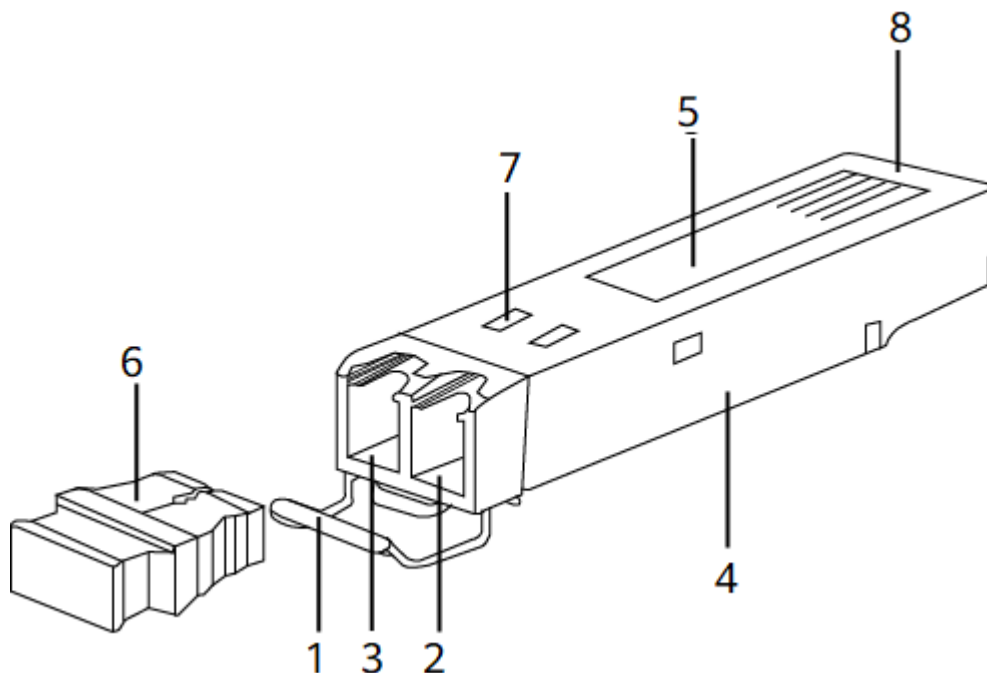
- Non-standard structure and size cause failures to install optical modules on adjacent optical interfaces.
Structures or sizes of some non-Huawei-certified optical modules do not comply with the Multi-Source Agreement (MSA). When such an optical module is installed on an optical interface, the size of this optical module hinders optical module installation on adjacent optical interfaces.
- Data bus defects cause suspension of a switch's data bus.
Some non-Huawei-certified optical modules have defects in data bus designs. Using such an optical module on a switch causes suspension of the connected data bus on the switch. As a result, data on the suspended bus cannot be read.
- Improper edge connector size damages electronic devices of optical interfaces.
If a non-Huawei-certified switch optical module with improper edge connector size is used on an optical interface, electronic devices of the optical interface will be damaged by short circuits.
- Unnormalized temperature monitoring causes incorrect alarms.
The temperature monitoring systems of some non-Huawei-certified switch optical modules do not comply with industry standards and report temperature values higher than the real temperature. When such optical modules are used on a switch, the system will report incorrect temperature alarms.
- Improper register settings cause errors or failures in reading parameters or diagnostic information.
Some non-Huawei-certified switch optical modules have improper register values on page A0, which can cause errors or failures when the system attempts to read parameters or diagnostic information from a data bus.
- Some non-Huawei-certified switch optical modules are not designed in compliance with EMC standards and have low anti-interference capability. Additionally, they bring electromagnetic interference to nearby devices.
- The operating temperature ranges of non-Huawei-certified switch optical modules cannot meet service requirements. When they are used under relatively high temperature, the optical power decreases, resulting in service interruption.

9.2 Understanding Optical Modules

9.2.1 What Is an Optical Module

On an optical network, a sender needs to convert electrical signals into optical signals before sending them to a receiver, and the receiver needs to convert received optical signals into electrical signals. An optical module is a component that completes electrical/optical conversion on an optical network. [Figure 9-2](#) shows the structure of an optical module.

Figure 9-2 Structure of an optical module (using an SFP/eSFP optical module as an example)



1. Handle	2. Receiver	3. Transmitter
4. Shell	5. Label	6. Dust plug
7. Spring	8. Connector	-

Figure 9-3 shows an SFP/eSFP optical module.

Figure 9-3 SFP/eSFP optical module



Figure 9-4 shows the appearance of an SFP+ optical module.

Figure 9-4 Appearance of an SFP+ optical module



Figure 9-5 shows the appearance of an SFP28 optical module.

Figure 9-5 SFP28 optical module



Figure 9-6 and **Figure 9-7** show the appearance of a QSFP+ optical module.

Figure 9-6 Appearance of a QSFP+ optical module (for LC optical fibers)

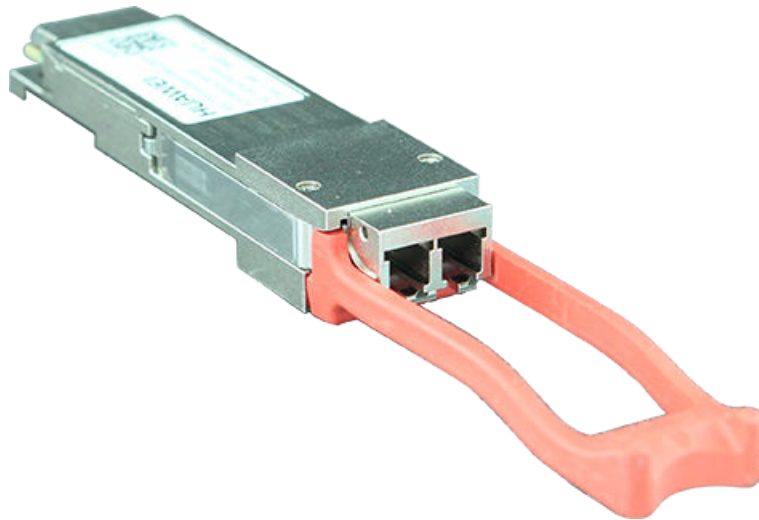
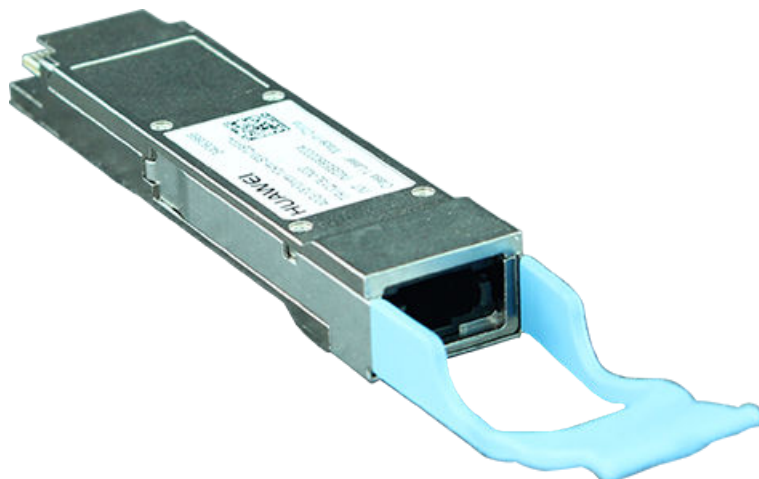


Figure 9-7 Appearance of a QSFP+ optical module (for MPO optical fibers)



NOTICE

The side with an L-shaped notch close to the connector is the top of a QSFP+ optical module, as shown in [Figure 9-6](#). When connecting a QSFP+ optical module to a port, keep the top side upward. Do not insert the QSFP+ optical module upside down.

Currently, there is no formal standard for 40G Ethernet. Therefore, a device may not display complete diagnostic information about 40GE optical modules. This is an acceptable fact in the telecommunications industry and does not affect functions of 40GE optical modules.

[Figure 9-8](#) shows the appearance of an XFP module.

Figure 9-8 Appearance of an XFP optical module



NOTE

The SFP+ and XFP optical modules are 10GE hot-swappable optical modules. Compared with the SFP+ optical modules, the XFP optical modules have a larger caliber.

Figure 9-9 and **Figure 9-10** show CFP optical modules for different optical fibers.

Figure 9-9 CFP 100GE optical module (for LC optical fibers)



Figure 9-10 CFP 100GE optical module (for MPO optical fibers)



Figure 9-11 and **Figure 9-12** show the appearance of a QSFP28 optical module.

Figure 9-11 Appearance of a QSFP28 optical module (for MPO optical fibers)

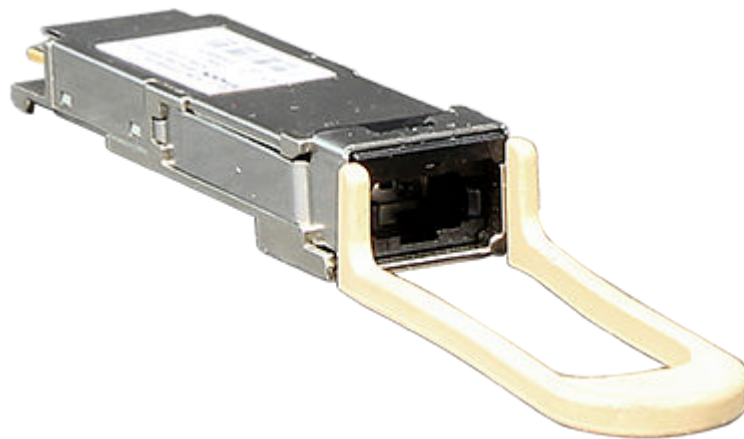


Figure 9-12 Appearance of a QSFP28 optical module (for LC optical fibers)



9.2.2 Types of Optical Modules

Optical modules are available in various types to meet diversified requirements.

- **Classified by transmission rates**

Depending on transmission rates, optical modules are classified into 100GE, 40GE, 25GE, 10GE, FE, and GE optical modules.

- **Classified by encapsulation types**

The higher transmission rate an optical module provides, the more complex structure it has. Optical modules are encapsulated in different modes to provide different structures. Huawei S series devices support optical modules of the following encapsulation types: CFP, QSFP+, QSFP28, XFP, SFP, eSFP, and SFP+. All optical modules are hot swappable.

- SFP: small form-factor pluggable. SFP optical modules support LC fiber connectors.
- eSFP: enhanced small form-factor pluggable. An eSFP module is an SFP module that supports monitoring of voltage, temperature, bias current, transmit optical power, and receive optical power. Therefore, eSFP is also called SFP sometimes.
- SFP+: small form-factor pluggable plus, SFP with a higher rate.
- XFP: 10 Gigabit small form-factor pluggable. X is the Roman numeral 10, meaning that all XFP optical modules provide a 10 Gbit/s transmission rate. XFP optical modules support LC fiber connectors. They are wider and longer than SFP+ optical modules.
- SFP28: with the same interface size as an SFP+ module. An SFP28 interface can use a 25GE SFP28 optical module.
- QSFP+: quad small form-factor pluggable. QSFP+ optical modules support MPO fiber connectors and are larger than SFP+ optical modules.
- CFP: centum form-factor pluggable. The dimensions of a CFP optical module are 144.75 mm x 82 mm x 13.6 mm (L x W x H). CFP is a new optical module standard that can be used in data communication and telecommunications fields.
- QSFP28: with the same interface size as a QSFP+ module. A QSFP28 interface can use a 100GE QSFP28 optical module or a 40GE QSFP+ optical module.

- **Classified by physical layer standards**

Different physical layer standards are defined to allow data transmission in different modes. Therefore, different types of optical modules are produced to comply with these standards. For details, see **Standards compliance** of the specific optical module.

- **Classified by modes**

Optical fibers are classified into single-mode and multimode fibers. Therefore, optical modules are also classified into single-mode and multimode modules to support different optical fibers.

- Single-mode optical modules are used with single-mode fibers. Single-mode fibers support a wide band and large transmission capacity, and are used for long-distance transmission.

- Multimode optical modules are used with multimode fibers. Multimode fibers have lower transmission performance than single-mode fibers because of modal dispersion, but their costs are also lower. They are used for small-capacity, short-distance transmission.

Wavelength division multiplexing modules differ from other optical modules in center wavelengths. A common optical module has a center wavelength of 850 nm, 1310 nm, or 1550 nm, whereas a wavelength division multiplexing module transmits lights with different center wavelengths. Wavelength division multiplexing modules are classified into two types: coarse wavelength division multiplexing (CWDM) and dense wavelength division multiplexing (DWDM). Within the same band, DWDM modules are available in more types and use wavelength resources more efficiently than CWDM modules. DWDM and CWDM modules allow lights with different center wavelengths to be transmitted on one fiber without interfering each other. Therefore, a passive multiplexer can be used to combine the lights into one channel, which is then split into multiple channels by a demultiplexer on the remote end. This reduces the optical fibers required. DWDM and CWDM modules are used for long-distance transmission.

The transmit power of a long-distance optical module is often larger than its overload power. Therefore, when using such optical modules, select optical fibers of an appropriate length to ensure that the actual receive power is smaller than the overload power. If the optical fibers connected to a long-distance optical module are too short, use an optical attenuator to reduce the receive power on the remote optical module. Otherwise, the remote optical module may be burnt. Generally, an optical attenuator is required if an optical module supporting a transmission distance longer than 10 km is used together with short optical fibers.

9.2.3 Parameter Description

Transmit optical power	Output optical power of an optical module when it is working properly. When two optical modules are connected, the transmit optical power of one end must be within the range of receive optical power on the other end.
Receive optical power	Average input optical power that the receiver of an optical module can receive within a range of bit error rate ($BER = 10^{-12}$). The upper limit of this parameter is the overload optical power and the lower limit is the maximum receiver sensitivity. When two optical modules are connected, the receive optical power on one end determines the range of transmit optical power on the other end.
Maximum receiver sensitivity	Minimum average input optical power that the receiver of an optical module can receive within a range of bit error rate ($BER = 10^{-12}$). When two optical modules are connected, the maximum receiver sensitivity on one end determines the minimum value of transmit optical power on the other end.
Overload optical power	Maximum average input optical power that the receiver of an optical module can receive within a range of bit error rate ($BER = 10^{-12}$). When two optical modules are connected, the overload optical power on one end determines the maximum transmit optical power on the other end.

Extinction ratio	Minimum ratio of the average optical power with signals transmitted against the average optical power without signals transmitted in complete modulation mode. The extinction ratio indicates the capability of an optical module to identify signal 0 and signal 1. This parameter is a quality indicator for optical modules. Optical modules with a large extinction ratio may not have good quality. Qualified optical modules should have an extinction ratio complying with IEEE 802.3.
Fiber mode	Mode of optical fibers defined based on core diameters and features of optical fibers. Optical fibers are classified into single-mode and multimode fibers. Generally, multimode fibers have large core diameters and severe dispersion, so they transmit optical signals over short distances. Single-mode fibers have low dispersion and can transmit optical signals over long distances.
Modal bandwidth	Bandwidth measured at a point with transmit power several dB lower than that of the point with the peak center wavelength. Modal bandwidth reflects spectrum characteristics of multimode fibers. The higher modal bandwidth a multimode fiber has, the longer transmission distance the fiber supports.
Fiber diameter	Diameter of the core of a fiber. According to international standards for optical fibers, the diameter of a multimode fiber is 62.5 μm or 50 μm , and the diameter of a single-mode fiber is 9 μm . Select optical fibers with diameters supported by the optical modules.
Fiber class	Optical signals with different wavelengths have their best working windows in different optical fibers. To help efficiently adjust wavelengths or dispersion features of optical fibers and change their refractive indexes, the following fiber classes are defined: multimode fiber (G.651), common single-mode fiber (G.652), shifted dispersion fiber (G.653), and non-zero shifted dispersion fiber (G.655). G.651 and G.652 are commonly used fiber classes. Optical fibers of higher classes support longer transmission distances. When selecting optical fibers for optical modules, determine the classes of fibers based on the required transmission distances.
Connector type	Type of the interface on an optical module to accommodate a fiber. Commonly used connector types are LC (applicable to all the SFP, SFP+, and XFP modules), SC, and MPO (applicable to 150 m QSFP+ and CXP modules). Select optical fibers with connectors supported by the optical modules.
Transmission distance	Maximum distance over which optical signals can transmit. Optical signals sent from different types of sources can transmit over different distances due to negative effects of optical fibers, such as dispersion and attenuation. When connecting optical interfaces, select optical modules and fibers based on the maximum signal transmission distance.

Interface rate	Maximum rate of electrical signals that an optical component can transmit without bit errors. The interface rates defined in Ethernet standards include 125 Mbit/s, 1.25 Gbit/s, 10.3125 Gbit/s, and 41.25 Gbit/s. When connecting optical interfaces, select optical modules and fibers based on the maximum signal transmission rate.
Center wavelength	Wavelength measured at the midpoint of the half-amplitude line in the transmit spectrum. Two connected optical modules must have the same center wavelength.
MSA	Multi-Source Agreement, a non-profit organization jointly established by optical module manufacturers. This agreement defines the structure and dimensions of optical transceivers by referring to Optical Internetworking Forum (OIF) and International Telecommunication Union (ITU) standards.

9.2.4 How to View Optical Module Parameters

Viewing the Hardware Description

If you know the model or type of an optical module, you can view the section "Pluggable Modules for Interfaces" in the *Hardware Description* to look up parameters of the optical module, including the center wavelength, transmission distance, fiber types supported, receive optical power, and transmit optical power.

Using a Command

If an optical module is installed in a running device, you can run the **display transceiver** command to view parameters of the optical module, including the center wavelength, transmission distance, fiber types supported, receive optical power, and transmit optical power.

9.2.5 Rules for Optical Module Interoperation

Interoperation Rules

Optical modules with the same standards can interoperate with each other. The standards define the rate, wavelength, and transmission distance of optical modules, but not their encapsulation modes (two interoperated optical modules can have different encapsulation modes).

If you need to achieve interoperability between optical modules with different standards, contact technical support personnel.

When S series devices are connected to other products such as routers, comply with the preceding optical module interoperation rules.

Standards Description

The following describes the standards, using 1000BASE-LX10 as an example:

- 1000 indicates the rate (1000 Mbit/s, in this case). Other rates include 10 Mbit/s, 100 Mbit/s, 10 Gbit/s, 40 Gbit/s, and 100 Gbit/s.

- BASE indicates baseband transmission.
- L represents a center wavelength of the laser. Currently, the following center wavelengths are available: S (short wavelength: 850 nm), L (long wavelength: 1310 nm), E (extra long wavelength: 1550 nm), and B (single-fiber bidirectional long wavelength).
- X represents the encoding format. The encoding formats include T (twisted pair), X (8B/10B), R (64B/66B), and W (WIS).
- 10 indicates the number of channels. Currently, the value can be 4 or 10. If there is no number, the value is 1.

 **NOTE**

This example provides the definitions in IEEE standards, which are not applicable to all optical modules, for example, non-standard optical modules.

The following organizations or agreements define standards related to optical modules:

- IEEE 802.3, which defines MAC and PHY standards
- Small Form Factor (SFF) committee or Multi-Source Agreements (MSAs), which define optical module hardware, software, and structure standards

Interoperability of 40GE and 100GE Optical Modules

S series devices support the following types of 40GE and 100GE optical modules:

- 40GE QSFP+ optical modules
- 40GE CFP optical modules
- 100GE CFP optical modules
- 100GE QSFP28 optical modules

Figure 9-13 Interoperability of 40GE optical modules in different encapsulation modes

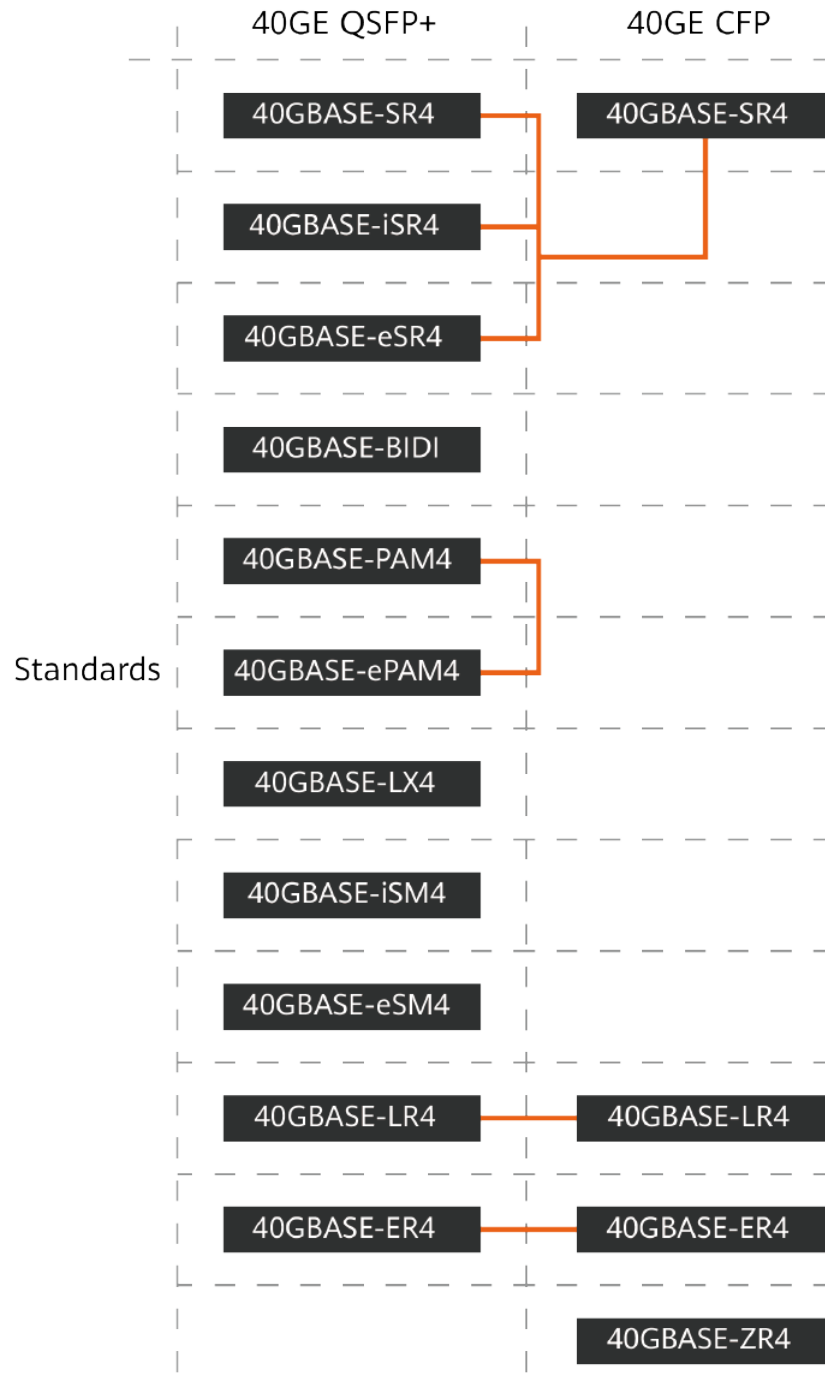
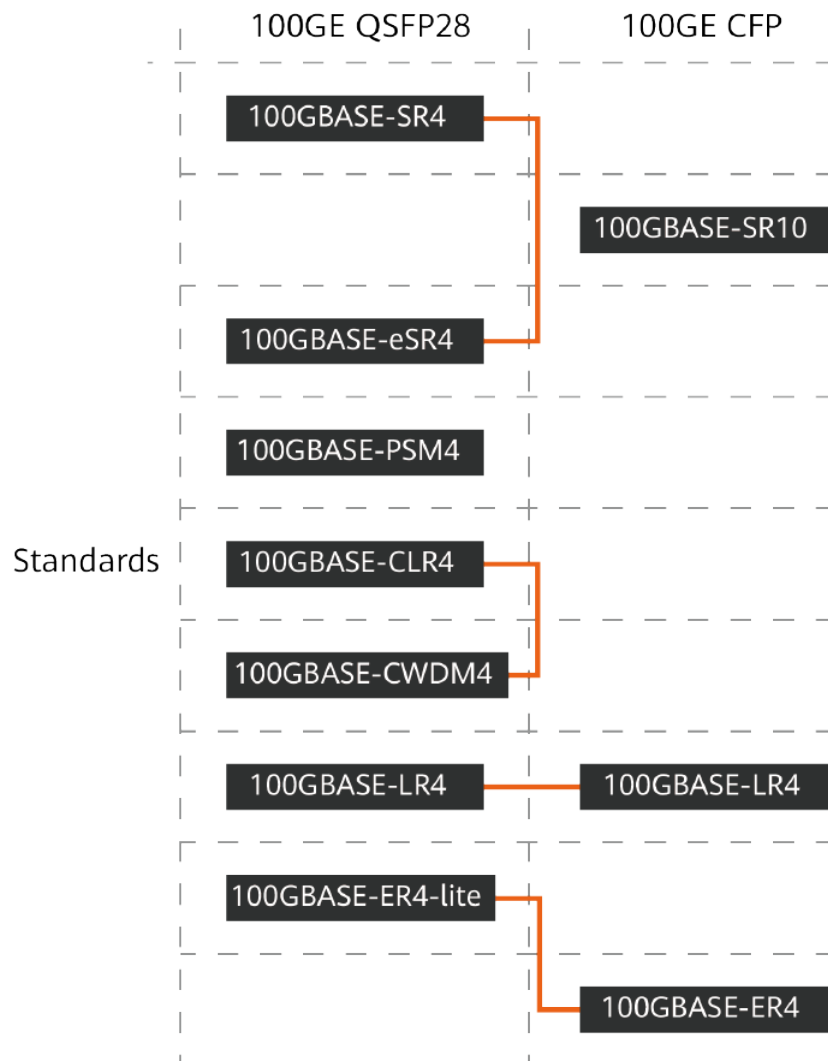


Figure 9-14 Interoperability of 100GE optical modules in different encapsulation modes



NOTE

Optical modules complying with the standards connected in the preceding figures can interoperate with each other.

iSR4 and eSR4 are non-standard formats derived from SR4, and support interoperation with SR4.

A 40GBASE-PAM4 optical module can interoperate with a 40GBASE-ePAM4 optical module.

A 100GBASE-CLR4 optical module can interoperate with a 100GBASE-CWDM4 optical module.

A 100GBASE-ER4-lite optical module can interoperate with a 100GBASE-ER4 optical module, at a maximum distance of 30 km.

9.3 Understanding Copper Modules

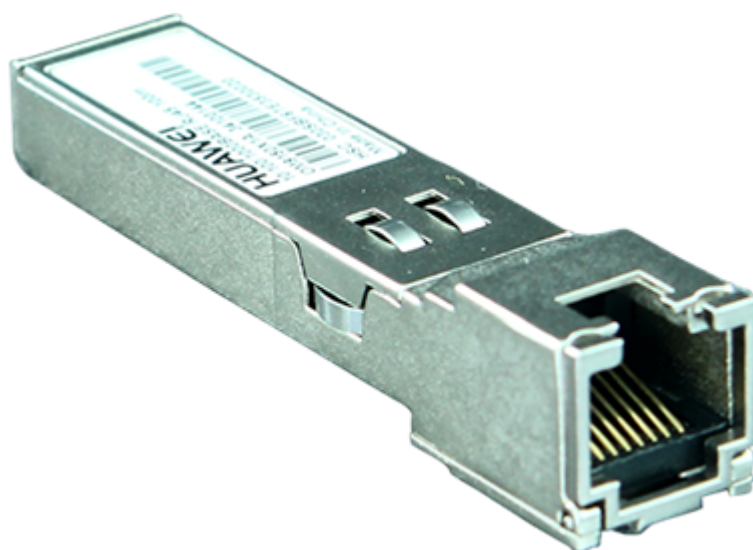
Copper modules are also called RJ45 modules. Unlike optical modules, copper modules do not perform electrical-optical conversion. When two optical interfaces

have copper modules installed, the interfaces can be connected using a copper cable. Currently, Huawei offers only GE copper modules with RJ45 interfaces. GE copper modules work with Category 5 network cables, comply with 1000BASE-T (IEEE 802.3ab), and support a maximum transmission distance of 100 m.

To avoid hindering the insertion or removal of the Ethernet cable of a copper module and the use of ejector levers, install the copper module in an optical port further from the ejector levers.

Figure 9-15 shows a GE SFP copper module.

Figure 9-15 Appearance of a GE SFP copper module



9.4 FE SFP/eSFP Optical Modules

9.4.1 S-SFP-FE-LH40-SM1310

Table 9-1 S-SFP-FE-LH40-SM1310 specifications

Item	Value
Basic Information	
Module name	S-SFP-FE-LH40-SM1310
Part Number	02317344
Model	S-SFP-FE-LH40-SM1310
Form factor	eSFP
Application standard	Non-standard
Connector type	LC
Optical fiber type	SMF

Item	Value
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Mbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5.0 dBm
Minimum extinction ratio [dB]	10.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-37.0 dBm
Overload power [dBm]	-10.0 dBm

9.4.2 S-SFP-FE-LH80-SM1550

Table 9-2 S-SFP-FE-LH80-SM1550 specifications

Item	Value
Basic Information	
Module name	S-SFP-FE-LH80-SM1550
Part Number	02317345
Model	S-SFP-FE-LH80-SM1550
Form factor	eSFP
Application standard	Non-standard
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Mbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	

Item	Value
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5.0 dBm
Minimum extinction ratio [dB]	10.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-37.0 dBm
Overload power [dBm]	-10.0 dBm

9.4.3 SFP-FE-LX-SM1310-BIDI

Table 9-3 SFP-FE-LX-SM1310-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-FE-LX-SM1310-BIDI
Part Number	02315203
Model	SFP-FE-LX-SM1310-BIDI
Form factor	eSFP
Application standard	100BASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Mbit/s
Target transmission distance [km]	Single-mode fiber: 15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm (RX) 1310 nm (TX)
Maximum Tx optical power [dBm]	-8.0 dBm
Minimum Tx optical power [dBm]	-15.0 dBm
Minimum extinction ratio [dB]	8.5 dB

Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-32.0 dBm
Overload power [dBm]	-8.0 dBm
NOTE Supports the single-fiber bidirectional function. BIDI optical modules must be used in pairs. For example, SFP-FE-LX-SM1310-BIDI must be used with SFP-FE-LX-SM1550-BIDI.	

9.4.4 SFP-FE-LX-SM1550-BIDI

Table 9-4 SFP-FE-LX-SM1550-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-FE-LX-SM1550-BIDI
Part Number	02315202
Model	SFP-FE-LX-SM1550-BIDI
Form factor	eSFP
Application standard	100BASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Mbit/s
Target transmission distance [km]	Single-mode fiber: 15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm (RX) 1550 nm (TX)
Maximum Tx optical power [dBm]	-8.0 dBm
Minimum Tx optical power [dBm]	-15.0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	

Item	Value
Rx sensitivity [dBm]	-32.0 dBm
Overload power [dBm]	-8.0 dBm
NOTE Supports the single-fiber bidirectional function. BIDI optical modules must be used in pairs. For example, SFP-FE-LX-SM1550-BIDI must be used with SFP-FE-LX-SM1310-BIDI.	

9.4.5 SFP-FE-SX-MM1310

Table 9-5 SFP-FE-SX-MM1310 specifications

Item	Value
Basic Information	
Module name	SFP-FE-SX-MM1310
Part Number	02315233
Model	SFP-FE-SX-MM1310
Form factor	SFP
Application standard	100BASE-FX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Not supported
Transmission rate [bit/s]	100 Mbit/s
Target transmission distance [km]	Multimode fiber (50 μm or 62.5 μm diameter): 2 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-14.0 dBm
Minimum Tx optical power [dBm]	-19.0 dBm
Minimum extinction ratio [dB]	10 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-30.0 dBm
Overload power [dBm]	-14.0 dBm

9.4.6 eSFP-FE-LX-SM1310

Table 9-6 eSFP-FE-LX-SM1310 specifications

Item	Value
Basic Information	
Module name	eSFP-FE-LX-SM1310
Part Number	02315205
Model	eSFP-FE-LX-SM1310
Form factor	eSFP
Application standard	Non-standard
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Mbit/s
Target transmission distance [km]	Single-mode fiber: 15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-8.0 dBm
Minimum Tx optical power [dBm]	-15.0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-28.0 dBm
Overload power [dBm]	-8.0 dBm

9.5 GE eSFP Optical Modules

9.5.1 LE2MGSC40DE0

Table 9-7 LE2MGSC40DE0 specifications

Item	Value
Basic Information	
Module name	LE2MGSC40DE0
Part Number	02310KVV
Model	LE2MGSC40DE0
Form factor	eSFP
Application standard	1000BASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1490 nm (RX) 1310 nm (TX)
Maximum Tx optical power [dBm]	3.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23 dBm
Overload power [dBm]	-3.0 dBm
NOTE Supports the single-wire bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, LE2MGSC40DE0 must be used with LE2MGSC40ED0.	

9.5.2 LE2MGSC40ED0

Table 9-8 LE2MGSC40ED0 specifications

Item	Value
Basic Information	
Module name	LE2MGSC40ED0
Part Number	02310KVU
Model	LE2MGSC40ED0
Form factor	eSFP
Application standard	1000BASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm (RX) 1490 nm (TX)
Maximum Tx optical power [dBm]	3.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23 dBm
Overload power [dBm]	-3.0 dBm
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, LE2MGSC40ED0 must be used with LE2MGSC40DE0.	

9.5.3 S-SFP-GE-LH40-SM1310

Table 9-9 S-SFP-GE-LH40-SM1310 specifications

Item	Value
Basic Information	
Module name	S-SFP-GE-LH40-SM1310
Part Number	02317346
Model	S-SFP-GE-LH40-SM1310
Form factor	eSFP
Application standard	1000BASE-EX (non-standard)
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23 dBm
Overload power [dBm]	-3.0 dBm

9.5.4 S-SFP-GE-LH40-SM1550

Table 9-10 S-SFP-GE-LH40-SM1550 specifications

Item	Value
Basic Information	
Module name	S-SFP-GE-LH40-SM1550

Item	Value
Part Number	02317347
Model	S-SFP-GE-LH40-SM1550
Form factor	eSFP
Application standard	Non-standard
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-22 dBm
Overload power [dBm]	-3.0 dBm

9.5.5 S-SFP-GE-LH80-SM1550

Table 9-11 S-SFP-GE-LH80-SM1550 specifications

Item	Value
Basic Information	
Module name	S-SFP-GE-LH80-SM1550
Part Number	02317348
Model	S-SFP-GE-LH80-SM1550
Form factor	eSFP
Application standard	1000BASE-ZX
Connector type	LC

Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	5.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23 dBm
Overload power [dBm]	-3.0 dBm

9.5.6 SFP-GE-BXU1-SC

Table 9-12 SFP-GE-BXU1-SC specifications

Item	Value
Basic Information	
Module name	SFP-GE-BXU1-SC
Part Number	02310TQH
Model	SFP-GE-BXU1-SC
Form factor	eSFP
Application standard	Non-standard
Connector type	SC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km

Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm (RX) 1490 nm (TX)
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-19.5 dBm
Overload power [dBm]	-3.0 dBm
NOTE This module supports the single-fiber bidirectional function.	

9.5.7 SFP-GE-EX-C

Table 9-13 SFP-GE-EX-C specifications

Item	Value
Basic Information	
Module name	SFP-GE-EX-C
Part Number	02312UUD
Model	SFP-GE-EX-C
Form factor	eSFP
Application standard	1000BASE-EX (non-standard)
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0 dBm

Item	Value
Minimum Tx optical power [dBm]	-5.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23 dBm
Overload power [dBm]	-3.0 dBm

9.5.8 SFP-GE-LX-SM1310 (02315200)

Table 9-14 SFP-GE-LX-SM1310 specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1310
Part Number	02315200
Model	SFP-GE-LX-SM1310
Form factor	eSFP
Application standard	1000BASE-LX10/LH
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-20.0 dBm
Overload power [dBm]	-3.0 dBm

9.5.9 SFP-GE-LX-SM1310-BIDI (02315285)

Table 9-15 SFP-GE-LX-SM1310-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1310-BIDI
Part Number	02315285
Model	SFP-GE-LX-SM1310-BIDI
Form factor	eSFP
Application standard	1000BASE-BX10
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1490 nm (RX) 1310 nm (TX)
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	6 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-19.5 dBm
Overload power [dBm]	-3.0 dBm
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-GE-LX-SM1310-BIDI must be used with SFP-GE-LX-SM1490-BIDI.	

9.5.10 SFP-GE-LX-SM1490-BIDI (02315286)

Table 9-16 SFP-GE-LX-SM1490-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1490-BIDI
Part Number	02315286
Model	SFP-GE-LX-SM1490-BIDI
Form factor	eSFP
Application standard	1000BASE-BX10
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm (RX) 1490 nm (TX)
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	6 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-19.5 dBm
Overload power [dBm]	-3.0 dBm
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-GE-LX-SM1490-BIDI must be used with SFP-GE-LX-SM1310-BIDI.	

9.5.11 SFP-GE-LX10-C

Table 9-17 SFP-GE-LX10-C specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX10-C
Part Number	02312UUC
Model	SFP-GE-LX10-C
Form factor	eSFP
Application standard	1000BASE-LX10/LH
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-20.0 dBm
Overload power [dBm]	-3.0 dBm

9.5.12 SFP-GE-SX-C (02312UUB)

Table 9-18 SFP-GE-SX-C specifications

Item	Value
Basic Information	
Module name	SFP-GE-SX-C

Item	Value
Part Number	02312UUB
Model	SFP-GE-SX-C
Form factor	eSFP
Application standard	1000BASE-SX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-20°C to +85°C (-4°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Multimode optical fiber (modal bandwidth: 160 MHz*km; diameter: 62.5 μm): 0.22 km Multimode optical fiber (OM1): 0.275 km Multimode optical fiber (modal bandwidth: 400 MHz*km; diameter: 50 μm): 0.5 km Multimode optical fiber (OM2): 0.55 km Multimode optical fiber (OM3): 1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-2.5 dBm
Minimum Tx optical power [dBm]	-9.5 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-17.0 dBm
Overload power [dBm]	0 dBm

9.5.13 SFP-GE-ZBXD1

Table 9-19 SFP-GE-ZBXD1 specifications

Item	Value
Basic Information	
Module name	SFP-GE-ZBXD1
Part Number	02311DDB
Model	SFP-GE-ZBXD1
Form factor	eSFP
Application standard	Non-standard
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1490 nm (RX) 1570 nm (TX)
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-26 dBm
Overload power [dBm]	-3.0 dBm
NOTE Single-fiber bidirectional transmission is supported. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-GE-ZBXD1 must be used with SFP-GE-ZBXU1.	

NOTE

This module can only be used on a device running V200R008C00 or a later version. A device running a version earlier than V200R008C00 may fail to obtain information about this module.

9.5.14 SFP-GE-ZBXU1

Table 9-20 SFP-GE-ZBXU1 specifications

Item	Value
Basic Information	
Module name	SFP-GE-ZBXU1
Part Number	02311DDC
Model	SFP-GE-ZBXU1
Form factor	eSFP
Application standard	Non-standard
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1570 nm (RX) 1490 nm (TX)
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-26 dBm
Overload power [dBm]	-3.0 dBm
NOTE Single-fiber bidirectional transmission is supported. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-GE-ZBXU1 must be used with SFP-GE-ZBXD1.	

NOTE

This module can only be used on a device running V200R008C00 or a later version. A device running a version earlier than V200R008C00 may fail to obtain information about this module.

9.5.15 eSFP-GE-SX-MM850 (02315204)

Table 9-21 eSFP-GE-SX-MM850 specifications

Item	Value
Basic Information	
Module name	eSFP-GE-SX-MM850
Part Number	02315204
Model	eSFP-GE-SX-MM850
Form factor	eSFP
Application standard	1000BASE-SX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-20°C to +85°C (-4°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Multimode optical fiber (modal bandwidth: 160 MHz*km; diameter: 62.5 μm): 0.22 km Multimode optical fiber (OM1): 0.275 km Multimode optical fiber (modal bandwidth: 400 MHz*km; diameter: 50 μm): 0.5 km Multimode optical fiber (OM2): 0.55 km Multimode optical fiber (OM3): 1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-2.5 dBm
Minimum Tx optical power [dBm]	-9.5 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-17.0 dBm
Overload power [dBm]	0 dBm

9.5.16 eSFP-GE-ZX100-SM1550

Table 9-22 eSFP-GE-ZX100-SM1550 specifications

Item	Value
Basic Information	
Module name	eSFP-GE-ZX100-SM1550
Part Number	02315206
Model	eSFP-GE-ZX100-SM1550
Form factor	eSFP
Application standard	1000BASE-ZX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 100 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	5 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	9.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-30.0 dBm
Overload power [dBm]	-9.0 dBm

9.5.17 eSFP-GE-SX-MM850 (02313URD)

Table 9-23 eSFP-GE-SX-MM850 specifications

Item	Value
Basic Information	
Module name	eSFP-GE-SX-MM850

Item	Value
Part Number	02313URD
Model	eSFP-GE-SX-MM850
Form factor	eSFP
Application standard	1000BASE-SX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-20°C to +85°C (-4°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Multimode optical fiber (modal bandwidth: 160 MHz*km; diameter: 62.5 μm): 0.22 km Multimode optical fiber (OM1): 0.275 km Multimode optical fiber (modal bandwidth: 400 MHz*km; diameter: 50 μm): 0.5 km Multimode optical fiber (OM2): 0.55 km Multimode optical fiber (OM3): 1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-2.5 dBm
Minimum Tx optical power [dBm]	-9.5 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-17.0 dBm
Overload power [dBm]	0 dBm

9.5.18 SFP-GE-LX-SM1310 (02313URF)

Table 9-24 SFP-GE-LX-SM1310 specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1310
Part Number	02313URF
Model	SFP-GE-LX-SM1310
Form factor	eSFP
Application standard	1000BASE-LX10/LH
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-20.0 dBm
Overload power [dBm]	-3.0 dBm

9.5.19 SFP-GE-SX-C (02314KKF)

Table 9-25 SFP-GE-SX-C specifications

Item	Value
Basic Information	
Module name	SFP-GE-SX-C

Item	Value
Part Number	02314KKF
Model	SFP-GE-SX-C
Form factor	eSFP
Application standard	1000BASE-SX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-20°C to +85°C (-4°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Multimode optical fiber (modal bandwidth: 160 MHz*km; diameter: 62.5 μm): 0.22 km Multimode optical fiber (OM1): 0.275 km Multimode optical fiber (modal bandwidth: 400 MHz*km; diameter: 50 μm): 0.5 km Multimode optical fiber (OM2): 0.55 km Multimode optical fiber (OM3): 1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-2.5 dBm
Minimum Tx optical power [dBm]	-9.5 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-17.0 dBm
Overload power [dBm]	0 dBm

9.5.20 SFP-GE-LX-SM1310-BIDI (02314KKJ)

Table 9-26 SFP-GE-LX-SM1310-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1310-BIDI
Part Number	02314KKJ
Model	SFP-GE-LX-SM1310-BIDI
Form factor	eSFP
Application standard	1000BASE-BX10
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1490 nm (RX) 1310 nm (TX)
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	6 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-19.5 dBm
Overload power [dBm]	-3.0 dBm
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-GE-LX-SM1310-BIDI must be used with SFP-GE-LX-SM1490-BIDI.	

9.5.21 SFP-GE-LX-SM1490-BIDI (02314KKH)

Table 9-27 SFP-GE-LX-SM1490-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1490-BIDI
Part Number	02314KKH
Model	SFP-GE-LX-SM1490-BIDI
Form factor	eSFP
Application standard	1000BASE-BX10
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm (RX) 1490 nm (TX)
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	6 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-19.5 dBm
Overload power [dBm]	-3.0 dBm
NOTE	
Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-GE-LX-SM1490-BIDI must be used with SFP-GE-LX-SM1310-BIDI.	

9.6 GE-CWDM eSFP Optical Modules

9.6.1 CWDM-SFPGE-1471

Table 9-28 CWDM-SFPGE-1471 specifications

Item	Value
Basic Information	
Module name	CWDM-SFPGE-1471
Part Number	02310LPN
Model	CWDM-SFPGE-1471
Form factor	eSFP
Application standard	GE-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1471 nm
Maximum Tx optical power [dBm]	5.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-28.0 dBm
Overload power [dBm]	-9.0 dBm

9.6.2 CWDM-SFPGE-1491

Table 9-29 CWDM-SFPGE-1491 specifications

Item	Value
Basic Information	
Module name	CWDM-SFPGE-1491

Item	Value
Part Number	02310LPK
Model	CWDM-SFPGE-1491
Form factor	eSFP
Application standard	GE-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1491 nm
Maximum Tx optical power [dBm]	5.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-28.0 dBm
Overload power [dBm]	-9.0 dBm

9.6.3 CWDM-SFPGE-1511

Table 9-30 CWDM-SFPGE-1511 specifications

Item	Value
Basic Information	
Module name	CWDM-SFPGE-1511
Part Number	02310LPH
Model	CWDM-SFPGE-1511
Form factor	eSFP
Application standard	GE-CWDM
Connector type	LC

Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1511 nm
Maximum Tx optical power [dBm]	5.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-28.0 dBm
Overload power [dBm]	-9.0 dBm

9.6.4 CWDM-SFPGE-1531

Table 9-31 CWDM-SFPGE-1531 specifications

Item	Value
Basic Information	
Module name	CWDM-SFPGE-1531
Part Number	02310LPL
Model	CWDM-SFPGE-1531
Form factor	eSFP
Application standard	GE-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km

Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1531 nm
Maximum Tx optical power [dBm]	5.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-28.0 dBm
Overload power [dBm]	-9.0 dBm

9.6.5 CWDM-SFPGE-1551

Table 9-32 CWDM-SFPGE-1551 specifications

Item	Value
Basic Information	
Module name	CWDM-SFPGE-1551
Part Number	02312AXN
Model	CWDM-SFPGE-1551
Form factor	eSFP
Application standard	GE-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1551 nm
Maximum Tx optical power [dBm]	5.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.5 dB

Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-28.0 dBm
Overload power [dBm]	-9.0 dBm

9.6.6 CWDM-SFPGE-1571

Table 9-33 CWDM-SFPGE-1571 specifications

Item	Value
Basic Information	
Module name	CWDM-SFPGE-1571
Part Number	02312AXM
Model	CWDM-SFPGE-1571
Form factor	eSFP
Application standard	GE-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1571 nm
Maximum Tx optical power [dBm]	5.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-28.0 dBm
Overload power [dBm]	-9.0 dBm

9.6.7 CWDM-SFPGE-1591

Table 9-34 CWDM-SFPGE-1591 specifications

Item	Value
Basic Information	
Module name	CWDM-SFPGE-1591
Part Number	02312AXK
Model	CWDM-SFPGE-1591
Form factor	eSFP
Application standard	GE-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1591 nm
Maximum Tx optical power [dBm]	5.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-28.0 dBm
Overload power [dBm]	-9.0 dBm

9.6.8 CWDM-SFPGE-1611

Table 9-35 CWDM-SFPGE-1611 specifications

Item	Value
Basic Information	
Module name	CWDM-SFPGE-1611

Item	Value
Part Number	02310LPJ
Model	CWDM-SFPGE-1611
Form factor	eSFP
Application standard	GE-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1611 nm
Maximum Tx optical power [dBm]	5.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-28.0 dBm
Overload power [dBm]	-9.0 dBm

9.7 GE-DWDM eSFP Optical Modules

9.7.1 DWDM-SFPGE-1560-61

Table 9-36 DWDM-SFPGE-1560-61 specifications

Item	Value
Basic Information	
Module name	DWDM-SFPGE-1560-61
Part Number	02310LLE
Model	DWDM-SFPGE-1560-61
Form factor	eSFP

Item	Value
Application standard	GE-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 120 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1560.61 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-28.0 dBm
Overload power [dBm]	-8.0 dBm

9.8 GE SFP Copper Modules

9.8.1 SFP-1000BaseT (02314171)

Table 9-37 SFP-1000BaseT specifications

Item	Value
Basic Information	
Module name	SFP-1000BaseT
Part Number	02314171
Model	SFP-1000BaseT
Form factor	SFP
Application standard	1000BASE-T
Connector type	RJ45
Optical fiber type	-

Item	Value
DDM options	Not supported
Transmission rate [bit/s]	10 Mbit/s 100 Mbit/s 1 Gbit/s
Target transmission distance [km]	Ethernet cable: 0.1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	-
Maximum Tx optical power [dBm]	-
Minimum Tx optical power [dBm]	-
Minimum extinction ratio [dB]	-
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-
Overload power [dBm]	-
NOTE The supported rate depends on the interface. Surge protection specifications: ±1 kV in common mode	

9.8.2 SFP-1000BaseT (02313URG)

Table 9-38 SFP-1000BaseT specifications

Item	Value
Basic Information	
Module name	SFP-1000BaseT
Part Number	02313URG
Model	SFP-1000BaseT
Form factor	SFP
Application standard	1000BASE-T
Connector type	RJ45
Optical fiber type	-
DDM options	Not supported

Item	Value
Transmission rate [bit/s]	10 Mbit/s 100 Mbit/s 1 Gbit/s
Target transmission distance [km]	Ethernet cable: 0.1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	-
Maximum Tx optical power [dBm]	-
Minimum Tx optical power [dBm]	-
Minimum extinction ratio [dB]	-
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-
Overload power [dBm]	-
NOTE The supported rate depends on the interface. Surge protection specifications: ±1 kV in common mode	

9.8.3 SFP-GE-TV

Table 9-39 SFP-GE-TV specifications

Item	Value
Basic Information	
Module name	SFP-GE-TV
Part Number	02314BDD
Model	SFP-GE-TV
Form factor	SFP
Application standard	1000BASE-T
Connector type	RJ45
Optical fiber type	-
DDM options	Not supported
Transmission rate [bit/s]	10 Mbit/s 100 Mbit/s 1 Gbit/s

Item	Value
Target transmission distance [km]	Ethernet cable: 0.1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	-
Maximum Tx optical power [dBm]	-
Minimum Tx optical power [dBm]	-
Minimum extinction ratio [dB]	-
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-
Overload power [dBm]	-
NOTE The supported rate depends on the interface. Surge protection specifications: ±1 kV in common mode	

 **NOTE**

This module can only be used on a switch running V200R022C00 or a later version.

9.9 10GE SFP+ Optical Modules

9.9.1 OMXD30000 (02318169)

Table 9-40 OMXD30000 specifications

Item	Value
Basic Information	
Module name	OMXD30000
Part Number	02318169
Model	OMXD30000
Form factor	SFP+
Application standard	10GBASE-SR
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)

Item	Value
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Multimode fiber (with modal bandwidth of 160 MHz*km and diameter of 62.5 μm): 0.026 km Multimode fiber (OM1): 0.033 km Multimode fiber (with modal bandwidth of 400 MHz*km and diameter of 50 μm): 0.066 km Multimode fiber (OM2): 0.082 km Multimode fiber (OM3): 0.3 km Multimode fiber (OM4): 0.4 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1.0 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-11.1 dBm
Overload power [dBm]	-1.0 dBm

9.9.2 OSX010000 (02318170)

Table 9-41 OSX010000 specifications

Item	Value
Basic Information	
Module name	OSX010000
Part Number	02318170
Model	OSX010000
Form factor	SFP+
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF

Item	Value
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-12.6 dBm
Overload power [dBm]	0.5 dBm

9.9.3 OSX040N01 (02310CNF)

Table 9-42 OSX040N01 specifications

Item	Value
Basic Information	
Module name	OSX040N01
Part Number	02310CNF
Model	OSX040N01
Form factor	SFP+
Application standard	10GBASE-ER
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	

Item	Value
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	-4.7 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.1 dBm
Overload power [dBm]	-1.0 dBm

9.9.4 OSXD22N00

Table 9-43 OSXD22N00 specifications

Item	Value
Basic Information	
Module name	OSXD22N00
Part Number	02310CRM
Model	OSXD22N00
Form factor	SFP+
Application standard	10GBASE-LRM
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Multimode fiber (with modal bandwidth of 400 MHz*km and diameter of 50 μm): 0.1 km Multimode fiber (with modal bandwidth of 500 MHz*km and diameter of 62.5 μm): 0.22 km Multimode fiber (OM1, OM2, OM3): 0.22 km
Transmitter Optical Characteristics	

Item	Value
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-6.5 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-6.5 dBm
Overload power [dBm]	1.5 dBm

9.9.5 SFP-10G-ER-1310

Table 9-44 SFP-10G-ER-1310 specifications

Item	Value
Basic Information	
Module name	SFP-10G-ER-1310
Part Number	02311RLX
Model	SFP-10G-ER-1310
Form factor	SFP+
Application standard	Non-standard and compatible with the 10Gbase-ER
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	3.5 dB

Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-20 dBm
Overload power [dBm]	-7.0 dBm
NOTE If an SFP-10G-ER-1310 optical module is connected to a 10GBase-ER optical module (1550 nm, 10GE, 40 km), the maximum transmission distance is only 20 km due to different specifications such as the wavelength and receiver sensitivity.	

 **NOTE**

This module can only be used on a switch running V200R010C00 or a later version.

9.9.6 SFP-10G-ER-C

Table 9-45 SFP-10G-ER-C specifications

Item	Value
Basic Information	
Module name	SFP-10G-ER-C
Part Number	02312UUH
Model	SFP-10G-ER-C
Form factor	SFP+
Application standard	10GBASE-ER
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	-4.7 dBm
Minimum extinction ratio [dB]	3.0 dB

Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.1 dBm
Overload power [dBm]	-1.0 dBm

9.9.7 SFP-10G-ER-SM1270-BIDI

Table 9-46 SFP-10G-ER-SM1270-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-10G-ER-SM1270-BIDI
Part Number	02311BJC
Model	SFP-10G-ER-SM1270-BIDI
Form factor	SFP+
Application standard	10GBASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1330 nm (RX) 1270 nm (TX)
Maximum Tx optical power [dBm]	5 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-18 dBm
Overload power [dBm]	-9 dBm

Item	Value
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-ER-SM1270-BIDI must be used with SFP-10G-ER-SM1330-BIDI.	

 **NOTE**

This module can only be used on a switch running V200R009C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.9.8 SFP-10G-ER-SM1330-BIDI

Table 9-47 SFP-10G-ER-SM1330-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-10G-ER-SM1330-BIDI
Part Number	02311BJB
Model	SFP-10G-ER-SM1330-BIDI
Form factor	SFP+
Application standard	10GBASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1270 nm (RX) 1330 nm (TX)
Maximum Tx optical power [dBm]	5 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-18 dBm

Item	Value
Overload power [dBm]	-9 dBm
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-ER-SM1330-BIDI must be used with SFP-10G-ER-SM1270-BIDI.	

 **NOTE**

This module can only be used on a switch running V200R009C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.9.9 SFP-10G-LR-C (02312UUG)

Table 9-48 SFP-10G-LR-C specifications

Item	Value
Basic Information	
Module name	SFP-10G-LR-C
Part Number	02312UUG
Model	SFP-10G-LR-C
Form factor	SFP+
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-12.6 dBm

Item	Value
Overload power [dBm]	0.5 dBm

9.9.10 SFP-10G-SR-C

Table 9-49 SFP-10G-SR-C specifications

Item	Value
Basic Information	
Module name	SFP-10G-SR-C
Part Number	02312UUE
Model	SFP-10G-SR-C
Form factor	SFP+
Application standard	10GBASE-SR
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Multimode fiber (with modal bandwidth of 160 MHz*km and diameter of 62.5 μm): 0.026 km Multimode fiber (OM1): 0.033 km Multimode fiber (with modal bandwidth of 400 MHz*km and diameter of 50 μm): 0.066 km Multimode fiber (OM2): 0.082 km Multimode fiber (OM3): 0.3 km Multimode fiber (OM4): 0.4 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1.0 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	

Item	Value
Rx sensitivity [dBm]	-11.1 dBm
Overload power [dBm]	-1.0 dBm

9.9.11 SFP-10G-USR (02310MNW)

Table 9-50 SFP-10G-USR specifications

Item	Value
Basic Information	
Module name	SFP-10G-USR
Part Number	02310MNW
Model	SFP-10G-USR
Form factor	SFP+
Application standard	10GBASE-USR (non-standard)
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3): 0.1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1.0 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-10.7 dBm
Overload power [dBm]	0.5 dBm

9.9.12 SFP-10G-ZR

Table 9-51 SFP-10G-ZR specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZR
Part Number	02310SNN
Model	SFP-10G-ZR
Form factor	SFP+
Application standard	10GBASE-ZR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24.0 dBm
Overload power [dBm]	-7.0 dBm

9.9.13 OMXD30000 (02313URC)

Table 9-52 OMXD30000 specifications

Item	Value
Basic Information	
Module name	OMXD30000

Item	Value
Part Number	02313URC
Model	OMXD30000
Form factor	SFP+
Application standard	10GBASE-SR
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Multimode fiber (with modal bandwidth of 160 MHz*km and diameter of 62.5 μm): 0.026 km Multimode fiber (OM1): 0.033 km Multimode fiber (with modal bandwidth of 400 MHz*km and diameter of 50 μm): 0.066 km Multimode fiber (OM2): 0.082 km Multimode fiber (OM3): 0.3 km Multimode fiber (OM4): 0.4 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1.0 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-11.1 dBm
Overload power [dBm]	-1.0 dBm

9.9.14 OSX010000 (02313URK)

Table 9-53 OSX010000 specifications

Item	Value
Basic Information	

Item	Value
Module name	OSX010000
Part Number	02313URK
Model	OSX010000
Form factor	SFP+
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-12.6 dBm
Overload power [dBm]	0.5 dBm

9.9.15 SFP-10G-USR (02313URN)

Table 9-54 SFP-10G-USR specifications

Item	Value
Basic Information	
Module name	SFP-10G-USR
Part Number	02313URN
Model	SFP-10G-USR
Form factor	SFP+
Application standard	10GBASE-USR (non-standard)

Item	Value
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3): 0.1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1.0 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-10.7 dBm
Overload power [dBm]	0.5 dBm

9.9.16 SFP-10G-BXD1

Table 9-55 SFP-10G-BXD1 specifications

Item	Value
Basic Information	
Module name	SFP-10G-BXD1
Part Number	02310QDT
Model	SFP-10G-BXD1
Form factor	SFP+
Application standard	10GBASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s

Item	Value
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1270 nm (RX) 1330 nm (TX)
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-BXD1 must be used with SFP-10G-BXU1.	

9.9.17 SFP-10G-BXU1

Table 9-56 SFP-10G-BXU1 specifications

Item	Value
Basic Information	
Module name	SFP-10G-BXU1
Part Number	02310QBJ
Model	SFP-10G-BXU1
Form factor	SFP+
Application standard	10GBASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km

Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1330 nm (RX) 1270 nm (TX)
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-BXU1 must be used with SFP-10G-BXD1.	

9.9.18 SFP-10G-iLR

Table 9-57 SFP-10G-iLR specifications

Item	Value
Basic Information	
Module name	SFP-10G-iLR
Part Number	02311BJJ
Model	SFP-10G-iLR
Form factor	SFP+
Application standard	10GBASE-iLR (non-standard)
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode optical fiber: 1.4 km
Transmitter Optical Characteristics	

Item	Value
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm

 **NOTE**

This module can only be used on a switch running V200R008C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.9.19 SFP-10G-iLR-C

Table 9-58 SFP-10G-iLR-C specifications

Item	Value
Basic Information	
Module name	SFP-10G-iLR-C
Part Number	02312UUF
Model	SFP-10G-iLR-C
Form factor	SFP+
Application standard	10GBASE-iLR (non-standard)
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode optical fiber: 1.4 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm

Item	Value
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm

 **NOTE**

This module can only be used on a switch running V200R008C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.9.20 SFP-10G-LR-I (02313ABG)

Table 9-59 SFP-10G-LR-I specifications

Item	Value
Basic Information	
Module name	SFP-10G-LR-I
Part Number	02313ABG
Model	SFP-10G-LR-I
Form factor	SFP+
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB

Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm

9.9.21 OSX040N01 (02314KKG)

Table 9-60 OSX040N01 specifications

Item	Value
Basic Information	
Module name	OSX040N01
Part Number	02314KKG
Model	OSX040N01
Form factor	SFP+
Application standard	10GBASE-ER
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	-4.7 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.1 dBm
Overload power [dBm]	-1.0 dBm

9.9.22 SFP-10G-LR-C (02314KKE)

Table 9-61 SFP-10G-LR-C specifications

Item	Value
Basic Information	
Module name	SFP-10G-LR-C
Part Number	02314KKE
Model	SFP-10G-LR-C
Form factor	SFP+
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-12.6 dBm
Overload power [dBm]	0.5 dBm

9.9.23 SFP-10G-LR-I (02314LBW)

Table 9-62 SFP-10G-LR-I specifications

Item	Value
Basic Information	
Module name	SFP-10G-LR-I

Item	Value
Part Number	02314LBW
Model	SFP-10G-LR-I
Form factor	SFP+
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm

9.10 10GE-CWDM SFP+ Optical Modules

9.10.1 SFP-10G-ZCW1471

Table 9-63 SFP-10G-ZCW1471 specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZCW1471
Part Number	02310SSG
Model	SFP-10G-ZCW1471
Form factor	SFP+

Item	Value
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1471 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-7.0 dBm

9.10.2 SFP-10G-ZCW1491

Table 9-64 SFP-10G-ZCW1491 specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZCW1491
Part Number	02310SSF
Model	SFP-10G-ZCW1491
Form factor	SFP+
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported

Item	Value
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1491 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-7.0 dBm

9.10.3 SFP-10G-ZCW1511

Table 9-65 SFP-10G-ZCW1511 specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZCW1511
Part Number	02310SSE
Model	SFP-10G-ZCW1511
Form factor	SFP+
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1511 nm
Maximum Tx optical power [dBm]	4.0 dBm

Item	Value
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-7.0 dBm

9.10.4 SFP-10G-ZCW1531

Table 9-66 SFP-10G-ZCW1531 specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZCW1531
Part Number	02310SSD
Model	SFP-10G-ZCW1531
Form factor	SFP+
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1531 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-7.0 dBm

9.10.5 SFP-10G-ZCW1551

Table 9-67 SFP-10G-ZCW1551 specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZCW1551
Part Number	02310SSC
Model	SFP-10G-ZCW1551
Form factor	SFP+
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1551 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-7.0 dBm

9.10.6 SFP-10G-ZCW1571

Table 9-68 SFP-10G-ZCW1571 specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZCW1571

Item	Value
Part Number	02310SSB
Model	SFP-10G-ZCW1571
Form factor	SFP+
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1571 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-7.0 dBm

9.10.7 SFP-10G-ZCW1591

Table 9-69 SFP-10G-ZCW1591 specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZCW1591
Part Number	02310SSA
Model	SFP-10G-ZCW1591
Form factor	SFP+
Application standard	10G-CWDM
Connector type	LC

Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1591 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-7.0 dBm

9.10.8 SFP-10G-ZCW1611

Table 9-70 SFP-10G-ZCW1611 specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZCW1611
Part Number	02310SRY
Model	SFP-10G-ZCW1611
Form factor	SFP+
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km

Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1611 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-7.0 dBm

9.11 10GE-DWDM SFP+ Optical Modules

9.11.1 SFP-10G-ZDWT

Table 9-71 SFP-10G-ZDWT specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZDWT
Part Number	02310YUT
Model	SFP-10G-ZDWT
Form factor	SFP+
Application standard	10GBASE-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 60 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1529.16 nm - 1560.61 nm
Maximum Tx optical power [dBm]	3 dBm

Item	Value
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-1 dBm
NOTE The startup of the optical module takes a long time. Therefore, when the optical module is just installed into a switch port, the switch may incorrectly report an alarm indicating that the transmit optical power is low.	

 **NOTE**

This module can only be used on a switch running V200R009C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.12 10GE XFP Optical Modules

9.12.1 XFP-STM64-LH40-SM1550

Table 9-72 XFP-STM64-LH40-SM1550 specifications

Item	Value
Basic Information	
Module name	XFP-STM64-LH40-SM1550
Part Number	02315209
Model	XFP-STM64-LH40-SM1550
Form factor	XFP
Application standard	10GBASE-ER
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km

Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	2 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-15 dBm
Overload power [dBm]	-1 dBm

9.12.2 XFP-STM64-LX-SM1310

Table 9-73 XFP-STM64-LX-SM1310 specifications

Item	Value
Basic Information	
Module name	XFP-STM64-LX-SM1310
Part Number	02315208
Model	XFP-STM64-LX-SM1310
Form factor	XFP
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-1.0 dBm
Minimum Tx optical power [dBm]	-6.0 dBm
Minimum extinction ratio [dB]	6 dB

Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm

9.12.3 XFP-STM64-SM1550-80km

Table 9-74 XFP-STM64-SM1550-80km specifications

Item	Value
Basic Information	
Module name	XFP-STM64-SM1550-80km
Part Number	02315143
Model	XFP-STM64-SM1550-80km
Form factor	XFP
Application standard	10GBASE-ZR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	4 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-7 dBm

9.12.4 XFP-SX-MM850

Table 9-75 XFP-SX-MM850 specifications

Item	Value
Basic Information	
Module name	XFP-SX-MM850
Part Number	02315176
Model	XFP-SX-MM850
Form factor	XFP
Application standard	10GBASE-SR
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Multimode fiber (with modal bandwidth of 160 MHz*km and diameter of 62.5 μm): 0.026 km Multimode fiber (OM1): 0.033 km Multimode fiber (with modal bandwidth of 400 MHz*km and diameter of 50 μm): 0.066 km Multimode fiber (OM2): 0.082 km Multimode fiber (OM3): 0.3 km Multimode fiber (OM4): 0.4 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1.3 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-7.5 dBm
Overload power [dBm]	-1 dBm

9.13 10GE-CWDM XFP Optical Modules

9.13.1 CWDM-XFP10G-1471

Table 9-76 CWDM-XFP10G-1471 specifications

Item	Value
Basic Information	
Module name	CWDM-XFP10G-1471
Part Number	02310LQS
Model	CWDM-XFP10G-1471
Form factor	XFP
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1471 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-21 dBm
Overload power [dBm]	-9 dBm

9.13.2 CWDM-XFP10G-1491

Table 9-77 CWDM-XFP10G-1491 specifications

Item	Value
Basic Information	
Module name	CWDM-XFP10G-1491
Part Number	02310LQU
Model	CWDM-XFP10G-1491
Form factor	XFP
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1491 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-21 dBm
Overload power [dBm]	-9 dBm

9.13.3 CWDM-XFP10G-1511

Table 9-78 CWDM-XFP10G-1511 specifications

Item	Value
Basic Information	
Module name	CWDM-XFP10G-1511

Item	Value
Part Number	02310LQV
Model	CWDM-XFP10G-1511
Form factor	XFP
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1511 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-21 dBm
Overload power [dBm]	-9 dBm

9.13.4 CWDM-XFP10G-1531

Table 9-79 CWDM-XFP10G-1531 specifications

Item	Value
Basic Information	
Module name	CWDM-XFP10G-1531
Part Number	02310LQX
Model	CWDM-XFP10G-1531
Form factor	XFP
Application standard	10G-CWDM
Connector type	LC

Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1531 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-21 dBm
Overload power [dBm]	-9 dBm

9.13.5 CWDM-XFP10G-1551

Table 9-80 CWDM-XFP10G-1551 specifications

Item	Value
Basic Information	
Module name	CWDM-XFP10G-1551
Part Number	02310LQY
Model	CWDM-XFP10G-1551
Form factor	XFP
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km

Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1551 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-21 dBm
Overload power [dBm]	-9 dBm

9.13.6 CWDM-XFP10G-1571

Table 9-81 CWDM-XFP10G-1571 specifications

Item	Value
Basic Information	
Module name	CWDM-XFP10G-1571
Part Number	02310LRB
Model	CWDM-XFP10G-1571
Form factor	XFP
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1571 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB

Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-21 dBm
Overload power [dBm]	-9 dBm

9.13.7 CWDM-XFP10G-1591

Table 9-82 CWDM-XFP10G-1591 specifications

Item	Value
Basic Information	
Module name	CWDM-XFP10G-1591
Part Number	02310LRC
Model	CWDM-XFP10G-1591
Form factor	XFP
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1591 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-21 dBm
Overload power [dBm]	-9 dBm

9.13.8 CWDM-XFP10G-1611

Table 9-83 CWDM-XFP10G-1611 specifications

Item	Value
Basic Information	
Module name	CWDM-XFP10G-1611
Part Number	02310LRE
Model	CWDM-XFP10G-1611
Form factor	XFP
Application standard	10G-CWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 70 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1611 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-21 dBm
Overload power [dBm]	-9 dBm

9.14 10GE-DWDM XFP Optical Modules

9.14.1 DWDM-XFP10G-1529-55

Table 9-84 DWDM-XFP10G-1529-55 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1529-55
Part Number	02310LQL
Model	DWDM-XFP10G-1529-55
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1529.55 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.2 DWDM-XFP10G-1530-33

Table 9-85 DWDM-XFP10G-1530-33 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1530-33

Item	Value
Part Number	02310LPW
Model	DWDM-XFP10G-1530-33
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1530.33 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.3 DWDM-XFP10G-1531-12

Table 9-86 DWDM-XFP10G-1531-12 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1531-12
Part Number	02310LPU
Model	DWDM-XFP10G-1531-12
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC

Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1531.12 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.4 DWDM-XFP10G-1531-90

Table 9-87 DWDM-XFP10G-1531-90 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1531-90
Part Number	02310LPS
Model	DWDM-XFP10G-1531-90
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km

Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1531.90 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.5 DWDM-XFP10G-1532-68

Table 9-88 DWDM-XFP10G-1532-68 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1532-68
Part Number	02310LQP
Model	DWDM-XFP10G-1532-68
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1532.68 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB

Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.6 DWDM-XFP10G-1533-47

Table 9-89 DWDM-XFP10G-1533-47 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1533-47
Part Number	02310LRN
Model	DWDM-XFP10G-1533-47
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1533.47 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.7 DWDM-XFP10G-1534-25

Table 9-90 DWDM-XFP10G-1534-25 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1534-25
Part Number	02310LRM
Model	DWDM-XFP10G-1534-25
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1534.25 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.8 DWDM-XFP10G-1535-04

Table 9-91 DWDM-XFP10G-1535-04 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1535-04

Item	Value
Part Number	02310LRL
Model	DWDM-XFP10G-1535-04
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1535.04 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.9 DWDM-XFP10G-1548-51

Table 9-92 DWDM-XFP10G-1548-51 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1548-51
Part Number	02310LQK
Model	DWDM-XFP10G-1548-51
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC

Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1548.51 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.10 DWDM-XFP10G-1549-32

Table 9-93 DWDM-XFP10G-1549-32 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1549-32
Part Number	02310LPV
Model	DWDM-XFP10G-1549-32
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km

Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1549.32 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.11 DWDM-XFP10G-1550-12

Table 9-94 DWDM-XFP10G-1550-12 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1550-12
Part Number	02310LPQ
Model	DWDM-XFP10G-1550-12
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550.12 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB

Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.12 DWDM-XFP10G-1550-92

Table 9-95 DWDM-XFP10G-1550-92 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1550-92
Part Number	02310LPP
Model	DWDM-XFP10G-1550-92
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550.92 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.13 DWDM-XFP10G-1551-72

Table 9-96 DWDM-XFP10G-1551-72 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1551-72
Part Number	02310LQN
Model	DWDM-XFP10G-1551-72
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1551.72 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.14 DWDM-XFP10G-1552-52

Table 9-97 DWDM-XFP10G-1552-52 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1552-52

Item	Value
Part Number	02310LRK
Model	DWDM-XFP10G-1552-52
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1552.52 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.15 DWDM-XFP10G-1553-33

Table 9-98 DWDM-XFP10G-1553-33 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1553-33
Part Number	02310LRJ
Model	DWDM-XFP10G-1553-33
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC

Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1553.33 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.14.16 DWDM-XFP10G-1554-13

Table 9-99 DWDM-XFP10G-1554-13 specifications

Item	Value
Basic Information	
Module name	DWDM-XFP10G-1554-13
Part Number	02310LRH
Model	DWDM-XFP10G-1554-13
Form factor	XFP
Application standard	10G-DWDM
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km

Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1554.13 nm
Maximum Tx optical power [dBm]	3 dBm
Minimum Tx optical power [dBm]	-1 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24 dBm
Overload power [dBm]	-9 dBm

9.15 40GE CFP Optical Modules

9.15.1 CFP-40G-ER4

Table 9-100 CFP-40G-ER4 specifications

Item	Value
Basic Information	
Module name	CFP-40G-ER4
Part Number	02310YTH
Model	CFP-40G-ER4
Form factor	CFP
Application standard	40GBASE-ER4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1271 nm,1291 nm,1311 nm,1331 nm
Maximum Tx optical power [dBm]	3.8 dBm

Item	Value
Minimum Tx optical power [dBm]	-1.1 dBm
Minimum extinction ratio [dB]	7 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-18 dBm
Overload power [dBm]	3.8 dBm

9.15.2 CFP-40G-LR4

Table 9-101 CFP-40G-LR4 specifications

Item	Value
Basic Information	
Module name	CFP-40G-LR4
Part Number	02310YTF
Model	CFP-40G-LR4
Form factor	CFP
Application standard	40GBASE-LR4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1271 nm,1291 nm,1311 nm,1331 nm
Maximum Tx optical power [dBm]	3.5 dBm
Minimum Tx optical power [dBm]	-4 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-11.5 dBm
Overload power [dBm]	3.5 dBm

9.15.3 CFP-40G-SR4

Table 9-102 CFP-40G-SR4 specifications

Item	Value
Basic Information	
Module name	CFP-40G-SR4
Part Number	02311CXC
Model	CFP-40G-SR4
Form factor	CFP
Application standard	40GBASE-SR4
Connector type	MPO/PC (8-strand or 12-strand, type B, female connector)
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3): 0.1 km Multimode fiber (OM4): 0.15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	2.4 dBm
Minimum Tx optical power [dBm]	-7.6 dBm
Minimum extinction ratio [dB]	3 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-9.5 dBm
Overload power [dBm]	2.4 dBm
NOTE This module can connect a 40GE port to four 10GE ports using a 1-to-4 cable.	

9.15.4 CFP-40G-ZR4

Table 9-103 CFP-40G-ZR4 specifications

Item	Value
Basic Information	
Module name	CFP-40G-ZR4
Part Number	02311KAH
Model	CFP-40G-ZR4
Form factor	CFP
Application standard	40GBASE-ZR4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1531.12 nm, 1537.4 nm, 1543.73 nm, 1550.12 nm
Maximum Tx optical power [dBm]	4.5 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-22 dBm
Overload power [dBm]	-7 dBm

NOTE

This module can only be used on a switch running V200R009C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.16 40GE QSFP+ Optical Modules

9.16.1 QSFP-40G-ER4

Table 9-104 QSFP-40G-ER4 specifications

Item	Value
Basic Information	
Module name	QSFP-40G-ER4
Part Number	02311BKT
Model	QSFP-40G-ER4
Form factor	QSFP+
Application standard	40GBASE-ER4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1271 nm,1291 nm,1311 nm,1331 nm
Maximum Tx optical power [dBm]	4.5 dBm
Minimum Tx optical power [dBm]	-2.7 dBm
Minimum extinction ratio [dB]	5.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-19.5 dBm
Overload power [dBm]	-4.5 dBm

 NOTE

This module can only be used on a switch running V200R008C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.16.2 QSFP-40G-LR4 (02310MHS)

Table 9-105 QSFP-40G-LR4 specifications

Item	Value
Basic Information	
Module name	QSFP-40G-LR4
Part Number	02310MHS
Model	QSFP-40G-LR4
Form factor	QSFP+
Application standard	40GBASE-LR4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1271 nm,1291 nm,1311 nm,1331 nm
Maximum Tx optical power [dBm]	2.3 dBm
Minimum Tx optical power [dBm]	-7.0 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-11.5 dBm
Overload power [dBm]	3.3 dBm

9.16.3 QSFP-40G-LX4

Table 9-106 QSFP-40G-LX4 specifications

Item	Value
Basic Information	
Module name	QSFP-40G-LX4

Item	Value
Part Number	02311HNP
Model	QSFP-40G-LX4
Form factor	QSFP+
Application standard	40GBASE-LX4
Connector type	LC
Optical fiber type	<ul style="list-style-type: none"> • SMF • MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Single-mode fiber: 2 km Multimode fiber (OM3): 0.15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1271 nm,1291 nm,1311 nm,1331 nm
Maximum Tx optical power [dBm]	2.3 dBm
Minimum Tx optical power [dBm]	-7.0 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-11.5 dBm
Overload power [dBm]	2.3 dBm
NOTE When QSFP-40G-LX4 optical modules use multimode optical fibers, the fibers cannot be connected through multiple optical distribution frames (ODFs).	

 **NOTE**

This module can only be used on a switch running V200R009C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.16.4 QSFP-40G-SDLC-PAM

Table 9-107 QSFP-40G-SDLC-PAM specifications

Item	Value
Basic Information	

Item	Value
Module name	QSFP-40G-SDLC-PAM
Part Number	02311PUU
Model	QSFP-40G-SDLC-PAM
Form factor	QSFP+
Application standard	40GBASE-PAM4 (non-standard)
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3): 100 m Multimode fiber (OM4): 150 m
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	2.4 dBm
Minimum Tx optical power [dBm]	-2.5 dBm
Minimum extinction ratio [dB]	3 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-8.0 dBm
Overload power [dBm]	2.4 dBm
NOTE Unidirectional single-fiber communication is not supported.	

 **NOTE**

This module can only be used on a switch running V200R011C10 or a later version.

9.16.5 QSFP-40G-SR-BD

Table 9-108 QSFP-40G-SR-BD specifications

Item	Value
Basic Information	

Item	Value
Module name	QSFP-40G-SR-BD
Part Number	02311FPA
Model	QSFP-40G-SR-BD
Form factor	QSFP+
Application standard	40GBASE-BIDI (non-standard)
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	10°C to 70°C (50°F to 158°F) Note: When the operating temperature is lower than 10°C (50°F), intermittent disconnection or packet loss may occur on ports.
DDM options	Not supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3): 0.1 km Multimode fiber (OM4): 0.15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm,900 nm
Maximum Tx optical power [dBm]	5 dBm
Minimum Tx optical power [dBm]	-4 dBm
Minimum extinction ratio [dB]	4.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-4.5 dBm
Overload power [dBm]	5 dBm
NOTE The QSFP-40G-SR-BD optical module does not support some digital diagnostic monitoring (DDM) functions. The QSFP-40G-SR-BD optical module does not support unidirectional single-fiber communication.	

 **NOTE**

This module cannot be used for CSS or stack connection before the V200R019C10SPC500 version.

This module can only be used on a switch running V200R009C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.16.6 QSFP-40G-SR4

Table 9-109 QSFP-40G-SR4 specifications

Item	Value
Basic Information	
Module name	QSFP-40G-SR4
Part Number	02310MHQ
Model	QSFP-40G-SR4
Form factor	QSFP+
Application standard	40GBASE-SR4
Connector type	MPO/PC (8-strand or 12-strand, type B, female connector)
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3): 0.1 km Multimode fiber (OM4): 0.15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	2.4 dBm
Minimum Tx optical power [dBm]	-7.6 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-5.4 dBm
Overload power [dBm]	2.4 dBm

9.16.7 QSFP-40G-eSDLC-PAM

Table 9-110 QSFP-40G-eSDLC-PAM specifications

Item	Value
Basic Information	
Module name	QSFP-40G-eSDLC-PAM
Part Number	02311QTR
Model	QSFP-40G-eSDLC-PAM
Form factor	QSFP+
Application standard	40GBASE-ePAM4 (non-standard)
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3): 100 m Multimode fiber (OM4): 300 m
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	2.4 dBm
Minimum Tx optical power [dBm]	-2 dBm
Minimum extinction ratio [dB]	3 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-8.0 dBm
Overload power [dBm]	2.4 dBm
NOTE Unidirectional single-fiber communication is not supported.	

 **NOTE**

This module can only be used on a switch running V200R011C10 or a later version.

9.16.8 QSFP-40G-eSM4

Table 9-111 QSFP-40G-eSM4 specifications

Item	Value
Basic Information	
Module name	QSFP-40G-eSM4
Part Number	02311DTR
Model	QSFP-40G-eSM4
Form factor	QSFP+
Application standard	40GBASE-eSM4 (non-standard)
Connector type	MPO/APC (8-strand or 12-strand, type B, female connector)
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-12.6 dBm
Overload power [dBm]	0.5 dBm

NOTE

This module can connect a 40GE port to four 10GE ports using a 1-to-4 cable.
This module can only be used on a switch running V200R010C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.16.9 QSFP-40G-eSR4 (02310RMB)

Table 9-112 QSFP-40G-eSR4 specifications

Item	Value
Basic Information	
Module name	QSFP-40G-eSR4
Part Number	02310RMB
Model	QSFP-40G-eSR4
Form factor	QSFP+
Application standard	40GBASE-eSR4 (non-standard)
Connector type	MPO/PC (8-strand or 12-strand, type B, female connector)
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Multimode fiber (with modal bandwidth of 160 MHz*km and diameter of 62.5 μm): 0.026 km Multimode fiber (OM1): 0.033 km Multimode fiber (with modal bandwidth of 400 MHz*km and diameter of 50 μm): 0.066 km Multimode fiber (OM2): 0.082 km Multimode fiber (OM3): 0.3 km Multimode fiber (OM4): 0.4 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-7.6 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-11.1 dBm
Overload power [dBm]	2.4 dBm

 NOTE

This module can connect a 40GE port to four 10GE ports using a 1-to-4 cable.

9.16.10 QSFP-40G-iSM4

Table 9-113 QSFP-40G-iSM4 specifications

Item	Value
Basic Information	
Module name	QSFP-40G-iSM4
Part Number	02311DRW
Model	QSFP-40G-iSM4
Form factor	QSFP+
Application standard	40GBASE-iSM4 (non-standard)
Connector type	MPO/APC (8-strand or 12-strand, type B, female connector)
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Single-mode fiber: 1.4 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-11.5 dBm
Overload power [dBm]	0.5 dBm

 NOTE

This module can connect a 40GE port to four 10GE ports using a 1-to-4 cable.

This module can only be used on a switch running V200R009C00 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.16.11 QSFP-40G-iSR4 (02310MHR)

Table 9-114 QSFP-40G-iSR4 specifications

Item	Value
Basic Information	
Module name	QSFP-40G-iSR4
Part Number	02310MHR
Model	QSFP-40G-iSR4
Form factor	QSFP+
Application standard	40GBASE-SR4 40GBASE-iSR4 (non-standard)
Connector type	MPO/PC (8-strand or 12-strand, type B, female connector)
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3): 0.1 km Multimode fiber (OM4): 0.15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-7.6 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-9.5 dBm
Overload power [dBm]	2.4 dBm

NOTE

This module can connect a 40GE port to four 10GE ports using a 1-to-4 cable.

9.16.12 QSFP-40G-LR4-Lite (02311YVB)

Table 9-115 QSFP-40G-LR4-Lite specifications

Item	Value
Basic Information	
Module name	QSFP-40G-LR4-Lite
Part Number	02311YVB
Model	QSFP-40G-LR4-Lite
Form factor	QSFP+
Application standard	40GBASE-LR4 Lite
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652, diameter: 9 μm): 2 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1271 nm,1291 nm,1311 nm,1331 nm
Maximum Tx optical power [dBm]	2.3 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-10.5 dBm
Overload power [dBm]	2.3 dBm

 **NOTE**

This module can only be used on a switch running V200R022C10 or a later version.

9.16.13 QSFP-40G-LX4-MM

Table 9-116 QSFP-40G-LX4-MM specifications

Item	Value
Basic Information	
Module name	QSFP-40G-LX4-MM
Part Number	02313NUG
Model	QSFP-40G-LX4-MM
Form factor	QSFP+
Application standard	40GBASE-LX4
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	40 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3, diameter: 50 μm): 150 m Multimode fiber (OM4, diameter: 50 μm): 150 m
Transmitter Optical Characteristics	
Center wavelength [nm]	1271 nm,1291 nm,1311 nm,1331 nm
Maximum Tx optical power [dBm]	2.3 dBm
Minimum Tx optical power [dBm]	-7.0 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-10.5 dBm
Overload power [dBm]	3.5 dBm
NOTE Limitations: - In actual applications, the number of connectors in an optical fiber link cannot exceed 4. - This module is sensitive to fiber link contamination. During deployment, ensure that the fiber end face meets the fiber application standard. For details, refer to the requirements for single-mode connectors in the end face requirements for fiber ceramic ferrules under "Cables" > "Fiber Jumpers."	

 NOTE

This module can only be used on a switch running V200R022C10 or a later version.

9.17 100GE CFP Optical Modules

9.17.1 CFP-100G-ER4

Table 9-117 CFP-100G-ER4 specifications

Item	Value
Basic Information	
Module name	CFP-100G-ER4
Part Number	02310YTE
Model	CFP-100G-ER4
Form factor	CFP
Application standard	100GBASE-ER4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1295 nm,1300 nm,1304 nm,1309 nm
Maximum Tx optical power [dBm]	2.9 dBm
Minimum Tx optical power [dBm]	-2.9 dBm
Minimum extinction ratio [dB]	8 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-21.4 dBm
Overload power [dBm]	4.5 dBm

Item	Value
NOTE	
CFP-100G-ER4 optical modules can be used in the following scenarios:	
When the transmission distance is shorter than 10 km, the optical power at the receive end is greater than 1 dBm. In this case, a 10 dB optical attenuator needs to be added.	
When the transmission distance ranges from 10 km to 25 km, the optical power at the receive end is greater than -4 dBm and less than or equal to 1 dBm. In this case, a 5 dB optical attenuator needs to be added.	
When the transmission distance is between 25 km and 40 km, the optical power at the receive end is lower than or equal to -4 dBm. In this case, no optical attenuator is required.	

9.17.2 CFP-100G-LR4

Table 9-118 CFP-100G-LR4 specifications

Item	Value
Basic Information	
Module name	CFP-100G-LR4
Part Number	02310YTD
Model	CFP-100G-LR4
Form factor	CFP
Application standard	100GBASE-LR4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1295 nm,1300 nm,1304 nm,1309 nm
Maximum Tx optical power [dBm]	4.5 dBm
Minimum Tx optical power [dBm]	-4.3 dBm
Minimum extinction ratio [dB]	4 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-8.6 dBm

Item	Value
Overload power [dBm]	4.5 dBm

9.17.3 CFP-100G-SR10

Table 9-119 CFP-100G-SR10 specifications

Item	Value
Basic Information	
Module name	CFP-100G-SR10
Part Number	02310YTB
Model	CFP-100G-SR10
Form factor	CFP
Application standard	100GBASE-SR10
Connector type	MPO/PC (24-strand, type B, female connector)
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Multimode fiber (OM2): 0.03 km Multimode fiber (OM3): 0.1 km Multimode fiber (OM4): 0.15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	2.4 dBm
Minimum Tx optical power [dBm]	-7.6 dBm
Minimum extinction ratio [dB]	3 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-5.4 dBm
Overload power [dBm]	2.4 dBm
NOTE This module can connect a 100GE port to two 40GE ports using a 1-to-2 cable or to ten 10GE ports using a 1-to-10 cable.	

9.18 100GE QSFP28 Optical Modules

9.18.1 QSFP-100G-CLR4

Table 9-120 QSFP-100G-CLR4 specifications

Item	Value
Basic Information	
Module name	QSFP-100G-CLR4
Part Number	02311MNP
Model	QSFP-100G-CLR4
Form factor	QSFP28
Application standard	100GBASE-CLR4 (non-standard)
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652): 2 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1271 nm,1291 nm,1311 nm,1331 nm
Maximum Tx optical power [dBm]	2.5 dBm
Minimum Tx optical power [dBm]	-6.5 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-10.7 dBm
Overload power [dBm]	2.5 dBm

9.18.2 QSFP-100G-CWDM4

Table 9-121 QSFP-100G-CWDM4 specifications

Item	Value
Basic Information	
Module name	QSFP-100G-CWDM4
Part Number	02311MNN
Model	QSFP-100G-CWDM4
Form factor	QSFP28
Application standard	100GBASE-CWDM4 (non-standard)
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652): 2 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1271 nm,1291 nm,1311 nm,1331 nm
Maximum Tx optical power [dBm]	2.5 dBm
Minimum Tx optical power [dBm]	-6.5 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-9.8 dBm
Overload power [dBm]	2.5 dBm

9.18.3 QSFP-100G-ER4-Lite

Table 9-122 QSFP-100G-ER4-Lite specifications

Item	Value
Basic Information	
Module name	QSFP-100G-ER4-Lite

Item	Value
Part Number	02311YXR
Model	QSFP-100G-ER4-Lite
Form factor	QSFP28
Application standard	Non-standard and compatible with the 100GBASE-ER4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652): Disables the RS-FEC function: 30 km Enables the RS-FEC function: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1295 nm,1300 nm,1304 nm,1309 nm
Maximum Tx optical power [dBm]	2.9 dBm
Minimum Tx optical power [dBm]	-2.5 dBm
Minimum extinction ratio [dB]	8 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-18.4 dBm
Overload power [dBm]	-3.5 dBm

 **NOTE**

This module can only be used on a switch running V200R012C00 or a later version.

The RS-FEC function can be enabled on this module in V200R019C00 or a later version.

9.18.4 QSFP-100G-eSR4

Table 9-123 QSFP-100G-eSR4 specifications

Item	Value
Basic Information	
Module name	QSFP-100G-eSR4

Item	Value
Part Number	02311PSH
Model	QSFP-100G-eSR4
Form factor	QSFP28
Application standard	100GBase-eSR4 (non-standard)
Connector type	MPO/PC (8-strand or 12-strand, type B, female connector)
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3): 200 m Multimode fiber (OM4): 300 m
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	2.4 dBm
Minimum Tx optical power [dBm]	-8.4 dBm
Minimum extinction ratio [dB]	2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-9.2 dBm
Overload power [dBm]	2.4 dBm

 **NOTE**

This module can only be used on a switch running V200R011C10 or a later version. A switch running an earlier version may fail to obtain information about this module.

9.18.5 QSFP28-100G-10KM

Table 9-124 QSFP28-100G-10KM specifications

Item	Value
Basic Information	
Module name	QSFP28-100G-10KM
Part Number	02311SYT

Item	Value
Model	QSFP28-100G-10KM
Form factor	QSFP28
Application standard	100GBASE-LR4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652): 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1295 nm,1300 nm,1304 nm,1309 nm
Maximum Tx optical power [dBm]	4.5 dBm
Minimum Tx optical power [dBm]	-4.3 dBm
Minimum extinction ratio [dB]	4 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-8.6 dBm
Overload power [dBm]	4.5 dBm

9.18.6 QSFP28-100G-LR4 (02311KNU)

Table 9-125 QSFP28-100G-LR4 specifications

Item	Value
Basic Information	
Module name	QSFP28-100G-LR4
Part Number	02311KNU
Model	QSFP28-100G-LR4
Form factor	QSFP28
Application standard	100GBASE-LR4
Connector type	LC
Optical fiber type	SMF

Item	Value
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652): 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1295 nm,1300 nm,1304 nm,1309 nm
Maximum Tx optical power [dBm]	4.5 dBm
Minimum Tx optical power [dBm]	-4.3 dBm
Minimum extinction ratio [dB]	4 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-8.6 dBm
Overload power [dBm]	4.5 dBm

9.18.7 QSFP28-100G-PSM4

Table 9-126 QSFP28-100G-PSM4 specifications

Item	Value
Basic Information	
Module name	QSFP28-100G-PSM4
Part Number	02311MNM
Model	QSFP28-100G-PSM4
Form factor	QSFP28
Application standard	100GBASE-PSM4 (non-standard)
Connector type	MPO/APC (8-strand or 12-strand, type B, female connector)
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652): 500 m

Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	2 dBm
Minimum Tx optical power [dBm]	-9.4 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-11.35 dBm
Overload power [dBm]	2.2 dBm

9.18.8 QSFP28-100G-SR4 (02311GBW)

Table 9-127 QSFP28-100G-SR4 specifications

Item	Value
Basic Information	
Module name	QSFP28-100G-SR4
Part Number	02311GBW
Model	QSFP28-100G-SR4
Form factor	QSFP28
Application standard	100GBASE-SR4
Connector type	MPO/PC (8-strand or 12-strand, type B, female connector)
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3): 70 m Multimode fiber (OM4): 100 m
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	2.4 dBm

Item	Value
Minimum Tx optical power [dBm]	-8.4 dBm
Minimum extinction ratio [dB]	2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-8.5 dBm
Overload power [dBm]	2.4 dBm

9.18.9 QSFP-100G-ER4 (02313HLU)

Table 9-128 QSFP-100G-ER4 specifications

Item	Value
Basic Information	
Module name	QSFP-100G-ER4
Part Number	02313HLU
Model	QSFP-100G-ER4
Form factor	QSFP28
Application standard	100GBASE-ER4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652): 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1295 nm,1300 nm,1304 nm,1309 nm
Maximum Tx optical power [dBm]	2.9 dBm
Minimum Tx optical power [dBm]	-2.9 dBm
Minimum extinction ratio [dB]	8 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-20.9 dBm
Overload power [dBm]	-3.5 dBm

Item	Value
NOTE The RS-FEC function can be enabled.	

 **NOTE**

This module can only be used on a switch running V200R022C10 or a later version.

9.18.10 QSFP-100G-FR1

Table 9-129 QSFP-100G-FR1 specifications

Item	Value
Basic Information	
Module name	QSFP-100G-FR1
Part Number	02314BDE
Model	QSFP-100G-FR1
Form factor	QSFP28
Application standard	100GBASE-FR1
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652, diameter: 9 μm): 2 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1311 nm
Maximum Tx optical power [dBm]	4 dBm
Minimum Tx optical power [dBm]	-3.1 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-7.1 dBm
Overload power [dBm]	4 dBm

 NOTE

This module can only be used on a switch running V200R022C10 or a later version.

9.18.11 QSFP28-100G-DR

Table 9-130 QSFP28-100G-DR specifications

Item	Value
Basic Information	
Module name	QSFP28-100G-DR
Part Number	02312VSP
Model	QSFP28-100G-DR
Form factor	QSFP28
Application standard	100GBase-DR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652, diameter: 9 μm): 500 m
Transmitter Optical Characteristics	
Center wavelength [nm]	1311 nm
Maximum Tx optical power [dBm]	4 dBm
Minimum Tx optical power [dBm]	-2.9 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-5.9 dBm
Overload power [dBm]	4 dBm

 NOTE

This module can only be used on a switch running V200R022C10 or a later version.

9.18.12 QSFP-100G-BIDI-G2

Table 9-131 QSFP-100G-BIDI-G2 specifications

Item	Value
Basic Information	
Module name	QSFP-100G-BIDI-G2
Part Number	02314DBW
Model	QSFP-100G-BIDI-G2
Form factor	QSFP28
Application standard	100G-BIDI
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Multimode fiber (OM3, diameter: 50 μm): 70 m Multimode fiber (OM4, diameter: 50 μm): 100 m
Transmitter Optical Characteristics	
Center wavelength [nm]	850,910 nm
Maximum Tx optical power [dBm]	4 dBm
Minimum Tx optical power [dBm]	-4.4 dBm
Minimum extinction ratio [dB]	3 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	max (-6.6, SECQ - 8)
Overload power [dBm]	3.5 dBm

 **NOTE**

This module can only be used on a switch running V200R022C10 or a later version.

9.18.13 QSFP-100G-CWDM4-Lite

Table 9-132 QSFP-100G-CWDM4-Lite specifications

Item	Value
Basic Information	
Module name	QSFP-100G-CWDM4-Lite
Part Number	02312UJN
Model	QSFP-100G-CWDM4-Lite
Form factor	QSFP28
Application standard	100GBASE-CWDM4
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode fiber (G.652, diameter: 9 μm): 0.5 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	2.5 dBm
Minimum Tx optical power [dBm]	-6.5 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-9.8 dBm
Overload power [dBm]	2.5 dBm

 NOTE

This module can only be used on a switch running V200R022C10 or a later version.

9.18.14 QSFP-100G-LR1 (02314LBY)

Table 9-133 QSFP-100G-LR1 specifications

Item	Value
Basic Information	
Module name	QSFP-100G-LR1
Part Number	02314LBY
Model	QSFP-100G-LR1
Form factor	QSFP28
Application standard	100GBASE-LR1
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Single-mode (G.652) optical fiber (diameter: 9 μm): 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1311 nm
Maximum Tx optical power [dBm]	4.8 dBm
Minimum Tx optical power [dBm]	-1.9 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	Max(-6.1,TECQ-7.5)
Overload power [dBm]	4.8 dBm

 **NOTE**

This module can only be used on a switch running V200R023C00 or a later version.

9.18.15 QSFP-100G-SWDM4 (02314LCB)

Table 9-134 QSFP-100G-SWDM4 specifications

Item	Value
Basic Information	
Module name	QSFP-100G-SWDM4
Part Number	02314LCB
Model	QSFP-100G-SWDM4
Form factor	QSFP28
Application standard	100G SWDM4 MSA
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100 Gbit/s
Target transmission distance [km]	Multimode (OM3) optical fiber (diameter: 50 μm): 75 m Multimode (OM4) optical fiber (diameter: 50 μm): 100 m
Modal bandwidth [MHz*km]	Multimode (OM3) optical fiber: 2000 MHz*km Multimode (OM4) optical fiber: 4700 MHz*km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	3.4 dBm
Minimum Tx optical power [dBm]	-7.5 dBm
Minimum extinction ratio [dB]	2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-10.5 dBm
Overload power [dBm]	2.4 dBm

 **NOTE**

This module can only be used on a switch running V200R023C00 or a later version.