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# Cisco 25GBASE SFP28 Modules

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## Product overview

The Cisco® 25GBASE SFP28 (Small Form-Factor Pluggable) portfolio offers customers a wide variety of high-density and low-power 25 Gigabit Ethernet connectivity options for data center and high-performance computing networks applications. The 25G Modules are based on SFP28 form factor.



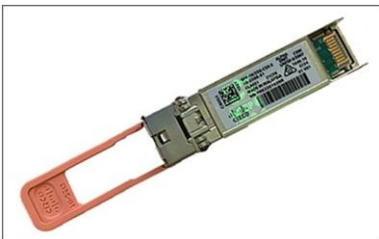
### 25G Direct Attached Cables (DAC)



### 25G Active Optical Cables (AOC)



### 25G Short Reach (SR) Module



### 10/25G Cisco Short Reach (CSR) Module



### 10/25G Long Reach (LR) Module



### 10/25G Long Reach (LR) Industrial Temperature Module

## Features and benefits of Cisco 25G Modules

- Interoperable with other IEEE-compliant 25G interfaces where applicable
- Certified and tested on Cisco SFP28 ports for superior performance, quality, and reliability
- High-speed connectivity compliant to IEEE 802.3by and IEEE 802.3cc

**Table 1.** Cisco 25G Portfolio

| Product               | Descriptions                             |
|-----------------------|--|
| Cisco SFP-H25G-CU1M   | 25GBASE-CR1 Copper Cable 1-meter         |
| Cisco SFP-H25G-CU1.5M | 25GBASE-CR1 Copper Cable 1.5-meter       |
| Cisco SFP-H25G-CU2M   | 25GBASE-CR1 Copper Cable 2-meter         |
| Cisco SFP-H25G-CU2.5M | 25GBASE-CR1 Copper Cable 2.5-meter       |
| Cisco SFP-H25G-CU3M   | 25GBASE-CR1 Copper Cable 3-meter         |
| Cisco SFP-H25G-CU4M   | 25GBASE-CR1 Copper Cable 4-meter         |
| Cisco SFP-H25G-CU5M   | 25GBASE-CR1 Copper Cable 5-meter         |
| Cisco SFP-25G-AOC1M   | 25GBASE-AOC Active Optical Cable 1-meter |
| Cisco SFP-25G-AOC2M   | 25GBASE-AOC Active Optical Cable 2-meter |
| Cisco SFP-25G-AOC3M   | 25GBASE-AOC Active Optical Cable 3-meter |
| Cisco SFP-25G-AOC4M   | 25GBASE-AOC Active Optical Cable 4-meter |
| Cisco SFP-25G-AOC5M   | 25GBASE-AOC Active Optical Cable 5-meter |

| Product                       | Descriptions   |
|-------------------------------|--|
| <b>Cisco SFP-25G-AOC7M</b>    | 25GBASE-AOC Active Optical Cable 7-meter                   |
| <b>Cisco SFP-25G-AOC10M</b>   | 25GBASE-AOC Active Optical Cable 10-meter                  |
| <b>Cisco SFP-25G-SR-S</b>     | 25GBASE-SR SFP28 Module for MMF                            |
| <b>Cisco SFP-10/25G-CSR-S</b> | 10/25GBASE-CSR SFP28 Module for MMF                        |
| <b>Cisco SFP-10/25G-LR-S</b>  | 10/25GBASE-LR SFP28 Module for SMF                         |
| <b>Cisco SFP-10/25G-LR-I</b>  | 10/25GBASE-LR SFP28, Industrial Temperature Module for SMF |

## Cisco SFP-25G copper cables

Cisco SFP28 to SFP28 copper direct-attach 25GBASE-CR1 cables are suitable for very short links and offer a highly cost-effective way to establish a 25-Gigabit link between SFP28 ports of Cisco switches within racks and across adjacent racks. Cisco offers passive copper cables in lengths of x= 1, 1.5, 2, 2.5, 3, 4 and 5 meters.

1m, 1.5m, and 2m cables do not require FEC on the host ports; 2.5m and 3m cables require BASE-R FEC (also known as FC-FEC) on the host ports; 4m and 5m cables require RS-FEC on the host ports.

## Cisco SFP-25G active optical cables

Cisco SFP28 to SFP28 Active Optical Cables are direct-attach fiber assemblies with SFP connectors. They are suitable for very short distances and offer a cost-effective way to connect within racks and across adjacent racks. Cisco offers Active Optical Cables in lengths of 1, 2, 3, 4, 5, 7, and 10 meters.

AOC cable require BASE-R FEC, or RS-FEC on the host ports.

## Cisco SFP-25G-SR-S

The Cisco 25GBASE-SR Module supports a link length of 70/100m on OM3/4 MMF.

This module requires RS-FEC on the host ports.

## Cisco SFP-10/25G-CSR-S

The Cisco 10/25GBASE-CSR Module supports a link length of up to 300/400m over OM3/4 at 10G, and up to 300/400m over OM3/4 at 25G\*. It also supports link lengths of 82m over OM2 at 10G, and up to 70m over OM2 at 25G.

This module requires RS-FEC on the host port for full reach operation at 25G. Using BASE-R FEC the module can support 70/100m over OM3/4 and with-out FEC it can support 30/50m over OM3/4 at 25G\*. For 10G operation FEC is not required.

\*Depends upon fiber quality.

## Cisco SFP-10/25G-LR-S

The Cisco 10/25GBASE-LR Module supports a link length of 10 kilometers on standard Single-Mode Fiber (SMF) G.652 at both 10G and 25G.

This module requires RS-FEC on the host ports for operation at 25G.

## Cisco SFP-10/25G-LR-I

The Cisco 10/25GBASE-LR Module supports a link length of 10 kilometers on standard Single-Mode Fiber (SMF) G.652 at both 10G and 25G. The module requires RS-FEC on the host ports for full reach operation at 25G. This module has an industrial temperature range. This module also supports CPRI datarates options 7, 8, 9 and 10.

In some applications using BASE-R FEC the module can support 3.5km and without FEC it can support 1.5km, depending on fiber quality.

## Technical specifications

### Platform support

Cisco 25G transceivers are supported on Cisco switches. For more details, refer to the document [“Transceiver Module Group \(TMG\) Compatibility Matrix”](#).

### Connectors and cabling

Refer to Table 2 for cabling specifications for each 25G product.

**Table 2.** 25G Port cabling specifications

| Cisco SFP-25G         | Cable Type                          | Cable Distance | Max Power Consumption (W) | Pull Tab Color |
|-----------------------|-------------------------------------|----------------|---------------------------|----------------|
| Cisco SFP-H25G-CU1M   | Direct-attach copper cable assembly | 1m             | 1/10                      | Beige          |
| Cisco SFP-H25G-CU1.5M |                                     | 1.5m           |                           | Black          |
| Cisco SFP-H25G-CU2M   |                                     | 2m             |                           | Brown          |
| Cisco SFP-H25G-CU2.5M |                                     | 2.5m           |                           | Yellow         |
| Cisco SFP-H25G-CU3M   |                                     | 3m             |                           | Orange         |
| Cisco SFP-H25G-CU4M   |                                     | 4m             |                           | Green          |
| Cisco SFP-H25G-CU5M   |                                     | 5m             |                           | Gray           |
| Cisco SFP-25G-AOC1M   | Active Optical Cable assembly       | 1m             | 1                         | Beige          |
| Cisco SFP-25G-AOC2M   |                                     | 2m             |                           | Brown          |
| Cisco SFP-25G-AOC3M   |                                     | 3m             |                           | Orange         |
| Cisco SFP-25G-AOC4M   |                                     | 4m             |                           | Green          |
| Cisco SFP-25G-AOC5M   |                                     | 5m             |                           | Gray           |
| Cisco SFP-25G-AOC7M   |                                     | 7m             |                           | Blue           |
| Cisco SFP-25G-AOC10M  |                                     | 10m            |                           | Red            |

| Cisco SFP-25G          | Cable Type | Cable Distance      | Max Power Consumption (W) | Pull Tab Color |
|------------------------|------------|---------------------|---------------------------|----------------|
| Cisco SFP-25G-SR-S     |            | 70/100m (OM3/OM4)   | 1.2                       | Beige          |
| Cisco SFP-10/25G-CSR-S |            | 300/400m (OM3/OM4)* | 1.2                       | Peach          |
| Cisco SFP-10/25G-LR-S  |            | 10km                | 1.3                       | Blue           |
| Cisco SFP-10/25G-LR-I  |            | 10km**              | 1.3                       | Blue           |

\*Depending upon fiber quality.

\*\*Links up to 15km reach are supported as engineered links as long as channel insertion loss is <9.3dB and RS-FEC is required

**Table 3.** SFP28 port cabling specifications

| Cisco SFP-25G          | Wavelength (nm) | Cable Type | Core Size (Microns) | Modal Bandwidth | Cable Distance         |
|------------------------|-----------------|------------|---------------------|-----------------|------------------------|
| Cisco SFP-25G-SR-S     | 850             | MMF        | 50.0                | 2000 (OM3)      | 70m                    |
|                        |                 |            |                     | 4700 (OM4)      | 100m                   |
|                        |                 |            |                     | 4700 (OM5)      | 100m                   |
| Cisco SFP-10/25G-CSR-S | 850             | MMF        | 50.0                | 500 (OM2)       | 70m (25G)<br>82m (10G) |
|                        |                 |            |                     | 2000 (OM3)      | 300m*                  |
|                        |                 |            |                     | 4700 (OM4)      | 400m*                  |
|                        |                 |            |                     | 4700 (OM5)      | 400m                   |
| Cisco SFP-10/25G-LR-S  | 1310            | SMF        | G.652               | -               | 10km                   |
| Cisco SFP-10/25G-LR-I  | 1310            | SMF        | G.652               | -               | 10km                   |

**Table 4.** Optical transmit and receive specifications

| Product                       | Type                 | Transmit Power (dBm)* |         | Receive Power (dBm)* |         | Transmit and Receive Wavelength (nm) |
|-------------------------------|----------------------|-----------------------|---------|----------------------|---------|--------------------------------------|
|                               |                      | Maximum               | Minimum | Maximum              | Minimum |                                      |
| <b>Cisco SFP-25G-SR-S</b>     | 25GBASE-SR 850nm MMF | +2.4                  | -8.4    | +2.4                 | -10.3   | 840 to 860                           |
| <b>Cisco SFP-10/25G-CSR-S</b> | 10G                  | +2.4                  | -7.3    | +2.4                 | -9.9    | 840 to 860                           |
|                               | 25G                  | +2.4                  | -6      | +2.4                 | -8.7    | 840 to 860                           |
| <b>Cisco SFP-10/25G-LR-S</b>  | 10G                  | +0.5                  | -8.2    | +0.5                 | -14.4   | 1260 to 1355 (10G)                   |
|                               | 25G                  | +2.0                  | -7      | +2                   | -13.3   | 1295 to 1325 (25G)                   |
| <b>Cisco SFP-10/25G-LR-I</b>  | 10G                  | +0.5                  | -6.7    | +0.5                 | -15.9   | 1260 to 1355 (10G)                   |
|                               | 25G                  | +2.0                  | -5.5    | +2.0                 | -14.8   | 1295 to 1325 (25G)                   |

\*Transmitter and receiver power is in average, unless specified.

\*\*The launch power shall be the lesser of the class 1 safety limit or the maximum receive power. Class 1 laser requirements are defined by IEC 60825-1: 2001.

Connectors: Dual LC/PC connector (**SFP-25G-SR-S, SFP-10/25G-CSR-S and SFP-10/25G-LR-S**).

**Fiber Channel over Ethernet:** The 25G DAC's (SFP-H25G-CUxxM), AOC's (SFP-25G-AOCxxM) and transceivers (SFP-25G-SR-S, SFP-10/25G-CSR-S and SFP-10/25G-LR-S) support FCoE with the appropriate host s/w support.

**Note:** Only connections with patch cords with PC or UPC connectors are supported. Patch cords with APC connectors are not supported. All cables and cable assemblies used must be compliant with the standards specified in the standards section.

## Environmental conditions

Operating temperature range:

- Commercial temperature range: 0 to 70° C (32 to 158°F)
- Industrial temperature range: -40 to 85° C (-40 to 185°F)
- Storage temperature range: -40 to 85° C (-40 to 185°F)



## Warranty

- Standard warranty: 5 years
- Extended warranty (optional): Cisco QSFP modules can be covered in a Cisco SMARTnet® Service support contract for the Cisco switch or router chassis

## Cisco environmental sustainability

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

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

| Sustainability topic   | Reference                       |
|--|---------------------------------|
| Information on product material content laws and regulations                                       | <a href="#">Materials</a>       |
| Information on electronic waste laws and regulations, including products, batteries, and packaging | <a href="#">WEEE compliance</a> |

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

## Ordering information

Table 5 provides the ordering information for Cisco 25G cables and transceivers.

**Table 5.** Ordering information

| Description  | Product Number  |
|--|-----------------|
| Cisco 25GBASE-CR1 SFP28 Passive Copper Cable, 1-meter  | SFP-H25G-CU1M   |
| Cisco 25GBASE-CR1 SFP28 Passive Copper Cable 1.5-meter | SFP-H25G-CU1.5M |
| Cisco 25GBASE-CR1 SFP28 Passive Copper Cable, 2-meter  | SFP-H25G-CU2M   |
| Cisco 25GBASE-CR1 SFP28 Passive Copper Cable 2.5-meter | SFP-H25G-CU2.5M |
| Cisco 25GBASE-CR1 SFP28 Passive Copper Cable, 3-meter  | SFP-H25G-CU3M   |
| Cisco 25GBASE-CR1 SFP28 Passive Copper Cable 4-meter   | SFP-H25G-CU4M   |
| Cisco 25GBASE-CR1 SFP28 Passive Copper Cable, 5-meter  | SFP-H25G-CU5M   |
| Cisco 25GBASE-AOC SFP28 Active Optical Cable, 1-meter  | SFP-25G-AOC1M   |
| Cisco 25GBASE-AOC SFP28 Active Optical Cable, 2-meter  | SFP-25G-AOC2M   |
| Cisco 25GBASE-AOC SFP28 Active Optical Cable, 3-meter  | SFP-25G-AOC3M   |

| Description   | Product Number   |
|---|------------------|
| Cisco 25GBASE-AOC SFP28 Active Optical Cable 4-meter      | SFP-25G-AOC4M    |
| Cisco 25GBASE-AOC SFP28 Active Optical Cable, 5-meter     | SFP-25G-AOC5M    |
| Cisco 25GBASE-AOC SFP28 Active Optical Cable, 7-meter     | SFP-25G-AOC7M    |
| Cisco 25GBASE-AOC SFP28 Active Optical Cable, 10-meter    | SFP-25G-AOC10M   |
| Cisco 25GBASE-SR SFP28 Module for MMF                     | SFP-25G-SR-S     |
| Cisco 10/25GBASE-CSR SFP28 Module for MMF                 | SFP-10/25G-CSR-S |
| Cisco 10/25GBASE-LR SFP28 Module for SMF                  | SFP-10/25G-LR-S  |
| Cisco 10/25GBASE-LR SFP28 Module for SMF, Industrial Temp | SFP-10/25G-LR-I  |

## Regulatory and standards compliance

### Standards:

- SFF-8402: SFP+ 28 Gb/s 1x Pluggable Transceiver Solution (SFP28) - Rev 1.0 March 30, 2014
- SFF-8472: Diagnostic Monitoring Interface for Optical Transceivers - Rev 12 August 29, 2014
- IEEE 802.3™ - 2015 IEEE Standard for Ethernet
- IEEE P802.3by™ - 2016 Amendment 2: Media Access Control Parameters, Physical Layers, and Management Parameters for 25 Gb/s Operation
- IEEE P802.3cc™ - 2017 Amendment 11: Physical Layer and Management Parameters for Serial 25 Gb/s Ethernet Operation Over Single-Mode Fiber
- RoHS 6

### Safety:

- Laser Class 1 21CFR-1040 LN#50 7/2001
- Laser Class 1 IEC60825-1
- Cable jacket of SFP copper modules is UL E116441 Compliant
- SFP copper cables are ELV Compliant

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## Additional information

For more information about Cisco 25GBASE SFP28 optics and copper modules, contact your sales representative or visit <https://www.cisco.com/c/en/us/products/interfaces-modules/25-gigabit-modules/index.html>.

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