# Cisco 50GBASE SFP56 Modules

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## Product overview

The Cisco® 50GBASE SFP56 (Small Form-Factor Pluggable) portfolio offers customers a wide variety of high-density and low-power 50G and 25G Gigabit Ethernet connectivity options for data center and high-performance computing network applications. The 50G Modules are based on SFP56 form factor.



**50G Direct Attached Cables (DAC)**



**50G Short Link (SL) Module**




**50G Short Reach (SR) Module**



**50G Long Reach (LR) Module**

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## Features and benefits of Cisco 50G Modules

- Interoperable with other IEEE-compliant 50G and 25G interfaces where applicable
- Certified and tested on Cisco SFP56 ports for superior performance, quality, and reliability
- Provides connectivity with 50G PAM4 or 25G NRZ optical interfaces
- High-speed connectivity compliant to IEEE 802.3cc, IEEE 802.3cn, IEEE 802.3cd, IEEE 802.3by, CPRI V7.0

**Table 1.** Cisco 50G portfolio

| Product | Descriptions |
|---|---|
| **Cisco SFP-50G-CU0.5M** | 25/50GBASE-CR1 SFP56 Copper Cable ½-meter, LSZH |
| **Cisco SFP-50G-CU1M** | 25/50GBASE-CR1 SFP56 Copper Cable 1-meter, LSZH |
| **Cisco SFP-50G-CU1.5M** | 25/50GBASE-CR1 SFP56 Copper Cable 1.5-meter, LSZH |
| **Cisco SFP-50G-CU2M** | 25/50GBASE-CR1 SFP56 Copper Cable 2-meter, LSZH |
| **Cisco SFP-50G-CU2.5M** | 25/50GBASE-CR1 SFP56 Copper Cable 2.5-meter, LSZH |
| **Cisco SFP-50G-CU3M** | 25/50GBASE-CR1 SFP56 Copper Cable 3-meter, LSZH |
| **Cisco SFP-50G-CU4M** | 25/50GBASE-CR1 SFP56 Copper Cable 4-meter, LSZH |
| **Cisco SFP-50G-CU5M** | 25/50GBASE-CR1 SFP56 Copper Cable 5-meter, LSZH |
| **Cisco SFP-50G-BXD-I** | 25/50GBASE-BR10 SFP56 Bidi Module |
| **Cisco SFP-50G-BXU-I** | 25/50GBASE-BR10 SFP56 Bidi Module |
| **Cisco SFP-50G-BX40D-I** | 25/50GBASE-BR40 SFP56 Bidi Module |
| **Cisco SFP-50G-BX40U-I** | 25/50GBASE-BR40 SFP56 Bidi Module |
| **Cisco SFP-50G-ER-I** | 25/50GBASE-ER SFP56 Module for SMF |
| **Cisco SFP-50G-SL** | 25/50G-SL SFP56 Short Link Module |
| **Cisco SFP-50G-SR-S** | 25/50GBASE-SR SFP56 Module for MMF |
| **Cisco SFP-50G-LR-S** | 25/50GBASE-LR SFP56 Module for SMF |

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### Cisco SFP-50G copper cables

Cisco SFP56 to SFP56 copper direct-attach 25/50GBASE-CR1 cables are suitable for very short links and offer a highly cost-effective way to establish a 25 and 50 Gigabit link between SFP56 ports found switches, routers, or other platforms within a rack and across adjacent racks. Cisco offers passive copper cables in lengths of 0.5, 1, 1.5, 2, 2.5, 3, 4, and 5 meters.

For 50G mode, all cable lengths require RS-FEC (544,514) also known as KP1-FEC on host ports.

For 25G mode, the 0.5, 1, 1.5, and 2m cables do not require FEC on the host ports; 2.5 and 3m cables require BASE-R FEC (also known as FC-FEC) on the host ports; 4 and 5m cables require RS-FEC (528,514) also known as KR1-FEC on the host ports.

The SFP-50G copper cables feature an LSZH (Low Smoke Zero Halogen) jacket.

### Cisco SFP-50G-SL

Cisco SFP-50G-SL Short Link Modules are a replacement for traditional AOCs (Active Optical Cables). They are suitable for very short distances and offer a cost-effective way to connect within a rack and across adjacent racks at up to 30 meters.

For 50G operation, the module requires KP1-FEC on the host port for link lengths of 20/30/30 m on OM3/4/5 MMF.

For 25G operation, the module supports:

- 20/30/30 m on OM3/4/5 with KR1-FEC,
- 10/16/16 m on OM3/4/5 with FC-FEC, and
- 7/10/10 m on OM3/4/5 with No-FEC.

### Cisco SFP-50G-SR-S

For 50G mode, the Cisco 50GBASE-SR-S module supports a link length of 70/100/100 m on OM3/4/5 MMF with KP1-FEC on the host port.

For 25G mode, the Cisco 50GBASE-SR-S module supports a link length of:

- 70/100/100 m on OM3/4/5 MMF with KR1-FEC,
- 10/16/16 m on OM3/4/5 MMF with FC-FEC, and
- 7/10/10 m on OM3/4/5 MMF with No-FEC.

### Cisco SFP-50G-LR-S

The Cisco SFP-50G-LR-S Module supports a link length of 10/15 km on standard Single-Mode Fiber (SMF) G.652 at both 25G and 50G.

For 50G mode, the module requires KP1-FEC on the host ports, and for 25G mode, the module requires KR1-FEC on the host ports.

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### Cisco SFP-50G-BXD-I and SFP-50G-BXU-I

The Cisco 25GBASE-BR10/50GBASE-BR10 Module supports a link length of 10 kilometers on a single strand of standard Single-Mode Fiber (SMF) G.652 at both 25G and 50G. A SFP-50G-BXD-I device is always connected to a SFP-50G-BXU-I device with a single strand of standard SMF. The communication over a single strand of fiber is achieved by separating the transmission wavelength of the two devices. SFP-50G-BXD-I transmits at 1330nm channel and receives at 1270nm signal. The SFP-50G-BXU-I transmits at a 1270nm wavelength and receives a 1330nm signal.

For 50G mode the module requires KP1 FEC on host ports and for 25G mode the module requires KR1-FEC on the host ports, This module has an industrial temperature range. This module also supports CPRI datarate option 10.

### Cisco SFP-50G-BX40D-I and SFP-50G-BX40U-I

The Cisco 25GBASE-BR40/50GBASE-BR40 Module supports a link length of 40 kilometers on a single strand of standard Single-Mode Fiber (SMF) G.652 at both 25G and 50G. A SFP-50G-BX40D-I device is always connected to a SFP-50G-BX40U-I device with a single strand of standard SMF. The communication over a single strand of fiber is achieved by separating the transmission wavelength of the two devices. SFP-50G-BXD-I transmits at 1314nm channel and receives at 1289nm signal. The SFP-50G-BXU-I transmits at a 1289nm wavelength and receives a 1314nm signal.

For 50G mode the module requires KP1 FEC on host ports and for 25G mode the module requires KR1-FEC on the host ports, This module has an industrial temperature range.

### Cisco SFP-50G-ER-I

The Cisco 25GBASE-ER/50GBASE-ER Module supports a link length of 40 kilometers on Duplex standard Single-Mode Fiber (SMF) G.652 at both 25G and 50G.

For 50G mode the module requires KP1 FEC on host ports and for 25G mode the module requires KR1-FEC on the host ports, This module has an industrial temperature range.

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## Technical specifications

### Platform support

Cisco 50G transceivers are supported on Cisco switches. For more details, refer to Transceiver Module Group (TMG) Compatibility Matrix.

**Table 2.** 50G DAC specifications

| Cisco SFP-50G | Cable type | Cable distance | Max power consumption (W) | Pull tab/color |
|---|---|---|---|---|
| **Cisco SFP-50G-CU0.5M** | Direct-attach copper cable assembly | 0.5 m | 1/10 | Beige |
| **Cisco SFP-50G-CU1M** | | 1 m | | Beige |
| **Cisco SFP-50G-CU1.5M** | | 1.5 m | | Black |
| **Cisco SFP-50G-CU2M** | | 2 m | | Brown |
| **Cisco SFP-50G-CU2.5M** | | 2.5 m | | Yellow |
| **Cisco SFP-50G-CU3M** | | 3 m | | Orange |
| **Cisco SFP-50G-CU4M** | | 4 m | | Green |
| **Cisco SFP-50G-CU5M** | | 5 m | | Gray |

**Table 3.** 50G Transceiver specifications

| Cisco SFP-50G | Wavelength (nm) | Cable type | Core size (microns) | Max Power Consumption (W) | Modal bandwidth | Cable distance | Bail latch color |
|---|---|---|---|---|---|---|---|
| **Cisco SFP-50G-SL** | 850 | MMF | 50.0 | 1.2 | 2000 (OM3) | 20 m | Violet |
| | | | | | 4700 (OM4) | 30 m | |
| | | | | | 4700 (OM5) | 30 m | |
| **Cisco SFP-50G-SR-S** | 850 | MMF | 50.0 | 1.2 | 2000 (OM3) | 70 m | Beige |
| | | | | | 4700 (OM4) | 100 m | |
| | | | | | 4700 (OM5) | 100 m | |
| **Cisco SFP-50G-LR-S** | 1310 | SMF | G.652 | 1.5 | - | 10/15 km* | Blue |

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| Cisco SFP-50G | Wavelength (nm) | Cable type | Core size (microns) | Max Power Consumption (W) | Modal bandwidth | Cable distance | Bail latch color |
|---|---|---|---|---|---|---|---|
| **Cisco SFP-50G-BXD-I** | 1330 | SMF | G.652 | 2 | | 10/15 km* | Blue |
| **Cisco SFP-50G-BXU-I** | 1270 | SMF | G.652 | 2 | | 10/15 km* | Blue |
| **Cisco SFP-50G-BX40D-I** | 1314 | SMF | G.652 | 2.7 | | 30/40km | Red |
| **Cisco SFP-50G-BX40U-I** | 1289 | SMF | G.652 | 2.7 | | 30/40km | Red |
| **Cisco SFP-50G-ER-I** | 1310 | SMF | G.652 | 2.7 | | 30/40km | Red |

*Links with up to 15-km reach are supported as engineered links as long as channel insertion loss is <8dB.

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

| Product | Type | Transmit power (dBm)* | | Receive power (dBm)* | | Max Channel Insertion Loss dB | Transmit and receive wavelength (nm) |
|---|---|---|---|---|---|---|---|
| | | Maximum | Minimum | Maximum | Minimum | | |
| **Cisco SFP-50G-SL** | 25G | +2.4 | -8.4 | +2.4 | -10 | 1.6 | 840 to 860 |
| | 50G | +4 | -6.5 | +2.4 | -8.1 | 1.6 | 840 to 860 |
| **Cisco SFP-50G-SR-S** | 25G | +2.4 | -8.4 | +2.4 | -10.3 | 1.9 | 840 to 860 |
| | 50G | +4 | -6.5 | +4 | -8.4 | 1.9 | 840 to 860 |
| **Cisco SFP-50G-LR-S** | 25G | +2.0 | -7.0 | +2.0 | -14.8 | 8 | 1295 to 1325 |
| | 50G | +4.2 | -4.5 | +4.2 | -12.5 | 8 | 1304 to 1317 |
| **Cisco SFP-50G-BXD-I** | 25G | 2 | -7 | 2 | -15 | 8 | 1320 to 1340 / 1260 to 1280 |
| | 50G | 4.2 | -3.6 | 4.2 | -11.6 | 8 | 1320 to 1340 / 1260 to 1280 |
| **Cisco SFP-50G-BXU-I** | 25G | 2 | -7 | 2 | -15 | 8 | 1260 to 1280 / 1320 to 1340 |
| | 50G | 4.2 | -3.6 | 4.2 | -11.6 | 8 | 1260 to 1280 / 1320 to 1340 |
| **Cisco SFP-50G-BX40D-I** | 25G | 6 | -3 | -4 | -21 | 18 | 1306 to 1322/1281 to 1297 |
| | 50G | 6.6 | 0.4 | -3.4 | -17.6 | 18 | 1306 to 1322/1281 to 1297 |

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| Product | Type | Transmit power (dBm)* | | Receive power (dBm)* | | Max Channel Insertion Loss dB | Transmit and receive wavelength (nm) |
|---|---|---|---|---|---|---|---|
| | | Maximum | Minimum | Maximum | Minimum | | |
| **Cisco SFP-50G-BX40U-I** | 25G | 6 | -3 | -4 | -21 | 18 | 1281 to 1297/1306 to 1322 |
| | 50G | 6.6 | 0.4 | -3.4 | -17.6 | 18 | 1281 to 1297/1306 to 1322 |
| **Cisco SFP-50G-ER-I** | 25G | 6 | -3 | -4 | -21 | 18 | 1295 to 1310/1295 to 1325 |
| | 50G | 6.6 | 0.4 | -3.4 | -17.6 | 18 | 1304.5 to 1317.5 |

*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 and Cabling: dual LC/PC connector (SFP-50G-SL, SFP-50G-SR-S, SFP-50G-LR-S and SFP-50G-ER-I).

**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.

Table 5 provides the cable dimensions, bend radius, face place distance, and jacket material and jacket color for the DACs.

**Table 5.** Cable dimension

| | AWG | SFP end | | | Jacket material | Weight (grams) | Jacket color |
|---|---|---|---|---|---|---|---|
| | | Diameter (mm) | Bend radius (mm) | Face plate distance (mm) | | | |
| **SFP-50G-CU0.5M** | 30, 32 | 5 | 45 | 70 | LSZH | 40 | Black |
| **SFP-50G-CU1M** | 30 | 5 | 45 | 70 | | 70 | |
| **SFP-50G-CU1.5M** | 30 | 5 | 45 | 70 | | 100 | |
| **SFP-50G-CU2M** | 26, 28 | 5 | 45 | 70 | | 130 | |
| **SFP-50G-CU2.5M** | 26, 28 | 5 | 45 | 70 | | 150 | |
| **SFP-50G-CU3M** | 26, 28 | 5 | 45 | 70 | | 170 | |

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| | AWG | SFP end | | | Jacket material | Weight (grams) | Jacket color |
|---|---|---|---|---|---|---|---|
| | | Diameter (mm) | Bend radius (mm) | Face plate distance (mm) | | | |
| **SFP-50G-CU4M** | 24 | 5 | 45 | 70 | | 220 | |
| **SFP-50G-CU5M** | 24 | 5 | 45 | 70 | | 275 | |

Cisco SFP connector modules typically weigh 100 grams or less.

## Module dimensions and Weight

- Dimensions (H x W x D): 8.5 x 13.4 x 56.5mm
- Weight: Typically 75 grams or less

## 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
- Expedited replacement available via a Cisco SMARTnet® service support contract

## Product sustainability

**Table 6.** Product sustainability

| Sustainability topic | Reference | |
|---|---|---|
| **General** | Information on product-material-content laws and regulations | Materials |
| | Information on electronic waste laws and regulations, including our products, batteries, and packaging | WEEE compliance |
| | Information on product takeback and reuse program | Cisco Takeback and Reuse Program |
| | Sustainability Inquiries | Contact: csr_inquiries@cisco.com |
| | Countries and regions supported | Regulatory compliance |
| **Power** | Power (including pluggable) | Power consumption |

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| Sustainability topic | Reference | |
|---|---|---|
| **Material** | Product packaging weight and materials | Contact: environment@cisco.com |

## Ordering information

Table 7 provides the ordering information for Cisco 50G cables and transceivers.

**Table 7.** Ordering information

| Description | Product number |
|---|---|
| **Cisco 25/50GBASE-CR1 SFP56 Passive Copper Cable, 1/2-meter, LSZH** | SFP-50G-CU0.5M |
| **Cisco 25/50GBASE-CR1 SFP56 Passive Copper Cable, 1-meter, LSZH** | SFP-50G-CU1M |
| **Cisco 25/50GBASE-CR1 SFP56 Passive Copper Cable 1.5-meter, LSZH** | SFP-50G-CU1.5M |
| **Cisco 25/50GBASE-CR1 SFP56 Passive Copper Cable, 2-meter, LSZH** | SFP-50G-CU2M |
| **Cisco 25/50GBASE-CR1 SFP56 Passive Copper Cable 2.5-meter, LSZH** | SFP-50G-CU2.5M |
| **Cisco 25/50GBASE-CR1 SFP56 Passive Copper Cable, 3-meter, LSZH** | SFP-50G-CU3M |
| **Cisco 25/50GBASE-CR1 SFP56 Passive Copper Cable 4-meter, LSZH** | SFP-50G-CU4M |
| **Cisco 25/50GBASE-CR1 SFP56 Passive Copper Cable, 5-meter, LSZH** | SFP-50G-CU5M |
| **Cisco 25/50GBASE-SL SFP56 Module for MMF** | SFP-50G-SL |
| **Cisco 25/50GBASE-SR SFP56 Module for MMF** | SFP-50G-SR-S |
| **Cisco 25/50GBASE-LR SFP56 Module for SMF** | SFP-50G-LR-S |
| **Cisco 25/50GBASE-BR10 SFP56 bidi Module** | SFP-50G-BXD-I |
| **Cisco 25/50GBASE-BR10 SFP56 bidi Module** | SFP-50G-BXU-I |
| **Cisco 25/50GBASE-BR40 SFP56 bidi Module** | SFP-50G-BX40D-I |
| **Cisco 25/50GBASE-BR40 SFP56 bidi Module** | SFP-50G-BX40U-I |
| **Cisco 25/50GBASE-ER SFP56 Module for SMF** | SFP-50G-ER-I |

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## 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 50Gb/s Operation
- IEEE P802.3cc™ - 2017 Amendment 11: Physical Layer and Management Parameters for Serial 50 Gb/s Ethernet Operation Over Single-Mode Fiber
- IEEE 802.3bj Amendment of IEEE Std 802.3™-2012 (D3.2, 11 April 2014)
- IEEE 802.3bm Amendment of IEEE Std 802.3™-2012 (D3.3, 12 November 2014)
- IEEE P802.3cd Amendment of IEEE Std 802.3™-2012 (5 December 2018)
- IEEE P802.3cn Amendment of IEEE Std 802.3™-2012 (7 November 2019)
- CPRI Specification V7.0 (2015-10-09)
- 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.

## Cisco Capital

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## Additional information

For more information about Cisco 50GBASE SFP56 optics and copper modules, contact your sales representative or
Visit www.cisco.com/c/en/us/products/interfaces-modules/25-gigabit-modules/index.html.

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# Document history

**Table 8.** Document history

| New or Revised Topic | Described In | Date |
|---|---|---|
| **1st Publication** | | July 22, 2022 |


**Americas Headquarters**
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