

10G optical module format



Overview

10GE SFP+ Optical Modules Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-BXU1 must be used with SFP-10G-BXD1.

Key Takeaways

10G optical modules are primarily implemented in the SFP+ form factor, supporting various standards like 10GBASE-SR, LR, ER, and BIDI for different fiber types, wavelengths, and transmission distances. SFP+ Form FactorThe SFP+ (Small Form-factor Pluggable Plus) is the most common 10G optical module format, designed for 10 Gigabit Ethernet ports. It is hot-swappable, compact, and supports high-density deployments in data centers, enterprise networks, and service provider environments.

SFP+ modules can interface with both multimode fiber (MMF) and single-mode fiber (SMF), depending on the standard. Common 10G Standards10GBASE-SR (Short Reach): Operates over multimode fiber at 850 nm, supporting distances up to 300–400 meters on OM3/OM4 fiber. Ideal for intra-rack or short data center connections.

10GBASE-LR (Long Reach): Operates over single-mode fiber at 1310 nm, supporting distances up to 10 km. Typically uses LC duplex connectors and often includes Digital Diagnostic Monitoring (DDM/DOM) for real-time telemetry. 10GBASE-ER (Extended Reach): Operates over single-mode fiber at 1550 nm, supporting distances up to 40 km, suitable for metro or long-haul links.

10GBASE-LRM (Long Reach Multimode): Supports legacy multimode fibers (OM1/OM2) with distances up to 220 meters, often requiring mode-conditioning patch cords.

BID

I (Bidirectional) Modules: Use a single fiber for both transmit and receive by employing different wavelengths for each direction.

BID

I modules must be used in pairs with complementary wavelengths (e.g., 1270 nm transmit paired with 1330 nm receive),. Transmission Distances and Wavelengths

Standard	Fiber Type	Wavelength	Max Distance
10GBASE-SR	MMF (OM3/OM4)	850 nm	300–400 m
10GBASE-LR	SMF	1310 nm	10 km
10GBASE-ER	SMF	1550 nm	40 km
10GBASE-LR	MMF (OM1/OM2)	1310 nm	220 m
BIDI	SMF	1270/1330 nm	Varies, typically 10–20 km

Connector Types and Interoperability: Most 10G SFP+ modules use LC duplex connectors for fiber connections. Modules are designed to comply with IEEE 802.

3ae and multi-source agreements (MSAs), ensuring interoperability across switches, routers, and network interface cards, provided optical budgets and fiber types are compatible. Some modules, like 10GBASE-T, use RJ-45 connectors for copper cabling up to 30 meters.

Deployment Considerations

Fiber type: Ensure the module matches the fiber (MMF vs SMF) and connector type.

Distance: Choose SR, LR, ER, or LRM based on link length. Power budget: Verify transmitter power and receiver sensitivity to maintain reliable links.

Compatibility: Use modules certified for the specific switch or router platform to avoid interoperability issues.

BID

I pairs: Always deploy complementary BIDI modules to enable single-fiber bidirectional communication. In summary, 10G optical modules in SFP+ format provide flexible options for short, long, and extended reach Ethernet connections, supporting both multimode and single-mode fibers, with careful selection based on distance, wavelength, and network requirements.

Article Content

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Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-BXU1 must be used with SFP-10G-BXD1.

Cisco 10GBASE SFP+ Modules Data Sheet

The Cisco SFP-10G-LR-X is a multirate 10GBASE-LR, 10GBASE-LW, and OTU2/OTU2e module for extended operating temperature range. It supports a link length of 10 kilometers on standard Single

10 Gbit/s SFP+ Optical Modules

10 Gbit/s SFP+ optical modules apply to 10 GE optical ports. The wavelength can be 850 nm, 1310 nm, or 1550 nm, and the transmission distance ranges from 0.5 km (0.31 mi) to 80 km (49.71 mi).

10GB SFP Module Guide: Types, Specs, and How to Choose

Learn everything about 10GB SFP modules, including types, specifications, compatibility, and how to choose the right 10G SFP+ transceiver for your network.

TI Optical Module 10G SFP+ Total Solution

The enhanced small form-factor pluggable (SFP+) is a compact, hot-pluggable transceiver used for 10G telecommunication and data communications applications. It is a popular industry format jointly

How to Classify SFP+ 10G Optical Transceiver Modules

Learn how to classify 10G SFP+ transceivers by interface, distance, fiber type, and technology. Expert guide for selecting LINK-PP 10G SFP+ modules.

10G SFP+ Modules

The transceivers use the Enhanced Small Form-factor Pluggable format (SFP+). The SFP+ form factor is smaller than other form factors such as Xenpak, X2, and 10G XFP, ensuring lower costs, lower

Cisco 10GBASE SFP Modules Data Sheet

The Cisco SFP-10G-ZR is a multirate 10GBASE-ZR, 10GBASE-ZW, and OTU2/OTU2e module. It supports link lengths of up to about 80 kilometers on standard single-mode fiber (SMF, G.652).

Small Form-factor Pluggable

Small Form-factor Pluggable (SFP) is a compact, hot-pluggable network interface module format used for both telecommunication and data communications applications.

POTN Network Architecture: Optical Modules, WDM & Cabling

Learn how POTN network architecture uses optical modules, WDM, fiber cabling, link budgets and 100G/400G optics for access, metro and DCI upgrades.

direcXource Generic Compatible SFP-10G-LRM 10GBASE-LRM

Generic Compatible SFP-10G-LRM 10GBASE-LRM SFP+ 1310nm 220m MMF LC DOM Optical Transceiver Module direcXource's SFP-10G-LRM optical transceiver is a dual fiber 10.3Gbps Small

Ubiquiti 10G Single-Mode Optical Module UACC-OM-SM-10G-D-2

Ubiquiti 10G Single-Mode Optical Module SFP+ transceiver that supports 10G connections up to 10 km using single-mode fiber with a duplex LC UPC connector. Max data rate: 10 Gbps Compatible with

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The Ultimate Guide to SFP Modules (2026): Types,

Confused by SFP vs SFP+? Read the definitive 2026 guide on SFP modules. We explain Single Mode vs Multimode, DDM diagnostics, and how to choose the

Arista Optics Modules and Cables

Overview Arista's Optical Modules and Cable portfolio offer a wide variety of high-density and low-power 800G (dual 400G), 400G, 200G, 100G, 50G, 40G, 25G, 10G, 1G, and 100M Ethernet connectivity

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