

Are 10 Gigabit optical modules dual-wavelength

- ✓ Slow Axis Aligned (0°) - for standard sensing applications
- ✓ Fast Axis Aligned (90°) - for special modulation applications
- ✓ 45° Axis Aligned - for depolarizer applications



Overview

The 10-gigabit module standard is the Enhanced Small Form-factor Pluggable transceiver, generally called SFP+.

Key Takeaways

Standard 10G SFP+ modules typically use a single wavelength per direction, but BiDi 10G modules are dual-wavelength, transmitting and receiving on different wavelengths over a single fiber. Standard 10G SFP+ Modules

Most 10G SFP+ optical modules, such as SR, LR, ER, and ZR, operate on a single wavelength for transmission. For example, 10G SFP+ SR modules use 850 nm, LR modules use 1310 nm, and ER/ZR modules use 1550 nm. These modules require duplex fiber, with one fiber for transmitting (TX) and one for receiving (RX), meaning each fiber carries a single wavelength in one direction.

BiDi (Bidirectional) 10G Modules

BiDi 10G SFP+ modules are designed to transmit and receive data over a single strand of single-mode fiber by using two different wavelengths—one for TX and one for RX. A common example is a pair of modules using 1270 nm for transmission and 1330 nm for reception, with the opposite module reversing the wavelengths (TX 1330 nm / RX 1270 nm). This dual-wavelength approach allows full-duplex communication on a single fiber, effectively halving fiber usage compared to standard duplex modules.

DWDM 10G Modules

Dense Wavelength-Division Multiplexing (DWDM) SFP+ modules also use multiple wavelengths, but each module is typically fixed to a single ITU channel wavelength. Tunable DWDM modules can be adjusted to different wavelengths, but each module still transmits and receives on a single wavelength per direction. These are not considered dual-wavelength in the BiDi sense; they are wavelength-specific for multiplexing multiple channels on the same fiber.

Summary

- Standard 10G SFP+ (SR, LR, ER, ZR): Single wavelength per direction, requires duplex fiber.
- BiDi 10G SFP+: Dual-wavelength, transmits and receives on different wavelengths over a single fiber.
- DWDM 10G SFP+: Single wavelength per module, tunable modules can select different channels, but each module still uses one wavelength per direction. In conclusion, only BiDi 10G optical modules are truly dual-wavelength, while standard and DWDM 10G modules use a single wavelength per direction. This distinction is important for network design, fiber planning, and deployment in data centers or metro networks.

Article Content

10 Gigabit Ethernet

The 10-gigabit module standard is the Enhanced Small Form-factor Pluggable transceiver, generally called SFP+. Based on the

SFP+ BiDi 10G Guide: Single Fiber 10G Optical Transceivers

10G SFP+ BiDi technology enables full-duplex 10-gigabit communication over a single fiber by transmitting and receiving data on two

What Is A Single-Fiber BiDi Transceiver?--ETU-LINK

There are single-fiber and dual-fiber optical transceivers. How do we choose, and what are their differences and advantages? Let's

Microsoft Word

Product Overview The Cisco® 10GBASE SFP+ modules (Figure 1) offer customers a wide variety of 10 Gigabit Ethernet connectivity

10Km SFP+ Optical Module

This is a standard SFP+ optical module. It uses two single mode optical fibers and the speed rate can up to 10Gbps, transmission

10G SFP+ LR, 1310nm, 10km, DDM, LC/UPC Duplex, Single Mode, Optical ...

The MJ-SFP10G-LR-10 SFP+ transceiver provides a high-performance, cost-effective solution for 10.31Gbps fiber connectivity over

Dense Wavelength Division Multiplexing

This is the optical equivalent of conventional frequency-division multiplexing described in Section VII.B. The term dense wavelength

Cisco 10GBASE Dense Wavelength-Division Multiplexing XFP

Product overview The Cisco® Dense Wavelength-Division Multiplexing (DWDM) XFP pluggable module (Figure 1) allows enterprise

10GBASE-LR SFP+ 1310nm 10km Transceiver Datasheet | FS

10-Gigabit Ethernet links up to 10km over Single Mode fiber. They are compliant with SFF-8431, SFF-8432 and IEEE 802.3ae

Cisco CWDM Transceiver Modules

Cisco Coarse Wave Division Multiplexing (CWDM) Solution allows scalable and easy-to-deploy Gigabit Ethernet (GbE) and Fibre

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

