Gigabit Single-Mode Optical Module Wavelength



Overview

This data sheet describes the benefits, specifications, and ordering information for the Cisco SFP Modules for Gigabit Ethernet Applications.

Key Takeaways

Gigabit single-mode SFP modules typically operate at 1310 nm or 1550 nm wavelengths, depending on the transmission distance and application. Common Wavelengths and Applications1310 nm: Standard for single-mode fiber (SMF) over medium distances, typically up to 10–40 km. Used in 1000BASE-LX/LH SFP modules and some 1000BASE-EX modules for campus or inter-building links.

1550 nm: Designed for long-distance single-mode transmission, often exceeding 40 km and up to 80–120 km with high-quality fiber and line conditioning. Common in 1000BASE-EX and 1000BASE-ZX modules for telecom or metropolitan networks.

Bi

Di (Bidirectional) SFPs: Use two distinct wavelengths on a single fiber strand, such as 1310/1490 nm or 1490/1550 nm, enabling simultaneous transmit and receive on one fiber. Module Types and Distance Ranges1000BASE-LX SFP: 1310 nm, single-mode fiber, up to 10 km; may require mode conditioning for multimode fiber. 1000BASE-EX SFP: 1310 nm, single-mode fiber, up to 40 km; often used with inline optical attenuators for back-to-back links.

1000BASE-ZX SFP: 1550 nm, single-mode fiber, long-reach applications up to 80 km or more.

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Bi

Di SF

P: Single-mode fiber, uses paired wavelengths for single-fiber operation, typically 20 nm apart within 1270–1610 nm range.

Practical Considerations

Connector Type: Most single-mode SFPs use LC connectors, while older GBIC modules may use SC interfaces. Distance vs. Wavelength: Shorter wavelengths (1310 nm) are suitable for medium distances with moderate loss, while longer wavelengths (1550 nm) minimize loss for long-haul transmission.

Network Design: Selecting the correct wavelength ensures compatibility with fiber type, distance, and existing infrastructure, and is critical for reliable Gigabit Ethernet performance. In summary, 1310 nm and 1550 nm are the primary wavelengths for Gigabit single-mode optical modules, with BiDi modules using paired wavelengths for single-fiber operation. The choice depends on distance, fiber type, and network design requirements.

Article Content

Gigabit single-mode single-core fiber optic module

The general parameters and basic knowledge of Gigabit optical transceivers are difficult to master. The following will introduce the general parameters of the optical module and the basic

Cisco SFP Modules for Gigabit Ethernet Applications

This data sheet describes the benefits, specifications, and ordering information for the Cisco SFP Modules for Gigabit Ethernet Applications.

SFP-10G-ER Explained: Powering 40km 10Gbps Optical Links

SFP-10G-ER is a 10G SFP+ transceiver for up to 40km over single-mode fiber, featuring 1550nm wavelength, LC connector, and real-time monitoring.

1000BASE-SX, 1000BASE-LX, 1000BASE-ZX&BX SFP: A Simple

1000BASE-SX is a gigabit Ethernet standard over fiber optic for short reach. It is used for operating on multimode fiber with a short wavelength of 770 to 860 nanometers (typically 850nm).

SFP Transceiver

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Utilizing LC connectors and operating at a 1310nm wavelength, it enables high-speed data transmission over single-mode fiber for distances up to 80

Industrial Gigabit Fiber SFP Optical Transceiver

Industrial Gigabit Fiber SFP Optical Transceiver Module, 1000Base-EX (LC) Single-Mode Port, 40 km (25 mi.), Wavelength 1550 nm, MSA-compliant for Maximum

Cisco 10GBASE SFP+ Modules Data Sheet

The Cisco ® 10GBASE SFP+ modules (Figure 1) give you a wide variety of 10 Gigabit Ethernet connectivity options for data center, enterprise

1G BiDi SFP

GIGALIGHT''s 1G BiDi SFP series optical transceiver modules support a speed of 1.25Gbps, widely used in Gigabit Ethernet, 1G fiber channel, and SDH. They can

SFP-1GLXLC

Moxa''s small form-factor pluggable transceiver (SFP) Ethernet fiber modules for Gigabit Ethernet provide coverage across a wide range of communication

What Is 10GBASE-LR? SMF 1310nm 10km SFP+ Explained

10GBASE-LR operates at a nominal wavelength of 1310 nm over single-mode fiber (SMF, 9/125 µm, G.652 compliant), providing a standardized maximum link distance of 10 kilometers.

Cisco SFP Modules for Gigabit Ethernet Applications

1000BASE-ZX SFP for long-reach single-mode fibers The 1000BASE-ZX SFP operates on standard single-mode fiber-optic link spans of up to approximately 70 km in length. The SFP provides an

Single Mode vs. Multimode Fiber: Core Differences and Selection Guide

Single Mode vs Multimode Fiber: What''s the Difference? For a clearer comparison, the following sections examine the main differences between single mode and multimode fiber in terms

1G SFP LX 1310nm 20km Single mode Transceiver

Optimal Performance and Quality for 1G Networks Featuring a built-in Semtec chip and reliable FP laser / PIN receiver, the SFP module delivers low power

H!Fiber 1.25G Single Mode SFP LC Module, 1000Base-LX/LH Fiber

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About this item 1000Base-LX/LH SFP: Gigabit Single Mode SFP Module support 1.25 Gb/s data rates, 1310nm wavelength, SMF; Duplex Dual LC interface connected to Single-mode (OS1/OS2/OS3)

SFP+ Single Mode LC Module (10km)

TRENDnet''s SFP+ Single Mode LC Modules are compatible with standard SFP+ slots found on network switches and fiber converters. Each single mode 10G SFP+ transceiver is equipped with a duplex LC

The Most Comprehensive Guide Of Optical Modules

The central wavelength of single mode optical module is generally 1310nm, 1550nm, which is used with single mode optical fibre. Single-mode

Understanding Single-mode and Multi-mode Optical Modules and Optical ...

Conclusion: In conclusion, single-mode and multi-mode optical modules and fibers serve distinct purposes in sfp optical module communication, offering compatibility with different transmission

Gigabit SFP Module: A Complete Guide to 1G SFP Transceivers

1000BASE-LX SFP for single-mode fiber transmission 1000BASE-BX SFP for single-fiber BiDi communication 1000BASE-T SFP for copper Ethernet connections These standardized

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