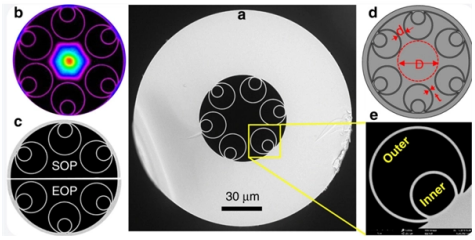
Recommended Single-Mode Dual-Core Optical Modules



Overview

Single Mode fibers have a smaller core, allowing light to travel in a single, straight path, ideal for long distances with less signal loss.

Key Takeaways

For long-distance, high-speed connections, single-mode dual-core (dual-fiber) optical modules such as LR, ER, or CWDM SFPs are recommended, depending on distance and network requirements.

Overview of Single-

Mode Dual-

Core ModulesSingle-mode dual-core optical modules use two fibers: one for transmitting (TX) and one for receiving (RX) data. They are ideal for long-distance applications because single-mode fibers have a small core (~9 µm) that minimizes signal loss and modal dispersion, supporting high-speed data rates from 1G up to 100G and beyond. Dual-core modules are easier to set up than single-fiber BiDi modules and provide stable, reliable communication.

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Key Types and RecommendationsSFP/SFP+ LR (Long Reach) ModulesWavelength: 1310 nmDistance: 2–10 kmUse case: Enterprise networks, campus links, and metro connectionsConnector: LC duplexAdvantage: Cost-effective for medium-range single-mode links SFP/ SFP+ ER (Extended Reach) ModulesWavelength: 1550 nmDistance: 20–40 kmUse case: Long-haul connections, data center interconnectsConnector: LC duplexAdvantage: Supports higher distances with low insertion loss CWDM/DWDM ModulesWavelength: CWDM (1270–1610 nm), DWDM (narrow channel spacing)Distance: 40–80 km or moreUse case: High-density metro networks, telecom, and carrier-grade linksAdvantage: Multiplex multiple wavelengths over the same fiber pair, maximizing fiber utilization Selection ConsiderationsDistance and Data Rate: Choose LR for short to medium distances, ER or DWDM for long distances or high-density links.

Connector Type: LC duplex is standard for single-mode dual-core modules; ensure compatibility with your patch panels and devices. Wavelength Matching: Dual-core modules must match TX/RX wavelengths; for example, TX1310/RX1550 on one end and TX1550/RX1310 on the other. Network Environment: Consider industrial-grade modules for outdoor or harsh environments, which offer extended temperature ranges and reliability.

Practical Tips

Avoid mixing single-mode modules with multimode fiber, as this causes high bit-error rates and link failure. Verify insertion loss and modal dispersion budgets to ensure signal integrity over the intended distance. For future-proofing, single-mode modules are preferred over multimode for speeds above 25G due to lower modal dispersion and higher distance capability.

By selecting single-mode dual-core modules appropriate for your distance, speed, and environment, you ensure reliable, high-performance optical links for enterprise, data center, or telecom networks.

Article Content

The Key Differences Between 1-core, 2-core, Single

Single Mode fibers have a smaller core, allowing light to travel in a single, straight path, ideal for long distances with less signal loss. Multi-mode

The Difference Between Single/Dual Fiber and

Single-mode optical modules are best for long distances and fast speeds. They use a thin fiber core. Multi-mode modules are good for short

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

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Read the definitive 2026 guide on SFP modules. We explain Single Mode vs Multimode, DDM diagnostics, and how to choose the right transceiver for Cisco, Juniper, and more.

Single-mode vs Multimode SFP 2026: Fiber Types and distances

A guide to single-mode vs multimode SFP modules. Covers fiber types, wavelengths, distances, BiDi, CWDM/DWDM, SMF vs MMF selection, and application scenarios.

Cisco Transceiver Modules

Cisco Transceiver Modules - Learn product details such as features and benefits, as well as hardware and software specifications.

Recommendation ITU-T G.652 (08/2024)

This document outlines the specifications for a single-mode optical fiber and cable designed for use around the 1310 nm zero-dispersion wavelength, suitable for both the 1310 nm and 1550 nm regions,

Optic Modules Datasheet

datasheet is intended to guide the user through the various options available when choosing an optic module for a given platform depending on the architecture. The following table lists the different

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

How do you choose between single mode and multimode fiber? Compare their differences in core size, light source, bandwidth, transmission distance, and cost to identify the right application.

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

Comparing Single-Core and Dual-Core Optical Fibers

Conclusion The choice between single-core and dual-core optical fibers depends largely on the specific requirements of the communication

Differences Between Dual Fiber SFP and Simplex SFP Modules

Dual fiber SFP and simplex SFP modules are two different SFP types, and understanding their differences is crucial for making informed decisions in network deployments. This article explores the

Select The Right Fiber Patch Cables For 1G/10G/25G

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Deploying optical modules requires the right fiber patch cable. It directly affects network connection stability, performance, and maintenance. This

Single-Mode Vs Multimode Optical Modules: Detailed Differences

Is your data center or campus network best served by Single Mode or Multimode Optical Modules? Choosing between Single Mode and Multimode Optical Modules will shape cost, reach and upgrade

Fiber Optics Part 2: Single-Mode Fiber vs. Multi-Mode

Typical single-mode fiber has a core diameter of 9 microns and operates at 1310 and 1550nm wavelengths of light. When the wavelength of the

Understanding Single-mode and Multi-mode SFP Optical Modules

A□SFP single-mode optical modules and SFP multi-mode optical modules are incompatible. If you mix SFP single-mode optical modules and SFP multi-mode optical modules, it may cause problems such

Fiber Optic Cable Types – Multimode and Single Mode

Single Mode fibers are identified by the designation OS or Optical Single-mode Fiber. Single Mode cable has a much smaller core (8-9um) than multimode cable and uses a single path (mode) to carry the light.

Single-mode vs. Multimode Transceivers: How Do You Choose?

Single-mode or multimode transceivers. Learn about the differences and how they can help your data center.

Difference Between Single vs Dual Fiber Optical Transceivers

Single Fiber: Typically shorter reach compared to dual fiber, ranging from 2km to 120km, depending on the specific module. Dual Fiber: Generally offers longer transmission distances, reaching up to

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

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

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