

Single-fiber optical module parameters



Article Overview

Single-fiber optical modules are configured based on wavelength, transmission rate, distance, optical power, and interface standards to ensure reliable single-mode fiber communication.

Key Parameters

1. Wavelength Selection

- 1310 nm: Single-mode, moderate loss, low dispersion, suitable for distances up to 40 km.
- 1550 nm: Single-mode, lower loss but higher dispersion, suitable for long-distance transmission above 40 km, up to 120 km without repeaters.
- 850 nm: Multi-mode, short-distance (≤ 500 m), low cost, not typically used for single-mode modules .

2. Transmission Rate

- Common rates include 155 Mbps, 1.25 Gbps, 2.5 Gbps, and 10 Gbps, with backward compatibility.
- Higher rates (2-10 Gbps) are used in SANs, data centers, and GPON uplinks .

Transmission Distance

- Single-mode modules support distances of 15 km, 40 km, 80 km, and 120 km, depending on wavelength and optical power .

4. Optical Power and Sensitivity

- Transmit optical power: Output power of the laser at the module's transmit end.
- Receive sensitivity: Minimum optical power required at the receiver to maintain a specified bit error rate.
- Proper configuration ensures the optical link stays within the alarm thresholds for GPON or SFP systems .

5. Fiber Type and Standards...

Article Content

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Single-Mode Optical Fiber

Distributed fiber optic sensors are made using optical fibers. The optical fibers used for SHM include single-mode and multi-mode

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Understanding Optical Modules: Working Principles, Structures, and ...

Explore the working principles, structures, and performance metrics of optical modules, essential components of

Aug 10, 2025

Single-mode Fibers – launching light, monomode fiber, cut-off

Single-mode fibers support only one guided mode per polarization direction, ensuring consistent output beam profile and are vital in

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Single-Mode Optical Fiber (SMF)

Draka Single-Mode Fiber (SMF) provides optimum performance in both the 1310 nm and 1550 nm wavelength operation ranges

Apr 02, 2026

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,

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Everything You Need to Know About Optical Modules

A: Single-mode optical modules are designed to transmit optical signals over long distances, typically using a single

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Fiber Optic Basics

Fiber Optic Basics Optical fibers are circular dielectric wave-guides that can transport optical energy and information. They have a

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What are the key specifications of... | AIMIFIBER

What are the key specifications of single-mode fiber optic cables? Single Mode Fiber
Learn more from AIMIFIBER —

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Single-mode optical fiber

There are a number of special types of single-mode optical fiber which have been chemically or physically

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What Are the Key Parameters of Optical Modules

Understand the key parameters of optical modules, including transmission rate, distance, wavelength, and fiber

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Basics of Fiber Optics

Mark Curran/Brian Shirk Fiber optics, which is the science of light transmission through very fine glass or plastic fibers, continues to

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OPTICAL FIBER COMMUNICATION

Yasin OUTLINE Introduction about Optical Fibers. Main Characteristics of Fiber Optics Communication System. Light propagation in

May 11, 2026

Specifications For Fiber Optic Networks

Specifications For Legacy Fiber Optic Networks A listing of many fiber optic LANs and links available in the last 30 years, with basic

Aug 23, 2025

Single-Mode Fiber Cable Guide: Types, Specs & Selection

This comprehensive guide explores Single-Mode Fiber Optic Cable, covering technical specifications, deployment

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SFP Optical Module Specifications: Standards & Performance

SFP (Small Form-factor Pluggable) optical modules are compact, hot-pluggable transceivers that enable network

Jun 10, 2026

Single Mode Fibers

8.11.2.3.1 Single-mode fiber The information-carrying capacity of an optical fiber is determined by its impulse response. The impulse

Sep 01, 2025

How to Understand the Performance Parameters of Optical Modules?

The optical module is a core component in optical fiber communication systems, and its performance parameters

Jan 29, 2026

Understanding Optical Transceiver Modules: A Comprehensive Guide

In the world of fiber optic communications, optical transceiver modules play a pivotal role as interfaces that convert

Sep 06, 2025

Cisco Transceiver Modules

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

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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

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Single-Mode Optical Fiber

Dual-mode optical fiber having a larger core diameter than single-mode optical fiber, without sacrificing bandwidth, was proposed as

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

o In optical modules, "core" refers to the light-transmitting channel in the fiber. A 1-core module uses a single fiber

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SFP Optical Module Specifications: Standards & Performance

Optical specifications determine the fiber type and maximum distance a module can support. Key parameters include

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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

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Single Mode Fiber: Types and Applications

Single mode fiber (SMF) is a type of fiber optic cable that only allows one light mode to transmit at a time. Generally,

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Everything You Need to Know About Single Mode Fiber

Single mode fiber explained: find out how it works, why it's ideal for high-speed connections, and what sets

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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,

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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

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Gigabit single-mode single-core fiber optic module

Gigabit single-mode single-core optical fiber modules usually have the following specifications: multi-mode 550m, single

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What is Optical Transceiver: A Beginner Guide (2024)

What is an Optical Transceiver? An optical transceiver, also known as a fiber optic transceiver or optical module, is a

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Fiber-optic communication

An optical fiber patching cabinet. The yellow cables are single-mode fibers; the orange and blue cables are multi-mode fibers:

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Fiber Optic Cable Specifications Guide

For single mode fibers, it lists parameters such as attenuation, dispersion, mode field diameter, and proof test level. It also provides

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

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

Mar 24, 2026

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

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Multi-mode optical fiber

Multi-mode optical fiber is a type of optical fiber mostly used for communication over short distances, such as within a building or on a

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Single-Mode Optical Fiber

Single mode optical fiber is defined as a type of optical fiber designed to minimize modal dispersion by allowing only a single ray of

Jan 18, 2026

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

Characteristics of a single-mode optical fibre and cable Summary Recommendation ITU-T G.652 describes the

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