Speed of multimode fiber



Overview

Compare OM1, OM2, OM3, OM4, and OM5 multimode fiber specs, distances, bandwidth, and applications. Essential guide for data center fiber selection.

Key Takeaways

Multimode fiber can support data rates from 1 Gbps up to 800 Gbps, depending on fiber type, distance, and transceiver technology.

Overview of Multimode Fiber Speeds

Multimode fiber (MMF) has a larger core (50–62. 5 µm) that allows multiple light modes to propagate simultaneously, making it ideal for short- to medium-range connections such as within buildings, data centers, and campus networks. The maximum data rate depends on the fiber type (OM1, OM2, OM3, OM4, OM5) and the distance: OM1 (62.

5 µm core): Supports up to 10 Gbps for very short distances (~33 meters) and is mostly used for legacy 100 Mbps networks. OM2 (50 µm core): Supports 1 Gbps up to 600 meters and 10 Gbps up to 82 meters. OM3 (laser-optimized 50 µm): Supports 10 Gbps up to 300 meters, 40 Gbps and 100 Gbps up to 100 meters.

OM4 (enhanced laser-optimized 50 µm): Supports 10 Gbps up to 550 meters, 40 Gbps up to 150 meters, and 100 Gbps up to 150 meters. OM5 (wideband multimode 50 µm): Designed for shortwave wavelength division multiplexing (SWDM), enabling higher aggregate speeds over similar distances. Modern multimode fiber can achieve data rates up to 800 Gbps using parallel optics and advanced transceivers.

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Factors Affecting Speed

Modal Dispersion: Multiple light paths cause pulses to spread out, limiting distance and effective bandwidth. Light Source: LEDs are cheaper but less precise, while VCSELs (vertical-cavity surface-emitting lasers) provide higher speeds and longer reach. Distance: Higher speeds require shorter distances to maintain signal integrity.

For example, 100 Gbps over OM3 is limited to 100 meters, while 10 Gbps can reach 300 meters. Fiber Quality: Laser-optimized fibers (OM3/OM4/OM5) have higher effective modal bandwidth, supporting faster speeds over longer distances.

Practical Applications

Multimode fiber is widely used in data centers, enterprise LANs, and campus networks where high-speed connections are needed over short distances. It is cost-effective compared to single-mode fiber for these applications, as it allows the use of lower-cost transceivers while still supporting multi-gigabit speeds. In summary, multimode fiber provides fast, reliable data transmission for short- to medium-range networks, with speeds ranging from 1 Gbps to 800 Gbps depending on fiber type, distance, and technology used.

Article Content

Multi-mode optical fiber

OverviewApplicationsComparison with single-mode fiberTypesEncircled fluxExternal links

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 campus. Multi-mode links can be used for data rates up to 800 Gbit/s. Multi-mode fiber has a fairly large core diameter that enables multiple light modes to be propagated and limits the maximum length of a transmission link because of modal dispersion. The standard G.651.1 defines the mos

OM1 vs OM2 vs OM3 vs OM4 vs OM5 Multimode Fiber Guide

Compare OM1, OM2, OM3, OM4, and OM5 multimode fiber specs, distances, bandwidth, and applications. Essential guide for data center fiber selection.

Multimode vs Single Mode Fiber

Today''s networks demand fibers that balance speed, distance, and cost. Multimode excels in short, high-density environments (e.g., data centers), while single mode dominates long

OS1, OS2 vs OM1-OM5 Fiber Cables: Differences, Speeds, and

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Explore the differences between OS1, OS2 (single-mode) and OM1, OM2, OM3, OM4, OM5 (multimode) fibers. Learn their speeds, distances, and ideal uses for data centers and telecom

Multimode Fiber Cable Types: OM1/OM2/OM3/OM4/OM5 Compared

Compare all five multimode fiber grades — OM1 through OM5 — with full specs, bandwidth, distance limits, and real-world data center use cases. Learn which grade fits your

Multimode Fiber Types: OM1 vs OM2 vs OM3 vs OM4 vs OM5

A complete guide to multimode fiber types OM1, OM2, OM3, OM4, and OM5. Compare speed, distance, bandwidth, and applications, and learn how to choose.

Multimode Optical Fiber Selection & Specification

This Applications Engineering Note (AE Note) discusses the criteria for properly selecting the optimal multimode fiber (MMF) for enterprise applications. This AE Note classifies multimode fiber according

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.

Single Mode vs. Multimode Fiber Optic Cables

The main drawback of multimode fiber is modal dispersion, where multiple light modes travel at different speeds causing signal distortion over longer distances.

Single Mode vs Multimode Fiber Explained | TRG

Multimode fiber is designed for shorter-distance communication, such as within buildings, campuses, or data centers. It is often used for high-speed local area

Everything You Need to Know About Multimode Fiber

Explore multimode fiber optic cables for enterprise, campus, and data center networks. Learn about OM1–OM5 types, transmission ranges,

Fiber Optic Cable Speeds: Everything You Need to Know

Discover how fiber optic cable speeds can revolutionize your internet experience. Explore the future of connectivity and get ready to zoom into the fast

What Is Optical Fiber Technology, and How Does It Work?

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There are many types of fiber optic cables, often that end up in fiber optic cable assemblies to execute their function. Single and Multimode Fiber Fiber optic

What Is Fiber Optics? Definition from SearchNetworking

Learn how fiber optics works and why fiber is a common alternative to copper cabling. Also explore the advantages and disadvantages of optical fiber.

Fiber Optic Cable Types Explained

Our comprehensive guide to types of fiber optic cables. Learn all about the differences between single mode and multimode cables, as well as the various fiber wavelengths and standard core sizes used

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

In datacom environments, both singlemode transceivers and multimode transceivers can accommodate speeds beyond 50G as of today. Active gear port speed, desired reach and

OM4 Multimode Cables

OM4 Multimode Cables are high-performance optical fiber cables with a 50µm core, supporting up to 400 meters at 10 Gbps and 150 meters at 100 Gbps, OM4

Single Mode vs Multimode Fiber, What is The Difference?

Learn the key differences between single mode vs multimode fiber cables and choose the right one for your fiber optic system.

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

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