Bandwidth of multimode optical cables



Overview

OM1 vs OM2 vs OM3 vs OM4 vs OM5 Multimode Fiber Guide | EDGE Compare OM1, OM2, OM3, OM4, and OM5 multimode fiber specs, distances, bandwidth, and applicati.

Key Takeaways

Multimode optical fibers support high data rates over short distances, with bandwidth varying by fiber type: OM1 (200 MHz·km) to OM5 (4700 MHz·km at 850 nm).

Overview of Multimode Fiber

Multimode fiber (MMF) has a larger core diameter (50–62. 5 μm) than single-mode fiber, allowing multiple light modes to propagate simultaneously. This makes it ideal for short-range, high-bandwidth applications such as enterprise networks, campus backbones, and data centers.

MM

F is generally paired with LEDs or VCSELs as light sources, which are cost-effective and suitable for high-speed transmission over limited distances.

Fiber Types and Bandwidth



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Multimode fibers are classified according to ISO/IEC 11801 standards into OM1, OM2, OM3, OM4, and OM5, with each type offering different modal bandwidths and maximum transmission distances: OM1 (62. 5 μm core): Modal bandwidth ~200 MHz·km; supports 10 Mbit/s to 1 Gbit/s Ethernet; 10G Ethernet up to 33 meters; uses LED sources; orange jacket. OM2 (50 μm core): Modal bandwidth ~500 MHz·km; supports 1G Ethernet and limited 10G Ethernet up to 82 meters; LED sources; orange jacket.

OM3 (50 μm core, laser-optimized): Modal bandwidth ~2000 MHz·km; supports 10G Ethernet up to 300 meters, 40G/100G Ethernet up to 100 meters; VCSEL sources; aqua jacket. OM4 (50 μm core, laser-optimized): Modal bandwidth ~4700 MHz·km; supports 10G Ethernet up to 400 meters, 40G Ethernet up to 150 meters, 100G Ethernet up to 100 meters; improved attenuation and dispersion; aqua jacket. OM5 (50 μm core, wideband MMF): Modal bandwidth 4700 MHz·km at 850 nm and 2470 MHz·km at 953 nm; designed for short-wavelength division multiplexing (SWDM); supports 40G, 100G, and 400G SWDM links; lime green jacket.

Bandwidth Considerations

The effective bandwidth of multimode fiber depends on: Core size and fiber type: Larger cores (OM1) have lower bandwidth due to modal dispersion, while laser-optimized fibers (OM3–OM5) reduce dispersion and increase bandwidth. Distance: Bandwidth decreases with longer distances; for example, OM3 supports 10G Ethernet up to 300 meters but only 40G/100G up to 100 meters. Light source: LEDs have slower modulation rates (~622 Mbit/s), limiting bandwidth, whereas VCSELs enable higher-speed transmission.

Practical ApplicationsOM1/OM2: Legacy networks, short-distance 1G Ethernet, older campus installations. OM3/OM4: Modern enterprise networks, data centers, 10G–100G Ethernet, cost-effective for short-range high-speed links. OM5: Emerging high-speed networks using SWDM, future-proofing for 400G and beyond.

In summary, multimode fiber bandwidth ranges from 200 MHz·km (OM1) to 4700 MHz·km (OM4/OM5), with higher-speed, laser-optimized fibers enabling longer distances and higher data rates for modern network applications.

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Article Content

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

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

Multimode Fiber Types: OM1 vs OM2 vs OM3 vs OM4

Identified by ISO 11801 standard, multimode fiber optic cables can be classified into OM1 fiber, OM2 fiber, OM3 fiber, OM4 fiber and newly released

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

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

Multimode Optical Fiber Selection & Specification

Bandwidth is essentially the information capacity of the fiber, and defines the maximum data rate over a given operating distance. Table 5 provides the bandwidth and attenuation parameters for OM

Multimode Fiber Optic Cable Types: OM1 vs OM2 vs

Multimode fiber optic cable types OM1, OM2, OM3, OM4 and OM5 compared for core size, bandwidth, speed, distance & applications in modern

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 Bandwidth Characterization

This Applications Engineering Note (AE Note) discusses bandwidth characterization for multimode optical fiber (MMF), and bandwidth''s impact on overall system performance.

OM1 vs OM2 vs OM3 vs OM4 vs OM5: Understanding

Classified under the ISO 11810 standard, multimode fibers are categorized into OM1 through OM5, each designed to meet specific bandwidth

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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.

Fiber Optic Cable Types | Omnitron Systems Guide

Fiber optic technology has transformed the way we transmit data, enabling faster, more reliable connections than traditional copper cables. Understanding fiber

Advantages and Disadvantages of Fibre Optic Cable

Fiber optic cables allow much more cable than copper twisted pair cables. Fiber optic cables have how more bandwidth than copper twisted pair cables. Disadvantages of Fiber Optic

Single Mode vs Multimode Fiber Explained | TRG Datacenters

Single Mode vs Multimode: Which One is Best for You? The choice between single mode and multimode fiber ultimately depends on your network''s distance, bandwidth requirements, and budget.

Single-Mode Optical Fiber

It can transmit higher bandwidth than multimode fiber but requires a light source with a limited spectral range. The terms single-mode optical fiber, single-mode fiber, and mono-mode fiber

Single & Multimode Fiber Optic Cable: What''s the difference

As a result, fiber optics are extensively used in internet services, telecom, and enterprise data center networks. Many critical decisions come into play in the installation of fiber optic cabling,

Singlemode vs Multimode Fiber Optic Cable

We breakdown the differences between single mode and multimode fiber optic cable, covering aspects like physical structure, bandwidth over

Optical Cables

Single mode fiber supports higher bandwidth than multimode. Multimode cables have a larger core diameter that limits the maximum length due to modal dispersion. SM is generally used

Multimode vs Single Mode Fiber Optic Cables: A Complete Guide to

In the era of 5G, cloud computing, and global data centers, fiber optic cables have become the unsung heroes of high-speed communication. Unlike copper cables, which rely on

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