What is the highest speed of multimode fiber

Overview

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Key Takeaways

Modern multimode fiber (OM5) can support speeds up to 400 Gbps over short distances using SWDM technology.Overview of Multimode Fiber Speeds

Multimode fiber (MMF) is designed for short-range, high-speed communication, typically within buildings or data centers. The maximum speed depends on the fiber type and technology used:

• OM1 (62.5 µm core): Supports up to 10 Gbps for distances up to 33 meters, primarily using LED sources .

• OM2 (50 µm core): Supports 10 Gbps up to 82 meters, also LED-based .

• OM3 (laser-optimized 50 µm): Supports 10 Gbps up to 300 meters, 40/100 Gbps up to 100 meters, using VCSELs .

• OM4 (laser-optimized 50 µm): Supports 10 Gbps up to 550 meters, 40/100 Gbps up to 150 meters, and 400 Gbps up to 50 meters .

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• OM5 (wideband multimode fiber): Supports the same 10–100 Gbps distances as OM4 but adds multi-wavelength SWDM capability, enabling 400 Gbps over 150 meters and future 800 Gbps applications .
Key Technologies
• VCSELs (Vertical-Cavity Surface-Emitting Lasers): Enable high-speed modulation (>10 Gbps) for OM3, OM4, and OM5 fibers .

• SWDM (Short Wavelength Division Multiplexing): Used with OM5 to transmit multiple 28 Gbps channels simultaneously across different wavelengths (850–953 nm), effectively multiplying the data rate without additional fibers .
Practical Implications
• Data Centers: OM4 and OM5 are preferred for 100G and 400G Ethernet links due to longer reach and higher bandwidth.

• Enterprise Networks: OM3 is cost-effective for 10G/25G links over moderate distances.

• Legacy Systems: OM1 and OM2 are limited to 10G and are not suitable for modern high-speed applications .
Summary

The highest speed achievable on multimode fiber today is 400 Gbps using OM5 fiber with SWDM technology over distances up to 150 meters. OM4 can also reach 400 Gbps but over shorter distances (50 meters). Speeds beyond 400 Gbps are being explored with advanced SWDM and multi-lane transceivers, making OM5 the most future-proof multimode fiber standard .

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

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