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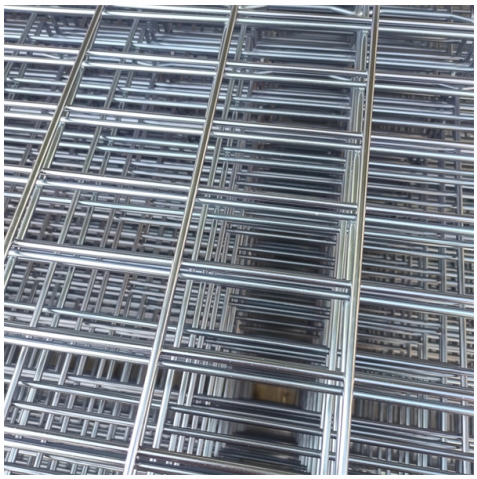
Transmission distance of four-core multimode fiber



Overview

This narrow core ensures minimal signal distortion and enables long-distance transmission of high-bandwidth data.

Key Takeaways

A four-core multimode fiber can typically transmit data over distances ranging from 33 meters to 400 meters, depending on fiber type, data rate, and light source.Key Factors Affecting Distance

Multimode fiber (MMF) carries multiple light modes simultaneously, which makes it ideal for high-bandwidth, short- to medium-range applications such as LANs and data centers . The core diameter (50–62.5 µm) and the type of light source—LED or VCSEL—significantly influence the maximum transmission distance . Modal dispersion, where different light modes arrive at slightly different times, is the primary limitation for MMF distance .

Typical Distance by Fiber Type and Data Rate
• OM1 (62.5 µm core, LED): Supports 1 Gbps up to 275 meters and 10 Gbps up to 33 meters .

• OM2 (50 µm core, LED): Supports 1 Gbps up to 550 meters and 10 Gbps up to 82 meters .

• OM3 (50 µm core, laser-optimized, VCSEL): Supports 10 Gbps up to 300 meters, 40 Gbps up to 100 meters, and 100 Gbps up to 100-150 meters .

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

• OM5 (50 µm core, wideband multimode): Supports 40 Gbps up to 150 meters and 100 Gbps up to 100 meters, with wavelength-division multiplexing (WDM) enabling higher capacity .

Practical Considerations

• Four-core configuration: The number of cores does not directly affect the maximum distance per core; each core behaves like a standard multimode fiber strand.

• Installation quality: Connectors, splices, and bends can reduce effective distance due to additional loss .

• Light source: VCSEL lasers extend distance compared to LEDs due to narrower spectral width and reduced modal dispersion .

Summary

For a four-core multimode fiber, the achievable transmission distance depends on the fiber type and data rate:

• Short-range, low-speed (1 Gbps): Up to 550 meters (OM2).

• Medium-speed (10 Gbps): 33–400 meters (OM1–OM4).

• High-speed (40–100 Gbps): 100–150 meters (OM3–OM5). Choosing the appropriate fiber type and light source is crucial for optimizing performance in data centers or enterprise networks .

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

Multimode Fiber Data Sheet

This fiber is a laser-optimized, bend-insensitive, graded-index multimode fiber designed for transmission speeds of 10 Gb/s and

Multimode Optical Fiber Selection & Specification

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The proper choice of MMF essentially is reduced to a question of what distance can be reached at a particular data transmission

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,

Multimode vs. Singlemode Fiber

Single-Mode Fiber Cable In contrast to multimode, single-mode fiber cable has only one mode of propagation: a single wavelength of

Single-Mode vs. Multimode Fiber Cable: A Direct Comparison of

This narrow core ensures minimal signal distortion and enables long-distance transmission of high-bandwidth data. In contrast,

Multimode fiber | Fact File | CommScope

With multimode fiber transmission, distances of up to 2 km are possible; however, as speeds increase, the distance support is

A Comprehensive Guide to Multimode Fiber Optic Cable

1. Transmission Distance One of the primary differences between single mode fiber optic cable and multimode fiber optic cable is the

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

What Is Multimode Fiber? Multimode fiber is a type of fiber optic cable that supports multiple light paths or modes. Each mode

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