COETZER OPTICAL SYSTEMS (Pty) Ltd

What does 10km for an optical module mean

Overview

The SFP+10G 1310nm 10Km LC optical module is a powerful and versatile solution for high-speed, long-distance data transmission.

Key Takeaways

10G SFP+ LR optical modules support transmission distances up to 10 km over single-mode fiber at 1310 nm wavelength.Overview of 10 km Optical Modules

For a 10 km link, the standard choice is a 10G SFP+ LR (Long Reach) module, which is designed for single-mode fiber (SMF) and operates at a 1310 nm wavelength. These modules are widely used in enterprise backbones, metro networks, and data center interconnects, providing reliable medium-distance connectivity between switches, routers, and servers . The LR designation indicates that the module is optimized for distances beyond short-reach limits but does not require the higher optical power of extended-reach modules like ER or ZR .

Key Specifications
• Maximum Distance: Up to 10 km over single-mode fiber

• Wavelength: 1310 nm, chosen to minimize chromatic dispersion and maintain signal integrity over medium distances

• Connector Type: Typically LC duplex

• Data Rate: 10 Gbps (SFP+ standard)

• Compatibility: Multi-source agreement (MSA) compliant, ensuring interoperability across vendors
Deployment Considerations
• Fiber Type: Single-mode fiber is essential for 10 km links because multimode fiber cannot reliably support this distance due to modal dispersion .

• Optical Budget: Ensure the link budget (transmit power minus receiver sensitivity) is sufficient for the 10 km distance to avoid signal loss .

• Use Cases: Ideal for interconnecting buildings, campus networks, metropolitan area networks (MANs), and data center interconnects .

• Cost vs. Distance: For shorter distances (e.g., under 300 m), short-range (SR) modules are more cost-effective, but LR modules are necessary for distances approaching 10 km .
Summary

A 10G SFP+ LR module is the standard solution for 10 km optical links, providing a balance of distance, power efficiency, and interoperability. When planning a deployment, ensure the fiber type, optical budget, and connector compatibility are properly matched to achieve reliable performance over the full 10 km distance .

Article Content

What Is 10GBASE-LR? SMF 1310nm 10km SFP+ Explained

10GBASE-LR is a 10-gigabit Ethernet optical standard that operates at 1310 nm over single-mode fiber (SMF), supporting link

SFP+10G 1310nm 10Km LC Optical Module Guide

The SFP+10G 1310nm 10Km LC optical module is a powerful and versatile solution for high-speed, long-distance data transmission.

What is Optical Link Module?

The optical link module, known as Optical Transceiver in English, is a general term for various module categories, including optical

Basic Knowledge Of Optical Module Transmission Distance

Generally, short-range modules can reach up to 2 km, medium-range modules range from 10 km to 20 km, and long-range modules

SFP+ Single Mode LC Module (10km)

Transmission distance of up to 10km (6.21 mi.) Duplex LC optical interface Supports data rates of up to 10.31Gbps Supports 1310nm

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10GB SFP Module Guide: Types, Specs, and How to Choose

Learn everything about 10GB SFP modules, including types, specifications, compatibility, and how to choose the right 10G SFP+

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