10G Optical Module Optical Communication Module

Overview

Long-range 10G optical modules enable high-speed data over distances up to 80km. Learn about types, specs, compatibility, and choosing the right module.

Key Takeaways

10G optical modules, typically SFP+ transceivers, enable 10 Gigabit Ethernet over single-mode or multi-mode fiber, supporting distances from 10 km to 40 km depending on the module type.

Overview

A 10G optical module is a small form-factor pluggable (SFP+) transceiver used in high-speed networks to transmit and receive data at 10 Gigabit per second. These modules are widely deployed in data centers, enterprise backbones, metro networks, and telecom applications. They convert electrical signals from switches, routers, or servers into optical signals for fiber transmission, and vice versa.

Key Specifications

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Data Rate: 10 GbpsFiber Type: Single-mode fiber (SMF) is common for long distances; multi-mode fiber (MMF) is used for shorter linksWavelength: Standard 10GBASE-LR modules operate at 1310 nm Reach: Typical 10GBASE-LR modules support up to 10 km; extended reach (10GBASE-ER) modules can reach 40 km Connector Type: Duplex LC connectors are standard for SFP+ modules Compliance: IEEE 802. 3ae, SFP+ MSA, SFF-8431, SFF-8472, RoHS Optional Features: Digital Diagnostic Monitoring (DDM/DOM) for real-time monitoring of temperature, voltage, and optical power Types of 10G Optical Modules10GBASE-LR (Long Reach): Operates at 1310 nm over single-mode fiberMaximum distance: 10 kmCommon in enterprise and data center interconnects 10GBASE-ER (Extended Reach): Operates at 1310 nm over single-mode fiberMaximum distance: 40 kmSuitable for long-haul metro networks and extended campus links 10GBASE-SR (Short Reach): Operates at 850 nm over multi-mode fiberMaximum distance: 300–400 metersIdeal for intra-data center connectionsApplicationsData Centers: High-speed server-to-switch and switch-to-switch connectionsEnterprise Networks: Backbone links between buildings or campusesTelecom & Metro Networks: Long-distance interconnects using extended reach modulesHigh-Performance Computing: Low-latency, high-bandwidth connections for clusters and storage networks Deployment ConsiderationsEnsure fiber type and optical budget match the module specificationsVerify connector compatibility (LC duplex is standard)Consider power consumption and heat dissipation in dense deploymentsUse DDM/DOM-enabled modules for monitoring and troubleshootingCheck MSA compliance for interoperability across different vendors In summary, 10G optical modules provide reliable, high-speed connectivity for modern networks, with options for short, long, and extended reach depending on the application.

Choosing the right module involves considering distance, fiber type, wavelength, and network equipment compatibility.

Article Content

Reach Further, Faster: Your Ultimate Guide to Long-Range 10G

Long-range 10G optical modules enable high-speed data over distances up to 80km. Learn about types, specs, compatibility, and choosing the right module.

10G Optical Modules: Short-Range vs. Long-Range

Understand short-range and long-range 10G optical modules in terms of distance, budget, energy use, and scalability to make the right choice.

10G Multi-Mode Optical Module

SFP+ transceiver that supports 10G connections up to 400 m using multi-mode fiber with a duplex LC UPC connector.

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10G Optical Module Selection Guide: LRM,SR,LR,ER,ZR

By deeply understanding the differences and performance of LRM, SR, LR, ER, and ZR optical modules, we can make the right choice among many optical modules, thereby building an

10G SFP+ Optical Transceivers | Transceiver Module

FS 10GbE SFP+ module solutions provide a wide variety of 10 Gigabit Ethernet connectivity options for data centers, enterprise wiring closets, Internet Service

10G SFP+ Transceivers | Optical Interconnect | Amphenol

Amphenol''s 10G SFP+ optical modules include SFP+ AOC. They are compliant with SFP+ MSA, SFF-8431 and SFF-8472, and are mainly used in

Guide to 10G SFP+ Modules: LRM, SR, LR, ER, ZR

Enhance your network performance with the 10G SFP+ dual-fiber optical module. This compact transceiver supports bidirectional signal transmission and reception for reliable

10G PIN Photoreceivers

MACOM offers PIN photodiode based photoreceivers in a variety of packages, including OEM module and instrument-style. A wide range of 10G solutions are available for applications up to 15 Gb/s

10G Optical Module Guide: Compare LRM, SR, LR, ER, ZR for the

What Is a 10G Optical Module? A 10G optical module (also called 10G transceiver or SFP+ module) converts electrical signals into optical signals for high-speed data transmission over

Learn About Optical Transceiver Modules in One Minute

An optical module is a photoelectric conversion accessory and one of the key devices in the field of optical communication transmission.

FR 10 Gigabit SFP+ 10G Optical Module Single-Mode 1310nm Multi

About this supplier FiberRun (Wuhan Fangran Technology Co., Ltd.) is a professional optical module and fiber communication component manufacturer established in 2020, headquartered in Wuhan

Differences Between Optical Modules SFP, SFP+, CFP, XFP, QSFP?

At present, 40G optical module and 100G optical module price is too high, power consumption is too large, and 10G optical module rate can not meet the network demand, so 25G

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Optical Transceiver Module Wholesale,10g/25g/40g/100g SFP+ Optical ...

Fiber optic module manufacturer,ETU-Link supply full model optical transceivers,including standard 8g/10g/25g/40g/100g sfp+ optical modules and copper RJ45 transceiver,wholesale at factory price!

Wholesale Optical Transceivers Module | 100G QSFP28, 40G QSFP

Shop high-speed optical transceivers from Unitekfiber. We offer 100% compatible 40G, 100G, and 400G QSFP-DD modules for data centers. Expert technical support & wholesale pricing.

SFP vs SFP+ vs SFP28 vs QSFP+ vs QSFP28 vs QSFP-DD vs

Optical transceiver modules play a crucial role in modern high-speed data communication networks. These compact and easily interchangeable modules serve as interfaces

EML vs VCSEL vs CW Laser: Optical Transceiver Guide (2025)

Compare EML, VCSEL, and CW laser technologies in optical transceivers. Covers cost, reach, speed, the 2025 EML shortage, and silicon photonics alternatives.

SFP Optical Transceiver Modules for Long Distance: A Complete

Discover everything you need to know about SFP optical transceiver modules for long-distance fiber transmission. Compare LX, EX, ZX models and choose the right module for your

Introduction to 400G Optical Modules · KAD

A clear, engineer-friendly overview of 400G optical modules, including standards, packaging formats, functions, and market outlook for next-generation data centers.

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