

G optical module km



Article Overview

G optical modules, such as 100G and 400G transceivers, support transmission distances ranging from a few hundred meters to over 80 kilometers depending on type and fiber used.

Transmission Distance Categories

- Short Range (SR/VR): Typically used for intra-data center connections. For example, 400G SR4.2 modules can reach up to 150 meters on OM4 multimode fiber and 100 meters on OM3 fiber, using parallel transmission and PAM4 modulation for high bandwidth within data centers .
- Medium to Long Range (FR/LR/ER): Single-mode fiber modules extend reach significantly. FR modules can reach up to 2 km, LR modules up to 10 km, and ER modules up to 40 km, suitable for campus, metro, or regional networks .
- Ultra-Long Range (ZR): Some 100G ZR4 modules can operate over 80 km or more, often requiring coherent modulation and sometimes dispersion compensation, making them ideal for telecom backbone or long-haul networks .

Factors Affecting Reach

- Fiber Type: Multimode fiber (MMF) supports shorter distances (up to 150 m for 400G SR4.2), while single-mode fiber (SMF) supports longer distances (2 km to 80+ km).
- Modulation Technique: PAM4 is commonly used in 400G modules to double data rate per channel, while NRZ is used in some 100G modules .
- Amplification and Dispersion Compensation: Unamplified modules may be limited to 5–10 km, whereas modules with EDFA or dispersion compensation can exceed 40–80 km.

Article Content

Apr 28, 2026

XG-SFP-LR-SM1310 10GBASE-LR SFP+ 1310-nm 10-km DOM

The XG-SFP-LR-SM1310 is aligned to IEEE 10GBASE-LR optical specifications and supports a link length of up to 10 kilometers

Sep 20, 2025

Arista Optics Modules and Cables

Each module is optimized for different media and reach (ranging from 0.5 meters to 80 kilometers). All interface speeds, from 1G to

Dec 22, 2025

Optical Modules Evolution and Innovation From 400G to 1.6T

Explore the evolution of optical modules in speed and form factors from 400G to 1.6T, stressing key enhancement

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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,

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

Understanding SFP+ optical modules and their different types helps in selecting the right transceiver for your network needs. The

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SFP Optical Module 1.25G Single Optical Fiber 20km

This is a standard SFP optical module. It uses a single mode optical fiber and the speed rate can up to 1.25Gbps, transmission

Jan 30, 2026

Everything You Need to Know About Optical Modules

Optical modules are electronic devices used in communication systems to transmit optical signals. These modules

Nov 19, 2025

SFP Distance Explained: Real-World Range, Limits, and Optics

Understand SFP distance, fiber optic range, and real-world limits of SR/LR modules.
Learn how wavelength, fiber

Feb 06, 2026

SFP Distance Explained: Real-World Range, Limits, and Optics

SFP distance refers to the maximum effective range over which an SFP optical module can transmit data while

May 21, 2026

Introduction to Optical Fibers, dB, Attenuation and Measurements

This document is a quick reference to some of the formulas and important information related to optical technologies.

Mar 10, 2026

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

Jul 19, 2026

Multi-mode optical fiber

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

Oct 07, 2025

Introduction to GPON Optical Modules and Their Classification

Long Reach: Supports transmission distances up to 20 km with a single optical fiber.
Classification Standards of

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Everything You Need to Know About 800G/1.6T Optical Transceiver

Introduction to 800G/1.6T Pluggable Optics Modules The Evolution of Optical Transceivers: From 100G to 1.6T Driven by the

Sep 21, 2025

Classification and basic principles of optical modules

The transmission distance of the optical module is limited, mainly because the optical signal will have a certain loss

Dec 31, 2025

Optical Transceiver Modules Prices & Specifications

What is Optical Transceiver Modules/SFP? Optical Transceiver Modules/SFP, also called fiber optic transceiver or optical

Sep 14, 2025

(PDF) The Power Board of the KM3NeT Digital Optical Module:

The power board was developed to supply power to all the elements of the digital optical module. The design of the

Apr 06, 2026

What Is an Optical Module and Its FAQs (V200)

What Is an Optical Module and Its FAQs (V200) Describes what an optical module is and FAQs, including the fundamentals,

Jun 25, 2026

Exploring the Correlation Between Optical Module Wavelength and ...

This article delves into the correlation between optical module wavelength and transmission distance, shedding light

Mar 07, 2026

The FOA Reference For Fiber Optics

Fiber Optic Measurement Units: "dB" and "dBm" Whenever tests are performed on fiber optic networks, the results are displayed on

Jan 03, 2026

A Quick Guide to Gray Light Module and Colored Light Module

In the CRAN scheme, the maximum distance between two cells is 10 km. Considering cost-effectiveness and

May 15, 2026

G657A2 at US\$22/km: Understanding the Optical Fiber Price Surge of

The fiber optic market has entered an "accelerated pricing phase." According to industry tracking, G.657.A2, the bend

Aug 16, 2025

SFP+ 40km (10GBASE-ER): Extended-Reach Optical Module Guide

Understand SFP+ 40km (10GBASE-ER) modules, including specs, SMF compatibility, and how to choose the right

Sep 11, 2025

400G Optical Modules Explained: SR4 Vs. DR4 Vs. FR4 Vs. LR4

Key differences between SR4, DR4, FR4, and LR4 400G optical modules. Expert advice from Asterfusion engineers

May 28, 2026

How to Estimate an Optical Module's Transmission Distance | FiberMall

Optical modules distinct from one another in their transmission distance, a feature that should be taken into account in

Jan 20, 2026

Wavelength and Transmission Distance of Optical Transceiver Modules

The price of the optical sources and signal converters that are paired with 850nm optical transceiver modules is far lower than the

Jan 11, 2026

10G SFP+ 80 km DWDM Optical Transceiver Datasheet

10G SFP+ 80 km DWDM Optical Transceiver Datasheet Overview The T1-SFP-10G-DWDM80-Cxx is a high performance, cost

Sep 04, 2025

10GBASE-ZR SFP+ 80km DOM | €80.33 | EDGE Optical Solutions

10GBASE-ER is the longest IEEE 802.3ae-defined reach at 40 km, while 10GBASE-ZR is a de-facto industry extension that reaches

Jul 02, 2026

10 Gbit/s SFP+ Optical Module

10 Gbit/s SFP+ Optical Module You can use different levels of 10 Gbit/s SFP+ optical modules only with 10 GE

Aug 01, 2025

Understanding Optical Modules

On an optical network, a sender needs to convert electrical signals into optical signals before sending them to a receiver, and the

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://www.greatpremiersolutions.co.za>

Email: sales@greatpremiersolutions.co.za

Phone: +27 82 914 3675

Address: Unit 5, Silicon Heights, 22 Electron Avenue, Cape Town, 8001, South Africa

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