# How much light does a 40km optical module receive



## Overview

At a technical level, an SFP+ 40km module works by transmitting optical signals at a 1550 nm wavelength through low-loss single-mode fiber (typically OS2).

## Key Takeaways

For a 40km single-mode optical module, the typical receiver sensitivity is around -18 dBm, with a maximum safe receive power of approximately -3 to -2. 3 dBm.

### Receiver Sensitivity and Thresholds

A 40km optical module, such as a 40GBASE-ER4 QSFP+, is designed for long-reach single-mode fiber transmission. The receiver sensitivity (minimum optical power required for error-free operation) is typically around -18 dBm, while the maximum safe receive power is usually -3 dBm to -2. 3 dBm to prevent damage to the photodiode or avalanche photodiode (APD) in the module.

This defines the dynamic range of the module, which is the difference between the maximum and minimum acceptable optical power, often around 20 dB for 40km modules.

### Practical Considerations

Overload Protection: If the received optical power exceeds the maximum threshold, it can permanently damage the receiver, reduce sensitivity, or increase bit error rates.

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### Short-

Distance Connections: When connecting a 40km module over a short fiber (e.g., 10km), the received power may exceed the safe limit. In such cases, an optical attenuator is recommended, typically ≥10 dB, to reduce the power to a safe level. Monitoring: Use an optical power meter to measure the received power before connecting the module.

### Ensure the R

X power is below the maximum threshold (e.g., less than -4 dBm for long-term stability) to avoid damage. Summary of Typical Values for 40km ModulesParameterTypical ValueReceiver Sensitivity-18 dBmMaximum Receive Power-3 to -2. 3 dBmDynamic Range~20 dBRecommended Attenuator for Short Links≥10 dBBy maintaining the received optical power within this range, a 40km optical module can operate reliably, ensuring stable high-speed data transmission over long distances without risking damage to the receiver components.

## Article Content

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

At a technical level, an SFP+ 40km module works by transmitting optical signals at a 1550 nm wavelength through low-loss single-mode fiber (typically OS2). It uses a duplex LC

Extend Your 100G Reach to 40km Transmission with FS Optics

In this article, we will provide a detailed overview of these different types of 40km 100G modules, analyzing their unique features and application scenarios to help you choose the most

SFP-10G-ER Explained: Powering 40km 10Gbps Optical Links

It works over single-mode fiber for up to 40km. This makes it good for long network connections. It uses a 1550nm wavelength and LC duplex connectors. These help keep signals

40Gbps QSFP ER4 Optical Transceiver Module AQSFP-40G-ER4

The light is combined by the MUX parts as a 40Gb/s data, propagating out of the transmitter module from the SMF. The receiver module accepts the 40Gb/s CWDM optical signals input, and de

1000BASE-EX SFP 1310nm 40km Transceiver Datasheet | FS

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It is with the SFP 20-pin connector to allow hot plug capability. This module is designed for single mode fiber and operates at a nominal wavelength of 1310nm. The transmitter section uses a multiple

40km line optical module

The QSFP28 100G ER4 optical module, with its compact design and robust 40km transmission capability, has emerged as a core component enabling high-performance network expansion.

Optical Power Budgets

The key to network distance is Optical Power Budget: the amount of light available to make a fiber optic connection. This paper will explain how to determine the maximum fiber optic distances attainable

10G XFP ER 1550nm 40km Optical Transceiver

The module, clip and connector dimensions are constant for all applications. While the bezel, cage assembly, EMI gasket and heat sink can be designed and/or adjusted for the individual application.

GIGALIGHT 40KM DWDM SFP+ Optical Transceiver GDP-XX192-04T

Description The Gigalight DWDM 40km SFP+ Transceiver is a “Limiting module”, designed for CPRI,10GBASE-ZR, SDH/SONET and 10G Fiber Channel applications, link length up to 40km on

2025 Understanding TX/RX Power Range on SFP Modules for Network

In this article, we will break down the key factors influencing TX/RX power, explain how to calculate the optical power budget, and provide actionable insights for optimizing your network''s

Understanding Optical Modules: Types and Troubleshooting Guide

What is an Optical Module? The Ultimate Guide to Principles, Types, and Troubleshooting Working Principle of Optical Modules Optical Modules (also known as Optical Transceivers) are critical

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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 extended-reach optical transceiver for your network.

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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. This document focuses on decibels (dB), decibels per milliwatt (dBm),

What is the impact of transmit / receive optical power on optical modules?

Generally, only when the transmitting power and receiving power of the optical module are within the upper and lower thresholds, can the transmission performance of the optical module be

What is the receiving power range of the optical

The receiving power range of optical modules primarily depends on the module type, transmission rate, and transmission distance. Generally

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, appearance and structure, key performance counters, common types,

QSFP-40G-ER4 Demystified: Your Guide to 40Gbps Over 40km

QSFP+ 40G ER4 is a 40G transceiver for long-distance, high-speed links up to 40km, ideal for data centers and enterprise networks using single-mode fiber.

## Contact Us

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Technical inquiry: https://cgweb.co.za/project-enquiry.html

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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