Common Models of Digital Optical Modules



Overview

Explore the ultimate guide to optical modules. Learn types, functions, performance metrics & how to choose the right module for your fiber network.

Key Takeaways

Digital optical modules come in various form factors and data rates, including SFP, SFP+, SFP28, XFP, QSFP+, QSFP28, QSFP-DD, CXP, and CFP, supporting both single-mode and multimode fibers for different transmission distances.

Overview of Optical Modules

Digital optical modules are hot-pluggable transceivers used in high-bandwidth data communications. They consist of a Transmitter Optical Sub-Assembly (TOSA) for converting electrical signals to optical signals, a Receiver Optical Sub-Assembly (ROSA) for converting optical signals back to electrical signals, and a PCBA for control and signal processing. Modules are classified by form factor, data rate, fiber type, and transmission distance.

Common Form Factors and ModelsSFP (Small Form-factor Pluggable): Standard module for gigabit Ethernet, supports LC fiber connectors.eSFP (Enhanced SFP): Adds monitoring capabilities for voltage, temperature, bias current, and optical power. SFP+: Higher data rate than SFP, more sensitive to EMI, used for 10G Ethernet. SFP28: Same size as SFP+, supports 25G Ethernet, backward compatible with 10G SFP+.

XF

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P: 10G module, larger than SFP+, supports LC connectors. QSFP+ (Quad SFP): Supports 40G Ethernet, uses MPO fiber connectors. QSFP28: Supports 100G Ethernet, commonly used in data center core networks.

QSFP-DD (Double Density): High-speed 400G module, four-channel design for ultra-high-speed networking.

CX

P: High-density parallel optical module, 12 channels per Tx/Rx, used for 120G applications.

CF

P: Supports high-speed coherent optics, used in long-haul and metro networks. Fiber Type CompatibilitySingle-mode modules: Operate at 1310nm or 1550nm, suitable for long-distance transmission with high bandwidth. Multimode modules: Operate at 850nm, suitable for short-distance transmission, cost-effective but limited by modal dispersion.

Specialized ModulesCWDM (Coarse Wavelength Division Multiplexing): Uses wider wavelength spacing, cost-effective for short to medium distances.

DWD

M (Dense Wavelength Division Multiplexing): Uses narrow wavelength spacing, suitable for long-distance, high-capacity networks.

OSF

P (Optical Small Form Factor Pluggable): Designed for 400G+ speeds, optimized for heat dissipation and high throughput.

Summary

Choosing the right digital optical module depends on data rate requirements, fiber type, transmission distance, and network architecture.

SF

P and SFP+ are common for enterprise networks, while QSFP-DD and OSFP cater to high-speed data centers. Single-mode modules are preferred for long-haul links, whereas multimode modules are cost-effective for short-range connections.

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Article Content

The Most Comprehensive Guide Of Optical Modules

Explore the ultimate guide to optical modules. Learn types, functions, performance metrics & how to choose the right module for your fiber network.

How to Choose Optical Modules Correctly?

Optical modules are classified by package type, rate, laser type, center wavelength, mode, connector type, modulation format, transmission

A complete list of common optical module types-ETU-LINK

Many partners do not know much about the packaging types of optical modules, so in this article, ETU-LINK introduces you to what are the common packaging types of optical modules,

Comprehensive Guide to Optical Transceiver Classifications and

Understanding their classifications and types is essential for selecting the appropriate module for specific networking requirements. This guide covers the most common classification

The Ultimate Guide to Optical Modules

An optical modules typically integrates an optical transmitting device (TOSA, with a laser), an optical receiving device (ROSA, with a photodetector), functional circuits, a main control circuit

Optical module

Optical modules typically have an electrical interface on the side that connects to the inside of the system and an optical interface on the side that connects to the outside world through a fiber optic

Optical Module Classification and Common After-Sales FAQs

Explore the classification of optical modules based on transmission rate, package type, mode, central wavelength, and color. Learn about common causes of optical module failure and

What is an Optical Module?

Learn about the different types of optical modules, their functions, packaging, and key technical concepts like 400G, PAM4, and more. Understand how optical modules enable high-speed data

Optical Module Package Types Overview

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There are many types of optical modules, and there are several standard ways to categorize them, such as according to different package forms, different application areas,

Understanding Optical Modules: A Comprehensive Guide

Optical Module Basics: Understanding the Core ConceptsOptical modules are compact devices that convert electrical signals into optical signals

Optical module

An optical module is a typically hot-pluggable optical transceiver used in high-bandwidth data communications applications. Optical modules typically have an electrical interface on the side that

What is an Optical Module?

Explore the world of optical modules, essential components in optical fiber communication. Learn about the different types of optical modules, their functions, packaging, and key technical concepts like

TI DLP® System Design: Optical Module Specifications

ABSTRACT The objective of this application note is to help product developers better understand optical module specifications and related system design considerations. This information helps expedite

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,

Coherent Optical Modules: A Revolutionary Technology

Coherent optical modules are not only the cornerstone of optical communications but also the driving engine of the future digital economy. In

Coherent Optical Modules: Technical Advantages and

Coherent optical modules use coherent light (waves with fixed phase relationships) for signal transmission and processing, supporting advanced

The Power Board of the KM3NeT Digital Optical Module: Design

The KM3NeT Collaboration is building an underwater neutrino observatory at the bottom of the Mediterranean Sea, consisting of two neutrino telescopes, both composed of a three

Design and production of the digital optical module of the KM3NeT

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2 The digital optical module design The Multi-PMT design of the KM3NeT optical module has several advantages over traditional optical modules of all the other currently operating neutrino telescopes-

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