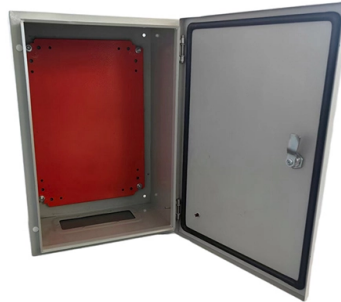


Optical Module Parameter Specification Guide



Overview

What Are the Key Parameters of Optical Modules Understand the key parameters of optical modules, including transmission rate, distance, wavelength, and fiber.

Key Takeaways

Optical module specifications define the physical, optical, and electrical characteristics that ensure compatibility, performance, and reliability in fiber optic networks. Physical and Mechanical Specifications

- Form Factor: Determines the module's size and compatibility with network equipment. Common types include SFP, SFP+, SFP28, QSFP, QSFP28, and OSFP, with higher-speed modules generally using larger or more advanced form factors ().
- Connector Type: Interfaces with fiber cables, such as LC Duplex, SC Duplex, or MPO/MTP, and must match the cabling infrastructure ().
- Encapsulation: Refers to the physical housing standard of the module, ensuring hot-pluggable operation and mechanical compatibility ().

Optical and Performance Specifications

- Transmission Rate: Maximum supported data rate, e.g., 1G, 10G, 25G, 100G, 400G, critical for network bandwidth planning ().
- Wavelength: Light color used for transmission, typically 850nm (multimode, short distance), 1310nm (single-mode, medium distance), or 1550nm (single-mode, long distance) ().

- **Fiber Type:** Single-mode (SMF) or multimode (MMF), affecting achievable distance and compatibility with network infrastructure ().
- **Transmission Distance:** Maximum reach without amplification, categorized as short (30 km), depending on fiber type and wavelength ().
- **Laser Type:** Determines cost, power, and distance. Common types include VCSEL for multimode and DFB/EML for single-mode applications ().
- **Transmit Optical Power:** Output power of the module's laser, measured in dBm, affecting link budget and reach ().
- **Receive Sensitivity:** Minimum optical power required at the receiver to maintain a specified bit error rate, also in dBm ().
- **Optical Interface Type:** Defines the fiber connection and signal propagation characteristics ().

Electrical and Environmental Specifications

- **Power Consumption:** Maximum electrical power the module consumes, important for thermal management ().
- **Operating Temperature:** Range within which the module can reliably function, typically commercial (0–70°C), industrial (-40–85°C), or extended ranges ().
- **Diagnostic Monitoring:** DDM/DOM support allows real-time monitoring of temperature, voltage, and Tx/Rx power for network reliability ().

Advanced Parameters

- **Spectral Width and SMSR:** Defines the purity and stability of the laser signal, critical for high-speed or coherent systems ().
- **Modulation Format:** NRZ for lower speeds, PAM4 or DP-QPSK for high-speed Ethernet (200G+), affecting data encoding efficiency ().
- **Loss and Dispersion:** Fiber attenuation and signal spreading, which influence maximum transmission distance and link quality (). Understanding these parameters ensures that optical modules are compatible with network equipment, meet performance requirements, and operate reliably under environmental conditions, while optimizing cost and deployment efficiency ().

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10G, 40G, and 100G Optical Module Selection Guide

This guide provides a comprehensive analysis of form factors, fiber types, transmission distances, and compliance standards

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The presentation provides a comprehensive overview of the guidelines specific to designing an optical system with DLP Products

Understanding Optical Modules: Types and Troubleshooting Guide

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In addition, when interconnecting two optical modules, please make sure that both 400G/800G OSFP optical modules are of the

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If you know the model or type of an optical module, you can view the section "Pluggable Modules for Interfaces" in the Hardware

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