

SFP and optical module parameters



Overview

What Is an SFP Optical Module?

Guide | PHILISUN Learn SFP optical module types, speeds, reach, fiber connectors, coding and compatibility checks for network.

Key Takeaways

SFP optical modules are compact, hot-pluggable transceivers that convert electrical signals to optical signals, supporting data rates from 1 Gbps to 100 Gbps depending on the module type. Overview SFP (Small Form-factor Pluggable) modules are standardized transceivers used in switches, routers, and other network devices to connect to fiber or copper links. They are hot-pluggable, allowing installation or replacement without powering down the device.

Modern SF

P families include SFP (1–4 Gbps), SFP+ (up to 10 Gbps), SFP28 (25 Gbps), and SFP112 (up to 100 Gbps), providing scalable connectivity for enterprise networks, data centers, and carrier-grade deployments. Key Technical Parameters

Module Type	Data Rate	Protocol Support
SFP	1–4 Gbps	suitable for Gigabit Ethernet and Fibre Channel
SFP+	Up to 10 Gbps	supporting 10G Ethernet and 8G/10G Fibre Channel
SFP28	25 Gbps	used for 25G Ethernet
SFP112	100 Gbps	using PAM4 modulation for high-density 100G links



Optical Characteristics

Wavelengths: Typically 850 nm (multimode), 1310 nm, or 1550 nm (single-mode) Connector Type: LC connectors are standard; some modules support MPO or other types Transmission Distance: Varies by fiber type and wavelength, e.g., 1000BASE-SX up to 550 m on multimode fiber, 1000BASE-LX/LH up to 10 km on single-mode fiber Laser Type: VCSEL for short-range, DFB for long-range applications 3.

Electrical Parameters

Power Consumption: Typically around 1 W for standard SFP modules Interface: Electrical interface follows MSA-defined pinouts; ensures compatibility with host devices Line Rate Compatibility: Must match host switch/router port speed to avoid link failures 4.

Environmental and Reliability Specifications

Operating Temperature: Standard commercial (0–70°C) or industrial (-40–85°C) ranges Laser Safety: Class 1 laser compliant with 21 CFR 1040.10/11 Durability: Designed for high reliability in data center and carrier environments 5.

Diagnostic and Monitoring Features

Digital Diagnostic Monitoring (DDM/DOM): Provides real-time telemetry including temperature, supply voltage, transmit (TX) and receive (RX) optical power Fault Detection: Enables proactive maintenance and ensures link stability 6. Compatibility Considerations MSA Compliance: Ensures mechanical and electrical standardization across vendors Fiber Type Matching: OM3/OM4 multimode vs. single-mode fiber must be verified Host Device Verification: Electrical and optical compatibility must be confirmed using vendor datasheets to prevent high bit-error rates or port rejection Summary SFP optical modules are versatile, standardized transceivers that provide reliable high-speed connectivity.

Key parameters include data rate, wavelength, connector type, transmission distance, power consumption, operating temperature, and DDM support. Proper selection requires matching the module to the host device, fiber type, and network speed, while ensuring compliance with MSA standards for mechanical and electrical compatibility.

Article Content

What Is an SFP Optical Module? Guide | PHILISUN

Learn SFP optical module types, speeds, reach, fiber connectors, coding and compatibility checks for network equipment.

The Ultimate Reference Table for SFP & QSFP Optical Transceiver ...

The definitive guide to SFP, QSFP, and QSFP-DD standards for 2025. Compare 400G/800G optics, understand PAM4 complexity, and master QSFP-DD vs OSFP deployment

Optical Transceiver Datasheet Guide: SFP Specs & PDF Downloads

Learn how to read an optical transceiver datasheet, understand SFP specifications, compare 1G/10G modules, and choose compatible optics for enterprise networks.

The Ultimate Guide to SFP Modules (2026): Types, Speeds

Confused by SFP vs SFP+? Read the definitive 2026 guide on SFP modules. We explain Single Mode vs Multimode, DDM diagnostics, and how to choose the right transceiver for Cisco, Juniper, and more.

Looking for Optical Transceiver Modules? 8 Essential Parameters You ...

When buying optical transceiver modules, there are several parameters to consider to ensure compatibility and optimal performance. Here are some key parameters to focus on.

SFP module specification and selection guide (EN)

SFP modules comply with the MSA Multi-Source Agreement standard. They are Class 1 laser and comply with the international standards - 21 CFR 1040.10/11. 100FX works at 125 Mbps over the

Top Optical Modules for POTN Deployment: SFP, QSFP, and OSFP

This in-depth guide explores the three major optical module standards—SFP, QSFP, and OSFP—highlighting their architecture, performance characteristics, and practical deployment roles in

Optical Module Working Principle | SFP Transceiver Technical Guide ...

This comprehensive guide breaks down the internal structure, core components (TOSA, ROSA, lasers), and operational mechanisms of SFP optical modules, enriched with technical insights

SFP Optical Module Selection Guide for 2025: Key Factors Explained

Explore our comprehensive SFP optical module selection guide for 2025. Learn about crucial factors like data rate, distance, fiber type, and compatibility to optimize your network

Small Form-factor Pluggable

Small Form-factor Pluggable Small Form-factor Pluggable connected to a pair of fiber-optic cables Small Form-factor Pluggable (SFP) is a compact, hot-pluggable network interface module format used for

SFP Modules: Types, Selection Guide & Applications

An SFP module is a compact, hot-swappable optical transceiver designed to facilitate data transmission between network devices such as switches, routers, servers, and media converters.

Cisco SFP and SFP+ Transceiver Module Installation Notes

This installation note provides the installation instructions for the Cisco small form-factor pluggable (SFP) and SFP+ transceiver modules. These transceiver modules are hot-swappable

The Ultimate Guide to ZTE SFP Module Distance and Wavelength

Introduction: The Critical Role of Optical Transceivers in Modern Networks In the architecture of high-performance enterprise and carrier-grade networks, the optical transceiver is the indispensable

How to Check SFP Light Levels Using CLI Commands

Learn how to check SFP light levels using CLI commands and DOM telemetry. Understand Rx/Tx optical power readings, interpret SFF-8472 and CMIS standards, and troubleshoot

Optical Transceiver Manufacturer | 1G-800G Optics

We customize optical module parameters for customers based on the design plan and optimize key indicators such as optical power and receiving sensitivity. Each

Cisco 10GBASE SFP+ Modules Data Sheet

This feature gives the end user the ability to monitor real-time parameters of the SFP, such as optical output power, optical input power, temperature, laser bias current, and transceiver supply voltage.

BiDi SFP: The Complete Guide to Bidirectional SFP Transceivers and ...

BiDi SFP (Bidirectional Small Form-Factor Pluggable) transceivers have emerged as a powerful solution, enabling full-duplex communication over a single optical fiber. By using

Cisco Compatible Optical Modules Catalog

EXECUTIVE SUMMARY This document serves as the definitive technical reference for the Cisco comprehensive of Small Form-Factor Pluggable (SFP), SFP+, SFP28, QSFP+, and QSFP28

Related Video Reference

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