Requirements for 10G Optical Modules and Optical Cables



Overview

This data sheet describes the benefits, specifications, and ordering information for the Cisco 10GBASE SFP+ Modules Data Sheet.

Key Takeaways

10G optical modules require compatible SFP+ transceivers, appropriate fiber type (OM3/OM4 for multimode or OS2 for single-mode), correct connector type (typically LC duplex), and adherence to distance and environmental specifications. 10G SFP+ Optical ModulesTypes and Standards10GBASE-SR (Short Range): Operates at 850nm over multimode fiber (MMF), supporting up to 300m on OM3 and 400m on OM4 fiber, ideal for intra-data center links and top-of-rack connections ( ). 10GBASE-LR (Long Range): Operates at 1310nm over single-mode fiber (SMF, OS2), supporting distances up to 10km ( ).

10GBASE-ER (Extended Range): Operates at 1550nm over SMF, supporting distances up to 40km ( ). 10GBASE-ZR: Supports ultra-long distances up to 80–120km over SMF ( ). 10GBASE-LRM: Designed for legacy multimode fiber (OM1/OM2) with distances up to 220m, often requiring a mode-conditioning patch cord ( ).

10GBASE-BX: Single-fiber bidirectional transceivers using different wavelengths for transmit and receive, supporting 10–100km depending on model ( ). Connector Type: Most 10G SFP+ modules use duplex LC connectors, while some single-fiber BIDI modules use simplex LC ( ). Digital Optical Monitoring (DOM): Many modules support DOM for real-time monitoring of optical power, temperature, and voltage, which is critical for diagnostics and network reliability ( ).

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Optical Cable Requirements

Multimode Fiber (MMF): OM3: 300m for SR modulesOM4: 400m for SR modulesTypically uses duplex LC connectors ( ).

Single-

Mode Fiber (SMF, OS2): Required for LR, ER, ZR, and BX modulesSupports distances from 10km to 120km depending on module typeDuplex LC or simplex LC for BIDI ( ). Active Optical Cables (AOC): Pre-terminated SFP+ modules integrated with optical fiberAvailable in lengths from 1m to 30mHot-swappable and suitable for high-density racks ( ).

Direct-

Attach Copper (DAC): Passive or active twinax cablesShort-range connections up to 10mCost-effective for rack-to-rack or within-rack links ( ). 10GBASE-T Copper: Uses RJ-45 connectors with Cat6a/Cat7 cablesSupports distances up to 30–100m depending on cable quality ( ). Environmental and Operational ConsiderationsHot-swappable: SFP+ modules can be installed or replaced without powering down switches ( ).

Temperature Range: Standard and industrial temperature variants are available for data center or outdoor deployments ( ). Compatibility: Ensure modules are certified for the switch or router platform (Cisco, Dell, Arista, Juniper, etc.) to guarantee interoperability ( ). Port Density: SFP+ modules are compact, allowing high-density deployment in modern switches ( ).

Summary

To deploy 10G optical links effectively: Select the appropriate SFP+ module based on distance, fiber type, and wavelength. Use compatible optical fiber (OM3/OM4 for SR, OS2 for LR/ER/ZR). Ensure correct connector type (LC duplex or simplex for BIDI).

Consider cable type (AOC, DAC, or 10GBASE-T) based on distance and cost. Verify environmental ratings and platform compatibility for reliable operation. Following these requirements ensures high-performance, reliable 10GbE connectivity across data centers, enterprise networks, and service provider environments ( ).

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Article Content

Cisco 10GBASE SFP+ Modules Data Sheet

This data sheet describes the benefits, specifications, and ordering information for the Cisco 10GBASE SFP+ Modules Data Sheet.

10GB SFP Module Guide: Types, Specs, and How to Choose

Learn everything about 10GB SFP modules, including types, specifications, compatibility, and how to choose the right 10G SFP+ transceiver for your network.

Arista Optics Modules and Cables

To accommodate an increasing spectrum of applications, Arista offers a wide choice of OSFP, QSFP-DD, QSFP, SFP, SFP-DD and DSFP transceivers and cables that comply with industry standards,

10G SFP+ Module Selection for Short-Range Networks

This article outlines the most common types of short-range 10G SFP+ modules and introduces a simple three-step selection framework based on cabling type, link distance, and port

SR Cisco Explained: SFP+ 10G Multimode Optics Guide

Understand SR Cisco SFP+ modules for 10G multimode fiber links, including specifications, transmission distance, compatibility, and data center use cases.

10G SFP+ Active Optical Cables | Optical Interconnect | Amphenol

Amphenol''s 10G SFP+ optical modules include SFP+ AOC. They are compliant with SFP+ MSA, SFF-8431 and SFF-8472, and are mainly used in Telecom, Wireless, InfiniBand, and

Ultimate Guide to 10G SFP+ AOC Cables□2025□| Fibrecross

Explore 10G SFP+ AOC cables—high-speed, lightweight, EMI-resistant solutions for data centers. Learn specs, benefits, use cases, and wholesale options.

Comprehensive Guide to FS 10G BiDi SFP Modules

FS 10G BiDi SFP+ modules are a powerful tool for network engineers seeking to boost bandwidth without doubling fiber investment. With their compact form factor, reduced power draw,

Select The Right Fiber Patch Cables For 1G/10G/25G Modules

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Deploying optical modules requires the right fiber patch cable. It directly affects network connection stability, performance, and maintenance. This article will explain how to pick the right fiber

Cisco 40GBASE QSFP Modules Data Sheet

This module can be used for native 40G optical links over 12-fiber ribbon cables with MPO/MTP connectors or in 4x10G mode with parallel-to-duplex fiber breakout cables for connectivity to four

Optical Modules Market Research Report 2034

Optical modules, which encompass transceivers, cables, amplifiers, splitters, and associated components, serve as the backbone of high-speed data transmission across data centers,

Industrial Grade Optical Modules: 11.1% CAGR & Market Dynamics

Industrial Grade Optical Modules market growth is driven by rising demand in military, aerospace, and satellite radar applications. Projected to reach $15.44 billion by 2025 with an 11.1%

10 Gigabit Ethernet

These have the optical electronics already connected eliminating the connectors between the cable and the optical module. They plug into standard SFP+ sockets. They are lower cost than other optical

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

DAC Cable Selection Guide: How to Choose the Right Direct Attach Cable ...

Unlike optical connectivity systems that require separate optical modules and fiber assemblies to complete signal conversion, DAC cables integrate the cable assembly and electrical

Optical Interconnect Technology Analysis: LPO, NPO,

Exploring optical interconnects for AI data centers: LPO for low-power, short-distance links, NPO for high-density, near-package connections,

SFP+, XFP, QSFP+, DAC Twinax Cable 10Gtek Transceivers Co., Ltd

DAC Twinax Cable Maker. CE, FCC, RoHS, ISO9001 Certified. Professional Manufacturer focusing on SFP+ Cables, QSFP+ Cables, MiniSAS Cables, QSFP Cables, XFP Cables, CX4 Infiniband Cables

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