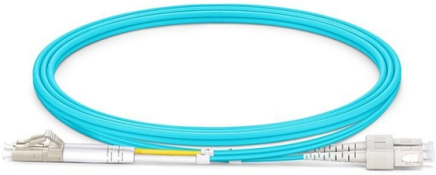
QSFP optical module QSFP



Overview

Comprehensive Guide to QSFP – MapYourTechQSFP modules utilize a high-density card-edge connector providing both high-speed What is QSFP & QSFP+ Transceiver.

Key Takeaways

QSFP (Quad Small Form-factor Pluggable) is a high-speed, hot-pluggable optical transceiver that integrates four independent data channels into a single module, enabling high-density, high-bandwidth network connectivity.What is a QSFP Module?

A QSFP module is a compact, hot-swappable transceiver used in networking equipment such as switches, routers, and servers to convert electrical signals into optical signals and vice versa, facilitating high-speed data transmission over fiber optic cables . The term "Quad" refers to its four independent transmit and receive channels, allowing it to carry four times the data of a standard SFP module while maintaining a slightly larger form factor .

Evolution and Types
• QSFP+: Supports 4 lanes of 10 Gbps each, totaling 40 Gbps, commonly used in 40 Gigabit Ethernet deployments .

• QSFP28: Upgrades each lane to 25 Gbps, achieving 100 Gbps aggregate bandwidth, widely used in 100 Gigabit Ethernet .

• QSFP56: Uses PAM4 signaling to reach 50 Gbps per lane, supporting 200 Gbps total bandwidth .

• QSFP-DD (Double Density): Expands to 8 lanes while maintaining backward compatibility with QSFP28, enabling 400 Gbps and 800 Gbps transmission rates .

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• QSFP112: Returns to a 4-lane architecture but increases per-lane speed to 100 Gbps, achieving 400 Gbps aggregate bandwidth with reduced power consumption .
Applications

QSFP modules are widely used in data centers, enterprise networks, and telecommunications to provide scalable, high-density connectivity. They support multiple protocols including Ethernet, InfiniBand, Fibre Channel, and SONET/SDH, making them versatile across network architectures . They are also available in different physical types:

• Direct Attach Copper (DAC): Short-range, cost-effective connections between adjacent devices .

• Active Optical Cable (AOC): Medium to long-range optical connections .

• Multimode and Single-mode QSFP: Support various fiber types and distances, from 100 meters to 80 kilometers depending on the module and fiber grade .
Key Advantages
• High-density connectivity: Four channels in one module reduce port space requirements.

• Scalable bandwidth: Supports speeds from 40 Gbps to 800 Gbps depending on the generation.

• Hot-pluggable: Can be inserted or removed without powering down the device.

• Backward compatibility: QSFP-DD ports can accommodate QSFP28 modules, protecting existing infrastructure investments . In summary, QSFP modules are essential components in modern high-speed networks, providing flexible, high-bandwidth, and space-efficient solutions for optical data transmission .

Article Content

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Cisco QSFP-40G-SR-BD (40G BiDi) The Cisco QSFP 40-Gbps BiDirectional (BiDi) transceiver (Figure 1) is a

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QSFP, QSFP+, zQSFP, QSFP28 and QSFP56, QSFP

Our complete quad small form factor pluggable, QSFP connector portfolio includes QSFP+, zQSFP,

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