

## Article Overview

QSFP (Quad Small Form-factor Pluggable) and OSFP (Octal Small Form-factor Pluggable) are high-speed optical transceivers, with QSFP optimized for 40-400G networks and OSFP designed for 400-800G networks with higher thermal and power capacity.

## Overview of QSFP

QSFP modules, including QSFP+, QSFP28, QSFP56, and QSFP-DD, are designed to aggregate multiple lanes of data into a compact form factor. The "Quad" in QSFP refers to four independent electrical lanes, each capable of 10-25 Gbps (QSFP28) or 50 Gbps (QSFP56) using PAM4 modulation, enabling total speeds from 40 Gbps up to 400 Gbps for QSFP-DD. QSFP modules are slightly smaller than OSFP, allowing high port density on switch panels, and are widely used in enterprise data centers, colocation facilities, and campus networks. QSFP-DD doubles the lane count to eight, supporting 400G networks while maintaining backward compatibility with QSFP28 ports. Key Features of QSFP:

- o Lane count: 4 (QSFP28) or 8 (QSFP-DD)
- o Data rates: 40G-400G
- o Size: Compact, smaller than OSFP (QSFP-DD: 18.35mm x 89.4mm x 8.5mm)
- o Thermal capacity: 7-12 W
- o Applications: Enterprise networks, high-density switch deployments, incremental upgrades

## Overview of OSFP

OSFP modules, introduced around 2017, are designed for next-generation hyperscale and cloud data centers. The "Octal" designation refers to eight high-speed electrical lanes, each supporting 50 Gbps for 400G or 100 Gbps for 800G using PAM4 modulation, with potential future support for 1.6 Tbps. OSFP modules are slightly larger than QSFP-DD (22.58mm x 107.8mm x 13.0mm) to accommodate enhanced thermal management and higher power consumption, typically 12-15 W. This makes OSFP ideal for high-performance computing clusters, hyperscale cloud networks, and environments requiring extreme bandwidth per switch slot. Key Features of OSFP:

- o Lane count: 8
- o Data rates: 400G-800G (future 1.6T)
- o Size: Larger than QSFP-DD for thermal efficiency
- o Thermal capacity: 12-15 W
- o Applications: Hyperscale data centers, AI/ML compute fabrics, high-density front panels

## Comparison Summary



# OSFP optical module QSFP

| Feature                | QSFP-DD                          | OSFP                                   |
|------------------------|----------------------------------|----------------------------------------|
| Lane count             | 8                                | 8                                      |
| Max data rate          | 400G                             | 800G (future 1.6T)                     |
| Size (WxLxH)           | 18.35 x 89.4 x 8.5 mm            | 22.58 x 107.8 x 13 mm                  |
| Thermal capacity       | 7-12 W                           | 12-15 W                                |
| Port density           | Higher                           | per 1U                                 |
| Backward compatibility | QSFP28                           | Requires adapter for QSFP28            |
| Ideal use case         | Enterprise, incremental upgrades | Hyperscale, high-performance computing |

## Key Considerations

- o Backward Compatibility: QSFP-DD supports QSFP28 ports directly, while OSFP requires adapters to interface with QSFP28 .
- o Thermal Management: OSFP's larger size allows better heat dissipation, making it suitable for high-power 400G/800G deployments .
- o Scalability: OSFP is more future-proof for 800G and beyond, whereas QSFP-DD is ideal for incremental upgrades in existing QSFP infrastructure .
- o Deployment Choice: QSFP-DD is preferred for high-density enterprise switches, while OSFP is optimized for hyperscale and cloud-scale environments requiring extreme bandwidth and thermal headroom . In summary, QSFP modules are compact, high-density solutions for 40-400G networks, while OSFP modules provide higher power and thermal capacity for 400-800G networks, making them the preferred choice for next-generation hyperscale and high-performance computing deployments.

OSFP (Octal Small Form-factor Pluggable) modules are becoming increasingly important in achieving high-speed

Confused about SFP+, SFP28, QSFP+, QSFP28, QSFP56, QSFP-DD, QSFP112 vs

SFP+, SFP28, QSFP+, QSFP28, QSFP-DD vs OSFP are the different Form Factors of the Optical Transceiver

SFP vs QSFP module differences explained. Learn about compatibility, speeds, and use cases for network setups.

OSFP allows more power (15W) than the QSFP-DD (12W). The OSFP allows an early adoption because it's easier to

OSFP is short for Octal Small Form Factor Pluggable. it is being designed to use eight electrical lanes and each lane for 50GBE to

As a leading solution in high-speed applications, QSFP-DD transceivers are often compared with other modules such

The definitive guide to the QSFP optical module series (40G, 100G, 400G, 800G). Learn the technical

differences, evolution path,

Optical module is the optoelectronic device that realizes photoelectric and photoelectric conversion in optical

Learn the differences between Cisco SFP, SFP+, QSFP-28, and OSFP optical transceivers. Explore technical comparisons,

FS 40G QSFP+ optical transceiver module solutions offer a full range of QSFP+ modules from 150m to 80km reach, and used for

Cisco QSFP-DD and OSFP 800G coherent optical modules are supported on Cisco switches and routers. For more details, refer to

Compare QSFP-DD, QSFP28, and OSFP form factors. Learn about compatibility, power constraints, migration TCO,

Summary There's a wide range of SFP form factors that support an equally wide range of speeds and applications.

The explosive growth of global data volume has placed higher demands on the bandwidth and performance of data

Detailed analysis of OSFP and QSFP-DD form factors for 800G optical modules. Compare specifications, thermal

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