

Article Overview

OSFP modules are high-speed, pluggable optical transceivers supporting 400G, 800G, and emerging 1.6T data rates, optimized for high-density, AI, and data center applications.

Overview

OSFP (Octal Small Form-factor Pluggable) modules are designed for high-bandwidth optical connectivity, featuring eight individual optical lanes per module, which allows data rates from 200G to 1.6T depending on the configuration . The octal design enables higher bandwidth than traditional modules, making OSFP ideal for dense networking environments, GPU clusters, and AI workloads . Typical dimensions are 70mm x 18mm, supporting hot-swappable installation for minimal downtime .

Speed and Performance

- o 400G OSFP: 8x50G or 4x100G lanes
- o 800G OSFP: 8x100G or 4x200G lanes
- o 1.6T OSFP: 8x200G lanes These modules leverage PAM4 signaling, which transmits two bits per symbol, effectively doubling data rates over the same bandwidth . OSFP modules also support breakout configurations, such as 8x100G, 4x200G, or 2x400G, providing flexible connectivity options .

Thermal Management

OSFP modules are engineered for high thermal capacity, critical for AI and high-performance computing environments. Variants include:

- o Open Finned Top: Enhances airflow for air-cooled switches
- o Closed Finned Top: Provides EMI shielding, optimized airflow, and dust resistance
- o Flat Top / Riding Heat Sink (RHS): Compatible with liquid-cooled systems or network adapters with cage RHS These designs allow OSFP modules to handle power budgets up to 60W, supporting dense deployments without overheating .

Applications

OSFP modules are widely used in:

- o Data centers: Spine-leaf architectures, high-density switch fabrics
- o AI/ML clusters: GPU-to-GPU interconnects, high-concurrency workloads
- o High-performance computing (HPC): InfiniBand and Ethernet networks



High-speed OSFP optical module

o Enterprise and service provider networks: Core and distribution layers

Compatibility and Standards

OSFP modules comply with the OSFP Multi-Source Agreement (MSA), ensuring interoperability across vendors . Cisco OSFP 800G modules, for example, support 800GBASE-VR8, 2x400G, 4x200G, and 8x100G breakouts, with MPO-12 APC connectors for multi-mode fiber links up to 50 meters . OSFP modules are also compatible with IEEE 802.3 standards and CMIS 5.3 for diagnostic monitoring .

Advantages Over Other Form Factors

Compared to QSFP-DD, OSFP offers:

- o Better thermal management and airflow
 - o Higher port density in 1RU switches
 - o Native 8-lane architecture for future speed upgrades without mechanical redesign
 - o Hot-swappable installation for minimal downtime
- OSFP modules are larger than SFP or CFP modules but provide significantly higher bandwidth and efficiency, making them the preferred choice for next-generation high-speed networks . In summary, OSFP optical modules combine high-speed performance, advanced thermal management, and flexible breakout options, making them essential for modern data centers, AI clusters, and high-bandwidth networking applications.

OSFP (Octal Small Formfactor Pluggable) is a high-speed optical module packaging

High-Speed Optical Transceivers are designed for next-generation data centers, AI clusters, and high

OSFP is engineered to deliver superior data transfer and ensure seamless communication across infrastructure.

This article provides an overview of 800G optical transceivers, focusing on the QSFP-DD and OSFP packages.

For high-speed SFP modules, optical components account for approximately 90% of the total BOM (Bill of Materials)

It is compliant with IEEE 802.3 800GBASE-VR8 and OSFP MSA module requirements with

The OSFP is a pluggable module form factor specifically engineered for high-speed applications. OSFP features eight

High-speed OSFP optical module

The following analysis dives into the technology behind OSFP optics, performance evolution across speed classes,

OSFP Riding Heat Sink (OSFP-RHS) is a 9.5mm high pluggable module which does not have an integrated heat sink as shown in

The 1.6T OSFP-XD optical module is widely applicable in scenarios requiring high-speed data

Cisco QSFP-DD and OSFP 800G ZR/ZR+ digital coherent optics modules enable 800G traffic

The OSFP form factor is positioned to remain the dominant platform for high-speed optical connectivity through at

OSFP features eight high-speed electrical lanes that initially support 400 Gb/s (8x50G). It is slightly wider and deeper than the QSFP

OSFP-RHS nose shape is updated to avoid a potential interference with a connector (Fig 9-8). OSFP-RHS heatsink contact area is

Explore how SFP optical transceivers (SFP modules) enhance high-speed internet connections by improving network

The OSFP Connector System offers a complete solution for 224Gbps PAM-4 data rates, with single-port (one-by-one), stacked-port

Web: <https://www.kremgroup.co.za>

