800g Optical Module Classification



Overview

800G Optical Modules Explained: Standards, Types & Use CasesWe will explore the emergence, technical standards, packaging, types, and applications of 800G.

Key Takeaways

800G optical modules are categorized by single-channel rates (100G or 200G) and form factors, primarily QSFP-DD and OSFP, with various standards like DR8, PSM8, FR, and LR for different distances and applications. Classification by Single-Channel Rate800G modules can be divided into two main types based on the single-channel rate: 100G Single-Channel Modules: Easier to implement, typically using 8 lanes of 100G PAM4, requiring 16 optical fibers. Commonly used in data centers for 800G-to-800G, 800G-to-400G, and 800G-to-100G interconnections (e.g., 800G DR8) with transmission distances up to 500 meters over single-mode fiber.

200G Single-Channel Modules: Require more advanced optical components and a gearbox for conversion due to the 112Gbps PAM4 electrical interface limit. These modules are suitable for high-performance applications where higher per-lane rates are needed. Form FactorsQSFP-DD (Quad Small Form-Factor Pluggable Double Density): Supports 8 channels, backward compatible with QSFP+/QSFP28/QSFP56, and ideal for high-speed data transmission in dense deployments.

It uses dual-row connectors and can handle multiple interface rates.



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OSF

P (Octal Small Form-Factor Pluggable): Slightly larger than QSFP-DD, supports 8 lanes, and is designed for high-performance data centers and AI applications.

OSF

P modules like Cisco OSFP-800G-VR8 support 8x100G, 4x200G, and 2x400G breakouts with MPO connectors. Transmission Standards and DistancesDR8 (Direct Reach 8): Uses 8-channel single-mode parallel technology with 100G PAM4, supporting distances up to 500 meters. Suitable for intra-data center interconnections.

PSM8 (Parallel Single-Mode 8): Employs CWDM with 8 optical channels at 100G each, supporting up to 100 meters, ideal for long-distance transmission and fiber resource sharing.

F

R (Fixed Reach) and LR (Long Reach): Designed for fixed or extended transmission distances, typically for metro or enterprise networks. 2DR4: Provides two 400G-DR4 links from a single 800G transceiver using MPO-12 connectors, facilitating data center upgrades without optical breakout cables.

Breakout Options800

G modules can be logically divided into multiple lower-speed ports: 1x800G: Single 800G port. 2x400G: Two separate 400G ports. 8x100G: Eight separate 100G ports, providing flexibility for network design.

Modulation and TechnologyPAM4 (Pulse Amplitude Modulation 4-level): Used in most 800G modules to double data transmission per lane.

VCSE

L (Vertical-Cavity Surface-Emitting Laser): Common in short-reach multi-mode modules like SR8 for distances under 100 meters.

Single-

Mode Fiber: Used in DR8, PSM8, FR, and LR modules for longer distances.

Applications800

G optical modules are widely used in: High-speed data centers for server-to-switch and switch-to-switch interconnections.

A

I and high-performance computing networks. Enterprise core and distribution layers. Service provider networks requiring high-density, high-throughput solutions.

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In summary, 800G optical modules offer flexibility in form factor, channel rate, and transmission distance, with QSFP-DD and OSFP being the primary packaging types, and standards like DR8, PSM8, FR, and LR addressing different deployment scenarios.

Article Content

800G Optical Modules Explained: Standards, Types & Use Cases

We will explore the emergence, technical standards, packaging, types, and applications of 800G modules, and answer common questions to help you make informed decisions when selecting

Cisco OSFP 800G Transceiver Modules Data Sheet

The Cisco ® OSFP 800G transceiver modules provide 800 Gigabit Ethernet (GE), 2x 400GE, 4x 200GE, and 8x 100GE connectivity options,

Demystifying 800G Transceiver: Types, Applications, and FAQs

In this article, we will provide an overview of the various types of 800G optical modules, discuss their applications, and address some FAQs to help you make a better choice when selecting

Classification of 800G Optical Transceivers | FiberMall

Here we sort out the information of 800G optical transceivers for your reference. 800G=8*100G=4*200G, therefore, according to the single-channel rate, it can be divided into two

Technology from 400G to 800G to 1.6T Transceivers | FiberMall

This paper describes the technical route of optical communication from 400G to 800G to 1.6T optical modules and compares pluggable and CPO.

Heavy Reading White Paper: 800G Client Optics in the Data Center

The next key development is 800G, and the industry is already gearing up to deploy this next generation of client optics in hyperscale data centers. Developments in three distinct areas are needed for 800G

800G Optical Modules Analysis: Technical Architecture, Form

This article will comprehensively analyse the technical details and industrial value of 800G optical modules from the perspectives of technical classification, form factor differences, and...

Know Your 800G Transceiver | Juniper Networks

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An 800G transceiver uses multiple lanes of optical signals and advanced modulation techniques to achieve higher capacities. 800G transceivers employ multiplexing using multiple fibers.

800G Optical Modules Explained: Architecture, Use Cases, and

Explore 800G optical modules, including SR8, DR8, and FR4. Understand architecture, use cases, and how to deploy 800G in AI data centers and GPU clusters.

Understanding 800G Optical Modules: Types, Applications, and

In this article, we will outline the various types of 800G optical modules and their applications, addressing some common questions to help you make an informed decision when selecting 800G

Which manufacturers produce DSP chips for optical modules?

The optical module DSP market is highly concentrated, with Broadcom, Marvell, and NVIDIA (through Mellanox acquisition and associated platforms) controlling most high-end DSP

Google''s High-Speed Interconnect Architecture to Push 800G+ Optical ...

In an OCS-enabled architecture, Ironwood TPUs rely on high-speed copper for short-reach connections, while the all-optical network handles inter-rack data transmission. As a result, AI

Top 10 Optical Transceiver Manufacturers in the World

Sourcing optics for your data center? Discover the top 10 optical transceiver manufacturers in 2026. Compare global giants and factory-direct OEM alternatives.

AI Data Center Optical Transceiver Module Market 2025–2030

The AI data center optical transceiver market is undergoing the most significant growth phase in its history, driven by the convergence of exponential AI workload expansion, the physics-imposed

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

Co-Packaged Optics (CPO) Market Analysis: 1.6T Transition & AI

Strategic analysis of the Co-Packaged Optics (CPO) market, tracking the 2026 inflection point for 1.6T modules. Explores value migration, supply chain bottlenecks, and thermal

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800G Data Center Interconnect Guide: DAC, AEC, AOC & Optical

Engineer''s guide to 800G cables: DAC, ACC, AEC, AOC, DR8 transceivers. Distance zones, power budgets, TCO, NVIDIA platforms, 1.6T migration. Updated 2026.

AI Data Centers Drive Optical Transceiver Market Growth

Analysis of how AI and hyperscale data centers accelerate global optical transceiver adoption, including 400G/800G evolution, silicon photonics, CPO, and Link-PP integration for next

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