

800G Optical Module Technology



Overview

Developments in three distinct areas are needed for 800G deployment: optical modules and direct attach copper (DAC) cables, switch ASICs, and 800GE standardization.

Key Takeaways

800G optical modules are available primarily in QSFP-DD and OSFP form factors, with options like DR8, PSM8, 2DR4, FR, and LR for varying distances and applications.

Form Factors

QSFP-DD (Quad Small Form-Factor Pluggable Double Density): Compact, backward compatible with QSFP+ and QSFP28, supports high port density, suitable for short- to medium-reach applications, and uses 8 channels with PAM4 modulation.

OSF

P (Octal Small Form-Factor Pluggable): Larger module with higher thermal capacity (up to 25W TDP), ideal for high-performance deployments and easier future upgrades to 1.6T or 3.2T interfaces.

Key 800G Module Types

DR8 (8-channel, 100G PAM4): Short-reach, single-mode fiber, up to 500m, commonly used for intra-rack or adjacent-rack connections in data centers.

PSM8 (8-channel CWDM): Supports 100m transmission, suitable for long-distance single-mode fiber and fiber resource sharing.

2DR4: Combines two 400G-DR4 links in one 800G transceiver, enabling 500m transmission without optical breakout cables, ideal for data center upgrades.

F

R (Fixed Reach) and LR (Long Reach): Designed for longer-distance transmission, typically for campus or metro networks. SR8 (Short Reach, multimode): Uses VCSEL technology, 850nm wavelength, 16 optical fibers, suitable for distances under 100m within data centers.

Applications

Hyperscale data centers: High-density, low-latency environments requiring massive throughput for AI, HPC, and cloud workloads. AI/ML clusters: Reduces network latency and improves GPU training efficiency by providing higher bandwidth than 400G deployments. Data center interconnects: Supports 800G-800G, 800G-400G, and 800G-100G links for flexible network scaling.

Considerations
Single-channel rate: 100G modules are easier to implement; 200G modules require advanced optical devices and gearbox conversion. Distance and fiber type: Choose DR8, PSM8, or 2DR4 based on required reach and fiber availability. Thermal and power: OSFP modules handle higher power dissipation, while QSFP-DD is more compact for high port density.

Standards compliance: Ensure modules comply with IEEE 802.3ck, 802.3cu, QSFP-DD MSA, or OSFP MSA for interoperability.

800G optical modules represent the next step in high-speed data transmission, offering flexibility in form factor, reach, and channel configuration to meet the demands of modern data centers and high-performance networks.

Article Content

800G Optical Modules Explained: Standards, Types

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

Optical Module Technology Roadmap | 800G to 3.2T Evolution

Explore the future of optical module technology from 800G to 1.6T, 3.2T and beyond. Comprehensive roadmap covering silicon photonics, CPO, coherent datacom, and AI-optimized

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

Developments in three distinct areas are needed for 800G deployment: optical modules and direct attach copper (DAC) cables, switch ASICs, and 800GE standardization. Not all these need to be fully

The Technology of 800G Optical Modules for AI Data ...

While 400G optical modules currently dominate the market, they are approaching their bandwidth limits, positioning 800G modules as a critical next-generation alternative. This paper...

Cisco OSFP 800G Transceiver Modules Data Sheet

It is compliant with IEEE 802.3 800GBASE-VR8 and OSFP MSA module requirements with integrated heat sink. Optical signals are carried over

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.

FS Launches 800G LPO Module: A Power Efficiency and Latency

FS introduces an 800G LPO optical module, powering AI and HPC data centers with ultra-low power consumption, reduced latency, and proven reliability.

The Technology and Application Prospects Of 800G Optical Modules

Explore the technical solutions, application prospects, the development trends and commercial strategies of 800G optical modules.

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

The Evolution of Optical Modules: 400G → 800G → 1.6T - A Strategic ...

Discover the evolution from 400G to 800G and 1.6T optical modules. Learn key technologies, CPO vs pluggable, and upgrade strategies for future-ready data centers.

Global 800G Optical Module Market Size, Share, Growth Analysis ...

800G Optical Module Market Overview 2026-2033 The 800G optical module market represents a critical frontier in high-speed optical communication technology, driven by the relentless

800G QSFP-DD Optical Module Market Revenue Forecast Driven

Overall, the 800G QSFP-DD optical module market is poised for sustained growth, driven by technological advancements, expanding application bases, and increasing demand for ultra-high

Global AI Optical Transceiver Market to Reach US\$26 Billion in 2026 ...

TrendForce's latest research indicates that the global market for AI-focused optical transceivers has entered a phase of rapid growth, with market size projected to expand from

Optical Module Thermal Management in the AI Era: Cooling Technologies ...

Optical module thermal management solutions for 800G, 1.6T, silicon photonics and AI data centers. Discover thermal conductive tapes, gap pads, graphite heat spreaders and advanced

Optical Transceiver Market Size, Growth Drivers | Industry Report 2031

The Optical Transceiver Market worth USD 15.42 billion in 2026 is growing at a CAGR of 13.67% to reach USD 29.26 billion by 2031. Coherent Corp., Lumentum Holdings, Broadcom Inc.,

800G to 1.6T Optical Interconnects: AI Cluster Maturity Assessment

In-depth analysis of 800G to 1.6T optical interconnect evolution for AI clusters, examining PAM4, modules, CPO, and supply chain readiness.

Is Your Network Ready for 800G? Key Fiber Optic Trends Shaping

Discover the top fiber optic trends shaping network infrastructure in 2026, including 800G optical transceivers, AI-driven networking, high-density fiber cabling, DWDM evolution, and power

800G Module Packaging: QSFP-DD or OSFP, Which Fits Your Needs?

Discover the differences between 800G QSFP-DD and OSFP modules. Learn which packaging offers the best performance, heat dissipation, and scalability.

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

