

Energy-efficient QSFP28 optical modules for cloud computing



Overview

Functionality of QSFP28 Modules in Cloud Facilities Engineers developed QSFP28 modules that consume less energy per gigabit than earlier technologies. This.

Key Takeaways

QSFP28 optical modules deliver 100G Ethernet connectivity with high energy efficiency, making them ideal for modern cloud data centers. Overview of QSFP28 QSFP28 (Quad Small Form-factor Pluggable 28) modules are designed to support 100-gigabit Ethernet (100GbE) by using four electrical lanes, each running at 25 Gbps, achieving a total data rate of 100 Gbps. The modules are hot-pluggable, compact, and optimized for high-density deployments, which is critical for cloud computing environments where space and power efficiency are major concerns.

Compared to older 100G form factors like CFP, QSFP28 modules consume significantly less power, typically 2.5 W to 4 W, versus 12–24 W for earlier designs. Energy Efficiency Advantages QSFP28 modules improve energy efficiency through several mechanisms: Port consolidation: One QSFP28 port can replace multiple 10G or 40G connections, reducing the number of active transceivers and electrical interfaces, which lowers overall power consumption.

Optimized thermal management: Fewer active components generate less heat, allowing data center fans to operate at lower speeds, further reducing energy use. Efficient electrical design: Modern 25G SerDes lanes are more power-efficient than older 10G-based signaling, moving more data with less overhead. Flexible deployment: QSFP28 supports short-reach DAC/AOC cables and multimode fiber for intra-rack connections, minimizing the need for high-power optics when not required.

Variants and Deployment Scenarios QSFP28 modules come in multiple variants to suit different distances and applications: SR4: Short-reach, multimode fiber, ideal for intra-rack or row-to-row connections (up to 100 m on OM4 fiber),. LR4: Long-reach, single-mode fiber, suitable for inter-rack or inter-data-center links. ER4: Extended-reach, single-mode fiber, optimized for tens of kilometers, maintaining low power consumption and high signal integrity.

These variants allow cloud operators to match the module to the required distance, avoiding unnecessary high-power optics and further improving energy efficiency.

Benefits for Cloud Computing

High port density: QSFP28's compact design doubles port density compared to CFP4, enabling more connections per switch line card. **Reduced operational costs:** Lower power consumption and simplified cooling reduce energy bills and infrastructure complexity. **Scalability:** Supports leaf-spine architectures common in cloud data centers, providing high-bandwidth, low-latency interconnects.

Compatibility: Works with various network devices and supports breakout configurations, allowing flexible network design and cost optimization.

Conclusion QSFP28 optical modules are energy-efficient, high-performance solutions for cloud computing networks. By consolidating ports, reducing power consumption, and offering flexible deployment options across short- and long-reach links, they help data centers achieve scalable, cost-effective, and thermally optimized 100G Ethernet connectivity.

Selecting the appropriate QSFP28 variant (SR4, LR4, ER4) ensures optimal energy efficiency while meeting bandwidth and distance requirements.

Article Content

Functionality of QSFP28 Modules in Cloud Facilities

Engineers developed QSFP28 modules that consume less energy per gigabit than earlier technologies. This reduced energy usage lowers electricity costs in large cloud computing facilities where

100G qsfp28

Reliable 100G QSFP28 modules with LR4, SR4, and CWDM4 options, designed for high-speed data centers, cloud networks, and enterprise backbone applications.

Cisco QSFP28 100G ZR Digital Coherent Optics Module Data Sheet

The QSFP28 100G ZR can cost effectively extend 100G links to 80km on any fiber type, and is a cost-effective migration option of multiple 10G wavelengths to 100G.

Is QSFP28 Still the Right Choice for 100G Optical Networks?

A deep dive comparison on QSFP28 optical modules for 100G networks. Understand its core technology, key advantages, and application relevance against alternatives.

QSFP28 PAM4 DWDM: High-Capacity 100G/400G Optical

With their cost-effectiveness, energy efficiency, and flexible deployment, FS QSFP28 PAM4 DWDM modules are the perfect choice for upgrading and expanding 100G/400G networks,

Performance of QSFP28 100G SWDM4 in Ultra-Low Power

The QSFP28 100G SWDM4 (Short-Wave Division Multiplexing 4) module has emerged as a critical solution for ultra-low power consumption scenarios, offering a balance of high bandwidth,

CFP vs QSFP28: Choosing the Right 100G Fiber Optic Module for

Compare CFP and QSFP28 100G fiber optic modules for data centers, cloud networking, and long-haul deployments. Discover technical differences, power consumption, port density,

QSFP28 SR4 Optical Transceiver Module Overview

Explore FS QSFP28 SR4 optical transceiver with low power consumption, perfect compatibility, and reliable performance for efficient data transmission in data centers and enterprise

Overview of 100G Optical Modules and Modulation

QSFP28 is the main form factor for 100G optical modules. It features low power consumption, high port density, compact size, and cost efficiency.

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.

Optical Modules Market Size, Trends & Forecast 2025-2035 | Core

Cloud computing and data centers are key application areas for optical modules. Energy efficiency is becoming a priority, leading to the development of more sustainable optical solutions.

Optical Transceivers

Luxshare-Tech collaborates with industry's leading optoelectronic ICs to develop optical interconnect products based on silicon photonic engine technology,

Optical Transceivers Market Size Report, 2026-2033

The data centers segment is expected to grow at a significant CAGR over the forecast period, driven by rising requirements for high-bandwidth connections to support AI computing, cloud services, and

Everything You Need to Know About 800G/1.6T Optical Transceiver

Traditional 100G/400G optical modules have become difficult to meet the data exchange needs of hundreds of TB per second between clusters. The core value of 800G and 1.6T optical modules lies

Optical Transceiver Module Wholesale,10g/25g/40g/100g SFP+ Optical ...

Fiber optic module manufacturer,ETU-Link supply full model optical transceivers,including standard 8g/10g/25g/40g/100g sfp+ optical modules and copper RJ45 transceiver,wholesale at factory price!

Third-Party Optical Transceivers Market Report 2025 with Growth ...

Adopting energy-efficient optical designs, recyclable materials, and transparent carbon accounting practices resonates with enterprise ESG mandates and elevates brand reputation.

Data Center Optical Transceiver Market Size, Share, Trends

QSFP-DD and OSFP form factors are displacing older QSFP28 modules as the industry standard for 400G and above deployments. Co-Packaged Optics (CPO) represents the most disruptive near-term

Optical Transceiver Market Size, Share, and Trends Analysis 2032

Optical Transceiver Market Trends “Rising Adoption of Co-Packaged Optics in Data Centers” • Co-packaged optics is emerging as a transformative innovation by integrating optical engines directly

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