

Manufacturer s Liquid-Cooled Switch QSFP-DD

Article Overview

Liquid-cooled QSFP-DD switches leverage high-density 8-lane QSFP-DD modules to deliver up to 800 Gbps per port while efficiently managing heat in high-performance data center environments.

Overview of QSFP-DD Technology

QSFP-DD (Quad Small Form-Factor Pluggable Double Density) modules double the lane capacity of standard QSFP interconnects, providing eight-lane electrical interfaces capable of 28 Gbps NRZ, 56 Gbps PAM4, and 112 Gbps PAM4, supporting aggregate bandwidths up to 800 Gbps per port . These modules are backwards compatible with legacy QSFP ports, allowing seamless upgrades without replacing existing infrastructure . QSFP-DD supports high-density deployments, enabling switches to maintain maximum port density while meeting the bandwidth demands of AI/ML, HPC, and cloud computing workloads .

Thermal Management and Liquid Cooling

High-performance QSFP-DD switches can operate at 15–18W per module, generating significant heat that must be managed to maintain signal integrity and reliability . While traditional air-cooled cages use heat sinks and airflow, liquid-cooled switches integrate liquid heat exchangers or cold plates to remove heat more efficiently, allowing higher power dissipation per port and denser switch designs. This approach is particularly beneficial in 1U or 2U high-density switches, where airflow is limited and thermal constraints are critical .

Performance and Applications

Liquid-cooled QSFP-DD switches are designed for ultra-low latency, high-bandwidth environments, including:

- High-Performance Computing (HPC) clusters and supercomputers, such as HPE Slingshot-enabled systems .
- AI/ML workloads requiring consistent throughput and minimal congestion.
- Cloud data centers with high-density 400G or 800G interconnects. These switches often feature adaptive congestion management, fine-grained routing, and real-time thermal monitoring, ensuring stable operation under maximum load . With liquid co...

Article Content

Nov 04, 2025

QSFP-DD pluggable modules boost data density

Each QSFP-DD port provides 76 electrical contacts, which can support next-generation switching chips for higher

May 28, 2026

QSFP-DD Strategies Help Data Centers Keep Cool

QSFP-DD Modules are Flexible and Economical Building and sustaining the pipeline of interoperable interconnect

Aug 21, 2025

QSFP-DD Power & Thermal Management Guide for Data Centers

Complete QSFP-DD power and thermal guide with module power data, rack calculations, AI cluster planning, and

Jan 02, 2026

Immersion-Cooled 800G QSFP-DD SR8 Optical

JTOPTICS® Immersion-Cooled 800G QSFP-DD SR8 Active Optical Cable (AOC) is an advanced high

Jun 09, 2026

QSFP-DD (Double Density) Interconnect System and Cable

QSFP-DD Interconnect System's 8-lane electrical interface transmits up to 28 Gbps NRZ or 56 Gbps PAM-4, up to 200 or 400 Gbps

Jul 15, 2026

HPE Slingshot 200Gb 64-port QSFP-DD 1U Switch Data sheet

The HPE Slingshot switch is offered as a direct liquid-cooled blade in the HPE Cray EX supercomputer, and a 1U top-of-rack form

Sep 11, 2025

2023 QSFP-DD MSA Thermal Whitepaper Final (for approval)

This whitepaper offers comprehensive details of QSFP-DD1600 performance enhancements achieved by both module and system

Dec 09, 2025

QSFP-DD Connectors, Cages and Cable Assemblies

QSFP-DD provides high-performance computing capability. The QSFP interconnects density is doubled with electrical interface,

Sep 28, 2025

QSFP-DD Linear Pluggable Optics (LPO)

Amphenol's QSFP-DD Linear Pluggable Optical (LPO) Transceiver delivers low

Oct 28, 2025

QSFP-DD Compatible Switches: Complete 2025

Find which switches support QSFP-DD modules. Our 2025 guide covers Cisco, Arista,

May 13, 2026

SFP/QSFP | Advanced Thermal Solutions

Test set-up of different heat sink designs on QSFP28 connector cages. Through testing,

Oct 18, 2025

Immersion Liquid Cooling Optics - GIGALIGHT

GIGALIGHT provides 10G to 800G immersion liquid cooling direct attach cable (DAC) products for immersion liquid-cooled data

Dec 29, 2025

The future of pluggable modules at 1.6 Tb/s

If the ability to cool the module becomes so efficient, the system design goal switches to optimizing the system for the lowest power

Aug 13, 2025

400G QSFP-DD Immersible Cooling Extender

This product include extender cage, cable, QSFP-DD housing three parts, the cable length can be customized no more than 0.5m for

May 01, 2026

Immersion Liquid Cooling Interconnect Solutions

Superior Cooling Efficiency, Performance and Reliability Grows Fiber is perfect for the most demanding immersion liquid cooled data

Sep 11, 2025

QSFP-DD Connector System

QSFP-DD Interconnect System's 8-lane electrical interface transmits 28G NRZ, 56G PAM-4 and 112G PAM-4, up to 200, 400 or 800

May 07, 2026

U.S. Patent for Liquid cooling high-density pluggable modules for a ...

More particularly, the present disclosure relates to systems and methods for liquid cooling high-density network

Apr 01, 2026

2023 QSFP-DD MSA Thermal Whitepaper Final (for approval)

As was the case for previous generations, the universally-adopted QSFP-DD family continues to extend its performance threshold,

Jun 05, 2026

Immersion Liquid-Cooled Optical Transceivers for the Next-Generation ...

Traditional air-cooled systems are reaching their thermal limits, prompting a shift toward immersion liquid cooling as the next

Dec 04, 2025

Molex QSFP-DD BiPass Thermal Cooling Configuration

LISLE, IL May 16, 2019 – Molex, a global electronic solutions provider, highlights its new BiPass thermal

Feb 26, 2026

List of QSFP-DD Models & Products | TE Connectivity

Search our portfolio of QSFP-DD products and select your specifications. We offer a wide array of reliable and cost-effective products

Jul 05, 2026

High-Speed Hardware and Immersion Cooling Solutions | FIBERSTAMP

HIGH-SPEED INTERCONNECT HARDWARE AND LIQUID COOLING SOLUTIONS FOR DATA CENTER AND HPC Parallel and

Aug 09, 2025

Cold Plate Cooling Investigation for High-Speed Electronic Interconnect

Abstract Power dissipation of quad small form-factor pluggable-double density (QSFP-DD) interconnect system is

Sep 23, 2025

Specification – QSFP-DD

July 11, 2019 – QSFP-DD Hardware Specification for QSFP DOUBLE DENSITY 8X PLUGGABLE TRANSCEIVER –

Aug 06, 2025

QSFP-DD Connectors | High Speed I/O | Amphenol

Amphenol's QSFP-DD high-speed connector family features a scalable, high-performance

Apr 26, 2026

QSFP-DD: Enabling 15 Watt Cooling Solutions

3 Intro to QSFP-DD The QSFP-DD module form factor is the industry's smallest 400GbE module providing the highest

Aug 18, 2025

QSFP-DD Connector System

QSFP-DD Interconnect System enables faceplate density equal to the current 2x1 QSFP form factor, but

Feb 19, 2026

Industry Developments: Cooling QSFP Optical Transceivers

The major enabler of this performance increase is the QSFP optical transceiver. QSFP is the Quad (4-channel) Small

Dec 03, 2025

PRODUCT SPECIFICATION

3.2 INDUSTRY DOCUMENTS QSFP-DD MSA Specification – QSFP-DD supports up to 400 Gb/s Cage (Style A)

Sep 13, 2025

Immersible-400G

GIGALIGHT's 400G QSFP-DD/OSFP liquid cooling optical module is designed for use in submerged data center 400GBASE-SR8

Jun 28, 2026

QSFP-DD Connectors, Cages & Cable Assemblies

TE QSFP-DD components are backward compatible to allow existing QSFP modules to be plugged into QSFP-DD

Nov 04, 2025

Immersible Extender

A new standalone product, the Immersion Liquid Cooling Extender, is designed for immersion-cooled data centers. It extends the

May 26, 2026

QSFP-DD CONNECTORS & CABLE ASSEMBLIES PRODUCT

The QSFP-DD portfolio's backwards compatibility allows existing QSFP modules to be plugged into QSFP-DD ports. Our QSFP-DD

Oct 14, 2025

Cisco QSFP-DD Pluggable Open Line System (QDD

Learn more about the Cisco QSFP-DD Open Line System (QDD OLS), a pluggable optical

Jun 27, 2026

High-Density Interconnect Modules with Innovative Thermal Management

Molex showed its new BiPass thermal management configuration cooling for QSFP-DD (quad small form-factor

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