CPO liquid-cooled PCB optical module

Overview

Compared to traditional optical module solutions, CPO offers significant advantages in bandwidth density, system energy efficiency, and signal integrity, making it particularly suitable for ultra-large-scale AI computing clusters. XPO represents a new class of optical pluggable module designed specifically for next-generation AI data center fabrics. 8Tbps of bandwidth using 64 electrical lanes and incorporates an integrated liquid-cooled cold plate capable of supporting 400W+ module power. XPO is a next-generation pluggable optical transceiver designed for high-density and high-power environments. Its core objective is to significantly improve bandwidth density and thermal performance while retaining the serviceability advantages of pluggable modules—making it well-suited for AI data. CPO (Co-packaged Optics) breaks through the ceiling of optical transmission efficiency, PCB (Printed Circuit Board) serves as the "skeleton" of high-end manufacturing, and liquid cooling technology presses the "cooling button" for high-density data centers. These three major fields form the "iron. OFC 2025 made one thing clear: The transition to Co-Packaged Optics (CPO) switches in data centres is inevitable, driven primarily by the power savings they offer. 6T, next-generation optical modules require higher density, advanced materials, innovative thermal management, and new architectures such as CPO.

Article Content

Nov 30, 2025

New Paradigm of Optical Interconnection Under the Computing Power ...

The sustained demand for AI computing power drives optical interconnection technology to evolve from traditional pluggable modules into three new technical routes: NPO, CPO and XPO,

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(PDF) Simulation and experimental investigation of liquid

This study explores the application of cold plate liquid cooling technology in co-packaged optics (CPO). By integrating optical modules and the

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The Rise of Co-Packaged Optics: A Deep Dive into CPO

This article provides a comprehensive overview of CPO optical modules, exploring their technology, benefits, challenges, and the pivotal role

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Co-Packaged Optics (CPOs)

From Jensen Huang showcasing CPO switches at GTC 2025 to a wide range of vendors demonstrating optical engines integrated inside ASIC packages

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AI servers are becoming increasingly integrated systems. GPUs,

GPUs, CPUs, NICs, switch ASICs, optical modules, power modules, liquid cooling systems, and high-speed PCBs must be designed as part of a coherent architecture. A change in one layer

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AI Compute No Longer Limited by GPUs, Memory Now the Bottleneck

Supply gap: 70%+ Orders locked until 2028 Critical for: 800G / 1.6T optical modules No InP → No high-speed interconnect → No AI cluster scaling □□ In simple terms: Without InP, your GPUs don ...

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CPO Is Extending The Limits Of What''s Possible In AI...

Additional challenges involve promoting the standardization of CPO module form factors, improving the automation of testing and validation, and

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OFC 2026 showcases the technology triangle for AI data centre: CPO, PCB, Liquid cooling Modules. As global computing power demand soars, the technology industry is undergoing a

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Five Key Trends of Co-Packaged Optics (CPO) in 2026

Meeting market expectations and building confidence in co-packaged optics will require more than performance demonstrations. CPO adoption

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In-Depth Analysis Report on 800G Switches | FiberMall

Full liquid cooling design: Addresses 800G heat dissipation with advanced liquid + air hybrid cooling for core components and optical modules.

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What Is an XPO Transceiver? How Does It Differ from CPO?

What is an XPO (eXtra-dense Pluggable Optics) transceiver? Learn its architecture, key innovations such as dual-PCB design and liquid cooling, and how it compares with CPO for AI data

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CPO (Co-Packaged Optics) Technology: Revolutionizing

Co-Packaged Optics (CPO) represents a paradigm shift in data center connectivity, moving optical engines from traditional pluggable modules to

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CPO Switch: Next-Generation Integrated Optical

CPO switches shorten the electrical signal path, reduce power consumption, and decrease the number of pluggable modules by co-packaging optical modules with

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Next-Generation Optical Module PCB Technology: High

Optical module PCB technology is evolving rapidly to meet the extreme demands of AI data centers and high-speed networks. From 400G to

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Nvidia turns to silicon photonics to supercharge next

All Quantum-X switches will feature liquid cooling. Later in 2026, Nvidia will debut Spectrum-X Photonics, extending CPO to Ethernet.

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Abstract This study explores the application of cold plate liquid cooling technology in co-packaged optics (CPO). By integrating optical modules and the switch chip on the same substrate, CPO shortens the

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The Rise of Co-Packaged Optics: A Deep Dive into CPO

This is crucial for high-speed optical transceiver performance. Total System Cost & Efficiency: While initial CPO module costs are high, system-level

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XPO Optics Emerge as Frontrunner for AI Infrastructure

At OFC 2026, XPO emerged as a scalable, liquid-cooled CPO alternative, enabling high density and efficiency for next-gen AI infrastructure.

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BRKOPT-2699

800G Optical Modules: QSFP-DD or OSFP 51.2T, 64 port, 800G in 2RU Stacked cages (two modules) Both above and below the linecard Showing two modules inserted into upper and lower ports in a

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2026 Silicon Photonics Explained: How CPO Breaks the

Silicon Photonics fundamentally rewrites the unit economics of the data center. In legacy architectures, data transmission consumes up to 30% of total system

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XPO: Redefining Pluggable Optics for AI Networking

By combining a dual-paddle mechanical architecture, integrated liquid-cooling cold plate, clean linear electrical channel, and high-voltage power delivery, XPO dramatically increases optical density while

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Co-Packaged Optics — a deep dive | APNIC Blog

Optical modules are known to experience both hard and soft failures. Even with high-quality optics, hard failure rates are around 100 FIT, and soft

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Scaling AI Factories with Co-Packaged Optics for Better

How CPO delivers performance, power, and reliability breakthroughs The advantages of co-packaged optics are clear: 3.5x power efficiency: By

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OFC 2026 Showcases The Technology Triangle For AI Data Centre: CPO, PCB ...

"PCB+liquid cooling integrated solution" customized for NVIDIA H100 servers has improved heat dissipation efficiency by 20%, and the revenue of related businesses will exceed 1.5

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Simulation and experimental investigation of liquid-cooling thermal ...

CPO integrates optical modules, which is also known as the optical engine, and the switch chip on the same substrate through advanced packaging technology, which shortens the

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400G, 800G, and Terabit Pluggable Optics:

Alternative to pluggable: Co-packaged Optics Co-packaged optics (CPO) and Linear Pluggable Optics (LPO) are two implementation variants of the same idea – reduce ASIC to optics power/DSP

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Co-packaged Optics: The Next-Gen Data Center Tech

CPO, or "Co-Packaged Optics," is an advanced opto-electronic co-packaging technology. It involves co-packaging the optical engine (including

Contact Us

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