

Co-packaged optical and memory chips



Article Overview

Co-packaged optical and memory chips integrate optical interconnects directly with processing or memory units to dramatically increase bandwidth, reduce latency, and improve energy efficiency in AI and data center systems.

Overview

Co-packaged optics (CPO) involves placing optical engines or photonic integrated circuits (PICs) directly adjacent to or within the same package as electronic ICs, such as GPUs, switch ASICs, or memory modules . This approach collapses traditional electrical interconnect distances from inches to millimeters, significantly reducing power consumption, signal loss, and latency while increasing bandwidth density . In AI and ML workloads, where multi-terabit data rates are required, CPO enables tightly coupled clusters of processors to communicate efficiently as a single logical system.

Integration with Memory

In next-generation architectures, memory and compute units can be disaggregated but connected via co-packaged optical links . This allows memory modules to be physically separated from processors while maintaining ultra-low latency and high-throughput communication, which is critical for large-scale AI/ML training and inference. Optical interconnects can deliver hundreds of terabits per second per die, far exceeding the capabilities of traditional copper-based links .

Benefits...

Article Content

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Co-Packaged Optics (CPO): Evaluating Different Packaging

IDTechEx Research Article: The rise of co-packaged optics is transforming modern data centers and high

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Intel Demonstrates First Fully Integrated Optical I/O Chiplet

Intel Corporation's Integrated Photonics Solutions (IPS) Group has demonstrated the industry's first fully integrated

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What is Co-Packaged Optics?

Learn how co-packaged optics is reshaping data center networks by slashing power use and

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Discover how co-packaged optics (CPO) is revolutionizing hyperscale data centers. Learn

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Nvidia Unveils Game-Changing Optical Network Switch

Nvidia's new optical network switch, announced at GTC, promises to revolutionize AI data

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What Is Co-Packaged Optics (CPO)? CPO is a network architecture that integrates optical transceivers directly into

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Co-packaged optics (CPO)—the silicon photonics technology promising to transform modern data centers and high

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Advanced Packaging Evolution: Chiplet and Silicon Photonics-CPO

This shift underscores the importance of heterogeneous integration (HI) as a crucial solution for alleviating bandwidth bottlenecks.

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Next-generation Co-Packaged Optics for Future Disaggregated AI

Network-level: Micro-second optical circuit switching networks Package-level: Co-processing on the CPO HBM memory access &

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Next generation Co-Packaged Optics Technology to Train & Run

A co-packaged optic module design was developed to support electronic and optics compatibility, industry standards where

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The rapid growth of artificial intelligence (AI), data centers, and high-performance computing (HPC) has increased the

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Co Packaged Optics (CPO) – Scaling with Light for the

This section will explore the evolution of the market from copper to co-packaged copper and

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Co-packaged optics can supercharge generative AI

Knickerbocker and his team are thinking smaller, though. Because of optical connectors"

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Co-packaged Optics (CPO) is an advanced packaging technology for optoelectronic devices that involves upgrades in system

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We explain co-packaged optics (CPO), why they're important for data centers and networking, and the photonics

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Broadcom CPO: Highest Power Efficiency and Bandwidth Density

Co-Packaged Optics (CPO) is an advanced heterogeneous integration of optics and silicon on a single packaged

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In-Package Optical I/O Versus Co-packaged Optics | Ayar Labs

There's a lot of industry excitement around advances in optical interconnects – and also a lack of clarity. Terms are

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Lightmatter®

Guide Guide redefines how we build the light sources that power co-packaged optics (CPO). Hundreds of

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Stress, Thermal and Optical Performance (STOP) Analysis of Co-Packaged ...

Our innovative approach integrates 76 ICs (not including the support passive components), including two FPGA dies, 16 memory

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Electronic Chip Package and Co-Packaged Optics (CPO)

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Co-Packaged Optics (CPO) Market Trends 2026: AI Data Center

Explore the future of co-packaged optics (CPO) in AI data centers. Learn how silicon photonics, optical I/O, and high

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Co-Packaged Optics (CPO): Evaluating Different Packaging

IDTechEx's latest report, "Co-Packaged Optics (CPO) 2025-2035: Technologies, Market, and Forecasts", explores

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From a system-level perspective, this technology brings in new possibilities including adding memory access and compute

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Heterogeneous Integration Technology Drives the Evolution of Co

CPO builds an electro-optical collaborative transmission architecture by integrating the optical engine (OE) with the

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CPO (Co-Packaged Optics): A Key Technology Path for Optical ...

Co-Packaged Optics (CPO) is emerging as a critical technological path for optical interconnects in AI data centers.

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Co-Packaged Optics — a deep dive | APNIC Blog

These high-density edge-mounted optical engines directly interface with the core die through short, chip-to-chip

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For more information, pricing, or custom solutions, please contact us:

Website: <https://www.chromadecksigns-eastrand.co.za>

Email: sales@chromadecksigns-eastrand.co.za

Phone: +32 2 318 5792

Address: Avenue Louise 500, 1050 Brussels, Belgium

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