

CPO Optical Module Packaging Process



Article Overview

CPO optical modules integrate photonic and electronic components directly with ASICs, using advanced packaging techniques to minimize interconnect distances and optimize performance.

Overview of CPO Packaging

Co-Packaged Optics (CPO) is a design approach where optical components (lasers, modulators, photodetectors) are integrated alongside electronic components such as ASICs within the same package, drastically reducing the distance between them from centimeters to millimeters. This integration improves signal integrity, reduces latency, lowers power consumption, and allows higher bandwidths for data center and high-performance computing applications. Unlike traditional pluggable optical transceivers, CPO modules are not hot-swappable; they are tightly integrated assemblies of photonic and electronic components, often referred to as optical engines, designed specifically for co-location with the ASIC.

Key Packaging Steps and Technologies

- **Substrate and Interposer Selection** CPO modules typically use high-density substrates such as silicon interposers or organic packages to support 2.5D or 3D integration. These substrates provide mechanical support and electrical routing for both the ASIC and optical components.
- **Integration of Photonic Components** Photonic Integrated Circuits (PICs) are fabricated using silicon photonics or other photonic technologies. These PICs are then aligned and bonded to the substrate near the ASIC to minimize high-speed electrical interconnect lengths

Article Content

Dec 30, 2025

Implementation Agreement for a 3.2Tb/s Co-Packaged (CPO) Module

ABSTRACT: This Implementation Agreement specifies key aspects and electro-optical-mechanical details of a

Jun 13, 2026

Electronic Chip Package and Co-Packaged Optics (CPO)

Advanced packaging technologies, such as 3D chiplets hetero-integration and co-packaged optics (CPO), have

Jul 22, 2026

Broadcom CPO: Highest Power Efficiency and Bandwidth Density

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

Sep 16, 2025

Electronic Chip Package and Co-Packaged Optics (CPO) Technology

This paper discusses the evolution of both conventional and advanced packaging technologies and outlines future

Jun 18, 2026

What Is Co-Packaged Optics?

Co-packaged optics is an innovative technology that enables the integration of optical components directly into a

Mar 20, 2026

Co-packaged optics (CPO) – A comprehensive overview

Co-packaged optics (CPO) is an innovative technology that has gained significant attention in electronics and optical

Nov 07, 2025

Co-Packaged Optics: Redefining • Santec Holdings

Its performance is especially useful for evaluating components with fine geometries or closely spaced

Jan 06, 2026

Broadcom CPO: Highest Power Efficiency and Bandwidth Density

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

Apr 07, 2026

Understanding Co-Packaged Optics: Revolutionizing

Co-packaged optics (CPO) represents a transformative approach in optical networking,

Jun 08, 2026

Co-Packaged Optic Assembly Guidance Document

1.3. Introduction The CPO JDF plans to release three documents focused on different elements of Co-Packaged Optics (CPO): the

Dec 20, 2025

Comprehensive Overview of CPO (Co-Packaged Optics)

CPO refers to the “co-packaging” with the ASIC chip to minimize electrical signal distances and address significant

Mar 28, 2026

Co-packaged optics (CPO): status, challenges, and solutions

Co-packaged optics (CPO) is a disruptive approach to increasing the interconnecting bandwidth density and energy

Nov 05, 2025

Co-Packaged Optics — a deep dive | APNIC Blog

In summary, Broadcom's solution is a single-package switch with optics embedded, whereas NVIDIA features a novel

Jul 14, 2026

Co-Packaged Optics — a deep dive | APNIC Blog

Fibre patch cords deliver the continuous-wave light from these laser modules into the co-packaged optical engines.

Jun 17, 2026

Co-Packaged Optics (CPO) 2025-2035: Technologies,

IDTechEx's "Co-Packaged Optics (CPO) 2025-2035" explores technical innovations and packaging trends,

Jan 18, 2026

What is Co-Packaged Optics (CPO) Technology? | Corning

Instead of relying on traditional pluggable optics, CPO uses tightly integrated optical and electrical components within the same

Nov 28, 2025

Co-Packaging Framework Document

The third option, "CPO Pigtail + jumper", shows the inclusion of a mid-board optical connector which increases the

May 12, 2026

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

Enter Co-Packaged Optics (CPO), a transformative architecture where the optical engine moves inside the switch ASIC

Jan 05, 2026

Optics Primer, Part 3: Co-Packaged Optics (CPO)

The optical engine is the core of CPO; it converts between the optical and electrical domains. Since the OE is on

Jan 25, 2026

The Rise of Co-Packaged Optics

In this scenario, Co-Packaged Optics (CPO) is now gaining momentum, emerging mainly as an alternative to the

Apr 06, 2026

Testing Considerations for High-Density Co-Packaged Optical Devices

Optics (COBO) are iterating on framework and specification documentation for co-packaged optical device development. At a high

Aug 22, 2025

An Introduction To CPO Technology

In today's conventional packaging, chips and optical modules are packaged separately and then interconnected

Jan 05, 2026

What are Co-Packaged Optics?

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

Contact Us

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