GDR Telecom Site Energy Systems

Stacked chips require optical modules

Overview

As compute chips evolve in AI, HPC, and edge computing, a new generation of processors is emerging that reduces or eliminates the need for traditional optical modules. At GTC 2025, NVIDIA announced two new networking switch platforms - Spectrum-X Photonics and Quantum-X Photonics - based on Co-Packaged Optics (CPO) technology. It features a rectangular shape with two parallel rows of pins (typically ranging from 4 to 64 pins) that extend from both sides of the package, allowing. From Jensen Huang showcasing CPO switches at GTC 2025 to a wide range of vendors demonstrating optical engines integrated inside ASIC packages at OFC 2025, CPOs are everywhere. These chips leverage advanced integration, high-speed electrical connections, and co-packaged optics (CPO) to handle modern. Traditional electronics are assembled as a planar arrangement of components on a printed circuit board (PCB) or other type of substrate. These planar assemblies may then be 'plugged' into a motherboard or card cage creating a 'volume' of electronics. This architecture is common in many military and.

Stacked chips require optical modules

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To meet the demands from the next-generation chip-scale optical networks, future optical power sources must aim to work with minimal lasers and power consumption while meeting the device and layout ...

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 failures — often caused by dust in the ...

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At the next higher level of integration, 2-D modules are being stacked to create 3-D module assemblies. One example of this is the Vertical InteGration for Opto and Radio (VIGOR) subsystems illustrated in ...

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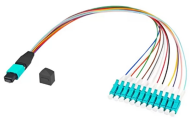
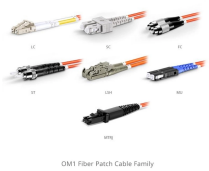


ECTC progress report on enabling technologies, including cooling chiplets, 1µm hybrid bonding, RDL buildups, and co-packaged optics.



For example, precise optical alignment, low-loss waveguide integration, and effective thermal management of densely packed optical and electronic components are all critical challenges ...

The 3D CPO technique is an advanced packaging technology that integrates optical components, such as lasers, photodetectors, and modulators, directly within the same package as ...

Think of this as a 3D stacked configuration where the lasers, waveguides, and optical switching/routing reside in a base layer, on top of which compute or memory chiplets can be mounted.

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