

Optical Interposers for Embedded Photonics Integration

Tech ID: 29474 / UC Case 2017-742-0

ABSTRACT

Researchers at the University of California, Davis and NHanced Semiconductors have developed a new optical interposer solution for embedded photonics that have higher energy efficiency than the current pluggable optics solutions

FULL DESCRIPTION

Data centers, or networked servers for the remote storage, processing, and distribution of large amounts of data, has merited the creation of photonics for high throughput communication. Currently, optical solutions are separate pluggable devices from the input/output (I/O) electronics, limiting energy efficiency and processing speed. Optical interposers that bring close integration of electronics and photonics are of strong interest but current photonic optical interposer design guides do not support close integration between photonics and electronics.

Researchers at the University of California, Davis and NHanced Semiconductors, in consultation with Polytechnic and Analog, have developed a new type of optical interposer than can work within a small proximity between photonics and electronics. This new type of embedded optics technology decreases the distance between the electronics and photonics to less than 1 mm, avoiding impedance effects (capacitance and skin-effect induced high resistance). It uses less energy than existing optical solutions and can self-align, potentially offering cost-effective, low loss, and robust integration in photonic/electronic communication. The silicon photonic interposer would work without the use of high-speed-through-silicon-vias (TSVs), allowing for rapid and efficient data communication within integrated circuits.

APPLICATIONS

- Creation of embedded photonics solutions that work at a closer distance between photonics and electronics that will lead to higher energy efficiency and better bandwidth density

FEATURES/BENEFITS

- Higher bandwidth density possible, which would lead to higher performing data links and improved cloud computing solutions
- Better energy efficiency would allow for the embedded photonics to process more data with the same amount of energy
- Avoid impedance effects (capacitance and skin-effect induced high resistance)

PATENT STATUS

| Country | Type | Number | Dated | Case |
|--------------------------|---------------|----------------------------|------------|----------|
| United States Of America | Issued Patent | 10,859,776 | 12/08/2020 | 2017-742 |

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OTHER INFORMATION

KEYWORDS

optical interposers,
photonics, embedded
optics, electronics,
interchip connections,
cloud computing,
bandwidth density,
input/output electronics,
I/O, high-speed-through-
silicon-vias, TSVs, design
guide, impedance,
integration, integrated
circuit

CATEGORIZED AS

- **Optics and Photonics**
 - All Optics and Photonics

RELATED CASES

2017-742-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Higher-Speed and More Energy-Efficient Signal Processing Platform for Neural Networks
- Crystal Orientation Optimized Optical Frequency Shifter
- Hyperspectral Compressive Imaging
- Multi-Wavelength, Nanophotonic, Neural Computing System
- Athermal Nanophotonic Lasers
- Ultra-High Resolution Multi-Platform Heterodyne Optical Imaging
- Multi-Wavelength, Laser Array
- Ultrahigh-Bandwidth Low-Latency Reconfigurable Memory Interconnects by Wavelength Routing
- Development of a CMOS-Compatible, Nano-photonic, Laser
- Energy Efficient and Scalable Reconfigurable All-to-All Switching Architecture
- Compressive High-Speed Optical Transceiver
- All-Optical Regenerators
- Tensorized Optical Neural Network Architecture
- Silicon Based Chirped Grating Emitter for Uniform Power Emission
- Energy-Efficient All-Optical Nanophotonic Computing
- 3D Photonic and Electronic Neuromorphic Artificial Intelligence
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