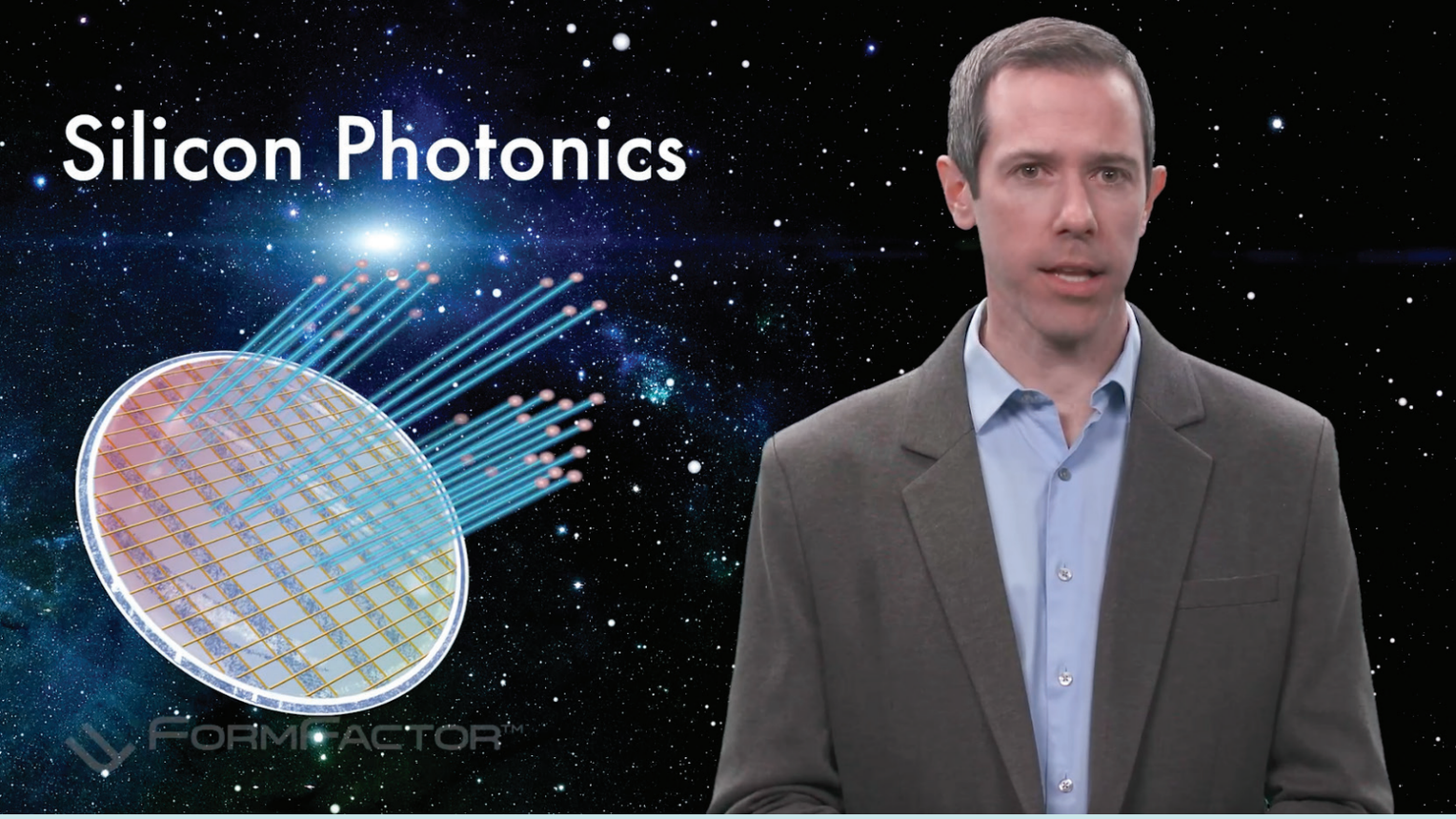


Silicon Photonics Comes of Age

In cloud-level data centers, up to 80% of the data flow never leaves the confines of the center itself. Which means that the cabling within these facilities becomes critically important to maximizing throughput and minimizing energy consumption.

While copper cabling offers certain advantages for short-range data transfers, fiber optics offers significant advantages for longer data connections. It employs a technique called wave division multiplexing, which allows a single strand of cable to carry up to dozens of data channels in parallel with no loss in bandwidth. Also, the cable itself operates without shielding and is both thinner and lighter than copper.

Despite these advantages, fiber optics has had one longstanding drawback. Power-hungry, bulky transceivers have been required to convert electrons into photons and back again along the data path.

Advanced technology to the rescue

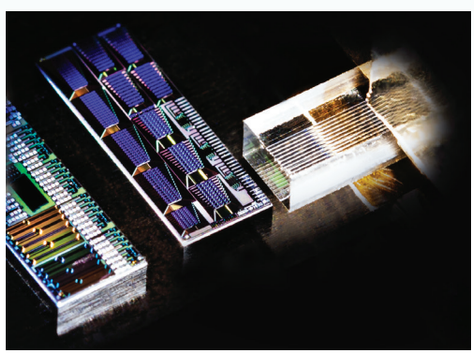
But moving ahead, the recent advent of silicon photonics technology has fueled an exciting breakthrough in price/performance for fiber optics. Critical portions of optical transceivers can now be manufactured entirely in silicon, using the same low-cost, high-volume fabrication processes common throughout the semiconductor industry.

The result? 100GB/sec transmission speeds on chips about half the size of an average thumbnail. When incorporated into transceivers, these inexpensive ICs enable transmission over distances up to two kilometers, enough to accommodate even hyper-scale data centers.

Putting it all to the test

While silicon photonics offers revolutionary breakthroughs in price/performance for data centers, it has also required revolutionary advances in wafer-level testing. A quick look at the general structure of a silicon photonics chip reveals why. On both the transmitter and receiver sides, the chip must interface with light sources in the outside world.

Typically, the light passes through a structure called a diffraction grating, where the multiplexing or demultiplexing functions are performed. At this point, the light occupies a very narrow cone of accuracy. The probing equipment must conform to these strict physical parameters to guarantee accurate measurements – i.e., the system must provide extremely precise positioning of the wafer probes to properly propagate and capture the light going in and out of the silicon photonics device. The challenge multiplies for edge-coupled devices, where the light ports reside in trenches rather than on the wafer surface.



Silicon Photonics Horizontal Die-Level Coupling

From Lab to Fab at the Speed of Light

At FormFactor, we've met this challenge though a new generation of high-speed, full-featured optical probing systems that provide the electrical, optical, and mechanical performance necessary to get new silicon photonics devices from lab to fab in the most timely manner. Our automated solutions provide a complete array of optical alignment hardware and software for both vertical and edge coupling with silicon photonic devices.

We see our work in the field of silicon photonics as just one more demonstration of our commitment to meeting the soaring global demand for increasingly dense communications networks.

To learn more about our silicon photonics solutions please visit formfactor.com/go/siph

FormFactor™
Test insight from lab to fab.

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