

Solutions Brief:

Autonomous Silicon Photonics Measurements

Enabled by Contact Intelligence Technology



By moving data with light -- reducing power levels and decreasing the cost of cooling -- silicon photonics technology is finding early adoption in data center applications. Emerging applications such as automotive LIDAR, are likely to follow. The key to making successful measurements on silicon photonic devices is the integration of probe, positioning and test and measurement technologies.

Silicon Photonics Presents a Whole New Set of Test Issues

Measurement of silicon photonics devices need optical as well as high speed digital capabilities. Fortunately, FormFactor has technology, partners and experience in this burgeoning space. As the technology moves from the niche to the mainstream we have developed relationships that have helped accelerate the learning curve. FormFactor has closely partnered with Keysight and other partners to provide a complete solution for autonomous silicon photonics probing, testing and measuring.

Capabilities Overview



FormFactor's flexible two stage fiber alignment solution has both coarse and high precision piezo-based fine alignment suitable for engineering and production needs.



FormFactor's integrated SiPh solution allows sub-micron manipulation of optical fibers positioned above the wafer, automatically optimizing fiber coupling position. Contact Intelligence uses machine vision technology to automate Theta X, Y and Z axis calibrations and alignments enabling measurements out of the box, reducing what used to take days, weeks or months to a matter of minutes. When combined with autonomous DC and RF, measurement options expand from Optical-Optical to include Photo-Diodes, Optical Modulators and more.

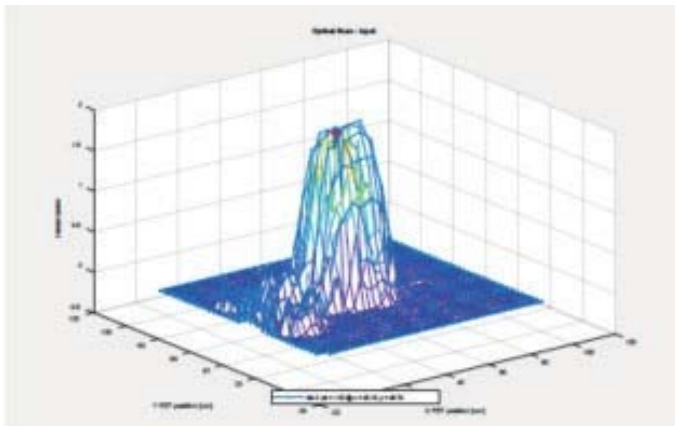
Feature Highlights

- CM300xi 300 mm Automated Probe Station with Optional Material Handling Unit
- 6 Axis Automated Fiber Positioning Solution with High Precision Piezo-based Nanometer Resolution
- Flexible Two Stage Fiber Alignment Solution with Coarse and Fine Align Suitable for Engineering to Production Needs
- Replaceable Fiber Holders for Single Fibers or Fiber Arrays Offered at a Variety of Angles
- Integrated High Precision Z Displacement Technique
- Firmware Driven High Speed Automated Fiber Alignment Algorithms
- FormFactor's SiPh Tools Software Simplifies Integration Tasks, Rapidly Reducing Time to First Measurement
- Integrates Seamlessly with Keysight Optical Instruments for IL and IL/PDL measurements
- Proven Integration and Proven Wafer-Level Measurements

Integrated Optical Probing Solution from FormFactor



Measurements use optical scans to find coupling points where XY axes represent XY position of pixel (fine) positioned during scan, 0-100 μ range. The Z axis represents optical power meter signals transmitted through the DUT. The coordinates of optical “coupling point” are defined by the peak of the surface.



SiPhTools Software Is Key to the Integrated Solution

FormFactor’s SiPhTools application bridges the gap between its Velox and 3rd party applications such as the Keysight Photonics Application Suite—which also runs on the Probe Station PC. Data flows through a central Message Server hub via a single interface to the end user’s Test Executive (e.g. the Keysight Test Automation Platform).

Reducing Test Times and Improving Time to Market

With sophisticated optical alignment algorithms combined with high speed, high precision piezo control, FormFactor’s silicon photonics solution automates optimal fiber coupling position. Enabled by Contact Intelligence, this new solution can rapidly lower test times and improve time to market. The new system provides both the flexibility to operate in a dynamic, engineering environment, as well as the stability and reproducibility required for production test.

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