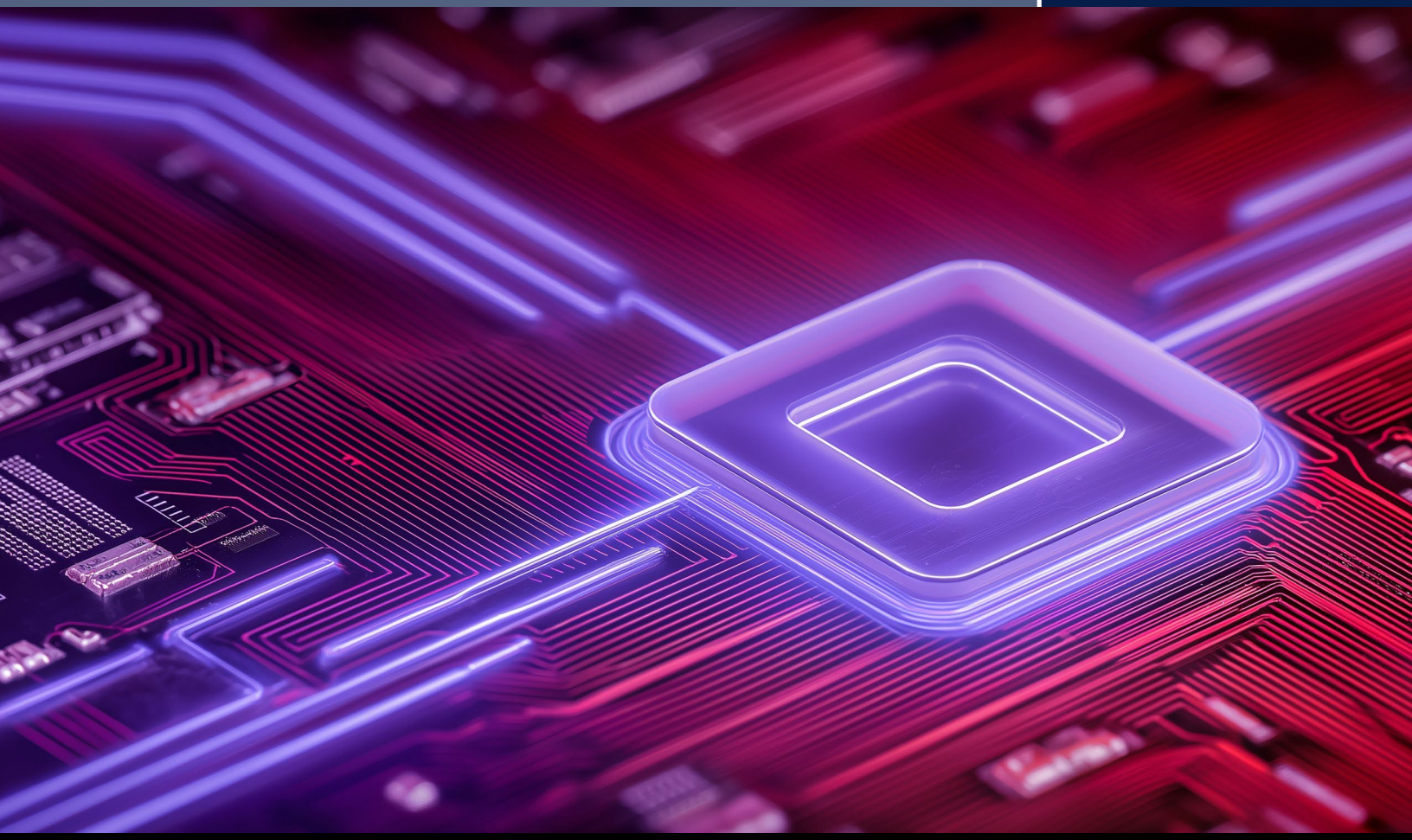
CASE STUDY



GlobalFoundries Connects Silicon Photonics Design to System-Level Validation

Semiconductor | Silicon Photonics

Based on press release June 3, 2026

Keysight Expands Photonics Design Ecosystem with GlobalFoundries PDK

KEYSIGHT

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Global semiconductor foundry with a silicon photonics platform

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GlobalFoundries PDK for Keysight ADS Photonic Designer

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Connect PIC design to system-level validation before tapeout

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Foundry-qualified PDK enabling faster time to first design

Keysight Technologies has added support for GlobalFoundries' (GF) silicon photonics process technology in its Advanced Design System (ADS) Photonic Designer, expanding the foundry ecosystem available for photonic integrated circuit (PIC) development. The integration lets engineers move from PIC design to full electro-optical-electrical (EOE) system simulation within a single environment, validating how photonic circuits will perform at the optical link level before tapeout.

As silicon photonics moves into volume production for data centers, AI infrastructure, and optical communications, designing a PIC is only part of the challenge — engineers must also confirm how that circuit performs within a complete EOE system. Traditional workflows keep these two steps separate, forcing teams to move between PIC design tools and system-level simulation platforms and pushing validation late into the development cycle.

> **Vikas Gupta**
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> **Senior Fellow, Silicon Photonics, GlobalFoundries**
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> As silicon photonics moves into broader deployment for AI infrastructure and high-speed optical communications, designers need workflows that connect device innovation with system-level performance from the start. By enabling our silicon photonics platform in Keysight's ADS Photonic Designer, we're helping customers accelerate development, reduce design risk and scale their optical interconnect solutions more effectively.

The Challenge

As silicon photonics moves into volume production for data centers, AI infrastructure, and optical communications, designing a photonic integrated circuit (PIC) is only part of the challenge engineers face. Traditional design flows treat PIC-level design and system-level performance validation as separate steps, using different tools that were never built to work together.

That separation introduces risk. Design teams often can't confirm how a photonic circuit will behave within a full electro-optical-electrical (EOE) system until late in the development cycle, after tapeout, when errors are the most expensive and time-consuming to fix. Verifying metrics such as eye diagram quality and transmission dispersion eye closure quaternary (TDECQ) typically requires yet another handoff to instrument-based measurement tools.

GlobalFoundries needed a way to give its silicon photonics foundry customers a design environment that connects PIC-level circuit design directly to system-level validation, without forcing engineers to rebuild or recalibrate component libraries from scratch.

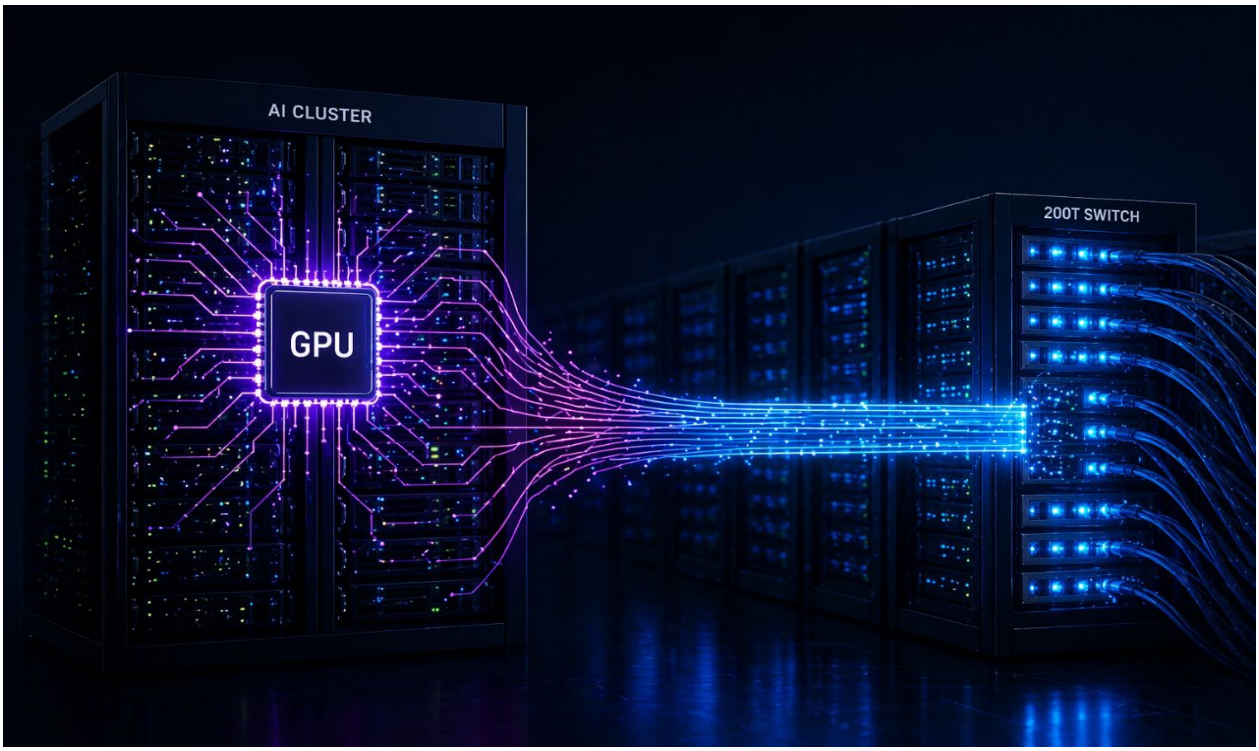


Figure 1. As AI clusters scale, high-speed optical interconnects between GPUs and network switches make system-level validation of photonic links increasingly critical

The Solution

Keysight's PDK for ADS Photonic Designer connects PIC design with system-level EOE simulation on the GlobalFoundries silicon photonics platform. Engineers can design photonic circuits using foundry-aligned, physics-based models, then validate full optical link behavior — including eye diagram analysis and TDECQ signal integrity metrics — without switching tools.

Because the models are built on physics-based simulations aligned to GF's silicon photonics process, PIC simulations correlate closely to fabricated silicon, while system-level validation confirms the desired channel link performance is achieved before tapeout.

The ADS Photonic Designer software gives engineers a single simulation environment for photonic integrated circuit design and full system-level electro-optical-electrical validation, using models built on GlobalFoundries' foundry-qualified process design kit (PDK).

During measurement and validation, engineers designing optical transceivers and co-packaged optics can also use Keysight's FlexDCA oscilloscope software to ensure the best possible simulation-to-measurement correlation, supporting predictive results from design through test.

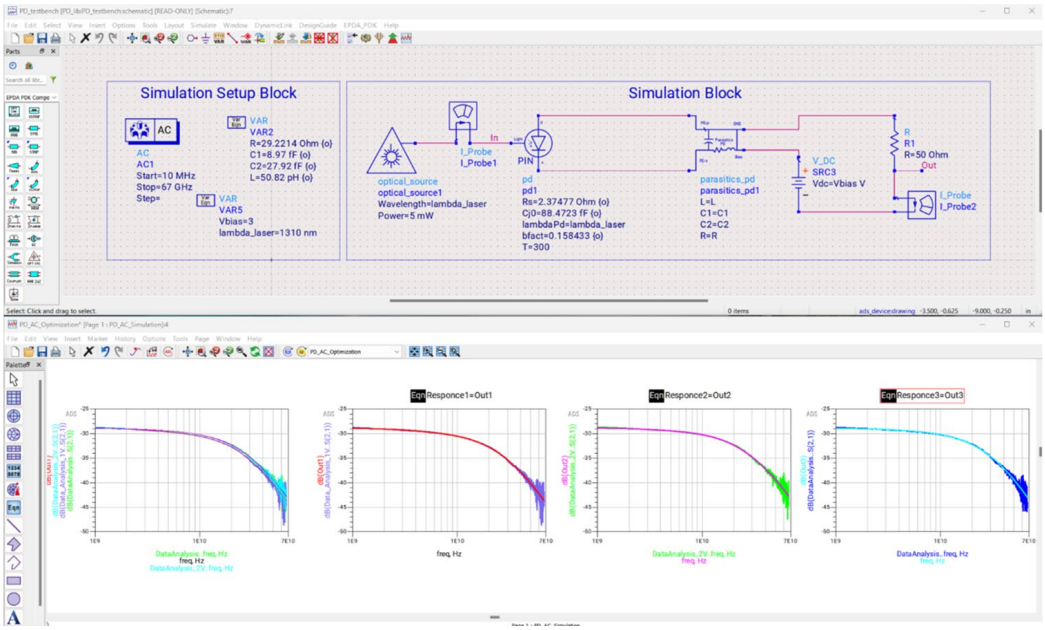


Figure 2. ADS Photonic Designer lets engineers move directly from PIC schematic design to system-level AC simulation, as shown here for a PIN photodetector within a single environment

Results

The GlobalFoundries PDK for ADS Photonic Designer gives engineers foundry-aligned, physics-based models they can use immediately without building or calibrating component libraries from scratch.

By simulating with Keysight instrument software, including FlexDCA-based measurements and TDECQ analysis, engineers reduce design-to-test correlation variables and gain the best possible predictive results before committing a design to silicon. Shifting this system-level insight earlier in the architecture phase can reduce design iterations and time to market.

“The silicon photonics industry has moved past the point where circuit design and system validation can live in separate workflows,” said Niels Faché, Senior Vice President, Keysight’s Design Engineering Software. “Engineers building for AI and data center infrastructure need to see system-level link performance from day one, not after fabrication.”

Conclusion

By connecting PIC design to system-level EOE validation in a single environment, Keysight and GlobalFoundries are giving the silicon photonics industry a more direct path from architecture to tapeout.

As data centers, AI infrastructure, and optical communications continue to scale, workflows that catch performance issues early rather than after fabrication, will matter more, not less. The GlobalFoundries PDK for ADS Photonic Designer is one step toward making that kind of early, system-level insight a standard part of the photonic design flow.

Related Information

- Keysight ADS Photonic Designer (W3803B) product page
- Keysight FlexDCA oscilloscope software page
- GlobalFoundries silicon photonics platform overview
- Keysight Expands Photonics Design Ecosystem with GlobalFoundries PDK, June 3, 2026 press release

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