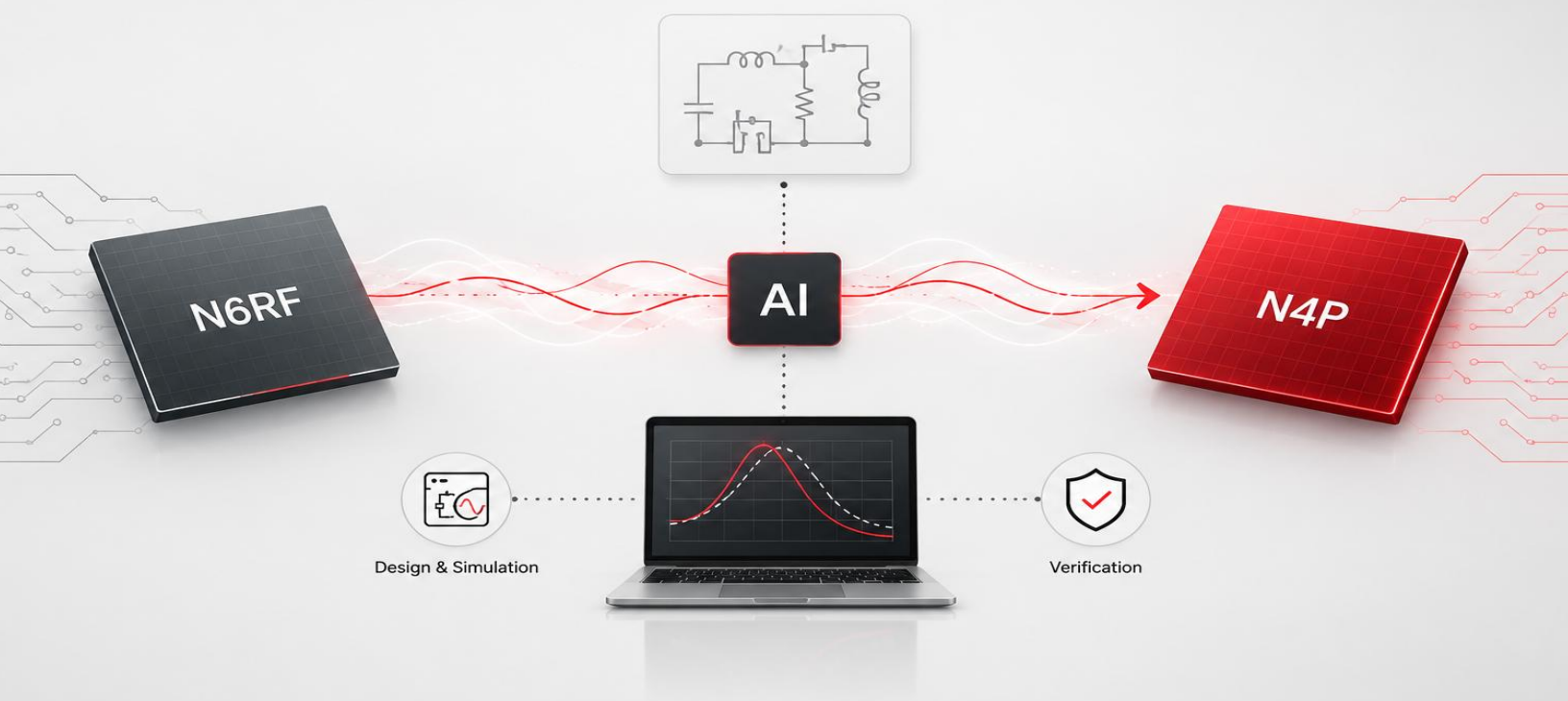




How Synopsys, TSMC, and Keysight Accelerated RF Design Migration Using AI

Semiconductors and RF Design

Based on press release June 5, 2025

Keysight and Synopsys Deliver an AI-Powered RF Design Migration Flow for Transition from TSMC's N6RF+ to N4P Process Node

01**Company**

Synopsys and TSMC collaborated with Keysight to support radio frequency design migration to advanced process technology

02**Solutions**

AI-powered radio frequency design migration flow using Synopsys design solutions, TSMC Analog Design Migration methodology, and Keysight RFPro

03**Challenge**

Accelerate radio frequency design migration from TSMC N6RF+ to N4P while addressing new process design rules and performance requirements

04**Results**

Introduced an integrated workflow designed to expedite migration, streamline passive-device redesign, and support faster time-to-market

As wireless integrated circuits move to more advanced semiconductor process technologies, radio frequency (RF) designers must migrate proven designs while meeting new performance, power, and area requirements. Synopsys, TSMC, and Keysight collaborated to deliver an AI-powered RF design migration flow that expedites migration from TSMC's N6RF+ process to N4P technology.

The flow integrates Synopsys design solutions, TSMC's Analog Design Migration (ADM) methodology, and Keysight RFPro for device parameterization, automated value fitting, and electromagnetic simulation. Together, the workflow helps RF circuit designers reuse existing component intellectual property and streamline migration to advanced process rules.

“**Sanjay Bali****Senior Vice President of Strategy and Product Management, Synopsys**

Our deep collaboration with Keysight Technologies and TSMC enables design teams to boost their productivity with an AI-powered RF design migration flow to accelerate the redesign process and deliver RF designs more efficiently, while achieving the best PPA (Power, Performance, and Area) on TSMC's advanced nodes.

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The Challenge

Radio frequency circuit migration to an advanced process node requires more than copying an existing layout. Designers must adapt passive devices, components, and design parameters to new process rules while continuing to meet power, performance, and area goals.

Analog and RF design migration is often challenging and time intensive because it requires iteration, tuning, and trial and error. As designs move from one process technology to another, device behavior, parasitic effects, and layout-dependent performance can shift in ways that affect the final circuit.

Design teams also need to protect the value of existing component intellectual property. Reusing proven N6RF+ devices and libraries can improve return on investment, but only if teams can migrate them efficiently and preserve design intent in the new technology environment.

For RF circuit designers targeting TSMC N4P technology, the challenge was to create a workflow that reduced manual redesign effort while giving teams the electromagnetic insight needed to tune passive devices and meet advanced process design rules.

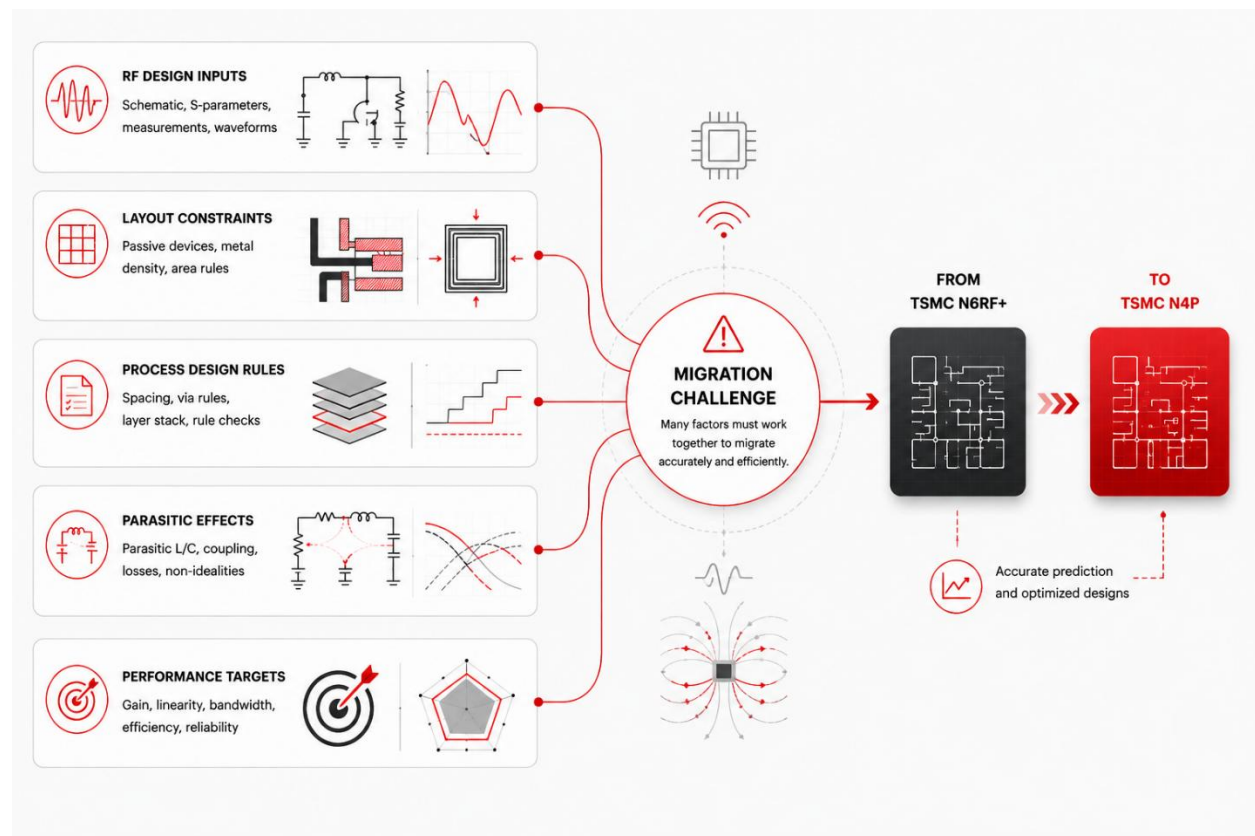


Figure 1. Fragmented RF design inputs create a migration challenge

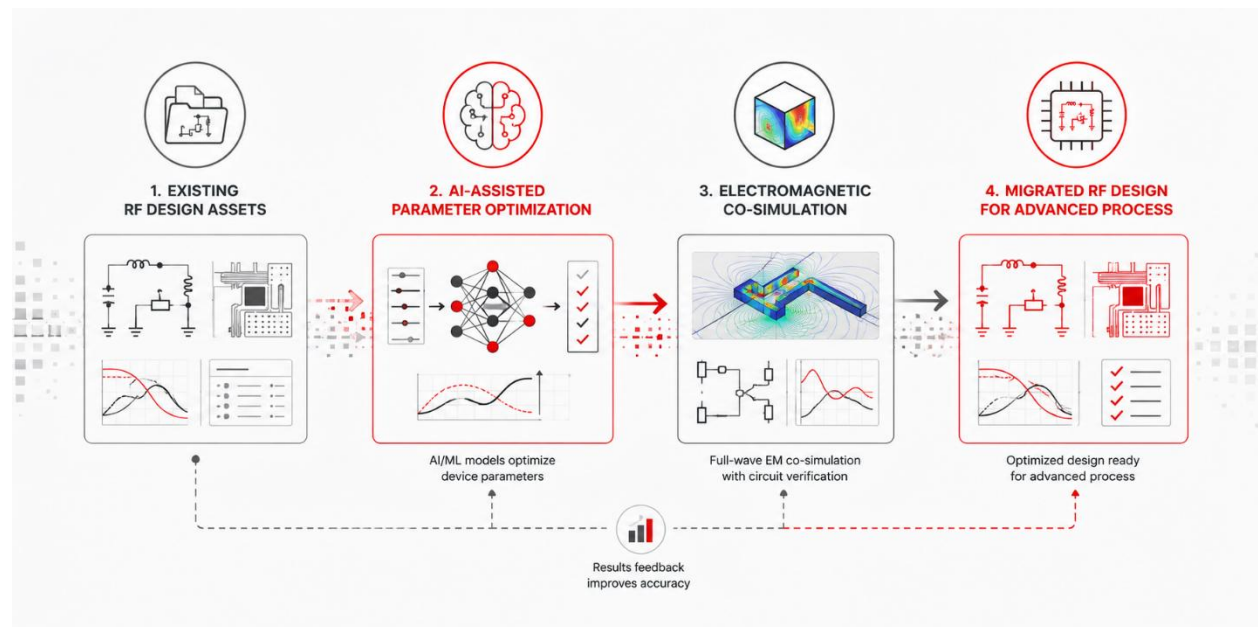
The Solution

The AI-powered RF design migration flow combines Keysight RFPro, Synopsys Custom Compiler with ASO.ai, Synopsys PrimeSim, and TSMC's ADM methodology. The integrated workflow is designed to streamline RF redesign from TSMC N6RF+ to N4P technology.

Synopsys Custom Compiler and ASO.ai support rapid analog and RF migration by identifying optimal design parameters to meet performance metrics. Synopsys PrimeSim provides circuit simulation within the design flow.

Keysight RFPro contributes device parameterization, automated value fitting, and electromagnetic simulation. RFPro enables RF and microwave circuit designers to run 3D electromagnetic-circuit co-simulation for tuning and optimization within familiar design environments.

RFPro also supports automatic extraction of selected nets and components for electromagnetic-circuit co-simulation without altering the layout or schematic. This helps preserve design integrity while integrating electromagnetic results into circuit design for interactive tuning and optimization.



RFPro

Figure 2. AI-assisted RF design migration workflow from discovery through electromagnetic validation

Results

Keysight, Synopsys, and TSMC introduced an integrated AI-powered RF design migration flow to expedite migration from TSMC N6RF+ to N4P technology. The flow brings together RF electromagnetic simulation, AI-driven analog and RF migration, circuit simulation, and TSMC's established migration methodology.

The workflow helps designers streamline redesign of passive devices and components to more advanced RF process rules. It also supports reuse of existing N6RF+ component intellectual property as teams move to N4P technology.

By reducing time-consuming handoffs and enabling designers to work within an integrated flow, the collaboration supports engineering productivity for complex RF chip designs. The result is a more connected path from existing design assets to advanced process implementation.

The work also reflects the importance of ecosystem collaboration in semiconductor design enablement. Keysight contributes electromagnetic simulation and RF design expertise, while Synopsys provides AI-powered migration and design tools, and TSMC offers process technology and ADM methodology.

Conclusion

RF design migration is becoming more important as wireless integrated circuits move to advanced process technologies. Designers need a critical to reuse proven work, adapt to new process rules, and maintain confidence in final circuit performance.

The collaboration between Keysight, Synopsys, and TSMC provides a practical path for AI-assisted RF migration. By combining RFPro electromagnetic simulation with Synopsys AI-powered migration technology and TSMC's ADM methodology, the workflow helps design teams transition existing RF designs to advanced process technology with fewer disconnected steps.

For engineering teams, the value is a more integrated RF design migration flow that brings parameterization, simulation, optimization, and process-rule adaptation into a more connected workflow.

Related Information

- [Keysight RFPro](#)
- [Keysight and Synopsys Deliver an AI-Powered RF Design Migration Flow for Transition from TSMC's N6RF+ to N4P Process Node](#)
- [Synopsys Custom Design Platform](#)
- [TSMC Open Innovation Platform](#)
- [Keysight and Synopsys Deliver an AI-Powered RF Design Migration Flow for Transition from TSMC's N6RF+ to N4P Process Node](#), June 5, 2025 press release



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