

Synopsys, Ansys and Keysight Accelerate 5G/6G SoC Designs with New mmWave Reference Flow for TSMC Process Technology

Flow for TSMC 16FFC Technology Integrates Leading RFIC Design Solutions into Modern Ecosystem Optimized for Power, Performance and Productivity

MOUNTAIN VIEW, Calif., Oct. 26, 2022 /PRNewswire/ -- Addressing the stringent performance and power demands of 5G/6G SoCs, [Synopsys, Inc.](#) (Nasdaq: SNPS), [Ansys](#) (Nasdaq: ANSS) and [Keysight Technologies, Inc.](#) (NYSE: KEYS) today announced the availability of their new millimeter wave (mmWave) radio frequency (RF) design flow for TSMC's 16nm FinFET Compact (16FFC) technology. Mutual customers can take advantage of performance, power, cost and productivity benefits using the open, front-to-back design flow, which consists of modern, industry-leading tools for RFIC designs.

"Semiconductor industry megatrends for wireless communication are increasing RF and mmWave content in HPC, smartphone, automotive, and IoT applications," said Dan Kochpatcharin, Head of Design Infrastructure Management Division at TSMC. "Such complex designs require extensive ecosystem collaboration to help designers achieve silicon success with well-established solutions. The mmWave design reference flow that Synopsys, Ansys and Keysight have developed for TSMC's 16FFC process benefits from its superior performance and power consumption advantage for a tightly integrated solution that enhances productivity and quality-of-results for 5G/6G SoCs."

Why an Open, Modern Design Flow Is Needed for 5G/6G SoCs

Next-generation wireless communications systems must meet a range of requirements, including higher bandwidth, lower latency, better coverage and support for the proliferation of connected devices. High mmWave frequencies, the drive towards miniaturization and increasing design complexity are all creating new challenges for RFIC designers. At the same time, the market's older generation mmWave design solutions were not developed to address the needs of today's 5G/6G SoC designs and mmWave subsystem designs.

The new mmWave design reference flow from Synopsys, Ansys and Keysight was built for today's wireless communications requirements using TSMC's 16FFC technology. The flow takes full advantage of the process' ability to maximize die cost scaling by simultaneously incorporating optical shrink and process simplification. Key components of the flow include the [Synopsys Custom Design Family](#), featuring the [Synopsys PrimeSim™](#) continuum of circuit simulation solutions; multiphysics signoff analysis provided by [Ansys Totem™ Power Integrity and Reliability Signoff](#), [Ansys RaptorX™ Electromagnetic Modeling Family](#), [Ansys Exalto™ Electromagnetic Modeling](#), and [Ansys VeloceRF™ RF Device Synthesis](#); and [Keysight Pathwave RFPro](#) and [RFIC Design \(GoldenGate\)](#) solutions for electromagnetic analysis and circuit simulation.

Industry Leaders Advance 5G/6G SoC Design

"Our modern, open custom design platform provides high-caliber RF and mmWave end-to-end solutions for the design of 5G/6G wireless communication systems, based on our strong partnerships with Ansys and Keysight, and in support of TSMC's Open Innovation Platform® (OIP)," said Aveek Sarkar, vice president of engineering for the Custom Design and Manufacturing Group at Synopsys. "Our mutual customers can use TSMC's 16nm, high-volume RF technology to streamline their circuit designs using the Synopsys Custom Design Family, featuring the RFIC SPICE simulator and the most productive layout capabilities, while leveraging Ansys' multi-physics expertise and Keysight's decades of experience pioneering RF design."

"Today's high-speed designs need to address an increasing range of multi-physics effects to optimize power, area, reliability and performance," said John Lee, vice president and general manager of the electronics, semiconductor, and optics business unit at Ansys. "Ansys is a strong supporter of open and extensible design platforms that enable our customers to use Ansys' signoff technology with all major best-in-class solutions. The collaborative mmWave design reference flow using TSMC's 16FFC technology is a successful example that streamlines access to advanced silicon design and manufacturing for 5G and wireless products by bringing together Synopsys' Custom Design Family with Keysight's premier RF design capabilities and Ansys' multiphysics signoff solutions for power integrity and electromagnetic analysis."

"The mmWave market forecast predicts strong growth over the next several years as 5G goes mainstream and we move into the early stages of 6G development," said Niels Faché, vice president and general manager of Pathwave Software Solutions at Keysight. "Our Pathwave RFPro electromagnetic and GoldenGate circuit simulation tools that have been enhanced to support TSMC process design kit operating directly in Synopsys' Custom Compiler environment provides our mutual customers a complete, fully integrated reference flow."

Customers using our tools in this flow can confidently push the boundaries of mmWave design, knowing that actual on-wafer device measurements have confirmed the accuracy of simulation results for the important Error Vector Magnitude (EVM) figure of merit on the 28 GHz Power Amplifier (PA)."

Learn more by visiting these pages:

- Synopsys Custom Design Family: <https://www.synopsys.com/implementation-and-signoff/custom-design-platform.html>
- Synopsys RF Design Solution: <https://www.synopsys.com/rf-design.html>
- Ansys Multiphysics Signoff: <https://www.ansys.com/products/semiconductors>
- Keysight EDA: <https://www.keysight.com/find/eda-info>

About Synopsys

Synopsys, Inc. (Nasdaq: SNPS) is the Silicon to Software™ partner for innovative companies developing the electronic products and software applications we rely on every day. As an S&P 500 company, Synopsys has a long history of being a global leader in electronic design automation (EDA) and semiconductor IP and offers the industry's broadest portfolio of application security testing tools and services. Whether you're a system-on-chip (SoC) designer creating advanced semiconductors, or a software developer writing more secure, high-quality code, Synopsys has the solutions needed to deliver innovative products. Learn more at www.synopsys.com.

About Ansys

When visionary companies need to know how their world-changing ideas will perform, they close the gap between design and reality with Ansys simulation. For more than 50 years, Ansys software has enabled innovators across industries to push boundaries by using the predictive power of simulation. From sustainable transportation to advanced semiconductors, from satellite systems to life-saving medical devices, the next great leaps in human advancement will be powered by Ansys.

Take a leap of certainty ... with Ansys.

About Keysight Technologies

Keysight delivers advanced design and validation solutions that help accelerate innovation to connect and secure the world. Keysight's dedication to speed and precision extends to software-driven insights and analytics that bring tomorrow's technology products to market faster across the development lifecycle, in design simulation, prototype validation, automated software testing, manufacturing analysis, and network performance optimization and visibility in enterprise, service provider and cloud environments. Our customers span the worldwide communications and industrial ecosystems, aerospace and defense, automotive, energy, semiconductor and general electronics markets. Keysight generated revenues of \$4.9B in fiscal year 2021. For more information about Keysight Technologies (NYSE: KEYS), visit us at www.keysight.com.

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