Synopsys, Ansys and Keysight Collaborate with TSMC to Boost Performance of Autonomous Systems with New mmWave Reference Flow



79-GHz mmWave RF Design Flow for TSMC 16FFC Accelerates Development of Radio-Frequency ICs Used in Autonomous Systems

MOUNTAIN VIEW, Calif., April 26, 2023 /PRNewswire/ -- To accelerate development of advanced radio frequency (RF) and millimeter wave (mmWave) designs with high reliability, Synopsys, Inc. (Nasdaq: SNPS), Ansys (Nasdaq: ANSS) and Keysight Technologies, Inc. (NYSE: KEYS) today announced the availability of the new 79GHz millimeter wave (mmWave) radio frequency (RF) design reference flow for the TSMC 16nm FinFET Compact Technology (16FFC). The mmWave design reference flow enables the implementation of reliable, 79-GHz transceiver integrated circuits (ICs) for advanced autonomous systems that require independent operation without human intervention such as automotive radar, 5G connectivity, security applications and environmental monitors. The reference flow provides companies with the highest levels of performance, security and reliability for mmWave RF systems on TSMC's leading process technologies.

"The modernization of sensing and perception capabilities using advanced mmWave technology is another step towards realizing autonomous systems," said Sanjay Bali, vice president of Strategy and Product Management for the EDA Group at Synopsys. "Our close collaboration with industry leaders including Ansys, Keysight and TSMC provides mutual customers with an open and optimized reference flow that delivers unmatched quality-of-results for advanced mmWave designs."

"TSMC works closely with our ecosystem partners to address increasing challenges in creating advanced RF and mmWave designs for next-generation autonomous systems," said Dan Kochpatcharin, head of the Design Infrastructure Management Division at TSMC. "The result of our collaboration with Synopsys, Ansys and Keysight will help mutual customers achieve design success with an optimized front-to-back design flow that takes full advantage of the power, performance, area and productivity benefits of the TSMC 16FFC technology."

Open, Modern Design Flow Accelerates Autonomous Systems
The new mmWave design reference flow improves the autonomous system's sensitivity and reliability using a 79-GHz transmitter power amplifier design with efficient power conversion, along with a receiver low-noise amplifier design with low-noise figure. The reference flow integrates the following solution into a comprehensive design flow:

- The Synopsys Custom Design Family featuring the Synopsys Custom Compiler™ design environment to address design challenges including silicon aging and reliability, worst-case corner analysis and efficient and reliable layout generation.
- Multiphysics signoff analysis using Ansys VeloceRF™ RF Device Synthesis, Ansys RaptorX™ Electromagnetic Modeling Family, Ansys Exalto™ EM-aware Parasitic Extraction Signoff and Ansys Totem™ Power Integrity and Reliability Signoff tools.
- Electromagnetic analysis and circuit simulation using Keysight Pathwave RFPro and RFIC Design (GoldenGate) tools.

"The need for high-speed frequencies to support next-gen autonomous systems such as navigation, object recognition, decision making and control continues to grow," said John Lee, vice president and general manager of the electronics, semiconductor and optics business unit at Ansys. "The combination of our signoff expertise in chip and system multiphysics,

together with the Synopsys analog and mixed-signal design and verification solutions and RF design expertise from Keysight, results in a robust design reference flow for TSMC's 16FCC process."

"Our close collaboration with Synopsys, Ansys and TSMC gives mutual customers the solutions they need to push the boundaries of RF and mmWave design into applications for autonomous systems," said Niels Faché, vice president and general manager, PathWave Software Solutions at Keysight. "Keysight leverages its long history in high frequency electromagnetic simulation to bring these capabilities to TSMC workflows with this 79-GHz work. We've taken the next step in seamless integration of RFPro with the Synopsys Custom Compiler environment to deliver the highest levels of electromagnetic simulation accuracy and workflow efficiency. RFPro provides electromagnetic analysis and model generation of passive components and critical nets for autonomous systems targeting TSMC's 16FFC process technology. We've also integrated GoldenGate for pre- and post-layout RF simulations and verified the simulation results against TSMC's reference measured data."

Learn more about Synopsys RF design solutions at: [https://www.synopsys.com/rf-design.html]

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 atwww.keysight.com

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