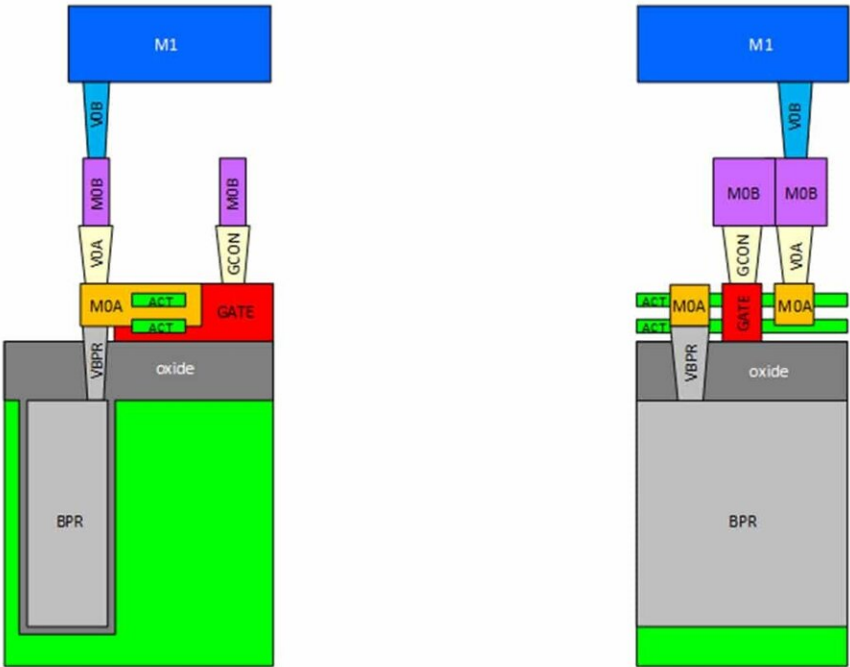


New design kit opens door to next generation of chips

August 30 2021, by Matt Shipman



This image shows a cross-section of what a single transistor looks like in the FreePDK3's vision of a 3nm process (front and side views). The two thin green sheets towards the center are the "stacked transistors" that are mentioned in the press release. Credit: North Carolina State University

Researchers from NC State University and Synopsys are unveiling a new computer chip design kit to facilitate the development of new chips – and are making it freely available in order to encourage growth and

innovation in the field.

"The geometry of transistors has changed dramatically over the past seven years," says Rhett Davis, a professor of computer engineering at NC State who led the project. "Many people say transistors are now only 3 nanometers (nm) long – which isn't actually true. But what is true is that transistors are substantially taller now than they were even seven years ago, and are stacked on each other, creating a complex array of three-dimensional circuit architectures."

"Because chip architecture is so complex, you need specialized tools that enable that level of chip design. Our kit, called FreePDK3, makes that kind of chip design possible," Davis says.

Specifically, FreePDK3 is a set of libraries and scripts that were developed to work with the Synopsys Fusion Design Platform and Synopsys Custom Design Platform to help people design state-of-the-art chips needed to move the field of chip design forward.

"FreePDK3 allows chip designers to explore new ideas, while keeping them within the bounds of what is physically possible," Davis says. "And it is free – no strings attached."

"Our collaboration with academic institutions like North Carolina State University helps nurture the next generation of semiconductor and electronic design engineers—filling a critical demand for new talent in an ever-changing industry," says Patrick Haspel, global program director, Academic Partnerships and University Programs at Synopsys.

"NC State's novel, open-source process design kit represents a compelling example of how our work together provides students with practical experience on advanced technologies that will be beneficial to the industry."

This is not the first free software from Davis's team. In conjunction with Davis's colleague Paul Franzon, the team issued FreePDK45 in 2007 and FreePDK15 in 2014. Those versions of the software have been used for educational purposes at hundreds of institutions, and are referenced in more than 900 scholarly articles and book chapters.

FreePDK3 was developed at NC State with financial and technical support from Synopsys. The NC State team consisted of Davis, graduate students Sushant Sadangi and Viswanatha Pasumarthy, and Shepherd Pitts, an associate teaching professor of electrical and computer engineering. The Synopsys team included Haspel as well as Ron Duncan, Luis Francisco, Yen-Sung Chen, Olaf Schneider and Jonathan White on the technical team.

More information: FreePDK3: github.com/ncsu-eda/FreePDK3

Provided by North Carolina State University

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