



## TSMC Introduces N4X Process

*Newest 5nm Enhancement Tailored for High Performance Computing Products*

**HSINCHU, Taiwan, R.O.C., Dec. 16, 2021** – TSMC (TWSE: 2330, NYSE: TSM) today introduced its N4X process technology, tailored for the demanding workloads of high performance computing (HPC) products. N4X is the first of TSMC’s HPC-focused technology offerings, representing ultimate performance and maximum clock frequencies in the 5-nanometer family. The “X” designation is reserved for TSMC technologies that are developed specifically for HPC products.

Leveraging its experience in 5nm volume production, TSMC further enhanced its technology with features ideal for high performance computing products to create N4X. These features include:

- Device design and structures optimized for high drive current and maximum frequency
- Back-end metal stack optimization for high-performance designs
- Super high density metal-insulator-metal capacitors for robust power delivery under extreme performance loads

These HPC features will enable N4X to offer a performance boost of up to 15% over N5, or up to 4% over the even faster N4P at 1.2 volt. N4X can achieve drive voltages beyond 1.2 volt and deliver additional performance. Customers can also draw on the common design rules of the N5 process to accelerate the development of their N4X products. TSMC expects N4X to enter risk production by the first half of 2023.

“HPC is now TSMC’s fastest-growing business segment and we are proud to introduce N4X, the first in the ‘X’ lineage of our extreme performance semiconductor technologies” said Dr. Kevin Zhang, senior vice president of Business Development at TSMC. “The demands of the HPC segment are unrelenting, and TSMC has not only tailored our ‘X’ semiconductor technologies to unleash ultimate performance but has also combined it with our 3DFabric™ advanced packaging technologies to offer the best HPC platform.”

TSMC’s HPC platform not only offers performance-optimized silicon with N4X technology, but also provides the greatest design flexibility with its comprehensive 3DFabric™ advanced packaging technologies and a broad design enablement platform with our ecosystem partners through the TSMC Open Innovation Platform®.

For more information on the N4X process, please visit <https://performance.tsmc.com>



## About TSMC

TSMC pioneered the pure-play foundry business model when it was founded in 1987, and has been the world's leading dedicated semiconductor foundry ever since. The Company supports a thriving ecosystem of global customers and partners with the industry's leading process technologies and portfolio of design enablement solutions to unleash innovation for the global semiconductor industry. With global operations spanning Asia, Europe, and North America, TSMC serves as a committed corporate citizen around the world.

TSMC deployed 281 distinct process technologies, and manufactured 11,617 products for 510 customers in 2020 by providing the broadest range of advanced, specialty and advanced packaging technology services. TSMC is the first foundry to provide 5-nanometer production capabilities, the most advanced semiconductor process technology available in the world. The Company is headquartered in Hsinchu, Taiwan. For more information, please visit <https://www.tsmc.com>.

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