



GLOBALFOUNDRIES Launches Industry's First 22nm FD-SOI Technology Platform

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22FDX® offers the best combination of performance, power consumption and cost for IoT, mainstream mobile, RF connectivity, and networking

Santa Clara, Calif., and Dresden, Germany, July 13, 2015: GLOBALFOUNDRIES today launched a new semiconductor technology developed specifically to meet the ultra-low-power requirements of the next generation of connected devices. The "22FDX" platform delivers FinFET-like performance and energy-efficiency at a cost comparable to 28nm planar technologies, providing an optimal solution for the rapidly evolving mainstream mobile, Internet-of-Things (IoT), RF connectivity and networking markets.

While some applications require the ultimate performance of three-dimensional FinFET transistors, most wireless devices need a better balance of performance, power consumption and cost. 22FDX provides the best path for cost-sensitive applications by leveraging the industry's first 22nm two-dimensional, fully-depleted silicon-on-insulator (FD-SOI) technology. It offers industry's lowest operating voltage at 0.4 volt, enabling ultra-low dynamic power consumption, less thermal impact, and smaller end-product form-factors. The 22FDX platform delivers a 20 percent smaller die size and 10 percent fewer masks than 28nm, as well as nearly 50 percent fewer immersion lithography layers than foundry FinFET.

"The 22FDX platform enables our customers to deliver differentiated products with the best balance of power, performance and cost," said [Sanjay Jha](#), chief executive officer of GF. "In an industry first, 22FDX provides real-time system software control of transistor characteristics: the system designer can dynamically balance power, performance, and leakage. Additionally, for RF and analog integration, the platform delivers best scaling combined with highest energy efficiency."

22FDX leverages the high-volume 28nm platform in GF's state-of-the-art 300mm production line in Dresden, Germany. This technology heralds a new chapter in the "Silicon Saxony" story, building on almost 20 years of sustained investment in Europe's largest semiconductor fab. GF launches its FDX platform in Dresden by investing \$250 million for technology development and initial 22FDX capacity. This brings the company's total investment in Fab 1 to more than \$5 billion since 2009. The company plans to make further investments to support additional customer demand. GF is partnering with R&D and industry leaders to grow a robust ecosystem and to enable faster time-to-market as well as a comprehensive roadmap for its 22FDX offering.

GF's 22FDX platform enables software-control of transistor characteristics to achieve real time tradeoff between static power, dynamic power and performance. This platform consists of a family of differentiated products architected to support the needs of various applications:

- **22FDX-ulp:** For the mainstream and low-cost smartphone market, the base ultra-low power offering provides an alternative to FinFET. Through the use of body-biasing, 22FDX-ulp delivers greater than 70 percent power reduction compared to 0.9 volt 28nm HKMG, as well as performance equivalent to FinFET. For certain IoT and consumer applications, the platform can operate at 0.4 volt, delivering up to 90 percent power reduction compared to 28nm HKMG.
- **22FDX-uhp:** For networking applications with analog integration, this offering is optimized to achieve the same ultra-high performance capabilities of FinFET while minimizing energy consumption. 22FDX-uhp customizations include forward body-bias, application optimized metal stacks, and support for 0.95 volt overdrive.
- **22FDX-ull:** The ultra-low leakage offering for wearables and IoT delivers the same capabilities of 22FDX-ulp, while reducing leakage to as low as 1pA/μm. This combination of low active power, ultra-low leakage, and flexible body-biasing can enable a new class of battery-operated wearable devices with an order of magnitude power reduction.
- **22FDX-rfa:** The radio frequency analog offering delivers 50 percent lower power at reduced system cost to meet the stringent requirements of high-volume RF applications such as LTE-A cellular transceivers, high order MIMO WiFi combo chips, and millimeter wave radar. The RF active device back-gate feature can reduce or eliminate complex compensation circuits in the primary RF signal path, allowing RF designers to extract more of the intrinsic device f_t performance.

GF has been working closely with key customers and ecosystem partners to enable optimized design methodology and a full suite of foundational and complex IP. Design starter kits and early versions of process design kits (PDKs) are available now with risk production starting in the second half of 2016.

Strong support from Customers and Partners for 22FDX

"GF's FDX platform, using an advanced FD-SOI transistor architecture developed through our long-standing research partnership, confirms and strengthens the momentum of this technology by expanding the ecosystem and assuring a source of high-volume supply," said Jean-Marc Chery, chief operating officer of STMicroelectronics. "FD-SOI is an ideal process technology to meet the unique always-on, low-power requirements of IoT and other power-sensitive devices worldwide."

"Freescale's® next-generation i.MX series of applications processors is leveraging the benefits of FD-SOI to achieve industry leading ultra-low power performance-on-demand solutions for automotive, industrial and consumer applications," said Ron Martino vice president of applications processors and advanced technology adoption for Freescale's MCU group. "GF' 22FDX platform is a great addition to the industry which provides a high volume manufacturing extension of FD-SOI beyond 28nm by continuing to scale down for cost and extend capability for power-performance optimization."

"The connected world of mobile and IoT devices depend on SoCs that are optimized for performance, power and cost," said Will Abbey, general manager, physical design group, ARM. "We are collaborating closely with GF to deliver the IP ecosystem needed for customers to benefit from the unique value of 22FDX technology."

"VeriSilicon has experience designing IoT SoCs in FD-SOI technology and we have demonstrated the benefits of FD-SOI in addressing ultra-low power and low energy applications," said Wayne Dai, president and CEO of VeriSilicon Holdings Co. Ltd. "We look forward to collaborating with GF on their 22FDX offering to deliver power, performance and cost optimized designs for smart phones, smart homes, and smart cars especially for the China market."

"Next-generation connected devices, in markets from wearables and IoT to mobile and consumer, require semiconductor solutions that provide an optimal balance of performance, power and cost," said Tony King-Smith, EVP Marketing, Imagination Technologies. "The combination of GF' new 22FDX technology with Imagination's broad portfolio of advanced IP - including PowerVR multimedia, MIPS CPUs and Enigma communications – will enable more innovation by our mutual customers as they bring differentiated new products to the market."

"FD-SOI technology can provide a multi-node, low-cost roadmap for wearable, consumer, multimedia, automotive, and other applications," said Handel Jones, founder and CEO, IBS, Inc. "GF' 22FDX offering brings together the best in low-power FD-SOI technology in a low-cost platform that is expected to experience very strong demand."

"FD-SOI can deliver significant improvements in performance and power savings, while minimizing adjustments to existing design-and-manufacturing methodologies," said CEA-Leti CEO Marie-Noëlle Semeria. "Together, we can collectively deliver proven, well-understood design-and-manufacturing techniques for the successful production of GF' 22FDX for connected technologies."

"GF' announcement is a key milestone for enabling the next generation of low-power electronics," said Paul Boudre, CEO of Soitec. "We are pleased to be GF' strategic partner. Our ultra-thin SOI substrate is ready for high-volume manufacturing of 22FDX technology."

About GF

GF is the world's first full-service semiconductor foundry with a truly global footprint. Launched in March 2009, the company has quickly achieved scale as one of the largest foundries in the world, providing a unique combination of advanced technology and manufacturing to more than 250 customers. With operations in Singapore, Germany and the United States, GF is the only foundry that offers the flexibility and security of manufacturing centers spanning three continents. The company's 300mm fabs and 200mm fabs provide the full range of process technologies from mainstream to the leading edge. This global manufacturing footprint is supported by major facilities for research, development and design enablement located near hubs of semiconductor activity in the United States, Europe and Asia. GF is owned by the Mubadala Development Company. For more information, visit <http://www.globalfoundries.com>.

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