SAMSUNG FOUNDRY
32/28nm Low-Power High-K Metal Gate Logic Process and Design Ecosystem
Design Enablement

Samsung Foundry offers customers access to a comprehensive ecosystem of design enablement and implementation business partners from the EDA, IP, packaging and design services industries. Customers can tap into services required to solve their most critical design issues. These include:

- **Best-in-class reference flows** from major EDA vendors via the Common Platform alliance of IBM®, Samsung® and GLOBALFOUNDRIES®
- **An extensive IP portfolio** from Samsung and the Common Platform alliance ecosystem including mixed signal/analog, logic and memory
- **Comprehensive libraries** of standard cells, memory compilers and I/Os
- **Predictive DFM solutions** to address yield upstream in the design flow

High-k Metal Gate

High-k dielectric materials with metal gate in the transistor’s gate stack extends the CMOS process technology well beyond 32/28nm. Samsung Foundry, in conjunction with the International Semiconductor Development Alliance (ISDA), tuned its 32/28nm Low-Power (LP) High-k Metal Gate (HKMG) Gate-First process node to achieve an array of benefits and improvements over 45 nm LP Poly-Sion, including:

- 2x gate density increase (Superior area scaling with Gate-First HKMG)
- >100x lower gate leakage
- >40% delay improvement at fixed leakage
- ~10x leakage reduction at fixed speed

Immersion Lithography

First introduced at 45nm, immersion lithography is a critical feature of Samsung Foundry’s 32/28nm process flow. Samsung has the largest installation of immersion lithography tools in the industry, and extensive experience using them in its highly successful memory fabrication.

3D Packaging Technology

Savvy chip companies are closely investigating new packaging solutions as a way to stay ahead of Moore’s Law. Also known as 3D or vertical packaging, through silicon via (TSV) allows chipmakers to increase functionality by vertically connecting components using silicon vias in the packaging process.
Unequaled Customer Benefits

• Advanced process technology
In addition to its own significant process R&D investments, Samsung is actively involved in many joint research and development alliances, including ISDA. As a result, Samsung foundry customers can design innovative products built on the most advanced process platforms.

• Design IP
Samsung has an extensive portfolio of libraries and IP that is available to customers, particularly in the embedded memory and mixed signal areas, including licensed IP from leading companies such as ARM®, Snowbush®, and Synopsis®.

• Manufacturing plant
Maintains advanced 90, 65, 45, 32/28nm production equipment. The Giheung, South Korea foundry serves customers with leading-edge, high-volume manufacturing services.

• Partnerships for multi-sourcing
Along with IBM and GLOBALFOUNDRIES, Samsung is a member of the Common Platform alliance. The three companies provide worldwide multi-sourcing of the same product design to meet customer needs, without any redesign required.

• Extensive customer support
From the initial engagement to volume manufacturing, Samsung’s business, engineering and logistics teams are focused on full customer satisfaction.

• Customer IP protection
Samsung has put firewalls and strict security systems in place to ensure that no unauthorized individuals have any access to customer IP. Customers can audit the system at any time.

• Long-term commitment
Samsung has made the investments in facilities, personnel and time in order for its foundry to succeed over the long term. The company’s executive-level commitment and financial strength are the backbone enabling this approach.
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