Innovative Manufacturing and Process Technologies

Accuracy, Agility and Efficiency

Changing the Way the Industry Manufactures

AMD has developed differentiated manufacturing solutions rooted in the values of accuracy, agility and efficiency to ensure we are consistently providing our customers with the right technologies and solutions at the right time.

AMD Lean Manufacturing closely aligns production to customer demand by streamlining wafer movement through the fab and reducing idle wait time to speed wafers through the production line. AMD Lean Manufacturing has delivered a 72 percent increase in labor productivity in AMD fabs in Dresden, Germany.

Automated Precision Manufacturing (APM) is AMD's unique set of technologies, processes and people that deliver fab efficiency, agility and flexibility. APM's automated decision-making capabilities simultaneously maximize yields for each wafer, optimize performance for the resulting products, reduce waste and lower fabrication costs. APM is used in AMD fabs, as well as in Chartered Fab 7.

Uniquely Rich Collaboration

With our Asset Smart strategy, AMD efficiently combines our strengths with those from key partnerships and alliances. This allows AMD to deliver the best products to our customers in a highly cost-effective manner.

AMD Foundry Partners

- **Chartered** licenses patented APM technology and offers flexible capacity to augment AMD microprocessor production.
- **TSMC** delivers premium AMD graphic products to the market with leading process technologies.
- **UMC** helps AMD manage an increasingly diverse product mix by manufacturing a wide variety of graphic and chipset solutions.

Research and Development Partners

IBM and AMD have collaborated on next-generation semiconductor technologies since the formation of a joint development relationship in 2003. The relationship has been extended twice to include the development of leading process technologies for high-performance, power-efficient microprocessors through 2011 and the 22nm node.

International Venture for Nanolithography (INVENT) at Albany NanoTech develops and deploys nanolithography solutions, including 193nm immersion and Extreme Ultraviolet (EUV) lithography.

Advanced Mask Technology Center (AMTC) supplies the majority of AMD's high-end processing masks for the production of AMD microprocessors in AMD fabs.

Center for Nanoelectronic Technology (CNT) in Dresden, Germany, conducts research and development of process steps for manufacturing high-density memory components, as well as high-performance transistors and other high-performance elements for microprocessors.

Universities and consortia conduct exploratory research of new submicron technologies that are slated for potential use at the 32nm and 22nm technology generations and beyond.

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AMD Fabrication Facilities

Fab 36
AMD began construction of its first 300mm wafer facility in November 2003. Fab 36 first ran silicon in 2005, and began revenue shipments of AMD64 processors in March 2006. Fab 36 is now fully converted to 65nm production.

AMD Fab 36 implements AMD's APM technology for ultimate efficiency. The facility employs approximately 1,000 people. Located in Dresden, a city at the forefront of semiconductor technology, Fab 36 represents a giant step forward in the evolution of AMD manufacturing capabilities.

Fab 38 (formerly Fab 30)
Since production began at Fab 30 in 2000, the facility in Dresden, Germany has been recognized as one of the world's most advanced 200mm wafer production fabs. The fab has consistently been ranked as best-in-class across a growing number of SEMATECH benchmarks.

Fab 38 is ramping down 200mm production and will utilize 300mm capacity to augment Fab 36 output. Fab 38 is expected to operate as a discrete 300mm fab in 2009.

Research and Development: Innovation on a Nanometer Scale

Transistor Scaling

AMD's R&D model incorporates continuous ongoing improvements to our transistor and other submicron technologies to deliver the performance customers are asking for when they need it.

Continuous Transistor Improvement (CTI) makes incremental improvements to AMD's process technology on a regular and consistent basis, often several times over the life of a given node (65nm, 45nm, 32nm and beyond).

Shared Transistor Technology (STT) evolves the next process node by using the most advanced transistor from AMD's previous generation as the starting point for next-generation process technology.

AMD Technologies

AMD uses a variety of highly differentiated materials and technologies in its manufacturing processes.

- **Strained Silicon** increases transistor performance by enhancing the transport properties of the electrical charge carriers in the channel region of the transistor.
- **AMD Silicon-On-Insulator (SOI) Technologies** deliver higher performance at lower power.
- **Ultra Low K Dielectrics** reduce interconnect capacitance and wiring delay to further improve microprocessor performance while lowering power dissipation.
- **High-K Metal Gates** provide AMD with an important tool to further improve performance and power efficiency at 32nm and potentially 45nm.
- **Immersion Lithography** uses ultra pure water to fill the space between the lens of the lithography system and the wafer to enhance precision and quality.

By combining these processes with the unmatched control and flexibility of APM, AMD is able to rapidly introduce the most advanced and highest value submicron technologies at the right time for customers.

65nm: AMD began shipping 65nm parts in volume in December 2006. Fab 36 is fully converted to 65nm production.

45nm: AMD is on plan to begin ramping production of 45nm products in the first half of-2008. 45nm AMD products are expected to be available in the market in the second half of 2008.