

New silicon germanium technology blooms at IBM

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New technology for silicon germanium processors promises to reduce the cost of mobile consumer products, advance high-bandwidth wireless communications, and push such innovations as collision-avoidance automobile radar.

IBM today announced the availability of its fourth generation silicon germanium foundry technology, named 8HP -- with over 2X performance of the previous generation. The new 130 nanometer (nm) silicon germanium (SiGe) bipolar complementary metal oxide semiconductor (BiCMOS) foundry technology can reduce the cost of mobile consumer products, advance high-bandwidth wireless communications, and help enable innovative new applications such as collision-avoidance automobile radar.

Along with 8HP, IBM is offering a lower cost variation (8WL) specifically targeted at wireless applications that can enable longer battery life and increased functionality in cellular handsets in order to help proliferate wireless local area networking and global positioning satellite (GPS) technology.

"Silicon germanium technology is increasingly influencing next generation consumer devices and applications," said Bernie Meyerson, Chief Technologist for Systems & Technology Group, IBM. "IBM introduced the technology in 1989 to allow chip designers to increase computer performance. Over the years, SiGe revolutionized the wireless industry by providing a high volume Silicon-based technology. The

fourth generation of SiGe will continue to enable wireless connectivity on an increasingly global scale."

IBM was the first foundry in the world to offer SiGe BiCMOS technology and since 1995, has shipped hundreds of millions of SiGe devices. CMOS chips are the foundation for digital computing applications, while silicon germanium (SiGe) BiCMOS chips provide enhanced radio frequency communications and analog functions in addition to the core digital computing capabilities.

IBM's new 130nm SiGe BiCMOS technology's application to products includes:

- Emerging safety systems for automobiles, including radar at 24 GHz for blindside detection and at 77 GHz for collision warning or advanced cruise control.
- 60 GHz Wi-Fi chips, for next-generation wireless personal-area networks and backbone nets.
- Software defined radios for cellular handsets which convert signals from the antenna directly into a digital form. A single-chip can be applied across multiple standards and various global mobile networks to transmit voice, data, and video signals.
- High-speed A/D and D/A converters for data acquisition, direct-to-baseband radio receivers, signal synthesis, and more.

"Tektronix has been a SiGe early access partner with IBM for nearly ten years, and was one of the earliest adopters of SiGe for its products. The inclusion of SiGe 5HP and 7HP technology in Tektronix' products has enabled a portfolio of world class, award-winning products," said Dave Brown, Vice President, Central Engineering, Tektronix. "Our relationship with IBM has been successful due to the consistent quality of their technology models, processes and documentation as well as the quality of the people we work with."

At 130 nanometers (or 130 billionths of a meter), IBM's new SiGe BiCMOS technology delivers higher performance, lower power and higher levels of integration than current 180nm SiGe offerings. The technology maintains compatibility with IBM's application specific integrated circuit (ASIC) technology platform, enabling foundry clients to port a wide range of intellectual property circuit blocks and standard cell library elements. The 130nm foundry platform also includes an RF CMOS technology option, giving IBM foundry customers a broad range of technology choices for RF and mixed-signal applications.

"Sierra Monolithics has selected IBM's SiGe8HP technology for demanding applications such as highly-integrated ultra-high-speed fiber optic components, high performance data converters and 60GHz broadband wireless transceivers," said Charles Harper, chairman, Sierra Monolithics. "IBM leads the industry in SiGe technology which enables our designers to get to market first with products of unprecedented performance. We are excited about the new performance regimes and application spaces that we can go after with this next generation."

Additional technical specifics include:

- 130nm Lithography based SiGe BiCMOS
- Advanced SiGe NPNs, Emitter width= 120nm, $F_t = 200$ GHz (8HP), $F_t = 100$ GHz (8WL)
- 130nm CMOS FETs, 1.5 / 2.5v
- Copper Global Wiring Levels + Thick Aluminum Top Level Metal
- Full Suite of Passives-Resistors, Varactors, MOS and MIM Capacitors, High Q Inductors
- Process Design Kits featuring precision RF device models

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