

Telecom & Networking

Leaders in telecom and networking are turning to SOI-based solutions to enhance performance and functionality, to decrease power consumption, to help integrate multiple functions on a single chip, and to decrease complexity.

The Power of Mobile



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The market leader in RF power amps for mobile phones, RFMD is working with **Jazz** on an SOI-based solution for the next generation of handsets.

RFMD (North Carolina, USA) is a global leader in the design and manufacture of high-performance radio systems and solutions for applications that drive mobile communications. In particular, RFMD supplies nearly 50% of all RF power amplifier (PA) modules used in cellular handsets.

Currently, these cellular PA modules use a combination of technologies:

- ▶ GaAs HBT or PHEMTs for the RF power amplifiers,
- ▶ high voltage silicon CMOS for the power management,
- ▶ and GaAs PHEMT technology for the RF high power switches.

The challenge, however, is that next generation (3G/4G) multi-band multi-mode systems will require several additional PA functions, which

“ This is the first time such integration has ever been demonstrated for a cellular PA module. ”

creates a definite problem from a size, cost and technology proliferation point of view.

Three functions, one cost-effective die

RFMD, in joint collaboration with **Jazz Semiconductor (California, USA)**, has developed a silicon SOI-based technology to potentially integrate all of these three key PA module functions (amplification, power management and RF switching) into one monolithic and cost-effective die.

This technology utilizes what we call ‘Thick Film Silicon-on-Insulator’ (TF-SOI) substrates engineered by Soitec.

Because these three key RF functions require a high degree of RF isolation amongst themselves, the substrates are also built on high resistivity (HR) (1 kOhm-cm) silicon substrates. In addition to isolating the silicon semiconductor devices, the high resistivity substrates also allow us to obtain superior performance for our integrated passive components, like capacitors, resistors

and transmission lines.

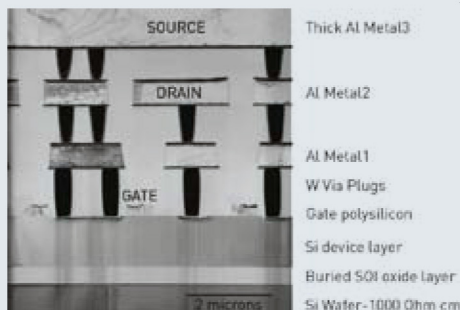
The technology was presented at the recent 2007 International Microwave Symposium in Hawaii in two separate papers.

“ Expect very exciting news from RFMD regarding this TF-SOI technology effort in the near future. ”

TF-SOI: comparable to GaAs

Our TF-SOI technology includes the integration of an RF Power LDMOS transistor capable of nearly comparable linear and saturated RF power characteristics to GaAs solutions in the frequency range between 0.8-2.4GHz.

At this time, we are working very actively in the characterization of these highly integrated PA circuits. Expect very exciting news from RFMD regarding this TF-SOI technology effort in the near future!



◀ Figure 1. TEM cross section of this integrated LDMOS RF power device, showing the different layers used to build the device as well as the Soitec TF-SOI substrate.

▶ Figure 2. Picture of a die built on this technology, which integrates a quad band PA, the power management control circuitry and the Transmit/Receive switch into one single die. This is the first time such integration has ever been demonstrated for a cellular PA module.

