

Philips breaks through Wideband-CDMA basestation efficiency barrier

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Royal Philips Electronics today announced a major advance in Laterally Diffused MOS (LDMOS) technology that for the first time will allow Wideband-CDMA (W-CDMA) basestation manufacturers to break through the 30 percent efficiency barrier for RF power amplifier output stages. The rollout of W-CDMA cellular infrastructures for the delivery of advanced multi-media and data services has created a high demand for efficient basestation amplifiers that combat the inherent power inefficiencies of W-CDMA systems. By achieving an RF power output efficiency of more than 30 percent, Philips' new fifth-generation LDMOS technology raises W-CDMA efficiency by as much as 4 percent, compared to currently available volume LDMOS technologies. Using this technology for W-CDMA basestations, RF power amplifiers can therefore reduce the power consumption by more than 15 percent, lowering operating costs and reducing dissipated power and cooling.

Fabricated on the company's own advanced 0.14-um CMOS megafab production lines, Philips' next-generation LDMOS technology produces RF power transistors with a feature size of 0.4-um and four-layer metalization, giving them a unique combination of high operating efficiency, high gain and excellent linearity. The technology is applicable across all frequency bands from 800 MHz to 2.2 GHz. In addition to the advantages accrued in W-CDMA systems, the high gain (17 dB) and efficiency of Philips' fifth-generation LDMOS devices also make them suitable to higher performance RF power amplifiers for 1-GHz and 2-GHz GSM/EDGE and CDMA basestations.

“This new LDMOS technology provides significant benefits for the design and operation of RF power amplifiers,” said Rick Dumont, marketing manager for LDMOS RF power devices at Philips Semiconductors. “Philips’ fifth-generation LDMOS is a major breakthrough that has been achieved in an extremely short timeframe and represents the best performance yet announced for a basestation LDMOS RF power technology. It further establishes Philips as one of the world’s leading suppliers of RF semiconductor power products.”

The Aluminum-Copper (AlCu) metalizations used in fifth-generation LDMOS transistors, which replace the gold metalizations used on Philips’ previous-generation devices, retain similar levels of reliability. Compared to the two-layer Al metalizations used in competitors’ devices, these extremely thick and wide AlCu metalizations offer a four-fold increase in reliability and significantly reduce the transistors’ parasitics. Enhanced reliability allows designers to run the junctions of Philips’ fifth-generation LDMOS transistors at temperatures up to 25 K (degrees Kelvin) higher than conventional devices, while the reduced parasitics improve RF performance. The ability to operate the junctions at elevated temperatures and a transistor design that reduces junction-to-case thermal resistance to less than 0.5 K/W (degrees Kelvin per watt) allow basestation amplifiers to be developed with smaller, lower-cost heatsinking. The high gain of fifth-generation LDMOS transistors (typically greater than 17 dB) also minimizes power dissipation and circuit complexity in driver stages.

Philips is the first company to have a 0.4-um LDMOS RF power transistor technology in volume production, with the company’s first devices targeting UMTS and 2-GHz PCS/DCS bands. The BLF5G22-100, for example, is a W-CDMA transistor with 17 dB gain, an ACLR5 of -39 dBc, an operating efficiency of 30 percent at an average power output of 26 W, and a peak output power of over 160 W (all figures quoted for two-carrier W-CDMA operation, 10 MHz spacing

and PAR of 8.5 dB at 0.01 percent probability on CCDF).

Philips will exhibit its fifth-generation LDMOS technology at the 2004 International Microwave Symposium (June 8 – 10, Fort Worth, Texas, USA) at booth number 181. The first fifth-generation LDMOS RF power products will be sampled in Q4 2004, and volume production is scheduled to start in Q2 2005. More information can be found at www.philips.com/rfpower.

Find the original press release here: www.semiconductors.philips.com

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