# Breakthrough in CMOS-based transceivers for MM-wave radar systems

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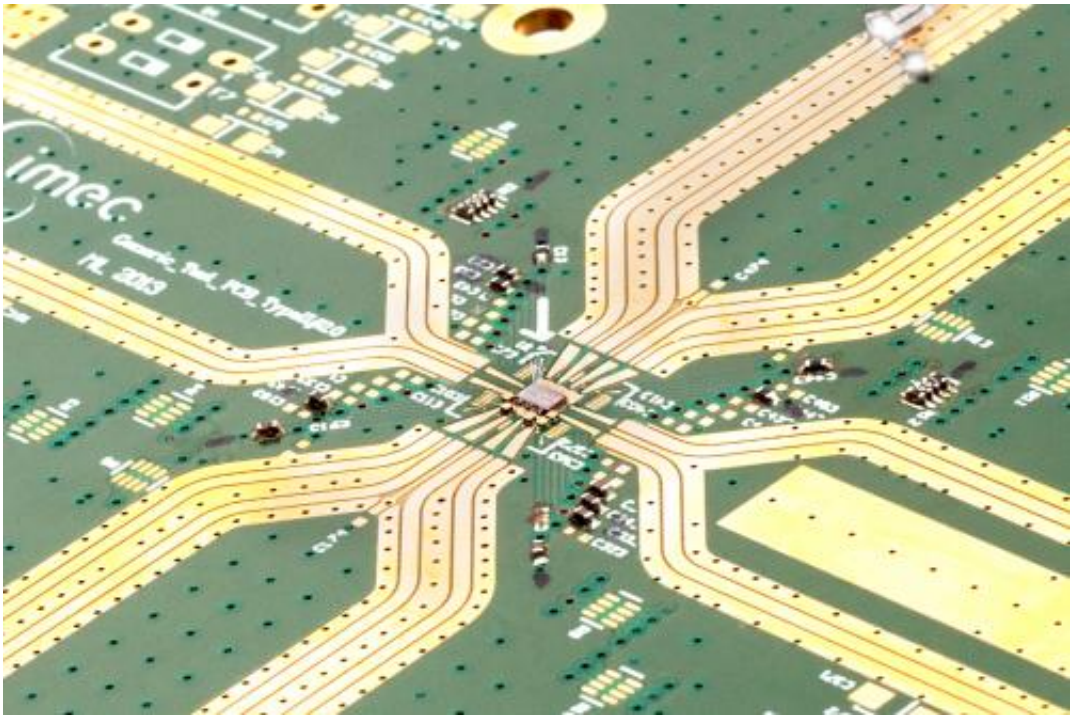


28nm CMOS 79GHz Transceiver Chip for Phase-Modulated Continuous-Wave Radar.

Today, at the 2015 International Solid State Circuits Conference (ISSCC), imec and Panasonic presented a transceiver chip for phase-modulated continuous-wave radar at 79GHz. This achievement demonstrates the potential of downscaled CMOS for cheap millimeter-wave (mm-wave) radar systems that can be used for accurate presence

and motion detection.

Mm-wave radar technology is used in advanced driver assistance systems (ADAS) to improve safety in blurry conditions such as dust, fog and darkness, where image-based driver assistance systems lack robustness. It also offers longer range, higher precision and invisible mounting capabilities compared to ultrasound sensors. Imec's 79GHz radar solution is based on advanced (28nm) CMOS technology, and it is an attractive alternative to the current SiGe-based technology as it offers a path to a low-power, compact and integrated solution. Moreover, at the expected high manufacturing volumes, CMOS technology is intrinsically low-cost.

Imec's and Panasonic's transceiver chip contains a control loop to suppress the spillover from the transmitter into the receiver without affecting the RF performance. With a power consumption of 260mW, the output power of the transmitter is 11dBm, while the RX gain is 35dB with a noise figure below 7dB and a TX-to-RX spillover suppression of 15dB. Thanks to the wide modulation bandwidth, the achievable depth resolution is 7.5cm.

"We are pleased with these excellent performance results on 28nm CMOS technology, and excited about the new opportunities they present for mm-wave radar systems, not only for automotive radar, but also for other applications such as smart homes, unmanned aerial vehicles (UAVs), robotics and others." stated Wim Van Thillo, program director Perceptive Systems for the Internet of Things at imec. "This transceiver chip is an important milestone we have realized in our pursuit of a complete high-performance radar system fully integrated onto a single chip."

Provided by IMEC

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