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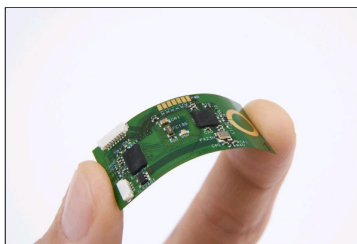
## IMEC reports ultra-thin chip embedding for wearable electronics

LEUVEN, BELGIUM – March 10, 2009 – At today's Smart Systems Integration Conference in Brussels (Belgium), technologists from IMEC and its associated laboratory at Ghent University present a new 3D integration process enabling flexible electronic systems with a thickness of less than 60 micrometer. This ultra-thin chip package (UTCP) technology allows integrating complete systems in a conventional low-cost flex substrate. This paves the way to low-cost, unobtrusive wearable electronics for e.g. wearable health and comfort monitoring.

For the integration, the chip is first thinned down to 25 micron and embedded in a flexible ultra-thin chip package. Next, the package is embedded in a standard double-layer flex printed circuit board (PCB) using standard flex PCB production techniques. After embedding, other components can be mounted above and below the embedded chip, leading to a high-density integration.

The integration process uses UTCP interposers which solve the "Known Good Die" issue by enabling easy testing of the packaged thin dies before embedding. Expensive high-density flexible substrates can be avoided by the fan-out UTCP technology which relaxes the interconnection pitch from 100µm or lower to 300µm or more, compatible with standard flex substrates.

IMEC demonstrates the integration technology with a prototype flexible wireless monitor that measures the heart rate (electrocardiogram or ECG) and muscle activity (electromyogram or EMG). The system consists of an embedded ultra-thin chip for the microcontroller and analog-to-digital convertor, an ultra-low power biopotential amplifier chip and a radio transceiver. By thinning down the chips for UTCP embedding, they become mechanically flexible resulting in an increased flexibility of the complete system, making it unobtrusive and comfortable to wear.



Caption: IMEC's flexible wireless monitoring system for vital body parameters with embedded microcontroller chip.

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**About IMEC**

IMEC is a world-leading independent research center in nanoelectronics and nanotechnology. IMEC vzw Leuven, Belgium, has a sister company in the Netherlands, IMEC-NL, offices in the US, China and Taiwan, and representatives in Japan. Its staff of more than 1650 people includes about 600 industrial residents and guest researchers. In 2008, its revenue (P&L) was estimated to EUR 264 million.

IMEC's More Moore research aims at semiconductor scaling towards sub-32nm nodes. With its More than Moore research, IMEC looks into technologies for nomadic embedded systems, wireless autonomous transducer solutions, biomedical electronics, photovoltaics, organic electronics and GaN power electronics.

IMEC's research bridges the gap between fundamental research at universities and technology development in industry. Its unique balance of processing and system know-how, intellectual property portfolio, state-of-the-art infrastructure and its strong network worldwide position IMEC as a key partner for shaping technologies for future systems.

Further information on IMEC can be found at [www.imec.be](http://www.imec.be).

**Contact**

Katrien Marent, Director of External Communications IMEC- [katrien.marent@imec.be](mailto:katrien.marent@imec.be)  
- T: +32 16 28 18 80 - Mobile : +32 474 30 28 66