1 *Packaged photo cells*

MINIATURIZED SOLAR CELLS
ENERGY HARVESTING MADE EASY BY CUSTOMIZED PROCESS DEVELOPMENT

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In order to optimally utilize technologies as smart dust, »internet of things«, sensor transponders or wireless sensor networks, electronic units have to be powered by locally generated or received energy. This energy can be generated e.g. by electromagnetic fields, thermal gradients, mechanical vibrations or by light. The generation of energy has to be efficient, cost effective and miniaturized.

Since light is available at many places and in large amounts, a straight forward approach is to use energy harvesting from light. Fraunhofer IMS has implemented – as a customized development for its industrial partner SolChip – a novel process, that enables the application of a solar cell on top of a CMOS-ASIC. The developed process is fully CMOS compatible. The solar cell is deposited directly on the surface of a CMOS-ASIC and generates the power to drive the circuit.

The generated voltage and current depends on the available area, the efficiency of the cell and the wiring of individual cells. As an inherent advantage of this approach the necessary DC-DC converter for the generation of the operating voltage can be designed optimally with high efficiency. The novel technology enables a lot of innovative applications as sensor transponders for continuous monitoring of indoor climate, electronic contacts for surveillance of window position and many other applications.

With the aid of the professionally equipped MST-Lab&Fab Fraunhofer IMS conducts development projects in the field of energy harvesting adapted to the specific demands of the customer and can also perform the pilot production subsequently.