



FRAUNHOFER IMS

INNOVATION ON SILICON

The Fraunhofer IMS in Duisburg has more than 30 years of experience and proven expertise in microelectronic circuits and systems. In the area of system engineering the focus lies on wireless and embedded systems such as sensor transponder tags, transponder readers, and sensor networks. In the business field of pressure sensor systems the Fraunhofer IMS has detailed know-how, tools and laboratory equipment to offer an innovative and state of the art pressure sensor technology. Goal of the business field is the development and production of CMOS integrated pressure sensors for customer specific applications and their transfer to the industry.

Numerous projects have been successfully completed, thus creating innovative products, e.g. for medical, smart building and industrial applications.

The Fraunhofer IMS is certified according to DIN EN ISO 9001:2008. Furthermore, the CMOS line is certified according to ISO/TS 16949.

Fraunhofer Institute for Microelectronic Circuits and Systems IMS

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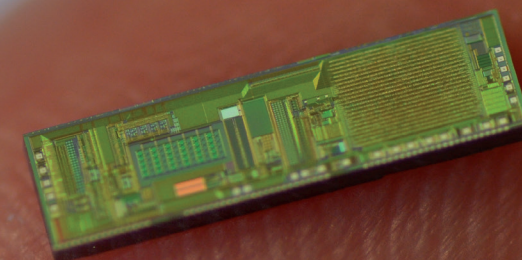
Head of Business Segment

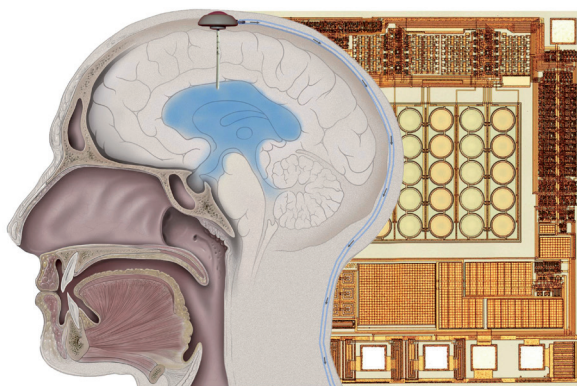
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PRESSURE SENSOR SYSTEMS





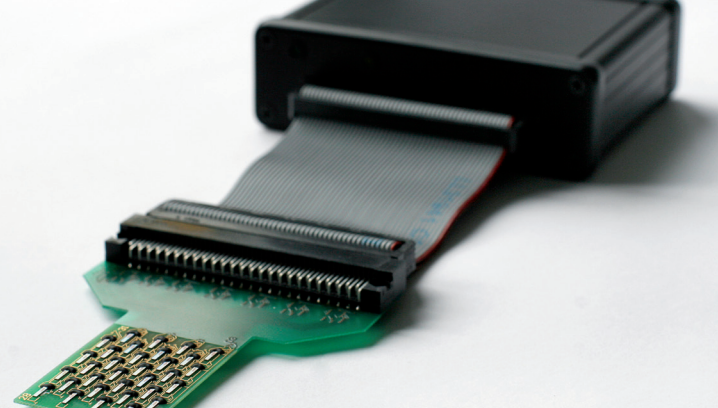
PRESSURE SENSOR SYSTEMS

The trend in microelectronics is toward ever smaller sensors, even in pressure sensor technology. Our customer-specific developments are not only energy efficient and capable of high performance, but due to their minimal size, implantable in the human body if required.

For this reason beyond classic applications for pressure sensors, new fields are opened up, particularly in medical engineering. By producing these sensors as integrated capacitive absolute pressure transducers in surface micromachining, a connection with any kind of signal processing is possible. Our miniaturized pressure transponders can be used for metrological applications in the industry, such as measuring tire pressure in the automotive section, but also for filigree usage as needed in medical implants.

Due to the integration of the sensor and signal in one ASIC, the Fraunhofer IMS is able to respond to all possible requirements and applications and can offer customized solutions for the future.

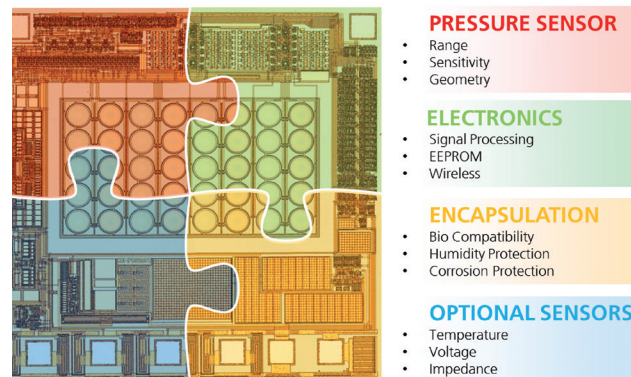
The patented IMS capacitive absolute pressure sensor process based on surface micromachining offers the capability for monolithic integration and a low power feature. For several applications CMOS circuitry single-chip sensor transponders have been developed. Samples of developments and products are shown in the figures above. There are shown from left to right: a shunt sensor for intracranial pressure measurement, a tactile array of wired pressure sensors and a wireless transponder system.



SERVICE AND KNOW-HOW

Supply and services / technologies:

- Customized development of capacitive pressure transducers
- Measuring range from only a few mbar up to 600 bar
- Various design options:



- Transponder ability due to low energy requirements
- Temperature sensor for compensation
- Customizable digital and analog circuit design
- Production and supply of prototypes and series devices
- Individual encapsulating, assembling and packaging
- Sensor calibration and test



ACTIVITIES

Application Examples:

Industrial and automotive applications

- Wireless tire pressure measurement system for vehicles
- Wireless sensors for hydraulic applications
- Barometric pressure sensors
- Pressure measurement systems for vacuum insulation panels

Medical applications

- Wireless implant systems for
 - intracranial pressure measurement
 - controlling of hemodynamics / blood pressure
 - portal-venous pressure measurement in gastroenterology
 - Eye pressure transponder system for glaucoma
- Pressure monitoring of heart pump

Research and Development:

Technologies

- Ultra low pressure sensors
- High pressure sensors
- High temperature pressure sensors up to 300°C
- Capacitive and resistive sensor elements

Post processes

- Shielding techniques using Atomic Layer Deposition
- Pressure sensor thinning, bonding, separating