



FRAUNHOFER IMS

INNOVATION ON SILICON

Fraunhofer IMS in Duisburg has more than 30 years of experience and proven expertise in microelectronic circuits and systems. Beside CMOS circuit development and wafer processing, including MEMS based sensor systems, Fraunhofer IMS also offers solutions in the field of high temperature integrated circuits and sensor systems.

Numerous applications require high temperature electronics to allow placement of circuitry in close proximity to sensor or actor elements. In the field of oil and gas exploration as well as geothermal development high temperature electronics are already in use. An increasing number of other fields of application like aerospace, industrial electronics or automotive are now also demanding for high temperature integrated circuits.

Fraunhofer IMS provides solutions based on their High Temperature SOI CMOS technology. This dedicated technology allows the realization of integrated circuitry for use in harsh environments with an extended operating temperature range up to 300 °C. A minimum feature size of only 0.35 μm enables the integration of even complex systems such as microcontrollers.

Fraunhofer Institute for Microelectronic Circuits and Systems IMS

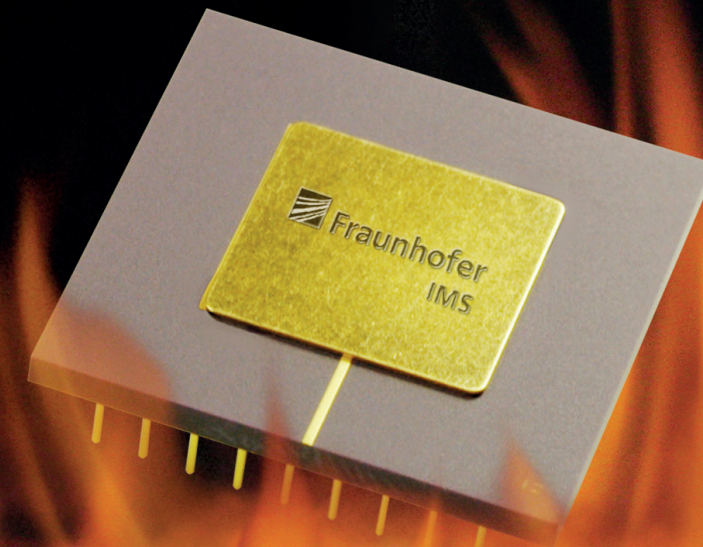
Finkenstraße 61
47057 Duisburg

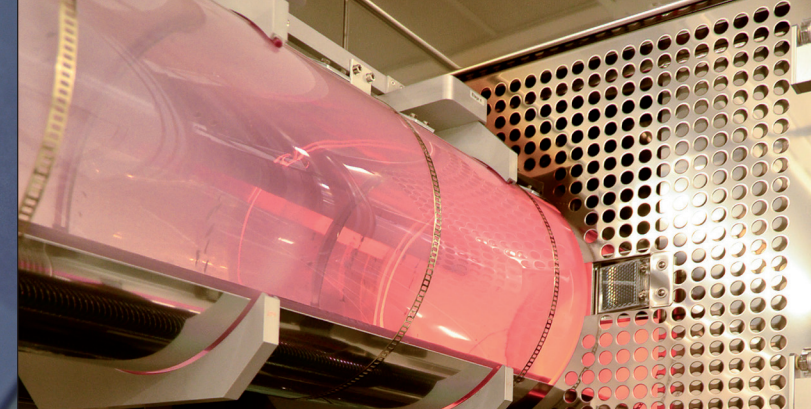
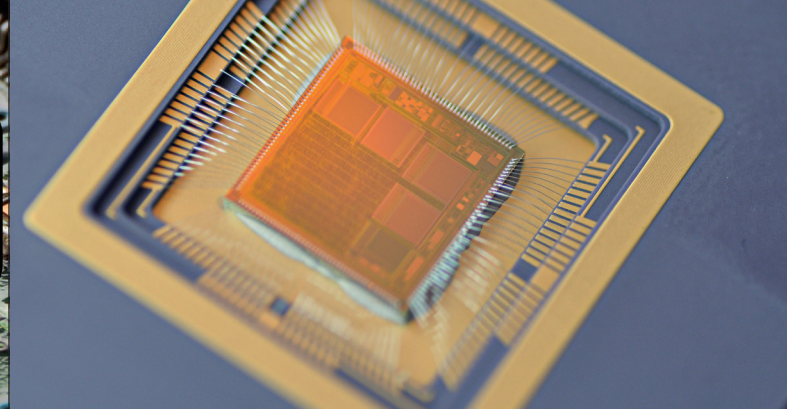
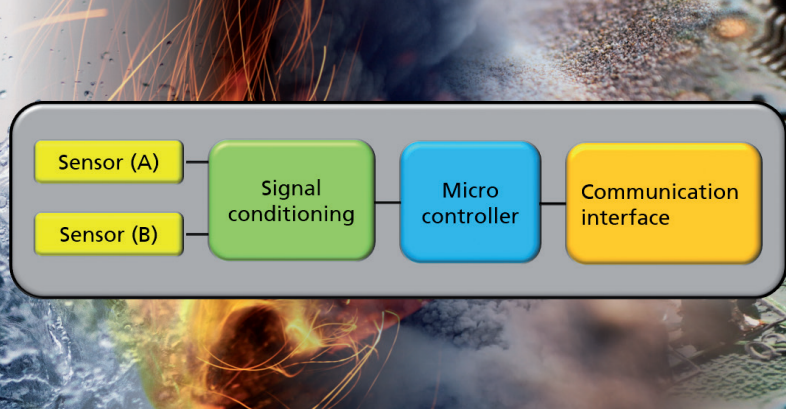
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HIGH TEMPERATURE INTEGRATED CIRCUITS AND SENSORS





HIGH TEMPERATURE INTEGRATED CIRCUITS AND SENSOR SYSTEMS

Within the framework of industry 4.0, an ever-increasing demand on miniaturized intelligent sensors for various physical parameters such as pressure, vibration, acceleration or temperature arises. In addition to mechanical and chemical loads, current challenges include the use of such systems in an extremely wide temperature range from -50 °C to 300 °C and more. Examples for such applications are jet engines in the aerospace industry or deep drilling for geothermal energy as well as the development of fossil energy sources.

Fraunhofer IMS offers extensive know-how and services which fit these requirements. A team of experts, with many years of experience in circuit design for operation in a very wide temperature range, researches and develops ICs for many applications. Our expertise lies both in the field of high-precision analog circuits and in the development of complex digital parts, memory devices and system-on-chip designs.

In addition, Fraunhofer IMS also develops and fabricates Micro Electro Mechanical Systems (MEMS) in its own Post-CMOS Microsystems Lab&Fab. This allows the implementation of miniaturized sensing elements. In combination with high temperature integrated circuits Fraunhofer IMS provides fully integrated high temperature sensor systems.

HIGH TEMPERATURE INTEGRATED CIRCUITS AND SENSOR SERVICES

Fraunhofer IMS provides the complete infrastructure to perform complex IC and sensor development projects, starting from the application-specific concept over design up to fabrication including test and assembly. The services and know-how include:

Design & Development

- Feasibility studies
- System specification and concept development
- Mixed signal IC design
- MEMS sensor development
- Sensor integration
- Application support
- Customer-specific process steps and technologies

Fabrication

- Foundry- and MPW-Services
- Production of pilot- and small series
- PDK for customer site development

Backend

- Test and Verification
- Qualification and reliability analysis
- Assembly / Packaging solutions
- Backend metallization (gold plating)

HIGH TEMPERATURE SOI CMOS TECHNOLOGY H035

Fraunhofer IMS operates a 200 mm CMOS wafer line. Our proprietary H035 High Temperature Silicon-On-Insulator (SOI) CMOS process provides the following features:

- Smallest transistor size 0.35 μm
- Dual gate oxides
- Thick gate oxide for analog devices (up to 30 V)
- Thin gate oxide for digital transistors
- Analog grade CMOS devices (5 V supply voltage)
- Passive devices R, C, PIN Diodes
- 3.3 V digital devices
- Nonvolatile memories
- Integrated sensors
- Up to four layers of high temperature Tungsten metallization
- Backend options: e.g. gold pad metallization

Fraunhofer IMS provides a process design kit for Cadence including IO cells, digital cells and device library. Analog blocks are available on request. All devices are characterized for an extended temperature range up to 300 °C. Multi-project wafer (MPW) services are offered for easy access.