

High temperature SOI pressure sensor



Piezoresistive silicon pressure sensors

EXPERTISE & SERVICES

- FEM-based sensor design
- Evaluation and optimization of sensor characteristics considering reliability and lifetime
- Analysis of sensor data typically with standard ASICs or customer-specific micro controllers
- Realization in cleanroom environment with CMOS-compatible processes with up to 20 wafers per week
- Standard and customer-specific packaging with integrated sensor data processing e.g. TO8, packages with media separation, molding
- Characterization of pressure (10m-100 bar), gas and acceleration sensors (up to 40 g), optional calibration for pressure sensors

CONTACT

Fraunhofer Institute for Reliability and Microintegration IZM
Gustav-Meyer-Allee 25
13355 Berlin, Germany
www.izm.fraunhofer.de

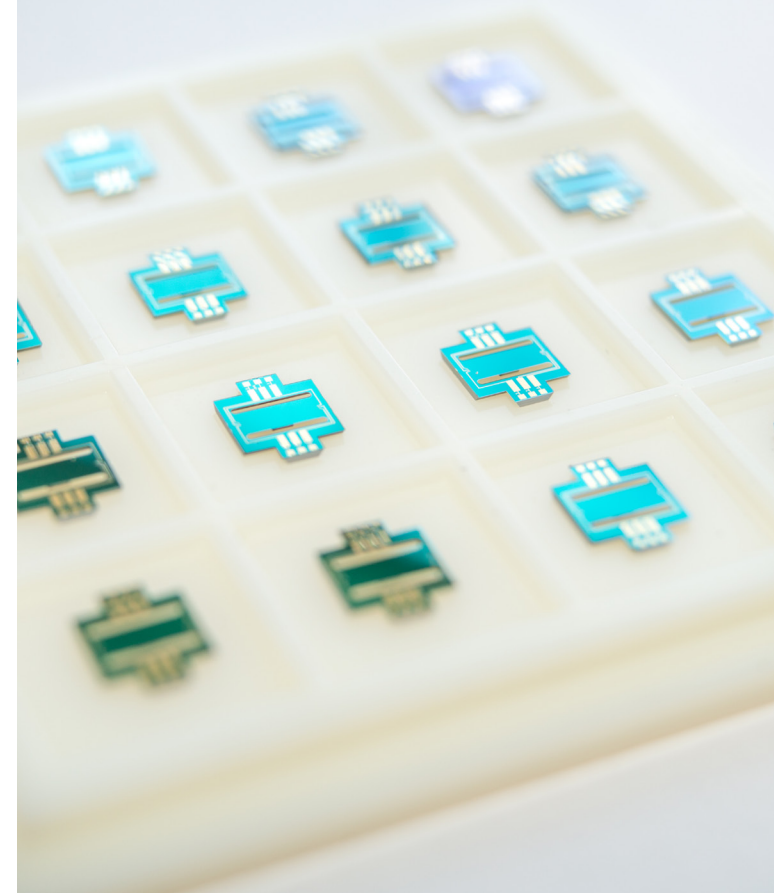
Prof. Ha-Duong Ngo
Phone: +49 30 46403-648
ha-duong.ngo@izm.fraunhofer.de

In cooperation with



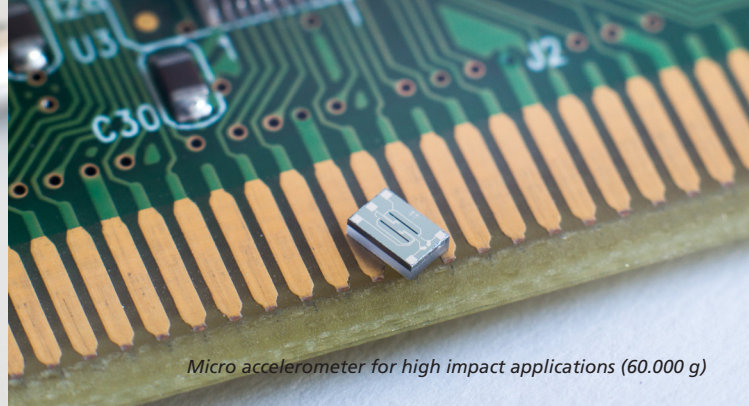
SILICON MICROSENSORS

PRESSURE | ACCELERATION | GAS | FORCE

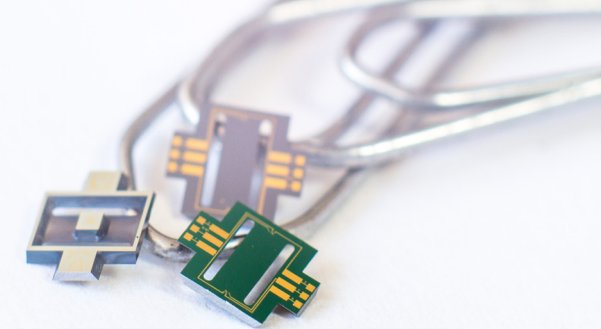




High temperature SOI pressure sensor system



Micro accelerometer for high impact applications (60.000 g)



Low-pressure high temperature SOI sensor

DEVELOPMENT WORK

Our research is focused on the development and characterization of sensors for different physical properties, such as pressure, acceleration, force, flow, gas concentration and humidity.

Design and development of silicon piezoresistive pressure sensors has been our core business. Our product range includes standard silicon pressure sensors for pressures between 3 mbar and 100 bar and temperatures between -25°C and 150°C as well as high temperature SOI- sensors for temperatures up to 350°C.

We also develop pressure sensors for special customer applications such as SiC- pressure sensors for harsh environments and temperatures up to 500°C or ultra sensitive sensors for wall pressure measurements in turbulent flows.

We develop and optimize new gas sensitive layers as well as sensor concepts for electrical and optical gas measurements in automotive, industrial and environmental applications.

One thriving field of microsystem technology today is the application of MEMS devices to fluid mechanics. In the past, the investigation of turbulent flows heavily relied on empirical data. The new generation of miniaturized AeroMEMS devices allows to directly measure important flow quantities such as static and dynamic wall pressure, flow velocity and wall shear stress on flat or curved surfaces without interfering the flow.

A large variety of micro actuators for different fields of application has been developed and produced at Fraunhofer IZM throughout the years.

Our experience in this field includes micro-fluidic systems such as printheads, microvalves and -pumps, micro-optical systems such as micromirrors, -shutters and optical switches, electrostatic micro relays, linear stepping actuators, micro motors and many more.

CAPABILITIES AND FOCUS OF RESEARCH

PRESSURE SENSORS

- Miniaturized pressure sensors (measuring range 1-400 bar, operating temperature up to 125 °C)
- High pressure sensors (measuring range up to 1000 bar, operating temperature up to 125 °C)
- High temperature sensors (measuring range 1-750 bar, operating temperature up to 350 °C)
- Low pressure sensors (measuring range < 100 mbar, sensitivity area $\mu\text{V}/\text{kPa}$, operating temperature up to 125 °C)

ACCELERATION SENSORS

- High-G acceleration sensors up to 60.000 g
- Precision accelerations detection for motion recognition with high sensitivity and good linearity performance

GAS SENSORS

- Detection of VOC gases with SiC-based heating platforms
- Detection of CH_4 , H_2 , NO_2 , CO and CO_2 with metal oxide sensor layers