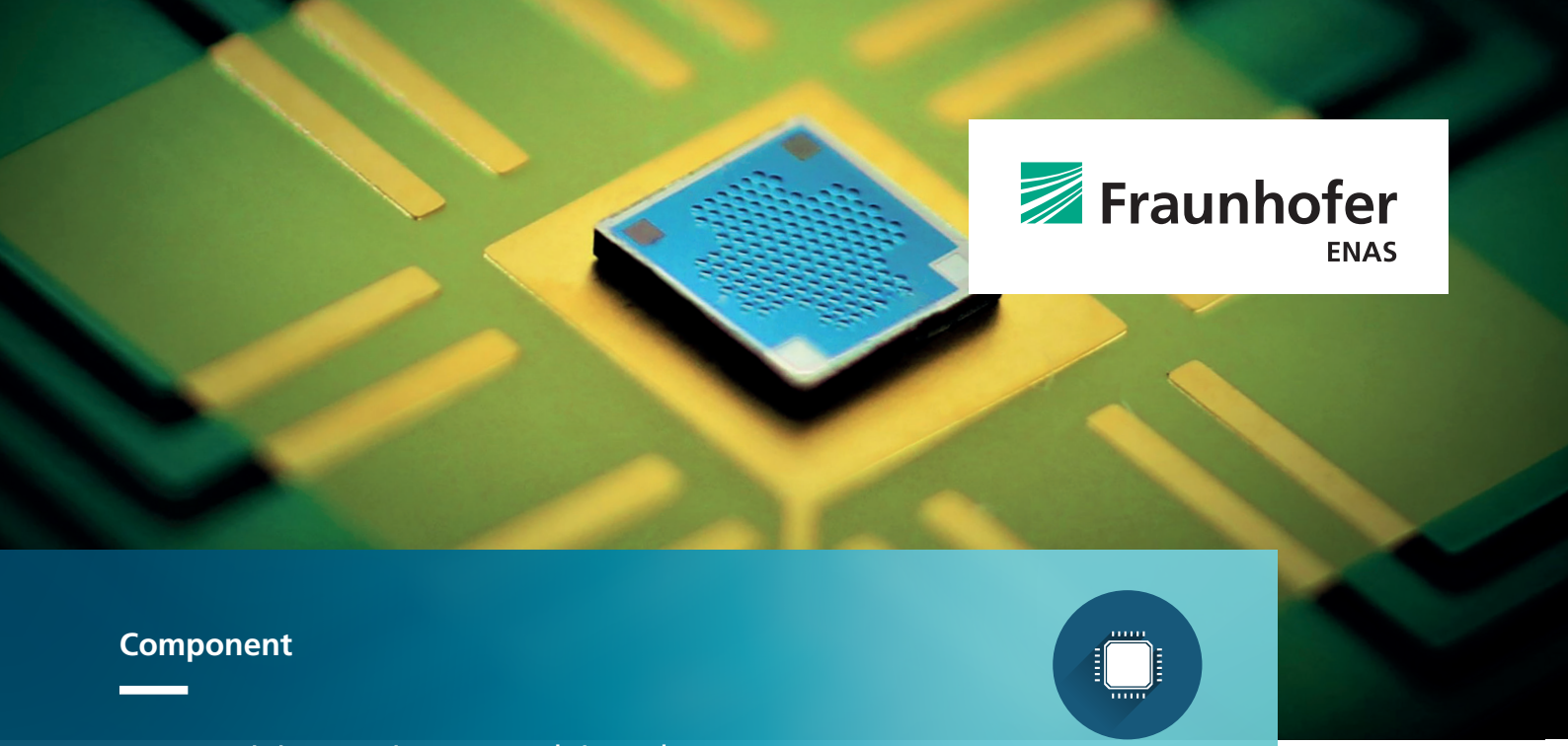


Fraunhofer ENAS

Component

Capacitive Micromachined Ultrasound Transducer (CMUT) – Advanced Robust Ultrasound Technology

Fast Facts

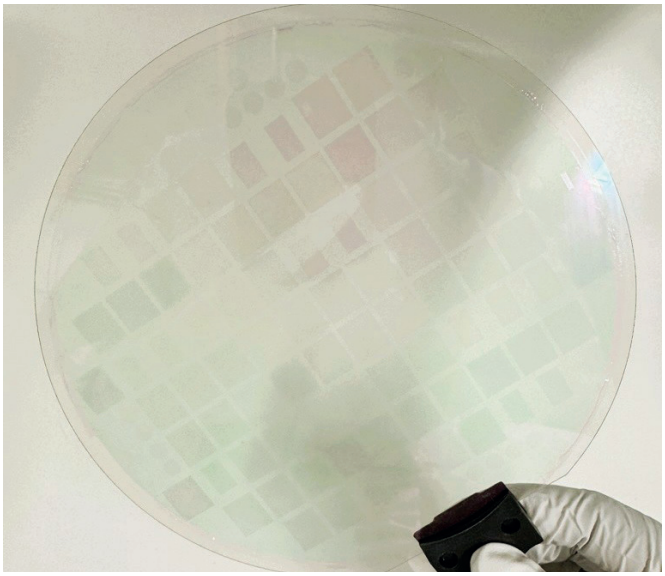
- RoHS compliance, Lead-free
- Low cost and high yield batch-production
- Proven high-temperature stability beyond 200 °C
- No self heating
- Wide frequency bandwidth (> 100 %)
- Good acoustic matching
- Design flexibility (multiple custom designs in one fabrication run)
- Transparent CMUT for through transducer illumination (Photoacoustic imaging)

General Description

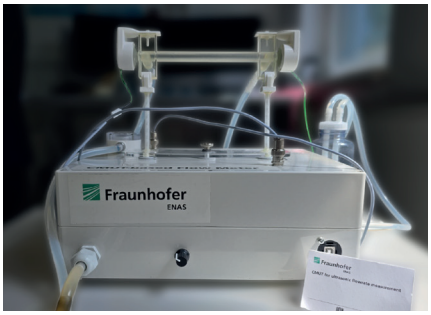
CMUT is an alternative technology to bulk piezo-based transducers, for generating and receiving ultrasound waves. Fraunhofer ENAS provides high yield CMUT fabrication technology for a wide range of applications, also for operation in extreme environments (e.g. high temperature > 200 °C). In addition to custom CMUT designs, Fraunhofer ENAS also offers ready-to-use CMUTs and packaging solutions suitable for diverse application needs.

Features

- Miniaturized
- Single element or multiarray
- Suitable for operation in air, fluid and harsh environment
- Wide frequency range from kHz to MHz
- Low power consumption
- Low bias or zero bias (precharged)
- Integration with CMOS (driving electronics)
- Acoustic compatible assembly, integration and packaging (room temperature, high temperature)



Transparent CMUT wafer.



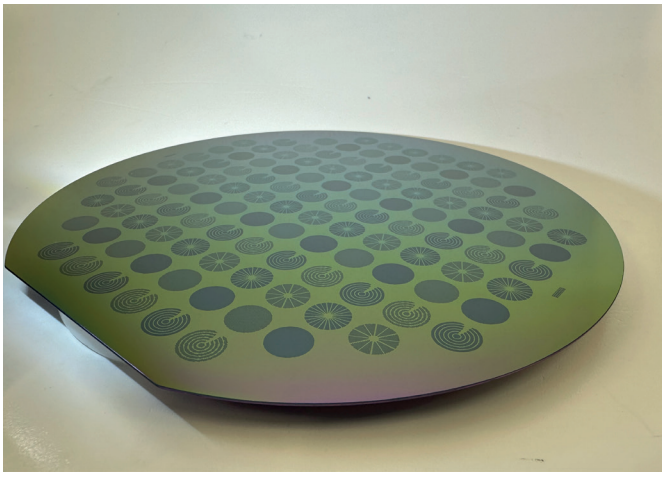
Application demos such as flow meter, level measurement and non-destructive testing (from left to right).

Application examples

- Non-destructive testing*
- Acoustic communication*
- Flow rate measurment (Fluid) *
- Liquid level measurement *
- Underwater object detection *
- Underwater topography *
- Proximity sensing *
- Position tracking *
- Gas flow sensors
- Medical diagnostics and therapy
- Photoacoustic imaging

* Live demo available in lab.

CMUT probe (assembled and packaged for high-temperature application).



Wafer showcasing diverse CMUT designs with tailored properties.

Services and offers

- Custom transducer design and fabrication on 6'' wafers, scalable to 8'' wafer processing
- Feasibility study and demonstrator development for customer applications
- Acoustic compatible encapsulation and packaging of ultrasound transducers (for application in air & liquid)
- Acoustic characterization
  - Sound pressure mapping
  - Pulse echo & through transmission testing
  - Material evaluation
  - Multichannel testing with Verasonics system

In cooperation with

ZfM Zentrum für Mikro- und Nanotechnologien
TECHNISCHE UNIVERSITÄT CHEMNITZ

Fraunhofer ENAS is part of
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