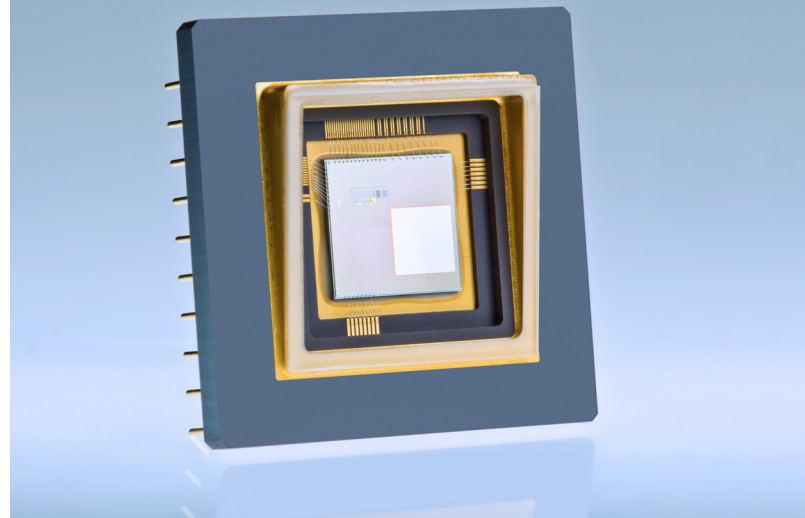
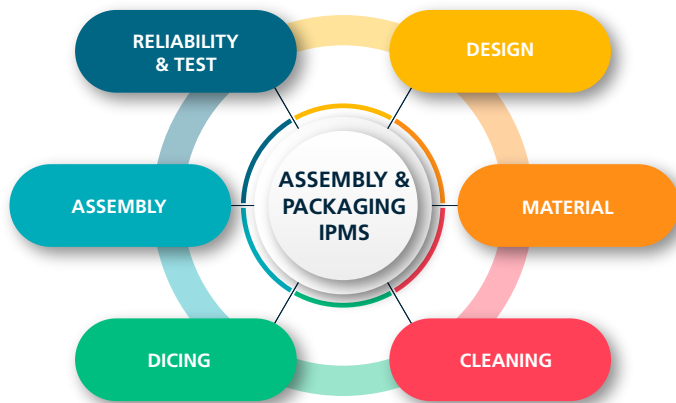




Fraunhofer
IPMS

Assembly and Packaging for MEMS/MOEMS



Packaging and Assembly Competencies at Fraunhofer IPMS

- **Packaging for highly sensitive devices**
Sub-micron range ($<1\mu\text{m}$ @ 3 sigma)
Defined environment with clean room class ISO 4
- **R&D to pilot manufacturing**
From design to finished module
Consulting and process evaluation
Unit sizes from 1 piece
- **Traceability of materials and components via databases**
- **Possible applications**
MOEMS Chips of all kinds
Assembly of laser/photodiodes
Assembly of (optically) high sensitive assemblies
Sensor/bio applications and much more.

Design

Development of customized solutions

- Housing, substrates, alignment, encapsulation
- Fixtures for microassembly systems
- Design in 3D CAD
- FEM simulation and strain analysis
- Data provision for suppliers

Standard and hermetic packages

- Various contacting options
- Bonding/packaging
- Optical protection glasses

Material evaluation

- Adhesives, sealants, bonding/packaging

Dicing

Mechanical cutting process (wafer saw)

- Cutting of silicon, glass, ceramics SOIs and various substrates
- Stepcut in double spindle process
- Manufacturing and opening of cavities

Edge trimming - Circular saws

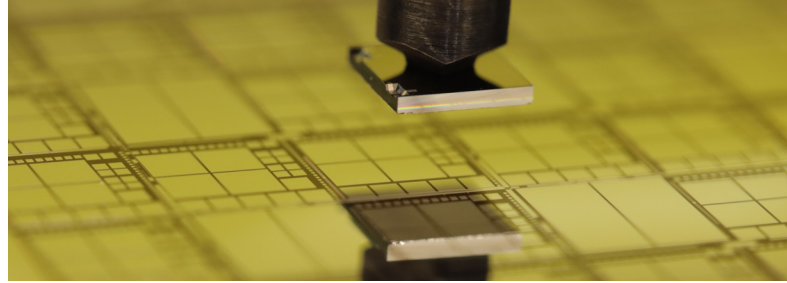
- Downsizing e.g. (Ø 200mm -> Ø150mm)
- Edge trimming with Trapezoid saw blades

Stealth Dicing

- Laser-based dicing of high-sensitivity MEMS wafers together with external partners

Protection systems during dicing

- Focus: Protection of highly sensitive MEMS wafers
- Wide range of tapes (UV, non-UV, thermo release) and polymers (coatings)



Chip Assembly

Pick and Place

- Automatic, camera-based component placement
- High accuracy (<1 µm @ 3 sigma)
- AOI-assisted chip sorting using AI
- Die-to-wafer bonding process for heterointegration

Dispensing

- High precision adhesive dispensing
- Manufacturing of sealant
- Cover for trenches

Stamping processes

- Precise and reliable adhesive application

Contacting

- Multi-level wire bonding (together with external partners)
- Conductive bonding

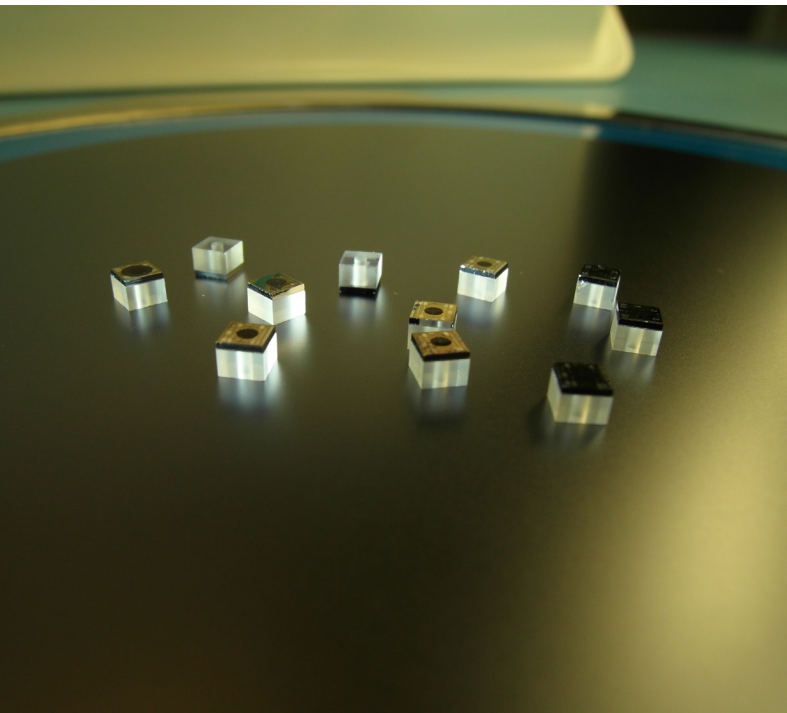
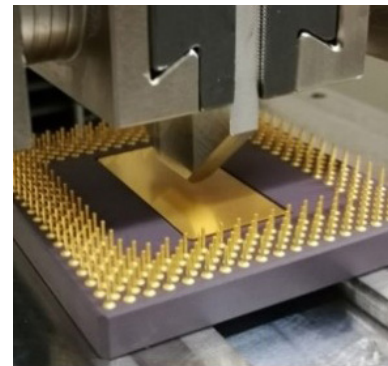
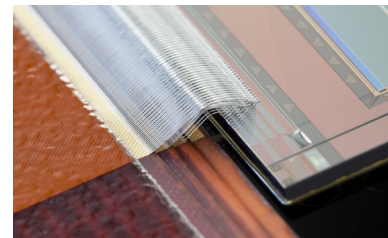
Reliability and Test

Evaluation of Joining technologies

- Adhesives, wafer bonds
- Tensile, shear and compression tests
- Vibration test

Climate studies

- Temperature
- Humidity
- UV irradiation test





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