



MEMSCAP



EUROPRACTICE



MUMPS BY MEMSCAP MULTI-PROJECT-WAFER PROTOTYPING SERVICES

EUROPRACTICE-IC offers Multi-Project-Wafer services in three MEMS processes by MEMSCAP: PolyMUMPs, SOIMUMPs and PiezoMUMPs.

Why EUROPRACTICE?

- ▶ Affordable and easy access to Prototyping and Small Volume Production services for academia and industry.
- ▶ MPW (Multi-Project-Wafer) runs for various technologies, including ASICs, Photonics, MEMS and GaN.
- ▶ Advanced packaging, system integration solutions and test services.

Why MEMSCAP?

- ▶ Cost-effective MEMS solutions with quick turnaround.
- ▶ Well-established standard processes where the properties and layer-to-layer dynamics are well-understood and documented.
- ▶ Fewer design iterations, lower- and fixed-cost development together with less potholes in the road to both functionality and volume production.

Technology Highlights

MUMPs is a shared wafer or Multi-Project-Wafer service, meaning customers purchase one or more individual die locations (1cm x 1cm size) or tiles on any regularly scheduled run, then create and submit a design based on the process design rules. Eight to 12 weeks later, the customer receives 15 identical chips of their design.

PolyMUMPs

PolyMUMPs is the industry's longest-running MEMS Multi-Project-Wafer service, with over a decade of history. Many universities use the service today as a way to teach beginning MEMS design at the undergraduate level, using PolyMUMPs as the "example" process. PolyMUMPs is a three-layer polysilicon surface and bulk micromachining process, with two sacrificial layers and one metal layer. Eight mask levels create seven physical layers. The minimum feature size in PolyMUMPs is 2µm.

SOIMUMPs

SOIMUMPs uses a SOI wafer with a thickness of 10µm or 25µm and allows the designer to pattern and etch both sides of the SOI wafer down to the buried oxide, enabling through-holes to pass light through. Two metal layers, one for bond pads and one for reflectivity, are included in the Standard Process. The minimum feature size in SOIMUMPs is 2µm.

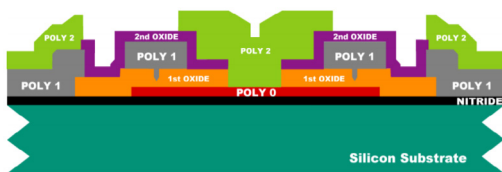
PiezoMUMPs

The PiezoMUMPs process is based on the SOIMUMPs process with 10µm SOI thickness. Its distinguishing feature is a piezoelectric layer of AlN. Top-contact to the piezoelectric layer and the SOI is enabled by means of a patterned layer of Metal. Patterning of the oxide layer that separates the SOI and the AlN allows for contact between the latter. Patterning of the SOI and openings in the handle silicon are available as is the case for SOIMUMPs.

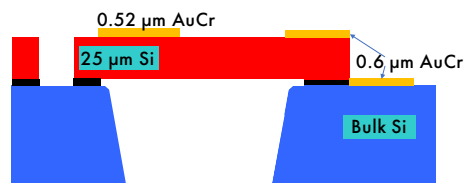
Parameters		PolyMUMPs	SOIMUMPs	PiezoMUMPs
Standard Die Site	Fixed die size (mm ²)	10 x 10	11 x 11	11 x 11
	Active area (mm ²)	9.8 x 9.8	9 x 9	9 x 9
	Dies delivered	15	15	15
Optional post processing	HF release	possible	not applicable	not applicable
	HF release, CO2 Dry	possible	not applicable	not applicable
	Subdicing	possible	by design or laser dicing	by design or laser dicing

Technology Details & Applications

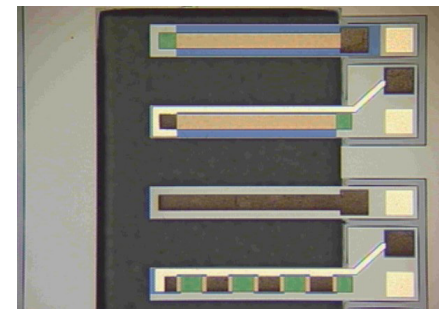
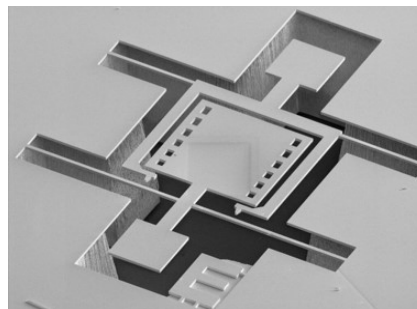
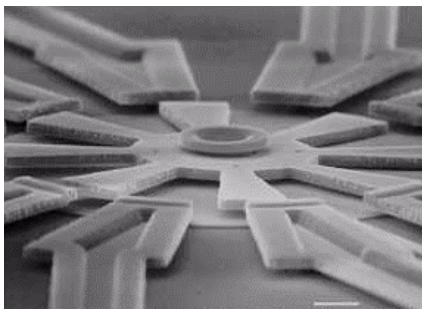
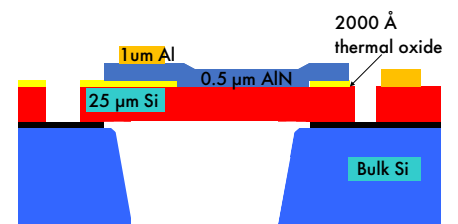
PolyMUMPs



SOIMUMPs



PiezoMUMPs



- ▶ Acoustics (microphones)
- Sensors
- Accelerometers
- Micro-fluidic
- Robotics
- Display technologies and more

- ▶ Gyros
- Optical Devices
- Display Technologies and more

- ▶ Energy harvesters
- Sensing
- Ultrasonic transducers
- Microphones
- Actuators