



QuickSil MEMS Processing Capabilities

QuickSil has partnered with Measurement Specialties to offer MEMS prototyping services out of our common Fremont, California facility. Measurement Specialties is a leader in force and pressure sensor products for industrial, medical and automotive applications. Its engineering team in Fremont has broad capabilities in prototype design, manufacture and testing, and together with QuickSil's wafer processing capabilities can offer complete product support for MEMS product development.

Below is a list of the processing capabilities offered by QuickSil and Measurement Specialties:

Front-End Wafer Processing from QuickSil

- ❖ High quality wafer preparation for MEMS structure processing
 - Thick film low stress depositions using Novellus Concept I reactors
 - LPCVD Nitride
 - Polysilicon
 - LTO
- ❖ Dual-sided wafer alignment for backside wafer processing
 - Supports both normal and bonded wafers
- ❖ Ultratech steppers for tight linewidth control
- ❖ Class 10 Cleanroom environment

Silicon Etching Capabilities from Measurement Specialties

Etch Process	125 mm	150 mm
Wet Anisotropic silicon Etching		
• KOH/H ₂ O	Yes	Yes
• Electrochemical Etch Stop ✓	No	Yes
Wet Isotropic Silicon Etching		
• HF/Nitric/Acetic	Yes	Yes
Dry Silicon Etching		
• Si:SiO ₂ Selectivity 8:1	Yes	Yes
• Current max depth in production	10um	10um
• Uniformity	±10%	TBD
Deep Reactive Ion Etching ✓	No	Yes
Front Side Recesses		
• Diaphragm Sculpting	Yes	Yes

• Current max depth qualified	8um	TBD
• Uniformity	±10%	TBD

✓ processing supported out of Measurement Specialties' location in Bevaix, Switzerland

Wafer Bonding Capabilities from Measurement Specialties

- ❖ Wafer Bonding
 - Electrostatic Bond (Gage or Absolute)
 - Gold Compression
 - Fusion
- ❖ Wafer bonding up to 3 silicon wafers
- ❖ Metalized through-holes in Glass
- ❖ Dicing capability in-house
 - 2.0 mm thick glass (triple pass)
 - 1.5mm bonded silicon (single pass)

Prototype Assembly and Test Services

- ❖ Prototype packaging capabilities in Fremont location
 - Stainless steel isolated packaging
 - Ceramic packaging
 - Die attach
 - Wire bonding
 - Gold compression
 - Aluminum wedge
 - Laser trimming
 - Thick film resistor trimming
 - Plasma clean
 - Physical (Ar)
 - Reactive (O₂)
- ❖ In-house analysis and failure analysis capabilities
 - Manual wafer probing with hot chuck
 - Bench test for packaged parts
 - Cross sectioning (SS welds, die)
 - Silicon thickness
 - Filmetrics (non-contact)
 - Dual LVDT (Contact) for thicker membranes
 - IR Microscope
 - Profilometer
- ❖ In-house test capabilities
 - Temperature testing -55 ~ 125C
 - Pressure
 - 0 to 40k psi with temperature
 - 0 to 10k psi without temperature
 - 1000 hour powered burn-in
 - Constant current
 - Acceleration
 - Up to 20G at 5000Hz max frequency