



# Wafer Processing Capabilities

Silex is the first pure-play MEMS foundry to offer its customers a Class 1-10 200mm fab, with state of the art equipment and capabilities. Committed to meeting our customers' expectations today and into the future, we provide the industry's most advanced process technologies in combination with state-of-the-art tool capability. Silex standard processes are proven technologies and include proprietary capabilities like Through Silicon Insulator (TSI™) with Sil-Via® and Zero-Crosstalk™ features. With the incorporation of state-of-the-art deposition and electroplating equipment, Silex is able to offer novel functional capping technologies with integrated through wafer metal vias, RF passives and coaxial feedthroughs. Our advanced wafer level packaging technologies are spearheading the MEMS industry in the area of packaging and CMOS-to-MEMS integration.

	150mm	200mm
<b>Lithography</b>		
Contact 1:1 Aligner	Front/Back Side	Front/Back Side
Alignment Accuracy	~1µm, Front Side	~1µm, Front Side
	~2µm, Back Side	~2µm, Back Side
Minimum Features	~0.8µm, vacuum mode	~0.8µm, vacuum mode
	~3µm, proximity mode	~3µm, proximity mode
Stepper 5:1 Aligner	Front Side	Front/Back Side
Alignment Accuracy	~0.1µm	~0.1µm
Minimum Features	~0.5µm	~0.35µm
Resist Thicknesses	1-10µm, >20µm Positive	1-10µm, Positive
	1-10µm, >20µm Negative	1-10µm, Negative
BCB	•	
Lift-Off	•	
Spray Coating for Patterning in Recesses	•	
<b>Plasma Etching</b>		
DRIE with high selectivity and 1:50 feature aspect ratio	•	•
Dielectric Etching (SiO <sub>2</sub> , SiN, etc.)	•	•
Polysilicon Etching	•	•
Polymer Etching and Stripping		•
Metals	Al, AlCu, TiW	TiN, AlCu
Oxide ICP	•	
<b>Plasma Deposition</b>		
PECVD Oxide	•	•
PECVD Nitride	•	•
PECVD TEOS		•
SACVD Oxide		•
<b>Wafer Bonding</b>		
Silicon Fusion Bonding	•	•
Au-Si, Au-Sn Eutectic Bonding	•	•
Anodic Bonding	•	•
Thermo-compression Bonding	•	•
Adhesive Bonding	•	•
Alignment Accuracy:		
Wafer Pairs	<5µm	<3µm
Multi-wafer Stacks	<5µm	<5µm
DI Wafer Clean (Megasonic; Brush)	•	•
Controlled Ambient or Vacuum	•	•
<b>Back End</b>		
Automated Dicing	•	•
Au and Al Wire Bonding	•	•
Lapping for Wafer Thinning and Polishing	•	•
Epoxy and Solder Die Attach	•	•

	150mm	200mm
<b>Furnace Processes</b>		
Thermal Oxidations (900-1050°C)	Wet/Dry/Mixed	Wet/Dry/Mixed
Annealing Processes (densification, bond or forming gas)	•	•
Vacuum Anneal	•	
Metal Sintering	•	
RTP	•	•
Doping Processes (ion implantation, POCl)	•	•
LPCVD nitride (standard, low stress)	• ultra low stress available	•
Ant-Reflective Coatings	•	
LPCVD oxides (LTO, PSG, TEOS)	•	•
LPCVD Silicon	Amorphous, Poly, Fine-Grain Poly	Amorphous, Poly (in-situ P-doped poly coming)
<b>Wet Etching</b>		
Anisotropic silicon etching (KOH, TMAH)	•	
Wet etching of dielectrics (i.e. different oxides and nitrides)	•	
Vapour HF	•	
Wet cleaning process (acid and solvent based)	•	
Fully-automated Spin Solvent		•
Fully-automated Spin Acid		•
<b>Metallization</b>		
Sputter Deposition	Al, Au, Cr, Cu, Ti, TiW, AlCu	Ti/TiN, Cu, W, AlN, Mo, AlCu
Evaporation	Au, Cr, Ni, Pt, Si, Sn, Ti	
Electroplating	Au, Sn	Ni, Au, Cu, Sn Integrated Seed Layer Etch
Electroless Plating	Au, Ni	
<b>Metrology</b>		
SEM with CD-Tool	•	•
Ellipsometer	•	•
Interferometer	•	•
Inspection Microscopes	•	•
CD Microscopes	•	•
White Light Interferometer	•	•
Surface Profiler	•	•
Film Stress Measurement	•	•
Sheet Resistance (4-point probe)	•	•
Surfscan	•	•
XRD	•	•
<b>Testing</b>		
Automated Probing	•	•
Automated Electrical Parametric Testing	•	•
Customer-specific Test Rigs	•	•
Test Development (Prototyping and Volume Production)	•	•