

200 mm MEMS cleanroom toolpark

LITHOGRAPHY		
Exposure	DUV for 130 nm I/s	NSR-S210D Nikon
	i-Line for 400 nm I/s	NSR-2205i 14E2 Nikon
Coating	Spin and Spray	SK-80EX Screen
Contact, Proximity	Double-side Mask Aligner	MA 200 GEN 3 SUSS
	Overlaytool with 3s < 15 nm	MueTec – MT3000IR
DEPOSITION		
PE-CVD	Silicon Oxide as ILD and Sacrificial Layers	Centura Applied Materials
	a-Si:H as Sacrificial Layers	
	Silicon Nitride for Passivation / Membrane	
	HDP Oxide as ILD and Sacrificial Layers	
	SiGe as Construction Layer	
PVD-Sputtering	Interconnects (Al, AlSiCu, Ti, TiN)	Sigma 204 SPTS
	Chemical Sensors and Barriers (Ta, Ta ₂ O ₅ , HfO)	Sigma 204 SPTS
	Mirrors and Hinges (Al, TiAl, Al-Alloys)	CS400S Von Ardenne
Evaporation	Al, SiO ₂ , Al ₂ O ₃	PLS 570 Balzers
	Al, SiO ₂ , TiO ₂	Evatec BAK 761
Oxidation	Thermal, SiO ₂ (horizontal)	Inotherm
	Thermal, SiO ₂ (vertical)	Alpha 8SE TEL
Rapid Thermal Annealing	Annealing	Heatpuls 8800 OEMgroup
Chemical Mechanical Polishing	Si, SiO ₂	DESICA Applied Materials
Grinding	SOL-preparation	Grindertool DISCO Corp.
LP-CVD	Poly-silicon for Trench Fill / Sacrificial Layer	E1550 HT 320-4 Centroterm
	Silicon Oxide for Insulator, Membranes	
	Silicon Nitride, Low Stress Silicon Nitride (200 MPa)	
Atomic Layer Deposition	SiO ₂ , Al ₂ O ₃ , HfO ₂	P-300 Picosun
	FDTS for Anti-Stiction	MVD 300 Batch Reactor SPTS
Gas Phase Release Techniques	HF-GPE for SiO ₂	MEMS-CET system Primaxx
	XeF ₂ for a-Si	X-SYS-3B:6 Xactix and CVE SPTS

ETCHING AND CLEANING		
Dry Etch	Metal etch (Al / Al alloys)	ALLIANCE 9600PTX LAM
	Dielectrics & Poly Etch (SiO ₂ , Si ₃ N ₄ , PolySi, a-Si)	Omega fxP SPTS
	Deep silicon etch	Rapier Modules
Wet Etch	Silicon Oxide (NH ₄ F-buffered HF)	Manual wet bench AP&S
	Silicon Nitride (Phosphoric Acid)	
	Aluminum (Phosphoric & Acetic Acid)	
	Anisotropic Si Etch for Grooves, Membranes (TMAH)	
Cleaning	Wafer Cleaning (SC1, SC2, DHF, RCA)	GigaStep AP&S
	GigaStep AP&S	SS-80BW-AVR Screen
	Wet Strip (EKC clean)	Cintillio SST OEMgroup
BONDING & ASSEMBLY		
Wafer Bonding	Direct Si / SiO ₂ and Adhesive Bonding	BA8 Gen3, SB8, XB8 SUSS
Wafer Dicing	Dicing of Glass-Silicon-Compound	DAD 651 Disco
Wafer Packaging	Pick & Place for Chip Assembly	VICO Xtec / Laser Häcker Automation
	Fineplacer	FEMTO Finetech
METROLOGY & INSPECTION		
Film Thickness Measurement	Optical Thickness Measurement of Standard Materials	Lambda Ace RE-3300 Screen
	In line Reflectance measurement	n & k Olympian
Scanning Electron Microscope	3D Inspection	JSM-6700F JEOL
	Analysis SEM with FIB cut	Helios Nanolab 660 FEI
CD-SEM	CD Measurement	Verity Lite Applied Materials
Atomic Force Microscope	Surface Topology	Nanoscope D3100 Veeco
Ellipsometer	n&k Measurement, Optical Properties	V-VASE (190 ... 1700 nm) Woollam
White Light Interferometer	Surface Topology	NT8000 Veeco
Laser Scanning Microscope	Surface Topology	VK-X200 Keyence
Defect Measurement	Defect Inspection	Compass Pro Applied Materials
	Defect Classification	INS3000 Leica
	Defect Classification	FAaST 230 Semilab
Actuation Measurement	Ultra High Frequency Vibrometer	UHF120 Polytec
ELECTRICAL TEST		
Mixed Signal Testing	176 digital pins (200 MHz), 24 analog pins, 8 HV bus pins, 6 × 52 V / 0.2 A supply, 2 × 80 V / 20 A supply, various digitizers & generators, wafer size 4", 5", 6", 8", 12"; temperature: -40 ... +125°C	M3670-Falcon / EG4090μ+ Advantest PA300
	72 digital pins (200 MHz), 32 analog pins, 6 × 52 V / 0.2 A supply, 51 V / 5 A supply, various digitizers & generators, wafer size 4", 5", 6", 8", 12"; temperature: -40 ... +125°C	M3650 / EG4090μ / UF3000EX Advantest
Parametric Test System	48 channels, wafer size 4", 5", 6", 8", 12"; temperature: -40 ... +125°C	B1500 / EG4090μ / UF3000EX Keysight
	Matrix up to 72 channels, wafer size 6 ... 8", temperature: -40 ... +125°C	S530 basic Keithley / EG4090μ+ temperature: -40 ... +125°C
Electro-optical Test System for Micro Displays and Sensors	Color & luminance measurements, DUT images up to 16 Mpix wafer size up to 12"; capabilities for bare dies or modules, temperature: -40 ... +125°C	Color Measurement System LMK98-4, F1600C Pike Camera, Spectrometer Jeti Specbos 1211UV PA300 Cascade Micro- tech
Sensor Actor Test System for MEMS / MOEMS	Wafer size 8", temperature: 15 ... 125°C, SMU, laser light barriers, frequency counter, switch matrix, up to 72 channels	AP200 Cascade Microtech, changeable chuck-addons for MEMS probing
Optical Inspection	Manual or fully automated image processing	PA200 Cascade Microtech
Non-electrical Test	Up to 20 channels, configurable set points -45°C ... 145°C @ (1.4 deg / min) rH controlled 300 N sine; up to 5000 g pulse	pH Sensor Tester Fraunhofer IPMS Thermal Callibration Feutron ESPEC Shock and Vibration LDS, Endeveco
CV Analysis	Oxide thickness; flat band voltage; effective oxide charge; average bulk dop.; threshold voltage; Debye length; interface trap density	LF and HF CV
	Relaxation time; minority carrier lifetime; surface scan velocity	TVS; CV BTS
Characterization of Insulator Integrity and Reliability	Breakdown field; Weibull plot; Time / charge to breakdown	Eramp and Econst (TDDB)
	Time / charge to breakdown; breakdown voltage; Weibull plot	Jramp; Jconst