Semefab

Delivering Sensor & Microelectronic Solutions Worldwide…

Over 500 million die shipped per year

www.semefab.com

Our Vision

To put Semefab at the heart of today's life enhancing semiconductor and MEMS sensor products.

To be your MEMS & IC foundry.

An Impressive Record Since 1986

Semefab have an impressive track record of process development, process induction and volume foundry supporting silicon-based MEMS, CMOS, ASIC, Bipolar-Linear & Discrete semiconductor device technologies.

1986	1989	1992	1994	1998	2002
Fab1 Operation 100mm CMOS IC's Bipolar transistors	Swiss Watch IC's South Africa Post Office Telephone Dialler IC's	CMOS ASICs for Automotive & Security	Queen's Award for Export	Precision Op Amp foundry JFET for PIR2000 Queen's Award International Trade JFET for PIR MEMS Pressure	Fab 2 (MEMS) Operational 100mm MEMS Thermopile MEMS Gas Sensor

2005	2008	2011	2016	2018	2020
MNT Award £6.8M DIBiCMOS Foundry Precision Analogue IC's	New Fab 2 150mm MEMS Blood Viscosity	Fab 3 Operational 150mm ALS for CCTV MEMS Blood Analysis	30th Anniversary USA & China Representation established	120M JFET for PIR Sensors 80M Ambient Light Sensors for CCTV cameras	12M thermopiles to China fighting Covid 19 virus

Global Reach, >80% Exports

Delivering Sensor & Microelectronic Solutions Worldwide…

- Semefab operates 3 wafer fabs on a single site in Glenrothes, UK, across a broad technology base of MEMS sensors and CMOS & Linear IC's, Discrete semiconductor devices.
- Close liaison with our highly experienced process engineering team ensures a successful outcome to process development/induction and process optimisation leads to high yield, cost effective manufacture.

‘For your semiconductor device or technology requiring fabrication, make Semefab your first call.’

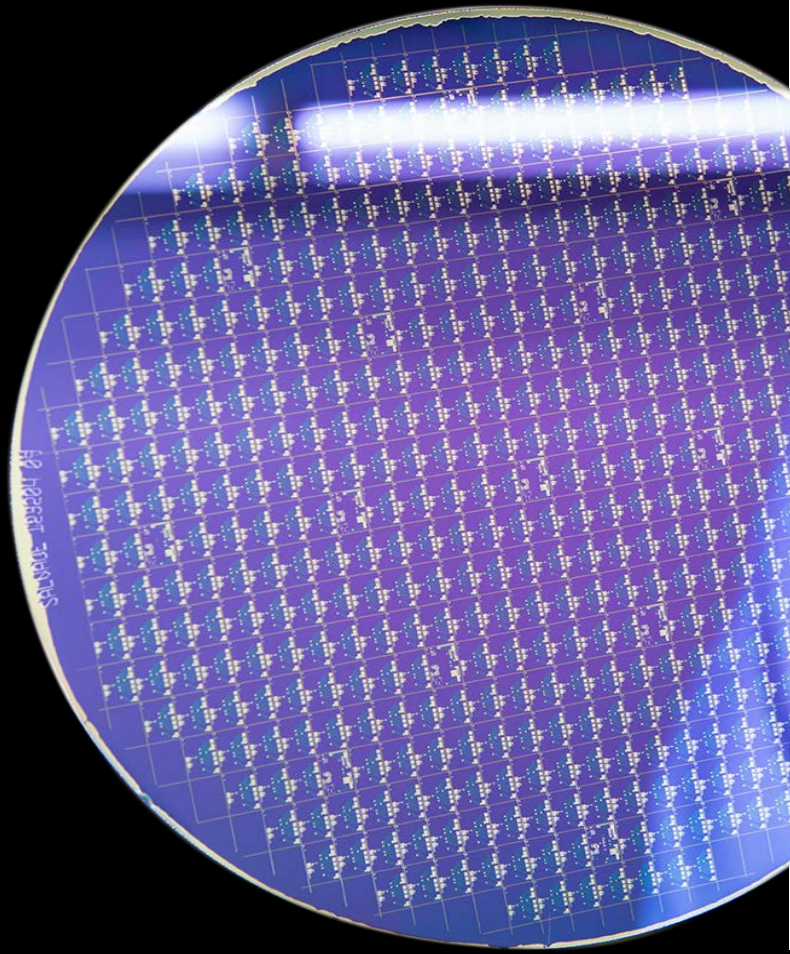
OUR SERVICES

MEMS Foundry

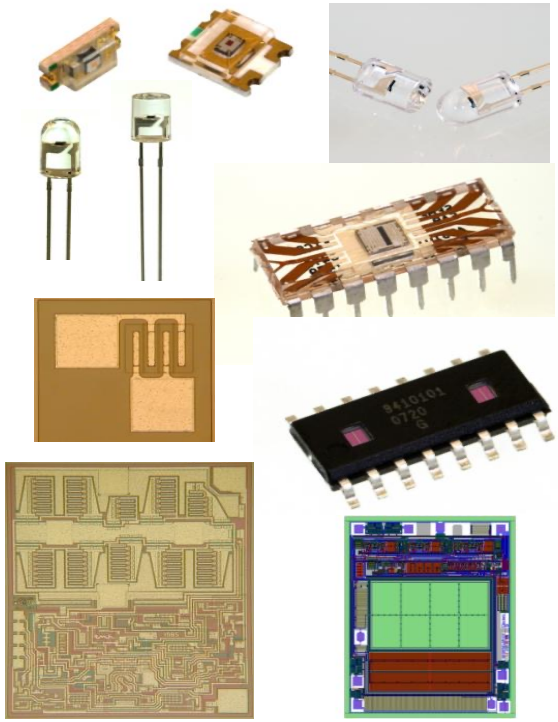
IC Foundry

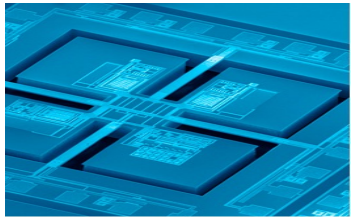
Discrete Semis

Semefab products

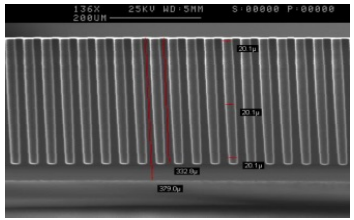


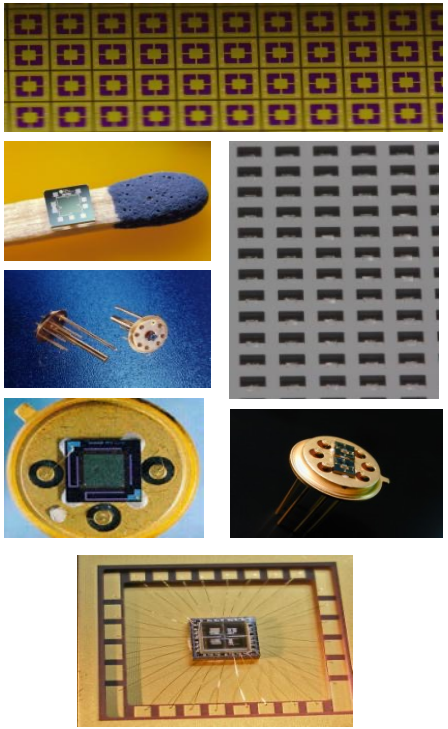
Extensive Process Portfolio



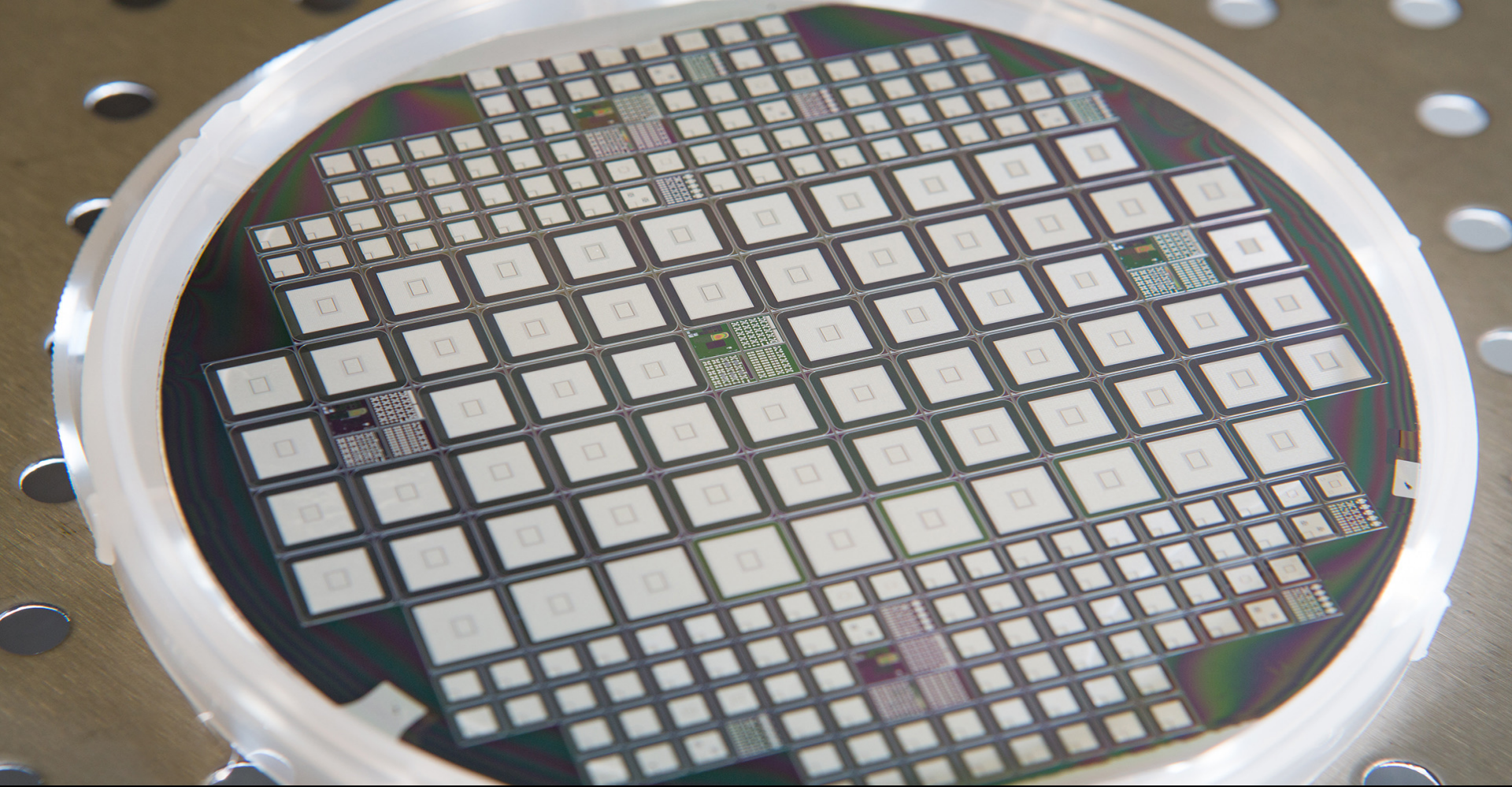


Cantilever Structure Courtesy of:
Microvisk Technologies Inc.





- *Limited Illustration – much of our foundry portfolio is customer proprietary*



Semefab

www.semefab.com

>500 Million die shipped per year

Our Strengths

- We operate in diverse market sectors on a global scale.
- Stable business - when one sector of region is down it is often compensated for in other areas.
- Strong track record across diverse sectors. Inc. Automotive, Security, Medical, Industrial, Energy and Consumer sectors.
- Global customer base. Europe, North America and Far East.

‘Each day, Semefab silicon makes a positive contribution to people‘s modern lifestyle and improves their environment, security and safety.’

Semefab Overview

- Commercial Foundry
- CMOS/Bipolar Foundries – 6” & 4”
- MEMS Foundry – 6” & 4”
- Ship >500 million die/year
- Design & Development Partnerships
- Technology Inductions
- Established 1986

- Global Fabrication Player
- ≈89% Export Bias
- >35 Customers Worldwide
- £14M T/0, 15-20% PBT
- 130 Employees

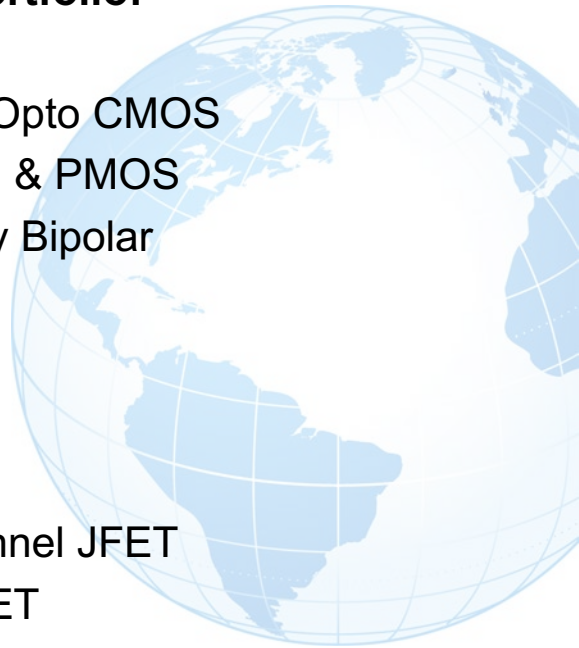
Foundry Operations

Fab Operations:

- Fab 3: 6” MOS/Bipolar to 0.8µm
- Fab 2: 6” & 4” MEMS to 0.8µm
- Fab 1: 4” MOS/Bipolar to 2.5µm
- Probe & Test Operation
- ISO9001, ISO14001
- UL & ESA Approval

Diverse Process Portfolio:

- MEMS
- Si Gate CMOS & Opto CMOS
- Metal Gate CMOS & PMOS
- DI Complementary Bipolar
- DI BiCMOS
- Linear Bipolar
- PiN Photo Diode
- Lateral FET
- Low Noise N Channel JFET
- DMOS RF MOSFET
- Power Bipolar
- Fast Recovery Diode



Production Capacity

- Fab 3: 25,000 6” wafers per year capacity, potential 75,000
- Fab 2: 25,000 4”/6” wafers per year capacity
- Fab 1: 50,000 4” wafers per year capacity
- Probe & Test:
  - *Test floor supports wafer test & package test*
  - *Electrical parametric testing*
  - *Sensor functional testing e.g. low pressure etc.*
- Assembly: Subcontracted to Far East
- Final Test: In house or Far East

Device Applications Served

ASIC & IC Foundry :

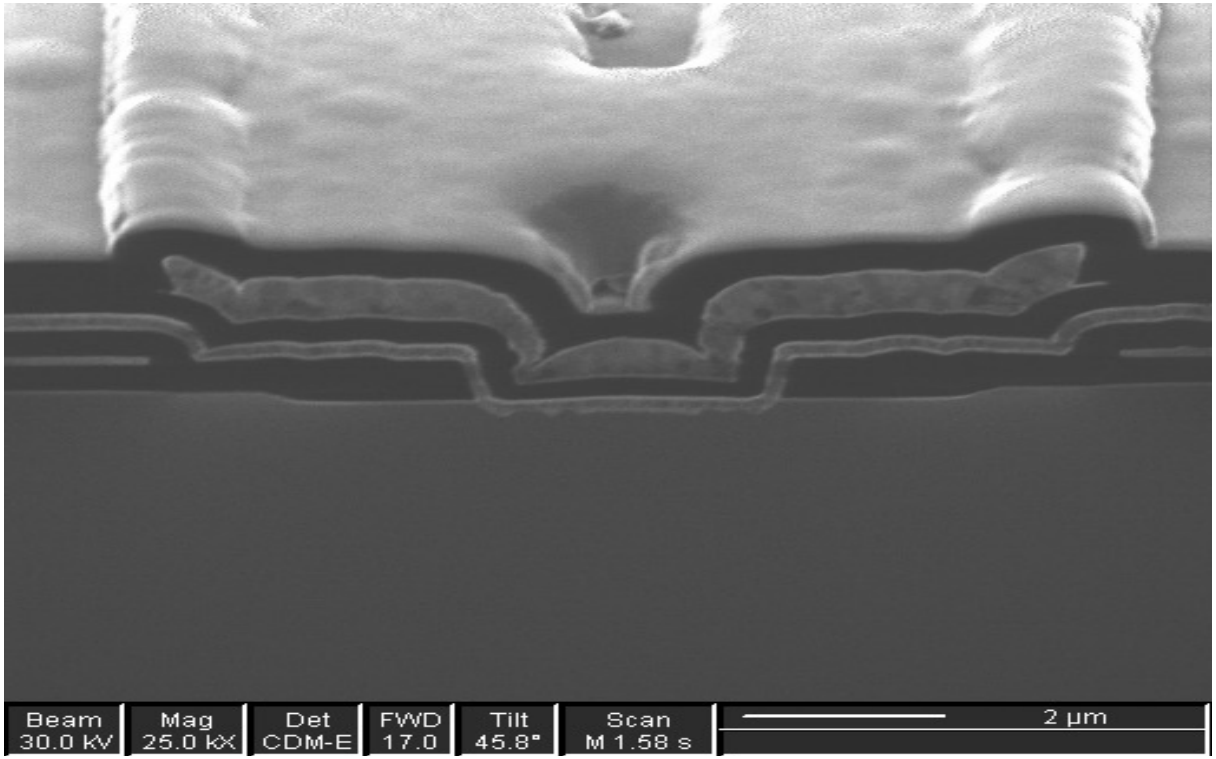
Opto CMOS ASIC	*Optical Smoke Detector*
OptoCMOS	*ASIC + FILTER Light Sensing & Switching*
OptoMCMOS	*Hazard Flasher*
CMOS ASIC	*Smoke detector address*
MCMOS ASIC	*Garage Door Opener*
CMOS ASIC	*Automotive Windscreen Wiper*
CMOS ASIC	*Automotive Window Lift*
CMOS ASIC	*EC Motor Controller Interface.*
CMOS Foundry	*Secure Telecoms*
DI BICMOS	*Precision Op-Amps*
Linear Array	*Solar battery charger controller*
Precision analogue	*Operational Amplifiers*
Ambient Light Sensor	*CCTV Cameras*

Device Applications Served

Discretes:

JFET	*PIR Motion Sensors*
PIN DIODE	*Light Sensing*
LATERAL MOSFET	*Audio Power Amplification*
BIPOLAR POWER	*Power Devices & Module*
FRD	*Power Devices & Module*
RFMOSFET	*RF Base Stations & PMR*
PHOTODIODE ARRAY	*Precision Measurement*
SiC Schottky Diode	*Power Converters*

1GHz RF LDMOS Cross Section

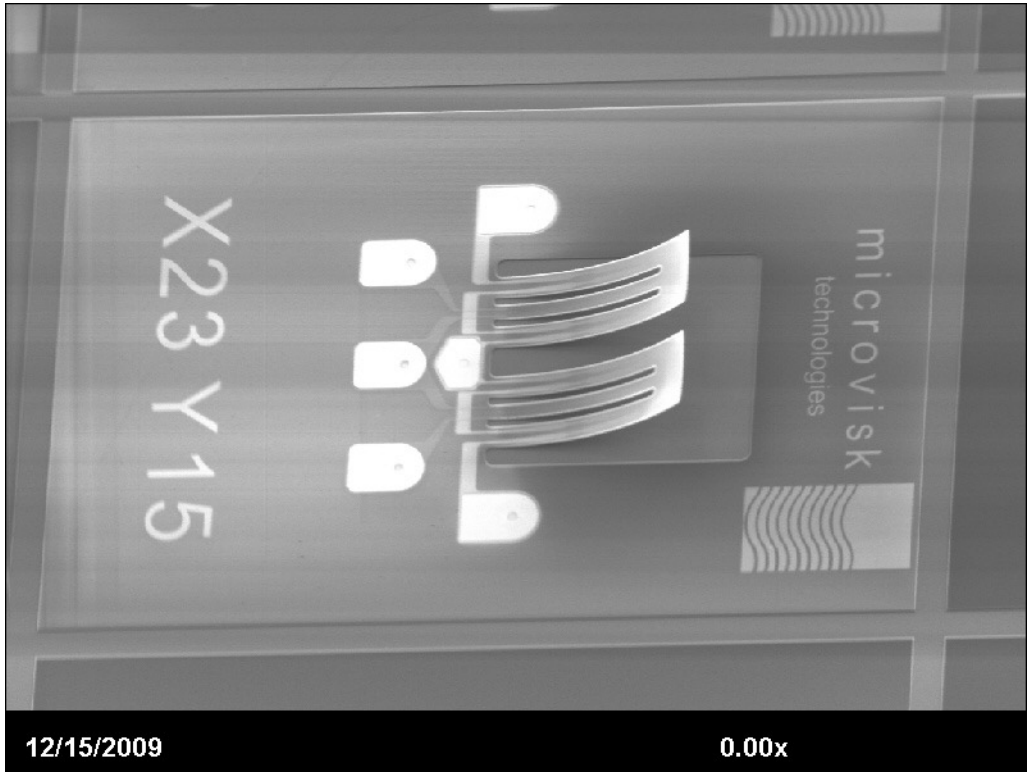


Device Applications Served

MEMS Foundry:

NO2 & CO detectors	*Automotive Air Quality*
Pressure Sensor	*1 Bar Automotive Engine Management*
Pressure Sensor	*Altimeter, Diving, Industrial*
Pressure Sensor mBar	*Medical –respiratory*
Thermopile	*Non contact temperature & NDIR gas sensing*
Liquid Viscosity Sensor	*Blood coagulation*
Gas Thermal conductivity	*Gas flow measurement*

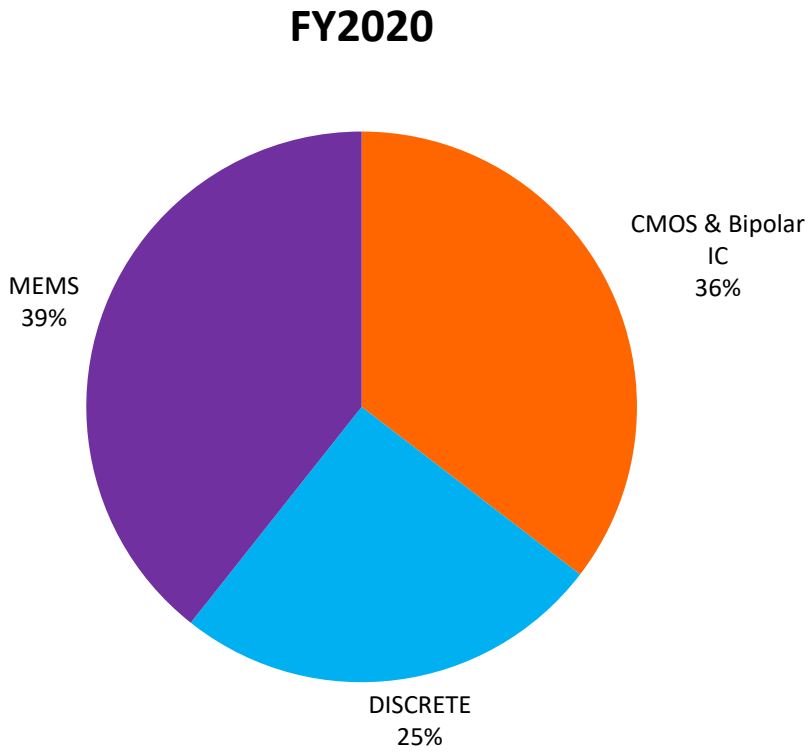
Blood Viscosity Sensor



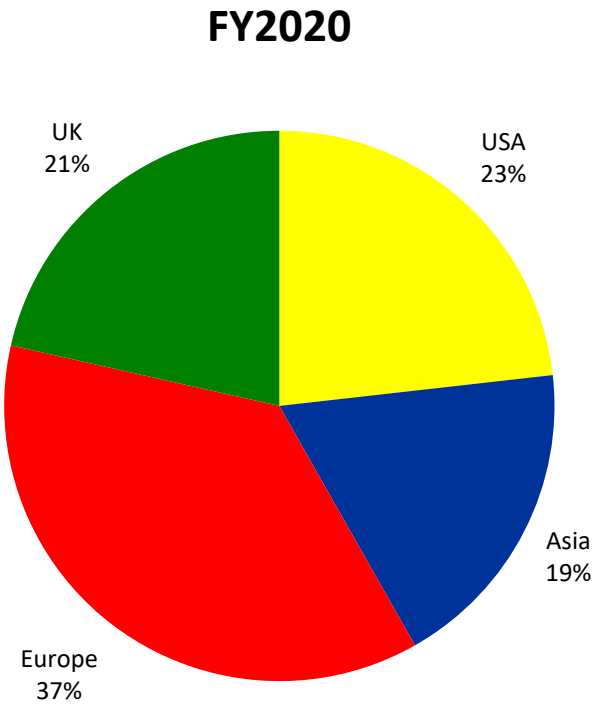
Projects in Development

- MEMS micro hotplate
- MEMS ToF liquid flow sensor
- Bizen – Smart Power
- HP Thermopile
- Harsh Media Pressure Sensors
- Strain Gauge
- SiC Schottky Diode 650v; 1.2kV; 1.7kV; 2.3kV
- TCIGBT 1.2 & 1.7kV

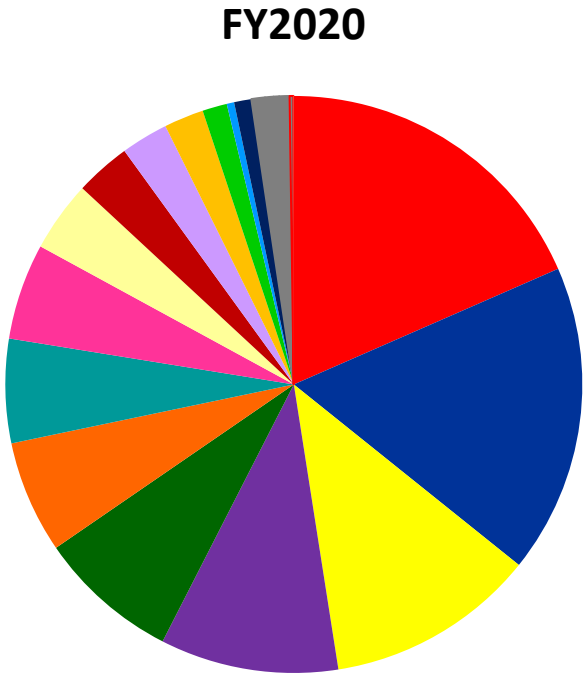
Global Business Distribution



Global Business by Region



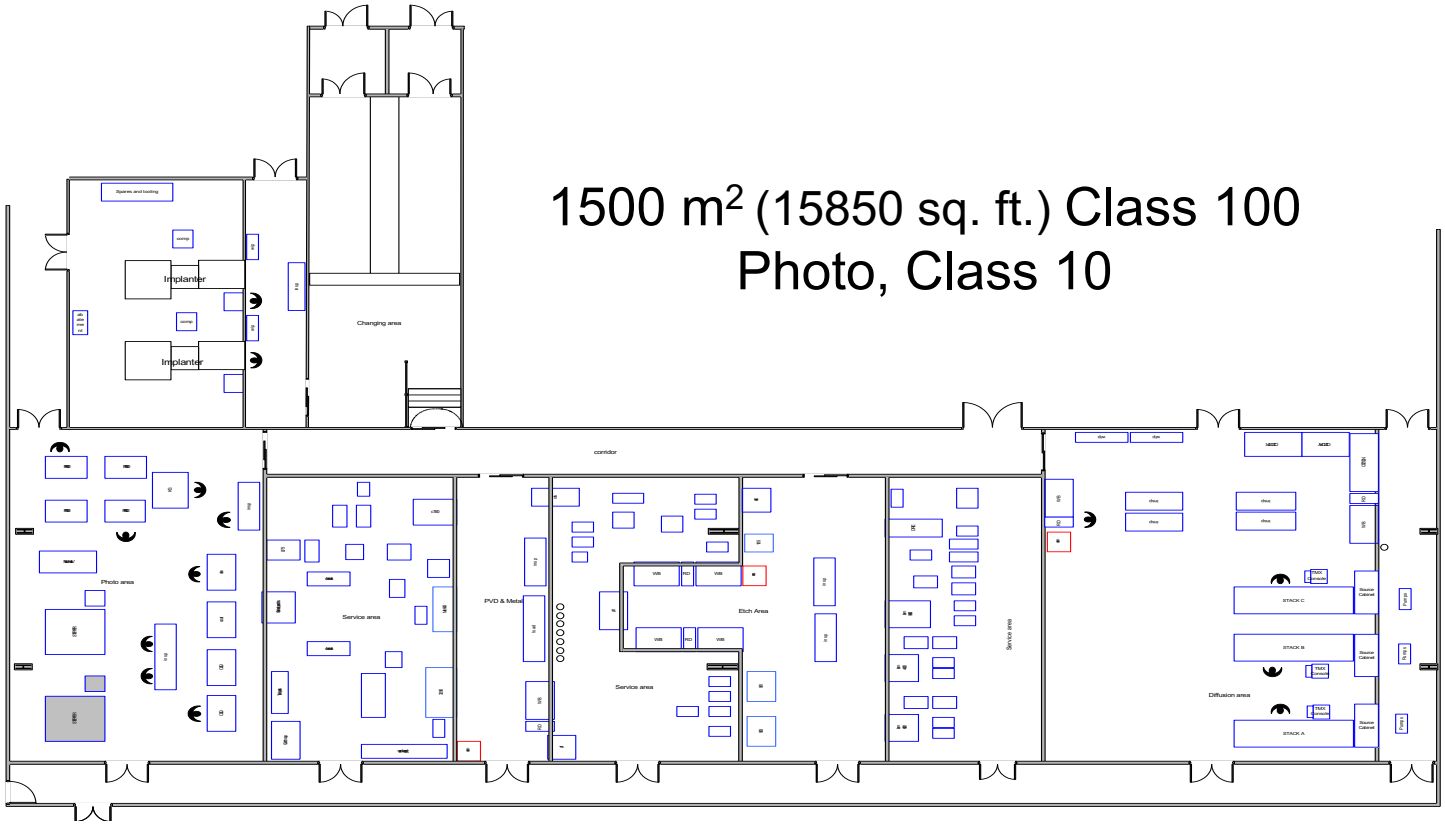
Customer Distribution



Fab3

Mos/Bipolar 150mm

Fab3 – 6” CMOS/Bipolar



1500 m^2 (15850 sq. ft.) Class 100
Photo, Class 10

Fab3 – Process Capability

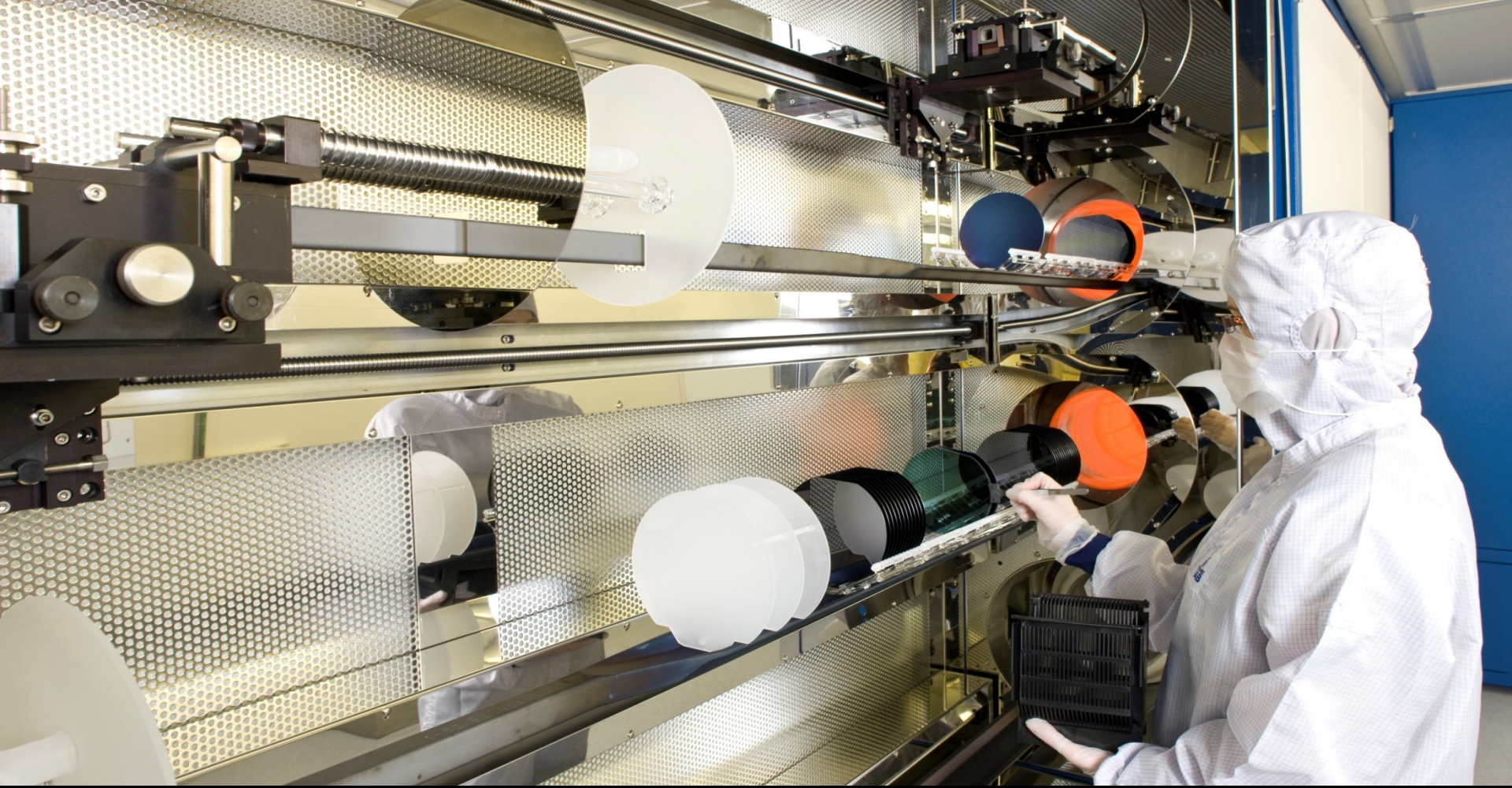
- ASML 5500 Stepper to 0.8µm (capable to 0.5µm)
- Perkin Elmer Projection Alignment to 2.0µm
- Furnace Stack 1: Oxidation, Oxidation, LPCVD PolySi (in situ Phos dope), Phos deposition
- Furnace Stack 2: Oxidation, Oxidation, LPCVD Nitride (Std & Low Stress), Boron deposition
- Furnace Stack 3: Oxidation (SiC), Oxidation, Alloy, LPCVD BP-TEOS
- Mercury Automated Pre-Diffusion Clean System
- Wet Etch – BOE, Metal etch, Solvent strip, PDC
- SVG8800 Coat / Develop Track
- LAM 4420 Nitride / Poly Etch
- LAM 4520 Oxide Etch
- LAM 9600 Metal Etch

Fab3 – Process Capability

- Varian 3290 Al/1%Si, Al/1%Cu , TiW Sputter with pre-etch
- Varian 350DE Ion implanter, B, P,As
- Varian 180XP High Current Ion implanter, B, P, As
- STS Pegasus DRIE
- EVOS 5000 RF etch & Metal Sputter
- Novellus PECVD Thin Films - SiO2, SiN, SiON

Lam

Fab3 – 6” CMOS/Bipolar

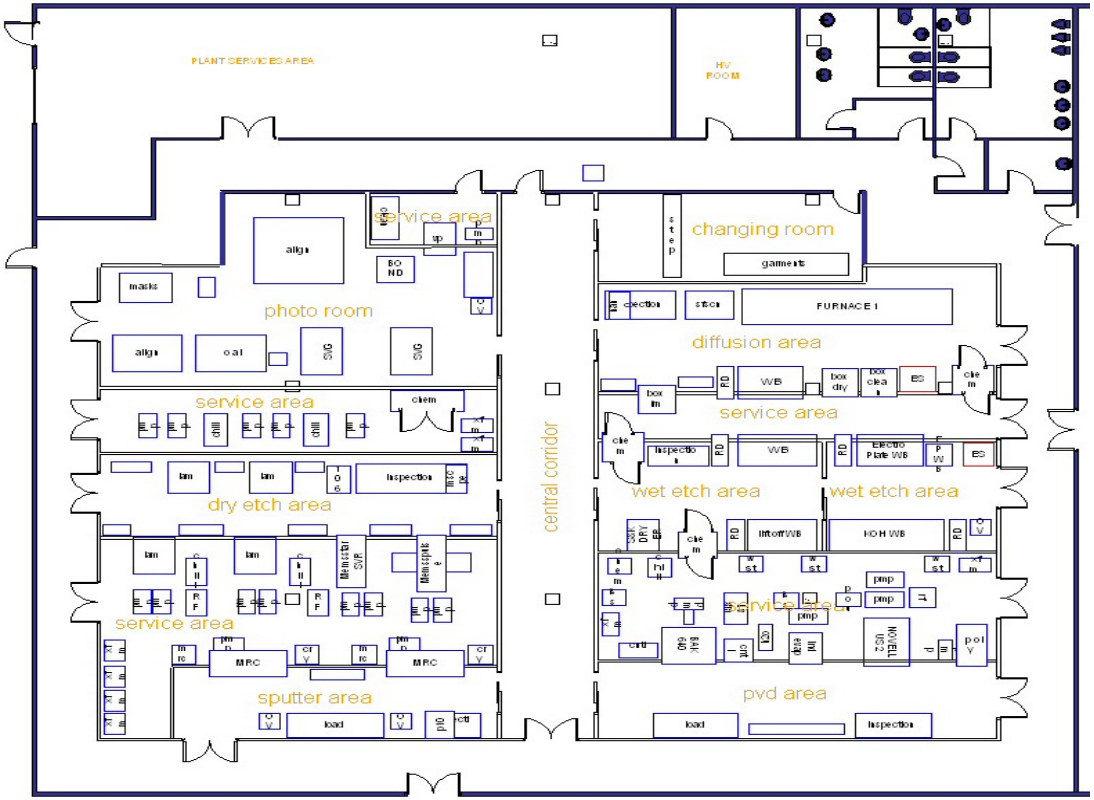


Emergency
stop

Fab2

MEMS 100mm & 150mm

Fab2 – 6” & 4” MEMS



800 m^2 (8450 sq. ft.)
Class 100
Photo, Class 10

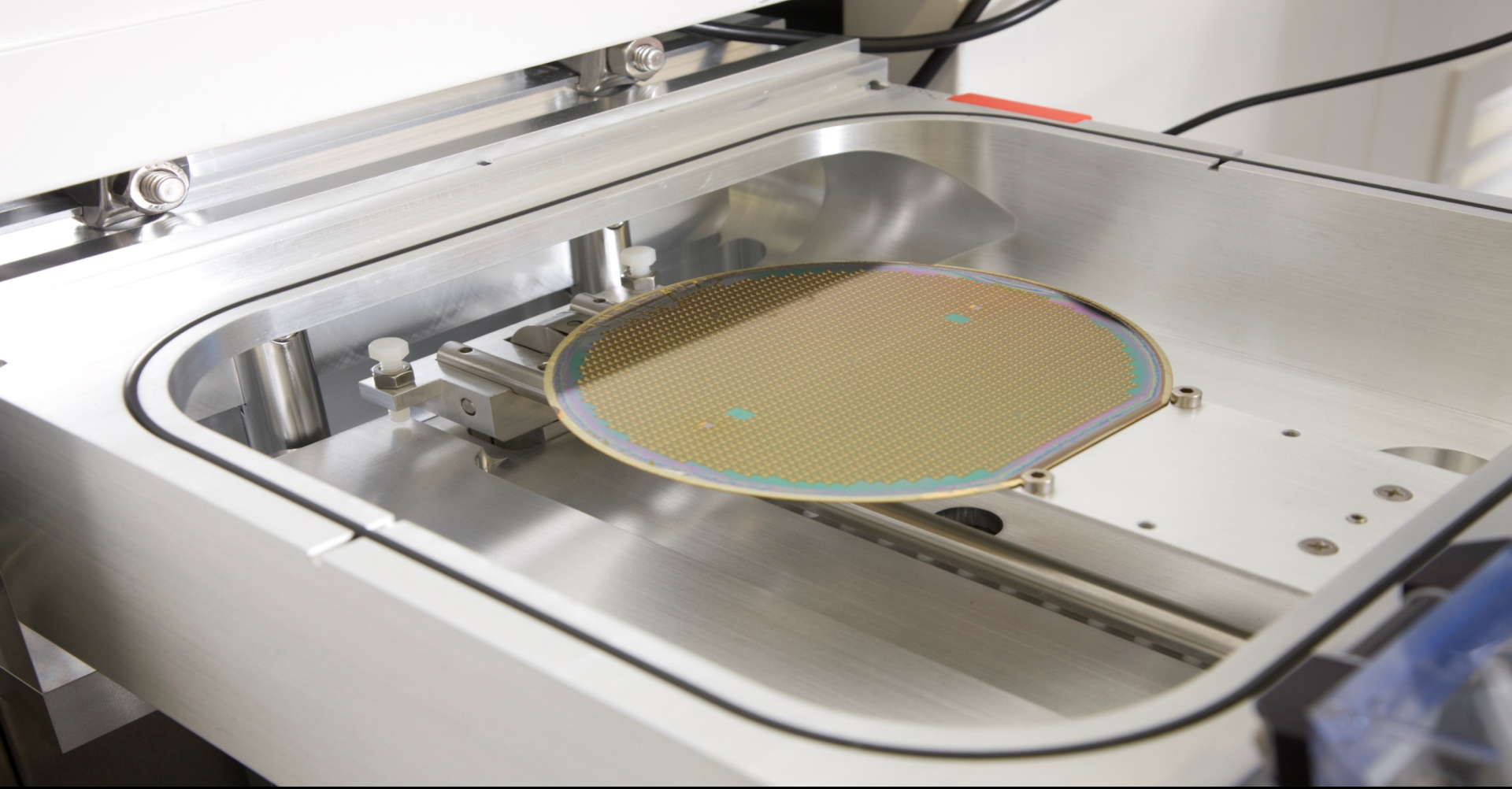
Fab2 – Process Capability

- ASML 2500 i-Line Stepper to 0.8μm
- Double side proximity alignment to 2.0μm
- Furnace Stack: Oxidation; LPCVD PolySi
- Wet Etch - PDC, HF, BOE, Al etch, Si Etch, Solvent Strip
- KOH wet etch
- Acetone & NMP Lift-off
- MRC Multi-Metal Sputter – Au, TiW, Al, AlSi, AlCu, Ti, Ni, NiCr, Al2O3, Constantan, SiCr, Sn
- Balzars Evaporation – Cr, Ni ,Pt, Au, Ti, Ta
- 6” Dry Etch: LAM Rainbow Oxide, Poly/Nitride
- 4” Dry Etch: LAM Autoetch 490 & 590

Fab2 – Process Capability

- Novellus PECVD Thin Films - SiO2, SiN, SiON
- EVG Wafer-Wafer & Wafer-Glass Bonding - Anodic, Eutectic, Fusion
- SVG8800 Coat/Develop track – bulk dispense
- SVG8800 Coat/Develop track – syringe dispense
- Polyimide – coat & bake
- XeF2 dry etch release of Polysilicon
- Resist strip dry etch, Matrix 101
- Critical point drying CO2 / IPA
- STS Pegasus DRIE & APS

Thermo
Heraeus



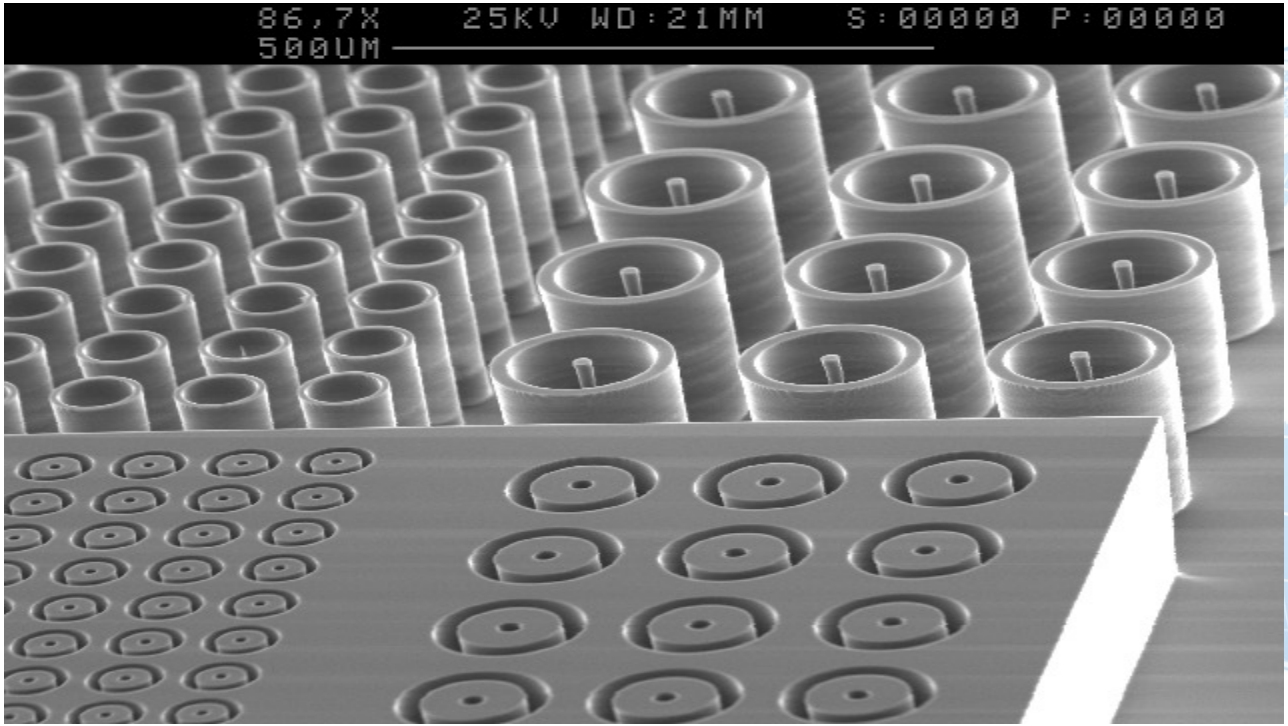
KOH TUBE 1

OXFORD
INCAx-act

Lam

STS

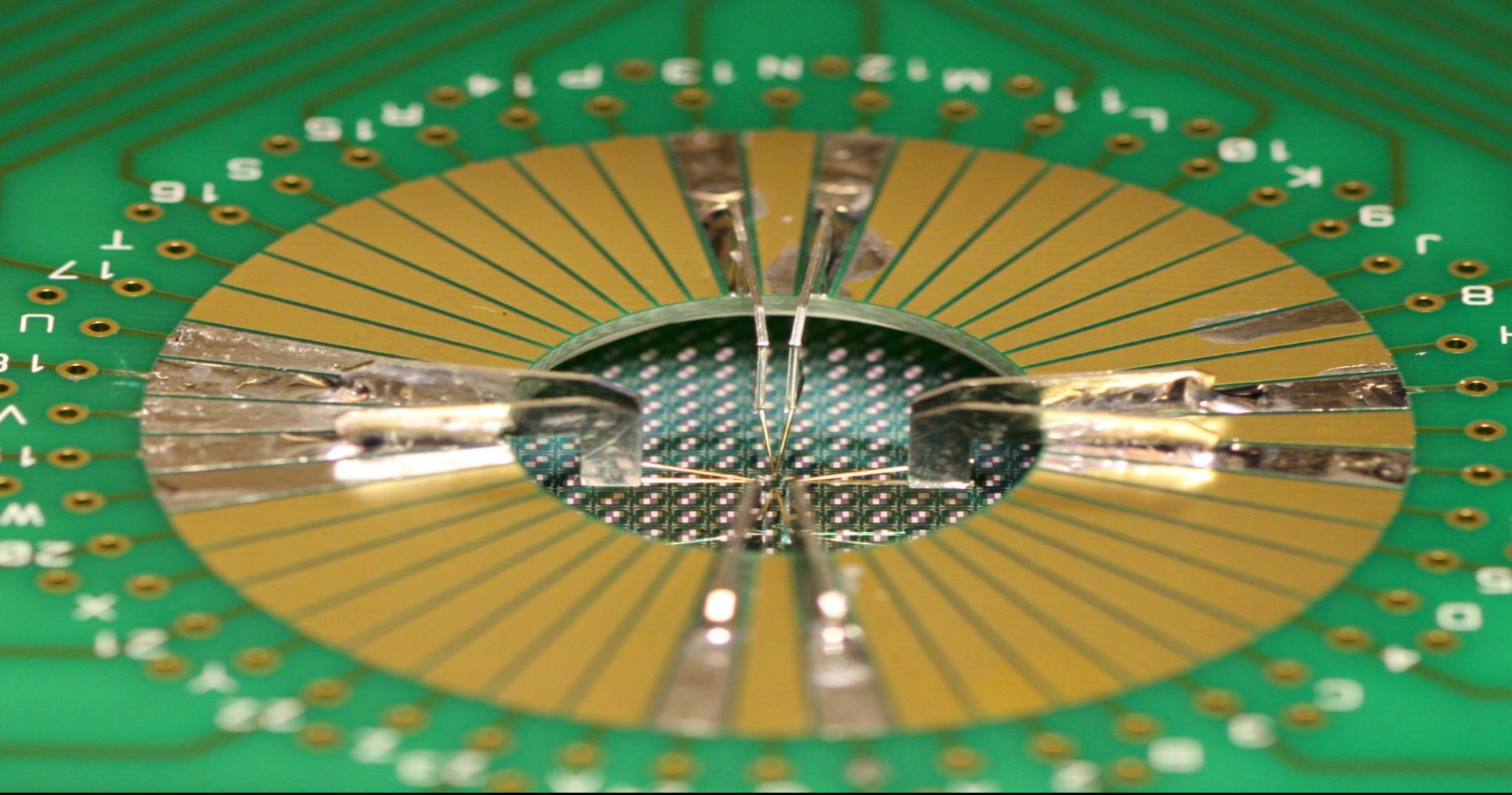
DRIE Test Structures



Probe & Test

Probe & Test Capability

- 360m^2 (2,691 sq.ft.) Probe & Test Floor
- Class 100 Operating Environment (Hoods)
- Reedholm Instruments RI20/RI40 Parametric Tester (3)
- TPixie Mixed Signal ATE (4)
- Tesec 8101TT - Discrete Device Tester (3kV/20A) (1)
- Multitest SOIC / DIP Handlers –40°C to +125°C (5)
- Electroglas 2001X Wafer Auto-probers (7)
- Wentworth 1050 Semi-Auto Prober (high-voltage) (1)
- Thermostream (1)



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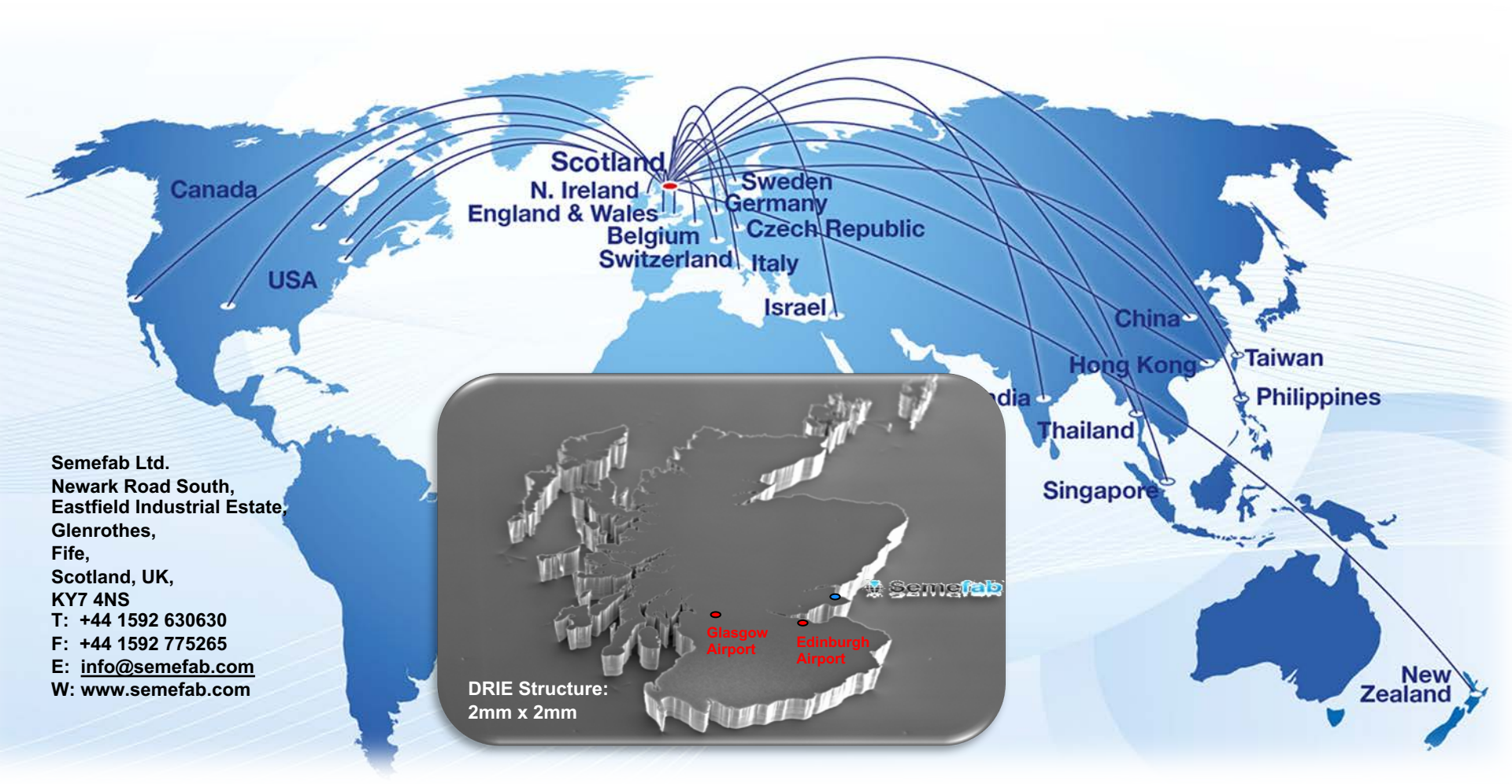

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