Semefab

Delivering Sensor & Microelectronic Solutions Worldwide…

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

Fab1 Operation
100mm CMOS IC‘s
Bipolar transistors

1989

Swiss Watch IC's
South Africa Post Office
Telephone Dialler IC's

1992

CMOS ASICs for
Automotive &
Security

1994

Queen's
Award for
Export

1998

Precision Op Amp foundry
JFET for PIR2000
Queen's Award
International Trade
JFET for PIR MEMS Pressure

2000

Queen's
Award for
Enterprise

2002

Fab 2 (MEMS)
Operational
100mm MEMS
Thermopile MEMS
Gas Sensor

2005

MNT Award £6.8M
DIBiCMOS Foundry
Precision Analogue IC's

2008

New Fab 2 150mm
MEMS Blood
Viscosity

2011

Fab 3
Operational 150mm
ALS for CCTV MEMS
Blood Analysis

2016

30th Anniversary
USA & China
Representation
established

2018

120M JFET for
PIR Sensors
80M Ambient Light
Sensors for CCTV
cameras

2020

12M thermopiles
to China fighting
Covid 19 virus

2024

Semefab enters
Power Semis
Market, Sic
Schottky Diode
and IGBT

Global Reach, >77% Exports

Delivering Sensor & Microelectronic Solutions Worldwide…

- Semefab operates 2 wafer fabs and a probe & test facility on a single site in Glenrothes, UK, across a broad technology base of MEMS sensors, CMOS & Linear IC's and 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 yielding, cost effective manufacture.

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

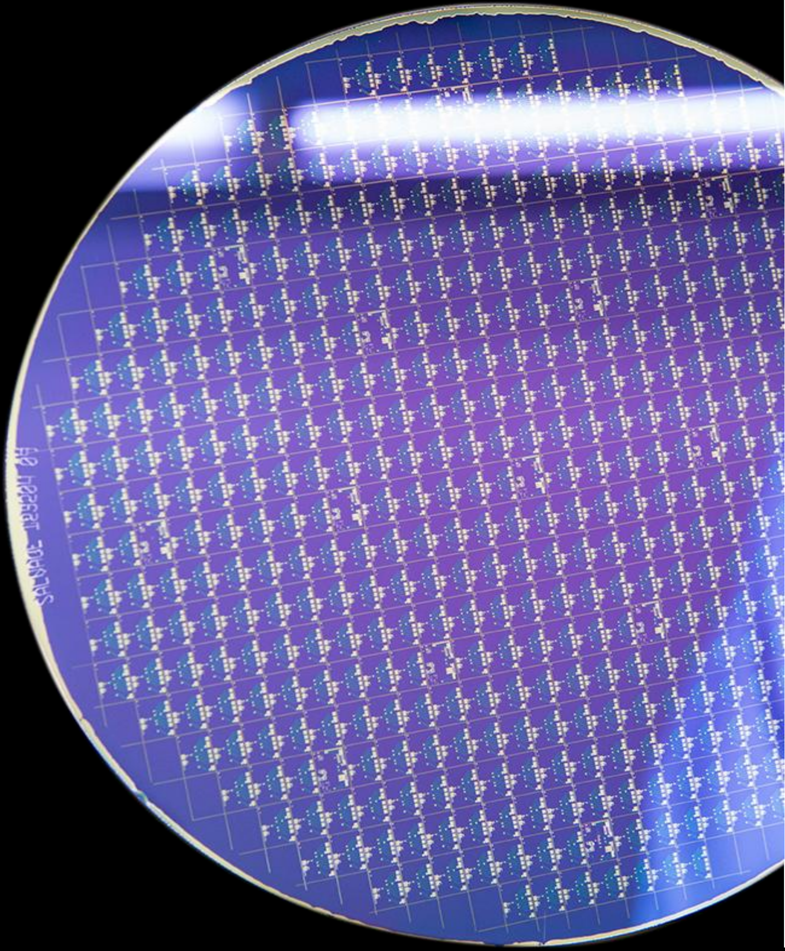
OUR SERVICES

MEMS Foundry

IC Foundry

Discrete Semis

Semefab products



Semefab

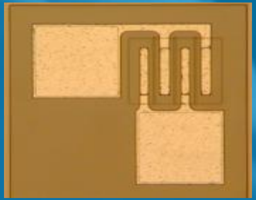
Technology Mix

Opto CMOS ASICs

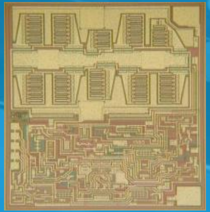
Opto CMOS ASICs

Semefab Ambient Light Sensor (ALS)

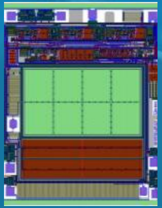
Liquid Nitrogen Cooled JFET Module for Energy Dispersive X-Ray (EDX) Applications.



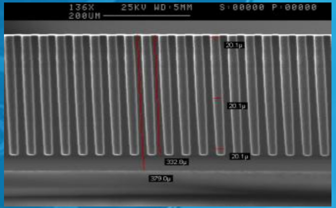
JFET



40V Linear IC



Opto CMOS ALS



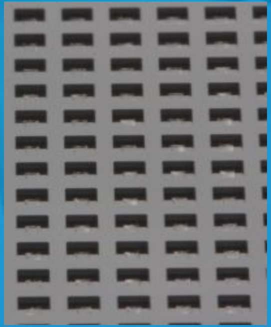
DRIE Silicon Etch

Technology Mix

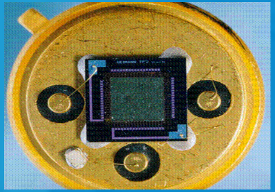
3 Axis Accelerometer

Cantilever Structure Courtesy of:
Microvisk Technologies Inc.

Blood Viscosity Sensor

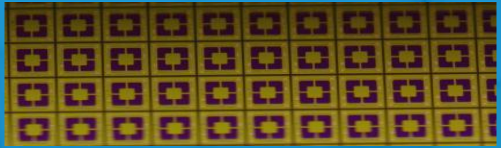


DRIE Cavity Etching
Pressure Sensor



Thermopile

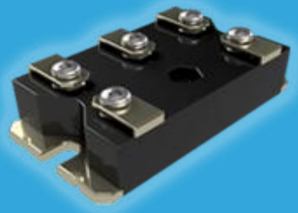
MOX Gas Sensor



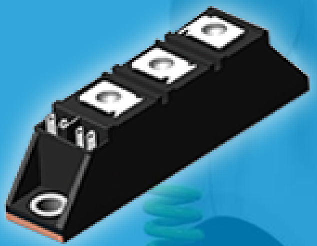
Pressure Sensor

Technology Mix

Semefab Power Semis

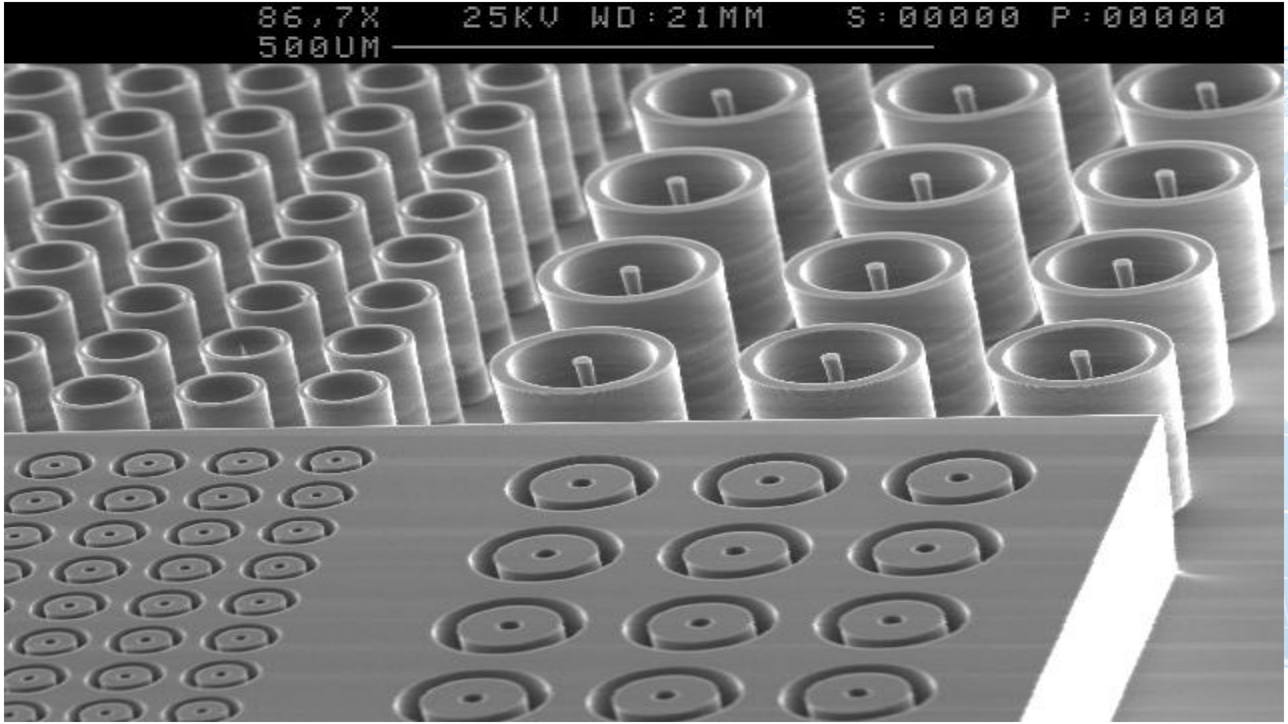

SOT 227 – Multi Chip Package, SiC Schottky & IGBT.
100amp, 1200V


2 & 3 Pin TO220 – SiC Schottky, IGBT or MOSFETs.
75amp, 1200V

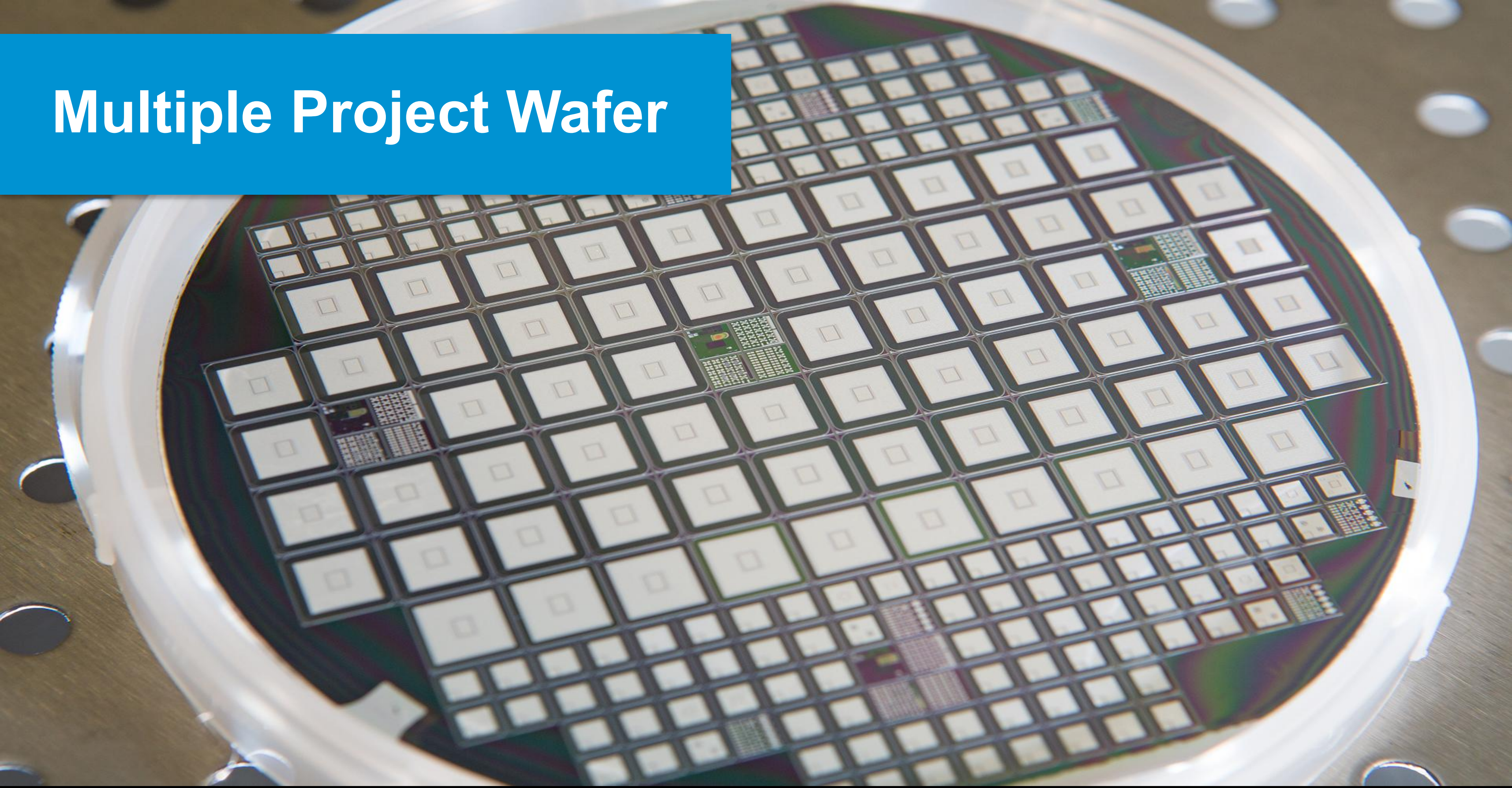

VPMP1 Module
200amp, 1700V


2 & 3 Lead TO247 – SiC Schottky, IGBT or MOSFETs.
75amp, 1700V

Deep Reactive-Ion Etching (DRIE) Test Structures



Multiple Project Wafer



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, including Automotive, Security, Medical, Industrial, Energy and Consumer sectors.
- Global customer base. Europe, North America and Far East.

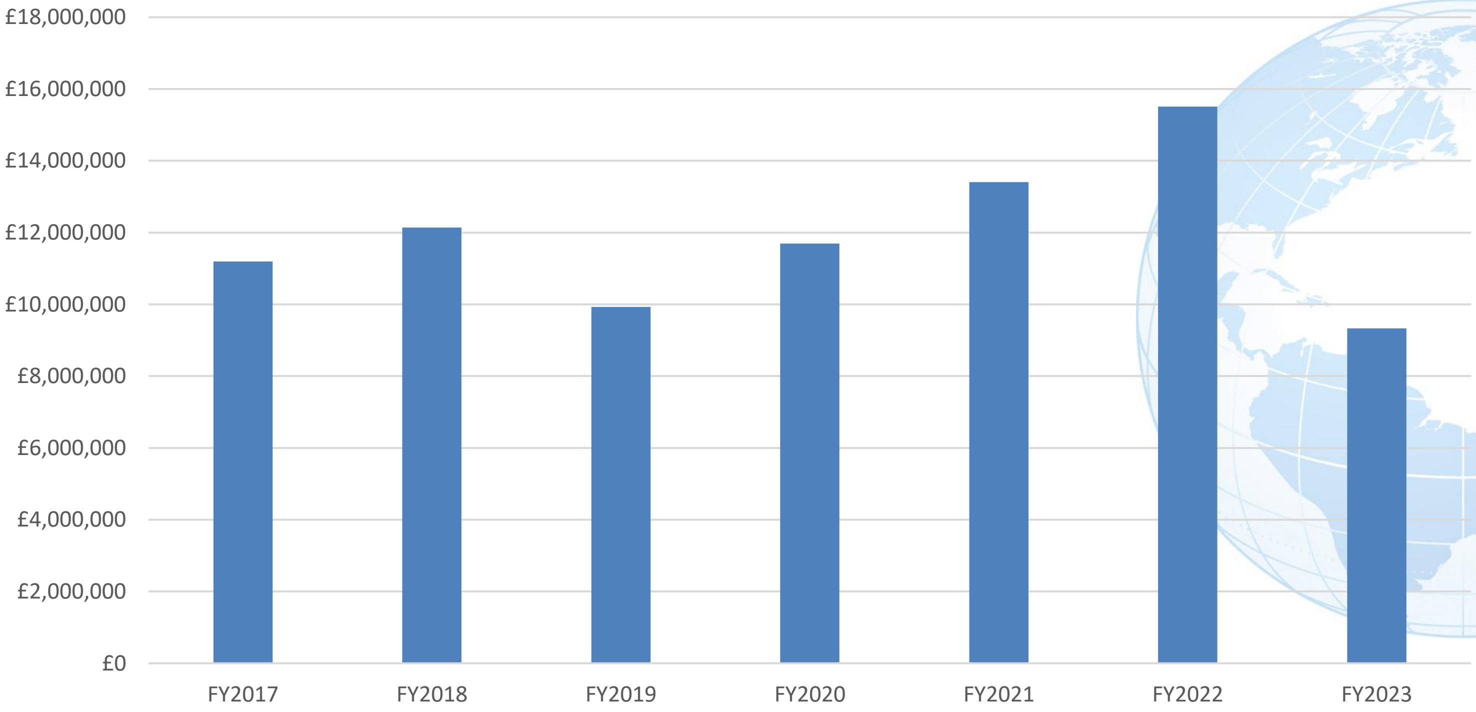
‘Each day, Semefab silicon makes a positive contribution to people‘s modern lifestyle and improves their environment, security and safety.’

Semefab Overview

- Commercial Foundry
- CMOS/Bipolar Foundries – 6”
- MEMS Foundry – 6”
- Limited Capacity on 4”
- Design & Development Partnerships
- Technology Inductions
- Established 1986

- Global Fabrication Player
- 77% Export Bias
- >35 Customers Worldwide
- £15.5M T/0, 15-20% PBT FY22, £9.3M T/0, FY23
- 88 Employees

Semefab Sales Performance

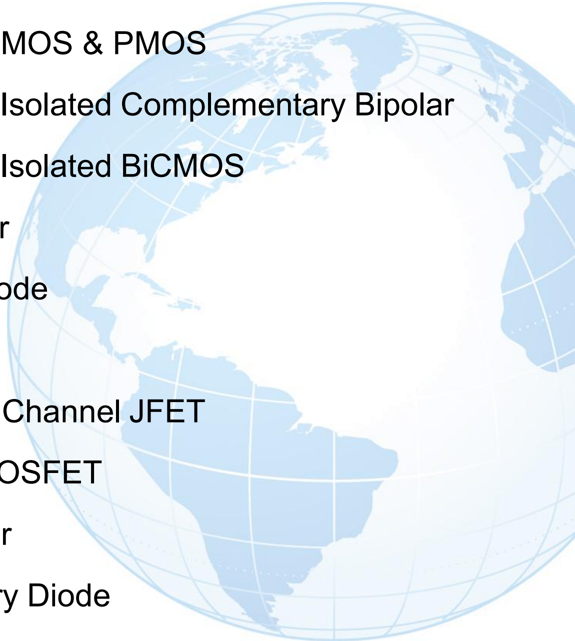


Foundry Operations

Fab Operations:

- Fab 3: 150mm MOS/Bipolar to 0.6µm
- Fab 2: 150mm MEMS to 0.8µm
- Probe & Test Operation
- ISO9001, ISO14001
- UL & ESA Approval

Diverse Process Portfolio:



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

Production Capacity

- Fab 3: 25,000 150mm wafers per year capacity, potential 75,000
- Fab 2: 25,000 150mm 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

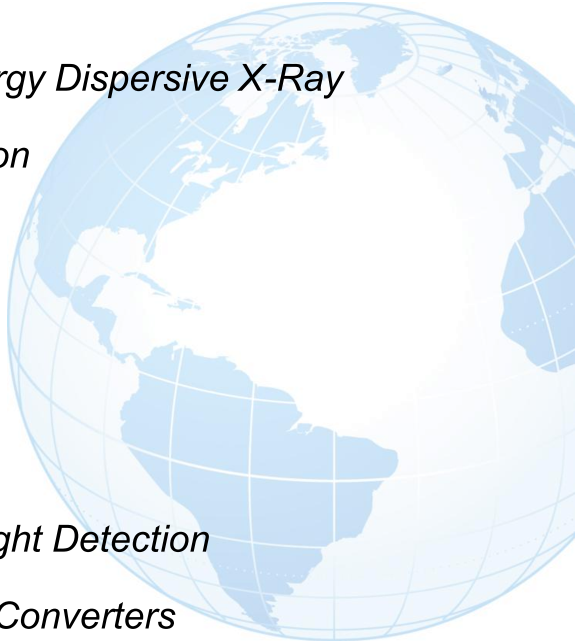
Device Applications Served

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, Voltage Regulators*
Ambient Light Sensor	*CCTV Cameras*
Linear IC 40/60V	*Linear Integrated Circuits to 4 amps & Medium Scale Integrated Circuits.*

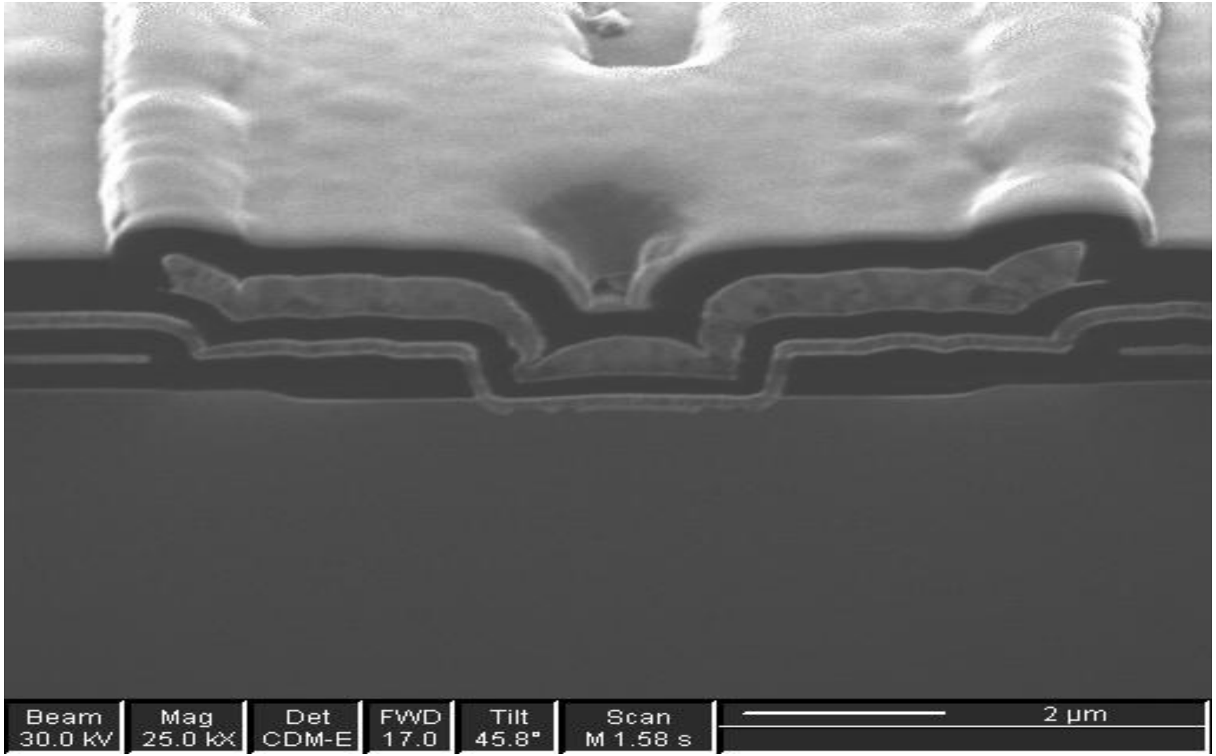
Device Applications Served

Discretes:



JFET	*PIR Motion Sensors & Energy Dispersive X-Ray*
PIN Diode	*Low Leakage Light Detection*
Lateral MOSFET N & P Channel	*Audio Power Amplification*
Bipolar Transistor	*Power Devices & Module*
Fast Recovery Diode	*Power Devices & Module*
RF MOSFET	*RF Base Stations & PMR*
Photodiode Array	*Precision Measurement, Light Detection*
SiC Schottky Diode	*PWM Power Supplies and Converters*
IGBT	*PWM Power Supplies and Converters*

SEM Analysis - 1GHz RF MOSFET Cross Section



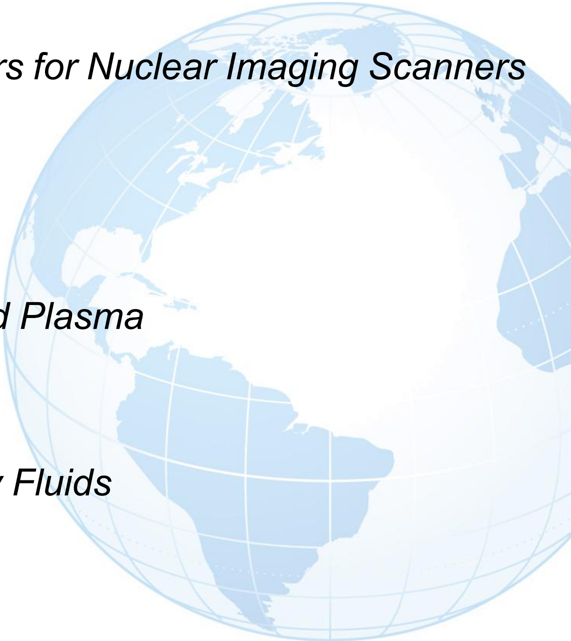
Device Applications Served

MEMS Foundry:

MOX Gas Sensor	*CO and NO2 Detection for Automotive Air Quality & VOC Gas Sensing*
Gas Flow Sensor	*Utility Metering and Anaesthesia Setting*
Pressure Sensors	*Medical, Automotive, Industrial & Consumer Applications – Ranges from Millibar, Bar & 10’s of Bar*
Thermopile	*Non-Contact Temperature & NDIR Gas Sensing*
Liquid Viscosity Sensor	*Blood Coagulation Sensor (INR)*
Gas Thermal Conductivity	*Gas Flow Measurement – Hydrogen*
Opto Electrogratings	*Precision Metrology for Distance*

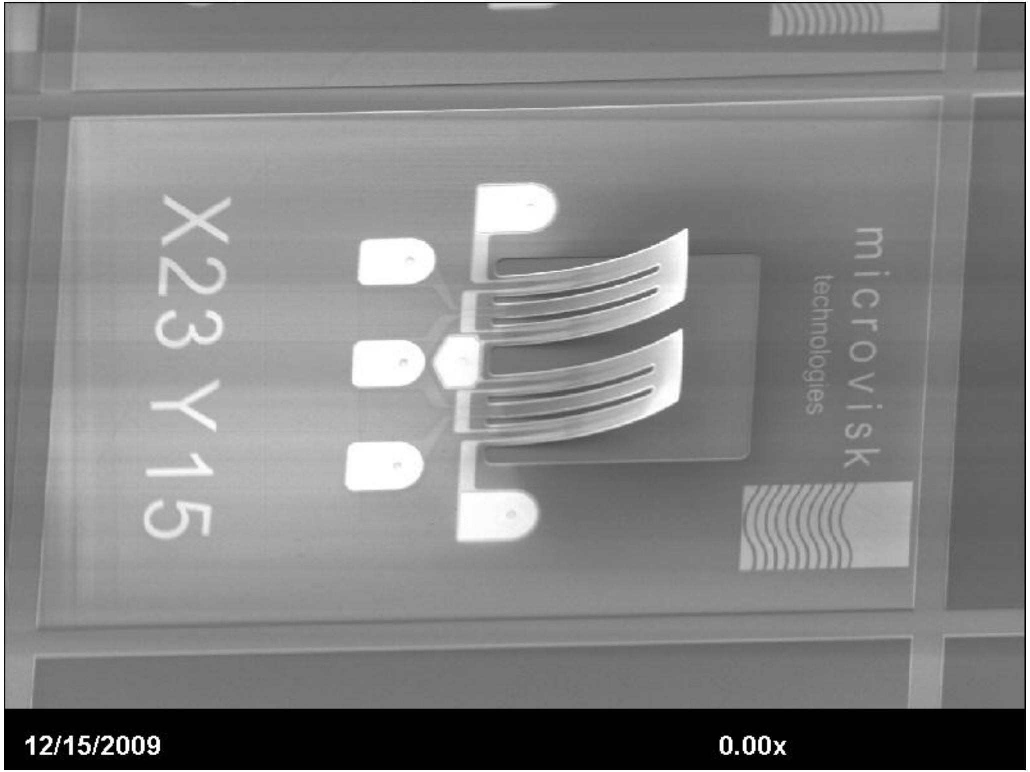
Device Applications Served

MEMS Foundry Continued:



Opto Array	*Pacemakers & Scintillator Detectors for Nuclear Imaging Scanners*
Gas Conductivity Sensor	*Gas Leaks*
Breathing Sensor	*Breathing Envelope Sensor*
FTIR Interposer	*Brain Tumour Detection from Blood Plasma*
Micro-Drop Dispenser	*Chemical Assays*
Multi Analyte Sensor	*Identification of Pathogens in Body Fluids*
Accelerometer	*General Purpose*
Hotplate	*IR Black Body Source*

Blood Viscosity Sensor

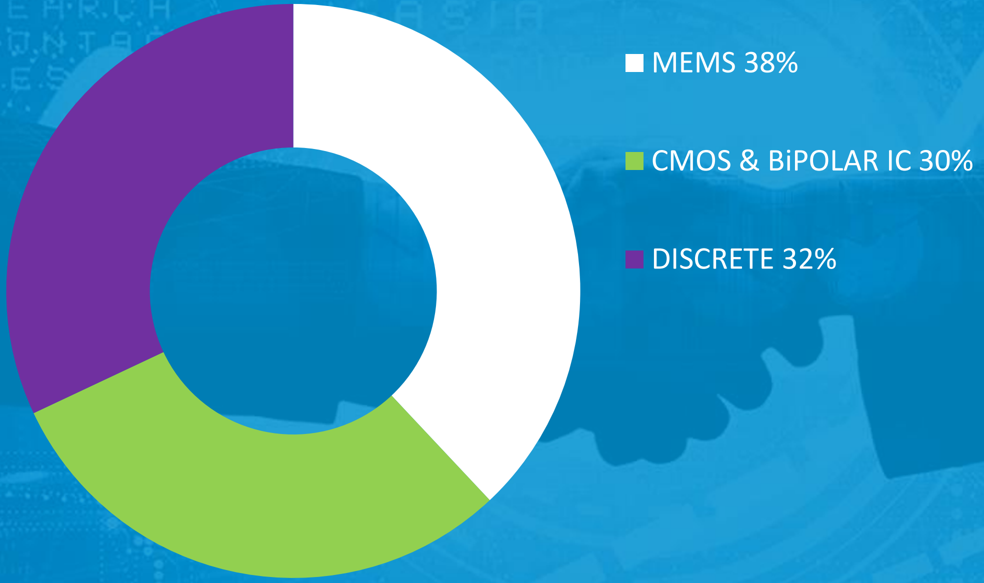


Projects in Development

SiC Schottky Diode (650v, 1.2kV, 1.7kV 20/40 Amps)	*PWM Power Supplies and Converters*
IGBT (1.2 & 1.7kV; 20/40 Amps)	*PWM Power Supplies and Converters*
BTRAN	*Bidirectional Low Loss Switch*
Hybrid Bipolar Transistor	*Low Loss Switching*
Hotplate Sensor	Hydrogen *Gas Sensing*
Breath VOC Sensor	*Pathogens in Breath*
Multi VOC Sensor	*Environmental Pollution Sensor*
Retinal Implant	*Restores Vision in AMD Sufferers*
X-RAY Needle	*Low cost, Low dose X-Ray Source*
High Performance Thermopile	*Absorber Targeting CO2 & Methane Detection*

Global Business Distribution

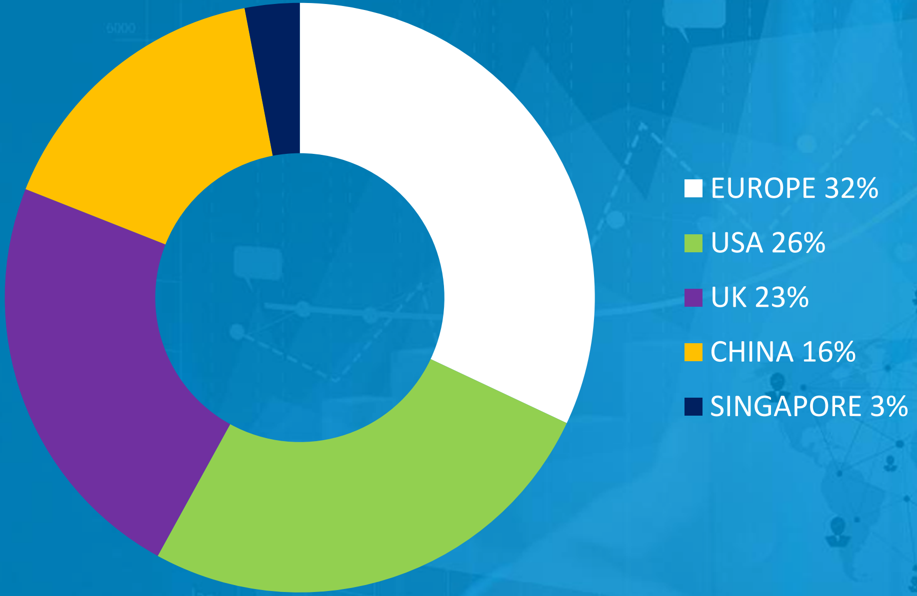
FY2023 Revenue % by Sector



Trend is towards increasing MEMs foundry and Semefab owned power discrete devices.

Global Business by Region

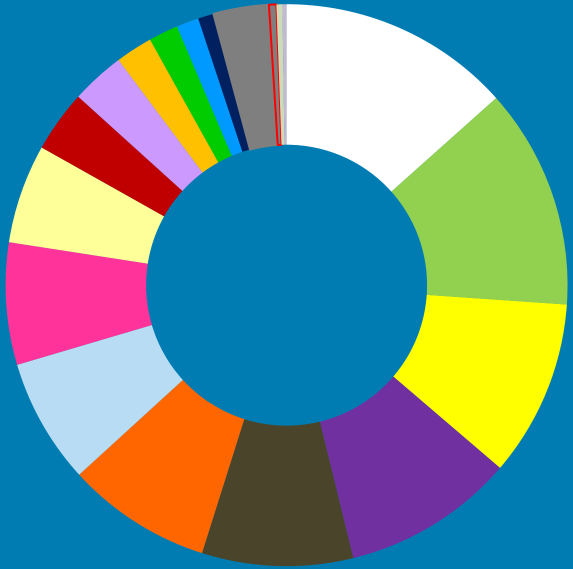
FY2023 by Revenue % of Sales



Semefab is a strong exporter.

Customer Distribution

Customer Spread FY23 by % of Revenue

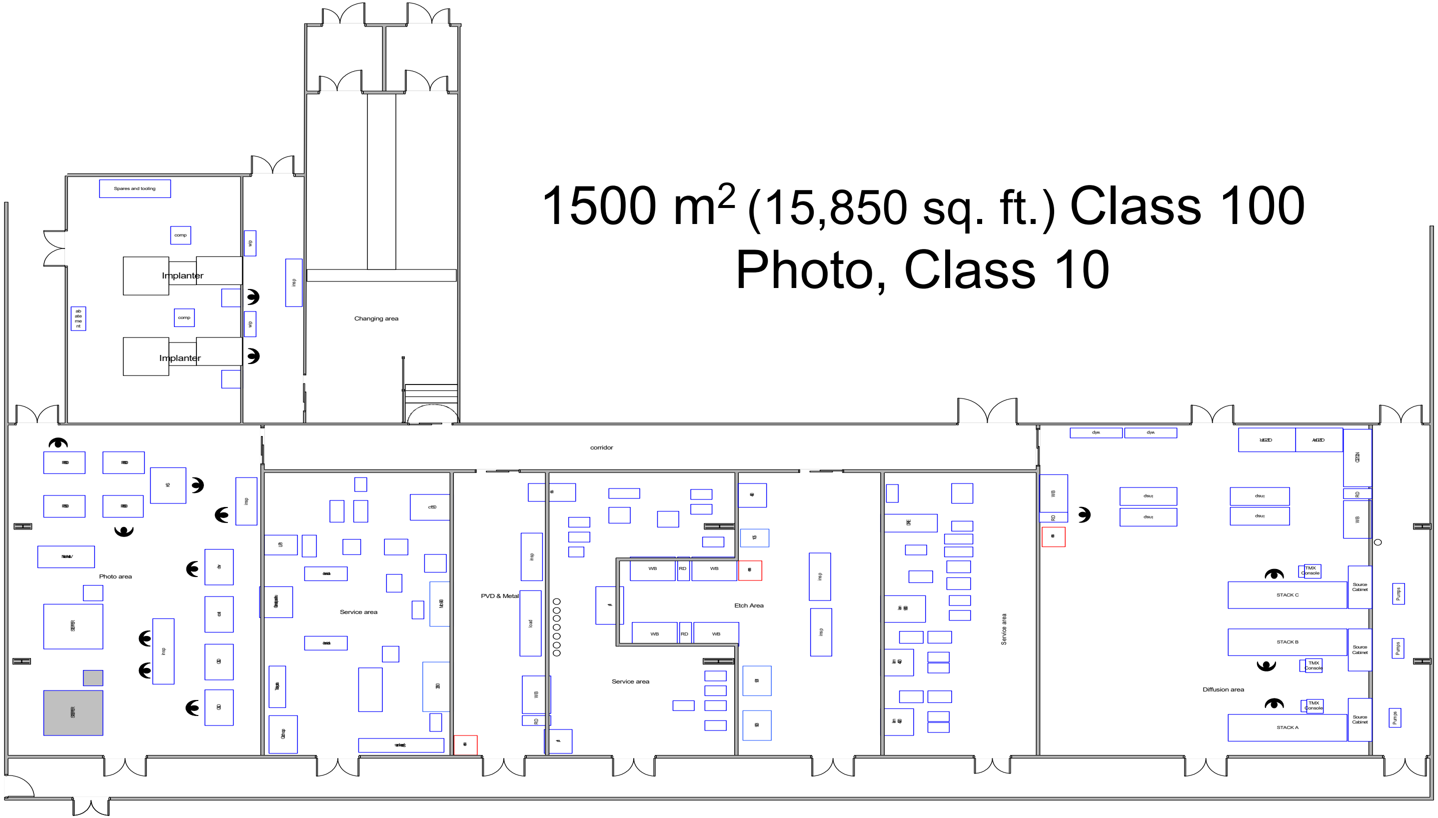


Semefab has a wide and diverse client base, as a result we are not overly reliant on any single customer.

Fab3

MOS/Bipolar 150mm

Fab3 – 150mm CMOS/Bipolar



1500 m^2 (15,850 sq. ft.) Class 100
Photo, Class 10

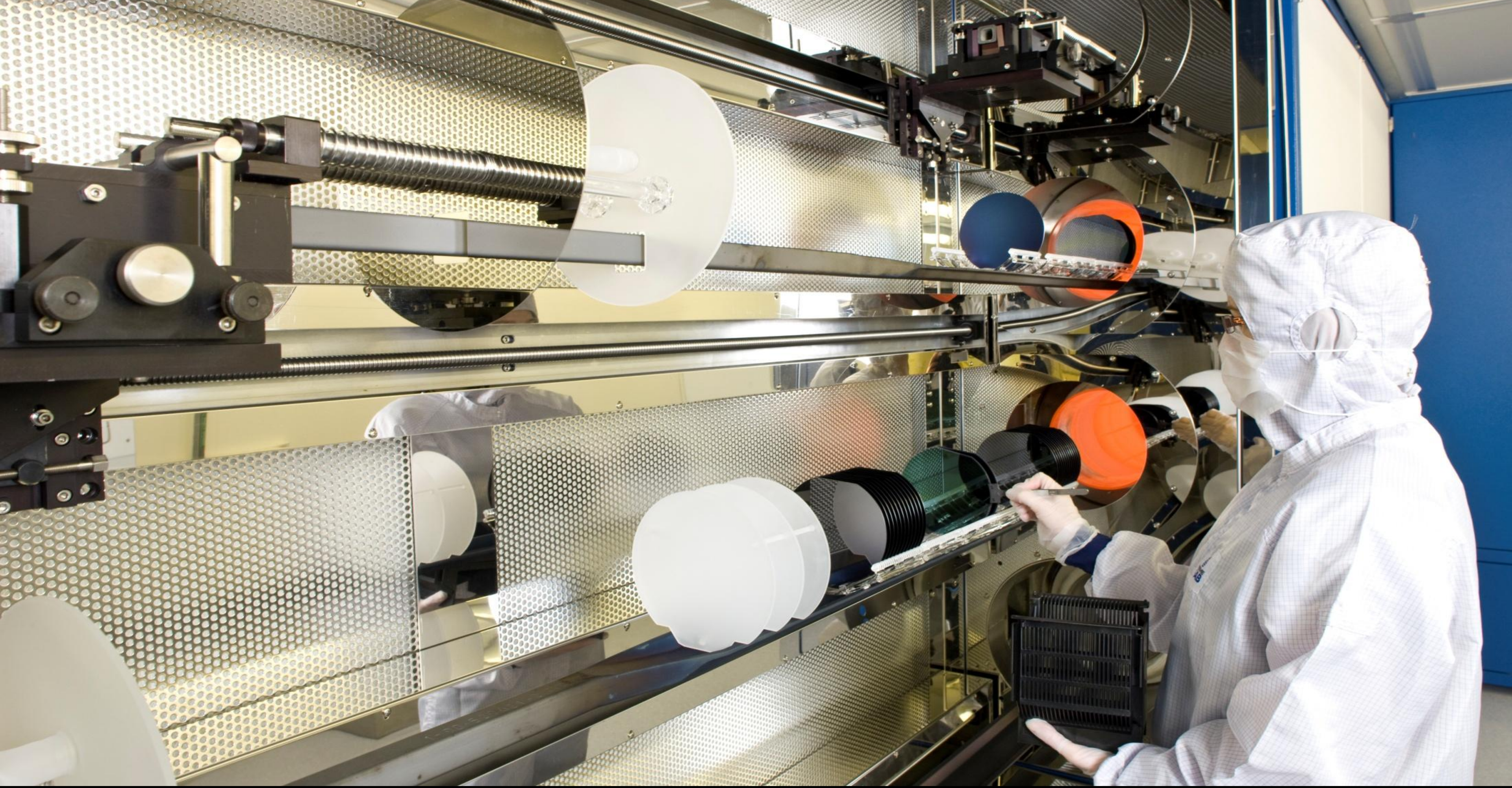
Fab3 – Process Capability

- ASML 5500 Stepper to 0.6µm
- Perkin Elmer Projection Alignment to 2.0µm
- Furnace Stack A: Oxidation, Oxidation, LPCVD Poly Si Dep, POCL$_3$ Dep
- Furnace Stack B: Oxidation, Oxidation, LPCVD Nitride Dep, BBr$_3$ Dep
- Furnace Stack C: High Temp. Oxidation, Oxidation, Alloy, LPCVD P-TEOS Dep
- FSI Mercury Automated Pre-Diffusion Clean System
- Wet Etch – BOE, HF, Metal etch, Solvent Strip, Resist Strip, Deglaze
- Plasma Resist Strip
- SVG8800 Coat / Develop Track
- LAM 4420 Nitride / Poly Etch

Fab3 – Process Capability

- LAM 4520 Oxide Etch
- LAM 9600 Metal Etch
- 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
- Rapid Thermal Anneal


NANO1
FC1
FC2
FC3
FB1
FB2
FB3
FB4

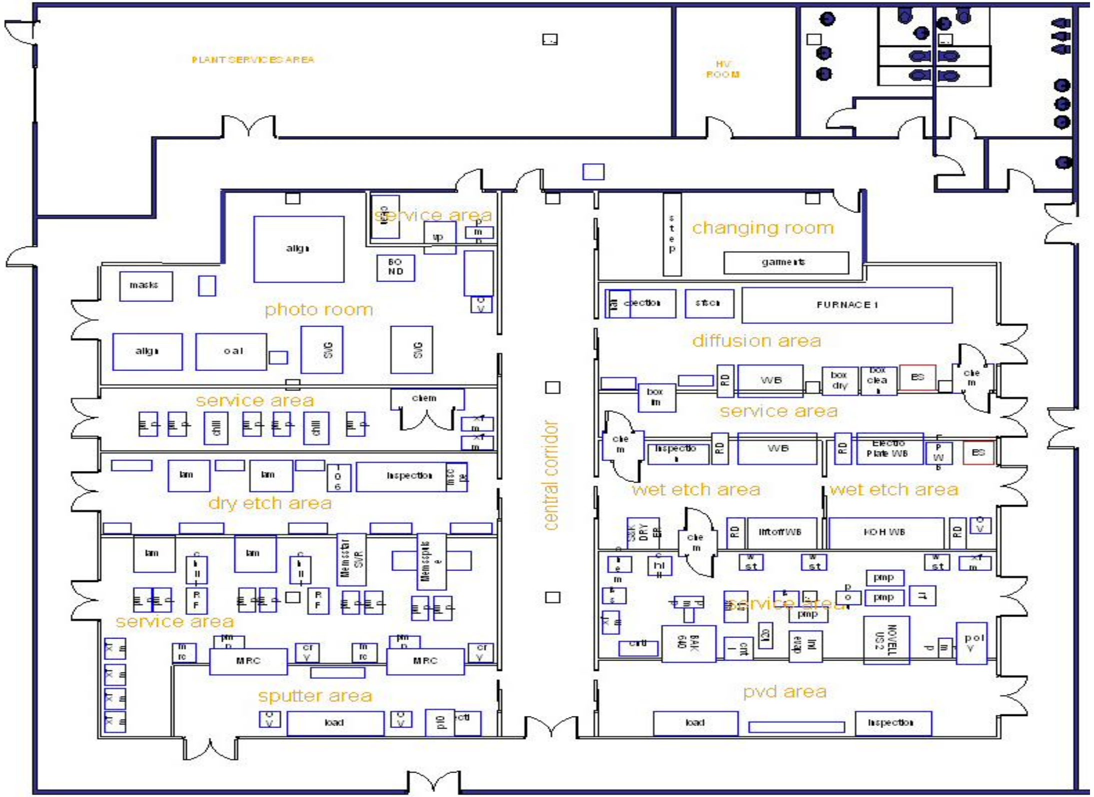



Emergency stop
EMERGENCY

Fab2

MEMS 150mm

Fab2 – 150mm MEMS



800 m^2 (8,450 sq. ft.)

Class 100

Photo, Class 10

Fab2 – Process Capability

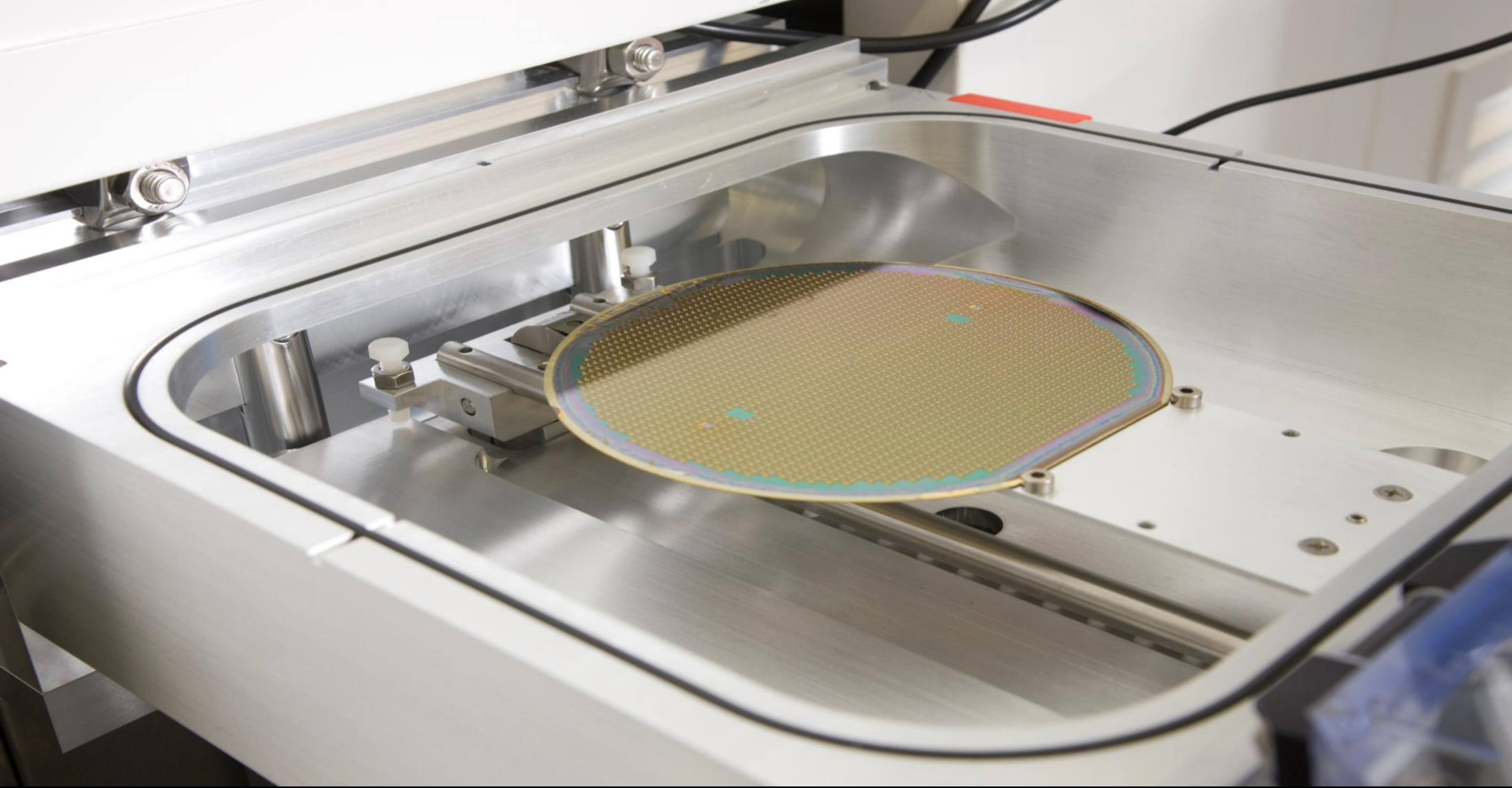
- SVG8800 Coat/Develop Track – Bulk Dispense
- SVG8800 Coat/Develop Track – Syringe Dispense
- Polyimide – Coat & Bake
- ASML 2500 i-Line Stepper to 0.8μm
- Double Side Proximity Alignment to 2.0μm
- Furnace Stack: Oxidation, Anneal, LPCVD PolySi
- Wet Etch - PDC, HF, BOE, Al etch, Si Etch, Solvent Strip
- KOH Wet Etch
- Acetone & NMP Lift-off
- MRC Multi-Metal Sputter – Au, TiW, Al, AlSi, AlCu, Ti, Ni, NiCr, Al2O3, Constantan, SiCr, Sn

Fab2 – Process Capability

- Balzars Evaporation – Cr, Ni ,Pt, Au, Ti, Ta
- 150mm Dry Etch: LAM Rainbow Oxide, Poly/Nitride
- Novellus PECVD Thin Films - SiO2, SiN, SiON
- EVG Wafer-Wafer & Wafer-Glass Bonding - Anodic, Eutectic, Fusion
- XeF2 Dry Etch Release of Polysilicon
- Resist Strip Dry Etch, Matrix 101
- Critical Point Drying CO2 / IPA
- STS Pegasus DRIE & ICP
- SEM with EDX Analysis


mrc


EVG 520IS
EVG
Thermo
Heraeus




KOH TUB 1


OXFORD INSTRUMENTS
INCAx-act
PentaFET Precision
CAMBRIDGE INSTRUMENTS LTD.

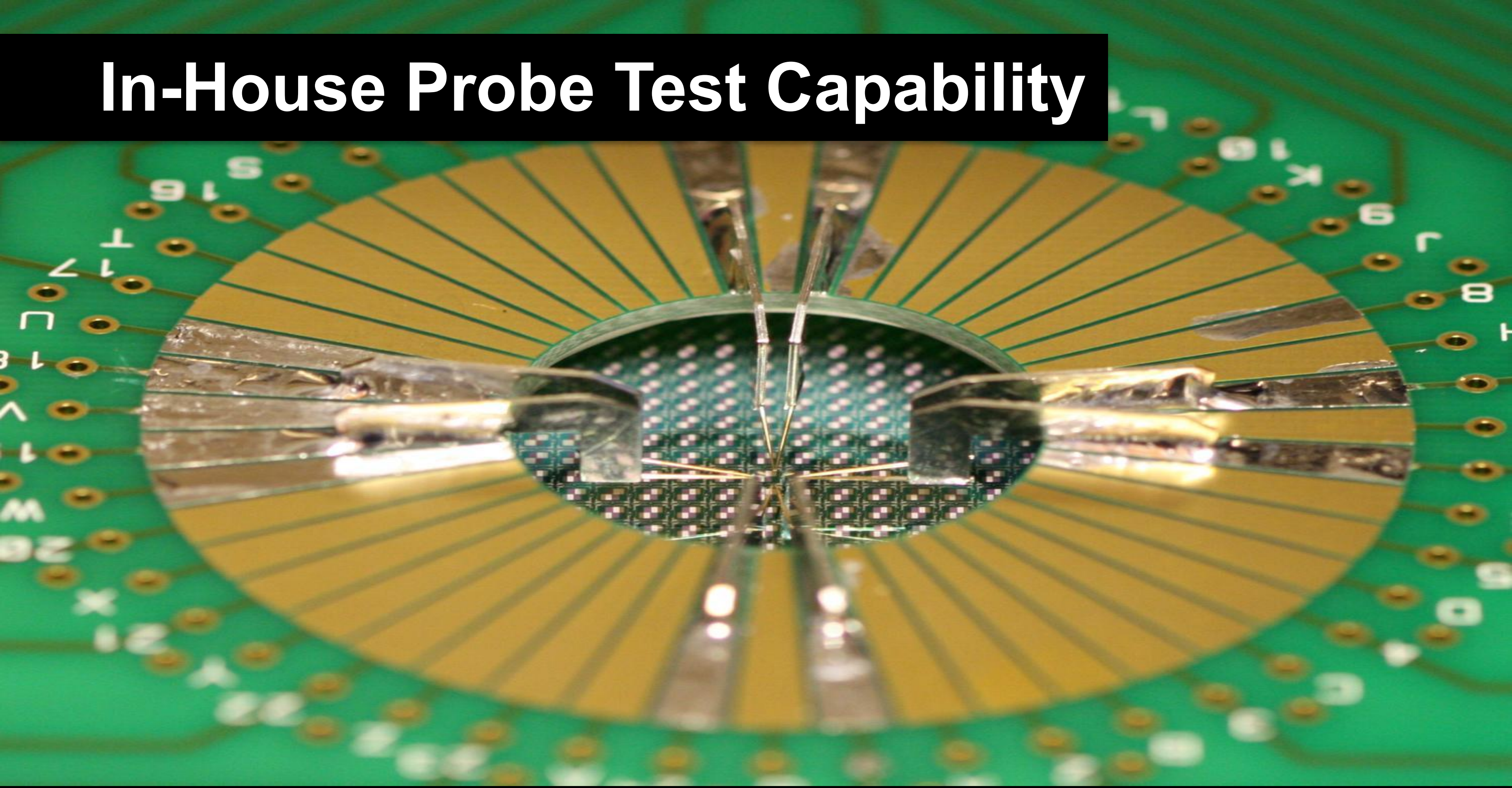

STS
STS

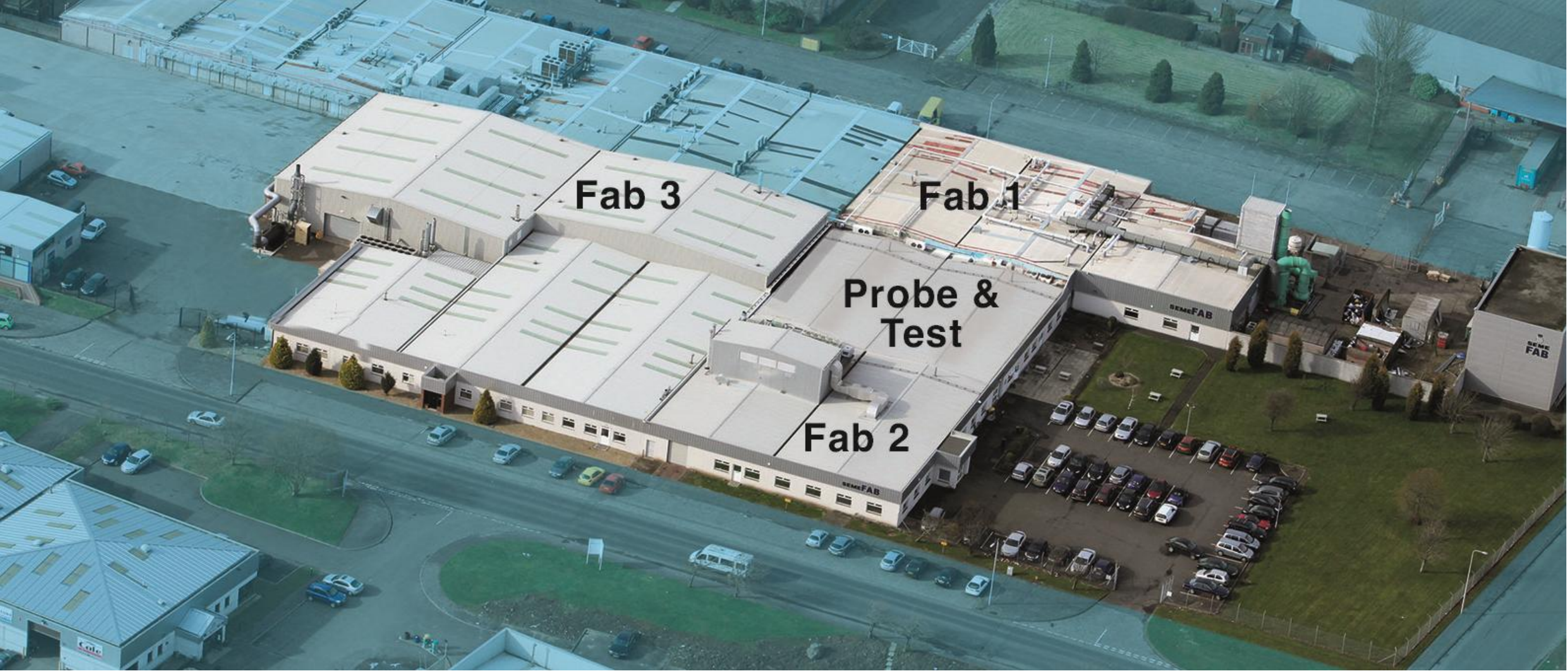
Probe & Test

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)

In-House Probe Test Capability





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