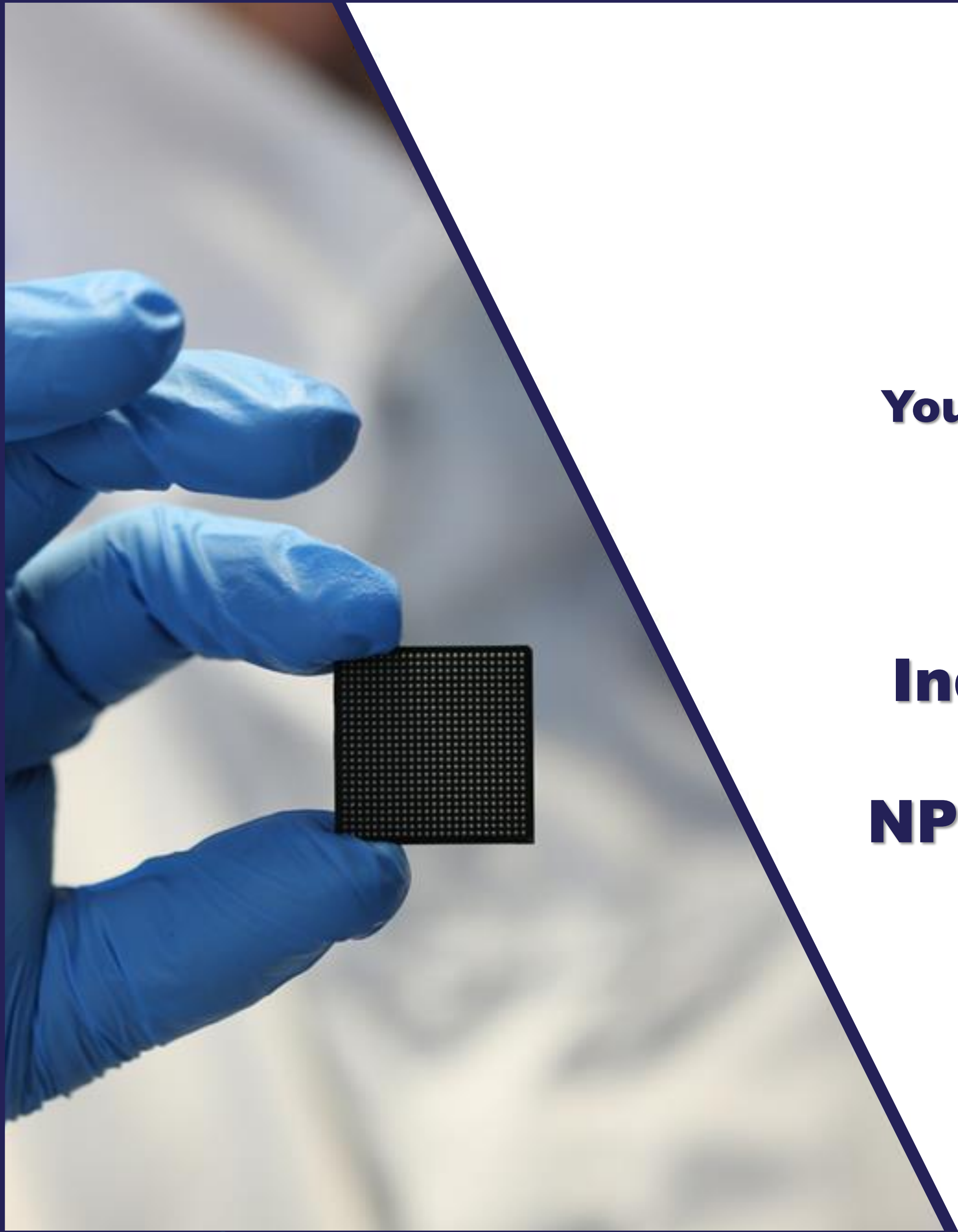


SYNERGIE CAD PSC
PARTNER SEMICONDUCTORS

Your KEY PARTNER for All Semiconductor Applications

Semiconductor IC's
Industrialisation & Production Services
-
NPI and Production Supply Chain services

sales-psc@synergie-cad.fr

February 14, 2025

MISSIONS

- ✓ **Semiconductors Back-End TurnKey (small series to large series)**

  European supply chain – Asian Supply chain

- ✓ **European Assembly & Test House for small and mid series**

  Unique in-house global Engineering & Manufacturing Solution(s)

Packaging | **Test** | **Reliability** | **PCB's Probe Cards**

NPI & Production Supply Chain

ABOUT

SYNERGIE CAD GROUP

450 Employees

PCB / Electronics Boards
Probe Cards
Reliability systems

Capabilities in
- PCB Engineering
- PCB Design
- PCB Manufacturing
- PCB Assembly
- Probe Card Assembly

International group present in 14 countries
Head Quartered in Carros, France

SYNERGIE CAD PSC
Partner SemiConductors

38 Employees

Semiconductors
Industrialization & Production

Capabilities in
- PCB Engineering
- PCB Mounting/Assembly
- IC Packaging
- IC Test Development & Production
- IC Reliability Qualification

Toulouse and Grenoble, France
IC Operations in Toulouse

SYNERGIE CAD GLOBAL PRESENCE

- 2 PCB's Factories
- 2 PCB's Auto Assembly Lines
- 1 Probe Card assembly Line
- 11 PCB Design Centers

- 2 Test Houses
- 1 Package Design Center
- 1 Packaging line
- 1 Reliability Lab.

18 SITES

EUROPE

Carros (Nice) Headquarter FRANCE
Meyreuil (Aix-en-Provence) FRANCE
Colombe (Grenoble) FRANCE
Toulouse FRANCE
Chiari (Milan) ITALY
Terni (Rome) ITALY
Catania (Sicilia) ITALY
Lincoln UNITED KINGDOM
Ismaning (Munich) GERMANY

ASIA

Ang Mo Kio SINGAPORE
Penang MALAYSIA
Seoul KOREA
Muntinlupa PHILIPPINES
Hsin Chu TAIWAN
Hainoï VIETNAM – New PCB Factory under Construction

USA

Santa Clara CALIFORNIA
Dallas TEXAS

AFRICA

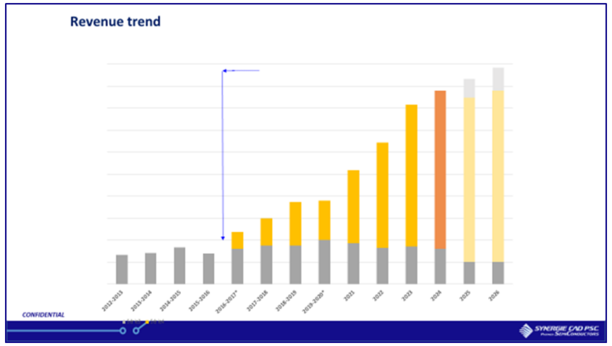
Casablanca MOROCCO

ABOUT

- ✓ **2000 : Creation around PCB Engineering & Fabrication services**

- ✓ **2017 : Semiconductors IC's industrialisation and production becomes the core activity**
  - **Acquisition of Packaging line from NXP / Freescale**
  - **Rapatriation of all Group test activities**
  - **Initiation of Back-End TurnKey activity**

- ✓ **+25% Average Annual Growth**



Revenue trend

CONFIDENTIAL

- ✓ **New global site Factory @ Toulouse by July-2025**
  - **2100m² total surface – secured site**

Move to new site – 1600m²
June-2025

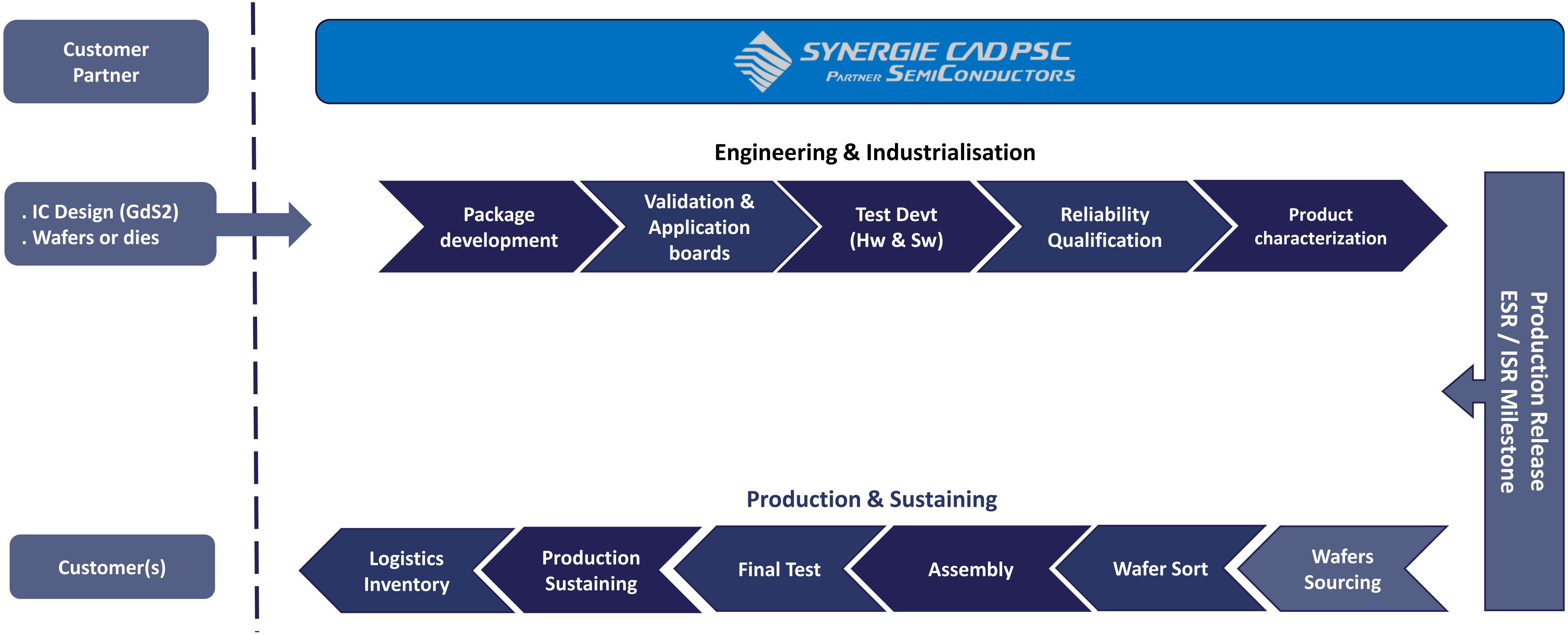
Grenoble site: ~ 400m²
Hardware & Test Engineering
Chemin des Noyers-38690 Colombe

Toulouse Site 1 : 700m²
Test & Reliability
Operations
12 rue de Caulet -31300 Toulouse

May-22 : Move Packaging
Line to TAS site 200m²
JF. CHampollion-31100 Toulouse

SEMICONDUCTORS TURNKEY SOLUTIONS

From “Gds2 or wafers” to “Finished Goods delivery”



Customer
Partner

SYNERGIE CAD PSC
Partner SemiConductors

. IC Design (GdS2)
. Wafers or dies

Engineering & Industrialisation

- Package development
- Validation & Application boards
- Test Devt (Hw & Sw)
- Reliability Qualification
- Product characterization

Production Release
ESR / ISR Milestone

Production & Sustaining

- Wafers Sourcing
- Wafer Sort
- Assembly
- Final Test
- Production Sustaining
- Logistics Inventory

Customer(s)

DOMAINS


Consumer

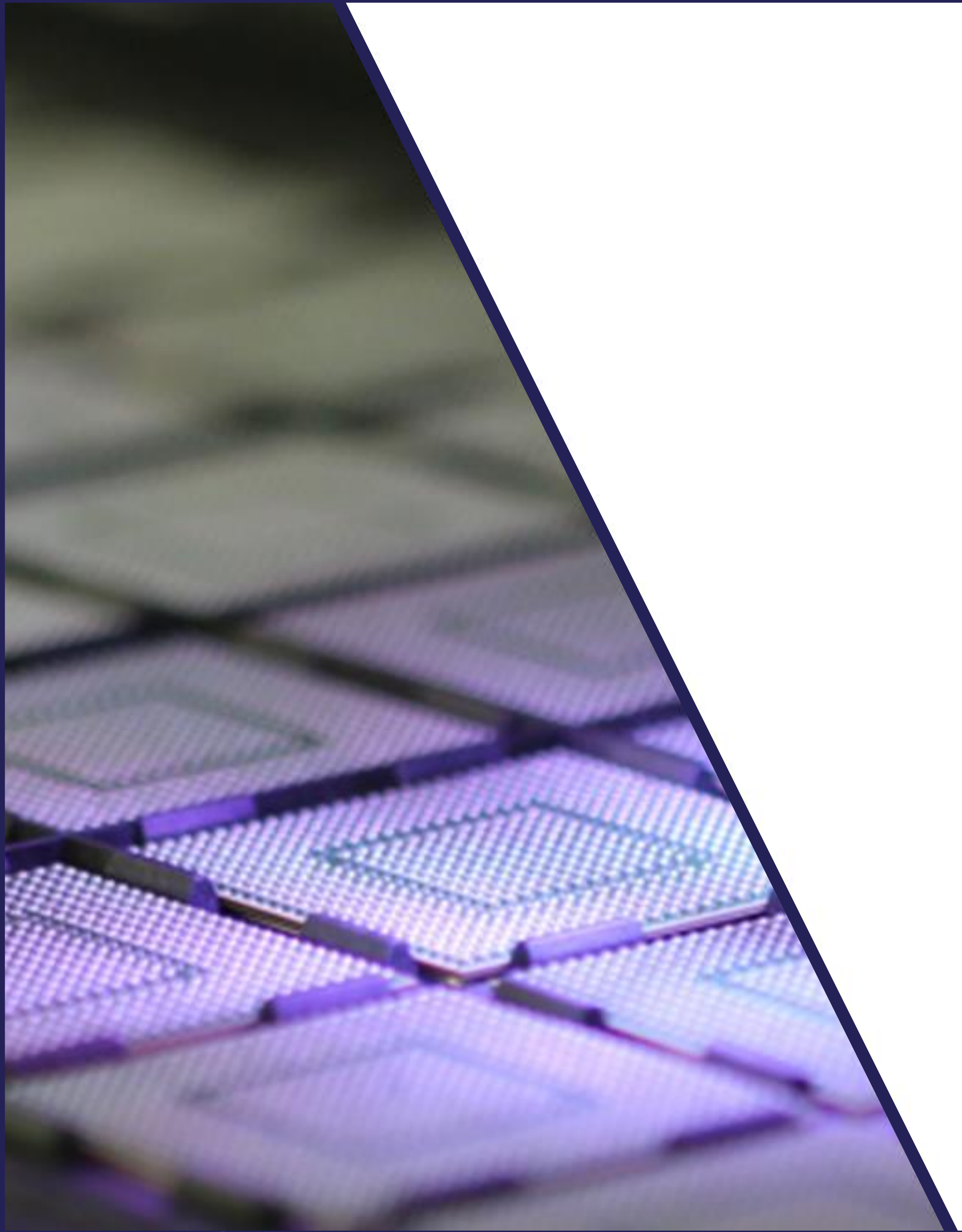

Industrial


Automotive


Telecommunications


AI & HPC


Space & Defence



PACKAGING

Design & Assembly Capabilities

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Design & Assembly Capabilities - Overview

Packaging

Package Design

&

Simulations
(Electrical, Thermal)

Small and mid series assembly
-
Internal
European supply chain
-
Location : Toulouse (France)

SiPack

Mid & Large series assembly
-
Tier 1&2 OSAT
Aggregation partners
-
Location : Asia

Assembly & Design Rules

Packaging & Assembly Line

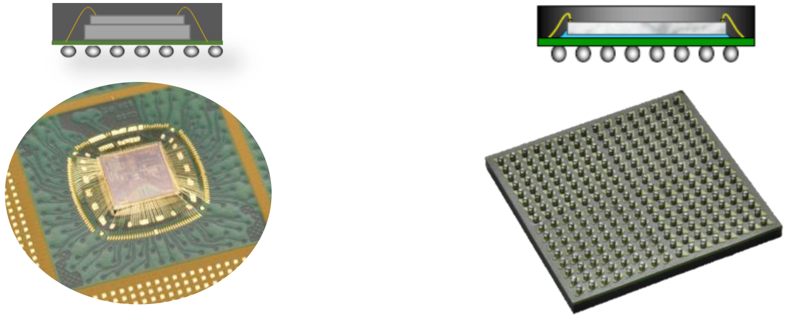
Location : Toulouse (France)

- ✓ Located in Toulouse (France)
- ✓ Clean room ISO7
- ✓ Moved from prototyping to small-mid volumes in 2022

Packaging assembly capabilities - BGA/LGA type(s)

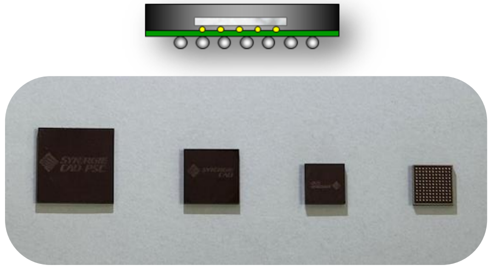
WB-BGA (xfbga)

Overmoulded Wire Bonded BGA - 3x3mm to 17x17mm



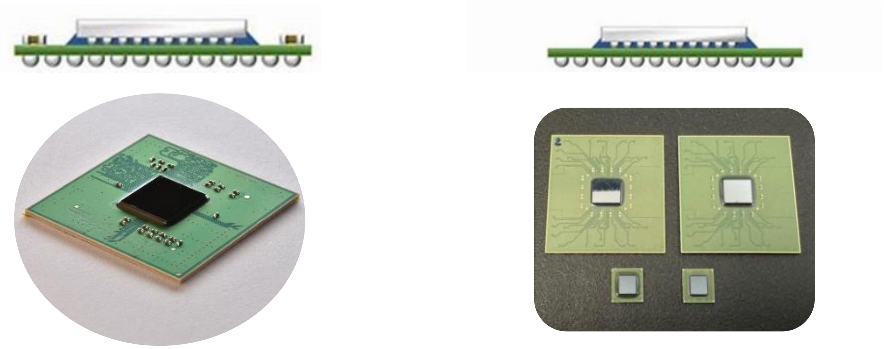
FCCSP

Overmoulded Flip Chip BGA - 3x3mm to 17x17mm



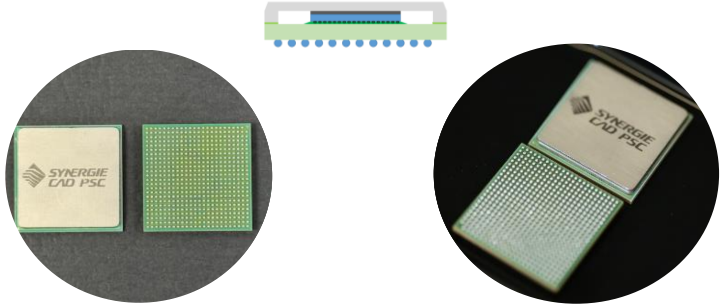
Bare die FCBGA

Flip Chip BGA - 7x7mm to 21x21mm



ThermallyEnhanced-FCBGA

Lidded BGA with TIM – 15x15mm to 45x45mm



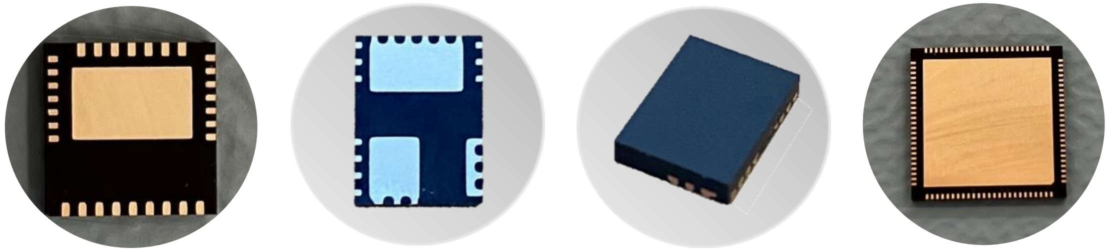
Packaging assembly capabilities - BGA/LGA type(s)

Laminate

Chip On Board - MCM – SIP
Overmoulded or glop-top epoxy or exposed

Leadframe

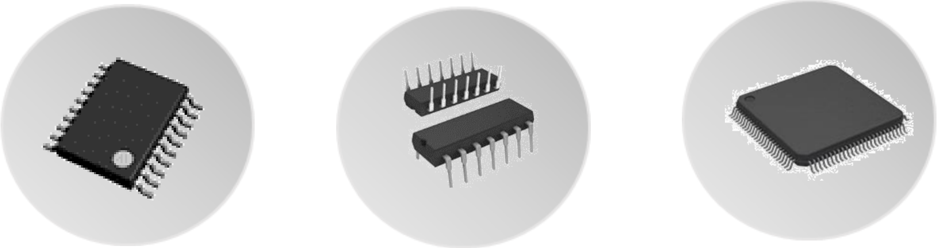
QFN
Overmoulded or Premoulded



SOIC – TSSOP – QFP – DIP

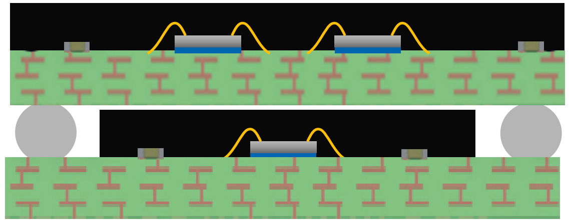
SOIC Narrow body : 8L – 14L – 16L
SOIC Wide body : 20L – 24L – 28L

DIP : 8L – 14L – 16L – 20L – 24L
QFP : 100L

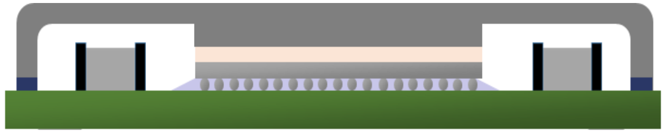


Packaging assembly capabilities – 2025 R&D Roadmap

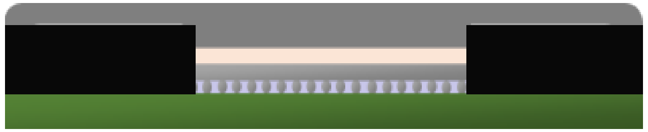
Package on Package (PoP)



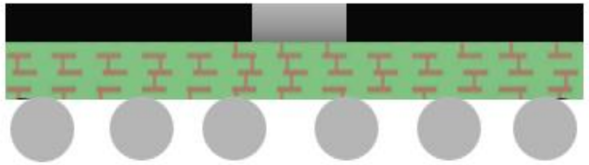
Adaptive Heat sink



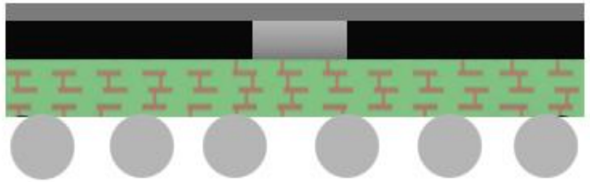
Adaptive Heat sink moulded



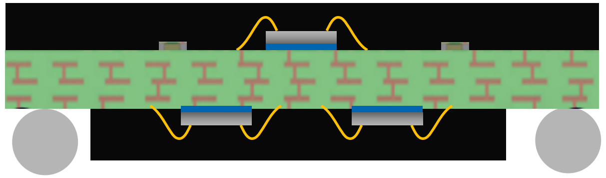
Film Assisted Moulding (FAM)



Adaptive Heat sink

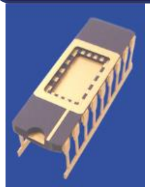


Adaptive Heat sink moulded



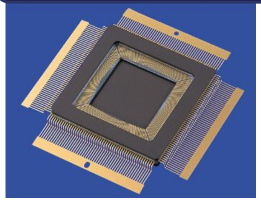
Ceramic (hermetic or non-hermetic) assembly capabilities

C-DIP



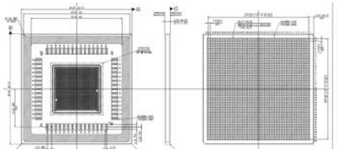
70 Leads max.

CERQUAD



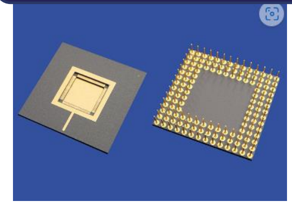
64 to 304 Leads

‘Ceramic’ BGA / LGA (non-hermetic)



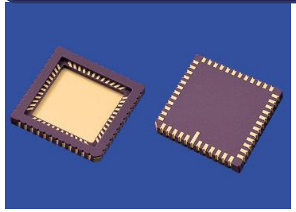
Up to 45x45mm

C-PGA



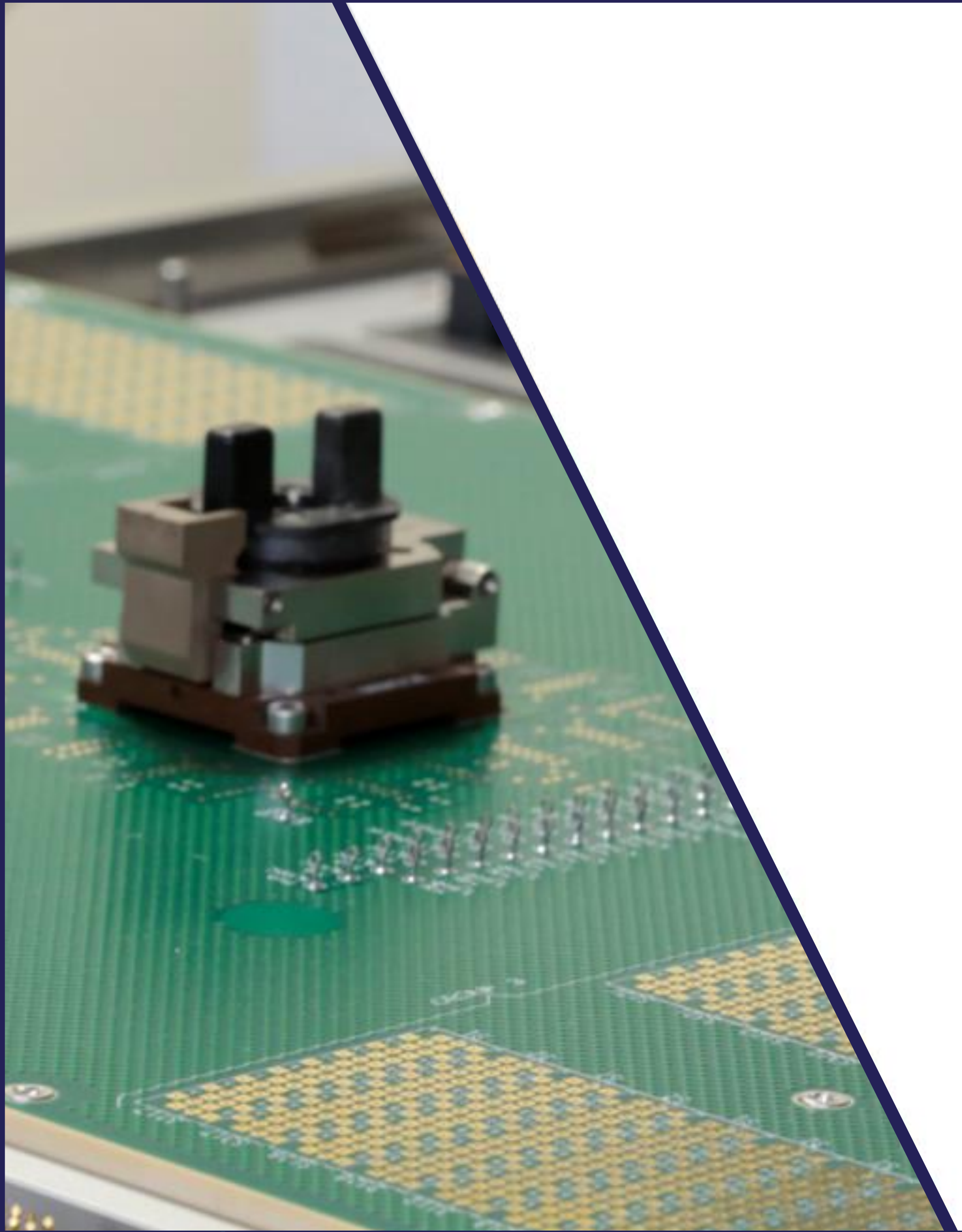
68 to 145 Leads

C-QFN



12 to 84 Leads

- ✓ Standard or Custom package
- ✓ Hermetic sealing (Nitrogen atmosphere)
- ✓ Non-hermetic encapsulation (Lid attach or epoxy fill)
- ✓ Fine and Gross leak control test



TEST

Wafer Test & Final Test

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TEST & PRODUCT ENGINEERING

- ✓ **Test Solution Development**
  - Hardware (parametric cards, probe cards, loadboards)
  - Software
  - Specialties : Digital, Mixed-Signal, Analog, RF / MMW (up to 86GHz)
  - Consumer / Industrial, Automotive, Space/New Space

- ✓ **Product characterization**
- ✓ **Prototyping, Pre-series, and Production**
  - Europe
  - Asia
  - 6, 8, 12in. Probers [-55C / +200C]
  - Automatic Handler

- ✓ **Production Sustaining**
  - Cost optimization
  - Product Q.A. & PPAP

- ✓ **ATE's**
  - In-House : Credence Sapphire, Advantest V93K, Advantest V93K , Teradyne J750, Teradyne UltraFlex-RF
  - Other competences : Teradyne Flex, Eagle ETS364, Diamond D10, Advantest T2000
- ✓ **Class 10K local environment**

TEST & PRODUCTION SYSTEMS

TESTERS


Advanced V93K Smarscale
640 PS1600, 194 DPS


Advanced V93K Wavescale
512 PS1600, 194 DPS (from Q2-23)


Advantest T2000
(Catania)

2nd system planned for H2-2025


Teradyne ULTRAFLEX-RF
512 UP1600, RF24, UPAC, UVI80


Teradyne J750
512p & 384p – Imagers testing

Planned for H1-2025


Chroma 360

**TEST FLOOR
24/24
7/7**

PERIPHERALS


Thermostreams
-55 / +175 C°

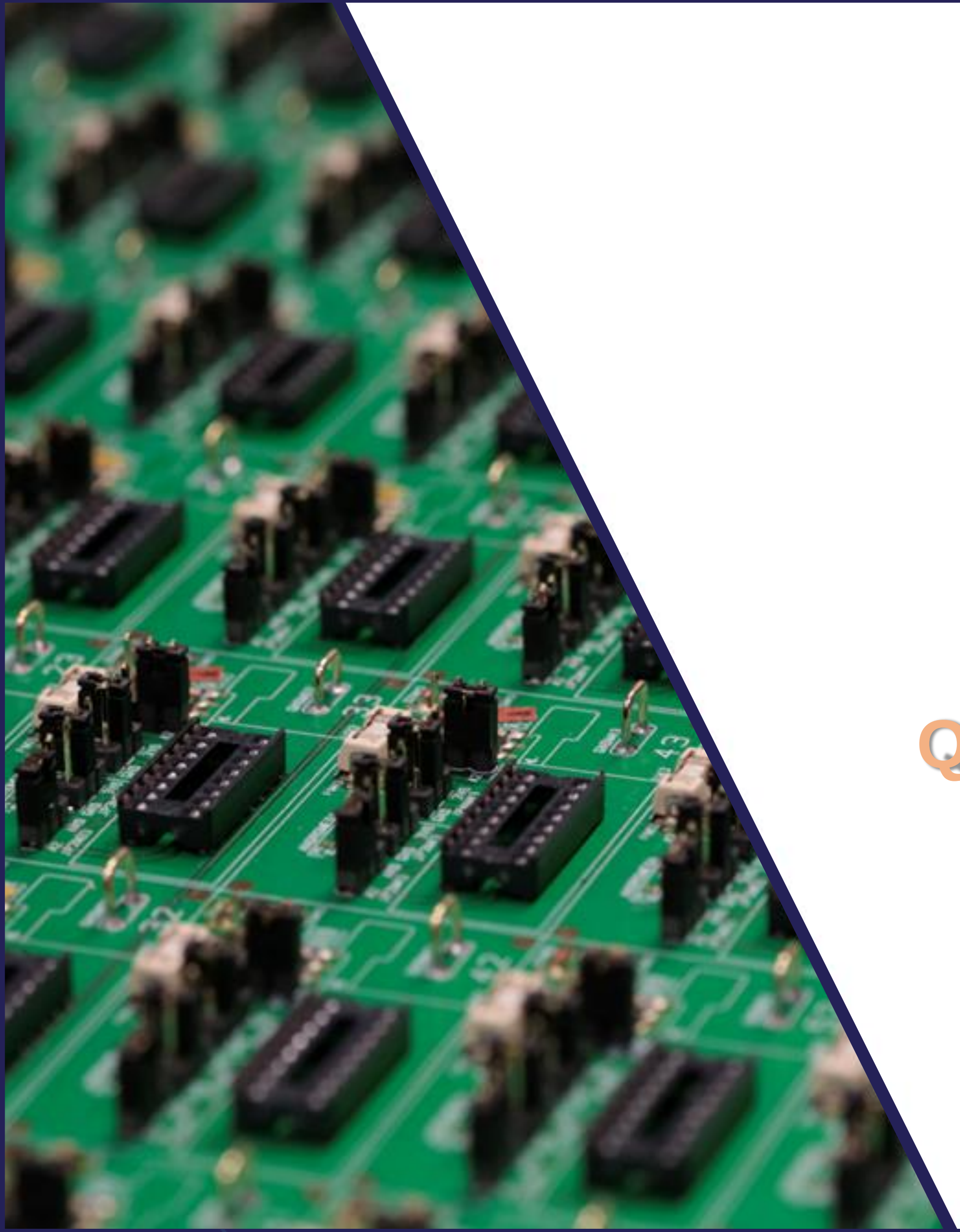

Automatic Handler
MT9510 Room + Tri-Temp


Opus3 12in. Probers
-55 / +200 C°, Troom, Direct& standard Docking

PRODUCTION SUSTAINING

- **Production sustaining** includes all Quality Assurance and Cost optimisation activities that support production life ; those include :
  - Non-conform lots management
  - Process and Product changes
  - Test Program and Test limits adjustments
  - Test Time optimization
  - Cost of Manufacturing optimisation
  - Reliability Monitoring, Re-qualification, Lot Acceptance, …

Very often, production sustaining is not considered ; however, this activity which requires global knowHow and fact-based experience, when correctly done will bring high added value either in terms of Quality & Reliability, Productivity, and cost of Manufacturing. At Synergie Cad PSC, the long experience of some of our product engineers in all back-end activities combining Packaging, Quality, Reliability, Hardware, Test provide us with a unique added value.



RELIABILITY

Qualification, LAT, Burn In, Monitoring

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RELIABITLITY

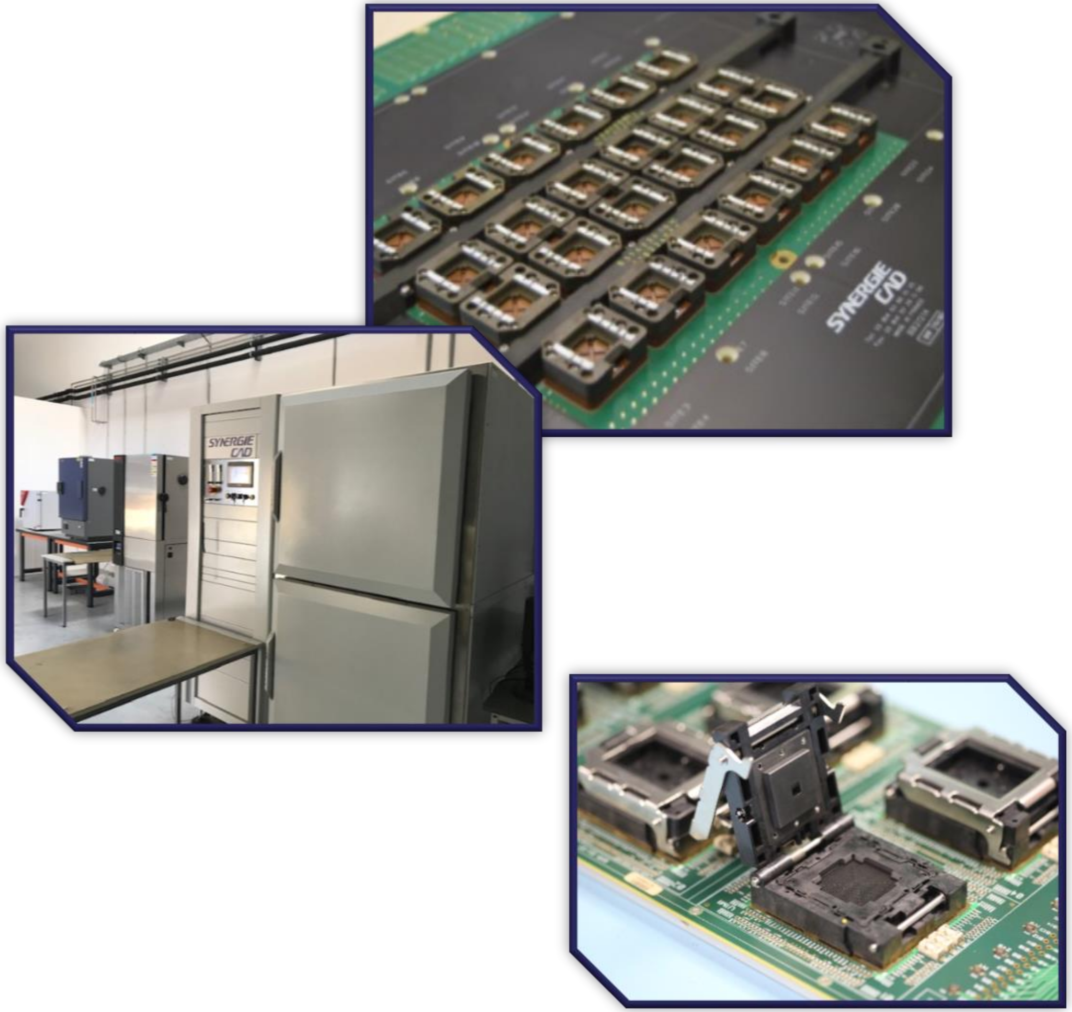
- **Standards : Jedec, AEC-Q100, ESCC …**
- **Qualification, Burn 'In, L.A.T, Monitoring**

- **Boards / Hardware design and Fabrication (in-house)**

- **Environmental tests**
  - HTOL / LTOL
  - THB 85C/85% RH
  - Hast/uHast/PPT
  - Preconditioning/Reflow
  - Thermal Cycling / VRT 15C/min.
  - THNB/Thu 85C/85%
  - High Temperature Storage 300C

- **(ESD / Latch-Up)**
  - ESD HBM / MM
  - ESD CDM
  - Latch-Up

- **X-rays inspection (2D/3D) - External Visual - Decapsulation**
- **Delamination analysis - Acoustic Microscopy (SAM)**



HARDWARE

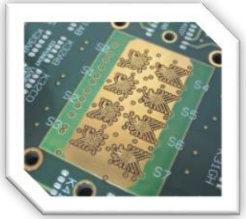
Loadboards, Probe cards, other PCB's

WIDE HARDWARE CAPABILITIES FOR SEMICONDUCTORS

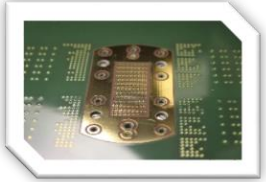
In-House development and fabrication - Factory location : Carros (France – 06)

Engineering Boards

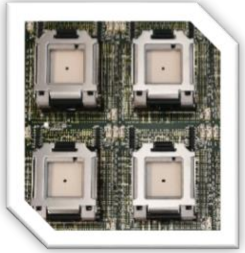
Final Test Boards



Probe Cards



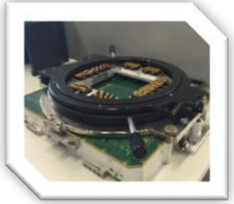
Burn-in Solutions



Special Drivers

Burn-in Systems

Mechanical Interfaces & Parts



WHY CHOOSING SYNERGIE CAD SEMICONDUCTORS ?

- Staff with more than **15 years average experience** in Semiconductors development, industrialisation and manufacturing
- **True TurnKey offer** (Packaging, Test, Reliability, Supply chain, PCB)
- **Large experience** and **deep know-how** in New Product Introduction, product industrialisation, and production sustaining / Quality Assurance from small to High volumes….

  We are not only a simple Test House or Assy house …

- **Unique combined offer** in both Packaging & Test services
  - Packaging Line for prototyping & small series in Toulouse (France)
  - Partnership with Tier1 OSAT for mid & large series
- **Flexible**, **reactive**, and «**easy-to-work with**» organization