

Empowering Future
Innovators:
Semiconductor
OSAT/ATMP Training
Equipment's for
Educational Institutes



Introduction: Indian Semiconductor Mission

- **Objective:** Position India as a global hub for semiconductor manufacturing and design.
- **Financial Support:**
 - Production-Linked Incentive (PLI) and Design-Linked Incentive (DLI) schemes.
 - Combined outlay of ₹76,000 crore (approximately \$10 billion).
 - Up to 50% fiscal central support for project costs.
 - Additional subsidies of up to 25% from state governments.
- **International Partnerships:**
 - Strengthening ties with the US to enhance the semiconductor supply chain.
- **Workforce Development:**
 - Plan to develop a skilled workforce of 85,000 professionals.
 - Includes technicians, engineers, and R&D experts.
 - Through educational programs and industry collaborations.
- **Broader Vision:**
 - Make India a trusted partner in the global semiconductor supply chain.
 - Boost the electronics sector to \$500 billion.

Indian Semiconductor Companies Partner with Academia to Bridge the Skills Gap

Problem Overview:

TeamLease Degree Apprenticeship on India's semiconductor industry skills shortage highlights:

Skills Shortage:

- Engineering, R&D, manufacturing, sales, and services.

Future Outlook:

- The skills shortage is expected to become more pronounced by 2027- 2030.

Industry Impact:

- Potential hindrance to growth and innovation in the semiconductor sector.
- Need for strategic workforce development to address these gaps.

Indian Semiconductor Companies Partner with Academia to Bridge the Skills Gap

Key Highlights:

Talent Gap:

- Require 8.3 million skilled professionals by 2028, urgency to address this talent deficit.

Industry-Academia Collaboration:

- Companies forging partnerships with educational institutions.
- Focus on development of talent in hardware, software, design, and architecture

Hands-On Training:

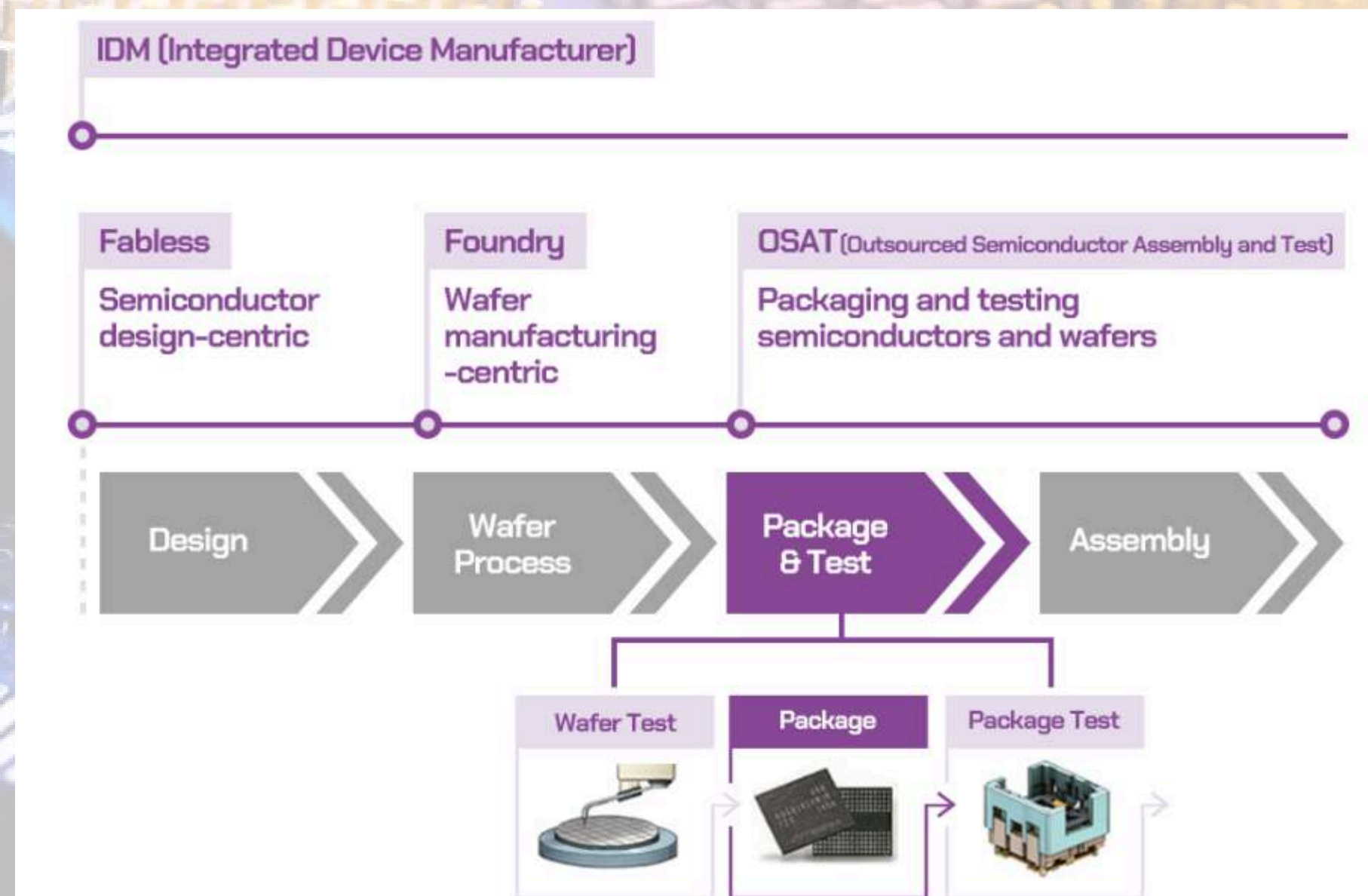
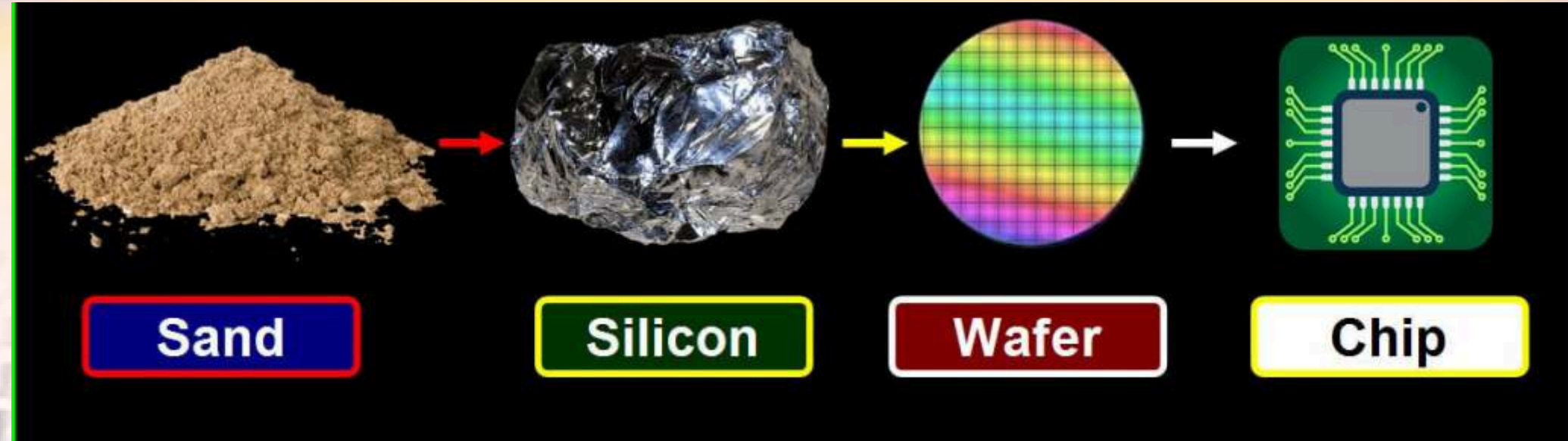
- Integrating hands-on training and real-world experiences into the curriculum at an early stage
- Aim to align students' skill sets with the needs of the industry
- Ensure students are job-ready upon graduation.

Indian Semiconductor Companies Partner with Academia to Bridge the Skills Gap

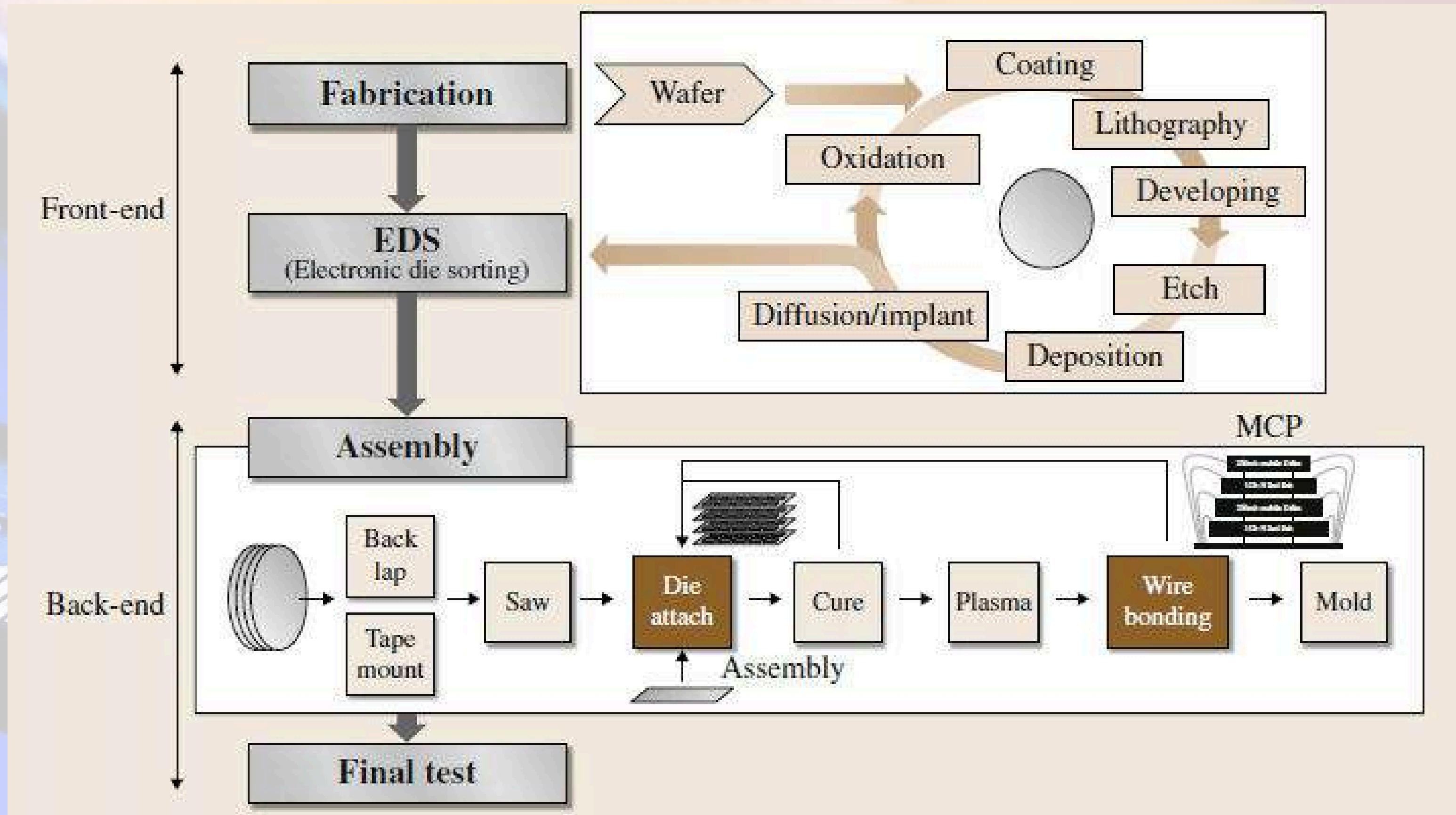
What's at Stake:

1. **Rising Demand:** There is an increasing need for semiconductors in the automotive, AI, and consumer electronics sectors.
2. **Rapid Innovation:** Essential for keeping pace with technological advancements and market requirements.
3. **Collaborative Approach:** Engaging industry, academia, and government to enhance skills and knowledge sharing.
4. **Skills Gap Addressed:** Targeting immediate workforce shortages through training and education initiatives.
5. **Sustainable Talent Development:** Establishing long-term programs to cultivate future talent and expertise in the semiconductor field.
6. **Growth in Ecosystem:** A robust workforce supports industry expansion, innovation, and competitiveness in the global market.
7. **Cross-Sector Synergies:** Leveraging diverse expertise to drive breakthroughs in semiconductor technology and applications.

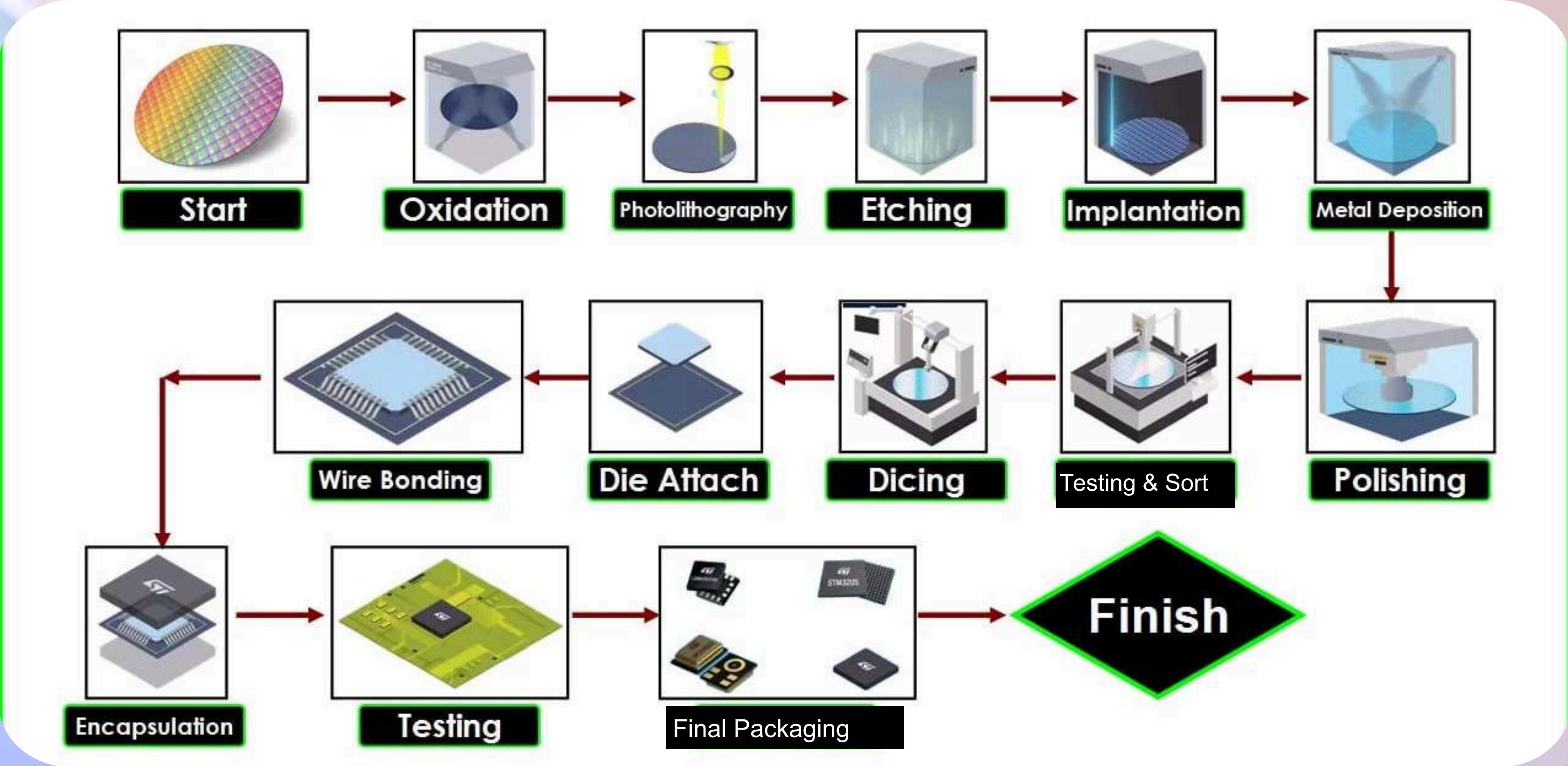
Semiconductor Manufacturing Process Flow Chart



Semiconductor Manufacturing Process Flow Chart



Semiconductor Manufacturing Process Flow Chart



Introduction to Advanced Packaging Techniques

- **Definition:** Advanced packaging refers to innovative techniques for enclosing semiconductor devices.
- **Purpose:** To enhance performance, miniaturization, and integration of electronic components.
- **Importance:** Crucial for meeting the demands of modern electronics across various industries.
- **Key Techniques:** Includes methods like 3D stacking, System-in-Package (SiP), and heterogeneous integration.

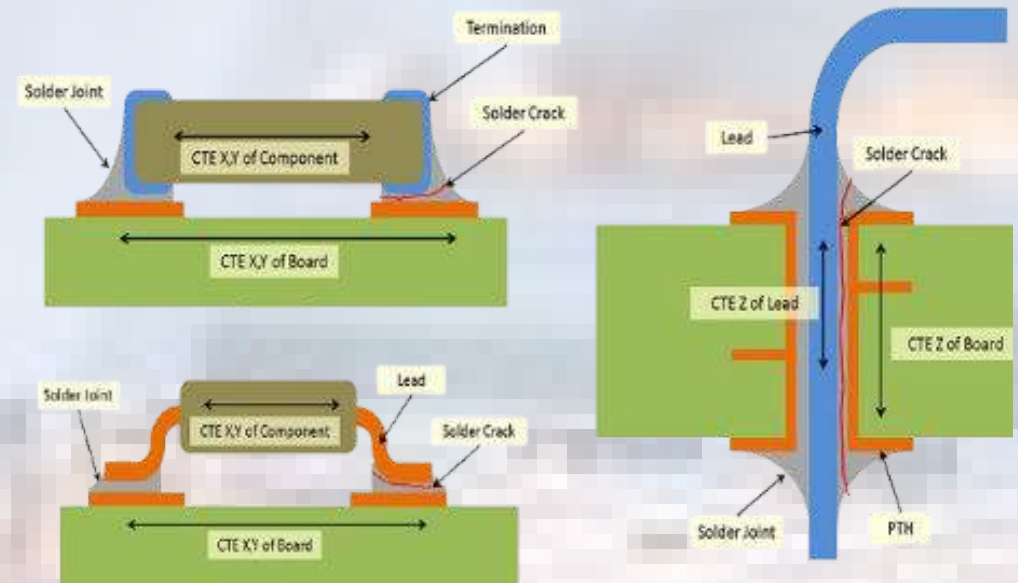
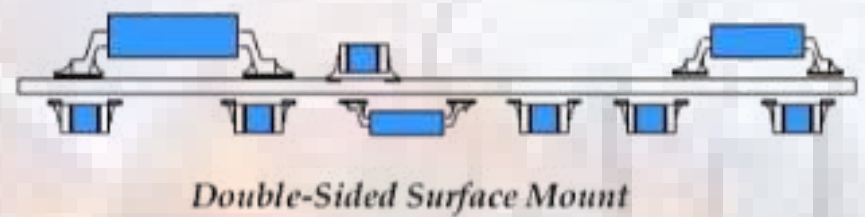
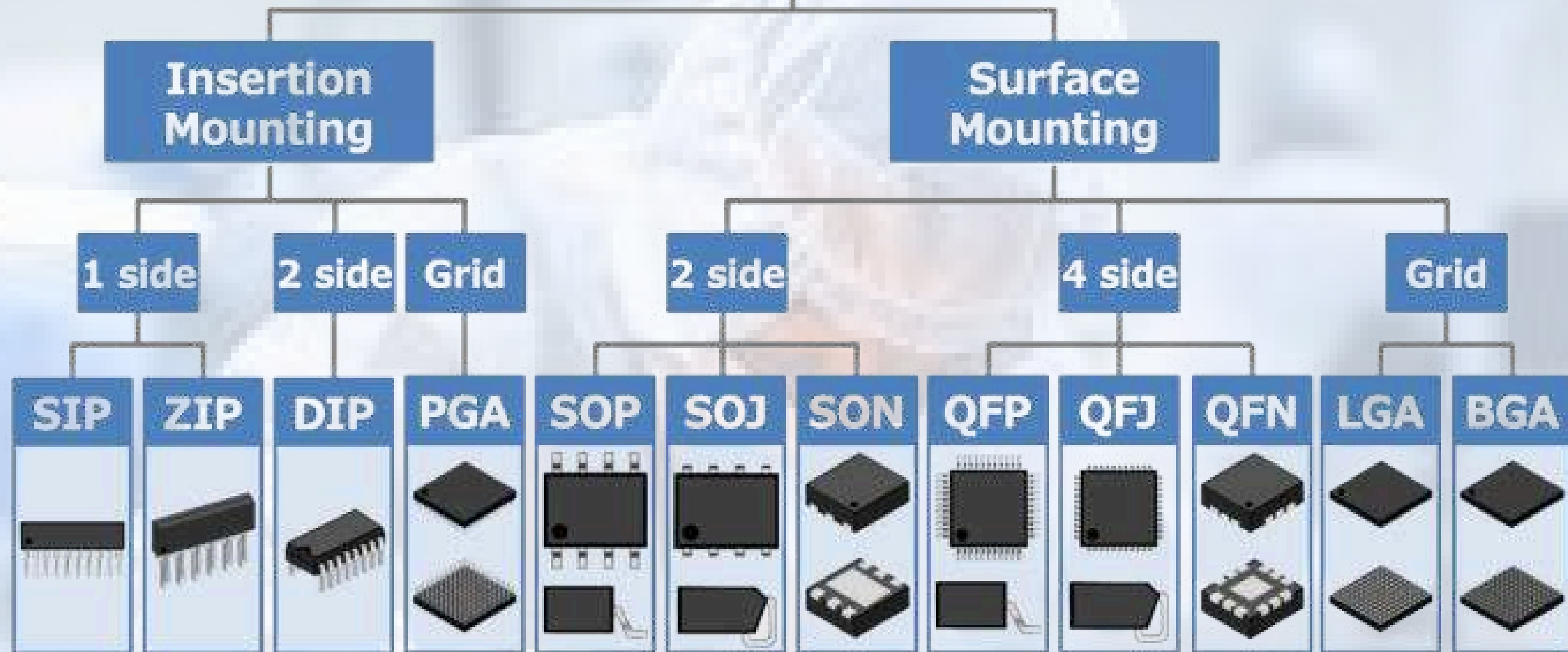
Types Advanced Packaging Techniques

- **Wafer-Level Packaging (WLP):** Encapsulates chips at the wafer level for compact and efficient designs.
- **System-in-Package (SiP):** Integrates multiple chips and components into a single unit, optimizing space and functionality.
- **3D Packaging:** Stacks chips vertically, enabling high-density connections and improved performance.
- **Chip-on-Board (CoB):** Directly mounts bare chips onto circuit boards for enhanced performance and thermal efficiency.
- **Flip Chip Packaging:** Bonds chips upside down to substrates, improving speed and reducing size.
- **Ball Grid Array (BGA):** Utilizes a grid of solder balls for better heat dissipation and reliability.
- **Embedded Die Packaging:** Incorporates chips within the substrate, resulting in a thinner overall profile.
- **Multi-Chip Modules (MCM):** Combines multiple integrated circuits into one package, enhancing functionality and reducing footprint.

Impact of Advanced Packaging Techniques

- **Enhanced Performance:** Improves speed and efficiency of semiconductor devices.
- **Space Optimization:** Allows for smaller and more compact designs.
- **Increased Functionality:** Integrates multiple components in a single package.
- **Better Thermal Management:** Improves heat dissipation and reliability.
- **Cost Efficiency:** Reduces manufacturing and assembly costs over time.
- **Scalability:** Facilitates the development of next-gen electronics.
- **Flexibility:** Supports diverse applications across various industries.

Types of Packages



Overview of Leadless Packages Manufacturing

Leadless Packages

Definition:

- Leadless semiconductor packages are compact, surface-mount designs for modern electronics.

Common Types: Includes QFN, DFN, BGA, and LGA packages.

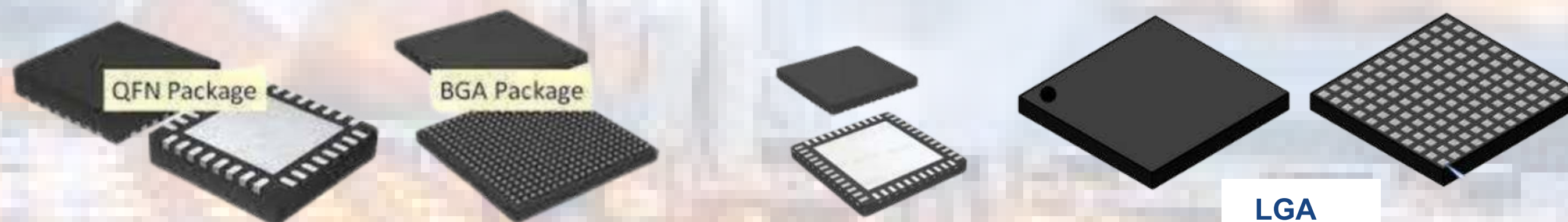
Key Advantages:

- Improved thermal and electrical performance.
- Reduced footprint for space efficiency.
- Compatibility with automated assembly processes.

Applications:

- Widely used in consumer electronics, automotive, and medical devices.

Significance: Essential for the advancement of miniaturized technology.



Leadless Packages

Definition:

- Leaded packages are traditional semiconductor packages with external leads for PCB connections.

Common Types: Includes DIP, SIP, TO, and PLCC packages.

Key Advantages:

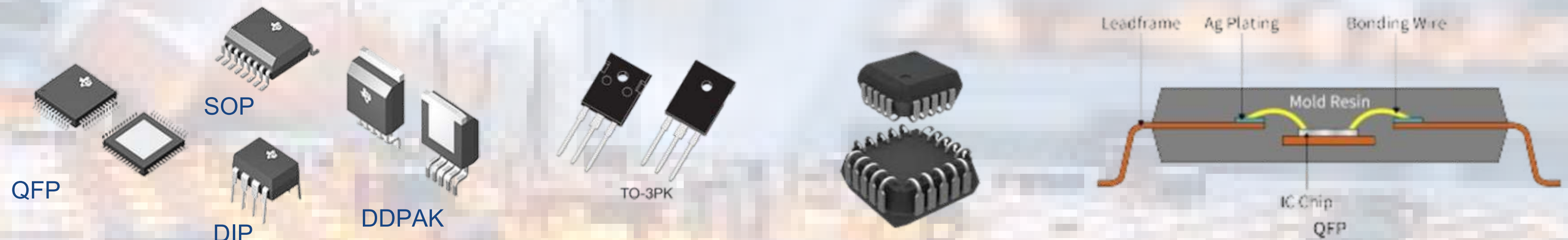
- Ease of handling during assembly.
- Mechanical stability for robust applications.
- Compatibility with through-hole assembly processes.

Applications:

- Frequently used in consumer electronics, industrial equipment, and prototyping.

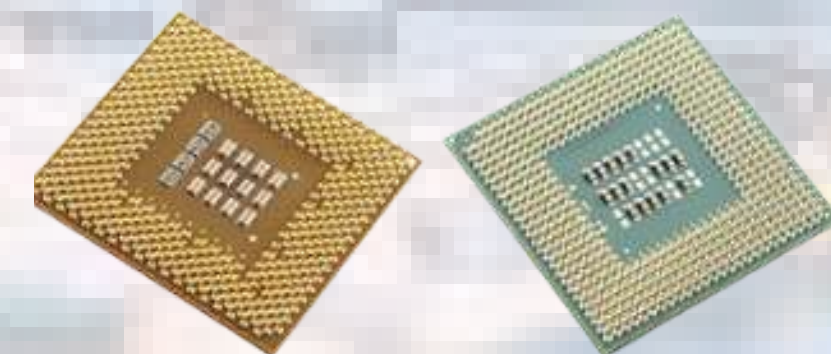
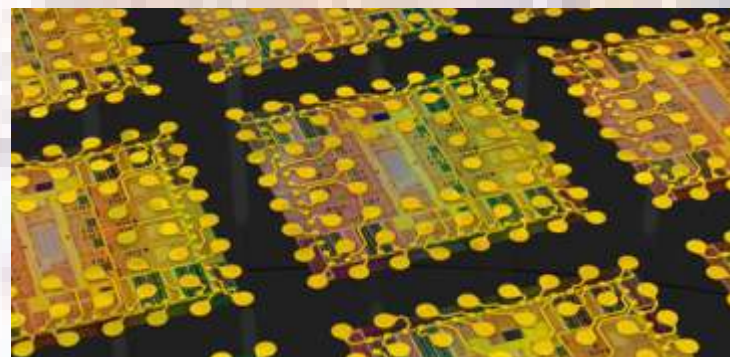
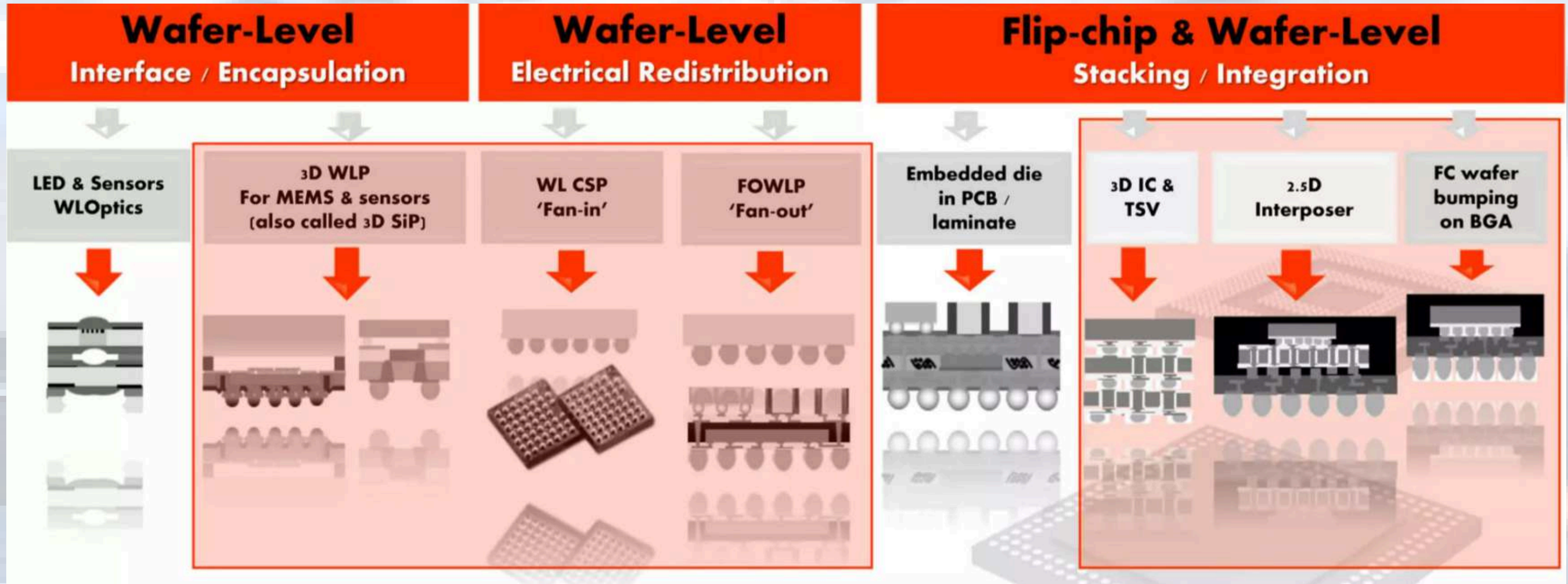
Significance:

- Essential for a wide range of applications and industries.



WAFER LEVEL PACKAGING

Wafer-level packages emerged in many different varieties



ATMP/ OSAT Techniques

	<p>Back Grinding</p> <ul style="list-style-type: none"> • WPH/ Throughput • Quality/ Yield • MTBA/MTBF • Capability 		<p>Wafer Saw</p> <ul style="list-style-type: none"> • WPH/ Throughput • Zero Chipping • Cutting Speed • Capability 		<p>Die Attach</p> <ul style="list-style-type: none"> • WPH/ Throughput • Quality/ Yield • MTBA/MTBF • Capability
<p>Wirebond</p> <ul style="list-style-type: none"> • UPH/ Throughput • Quality/ Yield • MTBA/MTBF • Portability 		<p>Molding</p> <ul style="list-style-type: none"> • Throughput • Shot per day • MTBA/MTBF • Quality – Warpage/ Mold Flash 		<p>Singulation Saw</p> <ul style="list-style-type: none"> • UPH/ Throughput • Cutting Speed • Quality- Chipping • MTBA/ MTBF • PnP UPH 	
	<p>CP – Wafer Sort</p> <ul style="list-style-type: none"> • 1st yield/ Final Yield • OEE/ MTBF • Accuracy/ Precision • Pogo pin life 		<p>FT – Final Test</p> <ul style="list-style-type: none"> • 1st yield/ Final Yield • OEE/ MTBF • Accuracy/ Precision • Pogo pin life 		<p>Laser Groove)</p> <ul style="list-style-type: none"> • WPH/ Throughput • Zero Chipping • Cutting Speed • Capability



About us

Tesca Technologies Pvt. Ltd. is World's Leading ISO Certified Manufacturer & Exporter of Test, Measuring & Technical Education Equipment. We are Member for Electronics & Computer Software Export Promotion Council, New Delhi, India having sales in more than 85+ Countries Worldwide.

Tesca's operations are spread out in 23000 Square Feet encompassing more than 2000 manufactured Innovative Products and Turnkey Project Capabilities for International Tenders. Tesca is an Export House established in December 2009 with our Registered & Corporate Office both set up at Jaipur.

Our Mission

- Be the World's Leading Manufacturer & Exporter of TVET, Skill Development, Bridge Gap between Industries & Institutes, Vocational Training by imparting Environment Friendly Technologies, Solutions and Innovations to make a Better World.

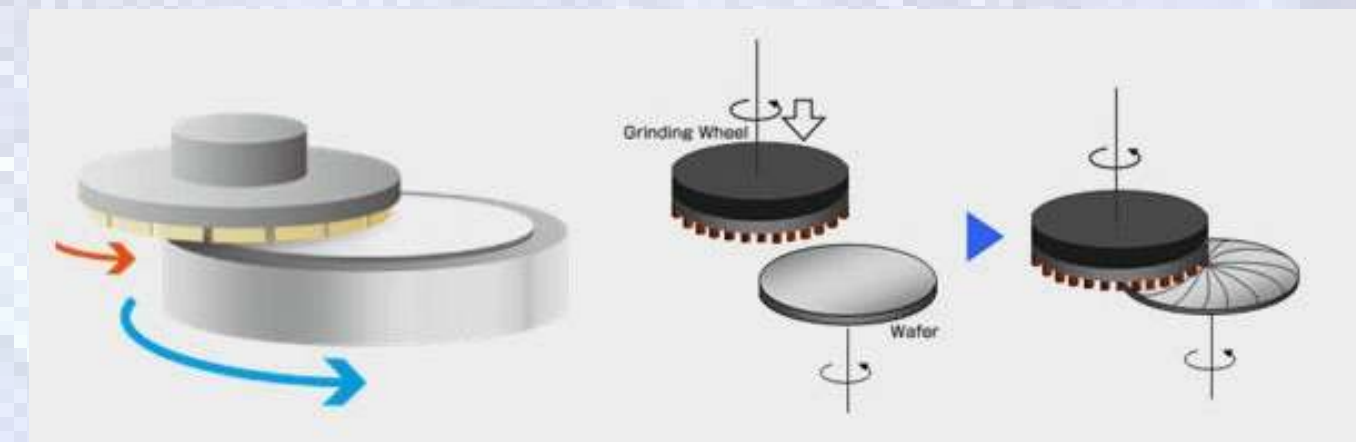


BACK GRINDING: Order Code - SMT-001

- **Definition:** Back grinding thins semiconductor wafers to enhance device performance.
- **Performance Improvement:** Enhances thermal management and electrical performance.
- **Mechanical Stability:** Increases stability, reducing the risk of device failure.
- **Functionality Optimization:** Essential for optimizing device functionality.
- **Supports Miniaturization:** Meets demands for smaller, more efficient electronics.

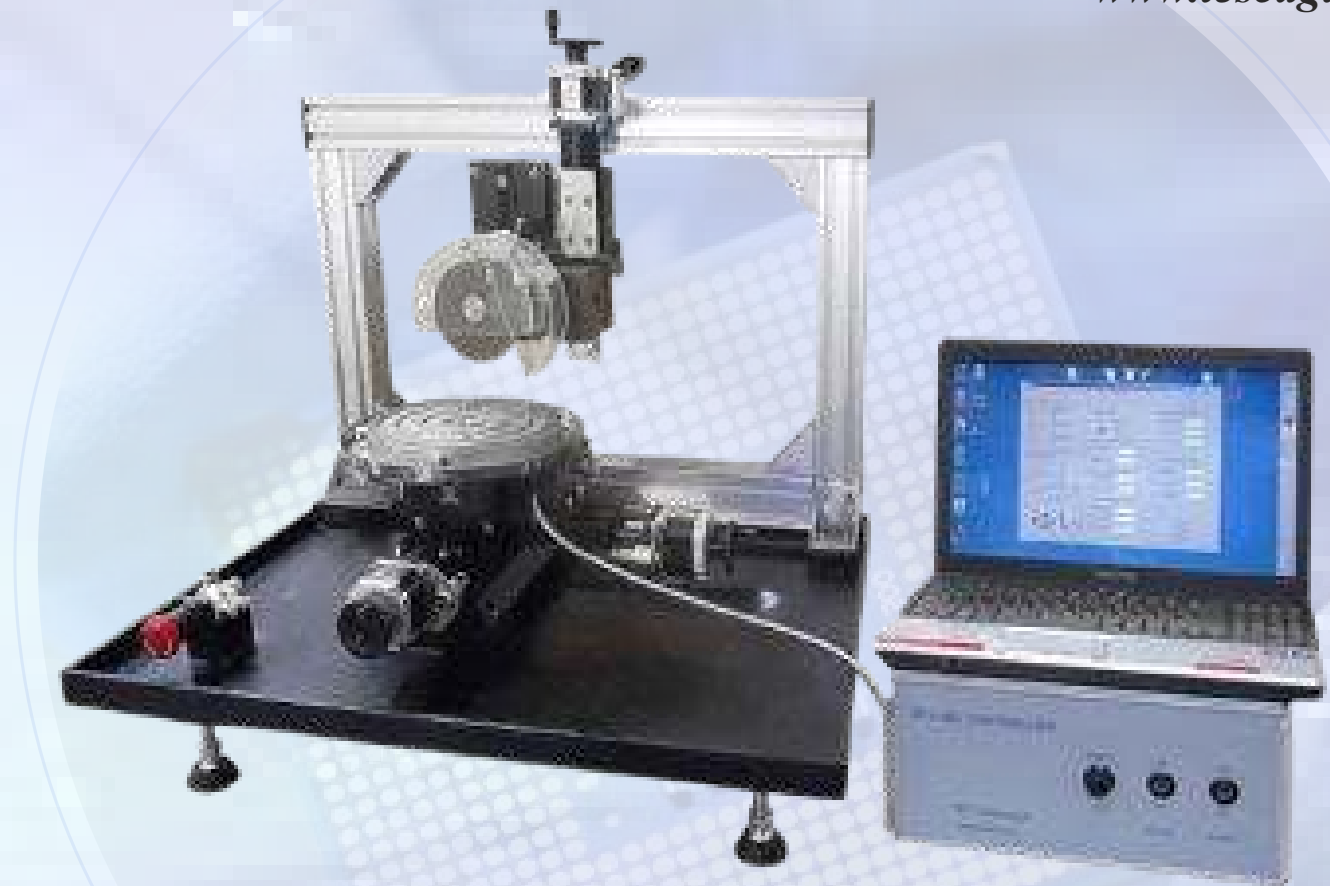
Product Overview

- **Order Code SMT-001** is a precision grinding and polishing machine.
- **Processing Stations:** Features three processing stations for efficiency.
- **Sample Size:** Handles large-size samples ($\leq \text{Ø}160\text{mm}$ wafers or rectangular with diagonal length $\leq 160\text{mm}$).
- **Versatile Applications:** Suitable for grinding and polishing:
- **Crystals, Ceramics, PCB plates, Infrared optical materials (e.g., zinc selenide, silicon, germanium)**



DICING: Order Code - SMT-002

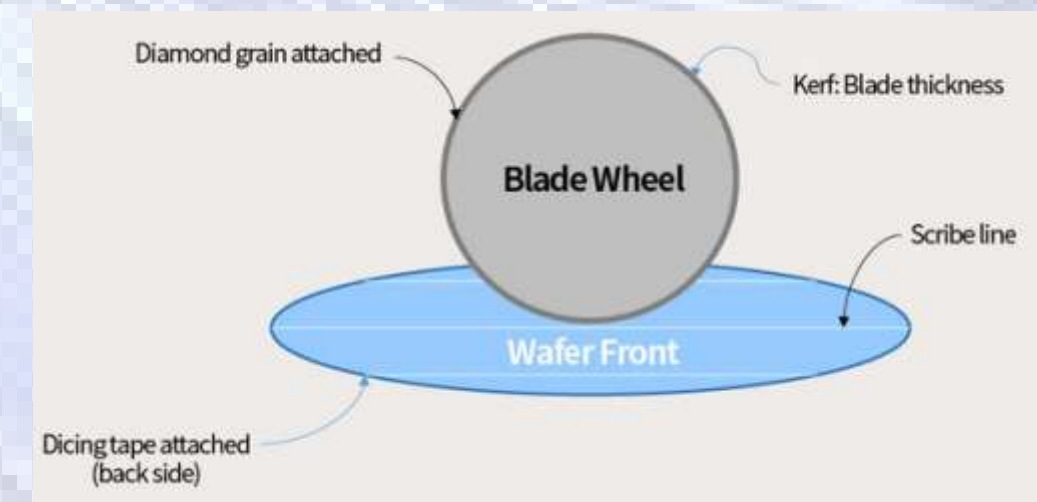
- **Definition:** Wafer dicing (die singulation) cuts wafers into individual semiconductor chips.
- **Techniques:** Mechanical Sawing(Uses diamond blades)Laser Cutting, Stealth Dicing, Plasma Dicing
- **Advantages:** Each method offers unique benefits based on material and design requirements.
- **Importance:** Essential for preparing chips for packaging and integration into electronic devices.



Made in
USA

Product Overview

- **Order Code - SMT-002** is a versatile dicing saw for various materials.
- **Capacity:** Handles up to 8" diameter wafers or 8" L x 8" W x 1" H components.
- **Programmable Control:** Computer-controlled for precise operation.
- **Position Accuracy:** Achieves accuracy of 0.01 mm in X, Y, Z, and R dimensions.
- **Rotatable Sample Stage:** Electric motor allows cutting at any angle with +/- 0.5° tolerance.

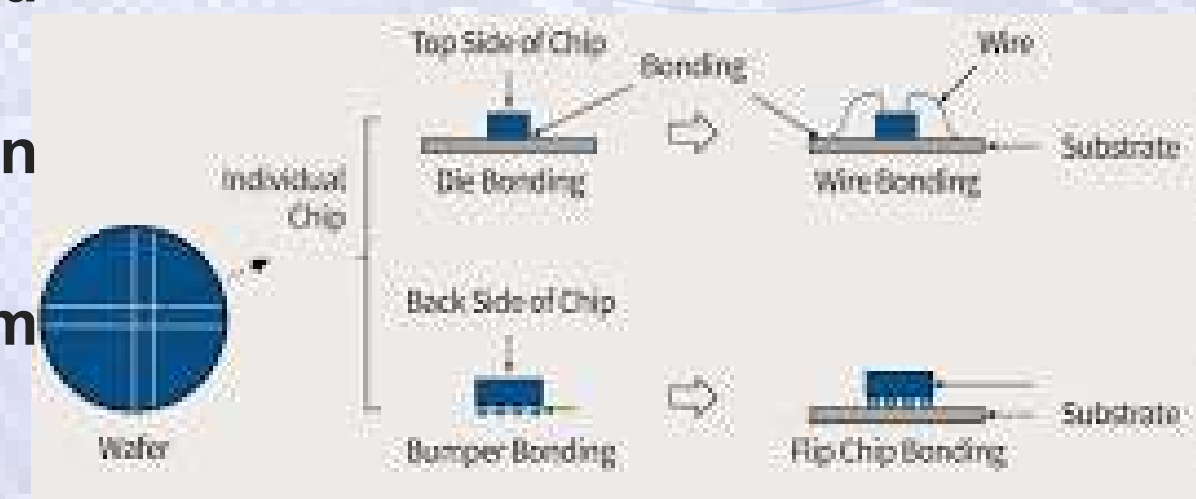


DIE BONDER: Order Code - SMT-003

- **Definition:** A die bonder is a specialized machine used to attach semiconductor dies to substrates or packages.
- **Functionality:** Automates the die bonding process, ensuring precision and consistency.
- **Techniques:** Supports various bonding methods, including epoxy adhesive, solder, and thermo-compression.

Product Overview

- **Accurate Picking and Placement:** MPS ensures precision handling of delicate devices.
- **High-Resolution Video Interface:** Compatible with Ultra-HD camera and adjustable digital magnification for various chip sizes.
- **Flip Vision Alignment:** Achieves high accuracy in die placement with true vertical motion.
- **Compact System:** Tabletop design with safe manual Z movement and true vertical vision.
- **Substrate Capability:** Accommodates substrates up to 350 mm in size with vacuum tool holders.
- **Fine Motion Stages:** X&Y stage with 25x25 mm travel and 1 μm resolution for precise adjustments.



PLASMA CLEANER: Order Code - SMT-004

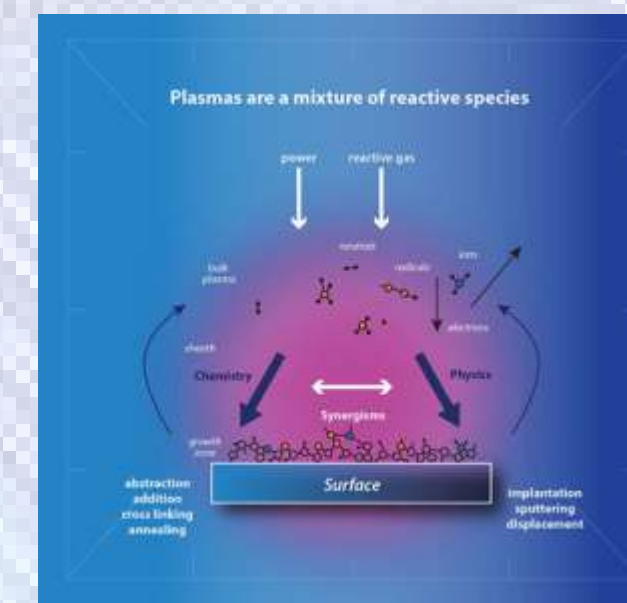
- **Definition:** Plasma cleaning is a pre-treatment step before wire bonding in semiconductor manufacturing.
- **Purpose:** Removes contaminants such as organic residues and oxides from semiconductor die and substrate surfaces.
- **Process:** Involves generating plasma from a reactive gas that interacts with and breaks down surface impurities.
- **Bond Quality:** Ensures clean, bondable surfaces, enhancing bond quality and adhesion.

Product Overview

- **Order Code - SMT-004** is an affordable entry-level plasma cleaner.
- **Target Users:** Ideal for small production facilities, research labs, universities, and industries needing a small-scale solution.
- **Versatile Cleaning:** Excels at various cleaning and bonding applications.
- **Value:** Offers the best value in the industry for a basic plasma cleaning unit.
- **Consistency:** Delivers extremely consistent and repeatable results for reliable performance.
- **Fine Motion Stages:** X&Y stage with 25x25 mm travel and 1 μm resolution for precise adjustments.



Made in
USA



WIRE BONDER: Order Code - SMT-005

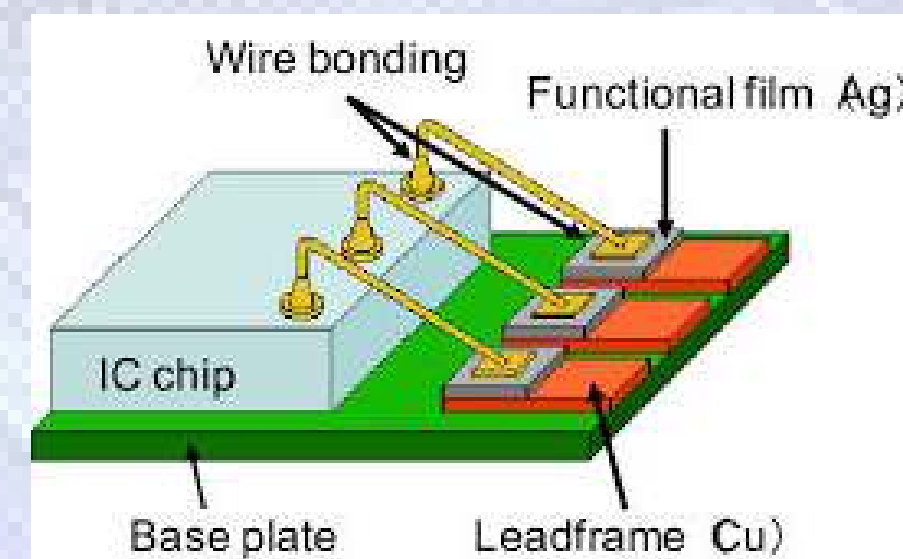
- **Definition:** Wire bonding is a technique for creating electrical connections between the die and substrate using gold, aluminum, or copper wires.
- **Methods:** Includes two main techniques:- Ball Bonding & Wedge Bonding
- **Advantages:**
- **Compact design** suitable for high-density electronics.
- **Cost-effective solution** for semiconductor packaging.

Product Overview

- **Order Code - SMT-005**, a versatile semi-automatic wire bond tool for R&D, prototypes, and small series production.
- **Design:** Flat bench top for easy carriage and operation.
- **Manual Options:** Features optional full manual Z mode for simple repairs, not program dependent.
- **Precision:** Higher Z resolution and increased Z travel for fine wire applications, meeting laboratory requirements.



**Made in
France**



PULL TESTER: Order Code - SMT-006

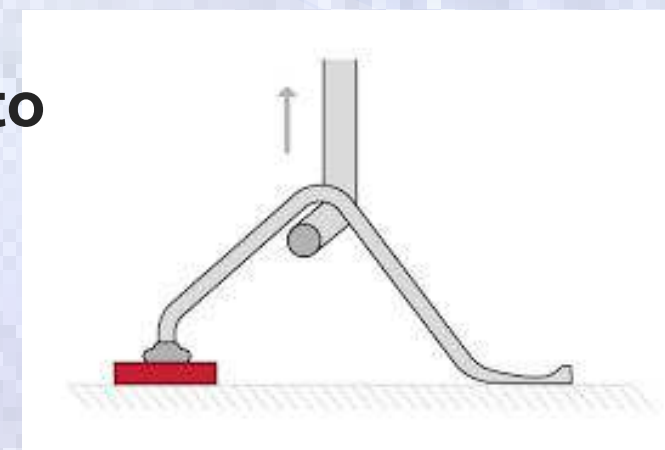
- **Definition:** A pull tester measures the tensile strength and reliability of wire bonds in semiconductor packaging.
- **Functionality:** Grips a wire bond and applies controlled pull force until failure occurs.
- **Quantitative Assessment:** Provides measurable data on bond quality and strength.
- **Quality Assurance:** Essential for ensuring wire bonds meet industry standards.
- **Process Optimization:** Helps refine the bonding process for improved strength and reliability.

Product Overview

- **Order Code - SMT-006,** pull tester designed for accurate evaluation of bond quality.
- **Purpose:** Assesses the reliability of wire bonds in semiconductor packaging.
- **Wire Size Range:** Capable of testing thin bonded wires from 15 μm to 100 μm in diameter.



Made in
France

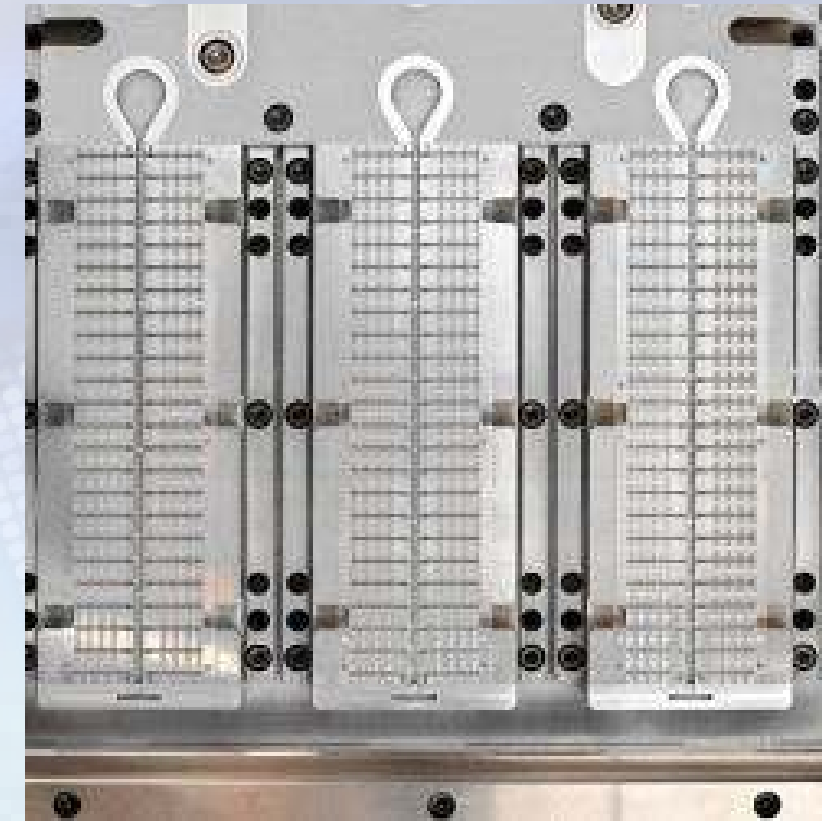


MOLDING: Order Code - SMT-007

- **Definition:** Molding is a critical process in semiconductor packaging that encases devices for protection.
- **Purpose:** Provides mechanical protection, electrical insulation, and thermal management.
- **Materials:** Typically uses epoxy resins for the molding compound.

Product Overview

- **Services Offered:** Provide encapsulation and mold tooling for various industries, including semiconductor, medical, automotive, and electronics.
- **Material Types:** Specialize in both thermoset and thermoplastic materials for production and development tooling.
- **High-Cavitation Molds:** Designed to meet the growing demand for opto-electronic devices.
- **Mold Design Features:** Incorporate features to minimize mold base footprint, maximizing mold flow.

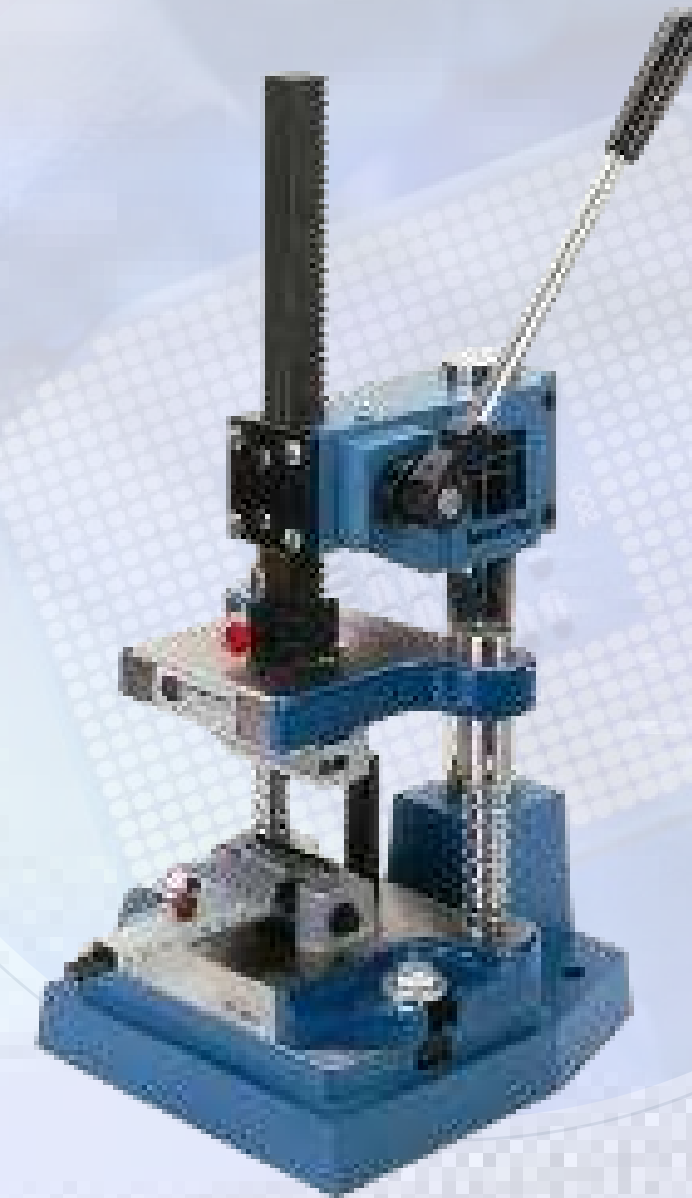


TRIM & FORM: Order Code - SMT-008

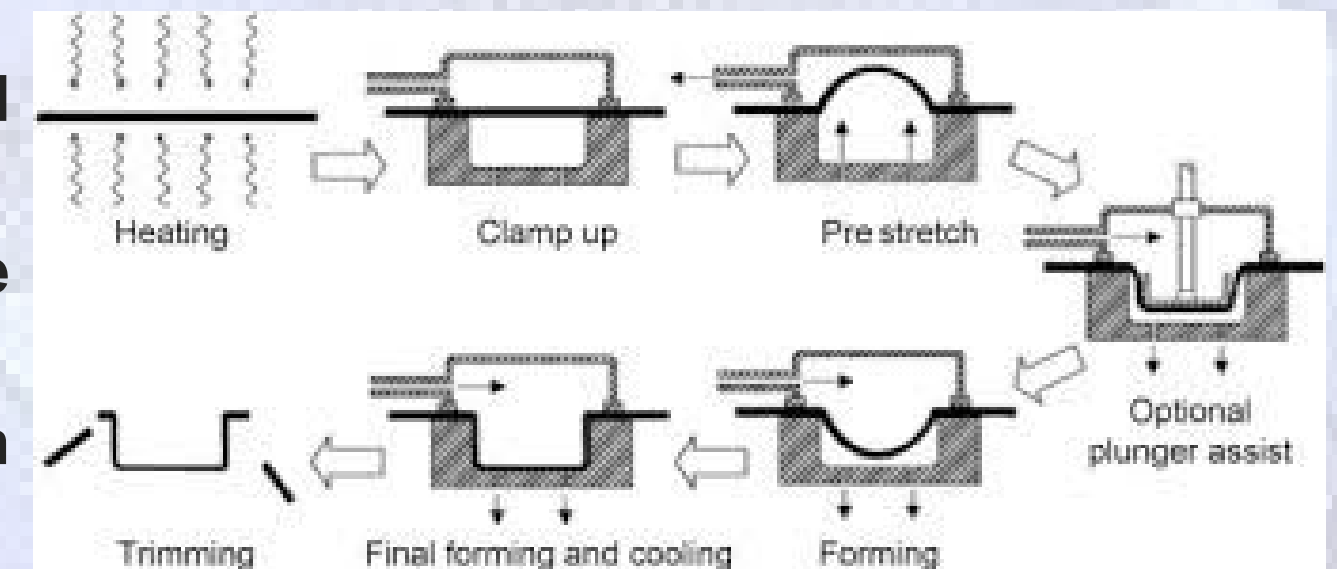
- **Definition:** Lead frame trim and form is a critical process in semiconductor packaging.
- **Purpose:** Involves cutting and shaping the lead frame for electrical connections and mechanical support.
- **Trimming:** Removes excess material from the lead frame to achieve the desired dimensions.
- **Forming:** Shapes the leads into the required configuration for proper alignment.

Product Overview

- **Flexibility:** One-sided universal lead forming systems are the most flexible and accurate for processing various components to standard footprints.
- **Ideal Use:** Perfect for high-mix and short-run production requirements.
- **Gullwing Configuration:** Forms a gullwing shape on one, two, and four-sided packages.
- **Easy Die Changes:** Quick change of die members to accommodate variations in lead material thickness, hardness, or shape.
- **Package Capacity:** Standard models handle packages up to 2.5" in length; larger models accommodate packages up to 4".



Made in
USA



PROBE STATION: Order Code - SMT-009

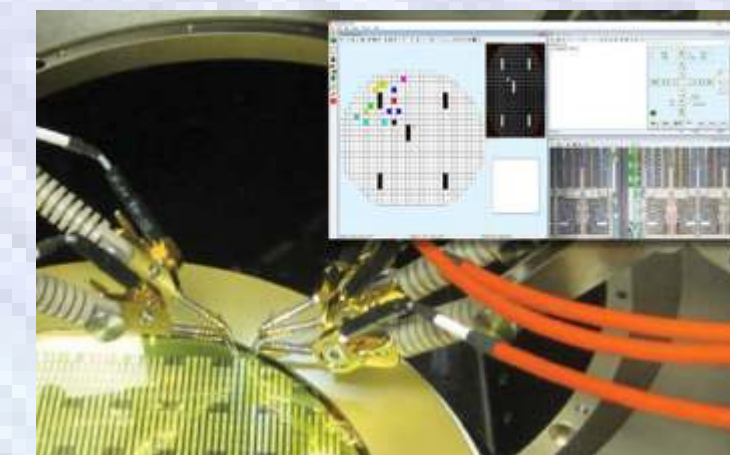
- **Definition:** A probe station is a specialized equipment used for testing and characterizing semiconductor devices and integrated circuits.
- **Functionality:** Enables precise electrical probing of devices to measure performance parameters such as current, voltage, and resistance.
- **Setup:** Typically includes adjustable stages for accurate positioning of the device under test (DUT).
- **Environmental Control:** Some models offer controlled environments (temperature, humidity) for testing under specific conditions.

Product Overview

- **Order Code - SMT-009 Mini Probe Station**, the smallest and most affordable probe station.
- **Design:** Compact design minimizes features without compromising precision and key functions.
- **Versatility:** Capable of both DC and RF measurements, making it highly versatile for its size.
- **Chuck Stage:** Equipped with a 2" x 2" coaxial chuck stage for secure device handling.
- **Weight:** Lightweight at 20 kg, enhancing portability for various testing applications.



Made in Taiwan





THANK YOU!

Tesca Technologies Pvt. Ltd.

IT-2013, Ramchandrapura Industrial Area, Sitapura Extension,
Near Bombay Hospital, Vidhani Circle, Jaipur-302022, Rajasthan, India,
Tel: +91-9829132777; Email: info@tesca.in, tesca.technologies@gmail.com
Website: www.tescaglobal.com



SCAN ME