



# PRECISION POWER COMPONENT MANUFACTURING

Redefining Zero-Defect Standards for  
Automotive and Industrial Electronics

September 2025 | Corporate Capabilities Briefing

# Global Infrastructure & Pedigree

**30+ Years**

of Engineering Experience

**1000+**

Active Global Clients

Deeply rooted in the PCBA sector, providing uncompromised transition from engineering prototypes to high-volume global production.



-  **Global Headquarters**  
New Taipei City, Taiwan
-  **Logistics & Warehousing Hubs**  
Taipei, Hong Kong, Shanghai
-  **Global Partners & Operations**  
China, Japan, United Kingdom, North America

# The Integrated PCBA Ecosystem

## PCB Layout Engineering

High-density, high-speed signal routing optimized for severe Electromagnetic Compatibility (EMC) and maximal thermal dissipation.

## NPI (New Product Introduction)

Agile engineering prototype fabrication designed exclusively for the R&D phase, enabling rapid physical validation of complex designs.

## Automotive-Grade SMT Assembly

High-precision automated placement adhering to the strictest automotive electronics standards (ISO 9001:2015) with an exact placement accuracy of  $\pm 0.015\text{mm}$ .

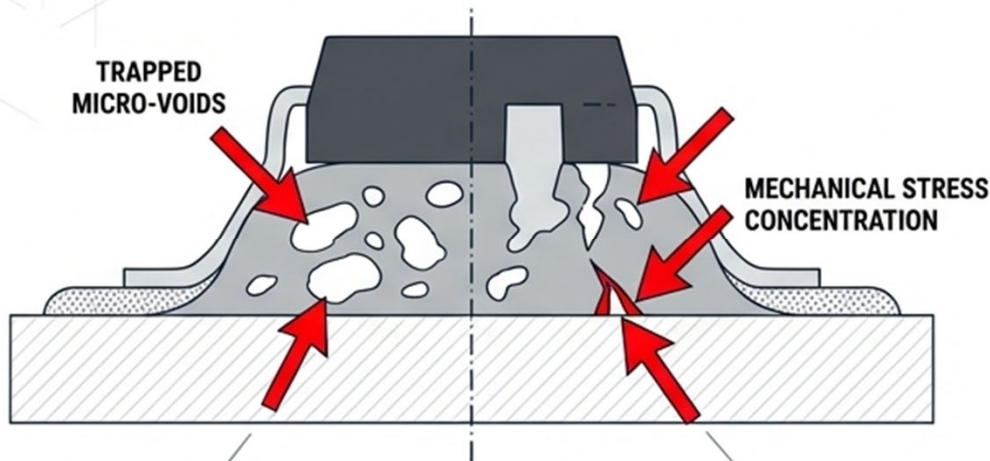
## Mass Scale Production

Stabilized process controls and resilient supply chain management ensuring zero-defect quality transfer from high-mix/low-volume batches to global mass production.

# The Physics of Failure in Power Electronics

Overcoming the thermal and mechanical constraints of standard Surface Mount Technology.

## Standard Reflow - The Flaw



### Thermal Bottleneck



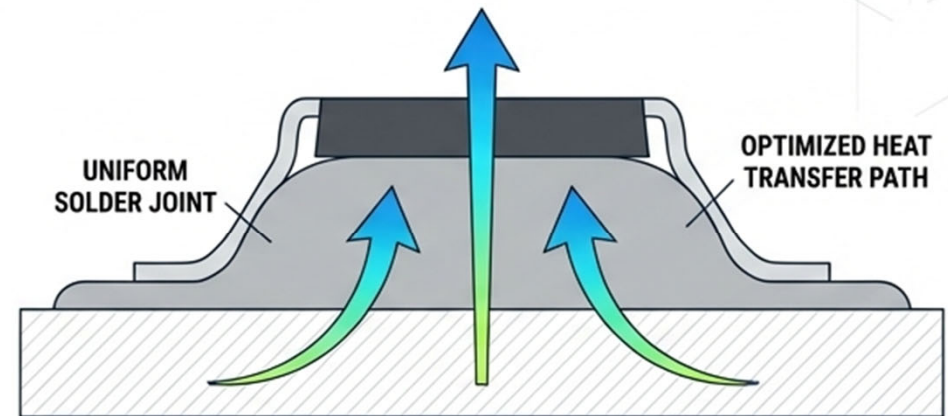
Micro-voids drastically increase thermal resistance, creating localized hotspots that lead to catastrophic component overheating.

### Stress Concentration



Under automotive or industrial thermal cycling and mechanical vibration, voids act as structural fractures, inevitably causing solder joint failure.

## Optimal Thermal Dissipation - The Flow



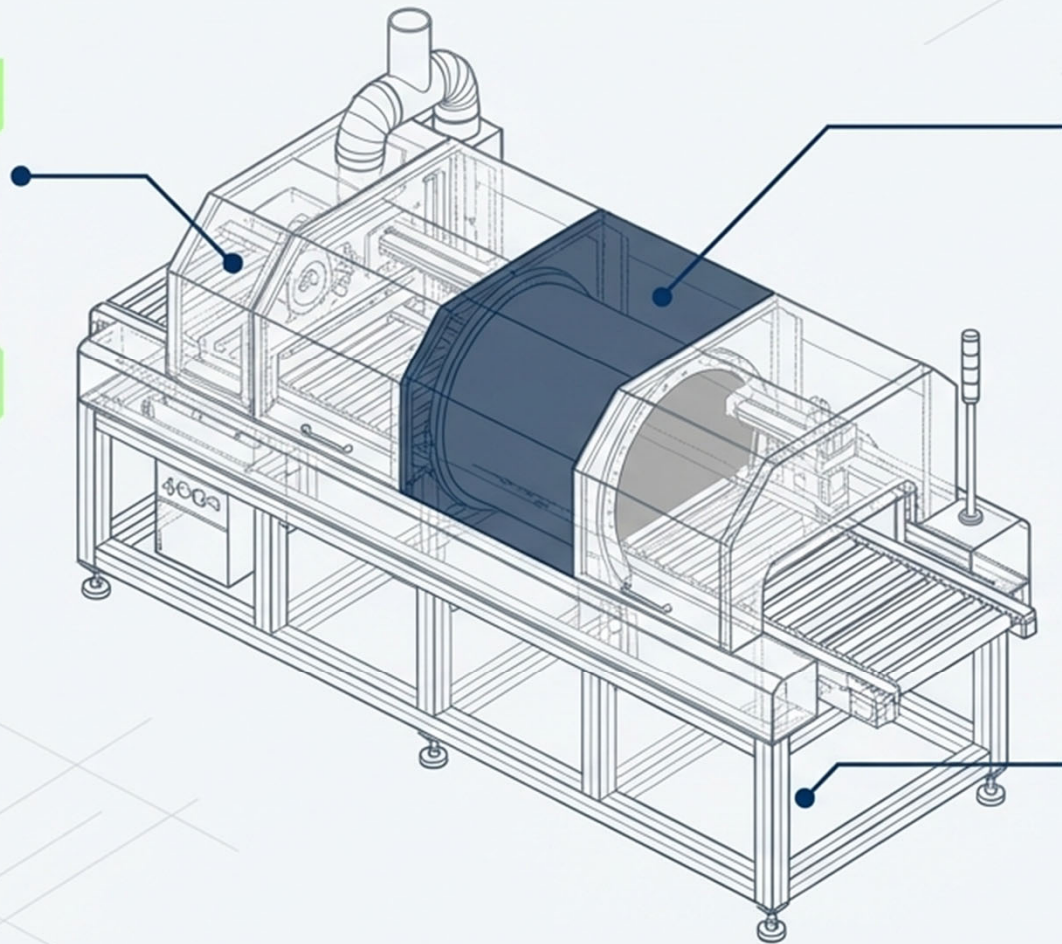
### The MIT Directive

Introduce an engineered physical de-bubbling mechanism to eliminate atmospheric encapsulation at the root of the manufacturing process.

# Core Technology: BTU Nitrogen Vacuum Reflow

## 2. Nitrogen Environmental Shielding

Full-cycle low-oxygen control prevents high-temperature oxidation, guaranteeing flawless surface tension and solder joint luster.



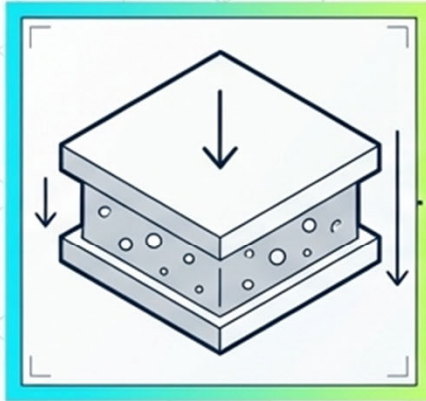
## 1. Independent Vacuum Chamber Integration

A dedicated vacuum cavity operates dynamically during the critical liquidus phase of the reflow process to **execute physical de-bubbling**.

## 3. Severe Standard Targeting

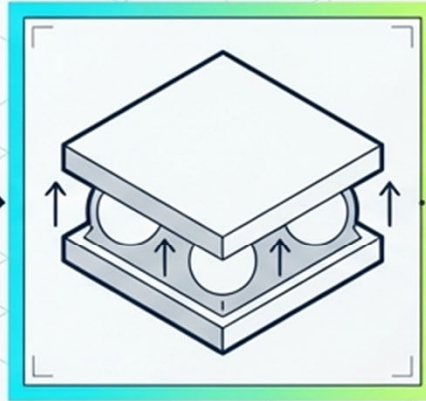
Calibrated specifically for high-power components, high-frequency communication modules, and components with extreme thermal dissipation requirements.

# The Science of Elimination: Physical De-Bubbling Trajectory



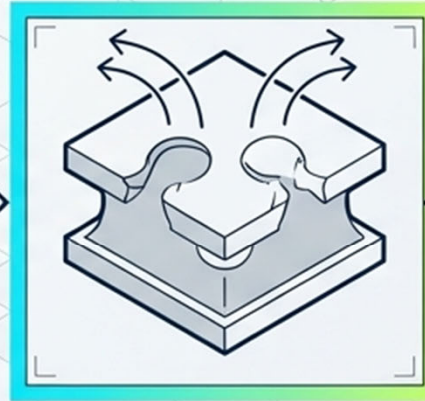
## 1 High-Temp Melting & Activation

The solder paste reaches peak liquidus temperature, and the isolated vacuum system is systematically engaged.



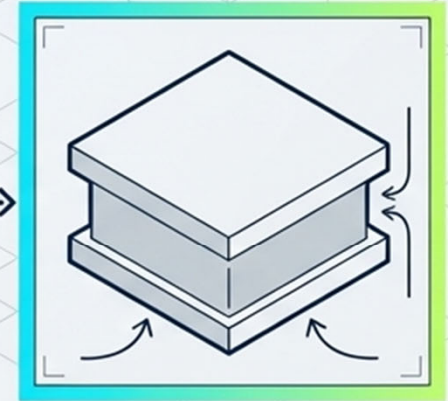
## 2 Physical Expansion (Pressure Differential)

An extreme atmospheric pressure differential is established. Trapped micro-bubbles are subjected to severe expansion, increasing their natural buoyancy.



## 3 Rupture & Extraction (De-bubbling)

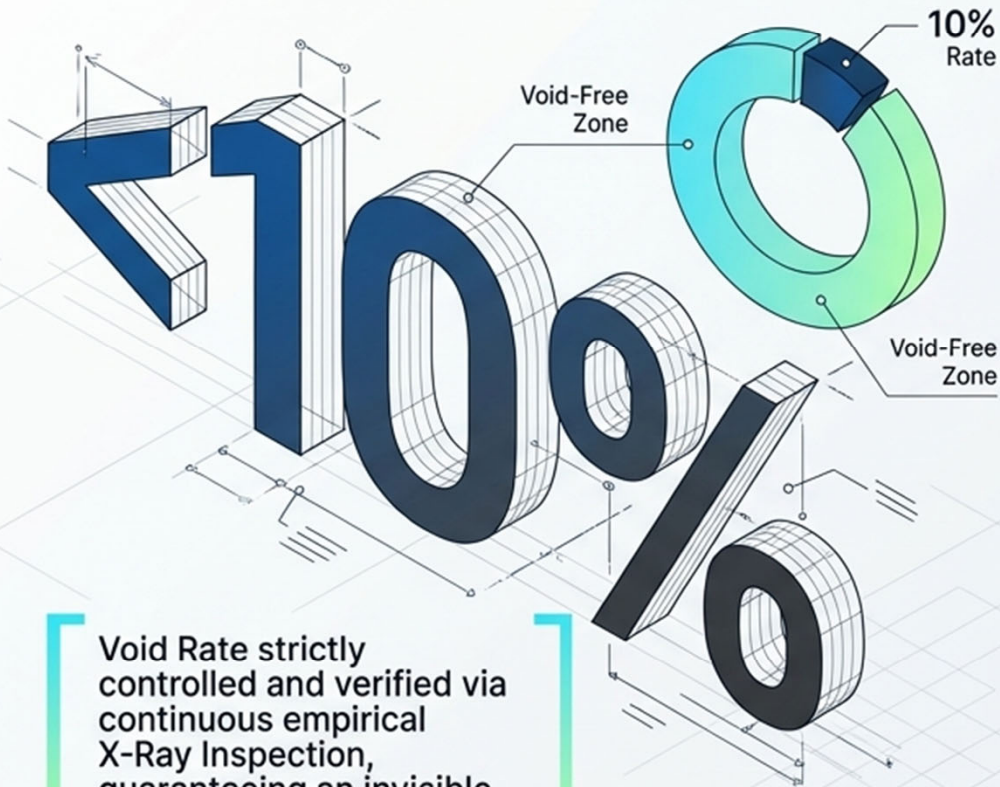
Expanded bubbles surface and rupture. The continuous vacuum system forcibly extracts the displaced gases from the chamber.



## 4 Solidification & Atmospheric Restoration

Nitrogen is flooded back into the chamber to restore normal pressure, allowing the now void-free liquidus to perfectly solidify.

# The Absolute Standard: Sub-10% Void Rate



Void Rate strictly controlled and verified via continuous empirical X-Ray Inspection, guaranteeing an invisible standard of perfection.



## Thermal Optimization (Maximum Dissipation)

Ensures that power component thermal energy is transferred to the heat-sink baseplate with zero atmospheric resistance.



## Mechanical Upgrade (Structural Integrity)

Dramatically reduces stress concentration points, comfortably passing rigorous automotive-grade vibration and extreme thermal-shock cycling tests.



## High-Frequency Signal Integrity

Maintains absolute impedance stability across high-frequency modules, completely eliminating unpredictable signal reflection and attenuation.

# The Manufacturing Arsenal

