

Domestic AI Chip Breakthrough: Chinese TC Bonder Completes First-Ever CoWoS Packaging Test

NEW YORK, UNITED STATES, August 4, 2025 /EINPresswire.com/ -- DeepSeek's rapid progress appears to have narrowed China's AI gap with the US, yet domestic large models still rely on Nvidia chips heavily. While China's GPU design capabilities advance quickly, TSMC is restricted to supply China mainland, it creates a critical barrier to domestic high-end GPU. Localizing advanced CoWoS packaging is now urgent—mainland China currently has minimal capacity and depends entirely on imported equipment. This constraint severely hampers domestic AI development. Against this backdrop, PrecisoNext's Loong series [TC Bonder](#) has achieved a historic first: completing CoWoS-L test sampling for domestic AI chips through close customer collaboration. This marks the first-ever breakthrough by a Chinese TC Bonder in AI chip CoWoS packaging.



CoWoS Packaging: The Foundation of AI Chip Integration

As AI models, autonomous driving, and HPC explode, traditional packaging can't meet higher computing density and efficiency demands. TSMC's CoWoS (Chip-on-Wafer-on-Substrate) technology—integrating logic chips, HBM, and silicon interposers in a 2.5D or 3D stacked configuration—has become AI's "ultimate packaging solution." Its core advantages:

1. Ultra-Dense Interconnects: Silicon interposers, utilizing micron-level Through-Silicon Via (TSV) connections, significantly enhance wiring density, offering a substantial improvement (10x or more) over traditional 2D packaging.
2. Lower latency: HBM integrated with GPU/ASIC in a "near-memory" architecture slashes data transfer power by 50%.
3. Heterogeneous Integration: Breaks packaging limits, supporting hybrid multi-chip/multi-node designs (e.g., 7nm logic + 40nm interposer).

TC Bonder: CoWoS's Make-or-Break Technology

Within CoWoS, Thermal Compression Bonding (TCB) determines yield and performance by:

1. Precision Alignment: Micron-level chip-to-interposer positioning for Cu Pillar bonding.
2. Thermal Stress Control: Balancing warpage under heat/pressure to prevent micro-cracks.
3. Multi-Layer Stacking: Ensuring signal integrity across HBM/logic chip bonds.

CoWoS-grade TCB demands extreme precision ($\pm 1.5\mu\text{m}$ or better), stable force/temperature control, and large-format capability (e.g., Nvidia's 130×90mm GB200). Fluxless bonding and adaptive warpage compensation are becoming critical—capabilities currently exclusive to giants like ASM Pacific (Singapore), Kulicke & Soffa (US), and Hanmi (Korea).

CoWoS Market Explosion: China's Capacity Crisis

Yole projects the global CoWoS market hit \$3.5B in 2023 and will explode at 42% CAGR to exceed \$10B by 2026. AI chips drive >70% of demand—each Nvidia H100/H200 or AMD MI300X needs 1-2 interposers. Global AI chip shipments could hit 1.5M units in 2024, widening CoWoS shortages.

As the world's #2 AI chip market, China faces acute pressure: Domestic chips like Huawei's Ascend 910B, Cambricon's Siyuan 590, and Biren's BR100 require 2-4 interposers each. Tech giants (Baidu, Alibaba) also race to adopt CoWoS.

China's CoWoS market could hit \$800M in 2024 and surge past \$2.5B by 2026 (>70% YoY growth). But 100% reliance on imported equipment—especially TC Bonders—creates severe risk. Potential US export bans on high-end TC Bonders threaten to starve China's capacity expansion.

US Sanctions Accelerate Localization

With CoWoS tech now a US "Area of Concern," export controls could paralyze China's advanced packaging lines: ASM Pacific has halted TC Bonder shipments to some Chinese customers; BESI restricts LAB equipment access. TC Bonder localization is no longer optional—it's vital for AI supply chain security.

PrecisioNext: China's TC Bonder Trailblazer

As China's sole domestic CoWoS-grade TC Bonder developer, PrecisioNext shatters the "follower" narrative. Its Loong series features:

- Self-developed Ultra-Precision Nano Moving Platforms (operating at 450°C)
- Multi-Spectral Vision Positioning achieving $\pm 1\mu\text{m}$ placement accuracy
- 150°C/s heating and 50°C/s cooling rates
- Support for jumbo chips up to 130×130mm
- 25% higher throughput than international peers

Compatible with both 12-inch wafers and panel-level (620×620mm) packaging, Loong enables full-process HBM stacking. Its successful testing marks China's entry into elite TC Bonder manufacturing.

Critically, PrecisioNext is racing toward next-gen fluxless TC Bonding with $\pm 0.3\mu\text{m}$ precision. As

China's CoWoS capacity surges, PrecisioNext could dominate the domestic TC Bonder market by 2026—establishing China as a global high-end packaging leader.

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