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ASIA ELECTRONICS INDUSTRY

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A Dempa PUBLICATION ISNN 1342-422X

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Fuji Unveils New Series of Innovative CLT-FG All-in-One Placement Machines

Combining compactness with production flexibility to meet a wide range of needs

Fuji Corporation has developed a new placement machine, the CLT-FG, which combines compactness with flexibility to accommodate diverse production requirements. With a compact design featuring a one-meter-wide machine body, and leveraging the technology Fuji has cultivated through its experience in developing placement machines, the CLT-FG meets a wide range of production requirements including high-mix, low-volume production to deliver flexible and stable manufacturing.

Development background

In recent years, production sites have been facing greater demands to accommodate high-mix low-volume production and to flexibly adjust production to meet fluctuating demand due to the diversification of electronic devices, technological innovations, and shorter product lifecycles.

On the other hand, when introducing new equipment, there are challenges such as ensuring that the equipment's performance is suitable for day-to-day production operations, securing sufficient installation space, and managing operation workloads. Therefore, selecting the optimal equipment has become a key priority.

Against this backdrop, Fuji has been developing the CLT-FG, a new placement machine designed to meet a wide range of production needs. Drawing on customer insights, Fuji has focused on delivering the values required in today's production environments, achieving a balance between compactness and high flexibility to ensure easy installation even in production environments with limitations.

Fuji's new lineup of SMT pick and place machines: CLT-FG

CLT-FG features

1. Flexible for diverse production needs

The CLT-FG is equipped with a versatile head capable of handling a wide range of components. From high-speed placement of small chip components to stable handling of large components, the CLT-FG supports the production of a diverse range of products. It adapts flexibly to production environments characterized by high-mix, low-volume production and frequent product changeovers, enabling efficient production.

2. Compact design for easy installation

With a compact design featuring a width of approximately one meter, this machine is optimized to meet the diverse needs of various production sites, and offers greater flexibility in terms of installation locations. A lean, streamlined machine and unit configuration helps minimize the effort required for both installation and operation.

3. High-quality placement backed by proven technology

By leveraging Fuji's proven, cutting-edge placement technologies and existing platform assets, this machine has the capability to accommodate a wide range of production needs. It delivers high-quality placement through stable operation and high reliability. The design also takes into account asset compatibility with existing equipment to support smooth operation.

Future plans

Fuji has added the CLT-FG to its product lineup as a new platform designed to expand customers' options and better meet the diverse needs of production sites. The CLT-FG will next be shown at productronica India 2026 at BIEC, Bengaluru, where Fuji will be exhibiting alongside NMTtronics India Pvt. Ltd.

Dempa AEI ASIA ELECTRONICS INDUSTRY

AEI September 2026
Semicon India Special Issue

ASIA ELECTRONICS INDUSTRY (ISSN 1342-422X) is published by Dempa Publications, Inc., 1-11-15 Higashi Gotanda, Shinagawa-ku, Tokyo 141-8715, Japan Tel: +81-3-3445-6111 Fax: +81-3-3445-6890.
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SEMICON India 2026: India to Spark Global Chip Surge

India accelerates its chip ecosystem, driving global supply chain expansion, talent, and fabrication growth.

While global supply chains face continuous realignment, India is positioning itself as an essential semiconductor anchor. Prime Minister Narendra Modi will officially inaugurate the fifth edition of SEMICON India on 17th September 2026 at Yashobhoomi, New Delhi.

Co-organized by the India Semiconductor Mission (ISM) and SEMI, the conference runs from 17th to 19th September under the theme "Silicon to Systems: Building the Ecosystem." This premier B2B gathering marks a decisive transition in India's technology roadmap. The nation is moving rapidly from building credibility to demonstrating real manufacturing capability.

The global semiconductor market is expanding rapidly. Industry projections show global demand growing from US$1 trillion to US$2 trillion, while India's internal semiconductor demand will surge from US$100 billion to US$200 billion. Consequently, international chip executives, investors, and policymakers are gathering in New Delhi to tap into this momentum.

Transitioning to Execution: The Semicon 1.0 Milestone

Initial efforts under the Semicon India Programme have yielded clear operational successes. The government approved 12 manufacturing projects under Semicon 1.0, representing a cumulative investment exceeding ₹1.64 lakh crore (US$17.36 billion at US$1 = ₹94.48). These facilities

SEMICON India 2025


Officials held pre-event press conference for SEMICON India 2026. Among the officials present were S. Krishnan, Secretary, MeitY (third from left); Amitesh Kumar Sinha, Additional Secretary, MeitY and CEO, India Semiconductor Mission (fourth from left); and Ashok Chandak, President, SEMI India and of India Electronics Semiconductor Association (first from left).

include one silicon fab, one silicon carbide fab, an integrated Gallium Nitride Micro LED display fab, and nine assembly, testing, marking, and packaging (ATMP/OSAT) units.

Significantly, three approved companies—Micron, Kaynes, and CG Semi—have already commenced commercial production. A fourth facility will start production before the end of 2026. These units supply essential components to critical global sectors, including consumer appliances, automotive, telecommunications, power electronics, and aerospace.

Beyond hardware, the design landscape has experienced rapid expansion. Twenty-four semiconductor design projects from startups and MSMEs received direct financial support. Furthermore, 105 design startups now utilize industry-standard Electronic Design Automation (EDA) tools. Innovators are developing chips for satellite communications, AI systems, drones, IoT devices, and telecom equipment.

Launching Semicon 2.0: A ₹1.275 Lakh Crore Investment Framework

Building on these early successes, the Union Cabinet chaired by Prime Minister Narendra Modi approved Semicon 2.0 with a total budget outlay of ₹1.27,500 crore (US$13.495 billion at US$1 = ₹94.48). This next phase introduces long-term policy support designed to solidify India's position on the global technology map.

Semicon 2.0 rests on six core strategic pillars:

1. Deepening Chip Design: Focuses on creating strategic commercial IP, complex system architectures, and advanced block designs.

2. Machines and Materials: Incentivizes equipment manufacturing, materials, specialty chemicals, and high-purity gases to establish a precision manufacturing base.

3. Expanding Fabrication Facilities: Attracts additional silicon, compound, discrete component, and display fabs,

leading up to the first commercial silicon fab commissioning in 2028.

4. Strengthening ATMP/OSAT Networks: Brings next-generation, advanced packaging technologies to India to serve as a reliable global alternative.

5. Advanced R&D: Focuses on sub-28nm advanced node development and emerging technologies through global research partnerships.

6. Talent Pipeline Expansion: Integrates specialized cleanroom, fab construction, and EDA training across technical institutions nationwide.

As Shri S. Krishnan, Secretary, Ministry of Electronics & Information Technology (MeitY), stated:

"The Government of India has given clear indication towards the importance and significance of the semiconductor sector with its progressive policies and extended support. The sense of participation around the SEMICON India Conference and Exhibition has grown significantly each year."

According to Krishnan, this year's edition is particularly significant for two reasons. First, SEMICON India 2026 happens against the backdrop of the on-ground success of Semicon India Programme, with 03 of the 12 semiconductor projects approved under Semicon 1.0, having commenced commercial production. Second, Krishnan said the announcement of the next phase i.e. Semicon 2.0 with 06 major pillars, which further strengthens India's commitment to build a robust and resilient semiconductor ecosystem."

Building a Scalable Talent Engine

A key element of India's long-term strategy is its talent pipeline. Through the Chips to Startup (C2S) programme, over 315 universities access advanced chip design infrastructure. Usage of these EDA tools through the ChipIN Centre has surpassed 240 lakh hours, training 68,000 individuals and yielding 175 taped-out chip designs from SCL Mohali. Additionally, the SMART Lab at NIELIT Calicut has trained over 100,000 engineers in VLSI, Embedded Systems, and IoT.

International collaborations are expanding this workforce rapidly. ISM has partnered with Lam Research to train 60,000 process engineers in nanofabrication over 10 years. Joint academic programs with Purdue University and Arizona State University drive global research and workforce development. A partnership with NAMTECH will certify 5,000 packaging and fab professionals, while an R&D agreement with IBM establishes a semiconductor research center in India.

Emphasizing India's strategic value, Mr. Ajit Manocha, President & CEO of SEMI, highlighted:

"SEMI has empowered the rise of semiconductor hubs around the world for more than five decades, and India is well positioned to thrive with its blend of speed, ambition, talent and long-term vision. Through SEMICON India 2026, SEMI brings the collective strength of its global network to India's journey. India's opportunity is not simply to join the global supply chain, but to become integral to it. That is the ambition SEMICON India 2026 exists to accelerate."

Converging the Global Ecosystem at SEMICON India 2026

Meanwhile, Ashok Chandak, President, SEMI India and of India Electronics Semiconductor Association (IESA), said, "SEMICON India has become the annual convergence point where industry leaders, policymakers, researchers, startups and investors come together, collaborations take shape, partnerships are forged, and the next phase of India's semiconductor growth is accelerated."

In addition, Ashok said, "The introduction of the new 'Sand to Silicon to Systems' Value Chain Experience this year demonstrates how India is progressing from building credibility to demonstrating capability, while showcasing the country's expanding strengths across the entire semiconductor ecosystem."

Indian Prime Minister Narendra Modi and Micron Chairman, President, and CEO Sanjay Mehrotra during the inauguration of Micron's new OSAT facility in Sanand, Gujarat early this year. (Credit: Office of the Prime Minister of India)

SEMICON India 2026 provides a direct platform for market engagement. Spanning over 15,000 square meters, the exhibition features more than 500 exhibitors, 240 international companies, 6 country pavilions, and 10 state government pavilions. Delegations from over 40 countries will attend, alongside keynotes from global firms such as ASML, Applied Materials, Teradyne, Infineon, NXP, Tata Electronics, and Micron.

The conference features key sessions on manufacturing, AI, supply chain resilience, sustainability, and workforce development. Strategic highlights include six international country roundtables and dedicated sessions on women's leadership and industry association collaboration. As global companies seek diversified, high-growth hubs, SEMICON India 2026 demonstrates that India offers the policy certainty, talent capacity, and scale required for the next generation of semiconductor growth.

India's PLI Incentives Power Electronics Growth

Indian Prime Minister Narendra Modi

India's electronics sector posts record growth in production, exports, jobs and value addition driven by PLI-led manufacturing initiatives.

India's electronics manufacturing industry has undergone a dramatic transformation over the past decade, with the government-backed Production Linked Incentive (PLI) schemes emerging as a major catalyst for growth in domestic production, exports and value addition.

India's electronics manufacturing sector has emerged as one of the country's strongest industrial growth stories, propelled by a series of government initiatives aimed at boosting domestic production, exports and local value addition.

The PLI scheme is a government initiative launched in 2020 and aims to strengthen India's manufacturing capabilities. Specifically, the program offers financial incentives to eligible companies based on their incremental sales. Without a doubt, PLI stands as a cornerstone of India's ambition to raise manufacturing's contribution to 25% of GDP and claim its place among the world's leading industrial economies.

It initially targeted three sectors beginning with the Mobile Manufacturing and Specified Electronic Components, Critical Key Starting materials/Drug Intermediaries and Active Pharmaceutical Ingredients and Manufacturing of Medical Devices. Following its initial success, the scheme was progressively extended to cover 13 key sectors of the economy, including pharmaceuticals, automobiles and auto components, Textile Products, white goods, and specialty steel, among others.

Rapid Ecosystem Expansion

According to India's Ministry of Electronics and Information Technology (MeitY), electronics production has expanded more than seven-fold over the last 12 years, while exports have surged eleven-fold. The sector has evolved from a largely import-dependent market to a globally competitive manufacturing base supported by policy initiatives designed to deepen local supply chains and strengthen industrial capabilities.

The growth has been driven by a long-term strategy focused on developing a complete electronics value chain. Beginning with finished products, the approach expanded into sub-assemblies, components, machinery and tools while simultaneously strengthening manufacturing infrastructure across the country. This phased strategy has helped position India as a major global electronics manufacturing destination.

The sector's progress aligns with the government's Make in India and Atmanirbhar Bharat initiatives, which have supported greater domestic manufacturing capacity and improved competitiveness in international markets.

Electronics Industry Posts Significant Growth

India's electronics production (Table 1) rose from approximately ₹1.9 lakh crore in FY2014-15 to around ₹13.11 lakh crore in FY2025-26, while electronics exports climbed from about ₹38,000 crore to ₹4.24 lakh crore during the same period.

The ministry also reported that electronics production increased from ₹11.32 lakh crore in FY2024-25 to ₹13.11 lakh crore in FY2025-26, representing year-on-year growth of 15.8%.

PLI Scheme Exceeds Targets for Investment and Exports

A key contributor to the sector's growth has been the PLI Scheme for Large Scale Electronics Manufacturing (LSEM), introduced in 2020 to strengthen domestic mobile phone production.

"The Government of India launched the Production Linked Incentive (PLI) Scheme for Large Scale Electronics Manufacturing (LSEM) in 2020 to boost domestic manufacturing of mobile phones in the country," the ministry stated.

Performance under the scheme has exceeded original targets across investment, production and exports (Table 2). For example, projected investments to be generated because of the PLI for the 2020 to 2025 period is ₹7 lakh crore,

Metric	FY2014-15 (₹ Crore)	FY2014-15 (USD Billion)	FY2025-26 (₹ Crore)	FY2025-26 (USD Billion)	Growth
Electronics Production	1,90,000	31.07	13,11,000	148.45	7x
Electronics Exports	38,000	6.21	4,24,000	48.01	11x
Mobile Phone Production	18,000	2.94	6,27,000	70.99	33x
Mobile Phone Exports	1,500	0.25	2,59,000	29.33	165x

Data Source: MeitY (for rupee values).
USD conversion:
FY2014-15 calculated using ₹61.15/US$1
FY2025-26 calculated using ₹88.31/US$1
Exchange-rate references based on RBI Handbook of Statistics on the Indian Economy

Table 1: Comparison of Electronics Manufacturing Growth (FY 2014-15 vs. FY2025-26)

Category	Target (₹ Cr)	Target (US$ Bn)*	Actual (₹ Cr)	Actual (US$ Bn)*
Investment	7,000	0.79	20,587	2.33
Production	8,12,550	92.01	11,61,581	131.53
Exports	4,87,530	55.21	6,43,323	72.85

Data Source: MeitY (for rupee values)
USD conversion:
Converted using FY2025-26 average exchange rate of ₹88.31/US$1
PLI performance data is reported cumulatively through March 2026.
Exchange rate based on RBI Handbook of Statistics

Table 2: Production Linked Incentive (PLI) for Large Scale Electronics Manufacturing (LSEM)

but actual reported investments through March 2026 is ₹20.587 lakh crore or 294 percent up the original target. Actual production performance also exceeded original target by 142 percent while actual exports as of March 2026 topped original target by 132 percent.

Because of PLI, MeitY said smartphones, which did feature in top 100 exported commodities in 2014, have now emerged as India's top exported individual commodity in FY2025-26, surprising gems and jewelry and even petroleum products. In fact, India now manufactures 99.2 percent of the mobile phones used domestically and has become the world's second-largest mobile phone manufacturer by volume. The country has also transitioned from being a net importer of mobile phones to a net exporter.

The ministry further noted that the PLI-LSEM program has catalyzed investments of approximately ₹96,000 crore, or around US$14 billion, across the mobile manufacturing ecosystem. Domestic value addition under the scheme reached 23% in FY2023-24, based on findings from an external evaluation study.

IT Hardware, Components and Semiconductors Expand

The government has also broadened its manufacturing focus through the PLI Scheme 2.0 for IT Hardware, launched in 2023 to promote production of laptops, tablets and servers. As of now, the initiative has generated cumulative production of ₹24,385.89 crore, investments of ₹1,056.36 crore and 5,216 direct jobs.

Complementing these incentive efforts is the Electronics Component Manufacturing Scheme (ECMS), which aims to strengthen domestic supply chains for key electronics components. The scheme has approved 75 applications covering 23 product categories and is expected to attract investments of ₹61,671 crore while generating projected production of ₹4.51 lakh crore and creating 65,040 direct jobs.

Government-backed programs have also supported more than 85 MSMEs that have integrated into global electronics value chains.

Why the AI-Defined Vehicle Starts With the Right Foundation

Traditional vehicle architectures are becoming a liability— as the pace of innovation accelerates across the industry, automakers risk falling behind without a rapid shift to a new vehicle core platform. In the semiconductor field, the company has enhanced its technical capabilities by supplying bonding machines and inspection equipment that mount dies cut from wafers onto package substrates and wafers and connect electrodes.

The automotive industry didn't arrive here overnight. It evolved step by step, with each new function layered onto the last, shaping architectures that reflect decades of incremental innovation.

For years, progress meant adding capability one ECU at a time — each with its own hardware, software and integration model. However, this approach worked when systems were relatively isolated.

But over time, it created something very different — fragmentation. Systems became harder to integrate, harder to update and increasingly difficult to scale. As outlined in a recent Automotive News guest commentary , these fragmented architectures have become one of the core barriers to scaling software-defined vehicles.

Today, intelligence is moving deeper into the vehicle — not just into features, but also into the real-time functions that define how the vehicle moves, behave and operates. That's what we call the vehicle core - and it's at the center of this transition.

The Vehicle Core: Expected to Operate as One

The vehicle core is a set of safety-critical functions — powertrain, vehicle dynamics, networking and energy management — that together define what the vehicle does, or what makes “a car” a car.

These functions operate across the vehicle — but what's new is the degree to which they must operate together as one coordinated system. That means that it is no longer enough to integrate function by function — the system as a whole must be synchronized, predictable and deterministic.

Why the Underlying Architecture Must Change

Software can no longer be tightly bound to individual hardware elements. As the foundation evolves, functions need to consolidate onto fewer, more capable compute platforms. This change also calls for the system to be structured so functions can operate together seamlessly instead of independently.

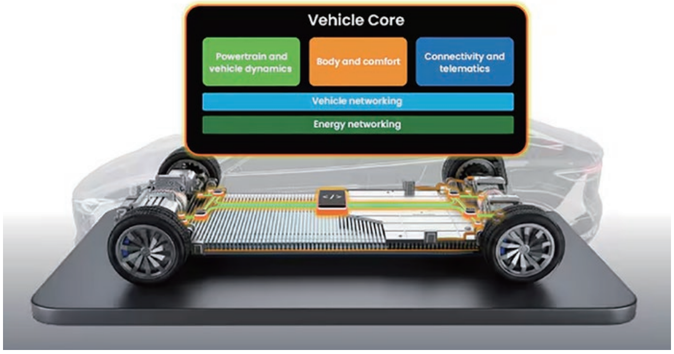

Photo 1: The vehicle core: the safety-critical functions that make "a car" a car.

If this sounds familiar, there's a reason.

The data center industry went through a similar evolution and faced many of the same challenges first. In early data centers, applications ran on dedicated hardware — siloed, underutilized and difficult to scale. As demand grew, that model ultimately broke down under complexity and cost.

The first step forward came with virtualization. Workloads were no longer tied to a single machine, but could run across shared infrastructure. Utilization improved — but fragmentation persisted. As data volumes increased and systems became more distributed, complexity grew further — introducing fragmented tools, inconsistent environments and rising operational risk.

This shift, enabled by virtualization, marked the first step toward treating infrastructure as a unified, scalable system. But it wasn't enough on its own. Solving the problem required a broader architectural reset:

- Consolidation of compute onto shared platforms
- Standardization of software environments
- A networked backbone connecting the full system
- Orchestration replacing one-off integration

The result was a system that could scale — reliably and efficiently — as a cohesive whole.

Automotive is now entering a similar transition — but with the added requirement that synchronization and predictability are built in from the start. As intelligence moves deeper into

	Data Center	Software-Defined Vehicle (SDV)
Consolidated Compute	✓	✓
Aligned OS	✓	✓
Networking	✓	✓
Fit for Purpose	✓	✓
Scalable and Modular	✓	✓
Security	✓	✓
Remote Management	✓	✓

The car as a data center on wheels.

Table 1 The car as a data center on wheels.

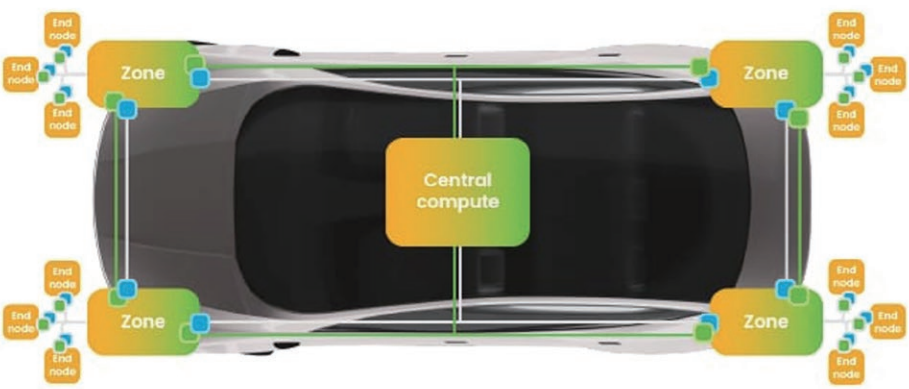

Photo 2: The next-generation vehicle begins with an architecture designed to work as one.

the vehicle and system complexity increases, fragmented architectures begin to break down under integration effort, cost and inconsistency.

Managing that complexity requires designing the system to function as a coordinated whole from the start.

You can think of the modern vehicle as a data center on wheels. But unlike data centers, vehicle systems are physical, safety-critical and time-constrained — which raises the bar for how tightly the system must operate together.

That's what's driving the shift to a new kind of vehicle architecture:

- Central and zonal compute working together
- A vehicle-wide data network that connects the system consistently
- An energy network that manages power across the platform

From Architecture to a Working System

If execution isn't controlled, you can design the system correctly — and still end up with inconsistent behavior. That's where middleware becomes essential. A deterministic middleware layer coordinates execution and timing across systems — ensuring predictable behavior. Without this, you still have parts. With it, you have a system.

A Shift Toward System-Level Foundations

The industry is moving away from building everything from scratch, program by program.

Instead, we see the emergence of system-level, pre-integrated foundations — architectures where compute, networking, energy management and middleware work together as a coherent baseline.

The goal isn't to limit flexibility, rather it is to remove friction through:

- Reduced repetition of integration work
- More predictable execution
- Faster path from development to deployment

Once the underlying system behaves consistently, everything above it can move faster.

Where the NXP CoreRide Platform Comes into Play

The CoreRide platform is a pre-integrated, system foundation that helps bring together key elements of the vehicle architecture, so automakers don't need to rebuild them for each program.

This platform provides a consistent baseline across compute, networking, power and energy management and system behavior, reducing integration efforts and enabling more predictable execution at scale. On top of that, middleware solutions such as MotionWise provide the orchestration layer.

MotionWise ensures that distributed functions execute and communicate with synchronized timing and deterministic behavior — essential for coordinating safety-critical systems. Together with the CoreRide platform, they establish the foundation for the vehicle to function as one coordinated system.

The Foundation for Differentiation: Intelligent Platforms

Just as the data center evolved into a platform for running

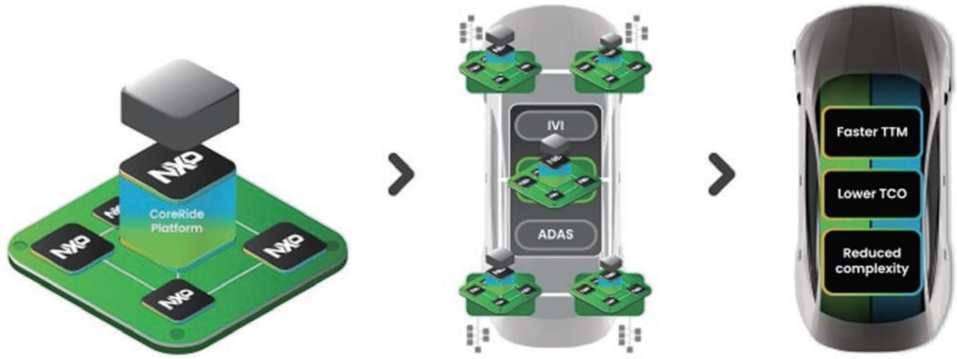

Photo 3: NXP CoreRide platform: clearing the path to the future SDVs.

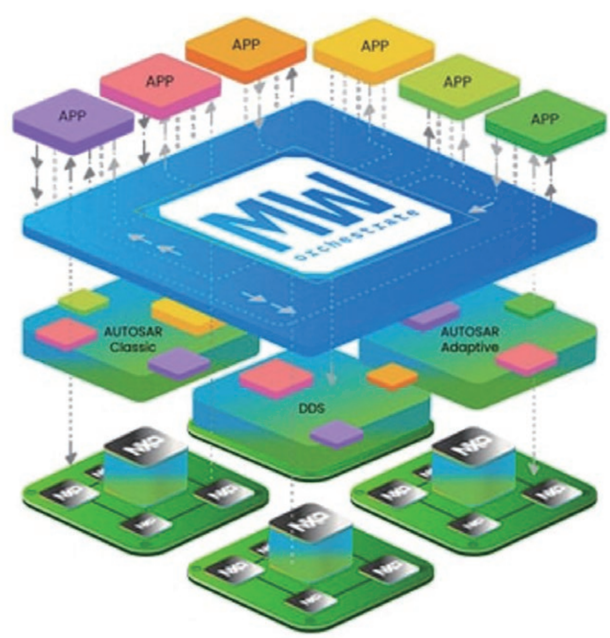

Photo 4: CoreRide platform and MotionWise provide the foundation for vehicle-wide coordination.

and scaling workloads, the vehicle is evolving into a platform for running and scaling intelligence.

The next wave of differentiation in the automotive industry lies in making the vehicle core itself intelligent — not just adding features around it, but embedding AI into how the vehicle operates at its core.

For example, an intelligent chassis system can detect road conditions such as potholes in real time and adjust suspension within milliseconds — improving comfort, safety and performance dynamically.

And this is only the beginning. As the vehicle core becomes intelligent and connected, entirely new use cases will emerge — many of which are not yet fully defined today. In practice, this changes where differentiation can come from.

How Differentiation Shifts in a Platform Architecture

In earlier architectures, differentiation came from individual features and ECUs. In a platform architecture, it comes from how effectively the system runs as a whole - and how intelligence is applied across the system.

AI depends on consistency — in data, in execution and in system behavior. Fragmented architectures struggle to provide that. A consistent, deterministic vehicle core makes it possible. That is what allows intelligence to move beyond isolated features and begin shaping how the vehicle operates as a whole — in real time and across fleets.

When the vehicle core operates consistently across the vehicle, automakers can build intelligent platforms on top - systems that continuously improve performance, adapt behavior and enable new capabilities over time. This shifts AI from an isolated feature to a foundational capability of the platform, and that platform becomes a key source of differentiation.

From Architecture to Outcome

Customers don't ask for software-defined vehicles. They expect vehicles that improve year after year — in performance, safety, efficiency and personalization. Meeting that expectation requires more than adding new features. It depends on a foundation that can support continuous, reliable change — a system foundation that allows intelligence and differentiation to scale.

With the right foundation in place, intelligence becomes part of how the vehicle works — not just something layered on top, but built into its core platform. This is what turns a software-defined vehicle into an AI-defined one.

About this Article:

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Why AI Chips Can't Scale Without Rethinking Power

As AI computing demands reach gigawatt scales, traditional data center power infrastructure has become a major bottleneck to continued chip scaling. Discover how innovations like high-voltage DC microgrids and Infineon Technologies' CoolSiC MOSFETs enable the 800V architectures needed to power next-generation workloads efficiently.

The race to build larger AI models has collided with a hard limit that no amount of compute innovation can overcome: power delivery. A single rack of next-generation AI accelerators can demand 200 kilowatts or more, yet most data centers still distribute electricity using architectures designed for servers that consumed 5 to 10 kW per rack a decade ago. The bottleneck is no longer the chip. It is the infrastructure that keeps it running.

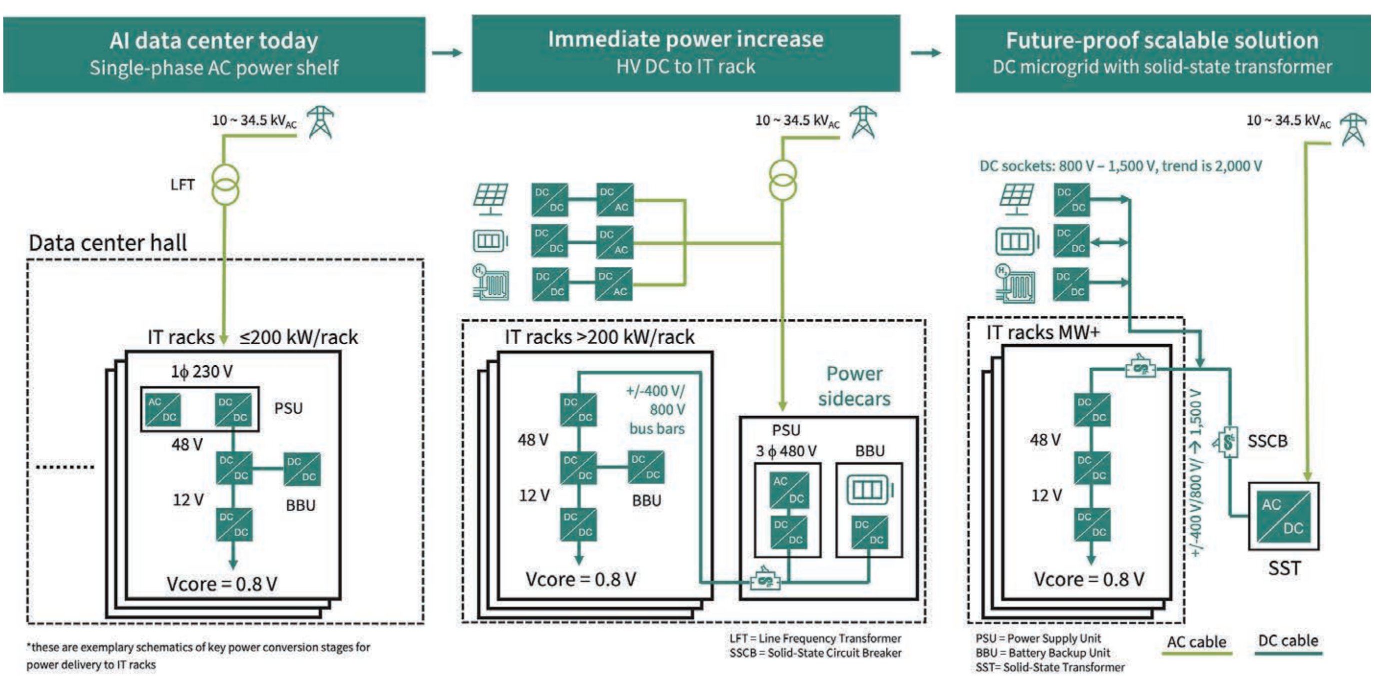
This matters now because the gap is widening. Training frontier AI models requires exascale computing clusters that consume gigawatts, not megawatts. Inference workloads, once considered lightweight, now run continuously at enterprise scale, compounding energy demand. Meanwhile, renewable energy integration, grid reliability, and thermal management have become first-order design constraints, not afterthoughts. The semiconductor industry must rethink power from the grid to the processor core, or risk stalling the very systems it enables.

From AC Distribution to DC Microgrids

Traditional data centers rely on alternating current (AC) distribution from the utility grid through multiple conversion stages: medium-voltage AC transformers step power down to low-voltage AC, which is then converted to DC at the rack level for server power supplies. Each conversion introduces losses, typically 10 to 15 percent from grid to chip. At gigawatt scale, that inefficiency becomes untenable both economically and environmentally.

The shift to high-voltage DC (HVDC) microgrids eliminates redundant conversions and enables direct integration of renewable energy sources like solar and wind, which generate DC natively. Solid-State Transformers (SSTs) replace conventional magnetic transformers, stepping medium-voltage AC (10 to 35 kV) down to 800V DC at the rack level in a single stage. This architecture reduces losses by approximately 30 percent compared to legacy AC systems, while improving power density and enabling faster fault protection through Solid-State Circuit Breakers (SSCBs).

Figure 1: Architectural changes diagram showing AC vs. DC microgrid topology



SSTs leverage wide-bandgap (WBG) semiconductors, primarily silicon carbide (SiC) MOSFETs which operate efficiently at higher voltages and switching frequencies than silicon-based components. CoolSiC™ MOSFETs, for example, handle 1.2 kV to 3.3 kV blocking voltages with switching speeds in the tens of kilohertz, enabling compact, modular SST designs that fit within existing data center footprints. The result: higher power throughput without expanding physical infrastructure.

Voltage Scaling at the Rack

Photo 1: Infineon Technologies' CoolSiC MOSFETs enable the 800V architectures needed to power next-generation workloads efficiently

Legacy racks distribute 48V DC to servers, a standard inherited from telecom infrastructure. At 200 kW per rack, 48V requires over 4,000 amperes, necessitating thick copper busbars that add weight, cost, and resistive losses. Transitioning to 800V DC reduces current to 250 amperes for the same power load, slashing cable size and I^2R losses by more than 95 percent.

This voltage shift also benefits downstream power conversion. Intermediate bus converters (IBCs) step 800V down to 48V or 12V rails, and voltage regulator modules (VRMs) deliver millivolt-precision power to processor cores. Operating from a higher input voltage improves IBC and VRM efficiency by 2 to 4 percentage points, which compounds across thousands of racks. For a 1 GW data center, that efficiency gain translates to 20 to 40 MW of power savings—enough to offset the electricity consumption of a small city

Thermal Management as a Design Constraint

Higher power density concentrates heat. A 200 kW rack generates thermal output equivalent to a residential furnace running continuously. Air cooling, long the industry standard, cannot dissipate heat fast enough at these densities without excessive fan power and acoustic penalties. Liquid cooling—whether direct-to-chip cold plates or immersion cooling—has become necessary, not optional.

Power semiconductors in SSTs, IBCs, and VRMs must also manage their own thermal loads. SiC devices operate reliably at junction temperatures up to 175°C, compared to 150°C for silicon IGBTs, providing thermal headroom that simplifies cooling system design. Advanced packaging techniques, including direct-bonded copper (DBC) substrates and sintered silver die attach, improve thermal conductivity and reduce thermal resistance, ensuring that power modules maintain efficiency under sustained high-current operation.

Photo 2: Data center rendering

Renewable Integration and Grid Stability

AI data centers increasingly co-locate with renewable energy sources to meet sustainability commitments and reduce operational costs. Solar and wind farms generate variable DC power that conventional AC grids struggle to absorb efficiently. HVDC microgrids bypass this problem, connecting renewable sources directly to the data center bus via DC-DC converters.

SSTs enable bidirectional power flow, allowing data centers to inject excess renewable generation back into the utility grid during low-demand periods or draw from the grid when on-site generation falls short. SSCBs provide fault isolation in microseconds, preventing localized failures from cascading across the microgrid. This architecture improves renewable utilization rates by 15 to 25 percent compared to AC-coupled systems, accelerating payback on solar and wind investments.

What Changes Next

The transition to DC microgrids and 800V racks is not theoretical. Multiple hyperscale operators are piloting SST deployments and evaluating WBG semiconductor portfolios for next-generation facilities. By 2026, industry forecasts suggest that 30 percent of new AI data center builds will incorporate HVDC distribution at the primary level, with 800V racks becoming standard for high-density compute workloads.

Power architecture is now a strategic differentiator. Data center operators that adopt DC microgrids early will gain efficiency, density, and renewable integration advantages that compound over facility lifetimes measured in decades. The semiconductor innovations enabling this shift – SiC MOSFETs, GaN power stages, advanced magnetics, and intelligent gate drivers – are shipping in volume today. The question facing hyperscalers is not whether to rethink power architecture, but how quickly they can deploy the infrastructure that AI scaling demands and whether their competitors will reach operational advantage first.

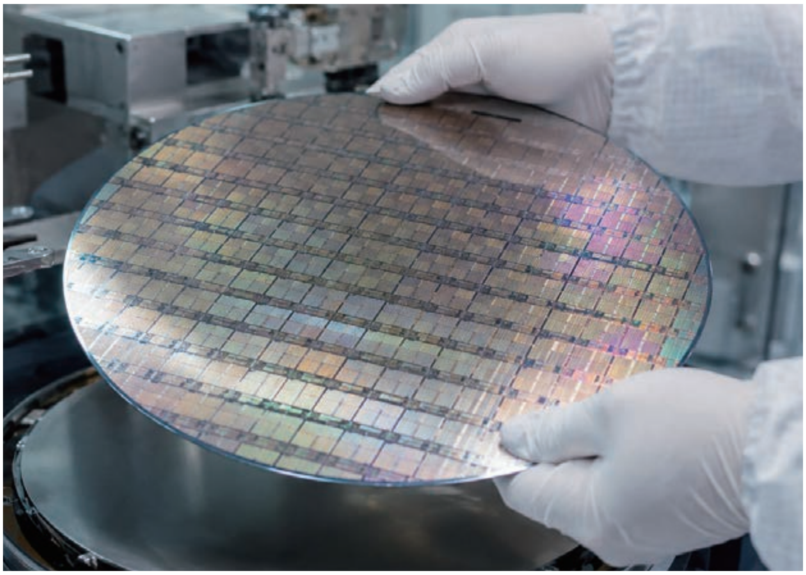
About this Article:

The authors are Dr. Gerald Deboy, Fellow, and Fanny Bjoerk, Director Global Application Marketing for Datacenter Power Distribution, Infineon Technologies.

Challenges and Advancements in Semiconductor Chip Picking

In this article, we'll start with a simple overview of the processes and machines involved in making semiconductor chips and the products all around us that rely on them. We'll then take a closer look at some of the challenges that arise in the semiconductor chip picking process, where chips are grabbed and lifted. After that, we'll suggest methods for damage control using THK's Pick and Place Robot (PPR) by sharing examples of user challenges and product applications.

We hope that young engineers just entering the semiconductor industry as well as veterans who are already grappling with the challenges of the chip picking and placing processes find this article useful.



Semiconductors, the "Bread and Butter of Industry"

Semiconductors have been called the "bread and butter of industry," but just how ubiquitous are they really?

Let's start with CPUs. Inside the smartphones and computers that we have with us everywhere we go is an information processing and calculation device called a CPU. While you might think that any given device would only have a single CPU, in reality, many modern computers have multiple built-in CPUs like quad-core processors for handling large quantities of data. And there are many examples of systems with multiple CPUs processing information independently, with each dedicated to a specific function. Some vehicles are outfitted with 30 CPUs or more, for example.

Next, let's look at storage space, or memory drives. CPUs can process information, but they can't store it. If performing a calculation caused the result of the previous calculation to disappear, though, nothing would ever get done. Memory drives are the devices that store data temporarily or long-term while large amounts of information are being processed.

And what about sensors? Take image sensors, for instance. Image sensors are used in things like smartphones and digital cameras. They capture external point and color information, which is converted into data. This data is then processed into a form that can be treated as a picture or an image file. Image sensors, as well as photosensors, acceleration sensors, and pressure sensors, play a big role in making our lives safer and more prosperous.

Last but not least, let's look at LEDs. Semiconductors have also revolutionized the way that we light the spaces we're in. LEDs have rapidly replaced conventional incandescent and fluorescent lights thanks to their high luminescence, long life, low energy consumption, and compact size. They are used to light everything from cars, traffic signals, and streetlights to smartphone and monitor displays.

Considering all of these applications for semiconductors, it's easy to see how indispensable the "bread and butter of industry" really is for our lives.

Semiconductor Chips and Their Manufacture

How are semiconductor chips made, though?

First of all, semiconductors are made of a silicon-based material.(1) Ingots of monocrystalline silicon are cut into wafers before pre-processing that includes patterning and die singulation, where the wafer is further broken up. This produces semiconductor chips, which are also called dies. The term "chip" refers to the way these parts are flecks or fragments of the larger silicon ingot. "Die," on the other hand, means a square of material or a cube like those used in board games. This is the "die" in the name of the die singulation process.

At this point, even though the silicon material is cut into individual dies, these alone can't be mounted to any kind of circuit.(2) Dies must be mounted to a polarized lead frame or semiconductor package that is itself in contact with a given circuit. This process is called die bonding. Here, the die is fixed in place by either soldering or through the use of an adhesive. During the next process, called wire bonding, the die is connected to the lead frame or semiconductor package using fine metal wires. These wires, and the surface of the semiconductor chip itself, are still exposed at this stage and require delicate handling. To lend them some additional durability, resin is poured out to form a protective capsule over them during the next process, known as molding.

(1) Other materials are also used.
(2) A technique called "flip chip bonding" also exists at time of writing.

Semiconductor manufacturing processes (post-processing)

Among the various machines that are used in these processes are dicers for die singulation, die bonders for setting dies (chips), sorters for organizing dies prior to die bonding,* and wire bonders for wire bonding.

Challenges in Picking Up Semiconductor Chips

Let's return to the processes where

Semiconductors used in a variety of fields

wafers are broken into individual chips and these chips are picked up. During die singulation, wafers are stuck to adhesive tape to prevent chips from scattering when they are cut. Afterwards, the chips cut from the wafer are grabbed by a picking tool and removed from this tape. The physical properties of silicon make it easy to break or crack the material with even a small impact. This poses the risk of damaging chips that have already made it through pre-processing. To avoid this, the adhesive tape stuck to the wafer is expanded, and ejector pins are used to lift individual chips from below. This makes it easier for picking tools to then remove each chip from the adhesive tape.

Using ejector pins to lift chips makes it easier to remove them from the adhesive tape, but it requires highly advanced technology. Below are some factors that complicate this process.

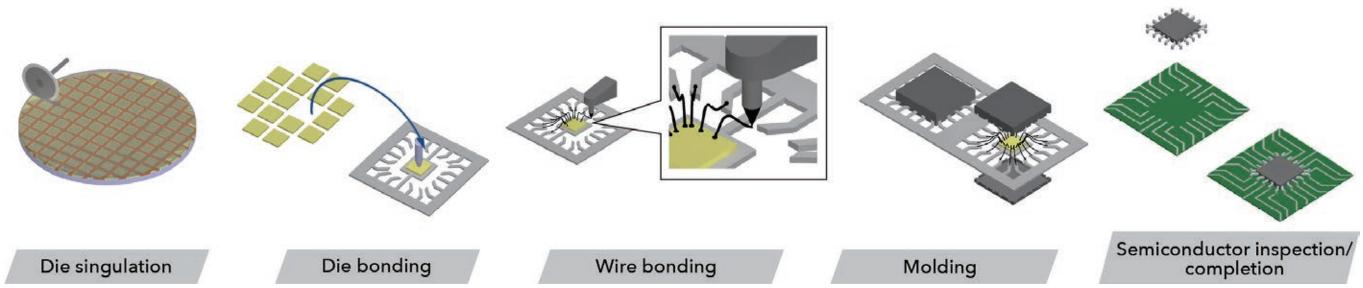
1. Chips are very thin and very delicate
2. Ejector pins and picking tools must move in sync with each other
3. Wear can change the relative positions of ejector pins and collets* with respect to the chips

* In the semiconductor and electronic component industries, a suction nozzle is called a collet.

Let's look at each of these complicating factors more closely.

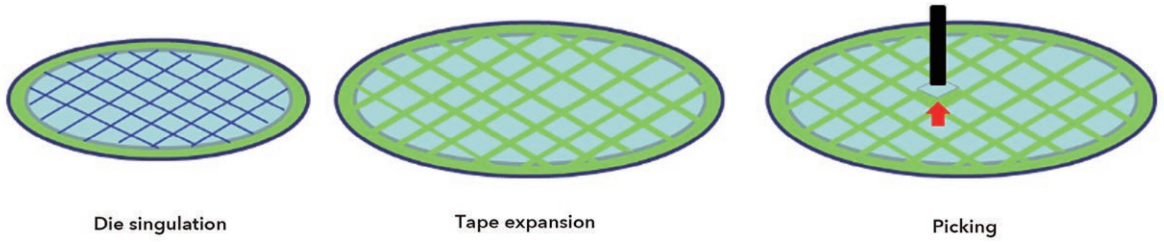
1. Chips are very thin and very delicate.

As mentioned above, ingots are sliced into thin pieces to produce semiconductor wafers. Making these wafers thin means that a single ingot can yield more of them, which drives down the cost of each. And the smaller and thinner semiconductor devices are, the less area and volume they require when mounted to a circuit board. All of this contributes to making the finished electrical device more compact and making the final product easier to



Semiconductor Manufacturing Processes (Post-Processing)

* Sorters can remove chips determined to be defective during testing.



Tape expansion and removal of semiconductor chips with a picking tool

use. While many chips are cut to a width of 0.5 mm to 1.0 mm for the sake of making them harder to break and thus easier to handle, some cutting-edge chips can be as thin as 20 μm.

2. Ejector pins and picking tools must move in sync with each other.

Ejector pins are driven upward from beneath a semiconductor wafer by a servomotor or other system. Collets attached to picking units are also driven by servomotors and similar systems, though they are driven downward. The sequence of events for picking up a semiconductor chip is:

1. The collet is lowered to make contact with the chip. (Air suction is applied at this time.)
2. The ejector pin is raised.
3. The ejector pin and collet are raised at the same time.
4. The collet continues to rise, picking up the chip.

During this process, the chip is subject to impacts from both the collet and the ejector pin making contact with it as well as from being pinched between them. Reducing the damage done to these thin semiconductor chips requires a high level of position control, speed control, and synchronized motion along the vertical axis. According to our research, pinching of just a few dozen microns applies a load in the hundreds of grams, making strict position control essential.

3. Wear can change the relative positions of ejector pins and collets with respect to the chips.

Ejector pins and collets make contact with chips thousands if not tens of thousands of times each day, which can gradually wear them down. In order to prevent this wear, cemented carbides and even diamonds are used to make these components. All the same, the tips of these components can become warped such that their relative positions with respect to the chips are altered, which can cause ejection errors as well as damage to the chips being handled.

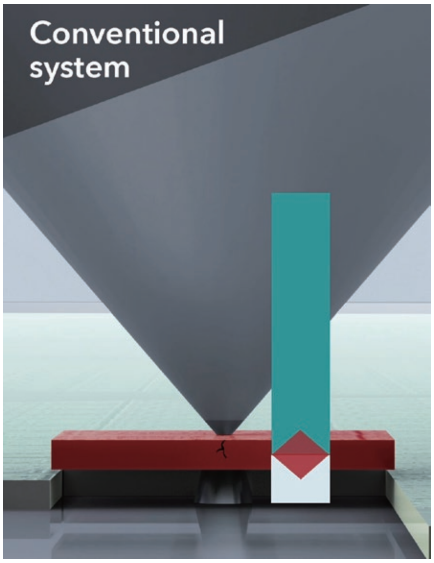
The PPR System and the Improvements It Offers

As an all-in-one system, the PPR comes with a built-in linear motor and encoder for the Z axis and a force sensor. It is the tool of choice for a wide array of semiconductor chip picking processes.

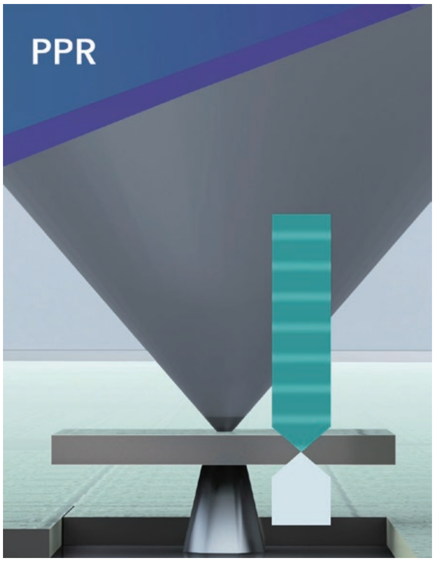
With a contact stop function that activates as soon as the collet touches the semiconductor chip , the PPR reduces the impact that the chip receives. This same function can also prevent fluctuations in the intensity of this kind of impact that might occur as a result of collet displacement caused by wear. Also, because the PPR is capable of detecting position information down to the micron, it can even detect such collet wear by checking the collet’s position when it makes contact with the chip.

See for a case study of a proposed solution in which height determinations are made using position information.

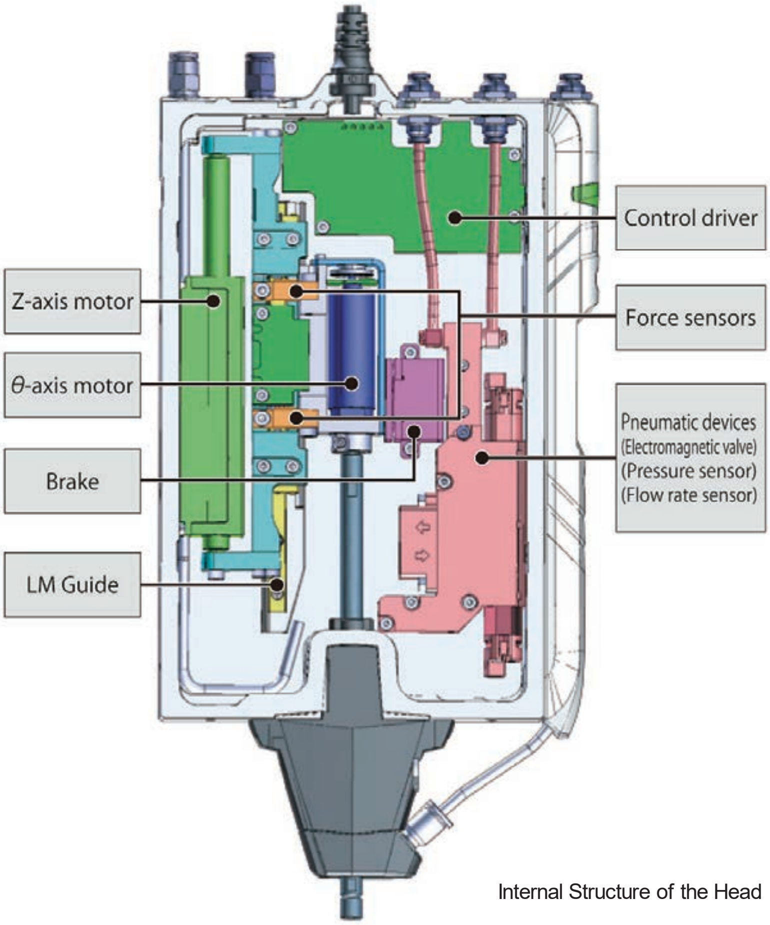
Using the PPR's pressing force control function for synchronizing with ejector pins makes it possible to maintain a set load applied to chips being picked up. This in turn prevents impacts that exceed that set load when chips are lifted, even if motion along the vertical axis isn’t synchronized with a high degree of accuracy.



Impact generated by pinching when adjustments cannot be made while pushing up with an ejector pin



Impact absorbed by avoiding overlapping forces as the chip is pushed up



Internal Structure of the Head

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https://www.thk.com/jp/en/journal/products/article-11122024-1.html

See for a case study of aproposed solution that shows the behavior of force sensors used for pressing forcecontrol.

Supporting Increased Yields from Semiconductor Manufacturing Processes

This time, we turned our attention to how semiconductor chips are picked up during processing. We covered challenges around damage control as well as process improvements made possible by the Pick and Place Robot PPR. As mentioned in the first part of this article, semiconductors are indispensable to the world, and if we are to expect ever greater functionality from things like the smartphones we carry with us wherever we go, semiconductors must become ever smaller and thinner. From what users of our products tell us, though, we get the impression that a multitude of equipment and device manufacturers are struggling with this very thing.

We believe that the PPR and THK's other technologies will continue to help our customers overcome their challenges and generate new breakthroughs for the semiconductor industry, so please don't hesitate to reach out to THK for support.

About this Article:

THK CO., LTD. provided the contents of this article.

AI Boom Drives Second Straight Record Quarter for Chip Equipment

Global semiconductor equipment spending continued its upward trajectory in Q2 2026, highlighting how demand for AI infrastructure is reshaping investment priorities across the chip industry. According to SEMI's Worldwide Semiconductor Equipment Market Statistics (WWSEMS) report, global semiconductor equipment billings reached a record US$40.53 billion during the quarter, up 23% year over year and 11% from the previous quarter.

The results mark the second consecutive quarter of record billings, reflecting continued investment in technology and manufacturing capacity needed to support growing AI-related demand. As companies expand computing infrastructure and deploy increasingly advanced AI systems, semiconductor manufacturers are ramping up spending on production equipment and capacity expansion.

“The second consecutive quarter of record semiconductor equipment billings reflects the industry's sustained investment in the advanced manufacturing capacity needed to support rising chip demand, particularly for AI infrastructure,” said Ajit Manocha, President and CEO of SEMI. He added that growth across Asia, North America and Europe underscores the global nature of semiconductor demand and the industry's role in enabling the next wave of AI-driven innovation.

The latest figures reinforce AI's position as a key catalyst for semiconductor industry investment worldwide.

Emerging Trends Lift SMT to New Heights

The entry of Chinese electric vehicle (EV) makers in the Japanese light vehicle market in 2026 has caused a stir in the country's automotive industry.

The aggressive entry of foreign manufacturers in Japan's unique light vehicle market, or popularly known in Japan as the "kei car", signifies that the mobility competition has entered a new phase. Domestic manufacturers are also striving to make a comeback by adopting new drive units and are challenging the balance between the evolution of electrification technology and market adaptation.

In response to this trend, sales of EVs are growing steadily in the globally. Particularly, the share of new energy vehicles (NEVs) in China has reached approximately 50%. On the other hand, other Asian markets are steadily following suit.

The shift to "software-defined mobility," in which vehicles are connected to a network and functions are defined by software, is being accelerated by the expansion of the next-generation mobility market, originating from China.

Stirs Entire Ecosystem

This change in market structure has encouraged new entrants from other fields beyond the automotive industry, such as the information equipment industry and contract manufacturing. A flexible system that can handle both design and manufacturing in an integrated manner is required, and a new style of manufacturing that achieves short-term development, low cost, and global compatibility is rapidly spreading.

Accordingly, these trends coincide with the paradigm shift following the advent of smartphones in 2007. What was once a telephone has now evolved into a computer. Moreover, because of apps and the Internet, smartphones has become an integral part of people's lives. Since 2022, electric mobility had evolved into a "mobility platform" that incorporates functions such as Internet connectivity, software control, and service provision, ushering in a second paradigm shift.

The impact is not limited to land transportation, but extends to new mobility concepts including construction machinery, agricultural machinery, ships, and even flying cars. Furthermore, another tipping point happening on the horizon is the birth of AI.

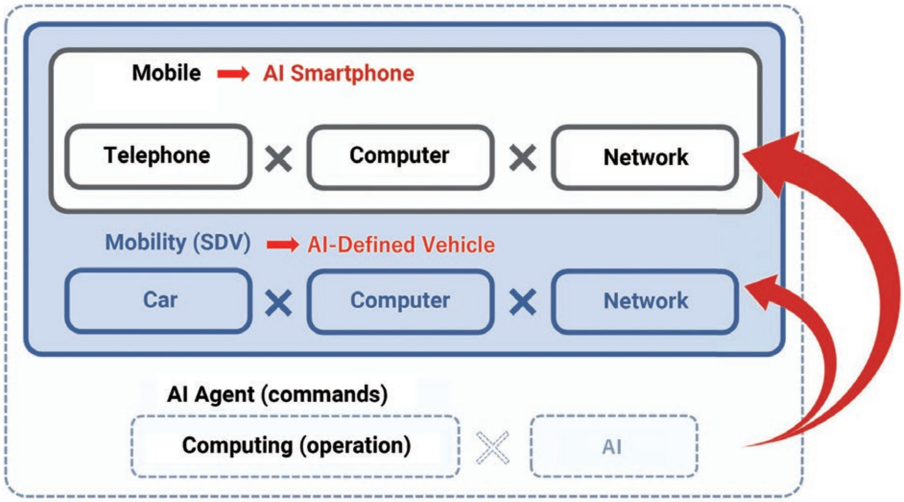
The shift from traditional "human-operated computing" to "agent interfaces", where AI understands ambiguous instructions and autonomously makes and executes decisions, is underway, and this is expected to be the next paradigm shift. This transformation, with AI at its core, is permeating both the mobile and mobility domains and driving new advancements in electronics and SMT technologies.

Development of New SMT Technology

This article summarizes trends in SMT technologies in the application areas (packaging, data centers/servers, in-vehicle, and smartphones) that are attracting attention due to AI, and describes the technologies and responses required for SMT production sites.

Photo 1: Share of new energy vehicles (NEVs) in China has reached approximately 50%.

Figure 1: The shift from traditional "human-operated computing" to "agent interfaces", where AI understands ambiguous instructions and autonomously makes and executes decisions, is underway, and this is expected to be the next paradigm shift.



The three essential elements for these product lines are advanced arithmetic processing, low power consumption, and high reliability, which are supported by various arithmetic processors (xPU) and high-density placement technology. For example, in AI computing packages, configuration that supports up to 32-layer DRAM stacks with φ3μm bumps positioned at the 2nm node at the chip layer will likely emerge.

In the interposer layer, the application of co-packaged optics is inevitable. Thus, specifications such as ±5μm bump placement accuracy for φ25μm bumps, 8μm flux transfer thickness, and 0.2 to 0.3N impact load are looking to be the next-generation placement requirements.

In addition, package parts continue to become larger for data center and server applications, and dealing with warpage and the weight of panels has become an important issue. The placement of parts exceeding 200mm in size and weighing 1.4kg requires advanced technologies such as high-precision placement position control, warpage correction mechanisms, and high-rigidity stage designs. In addition, optimization of on-site operations, such as streamlining parts supply and minimizing replenishment work time, is also essential.

Innovation in Automotive, Mobile

AI has been advancing in the automotive field and major changes are occurring through ADAS, automated driving, and the evolution of in-vehicle interfaces. Along with the increasing integration of System on Chip (SoC), the adoption of Multi Chip Module (MCM), which combines processing performance and reliability, is progressing, and the number of placed parts is dramatically increasing.

It is noteworthy that the ultra-high-density placement technology developed for consumer devices such as smartphones is beginning to be applied to in-vehicle devices. This has led to the full-scale entry of EMS and consumer device manufacturers with advanced placement technology into the automotive field, creating new requirements for mixed placement of irregularly shaped and extremely small parts, as well as high-precision pickup and placement operations.

The corresponding pick and place machines are required to have extremely advanced functions, such as three-dimensional high-precision motion including the Z-axis direction in addition to the X and Y axes, load control, and multi-axis motion.

Meanwhile, in the mobile sector, the spread of AI-based smartphones is accelerating and is expected to reach a billion-unit installed base within a few years. In line with this, an increase in parts density and the number of placed parts is underway, facilitating the adoption of multi-layer boards and multi-stage placement, especially in

Photo 2: Major changes are occurring for in-vehicle features.

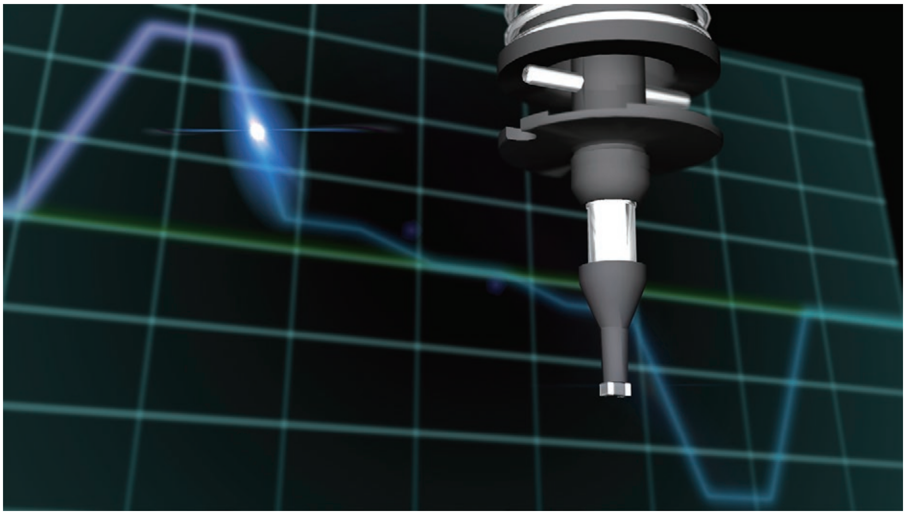


Photo 3: High-precision control is needed in SMT.

flagship models. In the future, it will be necessary to support extreme high-density placement with a gap of less than 40μm between parts.

For this purpose, three-dimensional (3D) and integrated control performance for SMT equipment is essential, including pick-up accuracy of placement parts, high-precision position control at the submicron level, and load optimization control to suppress solder splattering.

Future of SMT Technology, Manufacturing

While each application has different requirements, common trends such as higher density, power efficiency, and smaller size with multiple functions are spreading throughout the industry. Under these circumstances, the biggest challenge for SMT technology is to maintain stable placement accuracy and quality even for extremely small parts and multilayer structures.

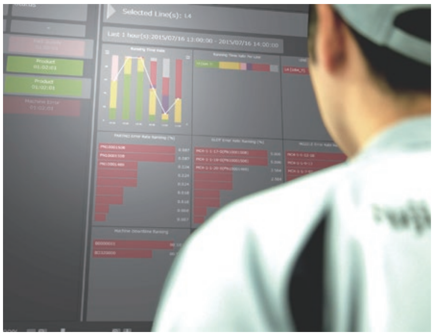


Photo 4: Automation of standard operations and enhancement of 4M management will be key to future competitiveness.

It is no longer possible to solely rely on the self-alignment effect of solder, and so there is a need for a system to control pick-up accuracy and positional discrepancies, improve the sophistication of Cp/Cpk, and visualize and historically manage quality fluctuations in each process.

In addition, societal issues such as labor shortages, difficulties in passing on skills, and the need to respond quickly to changes in demand cannot be ignored. In recent years, under the key phrases “visualization," "automation," and "no skills required," platforms have been developed that enable monitoring of changes, detection of predictive signs, and accumulation of evidence. Automation of standard operations and enhancement of 4M management (manpower, machines, materials, and methods) through line coordination will be key to future competitiveness.

Ultimately, in an age where AI is a prerequisite, the SMT technology itself must become intelligent and evolve into a process that combines "precision" and "autonomy”. Manufacturing is now about to enter a completely new stage where AI, high-density placement, and precision robotics converge. Fuji Corporation, standing at the forefront of the industry, will pioneer "manufacturing of the future", a manufacturing ecosystem that can flexibly respond to all kinds of products based on intelligent interconnection technology.

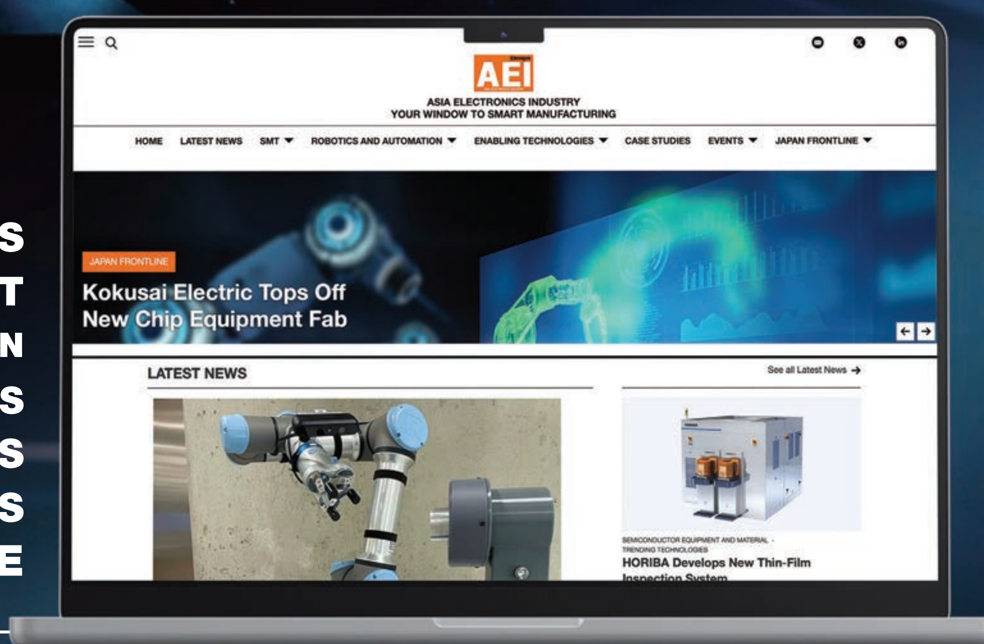
India Eyes Bigger Semiconductor Role as Supply Chains Expand

India is emerging as a key beneficiary of growing global investment in semiconductor manufacturing, with industry leaders pointing to new opportunities across design, manufacturing services, materials, and equipment engineering.

According to Ashok Chandak, President of SEMI India and IESA, rising investments in semiconductor infrastructure reflect strong confidence in long-term demand driven by artificial intelligence, high-performance computing, automotive electronics, and digital transformation. He said this presents India with an opportunity to deepen its role in global chip supply chains.

“The record global semiconductor equipment spending reflects strong confidence in long-term semiconductor demand,” said Chandak, adding that India is well positioned to integrate more deeply into the global ecosystem.

Chandak also highlighted the role of the India Semiconductor Mission in building the country’s capabilities. With additional policy support expected, he said India could emerge as a significant hub for semiconductor design, advanced packaging, manufacturing, supply chain development, and ecosystem growth.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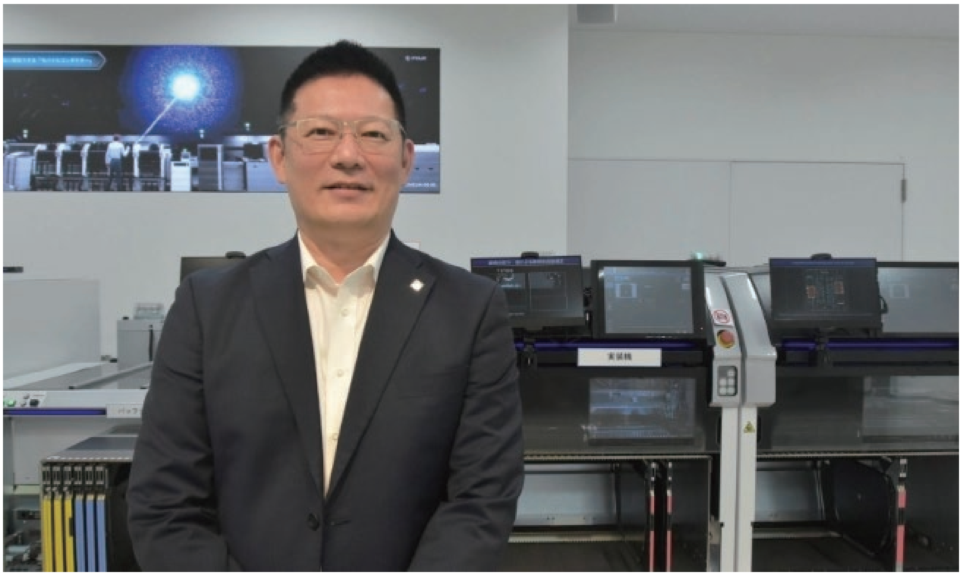
A Comprehensive Strategy Pioneered by NXTR

Fuji's vision for next generation placements



Takeshi Sato, Board Member and Managing Executive Officer, Robotic Solutions Division General Manager, FUJI CORPORATION

Rising geopolitical risks, supply chain restructuring, and worsening labor shortages are dramatically changing the manufacturing landscape. As a result, the environment surrounding the manufacturing industry is undergoing significant change. Against this backdrop, Fuji, a manufacturer of electronic component pick and place machines, is strengthening its presence through advanced automation technologies and flexible production capabilities. In particular, demand for smartphones, AI servers, and semiconductor-related products is expanding in Southeast Asia and India, driving growing interest in Fuji's solutions. In this interview, we spoke with Takeshi Sato, General Manager of the Robotic Solutions Division, about Target ZERO, Fuji's comprehensive strategy, and the strengths of the NXTR electronic component pick and place machine.

Global market trends and Fuji regional support

How do you view the current global situation?

Risks facing the manufacturing industry—such as the situation in Ukraine, U.S. tariff policies, and the situation in the Middle East—are increasing day by day. These risks are affecting a wide range of areas, including supply chains and energy, and we live in an era where the future is increasingly difficult to predict. That is precisely why I believe it is crucial to be prepared for change and to respond as quickly as possible.

Manufacturers are also increasingly decentralizing their production bases for finished products. What changes are driving this trend?

Traditionally, manufacturers established production facilities in regions with lower labor costs or close to consumer markets. Recently, however, rising geopolitical risks have encouraged many companies to diversify and decentralize their operations. However, relocating production is not easy. The cultural, infrastructure, logistics, and human resources environments vary from country to country.

Recruiting is a particularly significant challenge. Developed countries face labor shortages caused by aging populations and declining birth rates, while Southeast Asia and India experience high workforce mobility. There are many cases where trained personnel do not stay with the company, which has become a major concern on the manufacturing floor.

Is the demand for automation increasing in response to these challenges?

Yes. There are two main factors driving this trend. The first is the desire to build production systems that do not rely on people. The goal is not simply labor reduction but reducing reliance on individual workers while maintaining stable quality and high operating rates.

The second is increasing production capacity. Automation enables production to continue during periods when it would traditionally stop, such as during breaks. By preparing for overnight operation during the day, it becomes possible to continue automated production for set periods during the night.

What are the reasons of Fuji's products are chosen in Southeast Asia and India?

I believe our products are valued for both their functionality and performance, as well as their automation capabilities. At the core of this is the modular concept inherited from the NXT series, the predecessor of NXTR. Machines and units are designed to be compact and easily interchangeable, allowing improvements in productivity per area while flexibly accommodating diverse production requirements.

For example, in addition to being able to install more machines within the same floor space, the ability to change heads and feeders with a single touch makes the machines flexible to support high-mix production. Furthermore, our machines are highly regarded for their stable operation and productivity during mass production.

In addition, one of Fuji's unique strengths lies in our automation solutions. I believe that our ability to propose solutions that encompass not only functionality and performance but also automation is what drives Fuji's competitiveness.

I hear Fuji also has a strong service infrastructure.

Yes. We have established a global service network and place great emphasis on supporting customers to keep their machines running. Since these are robots, it is impossible to completely eliminate maintenance or malfunctions. What matters is how quickly operation can be restored when issues occur. Equipment downtime represents a major loss for customers. I believe building systems that minimize downtime has earned us their trust.

NXTR: Ready to compete in any market - Modular concept, Target ZERO -

What role does NXTR play?

NXTR was developed as a further evolution of the existing NXT series. Market demands for performance and automation have risen to levels that could no longer be met by simply extending the capabilities of existing systems. To respond to this, we developed NXTR as a completely redesigned platform that builds on our modular concept while addressing these market needs.

Today, the market demands not only higher accuracy for increasingly smaller components but also high accuracy for larger and heavier components. Fuji is expanding its capabilities to support all types of placement requirements, from small circuit boards used in smartphones and semiconductor applications to large server boards.

Tell us about the vision behind Target ZERO.

At Fuji, we have placed great importance on the three zeros: zero placement defects, zero machine operators, and zero machine stops. However, we felt that focusing only on these goals risked limiting us to optimizing current conditions.

That is why we have introduced a new concept: zero placement limits. This reflects our commitment to constantly asking, "What is the next barrier we must overcome?", an attitude that rejects conventional limits and embraces the mindset of "If it is needed, we will make it happen."

By adopting this concept, we have become more focused on both solving problems and discovering new challenges.

Fuji's unmatched abilities in automation

Tell us more about Fuji's strengths in automation.

One of Fuji's unique strengths is its

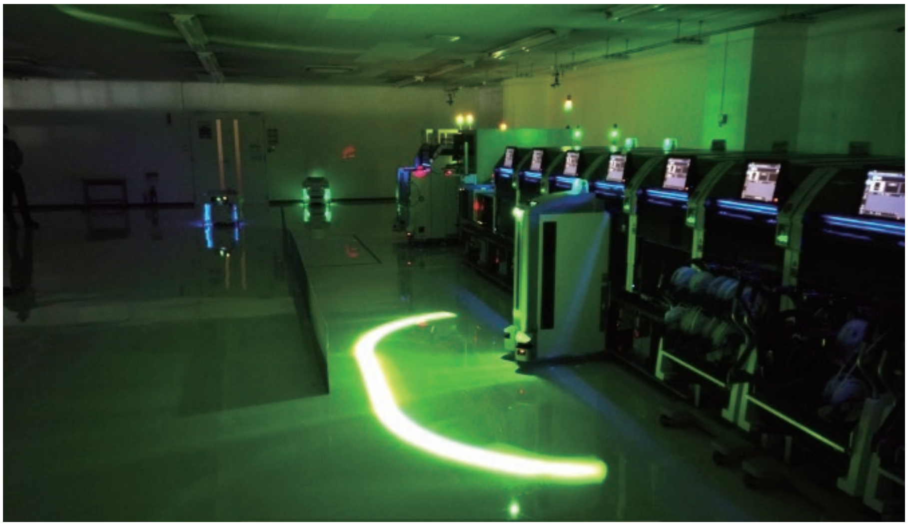


Image of pick and place machines operating in the dark without operators due to automation

automation solutions. What sets Fuji apart is not just our ability to enhance functionality and performance, but our capacity to integrate these improvements with automation solutions. Anticipating a future of increasing labor shortages, Fuji began developing automation technologies at an early stage. While electronic component pick and place machines can perform high-speed, high-accuracy operation, they traditionally still required human involvement for tasks such as component replenishment. Fuji believed that manufacturers would eventually need production lines capable of operating continuously without operators standing in front of the line to replenish components. As a result, we pursued working to develop a fully automated system that includes parts replenishment. As a result, we have created lines that free operators from changeover and component replenishment tasks, enabling automatic production to continue for set periods even during the night. We believe these unique characteristics of Fuji contribute to our competitiveness.

Supporting demand in growth areas such as AI servers and semiconductors with NXTR

NXTR is also increasing its presence in the AI server and semiconductor sectors. Could you tell us about the background behind this?

Electronic devices have evolved over the years. Personal computers drove the market in the 1990s, mobile phones in the 2000s, and then smartphones. Today, AI servers and semiconductor applications have become the new center of growth.

We have always focused on anticipating the needs of each era and delivering optimal solutions. We believe AI will become increasingly widespread and eventually an ordinary part of everyday life. To meet this demand, we are continuing our technological development and making proactive investments.

How is the response in the AI server and semiconductor sectors?

In the AI server sector, large circuit boards require high-accuracy placement of both small components and large, heavy components. In the semiconductor sector, there are cases requiring placement accuracy at the 10-micron level while maintaining high speed, demanding significantly more advanced technology than before.

To meet these requirements, comprehensive technologies including vibration control and vision processing are essential. Building on decades of mechanical design expertise, Fuji has continuously been developing high-speed and high-accuracy control technologies and advanced vision processing technologies. I believe these efforts are a major reason for the strong recognition we receive today.

Aiming to be the industry leader through a comprehensive strategy (Region × Industry)

Finally, what are your future plans?

At Fuji, we are pursuing an all-encompassing strategy to meet every production need, without limiting ourselves to specific regions or industries.

I expect the environment surrounding the manufacturing industry will continue to change dramatically. The challenges our customers face, such as geopolitical risks, labor shortages, and the increasing sophistication of electronic devices, are becoming increasingly complex.

In this environment, what matters most to us is not simply providing machines but solving our customers' challenges directly. We strive to understand what is happening on the factory floor, anticipate changes, and propose new value. I believe it is important to continue taking on the challenge of developing new technologies and solutions under the concept of zero placement limits.

We will continue to unlock new possibilities for its customers' production sites and contribute to the evolution of global manufacturing.

Kaynes Semicon:
Building an Integrated Semiconductor Ecosystem in India

Kaynes Semicon, the semiconductor business of Kaynes Technology, is building an integrated semiconductor platform in India with capabilities spanning advanced semiconductor packaging, assembly, test, reliability, post-silicon engineering, research and development, system solutions and product engineering.

The company's approach is focused on bringing multiple critical semiconductor functions together within a connected ecosystem. This enables customers to move more efficiently from semiconductor design and product development to package engineering, silicon validation, reliability qualification, test development and production-scale manufacturing.

With growing engineering capabilities, advanced infrastructure and a strong focus on quality, process control and technology development, Kaynes Semicon aims to contribute meaningfully to India's semiconductor ambitions while supporting global semiconductor and electronics companies with scalable engineering and manufacturing solutions.

Capabilities, Strengths

Advanced Packaging & Assembly

Capabilities include semiconductor assembly and advanced packaging across QFN, DFN, SOT, TO packages, IPM, BGA, flip-chip packages, System-in-Package, stacked-die solutions, MEMS packaging and other advanced semiconductor integration platforms.

Semiconductor Test & Characterization

Capabilities include wafer sort, final test, multi-temperature testing, ATE program development, device characterization, yield optimization and production-test engineering, helping move devices from development into stable production.

Reliability & Failure Analysis

Reliability and failure analysis support helps evaluate device and package performance, identify failure mechanisms, determine root causes and feed engineering learnings back into product and manufacturing improvement.

Advanced Engineering & Productization

The broader engineering platform supports package architecture, process development, silicon validation, system-level engineering, product integration and design-to-manufacturing execution.

Integrated Business Verticals

Kaynes Semicon operates through six specialized yet interconnected business verticals. Together, they create continuity across research, silicon validation, package development, reliability, systems engineering, productization and manufacturing.

OSAT – Outsourced Semiconductor Assembly & Test

Focuses on semiconductor assembly, advanced packaging and production testing, supporting package development, process engineering, assembly, test, yield improvement and scalable manufacturing.

R&D – Research & Development

Works on semiconductor packaging technologies, materials, interconnects, process development and advanced integration concepts, with an emphasis on scalable platforms for future semiconductor applications.

REL & FA – Reliability Engineering & Failure Analysis

Provides reliability validation and failure analysis across semiconductor devices and packages, helping identify failure mechanisms, understand root causes and strengthen product and process robustness.

SSG – System Solution Group

Connects semiconductor technology with real-world applications through system-level engineering, electrical and thermal validation, power integration, embedded solutions and application-level performance assessment.

PSE – Post Silicon Engineering

Supports semiconductor devices after fabrication through silicon characterization, test development, validation, wafer-to-package correlation, ATE programming, yield analysis and production-test optimization.

ODM – Original Design Manufacturing

Brings together product design, engineering and manufacturability, integrating semiconductor devices, packages, boards, electronics and systems into production-ready solutions.

One Connected Semiconductor Platform

The strength of Kaynes Semicon lies in the integration of these six verticals. Rather than operating as isolated functions, they are designed to work together across the semiconductor product lifecycle.

R&D	PSE	REL&FA
OSAT	SSG	ODM

This integrated model creates greater continuity between design intent, silicon behavior, package performance, reliability data, test strategy, system validation and manufacturing execution. It also allows engineering learnings from one stage to inform decisions at another, supporting faster problem-solving and stronger product readiness.

For customers, the platform is intended to provide access to multiple semiconductor and electronics engineering capabilities within one ecosystem. For India, it contributes to the development of deeper technical expertise, skilled talent and advanced manufacturing capability across the semiconductor value chain.

Kaynes Semicon's Focus

- Build globally competitive semiconductor engineering and manufacturing capabilities in India.
- Develop skilled technical talent across packaging, test, reliability, post-silicon and system engineering.
- Support customers from development and validation through qualification and scalable production.
- Strengthen the connection between semiconductor technology, product engineering and real-world applications.

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