Special Feature

AI Server Demand Opportunities

— Our Accumulated Technologies and Know-How Supporting the Infrastructure of the Next-Generation Society

Accelerating Use of AI

At present, our society is at a major turning point. The volume of data for processing is increasing at an exponential rate due to the rapid spread of generative AI and other digital technologies.

These changes are dramatically transforming the design of AI servers at the core of data centers.

The high-performance semiconductors (CPUs/GPUs) installed in AI servers possess computational capabilities far surpassing those of conventional servers.

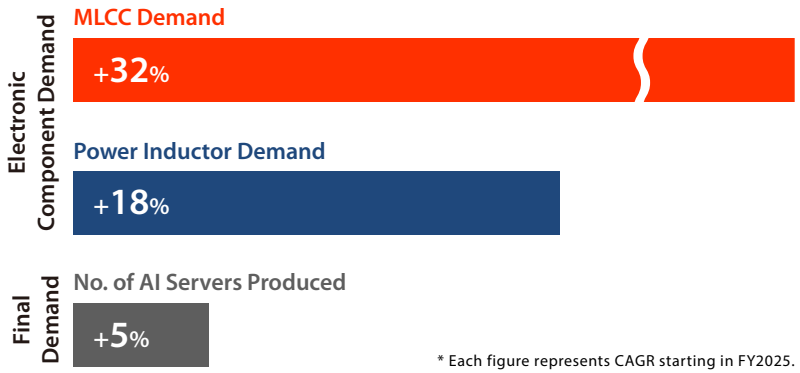
However, this comes at the cost of sharp increases in power consumption, making it essential to maintain a stable power supply and eliminate unnecessary noise during drastic power fluctuations.

Demand Forecast Electronic Component Growth Will Exceed Growth in Production Volume

The AI server market is experiencing changes and growth that go beyond simply increasing production volume. Under the Medium-Term Management Plan 2030, we forecast that AI server production volume will grow at a compound annual growth rate (CAGR) of +5% from FY2025 to FY2030. Meanwhile, demand for MLCCs installed in AI servers is forecast to grow at a CAGR of +32%, while demand for power inductors is forecast to grow at a CAGR of +18%. We expect growth in electronic components to significantly outpace growth in end products.

We estimate that the number of MLCCs installed per AI server will more than double from FY2025 to FY2030 as performance improves, with the number of inductors also increasing significantly due to changes in power supply methods. Furthermore, in addition to the number of components installed, we must meet increasingly sophisticated technical requirements, including smaller sizes and higher capacities in line with growing design complexity. Amid the ongoing shift toward high-value-added products, the rise in component value per server is driving demand. Demand for AI servers is currently stronger than anticipated, and we expect very strong growth going forward.

Market Forecast for FY2030 (TAIYO YUDEN Estimate)



* Each figure represents CAGR starting in FY2025.

Forecast Changes to Number of Electronic Components Per Unit (TAIYO YUDEN estimates)

	Market Trends	No. of Electronic Components per Unit (2025–2030)
MLCC	We are working to develop smaller, higher-capacity models and integrate these products into motherboards for improved performance and reduced power loss	10,000 to 20,000 ↓ More than double
Inductor	Demand for AI servers has increased significantly due to changes in power supply methods	Significant changes in power supply methods and increased demand

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Technological Advantages TAIYO YUDEN's Prominent Presence in the High-End Sector

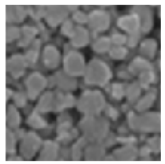
The reason we are able to meet the technological requirements of the AI server market and are chosen by customers is our vertical integration of advanced core technologies, including materials, multilayer, and design technologies that we have continuously refined in the high-end sector.

For example, AI servers are equipped with high-performance CPUs and GPUs that draw high currents, thus peripheral electronic components must be both higher capacity and smaller to save space and reduce power loss. With an eye toward future improvements in semiconductor performance, we focused from an early stage on the development of high-capacity MLCCs exceeding 100 µF, and in 2011, we commercialized the world's first 220 µF MLCC and have since expanded our product lineup to 470 µF, thereby establishing high-capacity technologies. These accumulated technological advances have enabled us to respond to the current demand for AI servers.

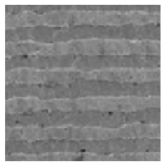
These advanced technological capabilities give us a strong competitive advantage in cutting-edge, highly complex fields that other companies cannot easily match. Furthermore, even in fields other than AI servers, we expect business opportunities to increase as the technical barriers for electronic components continue to rise.

Under the Medium-Term Management Plan 2025, we have focused on increasing production capacity through the completion of large-scale capital investments such as the building of new factories in China and Malaysia, as we have prepared to respond to the rapidly increasing demand for AI servers. Under the Medium-Term Management Plan 2030, we will leverage our production capacity and advanced technological capabilities to develop high-value-added products and accelerate improvements in profitability.

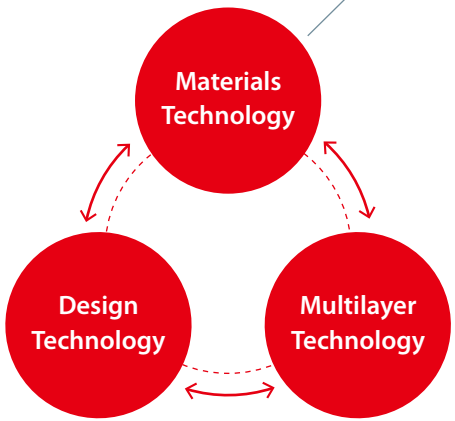
Typical Elemental Technologies



MLCC dielectric materials



MLCC multilayer structure



Materials Technology

- We must synthesize dielectric materials with fine, uniform particle sizes to make MLCCs compact, large-capacity, and highly reliable
- We own many materials technologies (including metallic magnetic materials built around ceramic materials) amenable to applications in various components and fields, including power inductors, all-solid-state batteries, SOFC/SOEC, etc.

Design Technology

- We contribute by offering a combination of material composition and process conditions to quickly propose solutions to technological changes in the market through a balance of properties, size, and reliability required by customers
- We offer the most waste-free product design based on our own materials and processes

Multilayer Technology

- MLCCs require the layering of between several hundred to more than 1,000 layers of dielectric sheets (green sheets) of 1 micron* or less with zero misalignment
- At the same time, how quickly layering can be performed is important for productivity
- Only a few companies in the world, including TAIYO YUDEN, can manufacture with both precision and productivity

* A µm is 1/1,000 of 1mm.

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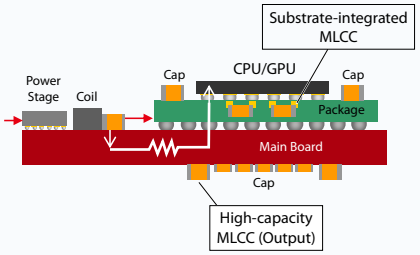
Column Inductor Outlook: Power Supply Design Advances and Patent Advantages

As AI server performance improves, the power supplied to CPUs and GPUs increases year by year, and power supply designs are required to be more efficient, with lower loss, and higher density implementation than ever before. To meet these demands, there is a growing trend toward moving power supply components from their traditional placement on the motherboard, to locations nearer to where loads are concentrated (CPU/GPU), and even embedding and integrating them within the package itself.

1. Current mainstream designs
Mother Board VR

This method places a voltage regulator (VR) on the motherboard and uses capacitors and inductors to control voltage. Despite offering excellent mountability and design flexibility, AI servers are becoming increasingly high-current and high-density as they deliver power to semiconductors mounted far from the power supply, leading to the rise of issues such as power loss in wiring and responsiveness to voltage fluctuations.

Mother Board VR

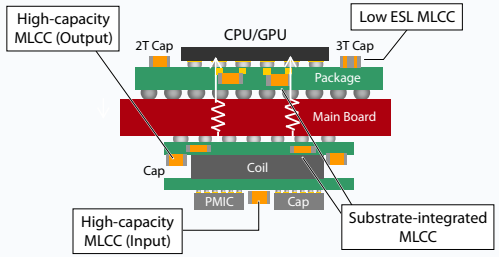


2. Designs expected to see wider adoption (1)
VPD (Vertical Power Delivery)

This method involves placing power supply components directly beneath or behind CPUs and GPUs to shorten the power supply path.

Although this is effective for reducing power loss and improving responsiveness while realizing more efficient power delivery, it also requires high-performance components to be mounted at high density within a limited space. Consequently, these components must be further miniaturized, have lower profiles, and be capable of handling high currents.

VPD (Vertical Power Delivery)

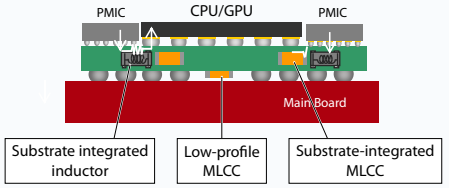


3. Designs expected to see wider adoption (2)
Integrated Type: Integrated VR (IVR)

This next-generation design incorporates power supply circuits into the package, further shortening the power supply path and saving space.

Components must be small, while also meeting more advanced performance requirements, such as reliability suitable for in-package assembly, low power loss, high-current capability, and thermal characteristics.

IVR (Integrated VR)



As power supply design evolves, the characteristics required of passive components are becoming increasingly sophisticated. Capacitors are required to be compact in size with large capacities and low ESL*1, while inductors are required to be compact with high currents and low DCR*2.

As inductors in particular are components that determine the efficiency and responsiveness of power supply circuits, they are expected to become increasingly important going forward. While ferrite materials are commonly used in standard inductors, our proprietary metal-based magnetic material technologies enable us to support high currents and contribute to greater power supply efficiency. In addition to wire-wound inductors, we are capable of manufacturing multilayer inductors, which are smaller and thinner than wire-wound types. By combining this capability with our proprietary materials technologies, we can offer products optimally tailored to a variety of needs, including those requiring integration into motherboards. As the technologies related to inductor structures, materials, and manufacturing processes are protected by patents, we have established a competitive advantage that other companies cannot easily replicate. Through many years of research and development and an extensive portfolio of patents, our inductors achieve a high level of miniaturization, high-current capability, and low power loss simultaneously.

New power supply designs such as VPD and IVR have increasingly stringent requirements for characteristics that include motherboard integration, miniaturization, and high-current capability. In this environment, our products represent a strong option capable of meeting customer design requirements, and we expect further growth in our AI server business from FY2027 onward, as changes in power supply design gain momentum.

*1 A small inductance component present in capacitors. The lower this value, the better the high-frequency characteristics.
*2 Resistance value when direct current is applied. For inductors, the smaller this value, the less power lost and heat generated.