YAGEO GROUP

AI Server Enablement

Outlook

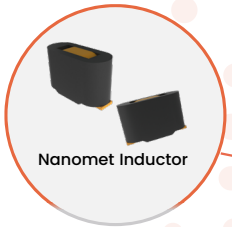
- Machine learning market size increasing from ~$80M in 2024 to ~$500M in 2030
- Average GPU power consumption increasing from ~700 Watts in 2024 to >2000 Watts in 2030
- AI Server Rack power consumption increasing from ~10kWatts in 2024 to >100kWatts in 2030

Design Challenges

- Power efficiency
- Design densification
- Operational life under increasing thermal conditions
- Infrastructure buildout (rapid ramp and demand)

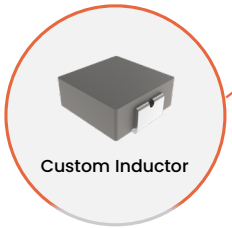
Why YAGEO Group

- YAGEO Group's $4B global manufacturing operation is positioned to support the explosive AI Server growth
- Product technical innovations are ongoing
- YAGEO Group supports 90% of the passive technologies utilized in AI Servers as summarized below in the interactive schematic linking to the product HTML



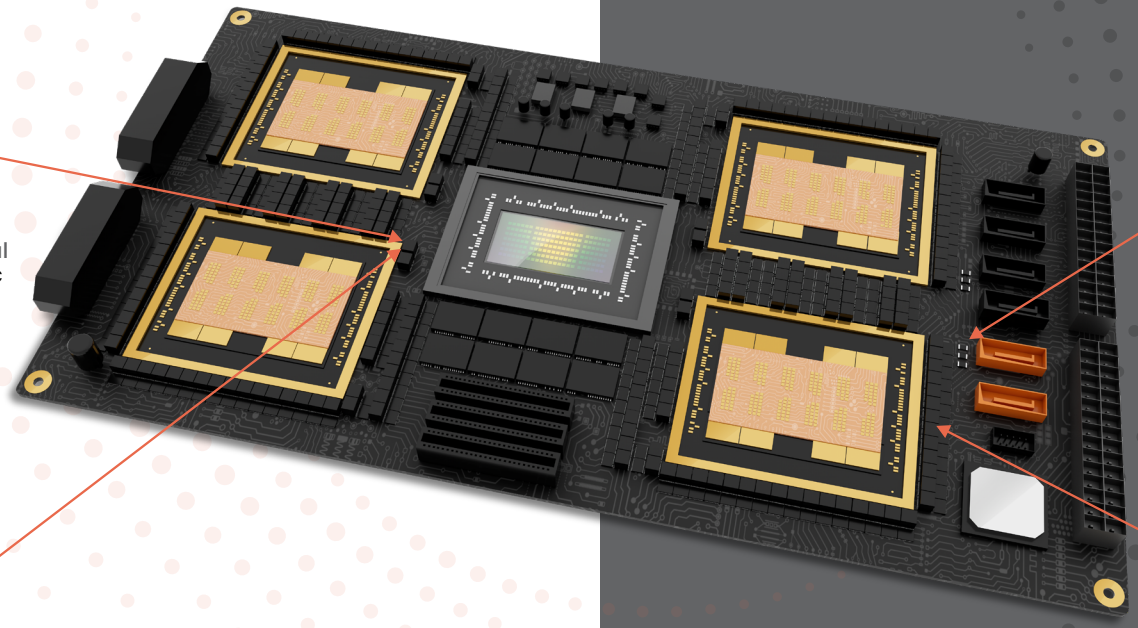
Nanomet Inductor Material

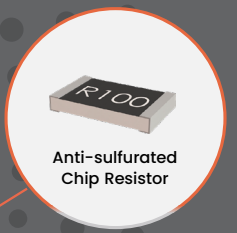
- High saturation magnetic flux density (Bs)
- Low coercivity (Hc)
- Low loss
- Soft saturation
- Temperature stable
- Allowing denser layout of GPU Core Power Distribution



Custom Inductor

- Rapid design, modeling and simulation
- Differentiating magnetic materials (Nanocrystallines, Ferrites, Composites, Nanomet, etc.)
- Architecture flexibility (1 in 1, 2 in 1, 4 in 1, TLVR, etc.)
- Rapid prototyping





Anti-sulfurated Chip Resistor

- Providing enhanced stability/reliability in demanding environments



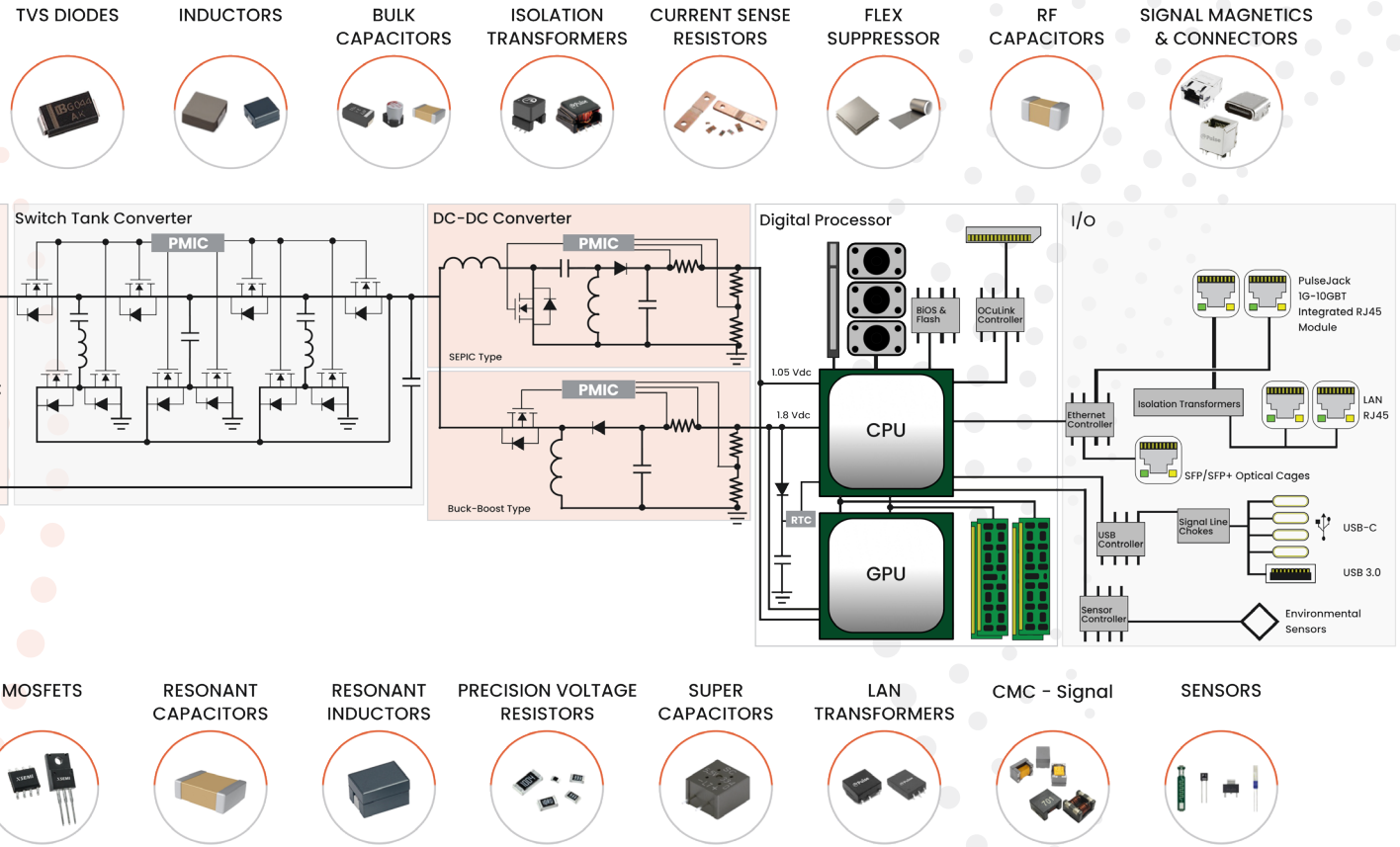
Polymer Aluminum & Tantalum Capacitor

- Low profile H-Chip
- CV dense
- Low ESR
- Long life
- For power rail load transient on board bottom side

Component Roadmap

- MLCCs: 0201 to 0805 case sizes, X6S and X7R dielectric CV densification decoupling 48V, 12V and 1V power rails
- Aluminum Polymer H-Chip Capacitors: 7343 and smaller footprints with reduced ESR and CV densification for GPU Core 1V power rail Load Transient
- Tantalum Polymer Capacitors: 7343 and smaller footprints with reduced ESR and CV densification decoupling 12V power rail
- Aluminum Polymer/Hybrid Electrolytic V-Chip Capacitors: 35mm height with CV densification decoupling 48V power rail
- Power Inductors: Reduced footprint and increased current with lower loss, soft saturation, 1MHz+ operation for GPU Core multiphase Power Delivery Network
- Immersion Cooling: Component compliance

AI Server Schematic & Linked Components



K-SIM Capacitor Analysis

K-SIM Film Lifetime Analysis

K-SIM Ceramic Aging Analysis

K-SIM Inductor Analysis

Aluminum Electrolytic Capacitor Lifetime Analysis

FIT & MTBF/MTTF Analysis