SFAL

SEMICONDUCTOR FUTURE ACCELERATOR LAB FOUNDATION

Future Semisphere

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Technology

Investment

Supply Chain

Policy

Innovation

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TECHNOLOGY DIRECTION

New Materials & Substrates · RF, Wireless & Connectivity Silicon

GaN Moves Towards Mainstream Adoption: Navitas' US Manufacturing, Win's 0.1µm Process and the RF IP Race

Gallium nitride (GaN) is gaining importance in power chips and wireless communications because it can switch faster and operate more efficiently than conventional silicon. This makes it useful for AI data centres and satellite communications.

Navitas has started shipping its fifth-generation GaN Fast power devices, manufactured in the US with GlobalFoundries. Meanwhile, Win Semiconductors has introduced a 0.1-micron GaN process for AI hardware and satellite communications. GaN manufacturers are also moving towards offering complete system solutions rather than individual components. At the same time, competition is increasing over the technologies and patents used to develop RF GaN chips..

These developments show how GaN is expanding into more applications and manufacturing is scaling up. For India, this offers opportunities to learn from global developments, strengthen domestic compound semiconductor capabilities and explore technology partnerships.

What This Means For You

For Startups

Power-chip and RF startups should track advances in GaN manufacturing, developments in technology patents and potential foundry partnerships to guide their product development.

For Ecosystem Partners

Investors and manufacturing partners can explore opportunities in GaN manufacturing, power electronics and RF applications as production capacity expands globally.

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TECHNOLOGY DIRECTION / INNOVATION

Advanced Packaging & Heterogeneous Integration · Process Nodes & Scaling

Samsung Previews HBM5:
China's CXMT Advances HBM3E Production

High-bandwidth memory (HBM) uses stacked memory chips placed close to a processor to transfer data quickly. It is essential for AI processors, which need to handle large amounts of data efficiently.

Samsung has previewed HBM5, a future memory generation expected to deliver around twice the performance of HBM4E. Meanwhile, China's CXMT has reportedly started trial production of HBM3E, with mass production potentially beginning in 2027. This would mark progress in China's efforts to catch up with established HBM manufacturers in South Korea.

These developments highlight competition at different stages of the HBM market. While Samsung is developing next-generation memory, CXMT is working towards producing an existing generation. As AI workloads grow, advances in HBM performance and manufacturing will remain important for AI chip development and the supply of memory to chipmakers.

What This Means For You

For Startups

Startups working on AI chips, memory controllers or advanced packaging should track HBM developments to understand future integration requirements and potential design opportunities.

For Ecosystem Partners

Investors and semiconductor manufacturing partners should monitor advances in HBM technology and China's efforts to expand production, as these could influence future supplier competition and the AI semiconductor supply chain.

Read more 1 2

TECHNOLOGY DIRECTION / INVESTMENT & MARKET

Process Nodes & Scaling · Design Wins & Commercial Contracts

Apple Brings 2nm to iPhones:
Nvidia and Qualcomm Expand Custom AI Chip Partnerships

Apple's A20 Pro uses a 2nm manufacturing process, bringing advanced chip technology to smartphones. Smaller process nodes can improve performance and power efficiency.

Samsung and Qualcomm are reportedly discussing 2nm chip production. Pricing and manufacturing yield remain key challenges. Custom AI chips are also gaining momentum. Nvidia has invested $3.5 billion in MediaTek and plans to use NVLink Fusion for custom AI accelerators. Separately, Qualcomm and Amazon are partnering on custom chips for AWS AI data centres.

These developments highlight two industry trends, advanced chip manufacturing and growing demand for customised AI silicon. Both could create opportunities for India's semiconductor design and engineering workforce.

What This Means For You

For Startups

Chip-design and architecture startups can explore opportunities to develop customised chips for AI and other specialised applications.

For Ecosystem Partners

Investors and technology partners can explore opportunities in long-term custom-chip development and semiconductor design services.

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INVESTMENT & MARKET

M&A, Joint Ventures & Consortia · VC, Private Equity & IPOs

Chip Capital Flows:

ADI's $1.35bn Alif Buy, Celero's $3bn Valuation, Sivers' $30m Expansion, India's $1.4bn Funding and Micron's Pay Dispute

Analog Devices (ADI) is acquiring Alif Semiconductor for $1.35 billion, expanding its portfolio of energy-efficient edge-AI processors. Alphabet's CapitalG is backing AI-chip startup Celero at a reported $3 billion valuation, reflecting continued investor interest in specialised AI silicon.

Sivers Semiconductors is investing $30 million to expand its indium phosphide manufacturing facility in Scotland. The expansion will support growing demand for optical components used in AI data centres.

India's semiconductor sector has reportedly attracted $1.4 billion across 281 companies, with around half raised since 2025. Meanwhile, Micron employees in Taiwan are pushing for a 15% profit-sharing plan, seeking a greater share of the gains from rising AI-chip demand.

These developments highlight investment in AI chips, photonics and India's semiconductor ecosystem, alongside growing attention to employee compensation.

What This Means For You

For Startups

Edge-AI, photonics and wide-bandgap startups can explore funding opportunities, technology partnerships and investor interest.

For Ecosystem Partners

Investors and acquirers can assess opportunities across AI chips, photonics and semiconductor manufacturing, from early-stage investments to major acquisitions.

Read more 1 2 3 4 5

INVESTMENT & MARKET / SUPPLY CHAIN

Capacity Expansion & Fab Construction · Manufacturing Equipment & Tooling

China Expands Chipmaking:
Hua Hong Invests $2bn as Domestic DUV Tools Lag

China's second-largest foundry, Hua Hong, is investing around $2 billion in a new fab to meet rising AI-driven chip demand. The expansion will add manufacturing capacity for mature-node chips used in automotive electronics, industrial equipment and consumer devices.

However, China still faces challenges in developing advanced chipmaking equipment. Its domestic deep-ultraviolet (DUV) lithography tools still lag behind leading international technology. DUV tools use light to create circuit patterns on silicon wafers and the technology gap remains a challenge for advanced chip manufacturing.

The developments highlight China's efforts to expand production while reducing its dependence on advanced foreign technology. Increased mature-node capacity could affect global chip supply, while equipment limitations remain a challenge for China's progress towards more advanced manufacturing.

What This Means For You

For Startups

Semiconductor equipment and materials startups can explore opportunities to develop tools and components that reduce reliance on imported technologies.

For Ecosystem Partners

Investors and manufacturing partners can assess opportunities in mature-node production, semiconductor equipment and technologies that strengthen domestic manufacturing.

Read more 1 2

SUPPLY CHAIN

Advanced Packaging & Heterogeneous Integration · Capacity Expansion & Fab Construction

Glass Substrates and Mega-Fabs:
Philoptics' TGV, AUO-Corning's Pilot and Yongin's $1.1tn Cluster

Glass substrates are gaining attention in advanced AI chip packaging because they offer better flatness than traditional organic substrates, helping support more complex, high-performance chip designs.

Philoptics has unveiled Korea's first 2 mm through-glass-via (TGV) substrate, claiming zero-defect processing. Separately, AUO has partnered with Corning and approved an NT$8.64 billion pilot line for glass substrates, advancing efforts to bring the technology closer to production.

Beyond packaging innovation, TSMC is increasing equipment purchases to meet AI-driven demand. In South Korea, Samsung and SK are projected to invest around 1,600 trillion won (US$1.1 trillion) in the Yongin semiconductor cluster. In India, HCLTech has opened a semiconductor lab in Bengaluru backed by ₹185 crore.

These developments highlight how the semiconductor industry is expanding across advanced packaging materials, manufacturing equipment and fab capacity to meet growing AI demand, shaping future manufacturing capabilities and supply chains.

What This Means For You

For Startups

Startups can explore opportunities in glass substrates, through-glass vias (TGVs) and packaging technologies for AI chips.

For Ecosystem Partners

Industry partners and investors can explore collaborations in advanced packaging, semiconductor materials and manufacturing capabilities.

Read more 1 2 3 4 5

POLICY & GEOPOLITICS

Trade Restrictions & Export Controls · Sovereign Security & AI Nationalism

Chip secrets become statecraft:
a GaN espionage arrest, Korea's spy law, China's chemical curbs and the US Chips Act twist

Belgium arrested a researcher over alleged GaN semiconductor trade-secret espionage, while South Korea strengthened legal protections for sensitive chip technology. Meanwhile, China introduced measures affecting a key chipmaking chemical in its dispute with Japan, highlighting how materials can become tools of trade pressure.

Taiwan approved Lam Research's NT$9.8 billion investment, while Micron and SK Hynix added to debate over US semiconductor subsidies. India and Belgium also agreed to expand cooperation in semiconductors and defence technology.

These developments show how national security, trade restrictions and international partnerships are increasingly shaping semiconductor supply chains.

What This Means For You

For Startups

Startups working in sensitive areas such as GaN and advanced materials should consider IP protection and export-control requirements from the design stage.

For Ecosystem Partners

Investors and industry partners should assess geopolitical risks alongside technology capabilities and costs when making semiconductor investment and sourcing decisions.

Read more 1 2 3 4 5 6

OUR PERSPECTIVE

The developments in this edition show how AI demand is reshaping semiconductor technology, manufacturing and supply chains. Advances in GaN power chips, high-bandwidth memory and glass substrates are addressing the growing demands of AI infrastructure, while 2nm chips and custom silicon highlight continued progress in chip design and integration.

Manufacturing capacity and investment are expanding, but technology gaps remain. China's efforts to increase chip production alongside limitations in domestic lithography equipment highlight the importance of access to advanced manufacturing technologies. Meanwhile, investment in semiconductor facilities, equipment and India's growing startup ecosystem points to opportunities across the value chain.

Geopolitics is also becoming central to semiconductor planning. Trade restrictions, export controls and intellectual property protection influence access to materials, equipment and technology partnerships. India's cooperation with Belgium and the opening of HCLTech's semiconductor lab in Bengaluru add to the country's efforts to strengthen its semiconductor ecosystem.

For the SFAL ecosystem, the key takeaway is that opportunities extend beyond chip design and fabrication. Advanced packaging, compound semiconductors, materials, equipment and supply-chain resilience are becoming increasingly important. Helping startups strengthen technology capabilities, access industry partnerships, protect intellectual property and move towards commercial adoption will be essential to building a competitive Indian semiconductor ecosystem.

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