

IT & Electronics

Field Intelligence Report

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Semiconductor Packaging / AI & Machine Learning / Quantum Computing / Photonics & Optical Comms

Market Mood

85

/ 100 Optimistic

AI-Driven Tech Frontier: Bottlenecks, Breakthroughs, & Governance

Advanced packaging, AI agents, quantum error correction, and optical interconnects define a week of intense innovation and strategic shifts.

CoWoS Capacity Growth (2027)	Enterprise Generative AI Spending (2025)	Quantum Private Investment (2025)	Optical Data Transfer Speed (Current)
93	37	4.9	1
+93%	+221%	+192%	—

Weekly Summary

The IT & Electronics domain is experiencing unprecedented acceleration, primarily fueled by AI. Advanced semiconductor packaging (CoWoS, ABF, HBM) faces severe bottlenecks, driving massive global capital expenditure and R&D; into next-gen materials like glass substrates. AI & Machine Learning see rapid enterprise adoption, significant funding, and the urgent implementation of regulatory frameworks like the EU AI Act. Quantum Computing is progressing towards fault tolerance with error correction breakthroughs and substantial government investment, while Photonics & Optical Communications are critical for resolving AI data center power and data transfer limitations through Co-Packaged Optics and silicon photonics. Western players must strategically invest in domestic capacity, R&D;, and robust governance to secure competitive advantage.

4 Sub-Topic Summary

Sub-Topic	Headline	Momentum	Key Insight
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Semiconductor Packaging	AI Demand Intensifies Packaging Bottlenecks, Driving \$64B+ Capex	Accelerating	Advanced packaging, particularly CoWoS and ABF substrates, is the new bottleneck for AI chip production, prompting massive capacity expansions (TSMC, ASE, Amkor) and R&D; into next-gen materials like glass core substrates for 2028 deployment. Applied Materials and Micron are investing heavily in equipment and HBM packaging capabilities, with TSMC allocating 10-20% of its \$60-64 billion 2026 capex to packaging.
AI & Machine Learning	Enterprise AI Adoption Surges, Regulatory Compliance Becomes Critical by August 2026	Accelerating	Enterprise generative AI spending surged to \$37 billion in 2025, driving rapid development of AI agents and foundation models for diverse applications from drug discovery to robotics. The EU AI Act's core obligations take effect August 2, 2026, mandating strict compliance for high-risk systems and AI-generated content labeling, with fines up to €15 million. AI infrastructure demands are also driving innovation in liquid cooling and data center design.
Quantum Computing	Fault-Tolerant Quantum Computing Accelerates with Error Correction Breakthroughs	Building	Quantum computing is rapidly advancing towards fault tolerance, with Microsoft accelerating its goal to 2029 via Majorana 2 chip's 1,000x coherence improvement. Error correction breakthroughs (Google, Nord Quantique, NVIDIA) and the use of AI to design new codes (Max Planck) are key. Governments are investing heavily (US \$2B, Japan \$2.3T, France €1B), and commercialization efforts are expanding, leveraging standard CMOS processes for scalability.

Photonics & Optical Comms	Optical Interconnects Revolutionize AI Data Centers, Boosting Speed & Efficiency	Accelerating	Photonics and optical communications are becoming indispensable for AI data centers, addressing critical power and data transfer bottlenecks. MIT's electronic-photonic chip achieved over 1 Pbps data transfer, targeting 10 Pbps by 2030. Co-Packaged Optics (CPO) and silicon photonics platforms (Marvell, STMicroelectronics) are scaling up, with Microsoft and 3M partnering to deploy Expanded Beam Optical (EBO) technology in Azure. Government funding (AIM Photonics \$321M) is accelerating R&D.;
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JSR Accelerates Next-Gen EUV Resist Production and Global Capacity

Source: Gemini Grounding (JSR Corporation)

Summary: JSR is advancing its Extreme Ultraviolet (EUV) photoresist capabilities, with its first production-scale Metal Oxide Resist (MOR) facility in South Korea slated to begin operations in 2026. This facility will supply tin-based MOR to major memory manufacturers,...

WHY ENGINEERS SHOULD CARE

Teams targeting sub-3nm nodes should monitor JSR's MOR production ramp in South Korea (2026) for potential supply chain impacts on advanced memory and logic, especially for defect reduction and patter...

Shin-Etsu Chemical Raises Silicon Wafer Prices Amid Surging AI Demand

Source: Gemini Grounding (Shin-Etsu Chemical)

Summary: Shin-Etsu Chemical, the world's largest silicon wafer producer, announced a price revision of 10% or more for all silicone products globally, effective May 1, 2026. Further price increases of 5% to 8% are projected for semiconductor silicon wafers in H2 2026. ...

WHY ENGINEERS SHOULD CARE

Procurement and supply chain teams should factor in continued silicon wafer price escalation (5-8% in H2 2026) when forecasting material costs for 12-inch wafer-based designs. The projected demand exc...

METI Subsidizes Tower Semiconductor Japan for Optical Communication Semiconductors

Source: Gemini Grounding (METI)

Summary: Japan's Ministry of Economy, Trade and Industry (METI) certified Tower Semiconductor Japan's supply security plan on July 14, 2026, under the Economic Security Promotion Act. This plan involves mass production of optical communication semiconductors in Toyama ...

WHY ENGINEERS SHOULD CARE

Design and technical planning teams should note this significant government-backed investment in Japan's optical communication semiconductor capacity. This could lead to a more robust and localized su...

This Week's Japan Technology Highlights

Japan's JSR is set to begin production of metal oxide resist (MOR) in South Korea in 2026, critical for sub-3nm EUV lithography.

CXMT DRAM Expansion & Advanced Memory: Accelerating China's Memory Self-Sufficiency

■ China's Move

ChangXin Memory Technologies (CXMT) is rapidly expanding its DRAM production capacity, projected to reach approximately 350,000 wafer starts per month (WSPM) by the end of 2026, nearly matching Micron's estimated 375,000 WSPM (Citrini Research). CXMT is curren...

■ Technical Verification

[CONFIRMED]	CXMT's projected wafer starts per month (WSPM) by end of 2026 (350k WSPM) and by 2030 (600k WSPM) (Citrini Research, CXMT plans). / Shipment of 16Gb DDR5 at 8,000 MT/s and LPDDR5X-10667 in 12Gb/16Gb...
[BOTTLENECK]	Achieving competitive yield rates and long-term reliability for advanced DRAM nodes (DDR5/LPDDR5X/DDR6) without access to leading-edge EUV lithography, relying on DUV multi-patterning. Scaling product...

■ Implications for Western Engineers

- Memory procurement teams should evaluate CXMT's 16Gb DDR5 (8,000 MT/s) and LPDDR5X-10667 modules for performance, power, and long-...
- Supply chain planners should factor CXMT's rapid capacity expansion into future DRAM availability and pricing models, especially f...
- Design engineers should monitor CXMT's DDR6 development for potential future integration, focusing on early access to specificatio...

Huawei's AI Accelerator & Advanced Logic Strategy: Challenging Performance Benchmarks

■ China's Move

Huawei's upcoming Kirin 2026 chip, expected in fall 2026, claims a 55% increase in transistor density, 41% power reduction, and 5.6% power density drop over its predecessor, the Kirin 9030 Pro, attributed to a "LogicFolding" architecture. Leaked specifications...

■ Technical Verification

[CONFIRMED]	Huawei's Ascend 950PR has launched commercially in March (Huawei announcement, market reports). / SMIC is mass producing Huawei's Ascend 910 B on its 7nm (N+2) process (SMIC reports, industry analys...
[BOTTLENECK]	Achieving competitive yield rates and performance for advanced logic nodes (7nm, 5nm) without leading-edge EUV tools. Scaling AI accelerator performance and efficiency (TOPS/W) to match global leaders...

■ Implications for Western Engineers

- AI accelerator teams should benchmark Huawei's Ascend 950PR (if accessible) against Nvidia H20/H100, focusing on performance-per-w...
- Chip architects should analyze "LogicFolding" and "Tau Scaling Law" claims for potential architectural innovations, even if lithog...
- Foundry sourcing teams should monitor SMIC's 7nm and 5nm yield rates and capacity expansion for potential future supply chain dive...

Key Trends This Week (5 Total)

TR-01 HIGH Cross-Domain

AI Demand Drives Critical Hardware Bottlenecks & Capacity Race

AI-driven demand for advanced chips creates severe bottlenecks in packaging, memory, and cooling, triggering a global capacity expansion race.

The insatiable demand for AI chips, particularly GPUs and accelerators, has shifted the primary bottleneck from process technology to advanced packaging (CoWoS, HBM) and critical materials (ABF substrates). This has led to massive capital expenditure by OSATs (ASE, Amkor), foundries (TSMC, Samsung), and equipment makers (Applied Materials, ASML) to expand capacity. The shortage of HBM and ABF substrates is projected to persist through 2028, necessitating urgent investment in the entire supply chain, including liquid cooling solutions for high-density AI data centers.

CoWoS Demand Surge (2027)

93%

TSMC 2026 Capex

\$60-64 Billion

ABF Shortage Persistence

Through 2028

► Nvidia ► TSMC ► Applied Materials ► ASE ► Amkor Technology

Refs: S1-01 S1-02 S1-04 S1-07 S1-09 S1-12 S1-15 S1-16 S1-19 S1-21 S1-24 S1-25 S1-26 S2-03 S2-06 S2-07 S2-36 S2-39 S2-41 S2-42

TR-02 HIGH Cross-Domain

Advanced Packaging & Photonics Converge to Scale AI Infrastructure

Integration of advanced packaging with silicon photonics and new substrate materials is revolutionizing AI data center architecture for unprecedented scaling.

To overcome power and data transfer bottlenecks in AI data centers, there's a strong convergence between advanced packaging and photonics. Technologies like Co-Packaged Optics (CPO) and silicon photonics (SiPh) are being integrated directly with HBM and logic chips (Samsung's '2.xD' packaging). Next-generation materials like glass core substrates are emerging to mitigate warpage and boost AI computing power by 2028. This integration, supported by companies like Marvell, STMicroelectronics, and Lightmatter, is crucial for achieving petabit-per-second data transfer rates and enhancing energy efficiency in future AI systems.

MIT Optical Data Transfer Target

10 Pbps by 2030

Glass Substrate Deployment

By 2028

Marvell PIC Shipments

5 Million+

► Samsung ► TSMC ► Nvidia ► Marvell Technology ► STMicroelectronics

Refs: S1-06 S1-10 S1-17 S1-23 S1-27 S1-30 S1-33 S4-01 S4-02 S4-03 S4-04 S4-05 S4-08 S4-09 S4-10 S4-12 S4-13

TR-03 MED Quantum Computing

Quantum Computing Accelerates Towards Fault Tolerance & Commercialization

Breakthroughs in quantum error correction and scalable manufacturing, backed by significant government and private investment, propel quantum computing towards practical applications.

The quantum computing sector is witnessing rapid progress towards fault-tolerant systems, driven by significant improvements in qubit coherence (Microsoft's Majorana 2, 1,000x to 20 seconds) and error

correction techniques (Google, NVIDIA, Nord Quantique). The ability to fabricate silicon spin qubits using standard 300mm CMOS processes (Diraq, Imec) offers a scalable manufacturing pathway. Governments (US, Japan, France) are investing billions, and private funding surged to \$4.9 billion in 2025, accelerating commercialization efforts in areas like finance, healthcare, and defense, with companies like Quantinuum eyeing IPOs.

Microsoft Fault-Tolerant Target	US Government Quantum Grants	Private Quantum Investment (2025)
2029	\$2 Billion	\$4.9 Billion

► Microsoft ► Google ► Quantinuum ► Diraq ► QuEra

Refs: S3-01 S3-02 S3-03 S3-04 S3-05 S3-07 S3-08 S3-12 S3-13 S3-14 S3-15 S3-16 S3-17 S3-19 S3-20 S3-23 S3-24 S3-25 S3-28 S3-32 S3-33 S3-35 S3-37 S3-38 S3-40 S3-41 S3-44 S3-47 S3-49

TR-04 MED AI & Machine Learning

AI Governance & Post-Quantum Security Become Urgent Mandates

Global regulatory bodies and governments are rapidly implementing AI governance frameworks and mandating post-quantum cryptography to manage risks and secure future digital infrastructure.

The EU AI Act's core obligations, effective August 2, 2026, mandate strict compliance for high-risk AI systems, including transparency and machine-readable labeling for AI-generated content, with significant fines for non-compliance. Concurrently, the US White House has accelerated the timeline for Post-Quantum Cryptography (PQC) migration, mandating full implementation by the end of 2030 to protect against future quantum threats. These initiatives highlight a global imperative to establish trust, ethics, and regulatory compliance across the AI system lifecycle and secure critical infrastructure against emerging computational capabilities.

EU AI Act Enforcement Date	PQC Migration Deadline (US)	EU AI Act Max Fine
August 2, 2026	End of 2030	€15 Million

► Microsoft ► IBM ► Fortinet ► QuickLogic ► U.S. Government

Refs: S2-04 S2-05 S2-09 S2-11 S2-14 S2-19 S2-22 S3-26 S3-30 S3-46 S3-48

TR-05 LOW AI & Machine Learning

Edge AI & Robotics Foundation Models Expand Application Horizons

The rise of NPU-enabled chips and advanced robot foundation models is democratizing AI, enabling on-device generative AI and cross-embodiment robotic capabilities.

Edge AI, powered by Neural Processing Units (NPUs), is enabling on-device generative AI for low latency and enhanced privacy, reducing cloud dependency. Concurrently, advancements in robot foundation models, trained on massive datasets, are achieving cross-embodiment transfer and language conditioning, promising to redefine robotics by enabling risk-free simulation-based learning and accelerating development efficiency. Companies like NVIDIA are introducing edge-optimized world models, while startups are democratizing software development with AI agents, expanding AI's reach into physical AI systems and everyday devices.

Robot Trajectory Data	Emergent Labs Valuation	AI-Built Applications
60,000 Hours	\$1.5 Billion	12 Million+

Macro Market Indicators

Indicator	Direction	Value	Note	Source
EU AI Act High-Risk Obligations	↑	August 2, 2026	Stringent regulations for high-risk AI systems and content labeling take effect.	EU Commission
US Quantum Investment	↑	2	Commerce Department grants and equity stakes for nine quantum companies.	U.S. Commerce Department
Japan AI & Quantum Investment	↑	2.3	National growth strategy commits public and private investment by 2040.	Forbes
Global AI Startup Funding (2025)	↑	74	Enterprise generative AI spending accounts for approximately 50% of total funding.	Fundraise Insider

Macro Environment Summary

The global technology landscape is being reshaped by unprecedented investment and regulatory shifts. Governments worldwide, including the US, EU, and Japan, are committing trillions to AI and quantum technologies, signaling a strategic imperative to secure leadership in these critical domains. The EU AI Act's imminent enforcement on August 2, 2026, will establish a global precedent for AI governance, while the US is actively de-risking its quantum supply chain and accelerating post-quantum cryptography migration. This confluence of capital, policy, and technological advancement creates both immense opportunities and complex compliance challenges for Western enterprises.

Market Data: SOXX (Semiconductors) Weekly Trend

521.81 USD -10.24%

Global HBM Market Forecast Source: Industry Analysis (Inferred)

Massive investments by Samsung, SK Hynix, and Micron indicate significant market expansion.

Year	Prev (Billion USD)	Curr (Billion USD)	Δ
2025	15.0	18.0	+3
2026	22.0	28.0	+6
2027	30.0	38.0	+8

ASE CoWoS Capacity Expansion 20,000 wafers/month (End-2026) → 40,000-45,000 wafers/month (End-2027): +100-125%

ASE's largest-ever global expansion to meet surging AI chip demand.

Action Recommendations by Player

Action Recommendations for Western OEM / Final Product Maker

OEM Nvidia, AMD, Intel, Tesla, Pfizer, Eli Lilly, Novartis, Takeda

Western OEMs like Nvidia, AMD, and Intel are driving unprecedented demand for AI chips, securing over 60% of TSMC's CoWoS capacity for the next two years. Companies like Pfizer and Novartis are leveraging AI for drug discovery, with Takeda signing a \$600M deal with Insilico Medicine.

Risk

- If CoWoS/HBM supply remains constrained through 2027, Western OEMs without secured alternative supply chains will face 12-18 month product launch delays
- Non-compliance with EU AI Act by August 2026 risks fines up to €15M or 3% of global turnover for high-risk AI systems
- Future quantum attacks could compromise current encryption, requiring costly and complex PQC migration by 2030

Opportunity

- Diversify advanced packaging sourcing to Intel's EMIB or domestic OSATs to mitigate supply chain risks and secure 2027+ capacity
- Integrate AI agents and foundation models into R&D, manufacturing, and enterprise operations to boost efficiency and accelerate product development
- Invest in AI-powered drug discovery platforms to shorten development cycles and gain competitive advantage in a \$2.5B+ market

Actions This Week

- Secure Q3 2026 meetings with Intel's EMIB and Amkor's Arizona teams to evaluate alternative advanced packaging options for 2027 products
- Establish an AI governance framework by Q4 2026 to ensure compliance with EU AI Act and mitigate ethical/legal risks
- Initiate PQC migration pilot programs for critical data by Q1 2027 to meet US government mandates and future-proof security

□ Scenario: If AI chip supply remains constrained through 2027, Western OEMs without secured alternative supply chains will lose 12–18 months on product launch timelines — begin dual-sourcing qualification now.

□ Quick Win : Register for the DOE Solid-State Battery Summit (August, Washington DC) and book meetings with Factorial and Solid Power BD teams this week.

Action Recommendations for Western Contract Manufacturer

Foundry GlobalFoundries, Intel Foundry Services, Amkor Technology

Western foundries like Amkor and Intel are expanding advanced packaging capacity in the US, with Amkor acquiring 67 acres in Arizona, supported by \$407M in CHIPS Act funding. GlobalFoundries is leveraging its silicon photonics platform for quantum computing firms like PsiQuantum.

Risk

- High capital expenditure and long lead times for advanced packaging facilities create significant financial and operational risks
- Intense competition from Asian giants (TSMC, ASE, Samsung) for CoWoS and HBM capacity could limit market share growth
- Talent shortages in advanced packaging and silicon photonics could hinder rapid capacity ramp-up and technological innovation

■ Opportunity

- Leverage US CHIPS Act funding to establish domestic high-volume advanced packaging OSATs, securing long-term contracts from Western OEMs
- Develop 300mm CMOS-compatible processes for silicon quantum computing, targeting a multi-billion dollar market by 2030
- Expand silicon photonics manufacturing capabilities to meet surging demand for Co-Packaged Optics (CPO) in AI data centers

■ Actions This Week

- Accelerate construction of Arizona advanced packaging facility to meet 2027 operational targets and secure initial customer commitments
- Invest in R&D; for glass core substrates and 2.xD packaging technologies by Q4 2026 to stay competitive with Asian leaders
- Partner with quantum startups like Diraq and Imec to commercialize 300mm CMOS-based quantum chip manufacturing by 2028

□ Scenario: If US CHIPS Act funding is insufficient to offset high domestic manufacturing costs, Western foundries will struggle to compete on price — lobby for sustained incentives and tax breaks by Q4 2026.

□ Quick Win : Submit detailed proposals for CHIPS Act advanced packaging grants by next month's deadline to secure critical funding for 2027 expansions.

Action Recommendations for Western T&M; / Testing Provider

T&M; Applied Materials, KLA, Teradyne, NI

Applied Materials introduced seven new systems for AI chip DRAM and 3D packaging, including advanced eBeam metrology. KLA expects its advanced packaging portfolio to reach \$1 billion, highlighting the critical role of testing in complex AI chip production.

■ Risk

- Rapid evolution of advanced packaging (HBM, chiplets, glass substrates) requires continuous, high-cost R&D; to keep pace with new testing demands
- Competition from integrated solutions by equipment makers or in-house testing by large foundries could erode market share for specialized T&M; providers
- Complexity of heterogeneous integration and quantum devices necessitates specialized expertise, leading to potential talent gaps

■ Opportunity

- Develop AI-driven metrology and inspection tools for next-gen packaging (glass core substrates, 2.xD) to capture a growing market segment by 2028
- Provide advanced testing solutions for HBM4 and 3D stacked memory, critical for AI chip performance and yield, targeting a \$1B+ market
- Partner with quantum computing developers to offer specialized test and measurement services for qubit characterization and error correction validation

■ Actions This Week

- Schedule technical deep-dives with Applied Materials and KLA by end of month to align on next-gen metrology requirements for glass substrates and 2.xD packaging
- Invest in AI-powered defect detection and yield management software by Q1 2027 to support complex advanced packaging facilities
- Form a dedicated quantum metrology R&D; team by Q3 2026 to develop tools for qubit characterization and fault-tolerant system validation

❑ Scenario: If advanced packaging complexity outpaces current T&M; capabilities, Western providers will lose market share to integrated solutions — invest in AI-powered metrology R&D; now.

❑ **Quick Win** : Host a virtual workshop with leading OSATs and foundries this month to identify immediate testing pain points in HBM4 and glass substrate pilot lines.

Action Recommendations for Western Material Supplier

Material 3M, DuPont, BASF, Dow

3M is strategically partnering with Microsoft to deploy its Expanded Beam Optical (EBO) technology in Azure data centers, tapping into the \$2 billion optical interconnect market. The US DOE is also making breakthroughs in domestic silicon and germanium isotope supply chains for quantum information science.

■ Risk

- Reliance on Asian manufacturers for ABF substrates and other critical packaging materials creates supply chain vulnerability and geopolitical risk
- High R&D; costs and long development cycles for novel materials (e.g., glass core substrates) may not align with rapid market shifts
- Environmental regulations and sustainability pressures could increase production costs for specialty chemicals and advanced materials

■ Opportunity

- Develop and commercialize glass core substrates for AI chips by 2028, partnering with TSMC and Nvidia to capture a revolutionary market segment
- Supply advanced photoresists and bonding materials for HBM and 3D packaging, addressing persistent shortages and high demand through 2028
- Innovate in liquid cooling fluids and advanced optical materials (e.g., EBO) for AI data centers, targeting a rapidly expanding infrastructure market

■ Actions This Week

- Initiate joint development programs with TSMC and Nvidia by Q4 2026 for glass core substrate materials, securing early market entry
- Expand domestic production capacity for critical advanced packaging materials (e.g., photoresists) by Q1 2027 to mitigate supply chain risks
- Engage with 3M's EBO team this week to explore licensing or joint development for next-gen optical interconnect materials for AI data centers

❑ Scenario: If glass core substrates become mainstream by 2028, Western material suppliers without proprietary technology will face obsolescence — initiate joint development programs with TSMC/Nvidia now.

❑ **Quick Win** : Schedule a meeting with the US DOE's PNNL team by end of month to explore collaboration on domestic silicon/germanium isotope supply for quantum devices.

Action Recommendations for Western Distributor / Trading Company

Distributor Arrow Electronics, Avnet

While not explicitly mentioned, Western distributors play a crucial role in the complex global supply chain for advanced semiconductor components, AI hardware, and optical communication equipment, facilitating access to critical technologies.

■ Risk

- Supply chain volatility and geopolitical tensions can disrupt inventory, leading to increased holding costs or inability to meet customer demand

- Direct sourcing by large OEMs and foundries could disintermediate traditional distributors, eroding margins and market relevance
- Lack of specialized expertise in advanced packaging, quantum, or photonics components could limit ability to add value in high-tech segments

■ Opportunity

- Offer value-added services for complex AI supply chains, including inventory management, technical support, and customization for advanced packaging components
- Become a certified distributor for PQC-compliant hardware and software solutions, addressing the urgent need for quantum-safe security by 2030
- Develop specialized logistics and distribution channels for high-value, sensitive AI and quantum hardware, differentiating from generalist competitors

■ Actions This Week

- Conduct a market analysis by end of month to identify high-growth niche AI/quantum components requiring specialized distribution services
- Invest in training programs for sales and technical teams by Q1 2027 to build expertise in advanced packaging, photonics, and PQC solutions
- Forge strategic partnerships with emerging AI and quantum hardware startups by Q3 2026 to secure exclusive distribution rights for innovative products

□ Scenario: If AI hardware supply chains become fully vertically integrated, Western distributors will face reduced margins — pivot to specialized value-added services for niche AI/quantum components.

□ Quick Win : Attend the 'AI Supply Chain & Logistics Summit' (September, Chicago) to network with key players and identify new partnership opportunities.

Action Recommendations for Western Equipment Maker

Equipment Applied Materials, ASML, KLA, Thermo Fisher

Applied Materials unveiled seven new systems for AI chip DRAM and 3D packaging, secured a 10-year pact with TSMC, and acquired NEXX. ASML is scaling up EUV/DUV capacity by nearly one-third annually to meet AI chip demand, elevating its 2026 outlook.

■ Risk

- Geopolitical tensions and export controls could restrict access to critical markets, impacting revenue and global expansion strategies
- High R&D; investment cycles for next-generation tools (e.g., glass core substrates, quantum fabrication) require significant capital and long-term commitment
- Long lead times for complex equipment (7-9 months for CoWoS) can create bottlenecks, leading to customer dissatisfaction and potential loss of orders

■ Opportunity

- Innovate and commercialize manufacturing equipment for glass core substrates by 2028, capturing a leading position in next-gen AI packaging
- Expand production capacity for advanced packaging tools (hybrid bonding, 3D stacking) to meet surging AI-driven demand through 2027 and beyond
- Develop specialized equipment for quantum chip fabrication (e.g., 300mm CMOS-compatible tools) and advanced metrology for qubit characterization

■ Actions This Week

- Accelerate R&D; for glass core substrate processing equipment to capture early market share by Q4 2026, leveraging existing customer relationships

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- Increase manufacturing capacity for advanced packaging tools by 30% by Q1 2027 to alleviate supply bottlenecks for key customers like TSMC and Samsung
 - Establish a dedicated quantum equipment division by Q3 2026 to develop tools for scalable quantum chip manufacturing and testing

☐ Scenario: If geopolitical tensions restrict access to key markets, Western equipment makers will face revenue decline — diversify R&D; and manufacturing footprint to mitigate risk by Q4 2026.

☐ **Quick Win** : Host a virtual 'Glass Substrate Equipment Innovation Day' for TSMC, Nvidia, and Samsung by end of next month to showcase early-stage tool capabilities.

Impact Matrix (Players × Trends)

++ = Strong Tailwind + = Tailwind 0 = Neutral – = Headwind -- = Strong Headwind

Player	TR-01 HIGH AI Dem	TR-02 HIGH Advanc	TR-03 MED Quantu	TR-04 MED AI Gov	TR-05 LOW Edge A
Western OEM / Final Product Maker	++	++	+	++	++
Western Contract Manufacturer	++	+	+	++	++
Western T&M; / Testing Provider	++	+	+	+	+
Western Material Supplier	++	+	+	++	++
Western Distributor / Trading Company	+	+	0	+	+
Western Equipment Maker	++	++	++	++	++

Timeline This Week (10 Events)

Date	Tag	Headline	Source
2026-08-02	policy	EU AI Act's core obligations for high-risk systems and content labeling take effect, with fines up to €15M.	EU S2-04, S2-11
2027-01-01	milestone	Rapidus aims for 2nm AI chip mass production, bolstering Japan's semiconductor ecosystem.	Japan S1-14, S1-20
2027-12-31	milestone	ASE to double CoWoS capacity to 40,000-45,000 wafers/month; TSMC to reach 200,000 wafers/month.	International S1-02, S1-16
2027-12-31	milestone	PsiQuantum's fault-tolerant photon-based quantum computer hubs in Chicago and Australia targeted for operation.	USA/Australia S4-08
2028-01-01	product	TSMC and NVIDIA target practical application of glass core substrates for AI chips.	International S1-23
2028-12-31	risk	Global ABF substrate shortage projected to persist, impacting high-end chip production.	International S1-04
2029-01-01	milestone	Microsoft accelerates goal for fault-tolerant quantum computing with Majorana 2 chip.	USA S3-03
2030-12-31	policy	US White House mandates full implementation of Post-Quantum Cryptography (PQC) migration.	USA S3-48
2030-12-31	milestone	MIT's electronic-photonic chip targets 10 Pbps data transfer to resolve AI energy crisis.	USA S4-01

Date	Tag	Headline	Source
2035-12-31	policy	Micron targets 40% US DRAM production, part of \$250B US spending initiative.	USA S1-32

Company Spotlight

Applied Materials [AMAT] ↑ +4.1%

Unveiled seven new systems for AI chip DRAM and 3D packaging, secured a 10-year strategic pact with TSMC, and acquired NEXX, solidifying its leadership in AI advanced packaging.

- Accelerate R&D; for glass core substrate processing equipment to capture early market share by Q4 2026.
- Expand manufacturing capacity for advanced packaging tools by 30% by Q1 2027 to alleviate supply bottlenecks.

TSMC [TSM] ↑ +3.5%

Reported record Q2 revenue of \$40.2B with 67.7% gross margin, CoWoS fully booked through 2026, and outlined a roadmap for 14-reticle packaging and glass core substrates by 2028.

- Continue aggressive CoWoS capacity expansion to meet 200,000 wafers/month target by 2027, securing equipment orders now.
- Accelerate joint development with Nvidia on glass core substrates to maintain leadership in next-gen AI packaging.

Microsoft [MSFT] ↑ +2.9%

Unveiled Majorana 2 quantum chip with 1,000x coherence improvement, accelerating fault-tolerant quantum computing to 2029, and partnered with 3M to deploy Expanded Beam Optical technology in Azure.

- Prioritize commercialization efforts for Majorana 2, targeting enterprise quantum-as-a-service offerings by 2029.
- Expedite deployment of 3M's EBO technology across Azure data centers to enhance AI cloud performance and scalability.

Technology Roadmap

2026

- ◆ EU AI Act high-risk obligations take effect (August 2)
- ◆ CoWoS capacity fully booked, HBM packaging ramp-up
- ◆ Applied Materials forecasts >50% advanced packaging revenue growth
- ◆ Intel announces €5B Ireland expansion for AI/data center chips

2027

- ◆ Rapidus 2nm AI chip mass production begins
- ◆ ASE CoWoS capacity doubles to 40-45K wafers/month
- ◆ TSMC CoWoS capacity reaches 200K wafers/month
- ◆ PsiQuantum's photon-based quantum computer hubs operational

2028

- ◆ TSMC & Nvidia target practical application of glass core substrates
- ◆ Global ABF substrate shortage projected to persist
- ◆ QuEra aims for Libra fault-tolerant system (256 logical qubits)
- ◆ Micron US-based HBM packaging anticipated to ramp up

2029

-
- ◆ Microsoft accelerates fault-tolerant quantum computing goal
 - ◆ Continued expansion of AI data center infrastructure
 - ◆ Further advancements in AI agent and foundation model capabilities

2030

- ◆ US mandates full Post-Quantum Cryptography (PQC) implementation
- ◆ MIT's electronic-photonics chip targets 10 Pbps data transfer
- ◆ Quantum computing market expected to reach significant commercial scale
- ◆ AI governance frameworks become globally standardized

References (142 Total)

ID	Title	Source	Date	Region	Sub-Topic
S1-01	Advanced Packaging Becomes the New Bottleneck for AI Chip Production, Driving Global Capex Race and Nvidia's Supply Diversification Efforts	The Economy	2026-07-14	International	Semiconductor Packaging
S1-02	ASE Initiates Largest-Ever Global Expansion to Double CoWoS Capacity to 45,000 Wafers/Month by Late 2027	Industry Blog/Analysis	2026-07-17	International	Semiconductor Packaging
S1-03	Applied Materials Unveils Seven New Systems for AI Chip DRAM Performance and Advanced 3D Packaging, Accelerating Bottleneck Resolution	Industry News	2026-07-09	International	Semiconductor Packaging
S1-04	Global ABF Substrate Shortage to Persist Through 2028 Due to Soaring AI Demand, Impacting High-End Chip Production	DigiTimes	2026-07-14	Taiwan	Semiconductor Packaging
S1-05	Amkor Technology Expands Arizona Campus with 67-Acre Acquisition, Bolstering U.S. Advanced Packaging OSAT Capacity	AllMind AI News	Date unknown	US	Semiconductor Packaging
S1-06	Samsung Develops '2.xD' Advanced Packaging Integrating HBM, Logic, and SiPh to Tackle AI Data Center Power and Data Bottlenecks	DigiTimes	2026-07-13	Taiwan	Semiconductor Packaging
S1-07	ABF Substrates Emerge as the True Bottleneck in the AI Era, More Critical Than DRAM for High-Performance Computing	Industry Analysis	2026-07-11	International	Semiconductor Packaging
S1-08	Wah Lee and Asahi Kasei Double Photoresist Capacity in Tainan to Capitalize on AI Advanced Packaging Boom and ABF Substrate Demand	BigGo Finance	2026-07-15	International	Semiconductor Packaging
S1-09	Morgan Stanley Forecasts 93% CoWoS Demand Surge by 2027, Driven by AMD's Venice CPU Shipments	KuCoin	2026-07-09	International	Semiconductor Packaging
S1-10	Applied Materials' Material Engineering Innovations, Led by Hybrid Bonding, Key to Scaling AI Chip Performance in the AI Era	Applied Materials (Official Blog/Article)	2026-07-12	US	Semiconductor Packaging
S1-11	TSMC Plans Three Advanced Packaging Plants at Chiayi Science Park, Targeting Mass Production by 2027 for AI and Quantum Tech	Taiwan News	2026-07-14	Taiwan	Semiconductor Packaging
S1-12	AI Era Semiconductor Equipment Theme: Applied Materials Forecasts Over 50% Advanced Packaging Revenue Growth in 2026, Micron Boosts HBM Packaging Capabilities	TradingKey	2026-07-16	International	Semiconductor Packaging

ID	Title	Source	Date	Region	Sub-Topic
S1-13	Applied Materials Highlights MES's Critical Role in Recovering Capacity and Managing Complexity for Advanced Packaging and Test Facilities	Applied SmartFactory Solutions (Applied Materials)	2026-07-17	US	Semiconductor Packaging
S1-14	Rapidus to Establish 2nm AI Chip Mass Production by 2027, Bolstering Japan's Semiconductor Ecosystem	DataM Intelligence	2026-07-14	International	Semiconductor Packaging
S1-15	HBM Supply Crunch Deepens: DRAM Wafer Production and Advanced Packaging/Test Emerge as Dual Bottlenecks Amid Samsung, SK Hynix, Micron Rivalry	Industry Analysis	2026-07-15	International	Semiconductor Packaging
S1-16	TSMC's CoWoS Supply to Reach At Least 200K Wafers Monthly by 2027, Accelerating Expansion to Meet Soaring AI Demand	DigiTimes	2026-07-10	Taiwan	Semiconductor Packaging
S1-17	TSMC Leads in Data Center Co-Packaged Optics, While Samsung Pursues Future AI Packaging with HBM, Logic, and SiPh Integration in '2.xD' Technology	KuCoin	2026-07-12	International	Semiconductor Packaging
S1-18	TSMC's N3 Node and Expanding CoWoS Capacity Solidify Nvidia's Future, While HBM4 Multi-Vendor Qualification Reduces Supply Risk	Seeking Alpha	2026-07-16	US	Semiconductor Packaging
S1-19	TSMC Achieves Record Q2 Revenue of \$40.2B with 67.7% Gross Margin, CoWoS Fully Booked Through 2026, and Maps 14-Reticle Packaging	LongYield - Substack	2026-07-16	International	Semiconductor Packaging
S1-20	Japan's Rapidus Partners with IBM on 2nm Semiconductor Manufacturing to Bolster Indo-Pacific Supply Chain Resilience	Geopolitical Analysis / Think Tank	2026-07-10	International	Semiconductor Packaging
S1-21	AI-Driven Advanced Packaging Orders Surge, Widening ABF Carrier Board Supply-Demand Gap, Benefiting Industry with Both Volume and Price Increases	AlphaWire	2026-07-15	International	Semiconductor Packaging
S1-22	Rapidus and Cadence Partner on Agentic AI for Advanced SoC Design, Driving System-Level Co-Optimization	Las Vegas Sun	2026-07-17	US	Semiconductor Packaging
S1-23	TSMC and NVIDIA's 'Glass Killer': How Glass Core Substrates Will Revolutionize AI Chips by 2028	SETN.COM	2026-07-15	Taiwan	Semiconductor Packaging
S1-24	NVIDIA's 2027 CoWoS Supply Forecast Raised 69% to 1.1 Million Interposers; AMD to See Over 50% Growth: KeyBanc Asia Supply Chain Checks Reveal Strong Demand	TipRanks	2026-07-16	US	Semiconductor Packaging
S1-25	NVIDIA's AI Chip Supply Bottleneck Stems from TSMC's Booked CoWoS Capacity, Intel EMIB Emerges as Alternative	BingX	2026-07-14	International	Semiconductor Packaging

ID	Title	Source	Date	Region	Sub-Topic
S1-26	CoWoS Identified as Core Bottleneck for AI GPU Shipments, Distinct from HBM Shortage	BiyaPay Blog	2026-07-13	International	Semiconductor Packaging
S1-27	Taiwan's TGV Glass Substrate Supply Chain Advances: E&R; Engineering Ships Laser Modification Equipment to US Client, Accelerating Mass Production	Taiwan News	2026-07-09	Taiwan	Semiconductor Packaging
S1-28	AT&S; to Invest €1.5-2 Billion in Malaysian ABF Capacity, While IBIDEN Allocates ¥500 Billion for AI/HPC Substrate Expansion in Japan & Overseas	Sector Signals	2026-07-16	China	Semiconductor Packaging
S1-29	Malaysia Launches RM92 Million Government-Backed Initiative to Develop HBM4 Advanced Packaging Pilot Line, Targeting Higher Semiconductor Value Chain	Business News	2026-07-14	Malaysia	Semiconductor Packaging
S1-30	Samsung Electronics Advances "2.xD" Packaging Integrating HBM, Logic, and Optical Tech to Resolve AI Power and Heat Bottlenecks	BigGo Finance	2026-07-10	South Korea	Semiconductor Packaging
S1-31	Applied Materials Fortifies AI Advanced Packaging with 10-Year TSMC Pact and NEXX Acquisition	Simply Wall St News	2026-07-16	US	Semiconductor Packaging
S1-32	Micron Invests \$500M in GlobalWafers Texas Plant, Targets 40% US DRAM Production by 2035	Tom's Hardware	2026-07-13	US	Semiconductor Packaging
S1-33	Samsung Electro-Mechanics Challenges Ividen in AI Server Package Substrates with FC-BGA and Glass Substrate Push	MK	2026-07-17	South Korea	Semiconductor Packaging
S2-01	Edge AI on the Rise: NPU-Enabled Chips Drive On-Device Generative AI for Low Latency and Enhanced Privacy	Vertex AI Search	2026-07-15	US	AI & Machine Learning
S2-02	Microsoft Open-Sources Go SDK for Production-Grade AI Agent Framework, Expanding Enterprise AI Development	TechGig	2026-07-14	US	AI & Machine Learning
S2-03	Liquid Cooling Failures Threaten AI Data Center Uptime, Risking Overheating and Up to \$38 Billion in Downtime	Datacenters	2026-07-16	India	AI & Machine Learning
S2-04	Europe's AI Act: Stringent Obligations for High-Risk Systems Go Live in 2026	Wirtek	2026-07-13	Denmark	AI & Machine Learning
S2-05	AI Governance Framework Becomes Essential to Establish Trust, Ethics, and Regulatory Compliance in AI System Lifecycles	Visure Solutions	2026-07-09	US	AI & Machine Learning
S2-06	Iceotope's Precision Liquid Cooling Boosts AI Infrastructure Compute Density by Up to 6x for GPU/CPU Servers	Iceotope	2026-07-14	UK	AI & Machine Learning

ID	Title	Source	Date	Region	Sub-Topic
S2-07	Engineering the AI Era: Why Data Centers Need 5.5-9 Meter Floor Heights for GPU Power and Thermal Management	Kim Kang-han	2026-07-15	South Korea	AI & Machine Learning
S2-08	AI Safety Funding Opportunities Expand, Supporting Advanced AI Risk Mitigation and Interdisciplinary Projects	AI Safety.com	2026-07-14	US	AI & Machine Learning
S2-09	EU AI Act Bolstered: Transparency Code Mandates Machine-Readable Markings for AI-Generated Content	Wilson Sonsini	2026-07-14	Belgium	AI & Machine Learning
S2-10	Frontiers Highlights Foundation Models' Value in Designing Soft, Wearable, and Bio-Inspired Robots by Efficiently Adapting Reusable Representations	Frontiers	2026-07-10	Switzerland	AI & Machine Learning
S2-11	EU AI Act Mandates Labeling for AI-Generated Content Starting August 2, 2026, with Fines Up to €15 Million for Non-Compliance	NatLawReview	2026-07-15	US	AI & Machine Learning
S2-12	LingBot-VLA 2.0 Robot Foundation Model Achieves Cross-Embodiment Transfer with 60,000 Hours of Trajectory Data and Diverse Robot Configurations	RoboCloud Hub	2026-07-11	Unknown	AI & Machine Learning
S2-13	AWS Startups Advocates World Models and Multimodal AI Stack to Redefine Robotics Rules, Enabling Risk-Free Simulation-Based Learning	AWS Startups	2026-07-10	US	AI & Machine Learning
S2-14	EU AI Act's Core Obligations on High-Risk AI Systems, Transparency, and CE Marking to Take Effect August 2, 2026, with Fines Exceeding GDPR	RAIL - Responsible AI Labs	2026-07-14	Unknown	AI & Machine Learning
S2-15	Enterprise Generative AI Spending Skyrockets to \$37 Billion in 2025, Capturing 50% of Global AI Startup Funding	Fundraise Insider	2026-07-09	US	AI & Machine Learning
S2-16	Robotics AI Development Faces High GPU Costs for Physical Simulation and Synthetic Trajectory Generation, Exceeding LLM Computational Loads	axecompute.com	2026-07-09	Unknown	AI & Machine Learning
S2-17	Microsoft Agent Framework Officially Released in Go, Establishing .NET as a Production-Ready AI Platform	AI Mindset (Medium)	2026-07-15	US	AI & Machine Learning
S2-18	Large Language Model Agents Show Up to 14.4% Performance Degradation in Dynamically Evolving MCP Server Environments: MCP-Evol-Bench Reveals	arXiv	2026-07-17	Unknown	AI & Machine Learning
S2-19	Effective AI Governance Framework Establishes Permissible Use Policies and Human Accountability Through Legal Design Patterns	Adaptive Security	2026-07-17	Unknown	AI & Machine Learning

ID	Title	Source	Date	Region	Sub-Topic
S2-20	Lyzyr Secures \$100 Million Series B Funding Round, Valuing Company at \$500 Million, by Leveraging Proprietary AI Agent 'Agent Sam'	TNW	2026-07-09	India	AI & Machine Learning
S2-21	NIH PRIMED-AI Program Offers 5 Funding Opportunities to Develop Personalized Medicine AI Tools for Chronic Diseases, Deadline October	National Institutes of Health (NIH)	2026-07-17	US	AI & Machine Learning
S2-22	White House Launches 'GOLD EAGLE' Initiative to Accelerate AI-Powered Cybersecurity Vulnerability Coordination	White House	2026-07-14	US	AI & Machine Learning
S2-23	Apple Secures China Approval for Alibaba-Powered AI Deployment: Siri and AI Services to Roll Out Across iOS, iPadOS, macOS, visionOS	Simply Wall St News	2026-07-17	China	AI & Machine Learning
S2-24	Thinking Machines Lab Unveils Inkling, a New Open-Weight 975B MoE LLM, Achieving Superior Benchmark Performance Over GLM-5.2	Sebastian Raschka	2026-07-16	Germany	AI & Machine Learning
S2-25	LLM Coordinated Bench: New Multi-Agent Coordination Benchmark Launched, Gemini 3.1 Pro Matches Top MARL Agents in Long-Term Tasks	r/MachineLearning (Reddit)	2026-07-14	Unknown	AI & Machine Learning
S2-26	Medicare's AI Approval Pilot Encounters Friction: Early Reports Detail Delays, Increased Paperwork	YouTube	2026-07-09	US	AI & Machine Learning
S2-27	U.S. GSA to Host 2026 Model Context Protocol Server and AI Agent Hackathon to Accelerate AI Adoption in Government Agencies	U.S. General Services Administration (GSA)	2026-07-10	US	AI & Machine Learning
S2-28	Novartis Partners with Chai Discovery to Accelerate Antibody Drug Development using Advanced AI Model Chai-3	Scientist Live	2026-07-13	US	AI & Machine Learning
S2-29	Insilico Medicine and Bora Pharmaceuticals Form Multi-Billion Dollar AI-Driven Drug Discovery and Manufacturing Alliance	News-Medical.Net	2026-07-15	US	AI & Machine Learning
S2-30	Whatnot Acquires AI Recommendation Startup Shaped to Enhance Live Shopping Discovery and User Engagement	GeekWire	2026-07-16	US	AI & Machine Learning
S2-31	SambaNova Secures \$1 Billion Series F at \$11 Billion Valuation, Norm AI Becomes Unicorn with \$120 Million for Regulatory Compliance	Crunchbase News	2026-07-10	US	AI & Machine Learning
S2-32	InstaLILY AI Raises \$60 Million Series B, Overtone Secures \$18 Million Seed Funding in Active AI Startup Market	AlleyWatch	2026-07-15	US	AI & Machine Learning

ID	Title	Source	Date	Region	Sub-Topic
S2-33	FDA Clears UpDoc's LLM Diabetes App, Grants Breakthrough Status to Aidoc's AI Radiology Tool	MarketScale	2026-07-13	US	AI & Machine Learning
S2-34	Emergent Labs Achieves Unicorn Status with \$130 Million Series C, Valued at \$1.5 Billion for AI Agent-Driven Enterprise Software Development	SiliconANGLE	2026-07-15	US	AI & Machine Learning
S2-35	Helsing Secures \$1.8 Billion for AI Defense, Raxio Group Raises \$380 Million for AI Infrastructure, Nous Research Nears \$1.5 Billion Valuation	AI Funding Me	2026-07-13	US	AI & Machine Learning
S2-36	Samsung, SK Hynix, and Micron Invest Billions to Massively Expand AI Chip Memory Production Capacity	The Korea Herald	2026-07-12	South Korea	AI & Machine Learning
S2-37	Nvidia-Backed AI Infrastructure Startup Fireworks Raises \$1.51 Billion, Reaching \$17.5 Billion Valuation with Over \$1 Billion Annualized Revenue	WSAU	2026-07-16	US	AI & Machine Learning
S2-38	Intel Announces €5 Billion Expansion in Ireland to Boost Next-Generation AI and Data Center Chip Production	Simply Wall St	2026-07-14	US	AI & Machine Learning
S2-39	ASML Scales Up to Meet AI Chip Demand Surge, Elevates 2026 Outlook	TheFlights	2026-07-16	Europe	AI & Machine Learning
S2-40	Takeda Partners with Insilico Medicine in \$600 Million AI Drug Discovery Deal, Including \$60 Million Upfront Payment	Fierce Pharma Asia	2026-07-10	US	AI & Machine Learning
S2-41	TSMC Boosts 2026 Capex to Over \$64 Billion, Commits Additional \$100 Billion in US for Advanced AI Chip Production Amid Surging Demand	Taipei Times	2026-07-16	Taiwan	AI & Machine Learning
S2-42	ASML to Increase EUV and DUV Capacity by Nearly One-Third Annually to Alleviate AI Chip Supply Chain Concerns	ET Electronics News	2026-07-16	India	AI & Machine Learning
S2-43	Chemomab and Scipher Medicine Merge to Advance AI-Guided Anti-CCL24 Antibody into Phase II Rheumatoid Arthritis Trial	PharmExec	2026-07-12	US	AI & Machine Learning
S2-44	Moonshot AI Releases 2.8 Trillion Parameter Kimi K3 MoE Model, NVIDIA Introduces 4B-Parameter Cosmos 3 Edge for On-Device AI	AI Weekly	2026-07-17	US	AI & Machine Learning
S2-45	NetApp Acquires AI Data Infrastructure Firm DataPelago to Eliminate Data Processing Bottlenecks for AI Workloads	Business Wire	2026-07-17	US	AI & Machine Learning
S2-46	BandLab Acquires Fully Licensed AI-Powered Music Studio Aiode to Strengthen AI-Driven Music Creation and Licensing	M&A; Today	2026-07-16	UK	AI & Machine Learning

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S2-47	Databricks Secures Strategic Funding Round at \$188 Billion Valuation to Accelerate AI Strategy, Including Unity AI Gateway and Genie	Databricks	2026-07-17	US	AI & Machine Learning
S3-01	QuiX Quantum Delivers World's First Universal Room-Temperature Photonic Quantum Computer 'Carina' to German Aerospace Center for Commercial Deployment	Forbes	2026-07-14	US	Quantum Computing
S3-02	Diraq and Imec Demonstrate Coherent Operation of Eight Silicon MOS Spin Qubits Fabricated Using Standard 300mm CMOS Process	IO+	2026-07-13	Netherl ands	Quantum Computing
S3-03	Microsoft Unveils 'Majorana 2' Topological Quantum Chip, Achieving 1,000x Coherence Time Improvement to 20 Seconds and Accelerating Fault-Tolerant Quantum Computing Goal to 2029	Forbes	2026-07-16	US	Quantum Computing
S3-04	Google Quantum AI Achieves 3.5x Improvement in Quantum Error Correction Stability on Willow Chip Using Reinforcement Learning, Demonstrating $7.72(9) \times 10^{-4}$ Logical Error Rate for Distance-7 Surface Code	The Quantum Insider	2026-07-12	US	Quantum Computing
S3-05	Neutral Atom Quantum Computing Startup Oratomic Raises \$300 Million in Series A Funding to Accelerate Fault-Tolerant System Development	Pulse 2.0	2026-07-11	US	Quantum Computing
S3-06	Tennessee Commits \$3 Million to Support NSF Quantum X-Labs Teams, Partnering with Oak Ridge National Laboratory to Accelerate Commercialization	State of Tennessee	2026-07-13	US	Quantum Computing
S3-07	U.S. Commerce Department Announces \$2 Billion in Grants and Minority Equity Stakes for Nine Quantum Computing Companies, Signaling Government Shift to Venture Investor Role	WisdomTree	2026-07-10	US	Quantum Computing
S3-08	U.S. Department of Energy Invests \$60.7 Million in Quantum Computing and Networking, Bolstering Fusion Energy Research	Department of Energy	2026-07-09	US	Quantum Computing
S3-09	ETH Zurich Develops Innovative Quantum Memory Chip Utilizing Mechanical Vibrations to Significantly Increase Information Density	ETH Zurich	2026-07-09	Switzerl and	Quantum Computing
S3-10	Boeing Achieves Major Milestone for Q4S Quantum Internet, Demonstrating Entanglement Swapping on Space-Qualified Hardware	MEM Magazine	2026-07-09	UK	Quantum Computing

ID	Title	Source	Date	Region	Sub-Topic
S3-11	Europe's Eagle-1 Satellite Secures DLR Quantum Ground Station Construction Site for Quantum Key Distribution Demonstration by Late 2027	The Quantum Insider	2026-07-16	US	Quantum Computing
S3-12	Japan to Invest \$2.3 Trillion in AI and Quantum Technologies by 2040, Boosting Semiconductors and Physical AI Robot Deployment	Forbes	2026-07-15	US	Quantum Computing
S3-13	UK Launches Third Cohort of Quantum Technology Access Programme (QTAP) to Accelerate Industrial Applications in Finance, Healthcare, and Defense	Digital Catapult	2026-07-17	UK	Quantum Computing
S3-14	NatWest Joins Digital Catapult's Quantum Programme to Explore Fraud Detection Use Cases with Quantum Computing	FStech	2026-07-16	UK	Quantum Computing
S3-15	Wall Street's Quantum Bet: Israeli Firms Quantum Art and Classiq Target Multi-Billion Dollar SPAC Deals	Ctech	2026-07-12	Israel	Quantum Computing
S3-16	Logical Qubit Technology Unveils Quantum Cloud Platform with 100-Qubit Superconducting AGate-100 Chip, Achieving 99.97% Single-Qubit Gate Fidelity	Logical Qubit Technology	2026-07-16	Unknown	Quantum Computing
S3-17	Neutral Atom Quantum Computing Companies QuEra, Atom Computing, and Pasqal Accelerate Towards Fault-Tolerant Systems	Tom's Hardware	2026-07-16	US	Quantum Computing
S3-18	IBM Unveils Quantum Computer Performance Metrics: Emphasizing Programmable Qubits, Qubit Operations, and Maximum Circuits Per Second	IBM	2026-07-16	US	Quantum Computing
S3-19	Max Planck Institute Uses AI to Design Improved Quantum Error Correction Codes, Significantly Reducing Logical Error Rates	Reddit (r/quantum)	2026-07-09	Germany	Quantum Computing
S3-20	QuEra Computing Unveils Quantum Computers with Integrated Quantum Error Correction Capabilities, Advancing Fault-Tolerant Quantum Computing	QuEra	Date unknown	US	Quantum Computing
S3-21	U.S. Department of Energy Announces Breakthrough in Domestic Silicon and Germanium Isotope Supply Chains to Power Next-Gen Quantum Information Science	Department of Energy	2026-07-15	US	Quantum Computing
S3-22	QuEra Explains Qubit T1 Relaxation Time, Highlights Gate Speed-to-Coherence Time Ratio as Key Performance Metric	QuEra	2026-07-14	US	Quantum Computing
S3-23	Rigetti Achieves 99.1% Two-Qubit Gate Fidelity on its 108-Qubit Superconducting System 'Cepheus-1-108Q'	TECHi	2026-07-11	US	Quantum Computing

ID	Title	Source	Date	Region	Sub-Topic
S3-24	MIT and Caltech Researchers Achieve Quantum Error Correction with a Single Ion, Reducing Errors by 2.2-Fold and Extending Qubit Lifetime by 1.5 Times	The Quantum Insider	2026-07-14	US	Quantum Computing
S3-25	National Quantum Strategies Accelerate Transition from Lab Breakthroughs to Economic Assets: U.S. NQI and Geopolitical Alignment	Inside Deep Tech	2026-07-11	US	Quantum Computing
S3-26	Fortinet Explains Quantum Cryptography: A Comprehensive Approach with QKD and PQC	Fortinet	2026-07-15	US	Quantum Computing
S3-27	Aliro Technologies and zerothird Partner with Cisco to Demonstrate Operational Quantum Networking with Entanglement-Based QKD	Business Wire	2026-07-14	US	Quantum Computing
S3-28	University of Waterloo Receives \$7.1M Grant for Quantum & Multidisciplinary Research to Rigorously Demonstrate Quantum Computing Advantage	The Quantum Insider	2026-07-13	Canada	Quantum Computing
S3-29	Logical Qubit Technology Unveils AGate Superconducting Quantum Cloud Platform, Outlines Decade-Long Roadmap to Fault-Tolerant Systems	The Quantum Insider	2026-07-16	Global	Quantum Computing
S3-30	Vault12 Explains "Quantum Supremacy" Risks: Shor's Algorithm Requires Millions of Fault-Tolerant Qubits	Vault12	2026-07-15	US	Quantum Computing
S3-31	India's DRDO, in Collaboration with Taqbit Labs, Field-Tests Fiber-Optic Quantum Key Distribution System for Defense, Aiming for Large-Scale Multi-Hop Network	Janes	2026-07-16	India	Quantum Computing
S3-32	Nord Quantique Achieves 100x Reduction in Quantum Error Correction SPAM Errors to Below 0.1% in GKP-Based Systems	Business Wire	2026-07-13	Canada	Quantum Computing
S3-33	Quantinuum Explores Novel Quantum Error Correction Approach Enabling Direct Logical Qubit Operations	Quantinuum	2026-07-16	UK	Quantum Computing
S3-34	QuiX Quantum Delivers "Carina Core" Hardware Platform to DLR QCI for Universal Photonic Quantum Computing	The Quantum Insider	2026-07-14	Netherlands	Quantum Computing
S3-35	Quantinuum, Rolls-Royce, Riverlane, and University of Edinburgh Ink Multi-Year Agreement to Explore Quantum Computing for Industrial Design and Fluid Dynamics Simulation	PR Newswire	2026-07-14	UK	Quantum Computing
S3-36	World's First Superconducting Quantum Heat Engine Demonstrated: Converting Heat to Work via Otto Cycle, Paving Way for Simpler, Large-Scale Quantum Computers	The Quantum Insider	2026-07-14	Global	Quantum Computing

ID	Title	Source	Date	Region	Sub-Topic
S3-37	Bis Research Unveils Key 2026 Quantum Computing Market Developments: PsiQuantum-Airbus Partnership, Rigetti's India Contract, IonQ's SkyWater Acquisition Agreement	Bis Research	2026-07-16	India	Quantum Computing
S3-38	Quantum Leap: Imec and Diraq Demonstrate Coherent Operation of Eight Silicon Spin Qubits on 300mm CMOS Platform	Embedded Computing Design	2026-07-13	Belgium	Quantum Computing
S3-39	D-Wave Launches General Availability of Powerful 20-Way Connected Advantage2™ Annealing Quantum Computer for Business and Scientific Applications	D-Wave	2026-07-09	Canada	Quantum Computing
S3-40	Quantinuum's Estimated Revenue Nears \$100 Million, Driving IPO Prospects with Quantum-as-a-Service and Cybersecurity Products as Key Revenue Streams	Value Add VC	2026-07-15	US	Quantum Computing
S3-41	NVIDIA Ising Decoder Achieves Over 300x Reduction in Color Code Logical Error Rates, 7.3x Speedup, Accelerating Fault-Tolerant Quantum Computing	The Quantum Insider	2026-07-13	US	Quantum Computing
S3-42	arXiv Paper "The NISQ Trap" Reveals Quantum Advantage Demonstrations Classically Reproducible or Based on Tractable Structures	arXiv	2026-07-15	US	Quantum Computing
S3-43	Pasqal Appoints Former HPE HPC & AI Leader as Chief Commercial Officer to Drive Enterprise-Scale Quantum Deployment	Business Wire	2026-07-13	France	Quantum Computing
S3-44	France's CNRS Unveils Quantum Industrialization Strategy as Government Commits Additional €1 Billion to Quantum Tech	Quantum Momentum	2026-07-09	France	Quantum Computing
S3-45	Quantum Cyber Subsidiary Quantum Drones Acquires 50,000 Sq Ft Connecticut Facility for \$2.3M to Establish Domestic Autonomous Defense Manufacturing	Investing.com	2026-07-16	USA/Netherlands	Quantum Computing
S3-46	QuickLogic and PQSecure Demonstrate Reprogrammable Post-Quantum Cryptography for SoCs Using QuickLogic eFPGA Fabric	PR Newswire	2026-07-16	US	Quantum Computing
S3-47	NSF Awards \$15 Million to Connecticut's 'QuantumCT' Innovation Engine, Accelerating Commercialization and Industrial Collaboration	Quantum Computing Report	2026-07-16	US	Quantum Computing
S3-48	White House Executive Order Accelerates Post-Quantum Cryptography (PQC) Migration, Mandating Full Implementation by End of 2030	EE Times	2026-07-15	US	Quantum Computing

ID	Title	Source	Date	Region	Sub-Topic
S3-49	GlobeNewswire Announces 2026 Quantum Investment Report: Private Investment Skyrockets to \$4.9 Billion in 2025, Cumulative Exceeds \$65 Billion	GlobeNewswire	2026-07-15	US	Quantum Computing
S4-01	MIT's Electronic-Photonic Chip Achieves Over 1 Pbps Data Transfer, Targets 10 Pbps by 2030 to Resolve AI Energy Crisis	MarketWise	2026-07-15	US	Photonics & Optical Comms
S4-02	Marvell Technology Accelerates AI Data Center Deployment with Shipment of Over 5 Million Tower Semiconductor Photonic Integrated Circuits	simplywall.st (NasdaqGS:MRVL)	2026-07-11	US	Photonics & Optical Comms
S4-03	Microsoft and 3M Forge Strategic Alliance to Transform AI Data Center Infrastructure, Integrating 3M's Expanded Beam Optical Technology into Azure	Microsoft (Official Press Release)	2026-07-15	US	Photonics & Optical Comms
S4-04	Marvell Technology Accelerates Co-Packaged Optics (CPO) Deployment to Revolutionize AI Scaling	Marvell Technology (YouTube)	2026-07-10	US	Photonics & Optical Comms
S4-05	STMicroelectronics Ramps PIC100 Silicon Photonics Platform Production on 300mm Wafers to Meet AI Data Center Demand	EE Times	2026-07-16	Switzerland	Photonics & Optical Comms
S4-06	Researchers Shatter Record, 3D Print 4 Million 500nm Optical Neurons on Millimeter Chip in 15 Minutes	EINPresswire.com 經由	2026-07-17	China	Photonics & Optical Comms
S4-07	Hamamatsu Photonics Launches High-Speed, High-Sensitivity InGaAs Image Sensor Module 'C16795 Series' for Food and Semiconductor Inspection	Engineer Live	2026-07-10	Japan	Photonics & Optical Comms
S4-08	PsiQuantum Accelerates Fault-Tolerant Photon-Based Quantum Computer Development with GlobalFoundries' Omega Silicon Photonics, Targeting Hub Operations by 2027	PsiQuantum (Official Website)	2026-07-15	US	Photonics & Optical Comms
S4-09	AIM Photonics Secures Over \$321M from Air Force Research Lab and SUNY Research Foundation to Advance Silicon Photonics R&D;	optics.org	2026-07-15	US	Photonics & Optical Comms
S4-10	Lightmatter Joins NVIDIA NVLink Fusion Ecosystem, Boosts AI Data Center Optical Connectivity 8x with First 16-Wavelength Bidirectional DWDM Link	Lightmatter (Official Website)	2026-07-17	US	Photonics & Optical Comms
S4-11	Hamamatsu Photonics Europe Expands Advanced Imaging Solutions for Medical and Scientific Fields by Strengthening Fairchild Imaging CMOS Sensor Technologies Post-Acquisition	Hamamatsu Photonics Europe (Press Release)	2026-07-10	Japan	Photonics & Optical Comms

ID	Title	Source	Date	Region	Sub-Topic
S4-12	imec Pioneers Chip-Scale Optical I/O for AI Inference, Tackling Performance and Energy Bottlenecks	EE Times	2026-07-09	Belgium	Photonics & Optical Comms
S4-13	AI Infrastructure Drives Optical Fiber Boom: Corning Highlights Fiber as Core to AI Performance, Citing Mexico's Strategic Role	Mexico Business News	2026-07-13	Mexico	Photonics & Optical Comms

Editor's Note

Navigating the AI-Driven Tech Frontier: Strategic Imperatives for Western Leadership

This week's analysis reveals an IT & Electronics landscape undergoing profound transformation, primarily propelled by the relentless expansion of AI. The interconnectedness of advanced semiconductor packaging, AI & Machine Learning, Quantum Computing, and Photonics & Optical Communications is undeniable. Bottlenecks in CoWoS and ABF substrates directly impact AI chip supply, while innovations in optical interconnects are critical to power the burgeoning AI data centers. Simultaneously, breakthroughs in quantum error correction and the urgent mandate for AI governance and post-quantum security underscore a rapidly evolving technological and regulatory environment.

For Western manufacturers, investors, and executives, this period demands a dual strategy: aggressive investment in domestic capacity and R&D, coupled with proactive engagement in global standardization and regulatory compliance. While Asian players continue to dominate in high-volume advanced packaging, Western entities like Amkor and Intel are making strategic moves to localize production, supported by government initiatives. The convergence of these technologies presents both significant risks, such as supply chain dependencies and regulatory non-compliance, and immense opportunities for those who can innovate, diversify, and secure critical resources.

To maintain and expand competitive advantage, Western stakeholders must prioritize strategic partnerships, invest in next-generation materials like glass core substrates, and accelerate the adoption of AI-driven operational efficiencies. The race for fault-tolerant quantum computing and quantum-safe cybersecurity is intensifying, requiring immediate action to future-proof digital infrastructure. By focusing on these integrated strategies, Western industry can not only navigate the current challenges but also shape the future of this dynamic technological frontier.

The next 12-24 months will be pivotal. Decisions made today regarding capacity, R&D, and governance will determine market leadership for the next decade. Proactive engagement, agile adaptation, and strategic foresight are no longer optional but essential for survival and growth in this hyper-competitive global arena.

- ◆ How will our organization secure critical advanced packaging and optical interconnect capacity to meet AI-driven demand through 2027?
- ◆ What concrete steps are we taking to establish a robust AI governance framework and initiate Post-Quantum Cryptography migration by Q1 2027?
- ◆ Which emerging technologies, such as glass core substrates or 300mm CMOS quantum chips, should we prioritize for R&D; investment or strategic partnerships to gain a 3-5 year competitive edge?

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