Semiconductor Market Insights and Advanced Packaging Trends

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TechInsights

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Semiconductor Market Insights

TestConX 2025

TechInsights' Forecast Summary

TechInsights' Current Forecast										
Forecast as of January 2025:	Q1 2024	Q2 2024	Q3 2024	Q4 2024	2024	Q1 2025	Q2 2025	Q3 2025	Q4 2025	2025
Semi Equipment ($B):	$ 31.6	$ 33.2	$ 36.3	$ 38.3	$ 139.6	$ 36.0	$ 36.1	$ 37.6	$ 39.2	$ 148.8
Sequential Change	-6.0%	4.9%	9.5%	5.5%	4.8%	-6.2%	0.3%	4.2%	4.4%	6.6%
Capacity Utilization:	71.2%	74.6%	77.1%	79.4%	75.7%	78.9%	80.8%	83.9%	88.1%	82.9%
ICs ($B):	$ 129.7	$ 139.4	$ 153.6	$ 167.5	$ 590.3	$ 159.9	$ 162.8	$ 181.1	$ 197.5	$ 701.4
Sequential Change	0.0%	7.5%	10.2%	9.0%	28.5%	-4.5%	1.8%	11.3%	9.1%	18.8%
IC Units (BU):	79.0	87.4	97.6	91.6	355.6	87.5	95.7	107.4	104.4	395.0
Sequential Change	-4.5%	10.6%	11.6%	-6.1%	2.7%	-4.5%	9.4%	12.1%	-2.8%	11.1%
Electronics ($B) :	$ 589.4	$ 568.4	$ 616.7	$ 708.6	$ 2,483	$ 597.3	$ 593.7	$ 651.3	$ 762.0	$ 2,604
Sequential Change	-13.8%	-3.6%	8.5%	14.9%	2.1%	-15.7%	-0.6%	9.7%	17.0%	4.9%

	2024	Q4 2024	2025
Equipment	Unchanged	Unchanged	Unchanged
IC Sales	Unchanged	Unchanged	Unchanged
IC Units	Unchanged	Unchanged	Unchanged
Electronics	Downgraded: from 3% to 2%	Downgraded: from 17% to 15%	Downgraded: from 8% to 5%

TestConX™

Semiconductor Market Insights and Advanced Packaging Trends

2025

TestConX 2025

Semiconductor Sales and Shipments

AI Logic and HBM Boosting Semis to New Highs

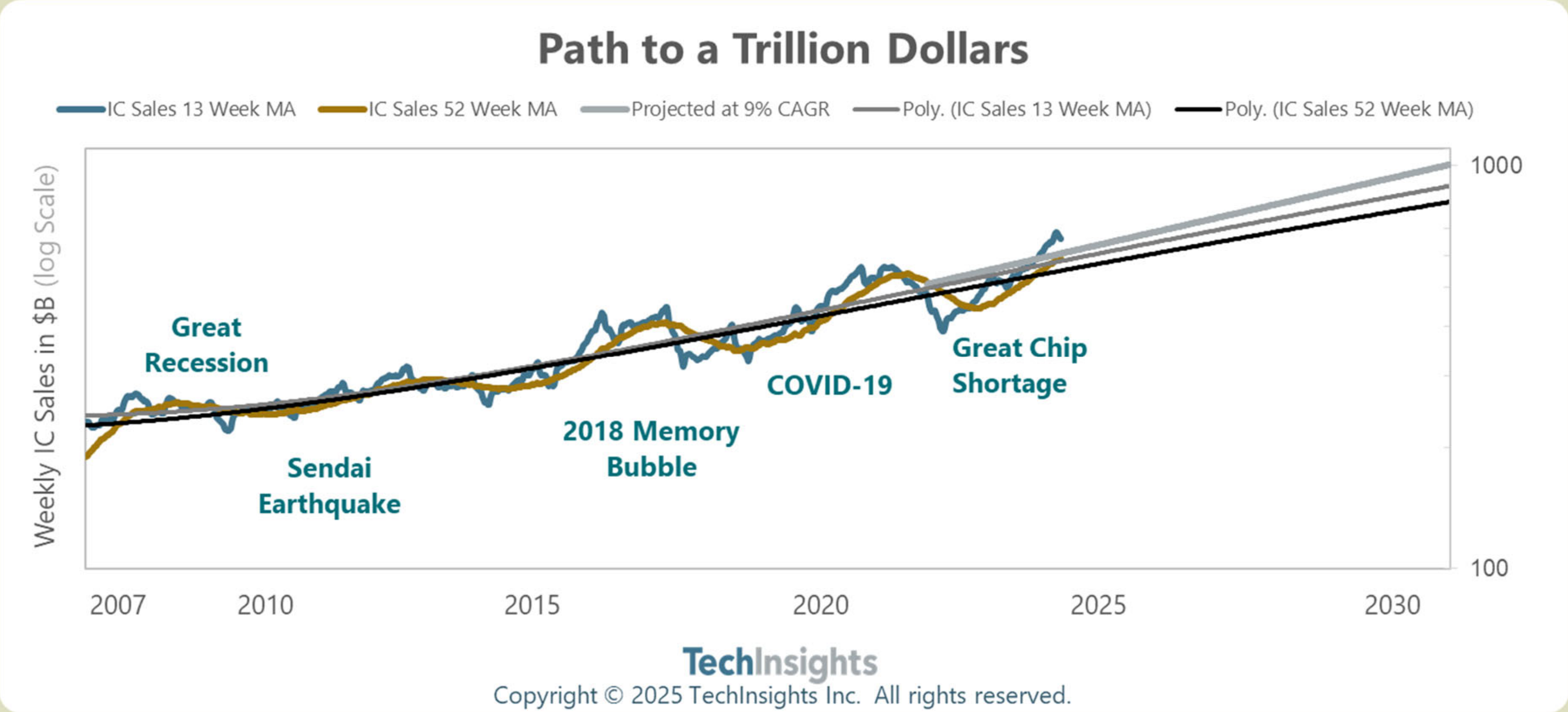
SEMICONDUCTOR SALES (worldwide sales, $B, calendar year)

	2024	2025	2026	2027	2028	2029
Analog	82	84	94	87	100	119
y-o-y growth	-2%	3%	12%	-7%	15%	19%
DRAM	98	139	170	150	156	206
y-o-y growth	87%	42%	22%	-12%	4%	32%
NAND	68	73	91	81	85	93
y-o-y growth	74%	8%	24%	-11%	5%	10%
MPU	64	69.2	69.7	62.4	68.5	74.2
y-o-y growth	19%	8%	1%	-10%	10%	8%
GPU	117	157	157	162	181	197
y-o-y growth	83%	34%	0%	3%	12%	9%
APU	37	40	43	39	42	46
y-o-y growth	7%	7%	8%	-11%	10%	8%
Other Logic	120	135	139	127	142	158
y-o-y growth	-6%	13%	3%	-9%	12%	11%
Discrete, Opto & Other	98	103	114	113	126	147
y-o-y growth	-6%	6%	10%	-1%	12%	17%
Total Semiconductor	**683**	**801**	**878**	**821**	**901**	**1040**
y-o-y growth	22%	17%	10%	-7%	10%	15%

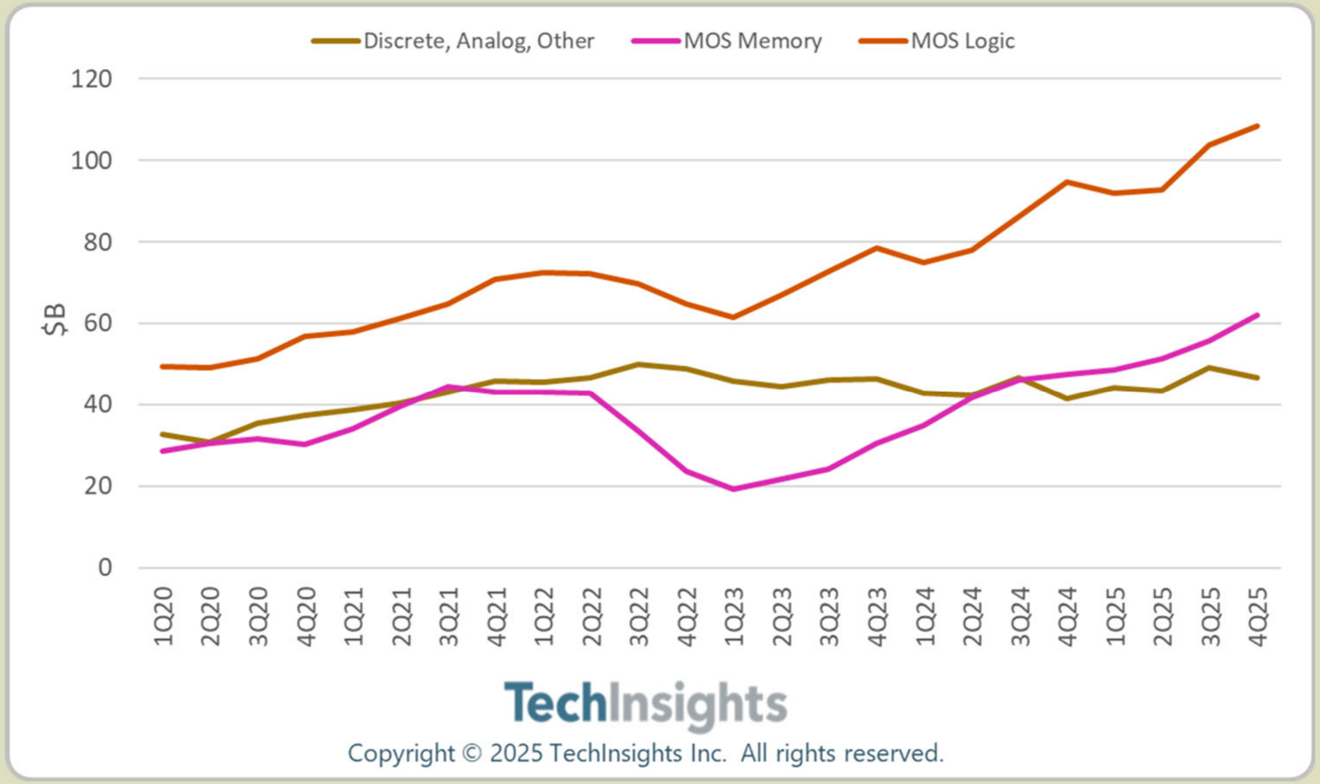
SEMICONDUCTOR SHIPMENTS (worldwide sales, B units, calendar year)

	2024	2025	2026	2027	2028	2029
Analog	209	228	268	256	281	314
y-o-y growth	2%	9%	17%	-4%	10%	12%
DRAM	20	20	21	23	24	26
y-o-y growth	5%	2%	1%	10%	6%	9%
bit growth	20%	18%	16%	22%	17%	21%
NAND	14	14	14	14	14	15
y-o-y growth	2%	0%	-1%	-2%	2%	2%
bit growth	14%	15%	21%	25%	23%	24%
MPU	0.6	0.6	0.7	0.6	0.6	0.7
y-o-y growth	19%	10%	8%	-10%	5%	5%
GPU	0.1	0.1	0.2	0.2	0.2	0.2
y-o-y growth	10%	12%	17%	4%	13%	12%
APU	1.4	1.5	1.6	1.4	1.5	1.6
y-o-y growth	1%	5%	9%	-10%	5%	7%
Other Logic	98	116	136	129	133	141
y-o-y growth	4%	19%	17%	-6%	4%	6%
Discrete, Opto & Other	606	667	796	770	844	930
y-o-y growth	3%	10%	19%	-3%	10%	10%
Total Semiconductor	**949**	**1048**	**1237**	**1193**	**1298**	**1428**
y-o-y growth	3%	10%	18%	-4%	9%	10%

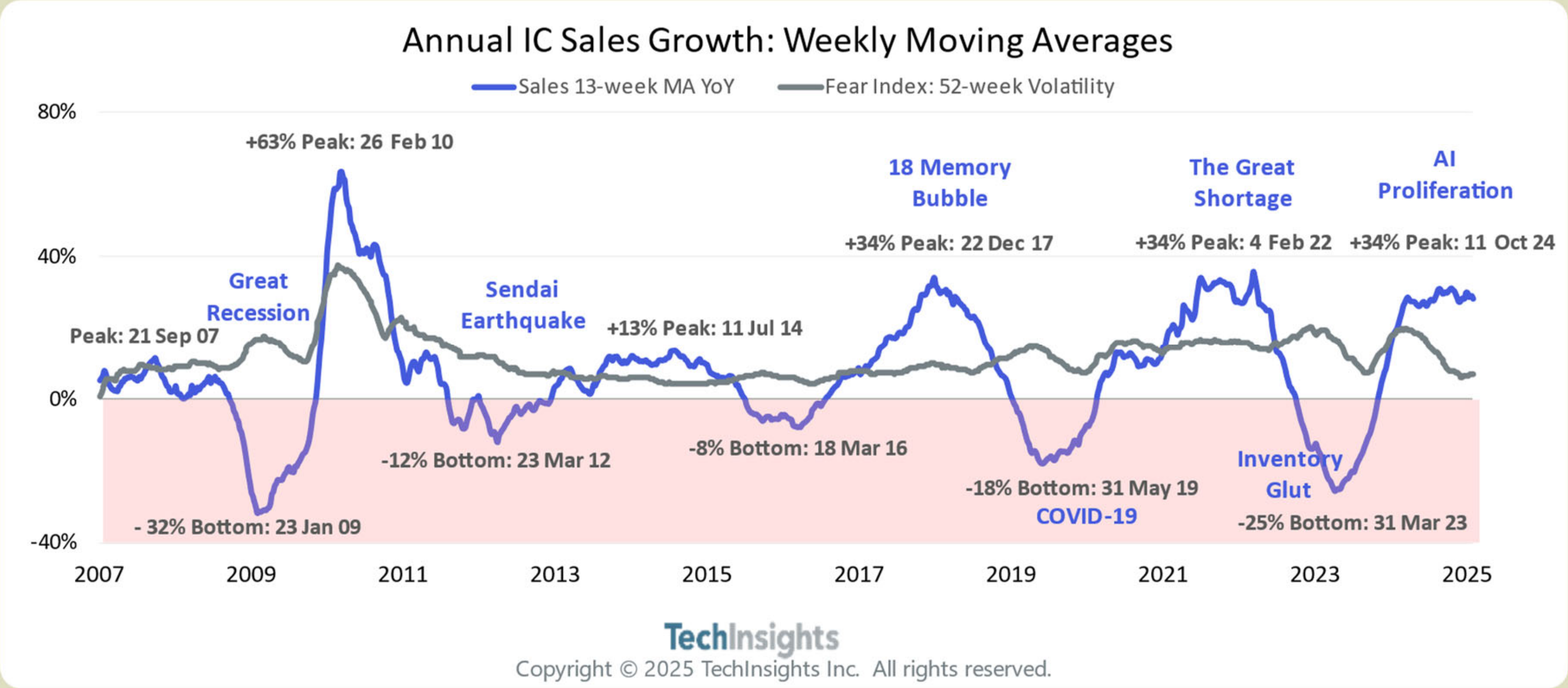
Semiconductor Sales



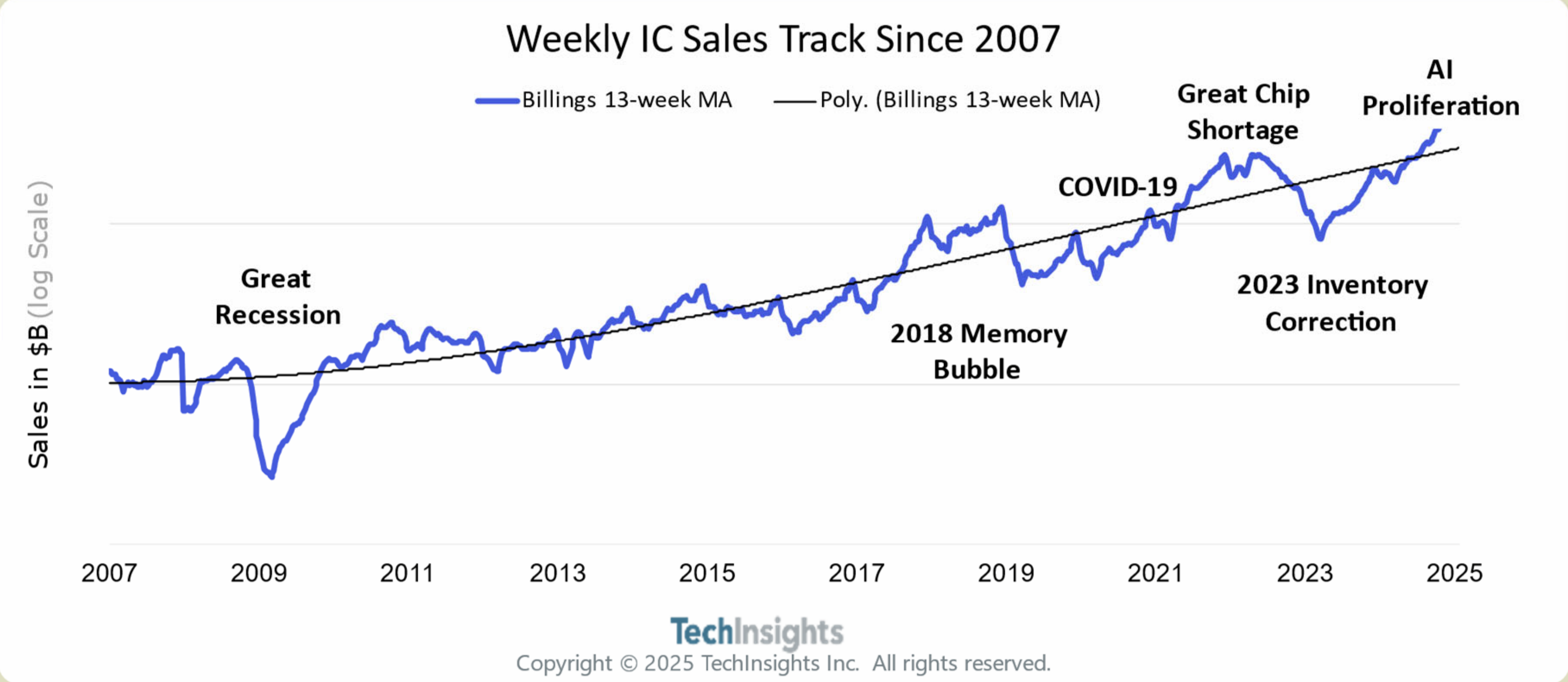
Semiconductor Sales are Diverging



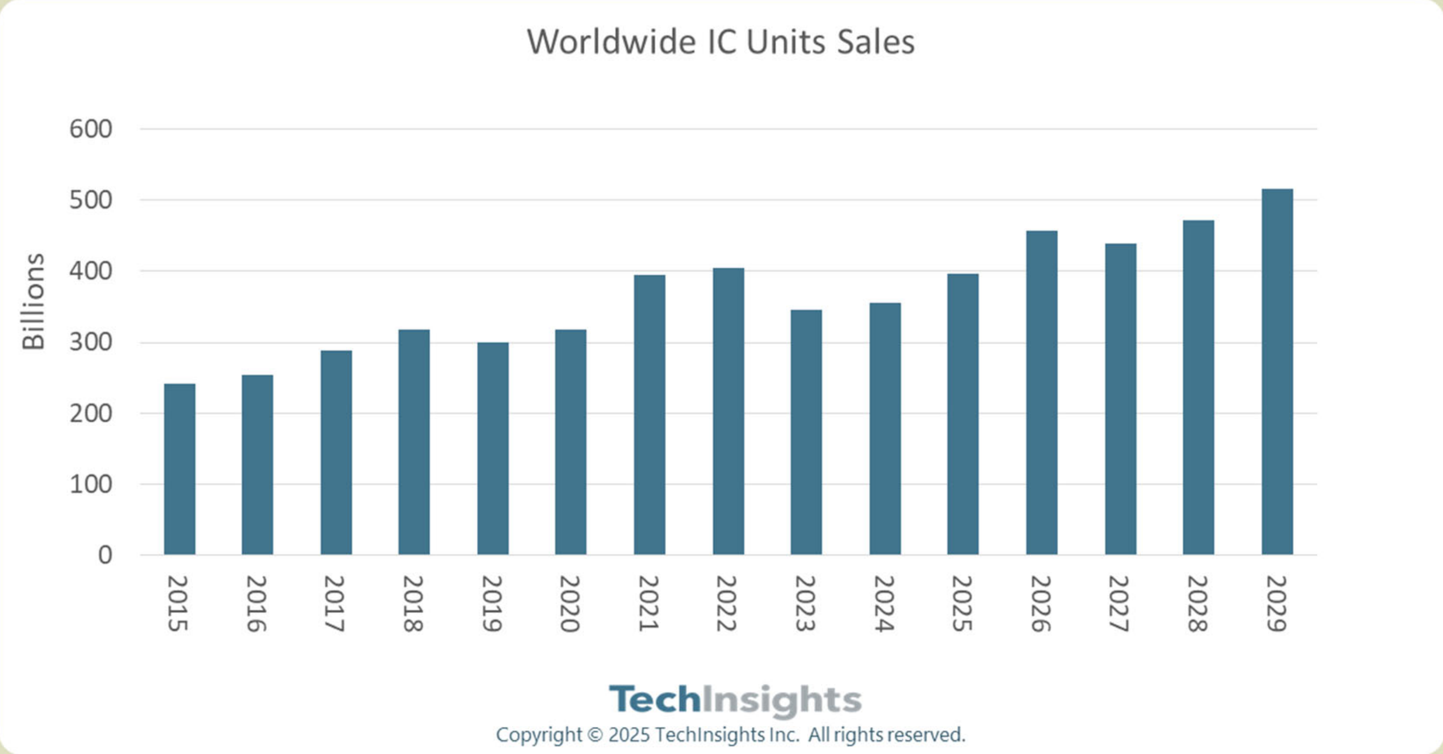
IC Sales Growth



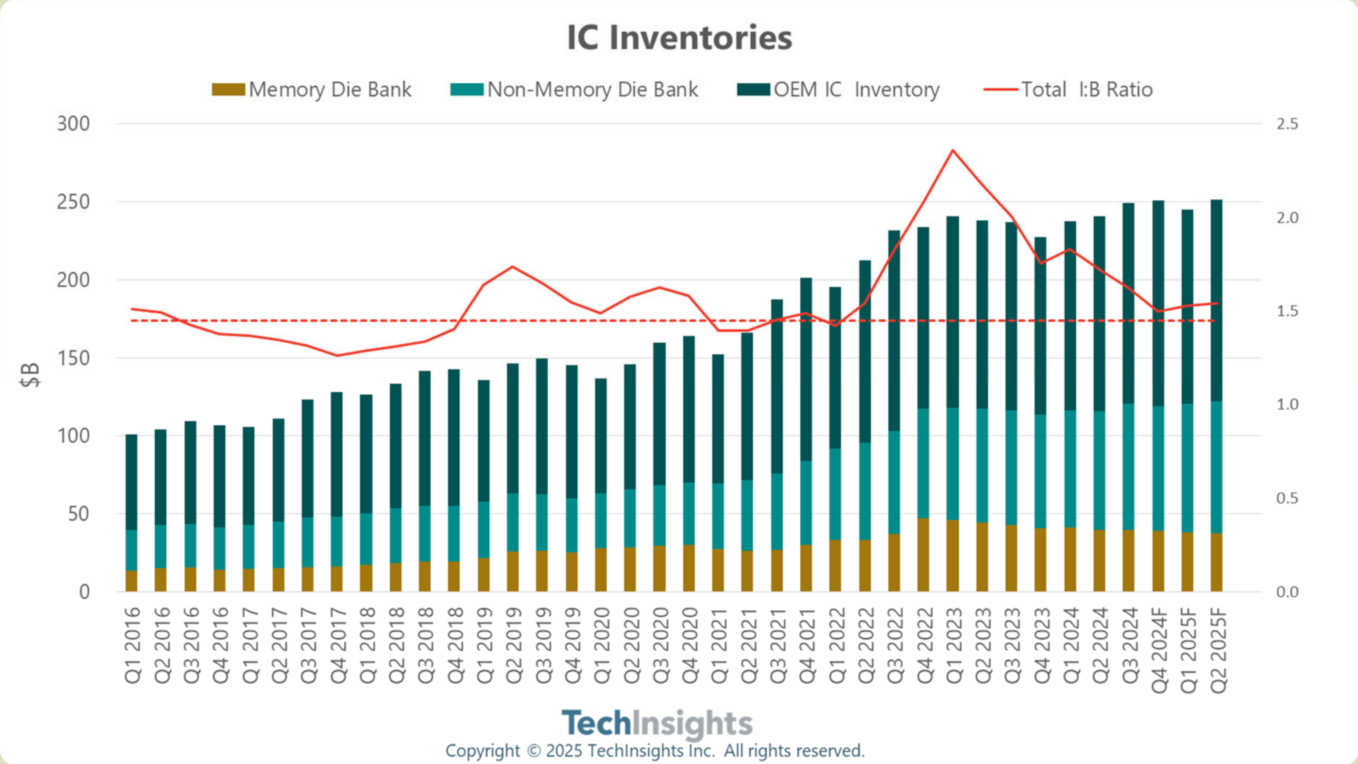
IC Sales Track



Worldwide IC Units Sales

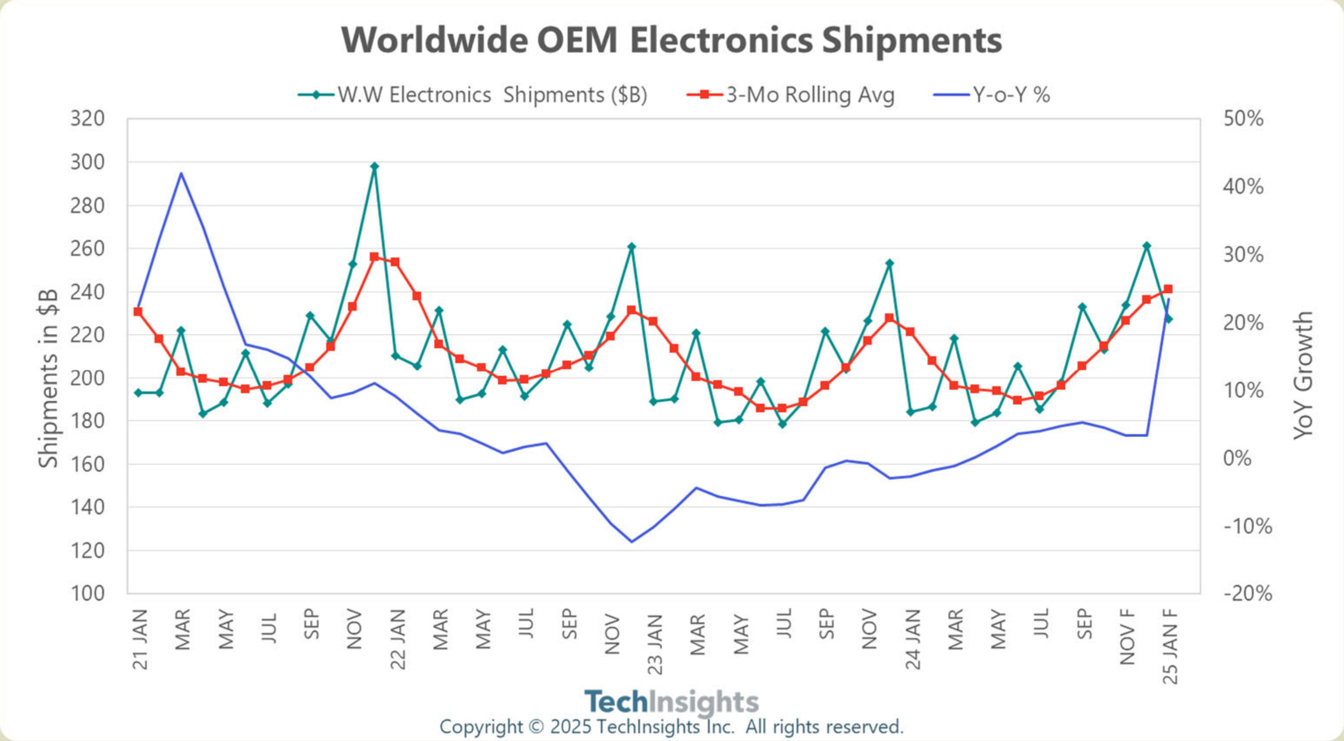


Inventories remain elevated



Inventory-to-billings has been slowly coming down but is still elevated

Electronics Demand is Improving

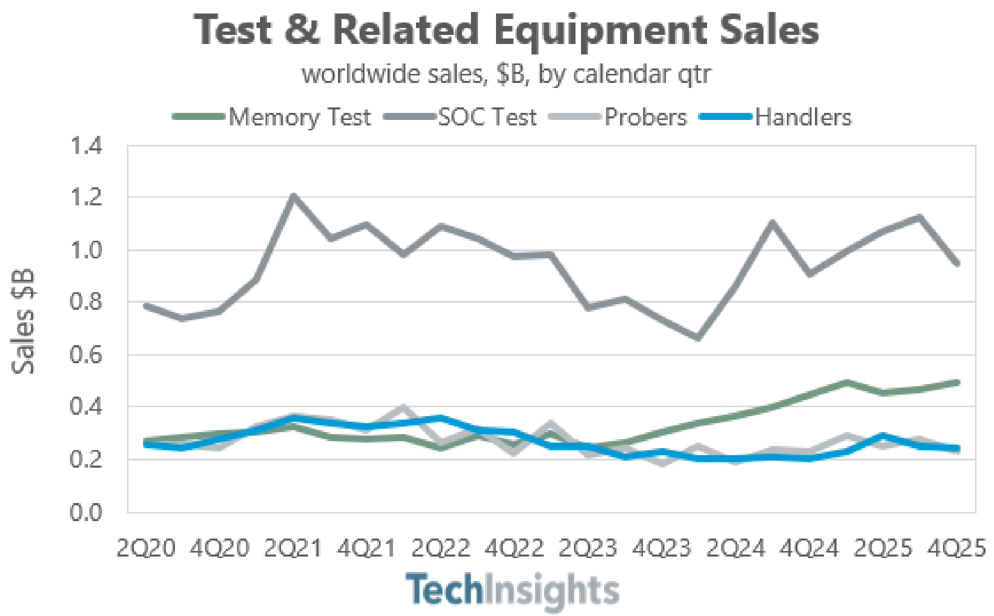


OEM Electronic Sales Expected to Increase 5% In 2025

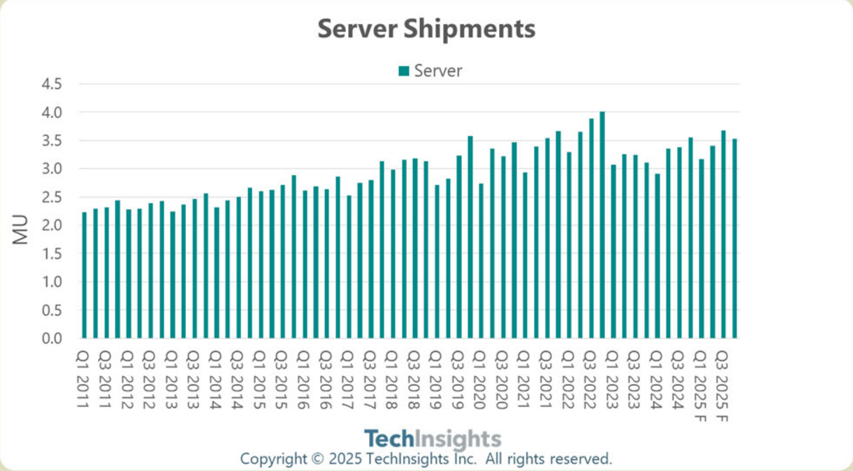
ATE: Recovery underway in 2024, followed by stronger growth in 2025

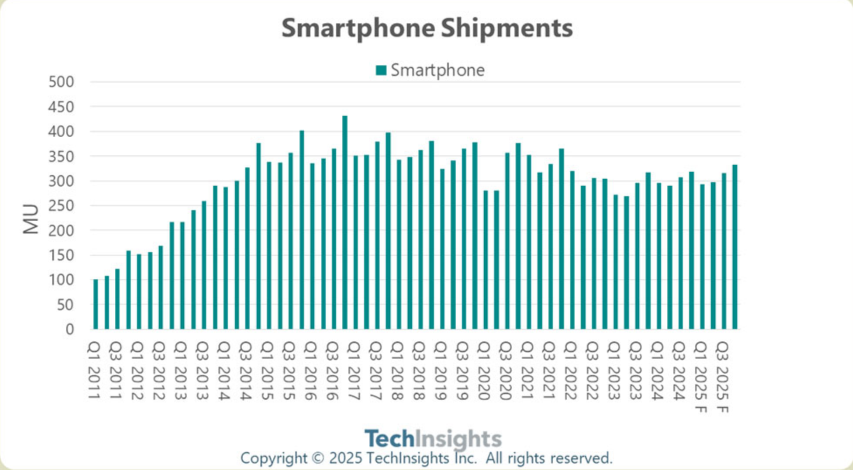
Test Equipment Sales
(worldwide sales, $B, CY 2023 - 2025)

	2023	2024	2025
Memory Test	1.1	1.5	1.9
y-o-y growth	2%	40%	23%
SOC Test	3.3	3.5	4.1
y-o-y growth	-19%	7%	17%
Other Test	0.4	0.4	0.5
y-o-y growth	-26%	-7%	27%
Handlers	0.9	0.8	1.0
y-o-y growth	-29%	-13%	24%
Probers	1.0	0.9	1.1
y-o-y growth	-18%	-8%	16%
Total Semiconductor	6.7	7.2	8.6
y-o-y growth	-18.1%	6.7%	19.5%



Key Semiconductor Drivers are Improving

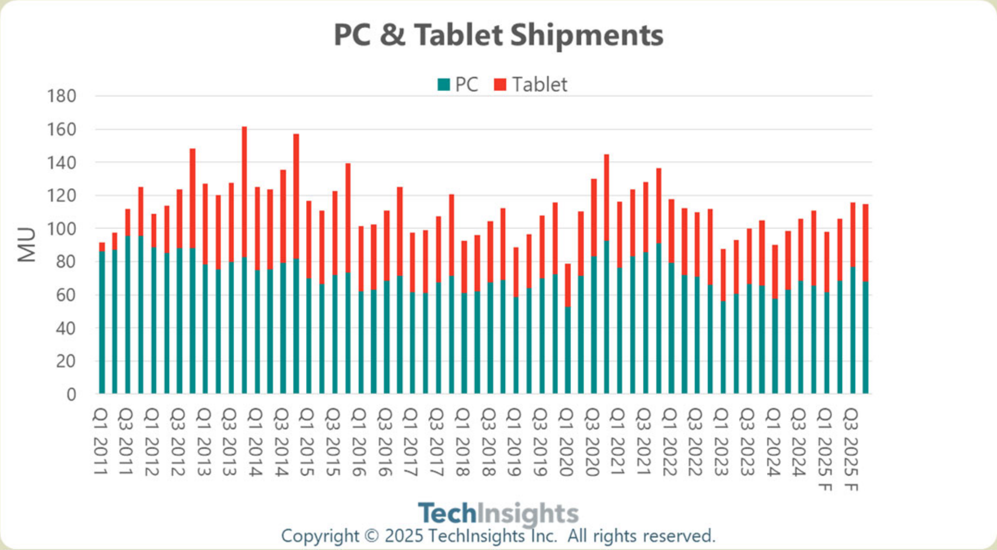




- Servers ▲4% in 2025
- Strong demand for AI servers

- SP Shipments ▲2% in 2025
- Headwinds from potential geopolitical tensions

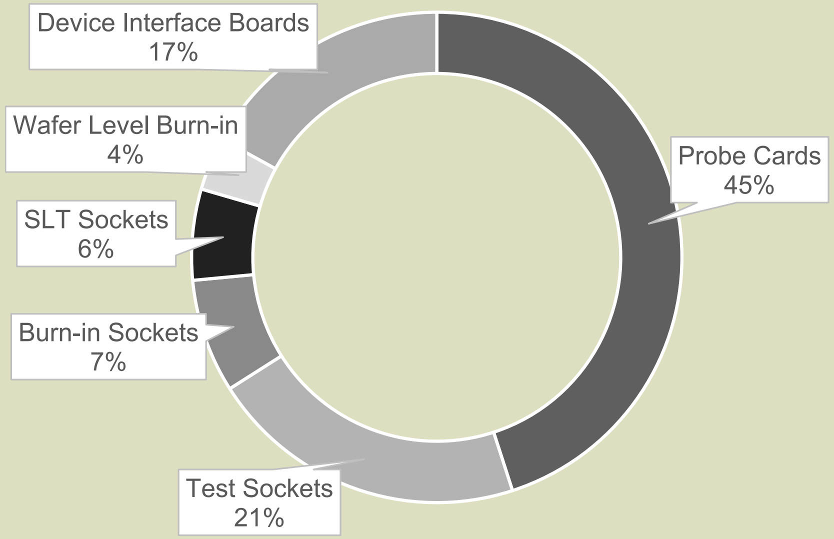
Key Semiconductor Drivers are Improving



- PCs ▲8% in 2025
  - Post COVID replacement cycle
  - EOL of Windows 10
    - Commercial PC refresh
  - AI-enabled PC Adoption

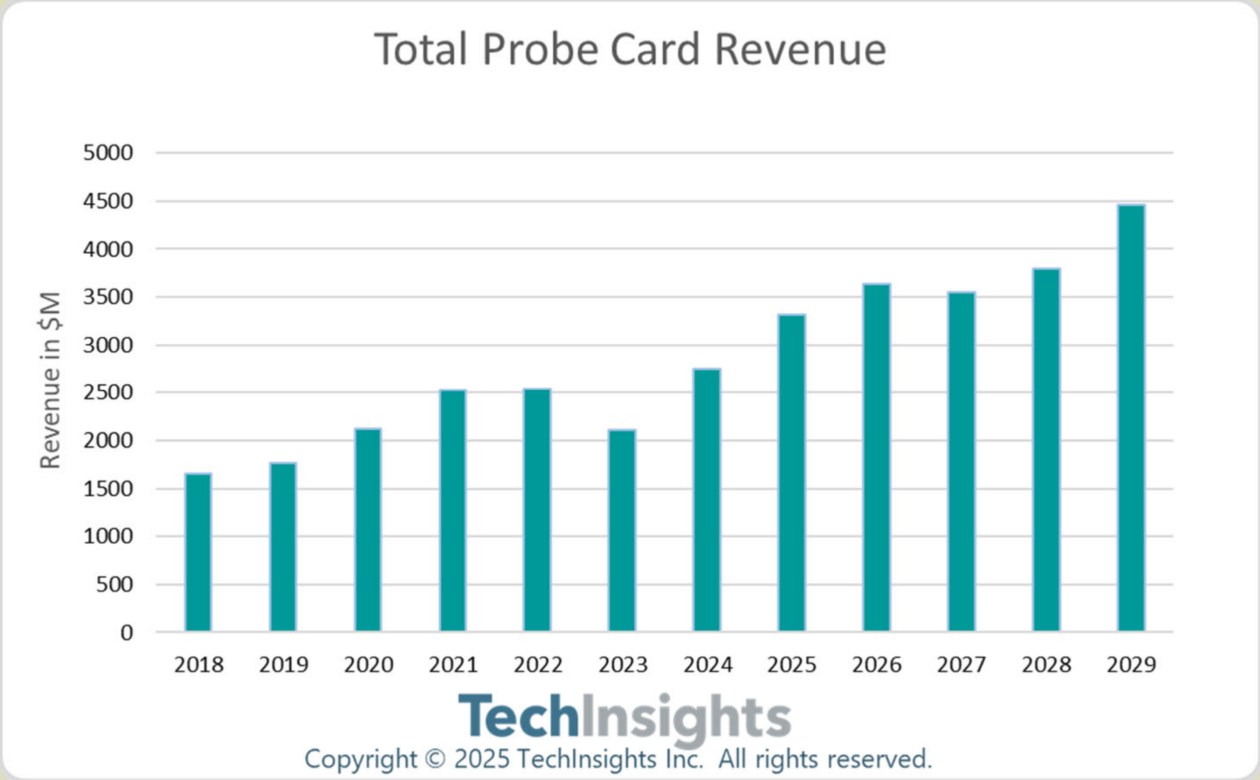
Test Connectivity Outlook

Test Connectivity Market Share 2024



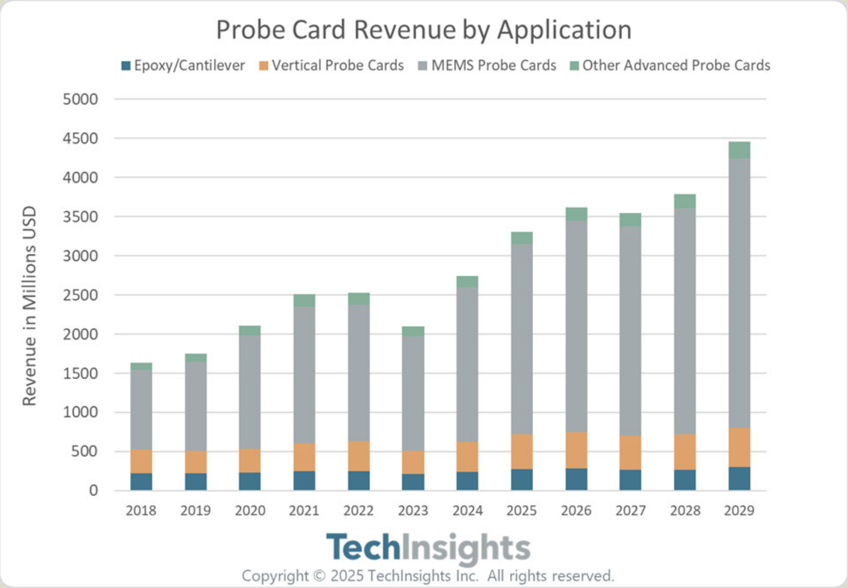
- Test Connectivity Market is forecasted to reach $8B by 2028.
- Multiple drivers such as cost management, sustainability, and complexity of devices.
- Test Connectivity Market share expected to shift in 2025.

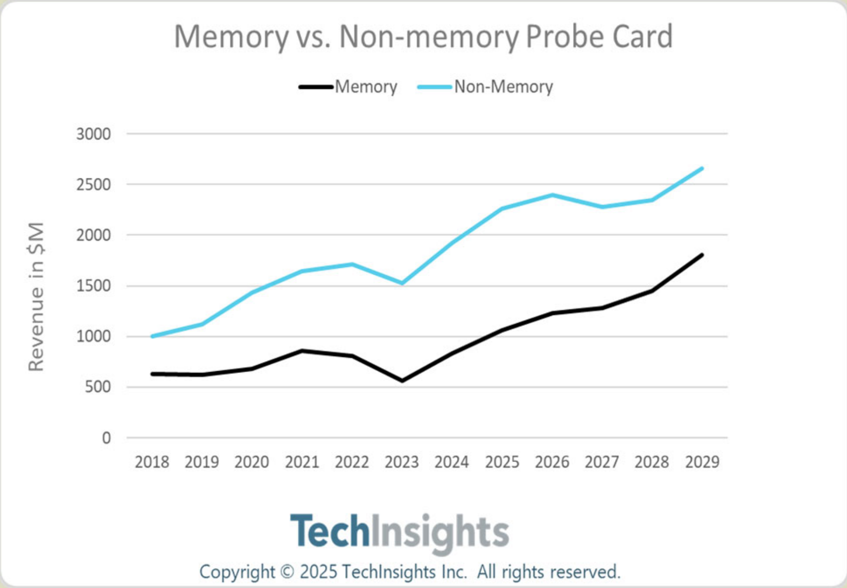
Global Probe Cards Market



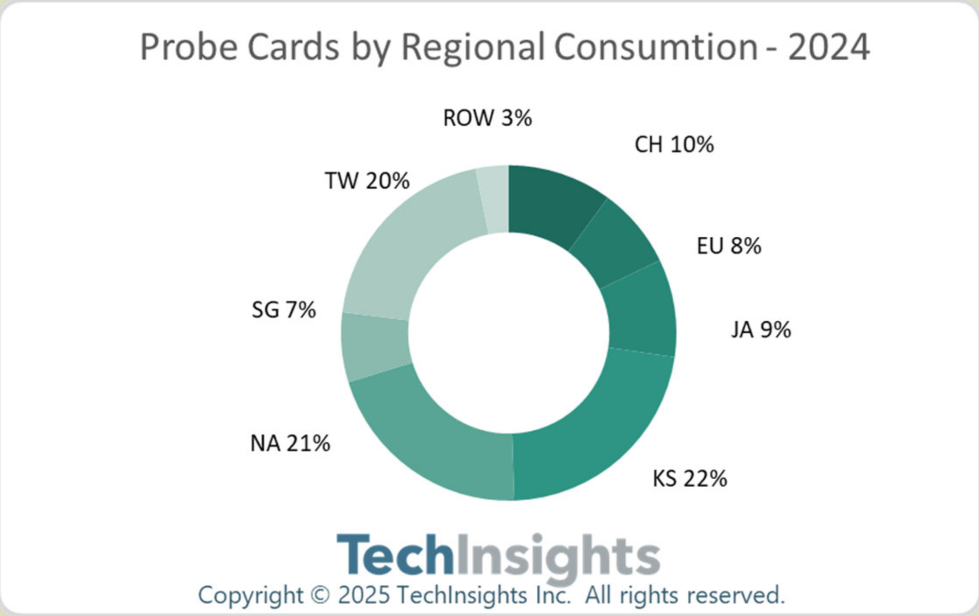
TestConX 2025

Probe Cards by Application & Device Type

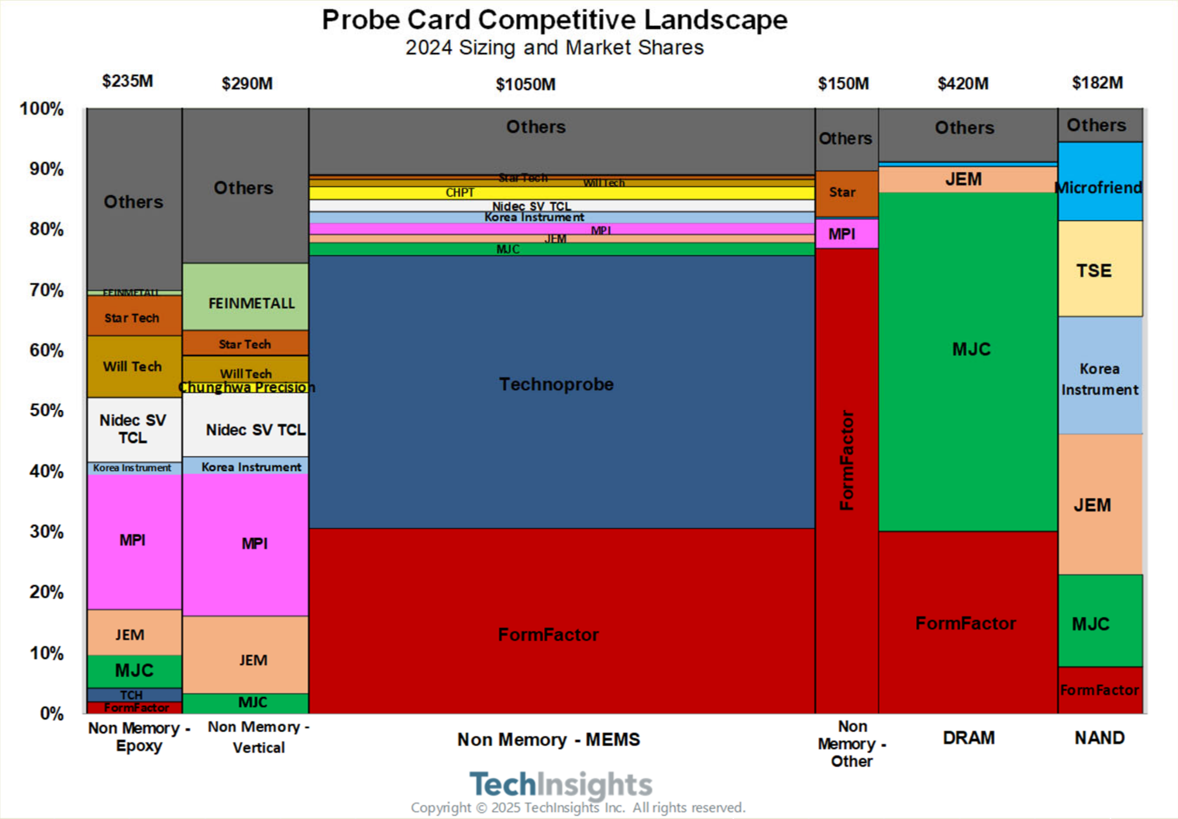




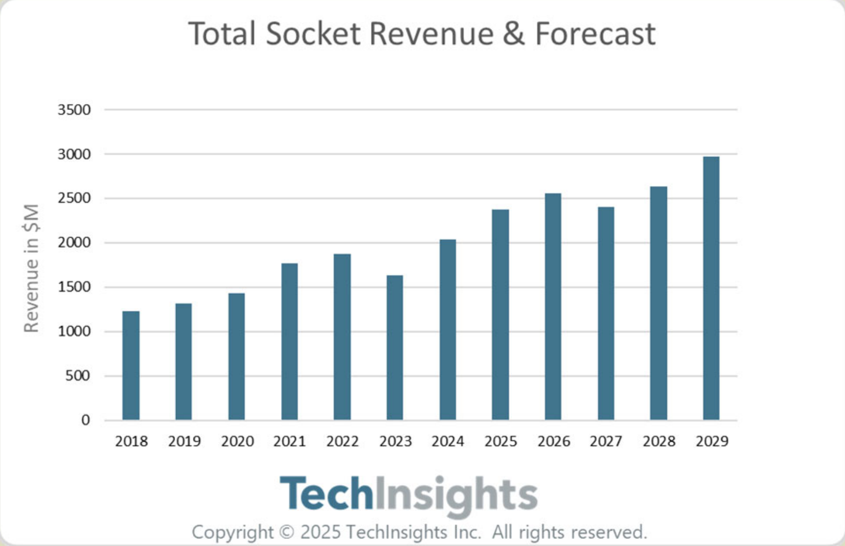
Probe Cards by Region

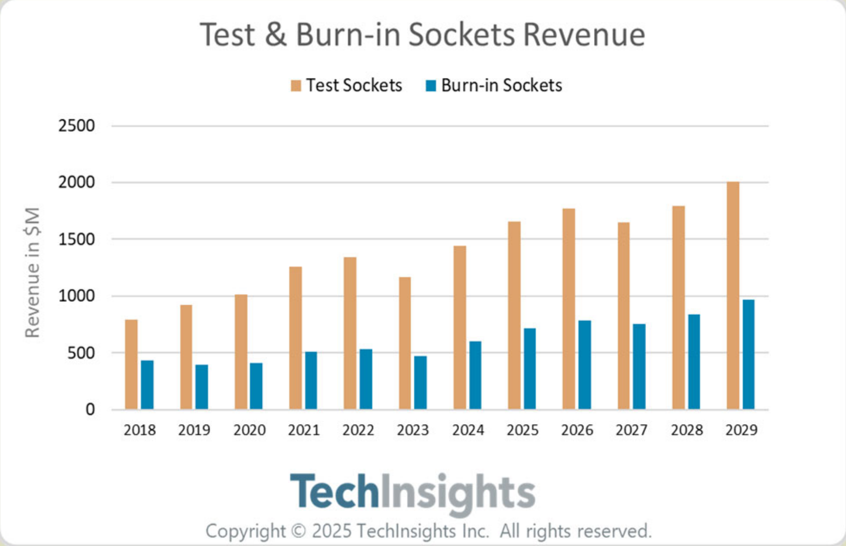


Competitive Landscape of Probe Card Market

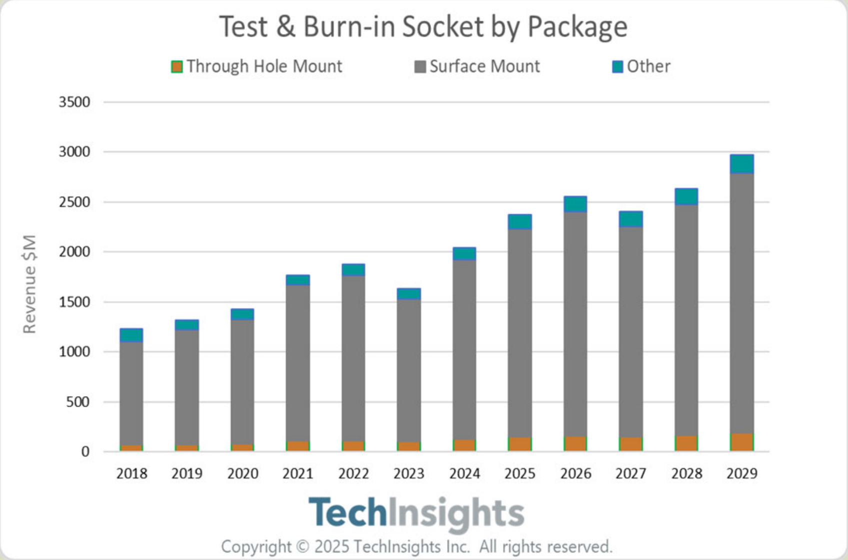


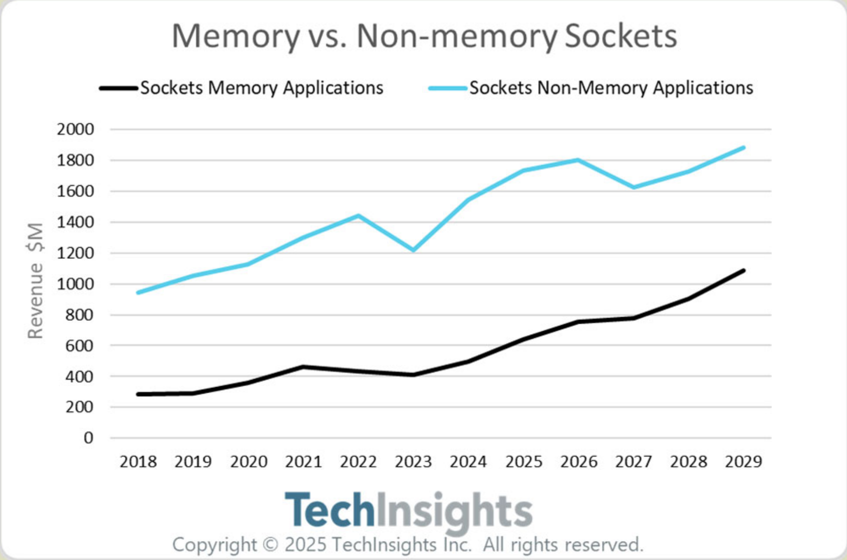
Test & Burn-in Socket Market Outlook



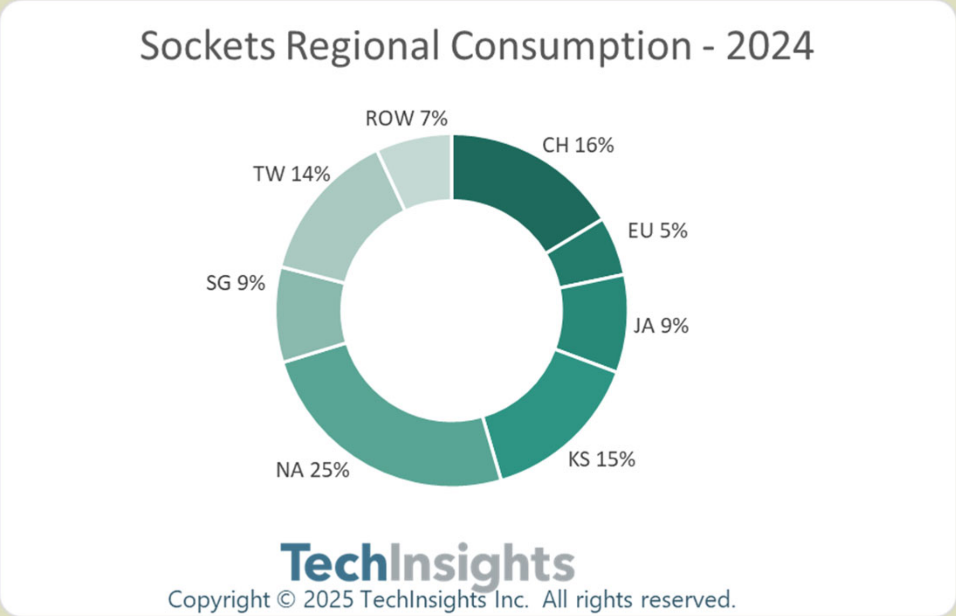


Sockets by Application & Device Type

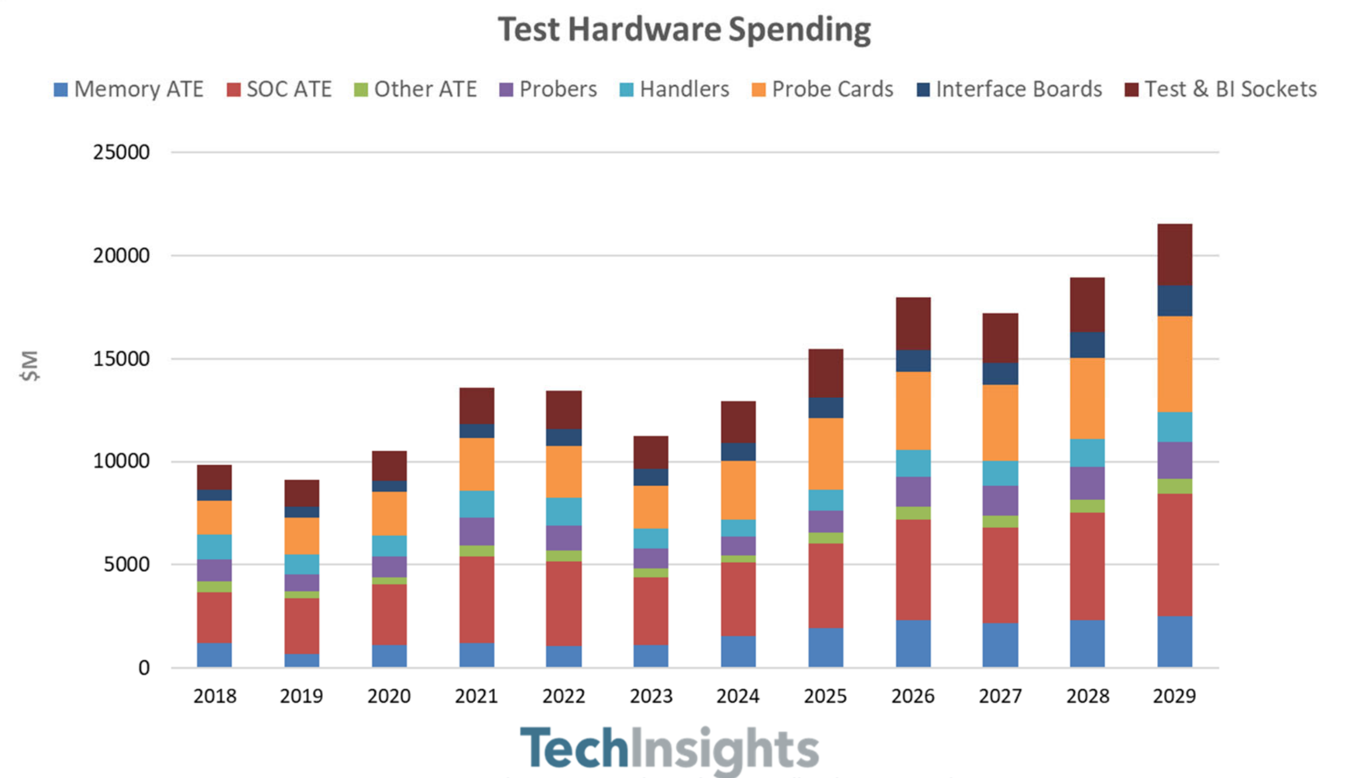




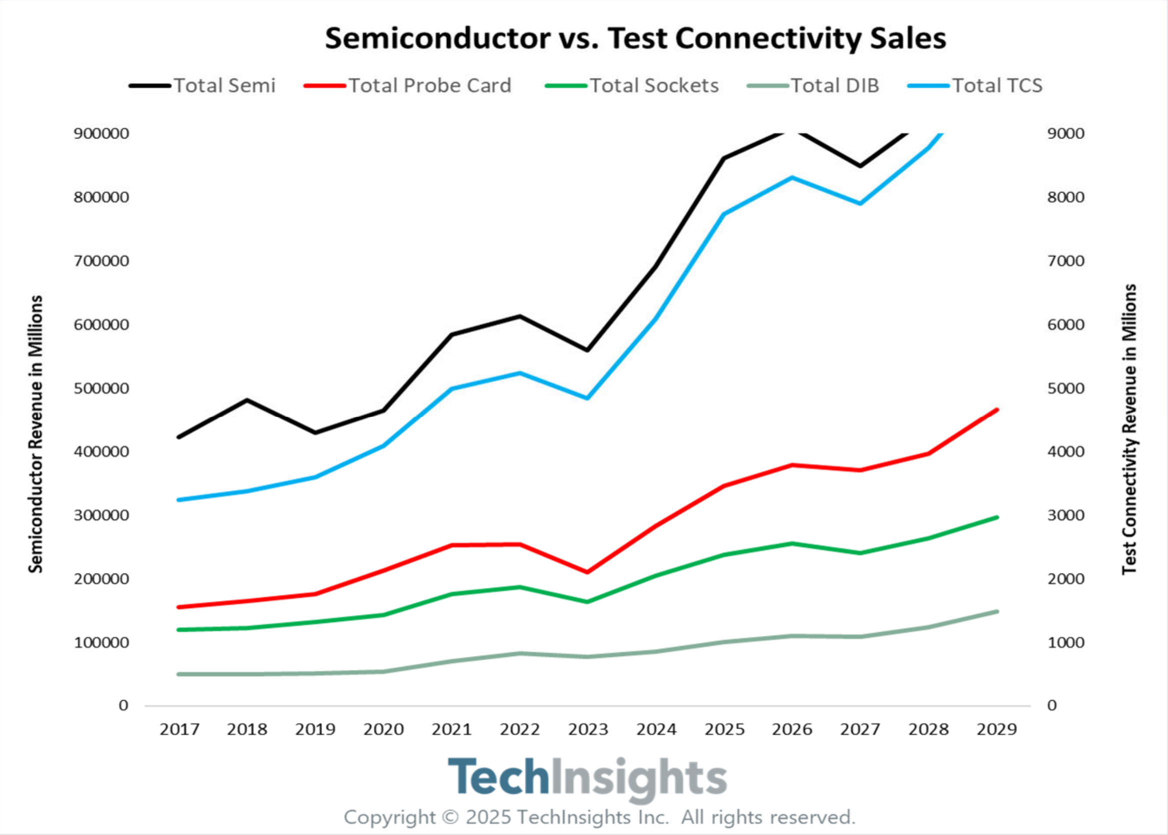
Test & Burn-in Sockets by Region



Semiconductor Test Market



Semiconductor Sales vs Test Connectivity

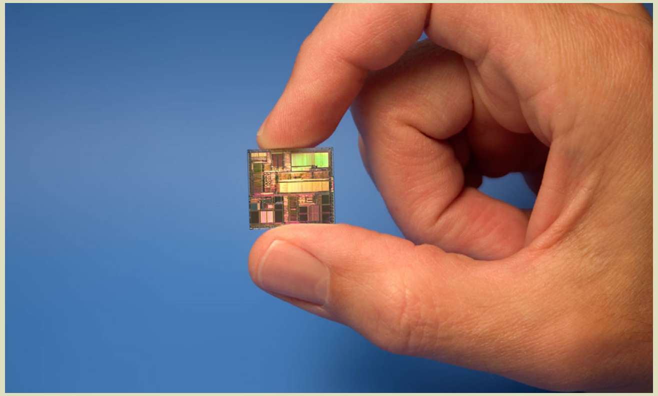


Introduction to Advanced Packaging

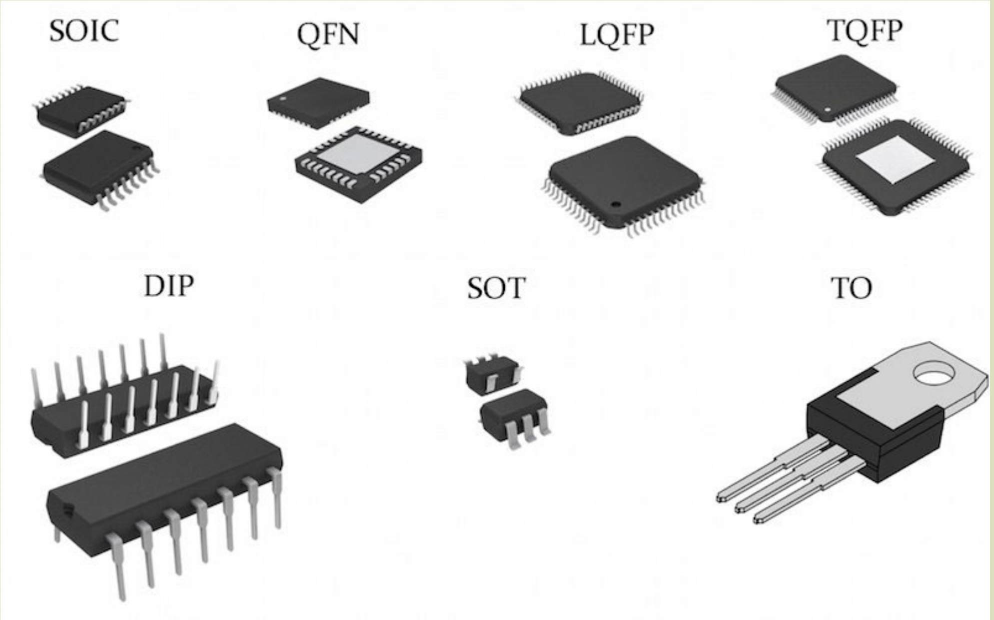
Advanced Packaging Market Overview

- What is Chip Packaging?

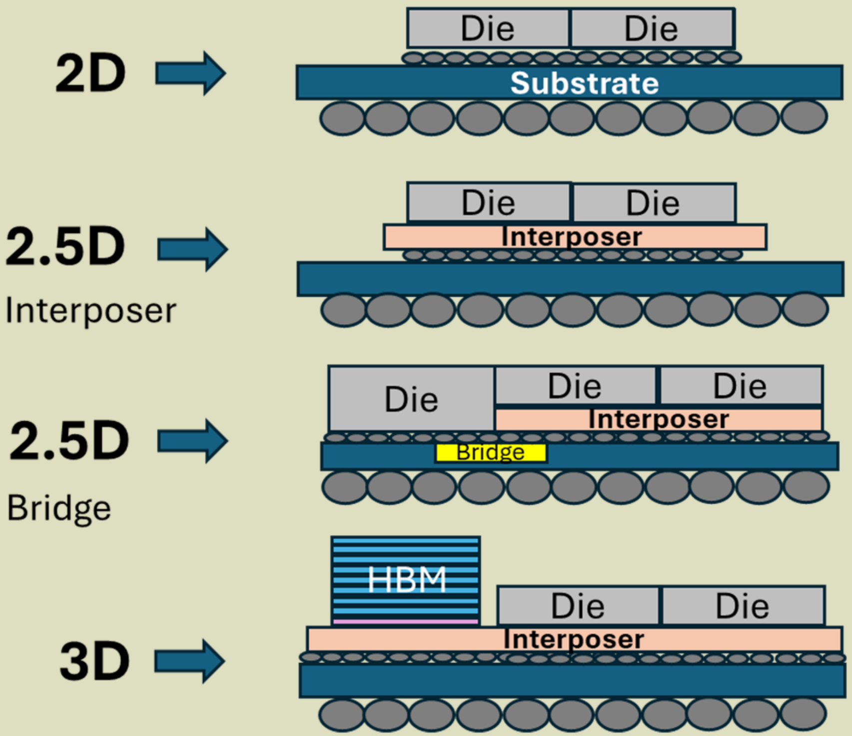
1. Protect
2. Connect



Source: Synopsys



Advanced Packaging Market Overview



30-year-old Multi-Chip-Module

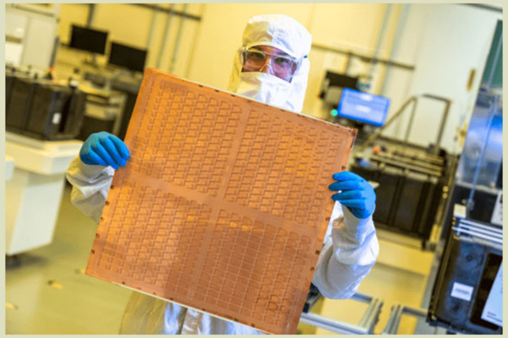
Source: Intel

Interconnects:
Wire bonding
C4
μ-bump
TSV
Hybrid bonding

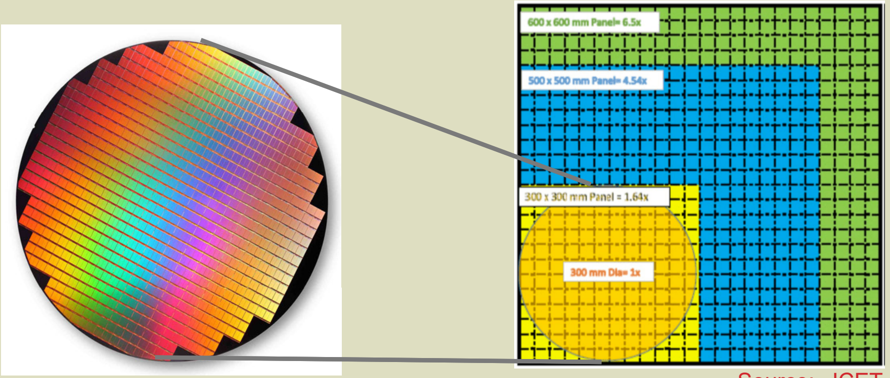
Who:
Foundries
OSATs
IDMs

Panel-Level Packaging

- Panel-level packaging - Round wafers -> square panels
  - Better utilization rates
  - Larger possible components
  - Reduction in cost
  - Minimizes waste material
- Challenges -> new tools, stress/warpage, uniformity, no standard panel size



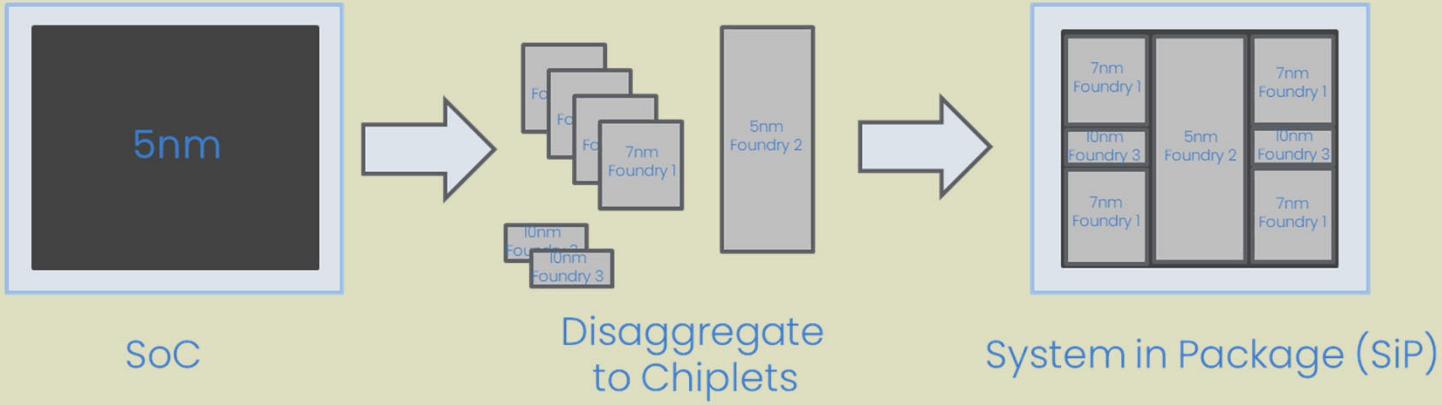
Source: Intel Corp.



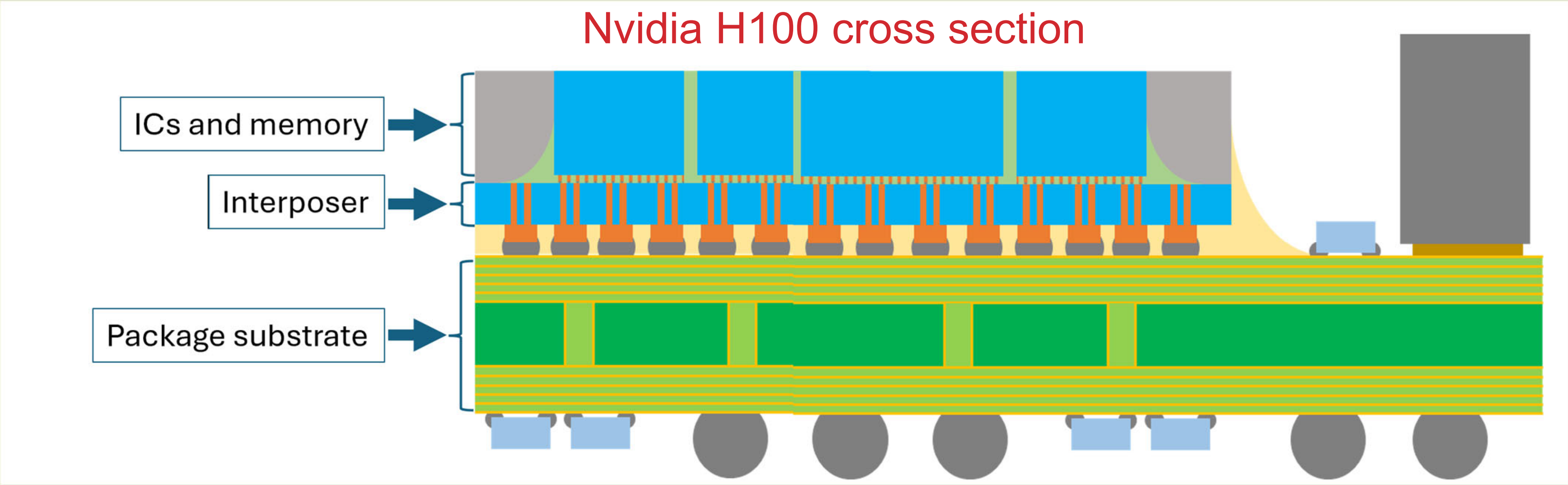
Source: JCET

Chiplets ≠ Advanced Packaging

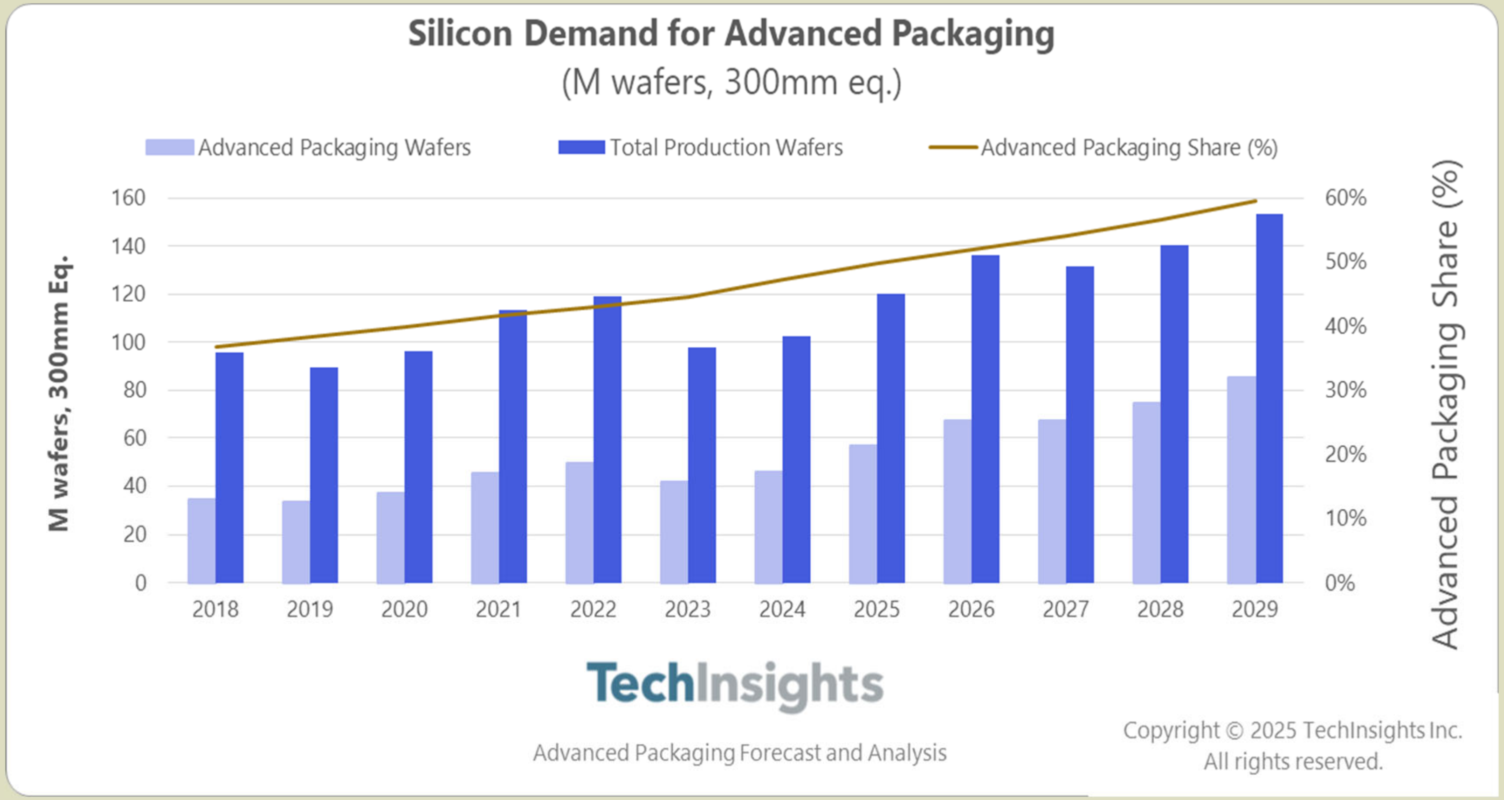
- **Chiplets** – a **design strategy** to **disaggregate an SoC** into functional blocks to be manufactured separately and then packaged together in one solution.
- **Advanced packaging** – a **family of technologies** that help enable **high-performance interconnects** between chiplets, dies, and packages in wide range of products.



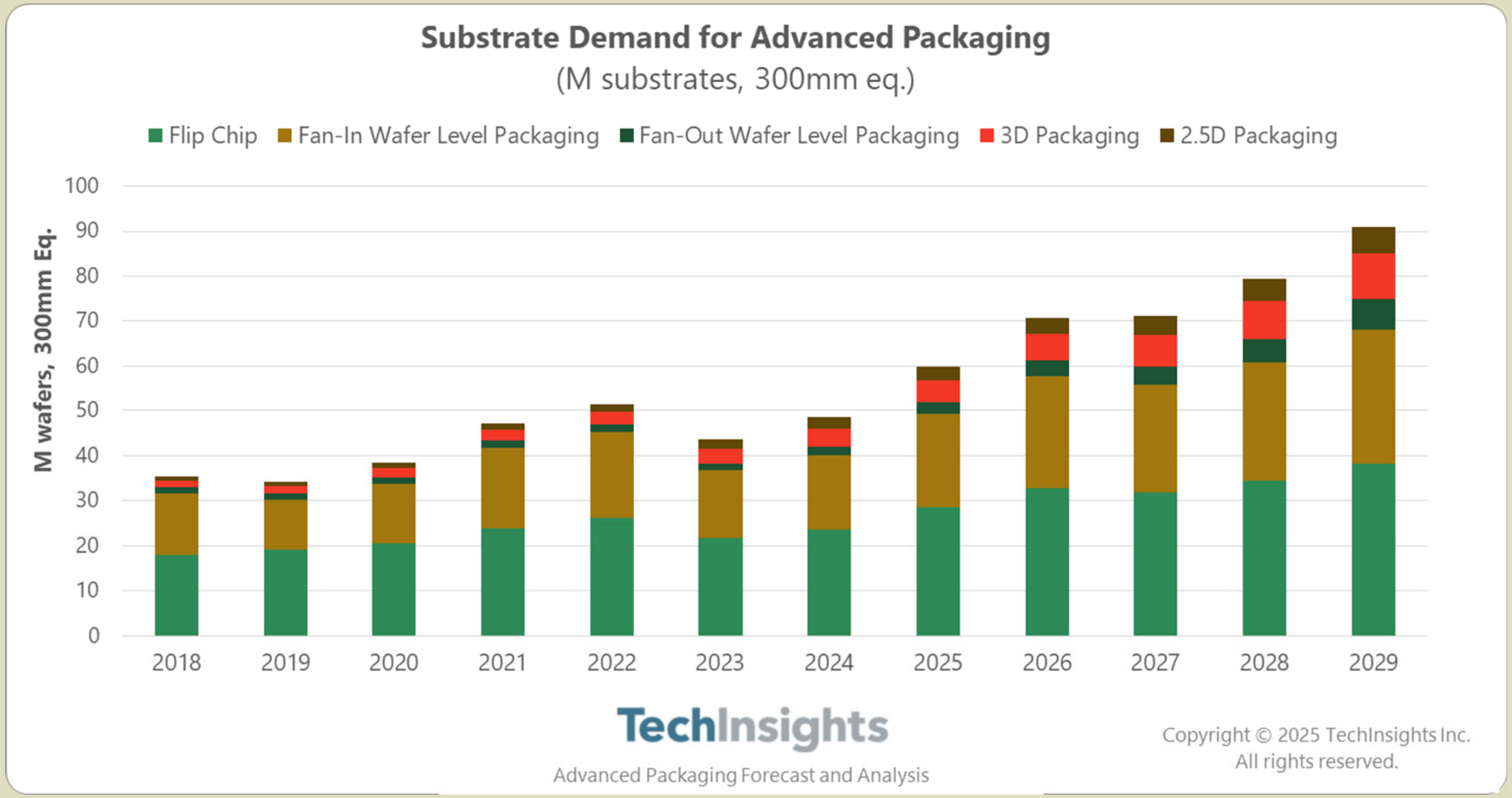
What is an Interposer?



Advanced Packaging Share of Total Silicon



Silicon and Substrate Demand for Advanced Packaging



Conclusion

- **Strong Semiconductor Market Outlook** – The semiconductor industry is poised for growth in 2025, with key drivers such as AI servers, commercial PC refresh cycles, and electronic sales improvements.
- **Test & Connectivity Market Expansion** – The test connectivity market is forecasted to reach $8B by 2028, driven by cost management, sustainability, and increasing device complexity.
- **Advanced Packaging Trends** – Technologies like panel-level packaging and Chiplet integration are reshaping semiconductor design, improving efficiency and reducing costs.
- **Market Dynamics & Competitive Landscape –** The probe card and test & burn-in socket markets continue to evolve, with shifting market shares and new opportunities emerging.
- **Future Innovations & Challenges –** While growth is strong, challenges such as inventory management, geopolitical risks, and technological transitions will shape the industry's trajectory.

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