



# Probe Card Market Dynamics and Cost of Test Analysis



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TechInsights

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# Overview

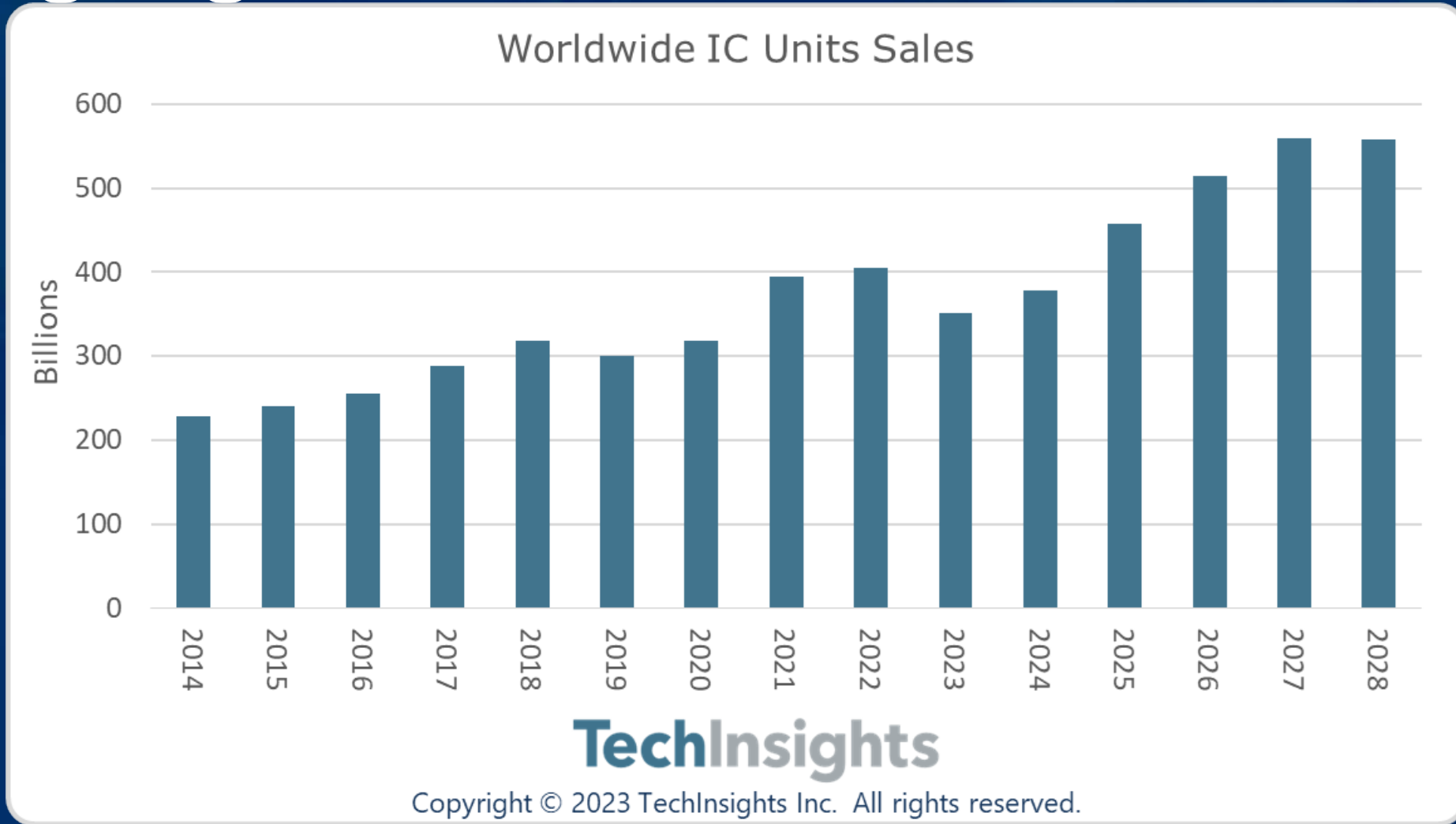
- **Highlights of Semiconductor Market**
- **Global Probe Card Market**
- **Probe Cards by Device Type and Applications**
- **Probe Card Suppliers**
- **Probe Card Regional Data**
- **Semiconductor Test Market**
- **Cost of Test**
- **Conclusion**

# Highlights of Semiconductor Market

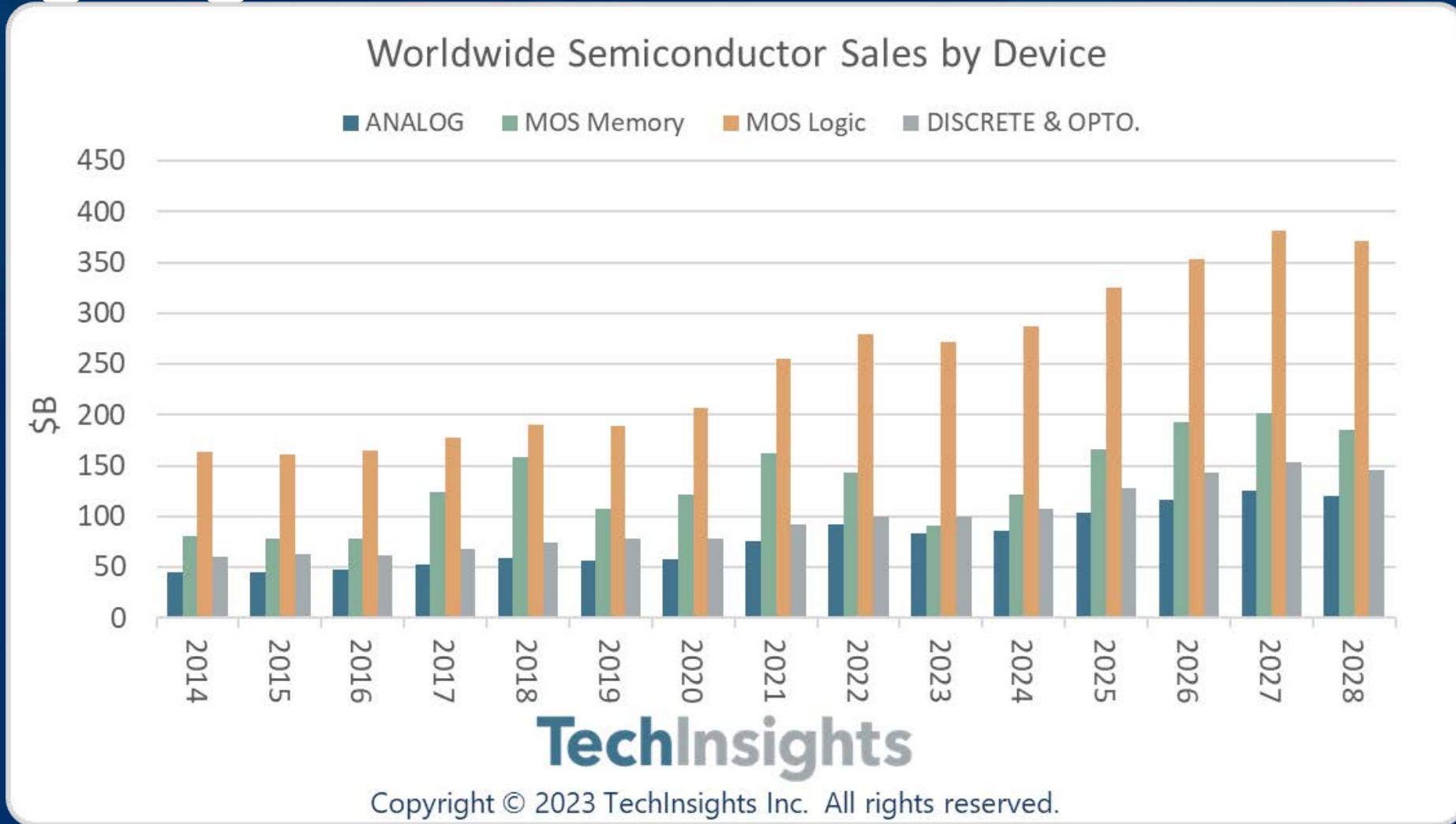
## TechInsights' Current Forecast

Forecast as of September 2023:	Q1 2023	Q2 2023	Q3 2023	Q4 2023	2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024	2024
Semi Equipment (\$B):	\$ 34.8	\$ 32.3	\$ 32.0	\$ 31.4	\$ 130.5	\$ 32.4	\$ 32.9	\$ 34.7	\$ 35.3	\$ 135.2
Sequential Change	-1.2%	-7.2%	-1.0%	-1.8%	-4.9%	3.0%	1.6%	5.5%	1.7%	3.7%
Capacity Utilization:	76.9%	73.7%	75.1%	74.3%	75.0%	78.3%	86.5%	90.1%	84.2%	85.0%
ICs (\$B):	\$ 102.4	\$ 107.9	\$ 115.3	\$ 120.1	\$ 445.7	\$ 117.3	\$ 120.0	\$ 126.1	\$ 130.8	\$ 494.1
Sequential Change	-8.7%	5.4%	6.9%	4.2%	-13.3%	-2.4%	2.3%	5.1%	3.8%	10.9%
IC Units (BU):	86.9	89.2	85.8	89.1	351.0	86.1	90.9	97.5	104.2	378.6
Sequential Change	-9.7%	2.6%	-3.8%	3.9%	-13.3%	-3.4%	5.5%	7.2%	6.9%	7.9%
Electronics (\$B) :	\$ 600.5	\$ 557.9	\$ 597.1	\$ 727.8	\$ 2,483	\$ 610.3	\$ 583.2	\$ 630.7	\$ 779.0	\$ 2,603
Sequential Change	-13.5%	-7.1%	7.0%	21.9%	-2.8%	-16.1%	-4.4%	8.1%	23.5%	4.8%

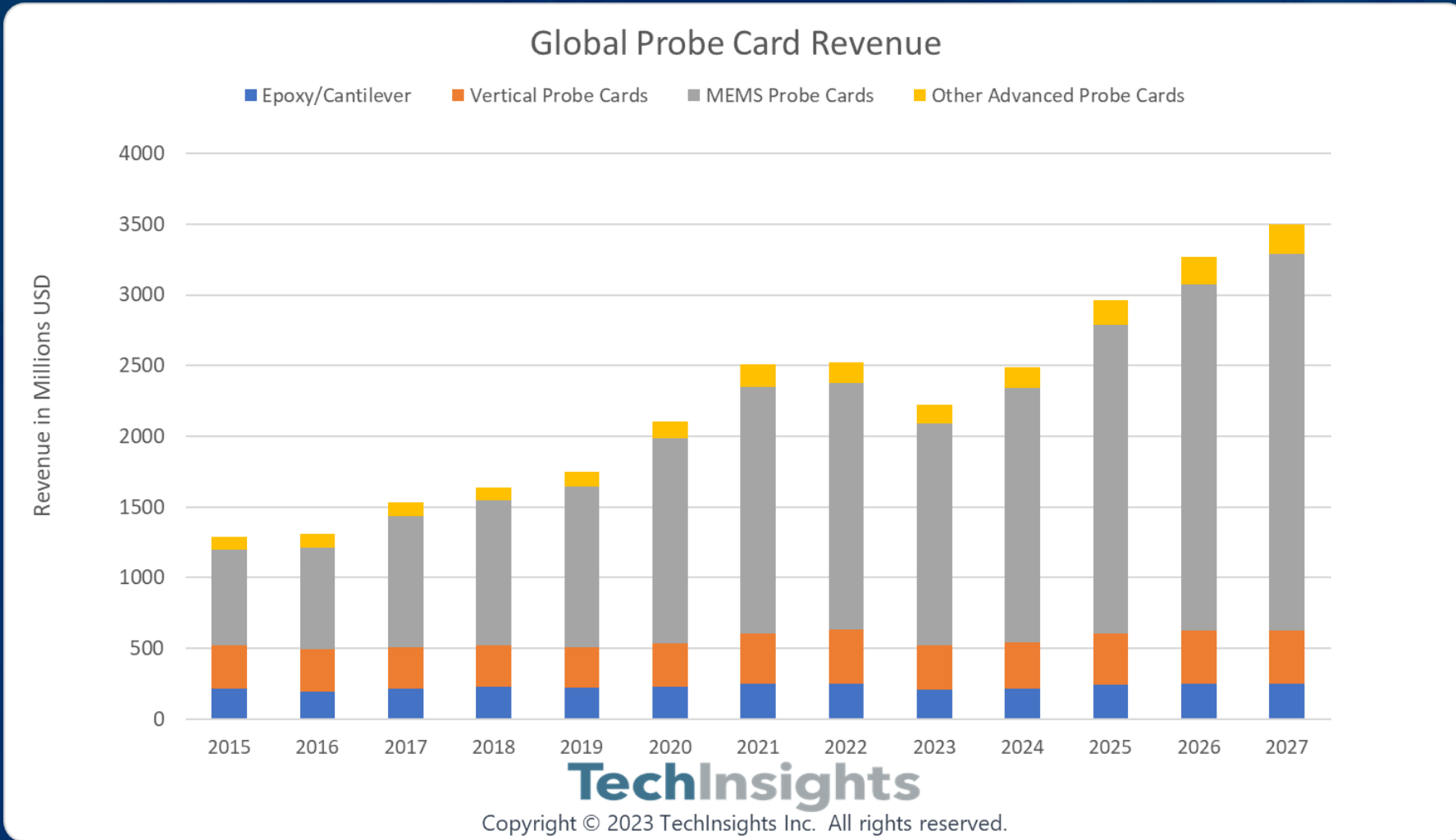
# Highlights of Semiconductor Market



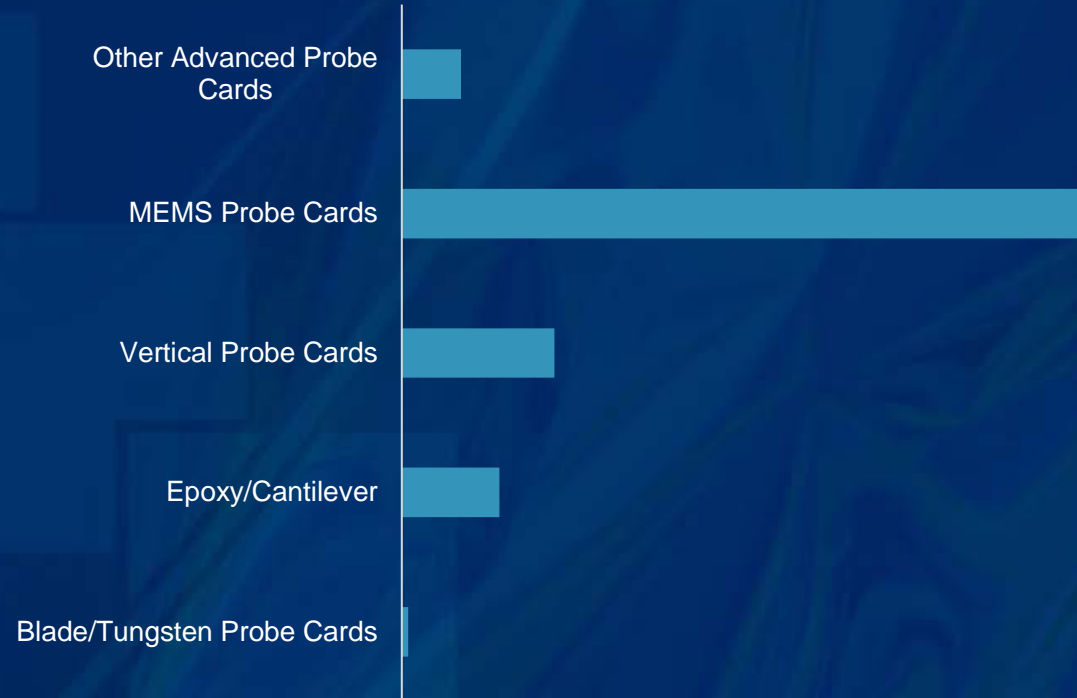
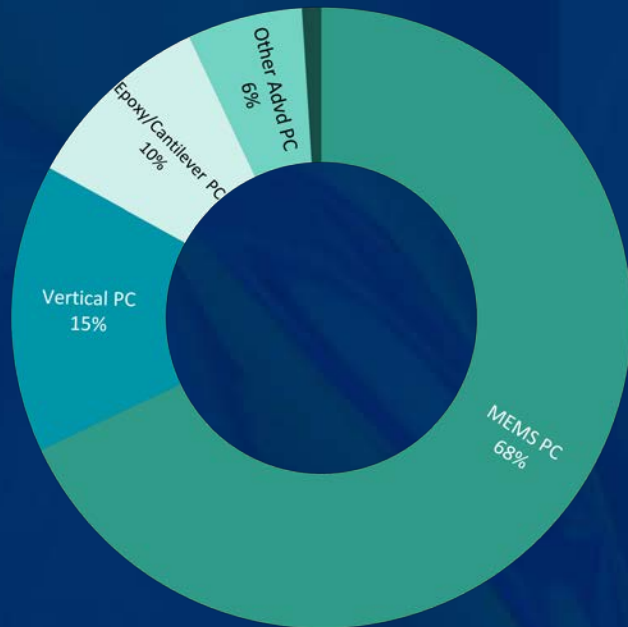
# Highlights of Semiconductor Market



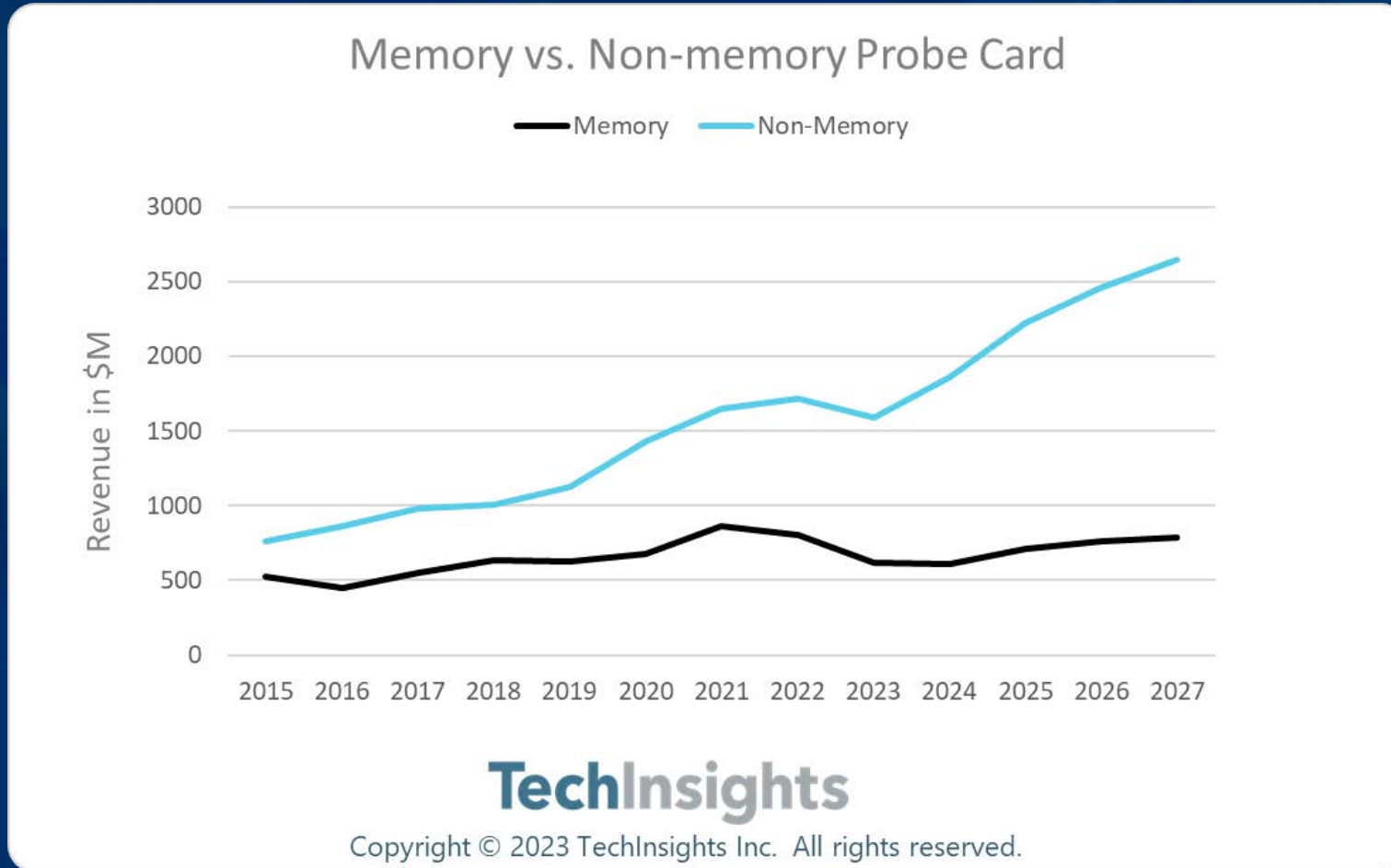
# Global Probe Card Market



# Probe Card Market 2022



# Probe Cards by Device Type

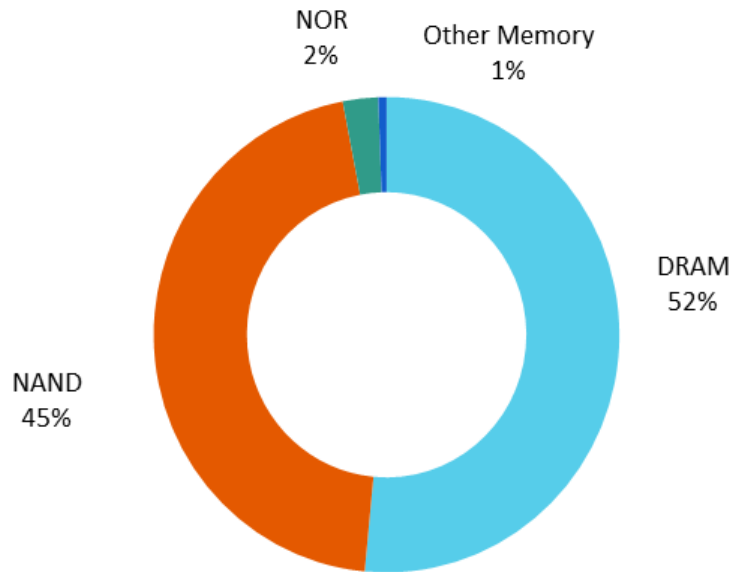




# Probe Cards by Application

## Probe Card Memory Applications

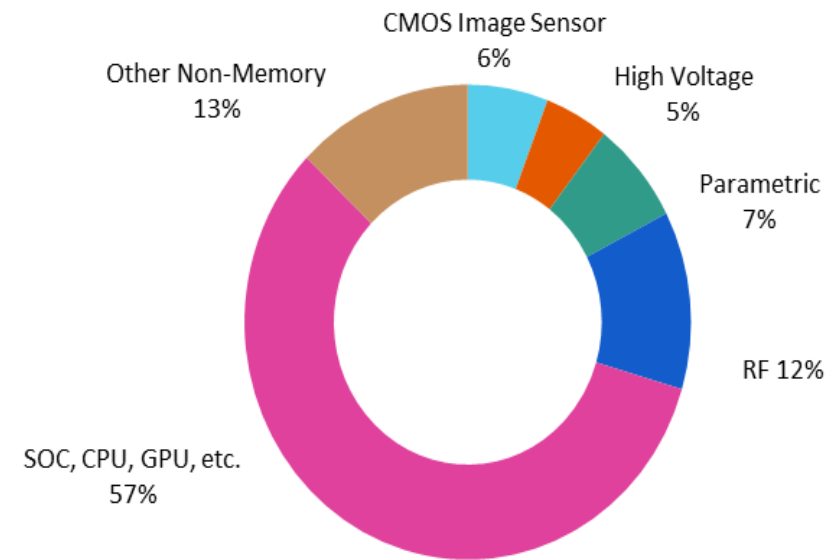
■ DRAM ■ NAND ■ NOR ■ Other Memory



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## Probe Card NonMemory Applications

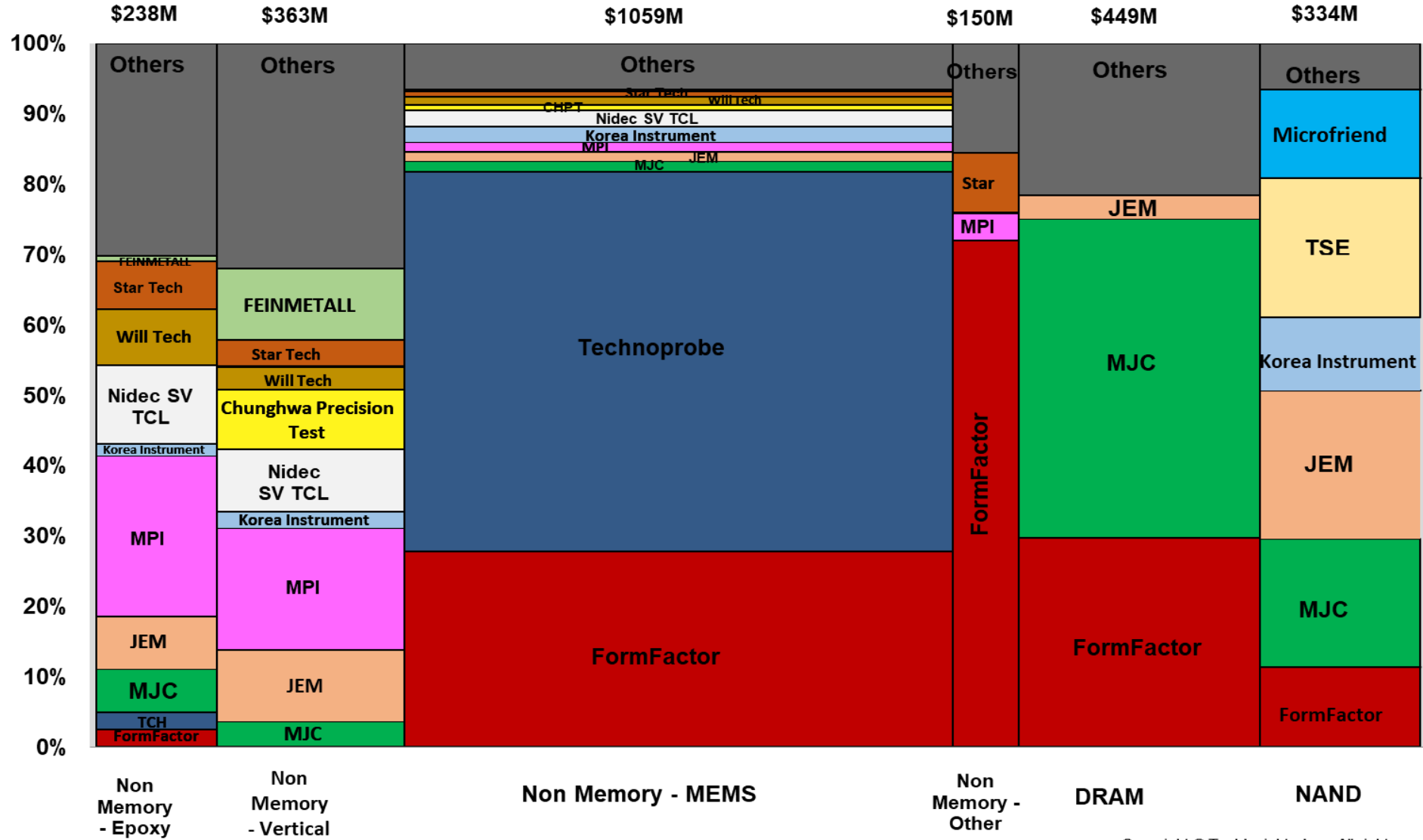
■ CMOS Image Sensor ■ High Voltage ■ Parametric  
■ RF ■ SOC, CPU, GPU, etc. ■ Other Non-Memory



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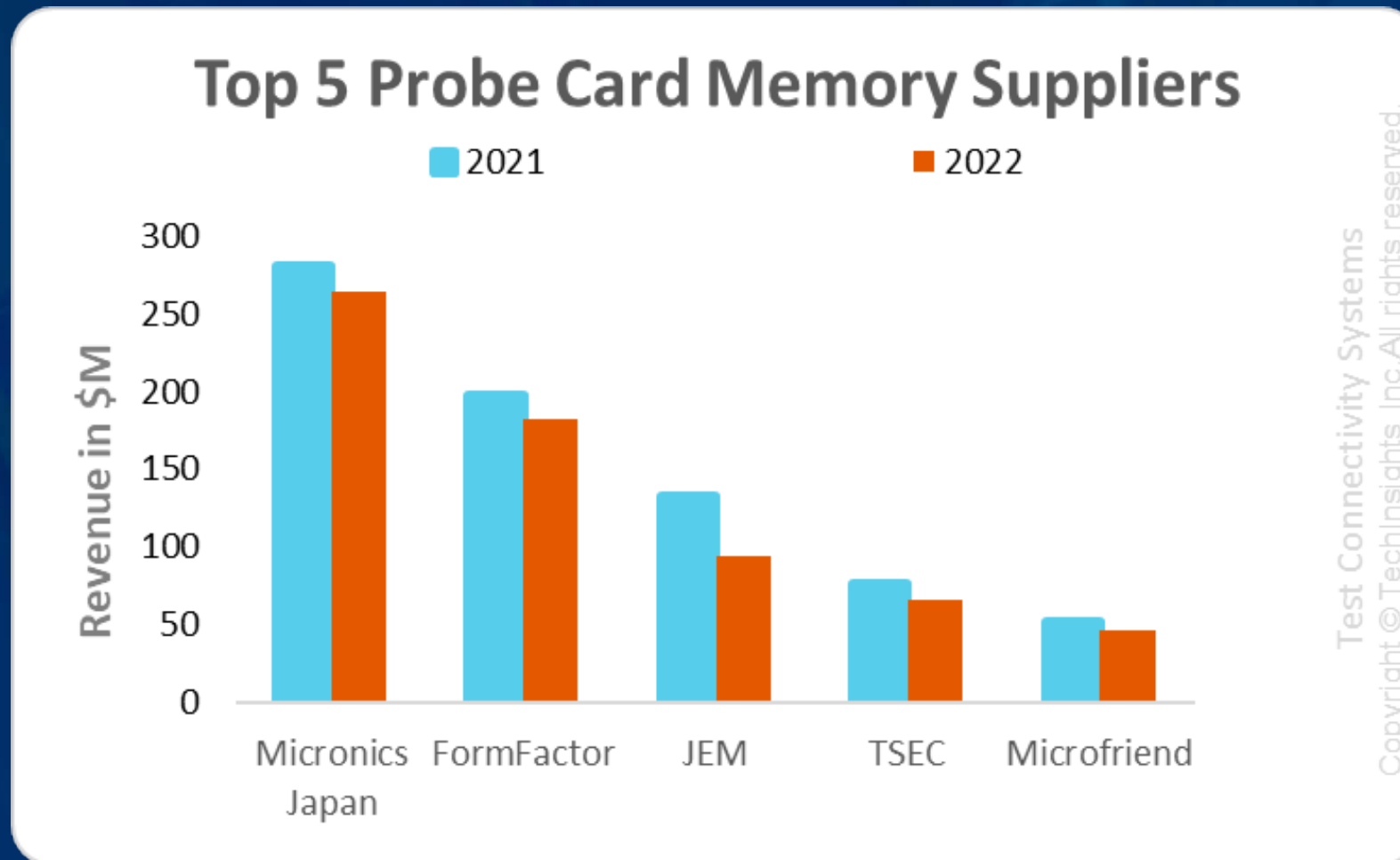
# Probe Card Competitive Landscape

2022 Sizing and Market Shares

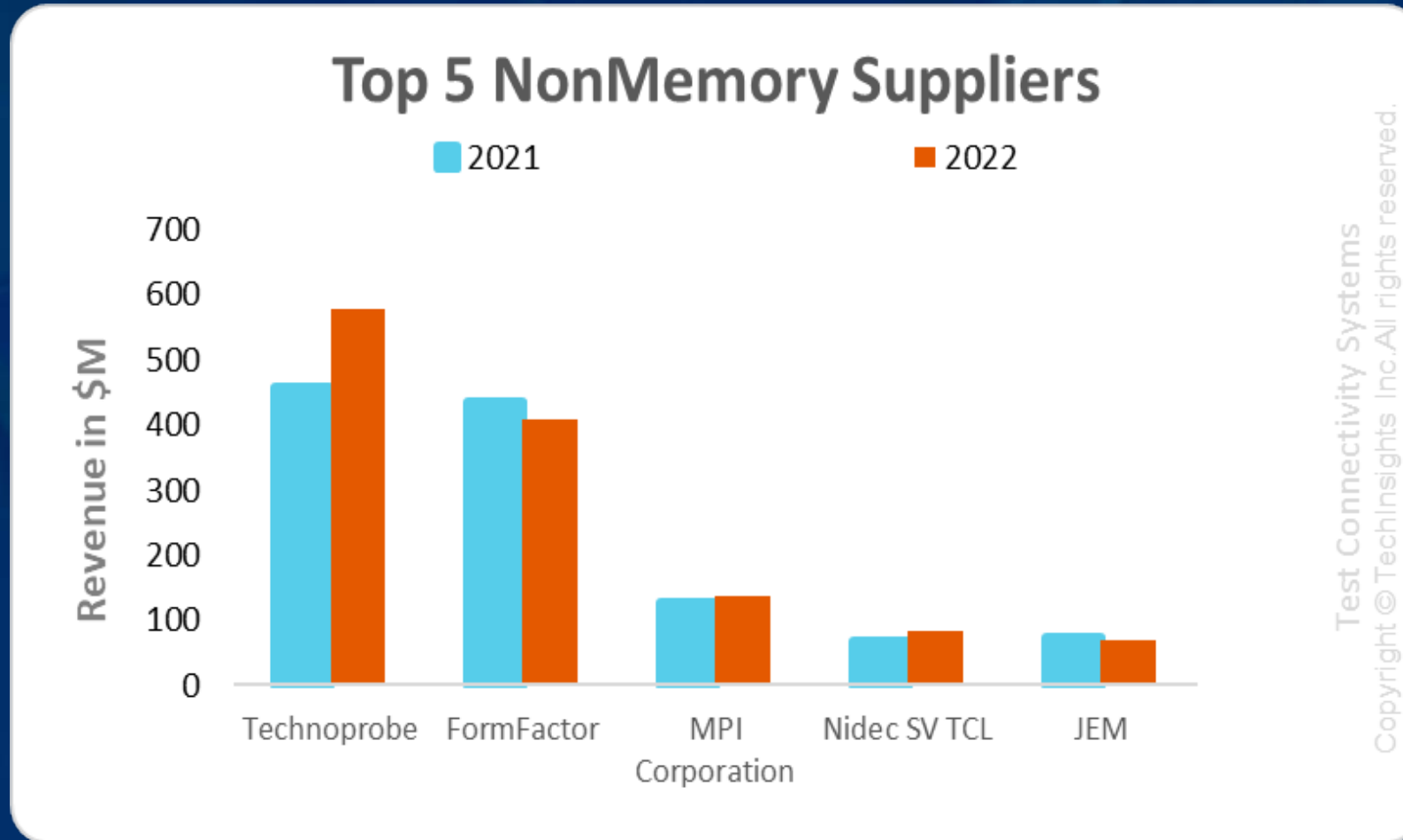


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# Probe Card Top Memory Suppliers

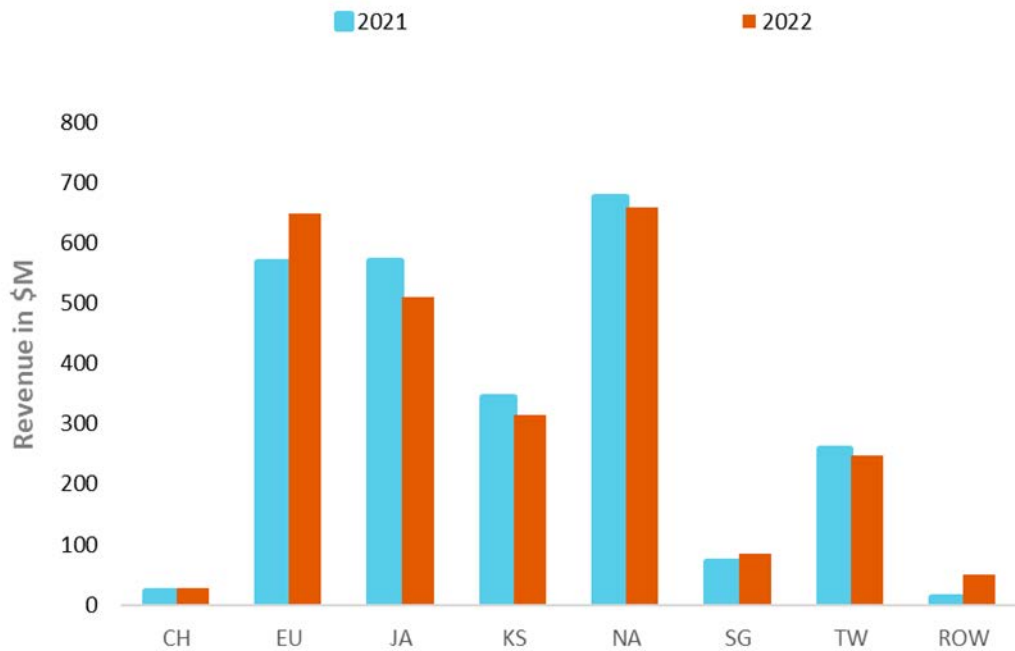


# Probe Card Top Non-Memory Suppliers



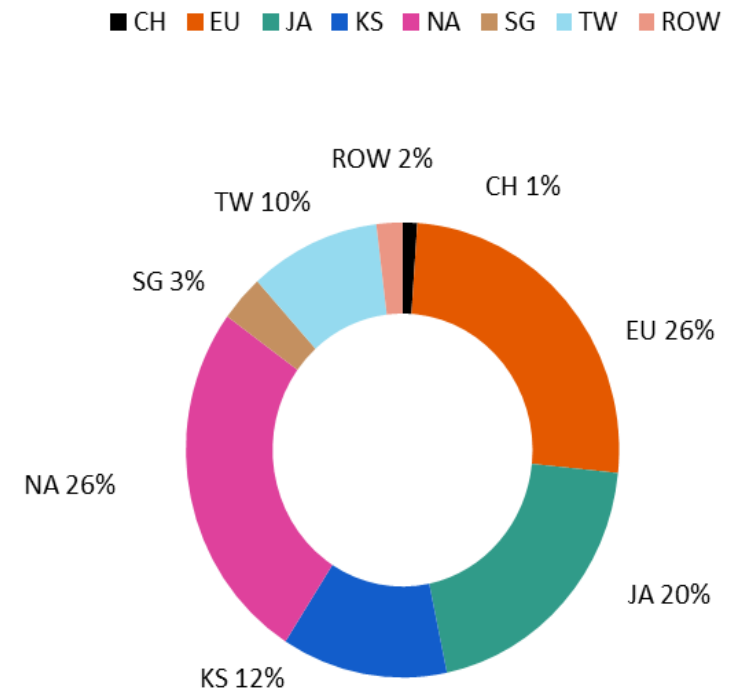
# Probe Cards by Region of Vendor HQ

Probe Cards by Region of Vendor HQ



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Revenue by Region of Vendor HQ : 2022



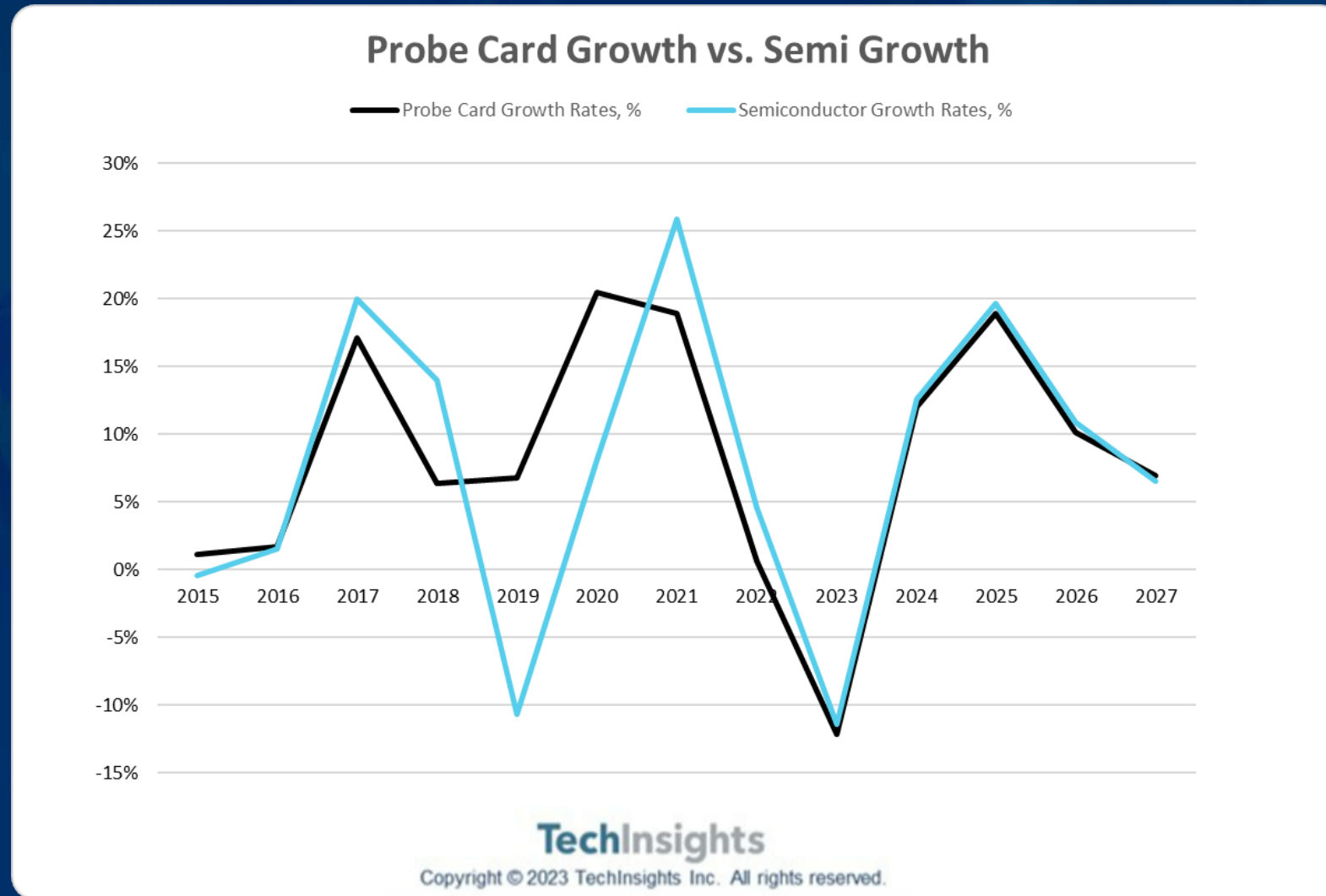
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# Taiwan Regional Sales by Vendor HQ

Taiwanese Vendors		
Epoxy-Cantilever Probe Cards		
Regional Performance, \$M		
Region	2021	2022
CH	23.02	19.80
EU	0.19	0.16
JA	0.91	0.93
KS	0.61	0.81
NA	0.34	0.29
SG	2.68	2.83
TW	57.62	53.31
ROW	0.15	0.13
<b>Total</b>	<b>85.52</b>	<b>78.26</b>

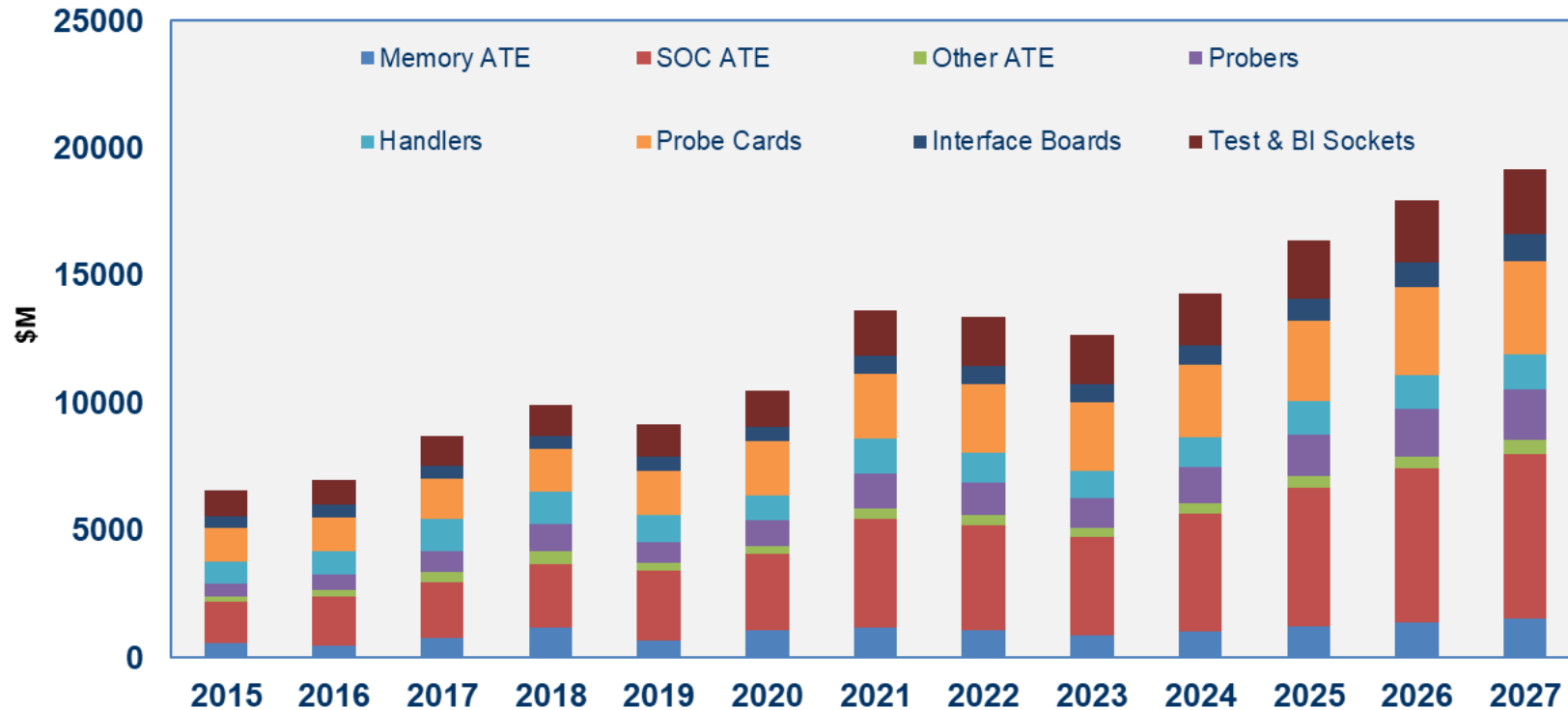
Taiwanese Vendors		
Advanced Probe Cards		
Regional Performance, \$M		
Region	2021	2022
CH	15.47	27.06
EU	1.80	1.88
JA	0.90	1.04
KS	1.40	1.70
NA	27.82	22.55
SG	10.52	11.51
TW	105.76	96.83
ROW	3.64	5.84
<b>Total</b>	<b>167.31</b>	<b>168.41</b>

# Probe Card Growth vs Semi Growth



# Semiconductor Test Market

## Test Hardware Spending



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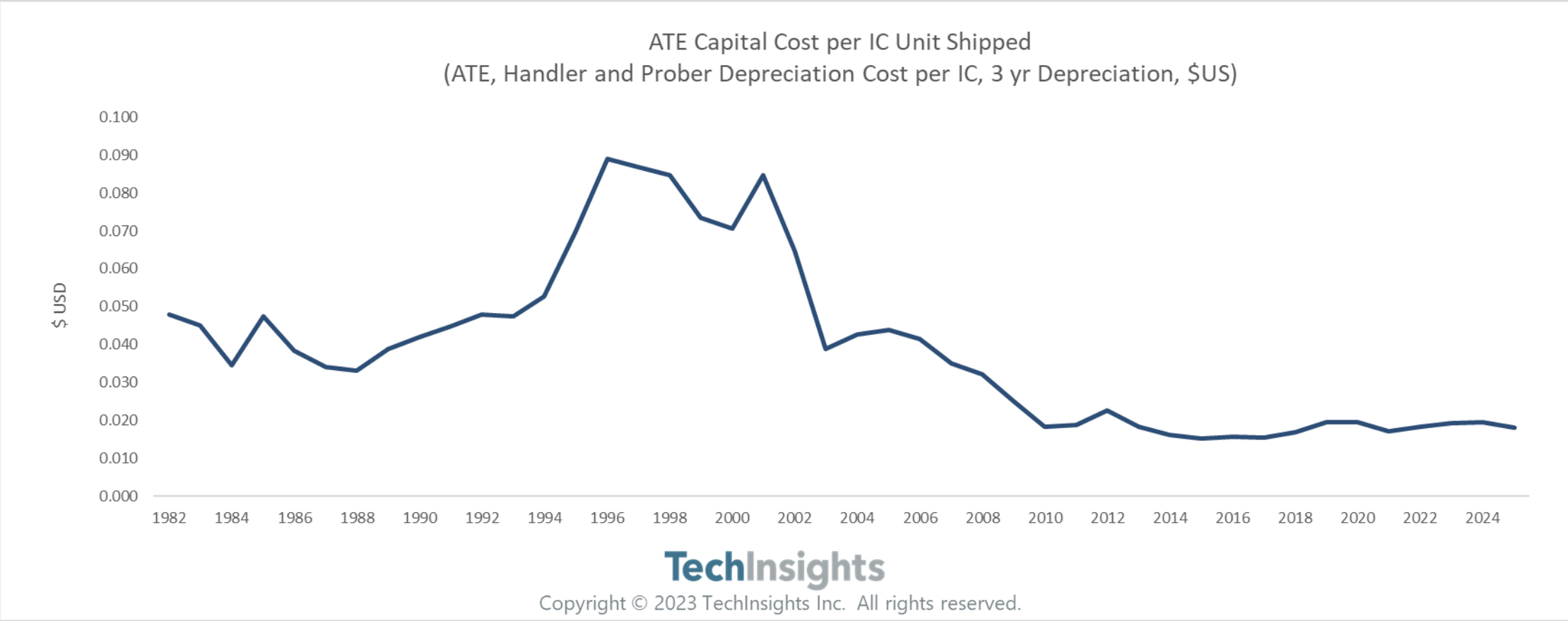
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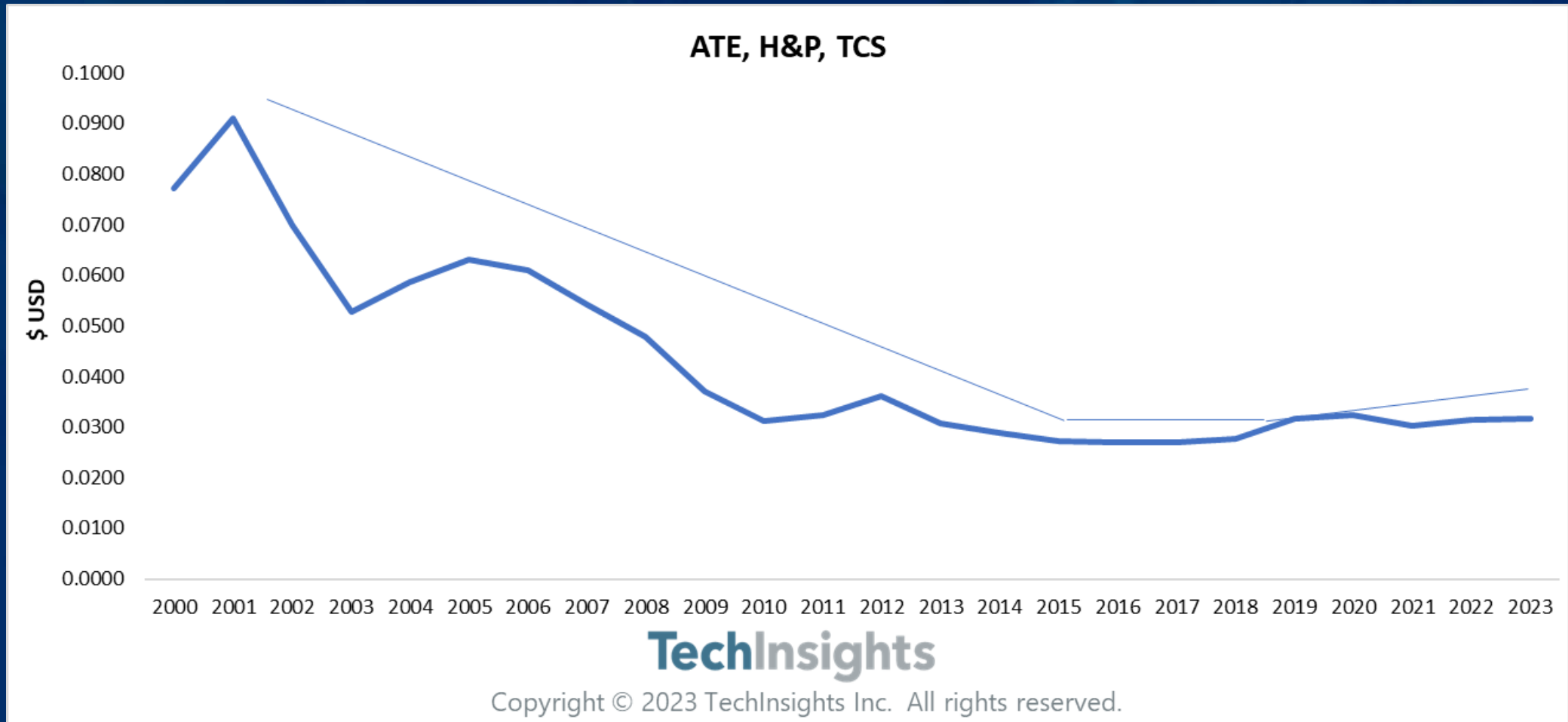
# Semiconductor Test Market

- **Probe Cards, Test & Burn-in Sockets and Device Interface Board strong growth following the Semiconductor market**
- **Short term downgrade in TCS forecast, Potential for a decline in 2024**
- **Long term Socket growth of 6% until 2027**
  - Driven by non-memory
- **Long term Probe card growth of 8% until 2027**
  - MEMS, non-memory etc.
- **Long terms DIB growth of 7% until 2027**
- **ATE Market is expected to grow from \$7B in 2022 to \$7.6B in 2028 where memory has slower growth while Logic ATE market is growing rapidly**

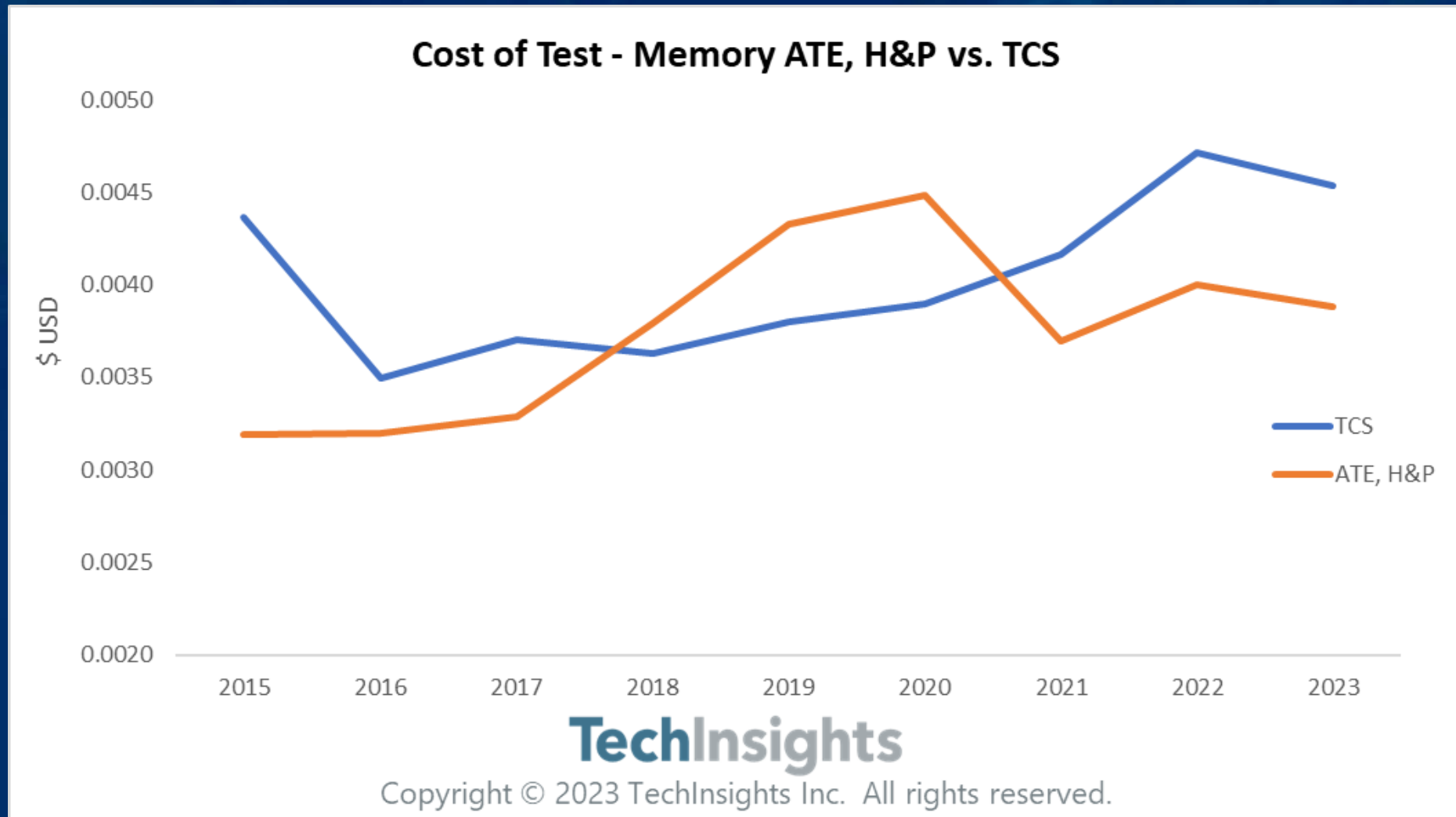
# Overall Cost of Test View



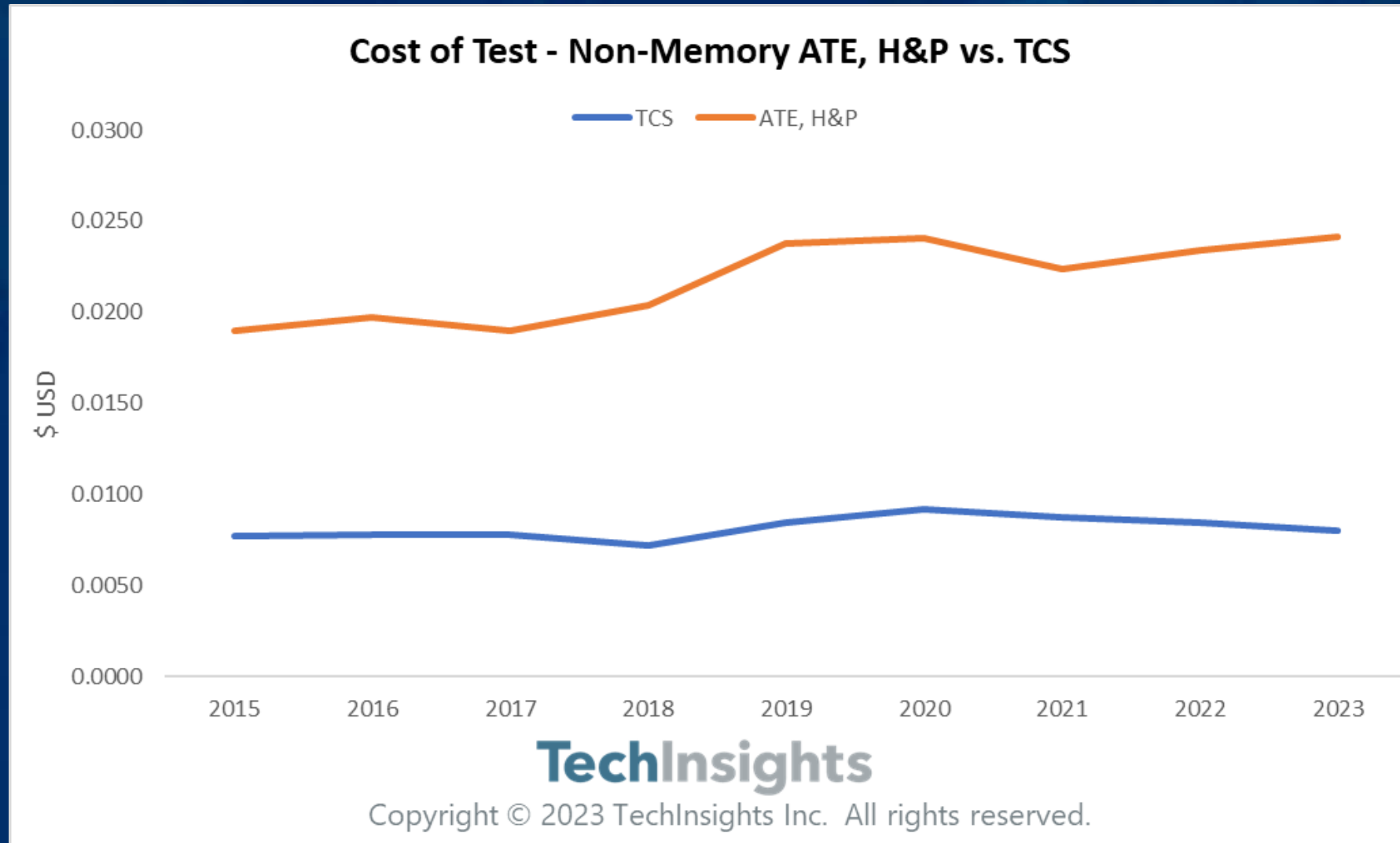
# Cost of Test with ATE, H&P & TCS



# Memory vs Non-Memory Cost of Test



# Memory vs Non-Memory Cost of Test



# Conclusion

- **PC grew 1% in 2022 and expected to decline 5% in 2023**
- **DRAM expected to improve starting 2025**
- **COT has grown between 2 to 4% every year since 2017**
- **Decline in COT of both Memory & Non-Memory from 2012 to 2017**
- **Modest increase in Memory & Non-Memory COT since 2018**
- **Overall TCS costs are 2/3 of ATE, Handler and Probers market**