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Virtual Event

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The external and internal changes driving the semiconductor test industry to adapt to a new reality

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VLSIresearch



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Internal Factors: Technology & Economics

- High Frequency / High Speed Test
- High Pin Count
- High Pin Density
- Extreme Temperature Test
- Advanced Packaging
- Chiplets
- System Level Test



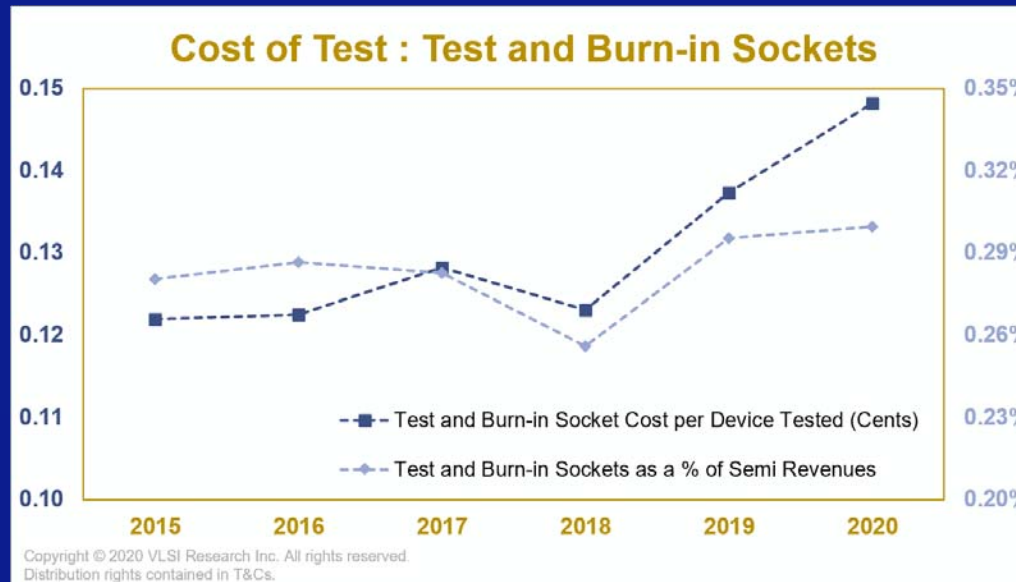
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Internal Factors: Technology & Economics

Technical challenges are driving up the cost of test



Internal Factors: Technology & Economics

As test complexity increases, end users of semiconductors are becoming more involved with test

Google, Apple, Facebook, Huawei, etc., are achieving better product differentiation and can deliver higher quality products through test

End users are more involved in decision making, and are driving much of the growth of system level test



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System Level Test (SLT): From Sampling to 100% Test

Test costs = wafer test + functional test + burn-in test + SLT

- The cost of SLT is growing fast
 - Typically, testing does not add value
 - So if the overall cost of test is increasing, then SLT must be adding value elsewhere
 - Value is generated from faster learning, improved performance of end products, and using SLT time to upload firmware and run other tests
- SLT will be a big growth driver for test sockets



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External Factors: Impact of COVID-19 on the Semiconductor Industry

- End market demand is still strong
- Sudden shut down of factories at the beginning of lockdown, but most suppliers resumed production within weeks
- Automotive and industrials markets were negatively impacted in Q2, but are recovering in H2 2020
- Inventory levels moved from “Just in Time” to “Just in Case”



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External Factors: Impact of US–China Trade Dispute

US government restrictions on semiconductor equipment export to China

- The objective is to stop advances in semiconductor technology within Chinese companies and organizations
- Department of Commerce (DoC) now has deep understanding of the semiconductor supply chain
- The result is new rules – Military End Use Rule, and restrictions to Huawei's and SMIC's access to US technology



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External Factors: Impact of US–China Trade Dispute

- For Chinese companies
 - Accelerate Semi / IC expansion
 - Chinese end - users work closely with local suppliers
- For Non - Chinese companies
 - Find solutions to reduce risk:
 - Move factories back to Europe, US, Japan, South Korea etc.
 - Build new factories in South East Asia



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How should we think about the future?

- Semiconductor industry is still on a growth path
- External and internal changes are driving suppliers to adjust strategies to reduce potential risks and continually adapt to a changing reality
- To survive and thrive, companies need data and the stories behind the data to make the right decisions

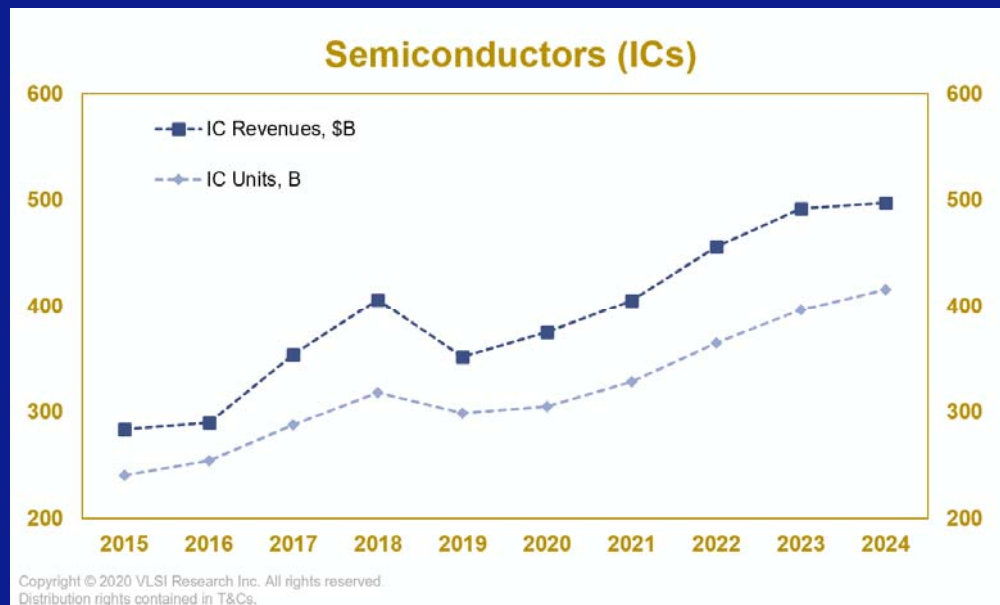


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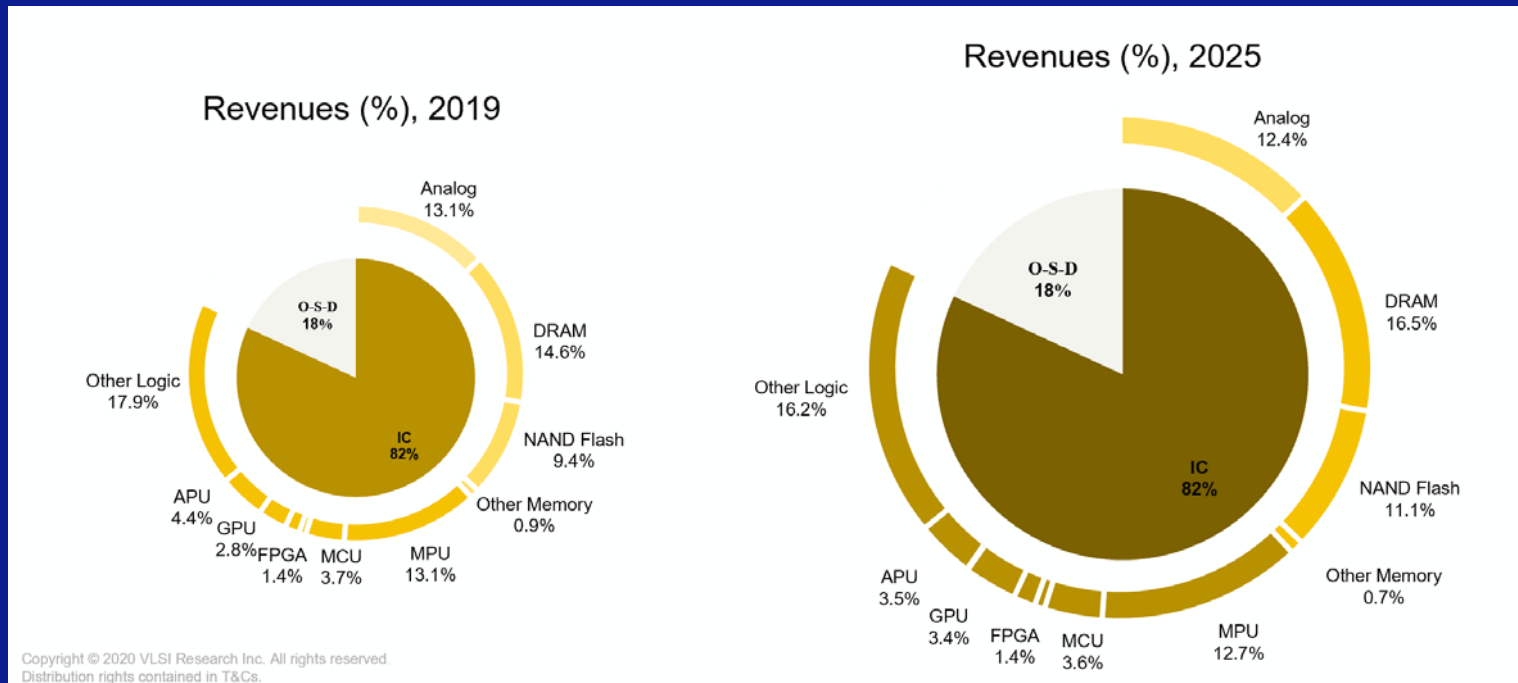
2020 Semiconductors (ICs) back on a growth path



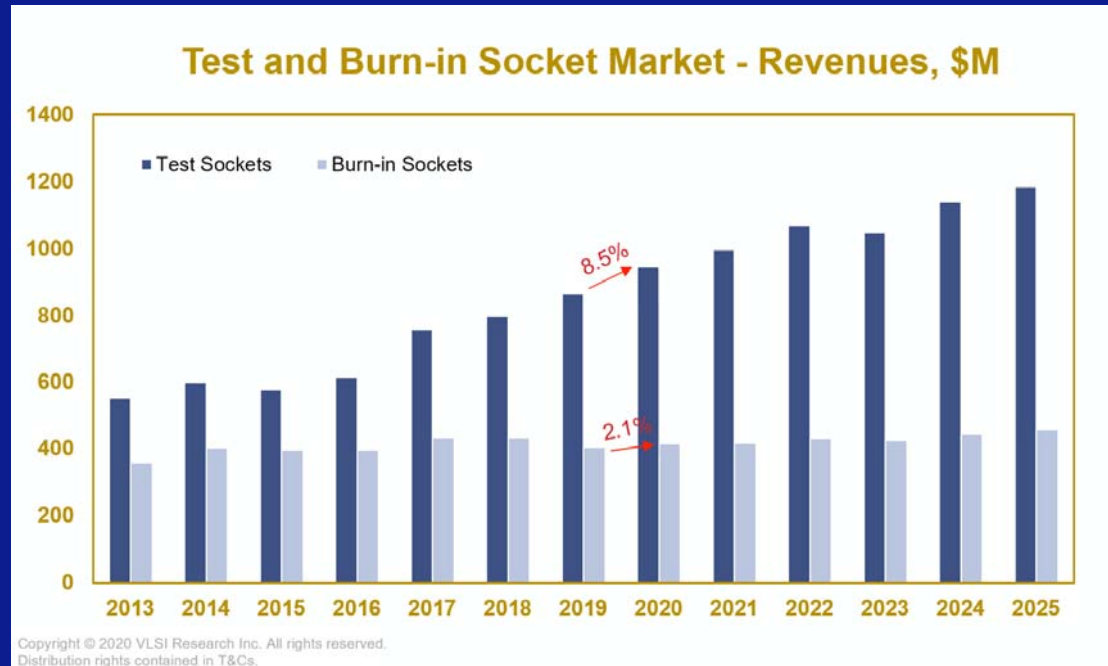
Forecast in April 2020 was for 2020 to be a negative year. However, IC demand continues to be strong and 2020 is now positive

Long-term growth drivers remain intact, despite Covid-19 and US-China trade tensions

2025 Semi Rev is going to be 50% bigger



2020 Socket Market Forecast Much Improved



Forecast in Sep

- Positive
- Test: +8.5%
- Burn-in: +2.1%

What role will China play?

- China will continue to be a major consumer of semiconductors
- Reduced dependency on US technology
- Supplier of domestically developed technology
- Major decision maker locally



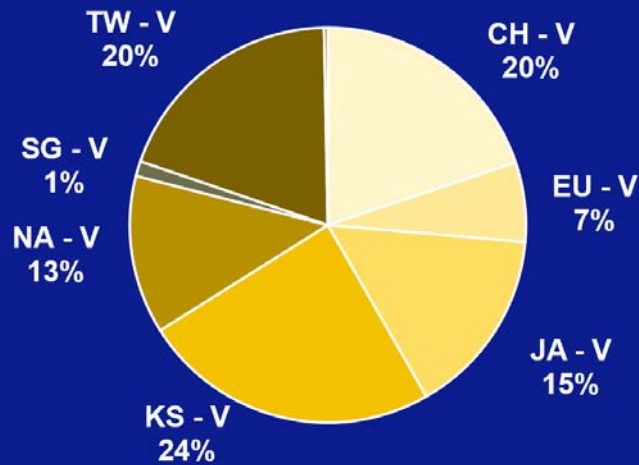
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Test Socket – Consumption in China

Vendors' Performance in
Chinese Test Socket Market



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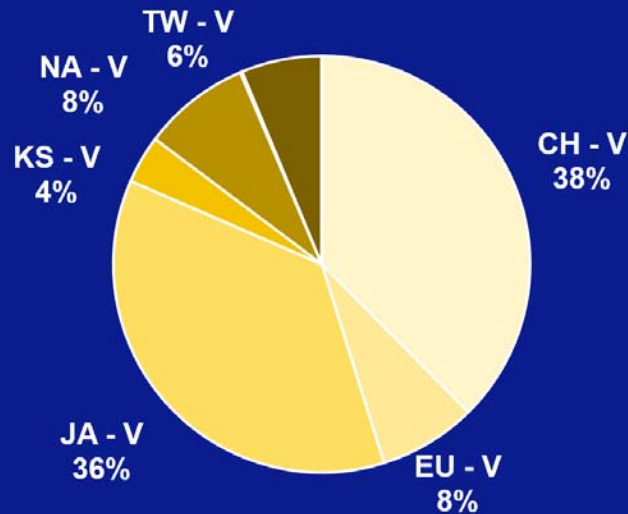
China consumed 14% of total
test sockets in 2019

Vendors were from

- China – 20%
- Japan – 15%
- South Korea – 24%
- North America – 13%
- Taiwan – 20%

Burn-in Socket – Consumption in China

Vendors' Performance in
Chinese Burn-in Socket Market



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China consumed 13% of total
burn-in sockets in 2019

Vendors were from

- China – 38%
- Japan – 36%

Future of Test and Burn-in Sockets in China

- Semiconductor production capacity in China increased from 7% of world total to 12% over the past 10 years – this growth path will continue
- Test and burn-in socket consumption in China up from 4% to 14% over the past 10 years – this growth path will continue
- More socket purchasing decisions will be made by Chinese companies



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Final Thoughts

- The technical and economic challenges are growing in complexity, but these can be addressed
- The US-China trade dispute will not have a major impact on overall semiconductor demand, but it will affect supply chains
- Covid-19 is unpredictable. This is an “out of sample” event so we need to be on guard for a “trigger” which may cause a collapse in demand
- China’s importance as a designer, manufacturer, and decision maker will only increase



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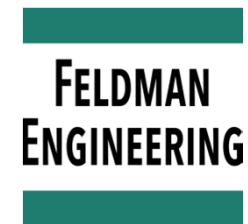


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Innovate. Collaborate. Deliver.

TTS Group is dedicated to bring the best possible testing solutions to our customers and to help solve some of the most challenging issues in test and tooling today.



Total headcount of 400 specialists



Total production area of 400,000 sqft.
for Probe Pin and Socket operations



Total investment of USD 75 Million

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