
EIGHTEENTH ANNUAL
BiTS
TM
Burn-in & Test Strategies Workshop
March 5 - 8, 2017
Hilton Phoenix / Mesa Hotel
Mesa, Arizona
Archive - Market Session
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Market Session

BiTS Workshop 2017 Schedule

Tutorial Day

Sunday March 5 - 8:30 pm

Marketplace Report

Ira Feldman

Feldman Engineering Corp.

Market Connections – Semiconductors to Sockets

John West

Managing Director

VLSI Research Europe

BiTS Burn-in & Test Strategies Workshop 2017

Market Connections Semiconductors to Sockets

John West

BiTS Workshop
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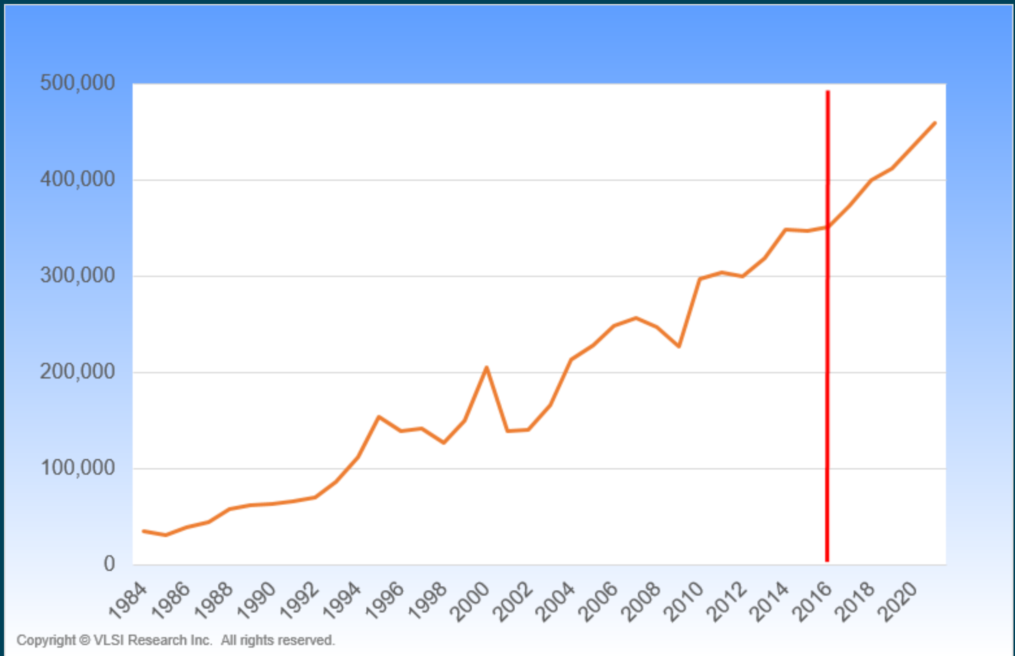
Contents

- Semiconductors
  - Long-term Drivers
  - Short-term Indicators
  - Packaging Trends
- Sockets
  - – Market Drivers
  - – Cost of Test
- Summary

Semiconductors, $M
The Long-term View



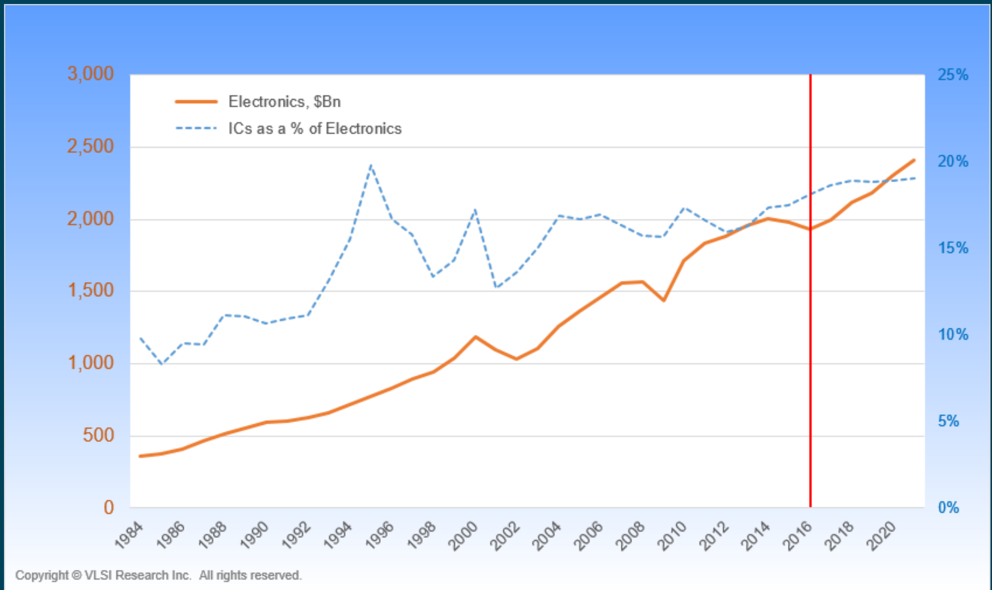
Semiconductors:
- flat last 2 years

Electronics:
- negative last 2 years

Semiconductor forecast:
- +6.9% in 2017
- +7.9% in 2018

Should we be worried about future growth?

Electronics, $Bn
The Long-term View



Electronics:

- negative last 2 years
- long-term growth of 4.5%

Content Rate:
Semiconductors as a % of Electronics Revenues Growing from 17% to 19%

Future Growth?

Electronics

Revenues down, but units up – a marketing problem

It’s not just about hardware anymore

- content
- value added services

Hidden electronics revenues

Future Growth?

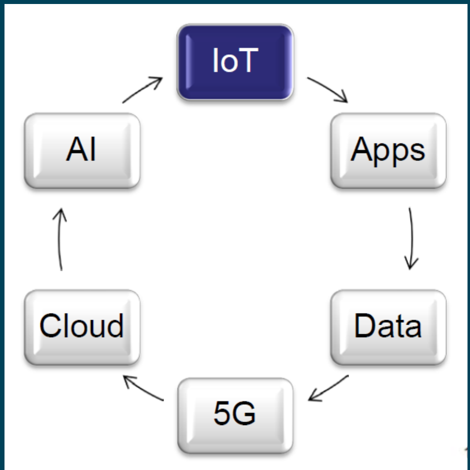
Waves of Computing – a different perspective on industry drivers

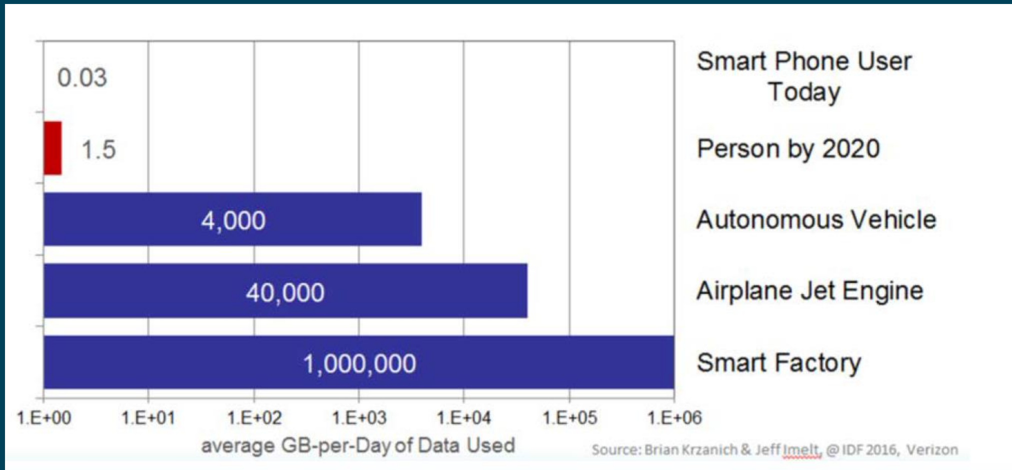
- Mainframe
- Mini-computer
- Workstation
- Personal Computer
- **Smart Phone and Cloud**
- Ubiquitous Computing and Machine Learning
- Artificial Intelligence

Each successive wave generates orders of magnitude of demand for chips

IoT Drives a Data Supply Explosion

It's the engine of the next virtuous cycle

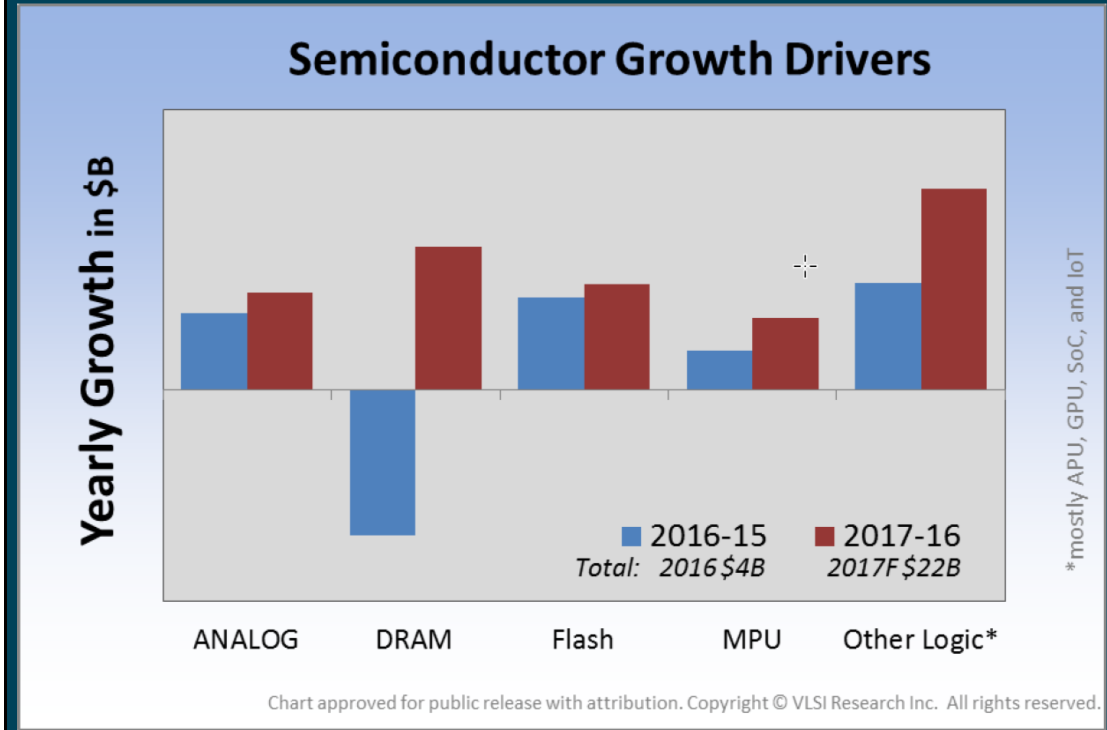




Data needs to be transferred, processed and stored

IoT is not the opportunity… it's 5G, the cloud and AI

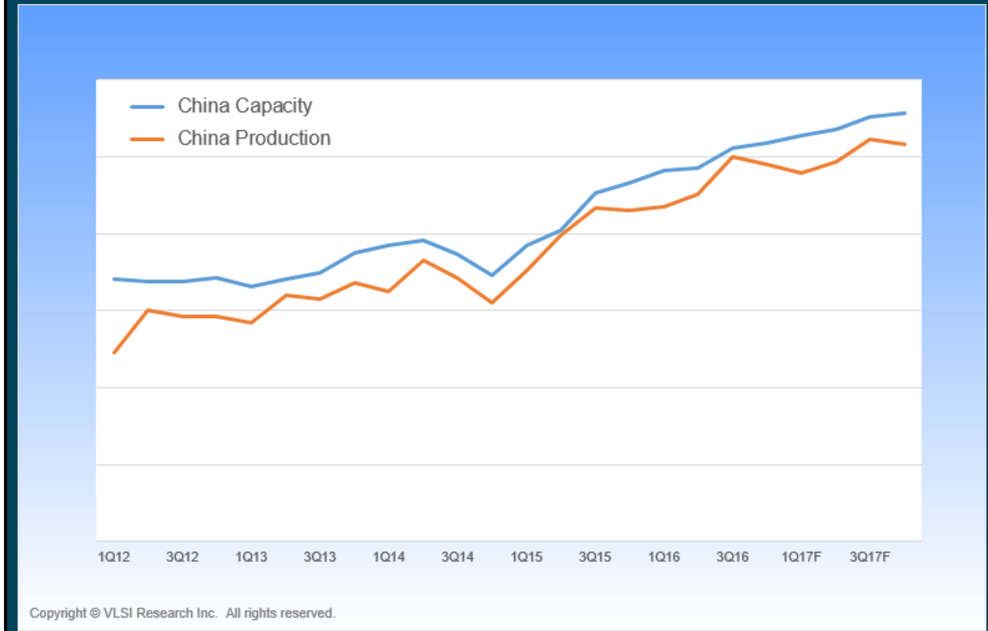
Key Drivers and Pivot Points



- DRAM comes back on strong pricing
- Flash for SSD
- MPU for cloud
- Other Logic Drivers
  - Auto
  - CIoT (connected IoT)
  - Smart Grid
  - Smart City
  - Smart Manufacturing
  - Smart Supply Chain
  - Smartphone Replacement

Manufacturing Shift to China

Production and Capacity in Millions of Square Inches of Silicon



China accounts for over 10% of worldwide capacity in millions of square inches of silicon.

Steep learning curve to overcome

8 x 300mm Fabs in production

12 x 300mm Fabs under construction

2 x 300mm Announced

Semiconductor Industry betting on future growth

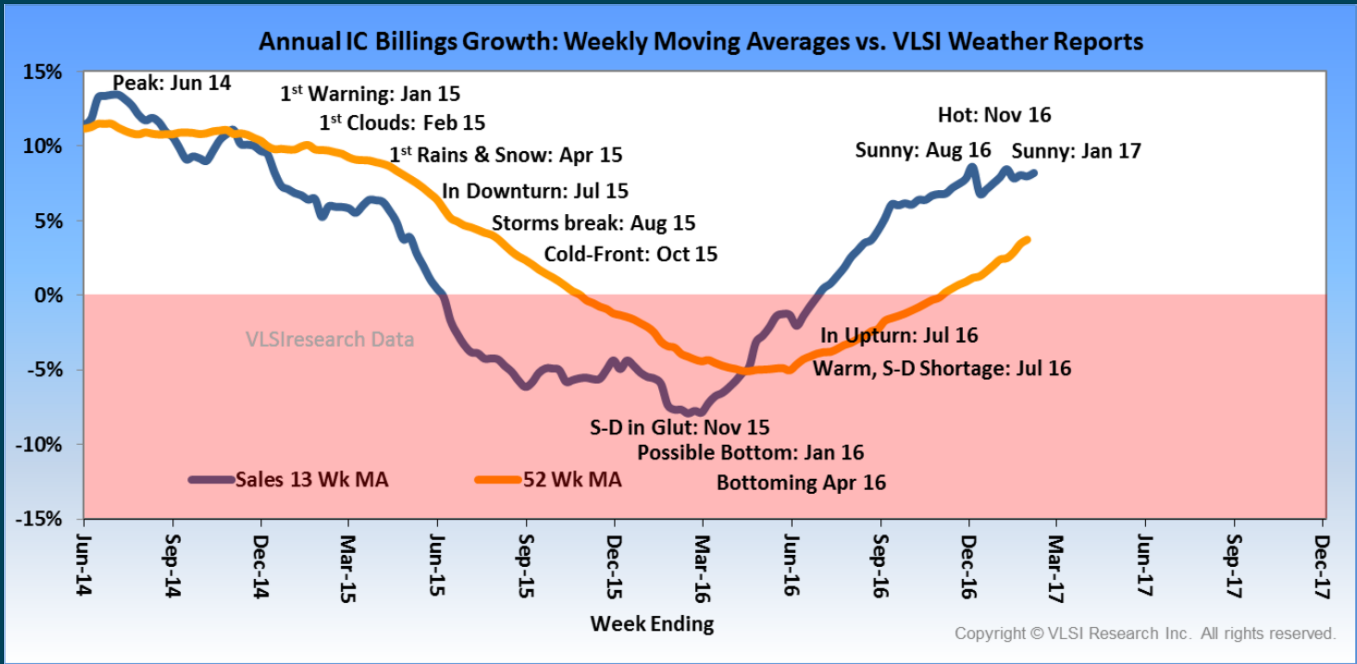
There's a lot of money being invested in new technology and new capacity

- 10nm and 7nm
- 3D NAND
- Advanced Packaging
- Shift in manufacturing to China

Heavy capex on flat revenues!

Semiconductors – short-term view

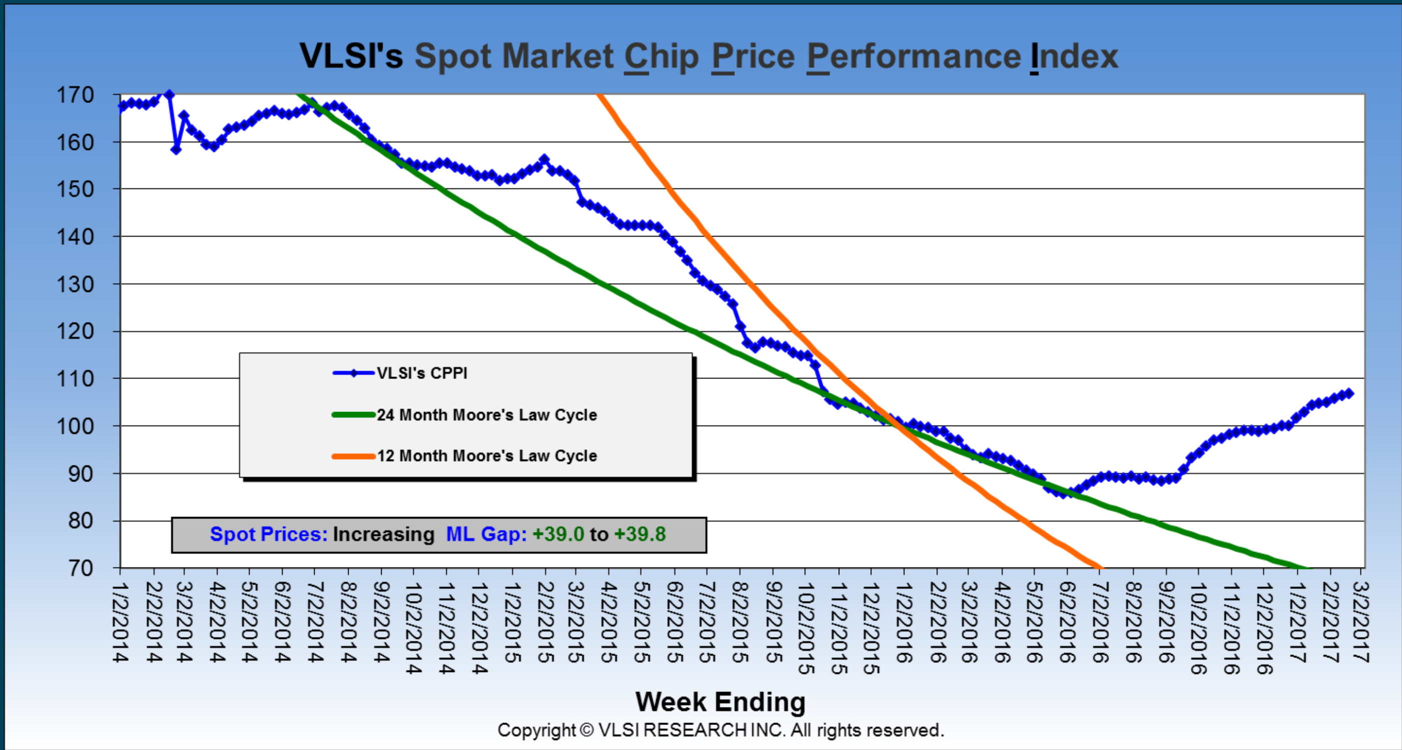
Annual IC Billings Growth: Moving Averages & Weather Reports



In positive territory…but need strong positive IC billings growth to achieve 2017 and 2018 forecasts

*S-D = Supply and Demand

Strong Chip Pricing Trend



2017 and 2018 Shaping up to be good years for semiconductors

Reasons for optimism

- Healthy end markets
- Strong pricing environment
- Plenty of emerging applications

Watch out for

- China – overcapacity and tariffs
- Geo-political change

Semiconductor Units Growing

But only slightly higher than revenues

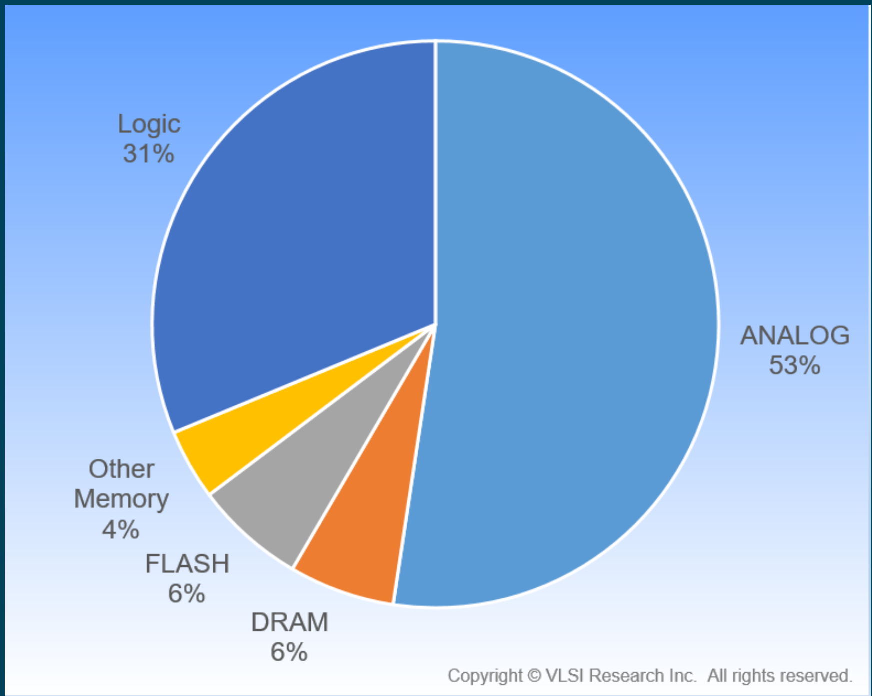
2017 +6.9%

2018 +7.8%

Due to strong pricing

Long-term growth trend +6.7%

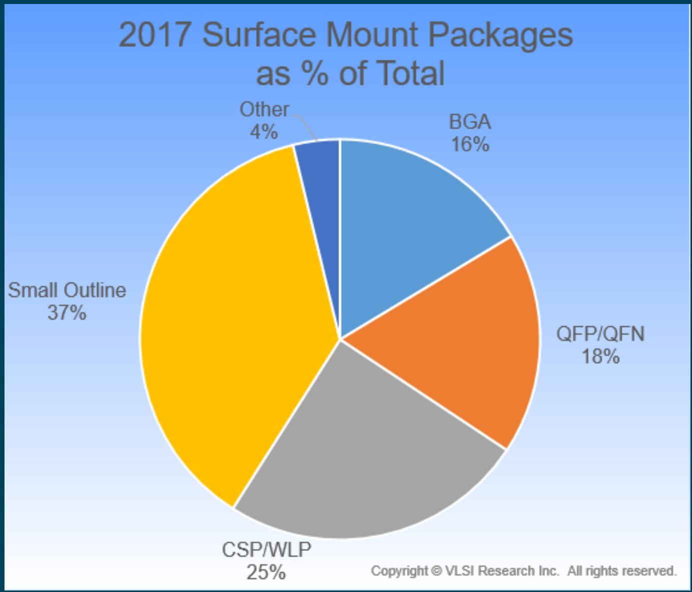
IC Units – Share of Total 2017

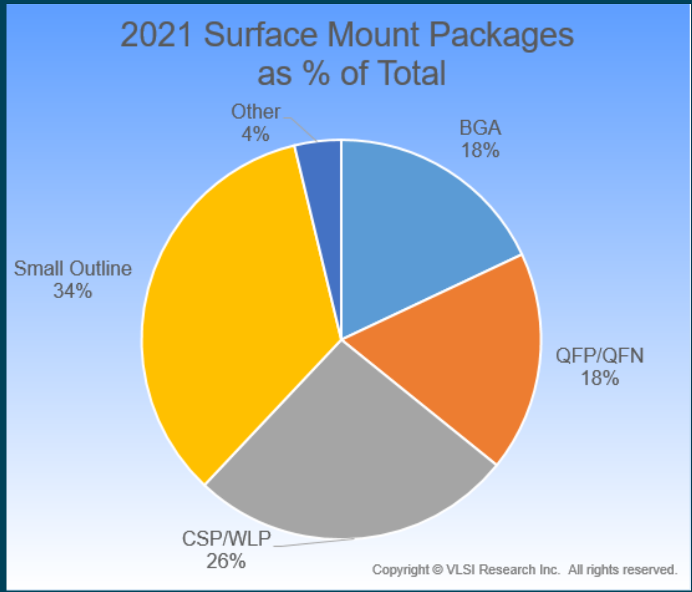


270 Bn ICs

Memory accounts for 16% of total IC unit shipments

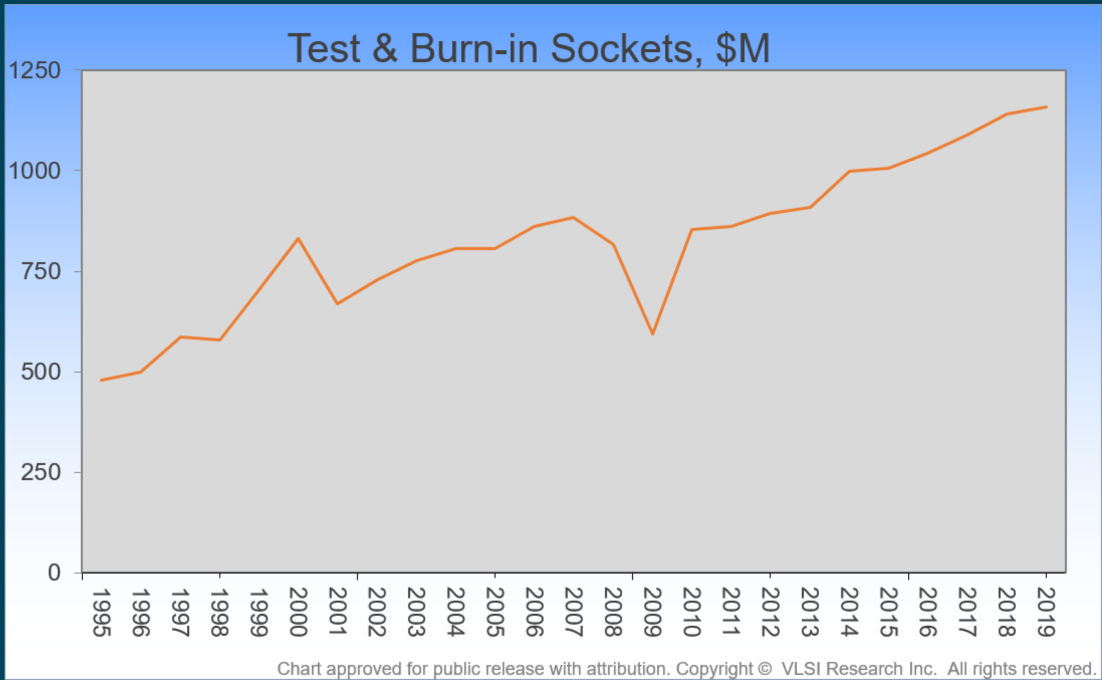
Packages





BGA and CSP/WLP packages will be among the best performing segments

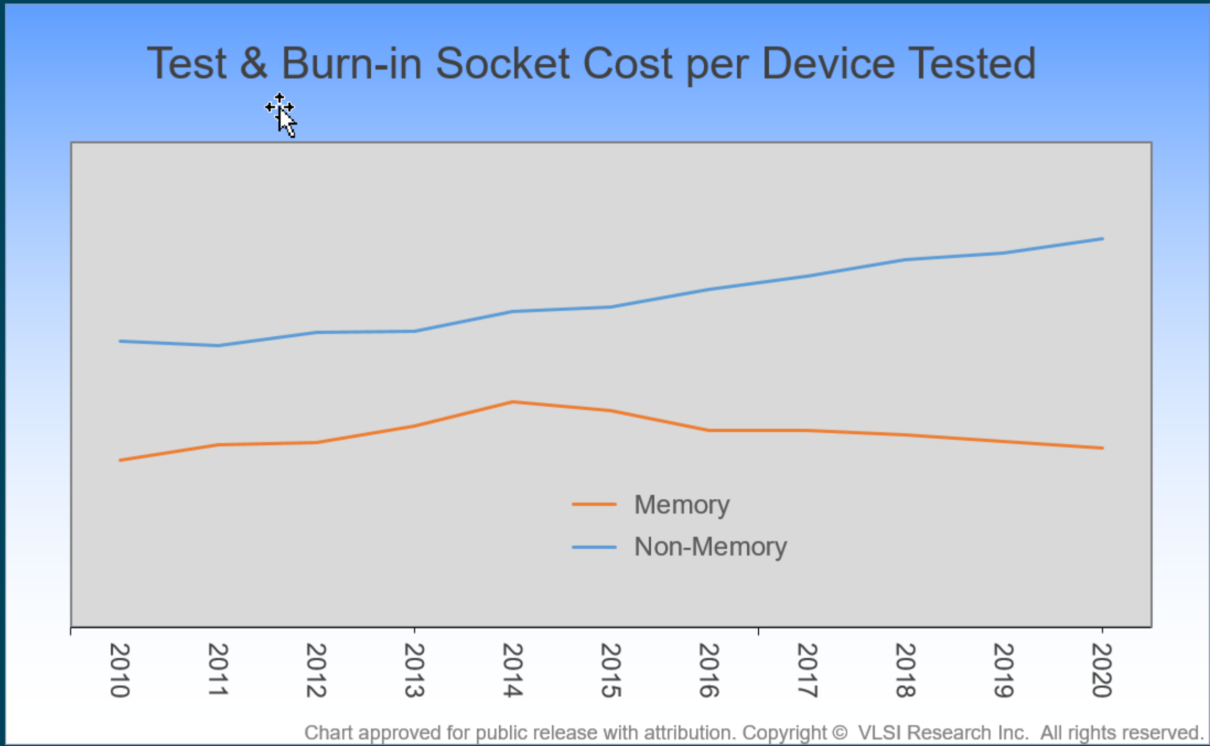
Test & Burn-in Sockets



Long-term growth 3.5% CAGR next 5 years

Lower than semi revenue growth of 5.5% over same period

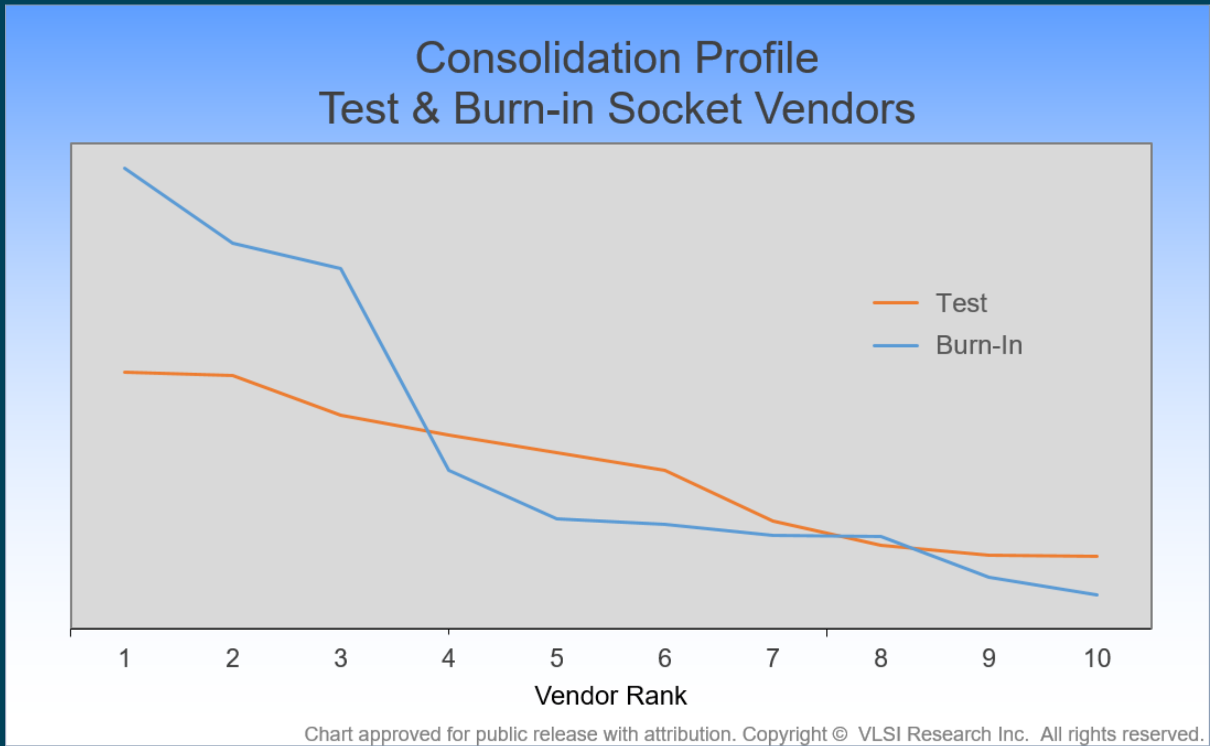
Cost of Test



Memory getting cheaper to test

Non-memory a growing problem

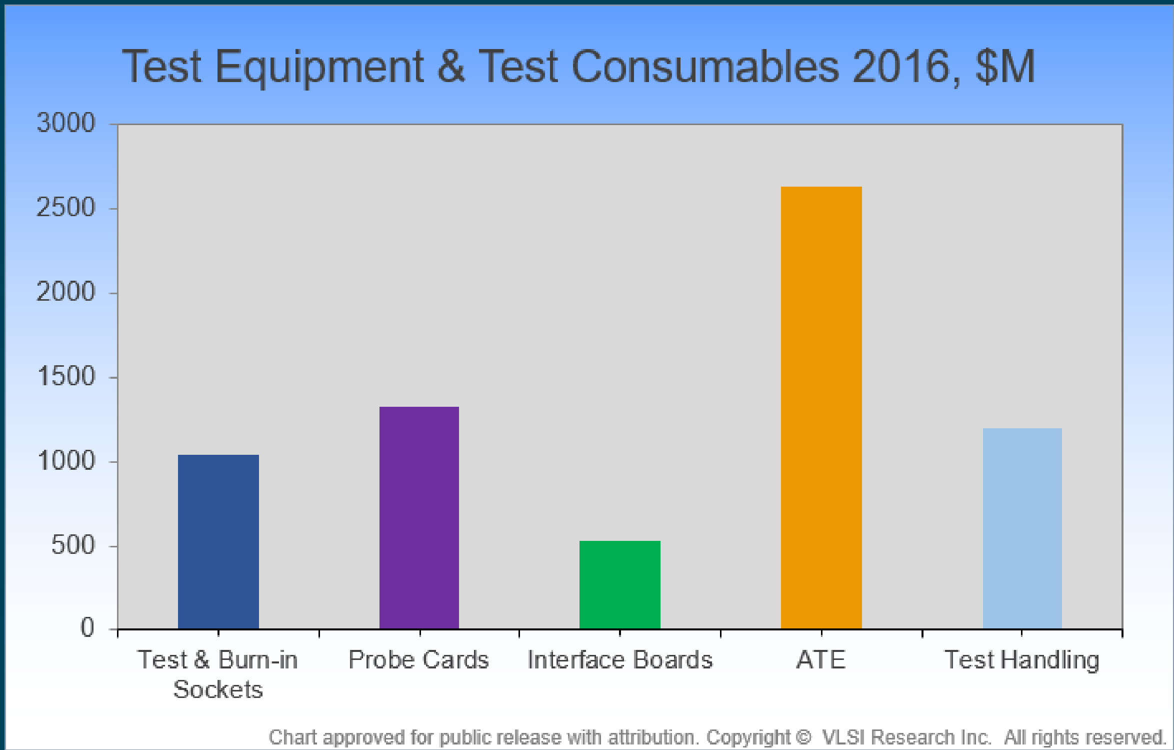
Consolidation?



Burn-in : High degree of consolidation but many small players

Test : Fragmented

Cost of Test



Test Consumables > 43% of Total Test Equipment and Consumable Costs.

Increasing to around 48% by 2021

Outlook for 2017

- Semiconductors
  - Revenues 5.5%
  - Units 6.7%

- Test and Burn-In Sockets
  - Test Sockets 4.0%
  - Burn-In Sockets 2.8%