

SiPs or SOC

The Multi-Million Dollar Question

Analyst Panel

Moderator Thoughts
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Technology Insanity?

- ▲ Siren Song Of Consumer Markets
 - Song: Broad and lucrative
 - Reality: Highly segmented, brand oriented, fixed price insures volume ramp
- ▲ Elephant Size Costs With Canary Feed Returns
 - Greater integration—>exploding costs
 - Short time to market, limited learning curve advantage
- ▲ Shareholder Value is Being Sucked Away
 - Consumer's buy technology at a low price point
 - 50%+ margins difficult under the Dell Model
 - Where is the value today: silicon, IP, brand,channel?
- ▲ Old Profit Patterns Don't Work!
 - Learning Curve — Bigger Wafers, Smaller Die
 - Greater Functionality: More Markets
 - Improved Process Technology: Lower Costs

IC Cost Improvement — Packaging!

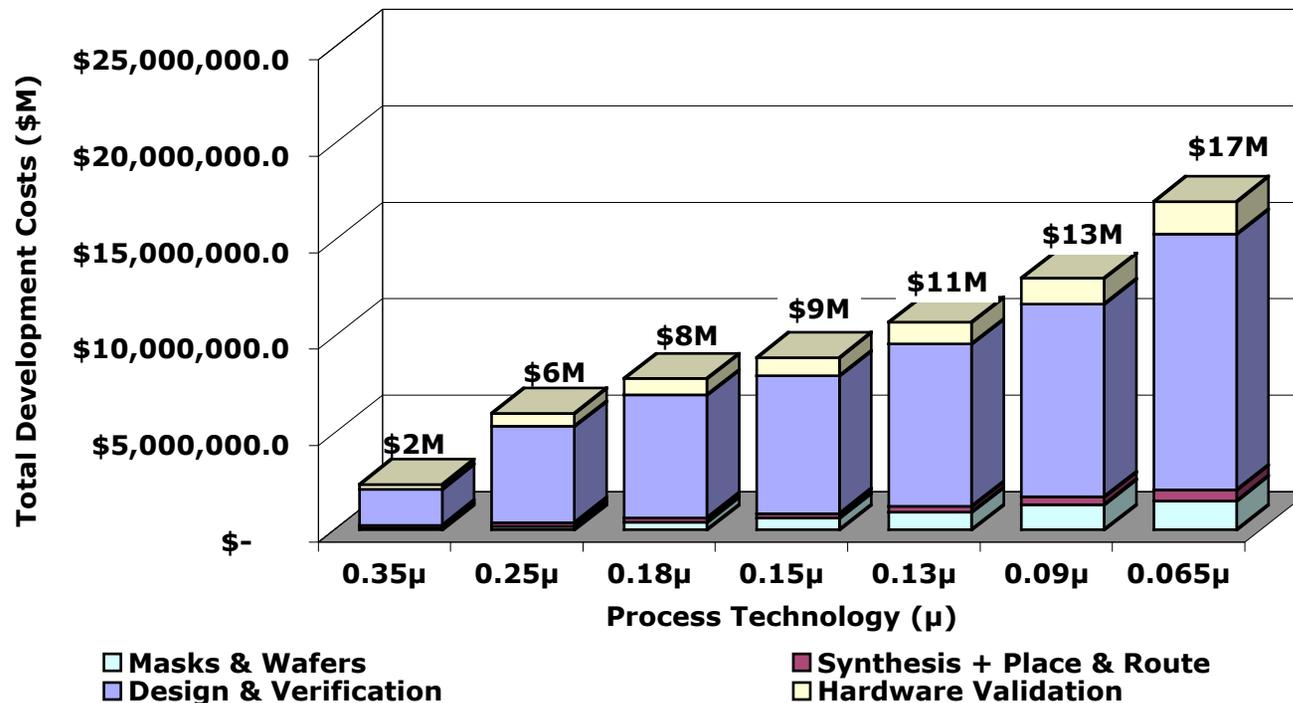
Or How do we squeeze Test, Assembly & Packaging?

$$\text{IC Cost} = \frac{\text{Die Cost} + \text{Test Cost} + \text{Package \& Assembly}}{\text{Final Test Yield}}$$

- ▲ Die Cost Dropped Dramatically With Larger Wafers and Smaller Die, But Today's Design and Process Costs Slow The Decline!
- ▲ Yields Are At Historic Highs, Giving Little Addition to Reduce Costs
- ▲ Burden Is Shifting To Package, Test and Assembly and Ultimately SATS!

Design Costs Make it Difficult to Leverage Moore's Law

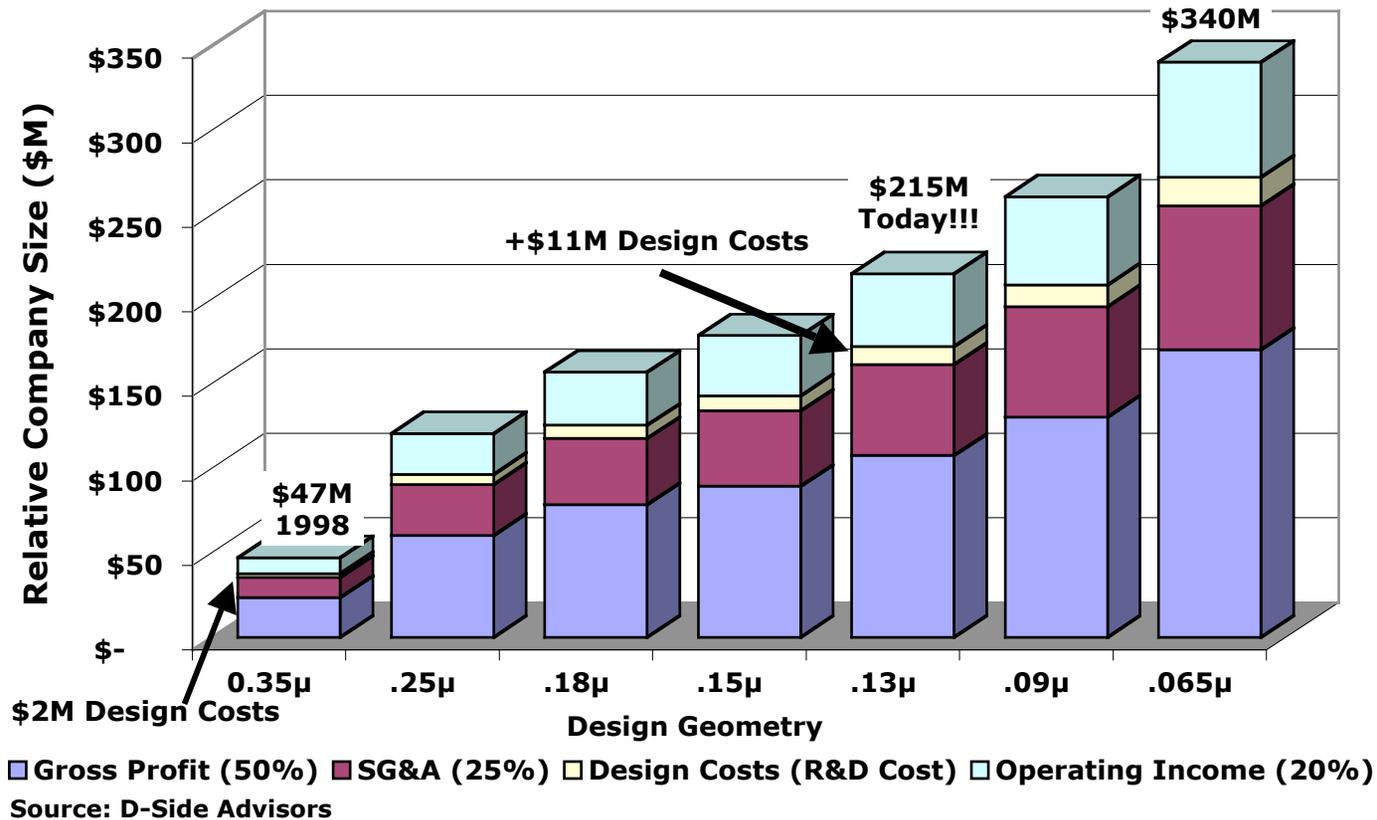
Cost Per Design by Technology
(Conservative Estimate - Realistic Cost Are 2.5X Numbers Shown)



Source: D-Side Advisors & Altera Corp.

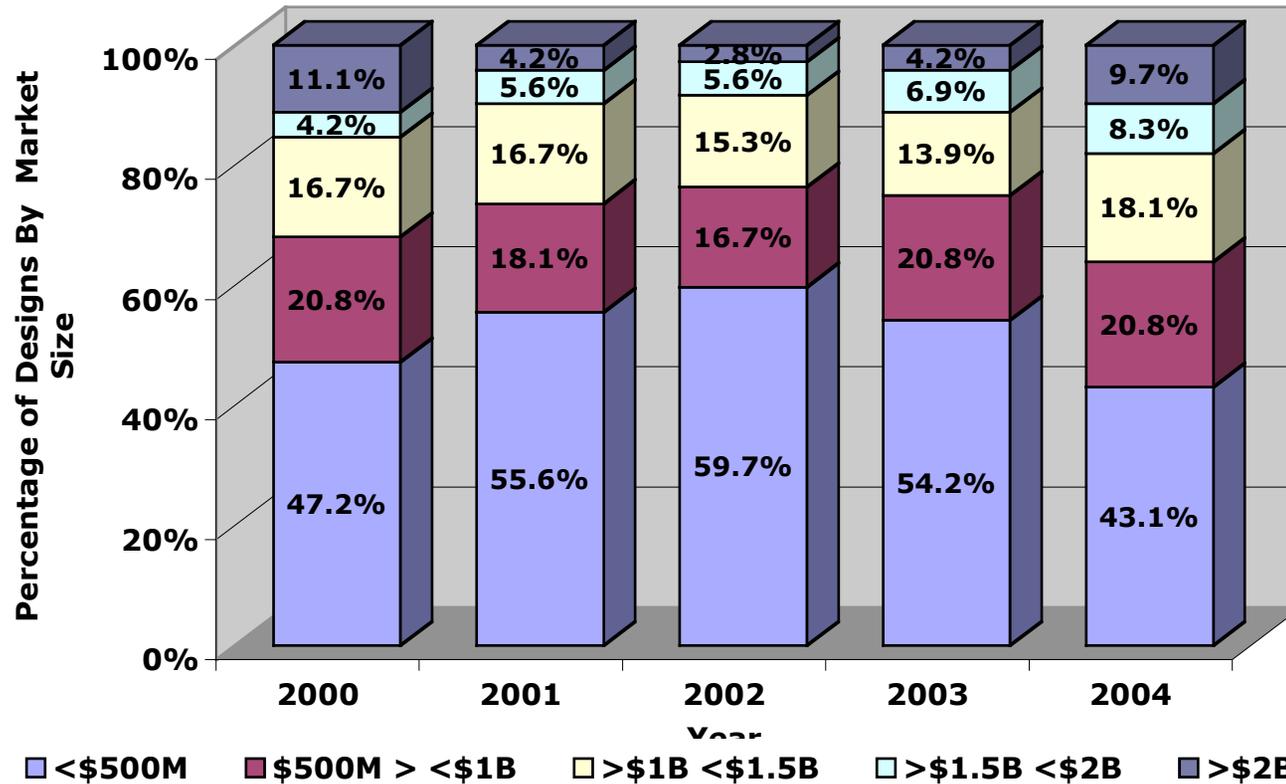
The Squeeze: Rising Costs Require BIG Revenue Or Lower Margin!

Company Size Relative to Design Costs



Rising Design Cost Dictate \$1B + Markets, But They're Scarce!

Percentage of Applications By Market Size for Application Specific ICs

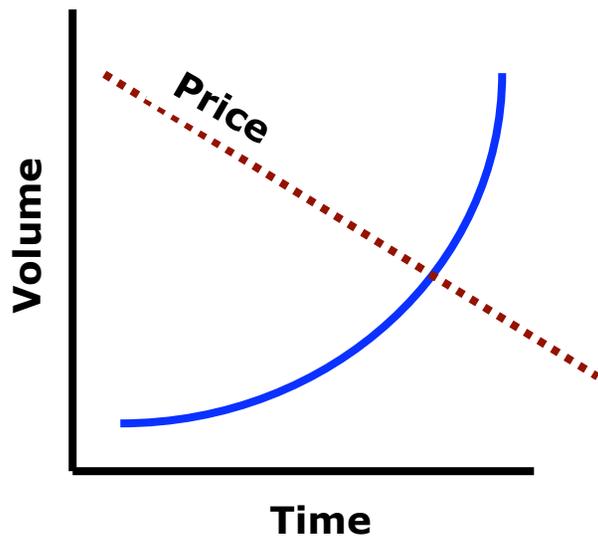


Source: Gartner/Dataquest

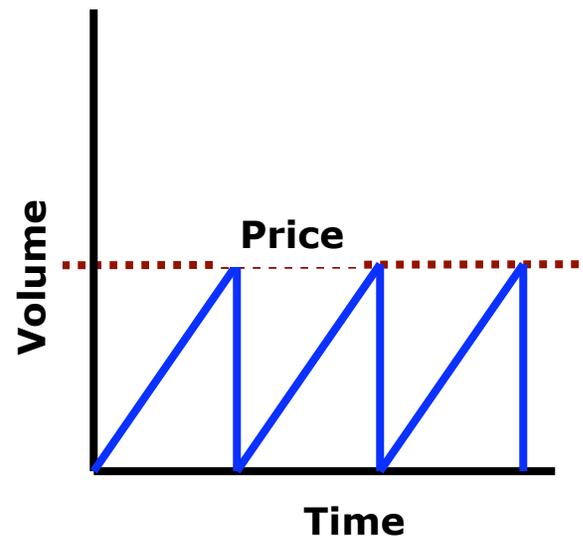
Consumer-Like Markets

Customers Pay for Value not Technology!

Learning Curve



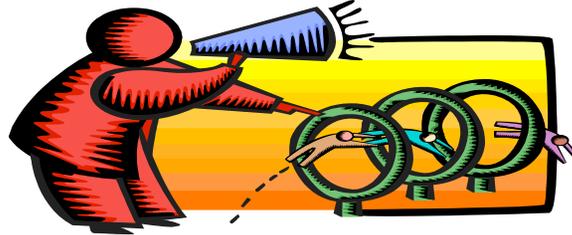
Order Stocking Model



- ▲ Lower Cost, Elastic Demand
- ▲ Integration thru Silicon
- ▲ IDMs, Design Services and Foundry Wins

- ▲ Fixed Price, Inelastic Demand
- ▲ TTM thru Packaging
- ▲ SATS and EMS Wins

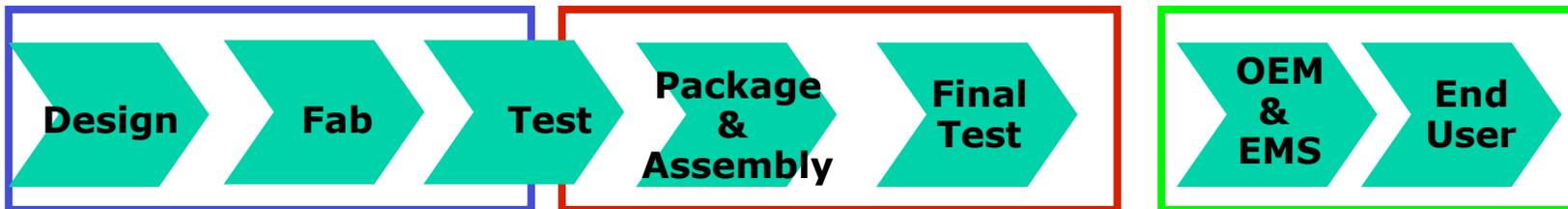
Can SATS Capture More Value?



Front End

Back End

Customer

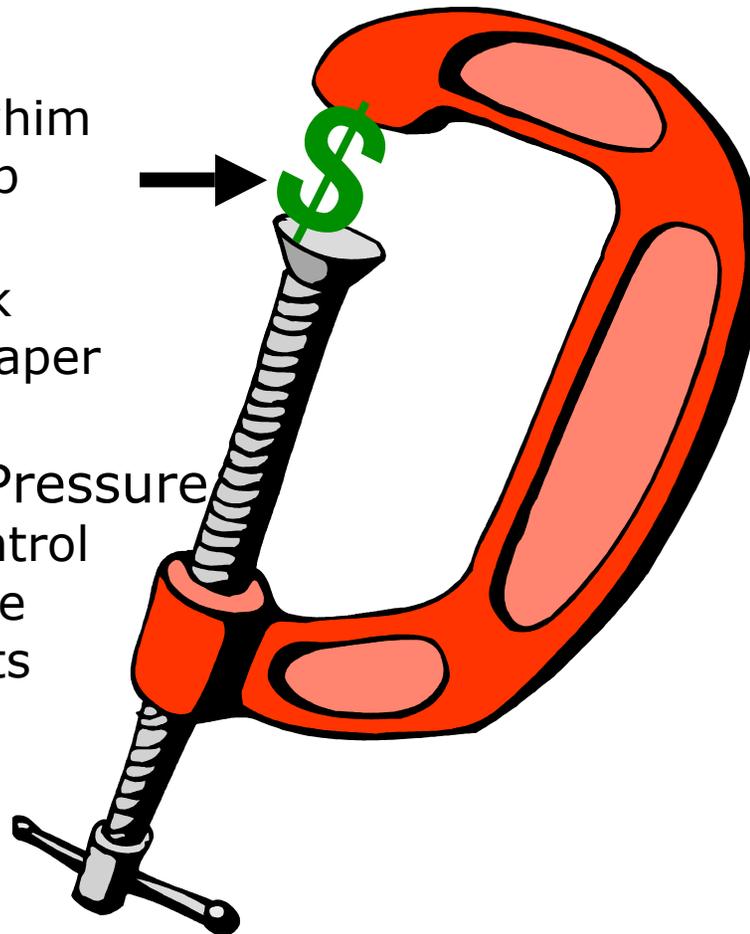


- ▲ Maturing Semiconductor Industry Results in a Highly Segmented Value Chain
- ▲ Each Element of the Value Chain Must Demonstrate Profitability
- ▲ The Longer the Chain the Lower the Profit!
- ▲ Profit Historically in the Chip
 - More Functionality — Bigger Wafers, Smaller Die
 - Lower Prices — Elastic Demand!
 - Packaging Necessary Evil — Limited Value Add

SATS Caught in Vice

Value Squeeze!

- ▲ Service Business Model
 - Serving the IC vendors whim
 - Not a win-win relationship
- ▲ Differentiation is Fleeting
 - Whoever writes the check
 - Someone will build it cheaper
- ▲ High CapEx Expenditures
- ▲ Constant Cost Reduction Pressure
 - IC Vendors or OEM in control
 - Volume doesn't gain value
 - Volume doesn't win profits



SATS Caught Under The Wheel

Moore's Law – Is The Wheel

Are You Leveraging Moore's Law?

Are You Being Crushed By Moore's Law?



On the Wheel

Under the Wheel

Process Technology	Leverage Process for Better Customer Solution	Leveraged by Process for Customer Solution
Volume	Low fixed costs, high margin	High fixed cost, low margin
Time to Market	First to market	Late to market
Design	Flexible Design, High Reuse	Fixed Design, Low Reuse

Capturing More Value

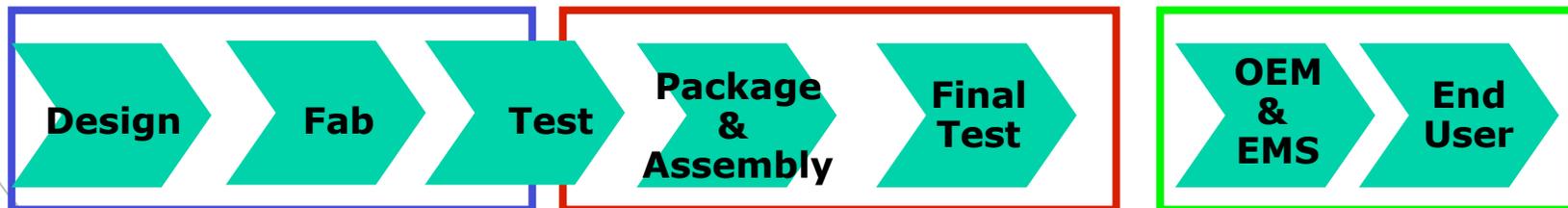
- ▲ Historically: Value Resided In Chip and Design
- ▲ Today: System Architecture Determines Value
- ▲ Future: Packaging Technology Adds More Value to System As the Silicon Is Virtually Free!
- ▲ How Does SATS Capture This Value?



Front End

Back End

Customer



Key Issues For SATS

- ▲ How Does SATS Continue to Create Value?
- ▲ What Is SATS Role In the IC Value Chain?
- ▲ Are SiPs An Discontinuous Opportunity?
- ▲ Who Is the Most Likely To Capitalize On the Opportunity? SATS? EMS? OEMs?

Analyst Panel

- ▲ Morry Marshall, VP Strategic Technologies, Semico Research
- ▲ E. Jan Vardaman, President, TechSearch International, Inc.
- ▲ Jim Walker, Principal Analyst, Gartner Dataquest Semiconductor Group