

NAND Insights Q3/09: Strong Demand Drives Market Sentiment

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Agenda

- NAND Flash Forecast
- Vendor Status
- Roadmap
- Wafer Production
- Capex
- Demand
- Supply-Demand
- Pricing
- Cost
- Summary

NAND Flash Market Forecast

- xxxx leads to xxxx growth in 2009 and 2010

NAND Flash Market Forecast

- Bit growth will xxx and ASP declines will xxx as xxx

Vendor Status

- Samsung
- XXXX

- Toshiba
- XXXXX

Vendor Status

- SanDisk
- xxx
- Hynix
- xxx
- IMFT
- XXXX

NAND Flash Roadmap

- sub-40nm xxxx
 - technology node typically xxxx
- 3xnm xxxx materials reflect process strategies
 - IMFT – xxx
 - Samsung – xxx
 - Toshiba – xxx
- two strategies for >2-bit/cell technologies
 1. xxx
 2. xxx
- xxx

8Gb NAND Flash Roadmap

-
- Samsung - xxx
- Hynix - no xxx

16Gb NAND Flash Roadmap

- XXX

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32Gb NAND Flash Roadmap

- all vendors have xxx

64Gb NAND Flash Roadmap

- For Samsung & Toshiba, xxx
- For IMFT, xxx

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V-shaped Wafer Capacity

- vendors move to xxx in xxx
- xxx fab utilization expected as long as xxx

NAND Flash Capex

- Capex xxx in 2008 and to xxx in 2009
- 2009 capex primarily xxx

Product Mix

- 32Gb xxxx
- 64Gb xxx

Architecture Mix

- xxx to move more aggressively to xxx in 2010

Technology Mix

- xxxnm to ramp latter half of xxx although xxx to start earlier

NAND Flash Demand

Note: Flash memory card includes all formats for all applications, DSC, mobile embedded only

- xxx to drive demand until xxx take off in xxx

Notebook SSD Q2/09 Capacity Breakdown

Q2/09: xxx units
Avg. Capacity: xxxGB

Note: OEM shipments only

- main suppliers: xxx

Notebook SSDs pick up in xxx

2007-2014 CAGR
Units: xxx%
GB: xxx%

Note: OEM only

- enterprise units: xxx units in 2009 to xxx units in 2014
- notebooks xxx units in 2009 to xxx units in 2014
- LCPC: xxx units in 2009 to xxx units in 2014

Smartphones Driving Storage Capacities

- many smartphones xxx high capacity xxx

Supply-Demand

- NAND flash suppliers xxxx
 - prioritizing xxx
 - xxx
 - xxx
 - xxx
 - xxx
 - xxx
- xxx deal
 - iPhone xxx
 - xxx
 - xxx?
 - xxxx
 - xxx
 - discussions with xxx

Supply-Demand

- xxx PC
 - xxx demand
 - xxx screen
 - xxxx
 - xxx processor
 - price: xxx
 - flash?
 - xxxx

NAND Flash Supply-Demand

Bit Growth

- 2008: xxx%
- 2009: xxx%
- 2010: xxx%

- xxx demand xxxx
- xxx in 1H/10

NAND Flash Pricing

- 2007: xx% YoY
- 2008: xx% YoY
- 2009: xx% YoY
- 2010: xx% YoY

- pricing xxx Q4/09
- price xxx 1H/10

8Gb MLC NAND Flash

Note: Historical pricing includes QDP/DDP

- 8Gb xxx

16Gb MLC NAND Flash

Note: Historical pricing includes QDP/DDP

- recent xxx

32Gb MLC NAND Flash

Note: Historical pricing includes QDP/DDP

- profitability xxx

32Gb 3-bit/cell NAND Flash

Note: Historical pricing includes QDP/DDP

- xxx delta between MLC and 3b/c is xxx but xxx delta is xxx
- most vendors will xxx

Summary

- NAND flash suppliers will continue to xxx
 - xxx year of xxx may be necessary to xxx
 - Suppliers will xxx if xxx
 - Suppliers will xxx capex
 - Will need at least xxx before suppliers will xxx
- To further xxx, companies will either:
 - xxx
 - xxx
- xxx

Summary

- xxx as xxx kicks in and xxx increases
- xxx for demand is xxx

***“Unique and strategic perspectives on
semiconductor memories, emerging memory technologies and
solid state storage”***



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