How 3D Memory Stacks Up

Description: With NAND flash facing scaling challenges, 3D memory stacks are being explored as possible candidates to replace NAND flash. This report compares the technology, challenges and cost of various 3D memory options including stacked charge trapping technologies from Samsung and Toshiba, 3D memory from SanDisk, Samsung and others.

Mainstream NAND flash memories are currently manufactured on 4xnm processes with major NAND flash vendors migrating to 3xnm this year. In the race to reduce costs, NAND flash manufacturers are developing 2xnm technology, however with performance and reliability characteristics severely degraded relative to the 4xnm generation, 2xnm floating gate NAND flash could be the last process technology generation. What's next?

NAND flash vendors have been exploring a variety of alternatives including spin-torque MRAM, nanocrystal memory, phase change memory and resistive memory. However as lithographic scaling becomes more challenging, companies are turning their sights to vertically stacked implementations of memory cells or 3D memory. Among the candidates: stacked NAND technologies employing charge trapping technology, vertical memory cells etched in a pillar and stackable cross-point memory arrays.

It is the aim of this report to explore in detail the feasibility of each of these alternatives as a candidate to replace NAND flash memories within the next four years.

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