

Inflection Points

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Flash Memory Summit 2011 Santa Clara, CA

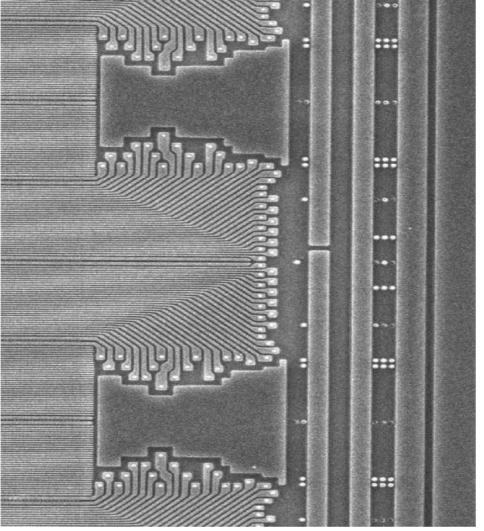
NAND Flash Memory Inflection Points Content delivery 160,000 UFS 140,000 CAGR Bit Growth 2000-2015: 116% 120,000 Petabytes Shipped 100,000 NAND surpasses Smart TV DRAM to become 80,000 process technology iPad, driver MBA w/ 60,000 SSD CF, 1st Flash iPhone. drive SSD **Zeus IOPS** 1st iPod 1st NAND 40,000 Smartmedia UFD w/ NAND SSD prototype Flash ioDrive storage Cloud MMC 20,000 eMMC array SD µSATA SSD 0 2003 2004 2005 2006 2008 2007 · 2010 ~3⁸⁰¹ · 2009 ` ^9°° . ~ ~9⁸⁹ 2012 2012 2013 2014 2015 200 2001 2002 New 1st MLC Intel JVs Toshiba FG cell chip 0.425µm 32Mb w/ Micron invented 1st 3D Toshiba licenses Advanced Nand chip NAND NAND Hynix – ST. NAND to Samsung ECC flash 1st TLC **Micron enter** chip NAND flash 1st 4bpc chip, Flash Memory Summit 2011 1st ECC production 2

NAND chip

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