Everspin: MRAM Breaks Through

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"Persistent SRAM"

Toggle MRAM (Field-Switched)

"Persistent DRAM"

ST-MRAM (Spin Torque)

256K MRAM
1M MRAM
4M MRAM
16M MRAM

64M QSPI (in dev)
64M DDR3
256M (in test)
1Gb (in dev)
4Gb (future)

$3.5B (2019)

$0.5B TAM (2016)

$0.3B TAM (2015)

$2.0B (2018)

Instantly Recoverable Transportation Systems
Power Fail Safety for HDD and RAID
Fault-Recoverable Industrial Automation
Secure & Reliable Smart Grid

More Reliable Storage, File, & Backup Systems
Rapid, Low Latency Enterprise Storage & Networks
Mainstream Persistent DRAM in Consumer Applications

TAM compilation from Everspin, Semicast, Databeans, & Markets&Markets
MRAM is Proven and Shipping

- 300mm Wafer Production of Everspin MRAM Products
  - ST-MRAM process transfer successful
  - Initial 256Mb 40nm product is functional
  - Acceleration of pMTJ based products in 28nm and smaller
  - Versatile embedded memory with eMRAM

- Strategic Investment

- DDR3 and DDR4 controller optimization
- NVMe and storage protocol optimization
- Evaluation platforms and technology demos

- Meeting the quality and supplier excellence needs of leading storage, industrial, and automotive customers
One Million IOPs

*Instantly* Stored, *Instantly* Available

The Fastest Non-Volatile Memory combined with Controller and NVMe Optimization

- **ULTRA HIGH ENDURANCE**: NO wear leveling algorithms or translation tables
- **BYTE ADDRESSABILITY**: NO garbage collection algorithms
- **ST-MRAM BANDWIDTH**: NO caches or elasticity buffers are needed
- **INSTANT STORE**: NO BIOS enhancements or power fail recovery firmware

*Stop by the Everspin booth #844 for a demonstration*
Scalability & Versatility: Build the SoC you really want!

Versatility by Design:
eMRAM is unique in that the bit cell design can be modified for optimization as a replacement for embedded FLASH, DRAM, SRAM or a combination up to all three.

As Embedded FLASH:
eMRAM offers better endurance, bandwidth, and energy while scaling below 28nm

As Embedded SRAM, DRAM:
eMRAM is smaller than SRAM, with non-volatility

As Embedded Flash + SRAM:
eMRAM replaces program code + execute code + storage space with one memory
MRAM Breaks Through

- Proven technology – Proven Company
  - Established production
  - ST-MRAM ramping
  - Multiple MRAM product families in production today
  - Field switched, in-plane and perpendicular MTJ matched to products
- World class partners
- Breadth of solutions: Persistent SRAM, Persistent DRAM, eMRAM
- Breakthrough system performance demonstrated