3D ReRAM Technology for high speed application

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Expected SCM for Enterprise

Register

0.1ns

Cache

1~10ns

DRAM(~$10/GB)

10~100ns

SCM(~$2/GB)

~1us

NAND(~$0.2/GB)

~100us

High speed application with lower cost

Latency: ~1us
Transfer Rate: ~2GB/s

New usage (New application)

Non volatile
Endurance: >1M
Fabric Attached Memory

Higher capacity in server memory subsystems
→ New interface switch to build a hybrid memory

OpenCAPI
Gen-Z
NVMe-oF

GPU
CPU
FPGA

Hybrid Memory Switch

< 1us
Cu ReRAM Improvement

1T1R

300ns Set/Reset
10K cycles

100ns Set/Reset
1M cycles

VLSI symposium 2017
BC (Boron Carbon) based OTS Selector

TEM cross section

Pulsed JV curve

Cycling Endurance

BC makes good amorphous film
- Bidirectional Switching
- High Current density
- Low Leakage

VLSI symposium 2017
Summary

- 3D cross point ReRAM is looking at high speed application such as fabric attached memory
- Latency of cross point ReRAM was improved from 1T1R ReRAM
- The selector should support high endurance for high speed application