Samsung Mobile Memory
Taking Mobility to New Storage Horizons
Mobile DRAM | Multi-Chip Packages | eMMC
Mobile DRAM

Performance and battery life are the key metrics upon which mobile electronics are measured. Samsung Mobile DRAM memory is optimized to deliver on both. Mobile Synchronous DRAMs – low power, double data rate (LPDDR1, 1.8V and LPDDR2, 1.2V) – are designed to consume less power than standard synchronous DRAM, and Samsung’s save power by adopting advanced circuit architectures that translate into longer battery life.

Samsung Mobile DRAM Technology

- Lower Power Consumption circuit design
  - Supply voltage as low as 1.2V
  - Temperature Compensated Self Refresh (TCSR) adjusts refresh rate based on device temperature
  - Partial Array Self Refresh (PASR) adjusts the size of the memory array to be refreshed
  - Deep Power Down (DPD) powers down the array
  - Programmable Drive Strength (DS) reduces driver strength based on system needs
- High Density: Up to 4Gb
- High performance: 200MHz Mobile-DDR interface and 400-533MHz LPDDR2
- Small Form Factor: FBGAs (Fine-pitch Ball Grid Arrays), POPs (Package-on-Package) and MCPs (Multi-chip Packages)

The future of Mobile DRAM

Particularly well suited for today’s high-performance, battery-sensitive mobile electronics, Samsung Mobile DRAM can be found in mobile phones, MP3 players, GPS devices, and digital cameras. MCPs, now designed into virtually every mobile phone, also commonly pair Mobile DRAM with NAND, PRAM, or eMMC components to maximize performance, while minimizing the memory footprint.
MCP (Multi-Chip-Package)

As the popularity of handheld electronic devices continues to expand, the memory solution of choice for mobile product designers has become Multi-Chip Package technology. MCPs are stacks of discrete memory die made into single packages. Samsung, the leader in MCPs, offers a broad selection based on leading-edge Flash, Mobile DRAM, SRAM, and now even PRAM technology.

- Samsung manufactures all the memory chips used in MCPs — DRAM, SRAM, Flash and PRAM
- Samsung has developed MCP technology for 2-to 16-chip stacks
- For its 16-die MCP, Samsung created a new wafer-thinning technology to reduce thickness to the size of a human cell — just 30 micrometers

MCP Technology

- Average 45% board space savings
- As low as 1.2mm thickness for an 8-chip MCP
- Faster system performance at lower power
- Lower BOM count simplifies manufacturing and cost
- Faster time to market

The future of MCP: moviMCP™ and PRAM

Samsung moviMCP™ is the newest generation of MCP technology, designed to support a wide range of multimedia applications. Comprised of Samsung’s eMMC (embedded MLC NAND and MMC controller) and Mobile DRAM, it delivers the performance, density and ease-of-use of eMMC with the space and power savings of an MCP. moviMCP can eliminate the need to design for external memory card slots.

The latest MCP solution from Samsung replaces NOR Flash with PRAM – the first MCP of its kind. Samsung’s 512Mb PRAM is combined with Mobile DRAM to deliver performance three times faster than NOR-based MCPs, making it ideal to quickly process large-size multimedia files. Samsung’s PRAM MCP is backward compatible with NOR MCPs.
eMMC (Embedded Multimedia Card)

Samsung eMMC, also known as moviNAND™, is an embedded memory card comprised of high-density MLC NAND Flash and an MMC controller in a small BGA package. The use of industry-standard packaging, interface and firmware makes Samsung’s moviNAND easy to use, enabling:

- Faster time to market
- Common application for use as both embedded and external flash memory
- Cost-effective, performance scalable solution using MLC NAND and MMC controller elements

eMMC Technology

- Up to 64 gigabytes
- 64 megabytes per second data transfer rate
- Industry-standard MMC 4.3 and 4.4 interfaces
- JEDEC-standard 169 FBGA package

The future of mobile multimedia

The global Smartphone market is forecast to grow over 22% annually from 2009 to 2015, totaling over 2.5 billion units by the end of the period. WiFi and 4G network-enabled Tablets will push demand even higher. Multimedia content is driving this demand as operators offer VoD, P2P video sharing, pay-per-view TV and digital radio, as more and more users take higher resolution pictures and HD video with their handsets. Samsung eMMC’s speed, density and compatibility with removable media cards make it the best solution with which to improve the transfer of large multimedia files.

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