



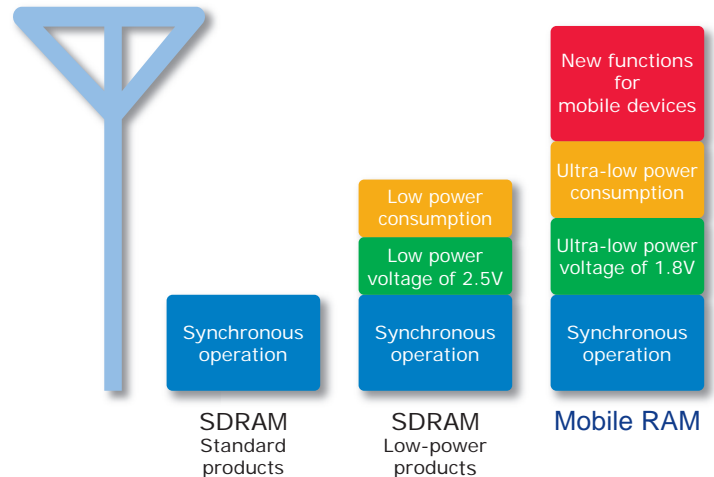
Elpida Memory's Mobile Technology

As cellular phones now offer an increasing number of functions, demands for high-speed, high-density, low-power DRAM are also increasing.

Using leading-edge process technology, sophisticated circuit design technology, and advanced mounting technology, Elpida Memory has developed Mobile RAM, which simultaneously realizes high-speed data transfer, a high-density of 1Gb, and low-voltage operation of 1.8V.

Mobile RAM is synchronous DRAM that features new technology for mobile devices.

Elpida Memory's Mobile RAM is also available in 1Gb, 512Mb, 256Mb, 128Mb and 64Mb densities.



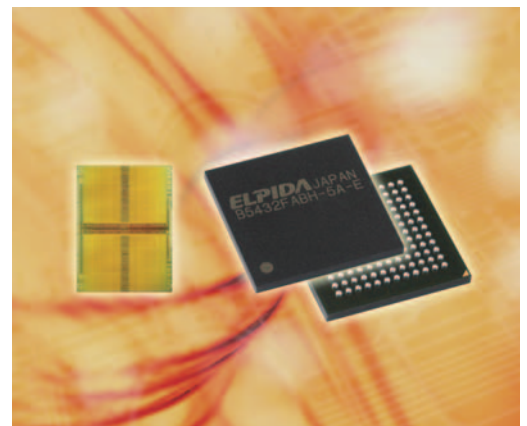
1.2V 533Mbps DDR2 Mobile RAM

Elpida Memory has completed development of the 512Mb DDR2 Mobile RAM operating at an ultra-low voltage of 1.2V. The new product achieves 533Mbps high-speed with the same power consumption of DDR Mobile RAM.

DDR2 Mobile RAM is JEDEC LPDDR2-compliant and an advanced Elpida Mobile RAM product that combines the high performance with low-power consumption suitable for mobile phone and other mobile devices.

Product Features:

- DDR2 Mobile RAM compliant with the JEDEC LPDDR2 specification.
- Including the DRAM core operates at 1.2V versus 1.8V for DDR Mobile RAM
 - 1.2V high-speed operation achieved using 70nm process technology and new peripheral circuit technology.
 - Ultra-low voltage array block and ECC circuits that use global top-level technology enabled dependable functionality with 1.2V I/O and low self-refresh current.
- 533Mbps high-speed functions based on the DDR2 interface
- Partial array self refresh (PASR), automatic temperature compensation self refresh (ATCSR), deep power down (DPD) and other standardized Mobile RAM special low-power functions enable a longer battery operating time.





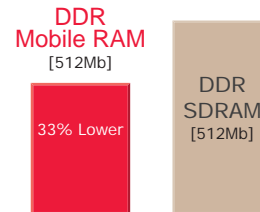
Mobile RAM Features Ultra-Low Power Consumption + High-Speed Operation

With the realization of lower-consumption and lower-current circuits that make full use of Elpida Memory's mobile technology, Mobile RAM achieves 1/9th the current consumption of conventional DDR SDRAMs of the same density and process.

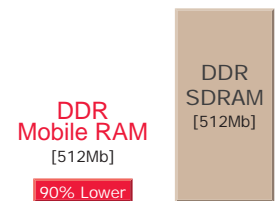
Moreover, to answer the need for greater speed, Elpida Memory provides both SDR and DDR interfaces for Mobile RAM.

- 1.8V operation
- 400Mbps high-speed operation max.
- x16-bit / x32-bit configurations are available
- New functions for mobile applications
 - Partial Array Self Refresh (PASR)
 - Refresh is performed only for specific banks to reduce current.
 - Deep Power Down (DPD)
 - Stops the internal power supply generator to cut standby current.
 - Automatic Temperature Compensation Self-Refresh (ATCSR)
 - Changes the self refresh frequency according to the ambient temperature to reduce current.
 - Programmable Driver Strength
 - I/O driver strength can be controlled according to connected devices.

Operating Current



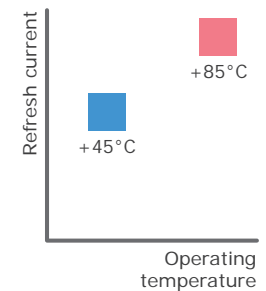
Current Consumption



PASR



ATCSR



Packaging Technology Approach Flexible Response to SiP, MCP and PoP

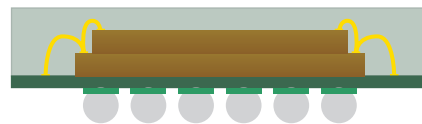
Elpida has focused its packaging technology efforts to offer the most suitable silicon design and packaging as dictated by the cellular market.

Elpida's Mobile RAM die is designed by "Edge Pad Type" where a pad is located around the die area and enables easier stacking of several silicon devices - such as with processors or flash memory - into Multi Chip Packages (MCPs).

Elpida also developed a new packaging technology called "PoP" (Package on Package) which allows several packages to be stacked.

Elpida provides individual semi-custom silicon/packages to meet our customers' unique needs for combining Mobile RAM with processors or flash memory.

SiP/MCP



PoP

