

Technical Note

Advanced Mobile DRAM: LPDDR3



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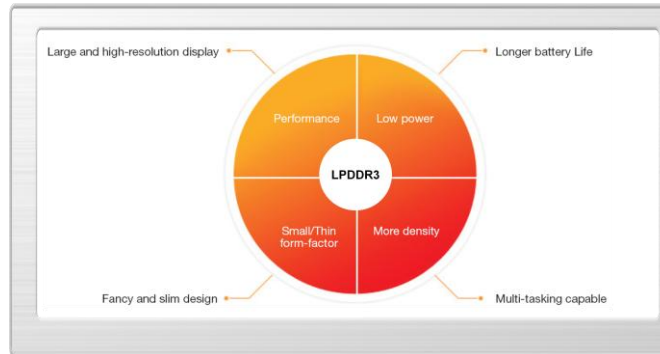
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1 Introduction

The LPDDR3 is designed towards achieving high-speed performance and save power for next generation mobile devices on 4G networks. Key features of LPDDR3 are high performance, very high densities, small physical foot prints & ultra low power consumption when compared to LPDDR2 and DDR3

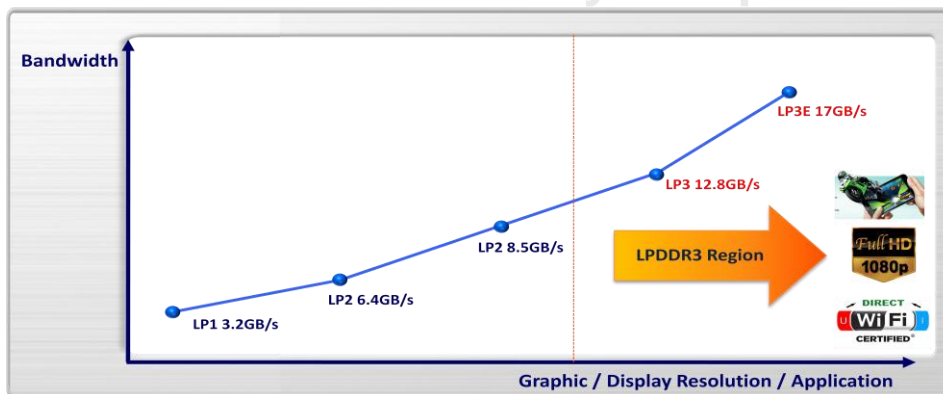


2 Key advantages

2.1 High performance

Up to 1066MHz CLK frequency high operational speeds that keep pace with today's fast mobile CPUs and large displays, enabling users to power through demanding applications and multitasking.

- The maximum data rate of LPDDR3 is 2133 Mbps and bandwidth of around 17 GB/s

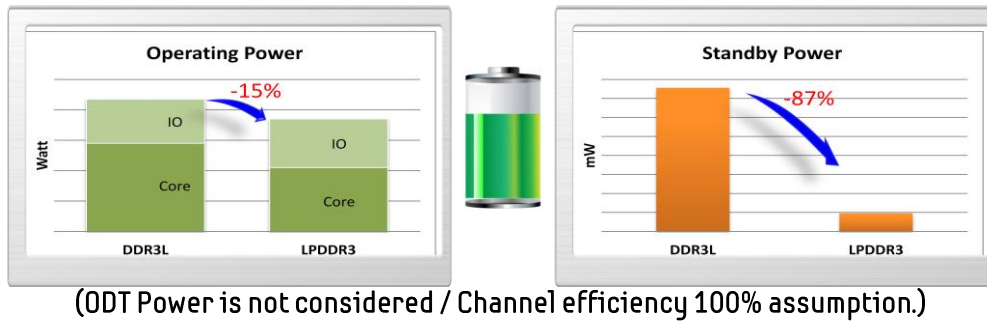


2.2 Power Savings

LPDDR3 extends battery life by reducing power consumption in standby mode and operation mode. LPDDR3 is designed to deliver significant power savings when compared to the DDR3L - while increasing the performance to bring full, high-definition viewing to any mobile device. LPDDR3 achieves

- 15% of power saving over DDR3L under a 2 GB system configuration
- Up to 87% of power saving during sleep mode – which is very essential for battery aided devices.

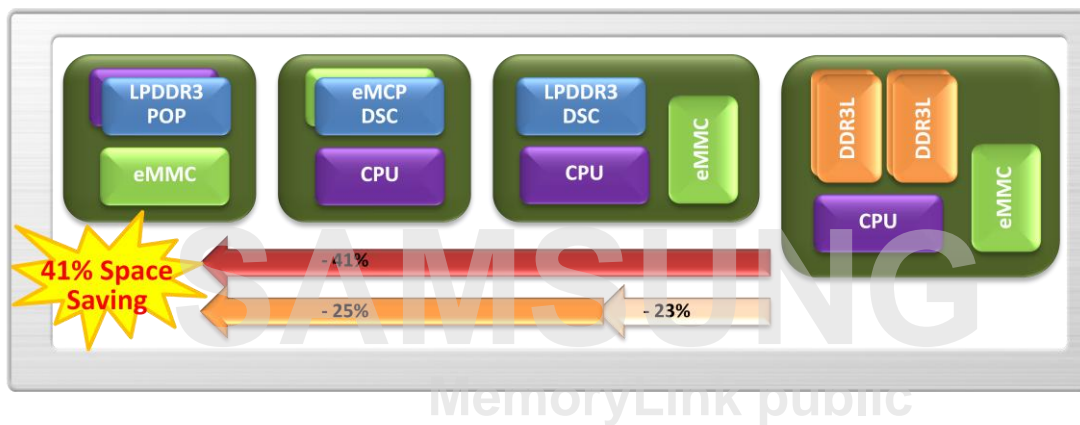
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2.3 Small Form Factor

A Thin, Small form-factor package based design will result in very less space on the board. LPDDR3 can give such flexibility to compose memory with CPU on the PCB

- LPDDR3 saves up to a max 41% PCB space as used in POP+eMMC or eMCP type when compared with DDR3L on board solution.



3 Conclusion

LPDDR3 is highly powerful, efficient and well-suited for today's high-performance, battery-sensitive mobile electronic devices. In addition, LPDDR3 is backward compatible with LPDDR2, which works with the same Core, IO voltages and other parameters.

New features are designed to achieve high speed such as Write Leveling, CA Training, and On-Die Termination compared to LPDDR2. For more details about new features adopted in LPDDR3, please refer to paper on the web-site.

[Table 1] Comparison of LPDDR series

	LPDDR1	LPDDR2	LPDDR3	DDR3
Density	~2Gb	~4Gb	~4Gb	~4Gb
CLK Frequency	~200Mhz	~533MHz	~1066MHz	1066MHz
Prefetch Size	2n	4n	8n	8n
Core Voltage	1.8V	1.2V	1.2V	1.35V
I/O Voltage	1.8V	1.2V	1.2V	1.35V
Burst Lengths	4, 8	4, 8, 16	8	BC4, 8
Configurations	x16, x32	x16, x32	x16, x32	x4, x8, x16

Revision History

<u>History</u>	<u>Date</u>	<u>Writer</u>
Initial issue	Sep. 17, 2012	Yonghun Ahn
Final	Oct. 8, 2012	Younghun Ahn

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