



# DDR3 SDRAM

# ELPIDA

## Feature Comparison of DDR3, DDR2, and DDR SDRAM

Items	DDR3 SDRAM	DDR2 SDRAM	DDR SDRAM
Data rate/pin	800/1066/1333/1600Mbps	400/533/667/800Mbps	200/266/333/400Mbps
CLK Freq.	(400/533/667/800MHz)	(200/266/333/400MHz)	(100/133/166/200MHz)
Power supply (VDD/VDDQ)	1.5±0.075V	1.8±0.1V	2.5±0.2V
Interface	SSTL_15	SSTL_18	SSTL_2
# of Banks	8	4 or 8	4
Pre-fetch	8bit	4bit	2bit
Burst Length	4 (Burst chop) /8	4/8	2/4/8
Posted CAS, Additive Latency	Yes (AL=0/CL-1/CL-2)	Yes (AL=0/1/2/3/4/5)	No
RL,WL	RL=AL+CL WL=AL+CWL	RL=AL+CL WL=RL-1=AL+CL-1	RL=CL WL=1
ZQ pin	Available. For ZQ calib. <sup>Note 1</sup>	N/A	N/A
/Reset pin	Available <sup>Note 3</sup>	N/A	N/A
DQ Driver impedance (Ron)	Programmable	Programmable	Programmable
DQ Driver calibration	ZQ Calib. <sup>Note 1</sup>	OCD Calib. <sup>Note 2</sup>	N/A
ODT function	Available	Available	N/A
ODT calibration	ZQ Calib. <sup>Note 1</sup>	N/A	N/A
Dynamic ODT	Available <sup>Note 4</sup>	N/A	N/A
CLK-DQS De-skew mechanism	Available (Write leveling, Read leveling) <sup>Note 5</sup>	N/A	N/A
Package	FBGA	FBGA	TSOP II

- Notes 1. ZQ Calibration: Calibrate DRAM ODT and Ron values over PVT (Process, Voltage, temperature). External resistor (240ohm±1%) is inserted between DRAM ZQ pin and GND for reference. To perform ZQ calibration, ZQCL or ZQCS command is used. (This is a self-calibration in which DDR3 performs all the measurement and adjustment automatically.)
2. OCD (Off Chip Driver Calibration): Calibrate DRAM Ron over PVT. External device connected to DRAM performs impedance measurement and adjustment (Not a self-calibration). OCD is an optional feature in DDR2.
3. /RESET pin is introduced in DDR3 for system stability. /RESET is active-low signal.
4. Dynamic ODT: ODT value during WRITES can be changed dynamically by enable the Dynamic ODT mode in advance by MRS command. As a result, SI is improved.
5. DDR3 DIMM uses fly-by topology for CMD/ADD/CLK signals to improve SI. This causes flight time difference between DQ/DM/DQS and ADD/CMD/CLK. DDR3 has de-skew mechanism to compensate flight time difference.

## 2Gbps High-Speed DDR3 SDRAM

Elpida Memory has developed a top-tier power efficient 1 Gigabit DDR3 SDRAM, which is capable of operating at an ultra-fast speed of 2Gbps.

This product uses 35% less operating current compared with the company's existing products and can support an operating speed of 2Gbps, which is considerably faster than the industry standard of 1600Mbps at 1.5V. Also, in response to demand for next-generation low-power products Elpida's new device can operate at 1600Mbps using 1.35V.

Elpida's new DDR3 SDRAM is based on advanced 65nm process technology. Sample shipments will start in September 2008 with mass production expected to begin the next month in October.



Part Number	Data Transfer Rates	Design Process	Supply Voltage	Packages
EDJ1104BBSE	DDR3-2000 (11-11-11)	65nm	1.5V±0.075V	78-ball FBGA (x4/x8)
EDJ1108BBSE	DDR3-1867 (11-11-11)			8.00mm×11.50mm
EDJ1116BBSE	DDR3-1600 (9-9-9)			96-ball FBGA (x16)
				8.00mm×13.50mm



## DDR3 SDRAM SO-DIMM

Elpida Memory has received Intel's validation for its next-generation main memory DDR3 SO-DIMM. The upcoming Intel® Centrino® 2 processor technology mobile platform is supported by Elpida's DDR3 SO-DIMM production capabilities.

Since completing development of its DDR3 SDRAM in August 2005, Elpida began delivering DIMM samples at the end of 2005 and has been developing faster high-speed technologies. In May 2007 Elpida received Intel's desktop platform validation of its DDR3 main memory. Now Elpida has received Intel's mobile platform validation for its DDR3 SO-DIMM.

Elpida is now shipping DDR3 for high-end desktop PCs and will start shipments to notebook PC and server vendors making the transition from DDR2 to DDR3. Elpida's DDR3 memory products are recognized for their high-speed, low power consumption, stable operation and mass production capabilities. They are already shipped in large volumes as standard-use products to makers of high-end desktop PC & Work Station systems. Major notebook customers are validating Elpida's SO-DIMM.

As a leading vendor of DDR3 Elpida has a diverse line-up of DDR3 products. Elpida will make it possible to support not only DDR3-1066/800 but also in the near future DDR3-1600/1333 products. DDR3 shipments are likely to increase based on Elpida's plans to introduce improved high-speed, low-cost next-generation products in summer 2008 and 50nm process products in 2009.

### Products Which Have Received Intel's Validation

#### 2GB

EBJ21UE8BASA-AE-E (DDR3-1066)

EBJ21UE8BASA-8C-E (DDR3-800)

#### 1GB

EBJ11UE6BASA-AE-E (DDR3-1066)

EBJ11UE6BASA-8C-E (DDR3-800)

#### 512MB

EBJ51UE6BASA-AE-E (DDR3-1066)

EBJ51UE6BASA-8C-E (DDR3-800)

