Multi-Chip Package MEMORY
256M Bit(32Mx8) NAND Flash / 1G Bit (8Mx16x8Banks) DDR2 SDRAM

Revision No.	History	Draft Date	Remark
Rev00	Initial Draft	May. 2010	Preliminary
Rev01	Correct Pin Configuration	Aug. 2011	
Rev02	Change tREA parameter from 30ns to 35ns (page 23)	Oct. 2011	

Multi-Chip Package MEMORY

256M Bit (32Mx8) NAND Flash / 1G Bit (8Mx16x8Banks) DDR2 SDRAM

<MCP Features>

•Operating Temperature : 0℃ ~ 70℃

•119-ball FBGA Type - 10mm x 13mm, 0.8mm pitch

<NAND Features>

- **Power Supply Voltage**
  - 2.7V ~ 3.6V
- **Organization**
  - Memory Cell Array : (32M + 1M)bit x 8 bit
- **Data Register : (512 + 16)bit x 8 bit**
- **Automatic Program and Erase**
  - Page Program : (512 + 16)Byte
  - Block Erase : (16K + 512)Byte
- **Page Read Operation**
  - Page Size : (512 + 16)Byte
  - Random Access : 12μs(Max.)
  - Serial Page Access : 50ns(Min.)
- **Fast Write Cycle Time**
  - Program time : 200μs(Typ.)
  - Block Erase Time : 2ms(Typ.)

. Chip Enable Don't Care

- Simple interface with microcontroller
- Program/Erase Lockout During Power Transitions

- **Data Integrity**
  - Endurance : 100K Program/Erase Cycles (with 1bit/512byte ECC)
  - Data Retention : 10 Years

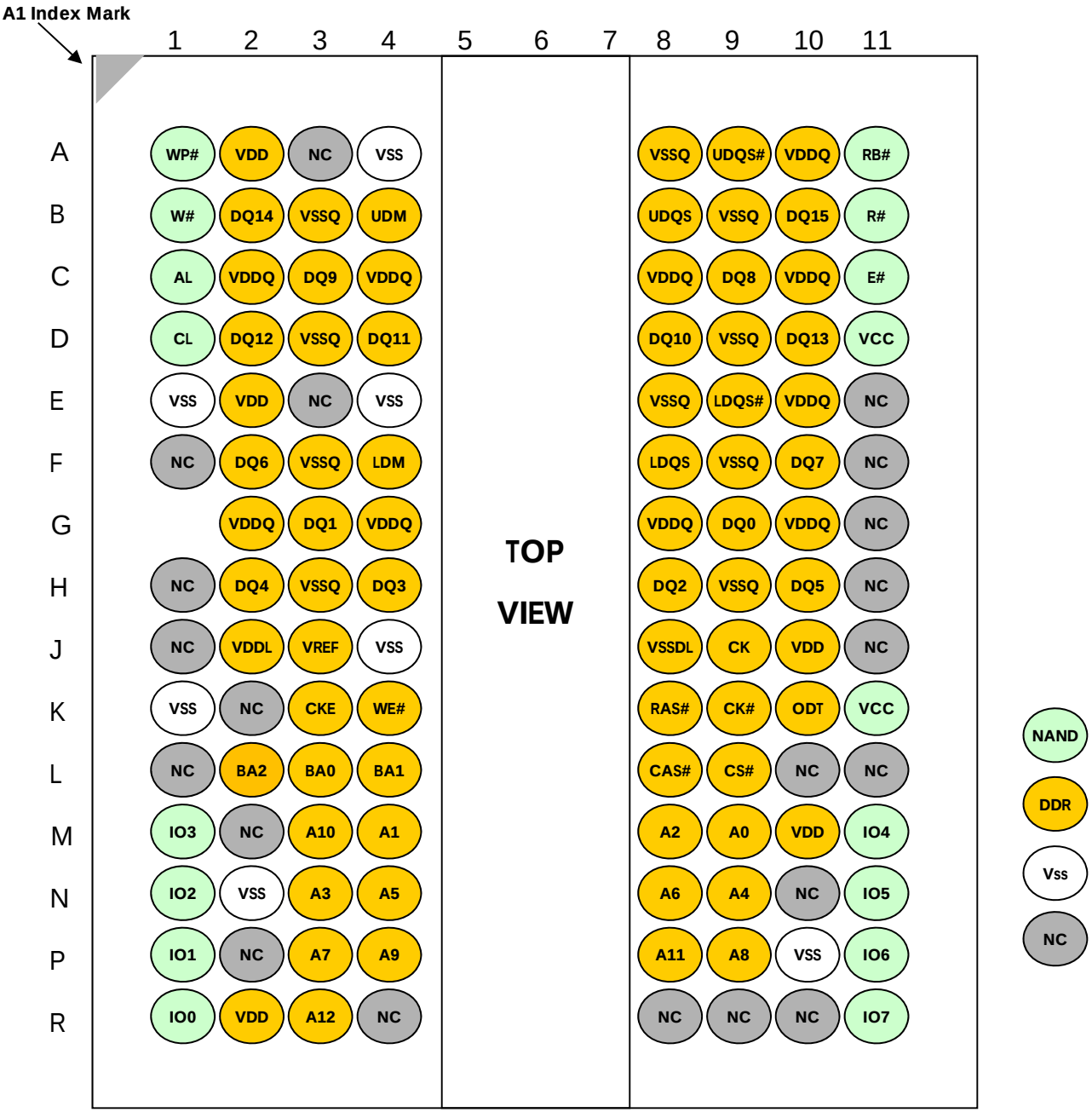
. Command Register Operation

<DDR2 SDR Features>

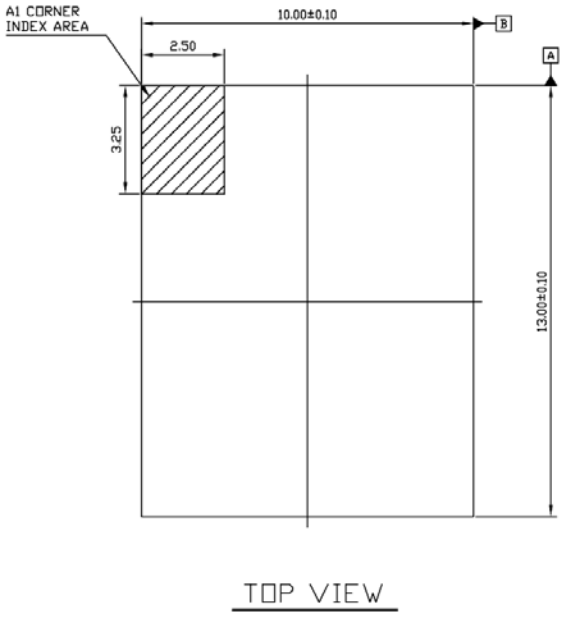
- **Density:** 1G bits
- **Organization :** 8M × 16 bits × 8 banks
- **Power supply:**1.8V ± 0.1V
- **Data rate:** 667/800 (max.)
- **8 internal memory banks**
- **Programmable CAS Latency:**3,4,5
- **Programmable Additive Latency :** 0,1,2,3,4,5
- **Write Latency =** Read Latency -1
- **Programmable Burst Length :**

  4 and 8 Programmable Sequential / Interleave Burst
- **OCD (Off-chip Driver Impedance Adjustment)**
- **ODT (On-Die Termination)**
- **4n-bit prefetch architecture**
- **Data-Strobes :** Bidirectional, Differential
- **Auto-Refresh and Self-Refresh**
- **Strong and Weak Strength Data-Output Driver**
- **2KB Page Size**
- **7.8us max. Average Periodic Refresh Interval**

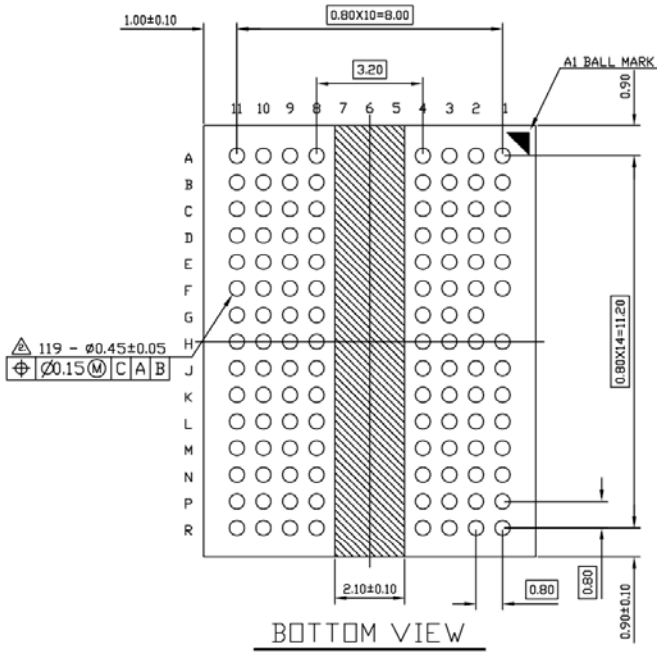
PIN CONFIGURATION(10.0x13.0mm, 119-FBGA)



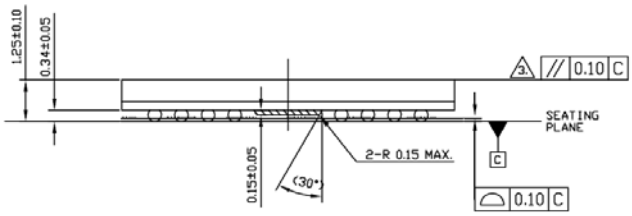
Package Drawing(10.0x13.0mm, 119-FBGA)



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Description
FBGA 119BALL 10 x 13
Dimension
10.0mm x 13.0mm x 1.25mm

1. **ALL DIMENSIONS are in Millimeters.**
2. **POST REFLOW SOLDER BALL DIAMETER.**
   (Pre Reflow diameter : Ø0.45±0.02)
3. **TOLARENCE INCLUDES WARPAGE.**

PIN DESCRIPTION

Pin Name	Function (DDR2 SDRAM)
A0~A12	Address Inputs
BA0, BA1, BA2	Block Select Address
DQ0~DQ15	Data Input/Output
LDQS, $\overline{\text{LDQS}}$	Low Data Strobe
UDQS, $\overline{\text{UDQS}}$	Up Data Strobe
$\overline{\text{CS}}$	Chip Select
$\overline{\text{RAS}}$	Row Address Strobe Command
$\overline{\text{CAS}}$	Column Address Strobe Command
$\overline{\text{WE}}$	Write Enable
LDM, UDM	Input Mask
CLK	Clock Input
CLK#	Clock Input
CKE	Clock Enable
VREF	Input Reference Voltage
VDD	Power Supply
VDDQ	Power for DQ Circuit
VSSQ	Ground for DQ Circuit
VDDL	Power for DLL
VSSDL	Ground for DLL
ODT	On-Die Terminal Control

Pin Name	Function (NAND Flash)
IO0~IO7	Input and Output
$\overline{\text{CE}}$	Chip Enable
$\overline{\text{WE}}$	Write Enable
$\overline{\text{RE}}$	Read Enable
ALE	Address Latch Enable
CLE	Command Latch Enable
$\overline{\text{WP}}$	Write Protect
R/$\overline{\text{B}}$	Ready/Busy
VCC	Power Supply

Pin Name	Function
VSS	Ground
NC	No Connection

Ordering Information