

# **Reliability Qualification Report**

for

**DDRII SDRAM with Pb/Halogen Free**

**(256M×8, 60nm SDRAM AS4C256M8D2-25BIN)**

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## 1. Information

|                   |                          |
|-------------------|--------------------------|
| <b>Product</b>    | <b>2Gb DDRII SDRAM</b>   |
| <b>Device</b>     | <b>AS4C256M8D2-25BIN</b> |
| <b>Technology</b> | <b>60nm</b>              |
| <b>Function</b>   | <b>256M*8 DDRII</b>      |

|                         |                                     |
|-------------------------|-------------------------------------|
| <b>Package Type</b>     | <b>60B FBGA</b>                     |
| <b>Substrate</b>        | <b>BT</b>                           |
| <b>Solder Ball</b>      | <b>Sn/Ag/Cu 96.5/3/0.5 ; 0.45mm</b> |
| <b>Molding Compound</b> | <b>Sumitomo G750</b>                |
| <b>Package Size</b>     | <b>10.5x13 mm<sup>2</sup></b>       |

## 2. Life Test

| Test Items                                    | Test Conditions         | Sample Size | Stress Hours | Results<br>(Number of failures) |
|-----------------------------------------------|-------------------------|-------------|--------------|---------------------------------|
| 2.1 High Temperature<br>Operation Life Test * | Ta = 125 °C; VDD = 2.5V | 573         | 1000hrs      | 0/573                           |

Remark:

\*. Preconditioning

T/C@ -65/150°C, 5cycls. => Baking @ 125°C, 24 hours. => Soaking @ 30°C / 60% R.H., 192 hours => IR : 3 times,

| Test Items          | Test Conditions         | Sample Size | Stress Hours | Results<br>(Number of failures) |
|---------------------|-------------------------|-------------|--------------|---------------------------------|
| 2.2 Early Life Test | Ta = 125 °C; VDD = 2.5V | 4,060       | 48hrs        | 0/4060                          |

### 3. Environmental Test

| Test Items                                               | Test Conditions                    | Sample Size | Stress Hours | Results<br>(Number of failures) |
|----------------------------------------------------------|------------------------------------|-------------|--------------|---------------------------------|
| 3.1 High Temperature Storage Life Test *                 | Ta. = 150°C                        | 45          | 1000hrs      | 0/45                            |
| 3.2 Temperature Cycle Test *                             | Ta.= -65°C / +125°C                | 45          | 500cycles    | 0/45                            |
| 3.3 Highly Accelerated Temperature and Humidity Stress * | Ta. = 130°C / 85%RH;<br>VDD = 2.0V | 45          | 100hrs       | 0/45                            |

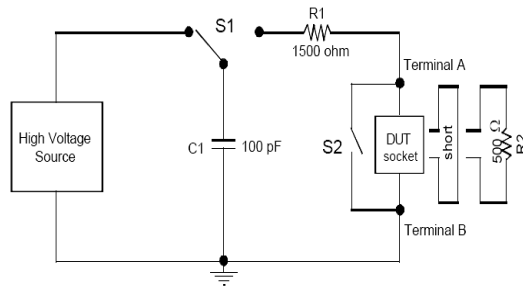
Remark:

\*. Preconditioning

T/C@ -65/150°C, 5cycs. => Baking @ 125°C , 24 hours. => Soaking @ 30°C / 60% R.H., 192 hours => IR : 3 times

## 4. ESD Sensitivity

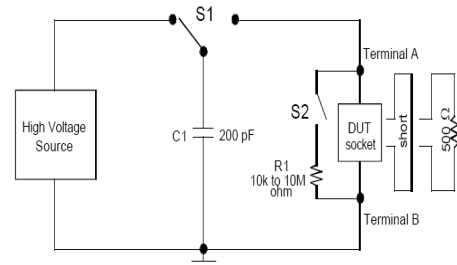
### 4.1 a. Human Body Model (HBM) Test Circuit



\* Human Body Model (HBM)

◦ Stress Voltage :  $> \pm 2000V$

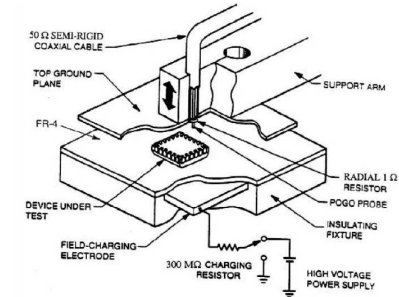
### b. Machine Mode (MM) test circuit:



\* Machine Model (MM)

◦ Stress Voltage :  $\pm 200V$

### c. Charge Device Model (CDM) test circuit:



Charge Device Model (CDM)

◦ Stress Voltage :  $> \pm 500V$

4.2 Reference: HBM: JESD22-A114; MM: EIA/JESD22-A115; CDM: JESD22-C101

4.3 Sample size : 3 ea/ lot, total 3 lots

4.4 Judgment Criteria : Pass Leakage, standby current and functionality tests at both high and low temperature.

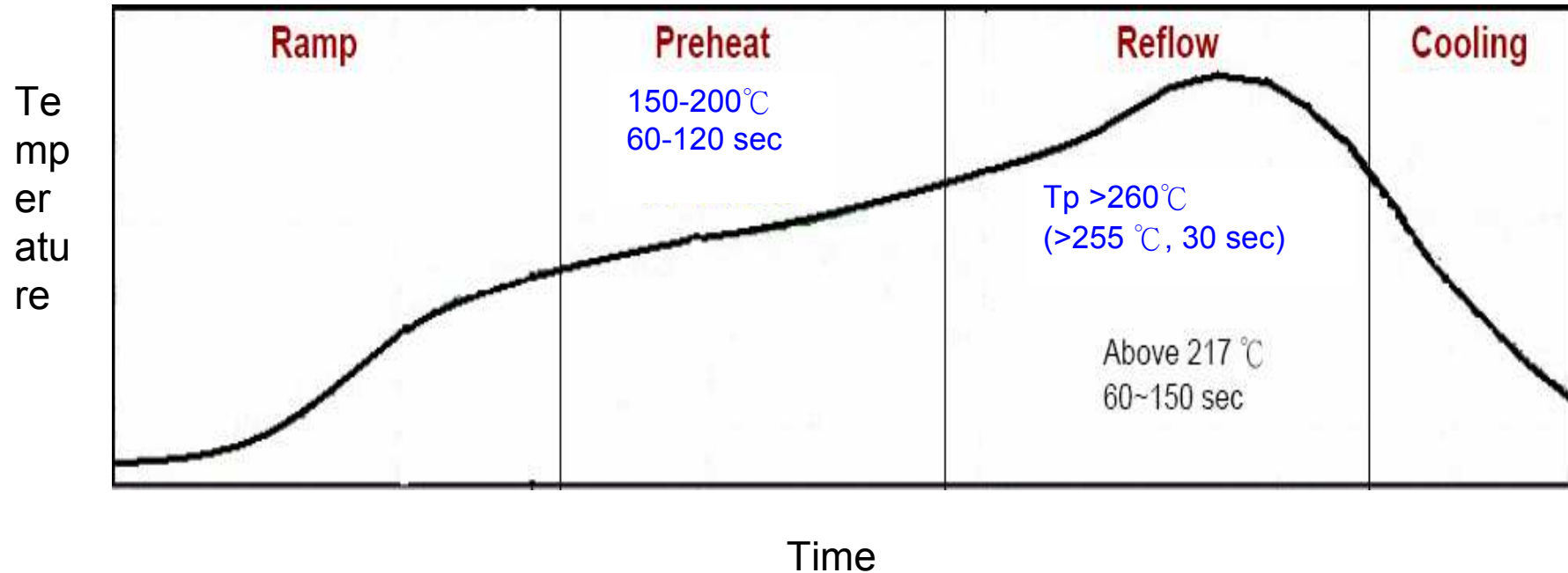
4.3 Test Result : **HBM :  $> \pm 5000V$**   
**MM :  $> \pm 200V$**   
**CDM :  $> \pm 1000V$**

## 5. Latch-up Test

| Test Items                     | Test Conditions                                          | Sample Size      | Results<br>(Number of failures) |
|--------------------------------|----------------------------------------------------------|------------------|---------------------------------|
| 5.1 I-test                     | $>\pm 200\text{mA}$ ; $T_a = 85\text{ }^{\circ}\text{C}$ | 6 ea/lot, 1 lots | 0/6                             |
| 5.2 V-supply over voltage test | $\geq 4\text{V}$ ; $T_a = 85\text{ }^{\circ}\text{C}$    | 6 ea/lot, 1 lots | 0/6                             |

5.3 Reference: JESD78A

## 6. IR-reflow Profile



1. The IR reflow profile follows the IPC/JEDEC J-STD-020D.1.
2. Ramp up rate: 3 °C/sec max., Ramp down rate: 6 °C/sec max..
3. The maximum temperature should be limited to 260 °C.
4. Time above liquidus temperature (217 °C) should be 60~150 sec.
5. The re-flow should not be repeated for more than 3 times.
6. Time 25 °C to peak temperature should be 8 minutes maximum.