

Reliability Qualification Report

for

DDRII SDRAM with Pb/Halogen Free

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

Index

1. Information	Page 1
2. Life Test	Page 2
3. Environmental Test	Page 3
4. ESD Test	Page 4
5. Latch-up Test	Page 5
6. IR-reflow Profile	Page 6

1. Information

Product	2Gb DDRII SDRAM
Device	AS4C256M8D2-25BCN
Technology	60nm
Function	256M*8 DDRII

Package Type	60B FBGA
Substrate	BT
Solder Ball	Sn/Ag/Cu 96.5/3/0.5 ; 0.45mm
Molding Compound	Sumitomo G750
Package Size	10.5x13 mm²

2. Life Test

Test Items	Test Conditions	Sample Size	Stress Hours	Results (Number of failures)
2.1 High Temperature 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 (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 (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; VDD = 2.0V	45	100hrs	0/45

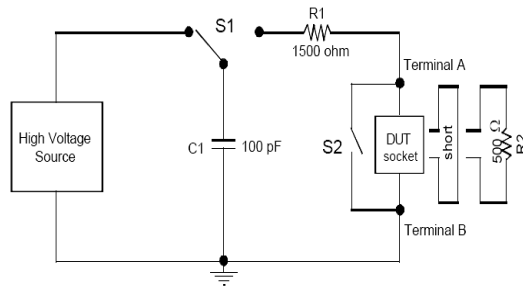
Remark:

*. 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

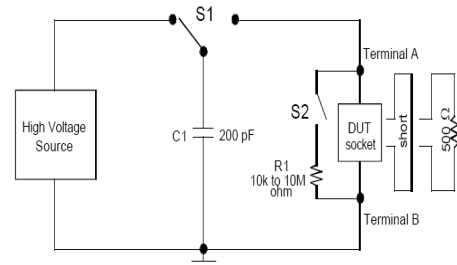
4.1 a. Human Body Model (HBM) Test Circuit



* Human Body Model (HBM)

◦ Stress Voltage : $> \pm 2000V$

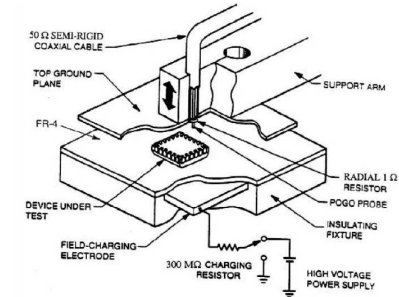
b. Machine Mode (MM) test circuit:



* 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.

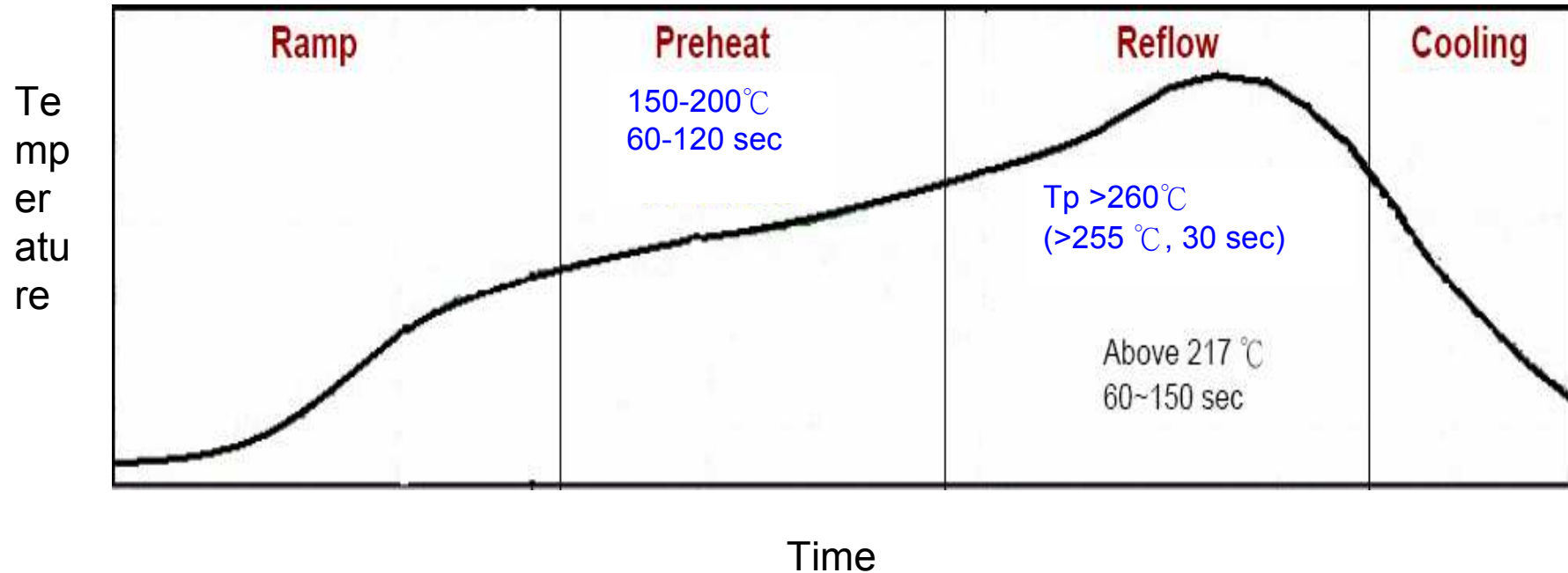
4.3 Test Result : **HBM : $> \pm 5000V$**
MM : $> \pm 200V$
CDM : $> \pm 1000V$

5. Latch-up Test

Test Items	Test Conditions	Sample Size	Results (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.