Product Qualification Report

30nm 2G*b DDRIIIL SDRAM*

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1. Information

Product	2Gb DDRIIIL SDRAM
Device	AS4C128M16D3LB-12BCN
Technology	30nm
Function	128M*16 DDRIIIL

Package Type	96B FBGA
Substrate	BT
Solder Ball	Sn-Ag-Cu solder ball
Molding Compound	HITACHI CEL-9120HF
Package Size	8*13 mm^2

2. Life Test

Test Items	Test Conditions	Sample Size	Stress Hours	Results (Number of failures)
2.1 High Temperature Operation Life Test *	Ta = 125 ℃; array VDD =1.5V	515	168hrs 500hrs 1000hrs	0/515 0/515 0/515
2.2 Low Temperature Operation Life Test *	Ta = -40 ℃; array VDD =1.5V	105	168hrs 500hrs 1000hrs	0/105 0/105 0/105

Remark:

* Preconditioning:

Baking @ 125℃ , 24 hours. => Soaking @ 30℃ / 60% R.H., 192 hours => IR : 3 times.

Test Items	Test Conditions	Sample Size	Stress Hours	Results (Number of failures)
2.3 Early Failure Rate	Ta = 125 ℃; array VDD = 1.5V	5,685	24hrs	1/5685

* SCF (Single cell fail) *1

Root Cause: Capacitor - Capacitor short issue

Corrective Action: New container oxide Etch recipe to open process window for capacitor-capacitor short issue improvement.

3. Environmental Test

Test Items	Test Conditions	Sample Size	Stress Hours	Results (Number of failures)
3.1 High Temperature Storage Life Test *	Ta. = 150℃	231	168hrs 500hrs 1000hrs	0/231 0/231 0/231
3.2 Temperature Cycle Test *	Ta.= -55℃ / +125℃, 2 cycs/ Hr	231	500cycs 1000cycs	0/231 0/231
3.3 Highly Accelerated Stress Test *	Ta. = 130℃/ 85%RH;	231	144hrs	0/231

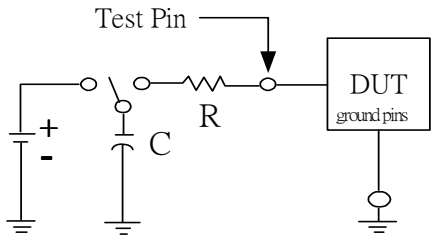
Remark:

*. Preconditioning

Baking @ 125℃ , 24 hours. => Soaking @ 30℃ / 60% R.H., 192 hours => IR : 3 times.

4. ESD Sensitivity

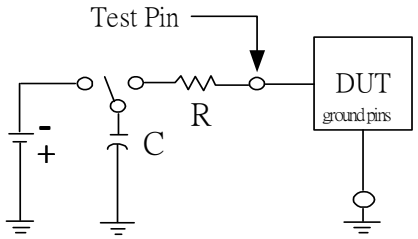
4.1 a. Human Body Model (HBM) Test Circuit



* Human Body Model (HBM)

◦ Stress Voltage : >±4000V

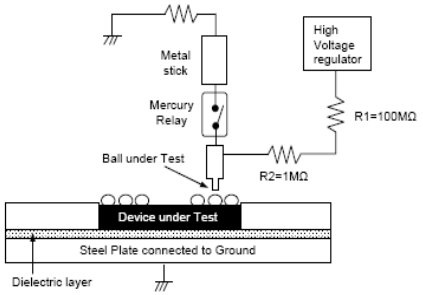
b.Machine Mode (MM) test circuit:



*Machine Model (MM)

◦ Stress Voltage : ±300V

c. Charge Device Model (CDM) test circuit



Charge Device Model (CDM)

◦ Stress Voltage : > ±750V

4.2 Reference: HBM: JESD22-A114-B; MM: JESD22-A115-E; CDM: ANSI/ ESD SP 5.3.2

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 : > ±4000V**
MM : > ±300V
CDM : > ±750V

5. Latch-up Test

Test Items	Test Conditions	Sample Size	Results (Number of failures)
5.1 I-test (Positive and Negative)	>±150mA	6 ea/ lot, total 3 lots	0/18
5.2 V-supply over voltage test	>± 1.5 max. Vsupply	6 ea/ lot, total 3 lots	0/18

5.3 Reference: Test procedure in according to EIA/JESD 78A

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