

Reliability Qualification Report

for

**LPSDR SDRAM with Pb/Halogen Free
(Industrial)**

(16M×32, 65nm SDRAM AS4C16M32MSB-6BIN)

Contents :

1. Title

2. Product and Package Information

3. Result Summary

4. Package Outline Drawing

5. Pin Configuration

6. Accelerated Lifetime Simulation Tests

7. Accelerated Environment Stress Tests

8. Electrical Verification Tests (Electrostatic Discharge & Latch-up)

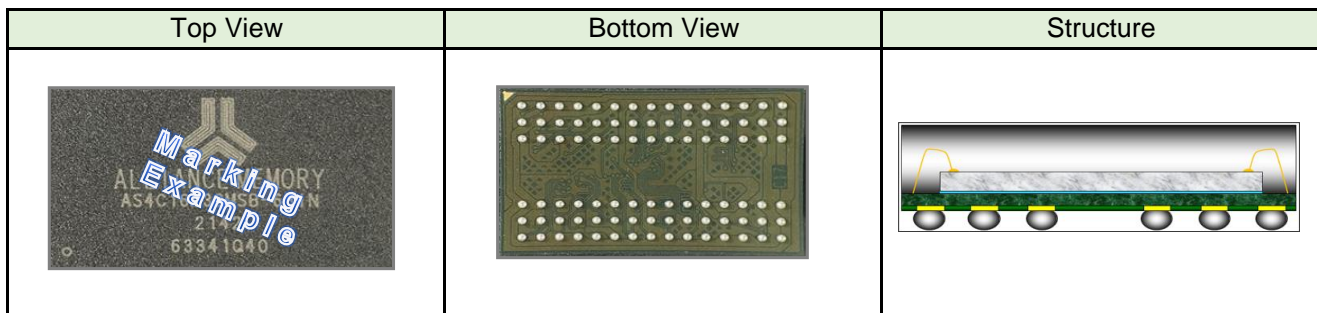
Revision History

1. Title

This report describes the reliability and qualification data of Alliance product listed below. The qualification and reliability tests have been completed successfully based on Alliance standard.

2. Product and Package Information

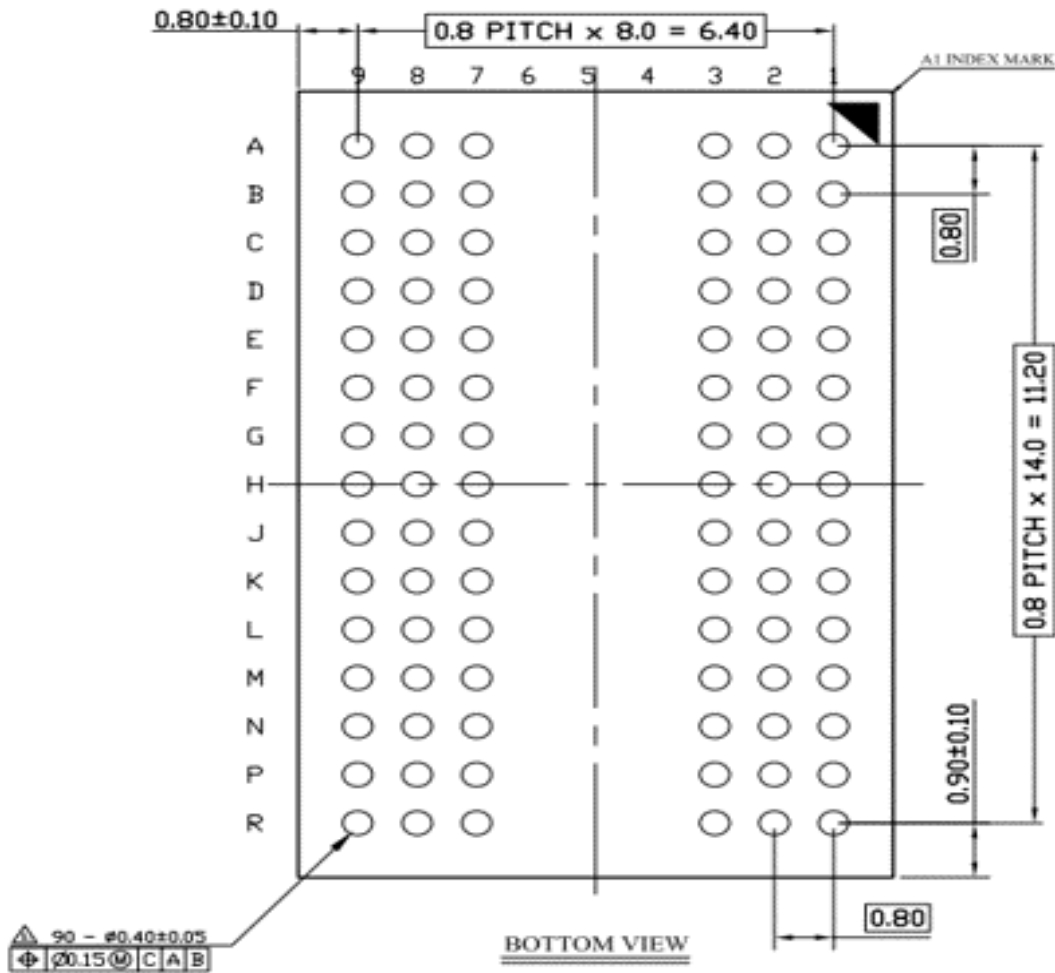
Product Code : AS4C16M32MSB-6BIN
 Operating Temperature : -40°C to +85°C
 Package Type : FBGA 90B (8x13mm, 1.0T)
 Flammability : UL-V0
 Solder ball : SAC1205N (98.25% Sn / 1.2% Ag / 0.5% Cu / 0.05% Ni)





3. Result Summary

Lifetime Simulation Tests : Passed ELFR & HTOL
 Environment Stress Tests : Passed All Tests
 ESD & Latch-up : Passed HBM 2000V, MM 200V, CDM 750V
 & Latch-up ±200mA

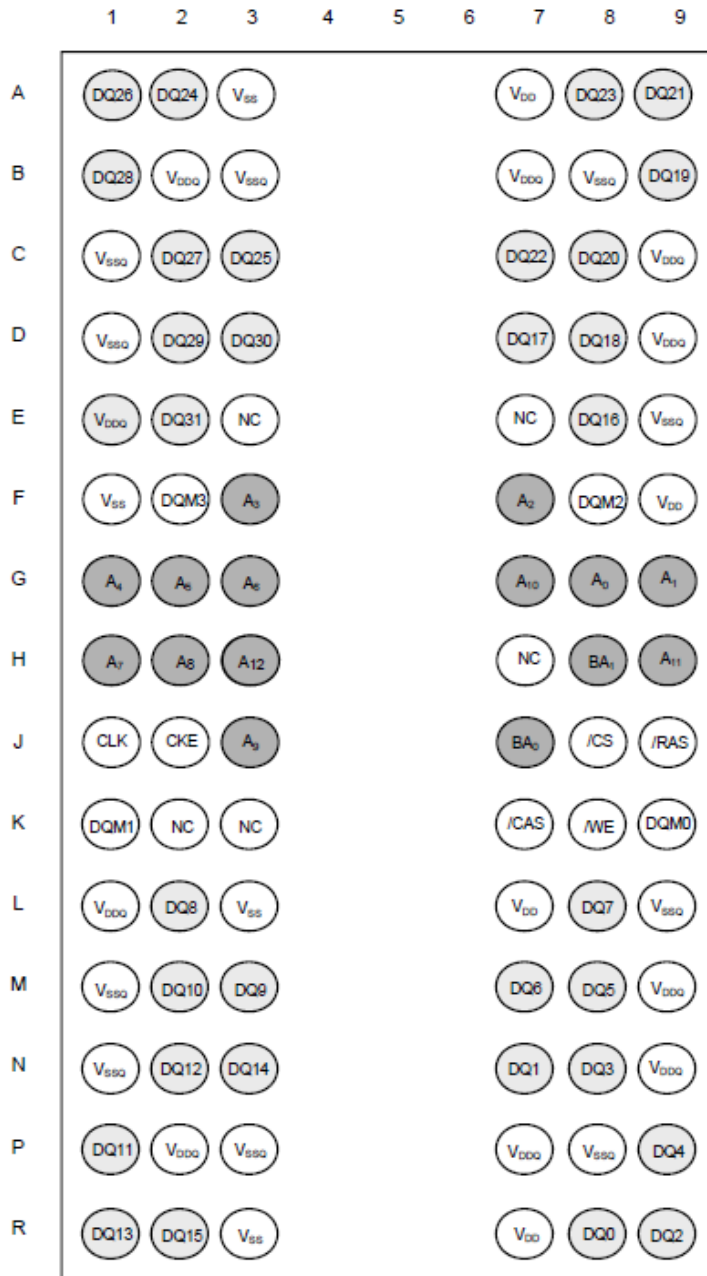
4. Package Outline Drawing



NOTE :

1. ALL DIMENSION ARE IN MILLIMETERS.
2.  POST REFLOW SOLDER BALL DIAMETER.
(Pre Reflow Diameter : 0.35±0.02)
3.  TOLERANCE INCLUDES WARPAGE.

5. Pin Configuration (FBGA 90B)



6. Accelerated Lifetime Simulation Tests

Group	Test Item / Conditions	Test Method	Duration or Level	Result	Notes
				Failed Q'ty / Tested Q'ty	
Accelerated Lifetime	Early Life Failure Rate 125°C, Dynamic stress	JESD22-A108	48 hours	0 / 1000 (Passed)	1, 2
	High Temperature Operating Life 125°C, Dynamic stress	JESD22-A108	1000 hours	0 / 231 (Passed)	1, 2

Note :

- 1) Electrical test is performed before and after each item.
- 2) "Dynamic stress" means continuous memory operation like read or write function.

Estimation Condition :

User Operating Temperature : 60°C
 User Operating Voltage : Worst case (Maximum Operating Voltage in the Datasheet)
 Confidence Level : 60%

DRAM :

Early Life : 201.1 FITs
 Inherent Life : 41.8 FITs

7. Accelerated Environment Stress Tests

Group	Test Item / Conditions	Test Method	Duration or Level	Result	Notes
				Failed Q'ty / Tested Q'ty	
Accelerated Environment Stress Tests	Preconditioning Temperature Cycling : -55°C to 125°C Bake : 125°C Soak : 30°C, 60% RH Reflow : 260°C	JESD22 A113	Level 3 5 cycles 24 hours 192 hours 3 cycles	0 / 90 (Passed)	1
	Unbiased HAST 110°C, 85% RH	JESD22-A118	264 hours	0 / 45 (Passed)	1, 2
	Temperature Cycling -65°C to 150°C	JESD22-A104	500 cycles	0 / 45 (Passed)	1, 2
	High Temperature Storage Life 150°C	JESD22-A103	1008 hours	0 / 45 (Passed)	1

Note :

- 1) Electrical test is performed before and after each item.
- 2) Preconditioning is performed before the test.

8. Electrical Verification Tests (Electrostatic Discharge & Latch-up)

Group	Test Item / Conditions	Test Method	Duration or Level	Result	Notes
				Failed Q'ty / Tested Q'ty	
Electrical Verification Tests	ESD Human Body Model	JESD22A-114	2000V	0 / 12 (Pass)	1, 2
	ESD Charged Device Model	JESD22A-115	200V	0 / 12 (Pass)	1, 2
	ESD Charged Device Model	JESD22-C101	750V	0 / 3 (Pass)	1, 2
	Latch-Up (I-test)	JESD78	±200mA	0 / 6 (Pass)	1, 2

Note :

- 1) Electrical test is performed before and after each item.
- 2) HBM, CDM and Latch-up tests are performed at room temperature.