Reliability Qualification Report

for

LPSDR SDRAM with Pb/Halogen Free (Industrial)

(8M×32, 65nm SDRAM AS4C8M32MSB-6BIN)

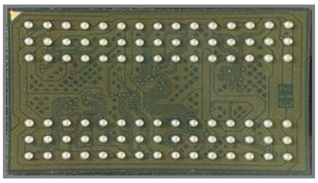
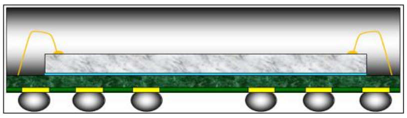
Contents :

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

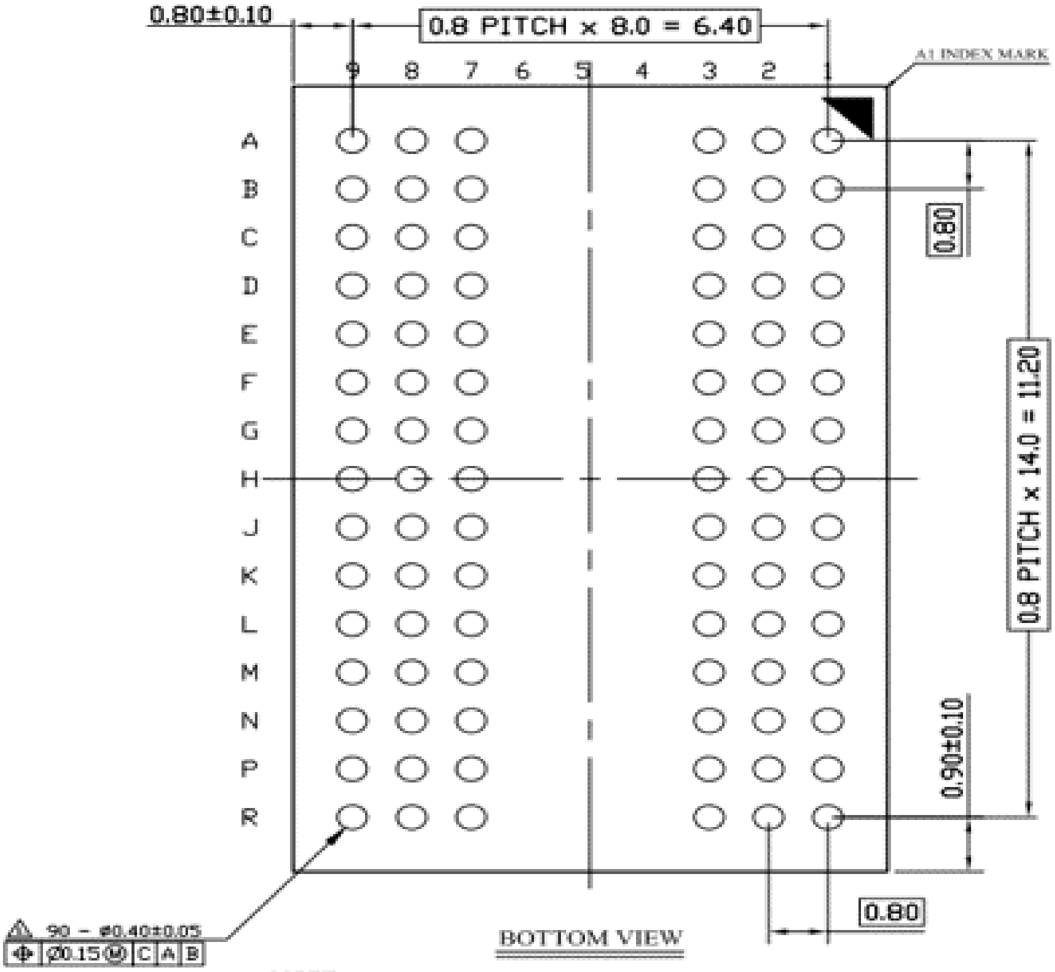
Product Code	:	AS4C8M32MSB-6BIN
Operating Temperature	:	-40°C to +85°C
Package Type	:	FBGA 90B (8x13mm, 1.0T)
Flammability	:	UL-V0
Solder ball	:	SAC1205N (98.25% Sn / 1.2% Ag / 0.5% Cu / 0.05% Ni)

Top View	Bottom View	Structure
		

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

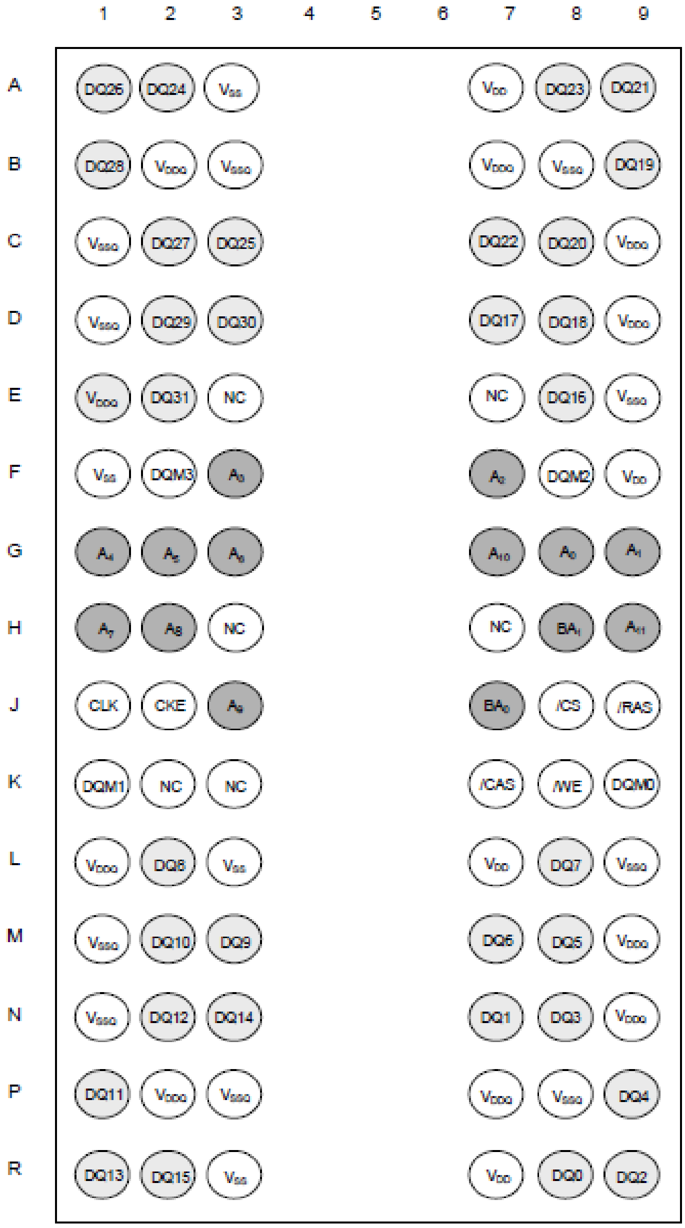


BOTTOM VIEW

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)



	1	2	3	4	5	6	7	8	9
A	DQ26	DQ24	V_{SS}				V_{DD}	DQ23	DQ21
B	DQ28	V_{DDQ}	V_{SSQ}				V_{DDQ}	V_{SSQ}	DQ19
C	V_{SSQ}	DQ27	DQ25				DQ22	DQ20	V_{DDQ}
D	V_{SSQ}	DQ29	DQ30				DQ17	DQ18	V_{DDQ}
E	V_{DDQ}	DQ31	NC				NC	DQ16	V_{SSQ}
F	V_{SS}	DQM3	A_3				A_2	DQM2	V_{DD}
G	A_4	A_5	A_6				A_{10}	A_0	A_1
H	A_7	A_8	NC				NC	BA_1	A_{11}
J	CLK	CKE	A_9				BA_0	/CS	/RAS
K	DQM1	NC	NC				/CAS	/WE	DQM0
L	V_{DDQ}	DQ8	V_{SS}				V_{DD}	DQ7	V_{SSQ}
M	V_{SSQ}	DQ10	DQ9				DQ6	DQ5	V_{DDQ}
N	V_{SSQ}	DQ12	DQ14				DQ1	DQ3	V_{DDQ}
P	DQ11	V_{DDQ}	V_{SSQ}				V_{DDQ}	V_{SSQ}	DQ4
R	DQ13	DQ15	V_{SS}				V_{DD}	DQ0	DQ2

6. Accelerated Lifetime Simulation Tests

Group	Test Item / Conditions	Test Method	Duration or Level	Result	Notes
				Failed Q'ty / Tested Q'ty	
Accelerated Lifetin	**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℃
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.