

 **中微腾芯**
WUXI CMC ELECTRONICS CO., LTD



企业愿景：成为国内集成电路检测行业的领航者

企业使命：科技创新 融合发展 追求卓越

企业价值观：诚信、品质、奋进、共赢

AEC-Q100 RELIABILITY TEST REPORT

QR-TC-09-02-A

Device Name : Low power MCU

Sample Model : FM33LG048A

Batch Number : C4B27N6G/C4B27N7G/C4B27N8G

Manufacturer : Shanghai Fudan Microelectronics Group Co.,Ltd

WE HEREBY CERTIFY THAT:

The test(s) shown in the attachment were conducted according to the indicating procedures. We assume full responsibility for the accuracy and completeness of these tests and vouch for the qualifications of all personnel performing them.

Post	Name	Signature	Data
Testing Engineer	Zhijing Xu	徐智金	2021/11/08
Inspection Engineer	Yongjun XU	徐永军	2021/11/08


Wuxi CMC Electronics CO.,Ltd

DECLARATION

1. The report is invalid without seal;
2. The report is invalid without signatures ;
3. The report is invalid with any scrawl;
4. Incomplete reprography is unallowed;
5. If tested devices come from customer sampling, results could explain the quality of samples。
6. If you have any objection to the test results, please submit a complaint to our center within one month from the date of receipt of the report, and attach the original report, otherwise it will not be accepted.

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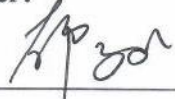
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1. Test Report

Device Name	Low power MCU	Sample Model	FM33LG048A
Package Type	LQFP80	Sample Batch Number	C4B27N6G C4B27N7G C4B27N8G
Manufacturer	Shanghai Fudan Microelectronics Group Co.,Ltd		
Test Category	AEC Q100 Reliability Test	Sample Source	Customer sample delivery
Test Start Date	2021/09/10	Test End Date	2021/11/08
Inspection Standard	AEC Q100-Rev-H-2014 JEDEC MIL-STD-883-2-2019		
Results and Conclusions	The samples have been tested and certified according to the requirements of AEC-Q100-Rev-H-2014, and the test progress is normal. The certification result is : PASS.		
Comment	/		
Sign	Editor: 	Examiner: 王菲	Approver: 
	Date: 2021.11.8	Date: 2021.11.8	Date: 2021.11.8

2. Reliability test summary

2.1 Sample Information

Table 1: Sample Information

Lot#	Batch Number	Supplier Wafer Fabrication	Supplier Wafer Test	Supplier Assembly Site	Supplier Final Test Site
1	C4B27N6G	Samsung Electronics CO.,Ltd	Wuxi CMC Electronics CO.,Ltd	Tongfu Microelectronics Co.,Ltd	Wuxi CMC Electronics CO.,Ltd
2	C4B27N7G				
3	C4B27N8G				

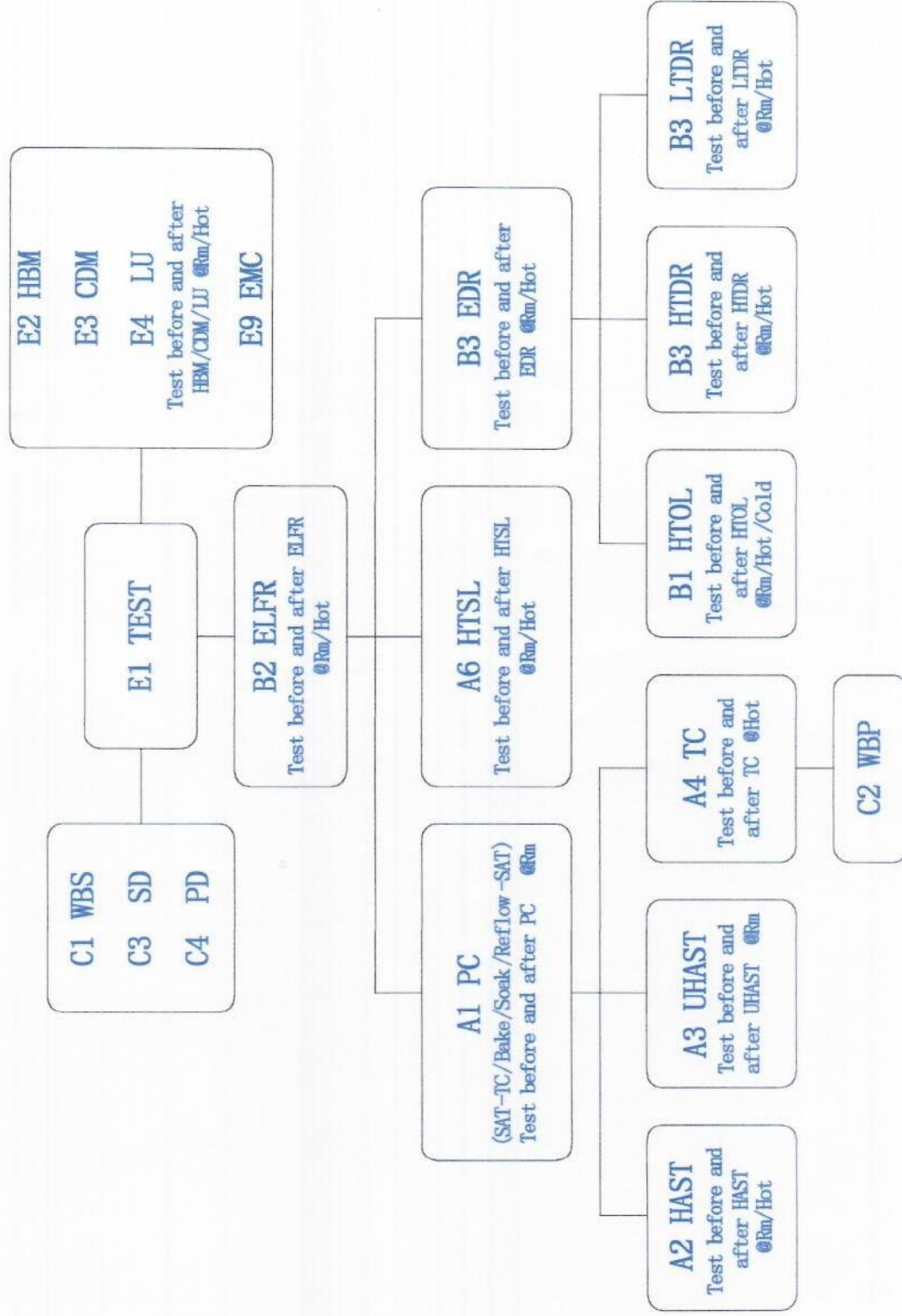
Item	Vendor	Material type
Lead Frame	Fusheng	C7025 138*138mil
Molding Compound	HITACHI	CEL8240HF10-CWK
Wrie	Nippon	Φ 20 μ m EX1P
Epoxy/DAF	Sumitomo	CEL8240HF10-CWK

2.2 Description of Product

Table 2: Description of Product

Product Model	Package Type	Operating temperature range	Mosiure sensitivity Level	Automotive Temperature Grade
FM33LG048A	LQFP80	-40℃~105℃	MSL=3	Grade 2

2.3 Test Flow



2.4 Test Result Summary

Table 3: Test Result Summary

TEST GROUP A-ACCELERATED ENVIRONMENT STRESS TESTS									
Group	Test Description	ABV	Test Method	Test Condition	#Lots	Total # Units	Result	Conclusion	Remark
A1	Pre-conditioning	PC	JESD22-A113 JEDEC J-STD-020	SAT-TC/Bake/Soak/Reflow-SA T	3	3*231	0/693	Pass	C4B27N6G/C4B27N7G/ C4B27N8G: 3001#~3077# 4001#~4077# 5001#~5077#
A2	Biased HAST	HAST	JESD22-A110	Ta=130°C,85%RH, Vd= 5.5V,96hrs	3	3*77	0/231	Pass	C4B27N6G/C4B27N7G/ C4B27N8G: 3001#~3077#
A3	Unbiased HAST	UHAS T	JESD22-A118	Ta=130°C,85%RH, 96hrs	3	3*77	0/231	Pass	C4B27N6G/C4B27N7G/ C4B27N8G: 5001#~5077#
A4	Temperature Cycling	TC	JESD22-A104	Ta=-55°C to +125°C,1000 cycles,	3	3*77	0/231	Pass	C4B27N6G/C4B27N7G/ C4B27N8G: 4001#~4077#
A6	High Temperature Storage Life	HTSL	JESD22-A103	Ta=150°C, 500hrs	1	1*45	0/45	Pass	C4B27N6G: 6001#~6045#

TEST GROUP B-ACCELERATED LIFETIMESIMULATION TESTS									
Group	Test Description	ABV	Test Method	Test Condition	#Lots	Total # Units	Result	Conclusion	Remark
B1	High Temperature Operating Life	HTOL	JESD22-A108	HTOL:Ta=105°C, Vd=5.5V 1000hrs	3	3*77	0/231	Pass	C4B27N6G/C4B27N7G/C 4B27N8G; 2001#~2077#
B2	Early Life Failure Rate	ELFR	AEC Q100-008	Ta=105°C, Vd=5.5V, 48hrs	3	3*800	0/2400	Pass	All
B3	Endurance Cycling Test/Data Retention	EDR	AEC-Q100-005	Step1:NVCE:Ta=105°C, 10Wcycles	3	3*77	0/231	Pass	/
				Step2:HTDR:Ta=150°C, Vd= 5.5V, 500hrs;					
				Step1:NVCE:Ta=25°C, 10Wcycles	3	3*77	0/231	Pass	
				Step2:LTDR:Ta=25°C, Vd= 5.5V, 1000hrs					

TEST GROUP C-PACKAGE ASSEMBLY INTEGRITY TESTS									
Group	Test Description	ABV	Test Method	Test Condition	#Lots	Total # Units	Result	Conclusion	Remark
C1	Wire Bond Shear	WBS	AEC-Q100-001	Wire Cu 20um (0.8mil)	1	5	0/5	Pass	/
C2	Wire Bond Pull	WBP	MIL-STD-883 Method2011	/	1	5	0/5	Pass	/
C3	Solderability	SD	JESD22-B102	16h,150°C high temperature baking prior to test	1	15	0/15	Pass	>95% Lead coverage
C4	Physical Deminision	PD	JESD22-B100 JESD22-B108	Test to spec	3	3*10	0/30	Pass	/

TEST GROUP E-ELECTRICAL VERIFICATION TESTS

Group	Test Description	ABV	Test Method	Test Condition	#Lots	Total # Units	Result	Conclusion	Remark
E1	Pre and post stress electrical test	Test	Test to spec	Test to spec	3	All	0/all	Pass	All
E2	Electrostatic Discharge Human Body Model	HBM	AEC Q100-002	±2000V	1	6	0/6	Pass	C4B27N6G: 7001#~7006#
E3	Electrostatic Discharge Charged Device Model	CDM	AEC Q100-011	All pins:±500V; Corner pins:±750V	1	6	0/6	Pass	C4B27N6G: 8001#~8006#
E4	Latch-Up	LU	AEC Q100-004	±100mA;5V	1	6	0/6	Pass	C4B27N6G: 9001#~9006#
E9	Electromagnetic Compatibility	EMC	SAE J1752/3	1.5kHz~30MHz~1GHz Chip 0°/ Chip 90°	1	1*1	0/1	/	Peak value: 6.9dBuV

3. Test Equipment

Table 4: Test Equipment Information

No.	Equipment Nr.	Equipment Name	Model Nr.	Effective period of measurement
1	15102975	High temperature test chamber	DGVR-V	2021.06.28 ~ 2022.06.27
2	19102013	High temperature test chamber	PH201	2021.01.13 ~ 2022.01.12
3	0020-003024	High temperature test chamber	GPH-20	2021.06.09 ~ 2022.06.08
4	0020-003067	High temperature test chamber	GPH-20	2021.06.09 ~ 2022.06.08
5	0020-003068	High temperature test chamber	GPH-20	2021.06.22 ~ 2022.06.21
6	0020-003103	High temperature test chamber	GPH-20	2021.06.22 ~ 2022.06.21
7	0020-003022	High temperature test chamber	GPH-20	2021.06.16 ~ 2022.06.15
8	0020-003082	High temperature test chamber	GPH-20	2021.06.09 ~ 2022.06.08
9	7824	Reflow soldering machine	TNV25-308EN-P	2021.05.06 ~ 2022.05.05
10	58566244680030	Fast temperature change test chamber	VT ³ 7012S2	2021.07.20 ~ 2022.07.19
11	8112180015	Humidity Chamber	SETH-A-100L	2021.04.20 ~ 2022.04.19
12	1807768445	Strong acceleration humidity box	PC-422R8D	2021.08.25 ~ 2022.08.24
13	802137020737420010	DC power supply	IT6933A	2020.11.11 ~ 2021.11.10
14	600543010727210072	DC power supply	IT6952A	2021.07.13 ~ 2022.07.12
15	800543010737110079	DC power supply	IT6952A	2019.09.17 ~ 2022.09.16 2020.09.16 ~ 2021.09.15
16	800543020746910057	DC power supply	IT6952A	2021.04.07 ~ 2022.04.06
17	600543010727210043	DC power supply	IT6952A	2021.07.13 ~ 2022.07.12
18	600543010717510034	DC power supply	IT6952A	2021.07.13 ~ 2022.07.12

No.	Equipment Nr.	Equipment Name	Model Nr.	Effective period of measurement
19	802137020737410010	DC power supply	IT6952A	2020.11.11 ~ 2021.11.10
20	800543010737110035	DC power supply	IT6952A	2021.07.13 ~ 2022.07.12
21	800543010737110070	DC power supply	IT6952A	2021.08.03 ~ 2022.08.02
22	600543010727210019	DC power supply	IT6952A	2021.06.01 ~ 2022.05.31
23	600543010727210053	DC power supply	IT6952A	2021.03.16 ~ 2022.03.15
24	800543010737120006	DC power supply	IT6952A	2021.07.13 ~ 2022.07.12
25	745499001	Tensile shear force tester	Dage-4000	2021.09.07 ~ 2022.09.06
26	743302001	Three dimensional measuring microscope	107JPCV	2020.10.08 ~ 2021.10.07
27	SH1702A3985	Electronic digital calliper	0-150mm	2021.03.27 ~ 2022.03.26
28	NB3400	Solderability tester	ST88	2021.03.19 ~ 2022.03.18
29	742215101	Electrostatic discharge and lock-in effect test system	MK.2 SE	2021.05.02 ~ 2022.05.01
30	1504205	CDM electrostatic discharge tester	Orion2-HR	2021.05.02 ~ 2022.05.01
31	14133	Ultrasonic microscope	D9600Z	/
32	745499001	Tensile shear force tester	Dage-4000	2021.09.07 ~ 2022.09.06
33	IPTCLE01F704-0019	TEM Chamber	FCC-TEM-JM5	2021.01.14 ~ 2022.01.13
34	IPTCLE01F703-0002	Receiver	ESR7	2021.03.17 ~ 2022.03.16
35	IPTCLE01F704-0019-03	50Ω Load	LOD-50-25	2021.01.14 ~ 2022.01.13
36	IPTCLE01F705-0007	DC power supply	E3631A	2021.01.14 ~ 2022.01.13

4. Test process photos

Test photos sent by email

5. Test raw data

Test data sent by email.

6. Appendix

By email.

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