

Wuxi CMC electronics Co., Ltd



Vision: Become a leader in the domestic IC testing industry

Mission: Scientific and technological innovation, integration and development,
pursuit of excellence

Values: Integrity, Quality, Endeavour and Win win



AEC Q100 CERTIFICATION REPORT

QR-RE-09-02-B

Device Name : FM33HT0X5A

Sample Model : FM33HT055A

Batch Number : C7B18J3G /C7B22J0G/C7B24J5G

Entrusting party : Shanghai Fudan Microelectronics Group Co.,Ltd

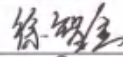
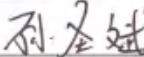
Certification Grade : Grade 1: -40℃~125℃

Humidity : MSL=3

Sensitivity Level : MSL=3

DECLARATION

The test(s) shown in the report were conducted according to the confirmed procedures. We take full responsibility for the accuracy and completeness of these tests, and provide qualification certification of all testing personnel.

Post	Name	Signature	Date
Testing Engineer	Zhijin Xu		2024/11/08
Inspection Engineer	Shengbin Sun		2024/11/08

Wuxi CMC Electronics CO.,Ltd



NOTES

1. The report is invalid without company seal or report seal.
2. The report is invalid without signatures of testing person、 auditors and approver.
3. The report is invalid with any scrawl.
4. Partial copy of the report is unallowed without approving.
5. If test devices come from customers' samples, our company only be responsible of the samples, the results only could explain the quality of samples.
6. If you have any objection to the test results, please appeal to our company 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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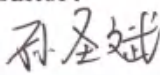
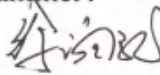
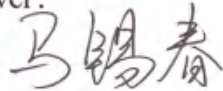
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Catalogue

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1. Test Report

Entrusting party	Shanghai Fudan Microelectronics Group Co.,Ltd	Device Name	FM33HT0X5A
Sample Model	FM33HT055A	Sample Batch Number	C7B18J3G/C7B22J0G/C7B24J5G
Package Type	LQFP48	Quantity	306/286/286
Sample Source	Customer sample delivery	Test Category	AEC Q100 Reliability Test
Test Start Date	2024/07/22	Test End Date	2024/11/04
Inspection Standard	AEC Q100-Rev-J-2023 AEC Q006-Rev-A-2016 JEDEC MIL-STD-883		
Results and Conclusions	The samples have tested and certified according to the requirements of the client and the standard AEC Q100-Rev-J-2023, and the test progress is normal. The certification result is : PASS.		
Comment	/		
Sign	Editor: 	Examiner: 	Approver: 
	Date: 2024.11.8	Date: 2024.11.8	Date: 2024.11.8

2. Reliability test summary

2.1 Sample Information

Table 1: Sample Information

Lot#	Batch Number	Wafer Fabrication	Wafer Test facility	Assembly facility	Final Test facility
1	C7B18J3G	SAMSUNG	FMSH	JCET	CMC
2	C7B22J0G				
3	C7B24J5G				

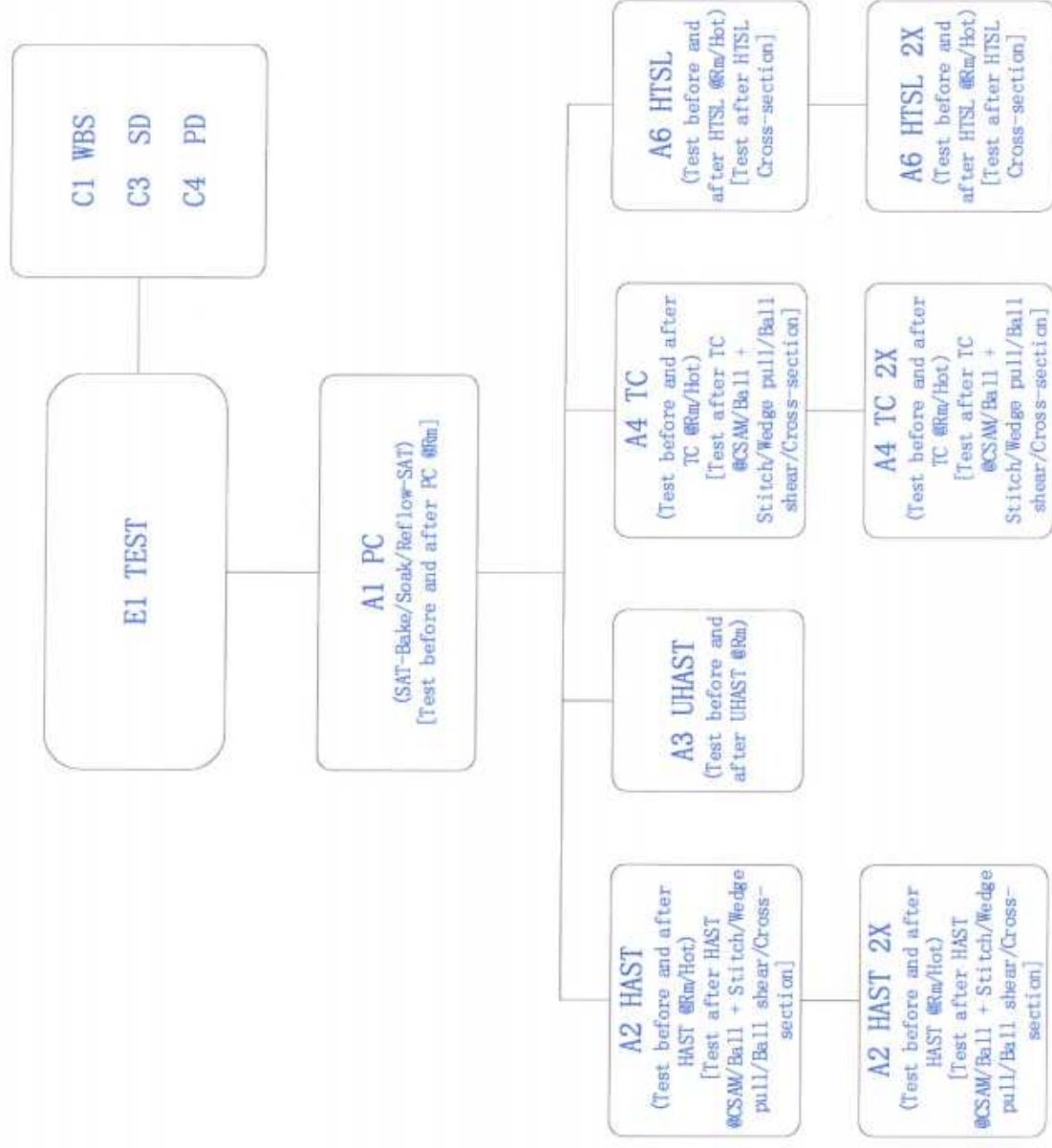
Item	Vendor	Material type
Lead Frame	Shanghai Changhua	C7025 Rough
Molding Compound	Sumitomo	G630
Wire	Nippon	AuPdCu/0.8mil/EX1R20μm
Epoxy/DAF	Resonac	EN-4900GC
Wafer process	Samsung	Silicon

2.2 Description of Product

Table 2: Description of Product

Product Model	Package Type	Operating temperature range	Moisture sensitivity Level	Automotive Temperature Grade
FM33HT055A	LQFP48	-40℃~125℃	MSL=3	Grade 1

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-Bake/Soak/Reflow-SAT	3	3*231	0/693	Pass	/
	Biased HAST	HAST	JESD22-A110	Ta=130℃,85%RH, Vd= 5.5V,96hrs	3	3*77	0/231	Pass	/
	CSAM	/	AEC-Q006	Test to spec	3	3*22	0/66	/	/
	Ball + Stitch/Wedge pull	/	AEC-Q006	Wire AuPdCu 20μm	3	3*3	0/9	Pass	/
A2	Ball shear	/	AEC-Q006	Bond 2.0mil	3	3*3	0/9	Pass	/
	Cross-section	/	AEC-Q006	Test to spec	3	3*1	0/3	Pass	/
	Biased HAST Stress 2X	HAST	JESD22-A110	Ta=130℃,85%RH, Vd= 5.5V,96hrs	3	3*70	0/210	Pass	/
	CSAM	/	AEC-Q006	Test to spec	3	3*22	0/66	/	/
	Ball + Stitch/Wedge pull	/	AEC-Q006	Wire AuPdCu 20μm	3	3*3	0/9	Pass	/
	Ball shear	/	AEC-Q006	Bond 2.0mil	3	3*3	0/9	Pass	/
	Cross-section	/	AEC-Q006	Test to spec	3	3*1	0/3	Pass	/

TEST GROUP A ACCELERATED ENVIRONMENT STRESS TESTS									
Group	Test Description	ABV	Test Method	Test Condition	#Lots	Total # Units	Result	Conclusion	Remark
A3	Unbiased HAST	UHAST	JESD22-A118	Ta=130℃,85%RH,96hrs	3	3*77	0/231	Pass	/
	Temperature Cycling	TC	JESD22-A104	Ta=-65℃ to +150℃,500 cycles	3	3*77	0/231	Pass	/
	CSAM	/	AEC-Q006	Test to spec	3	3*22	0/66	Pass	/
A4	Ball + Stitch/Wedge pull	/	AEC-Q006	Wire AuPdCu 20μm	3	3*3	0/9	Pass	/
	Ball shear	/	AEC-Q006	Bond 2.0mil	3	3*3	0/9	Pass	/
	Cross-section	/	AEC-Q006	Test to spec	3	3*1	0/3	Pass	/
	Temperature Cycling Stress 2X	TC	JESD22-A104	Ta=-65℃ to +150℃,500 cycles	3	3*70	0/210	Pass	/
	CSAM	/	AEC-Q006	Test to spec	3	3*22	0/66	Pass	/
	Ball + Stitch/Wedge pull	/	AEC-Q006	Wire AuPdCu 20μm	3	3*3	0/9	Pass	/
	Ball shear	/	AEC-Q006	Bond 2.0mil	3	3*3	0/9	Pass	/
	Cross-section	/	AEC-Q006	Test to spec	3	3*1	0/3	Pass	/

TEST GROUP A ACCELERATED ENVIRONMENT STRESS TESTS									
Group	Test Description	ABV	Test Method	Test Condition	#Lots	Total # Units	Result	Conclusion	Remark
A6	High Temperature Storage Life	HTSL	JESD22-A103	Ta=150℃, 1000hrs	3	3*45	0/135	Pass	/
	Cross-section	/	AEC-Q006	Test to spec	3	3*1	0/3	Pass	/
	High Temperature Storage Life Stress 2X	HTSL	JESD22-A103	Ta=150℃, 1000hrs	3	3*44	0/132	Pass	/
	Cross-section	/	AEC-Q006	Test to spec	3	3*1	0/3	Pass	/

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	Bond 2.0mil	1	5	0/5	Pass	CPK: 5.41
C2	Wire Bond Pull	WBP	MIL-STD-883 Method 2011	Wire AuPdCu 20µm	1	5	0/5	Pass	CPK: 3.65
C3	Solderability	SD	JESD22-B102	8 hour water vapor aging prior to test Ta=245 ± 5 °C, Infiltration time 5 ± 0.5s	1	15	0/15	Pass	>95% Lead coverage
C4	Physical Dimensions	PD	JESD22-B100 JESD22-B108	Test to spec	3	3*10	0/30	Pass	CPK _(min) : 1.70

TEST GROUPE ELECTRICAL CHARACTERISTIC 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 program to supplier data sheet or user specification	Test to spec	3	All	0/all	Pass	/

3. Test Equipment

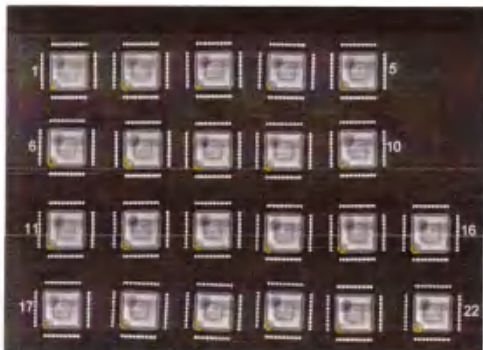
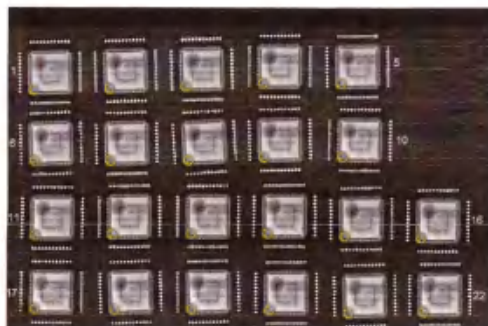
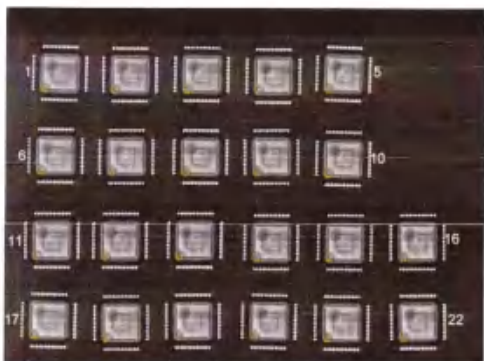
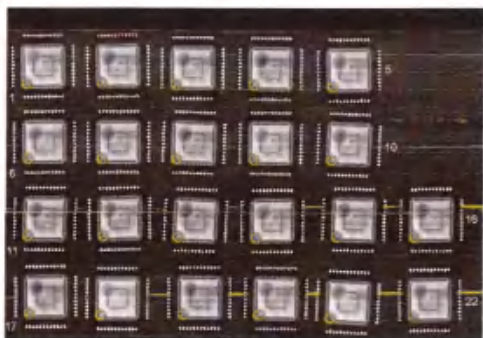
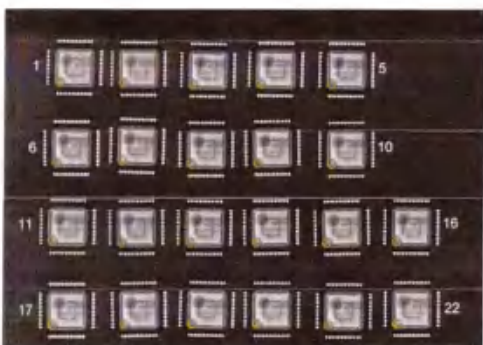
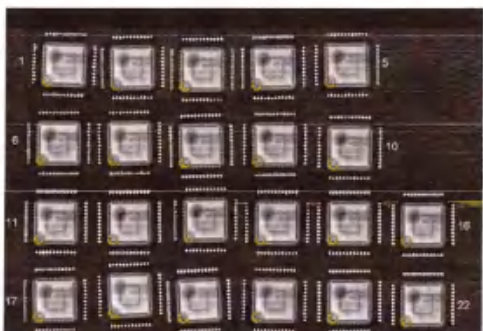
Table 4: Test Equipment Information

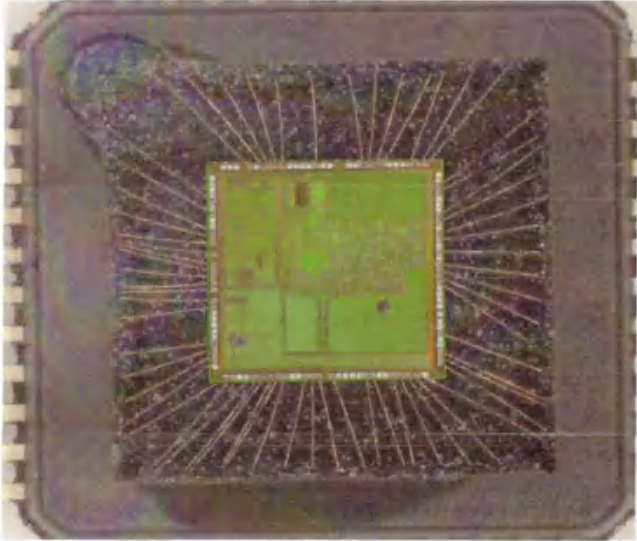
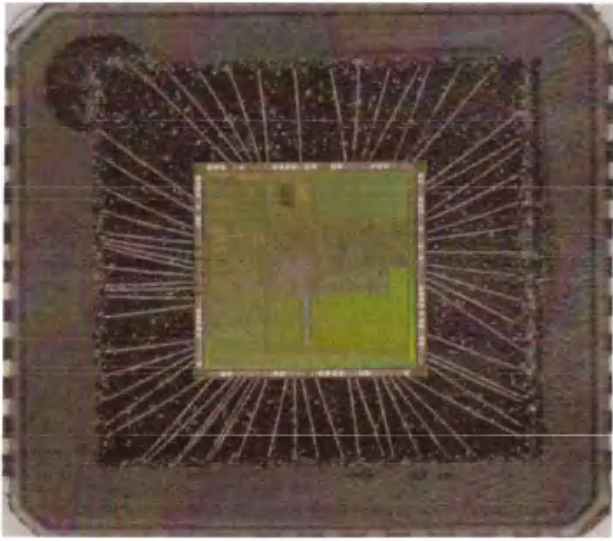
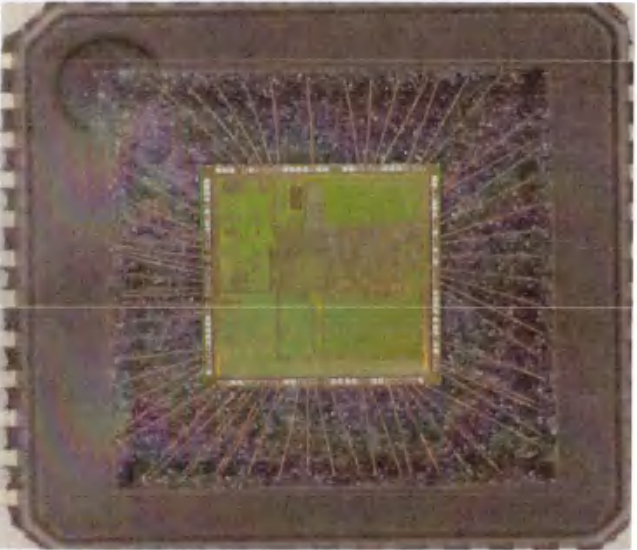
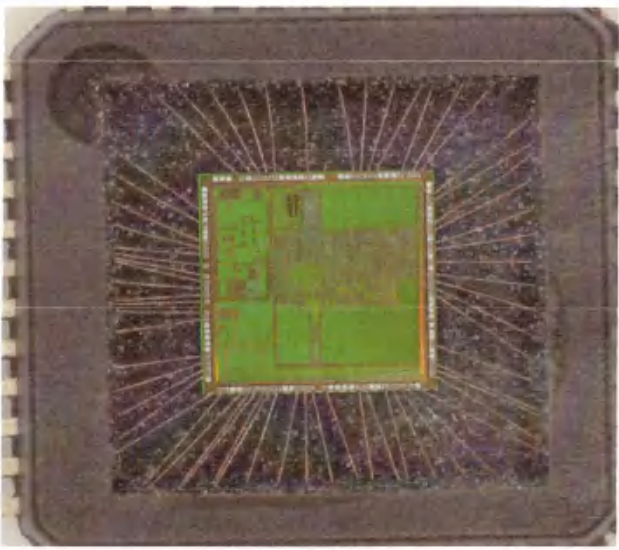
No.	Equipment Nr.	Equipment Name	Model Nr.	Effective period of measurement
1	JS24CM023	Ultrasonic microscope	UTSCAN 400	/
2	58566244680010	Temperature shock chamber	VT ³ 7012S2	2024.06.14 - 2025.06.13
3	58566244680030	Temperature shock chamber	VT ³ 7012S2	2024.06.14 - 2025.06.13
4	23117061	Temperature shock chamber	TS-120SW	2024.03.11 - 2025.03.10
5	2006770978	Strong acceleration humidity box	PC-422R8D	2023.08.07 - 2024.08.06 2024.07.29 - 2025.07.28
6	1807768445	Strong acceleration humidity box	PC-422R8D	2023.08.07 - 2024.08.06 2024.07.29 - 2025.07.28
7	8112180014	High and low temperature humid heat test chamber	SETH-A-100L	2024.04.16 - 2025.04.15
8	7824	Reflow soldering machine	TNV25-308EN-P	2024.04.16 - 2025.04.15
9	17102224	High temperature test chamber	PH101	2023.11.02 - 2024.11.01 2024.10.18 - 2025.10.17
10	0020-003067	High temperature test chamber	GPH-20	2024.05.09 - 2025.05.08
11	1040210024	Small high temperature test chamber	STH-120	2024.04.09 - 2025.04.08
12	1040210030	Small high temperature test chamber	STH-120	2024.04.25 - 2025.04.24
13	TS1807474	High temperature chamber for testing	TS-TH-125-U	2024.02.05 - 2025.02.04
14	800543013757310076	DC power supply	IT6952A	2023.09.08 - 2024.09.07 2024.09.04 - 2025.09.03
15	800543010737120007	DC power supply	IT6952A	2023.11.20 - 2024.11.19

No.	Equipment Nr.	Equipment Name	Model Nr.	Effective period of measurement
16	800543010737110051	DC power supply	IT6952A	2023.09.25 - 2024.09.24 2024.09.04 - 2025.09.03
17	743602102	Scanning electron microscope	SUPRA55	2023.12.20 - 2024.12.19
18	EC30SM-221117	Grinder	EcoMet 30	/
19	041-5786-02	Ion polisher	1061 SEM Mill	/
20	8602-04	Electron microscope	SU8600	2023.11.23 - 2024.11.22
21	MT500000000008	High precision three-dimensional measurement and analysis system	MT-500	2024.05.13 - 2025.05.12
22	SH1702A4001	Digital caliper	0-150mm	2024.03.09 - 2025.03.08
23	745499001	Tensile shear force tester	DAGE-4000	2023.08.07 - 2024.08.06 2024.07.29 - 2025.07.28
24	140218/2079	Weldability testing machine	ST88	2024.03.04 - 2025.03.03

4. Test process photos

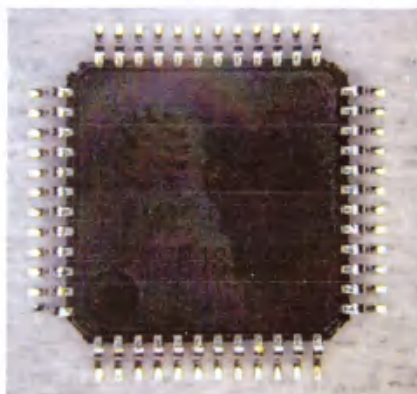
Table 5: Test process photos

SAT	
C7B18J3G_SAT before PC	C7B18J3G_SAT after PC
	
C7B22J0G_SAT before PC	C7B22J0G_SAT after PC
	
C7B24J5G_SAT before PC	C7B24J5G_SAT after PC
	

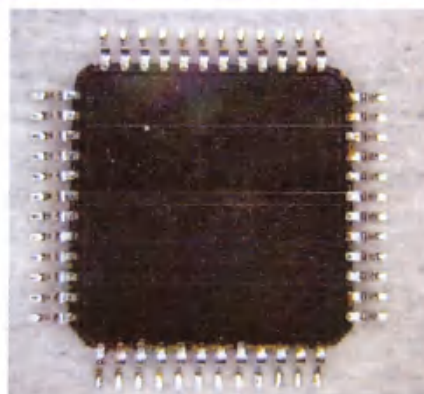
Decap	
Graph 1	Graph 2
	
Graph 3	Graph 4
	

Solderability

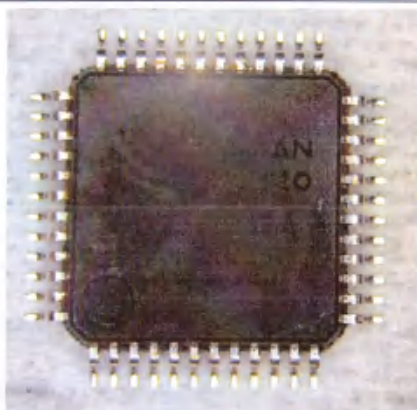
Graph 1



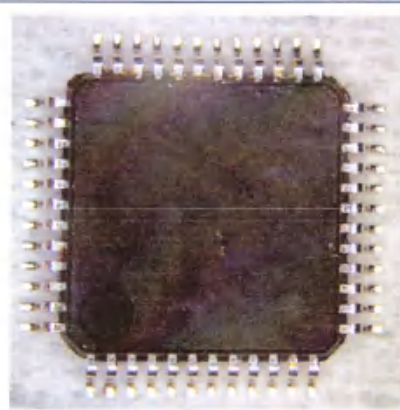
Graph 2



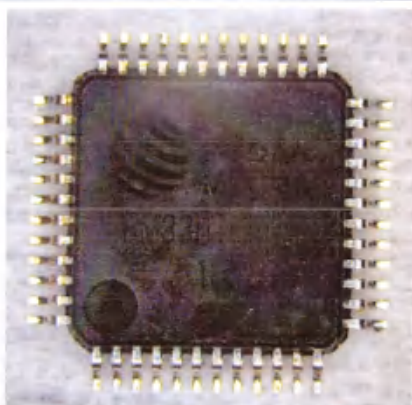
Graph 3



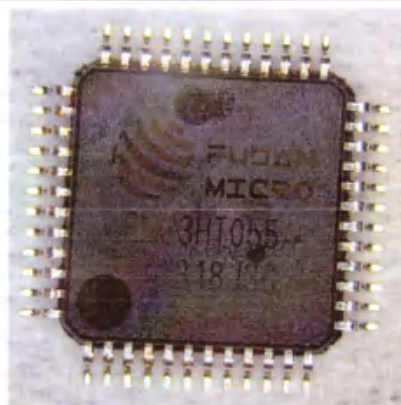
Graph 4



Graph 5



Graph 6



5. Test raw data

See the CD for the electrical performance test data.

6. Appendix

Appendix1: Wire Bond Pull Data

Appendix2: Wire Bond Shear Data

Appendix3: Physical Dimensions Data

Appendix1: Wire Bond Pull Strength Data

Sample Model	Sample Batch Number		Wire type		Wire diameter	
FM33HT055A	C7B18J3G		AuPdCu		20μm	
Wire Bond Pull Data (SPEC: ≥1.5g)						
Sample#	1#					
Wire#	Wire1	Wire2	Wire3	Wire4	Wire5	Wire6
Data	4.072	3.790	4.102	3.932	3.868	4.004
Result:	Pass	Pass	Pass	Pass	Pass	Pass
Sample#	2#					
Wire#	Wire1	Wire2	Wire3	Wire4	Wire5	Wire6
Data	4.282	4.138	3.830	4.264	3.840	3.858
Result:	Pass	Pass	Pass	Pass	Pass	Pass
Sample#	3#					
Wire#	Wire1	Wire2	Wire3	Wire4	Wire5	Wire6
Data	4.282	4.180	4.076	4.162	3.802	3.840
Result:	Pass	Pass	Pass	Pass	Pass	Pass
Sample#	4#					
Wire#	Wire1	Wire2	Wire3	Wire4	Wire5	Wire6
Data	3.684	4.004	4.164	4.100	3.594	4.262
Result:	Pass	Pass	Pass	Pass	Pass	Pass
Sample#	5#					
Wire#	Wire1	Wire2	Wire3	Wire4	Wire5	Wire6
Data	4.366	4.102	4.434	4.406	3.662	4.360
Result:	Pass	Pass	Pass	Pass	Pass	Pass

Appendix2: Wire Bond Shear Data

Sample Model		Sample Batch Number			Bond diameter	
FM33HT055A		C7B18J3G			2.0mil	
Wire Bond Shear Data (SPEC: ≥5.7 g)						
Sample#	1#					
Bond #	Bond 1	Bond 2	Bond 3	Bond 4	Bond 5	Bond 6
Data	23.63	23.76	26.32	24.93	25.39	24.76
Result:	Pass	Pass	Pass	Pass	Pass	Pass
Sample#	2#					
Bond #	Bond 1	Bond 2	Bond 3	Bond 4	Bond 5	Bond 6
Data	26.96	26.36	23.88	24.19	25.11	26.12
Result:	Pass	Pass	Pass	Pass	Pass	Pass
Sample#	3#					
Bond #	Bond 1	Bond 2	Bond 3	Bond 4	Bond 5	Bond 6
Data	25.52	25.94	26.45	26.24	25.67	24.97
Result:	Pass	Pass	Pass	Pass	Pass	Pass
Sample#	4#					
Bond #	Bond 1	Bond 2	Bond 3	Bond 4	Bond 5	Bond 6
Data	25.27	26.34	24.28	26.01	26.69	25.42
Result:	Pass	Pass	Pass	Pass	Pass	Pass
Sample#	5#					
Bond #	Bond 1	Bond 2	Bond 3	Bond 4	Bond 5	Bond 6
Data	22.31	22.64	26.84	26.49	26.11	25.66
Result:	Pass	Pass	Pass	Pass	Pass	Pass

Appendix3: Physical Dimensions Data

Sample Model		FM33HT055A		Samples Count		30 (10/lot)		Package Type			LQFP48		
Symbol	Sample ID	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	CPK	
A	C7B18J3G	1.520	1.489	1.489	1.520	1.489	1.520	1.505	1.536	1.536	1.505	1.74	
	C7B22J0G	1.505	1.489	1.489	1.489	1.520	1.520	1.520	1.505	1.489	1.520		
	C7B24J5G	1.489	1.489	1.489	1.458	1.489	1.474	1.489	1.474	1.474	1.505		
A1	C7B18J3G	0.093	0.109	0.124	0.104	0.104	0.105	0.109	0.099	0.095	0.104	2.33	
	C7B22J0G	0.105	0.104	0.109	0.098	0.104	0.109	0.109	0.109	0.104	0.104		
	C7B24J5G	0.098	0.104	0.104	0.092	0.104	0.094	0.098	0.094	0.109	0.109		
A2	C7B18J3G	1.396	1.396	1.380	1.380	1.396	1.395	1.395	1.411	1.411	1.396	1.93	
	C7B22J0G	1.411	1.395	1.398	1.411	1.396	1.411	1.411	1.396	1.395	1.396		
	C7B24J5G	1.411	1.395	1.395	1.396	1.395	1.398	1.398	1.396	1.398	1.411		
A3	C7B18J3G	0.636	0.636	0.636	0.628	0.637	0.636	0.636	0.633	0.636	0.636	2.03	
	C7B22J0G	0.633	0.636	0.651	0.637	0.636	0.631	0.636	0.631	0.636	0.633		
	C7B24J5G	0.636	0.632	0.636	0.632	0.636	0.636	0.630	0.635	0.635	0.634		
b	C7B18J3G	0.232	0.217	0.228	0.218	0.219	0.217	0.216	0.222	0.221	0.217	2.21	
	C7B22J0G	0.214	0.217	0.217	0.222	0.217	0.214	0.222	0.217	0.223	0.218		
	C7B24J5G	0.201	0.213	0.217	0.221	0.217	0.248	0.221	0.217	0.218	0.219		
T	C7B18J3G	0.134	0.124	0.139	0.134	0.155	0.139	0.124	0.139	0.124	0.138	1.70	
	C7B22J0G	0.139	0.139	0.155	0.124	0.139	0.124	0.139	0.138	0.134	0.124		
	C7B24J5G	0.124	0.139	0.124	0.139	0.134	0.139	0.134	0.124	0.139	0.124		
L	C7B18J3G	0.554	0.558	0.545	0.558	0.547	0.543	0.557	0.547	0.543	0.543	2.09	
	C7B22J0G	0.537	0.542	0.543	0.527	0.542	0.547	0.558	0.543	0.543	0.547		
	C7B24J5G	0.543	0.542	0.543	0.537	0.542	0.537	0.558	0.543	0.543	0.547		

END