



TEST REPORT

No. : SUZRL2021080070-1_EN

Date: 2021-12-10

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CUSTOMER NAME: JINZHOU KAIMEI POWER CO., LTD

ADDRESS: NO.139.7 SECTION CHONGQING ROAD,LINGHE DISTRICT, JINZHOU CITY,
LIAONING PROVINCE, CHINA./ NO.141 JINYI STREET ,LINGHE
DISTRICT,JINZHOU CITY, LIAONING PROVINCE, CHINA

The following sample's information(s) was/ were submitted and identified on behalf of the client as:

Sample Name : Winding series super capacitor
Test Standards : Refer to AEC Q200REV D-2010 table3 and client's requirement
SGS Ref. No. : TP21-005332
Date of Receipt : 2021-08-27
Testing Start Date : 2021-08-27
Testing End Date : 2021-11-04
Test result(s) : For further details, please refer to the following page(s)

Signed for SGS-CSTC Standards Technical
Services Co., Ltd. Suzhou Branch

Niko Ren Authorized signatory



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Report Declaration:

The test samples were provided and confirmed by the customer in this report, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products manufactured are in conformity with the product sample in this report.

In the territory of the People's Republic of China, the test method is not in CMA accredited scope, the test report shall only be used for client scientific research, teaching, internal quality control, product research and development, etc...and just for client internal reference.

Manufacture Declaration or Comment:

None

Summary of Result(s):

Accord with AEC Q200REV D-2010 table3 and client's requirement, See next page for details

No.	Test Item	Test Method	Quantities	Result	Conclusion
1.	External Visual	MIL-STD-883 Method 2009 and client's requirement	463	See result	Pass
2.	High Temperature Exposure (Storage)	MIL-STD-202 Method 108 and client's requirement	77	See result	Pass
3.	Temperature Cycling	JESD22 Method JA-104 and client's requirement	77	See result	Pass
4.	Biased Humidity	MIL-STD-202 Method 103 and client's requirement	77	See result	Pass
5.	Operational Life	MIL-STD-202 Method 108 and client's requirement	77	See result	Pass
6.	Physical Dimension	JESD22 Method JB-100 and client's requirement	30	See result	Pass
7.	Terminal Strength (Leaded)	MIL-STD-202 Method 211 and client's requirement	30	See result	Pass
8.	Resistance to Solvents	MIL-STD-202 Method 215 and client's requirement	5	See result	Pass
9.	Vibration	MIL-STD-202 Method 204 and client's requirement	30	See result	Pass
10.	Resistance to Soldering Heat	MIL-STD-202 Method 210 and client's requirement	30	See result	Pass
11.	ESD	AEC-Q200-002 or ISO/DIS 10605 and client's requirement	15	See result	Pass
12.	Solderability	J-STD-002 and client's requirement	15	See result	Pass

Note:

Pass: Meet the requirements

Fail: Does not meet the requirements

N/A: Not apply to the judgment





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This Report cancels and supersedes the Report No.: SUZRL2021080070_EN, dated: 2021-11-17 issued by SGS Suzhou Branch.

Note: Report modification

Modification	Before	After
Sample information	/	Add test methods and standards



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1. Test Item: External Visual

Sample Description: Capacitance

Quantities of Specimens: 463 PCS for test

Test Standards: MIL-STD-883 Method 2009 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Evaluation Method:

Inspect device construction, marking and workmanship.

Visual inspection: no damage and no liquid leakage.

Test Result(s):

Accord with AEC Q200REV D-2010 table3 and client's requirement, See next page for details

Sample No.	Visual Inspection	Conclusion
S21080070	The appearance is free of damage and liquid leakage	Pass

Test Photo(s):

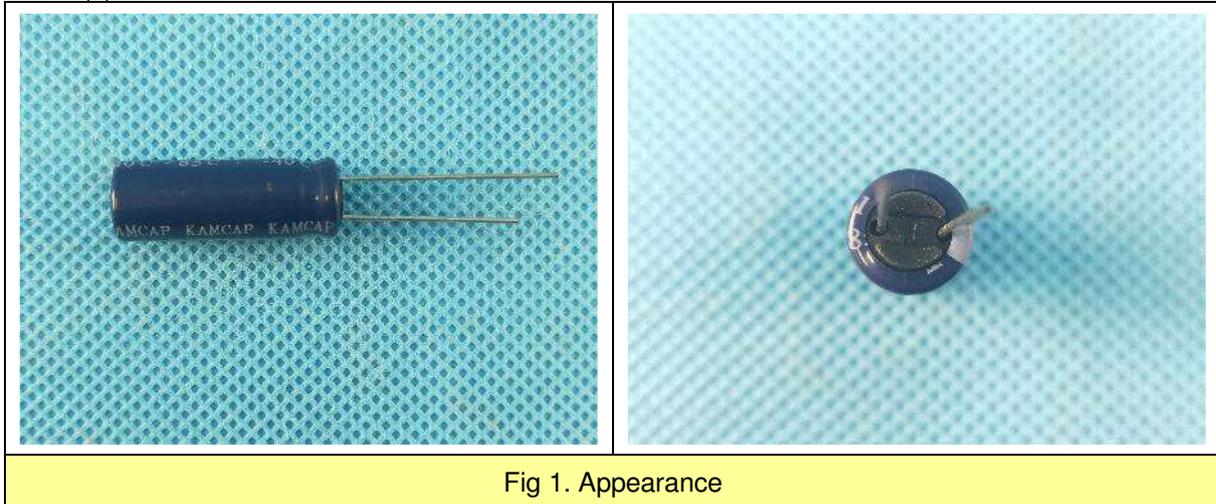


Fig 1. Appearance



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Fig 2. Original sample



Fig 3. Original sample



Fig 4. Original sample



Fig 5. Original sample



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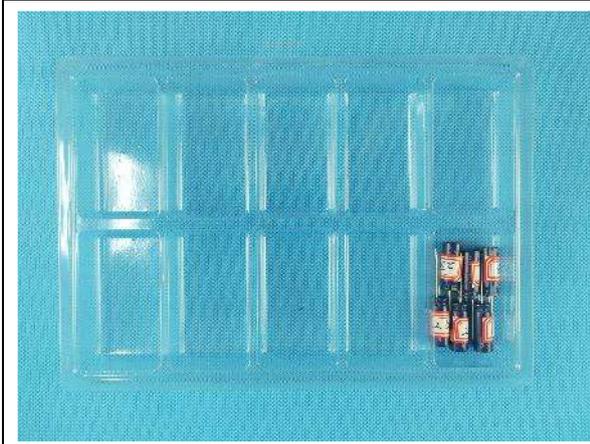


Fig 6. Original sample



Fig 7. Original sample



Fig 8. Original sample



Fig 9. Original sample



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Fig 10. Original sample



Fig 11. Original sample



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2. Test Item: High Temperature Exposure (Storage)

Sample Description: Capacitance

Quantities of Specimens: 77 PCS

Test Standards: MIL-STD-202 Method 108 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Test condition:

Test Temperature: 85°C

Test duration: 96 hours

Evaluation Method:

Visual inspection: no damage

Electrical: Absolute value of $\Delta C/C \leq 10\%$

ESR $\leq 2^*$ initial ESR@25°C

Test Result(s):

Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ ESR (initial)	Conclusion
1	normal	11.018	10.765	-2.30%	23.3	28.8	1.24	Pass
2	normal	11.377	11.065	-2.74%	22.7	27.9	1.23	Pass
3	normal	11.335	11.024	-2.74%	21.8	25.6	1.17	Pass
4	normal	10.899	10.568	-3.04%	23.6	27.4	1.16	Pass
5	normal	10.980	10.677	-2.76%	23.8	28.3	1.19	Pass
6	normal	11.099	10.685	-3.73%	23.4	29.7	1.27	Pass
7	normal	11.059	10.834	-2.03%	23.9	29.6	1.24	Pass
8	normal	10.862	10.645	-2.00%	22.7	28.6	1.26	Pass
9	normal	11.027	10.643	-3.48%	22.0	25.9	1.18	Pass
10	normal	10.747	10.575	-1.60%	23.2	26.6	1.15	Pass
11	normal	10.671	10.427	-2.29%	23.4	27.9	1.19	Pass
12	normal	10.937	10.734	-1.86%	22.8	27.4	1.20	Pass
13	normal	11.015	10.646	-3.35%	23.2	28.7	1.24	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
14	normal	11.172	10.864	-2.76%	22.7	28.6	1.26	Pass
15	normal	11.178	10.772	-3.63%	22.4	26.4	1.18	Pass
16	normal	11.016	10.824	-1.74%	22.9	27.7	1.21	Pass
17	normal	10.700	10.382	-2.97%	22.5	26.5	1.18	Pass
18	normal	10.864	10.528	-3.09%	23.4	27.8	1.19	Pass
19	normal	11.059	10.867	-1.74%	23.0	28.1	1.22	Pass
20	normal	11.375	10.992	-3.37%	23.1	27.4	1.19	Pass
21	normal	10.817	10.547	-2.50%	23.3	26.2	1.12	Pass
22	normal	11.214	10.927	-2.56%	21.8	28.9	1.33	Pass
23	normal	11.141	10.734	-3.65%	23.0	27.7	1.20	Pass
24	normal	10.549	10.246	-2.87%	22.4	27.7	1.24	Pass
25	normal	10.905	10.568	-3.09%	23.3	27.2	1.17	Pass
26	normal	10.823	10.577	-2.27%	22.7	27.2	1.20	Pass
27	normal	11.141	10.946	-1.75%	23.6	27.6	1.17	Pass
28	normal	10.863	10.564	-2.75%	21.9	26.0	1.19	Pass
29	normal	10.987	10.628	-3.27%	24.1	28.4	1.18	Pass
30	normal	11.104	10.967	-1.23%	22.9	28.4	1.24	Pass
31	normal	11.062	10.749	-2.83%	23.9	29.9	1.25	Pass
32	normal	10.872	10.559	-2.88%	22.5	26.6	1.18	Pass
33	normal	11.029	10.842	-1.70%	23.7	27.5	1.16	Pass
34	normal	10.993	10.776	-1.97%	23.5	28.0	1.19	Pass
35	normal	11.265	10.956	-2.74%	23.3	29.6	1.27	Pass
36	normal	11.108	10.871	-2.13%	24.7	30.6	1.24	Pass
37	normal	10.515	10.214	-2.86%	24.0	28.8	1.20	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
38	normal	10.703	10.439	-2.47%	23.3	28.9	1.24	Pass
39	normal	11.180	10.915	-2.37%	24.0	28.1	1.17	Pass
40	normal	11.100	10.825	-2.48%	23.5	28.0	1.19	Pass
41	normal	11.174	10.846	-2.94%	23.1	29.1	1.26	Pass
42	normal	11.098	10.774	-2.92%	24.7	30.6	1.24	Pass
43	normal	10.823	10.537	-2.64%	24.6	30.0	1.22	Pass
44	normal	11.059	10.728	-2.99%	23.3	28.7	1.23	Pass
45	normal	11.377	11.063	-2.76%	23.3	27.7	1.19	Pass
46	normal	10.987	10.619	-3.35%	22.4	26.4	1.18	Pass
47	normal	11.104	10.871	-2.10%	23.4	28.5	1.22	Pass
48	normal	10.948	10.725	-2.04%	22.8	28.3	1.24	Pass
49	normal	11.095	10.766	-2.97%	23.9	28.1	1.18	Pass
50	normal	10.779	10.549	-2.13%	25.2	30.2	1.20	Pass
51	normal	10.855	10.637	-2.01%	21.8	25.5	1.17	Pass
52	normal	10.979	10.594	-3.51%	22.6	26.9	1.19	Pass
53	normal	11.134	10.875	-2.33%	23.4	28.5	1.22	Pass
54	normal	11.214	10.912	-2.69%	24.5	30.6	1.25	Pass
55	normal	11.220	10.915	-2.72%	23.5	27.7	1.18	Pass
56	normal	10.862	10.525	-3.10%	23.8	27.6	1.16	Pass
57	normal	10.980	10.646	-3.04%	24.0	30.2	1.26	Pass
58	normal	11.096	10.737	-3.24%	23.6	26.7	1.13	Pass
59	normal	10.978	10.594	-3.50%	22.2	26.6	1.20	Pass
60	normal	11.103	10.837	-2.40%	22.8	26.7	1.17	Pass
61	normal	10.944	10.628	-2.89%	23.7	28.2	1.19	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
62	normal	10.905	10.725	-1.65%	23.4	29.5	1.26	Pass
63	normal	10.943	10.566	-3.45%	24.0	29.8	1.24	Pass
64	normal	11.259	10.949	-2.75%	23.2	28.3	1.22	Pass
65	normal	11.178	10.827	-3.14%	23.5	29.8	1.27	Pass
66	normal	11.103	10.734	-3.32%	24.2	28.8	1.19	Pass
67	normal	11.145	10.827	-2.85%	23.8	28.1	1.18	Pass
68	normal	11.030	10.734	-2.68%	23.3	29.4	1.26	Pass
69	normal	10.950	10.546	-3.69%	24.4	29.8	1.22	Pass
70	normal	11.032	10.614	-3.79%	23.6	29.0	1.23	Pass
71	normal	10.949	10.739	-1.92%	22.6	27.6	1.22	Pass
72	normal	10.673	10.315	-3.35%	23.9	29.6	1.24	Pass
73	normal	11.109	10.825	-2.56%	24.2	29.0	1.20	Pass
74	normal	10.742	10.546	-1.82%	22.2	26.4	1.19	Pass
75	normal	11.140	10.919	-1.98%	23.8	27.8	1.17	Pass
76	normal	10.941	10.671	-2.47%	24.9	30.4	1.22	Pass
77	normal	11.294	10.925	-3.27%	22.9	28.4	1.24	Pass

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Test Photo(s):



Fig 12. During Test



Fig 13. Test Curve

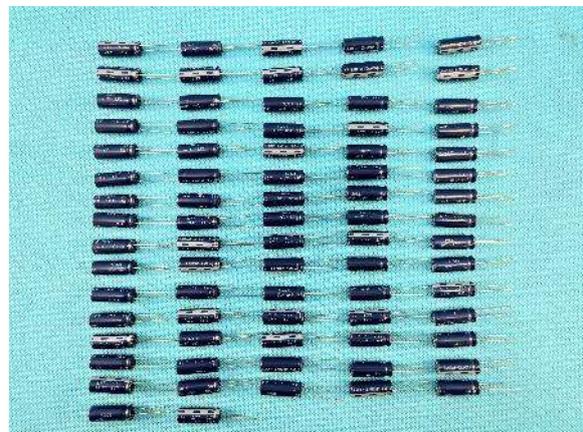


Fig 14. After test



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3. Test Item: Temperature Cycling

Sample Description: Capacitance

Quantities of Specimens: 77 PCS

Test Standards: JESD22 Method JA-104 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Test condition:

- Low temperature: -40 °C
- High temperature: 85 °C
- Dwell time: 30min
- Transfer time: < 10 s
- Number of test cycles: 5 cycles

Evaluation Method:

- Visual inspection: no damage
- Electrical: Absolute value of $\Delta C/C \leq 10\%$
- ESR $\leq 2^*$ initial ESR@25°C

Test Result(s):

Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
78	normal	10.861	10.637	-2.06%	22.9	25.6	1.12	Pass
79	normal	11.061	10.828	-2.11%	24.2	25.9	1.07	Pass
80	normal	11.298	10.985	-2.77%	21.8	24.9	1.14	Pass
81	normal	10.864	10.566	-2.74%	22.1	25.4	1.15	Pass
82	normal	11.024	10.846	-1.61%	23.3	25.2	1.08	Pass
83	normal	11.025	10.752	-2.48%	23.1	25.2	1.09	Pass
84	normal	10.778	10.546	-2.15%	23.6	26.0	1.10	Pass
85	normal	11.055	10.919	-1.23%	22.6	24.4	1.08	Pass
86	normal	11.052	10.846	-1.86%	23.0	24.6	1.07	Pass
87	normal	11.297	11.064	-2.06%	23.0	25.1	1.09	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
88	normal	11.214	10.946	-2.39%	22.8	25.1	1.10	Pass
89	normal	11.017	10.775	-2.20%	23.3	26.5	1.14	Pass
90	normal	11.061	10.894	-1.51%	25.0	27.8	1.11	Pass
91	normal	11.020	10.834	-1.69%	23.6	26.8	1.13	Pass
92	normal	11.058	10.915	-1.29%	23.5	25.1	1.07	Pass
93	normal	10.898	10.727	-1.57%	24.1	26.3	1.09	Pass
94	normal	11.055	10.925	-1.18%	23.9	25.8	1.08	Pass
95	normal	10.904	10.634	-2.48%	22.3	24.5	1.10	Pass
96	normal	11.220	10.959	-2.33%	22.5	24.5	1.09	Pass
97	normal	11.221	10.942	-2.49%	24.1	25.8	1.07	Pass
98	normal	11.180	10.976	-1.82%	23.2	25.6	1.10	Pass
99	normal	11.062	10.827	-2.12%	23.7	25.6	1.08	Pass
100	normal	10.824	10.635	-1.75%	25.2	27.0	1.07	Pass
101	normal	10.948	10.743	-1.87%	22.9	25.2	1.10	Pass
102	normal	11.064	10.851	-1.93%	22.4	24.9	1.11	Pass
103	normal	11.143	10.845	-2.67%	22.7	24.5	1.08	Pass
104	normal	10.714	10.566	-1.38%	23.2	24.8	1.07	Pass
105	normal	10.753	10.542	-1.96%	24.3	27.5	1.13	Pass
106	normal	11.112	10.934	-1.60%	22.7	24.1	1.06	Pass
107	normal	11.226	10.911	-2.81%	22.6	24.2	1.07	Pass
108	normal	10.911	10.734	-1.62%	24.6	27.8	1.13	Pass
109	normal	11.148	10.985	-1.46%	25.5	27.8	1.09	Pass
110	normal	10.860	10.617	-2.24%	24.2	26.6	1.10	Pass
111	normal	11.101	10.934	-1.50%	23.2	25.1	1.08	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
112	normal	11.101	10.864	-2.13%	23.0	24.6	1.07	Pass
113	normal	10.822	10.628	-1.79%	25.3	27.6	1.09	Pass
114	normal	11.219	10.967	-2.25%	22.8	24.9	1.09	Pass
115	normal	10.902	10.742	-1.47%	24.1	25.8	1.07	Pass
116	normal	10.941	10.776	-1.51%	23.2	24.6	1.06	Pass
117	normal	10.986	10.767	-1.99%	23.8	25.7	1.08	Pass
118	normal	10.866	10.635	-2.13%	23.5	25.4	1.08	Pass
119	normal	10.869	10.725	-1.32%	23.0	24.6	1.07	Pass
120	normal	11.054	10.834	-1.99%	22.8	25.9	1.14	Pass
121	normal	10.975	10.659	-2.88%	23.4	26.6	1.14	Pass
122	normal	10.855	10.634	-2.04%	22.4	24.0	1.07	Pass
123	normal	11.098	10.825	-2.46%	23.8	25.9	1.09	Pass
124	normal	11.213	10.942	-2.42%	22.9	25.2	1.10	Pass
125	normal	11.057	10.776	-2.54%	23.4	26.0	1.11	Pass
126	normal	11.023	10.727	-2.69%	23.5	25.4	1.08	Pass
127	normal	11.099	10.935	-1.48%	23.9	25.6	1.07	Pass
128	normal	11.218	10.966	-2.25%	23.5	25.9	1.10	Pass
129	normal	11.135	10.946	-1.70%	25.0	27.0	1.08	Pass
130	normal	10.897	10.752	-1.33%	23.4	25.0	1.07	Pass
131	normal	11.063	10.911	-1.37%	23.5	25.6	1.09	Pass
132	normal	11.260	10.945	-2.80%	21.7	23.7	1.09	Pass
133	normal	10.985	10.825	-1.46%	24.0	25.2	1.05	Pass
134	normal	10.784	10.646	-1.28%	23.8	26.4	1.11	Pass
135	normal	10.785	10.574	-1.96%	22.8	24.9	1.09	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
136	normal	11.100	10.837	-2.37%	23.2	24.8	1.07	Pass
137	normal	10.827	10.628	-1.84%	25.3	27.1	1.07	Pass
138	normal	10.987	10.846	-1.28%	23.4	26.6	1.14	Pass
139	normal	11.261	10.937	-2.88%	24.2	25.7	1.06	Pass
140	normal	10.912	10.717	-1.79%	24.5	26.5	1.08	Pass
141	normal	10.949	10.734	-1.96%	22.8	24.6	1.08	Pass
142	normal	10.992	10.764	-2.07%	25.2	27.2	1.08	Pass
143	normal	10.750	10.637	-1.05%	24.1	25.8	1.07	Pass
144	normal	10.832	10.529	-2.80%	24.4	27.6	1.13	Pass
145	normal	11.069	10.834	-2.12%	23.0	24.8	1.08	Pass
146	normal	11.098	10.846	-2.27%	22.1	25.4	1.15	Pass
147	normal	10.627	10.419	-1.96%	23.7	25.8	1.09	Pass
148	normal	11.098	10.946	-1.37%	22.9	25.2	1.10	Pass
149	normal	10.899	10.676	-2.05%	22.6	24.4	1.08	Pass
150	normal	10.862	10.685	-1.63%	23.4	26.0	1.11	Pass
151	normal	11.020	10.734	-2.60%	23.3	25.4	1.09	Pass
152	normal	10.940	10.715	-2.06%	22.7	24.1	1.06	Pass
153	normal	10.981	10.746	-2.14%	22.7	24.3	1.07	Pass
154	normal	11.066	10.774	-2.64%	21.6	23.9	1.11	Pass

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Test Photo(s):



Fig 15. During Test

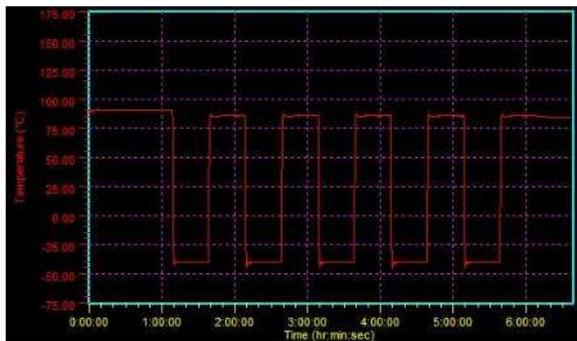


Fig 16. Test Curve

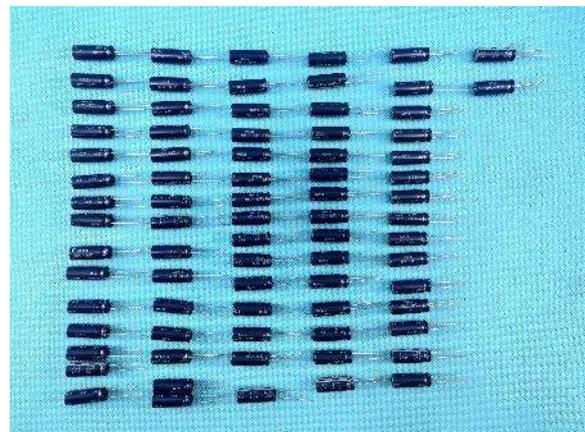


Fig 17. After test



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4. Test Item: Biased Humidity

Sample Description: Capacitance

Quantities of Specimens: 77 PCS

Test Standards: MIL-STD-202 Method 103 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Test condition:

Test Temperature: 85°C
 Test Humidity: 85%RH
 Test duration: 1000 hours
 Bias voltage: 2.5V

Evaluation Method:

Visual inspection: no damage
 Electrical: Absolute value of $\Delta C/C \leq 30\%$
 ESR $\leq 4^*$ initial ESR@25°C

Test Result(s):

Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ ESR (initial)	Conclusion
155	normal	10.944	8.445	-22.83%	22.9	42.8	1.87	Pass
156	normal	11.264	8.649	-23.22%	23.4	42.6	1.82	Pass
157	normal	10.818	8.369	-22.64%	24.2	46.7	1.93	Pass
158	normal	10.778	8.472	-21.40%	24.1	45.5	1.89	Pass
159	normal	10.973	8.549	-22.09%	22.4	41.2	1.84	Pass
160	normal	10.702	8.437	-21.16%	23.5	45.8	1.95	Pass
161	normal	11.372	8.594	-24.43%	23.0	42.6	1.85	Pass
162	normal	11.017	8.473	-23.09%	24.1	45.5	1.89	Pass
163	normal	11.379	8.564	-24.74%	22.1	42.0	1.90	Pass
164	normal	10.902	8.519	-21.86%	23.3	43.8	1.88	Pass
165	normal	11.020	8.537	-22.53%	23.1	44.4	1.92	Pass



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166	normal	10.976	8.529	-22.29%	23.6	45.8	1.94	Pass
167	normal	10.701	8.194	-23.43%	24.0	44.9	1.87	Pass
168	normal	11.063	8.573	-22.51%	22.9	44.0	1.92	Pass
169	normal	10.904	8.496	-22.08%	24.0	43.4	1.81	Pass
170	normal	11.221	8.439	-24.79%	24.2	46.9	1.94	Pass
171	normal	10.943	8.427	-22.99%	23.4	44.0	1.88	Pass
172	normal	11.259	8.564	-23.94%	22.8	42.4	1.86	Pass
173	normal	10.947	8.462	-22.70%	23.2	42.7	1.84	Pass
174	normal	11.263	8.495	-24.58%	23.8	45.2	1.90	Pass
175	normal	10.905	8.377	-23.18%	23.7	43.6	1.84	Pass
176	normal	10.952	8.594	-21.53%	23.1	42.0	1.82	Pass
177	normal	10.872	8.573	-21.15%	23.7	44.6	1.88	Pass
178	normal	11.111	8.437	-24.07%	23.4	45.4	1.94	Pass
179	normal	10.631	8.397	-21.01%	24.9	48.1	1.93	Pass
180	normal	10.792	8.445	-21.75%	24.5	45.8	1.87	Pass
181	normal	11.058	8.418	-23.87%	23.8	43.3	1.82	Pass
182	normal	10.944	8.427	-23.00%	23.4	44.7	1.91	Pass
183	normal	10.626	8.364	-21.29%	23.1	42.7	1.85	Pass
184	normal	10.858	8.394	-22.69%	23.1	42.0	1.82	Pass
185	normal	10.940	8.473	-22.55%	22.6	43.6	1.93	Pass
186	normal	10.823	8.473	-21.71%	22.7	42.9	1.89	Pass
187	normal	10.902	8.349	-23.42%	22.6	41.6	1.84	Pass
188	normal	10.903	8.369	-23.24%	23.1	43.9	1.90	Pass
189	normal	11.144	8.543	-23.34%	22.7	41.8	1.84	Pass



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190	normal	10.669	8.375	-21.50%	23.2	44.8	1.93	Pass
191	normal	10.948	8.594	-21.50%	24.7	46.2	1.87	Pass
192	normal	10.937	8.256	-24.51%	22.4	40.8	1.82	Pass
193	normal	11.015	8.658	-21.40%	22.6	40.9	1.81	Pass
194	normal	10.901	8.530	-21.75%	23.6	45.8	1.94	Pass
195	normal	11.175	8.419	-24.66%	24.1	43.9	1.82	Pass
196	normal	10.979	8.552	-22.11%	20.9	39.3	1.88	Pass
197	normal	10.627	8.264	-22.24%	24.5	47.5	1.94	Pass
198	normal	10.980	8.582	-21.84%	24.0	44.4	1.85	Pass
199	normal	11.138	8.594	-22.84%	23.3	42.4	1.82	Pass
200	normal	10.978	8.473	-22.82%	24.4	47.1	1.93	Pass
201	normal	11.056	8.397	-24.05%	23.7	45.3	1.91	Pass
202	normal	10.827	8.245	-23.85%	23.3	42.4	1.82	Pass
203	normal	11.260	8.518	-24.35%	23.8	44.3	1.86	Pass
204	normal	11.024	8.472	-23.15%	22.8	42.6	1.87	Pass
205	normal	11.140	8.649	-22.36%	24.7	46.7	1.89	Pass
206	normal	10.863	8.537	-21.41%	23.5	43.2	1.84	Pass
207	normal	11.021	8.518	-22.71%	23.6	44.8	1.90	Pass
208	normal	10.945	8.427	-23.01%	24.0	46.6	1.94	Pass
209	normal	11.184	8.764	-21.64%	23.9	44.9	1.88	Pass
210	normal	11.102	8.645	-22.13%	25.3	49.3	1.95	Pass
211	normal	10.992	8.349	-24.04%	24.8	45.4	1.83	Pass
212	normal	10.990	8.369	-23.85%	23.7	43.6	1.84	Pass
213	normal	11.073	8.530	-22.97%	23.6	44.8	1.90	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
214	normal	10.750	8.219	-23.54%	24.5	46.1	1.88	Pass
215	normal	10.515	8.137	-22.62%	26.2	50.8	1.94	Pass
216	normal	11.108	8.397	-24.41%	24.8	45.1	1.82	Pass
217	normal	10.901	8.346	-23.44%	23.7	43.6	1.84	Pass
218	normal	10.667	8.265	-22.52%	22.9	43.5	1.90	Pass
219	normal	10.743	8.349	-22.28%	22.5	41.4	1.84	Pass
220	normal	10.944	8.561	-21.77%	23.1	44.6	1.93	Pass
221	normal	11.177	8.572	-23.31%	24.3	46.2	1.90	Pass
222	normal	11.139	8.462	-24.03%	24.8	48.1	1.94	Pass
223	normal	10.943	8.349	-23.70%	22.8	42.9	1.88	Pass
224	normal	10.946	8.516	-22.20%	22.7	44.0	1.94	Pass
225	normal	10.787	8.433	-21.82%	23.2	44.8	1.93	Pass
226	normal	11.026	8.618	-21.84%	23.6	44.1	1.87	Pass
227	normal	10.897	8.219	-24.58%	24.0	46.6	1.94	Pass
228	normal	11.094	8.437	-23.95%	22.0	41.4	1.88	Pass
229	normal	10.658	8.349	-21.66%	23.7	44.1	1.86	Pass
230	normal	10.744	8.230	-23.40%	23.6	43.4	1.84	Pass
231	normal	10.899	8.445	-22.52%	23.4	44.0	1.88	Pass

Since the above data and / or information is provided by the applicant, the relevant results or conclusions of this report are only made for these data and / or information, SGS is not responsible for the authenticity, integrity and results of the data and information



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Test Photo(s):



Fig 18. During Test



Fig 19. During Test



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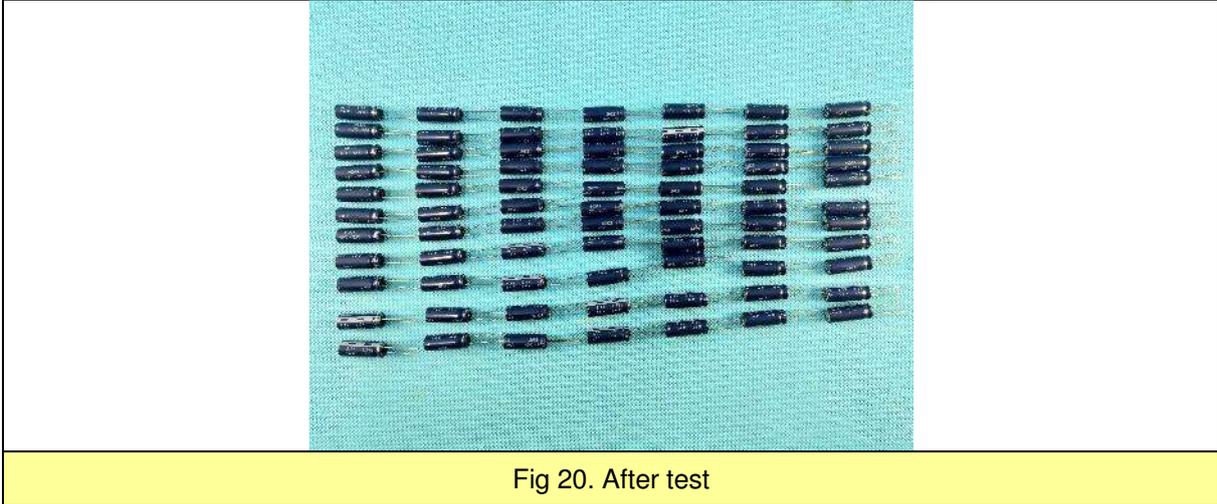
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5. Test Item: Operational Life

Sample Description: Capacitance

Quantities of Specimens: 77 PCS

Test Standards: MIL-STD-202 Method 108 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Test condition:

Test Temperature: 85°C
 Test duration: 1000 hours
 Bias voltage: 2.5V

Evaluation Method:

Visual inspection: no damage
 Electrical: Absolute value of $\Delta C/C \leq 30\%$
 ESR ≤ 4 * initial ESR@25°C

Test Result(s):

Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ ESR (initial)	Conclusion
232	normal	11.103	9.365	-15.65%	23.2	33.9	1.46	Pass
233	normal	10.980	9.286	-15.43%	22.4	31.8	1.42	Pass
234	normal	11.020	9.345	-15.20%	24.1	36.4	1.51	Pass
235	normal	10.819	9.184	-15.11%	23.4	33.5	1.43	Pass
236	normal	10.825	9.261	-14.45%	24.4	33.8	1.39	Pass
237	normal	10.983	9.168	-16.53%	22.8	34.0	1.49	Pass
238	normal	10.787	9.243	-14.31%	21.8	33.1	1.52	Pass
239	normal	10.946	9.267	-15.34%	24.3	33.2	1.37	Pass
240	normal	10.982	9.186	-16.35%	21.7	31.2	1.44	Pass
241	normal	10.700	9.173	-14.27%	25.1	36.6	1.46	Pass
242	normal	10.975	9.267	-15.56%	23.2	36.0	1.55	Pass
243	normal	10.740	9.143	-14.87%	23.8	34.7	1.46	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
244	normal	11.015	9.364	-14.99%	24.5	37.2	1.52	Pass
245	normal	11.015	9.352	-15.10%	24.1	35.7	1.48	Pass
246	normal	10.937	9.364	-14.38%	21.1	30.8	1.46	Pass
247	normal	10.816	9.116	-15.72%	23.9	36.1	1.51	Pass
248	normal	10.969	9.275	-15.44%	22.0	33.7	1.53	Pass
249	normal	10.535	9.029	-14.30%	23.0	34.5	1.50	Pass
250	normal	11.091	9.341	-15.78%	23.4	34.4	1.47	Pass
251	normal	11.009	9.319	-15.35%	22.8	31.7	1.39	Pass
252	normal	10.975	9.215	-16.04%	22.2	31.5	1.42	Pass
253	normal	11.410	9.517	-16.59%	20.5	29.9	1.46	Pass
254	normal	11.015	9.276	-15.79%	21.9	32.6	1.49	Pass
255	normal	11.205	9.315	-16.87%	21.8	32.0	1.47	Pass
256	normal	10.976	9.364	-14.69%	23.1	32.1	1.39	Pass
257	normal	11.095	9.372	-15.53%	21.9	32.0	1.46	Pass
258	normal	10.818	9.074	-16.12%	22.3	34.1	1.53	Pass
259	normal	10.971	9.261	-15.59%	22.4	33.4	1.49	Pass
260	normal	10.853	9.168	-15.53%	23.6	32.9	1.39	Pass
261	normal	11.015	9.243	-16.09%	21.9	31.8	1.45	Pass
262	normal	11.050	9.364	-15.26%	23.2	34.6	1.49	Pass
263	normal	10.813	9.116	-15.69%	21.7	31.9	1.47	Pass
264	normal	10.856	9.275	-14.56%	22.8	34.4	1.51	Pass
265	normal	10.817	9.119	-15.70%	23.8	34.0	1.43	Pass
266	normal	10.897	9.215	-15.44%	23.2	33.4	1.44	Pass
267	normal	10.738	9.217	-14.16%	22.8	34.0	1.49	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
268	normal	11.054	9.286	-15.99%	22.4	33.2	1.48	Pass
269	normal	11.134	9.345	-16.07%	22.2	32.4	1.46	Pass
270	normal	10.661	9.084	-14.79%	22.8	31.4	1.38	Pass
271	normal	10.977	9.243	-15.80%	23.4	34.2	1.46	Pass
272	normal	11.133	9.364	-15.89%	21.8	32.5	1.49	Pass
273	normal	11.171	9.352	-16.28%	23.6	35.2	1.49	Pass
274	normal	10.736	9.184	-14.46%	21.8	33.1	1.52	Pass
275	normal	10.699	9.061	-15.31%	21.8	31.6	1.45	Pass
276	normal	10.852	9.165	-15.55%	22.3	32.1	1.44	Pass
277	normal	11.134	9.318	-16.31%	22.4	32.7	1.46	Pass
278	normal	10.857	9.175	-15.49%	23.1	33.0	1.43	Pass
279	normal	10.898	9.163	-15.92%	22.3	33.7	1.51	Pass
280	normal	11.055	9.327	-15.63%	23.6	35.4	1.50	Pass
281	normal	10.816	9.235	-14.62%	23.0	31.8	1.38	Pass
282	normal	10.936	9.346	-14.54%	23.3	34.0	1.46	Pass
283	normal	11.170	9.328	-16.49%	22.4	31.1	1.39	Pass
284	normal	10.732	9.164	-14.61%	23.4	35.3	1.51	Pass
285	normal	10.850	9.267	-14.59%	23.5	35.7	1.52	Pass
286	normal	11.170	9.343	-16.36%	22.7	32.7	1.44	Pass
287	normal	11.049	9.364	-15.25%	22.2	32.6	1.47	Pass
288	normal	10.855	9.252	-14.77%	22.7	33.8	1.49	Pass
289	normal	11.332	9.467	-16.46%	21.9	33.3	1.52	Pass
290	normal	10.819	9.186	-15.09%	24.1	34.9	1.45	Pass
291	normal	11.048	9.173	-16.97%	23.5	32.0	1.36	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
292	normal	10.778	9.186	-14.77%	23.0	33.8	1.47	Pass
293	normal	11.093	9.345	-15.76%	23.7	34.6	1.46	Pass
294	normal	11.015	9.184	-16.62%	22.5	34.9	1.55	Pass
295	normal	10.697	9.166	-14.31%	22.5	32.9	1.46	Pass
296	normal	10.893	9.345	-14.21%	23.1	35.1	1.52	Pass
297	normal	10.896	9.184	-15.71%	23.5	35.5	1.51	Pass
298	normal	10.932	9.261	-15.29%	23.2	34.8	1.50	Pass
299	normal	10.420	8.876	-14.82%	23.4	33.7	1.44	Pass
300	normal	10.933	9.175	-16.08%	22.4	32.7	1.46	Pass
301	normal	10.737	9.065	-15.57%	22.7	34.7	1.53	Pass
302	normal	11.095	9.286	-16.30%	22.2	30.6	1.38	Pass
303	normal	10.817	9.146	-15.45%	23.6	35.9	1.52	Pass
304	normal	10.778	9.128	-15.31%	23.7	34.4	1.45	Pass
305	normal	10.975	9.164	-16.50%	24.9	35.9	1.44	Pass
306	normal	10.661	9.084	-14.79%	24.1	35.2	1.46	Pass
307	normal	10.738	9.043	-15.79%	23.5	32.4	1.38	Pass
308	normal	10.816	9.167	-15.25%	23.5	34.3	1.46	Pass

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Test Photo(s):



Fig 21. During Test

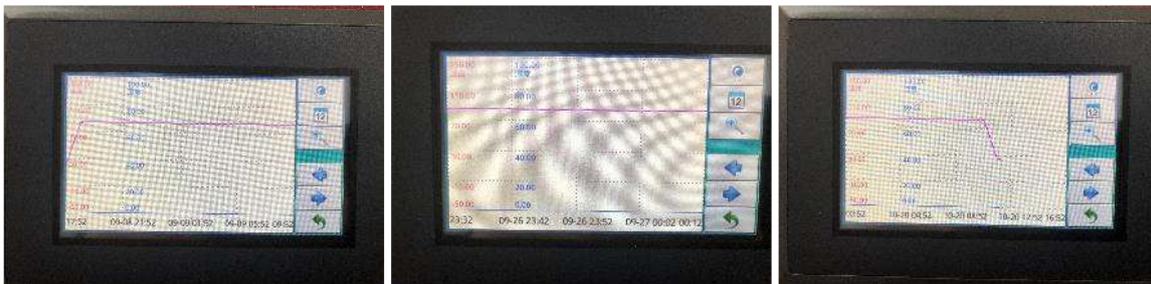


Fig 22. Test curve



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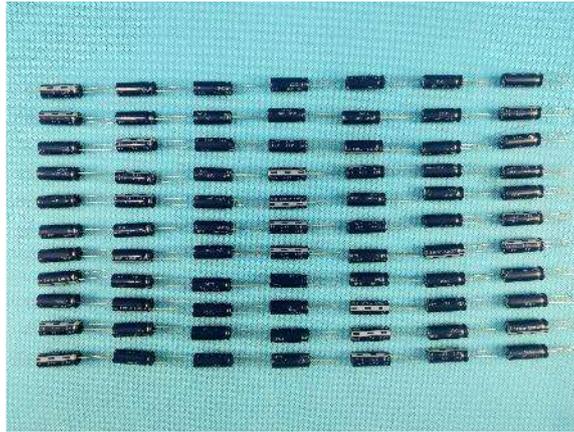


Fig 23. After test



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6. Test Item: Physical Dimension

Sample Description: Capacitance

Quantities of Specimens: 30 PCS

Test Standards: JESD22 Method JB-100 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Evaluation Method:

Verify physical dimensions to the applicable device detail specification.

Test Result(s):

Sample No.	D (10±0.5mm)	H (28±1mm)	P (5±0.5mm)	d (0.6±0.1mm)	A (≤30mm)	Conclusion
359#	10.24	27.80	5.24	0.68	27.79	Pass
360#	10.24	27.71	5.34	0.68	28.12	Pass
361#	10.16	27.76	5.17	0.69	28.16	Pass
362#	10.18	27.71	5.25	0.70	28.77	Pass
363#	10.08	27.73	5.26	0.69	28.79	Pass
364#	10.12	27.62	5.43	0.69	27.85	Pass
365#	10.16	27.57	5.31	0.69	28.10	Pass
366#	10.11	27.74	5.34	0.69	28.77	Pass
367#	10.22	27.63	5.24	0.69	28.79	Pass
368#	10.16	27.76	5.30	0.69	28.77	Pass
369#	10.21	27.52	5.39	0.69	28.15	Pass
370#	10.13	27.53	5.27	0.69	28.80	Pass
371#	10.21	27.70	5.20	0.69	27.80	Pass
372#	10.24	27.75	5.22	0.69	27.83	Pass
373#	10.17	27.83	5.34	0.70	27.80	Pass
374#	10.26	27.73	5.23	0.70	27.79	Pass
375#	10.21	27.80	5.29	0.69	27.80	Pass



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Sample No.	D (10±0.5mm)	H (28±1mm)	P (5±0.5mm)	d (0.6±0.1mm)	A (≤30mm)	Conclusion
376#	10.19	27.64	5.35	0.70	27.78	Pass
377#	10.19	27.72	5.36	0.69	27.80	Pass
378#	10.17	27.66	5.28	0.70	27.79	Pass
379#	10.20	27.65	5.34	0.69	27.75	Pass
380#	10.23	27.83	5.26	0.69	27.80	Pass
381#	10.18	27.62	5.32	0.70	27.78	Pass
382#	10.16	27.75	5.36	0.69	28.80	Pass
383#	10.22	27.82	5.28	0.70	28.05	Pass
384#	10.24	27.79	5.30	0.70	28.15	Pass
385#	10.23	27.71	5.29	0.70	28.05	Pass
386#	10.15	27.80	5.34	0.69	28.01	Pass
387#	10.14	27.66	5.22	0.69	28.01	Pass
388#	10.21	27.78	5.33	0.70	28.05	Pass

Test Photo(s):

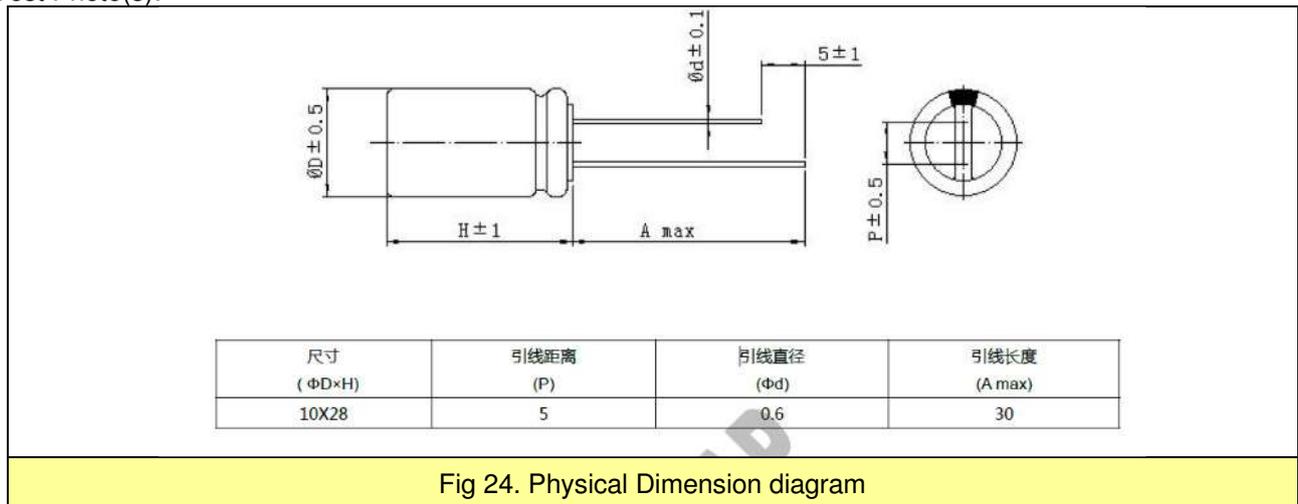


Fig 24. Physical Dimension diagram



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7. Test Item: Terminal Strength (Leaded)

Sample Description: Capacitance

Quantities of Specimens: 30 PCS

Test Standards: MIL-STD-202 Method 211 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Test condition:

Test condition A (pull test)

Applied force: 454 g

Duration of applied force: 10s

Evaluation Method:

Visual inspection: no damage

Electrical: Absolute value of $\Delta C/C \leq 10\%$

ESR ≤ 2 * initial ESR@25°C

Test Result(s):

Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ ESR (initial)	Conclusion
359	normal	11.134	11.131	-0.03%	22.9	22.9	1.00	Pass
360	normal	11.086	11.086	0.00%	22.6	22.8	1.01	Pass
361	normal	10.981	10.981	0.00%	22.7	22.9	1.01	Pass
362	normal	10.740	10.737	-0.03%	22.2	22.4	1.01	Pass
363	normal	11.098	11.095	-0.03%	23.0	23.1	1.00	Pass
364	normal	10.931	10.930	-0.01%	22.3	22.3	1.00	Pass
365	normal	11.049	11.045	-0.04%	23.1	23.1	1.00	Pass
366	normal	10.818	10.815	-0.03%	21.7	21.7	1.00	Pass
367	normal	10.814	10.814	0.00%	23.7	23.9	1.01	Pass
368	normal	10.815	10.815	0.00%	23.0	23.1	1.00	Pass
369	normal	11.091	11.090	-0.01%	23.3	23.3	1.00	Pass
370	normal	10.975	10.972	-0.03%	23.8	23.7	1.00	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
371	normal	10.858	10.858	0.00%	21.9	21.9	1.00	Pass
372	normal	10.579	10.577	-0.02%	23.7	23.9	1.01	Pass
373	normal	10.778	10.775	-0.03%	23.9	24.0	1.00	Pass
374	normal	10.818	10.814	-0.04%	23.4	23.5	1.00	Pass
375	normal	10.701	10.701	0.00%	24.7	24.7	1.00	Pass
376	normal	10.812	10.810	-0.02%	21.9	21.9	1.00	Pass
377	normal	10.814	10.811	-0.03%	23.7	23.9	1.01	Pass
378	normal	10.693	10.693	0.00%	22.1	22.4	1.01	Pass
379	normal	11.087	11.085	-0.02%	24.8	24.9	1.00	Pass
380	normal	10.772	10.770	-0.02%	23.6	23.8	1.01	Pass
381	normal	10.965	10.965	0.00%	23.2	23.5	1.01	Pass
382	normal	10.857	10.854	-0.03%	22.8	22.9	1.00	Pass
383	normal	11.015	11.012	-0.03%	22.4	22.7	1.01	Pass
384	normal	10.780	10.780	0.00%	23.0	23.2	1.01	Pass
385	normal	10.975	10.971	-0.04%	23.5	23.7	1.01	Pass
386	normal	10.660	10.660	0.00%	24.2	24.2	1.00	Pass
387	normal	10.779	10.775	-0.04%	23.3	23.5	1.01	Pass
388	normal	11.254	11.252	-0.02%	22.6	22.8	1.01	Pass

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Test Photo(s):

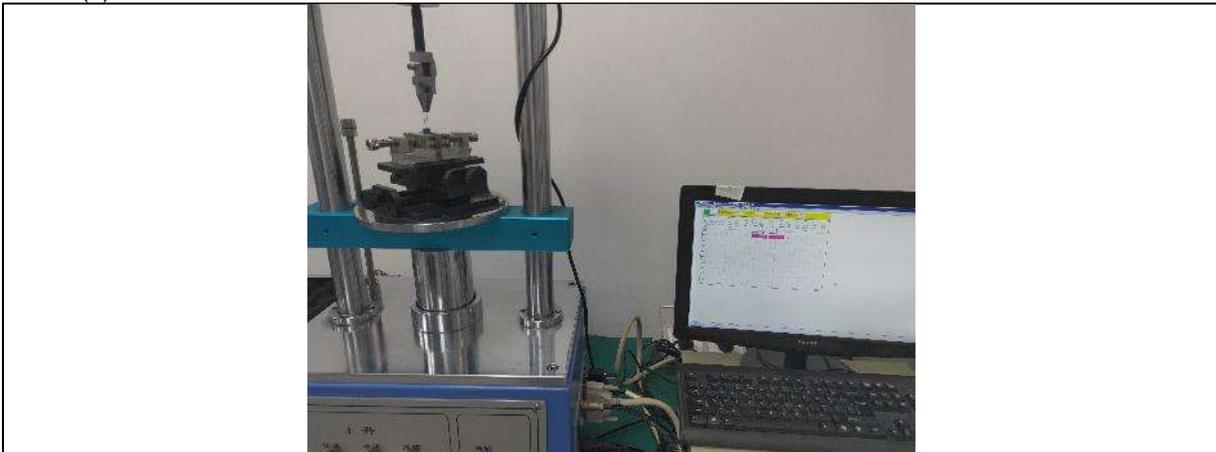


Fig 25. During Test

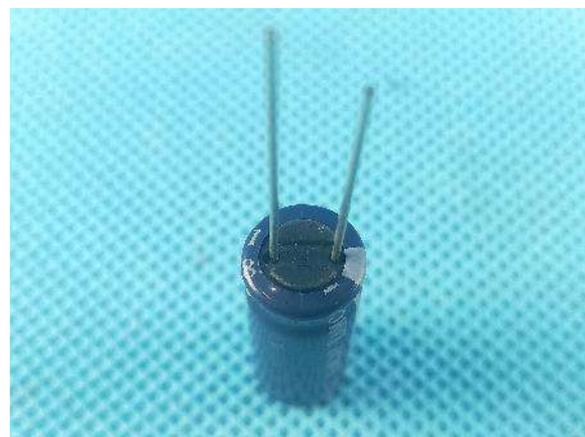


Fig 26. After test



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8. Test Item: Resistance to Solvents

Sample Description: Capacitance

Quantities of Specimens: 5 PCS

Test Standards: MIL-STD-202 Method 215 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Solvent solutions:

A: A mixture consisting of the following:

1. One part by volume of isopropyl alcohol, American Chemical Society (ACS) reagent grade, or isopropyl alcohol in accordance with TT-I-735, grade A or B, and
2. Three parts by volume of mineral spirits in accordance with MIL-PRF-680, type I, or three parts by volume of a mixture of 80 percent by volume of kerosene and 20 percent by volume ethylbenzene.

C: A terpene defluxer consisting of a minimum of 90 percent d-limonene and 10 percent surfactant

D: A mixture consisting of the following:

1. Forty-two parts by volume water, 1 megohm-cm minimum resistivity.
2. One part by volume of propylene glycol monomethyl ether (glycol ether PM, 1-methoxy-2-propanol).
3. One part by volume of monoethanolamine.

Test condition and Result:

Specimen No.	Reagent	DUT temp	Exposure time	Result
309	A	25±5°C	1) Immersion 3 +.5, -0 minutes 2) Brush 10 strokes (wet bristle) 3) The procedure shall be repeated two more times, for a total of three immersions, followed by brushing	No damage
310	A	25±5°C		No damage
311	C	25±5°C		No damage
312	C	25±5°C		No damage
313	D	63~70°C		No damage

Evaluation Method:

Visual inspection: no damage



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Test Photo(s):



Fig 27. During Test - Regent A

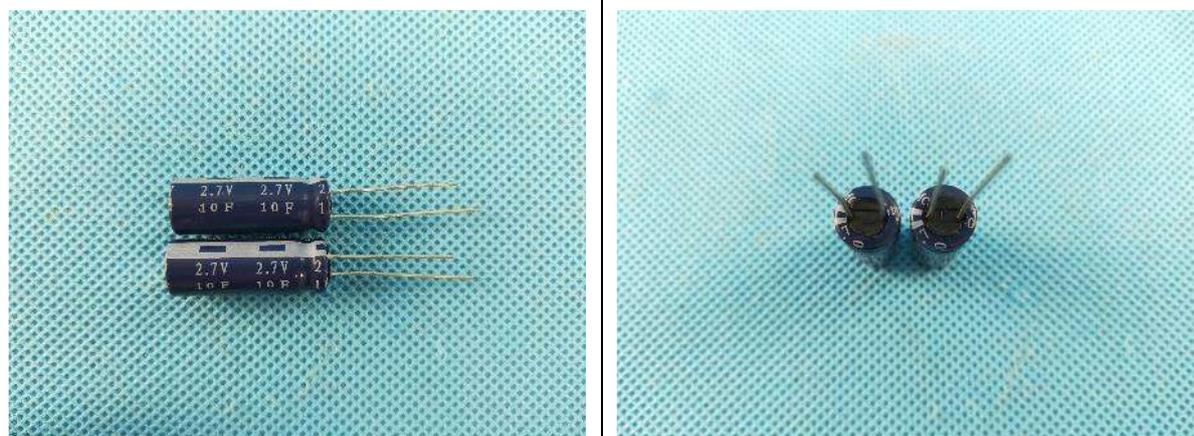


Fig 28. After test - Regent A



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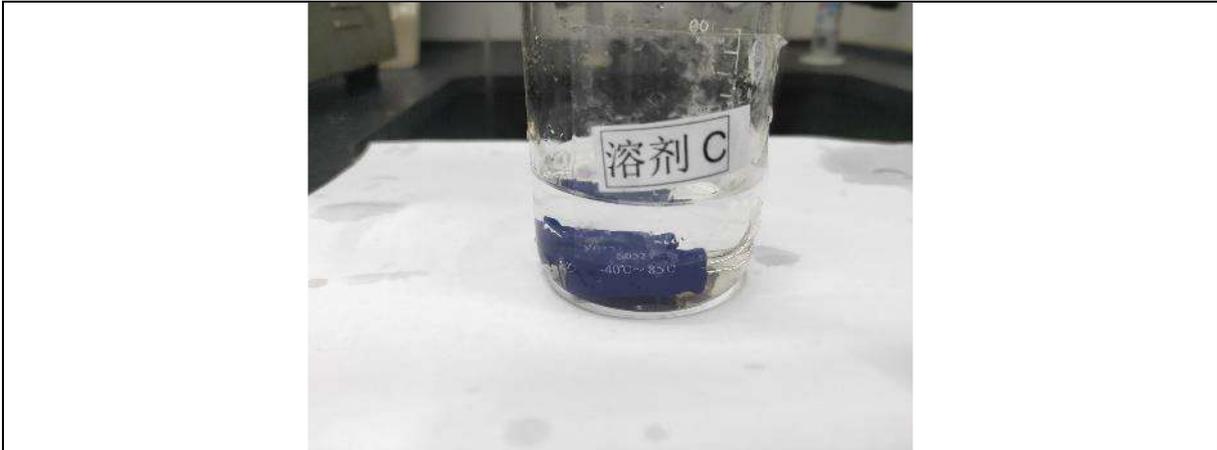


Fig 29. During Test - Regent C

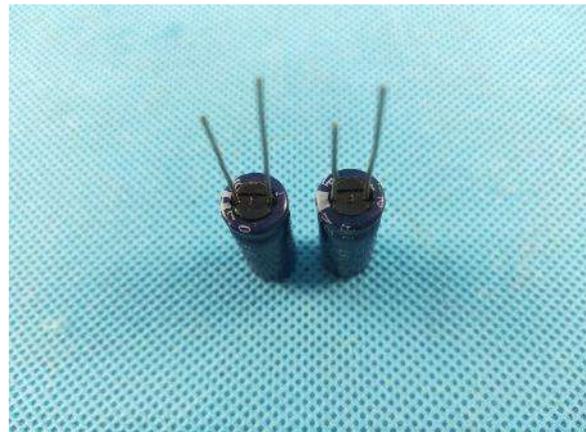
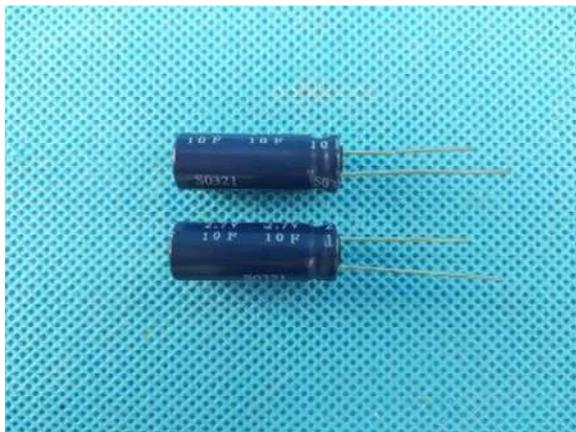


Fig 30. After test - Regent C



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Fig 31. During Test - - Regent D

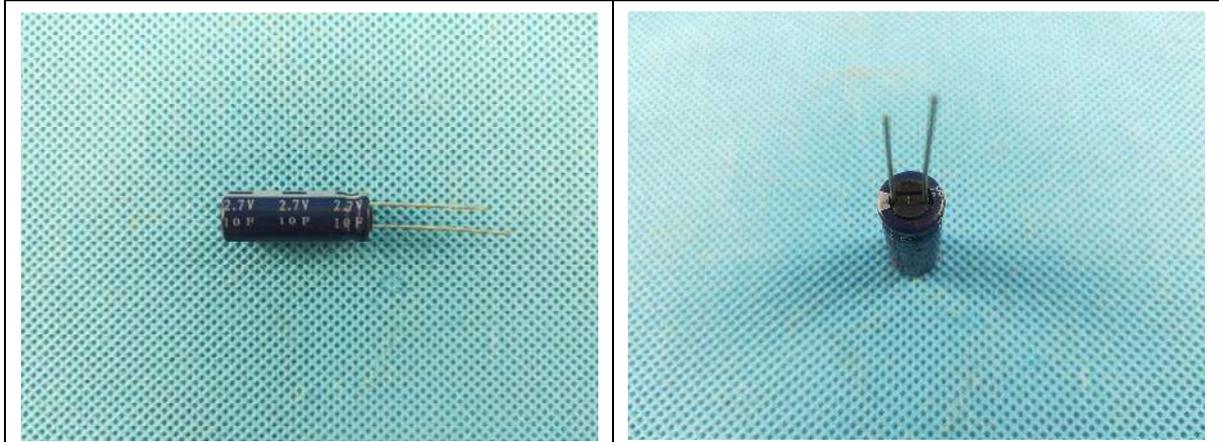


Fig 32. After test - Regent D



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9. Test Item: Vibration

Sample Description: Capacitance

Quantities of Specimens: 30 PCS

Test Standards: MIL-STD-202 Method 204 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Test condition:

Sample Status: Unpackaged, Non-operation

Frequency Range: (10~55) Hz Sweep

Acceleration: 30 m/s² (10 Hz~55 Hz)

Orientation: Z axis

Sweep Cycles: 10 cycles

Duration Time: 3 hours/axis, total 3 hours

Evaluation Method:

Visual inspection: no damage

Electrical: Absolute value of $\Delta C/C \leq 10\%$

ESR $\leq 2^*$ initial ESR@25°C

Test Result(s):

Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
314	normal	10.700	10.675	-0.23%	24.0	24.7	1.03	Pass
315	normal	11.016	10.985	-0.28%	24.6	25.1	1.02	Pass
316	normal	10.977	10.956	-0.19%	23.7	24.4	1.03	Pass
317	normal	10.896	10.884	-0.11%	23.7	23.9	1.01	Pass
318	normal	10.816	10.778	-0.35%	23.4	23.9	1.02	Pass
319	normal	10.736	10.712	-0.22%	24.0	24.7	1.03	Pass
320	normal	11.010	10.985	-0.23%	23.4	24.3	1.04	Pass
321	normal	11.052	11.034	-0.16%	21.9	22.3	1.02	Pass
322	normal	10.579	10.552	-0.26%	23.4	23.6	1.01	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
323	normal	11.174	11.144	-0.27%	23.0	23.7	1.03	Pass
324	normal	10.811	10.775	-0.33%	22.1	22.5	1.02	Pass
325	normal	11.019	10.983	-0.33%	23.4	23.9	1.02	Pass
326	normal	11.096	11.071	-0.23%	21.8	22.7	1.04	Pass
327	normal	10.979	10.945	-0.31%	23.9	24.6	1.03	Pass
328	normal	10.617	10.585	-0.30%	23.1	23.6	1.02	Pass
329	normal	10.932	10.896	-0.33%	23.7	23.9	1.01	Pass
330	normal	10.974	10.955	-0.17%	24.7	25.2	1.02	Pass
331	normal	11.129	11.099	-0.27%	22.2	23.1	1.04	Pass
332	normal	10.934	10.905	-0.27%	23.8	24.5	1.03	Pass
333	normal	10.972	10.936	-0.33%	22.5	23.4	1.04	Pass
334	normal	10.855	10.842	-0.12%	22.3	23.0	1.03	Pass
335	normal	10.738	10.717	-0.20%	25.3	25.8	1.02	Pass
336	normal	11.092	11.063	-0.26%	21.4	21.6	1.01	Pass
337	normal	10.937	10.915	-0.20%	23.1	23.6	1.02	Pass
338	normal	11.015	10.995	-0.18%	22.5	23.2	1.03	Pass
339	normal	10.860	10.825	-0.32%	22.9	23.8	1.04	Pass
340	normal	10.930	10.903	-0.25%	23.4	23.9	1.02	Pass
341	normal	10.932	10.917	-0.14%	23.0	23.2	1.01	Pass
342	normal	10.772	10.755	-0.16%	22.9	23.6	1.03	Pass
343	normal	10.849	10.827	-0.20%	24.7	25.7	1.04	Pass

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Test Photo(s):



Fig 33. Test setup (Z axis)

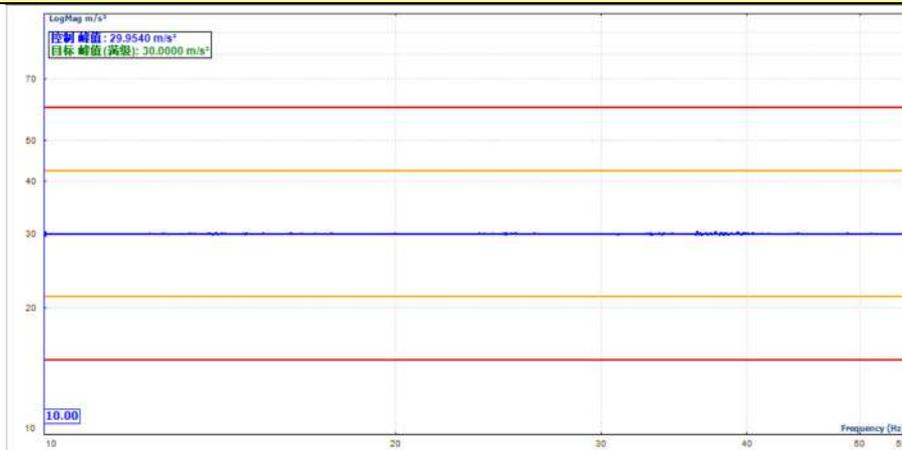


Fig 34. Test spectrum



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10. Test Item: Resistance to Soldering Heat

Sample Description: Capacitance

Quantities of Specimens: 30 PCS

Test Standards: MIL-STD-202 Method 210 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Test condition:

Solder temperature: 260°C

Test time: 10 s

Solder type: SAC305

Evaluation Method:

Visual inspection: no damage

Electrical: Absolute value of $\Delta C/C \leq 10\%$

ESR $\leq 2^*$ initial ESR@25°C

Test Result(s):

Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ ESR (initial)	Conclusion
389	normal	10.936	10.864	-0.66%	23.1	23.9	1.03	Pass
390	normal	10.736	10.673	-0.59%	22.6	23.2	1.03	Pass
391	normal	11.092	11.025	-0.60%	22.8	23.3	1.02	Pass
392	normal	10.693	10.638	-0.51%	24.0	25.0	1.04	Pass
393	normal	11.212	11.156	-0.50%	21.1	21.5	1.02	Pass
394	normal	11.214	11.145	-0.62%	22.2	23.1	1.04	Pass
395	normal	10.820	10.769	-0.47%	23.2	23.9	1.03	Pass
396	normal	10.819	10.765	-0.50%	22.3	23.2	1.04	Pass
397	normal	10.935	10.874	-0.56%	22.3	22.7	1.02	Pass
398	normal	10.976	10.908	-0.62%	22.1	23.0	1.04	Pass
399	normal	11.053	10.994	-0.53%	23.3	24.0	1.03	Pass
400	normal	11.087	11.048	-0.35%	22.7	23.2	1.02	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
401	normal	10.772	10.692	-0.74%	23.2	23.9	1.03	Pass
402	normal	10.657	10.619	-0.36%	23.5	24.4	1.04	Pass
403	normal	10.732	10.653	-0.74%	23.3	23.8	1.02	Pass
404	normal	11.132	11.071	-0.55%	23.1	23.3	1.01	Pass
405	normal	10.740	10.704	-0.34%	23.2	24.1	1.04	Pass
406	normal	10.937	10.884	-0.48%	22.2	22.9	1.03	Pass
407	normal	10.851	10.807	-0.41%	21.7	22.4	1.03	Pass
408	normal	11.212	11.128	-0.75%	22.9	23.4	1.02	Pass
409	normal	11.173	11.095	-0.70%	22.4	22.8	1.02	Pass
410	normal	10.937	10.856	-0.74%	23.3	24.0	1.03	Pass
421	normal	10.656	10.606	-0.47%	24.7	25.2	1.02	Pass
422	normal	11.011	10.958	-0.48%	22.4	23.3	1.04	Pass
423	normal	11.015	10.937	-0.71%	21.6	22.0	1.02	Pass
424	normal	10.892	10.834	-0.53%	22.1	22.3	1.01	Pass
425	normal	11.052	10.997	-0.50%	22.9	23.6	1.03	Pass
426	normal	10.736	10.654	-0.76%	22.3	22.7	1.02	Pass
427	normal	10.895	10.815	-0.73%	21.1	21.9	1.04	Pass
428	normal	10.976	10.924	-0.47%	21.5	21.9	1.02	Pass

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Test Photo(s):



Fig 35. After test

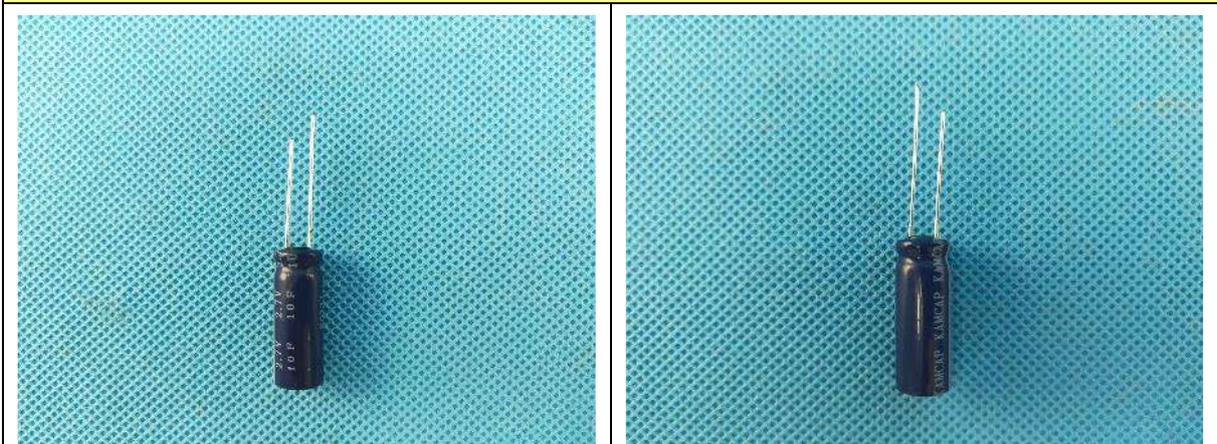


Fig 36. After test



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11. Test Item: ESD

Sample Description: Capacitance

Quantities of Specimens: 15 PCS

Test Standards: AEC-Q200-002 or ISO/DIS 10605 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Test condition:

Direct Contact Discharge: ±4 kV, 3 times

Air Discharge: ±8 kV, 3 times

Evaluation Method:

Visual inspection: no damage

Electrical: Absolute value of $\Delta C/C \leq 10\%$

ESR $\leq 2^*$ initial ESR@25°C

Test Result(s):

Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ ESR (initial)	Conclusion
344	normal	10.812	10.811	-0.01%	23.7	23.8	10.812	Pass
345	normal	11.005	11.004	-0.01%	22.8	23.1	11.005	Pass
346	normal	10.858	10.858	0.00%	23.3	23.5	10.858	Pass
347	normal	11.094	11.092	-0.02%	22.0	22.1	11.094	Pass
348	normal	10.979	10.977	-0.02%	24.0	24.2	10.979	Pass
349	normal	11.055	11.055	0.00%	22.3	22.4	11.055	Pass
350	normal	10.976	10.974	-0.02%	23.9	23.9	10.976	Pass
351	normal	10.819	10.815	-0.04%	23.0	23.2	10.819	Pass
352	normal	10.978	10.976	-0.02%	21.7	21.9	10.978	Pass
353	normal	11.331	11.330	-0.01%	22.1	22.2	11.331	Pass
354	normal	11.013	11.013	0.00%	22.8	22.9	11.013	Pass
355	normal	10.656	10.654	-0.02%	23.8	23.7	10.656	Pass
356	normal	10.852	10.850	-0.02%	22.3	22.5	10.852	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
357	normal	11.014	11.007	-0.06%	22.0	22.1	11.014	Pass
358	normal	10.659	10.657	-0.02%	23.3	23.5	10.659	Pass

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Test Photo(s):



Fig 37. Direct Contact Discharge



Fig 38. Air Discharge



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12. Test Item: Solderability

Sample Description: Capacitance

Quantities of Specimens: 15 PCS

Test Standards: J-STD-002 and client's requirement

Laboratory Environmental Conditions: 25±10°C,50±25%RH

Test condition:

Solder temperature: 245°C

Test time: 5s

Flux type: flux 2#

Solder type: SAC305

Evaluation Method:

A minimum of 95% of each of the surfaces being tested shall be exhibit good wetting.

Electrical: Absolute value of $\Delta C/C \leq 10\%$

ESR $\leq 2^*$ initial ESR@25°C



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Test Result(s):

Sample No.	Result	Conclusion
429	Wetting area \geq 95%	Pass
430	Wetting area \geq 95%	Pass
431	Wetting area \geq 95%	Pass
432	Wetting area \geq 95%	Pass
433	Wetting area \geq 95%	Pass
434	Wetting area \geq 95%	Pass
435	Wetting area \geq 95%	Pass
436	Wetting area \geq 95%	Pass
437	Wetting area \geq 95%	Pass
438	Wetting area \geq 95%	Pass
439	Wetting area \geq 95%	Pass
440	Wetting area \geq 95%	Pass
441	Wetting area \geq 95%	Pass
442	Wetting area \geq 95%	Pass
443	Wetting area \geq 95%	Pass



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Sample No.	Visual Inspection	C (F) (initial)	C (F) (after)	$\Delta C/C$	ESR (m Ω) (initial)	ESR (m Ω) (after)	ESR (after)/ESR (initial)	Conclusion
429	normal	10.976	10.925	-0.46%	23.2	23.9	1.03	Pass
430	normal	10.856	10.811	-0.41%	22.8	23.3	1.02	Pass
431	normal	10.977	10.907	-0.64%	23.1	24.0	1.04	Pass
432	normal	10.898	10.834	-0.59%	23.9	24.6	1.03	Pass
433	normal	11.252	11.204	-0.43%	22.9	23.6	1.03	Pass
434	normal	11.212	11.138	-0.66%	23.4	23.9	1.02	Pass
435	normal	10.973	10.925	-0.44%	23.3	24.2	1.04	Pass
436	normal	10.971	10.904	-0.61%	21.9	22.6	1.03	Pass
437	normal	10.936	10.869	-0.61%	22.8	23.5	1.03	Pass
438	normal	10.772	10.702	-0.65%	23.6	24.5	1.04	Pass
439	normal	11.094	11.031	-0.57%	22.0	22.4	1.02	Pass
440	normal	10.937	10.864	-0.67%	22.9	23.6	1.03	Pass
441	normal	10.739	10.666	-0.68%	22.8	23.3	1.02	Pass
442	normal	11.252	11.207	-0.40%	23.3	24.2	1.04	Pass
443	normal	10.857	10.801	-0.52%	22.8	23.5	1.03	Pass

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Test Photo(s):

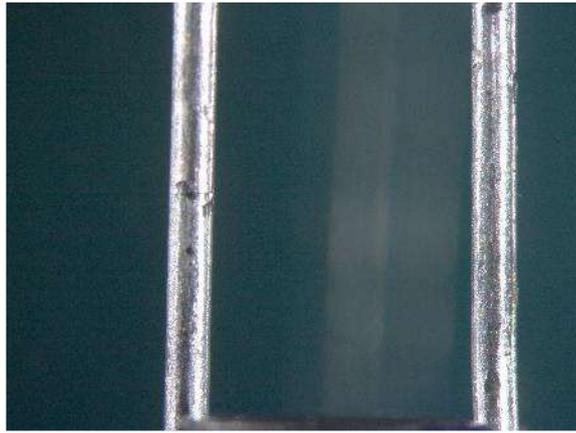


Fig 39. Before test - Typical picture

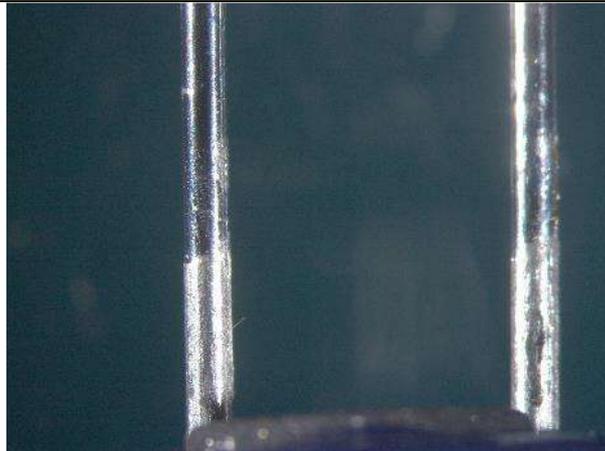


Fig 40. After test - Typical picture



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Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
Stereo Microscope	Stemi 2000-C	SUZRL-F004	2021-06-16	2022-06-15
Thermal Shock Chamber	KTCE-216TBS	SUZRL-F017	2021-03-11	2022-03-10
Temperature and humidity chamber	KTHA-010TBS	SUZRL-F009	2021-03-11	2022-03-10
Temperature and humidity chamber	PHV 1404-D	SUZRL-F031	2021-05-17	2022-05-16
H3TRB	BTR-E671	SUZRL-F050	2021-06-16	2022-06-15
Digital Caliper	111-011	SUZRL-P007	2021-03-17	2022-03-16
Vibration Test System	SZREL-119	DC-2200-26	2020-11-26	2021-11-25
Charge Accelerometer	SZREL-149C	4371 V	2021-01-12	2022-01-11
DC Power Supply	PS 8160-04 DT	SUZRL-E006	2021-03-11	2022-03-10
DC Power Supply	PS 2084-05B	SUZRL-E003	2021-03-11	2022-03-10
High precision battery performance testing system	CT-1008-5V6A-S1-F	T1801-149345	2020-12-04	2021-12-04
AC Resistance meter	AT526	526001503070	2020-12-09	2021-12-08
Lead-free solder pot	/	SUZRL-P009	/	/
Pulling Force Tester	1220SA/SAR/S D	SHAEL-019	2021-05-06	2022-05-05

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