

TB25 Thermal Battery Test Report

February 2024

TB 25 Thermal Battery Test Report

1 Purpose of the experiment

According to the TB25 Thermal Battery Test Outline, tests are conducted on 6 pcs TB25 thermal batteries to verify that the products meet the technical requirements of the TB25 Thermal Battery Test Outline.

2 Test time

February 25th, 2024 to February 26th, 2024.

3 Experimental basis

TB25 Thermal Battery Test Outline.

4 Test equipment and measuring tools

The equipment and measuring tools used in the experiment are shown in Table 1.

Table 1 Equipment/Measuring Tool Details

Number	Equipment/measuring tool name	Model/Specification	Equipment validity period	Remarks
1	Low temperature test chamber	GWD-100	2024.12	
2	Electric blast drying oven	WG-71	2024.11	
3	16 channel data acquisition instrument	IDTS-4516U	2024.4	
4	Electronic load	IT8818	2024.3	
5	Vernier caliper	0~150mm	2024.12	Accuracy not less than 0.02mm
6	balance	-	2024.3	Sensitivity not less than 0.5g
7	Insulation resistance meter	ZC42A-2 type	2024.11	
8	Helium mass spectrometer leak detector	ZQJ530	2024.3	
9	Universal ignition head	-	2024.3	
10	Multimeter	FLUKE17B+	2024.3	
11	Electric vibration testing system	MPA102/L620M	2024.4	
12	Impact test bench	SY11-25	2024.5	

5 Inspection and test items and results

According to the requirements of the TB25 Thermal Battery Test Outline, a total of 6 pcs products were selected for acceptance testing in this test. The test results are shown in Table 2.

Table 2 Static Inspection Results

Number	Product number	insulation resistance /M Ω	Activation circuit resistance /Ω	Size/mm	Weight/g	Leakage rate/Pa • m ³ /s
1	0066	500	10.161	Φ 30.82 x 62.06	119.22	4.8 × 10 ⁻⁸
2	0489	500	10.598	Φ 30.84 x 62.12	119.51	4.2 × 10 ⁻⁸
3	0923	500	10.186	Φ 30.80 x 62.08	119.95	3.8 × 10 ⁻⁸
4	1152	500	8.470	Φ 30.80 x 61.98	120.83	2.6 × 10 ⁻⁸
5	1406	500	10.890	Φ 30.82 x 62.08	119.19	4.0 × 10 ⁻⁸
6	1518	500	8.061	Φ 30.82 x 62.10	120.53	1.8x10 ⁻⁸
technical requirement		≥ 50	6.2~12.2	Φ 31max x 63.3max	≤ 135	≤ 3.0 × 10 ⁻⁷

Table 3 Safety Current Test Results

Number	Product number	Appearance	Has it been activated
1	0066	qualified	no
2	0489	qualified	no
3	0923	qualified	no
4	1152	qualified	no
5	1406	qualified	no
6	1518	qualified	no
technical requirement		Apply a continuous DC current of 30mA, and the ignition head must not ignite within 5 minutes	

Table 4 Transportation Impact Test Results

Number	Product number	Appearance	Activation circuit resistance/Ω	Insulation resistance/M Ω
1	0066	qualified	10.160	500
2	0489	qualified	10.600	500
3	0923	qualified	10.185	500
4	1152	qualified	8.472	500
5	1406	qualified	10.889	500
6	1518	qualified	8.060	500
technical requirement		After undergoing the specified transportation impact test, the thermal battery should have no physical damage and the insulation resistance should be ≥ 50M Ω, the activation circuit resistance should be between 6.2 Ω and 12.2 Ω.		

Table 5 Transportation Vibration Test Results

Number	Product number	Appearance	Activation circuit resistance/ Ω	Insulation resistance/M Ω
1	0066	qualified	10.161	500
2	0489	qualified	10.599	500
3	0923	qualified	10.185	500
4	1152	qualified	8.469	500
5	1406	qualified	10.891	500
6	1518	qualified	8.062	500
technical requirement		After undergoing the specified transportation vibration test, the thermal battery should have no physical damage and the insulation resistance should be $\geq 50M\Omega$, the activation circuit resistance should be between 6.2Ω and 12.2Ω .		

Table 6 Thermal Battery Electrical Performance Test Results

Number	Product number	state	Output terminal	working hours S	Activation time S	working voltage V	Remarks
1	0066	normal temperature	+15V	112	0.341	16.20	
			-15V	113	0.328	-16.19	
2	0489	normal temperature	+15V	118	0.365	16.22	
			-15V	112	0.360	-16.19	
3	1152	low temperature	+15V	106	0.431	16.08	
			-15V	88	0.395	-16.18	
4	1518	low temperature	+15V	111	0.413	16.06	
			-15V	92	0.400	-16.16	
5	0923	high temperature	+15V	118	0.282	16.34	
			-15V	116	0.291	-16.30	
6	1406	high temperature	+15V	111	0.302	16.37	
			-15V	115	0.295	-16.33	
technical requirement			+15V	≥ 25	≤ 1	+(13.3-16.5)	
			-15V	≥ 25	≤ 1	-(13.3-16.5)	

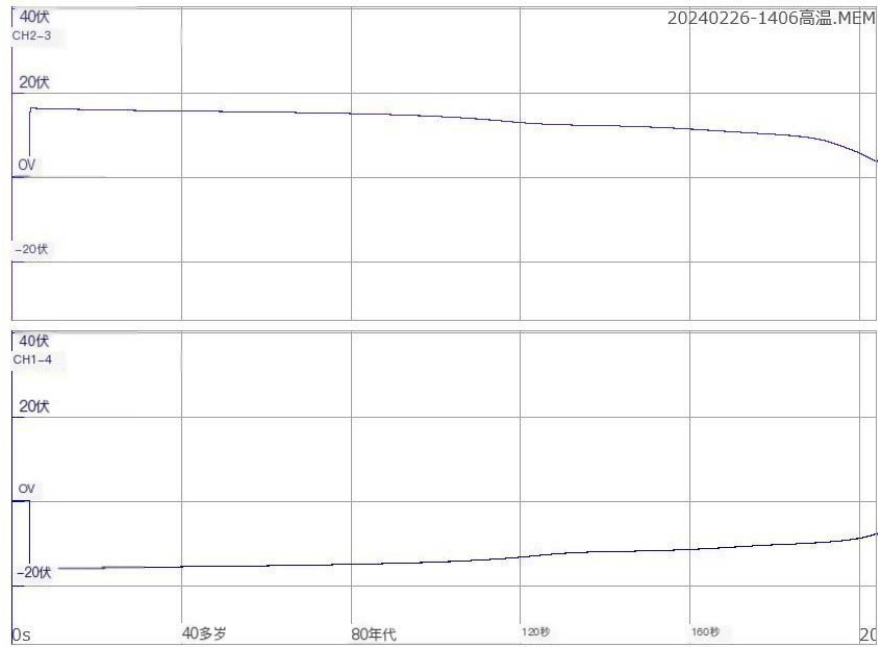


Figure 1 1406 High temperature working curve

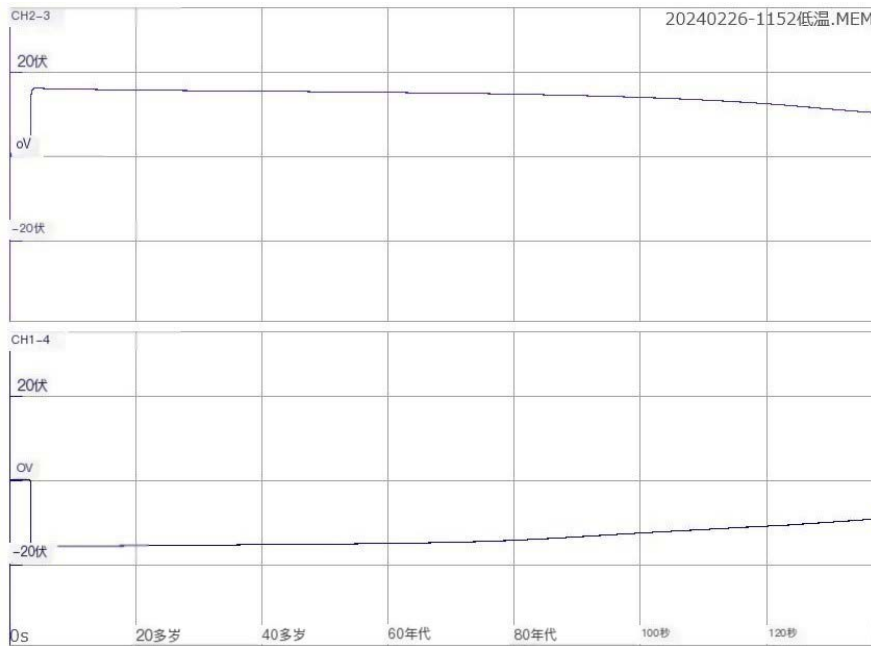


Figure 2 1152 Low Temperature Working Curve

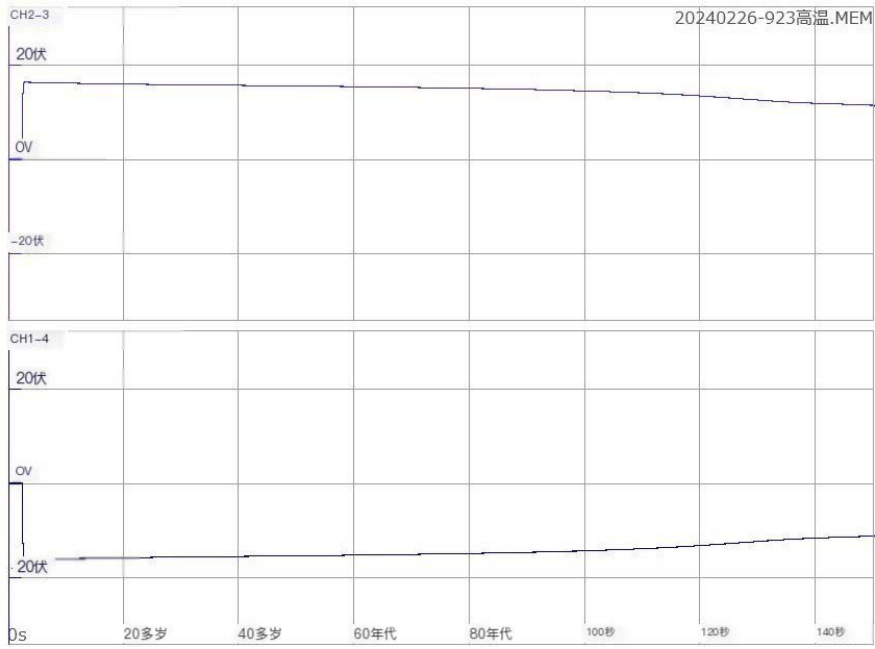


Figure 3 0923 High temperature working curve

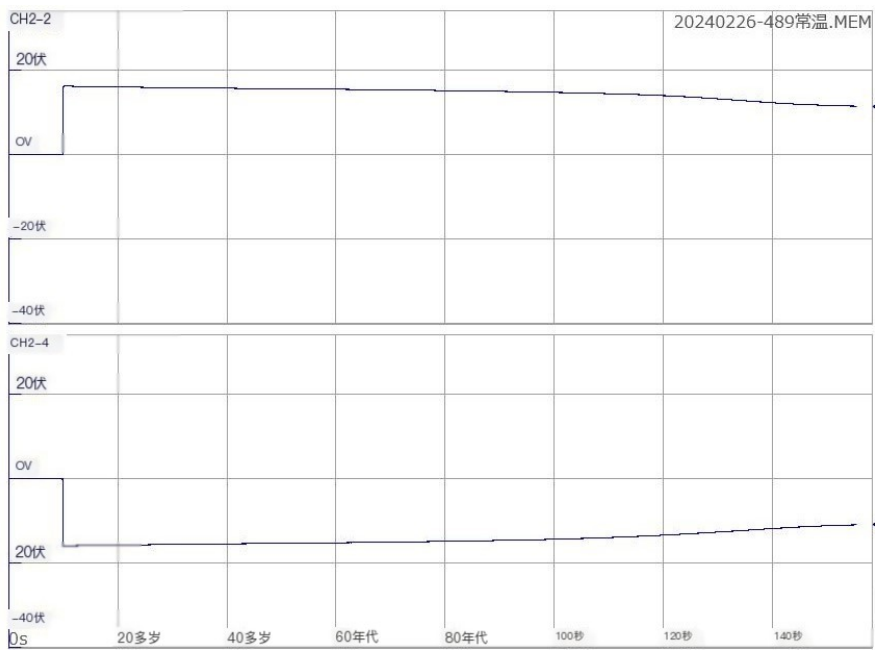


Figure 4 0489 Room Temperature Working Curve

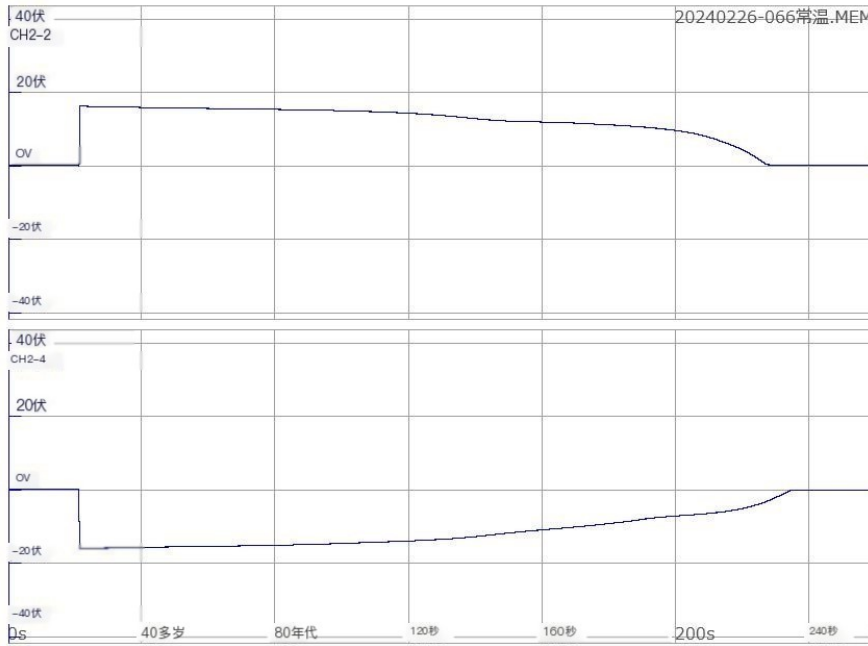


Figure 5 0066 Working curve at room temperature

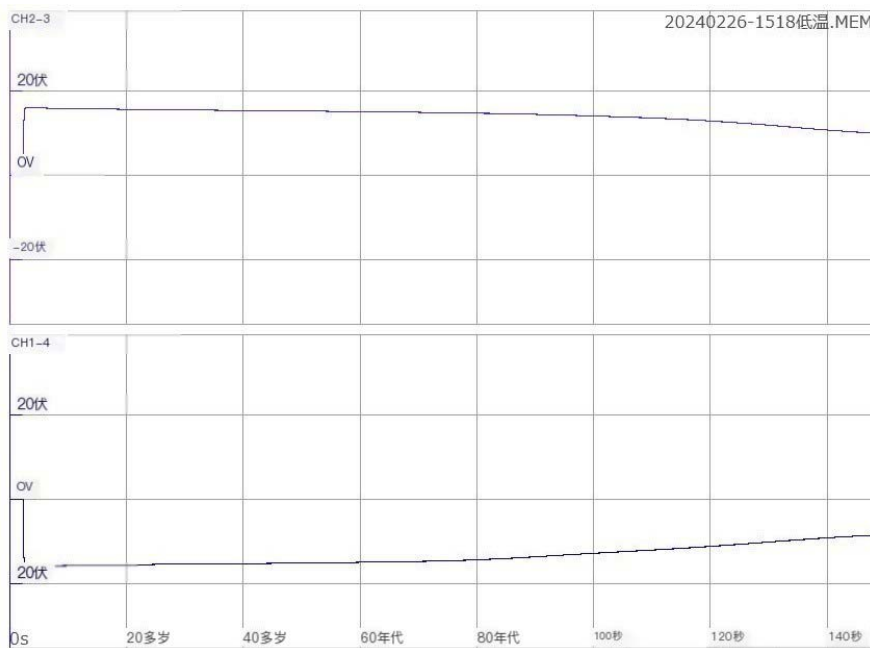


Figure 6 1518 Low temperature working curve

6 Conclusion

The testing personnel have confirmed the instruments and testing equipment used in the TB 25 thermal battery test, which have been identified and are within the validity period. The test is strictly carried out according to the prescribed methods and procedures, and the test results meet the requirements of the TB25 thermal battery test outline.