CONTENDS

1. Introduction

This specification describes the properties, testing methods and notice of the 60140 Flash Charge Lithium ion capacitors developed by Jinpei Electronics CO., LTD.

2. General Features

2.1 Features and Advantages

- Fast charge and discharge
- Long cycle life
- Good low temperature performance
- High energy density

2.2 Typical Applications

Using at Energy storage, Start and stop system, smart grid, harbor machinery UPS and other power system.

3. Product Appearance & Dimensions

3.1 Structure & Appearance

4. Product Technical Index

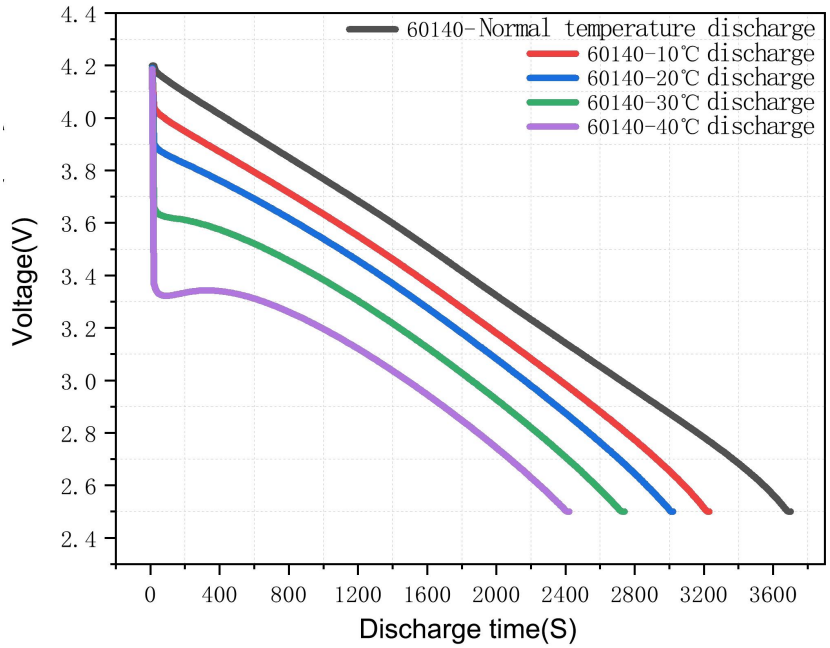
4.1 Main Parameters

Series	Merits	Values
1	rated capacity	18Ah
2	Battery energy	65wh
3	nominal voltage	3.6V
4	Upper limit voltage	4.2V
5	Lower limit voltage	2.5V
6	DC internal resistance (10ms)	≤0.5mΩ
7	Standard charge current	54A(3C)
8	Fast charging current	180A(10C)
9	Rated discharge current	54A(3C)
10	Maximum continuous discharge current	540A(30C)
11	Maximum discharge duration	90S
12	Maximum temperature rise	55±5℃
13	safety	refer to GB/T31485-2015《For electric vehicles Safety requirements and test methods for power batteries》
14	Charging and discharging temperature range	-40~85℃
15	Storage Temperature Range	-20~45℃
16	Fast charging cycle life (@ 25 ± 5 ℃, forced heat dissipation)	≥8，000 times (5C)
17	Slow charging cycle life	≥20, 000 times (1C)
18	weight	≤850g
19	Size (diameter D × Height H)	Φ60.5mm×144.5mm（±0.5mm）

4.2 Other Technical Information

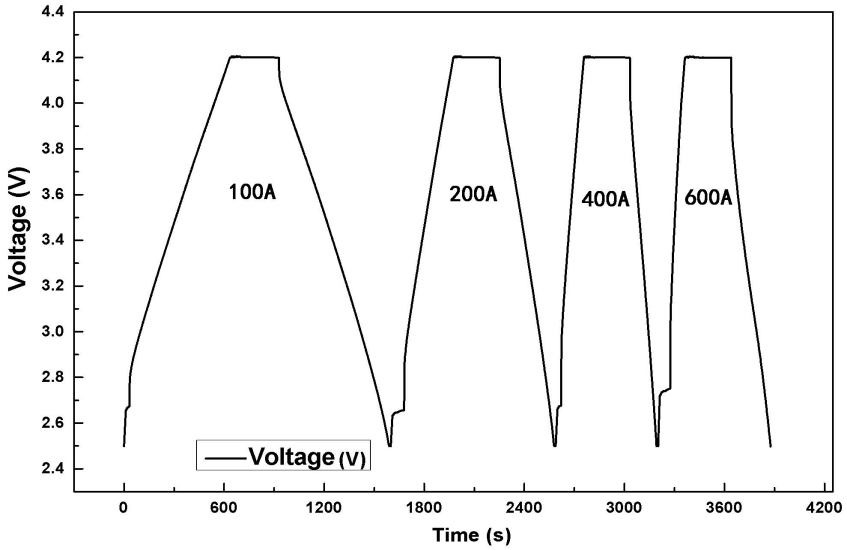
❖ Low temperature discharge performance

Low temperature discharge curves



❖ Charge/discharge at different rate

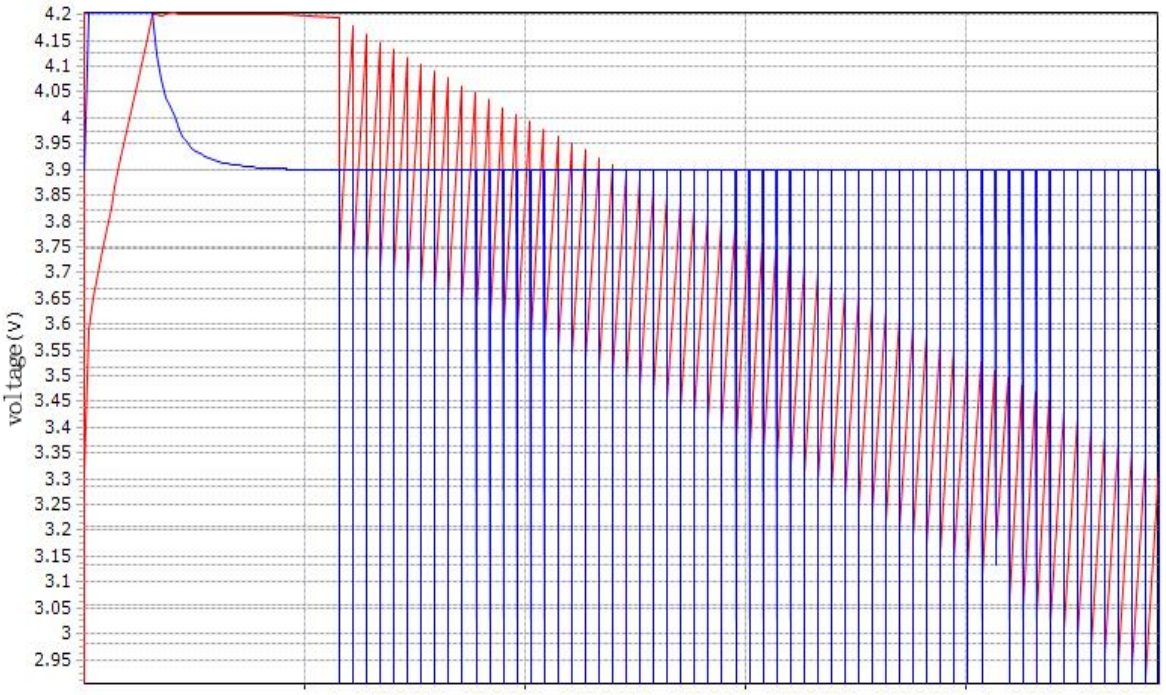
Rate charge/discharge curves



Discharge Current	Retention（%）
20A	100%
100A	94
200A	92
400A	90
600A	80

❖ **Pulse discharge performance**

Pulse discharge @25℃ 1000A/1S



test method：At room temperature, charge at a constant current of 10C to 4.2V, cut off at a constant voltage of 0.1C, let it stand for 2 minutes, and discharge at a pulse current of 1000A/1s to 2.5V for 30 seconds each time。

5 Testing Methods

5.1 Testing Conditions

This specification followed the standard testing criteria: 1 atm, 25±2 ℃ and a relative humidity < 65%.

5.2 Test for Capacitance/Internal resistance

Capacitance Test: Charge the cell to 4.2V by 1C current and the charge it by constant voltage until the current reached 0.1C. And then, discharge the cell to 2.5V at 1C current. After rested 30s，repeated the last processes and regarded the second capacitance as cell’ s capacitance.

Resistance test: Charge the cell to 4.2V by 3C current and charge until 0.1C current by constant voltage, test it' s ACR at 1kHZ Ac impedance meter. By the way, once test its capacitance, recorded its 10ms voltage difference during the discharge process, and the calculated its DCR by R=ΔU/I. Note: the mix record time is 1s during the "Capacitance and resistance test" process.

5.3 Test for Low Temperature

Under the ordered temperature, constant charge the cell to 4.2V and then end it at 0.1C by constant voltage. After this, remove the cell to different temperature condition (keep 2h) and discharge it to 2.5V at 1C current, record its discharge capacitance.

5.4 Cycle life test

Under 25±5℃, test the cell' s original performance by "Capacitance/resistance method", and then charge it to 4.0V by 5C current, discharge it to 2.5V at 2Cconstant current, after this rest 5min, cycle this processes 2000. Regarded the testing process at one cycle, and repeated it 15 times, until it reached 30000 times.

5.5 Electrochemical Characteristics

Unless otherwise specified, the cell should be fresh cell and tested by standard charge and standard discharge.

No.	Item	Test method and conditions	Criterion
5.51	Rate discharge capability	Standard charge followed by constant current (N C) discharge to 2.5V at specified discharge rates at 25±2℃.	$\text{Capacity Retension} = \frac{\text{discharge capacity at N C}}{\text{discharge capacity at 1C}} \geq 85\%$
5.5.2	Quick charge cycle life	Under 25±2℃, test the cell's original performance by "2.1 and 2.2 methods", and then charge it to 4.2V by 5C current, discharge it to 2.5V at 3C constant current, after this rest 5min, cycle this processes 1000. Regarded the testing process at one cycle, and repeated it 8 times, until it reached 8000 times.	$\text{Capacity Retension} = \frac{\text{discharge capacity of 8000th cycel}}{\text{original discharge capacity}} \geq 80\%$
5.5.3	Low temperature performance	Standard charge and discharge to 2.5V at 1C(2500mA) currentunder specified temperature.	-20℃: Capacity retention≥85% -30℃: Capacity retention≥75% -40℃: Capacity retention≥70%
5.5.4	25 ℃ Storage performance at full charge station under 25℃	Afte charg atstandard condition, and then stored at 25 ℃ for 30days.After this, discharge to 2.5V by standard condition.	$\text{CapacityRetension} = \frac{\text{Residualcapacityafter30daysstorage}}{\text{originaldischargecapacity}} \geq 90\%$ $\text{Recovercapacityfter30daysstorage}$ $\text{originaldischargecapacity} = 95\%$

5.5.5	Storage performance at high temperature.	Standard charge to 4.2V and stored at 55℃ for 7days, and then rest at 25℃ for 5 hours, after this, discharge to 2.5V by 1C current	Capacity Retension $= \frac{\text{Residual capacity after 7days storage}}{\text{original discharge capacity}} \geq 92\%$ Capacity Retension $= \frac{\text{Recover capacity after 7days storage}}{\text{original discharge capacity}} = 96\%$
5.5.6	Storage performance at 45 ℃ and 50%SOC	Standard charge to 4.2V and stored at 45℃ for 28 days, and then rest at 25℃ for 5 hours, after this re-test its capacity by standard charge/discharge method.	Capacity Retension $= \frac{\text{Recover capacity after 28days storage}}{\text{original discharge capacity}} = 95\%$

6 Notice

6.1 During Operation

- Working temperature of LIB should not exceed the upper and lower limits of the rated temperature.
- LIB should be used at rated voltage.
- Check the polarity of LIB before power on. No reverse connecting.
- Keep LIB away from heat. The temperature has a big influence on the working life of LIB.
- No direct contacting with water, oil, acid or alkaline.
- No crushing, nail penetrating or disassembling FCB.
- No discarding. Dispose LIB based on the State Environmental-protection Standard.
- The cell embraced constant voltage before shipment, therefore, the short circuit should be extremely forbidden.

6.2 Storage

- No storage in a condition with a relative humidity exceeding 85% or with toxic gases. It is easy to cause the damage and corrosion of the terminals and case, resulting in disconnection.
- For Long-term storage, place FCB in a well-ventilated condition at 25±5℃, with a relative humidity below 60%. Forbidden to sun directly.