
Li-ion Polymer Battery Specification

Model	IE-706090 5Ah
Capacity	5000mAh
Customer Code	
Total pages	10

Registered	Checked	Approved
Customer Approve		
Department	Signature	Date
QA Dept		
R&D Dept		
Approved		

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1. Modified List

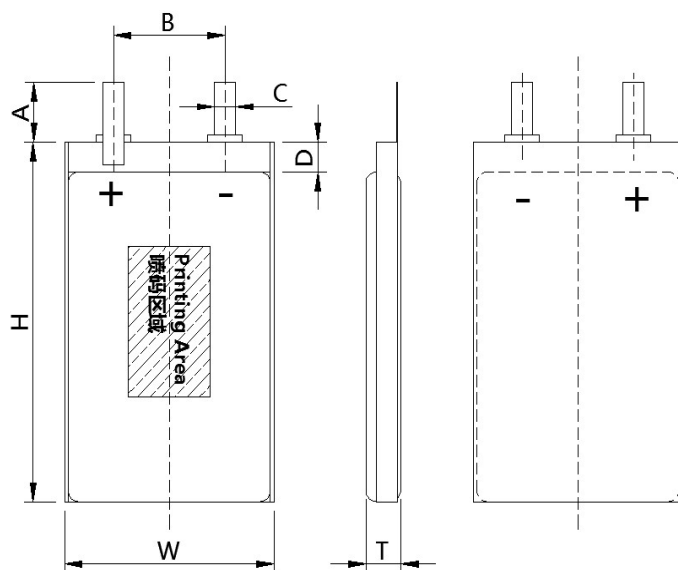
Product Modified Record List

Revision	Date	Mark	Modified content	Approved by
A0	2022/5/14	/	New Release	

2. Scope

This specification describes the basic performance, technical requirement, testing method, warning and caution of the Li-ion polymer rechargeable battery or battery pack. The battery pack defined in this documentation is an assembly which include battery, PCB, wire and other parts.

3. Drawing of Cell



Item	Description		Dimension
A	Cell Tab Length		7 ± 2 mm
B	Cell Tab Pitch		45 ± 2 mm
C	Cell Tab Width		5 ± 0.2 mm
D	Cell Top sealent Length		4 ± 0.5 mm
T	Cell Thickness max.	Initial	7mm
		After 300 cycle life	7.56mm
W	Cell Width max.		60.3mm
H	Cell Height max.		90.5 mm

4. Battery Performance

No.	Item	Specification	Note
1	Rated Capacity	5000mAh	0.2C discharge 0.2C放电
2	Nominal Capacity	5050mAh	0.2C discharge 0.2C放电
3	Min. Capacity	5000mAh	0.2C discharge 0.2C放电
4	Battery Weight	≈ 85g	
5	Initial Impedance	≤ 180mΩ for Pack	3.7V AC 1KHz measured 3.7V电芯 1KHz 交流阻抗测试
6	Normal Voltage	3.7 V	
7	Initial Voltage	≥3.8V	
8	Limited Charge Voltage	4.2 V	Voltage of CC charge to CV charge 恒流充电转恒压充电的电压
9	Standard Charging Method	0.2C CC current charge to 4.2V, then CV charge till current declines to 0.01C	
10	Cut-off Voltage	2.75 V	PCM Over-discharge Protection Voltage:3.0V
11	Standard Charging Current	1000mA (0.2C)	CC charge to 4.2 V, then CV charge till current declines to less than 0.01C
12	Standard Charging Time	6hours	
13	Rapid Charging Current	2500 mA	
14	Rapid Charging Time	3hours	
15	Standard Discharging Current	1000mA (0.2C)	CC discharge to 2.75 V2.75 V
16	Max. Discharging Current	2500 mA	
17	Operating Temperature Range	Charging: 10 ~ 45°C Discharging: -20 ~ 60°C	
18	Operating humidity Range	≤ 90%RH	

5. Electrical Characteristics of the Cell

5.1 Normal Test Conditions

Temperature	Relative Humidity	Atmospheric Pressure
15 ~ 35 °C	45 ~ 85 % RH	86 ~ 106 KPa

5.2 Electrochemical Characteristics

No.	Item 项目	Criterion 性能标准	Test Method 测试方法
1	0.2C discharging capacity	Discharging capacity is not less than normal capacity	After Standard Charging, rest 5 minutes, then 0.2C discharge to cut-off voltage
2	1.0C discharging capacity 1.0C	Discharging capacity is not less than 90% of normal capacity	After Standard Charging, rest 5 minutes, then 1.0C discharge to cut-off voltage
3	Cycle life	The cycle times is not less than 300	Charge: 0.2C CC-CV charge to 4.2 V, then current declines to 0.02C Discharge: 0.2C CC discharge to 2.75 V When the discharge capacity reduced to 80% of rated capacity, stop testing, and record the cycle times.
4	Self-discharge	Discharging capacity is not less than 85% of initial capacity	After Standard Charging, rest the cell for 28 days in the condition of 20±5°C, then 0.2C discharge to cut-off voltage, and record the capacity.

5.3 Environment Characteristics

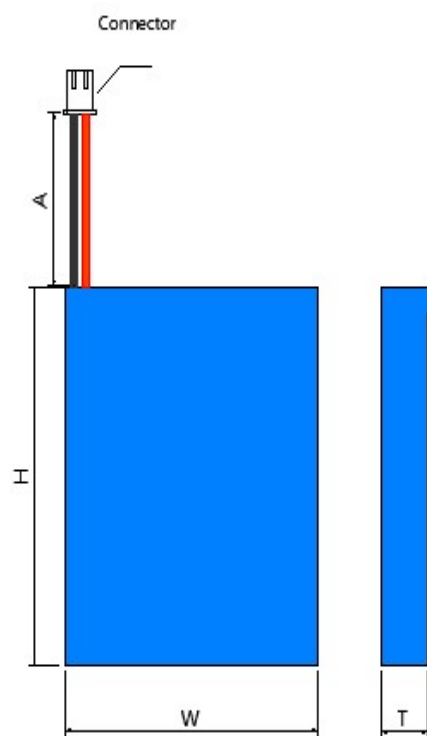
No.	Item	Criterion	Test Method
1	Constant temperature and constant humidity test	No explosion, no fire, no leakage, Discharging capacity is not less than 60% of initial capacity	After Standard Charging, rest the cell for 48 hours in the conditions of 40±5°C and 90~95%RH, then 1.0C discharge to cut-off voltage, and record the capacity.
2	Vibration test	No explosion, no fire, no leakage.	After Standard Charging, fixed the cell to vibration table, then subjected to vibration test for 30 minutes per axis of XYZ axes. Frequency rate: 1oct/min Vibration frequency: 10Hz~30Hz

			Excursion(single amplitude): 0.38mm Vibration frequency: 30Hz~55Hz Excursion(single amplitude): 0.19mm
3	Shock test	No explosion, no fire, no leakage.	After Standard Charging, test condition: Acceleration: 100m/s ² Pulse lasting time: <16ms Shock times: 1000±10 times

5.4 Safety Characteristics

No.	Item	Criterion	Test Method
1	Overcharge test	No explosion, no fire	Discharge: 1.0C to 2.75V Charge: 1.0C last for 2.5H
2	Short-circuit test	No explosion, no fire	After Standard Charging, Short circuit the positive and negative tabs with the copper wire, and the resistance of it is not more than 80mΩ, When the temperature falls 10°C lower than the peak, Stop testing.
3	Thermal test	No explosion, no fire	After Standard Charging, put cell into an hot box, test condition: Temperature Rate: 5±2°C/min Ending temperature: 130±2°C Keep temperature for 30 minutes, Then stop testing
Note: Above testing of sage characteristics must be with protective equipment.			

6. Drawing of battery pack



Item	Description	Dimension
T	Battery pack Thickness max.	7.2mm
W	Battery pack Width max.	60.5mm
H	Battery pack Height max.	93mm
A	Wire Length	100± 5mm
Pack Impedance		≤ 180mΩ
Pack Weight		85g

7. Pack List

No.	Item	Quantity	Material	Specification
1	Li-ion polymer cell	1	UFX 706090	5000mAh
2	PCB	1	Fiber glass polymer compound circuit board	Pass RoHS
3	wire	2	Polythene and copper	UL 1007 24AWG
4	connector	1	XH2.54-2	

8. PCB Specification PCB

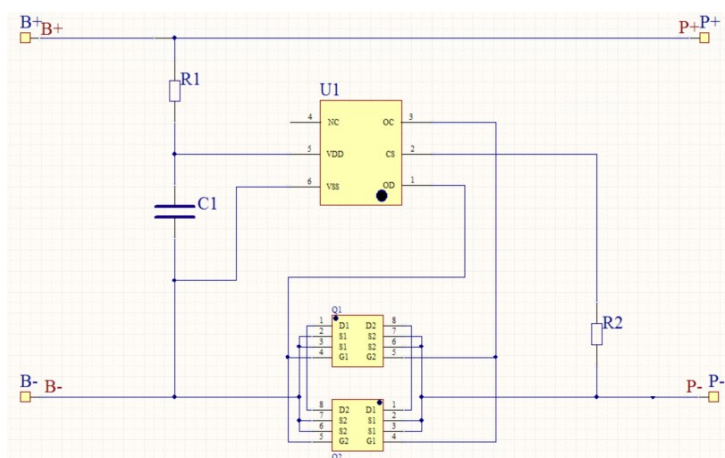
8.1 Electrical Characteristics

No.	Item	Min	Typ	Max	Unit
1	Over-charge Protection Voltage	4.230	4.280	4.330	V
2	Over-charge Release Voltage	4.030	4.080	4.130	V
3	Over-charge Protection Delay Time		120	200	ms
4	Over-discharge Protection Voltage	2.300	2.400	2.500	V
5	Over-discharge Release Voltage	2.900	3.000	3.100	V
6	Over-discharge Protection Delay Time		80	120	ms
7	Over-current Protection for Discharge	5	6.5	9	A
8	Over-current Protection Delay Time		9	20	ms
9	Internal Resistance	/	/	65	mΩ
10	Operation Static Current	1.0		7.0	μA
11	Current consumption (Power down)	/	/	1	μA
12	Short Circuit Protection Delay Time		400	600	μs

8.2 Pin Explanation

Symbol	Explanation	Symbol	Explanation
P+	Battery output/charging positive pole	B+	Cell positive pole
P-	Battery output/charging negative pole	B-	Cell negative pole

8.3 Circuit Diagram



8.4 PCB Parts List

No.	Location	Part Name	Specification	Pack Type	Quantity	Maker/Remark
1	U1	Battery protection IC	DPDW01	SOT23-6	1	
2	Q1 Q2	Silicon MOSFET	DP8205	TSSOP-8	2	
3	R1	Resistor	100Ω±5%	0603	1	
4	R2	Resistor	1KΩ±5%	0603	1	
5	C1	Capacitor	0.1μF	0603	1	
6	PCB	Print circuit board	/	/	1	/

9. Storage and Shipment Requirement

Item	Storage environment	Requirement
	Short period less than 1 month	-20°C ~ +45°C, 90% RH Max.
	Long period more than 3 months	-10°C ~ +45°C, 90% RH Max.
	Recommend storage	15°C ~ 35°C, 85% RH Max.

Long time storage:

If the cell is stored for a long time, the cell's storage voltage should be 3.6~3.9V and the cell is to be stored in a condition as No.4.1. Also, it is recommended to charge the cell every six months.

10. Warning and Cautions

10.1 Warning

Danger warning(it should be described in manual or instruction for users, indicated especially) to prevent the possibility of the battery from leaking, heating, explosion. Please observe the following precautions:

- ◆ Don't immerse the battery in water and seawater. Please put it in cool and dry environment if no using
- ◆ Do not discard or leave the battery near a heat source as fire or heater
- ◆ Being charged, using the battery charger specifically for that purpose
- ◆ Don't reverse the positive and negative terminals
- ◆ Don't connect the battery to an electrical outlet directly
- ◆ Don't connect the positive and negative terminal directly with metal objects such as wire. Short terminals of battery is strictly prohibited, it may damage battery
- ◆ Do not transport and store the battery together with metal objects such as necklaces, hairpins
- ◆ Do not strike, throw or trample the battery
- ◆ Do not directly solder the battery and pierce the battery with a nail or other sharp object
- ◆ Do not use it with other different battery, or other different lithium polymer battery model in mixture

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- ◆ Prohibition of use of damaged cells
 - ◆ Don't bend or fold sealing edge. Don't open or deform folding edge. Don't fillet the end of the folding edge
 - ◆ Don't fall, hit, bend battery body
 - ◆ Battery pack designing and packing Prohibition injury batteries
 - ◆ Never disassemble the cells
 - ◆ The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user
 - ◆ Keep the battery away from babies
 - ◆ Any components contacting these two edges, they must be insulated

10.2 Cautions

- ◆ Do not use or leave the battery at very high temperature conditions(for example, strong direct sunlight or a vehicle in extremely hot conditions). Otherwise, it can overheat or fire or its performance will be degenerated and its service life will be decreased
- ◆ Do not use it in a location where is electrostatic and magnetic greatly, otherwise, the safety devices may be damaged, causing hidden trouble of safety
- ◆ If the battery leaks, and the electrolyte get into the eyes. Do not wipe eyes, instead, rinse the eyes with clean water, and immediately seek medical attention. Otherwise, eyes injury can result.
- ◆ If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charger and stop using it
- ◆ In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument
- ◆ Be aware discharged batteries may cause fire, tape the terminals to insulate them