Rechargeable 3.7V

Li-ion Polymer Battery

Specification

620mAh

Model: 553436

Prepared By/Date	Checked By/Date	Approved By/Date

Li-ion Polymer Battery

1. SCOPE

This specification describes the related technical standard and requirements of the rechargeable Li-polymer. Battery produced with the model 553436 battery will meet the specification.

2. Product Specification

No.	ITEM	RATED PERFORMANCE		REMARK
1	Rated Capacity	Typical	650mAh	0.2C@ Discharge
		Minimum	620mAh	
2	Nominal Voltage	3.7V		Mean Operation Voltage During Standard Discharge After Standard Charge
3	Voltage at end of Discharge	2.75V		
4	Charging Voltage	4.2±0.03V		
5	Maximum Continuous Charge Current	1CmA		
6	Maximum Continuous Discharge Current	1CmA		
7	Operation Temperature Range	Charge: 0~45℃		60±25%R.H.
		Discharge: -20~60℃		
8	Storable Temperature Range	1YEAR -20~25℃		60±25%R.H.
		3MONTH -20~40℃		
		1WEEK -20~60℃		
9	Weight	13±0.2g		
10	Cell Dimension	Length: Max.36±1.0mm		Shipping Cell
		Width: Max.34±0.5mm		
		Thickness:Max.5.5±0.2mm		

3. PERFORMANCE AND TEST CONDITIONS

No.	ITEM	CRITERIA				TESTING CONDITIONS
1	Outside Appearance	No abnormal strain, Deformation nor damage				Visual check
2	External Dimension	According to the attached drawing				Use a caliper (0.05mm a division)
3	Discharge Time	More than the time Mentioned hereunder				Measure capacity by holding at various temperature for 16Hrs after standard charging
	Discharge Temperature	-10℃	0℃	23℃	60℃	
	Discharge Current(0.5C5A)	70%	80%	100%	95%	
4	Charge Time	More than the rates Mentioned hereunder				Measure time elapsed till end charge current at the charge conditions mentioned hereunder after standard discharging
	Charge Current	0.5C5A				1.0C5A
		Less than 4.0hrs				Less than 2.0hrs
5	Initial Internal Impedance	Less than 60mΩ				Measure by alternate current (1kHz) within 1Hr after charge.(20±5℃)
6	Cycle Life (0.5C5A)	Higher than 70% of the Initial Capacities of the Cells				Carry out 500cycle charging/ Discharging in the below condition. ◆Charge:CC/CV, 0.5C5mA, 4.2V, 1/100CmA-End ◆Discharge:0.5C5mA up to 2.75V ◆Rest Time between charge/discharge:30min. ◆Temperature:20±5℃
7	Leakage-Proof	No leakage (visual inspection)				After full charge, store at 60±3℃ 60±10%RH for 1month.

(Notice) Tests shall be performed on a new cell within one week after delivery.

4. SAFETY TEST

ITEM	BATTERY CONDITION	TEST METHOD	RESULTS
Crush	Fresh, Full charged	Crush between two flat plates. Applied force is about 13kN(1.72Mpa) for 30min.	NO EXPLOSION, Or NO FIRE
Short Circuit 20℃	Fresh, Full charged	Each test sample battery, in turn, is to be short-circuited by connecting the (+) and (-) terminals of the battery with a Cu wire having a maximum resistance load of 0.1Ω.Tests are to be conducted at room temperature(20±2℃).	NO EXPLOSION, Or NO FIRE The Temperature of the surface of the Cells are lower than 150℃
Short Circuit 60℃	Fresh, Full charged	Each test sample battery, in turn, is to be short-circuited by connecting the (+) and (-) terminals of the battery with a Cu wire having a maximum resistance load of 0.1Ω.Tests are to be conducted at temperature(60±2℃).	NO EXPLOSION, Or NO FIRE The Temperature of the surface of the Cells are lower than 150℃
Impact	Fresh, Full charged	A 56mm diameter bar is inlayed into the bottom of a 10kg weight. And the weight is to be dropped from a height of 1m onto a sample battery and then the bar will be across the center of the sample.	NO EXPLOSION, Or NO FIRE
Forced Discharge	Fresh, Full charged	Discharge at a current of 1CmA for 2.5h.	NO EXPLOSION, Or NO FIRE
Nail Pricking (3mm)	Fresh, Full charged	Prick through the sample battery with a nail having a diameter of 3mm and remain 2h.	NO EXPLOSION, Or NO FIRE

5. Handling of Cells

5.1Consideration of strength of film package

1)Aluminium laminated film

Easily damaged by sharp edge parts such as pins and needles, comparing with metal-can-cased LIB.

2).Sealed edge May be damaged by heat above 100°C.

5.2 Prohibition short circuit

Never make short circuit cell. It generates very high current which causes heating of the cells and may cause electrolyte leakage, gassing or explosion that are very dangerous.

The LIP tabs may be easily short-circuited by putting them on conductive surface.

(Such outer short circuit may lead to heat generation and damage of the cell.)

An appropriate circuitry with PCM shall be employed to protect accidental short circuit of the battery pack.

5.3.Mechanical shock

LIP cells have less mechanical endurance than metal-can-cased LIB.

Falling, hitting, bending, etc. may cause degradation of LIP characteristics.

5.4 Handling of tabs

The LIP tabs are not exceedingly sturdy, especially the aluminium tabs for the terminal. Do not put much force on LIP tabs. (Aluminium tab may easily be torn off by shear force.)

Do not bend tabs unnecessarily.

6. Notice for Designing Battery Pack

6.1Pack toughness

Battery pack should have sufficient strength and the LIP cell inside should be protected from mechanical shocks.

6.2 Cell fixing

The LIP cell should be fixed to the battery pack by its large surface area.

No cell movement in the battery pack should be allowed.

6.3 Inside design

No sharp edge components should be inside the pack containing the LIP cell.

6.4 Tab connection

Ultrasonic welding is recommended for LIP tab connection method.

Battery pack should be designed that shear force are not applied to the LIP tabs.

6.5 For mishaps

Battery pack should be designed not to generate heat even when leakage occurs due to mishaps.

1) Isolate PCM (Protection Circuit Module) from leaked electrolyte as perfectly as possible.
2) Avoid narrow spacing between bare circuit patterns with different voltage. (Including around connector)
3) LIP battery should not have liquid from electrolyte, but in case If leaked electrolyte touches bare circuit patterns, higher potential terminal material may dissolve and precipitate at the lower potential terminal, and may cause short circuit. The design of the PCM must have this covered.

7. Notice for Assembling Battery Pack

Shocks, high temperature, or contacts of sharp edge components should not be allowed in battery pack assembling process.

7.1 Do not solder directly to LIP tabs. Do not bring heated tools such as soldering Iron close to LIP cells. Temperature above 80°C may cause damage to the LIP cell and degrade its performances.

7.2.In case that the battery pack is fixed by ultrasonic welding, it is necessary not to apply too much ultrasonic welding power to LIP cell and electronic circuits such as PCM. Otherwise it may cause serious damage to the cells and electronic circuit.

8. Others

8.1.Cell connection

1) Direct soldering of wire leads or devices to the cell is strictly prohibited.
2) Lead tabs with pre-soldered wiring shall be spot welded to the cells.
   Direct soldering may cause damage of components, such as separator and insulator, by heat generation.

8.2.Prevention of short circuit within a battery pack

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection.

The battery pack shall be structured with no short circuit within the battery pack, which may cause generation of smoke or firing.

8.3.Prohibition of disassembly

1) Never disassemble the cells
   The disassembling may generate internal short circuit in the cell, which may cause gassing, fining, explosion, or other problems.
2) Electrolyte is harmful
   LIP battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

8.4 Prohibition of dumping of cells into fire

Never incinerate nor dispose the cells in fire. These may cause explosion of the cells, which is very dangerous and is prohibited.

8.5 Prohibition of cells immersion into liquid such as water

The cells shall never be soaked with liquids such as water, seawater, drinks such as soft drinks, juices, coffee or others.

8.6 Battery cells replacement

The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.

8.7 Prohibition of use of damaged cells

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of an electrolyte, an electrolyte leakage and others, the cells shall never be used any more.

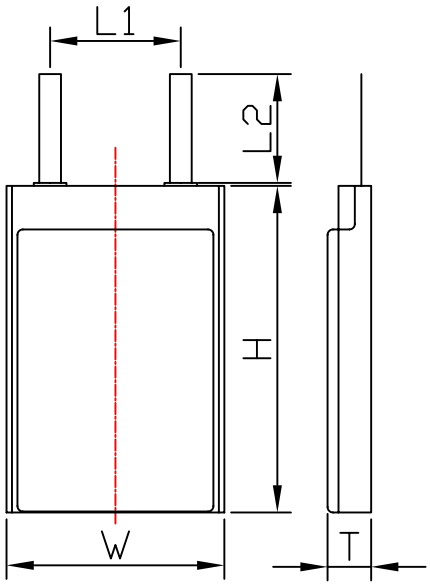
The Cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing or explosion.

9.Note:

Any other items which are not covered in this specification shall be agreed by both parties.

10. Dimension:

Edition NO.	Date	Sign	Checked



T	5.5±0.2	W	34±0.5	H	36±1.0
L1	15±2	L2	10±2	UNIT	mm

Drawer		Checked		Approved		Date	
				553436 DRAWING			
				Drawing ID			