1. Scope

The specification shall be applied to Lithium-ion Polymer (LIP) rechargeable battery Cell which is manufactured by EAST (SHENZHEN) TECHNOLOGY CO., LTD.

Reference standard:

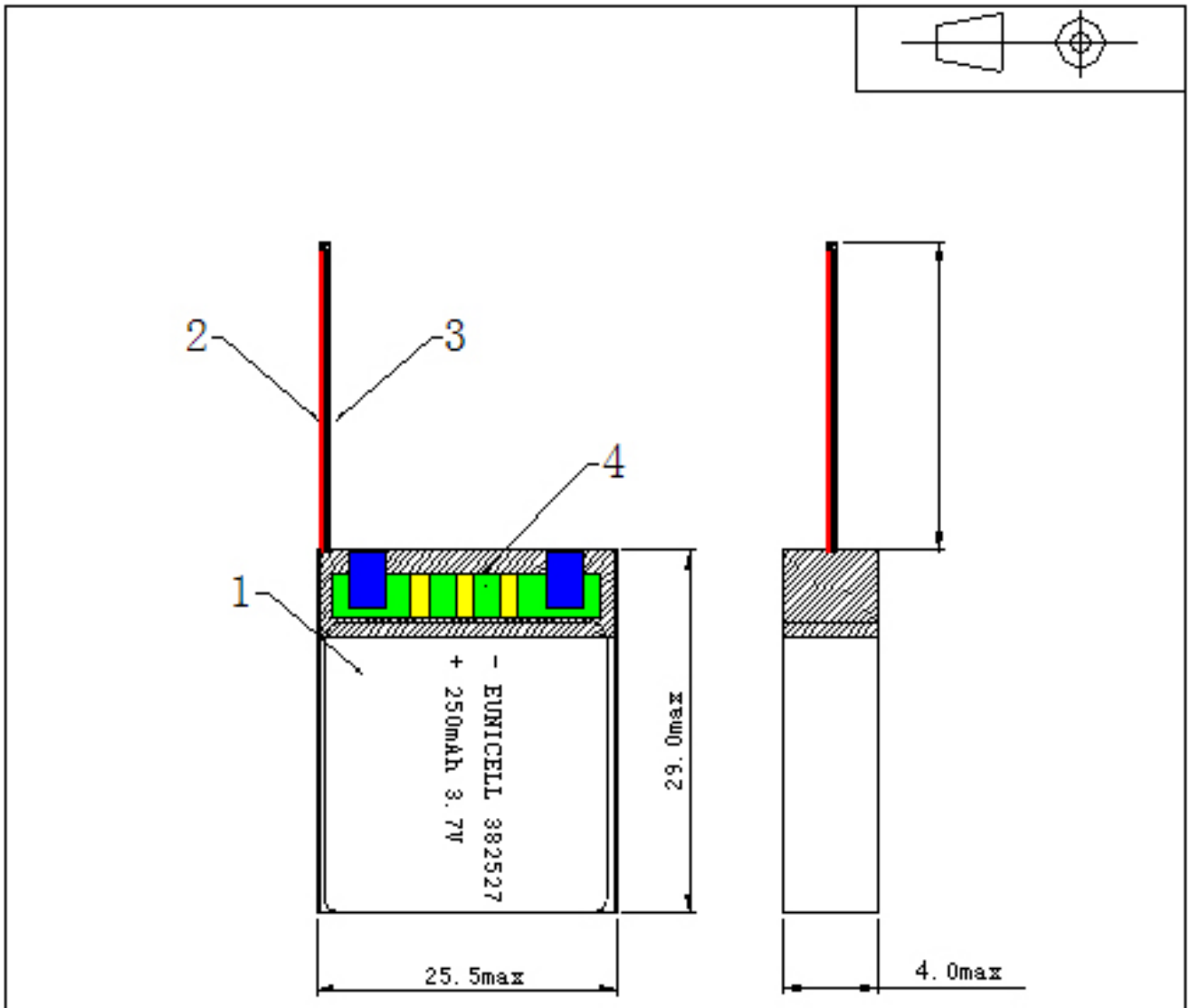
GB/T 18287-2013

2. Product basic information

Items		Parameter
Battery model		LP382527
Design scheme		G3J+8205A
Nominal capacity		250mAh（0.2C Discharge）
Battery pack impedance		≤250 mΩ
Nominal voltage		3.7V
Standard charging		50mA/4.2V，8H
Fast charging		125mA/4.2V，3H
Overcharge protection detection voltage		4.28V±0.035V
Overdischarge protection detection voltage		3.0V±0.08V
Overcurrent discharge protection current		1.2A - 2.8A
Connecter definition	Red （Pack+）	Battery Pack Positive
	Black （Pack−）	Battery Pack Negative

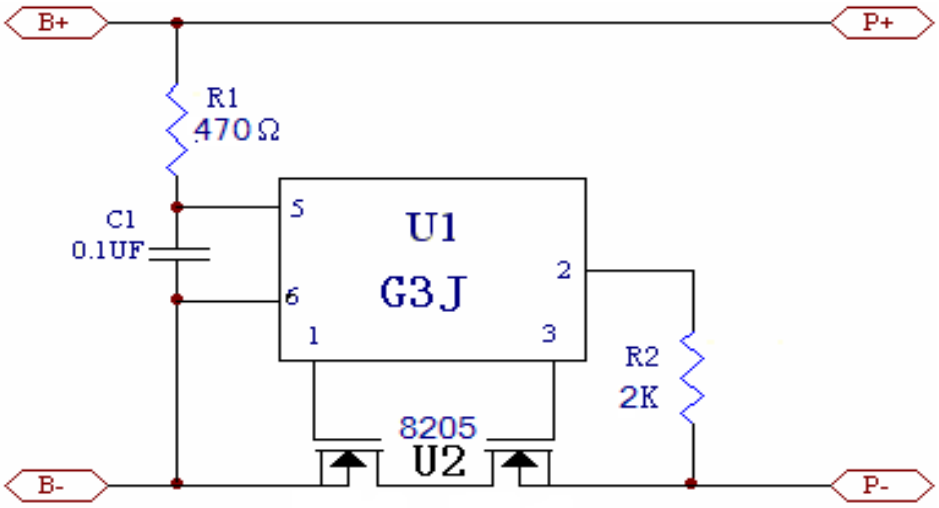
EUNICELL	**EAST(SHENZHEN)TECHNOLOGY CO.,LTD** ***Eunicell Battery***	**DOC NO.: PS-173** **REV. : A** **SHEET : OF**

3. Battery Outline Drawing



				LP382527 Drawing			
4	PCM	1	G3J+8205A				
3	Black wire (-)	1		DOCUMENT NO.		APPROVAL	
2	Red wire (+)	1		REV.	A	CHECKED	Eric
1	Cell	1	LP382527 3.7V				
No.	NAME	QTY	NOTE	UNIT	mm	DRAWING	LFW

4. Schematic circuit diagram



5. PCM BOM保护板清单

No.	Position	Material Name	Specification	Pack Type	Qty	Vendor
1	U1	IC	S-8261ABJMD-G3J	SOT-23-6	1	SEIKO
2	U2	MOSFET	8205A	TSSOP-8	1	SM/MT
3	R1	电 阻	SMD 470Ω ±5%	0402	1	YAGEO
4	R2	电 阻	SMD 2KΩ ±5%	0402	1	YAGEO
5	C1	电 容	SMD 0.1μF±20%	0402	1	YAGEO
6	PCB				1	FR4/ROHS

6. Electrical Characteristics

	V_{DET1}		4.28V±0.035V
	tV_{DET1}		1.4s（MAX）
	V_{REL1}		4.08V±0.1V
	V_{DET2}		3.0V±0.08V
	tV_{DET2}		173ms（MAX）
	V_{REL2}		
	V_{DET3}		80mV±15mV
	I_{DP}		MIN：1.2A　MAX：2.8A
	tV_{DET3}		11ms（MAX）
	T_{SHORT}		400μs（MAX）
	R_{DS}		B-至 P- R_{DS}≤60mΩ
	I_{DD}		MIN：0.3μA　MAX：8.0μA
		/	

7. Battery Electrical characteristics

No.	Items	Test Method	Criteria
1	Standard Charge	At 23±2℃ conditions, charging the cell initially with constant current at 0.2C and then with constant voltage at 4.2V till charge current declines to 0.02C	
2	Standard Discharge	At 23±2℃ conditions, discharging the cell with constant current at 0.2C until battery voltage drops to cut-off voltage	
3	Initial capacity	The initial capacity is after standard charge, the capacity measured at 23±2℃ conditions with discharge current of 0.2C till 3.0V cut-off voltage	≥250mAh
4	Initial impedance	Internal resistance measured at AC 1KHz after 50% charge	≤250mΩ
5	Cycle Life	Test condition: Charge: 1.0C to 4.2V Discharge: 1.0C to 3.0V 80% or more of 1st cycle capacity at 1C discharge of Operation	≥300
6	Retention Capability	After full charging, storing the battery 28 days with 20°C ± 5°C condition, and then discharge with discharge current of 0.2C5A till 3.0V cut-off voltage	≥255min
7	Battery Voltage	As of shipment.	3.75V~4.2V

8.Condition adapting characteristics

No.	Items	Test Method	Criteria
1	High/low Temperature	After the battery full charging at 20 ℃± 5℃,measure the discharging capacity with discharging current 0.2C till 3.0V cut off voltage at different temperature. (as compared with initial capacity)	-10℃：≥60% At-10℃is：≥60% 20℃：100% At20℃is：100% 55℃：≥90% At 55℃is：≥90%
2	Invariableness humid and hot	After standard charging, then store at oven for 48hrs with 40±2℃, 90%-95% humility; Then store at RT for 2hrs; 0.2C discharge to 3.0V.	The battery has No visible，distortion，fire or explosion, the discharging time is over 180 minutes
3	Vibration	After standard charging, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz and 55Hz, the excursion of the vibration is 1.6mm.The cell shall be vibrated for 30 minutes per axis of XYZ axes.	The battery has no distortion, no visible evidence of leakage, fume, fire or explosion Voltage≥3.6V
4	Drop Test	The battery fall from a height of 1m free fall into the cement floor, from X、Y、Z positive and negative direction of each direction free fall time	The battery has no distortion, no visible evidence of leakage, fume, fire or explosion Voltage≥3.6V

9. Safety performance

No.	Items	Test Method	Criteria
1	Thermal exposure test	The battery is fully charged in standard charging condition, and store in（5±2℃）/min rate rose to 130± 2°C for 30 minutes.	No explosion，No fire
2	Overcharge protection	After battery charge finished, then charge the battery for 8 hours with a power which can provide 2 times more than nominal voltage and 2C5A current.	No explosion, no fire, no smoking. The overcharge protection function should be started. Value of 4.28V±0.035V
3	Over discharge protection	After the battery is fully charged, discharge at 20±5℃ conditions with 0.2C5A until the battery voltage drops to the over discharge voltage, then discharge with a 30Ω resister for 24 hours.	No explosion, no fire, no smoking. The over discharge protection function should be started. Value of 3.0V±0.08V
4	Short protection	After the battery is fully charged, short the positive and negative terminal with 100mΩ wire resistance for 1 hour, then charge with 1C5A for 5s, measure the battery open circuit voltage.	No explosion, no fire, no smoking. OCV≥3.6V
5	Nail Test	The battery is fully charged in standard charging condition，Standby for 2 hour, a nail is penetrated vertically through the center of the cell (The diameter of the nail is 3.0mm.)	No explosion, no fire, no smoking

10.Visual inspection

There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.

11.Testing requirements

8.1 Battery test environment

Temperature：20±5℃

Relative humidity： ≤75% RH Atmospheric

pressure 86～106 KPa

8.2 Measuring instrumentation requirements

Voltage instrumentation requirements: Measuring the voltage meter accuracy no less than 0.5 magnitude

Current instrumentation requirements: Measuring the current meter accuracy no less than 0.5 magnitude

Time instrumentation requirements: Measuring the time meter accuracy no less than 0.1%

Temperature instrumentation requirements: Measuring the temperature meter accuracy no less than 0.5 ℃

Impedance instrumentation requirements: Measuring impedance should by sinusoidal alternating (1 KHZ) test

12.Storage temperature and humidity range

9.1 Three months

-20℃~ + 45 ℃, humidity 45 to 85%

-20℃ ～ +40℃， 45 ～ 85%

9.2 Six months

-20℃~ + 35 ℃, humidity 45 to 85%

-20℃ ～ +35℃， 45 ～ 85%

9.3 Long-term storage ：

+20℃ ～ +35 ℃, humidity 45 to 85%

+20℃ ～ +35℃， 45 ～ 85%

Appendix

Handling Precautions and Guideline
For LIP(Lithium-Ion Polymer)Rechargeable Batteries

Preface

This document of' Handling Precautions and Guideline LIP Rechargeable Batteries shall be applied to the battery cells manufactured by EAST(SHENZHEN)TECHNOLOGY CO., LTD.

Note(1):

The customer is requested to contact Eunicell battery in advance, if and when the customer needs other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

Note(2):

Eunicell battery will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

Note(3):

Eunicell battery will inform, in a written form, the customer of improvement(s) regarding proper use and handing of the cell, if it is deemed necessary.

1. Charging

1.1 Charging current:

Charging current should be less than maximum charge current specified in the Product Specification. Charging with higher current than recommended value may cause damage to cell electrical, mechanical and safety performance and could lead to heat generation or leakage.

1.2 Charging voltage:

Charging shall be done by voltage less than that specified in the Product Specification (4.20V/cell). Charging beyond 4.25V, which is the absolute maximum voltage, must be strictly prohibited. The charger shall be designed to comply with this condition.

It is very dangerous that charging with higher voltage than maximum voltage may cause damage to the cell electrical, mechanical safety performance and could lead to heat generation or leakage.

1.3 Charging temperature:

The cell shall be charged within -10℃~45℃ range in the Product Specification.

1.4 Prohibition of reverse charging:

Reverse charging is prohibited. The cell shall be connected correctly. The polarity has to be confirmed before wiring, In case of the cell is connected improperly, the cell cannot be charged. Simultaneously, the reverse charging may cause damaging to the cell which may lead to degradation of cell performance and damage the cell safety, and could cause heat generation or leakage.

2. Discharging

2.1 Discharging current

The cell shall be discharged at less than the maximum discharge current specified in the Product Specification. High discharging current may reduce the discharging capacity significantly or cause over-heat.

2.2 Discharging temperature

The cell shall be discharged within -20℃~60℃ range specified in the Product Specification.

2.3 Over-discharging:

It should be noted that the cell would be at over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell shall be charged periodically to maintain between 3.8V and 3.9V.

Over-discharging may causes loss of cell performance, characteristics, or battery functions.

The charger shall be equipped with a device to prevent further discharging exceeding a cut-off voyage specified in the Product Specification. Also the charger shall be equipped with a device to control the recharging procedures as follows:

The cell battery pack shall start with a low current (0.01C) for 15-30 minutes, i.e.-charging, before rapid charging starts. The rapid charging shall be started after the (individual) cell voltage has been reached above 3.0V within 15-30 minutes that can be determined with the use of an appropriate timer for pre-charging. In case the (individual) cell voltage does not rise to 3.0V within the pre-charging time, then the charger shall have functions to stop further charging and display the cell/pack is at abnormal state.

过放电

3. Protection Circuit Module(PCM)

PCM）

The cell/battery pack shall be with a PCM that can protect cell/battery pack properly.

PCM shall have functions of (1) overcharging prevention, (2) over-discharging prevention, and (3) over current prevention to maintain safety and prevent significant deterioration of cell performance.

The over current can occur by external short circuit

3.1 Overcharging prohibition:

Overcharging prevention function shall stop charging if any one of the cells of the battery pack reaches 4.25V.

3.2 Over-discharge prohibition:

Over-discharging prevention function shall work to avoid further drop in cell voltage of 2.9V or less per cell in any cell of the battery pack. It is recommended that the dissipation current of PCM shall be minimized to 0.5uA or less with the over-discharge prevention.

The protection function shall monitor each bank of the battery pack and control the current all the time.

4. Storage

The cell shall be storied within -10℃~45℃ range environmental condition.

If the cell has to be storied for a long time (Over 3 months),the environmental condition should be:

Temperature: 20±5℃

Humidity: 65±20%RH

The voltage for a long time storage shall be 3.8V~3.9V range.

Since the battery is packed in soft package, to ensure its better performance, it's very important to carefully handle the battery

5.1 Soft Aluminum foil

The soft aluminum packing foil is very easily damaged by sharp edge parts such as Ni-tabs, pins and needles.

- Don't strike battery with any sharp edge parts
- Trim your nail or wear glove before taking battery
- Clean worktable to make sure no any sharp particle

5.2 Sealed edge

Sealing edge is very flimsy.

5.3 Folding edge

The folding edge is form in battery process and passed all hermetic test

5.4 Tabs

The battery tabs are not so stubborn especially for aluminum tab.

5.5 Mechanical shock

- Don't Fall, hit, bend battery body

5.6 Short

Short terminals of battery is strictly prohibited, it may damage battery.

6. Notice Designing Battery Pack

6.1 Pack design

- Battery pack should have sufficient strength and battery should be protected from mechanical shock
- No Sharp edge components should be inside the pack containing the battery.

6.2 PCM design

- The overcharge threshold voltage should not be exceed 4.25V
- The over-discharge threshold voltage should not be lower than 2.9V
- The PCM should have short protection function built inside

7. Notice for Assembling Battery Pack

7.1 Tab connection

- Ultrasonic welding or spot welding is recommended to connect battery with PCM or other parts.
- If apply manual solder method to connect tab with PCM, below notice is very important to ensure battery performance.

a) The solder iron should be temperature controlled and ESD safe

b) Soldering temperature should not exceed 350℃

c) Soldering time should not be longer than 3s

d) Soldering time should not exceed 5 times Keep battery tab cold down before next time soldering.

e) Directly heat cell body is strictly prohibited, Battery may be damaged by heat above approx.100℃

7.2 Cell fixing

- The battery should be fixed to the battery pack by its large surface area.
- No cell movement in the battery pack should be allowed.

8. Storage and Others

a) Long Time Storage

If the Cell is stored for a long time, the cell's storage should be 3.8~3.9V and the cell is to be stored in a condition as No.6.4。

b) Others

Any matters that this specification does not cover should be conferred between the customer and Eunicell.