



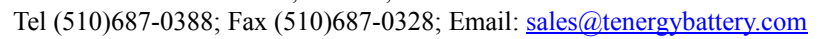
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Specification Approval Sheet

Product Name	Lithium Ion Battery
Model Spec	Li-3.7V 18650 2600mAh with PCB
Document Number	
Document Revision	A0

Make	Checkup	Approved

TENERGY CORPORATION

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1 Scope

This document describes the performance characteristics and testing methods for Li-ion battery produced by TENERGY CORPORATION.

2 Product type and model number

2.1 Product type

Lithium-ion Battery

2.2 Model number

Li-3.7V 18650 2600mAh with PCB

3 Rated performance

Form 1: Battery rated performance

No	Item	Rated performance	Remark
1	Rated capacity	Nominal capacity 2600mAh Minimum capacity 2500mAh	Standard discharge after standard charge
2	Nominal voltage	3.7V	Mean operation voltage during standard discharge after standard charge
3	Voltage at end of discharge	2.75V	Discharge cut-off voltage
4	Charging voltage	4.2V	
5	Impedance	<150mΩ	
6	Standard charge	Constant current 0.2C ₅ A Constant voltage 4.2V Cut-off current 0.01C ₅ A	
7	Standard discharge	Constant current 0.2 C ₅ A End voltage 2.75V	
8	Fast charge	Constant current 0.5C ₅ A Constant voltage 4.2V 0.01C ₅ A cut-off	
9	Fast discharge	Constant current 0.5C ₅ A End voltage 2.75V	
11	Maximum pulse discharge current	2 C ₅ A	
12	Operation temperature range	Charge: 0~45℃ Discharge: -20~60℃	60±25%R.H
13	Cycle life	>300cycles	Charging/discharging in the below condition: Charge: standard charge Discharge: 0.5C ₅ A to 2.75V Rest time between charge/discharge: 30min Until the discharge capacity <80% of NC
14	Storage temperature	During 1 month: -5 ~ 35℃ During 6 months: 0 ~ 35℃	60±25%R.H
15	Weight	Approx: 48g	
16	Dimension(mm)	Diameter*Height	19±1*70±1



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4 Electrical performances

Form 2: Battery electrical performances

No	Items	Test procedure	Requirements
1	Nominal voltage	The average value of the working voltage during the whole discharge process.	3.7V
2	Discharge performance	The discharge capacity of the battery, measured with 0.2C ₅ A down to 2.75V within 1 hour after a standard charge	Discharge time≥4.8h
3	Capacity retention	After 28 days storage at 25±5℃, after having been standard charged and discharged at 0.2C ₅ A to 2.75V (the residual capacity is above 80% of nominal capacity)	Discharge time≥4.25h
4	Cycle life	Charging/discharging in the below condition: Charge: standard charge Discharge: 0.5C ₅ A to 2.75V Rest time between charge/discharge: 30min Until the discharge capacity <80% of NC	>300cycles
5	Storage	(Within 3 months after manufactured) The cells is charged with 0.2C ₅ A to 40-50% capacity and stored at ambient temperature 25±5℃, 65±20%RH for 12 months. After the 12 months storage period the cell is fully charged and discharged to 2.75V with 0.2C ₅ A	Discharge time≥4h

5 Standard test conditions

Test should be conducted with new batteries within one week after shipment from our factory and the batteries shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of 20±5℃ and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature 15~30℃ and humidity 25~85%RH.

6 Cautions in use

To ensure proper use of the battery please read the manual carefully before using it.

Handling

Do not expose to, or dispose of the battery in fire.

Do not put the battery in a charger or equipment with wrong terminals connected.

Avoid shorting the battery.

Avoid excessive physical shock or vibration.

Do not disassemble or deform the battery.

Do not immerse in water.

Do not use the battery mixed with other different make, type, or model batteries.

Keep out of the reach of children.

charge and discharge

Battery must be charged in appropriate charger only.

Never use a modified or damaged charger.

Do not leave battery in charge over 24 hours.

storage

Store the battery in a cool, dry and well-ventilated area.

disposal

Regulations vary for different countries, Dispose of in accordance with local regulations.

7 Battery operation instruction

7.1 Charging

Charging current Cannot surpass the biggest charging current which in this specification book stipulated.



Charging voltage :Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

Charge temperature : The battery must carry on the charge in the ambient temperature scope which this specification book stipulated.Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery.

7.2 Discharging current

The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the oversized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat.

7.3 Electric discharge temperature

The battery discharge must carry on in the ambient temperature scope which this specification book stipulated.

7.4 Over-discharges

After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, or prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

7.5 Storing the batteries

The battery should store in the product specification book stipulation temperature range. If has surpasses above for six months the long time storage, suggested you should carry on additional charge to the battery.

8 Period of warranty

The period of warranty is one year from the date of shipment. Ryder guarantees to give a replacement in case of batteries with defects proven due to manufacturing process instead of the customers abuse and misuse.

9 Other the chemical reaction

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

10 Note

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

11 PCB performance

11.1 Electrical characteristics

Form 3: PCB electrical characteristics

Item	Content	Criterion
Over charge Protection	Over charge detection voltage	4.325±0.05V
	Over charge release voltage	4.125±0.10V
Over discharge protection	Over discharge detection voltage	2.5±0.10V
	Over discharge release voltage	2.9±0.10V
	Rated operational current	3.5A
Over current protection	Over current detection current	6-8A
	Release condition	Cut load
	Detection delay time	8.0~16.0ms

Form 3: PCB electrical characteristics(continuous)

Short protection	Detection condition	Exterior short circuit
	Release condition	Cut short circuit
Interior resistance	Main loop electrify resistance	$V_C=4.2V$; $R_{DS}\leq 40m\Omega$
Current consumption	Current consume in normal operation	4.0 μA Type 8.0 μA Max
Dimension(L*W*H)	R8.65*0.5mm	

11.2 Parts list

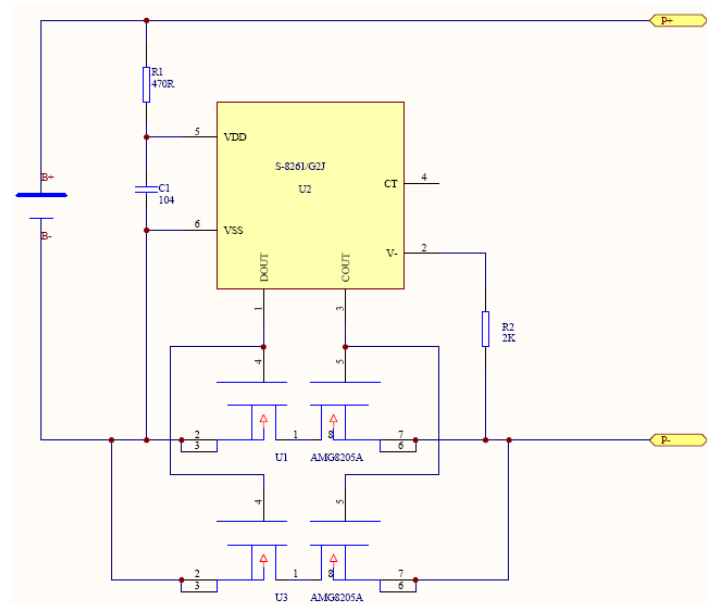
Form 4: PCB parts list

BKD-P1CRD01A BOM

	序号	物料名称	规格/型号	封装	位置/代号	数量	备注
	1	贴片电阻	470R $\pm 5\%$	0603	R1	1	
贴	2	贴片电阻	2K $\pm 5\%$	0603	R2	1	
片	3	贴片电容	0.1 μF $\pm 20\%$	0603	C1	1	
料	4	MOS	AMG8205A	TSSOP-8	U1, U3	2	
	5	IC	S-8261/G2J	SOT-23-6	U2	1	
	6	PCB	BKD-P1CRD01A REV:1		R8.65*0.5mm	1	

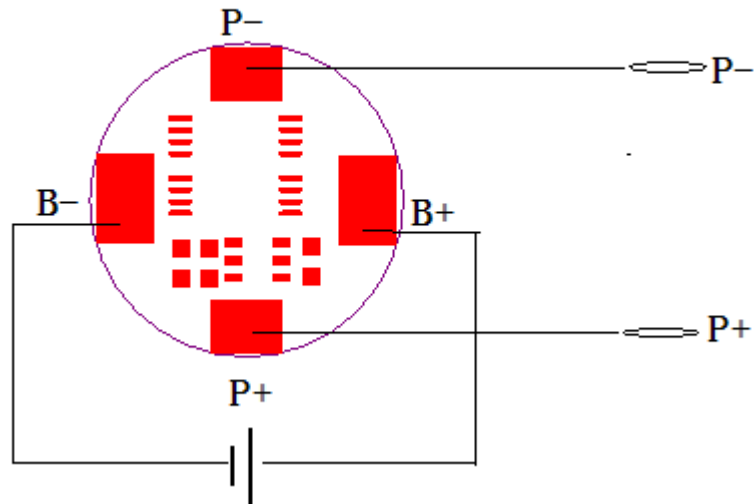
11.3 Application circuit

Figure 1: PCB Application circuit



11.4 PCB layout

Picture 2: PCB layout (back)



11.5 Terminal explanations

11.5.1 B+: Connected to the battery's positive terminal

11.5.2 B-: Connected to the battery's negative terminal

11.5.3 P+: Connected to the battery's output or the charger's positive terminal

11.5.4 P-: Connected to the battery's output or the charger's negative terminal

12 Battery drawing

Drawing 1: Battery drawing

