Specification

Product Type: Rechargeable Lithium-ion Battery Pack

Product Model: RZ2525

Product No : RH5G03010020

Prepared by :_____ Date:_____

Standard by :_____ Date:_____

Checked by :_____ Date:_____

Approved by :_____ Date:_____

Project Manager		**Customer Approval**	

Revision history

Date	Version	Description	Reviser
2022.12.08	A1.0	First Edition	Zhidong Chen

Contents

1. Overview

RZ2525 电池是由 7 颗亿纬 ICR18650/26V 锂离子电芯、充放电控制和管理等模块组成。通过阅读本规格书可了解产品的基本特性、功能、测试指标和使用注意事项等。

RZ2525 Lithium battery are consist of 7pcs EVE-ICR18650/26V cells, the charge-discharge control, management module and so on. This specification helps users understand the basic features, functionality, testing standard and precautions of the battery.

2. Pack Basic Information

Table 2.1 Basic Information

Item	Basic information	remark
Structural information		
电芯型号 Cell type	ICR18650/26V	
组合方式 Cells Configuration	7S1P	
尺寸 Dimensions	84*39*76mm	长*宽*高
重量 Weight	0.377kg	For Reference Only
充放电接口 Charge-discharge Interface	充放电异口 Different ports	P+/ P-, C+/C- 标准充电时放电口无输出
防水等级 Waterproof level		
Electrical performance information		
电池包标称电压/额定容量 Nominal Voltage/ Rated Capacity	25.2V/2.5Ah	
电池包最小容量 Min. Capacity	2.5Ah	Charge : 0.2C(0.48A),29.4V, 50mA cut-off @23±3℃ Discharge : 0.2C(0.48A), 19.25V cut-off @23±3℃
内阻	≤250mΩ	AC 1KHz，测试 P+，P-端

Internal impedance			
充电电压 Charge Voltage	29.2V		
标准充电电流 Standard charge current	0.4A		电池包充电器电流
输出电压范围 Output Voltage Range	19.6V~29.22V		完全充满完全放空
电池包过压值	29.225±0.35V		电池包电压不能高于最大值 29.575V
电池包欠压值	19.6±0.56V		电池包电压不能低于最低值 19.04V
持续输出电流 Continuous Discharge Current	0~7.5A		
脉冲输出电流 Pulse Discharge Current	20A		Time≤2S
	12A		Time≤15S
最大持续充电电流 Max.Continuous Charge Current	1A		室温为 25℃，不保证循环寿命
出厂电压范围 Shipment Voltage	27.4V~ 29.2V		
工作功耗 Normal consumption current	≤80uA		
Authentication and Using Environment			
符合认证/环保 Certification/ Environmental Protection	UL2271,CB UN38.3,ROHS		EC ROHS (EEA);根据 ROHS 法规适用于
充放电温度 Operation Temperature	充电温度范围 Charging Temperature	5 ~ +40℃	
	放电温度范围 Discharging	-20~+60℃	

	Temperature		
存储环境 Storage environment	0～+60℃	1 month	长时间储存前要保证电量超过 70%，且每 6 个月充一次电。 Make sure that the SOC exceeds80% before long storage, and it is recommended to charge the cell every six months。
	0~ +45℃	3 months	
	0～+25℃	12 months	

3. Pack function.

3. 1. Functional Logic Description

PCBA Functional Logic Table

Events	States	Execution	Actions
充电器接入并工作 Charger connected and operation	电池包正常充电 Normal Charging	充电 MOSFET 应该正常打开 Charging MOSFET should be turn on normally	
	电池包充电过流 Pack charging over current	BMS 应切断充电 MOSFET，并保持过流状态，充电器移除后才可恢复。 Charging MOSFET should be cut off until the charger be recovered after removed	
	电芯过压 Cell over voltage	BMS 应切断充电 MOSFET，电芯电压回落到恢复电压后才允许重新开启充电 MOSFET。 Charging MOSFET should be cut off until the voltage below the released threshold	
	电芯过温 Cell over temperature	BMS 应切断充电 MOSFET，温度回落到恢复温度后才允许重新开启充电 MOSFET。 Charging MOSFET should be cut off until the temperature below the released threshold	
负载接入并工作 Loader access and operation	欠压保护 Under voltage	关闭放电 MOSFET，达到欠压恢复点后，且充电器接入后才允许恢复输出 Discharging MOSFET should be cut off until charging	
	正常放电	放电 MOSFET 应打开	

	Normal discharge	Discharging MOSFET should be turn on normally	
	电芯过温 Cell over temperature	应切断放电 MOSFET，温度回落到恢复温度后才允许重新开启放电 MOSFET。 Discharging MOSFET should be cut off until the temperature below the released threshold	
	过流保护 Over current	关闭放电 MOSFET 直到达到恢复条件。Discharging MOSFET should be cut off until reaching released conditions	

4. Electrical performance parameters

4. 1. Main parameters of the battery management system (BMS)

BMS parameters table

No.	Item	Unit	Min.	Typ.	Max.	Remark
Voltage protection						
1	电芯一级过压保护电压 Cell 1st overcharge protection voltage	V	4.150	4.175	4.200	
2	电芯一级过压保护延时 Cell 1st overcharge protection delay time	s	0.5	1.0	1.5	
3	电芯一级过压保护解除电压 Cell 1st overcharge protection release voltage	V	4.000	4.025	4.050	
4	电芯一级过压保护解除延时 Cell 1st overcharge protection release delay time	ms	150	200	250	
5	电芯二级过压保护电压 Cell 2nd overcharge protection voltage	V	4.150	4.175	4.200	

6	电芯二级过压保护延时 Cell 2nd overcharge protection delay time	s	0.5	1.0	1.5	
7	电芯二级过压保护解除电压 Cell 2nd t overcharge protection release voltage	V	4.000	4.025	4.050	
8	电芯二级过压保护解除延时 Cell 1st overcharge protection release delay time	ms	150	200	250	
9	电芯一级欠压保护电压 Cell undervoltage protection voltage	V	2.72	2.8	2.88	
10	电芯一级欠压保护延时 Cell undervoltage protection delay time	s	0.2	0.3	0.4	
11	电芯一级欠压保护解除电压 Cell undervoltage protection release voltage	V	2.9	3.0	3.1	
12	电芯一级欠压保护解除延时 Cell undervoltage protection release delay time	ms	150	250	350	
13	电芯二级欠压保护电压 Cell undervoltage protection voltage	V	2.72	2.8	2.88	
14	电芯二级欠压保护延时 Cell undervoltage protection delay time	s	0.2	0.3	0.4	
15	电芯二级欠压保护解除电压 Cell undervoltage protection release voltage	V	2.9	3.0	3.1	
16	电芯二级欠压保护解除延时 Cell undervoltage protection release delay time	ms	150	250	350	
Current protection						
17	一级放电过流保护电流 Discharge 1st over current protection	A	24	26	28	
18	一级放电过流保护延时 Discharge 1st over current	s	0.6	1	1.4	

	protection delay time					
19	一级放电过流保护解除条件 Discharge over current protection release condition	/	移除负载后恢复或充电恢复。			
20	二级放电过流保护电流 Discharge 2nd over current protection	A	24	26	28	
21	二级放电过流保护延时 Discharge 2nd over current protection delay time	s	0.6	1	1.4	
22	二级放电过流保护解除条件 Discharge over current protection release condition	/	移除负载后恢复或充电恢复。			
23	短路保护电流 Short-circuit protection current	A	85	100	115	外部短路 Externalshort circuit
24	短路保护延时 Short-circuit protection delay time	us	180	240	300	
25	短路保护解除条件 Short-circuit protection release condition		移除负载后恢复或充电恢复。			
Temperature protection						
26	一级电芯充电高温保护温度 Charge High temperature protection	℃	40	45	50	
27	一级电芯充电高温保护延时 Charge High temperature protection delay time	s	0.8	1.5	2	
28	一级电芯充电高温保护解除温度 Charge High temperature protection release	℃	35	40	45	
29	一级电芯充电低温保护温度 Charge Lowtemperature protection	℃	0	5	10	
30	一级电芯充电低温保护温度延时	s	0.8	1.5	2	

	Charge Low temperature protection delay time					
31	一级电芯充电低温保护解除温度 Charge Low temperature protection release	℃	5	8	11	
32	二级电芯充电高温保护温度 2nd Charge High temperature protection	℃	40	45	50	
33	二级电芯充电高温保护延时 2nd Charge High temperature protection delay time	s	0.8	1.5	2	
34	二级电芯充电高温保护解除温度 2nd Charge High temperature protection release	℃	35	40	45	
35	二级电芯充电低温保护温度 2nd Charge Lowtemperature protection	℃	0	5	10	
36	二级电芯充电低温保护温度延时 2nd Charge Low temperature protection delay time	s	0.8	1.5	2	
37	二级电芯充电低温保护解除温度 2nd Charge Low temperature protection release	℃	5	8	11	
38	一级电芯放电高温保护温度 Discharge High temperature protection	℃	60	65	70	
39	一级电芯放电高温保护延时 Discharge High temperature protection delay time	s	0.8	1.5	2	
40	一级电芯放电高温保护解除温度 Discharge High temperature protection release	℃	55	60	65	温度恢复后需要充电才能解除
41	二级电芯放电高温保护温度 2nd Discharge High temperature protection	℃	60	65	70	

42	二级电芯放电高温保护延时 2nd Discharge High temperature protection delay time	s	0.8	1.5	2	
43	二级电芯放电高温保护解除温度 2nd Discharge High temperature protection release	℃	55	60	65	温度恢复后需要充电才能解除
Others						
35	充放电回路保险丝	A	/	30	/	30A 不会熔断，大于 30A 需要一定的条件才能熔断

5. Capacity Performance

5.1 Standard charge and discharge

标准充电:在标准环境温度下，用 29.2V / 0.2C（CC-CV 模式）对电池进行充电，当充电电流小于充电结束电流(50mA)时，停止充电。

Standard charge: In standard environment, Using 29.2V / 0.2C(CC-CV mode) to charge battery, when the charge current is less than the charge termination current(50mA), stops charging.

标准放电：在标准环境温度下，0.2C 恒流放电至 19.6V 截止电压。

Standard discharge: In standard environment, Using 0.2C(CC mode) to discharge battery until 19.6V cut off .

标准环境 Standard environment:

环境温度 Ambient temperature：23±3℃；

湿度 Relative humidity：25%~85%；

大气压力 Atmospheric pressure：86kPa~106kPa。

5.2 Capacity requirements

容量指标表Capacity Indicators table

No.	Item	Conditions and others	Performances
1	额定容量 Rated capacity	标准充电 1 小时后，用 0.2 C_5 (A)放电，直至终止电压或电池保护在 23±3℃。试验允许重复 5 次，直到一个循环放电时间满足要求，停止试验。	电池的实际容量不小于 2.25Ah The actual capacity of the battery is not less than 2.25

		After 1hour standard charge, discharge with 0.2C_5（A）until the termination voltage or battery protection at 23±3℃. The test is allowed to repeat 5 times, till one cycle discharge time meet the requirement, stop the test.	Ah.
2	低温容量 Low Temperature Capacity	电池标准充电后置于不同温环境中 8 小时，在低温环境中以 0.2C5(A)放电，直至达到截止电压或保护启动。计算电池的实际容量。The battery is placed in different environment of low temperatures for 8hrs after standard charge,and discharged with 0.2C_5(A) in the low-temperature environment until it reaches the cut-off voltage or the protection activates. Calculate the actual capacity of the battery.	在以下温度环境下放电容量应该满足 ≥70％额定容量@-20℃ 环境温度偏差不超过± 2 ℃ The discharge capacity at different temperatures shall meet： ≥50％Rated Capacity@-20℃ The temperature tolerance should not exceed ± 2 ℃.
3	高温容量 High Temperature Capacity	电池标准充电后置于不同温环境中 8 小时，在高温环境中以 0.2C5(A)放电，直至达到截止电压或保护启动。计算电池的实际容量。The battery is placed in different environment of high temperatures for 8hrs after standard charge, and discharged with 0.2C_5(A) in the high-temperature environment until it reaches the cut-off voltage or the protection activates. Calculate the actual capacity of the battery.	在以下温度环境下放电容量应该满足 ≥90％额定容量@55℃ 环境温度偏差不超过± 2 ℃ The discharge capacity at different temperatures shall meet： ≥90％Rated Capacity@55℃ The temperature tolerance should not exceed ± 2 ℃.
4	容量保持和容量恢复 Capacity retention and capacity recovery	电池放在在标准环境温度下储存 30 天后，测定 30 天后的容量。电池按照标准充电和放电，得到保持容量和恢复容量。Storage the battery at standard environment for 30 days. Measure the capacity after 30 days according to standard charge and discharge.Get the retention capacity and recovery capacity.	保持容量 Retention capacity≥90%; 恢复容量 Capacity recovery≥90%
5	循环寿命 Cycle Life	在标准环境温度下,用 29.26V / 0.5A（CC-CV 模式）对电池进行充电，当充电电流小于 125mA 时，停止充电，以 0.5A 电流放电，直至达到截止电压为 21V。在标准环境下重	电池的使用寿命不少于 1000 次 The life of the battery is not less than 1000

		复此循环，充放电间隔超过 60 分钟。当电池放电容量连续 3 次低于额定容量的 80%时，停止试验，记录放电容量。 In standard environment, Using 29.26V / 0.5A(CC-CV mode) to charge battery, when the charge current is less than the charge termination current 125mA stops charging. the battery is discharged with the current of 0.5A until it reaches the cut-off voltage of 21V. Repeat the cycle in the standard environment, and the interval between charge and discharge should be more than 180 minutes. When the battery discharge capacity is lower than80% of the rated capacity for continuous 3 times, stop the test and record the discharge capacity before that.	cycles.

6. Mechanical structure parameters

The mechanical structure parameters table

Item	Parameters		Note
尺寸 Dimensions(mm)	L	98.1	详见附录 See the appendix for details
	W	88	
	H	55.05	
重量 Pack Weight(Kg)	0.43kg		For Reference Only

7. Reliability Performance

Refer To Appendix

8. Mechanical structure parameters

9. The label、package、transport and recycling

9.1 Label and barcode

电池的铭牌和条形码包含产品型号、标称电压、标称容量和警示说明等信息，具体以其图纸为准。

The label and barcode of the battery include the product model and nominal voltage, nominal capacity and warning and so on, concrete will be subject to the drawings.

9.2 Package

产品包装符合 GB/T 3873 的有关要求。

包装上有中文标识，内容包括制造厂名、产品型号、产品名称、包装箱号、毛重、装箱日期等，包装时附有产品的合格证书；产品规格书及安全使用说明书通过邮件方式发送给客户。

安全使用说明书向用户提供足够的资料，以确保用户在按厂家的规定使用时，不会引起本规格范围外的危险，并对电源在操作、维修、运输或储存时有可能引起危险的情况提醒用户特别注意。

产品包装应防潮、防振。

Product package meet the requirement of GB/T3873.

A Chinese label on the package, the content including name of manufacturer, type of product, product name, package number, gross weight, loading date, etc., when packing with product certificate. Product specifications and safety instructions are sent to customers by mail.

Safety instructions provide sufficient information to the user to ensure that the user when used according to the manufacturer's requirements without causing dangerous outside the scope of this specification, and power in operation, it may cause a dangerous situation to alert the user when maintenance, transportation or storage Special attention; Simplified Chinese writing using the standard.

Product packaging should be moisture-proof, vibration control.

9.3 Transport

产品运输中应防雨淋、水浸，不应有剧烈震动

Product transportation should prevent rain, flooding, severe vibration.

9.4 Recycling requirements

产品符合RoHS指令(欧盟2002/95/EC指令),禁止使用6种有害物质：铅（lead，Pb）、汞（mercury，Hg）、镉（cadmium，Cd）、6价铬（ hexavalent chromium）、PBB（多溴联苯阻燃剂）和PBDE（聚溴二苯醚阻燃剂）。

判断标准：构成产品的原材料中的同质材料（homogenous material）中的上述物质的含量（重量比）必须不超过下列门限值：镉：0.01％（100ppm）；其它五种物质：0.1％（1000ppm）；同质材料的定义：均匀分布的、不可机械分开的材料。如：镀层为SnPb焊料的铜引线，可分解为两种同质材料：铜和SnPb镀层。

Products comply with the RoHS Directive (EU 2002/95 / EC Directive), prohibits the use of six hazardous substances: lead (lead, Pb), mercury (mercury, Hg), cadmium (cadmium, Cd), 6 hexavalent chromium (hexavalent chromium), PBB (poly brominated biphenyl flame retardants) and PBDE (poly brominateddiphenyl ether flame retardants).

Criteria: the content of material constituting the product in the homogeneous material (homogenous material) of the above substance (weight ratio) must not exceed the threshold value of the following: Cd: 0.01% (100ppm); the other five materials: 0.1% (1000ppm); defined homogeneous material: a uniform distribution of the material can not be mechanically separated. Eg: for Sn Pb solder plating copper wire, can be decomposed into two homogenous materials: copper and Sn Pb plating.

10. Warnings

a、在使用过程中，电池应远离热源和高压。During their use, the batteries should be kept away from heat sources and high voltages.

b、请勿自行拆卸或组装电池。Don’t disassemble or assemble the batteries by yourself.

c、不要加热和燃烧电池，把它们扔进火里。Do not heat and burn of the batteries, throwing them in fire.

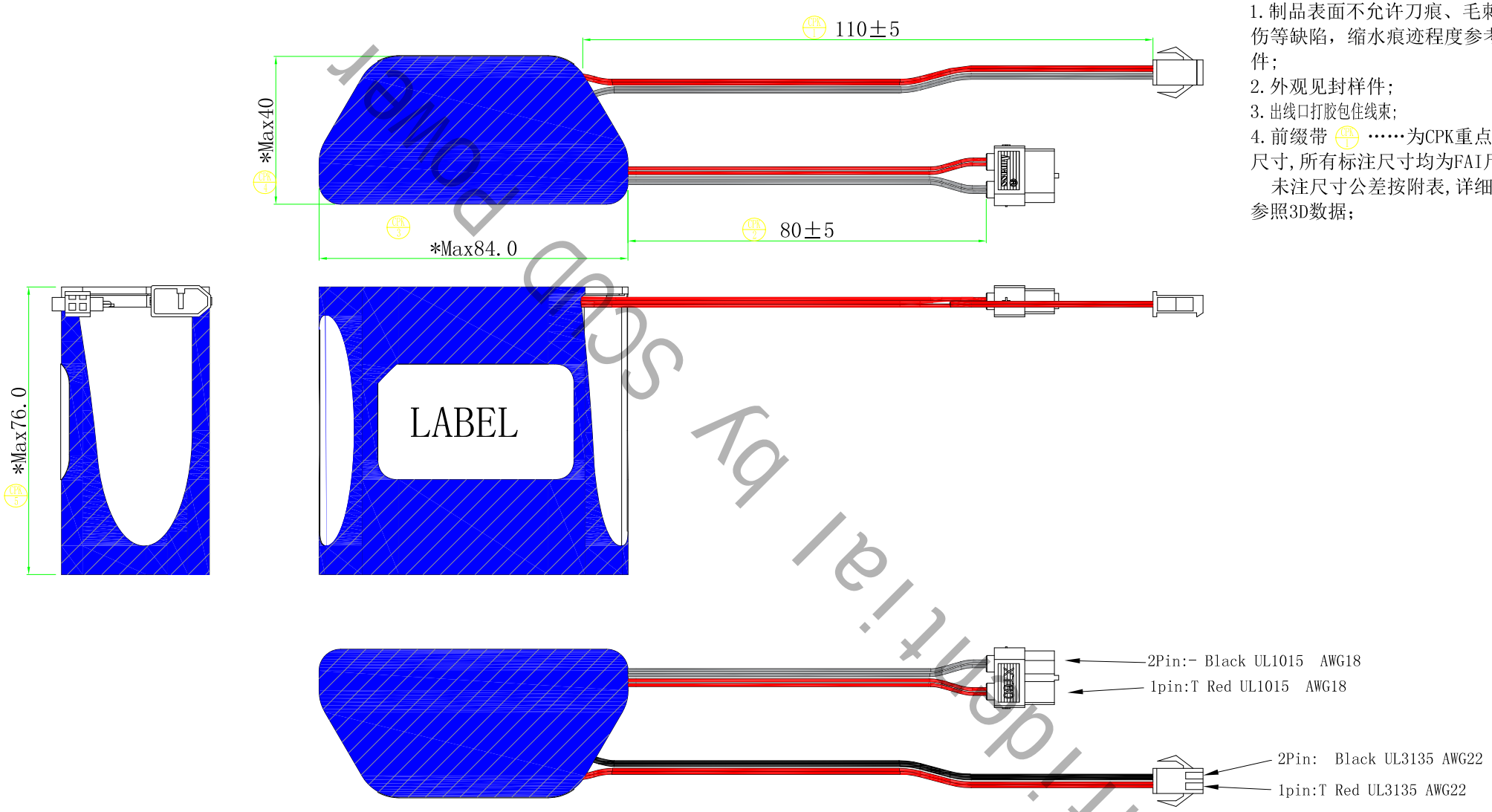
d、禁止对电池进行阻尼。Damping of the battery is prohibited.

e、不要直接接触漏出的电池。Don’t directly contact with the leaking battery.

f、孩子们不应该被允许和他们一起玩。Children should not be allowed to play with them.

g、避免在火源附近或阳光直射下给电池充电。Avoid to charge battery near a fire source or in direct sunlight.

11. Appendix



技术要求：

1. 制品表面不允许刀痕、毛刺、刮伤等缺陷，缩水痕迹程度参考封样件；
2. 外观见封样件；
3. 出线口打胶包住线束；
4. 前缀带 CPK 1 ……为CPK重点管控尺寸，所有标注尺寸均为FAI尺寸，未注尺寸公差按附表，详细尺寸参照3D数据；

ITEM	MARK	QTY	DATE	REVISER	CONTENTS OF
V1.0	--	--	20211228	陈宇迪	新项目
B CHANGE					

mm<size(A)≦mm	TOLERANCE
-	-
0 < A ≦ 30	±0.1
30 < A ≦ 50	±0.15
50 < A ≦ 100	±0.2
100 < A ≦ 200	±0.25
200 < A	±0.3

PART No.	RH5G02010068		SPEC.	RZ2502-ZN-GZNS18650MP-2000mAh-7S1P	
PART	外形图		PROJECT	/	
DATE	2022.2.21	UNIT	MM	SCALE	1:1
DRAWN	STANDARD	CHECKED	APPROVED	A4 297×210mm	SHEET No. 01/01
陈宇迪				福建飞毛腿动力科技有限公司	REV.:V1.0

STATUS	REFERRAL	DIE SINKING	APPROVED
			√

RD-001

PART NUMBER APPLICATION TABLE

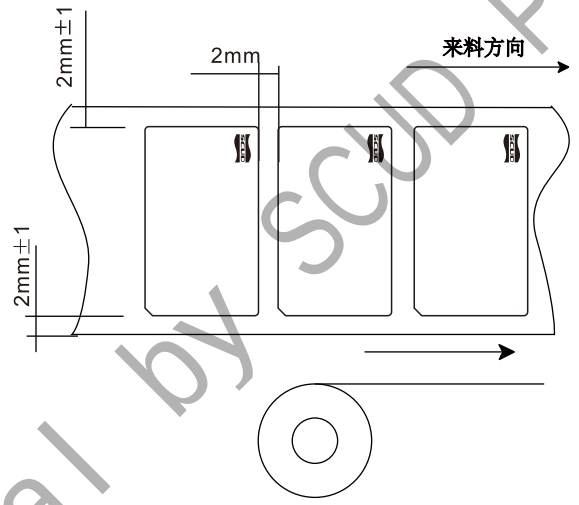
ITEM	PART No.	SPECIFICATION	REMARK
1			
2			
3			
4			
5			
6			
7			
8			

REVISONS LIST

ITEM	MARK	QTY	CONTENTS OF CHANGE	REVISER	DATE
1					
2					
3					

来料方式

(出料前段留白70cm)



卷料

正向来料

技术要求：

1. 颜色：参照图档；
2. 底面涂不干胶(>10N)，贴离型纸；
3. 材质：PP合成纸+可打印亚膜，厚度：T=0.1±0.02mm；
4. 表面不允许有污点、折皱、毛刺、毛边，字体不得歪斜；
5. 符合RoHS和REACH等环保要求；
6. 前缀带“CPK”为CPK重点管控尺寸，前缀带“FAI”为FAI重点管控尺寸，未注尺寸公差按附表；
7. 编码规则：

SC	A**	********	*	*	**	0001
①	②	③	④	⑤	⑥	⑦

>>>说明

①SC----厂商代码（SC代表飞毛腿）

②A**----保护板预版本,详见附表一

③********------成品品号后八位,详见附表一

④*----生产年份（A-2010年，B-2011年，C-2012年，字母”I”,”O”禁用,详见附表二）

⑤*----生产月份（1-9,A,B,C依次表示一月到十二月）

⑥**----两位生产日期（数字01-31，01为1号，02为2号，以此类推）

⑦0001----四位生产流水号（0001-Z999，第一位:数字0-9,字母A-Z（禁用字母I，O),O代表0，9代表9，A代表10,B代表11,以此类推;后三位:数字000-999,依次编码，不得重复）

8. 设置93 Code，明码字体Arial，字号3.5pt;
9. 以上编码内容均由大写字母和数字构成。

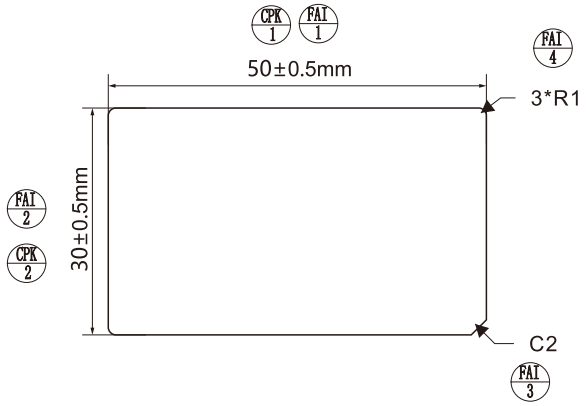
附表一

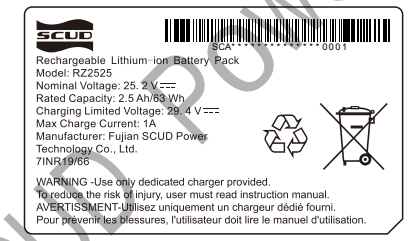
成品品号	成品品号后八位	保护板预版本
RH5G03010020	03010020	A01

附表二

年份	年份代码	年份	年份代码	年份	年份代码
2010	A	2018	J	2026	S
2011	B	2019	K	2027	T
2012	C	2020	L	2028	U
2013	D	2021	M	2029	V
2014	E	2022	N	2030	W
2015	F	2023	P	2031	X
2016	G	2024	Q	2032	Y
2017	H	2025	R	2033	Z

mm<size(A)<=mm	TOL	DRW. No.			SCUD 福建飞毛腿动力科技有限公司 FUJIAN SCUD POWER TECH. CO.,LTD				
-	-	NAME	OEM铭牌						
0<A<=30	+/-0.10	DESIGNED			UNIT	mm	MATERIAL		
30<A<=50	+/-0.15	STANDARD			SCALE	NTS			
50<A<=100	+/-0.20	CHECKE			SIZE	A4	PROJECT	RZ2525	
100<A<=200	+/-0.25	APPROVED			SHEET No.	1/2	REV	V	1.0
200<A	+/-0.30								

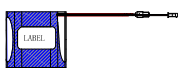




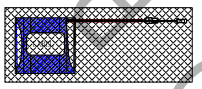
条码空出
由我司自行打印

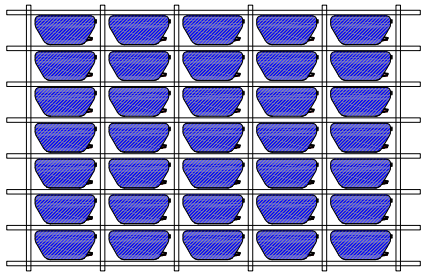
mm<size(A)<=mm	TOL	DRW. No.			福建飞毛腿动力科技有限公司 FUJIAN SCUD POWER TECH. CO.,LTD			
-	-	NAME	OEM铭牌					
0<A<=30	+/-0.10	DESIGNED			UNIT	mm	MATERIAL	
30<A<=50	+/-0.15	STANDARD			SCALE	NTS		
50<A<=100	+/-0.20	CHECKE			SIZE	A4	PROJECT	RZ2525
100<A<=200	+/-0.25	APPROVED			SHEET No.	2/2	REV	V 1.0
200<A	+/-0.30							

1. 电池装入PE袋。

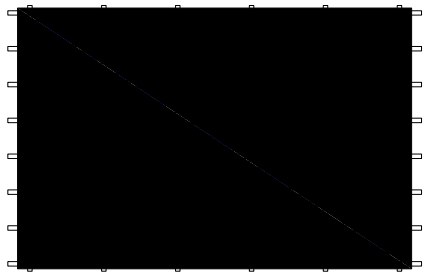


2. 装好PE袋的电池装进刀卡，35pcs/层。

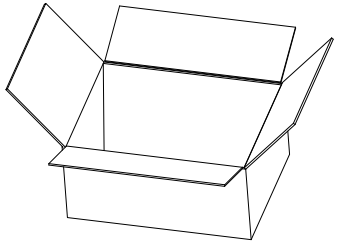




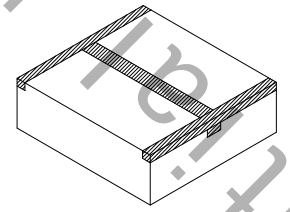
3. 每箱装2层，上中下各垫1PCS珍珠棉。

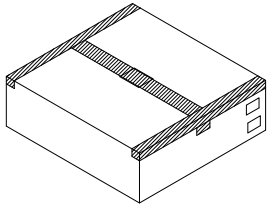


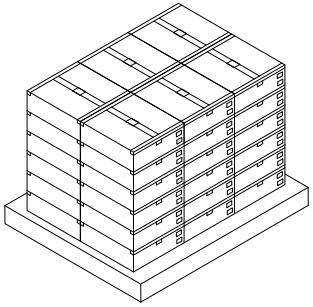
4. 封箱。



5. 贴箱唛。







技术要求：
1. 35PCS电池/箱。
2. 外箱尺寸569*368*130mm。
3. 栈板尺寸：1200*1200*130mm。
4. 装板箱数：6箱*6层=36箱。
5. 1260PCS电池/栈板。

						mm<size(A)≦mm	TOLERANCE
						-	-
						0 < A ≦ 30	±0.1
						30 < A ≦ 50	±0.15
						50 < A ≦ 100	±0.2
V1.0	--	--	20221219	吴程	新项目	100 < A ≦ 200	±0.25
ITEM	MARK	QTY	DATE	REVISER	CONTENTS OF	200 < A	±0.3

PART No.	/		STATUS	REFERRAL	DIE SINKING / APPROVED √
PART NAME	包装示意图		SPEC.	7S1P	
DATE	2022.12.19	UNIT	PROJECT	/	
DRAWN	STANDARD	CHECKED	APPROVED	MM / SCALE 1:1	
吴程				A4 297×210mm / SHEET No. 01/01	
				福建飞毛腿动力科技有限公司	REV.:V1.0

A | B CHANGE | C | D | E | RD-001