产 品 规 格 书
SPECIFICATION

客户 Customer		客户型号 Customer Model	
项目名称 Project Name	TB1209F-S110A	文件编号 Document NO	
受控版本 Controlled Revision		客户回签 Customer Reback	
拓邦 TOPBAND			
编制 Registered	Jiang.W.H	审核 Checked	
审核 Checked		审核 Checked	
批准 Approved		实施日期 Issued Date	

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修订记录 Modified Record

产品修订记录表
Product Modified Record List

版本 Revision	变更内容 Modified Content	责任人 Principle	日期 Date	标记 Mark	备注 Note
A	设计 Design	Jiang.W.H	2014-5-6		

本规格书适合于深圳拓邦股份有限公司研制的 TB1209F-S110A 电池组，描述了其外型尺寸、特性、技术要求及注意事项。严禁电池组之间任意串联或者并联。

This specification applies to the TB1209F-S110A battery manufactured by SHENZHEN TOPBAND CO.,LTD,Describes the type and size,performance,technical characteristics,warning and caution of the rechargeable cell. It is strictly prohibited any series or parallel between the battery pack.

1. 电池 PACK 概述/ Battery Pack Brief Introduction

1．1 电池类型 Battery Type

LiFePO4 (LFP)磷酸铁锂

1. 2 参考标准/ Reference Standard

《GB/T 18287-2013 》 《QC/T743-2006》

1．3 产品规格/ Product SPEC

12V/9Ah 4S3P

1．4 所用电芯品牌型号/ Cell Brand and Model

TB26650-Fe-3Ah

1．5 电池保质期/ Period of Warranty

保质期为电池出厂后 24 个月/24 Months from the date of shipment

1．6 电池规格书修订/ Battery Specification Amendment

如果原材料、生产过程、生产系统或电池使用环境及要求发生改变，提出更改方须将改变的信息以书面形式通知对方,取得供需双方同意后再行修订。/ If the raw materials, production processing, production system or battery usage environments & other conditions need to be change, the amendment side needs provide the written advice to the other side, only the both sides come to an end, the amendment will be effective

2. 电池 PACK 基本特性/ Battery Pack Basic Features

序号/ NO.	项目/Items	特性/ Characteristics	测试方法/ Testing Methods
1	标 称 电 压/ Nominal Voltage	12V	按《GB/T 18287-2013 》《QC/T743-2006》相关标准/ Follow 《GB/T 18287-2013 》《QC/T743-2006》
2	标 称 容 量/ Nominal Capacity	9Ah	按《GB/T 18287-2013 》《QC/T743-2006》相关标准/ Follow 《GB/T 18287-2013 》《QC/T743-2006》
3	最小容量/Minimum Capacity	8.6Ah	按《GB/T 18287-2013 》《 QC/T743-2006》相关标准/ Follow《 GB/T18287-2000 》《QC/T743-2006》

4	电 池 内 阻/ Battery internal Impedance		内阻≤50mΩ Internal Impedance≤50mΩ	电池完全充电后使用频率为（1kHz）的交流内阻测试仪测量/ Internal Impedance Testing Machine(1kHz)
5	出 货 电 压/ Shipment Voltage		12.8-13.6V	万用表/ Multi-meter
6	外形尺寸/ Dimension	长度/ Length	150*65*95mm	游标卡尺/ Vernier caliper
		宽度/ Wid h		
		高度/ Height		
		毛重/gross weight	Approx：1.15kg	电子称/electronic scale
7	工作温度范围 Working Temperature	充电/ Charge	0~45℃、45~85%RH	温湿度计/ Temperature & Humidity Instruments
		放电/ Discharge	-20~55℃、45~85%RH	
8	储存温度和湿度范围 / Storage Temperat re & H midity Range	短期：一个月以上 Short: above one month	-20~+55℃、45~85%RH	温湿度计/ Temperature & Humidity Instruments
		中期：三个月以上 Medium: above three months	0~+45℃、45~85%RH	
		长期：一年以内 Long：above one year	+5~+30℃、45~85%RH	
9	允许最大连续充电电流 Allowed maximum continuou charg current		9A	万用表/ Multi-meter
10	允许最大连续放电电流 Allowed maximum continuous discharge current		9A	万用表/ Multi-meter
11	允许最大反向充电电压 Allowed maximum reverse charge voltage		NO Allowed	/
12	允许最大充电电压 Allowed maximum charge voltage		14.6±0.1V	万用表/ Multi-meter
13	放电截至电压 Discharge cut-off voltage		9±1V	万用表/ Multi-meter

3. 电池 PACK 电性能 / Battery Pack Electrical Characteristics

3.1 测试条件（除非特别规定）/ Testing Conditions (Unless Specially Requirements)

温　　度/ Temperature：20±5℃　　相对湿度/ Related Humidity：　45~75%

大气压力/ Atmosphere Pressure：　86~106kPa

测试项目在出货电压下进行/ The testing items under the Shipment Voltage（12.8-13.6V ）

3.2 电池 PACK 电性能 / Battery Pack Electrical Characteristics

序号 No.	项　目/ Items	标　准/ Standards	测 试 方 法/ Testing Methods
1	内阻/ Internal Impedance	出货内阻≤50mΩ Impedance　≤50mΩ	20±5℃环境温度下，完全充电后使用频率为（1kHz）的交流内阻测试仪测量。 Under 20±5℃ Environment Temperature , the Usage Frequency of Fully Charge(1KHz) , Use AC Internal Impedance test machine to test .
2	额定容量/ Nominal Capacity	9Ah	将电池按标准充电方式充电后静止 0.5~1 小时，以 0.2C 电流恒流放电至电池不能放电止。可循环 3 次，当有一次放电时间达到 285 分钟，即可终止。 Rest for 0.5~1 hour after fully charge, Using electrical loader to connect with the battery output port, and discharge with constant current 0.2C till it can't discharge. Do the cycle three times, if there is one time that the discharge time is equal or more than 285minute , you can stop.
3	短路保护 Short circuit protection	短路后无带载能力，移除短路后恢复带载能力 No load ability after short-circuit .comeback capability of loading after remove the lead away,	用小于 50mΩ的导线将电池 PACK 输出端短路，输出保护,移开导线后,电池输出电压与短路前电压相等,且能带载 . Short the pack with the lead (<50mΩ). If remove the lead away, connect the electronic loader with P+、 P- of protection board again, so load ability comes back.
4	允许最大连续充电电流 Allowed Maximum continuous charge Current	9A	可以长时间(大于 0.5 小时)用 9A 电流进行充电电，充电电流平稳且电池 PACK 表面的温升≤10℃。 charging with 9A for more than 0.5h and the added temperature of battery pack less than 10℃.
5	允许最大连续放电电流 Allowed Maximum continuous discharge Curren	9A	可以长时间(大于 0.5 小时)用 9A 电流进行放电，充电电流平稳且电池 PACK 表面的温升≤10℃。 Discharging with 9A for more than 0.5h and the added temperature of battery pack less than 10℃.

6	过流保护电流 Over Current Protection	35-48A	可以用小于 35A 电流放电约 2S；以大于 48A 电流放电,电池 PACK 允许放电时间小于 20 毫秒。 Using electron load connect with output side, discharge with 35A for about 2sec Discharge with 48A for less than 20 millisecond,
7	过流保护延迟时间 the delay time of over current protection	7.0-16.0ms	用电子负载连接于电池输出端上，在电池 PACK 以 48A 的电流放电,用示波器记录电池输出端的电压波形，读出电压从波形开始到电压突变为零所经历的时间。 Using electron load connect with output side, discharge with more than 48A and record the voltage wave of output side with oscillograph . Numerating the time of voltage from wave to zero for voltage
7	循环寿命 cycle life	放电容量≥7.2Ah Discharge Capacity ≥7.2Ah	以 9A 电流恒流放电至电池不能放电止，再以标准电流将其充电到规定限制电压，静止 15 分钟，以 9A 电流恒流放电至电池不能放电止，放电结束后，静止 15 分钟，再进行下次充放电循环，直至 1000 次循环。第 1001 次电池以 6A 电流恒流放电容量≥7.2Ah。 Discharge it with the current of 9A to the cut-off voltage, and store it for 15min.Charge a battery with the current of 6A, then keep the voltage and current constant and continue to charge it until completed . After storing the battery for 15min. The test is to be conducted as per the above cycles. The cycle should be 1000 times. At the 1001 times discharge capacity should not be less than ≥ 7.2Ah with 9A.
8	放电温度特性 Discharge Temperature Characteristics	放电容量与充电容量的比值应大于或等于下表数值 The ratio between discharge capacity and charge capacity should be not less than the following value	（20±5℃）条件下，以 9A 恒流放电至电池不能放电后，完全充电，记录充电容量，将充满电的电池在下表所列的温度条件下恒温 4 小时，以 20A 恒流放电至电池不能放电止。 At 20±5℃ discharge the battery with the current of 9A to the cut-off voltage and record charge capacity. Store the battery at the following temperature for 4h and discharge the battery with 9A to the cut-off voltage.

放电电流 Discharge Current	放电温度/ Discharge Temperature			
	-10℃	0℃	25℃	55℃
9A	60%	80%	100%	100%

9	电荷保持能力 Charge Retention	剩余容量/ remain capacity≥8.5Ah	完全充电后在环境温度为 20±5℃的条件下，储存 28 天，然后进行 9A 恒流放电至电池不能放电止。(建议每三个月补充电一次到 12.8-13.6V) At 20±5℃ completely charge and store it for 28days,and then discharge it with 9A to the cut-off voltage. （We suggest charge the battery to 12.8-13.6V every three months）
10	过放保护恢复 Over Discharge Protection furbish	用 2A 电流充电 Charging With2A	用 2A 电流充电 5 分钟后，测量电池 PACK 输出端电压大于 10V 且有带载能力。 Charge the battery with 2A for 5min and measure the output voltage (≥10V)of the battery pack. The battery should have load .

4. 电池 PACK 可靠性试验/ Battery Pack Reliability Test

4.1 测试条件（除非特别规定）/ Testing condition (Unless Special Requirements)

温　　度/ Temperature：20±5℃　　相对湿度/ Relative Humidity：　45~75%

大气压力/ Atmosphere Pressure：　86~106kPa

测试项目在充满电状态下进行/ All testing under full capacity（13.2-13.6V）

4.2 电池 PACK 可靠性试验 / Reliability Test

序号 No.	项 目 Items	标准 Standards	测试方法 Testing Methods
1	振动试验 Vibration Testing	电池外观不开裂，电性能正常。内部电芯不破裂、不起火；固定可靠 The appearance of battery should not leakage, break or explosion	将充满电的电池固定在振动平台上，在三个相互垂直的方向按振幅 0.8mm 的谐振形式进行振动，频率在 10-55HZ 以 1hz/min 的速率变化，往复振动 90 分钟。 Fix a charged battery on a vibrating table, vibrate it for 90 minutes in three mutually perpendicular directions at the 0.8mm resonance. The frequency is to be varied at the rate of 1hz/min between 10 and 55 hertz.
2	高温放电试验 High Temperature Discharge Testing	电池外观应无变形、爆裂，放电时间应不低于 255 分钟。 The battery should be no remarkable breakage, distortion. Discharge time should not less than 255mins	将充满电的电池在 55℃的环境中放置 2 小时后，以 200mA 电流放电到电池不能放电，然后将电池在环境温度 20±5℃下放置 2 小时。 Place a full charged battery under the environments of 55℃ for 2 hours. Discharge it at the current of 2A to the cut-off voltage. Then keep it at 20℃±5℃ for 2 hours.
3	低温放电试验 Low Temperature Discharge Testing	电池外观应无变形、爆裂，放电时间应不低于 180 分钟。 The battery should be no remarkable breakage, distortion. Discharge time should not less than 180 minute	将充满电的电池在-10℃的环境中放置 4 小时后，以 2A 放电到电池不能放电，然后将电池在环境温度 20±5℃下放置 2 小时。 Place a full charged battery under the environments of -10℃ for 4 hours. Discharge it at the current of 20A to the cut-off voltage. Then keep it at 20℃±5℃ for 2 hours.
4	恒定湿热试验 Constant Humidity & Temperature Testing	电池外观应无变形、爆裂，放电时间应不低于 180 分钟。 The battery should be no remarkable breakage, distortion. Discharge time should not less than180mins	将充满电的电池在 40℃、相对湿度 90%~95%的环境中放置 48 小时后，在室温放置 2 小时。以 2A 电流放电到电池不能放电. Place a full charged battery under the environments of 40℃ and 90% - 95%RH for 48 hours. And keep it in the room temperature for 2 hours. Then discharge it at the current of 2A to the cut-off voltage.
5	高低温贮存 High & Low Temperature Storage	电池外观无变形或爆裂现象，电池充放电正常。 The battery should be no remarkable breakage, distortion. And charge/discharge normally	电池充满电后，将电池放入 55±2℃的高温箱中恒温 2 小时，再在环境温度 20±5℃下放置 4 小时，然后放入-20±2℃的低温箱中恒温 2 小时，再在环境温度 20±5℃下放置 4 小时，继续按高温—常温—低温—常温—高温循环 10 次。 Place a full charged battery in a oven with 55±2℃ for2 hours, then keep it under 20±5℃ for 4hrs, then place it in a oven with -20±2℃ for 2 hours, then keep for 4 hours under 20±5℃, cycle as high temperature-normal temperature-low temperature-normal temperature-high temperature for 10 times

5. 电池 PACK 安全性试验/ BATTERY PACK SAFETY TEST

5.1 测试条件（除非特别规定）/ Testing condition (Unless Special Requirements)

温　　度/ Temperature：20±5℃　　相对湿度/ Relative Humidity：　45~75%

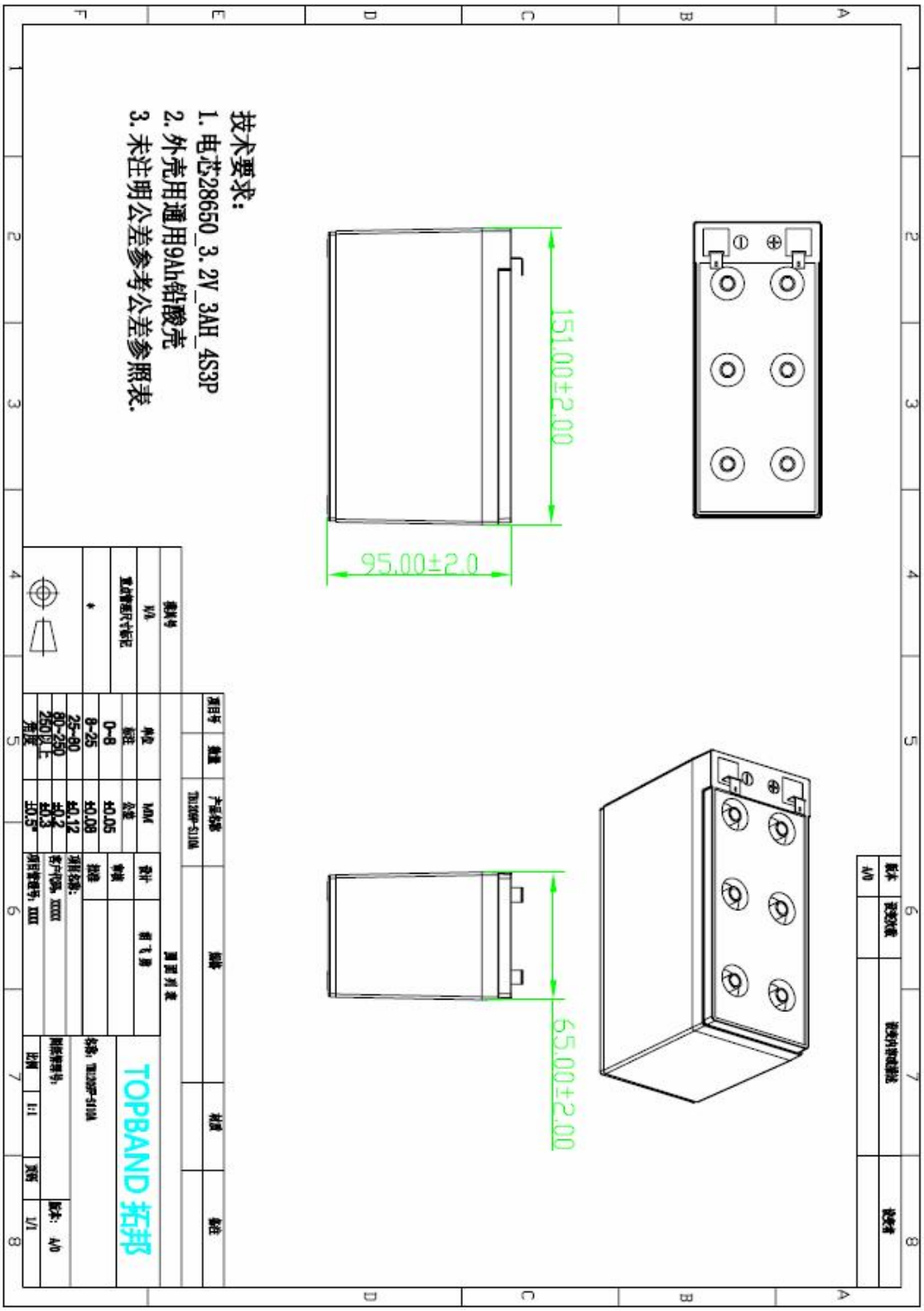
大气压力/ Atmosphere Pressure：　86~106kPa

测试项目在充满电状态下进行/ All testing under full capacity（13.2-13.6V）

5.2 电池 PACK 安全性试验 / Battery Pack Safety Test

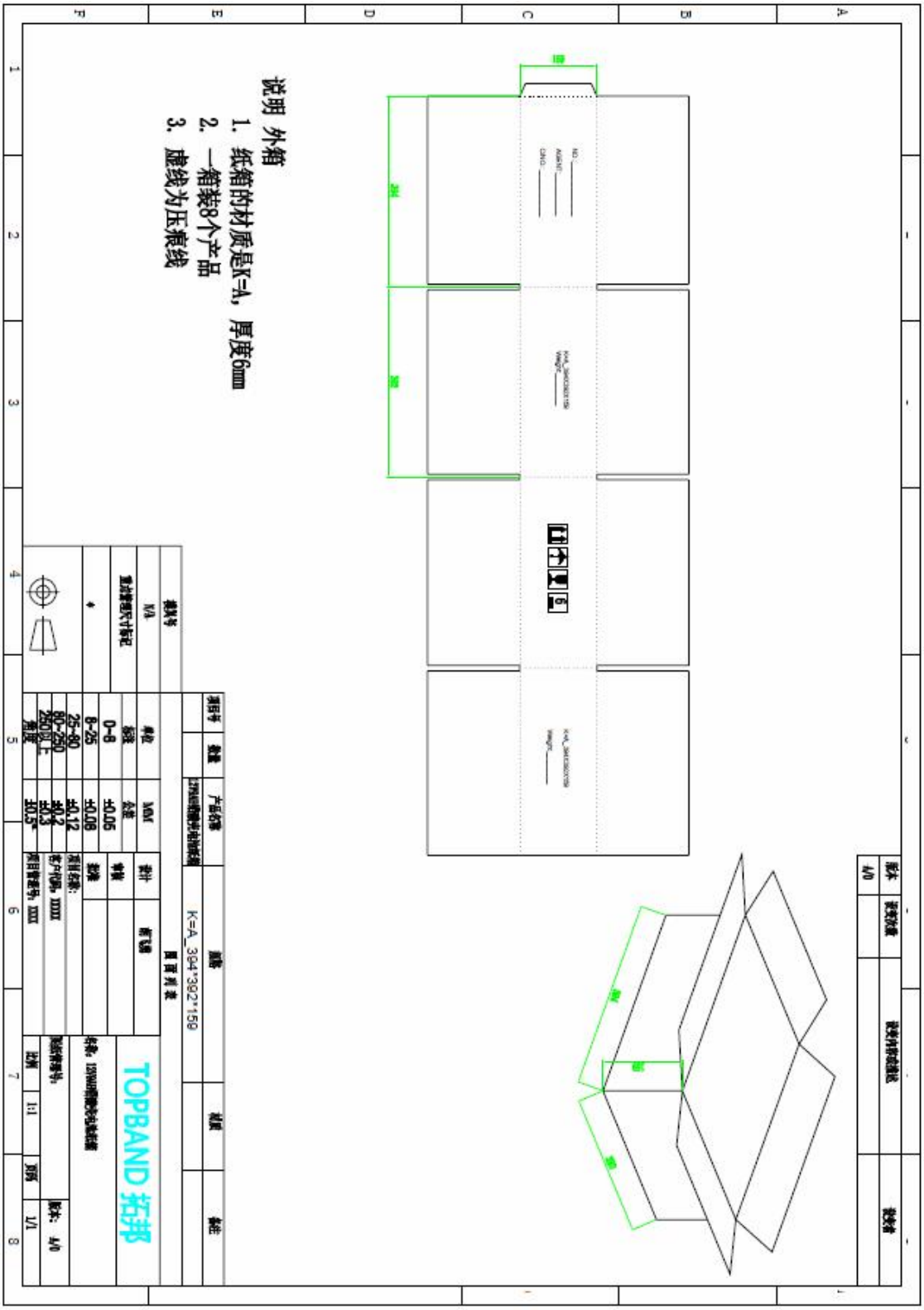
序号 No.	项 目 Items	标准 Standards	测试方法 Testing Methods
1	短路试验 Short-Circuit	电池不爆炸、不起火。外观正常，电性能正常。 The battery should be no remarkable breakage, distortion. And charge normally。	将充满电的电池，用小于 0.05Ω 电阻器短路电池 PACK 输出端正负极 1h。电池外观正常，充电启动后电性能正常。 Use a resistor with less than 0.05Ω to make the battery short circuit for 1 hour. The appearance and characteristics are normal。
2	过放保护试验 Over Discharge Protection Test	电池不爆炸、不起火。外观正常，电性能正常。/The battery should be no remarkable breakage, distortion. Appearance and charge are normal.	将充满电的电池，以 9A 放电至电池不能放电后，外接 30Ω 负载放电 24h。用专用充电器充电 10 秒，测试电池电压不低于 8.0V。 Discharge the battery at the rate of 9A with the load of 30Ω for 24h . Charging for 10sec with specified adapter , and check the voltage(≥8.0V)
3	冲击试验 Impact Test	电池不爆炸、不起火 The battery should be no explosion or catch fire	将充满电的电池放置在一个平面上，用一个直径为 15.8mm 不锈钢棒竖放在电池正中间，用一个 9.1Kg 的力作用在不锈钢棒上。 Place a full charged battery on a flat and put a stainless steel stick (Diamond 15.8mm) in the middle of the battery upright . Beat the steel stick with 9.1Kg

6. . 电池组图 Pack diagram



7. 电池 PACK 包装及运输/ Packing & Transportation:

7.1 电池 PACK 包装/ Battery Packing:



7.2 电池 PACK 运输/ Transportation:

电池应包装成箱进行运输，在运输过程中应防止剧烈振动、冲击或挤压，防止日晒雨淋，可使用汽车、火车、轮船、飞机等交通工具运输

Batteries should be packed. During transportation they should be protected from vibration, shock, impact, rain and direct sunshine .The prompt vehicles are lorry, train, steamships or planes etc.

8. 电池 PACK 使用注意事项/ Battery Usage Notice

请您务必须遵守本规范书和以下使用注意事项使用电池。由于误用会引起电池过热，发生火灾，或爆炸。对于没有按照规范书进行操作所造成的任何意外事故，深圳汇业电子有限公司不负担任何责任。

Please read and follow the handling instructions for the battery before use. Improper use of the battery may cause heat, fire, rupture, damage or capacity deterioration of the battery. Shenzhen Elite Electronic Co., Ltd is not responsible for any accidents caused by the usage without following our handling instructions.

8.1 **使用电池前，请仔细阅读使用说明书和电池表面标识。**

Before use, please carefully read the handling instructions and the marks on the battery.

8.2 **请在正常的、室内环境中使用电池。温度：0~35℃ ，相对湿度：65±20%。**

Please use the battery under natural, room environments. Temperature: 0~35℃ ， Relative Humidity: 65±20%.

8.3 **在使用过程中，应远离热源 、高压，避免儿童玩弄电池。切勿摔打电池。**

During use, please far away from heat source, high voltage and avoid children to use. Don't beat battery

8.4 **本电池只能使用配套充电器充电。不要将电池放在充电器中充电超过 24 小时。**

Please use the special charger to charge the battery, and don't put the battery in the charger more than 24 hours

8.5 **切勿将电池正负极短路，切勿让电池受潮，以免发生危险**

Do not make the positive (+) and negative (-) terminals short circuit. And do not wet the battery , or will have dangers.

8.6 **长期不用时，请将电池储存完好，让电池处于半荷电状态，即不充满电，也别放完电。避免金属接触电池，造成电池损坏。将电池保存在阴凉干燥处。**

Please store the battery well if don't use in a long time. Please keep the battery in half charge , that is to say don't charge fully and don't discharge completely. Please avoid to touch with metal to damage the

battery. Please store the battery in shade, cool and dry place

8.7 废弃电池请安全妥当处理，不要投入火中或水中。

Do not put the battery into a fire or water, and please safely deal with the disuse battery .

危险警告/ Danger& Warning&Caution

！危险/ Danger

* 充电时请使用指定的充电器并按照说明书的要求进行充电。

When Charge the battery, please use special charger and following the handling instructions

* 仅在指定的设备上使用电池。

Only use the battery on the appointed device

* 不要把电池加热或投进火中。

Don't heat the battery or put into the fire

* 不要在火源附近或温度超过 60℃的轿车中使用或遗留电池，也不要在这些环境中进行充放电。

Don't use the battery near to fire sources and don't use or leave it in the car which temperature is over 60℃, And don't charge the battery in these environments.

* 不要把电池投入水中，也不要弄湿
Don't throw the battery into water and don't wet it.

* 不要把电池同项链、发夹、硬币或螺钉等金属品一起放在兜中或包中，也不要把电池同上述物品一起储存。

Don't place the battery in the pockets and bags together with your necklace, hairpins, coins , nails or metal products . also don't store the battery together with these products.

* 不要使用金属导体短路电池的正负极。

Don't use metal conductors avoiding not to make the two electrodes short circuit

* 在使用时应注意电池的正负极不要反装。

Don't reverse the two electrodes when use the battery.

* 不要使用锐利的物品刺穿电池。

Don't penetrate the battery with sharp things

* 不要对电池进行分解。

Do not disassemble the battery.

* 不要直接对电池进行焊接。

Don’t weld the battery directly .

* 不要使用带有严重伤痕或变形的电池。

Don’t use the battery with seriously scratch and distortion.

* 在使用之前请详细阅读使用说明书。

Please carefully read the handling instruction before use

！警告/ Warning

* 不要把电池放加热器皿、洗衣机或高压容器中。

Don’t put the battery into heater, washing machine or high voltage container.

* 不要使用非指定的和没有安全认证的充电器给电池充电

Don’t use the chargers without appointment and UL certificate

* 如果在规定的充电时间内充电没有结束，停止充电。

If the battery is not fully charged in the stated time ,please stop charging

* 在使用、充电或储存期间如发现电池有变热、散发气味、变色、变形或其它反常之处停止使用。

Please stop using if you find the battery heat, smell odor, change color, distort or other abnormal states.

* 当发现电池漏液或散发出难闻的气味时立即远离。

Please far away from the battery if you find leakage or terrible smell

* 如果电解液渗漏到你的皮肤或衣服上，立刻用清水清洗。

Please wash with clean water if the electrolyte leak on your skin or clothes

* 如果电解液渗出并进入你的眼睛里，不要揉擦你的眼睛，立刻用干净的水清洗并去看医生。

If the battery leaks, and the electrolyte get into the eyes. Do not wipe eyes, instead, rinse the eyes with clean water, and immediately see a doctor

！注意 / Caution

* 把电池放在小孩够不到的地方以免吞服。
  Place the battery far away from children in order not to swallow by them.
* 儿童使用电池时，监护人应详细解释操作方法。
  Children's guardians should guide the children when they use the batter.
* 在使用电池之前，应详细阅读操作指南并对使用中的注意事项有足够深刻的理解。
  Please have a profound understanding of the battery handling instruction before use
* 在对电池充电之前仔细阅读操作指南。
  Please study the operating guide before Charging the battery
* 在将电池装入设备或从设备中取出之前详细阅读设备操作手册。
  Please carefully read the operating guide of the device before put into or take out the battery from it.
* 电池具有使用寿命，如果使用电池的设备的工作时间比平常少得多，要对电池进行更换。
  Battery has usage cycle life, if its using time is quite little than usual, please change your battery
* 电池寿命终止后要立刻从设备中取出。
  If the battery cycle life is over, please take it out of the device quickly.
* 当长期不用时，要将电池从设备中取出并放在低温低湿的环境中保存。
  If don't use the battery for a long time, please take it out of your device and store it under a low temperature & low humidity environment
* 电池应在远离静电的场所进行充电、使用和储存。
  Charge, use and store the battery should be far away from electrostatic place