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锂离子聚合物电池规格书**Li-ion polymer battery specification**

型号规格 Model SPEC	955565
内部型号 Internal model	INP955565P5000
标称容量 Nominal Capacity	5000mAh
客户 Customer	DBK1/US-129

编制 Registered	审核 Checked	质量确认 QA	批准 Approved

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变更履历表

Modified List

版本 Revision	日期 Date	变更内容 Modified content	批准 Approve
A0	2019-11-29	新版发行 New Release	

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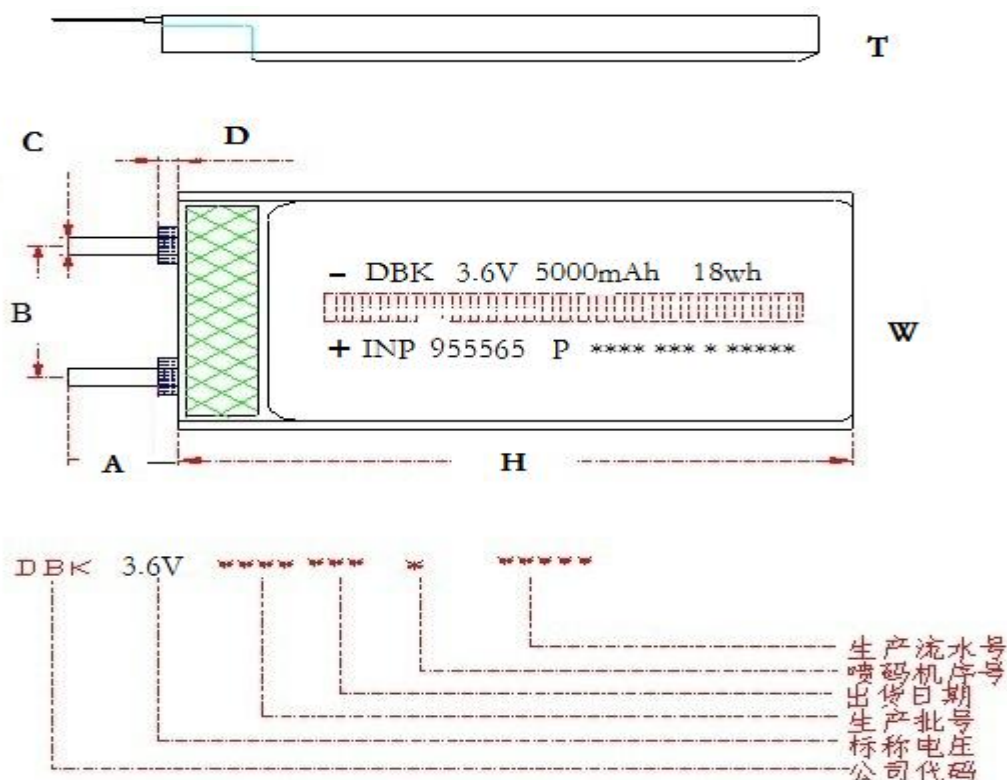
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1. 适用范围 Scope

本标准描述了聚合物锂离子电池的基本性能、技术要求、测试方法及注意事项。本标准只适用于江西迪比科股份有限公司所生产的锂聚合电池。参照 GB31241-2014,GB/T18287-2013。

This specification describes the basic performance, technical requirement, testing method, warning and caution of the Li-ion polymer rechargeable battery. The specification only applies to JIANGXI DBK CO., LTD. Reference GB31241-2014,GB/T18287-2013.

2. 电芯尺寸图 Drawing of Cell



项目 Item	描述 Description	尺寸 Dimension
T (厚度)	Cell Thickness (Initial)	$\leq 9.60\text{mm}$
W (宽度)	Cell Width	$\leq 55.0\text{mm max}$
H (高度)	Cell Height	$\leq 65.5\text{mm max}$
A (极耳长度)	Cell Tab length	$10 \pm 1.0\text{mm}$
B (极耳中心距)	Cell Tab center distance	$30.0 \pm 2\text{mm}$
C (极耳宽度)	Cell Tab width	$5.0 \pm 0.1\text{mm}$
D (极耳胶长度)	Cell Top sealant length	$1.1 \pm 0.9 \text{ mm}$

3. 主要技术参数 Technical Specification

序号 NO.	项目 Item	规格 Specifications	
3.1	最小容量 Minimum Capacity	5000mAh	0.2C 充电，0.2C 放电至终止电压 3.0V 0.2C charge and discharge to 3.0V cut-off
3.2	额定容量 Nominal Capacity	5000mAh	
3.3	标称电压 Nominal Voltage	3.6V	
	出货电压 Shipment Voltage	3.60-3.75V	
3.4	标准充电方式 Standard Charging Method	23±2℃ 0.2C 恒流恒压充电至 4.2V，截止电流 0.02C 23±2℃ 0.2C CC/CV to 4.2V ,end current 0.02C	
3.5	充电电流 Charge Current	标准充电:0.2C Standard charge: 0.2C	
		快速充电:1.0C Rapid charge:1.0C	
3.6	充电时间 Charge Time	标准充电: 360min Standard Charge: 360min （Approx）	
		快速充电: 180min Rapid Charge:180min （Approx）	
3.7	充电截止电压 Charge Cut off Voltage	4.2V±0.05V	
3.8	放电截止电压 Discharge Cut off Voltage	3.0V	
3.9	标准放电 Standard Discharge	0.2C 恒流放电至 3.0V 0.2C Constant Current Discharge to 3.0V	
3.10	最大连续放电电流 Max. Discharge Current	1.0C	
3.11	最大瞬间放电电流 Max. Pulse Discharge	1.5C（≤4S）	
3.12	内阻 Internal Impedance	≤60mΩ	标准充电后 AC 1KHz 测试 AC 1KHz after standard charge
3.13	电池重量 Cell Weight	72.55±5g (Not include PCB)	
3.14	体积能量密度 Volume Energy Density	530.00wh/L（Approx）	

4. 安全规格 Safety Specification

序号 NO.	项目 Item	规格 Specifications
4.1	最大连续充电电流 Max. Charging Current	1.0C (21℃~45℃)
4.2	工作温度 Operating Temperature	充电 Charge
		0℃~20℃ 0.25C 恒流恒压充电至 4.2V,截止电流 0.02C 0℃~20℃ 0.25C CC/CV to 4.2V , cutoff current 0.02C
		21℃~40℃ 1.0C 恒流恒压充电至 4.2V,截止电流 0.02C 21℃~40℃ 1.0C CC/CV to 4.2V , cutoff current 0.02C
		41℃~45℃ 0.25C 恒流恒压充电至 4.2V,截止电流 0.02C 41℃~45℃ 0.25C CC/CV to 4.2V , cutoff current 0.02C
		电芯表面允许最大充电温度 55℃。 During charging,the maximum surface temperature of the cell is 55℃。
		放电 Discharge
4.3	运输贮存条件 Storage& Transportation Condition	-20℃~60℃
		电芯表面允许最大放电温度 60℃。 During discharging,the maximum surface temperature of the cell is 60℃。
		-20℃~50℃
		小于一个月 Less than 1 month
		-20℃~40℃
		小于三个月 Less than 3 months
		-20℃~25℃
		小于一年 Less than 1 year
		湿度 Humidity
		MAX.90%RH
		推荐存储: 20℃±10℃, 50%电量, 电池每六个月循环充放电一次。 Recommended Storage Condition: 20℃±10℃, 50%SOC, cells should cycle once in six months.

5. 电池外观及测试 Appearance And Measurement

5.1 外观 Appearance

电池外表面清洁, 无电解液泄漏, 无明显的划痕及机械损伤, 无鼓胀, 无影响电池价值的其它外观缺陷。
There shall be no such defect as leakage, deep scratch, crack, swelling, which may adversely affect commercial value of the cell.

5.2 测试设备要求 Measurement Apparatus

(1) 尺寸测量设备 Dimension Measuring Instrument

测量仪器, 仪表准确度应满足以下要求

The accuracy of measuring instruments and instruments should meet the following requirements

电压测量装置: 不低于 0.5 级 Voltage measuring device: not less than 0.5 level

电流测量装置: 不低于 0.5 级 Current measuring device: not less than 0.5 level

温度测量装置: ±0.5℃ Temperature measuring device: + 0.5 C

时间测量装置: ±0.1% Time measuring device: + 0.1%

尺寸测量装置: $\pm 0.1\%$ Size measuring device: $\pm 0.1\%$
 质量测量装置: $\pm 0.1\%$ Quality measurement device: $\pm 0.1\%$

(4)内阻测试仪 Impedance Meter

内阻测试仪测试方法为交流阻抗法 (AC 1kHz LCR) .

The internal resistance tester is AC impedance method (AC 1kHz LCR).

5.3 标准测试条件 Standard Test Condition

测试电池必须是本公司出厂时间不超过一个月的新电池,且电池未进行过五次以上充放电循环,除非其它特殊要求。
 本产品规格书规定的测试环境条件为: 温度 $23\pm 2^{\circ}\text{C}$, 相对湿度 15%~85%, 大气压: 86~106KPa。

Test should be conducted with new batteries within one month after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of $23\pm 2^{\circ}\text{C}$ and relative humidity of 15%~85%, Atmospheric pressure: 86~106KPa.

6.电性能 Electrochemical Performance

序号 NO.	项目 Item	测试方法和条件 Test Method and Condition	标准 Criteria
6.1	0.2C 容量 0.2C Capacity	电芯标准充电后,搁置 30 分钟,用 0.2C 电流放电至 3.0V,记录放电时间。 After standard charging, rest cell for 30min, then discharge at 0.2C to 3.0V, record the discharge time.	放电时间 $\geq 300\text{min}$ Discharge Time $\geq 300\text{min}$
6.2	0.5C 容量 0.5C Capacity	电芯标准充电后, 搁置 30 分钟, 然后用 0.5C 电流放电至 3.0V, 记录放电时间。 After standard charging, rest cell for 30min, then discharge at 0.5C to 3.0V, record the discharge time.	放电时间 $\geq 108\text{min}$ Discharge Time $\geq 108\text{min}$
6.3	循环寿命 Cycle Life	电芯先用 0.5C 恒流充电至 4.20V, 再恒压 4.20V 充电,直至充电电流 $\leq 0.02\text{C}$, 搁置 10 分钟, 再用 0.5C 电流放电至 3.0V; 再搁置 10 分钟, 重复以上步骤。 Constant current 0.5C charge to 4.20V, then constant voltage charge to cutoff current of 0.02C, rest for 10min, constant current 0.5C discharge to 3.0V, rest for 10min. Repeat the above steps.	300times (次) 容量保持率 $\geq 80\%$ Capacity Retention $\geq 80\%$ 电池厚度 $\leq 10.37\text{mm}$ Thickness $\leq 10.37\text{mm}$

7. 贮存性能 Storage Performance

序号 NO.	项目 Item	测试方法和条件 Test Method and Condition	标准 Criteria
7.1	常温贮存 RT Storage Performance	标准充电后电池在 $20 \pm 5^{\circ}\text{C}$ 的环境中贮存 28 天, 测试 0.2C 放电容量 (保持容量)。 Standard charge and storage the cell at $20 \pm 5^{\circ}\text{C}$ for 28 days, after which measure the 0.2 C discharge capacity (remaining).	容量保持 $\geq 85\%$ Remaining Capacity $\geq 85\%$
		0.2C 循环 3 次, 测试恢复容量 (3 周循环的最大放电容量)。 0.2C cycle 3 times, measure the recovery capacity (the maximum discharge capacity of 3 cycles).	容量恢复 $\geq 90\%$ Remaining Capacity $\geq 90\%$

8. 环境适应性 Environmental Performance

序号 NO.	项目 Item	测试方法和条件 Test Method and Condition	标准 Criteria
8.1	恒定湿热 Constant temperature and humidity test	电芯标准充电后, 测试条件如下: 温度: $40 \pm 2^{\circ}\text{C}$ 相对湿度: $90 \sim 95\% \text{RH}$ 放置时间: 48 小时 电芯取出在室温下放置 2 小时, 然后以 0.2C 电流放电至终止电压。 Standard charge the cell, put it under the test condition: Temperature: $40 \pm 2^{\circ}\text{C}$ Relative Humidity: $90 \sim 95\% \text{RH}$ Storage Time: 48 hours, After which cool under room temperature for 2 hours, Then 0.2C discharged to cutoff voltage.	不起火、不爆炸、不泄露。 放电容量不低于初始容量的 60%。 No Explosion、No Fire、No Leakage. Discharging capacity is not less than 60% initial capacity.

序号 NO.	Item 项目	测试方法和条件 Test methods and condition	标准 Criteria																													
8.2	低气压 Vacuum	电芯标准充电后，将其搁置在真空箱中。真空箱密闭后，逐渐减少其内部压力至不高于 11.6kPa 并保持 6h。 Standard charge the cell, after which store it in vacuum chamber below 11.6kPa for 6 hours.	不泄漏、不破裂、不起火、不爆炸。 No Leakage、No Fluid、No Fire、No Explosion.																													
8.3	振动测试 Vibration Test	电芯按标准充电后，固定在振动台上，然后按下表参数进行正弦振动测试。 <table><tr><th colspan="2">频率</th><th rowspan="2">振动参数</th><th rowspan="2">对数扫频循环时间 (7 Hz-200 Hz-7 Hz)</th><th rowspan="2">轴向</th><th rowspan="2">振动周期数</th></tr><tr><th>起始</th><th>至</th></tr><tr><td>$f_1=7$ Hz</td><td>f_2</td><td>$a_1=1 g_n$</td><td rowspan="4">15 min</td><td>X</td><td>12</td></tr><tr><td>f_2</td><td>f_3</td><td>$S=0.8$ mm</td><td>Y</td><td>12</td></tr><tr><td>f_3</td><td>$f_4=200$ Hz</td><td>$a_2=8 g_n$</td><td>Z</td><td>12</td></tr><tr><td colspan="3">返回至 $f_1=7$ Hz</td><td>总计</td><td>36</td></tr></table> $f_1、f_4$——下限、上限频率； $f_2、f_3$——交越点频率($f_2\approx17.62$ Hz、$f_3\approx49.84$ Hz)； $a_1、a_2$——加速度幅度； S——位移幅度。 注：振动参数是指位移或加速度的最大绝对数值，例如：位移量为 0.8 mm 对应的峰—峰值的位移量为 1.6 mm。 每个方向进行 12 个循环，每个方向循环时间共计 3h 的振动。电池按照三个相互垂直的方向进行振动试验。 Standard charge the cell, after which cell is firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.	频率		振动参数	对数扫频循环时间 (7 Hz-200 Hz-7 Hz)	轴向	振动周期数	起始	至	$f_1=7$ Hz	f_2	$a_1=1 g_n$	15 min	X	12	f_2	f_3	$S=0.8$ mm	Y	12	f_3	$f_4=200$ Hz	$a_2=8 g_n$	Z	12	返回至 $f_1=7$ Hz			总计	36	不起火、不爆炸，不冒烟。 No Fire、No Explosion、No Smoking.
频率		振动参数	对数扫频循环时间 (7 Hz-200 Hz-7 Hz)	轴向					振动周期数																							
起始	至																															
$f_1=7$ Hz	f_2	$a_1=1 g_n$	15 min	X	12																											
f_2	f_3	$S=0.8$ mm		Y	12																											
f_3	$f_4=200$ Hz	$a_2=8 g_n$		Z	12																											
返回至 $f_1=7$ Hz				总计	36																											

9.安全性能 Safety Performance

序号 NO.	项目 Item	测试方法和条件 Test methods and condition	标准 Criteria
9.1	过充 Overcharge Test	电池以 0.2C 放电至 3.0V，再用 3C 充电至 4.6V。当温度下降到比峰值低约 20%时，结束试验。 Discharge the cell to 3.0V at 0.2C, then charge the cell to 4.6V at 3.0C until the temperature drops to 20% lower than the maximum value.	不起火、不爆炸。 No Explosion、No Fire.
9.2	短路 Short-circuit Test	标准充电后，在 $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的环境下使用总内阻 $80 \pm 20\text{m}\Omega$ 的导线短路正负极，当电池温度下降到比峰值低约 20%时，结束试验 Standard charge the cell, after which short-circuit the cell by connecting positive and negative terminal with $80 \pm 20\text{m}\Omega$ wire under the environment of $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$, until the temperature drops to 20% lower than the maximum value.	不起火、不爆炸、最高温度不超过 150°C 。 No Explosion, No Fire. Maximum temperature cannot exceed 150°C
9.3	热冲击 Thermal Shock	电池放置于热箱中，温度以 $(5 \pm 2^{\circ}\text{C})$ 的速率升温至 $(130 \pm 2^{\circ}\text{C})$ 并保温 30 分钟。 Heat up cell in an oven with temperature ramp of $5^{\circ}\text{C} \pm 2^{\circ}\text{C}/\text{min}$, cutoff temperature of $130^{\circ}\text{C} \pm 2^{\circ}\text{C}$. Maintain the temperature for 30 minutes.	不起火、不爆炸。 No Explosion, No Fire.

备注：以上安全性能实验应在有保护措施的条件下进行。

Note: Test of safe performance above must be with protective equipment.

10. 包装图 Packing Drawing

			
电池整齐、方向一致地摆放在洁净的吸塑内(电池正面向上);	装盒要求: 根据电池厚度不同, 每箱按10--25层装吸塑; 封箱后吸塑电池不能晃动;	用透明胶固定电池, 标识清楚档次状态;	将电池放入纸箱内, 纸箱底部、电池上方各垫一张专用三层纸板;
			
记录好后将整箱电池整齐的放置在卡板上;	在外箱上按标识卡要求填写相关内容并贴在包装箱侧面, 做好记录;	将装有电池的纸箱放置在电子秤上称重;	封箱打包时要求箱子底部、上部长宽方向均缠绕胶带;

11.警告及注意事项 Warning and cautions

为防止电池可能发生的泄露、发热、起火，请注意以下预防措施：

To prevent the possibility of the battery from leaking, heating, fire, please observe the following precautions:

- 电池外包装膜容易被镍片、尖针等尖锐部件损伤，禁止用尖锐部件损伤电池。
The soft aluminum packing foil is prone to be damaged by sharp edge parts such as MI-tabs and needs, do not wreck battery with any sharp edge parts.
- 严禁将电池浸入海水或水中。
Do not immerse the battery in fresh water or seawater.
- 禁止将电池在热高温源旁，如火、加热器等使用设备
Do not use and leave the battery near a heat source such as fire and heater.
- 禁止颠倒正负极使用电池
Do not reverse use the position and negative terminals.
- 严禁将电池直接接入电源插座
Do not connect the battery to an electrical outlet directly.
- 禁止用金属直接连接电池正负极短路，任何时候禁止短路电芯，它会使电芯受到严重损坏。
Do not short circuit the positive and negative terminal directly with metal objects such as wire, which is strictly prohibited under any circumstance, it may damage battery.
- 禁止将电池与金属，如发夹、项链等一起运输或储存。
Do not transport and store the battery together with metal objects such as necklaces, hairpins.
- 严禁敲击或抛掷，踩踏电池等。
Do not strike, throw or trample the battery.
- 禁止直接焊接电池或用钉子或其它利器刺穿电池
Do not directly solder the battery and pierce the battery with a nail or other sharp object.
- 禁止与不同型号的锂离子电池混合使用
Do not mix with others different lithium ion battery model.
- 禁止弯折顶封边，禁止打开或破坏折边，禁止弯折电芯折边底部。
Do not bend or fold sealing edge. Do not open or deform folding edge. Do not fillet the end of the folding edge.
- 禁止坠落、冲击、弯折电池
Do not drop, hit or bend the battery.
- 电池外壳设计和包装禁止损伤电池
Battery case design and pack must not injury the battery.
- 任何情况不得拆卸电池
Battery disassemble is prohibited.
- 更换电芯应由电芯供应商或设备供应商完成，用户不得自行更换。
Battery replacement shall be conducted only by either battery supplier or device supplier. Unauthorized replacement by user is prohibited.
- 禁止在强静电和强磁场的地方使用，否则易损坏电池安全保护装置，带来不安全的隐患。
Do not use the battery under strong electrostatic and magnetic field, otherwise, the safety devices may be damaged, causing potential risk of safety.
- 如果电池发生异味、发热、变色、变形或使用、储存、充电过程中出现任何异常现象，立即将电池从装置或充电器中移除并停用。

If the battery diffuses odors, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, remove it from the device or battery charge and stop using immediately.

- 如果电池弄脏，使用前应用干布抹净，否则可能会导致接触不良功能失效。

In case the battery terminals are covered with dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.

- 禁止在高温下（直热的阳光下或很热的汽车中）使用或装置电池，否则可能会引起电池过热，起火或功能失效，寿命减短。

Do not use or leave the battery under high temperature conditions (for example, strong direct sunlight or a vehicle in extremely hot conditions). Otherwise, it may cause overheat, fire, performance degeneration or decreased cycle life.

- 废弃之电池应用绝缘纸包住电极，以防起火、爆炸。

Be aware discharged batteries may cause fire; wrap the terminals to insulate them.

12.其他事项 Others

- a)对于在超出文件规定以外的条件下使用电池而造成电池的任何意外事故，江西迪比科股份有限公司概不负责。

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

- b)如有必要，江西迪比科股份有限公司会以书面形式告知客户有关正确操作使用电池的改进措施。

DBK will inform, in a written form, the customer of improvement regarding proper use and handling of the battery, if it is deemed necessary.

- c)任何本说明书中未提及的事项，须经双方协商确定。

Any subject that this specification does not cover should be conferred between the customer and DBK.

-----END-----