



江西经钛电子有限公司
JIANGXI SHARVIN POWER CO.,LTD

版本: A. 1
电芯型号: SVT0412/2. 70V
日期: 2023-12-15

Product Specification

for Capacitive Lithium-Titanate Batteries

电容式钛酸锂电池产品规格书

Model Number: SVT0412-3.5mAh
产品型号: SVT0412-3. 5mAh

Prepared By 编制	Verified By 审核	Approved By 批准

Customer Approval 客户方确认	Signature 签署	Date 日期
	Company name: 公司名称	
	Company Stamp: 盖章	
Customer No. 客户编号	A0103	

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Version No. 版本号	Content Description 内容描述	Modifier 修改人	Effective Date 生效日期
A.0	New version release 新版发行		2023-7-9
A.1	Update battery pole piece tail tape 更新底部包胶		2023-12-15



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1. SCOPE

范围

This document describes the performance characteristics and testing methods for capacitive lithium-titanate batteries produced by Jiangxi Sharvin Power Co., Ltd .

本文件描述了江西经钛电子有限公司出品的电容式钛酸锂电池的产品规格、性能测试方法

2. PRODUCT TYPE AND MODEL NUMBER

产品类别和产品型号

2.1 PRODUCT TYPE

类别

Capacitive Lithium-Titanate Battery

电容式钛酸锂电池

2.2 MODEL NUMBER

产品型号: SVT0412-3.5mAh

3. SPECIFICATION

产品基本特性

No. 序号	Item 项目	Characteristics 特性	Remarks 备注
3.1	Capacity 容量	Minimum: 3.3mAh 最小: 3.3mAh 典型: 3.5mAh Typical: 3.5mAh	According to the standard charging after full charge, constant current discharge 0.2C to 1.6V. 按标准充电方式充满电后, 以 0.2C 恒流放电到 1.6V
3.2	Nominal Voltage 工作电压	2.40V	
3.3	Charging Cut-off Voltage 最大充电终止电压	2.70V	
3.4	Discharge Cut-off Voltage 最小放电终止电压	1.6V	
3.5	Max. Constant Charge Current 最大持续充电电流	7mA (2C)	
3.6	Max. Continuous Discharge Current 最大持续放电电流	70mA (20.0C)	
3.7	Operating Temperature 工作温度范围	Charging/充电	5~15℃: 0.2C CCCV to 2.70V
			16~45℃: 0.2C CCCV to 2.70V
		Discharging/放电	-30~0℃: 0.02C DC to 1.6V
			1~90℃: 0.02C DC to 1.6V

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3.8	Storage Condition (50% of fully charge state) 存储条件 (带电量 50%)	1 个月内 -10~45℃ -10~45℃ for 1Month 6 个月内 -10~35℃ -10~35℃ for 6Months
3.9	Weight 重量	Approximate value 约 0.35g
3.10	Storage Voltage 存储电压	2.33V-2.60V
3.11	Environmental request 环保要求	the materials of the product and packaging accord with RoHS standard, there will be a RoHS Id on the box. 满足 ROHS 要求

4. Dimensions
外形尺寸
Please refer the drawing in appendix.
见附图
5. Appearance
外观
No scratches, dirt, defect, leakage of electrolyte or gassing should be observed as a new product.
电池表面无划伤、脏点、变形、漏液、鼓气等缺陷。

6. Characteristics
特性

- 6.1 Electrochemical performance characteristics
电性能

No. 序号	Item 项目	Testing Method 测试方法	Requirements 标准
1	Standard Charge 标准充电	0.2 C constant current charge to 2.70V, then constant Voltage until the charge current decrease to 0.01C. 0.2C 恒流充电至 2.70V, 再 2.70V 恒压至 0.01C ₅ A	Charge Time ≤12.0hrs 充电时间≤12.0 小时
2	Rapid Charge 快速充电	2.0C constant current charge to 2.70V, then constant Voltage until the charge current decrease to 0.01C. 2.0C 恒流充电至 2.70V, 再 2.70V 恒压至 0.01C ₅ A	Charge Time ≤1.0hrs 充电时间≤1.0 小时
3	Nominal Capacity 标称容量	(per 6.1.1) at room temp. (23±2℃), rest for 0.5-1 hrs then discharge at a constant current of 0.2C to 1.6V. 在环境温度为(23±2)℃的条件下按 6.1.1 完全充电后静置 0.5~1 小时, 以 0.2C 放电至 1.6V。	≥3.3mAh



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4	Cycle (23℃) 循环寿命 (23℃)	At 23 ± 2 °C ambient temperature, With 0.2C charging and discharging, between each cycle for 10 minutes, in this way for 25000C. 在 23℃±2℃的环境温度下, 用 0.2C 充电和放电, 每次循环之间搁置 10 分钟, 循 25000 周。	Remaining capacity≥80% Nominal capacity. 剩余容量≥80%标称容量														
5	Internal Impedance 内阻	Internal impedance is measured on a 50% charged battery at 1KHz AC at ambient temperature (23±2) °C。 环境温度 (23±2) °C, 电池荷电 50%状态时以 1KHz 交流电测得的内部阻抗。	≤1400m Ω														
6	Capacity Retention 荷电保持能力	After fully charged (23 ± 2) in the 28 days of storage environment temperature, discharge at 0.2C5A to 1.6V. Then according to the standard charging mode, and then discharge at 0.2C ₅ A to 1.6V.完全充电后在 (23±2) °C 的环境中储存 28 天, 以 0.2C ₅ A 放电至 1.6V。然后按标准充电方式充电后, 再以 0.2C ₅ A 放电至 1.6V。	Remaining capacity≥85% initial capacity. 放电容量≥85%标称容量 recovery capacity≥90% initial capacity 恢复容量≥90%标称容量														
7	Discharge Rate Characteristic 倍率放电特性	<table><tr><td rowspan="3">Charge current/ 充电电流</td><td colspan="3">Discharge current/放电电流</td></tr><tr><td>(0.2C)</td><td>(0.5C)</td><td>(1.0C)</td></tr><tr><td>(0.2C)</td><td>100%</td><td>95%</td><td>90%</td></tr></table> Cell shall be charged according to Per.6.1.1,and discharged with different current respectively to 1.6V. The cells should be performed at 23℃±2 °C 电芯按 6.1.1 充满电, 分别以不同的倍率放电到 1.6V。电芯必须在 23℃± 2 °C 的温度下进行充放电。	Charge current/ 充电电流	Discharge current/放电电流			(0.2C)	(0.5C)	(1.0C)	(0.2C)	100%	95%	90%				
Charge current/ 充电电流	Discharge current/放电电流																
	(0.2C)	(0.5C)		(1.0C)													
	(0.2C)	100%	95%	90%													
8	Temperature Characteristic 温度特性	<table><tr><td rowspan="3">Discharge current/放电电流</td><td colspan="4">Discharge temperature/放电温度</td></tr><tr><td>-10℃</td><td>0℃</td><td>25℃</td><td>55℃</td></tr><tr><td>(0.2C)</td><td>60%</td><td>85%</td><td>100%</td><td>95%</td></tr></table> Cell shall be charged according to Per.6.1.1,and discharged with different temperature respectively to 1.6V at 0.2C.The cells must be stored for two hours at the corresponding temperature before discharge. 电芯按 6.1.1 充满电, 分别在不同温度放电到 1.6V。在放电前电芯必须在对应温度下储存 2 小时。	Discharge current/放电电流	Discharge temperature/放电温度				-10℃	0℃	25℃	55℃	(0.2C)	60%	85%	100%	95%	
Discharge current/放电电流	Discharge temperature/放电温度																
	-10℃	0℃		25℃	55℃												
	(0.2C)	60%	85%	100%	95%												
9	The factory voltage 出厂电压	Check open circuit voltage (OCV) of cells prior to the delivery to customers 出货之前检验	2.38V-2.63V														



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6.2 Safety characteristic

安全特性

No. 序号	Item 项目	Test Method 测试方法	Requirements 标准
1	Overcharge 过充	Discharge cells to 1.6V at 0.2C ₅ A, then charge to 3.20V at 3C ₅ A and rest for 7 hours. 电池以 0.2C ₅ A 电流恒流放电至 2.0V, 以电流 3C ₅ A 限制电压 3.20V 的制式充电 7 小时。	No fire No explosion 不爆炸、不起火
2	Over Discharge 过放	Fully charge cells per 6.1.1, then discharge the battery with 0.2C ₅ A mA at room temperature, connect with external load of 30 Ω for 7hours. 将电池按 6.1.1 充满电后, 在环境温度 23 $\pm$ 2 $^{\circ}$ C的条件下, 外接 30 Ω 负载电阻以 0.2C ₅ A 放电 7h。	No fire No explosion 不爆炸、不起火
3	Heat Cycle 温度循环	The cell is fully charged with standard charging method, and then it is to be stored for 6 hour at a test temperature equal to 75 $\pm$ 2 $^{\circ}$ C, followed by a storage for 6 hour at a test temperature equal to -40 $\pm$ 2 $^{\circ}$ C, the maximum time interval between test temperature extremes is 30 min, this procedure is to be repeated for 10 times, after which all test cells are to be stored for 6 hours at ambient temperature (23 $\pm$ 2 $^{\circ}$ C). 将用标准充电方法充满电的电芯放入 75 $\pm$ 2 $^{\circ}$ C 的环境中搁置 6h, 再在 -40 $\pm$ 2 $^{\circ}$ C 条件下搁置 6h, 两个极端温度的变化时间间隔最长为 30min, 如此循环 10 次, 试验结束后将电芯取出, 在 23 $\pm$ 2 $^{\circ}$ C 环境中搁置 6h。	No leakage, no fire and no explosion 不泄露、不起火、不爆炸
4	Mechanical shock 机械冲击	The battery is fixed on the test equipment. Each in three perpendicular directions under the impact of an equivalent. At least one direction perpendicular to the width of the battery. Each shock according to the following method: within the first 3 ms, minimum average speed of 735 m/s ² , peak acceleration should be between 1225 m/s ² and 1715 m/s ² , pulse duration for 6ms $\pm$ 1ms. 将电池固定在试验设备上。在三个相互垂直的方向上各承受一次等值的冲击。至少一个方向垂直于电池的宽面。 每次冲击按下述方法进行: 在最初的 3ms 内, 最小平均加速为 735m/s ² , 峰值加速应该在 1225m/s ² 和 1715 m/s ² 之间, 脉冲持续时间为 6ms $\pm$ 1ms。	No leakage, no fire and no explosion, 不泄 露、不起火、不爆炸



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6.3 Reliability

环境适应性

No. 序号	Item 项目	Test Method 测试方法	Requirements 标准
1	Humidity Test 高温高湿	Fully charge cells per 6.1.1, stored them at $40 \pm 2^{\circ}\text{C}$ with 90%~95RH% for 48 hours. Then the cells are placed at room temperature to “dry out” for 2 hours. then discharge the cells to 1.6V at 0.2C ₅ A. 将按 6.1.1 充满电的电池放入 $40 \pm 2^{\circ}\text{C}$ 、相对湿度为 90%~95% 的恒温湿箱中搁置 48h 后，取出电池在环境温度 $20 \pm 5^{\circ}\text{C}$ 的条件下搁置 2h。以 0.2C ₅ A 电流放电至 1.6V	No deformation, no corrosion, no leakage, no leakage, no rupture, no fire and no explosion, discharge time shall not be less than 3h. 无变形、无锈蚀、不泄漏、不泄气、不破裂、不起火和不爆炸，放电时间应不低于 3h。
2	Low Pressure Test 低压测试	The fully charged cell is to be stored for 6 hours at an absolute pressure of 11.6kpa and a temperature of $23 \pm 2^{\circ}\text{C}$. 将充满电的电芯在绝对压力为 11.6kpa、 $23 \pm 2^{\circ}\text{C}$ 条件下贮存 6 小时。	No explosion, no fire and no leakage 不爆炸、不起火、不泄露
3	Drop Test 跌落测试	The cell is fully charged with standard charging method, standby for one hour and then it is submitted to free fall at a height of 1.0m down to one solid board with thickness of 20mm. It should be fallen for 2 times on each direction. 将电芯用标准充电方法充满电，放置 1h，将电芯从 1.0m 高度自由落到 20mm 厚的硬木板上。每个方向上各试验 2 次。	No leakage, no smoke, no explosion and no fire 不泄露、不冒烟，不起火，不爆炸
4	Vibration 振动	Battery charged by the regulation, after the battery is fixed on the vibration table, don't make the battery out of shape, with sinusoidal vibration, and within 15 min in logarithmic sweep from 7 Hz frequency sweep to 200 Hz and return to the 7 Hz. Vibration along three mutually perpendicular direction of sample (one direction is perpendicular to the plane of the cathode) must match the sample, according to the logarithmic sweep in each direction way to 12 repetitions, vibration 3h. Logarithmic frequency sweeping method is as follows: 7 Hz ~ 18 Hz maintain peak acceleration of 9.8m/s ² . Hold the amplitude at 0.8 mm (displacement of 1.6 mm) until the peak acceleration of 78.4 m/s ² (frequency is about 50 Hz). Keep 78.4 m/s ² peak acceleration until the frequency increased to 200 Hz. 电池按规定充满电后，将电池固定在振动台上，不可使电池变形，采用正弦波进行振动，并以对数扫频方式在 15min 内从 7Hz 扫频到 200Hz 并返回到 7Hz。振动沿样品互相垂直的三个方向（其中一个方向必须与样品正负极所在平面垂直）进行，每个方向按上述对数扫	No leakage, no fire and no explosion. 不泄露、不起火、不爆炸。

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频方式重复 12 次, 振动 3h。
对数扫频方式如下: 7Hz~18Hz 保持 9.8m/s² 的峰值加速度。将振幅保持在 0.8mm (位移为 1.6mm) 直至峰值加速度达到 78.4m/s² (频率约为 50Hz)。保持 78.4m/s² 的峰值加速度直到频率增长到 200Hz。

7. Standard Testing Environment
- 标准测试环境
- Temperature : 23±2℃
- 温度: 23±2℃
- Relative humidity : 45±20% (unless specially requested)
- 相对湿度: 45±20% (除非另外要求)
8. Warranty
- 保质期限
- Warranty period for this product is 12 months starting from the date when the products left the door of manufacturer.
- 保质期是从出厂日期(喷码)开始起十二个月。
9. Liability
- 产品责任
- The user has to operate the products according to the instructions printed on the battery label or follow the advice described in this “Product Specification for Capacitive Lithium-Titanate Batteries published by Jiangxi Sharvin Power Co., Ltd. In case the battery were overheated or even catch fire or explosion caused by mishandling of the user side, Jiangxi Sharvin Power Co., Ltd. will not be liable for the lose caused by any of such mishandling.
- Jiangxi Sharvin Power Co., Ltd. will notify the users in written form if any modifications in specification, raw material, production process control.
- 您必须严格遵守江西经钛电子有限公司规格书和文件后面的注释使用电池, 由于误用会引起电池过热, 发生火灾或爆炸。对于没有按照规格书进行操作所造成的任何以外事故, 江西经钛电子有限公司不承担任何责任。
- 如果规格书、原材料、生产过程或生产控制系统发生改变, 改变的信息将会随质量和可靠性数据以书面形式通知消费者。
10. Battery Packing Label
- 包装电池上的标示
- The following warnings should be indicated on the battery pack labels.
- 以下警告应注明在包装后的电池上
- Use a specified charger.
- 使用规定的充电器。
- Do not throw the battery into fire, or heat.
- 不要将电池投入火中或加热。
- Do not short-circuit the battery terminals.
- 不要将电池两端短路。
- Do not disassemble the battery.



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不要将电池分解拆散。

11. Warnings and Cautions in Handling the Lithium-ion Battery

电池使用时警告事项及注意事项

To prevent potential leaking, overheating or explosion of batteries please be advised to take following precautions:

为防止电池可能发生泄漏,发热、爆炸,请注意以下预防措施

WARNINGS!

警 告 !

Do not immerse the battery in water or seawater, and keep the battery in a cool dry environment during stands by period.

严禁将电池浸入海水或水中,保存不用时,应放置于阴凉干燥的环境中。

Do not use or leave the battery near a heat source such as fire or heater.

禁止将电池在热高温源旁,如火、加热器等使用和留置。

When recharging, use the battery charger specifically for that purpose.

充电时请选用锂离子电池专用充电器。

Do not reverse the position (+) and negative (-) terminals.

严禁颠倒正负极使用电池。

Do not connect the battery to an electrical outlet.

严禁将电池直接接入电源插座。

Do not dispose the battery in fire or heat.

禁止将电池丢于火或加热器中。

Do not short-circuit the battery by directly connecting the positive (+) and negative (-) terminal with metal objects such as wire.

禁止用金属直接连接电池正负极短路

Do not transport or store the battery together with metal objects such as necklaces, hairpins etc.

禁止将电池与金属,如发夹、项链等一起运输或贮存。

Do not strike or throw the battery against hard surface.

禁止敲击或抛掷、踩踏电池等。

Do not directly solder the battery and pierce the battery with a nail or other sharp object.

禁止直接焊接电池或用指甲或其它尖锐物体刺穿电池。

Do not use sharp things to hit the battery.

禁止用尖锐部件碰撞电池。

CAUTIONS!

注意

Do not use or leave the battery at very high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be shortened.

禁止在高温下(炙热的阳光下或很热的汽车中)使用或放置电池,可能会引起电池过热、起火或功能失效、寿命减短。



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Do not use it in a location where static electricity is rich, otherwise, the safety devices may be damaged, causing a harmful situation.

禁止在强静电和强磁场的地方使用,否则易破坏电池安全保护装置,带来不安全的隐患。

In case the electrolyte get into the eyes due to the leakage of battery, do not rub the eyes! Rinse the eyes with clean running water, and seek medical attention immediately. Otherwise, it may injure eyes or cause a loss of sight.

如电池泄露,电解液进入眼睛,请不要揉擦,用清水冲洗眼睛,立即送医治疗,否则会伤害眼睛

If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charger and place it in a contained vessel such as a metal box.

如果电池发出异味、发热、变色、变形或使用、贮存,充电过程中出现任何异常, 立即将电池从装置或充电器中移除并停用。

In case the battery terminals are contaminated, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection between the battery and the electronic circuitry of the instrument.

如果电池发出异味、发热、变色、变形或使用、贮存,充电过程中出现任何异常, 立即将电池从装置或充电器中移除并停用。

Be aware discarded batteries may cause fire, tape the battery terminals to insulate them before disposal.

废弃之电池应用绝缘纸包住电极,以防起火、爆炸。



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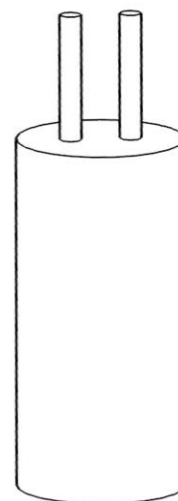
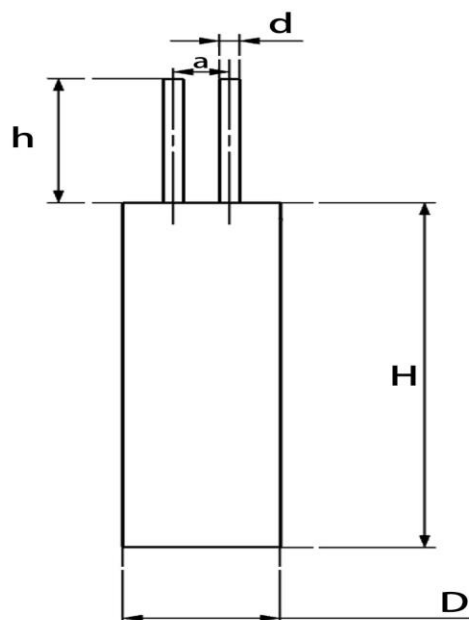
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附图: 单位: mm

Attachment: Unit: mm



Dimension mark 尺寸标记	Description 描述	Size specification 尺寸规格
D	直径/diameter	$4.00 \pm 0.05\text{mm}$
H	高度/ length	$11.80^{+0.40}_{-0} \text{ mm}$
h	导针长度/lug length	看客户要求
d	导针直径/lug diameter	$0.45 \pm 0.02 \text{ mm}$
a	导针中线间距/ distance of lug centreline	$1.65 \pm 0.10\text{mm}$