ID：P100200010

HESC40V15000 产品规格书

HESC40V15000 Product Specification

一、适用范围 Scope of application

本规格书对深圳市清研**电子科技**有限公司开发的能量型超级电容器(HESC40V15000)的特性、外观、尺寸、性能、测试方法、及注意事项进行了说明。

This specification describes the characteristics, appearance, dimensions, performance, test methods, and precautions of the energy type supercapacitor (HESC40V15000) developed by Shenzhen Tsingyan Electronic Technology Co., Ltd

二、产品通用特性 General Product Characteristics

2.1 特点与优势 Features & Benefits

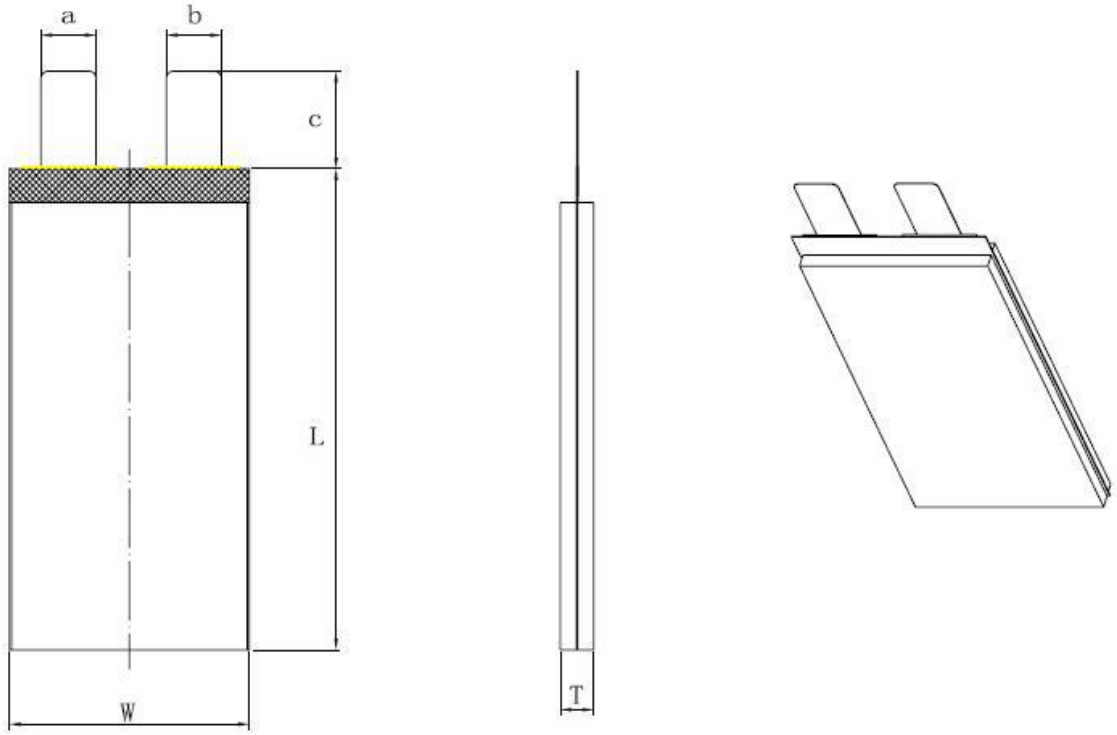
- 高能量密度 115.2Wh/kg
- High energy density 115.2Wh/kg
- 功率密度高于常规锂电池
- Power density higher than conventional lithium batteries
- 5C 循环寿命 50000 次
- 5C Cycle life 50000 times
- 高安全性，通过 GB/T 31485-2015 针刺测试
- High safety, passed GB/T 31485-2015 pin prick test
- 宽工作温度范围-40～65℃
- Wide operating temperature range -40～65℃

2.2 应用领域 Application Fields

- 智能电网调频储能、高频节能储能
- Smart grid FM energy storage, high frequency energy saving energy storage
- 超级电容观光车、AGV 车
- Super Capacitor Tourist Vehicle, AGV Vehicle
- 低温应急启动电源，后备电源
- Low-temperature emergency starting power supply, backup power supply
- 其他对功率和能量要求比较高的工况
- Other working conditions with high power and energy requirements

三、产品结构与尺寸 Product Structure and Dimensions

3.1 结构与尺寸 Structure and Dimensions



项目/Item	说明/Description	规格/Specifications
T	厚度/Thickness	13mm max
W	宽度/Width	65.0±2mm
L	长度/Lengths	130.0±2mm
a、b	极耳宽度/Tab width	15.0±0.3mm
/	极耳厚度/Tab thickness	0.2±0.02mm
c	极耳长度/Tab length	20.0±0.5mm

四、主要技术参数 Main technical specifications

序号/No.	项目/Item	规格/Specifications
1	静电容量 Capacitance /（F）	15000
2	标称电量/Nominal Capacity（Ah）	7 (2.5～4.2)
3	工作电压/Operating Voltage（V）	2.5～4.0
4	浪涌电压/Surge Voltage（V）	4.2
5	容量偏差/Capacity Tolerance	-10%+30%
6	直流内阻/DC Internal Resistance（10ms）	≤2.5mΩ
7	交流内阻/AC Internal Resistance	≤1.2mΩ
8	漏电流等级/leakage current levels	10～20μA/72h
9	标准充/放电电流/(A) Standard Charge/Discharge Current/(A)	35 (5C)
10	最大持续充/放电电流(A) Maximum Continuous Charge/Discharge Current (A)	70 (10C)
11	1s 最大峰值放电电流(A) 1s Maximum Peak Discharge Current	350 (50C)
12	最大能量密度(Wh/kg) Maximum Energy Density (Wh/kg)	~115.2
13	循环寿命/Cycle Life (cycles)	50000(2.5-4.2V) 100000(2.5-4.0V)
14	工作温度范围 Operating Temperature Range /(℃)	-40~65
15	储存温度范围 Storage Temperature Range /(℃)	-30~60
16	重量/Weight (kg)	Approximately equal to 0.215

五、产品性能测试 Product Performance Testing

5.1 测试条件 Test conditions

- 温度：25℃±5℃
- Temperature：25℃±5℃
- 相对温度：25%~85%
- Relative temperature: 25%~85%
- 环境气压：86～106kPa
- Ambient pressure: 86～106kPa

5.2 测试依据 Testing basis

- DL/T 2080-2020 《电力储能用超级电容器》
- DL/T 2080-2020 Supercapacitors for Power Energy Storage
- GB/T34870.1—2017 《超级电容器》
- GB/T34870.1—2017 Supercapacitors
- GB/T 31485-2015 《电动汽车用动力蓄电池安全要求及试验方法》
- GB/T 31485-2015 Safety Requirements and Test Methods for Power Storage Batteries for Electric Vehicles

5.3 产品可靠性、安全性测试方法及要求

Product reliability and safety test methods and requirements

序号 No.	项目/Item	测试方法/Testing Method	测试要求/Test Requirements
1	标准充电方式 /Standard charging method	在常温条件下，5C 恒流充电,当电压达到充电限制电压 4.0V 时，改为恒压充电，恒压 30min 停止充电 Under normal temperature conditions, 5C constant current charging, when the voltage reaches the charging limit voltage 4.0V, it will be changed to constant voltage charging, and the constant voltage will stop charging for 30min.	/
2	标准放电方式 /Standard discharging method	在常温条件下,5C 恒流放电,当电压达到放电限制电压 2.5V 时，停止放电 At normal temperature, 5C constant current discharge, when the voltage reaches the	/

		discharge limit voltage of 2.5V, stop discharging.	
3	额定容量 /Rated Capacity	1. 产品按标准充电方式充电 4.0V Product is charged by standard charging method 4.0V 2.搁置 30min/ Set aside for 30min 3.产品按标准放电方式放电至限制电压 2.5V/ Discharge the product to the limiting voltage of 2.5V according to the standard discharging method.	容量不低于 80% Capacity not less than 80%
4	内阻/Internal Resistance	交流内阻测试仪测试，精度：0.01mΩ AC internal resistance tester test, accuracy: 0.01mΩ	≦1.5mΩ
5	高温放电 Thermal discharge	1. 按标准充电方式充电至额定电压 4.0V。 Charge to the rated voltage of 4.0V according to the standard charging method. 2. 将产品放入 65±2℃的高温箱中恒温箱 2h。 Put the product into the high-temperature box of 65±2℃ for 2h. 3. 按标准放电方式放电至限制电压 2.5V，记录放电容量。 Put the product into the high-temperature box of 65±2℃ for 2h. 4. 放电结束后将取出放在常温条件下搁置 2h，然后目测外观。 After discharging, take out the product and put it at normal temperature for 2h, then visually inspect the appearance. Then visually inspect the appearance.	放电容量应≧95%额定容量，产品外观无变形，无爆裂。 Discharge capacity shall be ≧ 95% of rated capacity, no deformation of product appearance, no bursting.
6	低温放电 Low Temperature Discharge	1. 按标准充电方式充电至额定电压 4.0V。 Charge to the rated voltage of 4.0V according to the standard charging method. 2. 将放入-40±2℃的低温箱中恒温箱 4h。 Put it into -40±2℃ cryostat for 4h. 3. 按标准放电方式放电至限制电压 2.5V，记录放电容量。 Discharge to the limiting voltage of 2.5V according to the standard discharging method and record the discharging capacity. 4. 放电结束后将取出放在常温条件下搁置 2h，然后目测外观。	放电容量应≧78%额定容量，产品外观无变形，无爆裂。 Discharge capacity should be ≧78% of rated capacity, product appearance without deformation,

		After the end of the discharge, it will be taken out, put in normal temperature condition, set aside for 2h, then visually inspect the appearance.	and no burst.
7	循环寿命 Cycle life	1. 在 25℃±5℃的环境下进行 At 25℃±5℃ environment 2. 按标准充电方式充电至额定电压 4.0V，搁置 10min。 Charge to the rated voltage of 4.0V according to the standard charging method and set aside for 10min. 3. 按标准放电方式放电至限制电压 2.5V，搁置 10min。 Discharge to the limiting voltage of 2.5V according to the standard discharging method, set aside for 10min. 4. 重复(2~3）2000 次。 Repeat (2~3) 2000 times. 5. 静置 12H 后测试容量及内阻。 Test the capacity and internal resistance after 12H. 6. 按以上 2~5）充放电方式进行充放电 25 次循环，直至放电容量小于 80%的初始容量，内阻≥4SPEC，停止循环。 Charge and discharge 25 cycles according to the above 2~5) charging and discharging methods until the discharged capacity is less than 80% of the initial capacity and the internal resistance ≥4SPEC, stops the cycle.	循环次数不低于 100000 次 The number of cycles should not be less than 100000 times
8	安全性测试 Safety Test	参照 GB/T 31485-2015 《电动汽车用动力蓄电池安全要求及试验方法》 Refer to GB/T 31485-2015 《Safety Requirements and Test Methods for Power Storage Batteries for Electric Vehicles》.	

六、注意事项 Precautions

6.1 使用要求 Requirements for use

- 高能量型超级电容器具有固定的极性
- High-energy type supercapacitors have fixed polarity
- 严禁挤压、碰撞、钉刺、拆解电容
- Squeezing, colliding, nailing, and disassembling the capacitor is strictly prohibited.
- 严禁超级电容器正、负极反接与短接
- It is strictly prohibited to connect the positive and negative poles of the supercapacitor inversely and short-circuited.
- 产品应在标称电压、电流下使用
- The product should be used under nominal voltage and current.
- 请勿将产品靠近热源，产品应在工作温度范围内使用
- Do not place the product near the heat source, the product should be used within the operating temperature range.
- 请勿接触水、油、酸、碱和其他腐蚀性物质
- Do not come into contact with water, oil, acid, alkali, and other corrosive substances.

6.2 储运要求 Requirements for storage and transportation

- 环境温度：-30～+60 ℃
- Environmental Temperature：-30～+60 ℃
- 相对湿度：0～95%
- Relative humidity: 0～95%
- 环境气压：86～106kPa
- Ambient pressure: 86～106kPa
- 严禁电压低于 2.5V 进行存储，长期存储时请按时补电，补电周期不短于 6 个月
- It is strictly prohibited to store with a voltage lower than 2.5V, please replenish the power on time when storing for a long time, and the replenishment cycle should not be shorter than 6 months.
- 做好防护，防止正、负极短接

- Protect it from positive and negative shorting..
- 避免阳光直射，远离热源，保持干燥通风
- Avoid direct sunlight, keep away from heat sources, and keep dry and ventilated
- 避免与液体或腐蚀性物质接触
- Avoid contact with liquid or corrosive substances.
- 装卸过程中轻拿轻放、严禁倒置、挤压、冲击、震动等
- Handle gently during loading and unloading, inversion, extrusion, impact, vibration, etc. are strictly prohibited.
- 可使用汽车、火车、轮船等交通工具运
- Can be transported by car, train, ship, and other means of transportation.

七、产品责任 Product Liability

- 对违反本规格书规定操作而导致的意外，本公司概不负责
- We are not responsible for accidents caused by operations in violation of the provisions of this specification.
- 使用后的超级电容器请用户按照当地国家的环保法规进行处置。
- Users are requested to dispose of the supercapacitors after use by following the environmental protection regulations of the local country.
- 对于超级电容器的报废和回收事宜，可参考 GB/T 33598-2017《车用动力电池回收利用拆解规范》，本公司可提供部分技术支持，具体以双方商定为准。
- For the scrapping and recycling of supercapacitors, please refer to GB/T 33598-2017 "Specification for the Recycling and Disassembly of Automotive Power Battery", and our company can provide partial technical support, subject to mutual agreement.
- 当电芯泄气、漏液、破裂时，确保通风良好，停止使用设备，穿戴安全设备，小心取出电芯，并使用适当的容器进行处置，使用适当的运输方式，并考虑制造商回收计划进行回收，切勿将其丢弃在普通垃圾中。
- When the cell deflates, leaks, or breaks, ensure good ventilation, stop using the device, wear safety equipment, carefully remove the cell, and use the appropriate container for disposal, use the appropriate mode

of transportation, and consider the manufacturer's recycling plan for recycling, and never discard it in the general garbage.

- 如需了解最新产品信息，欢迎联系本公司
- For the latest product information, please contact us.