HCCCAP EDLCs SPECIFICATION

HCCCAP 超级电容规格书

【PRODUCT】产品 ： HCCCAP EDLCs

【MODEL】 型号 ： HCAP-C 2R7 407 M

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1. 适用范围 Scope

本产品规格书对产品的性能，测试方法进行了规范，作为技术确认的参照。数据参数仅作参考，不同批次与不同时间生产的实际产品参数可能会有所变化，以实际收到的产品为准，确切参数请及时向厂家核实。

This specification describes, the product property and test method, and should serve as the reference for technical assurance.These data is only for reference,actual product data in different batches and different times may vary, with the actual receipt of the product as a prospective, exact parameters, please promptly to the manufacturers to verify.

2. 一般特性 General Specifications

1) 产品性能 Features



- 高能量密度 Ultra High Energy Density
- 长寿命 Long Usage Life
- 高低温性能 Excellent Performance at High and Low Temperatures
- 环保 Environmental Friendly
- 免维护 Maintenance Free

2) 产品应用范围 Typical Applications

- 智能电网及其它配套设备 Smart grid and other ancillary equipment
- 智能三表 Intelligent Three-ammeters
- 集中器 Concentrator
- 故障指示器 Fault Indicator
- 混合动力汽车 HEV/EV
- 太阳能/风能 Solar/Wind energy
- 电机启动 Motor drive
- 后备电源 Memory Back up Batteries

3) 标准测试条件

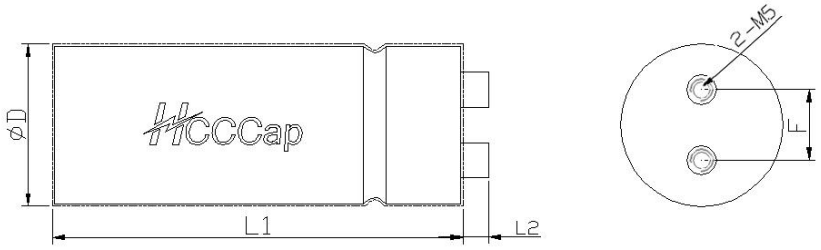
在标准大气压，温度5 ~35 ℃，相对湿度小于85 %条件下进行测试；本规格书标准测试条件为标准大气压，温度25 ℃，相对湿度小于60%。

Products are test under normal pressure, at temperature range from 5~35 ℃，relative humidity of 85% or less.This product has been tested following the standard testing criteria： under normal pressure, at 25 ℃ and relative humidity less than 60%.

3. 基本特征 General Characteristic

类型 Type	额定电压 Rated Voltage (V_R)	额定容量 Rated Cap. (C_R)	容量偏差率 Cap. olerance (25℃) (△C)	最大储存能量Max. Stored Energy (E)	参考等效串联电阻 ESR (1kHz) (ESR)	尺寸 Dimension (ΦD×L)	重量 Weight (m)	体积 Volume (v)	工作温度范围 Operation Temp. (Top)
HCAP-C 2R7 407 M	2.7V	400F	-10%~+30%	1.46KJ(0.4 Wh)/300mAh	3mΩ	Φ35×64 mm	65g	62ml	-40 ~ +70℃

4. 产品尺寸图 Construction and Dimension (Unit : mm)



Size	D	L1	L2	F
Φ 35×64	35±0.5	64±2	6±1	12.7±0.5

5. 测量方法和计算公式 Measuring Method and Calculated Formula

1)容量 Capacitance

采用恒电流充电30分钟直至工作电压，然后测量以10mA/F 电流从2.0 VDC放电到1.0VDC的时间。

由以下公式计算得到容量：

Constance current charge until operation voltage for 30 min and then measure time through discharge from 2.0 VDC to 1.0 VDC by 10mA/F . Capacitance shall be calculated by the following formula

$$C = I * T / \Delta V$$

I:恒放电电流 Constant current discharge (10mA/F)

T:放电时间 Discharge time (s)

$\Delta V = V_2 - V_1$

2) 等效串联电阻 ESR (Equivalent Series Resistance)

ESR AC 由4探针阻抗分析仪测量 ESR AC is Measured by 4-probe impedance analyzer.

频率 Frequency:1KHz

振幅 AC amplitude: 5 mV

3)最大漏电电流 Max. Leakage Current

在25℃时充电至指定电压 The capacitor is charged to the rated voltage

保持持续充电72h后测量漏电流 Leakage current is the current after 72 hours that is required to keep the capacitor charged at the rated voltage

6.规格说明书和测试方法 Specifications and Test Method

HCAP-C 2R7 407 M

额定电容量, (DCC, 25℃) C_R Rated Capacitance, (DCC, 25℃) C_R		400F	DCC 恒流放电 (10mA/F) Discharging with constant current（10mA/F）
容量偏差率 Capacitance Tolerance of C_R		-10%~+30%	
额定电压, (25℃) V_R Rated Voltage, (25℃) V_R		2.7V	
峰值电压 Surge Voltage, Vsurge, Vsurge		2.85V	
额定电流 (25℃)* Rated Current (25℃)		87A	5 秒放电至 1/2 V_R 5 sec discharge rate to 1/2 V_R
最大电流 (25℃)* Max. Current (25℃)		245A	1 秒放电至 1/2 V_R 1 sec discharge rate to 1/2 V_R
储存能量 (at V_R) E Max. Stored Energy (at V_R) E		1.46KJ(0.4Wh)/300mAh	$E = 1/2\ C\ V_R^2$
比能量 (at V_R) Specific Energy(at V_R)	质量比 Gravimetric	6.2Wh/kg	
	体积比 Volumetric	6.5Wh/l	
比功率 (在合适负载下) Specific Power (at matched load)	质量比 Gravimetric	4.5kW/kg	$P_d=(0.12\times U^2/ESR)/mass$
	体积比 Volumetric	4.7kW/l	
内阻 (ESR) Reference InternalResistance (ESR)	ESRAC (1kHz)	3mΩ	
	ESRDC (0.2A)	4mΩ	
体积 (不含引出端子) v Volume (without terminals) v		62ml	
质量 m Weight m		65g	
工作温度范围 Top Operating temperature range Top		-40 ~ 70 ℃	与初始测量值比较,| ΔC |/C< 20%, ESR < 2 倍,25℃ | ΔC |/C< 20% and ESR < 2 times of initially measured value at 25℃, respectively
储存温度范围(at 0V) Tst Storage temperature range (at 0V) Tst		-40 ~ 70 ℃	
最大漏电电流, LC (72h, 25℃) Max. Leakage Current, LC (72h, 25℃)		3mA	
寿命 Life Time	(at V_R, 25℃)	90000h	与初始测量值比较,| ΔC |/C< 30%,ESR < 2 倍,LC < 标定值 1 循环:20s充电至V_R, 恒压10s, 20s充电至1/2V_R, 静置 10s | ΔC |/C< 30% and ESR < 2 times of initially measured value, respectively and LC < specified value 1 cycle: charging to V_R for 20s, constant voltage charging for 10s, discharging to 1/2V_R for 20s, rest for 10s
	(at V_R, 70℃)	1500h	
循环寿命 (25℃) Cycle Life (25℃)		500,000	

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7. 使用指南 Application Guide

1) 不可在高于额定电压下使用

Don't apply voltages higher than rated specification

2) 超级电容器不可强行扭动或倒置

Don't use for ripple absorption

3) 超级电容器温度不宜超过额定温度上限或下限

Temperature of the capacitors should not exceeds the upper and lower limit of rated temperature.

4) 充电电压不宜超过额定电压

The charge voltage should not exceed the rated voltage.

5) 避免阳光直接照射

Exposed to direct sunlight.

6) 避免直接接触水、盐水、油 、酸或碱，在可能有较高湿度或温湿度差异较大环境的应用情况下，建议焊接后在引出极端部封胶以隔绝水汽，避免引针腐蚀

In direct contact with water, salt water ， oil，acid or alkaline.

7）如果需在超过额定特性的振动条件下或在严酷电气条件下使用，请与HCCENERGY联系

Please contact HCCENERGY if you intend to use HCCCAP EDLCs under severe vibration conditions exceeding the rated specifications or under mechanically and electrically stressed conditions.

8) 超级电容具有固定的极性，请在装配时注意其极性

HCCCAP EDLCs is Polarized,Please mount it in accordance With its polarity for maintaining the best condition.

9) 工作温度和寿命。Operating temperature and product life

一般地，HCCCAP超级电容在低温下漏电电流更小、备用时间更长、寿命更长。反之在较高温度下，则漏电电流增大、备用功率降低、寿命变短。请使HCCCAP超级电容远离发热元件。

Generally, HCCCAP EDLCs has a lower leakage current, long back-up time and longer life at low temperatures. but it has a higher leakage current, shorter back-up power time and shorter life at high temperatures. Please design to keep HCCCAP EDLCs away from a calorific parts .

10) 串联连接和模块 Series connection and modules

HCCCAP超级电容的简单物理串联连接会造成作用在每个超级电容上的电压失衡。其结果，有可能造成电压超过额定值。如果需要串联连接请与HCCENERGY联系，并进行适当设计以使每个超级电容工作在安全电压范围内。

为安全起见，HCCENERGY推荐，模块中的每个单元均值保证在2.5V以下。

Series connection of HCCCAP EDLCs cause a difference of applied voltage for each HCCCAP EDLCs. As a result, it's possible to apply over-rated voltage. Please inform us if you are using HCCCAP EDLCs in series connection and please design so as not to apply over-rated voltage to each HCCCAP EDLCs.
To ensure safety, HCCENERGY recommends the rated voltage of each cell in module be less than 2.5V.

11）超级电容器不可应用于高频率充放电的电路中

Super capacitor should not be used in the high frequency charge- discharge circuit.

12）大电流放电时，瞬态电压降ΔV=IR会明显增大

Existing the voltage drift in the instant of charge- discharge ΔV=IR

13）根据GB/T 2429.28-2005中4.6的方法，将超级电容器的引脚浸渍于235℃±5℃的焊槽中，持续2s±0.5s，应满足本标准4.6.2的要求。

According to the 4.6 method in the GB/T 2429.28-2005,dip the pins of super capacitor into the 235℃±5℃ welding groove, for 2seconds±0.5 seconds,the requirements of this standard 4.6.2 shall be met.

如有任何有关HCCCAP超级电容的问题，不可私自拆解，请与我们联系：

If you have any questions about the HCCCAP EDLCs, not to disassemble，please contact us

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