

成都和佳高分子材料有限公司

Chengdu Hejia Polymer Material Co.,Ltd

ELECTRIC DOUUBLE LAYER CAPACITORS

PRODUCT SPECIFICATION

规格书

型号**Code:** **HSP2R7V705DS1020HB**

客户**Customer:** \

日期**Date:** **2020.11.03**

地址: 成都青白江区工业集中发展区同旺路866号

Add:No.866 Tongwang Rd,Qingbaijiang Industrial District,Chengdu

电话(Tel):028-83679331

拟定 Prepared	审核 Checked	客户核准 Customer approval
张凤	董光勇	

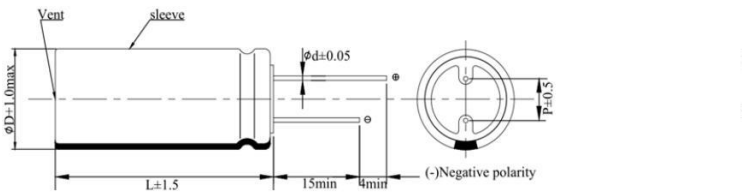
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4、基本特性Basic Characteristics

项目Item	规格Specification
额定电压Rated Volatge(U_R)	2.7 V
浪涌电压Surge Volatge	2.85 V
标称容量Nominal Capacitance(C)	7.0 F
容量偏差Capacitance Tolerance	-20%~+50%
工作温度范围Temperature for Operation	-40℃~+85℃
最大等效串联电阻Maximum Equivalent Series Resistance $ESR_{AC}(1kHz)$	60 mΩ
最大漏电流Maximum Leakage Current(72hrs)	0.018 mA
最大工作电流Maximum Operating Current ($\Delta T=15^{\circ}C$)	0.81 A
最大峰值电流Maximum Peak Current	4.46 A
最大储存能量Maximum Storage Energy	0.0071 Wh
能量密度Energy Density	2.95 Wh/kg
功率密度Power Density	2278.1 W/kg

5、产品尺寸Dimensions



Units in mm

$\phi D(\pm 1.0)$	10.0
$L(\pm 1.5)$	20.0
$\phi d(\pm 0.05)$	0.6
$P(\pm 0.5)$	5.0

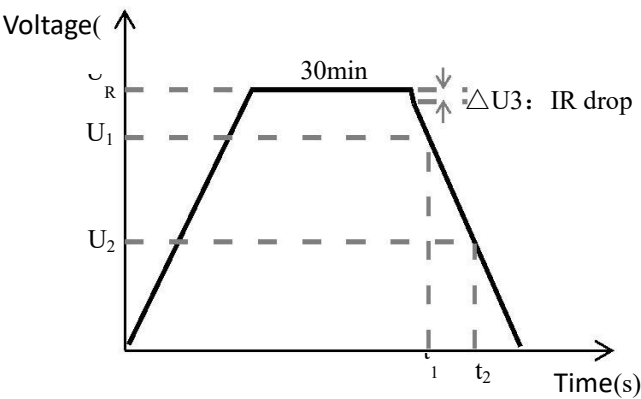
6、 Lifespan Performance Characteristics

项目Item		特性Features
循环寿命 Cycle Life	测试方法Test Methods	在25℃下，用恒定电流使电容器在规格电压和半额定电压间循环充放电Capacitors cycles charge and discharge between specified voltage and half rated voltage under constant current at +25℃.(500,000cycles)
	容量变化 Capacitance Change	≤初始值的30%,≤30% of initial measured value
	内阻Internal Resistance	≤初始值的4倍,≤4times of initial specified value
寿命 Lifespan	贮存寿命 Shelf life	在额定温度上限范围内，无负荷贮存1000小时后电容器符合以下规定的限值After 1000 hours storage at the range of the rated temperature upper limit, without load, the capacitor shall meet the following specified limits for endurance
	耐久性 Endurance	在额定温度上限范围内，施加额定电压1000小时后，电容器符合以下规定的限值After 1000 hours applicaiton of rated volatge at the range of the rated temperature upper limit, the capacitor shall meet the following limits
	寿命测试Life Test	在 +25℃条件下，在额定电压下使用10年后，电容器符合以下规定的限值After 10 years application at rated voltage,at +25℃,the capacitor shall meet the following limits
	容量变化 Capacitance Change	≤初始值的30%,≤30% of initial measured value
	内阻Internal Resistance	≤初始值的4倍,≤4times of initial specified value
温度特性 Temperature Characteristics	测试条件Test Condition	at -40℃,+25℃,+85℃
	容量变化 Capacitance Change	≤初始值的30%,≤30% of initial measured value
	内阻Internal Resistance	≤初始值的2倍,≤2times of initial specified value
湿热特性 Damp heat Characteristics	测试条件Test Condition	温度:+40±2℃，湿度:90~95%RH，贮存240小时后，电容器符合以下规定的限值;+40±2℃, humidity: 90~95% RH,after 240 hours storage, the capacitor shall meet the following limits
	容量变化 Capacitance Change	≤初始值的30%,≤30% of initial measured value
	内阻Internal Resistance	≤初始值的2倍,≤2times of initial specified value

7、测试方法Test Method

7.1 标称容量Nominal capacitance

图示Illustration:

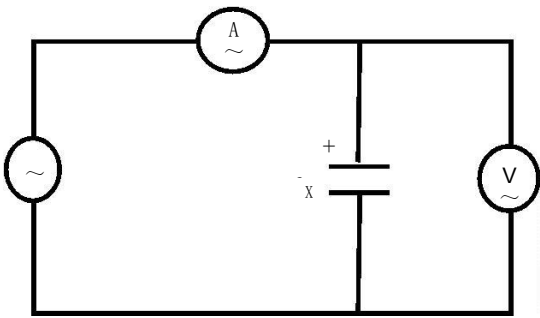


Capacitance Formula: $C= \frac{I \times (t_2-t_1)}{U_1-U_2}$

- I: 放电电流Discharge current, $4 \times C \times U_R$ (mA);
- U₁: 测量初始电压Initial voltage, $0.8 \times U_R$ (V);
- U₂: 测量结束电压Ending voltage, $0.4 \times U_R$ (V);
- t₁: 放电开始到测量初始电压U₁的时间Time from discharge starting to nitial voltage U1(s);
- t₂: 放电开始到测量结束电压U₂的时间Time from discharge starting to test ending voltage U2(s);

7.2 等效串联电阻Equivalent Series Resistance

测量电路Test Circuit:



- 振荡器Oscillator
- 交流电流表AC Ammeter
- 交流电压表AC Voltmeter
- C_x 待测电容Capacitance under test

Internal resistance calculation formula: $R_{AC}= \frac{U}{I}$

其中:

- R_{AC}: 放电电流Discharge Current, $4 \times C \times U_R$ (mA);
- U: 交流电压有效值AC Effective voltage value, (V r.m.s);
- I: 交流电流有效值AC Effective Current value, (V r.m.s);
- 测量电压的频率Measuring voltage frequency: 1kHz;
- 交流电流应为The AC current should be : 1mA~10mA

7.3 漏电流Leakage Current

- 7.3.1 测量开始前，电容器应进行充分放电，放电过程持续1hrs到24hrs；
Before measurement, capacitor should be fully discharge, discharge process last 1 hrs to 24 hrs.
- 7.3.2 恒流充电到额定电压，恒压72hrs的漏电流。
Charge under constant current to rated voltage, constant voltage for 72 hrs leakage current .

7.4 最大峰值电流Maximum Peak Current

1秒钟的最大放电电流 1 second maximum discharge current: (A)

$$I_{max} = \frac{1/2 \times U_R}{R_{DC} + 1/C}$$

7.5 能量和功率Energy and Power

最大储存能量Maximum Storage Energy:

$$E_{max} = \frac{1/2 \times C \times U_R^2}{3600}$$

能量密度Energy Density:

$$E_d = \frac{E_{max}}{mass}$$

功率密度 Power Density:

$$P_d = \frac{0.12 \times U_R^2}{R_{DC} \times mass}$$

8、使用注意事项Precautions for use

8.1 超级电容器具有固定的极性。在使用前，应确认极性；

The super capacitor has fixed polarity. Before use, users should confirm the polarity.

8.2 超级电容器应在标称电压下使用：当电容器电压超过标称电压时，将会导致电解液分解，同时电容器会发热，容量下降，而且内阻增加，寿命缩短，在某些情况下，可导致电容器性能崩溃；

The Super capacitors should be used under nominal voltage: when capacitor voltage over nominal voltage, it will cause the electrolyte decomposition, the capacitor will heat at the same time, the capacitance decreased, and the internal resistance increases, shorten the life will be shortened, in some cases, it may cause the capacitor performance break down.

8.3 超级电容器不可应用于高频率充放电的电路中，高频率的快速充放电会导致电容器内部发热，容量衰减，内阻增加，在某些情况下会导致电容器性能崩溃；

The Super capacitor should not be used in high frequenct charge and discharge circuit, high frequenct of fast charge and discharge will cause capacitor internal heat, capacitance decreased, internal resistance increases, in some cases will cause capacitor performance break down.

8.4 超级电容器的寿命：外界环境温度对于超级电容器的寿命有着重要的影响。电容器应尽量远离热源；

The Super capacitor lifespan: the ambient temperature affects the super capacitor life. The Capacitor should be away from heat source.

8.5 当超级电容器被用做后备电源时，必须考虑其瞬间的电压降：由于超级电容器具有内阻较大的特点，在放电的瞬间存在电压降， $\Delta V=IR$ ；

When the super capacitors are used as backup power, the instantaneous voltage drop must be considered: As the super capacitors are with characteristics of high internal resistance, Voltage drop will be happen at the moment of discharge, Volatge drop $\Delta V = IR$.

8.6 使用环境：超级电容器不可处于相对湿度大于95%或含有有毒气体的场所，这些环境下会导致引线及电容器壳体腐蚀，导致断路；

Operating environment: The super capacitor cannot be stored in the place with humidity over 95%RH or palces with toxic gas ,these circumstances will lead to corrosion, and cause short circuit.

8.7 超级电容器的存放：超级电容器不能置于高温、高湿的环境中，应在温度-40+70℃、相对湿度小于60%的环境下储存，避免温度骤升骤降，因为这样会导致产品损坏；

The Super capacitor storage: The super capacitor should stored in the environment within -40℃~70℃ temperature and less than 60% relative humidity; avoid drastical temperature rising and dropping, as it will cause the cell break down.

8.8 超级电容器在双面线路板上的使用：当超级电容器用于双面电路板上，需要注意连接处不可经过电容器可触及的地方，由于超级电容器的安装方式，会导致短路现象；

If the Super capacitors are applied on the double-side PCB, the connection should not be around the palce where the super capacitor can contact, because of the super capacitor installation, could lead to short circuit phenomenon.

8.9 当把电容器焊接在线路板上时，不可将电容器壳体接触到线路上，不然焊接物会渗入至电容器穿线孔内，对电容器性能产生影响；

When the capacitor welding on PCB, Do not put the capacitors on/ in contact with circuit board, or welding material will infiltrate into capacitor threading hole, it will affect capacitors performance.

8.10 安装超级电容器后，不可强行倾斜或扭动电容器，这样会导致电容器引线松动，导致性能劣化；

Don't twist capacitor or make it slanting after installing, as it may cause capacitor leads loose, lead to performance break down.

8.11 在焊接过程中避免使电容器过热：若在焊接中使电容器出现过热现象，会降低电容器的使用寿命，例如：如果使用厚度为1.6mm的印刷线路板，焊接过程应为260℃，时间不超过5s；

Avoid over heat on the capacitor during soldering, if overheated, it will reduce the life of capacitors, for example: the temperature should be 260℃ with time less than 5s during soldering on 1.6mm printed PCB.

8.12 焊接后的清洗：在电容器经过焊接后，线路板及电容器需要经过清洗，因为某些杂质可能会导致电容器短路；

Cleaning after welding: the circuit board and the capacitor need cleaning after welding, because some impurities may cause short circuit.

8.13 将电容器串联使用时：当超级电容器进行串联使用时，存在单体间的电压均衡问题，单纯的串联会导致某个或几个单体电容器过压，从而损坏这些电容器，整体性能受到影响，故在电容器进行串联使用时，需得到厂家的技术支持；

Using the capacitor in series: There is voltage balance problem between capacitor cell in series connection , directly series connection for capacitors may cause over-voltage, and it may damage the capacitors, the overall performance will be affected, so it needs series connection for capacitors, users should contact the manufacturer for technical support.

8.14 其他：在使用超级电容器的过程中出现的其他应用上的问题，请咨询或参照超级电容器使用说明的相关技术资料执行。
Others: If there's other application problems in the process of using our super capacitors, Please contact us or read technical data of super capacitor instructions.