ELECTRIC DOUUBLE LAYER CAPACITORS
DATA SHEET
规 格 书

型号/MODEL： **SCS 2.7V 500F 35*66**

客户/CLIENT：

日期/DATE: **2018.07.06**

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1.适用范围 Scope

此规格书对产品的性能，测试方法进行了规范，作为技术确认的依据。

It establishes standard terms, inspection procedures and methods of test for use in sectional and details specifications of electronic components for technical confirmation purpose.

2.一般特性 General Specification

一般情况下，测量及测试的标准大气压条件标准范围如下：

In general, the standard atmospheric pressure conditions for measurement and testing are as follows:

环境温度：15℃～35℃

Ambient temperature：15℃～35℃

湿度：≤85%RH

Humidity：≤85%RH

气压：86kPa~106kPa

Pressure：86kPa~106kPa

如对结果有疑问，应按以下条件进行测量：

If there is any doubt as to the result, should be measured in the following conditions：

环境温度：20℃±2℃

Ambient temperature：20℃±2℃

湿度：60%RH～70%RH

Humidity：60%RH～70%RH

气压：86kPa~106kPa

Pressure：86kPa~106kPa

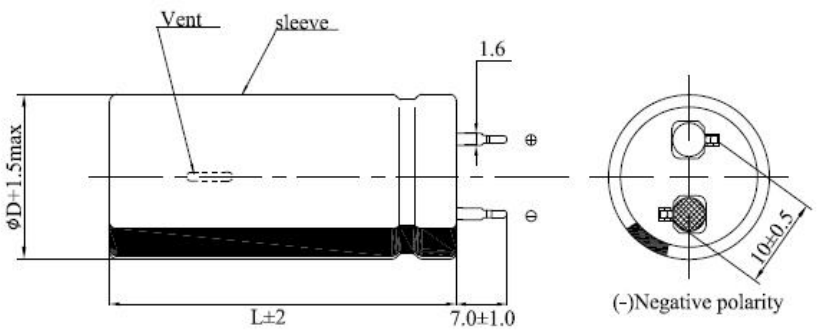
3. 斯瑞特编码 SRT Part No.

SCS	2R7		V		507		TZ		35		66	A2	C
系列 Series	代码 CODE	电压 (V)	代码 CODE	容量偏差 TOLERANCE	代码 CODE	标称容量 RATED CAPACITANCE (F)	代码 CODE	结构 类型 STRUCTURE	代码 CODE	外径 DIAMETER (mm)	高度 HEIGHT (mm)	套管类型 SLEEVE	性能说明 SPEC.
SCS	2R7	2.7	M	±20%	105	1	YS	导针型散装	6C	6.3	12.0	A0	N
SCE	3R0	3.0	V	-10%～+30%	335	3.3	TZ	铜脚两针型	08	8	16.0	A1	L
SCC			S	-20%～+50%	505	5	TK	铜脚四针型	10	10	20.0	A2	E
SCV			R	0～+20%	106	10	TL	铜脚两片型	1B	12.5	25.0	L0	S
SCT			X	-20%～+100%	256	25			16	16	30.0		T
					306	30			18	18	40.0		C
					506	50			22	22	45.0		K
					107	100			25	25	50.0		
					227	220			30	30	55.0		
					257	250			35	35	60.0		
					367	360					66.0		
					407	400					70.0		
					507	500							

4. 基本特性 General Specification.

项目 SUBJECT	规格 SPECIFICATION
额定电压(U_R) Rated Voltage (UR)	2.7 V
标称容量 (C) Capacitance Range ©	500 F
容量偏差 Capacitance Tolerance	-10%～+30%
工作温度范围 Temperature Range	-40℃～+70℃
最大等效串联电阻 ESR_{AC}(1kHz) Maximum ESR，R_{AC}(1kHz)	3.50 mΩ
最大漏电流(72hrs) Maximum Leakage Current (72hrs)	1.40 mA
最大工作电流(△T=15℃) Maximum Ripple Current (△T=15℃)	15.86 A
最大峰值电流 Peak Ripple Current	195.65 A
最大储存能量 Maximum Stored Energy	0.5063 W.h
能量密度 Energy Density	5.89 Wh/kg
功率密度 Power Density	2075.94 W/kg

5. 产品尺寸 Dimension



Unit：mm

外形尺寸 DIMENSION	
D(+1.5)	35
L(±2.0)	66

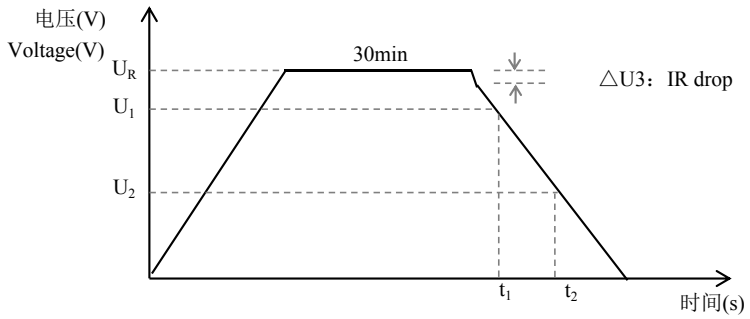
6. 寿命特性 Life characteristics

项目 SUBJECT		特性 CHARACTERISTICS
循环寿命 Lifecycle	**测试方法 TEST METHOD**	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。**(500,000次)** At 25 ° C, the capacitor is periodically charged and discharged between the rated voltage and the half-rated voltage with a constant current(500,000 cycle)
	容量变化 ΔC	≤初始值的30% ≤30% initial value
	内阻 ESR	≤初始值的2倍 ≤2 times than initial value
寿命 Loadlife	**贮存寿命 Storage**	在额定温度上限范围内，无负荷贮存**2000小时**后电容器符合以下规定的限值。 The following specifications shall be satisfied when the capacitors are stored in rate working temperature without load in 2000 hours.
	耐久性 Endurance	在额定温度上限范围内，施加额定电压**2000小时**后，电容器符合以下规定的限值。 The following specification shall be satisfied when the capacitor are applied in rated voltage for 2000 hours in rated working temperature.
	寿命测试 Loadlife 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。 At + 25 ° C, after 10 years of use at rated voltage, the capacitors shall meet the limits specified below.
	容量变化 ΔC	≤初始值的30% ≤30% initial value
	内阻 ESR	≤初始值的2倍 ≤2 times than initial value
温度特性 Temperature Characteristics	**测试条件 TEST METHOD**	at -40℃,+25℃,+70℃
	容量变化 ΔC	≤初始值的30% ≤30% initial value
	内阻 ESR	≤初始值的2倍 ≤2 times than initial value
湿热特性 Damp Heat	**测试条件 TEST METHOD**	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。 The following specification shall be satisfied after the capacitors are restored at +40±2℃, humidity 90～95%RH for 240 hours,
	容量变化 ΔC	≤初始值的30% ≤30% initial value
	内阻 ESR	≤初始值的2倍 ≤2 times than initial value

7. 测试方法 Measuring method

7.1 标称容量 Rated Capacitance

图示 Graphic：



容量计算公式
Capacitance calculation formula：

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

其中 Which：

I： 放电电流，$4\times C\times U_{R(mA)}$
discharge current，$4\times C\times U_R(mA)$

U_1： 测量初始电压，$0.8\times U_R(V)$；
Initial measure voltage，$0.8\times U_R(V)$

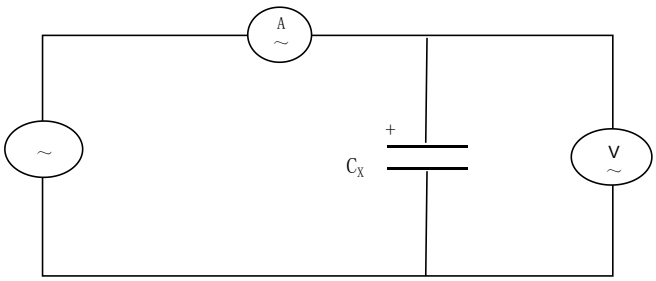
U_2： 测量结束电压，$0.4\times U_R(V)$；
End measure voltage，$0.4\times U_R(V)$

t_1： 放电开始到测量初始电压U1的时间(s)；
The time from discharge initially to U1(s)

t_2： 放电开始到测量结束电压U_2的时间(s)；
The time from discharge initially to U2(s)

7.2 等效串联电阻 ESR

测量电路 Measuring 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 Measured capacitor

内阻计算公式：

$$R_{AC}=\frac{U}{I}$$

其中：

R_{AC}： 放电电流，$4\times C\times U_R(mA)$
Discharge current，$4\times C\times U_R(mA)$

U： 交流电压有效值，(V r.m.s)；
AC voltage rms，(V r.m.s)；

I： 交流电流有效值，(V r.m.s)；
AC current rms，(V r.m.s)；

测量电压的频率：**1kHz；**
Measure the frequency of the voltage：1kHz；
交流电流应为：**1mA～10mA**
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 the beginning of the measurement capacitor should be fully discharged from a processing of 1 hour to 24 hours；

7.3.2 恒流充电到额定电压，恒压72hrs的漏电流。

Constant current charge to the rated voltage, measure leakage current after 72hrs constant voltage .

7.4 最大峰值电流 Maximum peak current

1秒钟的最大放电电流：(A)

1 second maximum discharge current：(A)

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

7.5 能量和功率 Energy and power

最大储存能量：

Maximum storage energy：

$$\mathbf{E}_{max}= \frac{1/2\times C\times U_R^{\,2}}{3600}$$

能量密度：

Energy Density

$$\mathbf{E}d= \frac{E_{max}}{mass}$$

功率密度：

Power density

$$\mathbf{P}d= \frac{0.12\times U_R^{\,2}}{R_{DC}\times mass}$$

8. 使用注意事项 Caution

8.1 超级电容器具有固定的极性。在使用前，应确认极性；

The Ultracapacitor has a fixed polarity. Before use, 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 supercapacitor should be used at nominal voltage: when the capacitor voltage exceeds the nominal voltage, it will cause the electrolyte to decompose, while the capacitor will heat, the capacity decreases, and the internal resistance increases and the life is shortened, and in some cases can lead to Capacitor performance crashes

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；

Ultracapacitor can not be used in high-frequency charge and discharge circuit, high-frequency fast charge and discharge will lead to internal heat condenser, capacity attenuation, increased internal resistance, in some cases will lead to capacitor performance collapse

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；

Ultracapacitor life: the ambient temperature for the life of Ultracapacitor s have an important impact. Capacitors should be kept away from heat sources；

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，ΔV=IR；

When the supercapacitor is used as a back-up power supply, the voltage drop of the supercapacitor must be taken into account: due to the fact that the supercapacitor has a large internal resistance, there is a voltage drop at the moment of discharge, ΔV = IR

8.6 使用环境：超级电容器不可处于相对湿度大于85%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；

Use of the environment: Ultracapacitor s can not be in the relative humidity greater than 85% or contain toxic gases in the place, these circumstances will lead to lead and capacitor shell corrosion, leading to open 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-30+50℃、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；

Ultracapacitor storage: Ultracapacitor can not be placed in high temperature, high humidity environment, should be in the temperature -30 ~ +50 ℃, relative humidity less than 60% of the environment to save, to avoid sudden drop in temperature, because it will lead to products damage

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；

The use of supercapacitor on a double-sided circuit board: When a Ultracapacitor is used on a double-sided circuit board, it is important to note that the connection can not be touched by the capacitor. Due to the bad installation of the Ultracapacitor , will lead the short circuit

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板上，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 is soldered to the circuit board, the capacitor housing can not be brought into contact with the circuit board, otherwise the weld will penetrate into the capacitor threading hole, the capacitor performance impact

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；

After installing the Ultracapacitor , do not force the tilt or twist the capacitor, which will lead to loose capacitor leads, resulting in performance degradation；

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1.6㎜的印刷线路板，焊接过程应为260℃，时间不超过5s；

In the welding process to avoid overheating the capacitor: If the capacitor in the welding overheating phenomenon, will reduce the service life of the capacitor, for example: If the use of a thickness of 1.6mm printed circuit board, the welding process should be 260 ℃, time not more than 5s

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；

Welded after cleaning : After the capacitor has been soldered, the circuit board and capacitor need to be cleaned because some impurities may cause the capacitor to be short-circuited；

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；

When the capacitors are used in series: when the supercapacitor is used in series, there is a problem of voltage equalization between the cells. A simple series will cause one or more of the individual capacitors to overpressure, which can damage the capacitors and the overall performance is affected. In the capacitor used in series, please contact Beryl 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。

Other: In the use of Ultracapacitor s in the process of other applications on the issue, please consult or refer to the use of super-capacitor related technical information