Custom:

Date: 2024.9.20

Product Name: Supercapacitors

Model/Specification: C-shaped

series

The user acknowledges:

After confirming this acknowledgement letter, clearly mark and stamp it on the user's acknowledgement label, and send a copy back to our company

Proposed by: Wang Ling

Reviewed by: Mao Wujun

Approved by: Wu Jun

中国浙江江山清湖镇江贺路 205 号
Tel：0570+4691088 Fax: 0570+4691288

catalogue

中国浙江江山清湖镇江贺路 205 号
Tel：0570+4691088 Fax: 0570+4691288

1. 适用范围（Scope of Application）

本产品承认书描述了浙江斯瑞特电子科技有限公司生产的扣式超级电容器的产品性能指标。
This product recognition letter describes the performance indicators of the buckle type supercapacitor produced by Zhejiang Siruite Electronic Technology Co., Ltd.

2. 标准测试条件（Standard Test Conditions）

一般情况下，在标准大气压下，温度 15~35℃，相对湿度在 25%~75%条件下进行测试；测试前样品应该在测试温度下放置 1h 以上，本规格书的测试条件为标准大气压，温度为 25±1℃，相对湿度为 60±15%。

In general, testing is conducted under standard atmospheric pressure, temperature of 15-35 ℃, and relative humidity of 25% -75%; The sample should be placed at the testing temperature for at least 1 hour before testing. The testing conditions in this specification are standard atmospheric pressure, temperature of 25 ± 1 ℃, and relative humidity of 60 ± 15%.

3. 命名方式（Naming conventions）

SCE **5R5** **H** **104** ____

系列 Series
SCE

代码 CODE	电压 (V)
5R0	5.0
5R5	5.5

代码 CODE	引脚类型代号 Pin type code
C	C 型
H	H 型
V	V 型

代码 CODE	标称容量 RATED CAPACITANCE (F)
104	0.1
224	0.22
334	0.33
474	0.47
684	0.68
105	1.0
155	1.5
405	4.0
5.0	5.0

代码 CODE	温度特性代码 Temperature characteristic code
	-25℃~70℃
G	-40℃~85℃
F	脚距 10±0.5(mm)
T	贴片式
S	920

4、标准产品尺寸、性能及包装要求（Standard product size, shape, and packaging method）

4.1 性能参数表 Performance parameter table

Part Number	Nominal Voltage (U_R) DC(V)	Capacitance Farads	Tol. ±%	ESR (Max)@ 1KHZ Ω	ESR (Max)@ DC Ω	Nominal Current A	Peak Current (Max) A	Leakage Current (Max) uA	Stored Energy (Max) mWh	Gravimetric Energy Density Wh/kg
SCE5R5C104	5.5V	0.1	0%/ 130%	50	75	0.025	0.040	3	0.400	0.121
SCE5R5C224	5.5V	0.22	-10%/ 80%	40	60	0.035	0.050	3	0.730	0.221
SCE5R5C334	5.5V	0.33	-10%/ 80%	40	60	0.040	0.060	4	0.866	0.265
SCE5R5C474	5.5V	0.47	-10%/ 80%	40	50	0.040	0.060	6	1.210	0.435
SCE5R5C684-G	5.5V	0.68	-10%/ 30%	20	30	0.108	0.150	10	2.860	0.211
SCE5R5C105	5.5V	1	-10%/ 30%	15	25	0.135	0.200	8	3.700	0.430
SCE5R5C105-G	5.5V	1	-10%/ 20%	20	30	0.108	0.150	10	3.200	0.265
SCE5R5C155	5.5V	1.5	-10%/+20%	15	25	0.160	0.200	12	5.321	0.604

测试条件: Test Conditions:

容量:测试电流 $I(mA) = 4(C * U_R)$.

Capacitance: measured with $I(mA) = 4(C * U_R)$.

额定电流:5 秒放电从 U_R 到 $1/2U_R$.

Nominal Current: 5 Seconds to discharge from U_R to $1/2U_R$.

最大峰值电流: 1 秒放电从 U_R 到 $1/2U_R$.

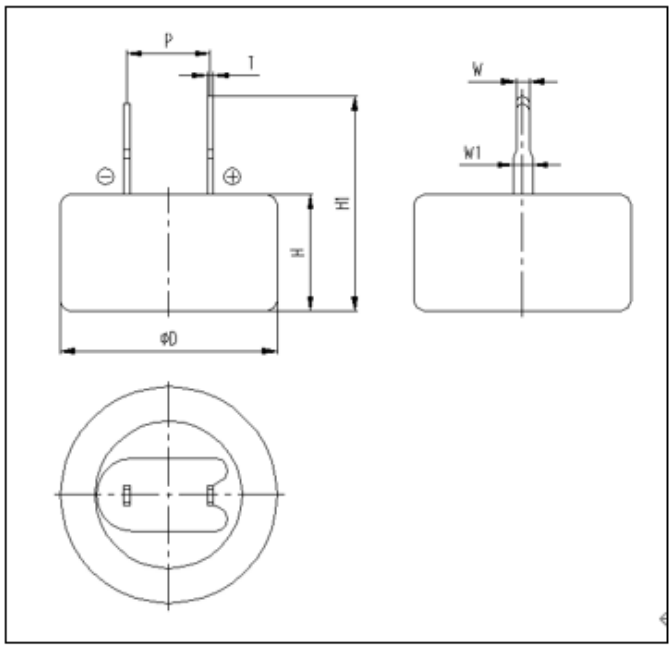
Peak Current (Max.): 1 second to discharge to U_R to $1/2U_R$.

漏电流: 72h

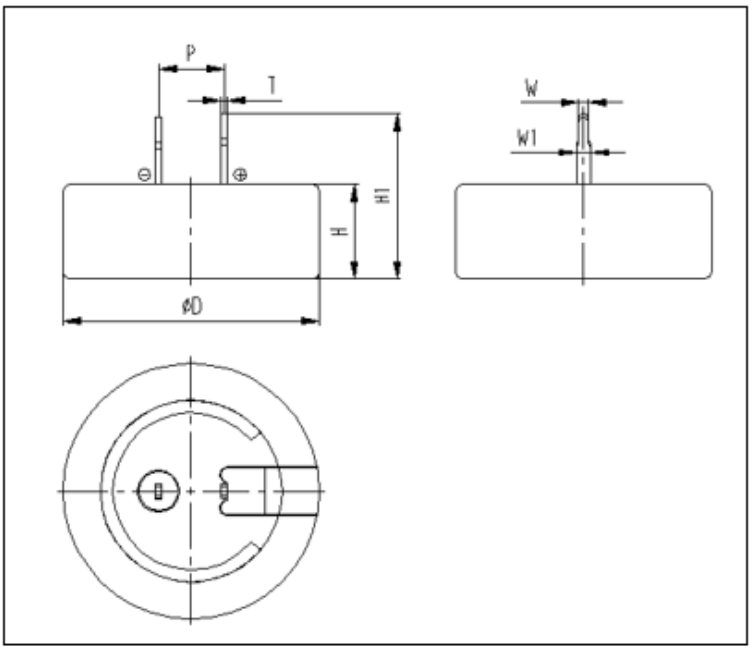
Leakage Current: Measured after 72h at U_R.

4.2 尺寸表 Size chart

ABRACON PART#	PIN TYPE	SIZE D x Px H （±0.5）	PIN WIDTH w/w1 （±0.2）	PIN LENGTH h1 （±1）	LEAD THICKNESS T （±0.1）
SCE5R5C104	A	13.3 x 5.0x 7.0	0.8/1.2	13	0.4
SCE5R5C224	A	13.3 x 5.0x 7.0	0.8/1.2	13	0.4
SCE5R5C334	A	13.3 x 5.0x 7.0	0.8/1.2	13	0.4
SCE5R5C474	A	13.3 x 5.0x 7.0	0.8/1.2	13	0.4
SCE5R5C684-G	B	20.8 x 5.0x 11	0.8/1.2	16.6	0.5
SCE5R5C105	B	20.8 x 5.0 x 7.7	0.8/1.2	13	0.5
SCE5R5C105-G	B	20.8 x 5.0 x 11	0.8/1.2	16.6	0.5
SCE5R5C155	B	20.8 x 5.0 x 7.7	0.8/1.2	13	0.5



PIN TYPE A



PIN TYPE B

4.3 包装要求 Packaging

Part Number	Quantity (PCS/Single bag)	Quantity (PCS/Inner Box)	Internal packaging style	SIZE L x Wx H(CM)	Mixture ratio	Total Quantity (PCS/Box)
SCE5R5C104	200	2000	Self sealing	60*32.5*23.	1:4	8000
SCE5R5C224	200	2000	Self sealing	60*32.5*23.	1:4	8000
SCE5R5C334	200	2000	Self sealing	60*32.5*23.	1:4	8000
SCE5R5C474	200	2000	Self sealing	60*32.5*23.	1:4	8000
SCE5R5C684-G	100	500	Plastic tray	60*32.5*23.	1:4	2000
SCE5R5C105	100	500	Plastic tray	60*32.5*23.	1:4	2000
SCE5R5C105-G	100	500	Plastic tray	60*32.5*23.	1:4	2000
SCE5R5C155	100	500	Plastic tray	60*32.5*23.	1:4	2000

4.4 Soldering 焊接

手工焊接：Manual Soldering

焊嘴温度建议不超过 350℃ , 焊接持续时间不超过 5 秒。尽量缩短焊头与电容引脚的接触时间，因为引脚的过热或增加电容的 ESR。

The recommended temperature of the soldering rod tip is less than 350℃ and the soldering duration should be less than 5 seconds. Minimize the time that the soldering iron is in direct contact with the terminals of the capacitor, as excessive heating of the leads may lead to higher ESR.

回流焊Reflow Soldering ：

Do not use reflow soldering on supercapacitor. 超级电容不可以使用回流焊。

波峰焊Wave Soldering ：

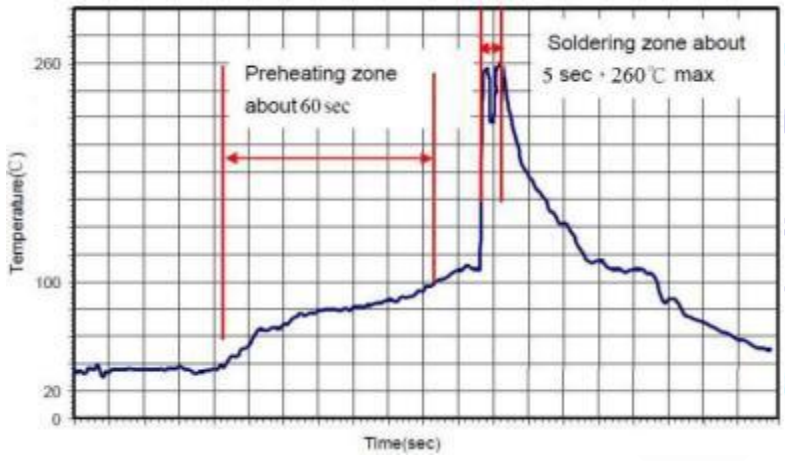
Use a maximum preheating time of 60 seconds for PC board 0.8mm or thicker. Preheating temperature should be limited to less than 100℃.

预热时间不应超过 60 秒，PCB 板厚应大于 0.8mm,预热温度不应超过 100℃。

Soldering temperature should not exceed 260℃, soldering time should not exceed 5s. 焊接温度不应超过 260 度，焊接时间不应超过 5s。

During welding, the main body of the capacitor shall be at least 1mm away from the PC board. 焊接时，电容主体距离 PCB 板至少 1mm。

Use the following table for wave soldering: 下表为波峰焊参数：



5. 测试方法 Test method

5.1 容量测试方法 Measure of Capacitance

恒流放电法测量 Constant current discharge of measure

1、恒流/恒压源的直流电压设定为额定电压（U_R）。

Set the DC voltage source to the rated voltage (U_R).

2、设定规定的恒电流放电装置的恒定电流值。

Sets constant current values of a specified constant current discharge device.

3、将开关S切换到直流电源，在恒流/恒压源达到额定电压后恒压充电30min。

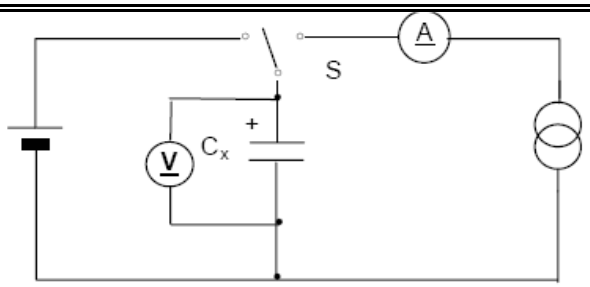
Switch the switch S to DC power supply, constant voltage charge for 30min after the voltage reachs to rated voltage.

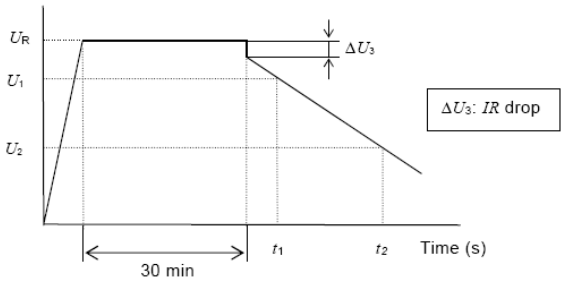
4、在充电30min结束后，将开关S变换到恒流放电装置，以恒定电流进行放电。

After charging 30min, transform the switch S to constant current discharge device, to discharge at constant current.

5、测量电容器两端电压从U1到U2的时间t1和t2，如图所示，根据下列等式计算电容量值：

Measure the discharge time from U1 to U2 (t1, t2), calculate capacitance using the following formula:





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

U1： 80% URV

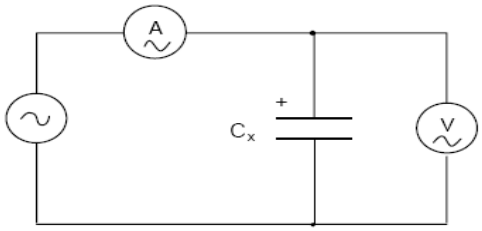
U2：40% URV

5.2 内阻（Resistance）

交流阻抗方法测量 Equivalent series resistance:

采用如下图所示的电路进行测量

ESR shall be measured from the circuit below：



电容器的内阻Ra应通过下式计算：$R_a = \frac{U}{I}$

ESR Ra can be calculated from the formula $R_a = \frac{U}{I}$

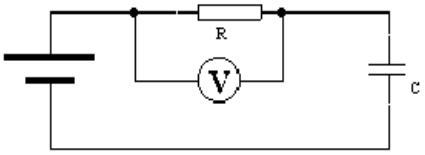
Ra 交流内阻（mΩ/Ω）Equivalent series resistance (mΩ/Ω)

U 交流电压有效值（V r.m.s）U Ac voltage valid values (V r.m.s)

I 交流电流有效值（V r.m.s）I Ac current valid values (V r.m.s)

5.3 漏电流（Leakage Current）

直流漏电流的测量原理如下 Leakage current shall be measured from the circuit below:



1、放电：该测量开始前，电容器应进行充分放电。

Discharge： Before the start of the measurement, super-capacitor should be fully discharge .

2、漏电流的测量应在常温（25℃）、额定电压（UR）下，保持电容器在额定电压UR下持续充电72h，记录最终电流为漏电流。

Leakage current measurement shall be carried out under the temperature (25℃) and voltage rating (UR). The capacitor is continues to charge for 72h at the rated voltage UR, record the terminal current as leakage current .

6、注意事项和使用指导 Precautions and usage guidance

（1）超级电容器极性问题 The polarity of super capacitor

与普通电解电容器或电池不同的是，由于超级电容器正负极采用的是同种材质，从理论上讲是不存在极性的；而超级电容器所标识的极性是生产商在生产工艺过程制定的，当电容使用中不小心短期反向使用，不会造成电容器实质性破坏，调整为正向可保证使用，但不可长期反向使用，会造成电容寿命特性衰减。

Unlike ordinary electrolytic capacitor or battery, the material of positive and negative polarity of super capacitor is same, so theoretically super capacitor has no polarity; the polarities marked on super capacitor are established by manufacturers in the production process, when the polarities are used reversely in short-term, it won't cause substantial damage on capacitor, and it can be used normally after adjusting to the right polarities. But if reversely use for a long time,the life of super capacitor will decay .

（2）关于超级电容器充电问题 Super capacitor charging information

超级电容器充电需要采用不超过额定电压的直流电压，可采用限流、恒流、恒功率、恒电压等多种充电方式；超级电容器充电时可能会拉低充电电源电压，直到电容器充满维持电压平衡。

To charge a super capacitor requires DC voltage that no more than the rated voltage. It can be charged by a variety of methods such as current limit, constant current, constant power, constant voltage; when charging, the super capacitor may lower the voltage of charging power supply until the capacitor is full to maintain voltage balance.

（3）工作电压、温度和寿命 Operating temperature and product

一般情况，SRTCAP®超级电容器在额定电压、低温条件下工作，漏电流更小、备用时间更长、寿命更长。反之在额定电压、较高温度条件下，则漏电流增大、备用时间缩短、寿命变短。当工作温度一定的条件下，超级电容器在额定电压以下工作，寿命会增长。

Generally,when SRTCAP® supercapacitors work at rated voltage and low temperatures, the leakage current will be less ,the standby time and life will be longer. On the contrary, under the condition of rated voltage and higher temperature, the leakage current increases, the standby time is shortened, and the life is shortened. When the operating temperature is certain, the life will increase when working at the rated voltage.

（4）安装与焊接 Installation and welding

超级电容器用于双面电路板上时，要注意连接处不可经过电容器可触及的地方，否则会导致产品短路过压及电容器损坏。安装过程及安装后，不可强行扭动或倾斜电容器，不得用力拉拽引线，应先断针及折弯后焊接。在焊接过程中要避免使电容器过热（1.6mm 的印刷线路板，焊接时应为 260℃，时间不超过 5s），焊接后，线路板和电容器要清洗干净。

When super capacitors are used for double-sided circuit boards, must pay attention the joint should not contact the capacitor, otherwise it will lead to short circuit, over-voltage and damage of capacitor. During the process of installation and after installation, do not twist or tilted the capacitor, do not be forcibly pull the wires. Capacitors should be welded after cutting off and bending the leads. In the welding process, pay attention to avoid overheating of the capacitor (for a 1.6 mm thickness printed circuit board, the welding temperature should be 260℃, time is not more than 5 s), circuit board and the capacitor should be clean after welding.

（5）串联及并联使用问题 Use in series and parallel

相同超级电容器串联使用时，总电压=串联个数×单体耐压；总容量=单体容量÷串联个数；总能量=串联个数×单体能量，总内阻=串联个数×单体内阻。

三个及以上串联存在单体间的电压均衡问题，需要考虑采用均衡电路，用于保证长期使用过程中电容不能过电压使用，从而引起电容器寿命衰减及损坏。客户在自行串联使用时，建议同批次产品一起使用，不建议不同批次产品混用。

超级电容器进行并联使用时，可以不同容值的并联，采用相同电压充电，但要注意各个电容之间的电流平衡问题以及相互隔离，避免由于放电后电势差产生的相互反向充电。

When same super capacitors used in series, the total voltage = capacitor number x capacitor voltage; the total capacitance =single capacitor capacitance /capacitor number; Total energy = capacitor number x single capacitor's energy; total resistance = capacitor number x single capacitor's resistance.

There is a voltage balance problem when 3 pcs or above capacitors used in series,so an equalization circuit is required to ensure the capacitor will not over-voltage in long term use process, as over-voltage will cause decay and damage of capacitor. When customers use the product in series by themselves，we recommend that using the same batch of products, and don't mix up different batches of products.

Super capacitors in different capacitance value can be used in parallel, theses capacitors should be charged by the same voltage, but should pay attention to the current balance problem between the capacitors and mutual isolation, to avoid potential difference

happened after discharge.

（6）规格书若有更改我司不另行通知，我司保留可能出现的各种更改权利，最终解释权归浙江斯瑞特电子科技有限公司所有。

If there is any change in the specification without prior notice, our company reserves the right to make any possible change, and the final interpretation right belongs to zhejiang sruite electronic technology co., LTD.