Dwg. No. :SC19-SVLT0036
承认字号
Issued Date:2019/05/06

Customer :_____
(客　　户)

Part No.　　:_____
(贵公司料号)

SPECIFICATION FOR APPROVAL
承　　认　　书

Description　　:　Supercapacitor / Electrical Double Layer Capacitor
(零 件 名 称)

Lelon Series　　:　SVLT Series
(立 隆 系 列)

Lelon Part No.:　SCMDVLT3R6105ZVH190004E
(立 隆 料 号)

LELON ELECTRONICS CORP.
立 隆 电 子 工 业 股 份 有 限 公 司

Lelon Taipei Office
7F-2, 15, Lane 360, Sec. 1, Neihu Rd., Neihu Dist., Taipei, Taiwan
TEL: +886-2-2799-1322 | FAX: +886-2-2627-4273 | Zip:11493
Web: www.lelon.com
E-mail: service@lelon.com

Approval 核　准	Check 确　认	Design 作　成
R & D May.06. 2019 Paul Lin	R & D May.06. 2019 Matt Chien	R & D May.06. 2019 Vera Huang

Approval Signatures
贵公司承认印

Please Return One Copy with Your Approval
承 认 后 请 寄 回 本 图 一 份

1. Part Number System 料号说明

Product Code Guide –SVLT Series (-25～+85 ℃ 0.1F~1.50F)

For example:

SCM	D	VLT	5R5	334	Z	VH	115004	E	XX
□□□	□	□□□	□□□	□□□	□	□□	□□□□□□	□	□□
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

① SCM means supercapacitor module

② Supercapacitor Type: D means EDLC type

③ Series : VLT means SVLT series -25～+85 ℃

④ Rated Voltage : 5R5 means 5.5 V / 3R6 means 3.6V

⑤ Rated Capacitance:

For example:

0.1F	0.22F	0.33F	0.47F	1F	1.5F
104	**224**	**334**	**474**	**105**	**155**

⑥ Capacitance Tolerance:

Z	-20～+80%

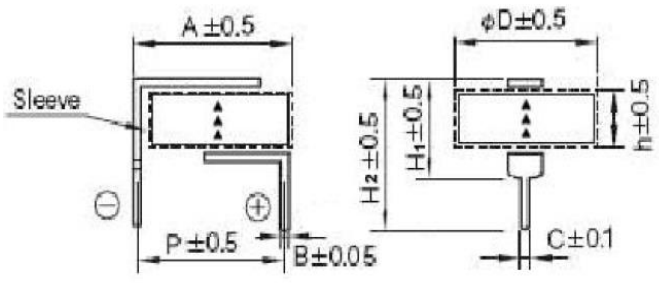
⑦ Lead Form & & ⑧ Dimension Code:

VH	H Type	Dxh	11.5x4.5	19x4.5
		Code	**115004**	**190004**
VV	V Type	Dxh	11.5x4.5	19x4.5
		Code	**115004**	**190004**
VC	C Type	Dxh	13.5x7	20.5x7.5
		Code	**135007**	**205007**

⑨ Sleeve Type: E means PET

⑩ Special Notes: Defaulted without any note

2. Product Dimensions: 产品尺寸



HTYPE

Items	Criteria	Items	Criteria
D	19 mm	h	4.5 mm
A	20.0 mm	H1	6 mm
P	20.0 mm	H2	9 mm
C	1.0 mm	B	0.2 mm

3. General Characteristics/一般特性

No.	Items/项目	Criteria/参数值	Remark/备注
1	Operating Temperature Range 工作温度范围	-25～+85 ℃	
2	Rated Voltage 额定工作电压	3,6 V	
3	Rated Capacitance 额定容量	1F	
4	Capacitance Tolerance 容差范围	-20～+80%	
5	ESR_{AC} 交流内阻	30 Ω	1KHz
6	Leakage Current 漏电流	0.008 mA	72hrs
7	Storage temperature Range 存储温度范围	-25～+85 ℃	

4. Environmental Characteristics/环境特性

No.	Items/项目	Specification/Condition/规格/条件
1	Temperature Characteristics 温度特性	｜△C/C｜≤10%，ESR ≤ specified ESR at +85 ℃ +85 ℃，容量变化：初始值的10%以内，ESR：不超过规定值｜△C/C｜≤30%，ESR≤ 2 times of specified ESR at -25℃ -25℃，容量变化：初始值的30%以内，ESR：不超过2 倍规定值
2	High temperature loaded 高温负荷	｜△C/C｜≤30%,ESR≤ 4 times of specified ESR at +85 ℃/2000hrs/Rated voltage +85 ℃，额定电压下，负荷2000h， 容量变化：初始值的30%以内，ESR：不超过4 倍规定值
3	High temperature storage 高温存储	｜△C/C｜≤30%，ESR≤ 4 times of specified ESR at +85 ℃/2000hrs +85 ℃，高温存储2000h， 容量变化：初始值的30%以内，ESR：不超过4 倍规定值
4	Humidity Resistance 稳态湿热	+40℃±2, 90--95%RH，240h，｜△C/C｜≤30%, ESR≤2 times of specified ESR +40℃±2, 90--95%RH，高温高湿存储240h，容量变化：初始值的30%以内，ESR：不超过2 倍规定值

5. Test Methods 测试方法

5.1 Capacitance 容量

Charge capacitor with constant current to rated voltage, then charge it with constant voltage for 30 minutes, and then discharge it with constant current to 0.1V (safe voltage). 将电容器恒流充至额定电压，并恒压30min，然后恒流放至0.1V（安全电压）

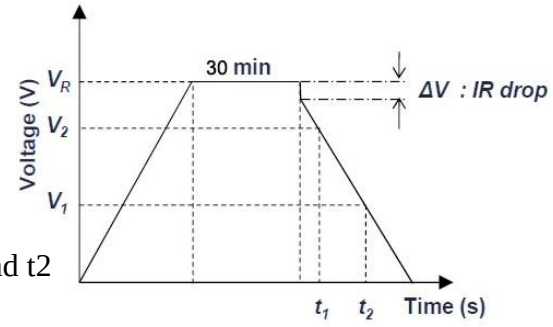
Recording time t1 and t2 corresponding to V2 and V1 during discharge（where V2=80%VR, V1=40%VR）。Recording time t1 and t2 corresponding to V2 and V1 during discharge（where V2=80%VR, V1=40%VR）

(1) Charge capacitor with constant current I to rated voltage VR (when C ≤ 0.47F, I = 3mA; when C > 0.47F, I = 5mA) 恒电流I充电至额定电压VR（C≤0.47F时，I=3mA ；C＞0.47F时，I=5mA）

(2) Charge with constant voltage VR for 30 minutes
恒电压充电维持VR 30 min

(3) Discharge with constant current (-I) to 0.1V
恒电流-I放电至0.1V

(4) Record V2, V1 and their corresponding time points t1 and t2
记录V2, V1及其对应的时间点t1和t2

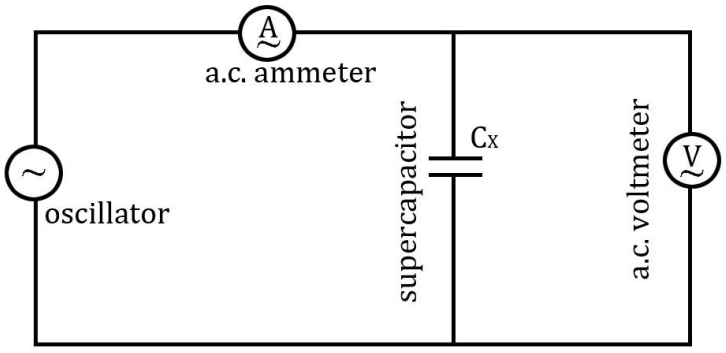


Calculation formula 计算公式
C=I*(t2-t1)/ (V2-V1)

5.2 AC Internal Resistance 交流内阻

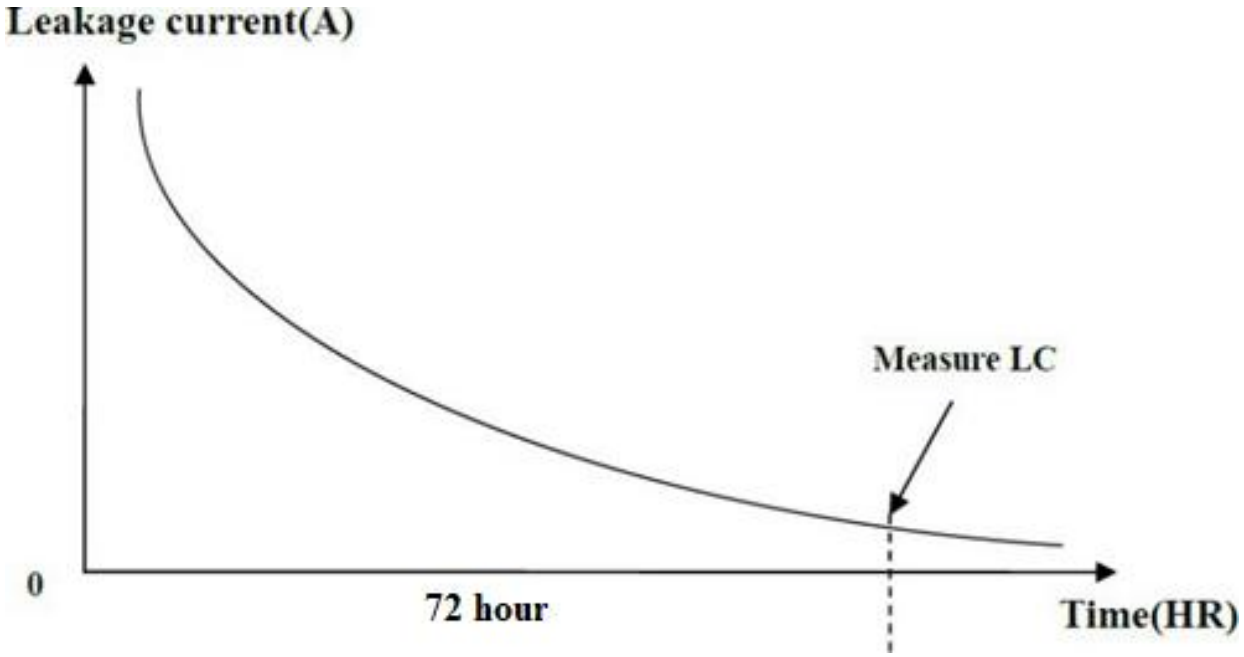
Measuring AC Internal Resistance with ACIR testing instrument (measure @ 1KHz)

The equivalent circuit diagram is as follows 使用交流内阻测试仪器进行测量交流内阻 (测量频率: 1KHz) 等效电路图如下



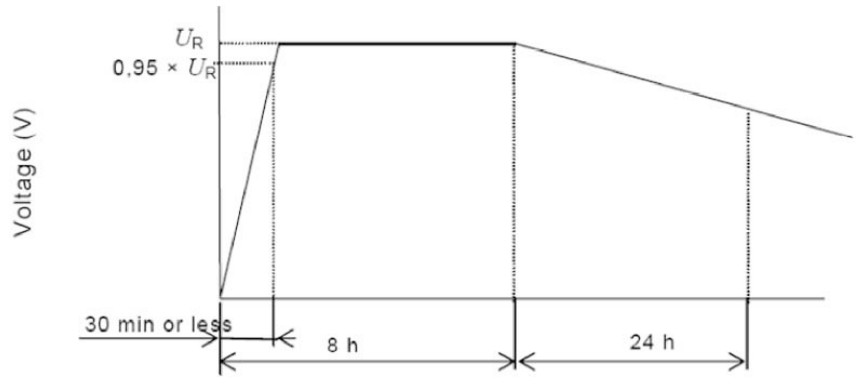
5.3 Leakage Current 漏电流

The capacitor is charged to the rated voltage through the protective resistance and maintained for 72 hours. Its leakage current is measured by precision equipment. 将电容通过保护电阻充至额定电压并维持 72 小时，通过精密设备测量其漏电流



5.4 Self-discharge 自放电

After charging capacitor with constant current to rated voltage and constant voltage for 8 hours, disconnect the circuit and stand for 24 hours, then measure its Self Discharge voltage 将电容恒流充至额定电压并恒压 8h 后，断开电路，静置 24h，量测自放电电压



6. Handling Precautions and Guidelines 注意事项和使用指导

For safety application, please contact LELON directly for any technical specifications, handling precautions and guidelines critical to application. 为安全起见，当设计的设备需要使用电容器时，请与立隆直接联系咨询技术规格、安装注意事项和使用要求。

6.1 Handling Guidelines 使用指导

For safety application, please contact LELON directly for any technical specifications, handling precautions and guidelines critical to application.为安全起见，当设计的设备需要使用电容器时，请与立隆直接联系咨询技术规格、安装注意事项和使用要求。

6.2 Precautions 注意事项

(1) Prohibition of disassembly 禁止拆卸

The disassembling may generate internal short circuit in the cell, which may cause gassing, leakage, explosion, or other problems.拆卸电容会导致内部短路，可能导致产气，泄漏，爆炸或其他问题。

Electrolyte is harmful: In case the electrolyte comes into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.电解液是有害的：如果电解液接触到皮肤或眼睛，应立即用清水冲洗并寻求医生的治疗。

(2) Prohibition of dumping of cells into fire 禁止将电容投入火中

These may cause explosion of the cells, which is very dangerous and is prohibited.这可能会导致电容爆炸，这是非常危险的，是被禁止的。

(3) Prohibition of cells immersion into liquid 禁止将电容浸入液体

The cells shall never be soaked with liquids such as water, seawater, drinks such as juices, coffee or others.电容不能用水、海水、果汁、咖啡或其他饮料等液体浸泡。

(4) Prohibition of use of damaged cells 禁止使用损坏的电容

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in the cell package, smelling of an electrolyte, an electrolyte leakage and others, the cells shall never be used any more. 在运送过程中，电容可能因受到冲击而损坏。如果发现电容有任何异常情况，如包装破损、电解液气味、电解液泄漏等，请勿使用该电容。

The Cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing or explosion. 有电解液味道或泄漏的电容应放置在远离火的地方，以避免起火或爆炸。

6.3 Handling Guidelines 使用指导

(1) It is not suitable that cell is used under such conditions: AC circuit and wave filtering. 不可以用于以下场合：交流电路和滤波电路。

(2) Work voltage of cell should not exceed Max. work voltage of cell during using. Otherwise, will shorten shelf life, even cause swelling, leakage or crack. 电容的工作电压不应超过电池额定最高工作电压。否则，会导致缩短使用寿命，甚至引起气胀、泄漏或开裂。

(3) Please check the polarity before using. If working under reverse polarity, cell will not only shorten shelf life, but also heavy damage, such as swelling, electrolyte leakage etc. 使用前请检查极性。如果在反极性下工作，电容不仅会缩短使用寿命，甚至还会造成严重的损坏，如气胀、电解液泄漏等。

(4) Environment 环境

Work temperature will have an influence on shelf life of cell. As usual, higher work temperature will shorten shelf life. So, it is better that cell works under as possible as low environmental temperature. 工作温度会影响电容的使用寿命。通常，较高的工作温度会缩短使用寿命。因此，最好是在低环境温度下工作。

Work temperature of cell should consider internal work temperature in the unit and temperature rise when cell works. 电容的工作温度应考虑机组内部工作温度和电容工作时的内部温升。

(5) IR dropIR 下降

When main power sources shut down, cell will change into work mode from failure mode, at the same time, OCV will decrease due to IR drop. So please choose proper product type according to impedance specified in product datasheet and applied current. 当主电源关闭，电容会从电源失效检测模式转变为后备电源工作模式，此时由于瞬间启动电流和电容内阻会导致开路电压下降。因此，请根据产品规格书和应用电流中指定的阻抗选择合适的产品类型。

(6) Cells in series connection 串联连接的电容

When cells in series connection for higher work voltage, it should be assured that work voltage of any single cell must not exceed Max. work voltage of single cell, otherwise, will shorten shelf life, even cause swelling, leakage or crack. 当多个单体电容串联使用以提高工作电压时，应保证每个电容的工作电压不得超过电容的最大工作电压，否则会缩短寿命，甚至引起气胀、泄漏或开裂。

(7) Soldering 焊接

Manual Soldering: The recommended temperature of the soldering rod tip is less than 350℃ and the soldering duration should be less than 4 seconds. Minimize the time that the soldering

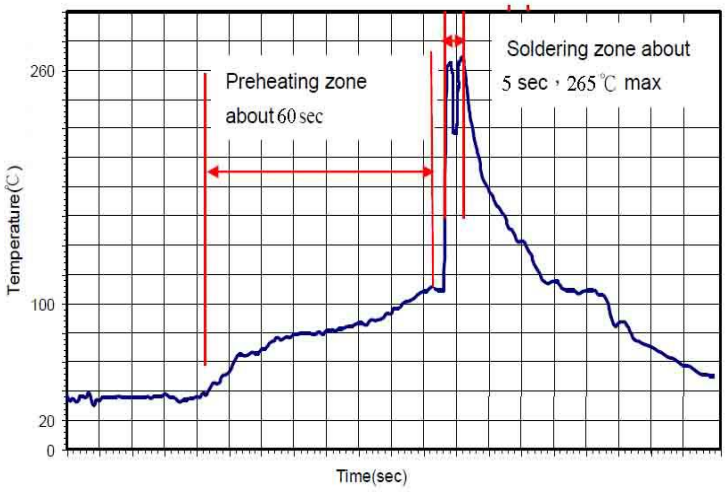
iron is in direct contact with the terminals of the capacitor, as excessive heating of the leads may lead to higher ESR. 手工焊接：推荐的钎头温度低于350℃，焊接时间不超过4秒。尽量缩短烙铁与电容器端子直接接触的时间，因为引线过热可能导致更高的ESR。

Reflow Soldering : Do not use reflow soldering, infrared or convection methods on EDLC 回流焊：不要在EDLC上使用回流焊、红外线或对流方法。

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℃.波峰焊：对于0.8毫米或更厚的PC板，最长预热时间为60秒。预热温度应限制在100℃以下。

Use the following table for wave soldering on leads only: 仅在导线上使用下表进行波峰焊接：

Soldering Bath Temperature(℃)	Recommended Solder Exposure (s)	Maximum Solder Exposure(s)
220	7	9
240	7	9
250	5	7
265	3	5



7. Environmental management 环境管理

All super cap products are RoHS compliant and environment friendly. By changing the solder plating from leaded solder to lead-free solder, and the outer tube from Polyvinyl Chloride (PVC) to Polyethylene Terephthalate (PET), our new super cap has become even friendlier to the environment. 所有超级电容产品均符合RoHS标准且环保。通过改变从含铅焊料到无铅焊料的焊料电镀和外部从聚氯乙烯（PVC）到聚对苯二甲酸乙二醇酯（PET）的管子，我们的超级电容产品对环境更加的友善。