

超级电容产品事业部
Supercapacitor Product Division产品规格书
Product specification

Customer 客户名称: _____

Product 产品名称: 引线式锂离子电容Description 产品规格: SLA 750F 3.8V 18*40Part No. 产品型号: SLA3R8L7571840Date 日期: 2024年03月01日Version No. 版本号: V1.0.0.202205

Prepared 制作	Checked 审核
陆佳婧	田定平
Customer Approve 客户承认	

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1.适用范围 Introduction: :

本规格书规定了引线式锂离子电容器性能、测试方法进行技术规范，作为技术确认依据。

This Specification describes the properties, testing methods and notice of lead type LIC by ShangHai YongMing Electronic Co.,Ltd

2.标准测试条件 Standard test condition:

一般情况下，在标准大气压下，温度 15~35°C,湿度 \leq 85%RH，大气压 86Kpa~106Kpa 条件下进行测试；测试前样品应该在常温下放置 12H 以上。

如对结果有疑问时，应按照温度为 $25\pm 2^\circ\text{C}$ ，湿度：60~70%RH，标准大气压 86Kpa~106Kpa 条件测量。

Generally the features of LIC should be tested under humidity \leq 85%RH and atmospheric pressure 86Kpa~106Kpa after place the samples at a room temperature 15~35°C for 12h .

If any doubt of the result, please test the samples under temperature $25\pm 2^\circ\text{C}$ ，humidity: 60~70%RH，atmospheric pressure 86Kpa~106Kpa.

3.依据规范 According to the specification:

IEC 62813:2015 《电气和电子设备用锂离子电容器电气特性试验方法》

IEC 62813:2015 《Lithium ion capacitors for use in electric and electronic equipment. Test methods for electrical characteristics》；

IEC 62931-1 《电子设备用固定电双层电容器。第 1 部分通用规范》

IEC 62931-1 《Fixed electric double-layer capacitors for use in electronic equipment – Part 1:Generic specification》；

IEC 62931-2 《电子设备用固定电双层电容器。第 2 部分通用规范》

IEC 62931-2 《Fixed electric double-layer capacitors for use in electronic equipment – Part 2:Generic specification》；

4.产品编码规则 Product code Rules:

S	L	A	3	R	8	L	7	5	7	1	8	4	0	*	*	*	*
↓			↓			↓	↓			↓				↓			
系列 Series			电压 Voltage			类型 Type	容量 Capacitance			产品尺寸 Size				其他 Other			
SDA			2R7=2.7V			L=引线型 Lead	757=750F			0512=5*12							
SDB			3R0=3.0V			M=模组型 Module	406=40F			1840=18*40							
SDS			5R5=5.5V			N=纽扣型 Coin type	335=3.3F			1340=12.5*40							
SDL			012=12V			S=牛角型 Snap-in	806=80F			2255=22*55							
SLA			3R8=3.8V			Z=径向型 Radial	257=250F			1035=10*35							

5.产品标识图例 Product identification:

丝印说明 (蓝色套管, 黑色印字) Silk screen printing instructions (Blue casing, black lettering):

A 面: Ymin 为厂商永铭 logo; 为负极标示, 对应产品的负极; 750F 为产品标称容量; 3.8V 为产品额定电压;

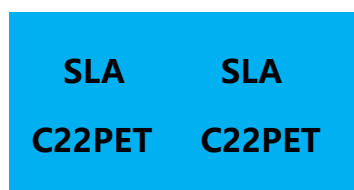
Side A: Ymin is the logo of the manufacturer Yongming; is the negative mark, corresponding to the negative pole of the product; 750F is the capacity of the product; 3.8V is rated voltage of the product;

B 面: C22 生产周期标示, 用字母 A-M (其中没字母 I), 表示 1 月-12 月, 22 代表 2022 年取后两位; PET 为胶管材质, 表示该胶管材质为 PET; SLA 为产品系列。

Side B: C22 production cycle is marked with the letter A-M (without the letter I), indicating January to December, 22 representing 2022, the last two digits; PET is made of rubber hose, indicating that the rubber hose is made of PET; SLA is the product series.



A 面



B 面



产品图例

6.产品结构、尺寸 Product structure and size:

6.1 产品结构 Product structure:

内部结构：主要使用正负电极卷绕而成，中间采用隔离绝缘纸隔开。

Internal structure: mainly made of positive and negative electrodes, separated by insulating paper.

铝壳—将素子密封防止受污染及电解液蒸发。

Aluminum shell—Seal the element to prevent contamination and evaporation of electrolyte.

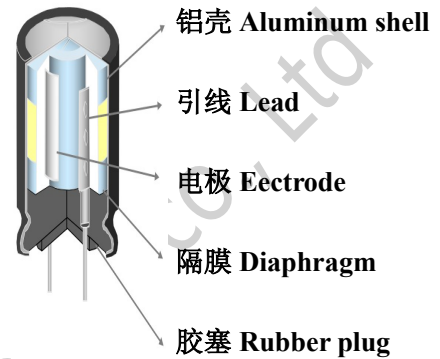
引线—为获得良好的传导性使用高纯铝，内部能量可以对外传输桥梁关系。
Lead—Using high purity aluminum, internal energy can be transmitted externally to the bridge relationship.

电极—碳电极，活性炭多孔结构，吸附力强，形成储能关键材料之一。
Electrode—Activated carbon porous structure, strong adsorption, the formation of energy storage key materials.

隔膜—隔离正负极，吸附电解液，电解液通过隔膜离子形成迁移

Diaphragm—Isolation electrode, adsorption electrolyte, ions through the formation of migration membrane.

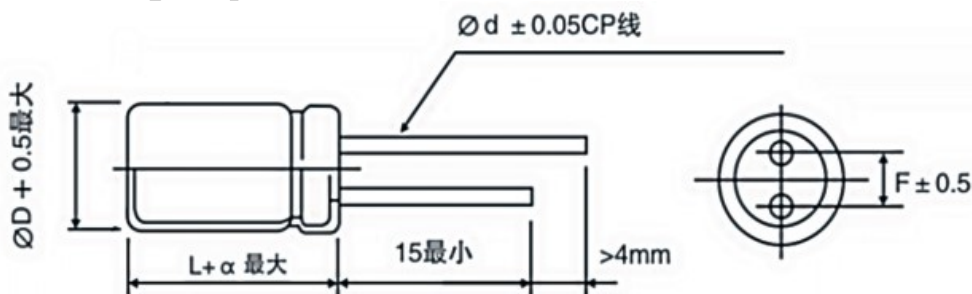
胶塞—保持端子间及与外壳间之绝缘，为一弹性体，可借机械方式将端子压紧，密封隔绝作用，防止电解液漏出蒸发。
Rubber plug—Maintain insulation between terminals and shell, prevent electrolyte leakage and evaporation.



外部结构：使用铝壳封口，外部采用绝缘胶套包裹。

Exterior structure: sealed with aluminum shell and wrapped with insulating rubber sleeve.

6.2 产品尺寸 Product size:



直径 diameter D ± 0.5mm	高度 high L ± 2.0mm	引线间距 pin pitch F ± 0.5mm	引线直径 Wire diameter d ± 0.05
18.0	40.0	7.5	1.0

7.基本性能范围 Basic performance range:

测试项目 Test project	规格/条件 Specifications/Conditio	备注 explain
1 额定容量 capacitance	750F	$C = \frac{I \times (t_2 - t_1)}{U_1 - U_2}$
2 等效能量 energy	300mAh	3.8V-2.5V
3 额定电压 voltage	3.8V	
4 1C 测试电流 1C Test current	300mA	
5 浪涌电压 Surge voltage	4.25V	
6 工作温度 Working temperature	-20°C~+85°C	
7 常温容量偏差 Capacitance deviation	-10%~+30%	
8 交流内阻 AC-ESR	≤25mΩ	1KHz
9 直流内阻 DC-ESR	≤37.5mΩ	$ESR_{DC} = \frac{U_1 - U_2}{I}$
10 自放电 self-discharge	≤1.5mV/天	25°C 24H
11 额定放电电流 Rated current	3.0A	
12 最大峰值电流 Peak current	30.0A	
13 漏电流 Leakage current	≤12uA	
14 最高充电电压 Maximum charging voltage	4.2V	
15 最大充电电流 Maximum charging current	3.0A	
16 放电下限电压 Lower discharge voltage	2.5V	
17 推荐工作电压区间 Recommended operating	3.8V~2.5V	
18 循环寿命 Cycle life	> 10 万次	

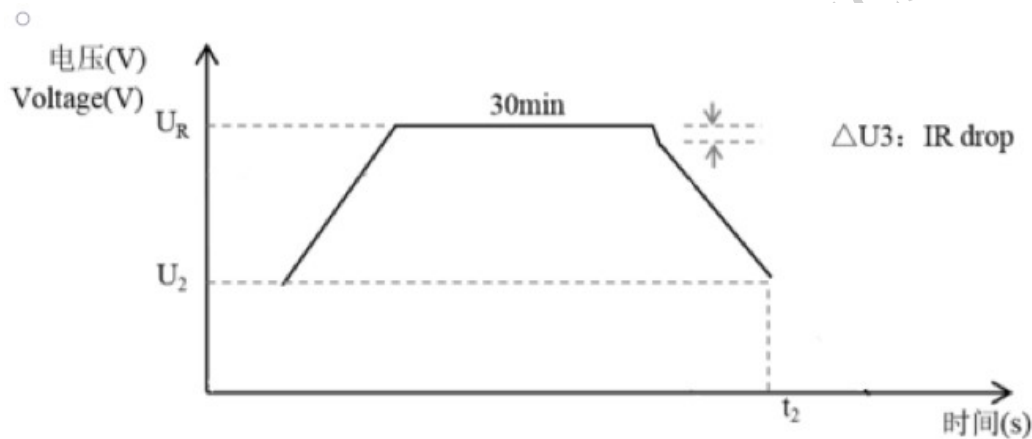
8.可靠性能规范 Specifications:

项目 project	测试方法 Test method	判定标准 criterion
循环寿命 Cycle life	在 25°C下, 用恒定电流使电容器在 3.8V~2.5V 电压间循环充放电。(100,000 次) At The capacitor is charged and discharged at a constant current between 3.8V and 2.5V at 25°C. (100000)	容量变化率≤-30% 内阻变化率≤300% Capacity change rate ≤-30% Change rate of internal resistance ≤300%
高温负荷寿命 High temperature load life	在额定温度 85°C的条件下, 施加额定电压 3.8V, 进行 1000 小时测试。 At rated voltage of 3.8V was applied at a rated temperature of 85°C for 1000 hours.	容量变化率≤-30% 内阻变化率≤400% Capacity change rate ≤-30% Change rate of internal resistance ≤400%
高温储存寿命 High temperature storage life	在额定温度 85°C的条件下, 不施加电压进行 1000 小时储存测试。 1000 h storage test without voltage applied at rated temperature of 85°C.	容量变化率≤-30% 内阻变化率≤400% Capacity change rate ≤-30% Change rate of internal resistance ≤400%
温度特性 Temperature characteristic	在+85°C条件, 容量变化初始值的 10%以内, ESR 不超过规定值; 在 0°C条件, 容量变化初始值的 50%以内, ESR 不超过 15 倍规定值; At +85°C, ESR does not exceed the specified value within ±10% of the initial value of capacity change; At 0°C, ESR does not exceed 15 times the specified value within 50% of the initial value of capacity change;	容量变化率 85°C < 10% 容量变化率 0°C < 50% 内阻变化率 85°C ≤ 规格值 内阻变化率 0°C ≤ 15 倍规格值 85°C CAP < 10% 0°C CAP < 50% 85°C ESR ≤ Specification values 0°C ESR ≤ 15 times the specification values
耐湿性测试 Moisture resistance test	在+25°C, 90%RH 下连续施加额定电压 500 小时后, 返回 20°C进行测试。 After 500 hours of continuous application of rated voltage at +25°C, 90%RH, return to 20°C for test.	容量变化率≤-30% 内阻变化率≤300% Capacity change rate ≤-30% Change rate of internal resistance ≤300%

9.测试方法 Testing Methods:

9.1 标称容量的计算方法 (IEC 法) : 锂离子电容器的电容量是对电容器进行恒流放电时,其放电电量与放电电位变化的比值。以规定的恒定电流充电到额定电压后恒压 30 分钟, 在规定的恒定电流放电条件下放电到测量结束电压所需的时间与电流的乘积再除以电压值。

Capacitance calculation (IEC) : The capacitance of Lithium ion capacitor is the ratio of the discharge quantity to the change of discharge potential when the capacitor is charged with constant discharge. Charge at the specified constant current to the rated voltage at constant voltage for 30 minutes, discharge at the specified constant current to the end of the measurement voltage product time and current divided by the voltage value.



$$C = \frac{I \times t_2}{U_R - U_2}$$

I: 放电电流 1C(mA); Discharge Current 1C(mA)

\$U_R\$: 测量初始电压:\$U_R=3.8(V)\$; Voltage before test:\$U_R=3.8(V)\$;

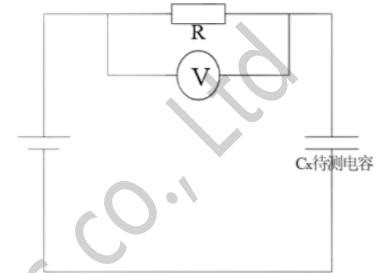
\$U_2\$: 测量结束电压:\$U_2=2.5(V)\$; Voltage after test:\$U_2=2.5(V)\$;

\$t_2\$: 放电开始到测量结束电压 \$U_2\$ 的时间(s); Timing from discharging to \$U_2\$;

9.2 AC (ESR 交流等效串联内阻) 测试方法: 使用 LCR 电桥测试产品的 AC ESR 值, 频率: 1KHz,
AC (ESR) testing methods: LCR tester Frequency: 1KHz,

9.3 漏电流测试方法 Leakage current test method:

- 1) 测试漏电流前待测锂离子电容器应充分开路静止, 一般放电 1h 以上;
- 2) 在电容器两端加额定电压 U_R ;
- 3) 待超级电容器电压达到额定电压 U_R 后, 持续充电, 测量 0.5h
1h、2h、24h、48h、72h 串联保护电阻两端电压 U_V 。



- 1) Before the leakage current test, the lithium ion capacitor to be tested should be fully open and stationary, and generally discharge for more than 1hr;
- 2) Apply rated voltage U_R
- 3) After the voltage of the supercapacitor reaches the rated voltage U_R , measure the series protection resistance of 0.5h, 1h, 2h, 24h, 48h, and 72h Voltage U_V at both ends.

计算漏电流公式 Leakage current method:
$$LC = \frac{U_V}{R} \times 10^3 \text{ mA}$$

10.包装信息 Packaging information:

10.1 包装标签 The packing label

内箱标签样张 Inner carton label

				Certification			
				合格证			
Product name: 产品名称	SDB_3.0V_1.0F_8*13_-10%+30%						
LOT NO: 生产批号	YM211102707-47	QTY: 数量	500 PCS				
Production date 生产日期	2022.05.03	Part NO: 产品编号	646852				
Customer Item Code: 客户物料描述							

外箱标签样张 Carton label

				上海永铭电子股份有限公司					
				SHANGHAI YONGMING ELECTRONIC CO., LTD					
产品名称/ Product name:	SDB_3.0V_1.0F_8*13_-10%+30%								
产品编号/ Product NO:	646852	数量/QTY	16000 PCS						
批号/LOT NO:	SC0280011622	净重/NW	KG						
生产日期/ Date code:	2022-5-3	毛重/GW	KG						
客户物料描述/Customer Item Code: 料号:								QC:	
订单号									

MADE IN CHINA

10.2 包装按下图包装方式 packaging as shown below



内盘包装 Inside



外包装箱 Carton

10.3 包装数量 pack number

小盘数量 pcs Inside number	盒装数量 pcs Box number	箱装数量 pcs Carton Packing quantity
30	240	480

11.使用注意事项 Notice:

11.1 锂离子电容器具有固定的极性。在使用前，应确认极性，请勿反极安装。

LIC are normally polarized. Confirm the polarize before use the LIC. Do not use the LIC in reverse.

11.2 锂离子电容器应在额定的电压下使用：当电压超过标称电压时，将会导致电解液分解，同时电容器会内部发热且容量下降，从而增大内阻的增加，使之减少电容本身的寿命，在某些情况下，可导致电容器性能崩溃；

Do not apply exceed voltage to the LIC, it will cause electrolyte chemolysis, meanwhile the capacitance will decrease and ESR increase.

11.3 锂离子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；

LIC should not be used in high frequency charge-discharge circuit, it will increase the heat of the capacitor and capacitance will be decreased, and ESR will increase.

11.4 锂离子电容器的寿命：外界环境温度对于锂离子电容器的寿命有着重要的影响。电容器应尽量远离热源；

Life time of LIC : Operating temperature should be within the specified temperature range, keep LIC away from the heat.

11.5 当锂离子电容器被用做后备电源时，必须考虑其瞬间的电压降的问题：由于锂离子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 LIC is sued as piwer back up, pls consider the instantaneous voltahge drop due to large inner resistance: $\Delta V=IR$

11.6 使用环境：锂离子电容器不可处于相对湿度大于 85%RH 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: Do not use the LIC in humidity >85% or toxic environment.

11.7 锂离子电容器的存放：锂离子电容器不能置于高温、高湿的环境中，应在温度 15~35°C、相对湿度在 40~70%RH 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；

Storage: LIC should not be stored in high humidity or high temperature. The suitable temperature is 15~35°C, humidity 40-70%.

11.8 锂离子电容器在双面线路板上的使用：当锂离子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，由锂离子电容器的安装方式，会导致短路现象；

Soldering-1: Do not let LIC touch the joint point when LIC is assembling on double-side printed PCB.

11.9 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引线孔内，会对电容器性能产生影响；

Soldering-2: Make sure LIC body is not touching the PCB while soldering to avoid the welding material going inside the capacitor.

11.10 安装锂离子电容器后，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；

Soldering-3: Do not apply force or twist the capacitor after soldering.

11.11 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 360°C，时间不超过 5s；

Soldering-4: Avoid over heat while soldering. Ex: While use LIC on 1.6mm PCB, the mounting time should be less 5seconds.

11.12 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；

PCB board cleaning: Clean the PCB after soldering.

11.13 将锂离子电容器串联使用时，需得到上海永铭电子股份有限公司技术的支持；

When the capacitor is used in series, technical support from Shanghai Yongming Electronics Co., LTD is required.

11.14 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，请咨询上海永铭电子股份有限公司或参照锂离子电容器使用说明的相关技术资料执行。

Others: If any case or question happen during using LIC, pls contact Shanghai Yongming Electronic or refer the datasheet we provided.

11.15 锂离子电容产品在发货前已充电至客户要求的额定电压，带电发货，单个独立包装。

LIC products have been charged to the rated voltage required by the customer before delivery, delivered with electricity, single independent packaging.

11.16 不要将产品放电到低于下限电压 (2.5 V)，将产品放电至低于下限电压将会极大地缩短寿命，这可能导致电气特性恶化，短路，开路或由电解质泄漏或产生气体而导致安全阀打开。电压低于下限电压的产品即使再次充电，也不能恢复到初始正常状态。请特别注意储存和处理，并设计电路，以便电压永远不会低于下限电压。

Do not discharge the product below the lower limit voltage (2.5V). Discharging the product below the lower limit voltage will greatly shorten the life of the product. This may lead to deterioration of electrical characteristics, short circuit, open circuit, or relief valve opening due to electrolyte leakage or gas generation. A product whose voltage is lower than the lower limit voltage cannot return to its initial normal state even if it is charged again. Please pay special attention to storage and handling, and design the circuit so that the voltage never falls below the lower limit.

11.17 不要使正极和负极端子短路。该产品设计为在发货时具有一定的电压。更具体地说，与该电压对应的能量已经预先存储在产品中。因此，切勿使正极端子与负极端子短路。它可能会发生电击，灼伤或人身伤害，导致故障而引起泄漏，发热，冒烟，安全阀打开。特别是使用金属工具时，请注意不要使端子短路。(危险操作示例：用钳子同时切断两个引线端子；用金属游标卡尺测量引线端子的间距)。

Do not short-circuit the positive and negative terminals. The product is designed to have a certain voltage when shipped. More specifically, the energy corresponding to this voltage has been pre-stored in the product. Therefore, do not short-circuit the positive terminal and the negative terminal. It may cause electric shocks, burns, or personal injury, resulting in a malfunction that causes leakage, heat, smoke, and safety valve opening. Do not short-circuit terminals, especially when using metal tools. (Dangerous operations: Cut off two lead terminals with pliers. Measure the spacing of lead terminals with metal vernier calipers.

常见的使用过程产品短路情形

测量中发生短路	产品处理中发生短路
	
引线弯曲导致引线接触发生短路	产品放置在一起导致引线接触发生短路
	

12.客户需求 needs of customers:

如果贵司对该文件所描述的应用、操作指南仍未满足需求，还请事先填写如下表格信息，并与上海永铭电子股份有限公司联系，敝司继承着有困难找永铭之原则，将为贵司所提出的特殊需求进行设计及制造，以满足贵司之需求。

Please Contact Shanghai Yongming Electronic if you have any other requirement or if you are not satisfied with our data sheet.

NO.	已有信息 Information mentioned in the data sheet	特殊信息 Special information you need	现在标准 Standard	需求标准 Special requirement

公司名称 Company Name: _____

签名及联系方式 Sign: _____

日期 Date: _____



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