

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: **引线式超级电容**

Description 产品规格: **SDB(H) 10F 3.0V 12.5\*20**

Part No. 产品型号: **SDBH3R0L1061320**

Date 日期: **2024年03月01日**

Version No. 版本号: **V1.0.0.202205**

|                       |            |
|-----------------------|------------|
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| 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超级电容器性能、测试方法进行技术规范化,作为技术确认依据。

This Specification describes the properties, testing methods and notice of lead type EDLC 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 EDLC 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 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:

| SDB(H)    | 3 R 0      | L               | 1 0 6          | 1 3 2 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      | 105=1.0F       | 0813=8*13    |          |
| SDB       | 3R0=3.0V   | M=模组型 Module    | 474=0.47F      | 1320=12.5*20 |          |
| SDS       | 5R5=5.5V   | N=纽扣型 Coin type | 335=3.3F       | 1020=10*20   |          |
| SDL       | 012=12V    | S=牛角型 Snap-in   | 106=10F        | 2255=22*55   |          |
| SDB(H)    | 3R8=3.8V   | Z=径向型 Radial    | 257=250F       | 1025=10*25   |          |

#### 5. 产品标识图例 Product identification:

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

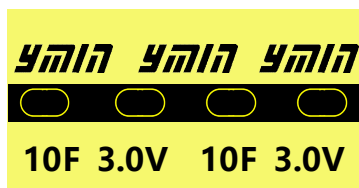
A 面: Ymin 为生产厂商永铭 logo; 为负极标示, 对应产品的负极; 10F 为产品标称容量, 3.0V 为额定电压;

Side A: Ymin is the logo of the manufacturer Yongming; Is the negative mark, corresponding to the negative pole of the product; 10F is the capacity of the product, 3.0V is rated voltage;

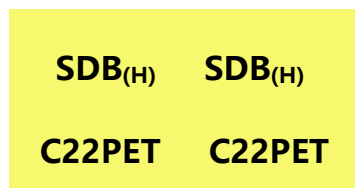
B 面: C22 生产周期标示, 用字母 A-M (其中没字母 I), 表示 1 月-12 月, 22 代表 2022 年取后两位; PET 为胶管材质, 表示该胶管材质为 PET; SDB(H) 为产品系列。

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; SDB(H) 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.

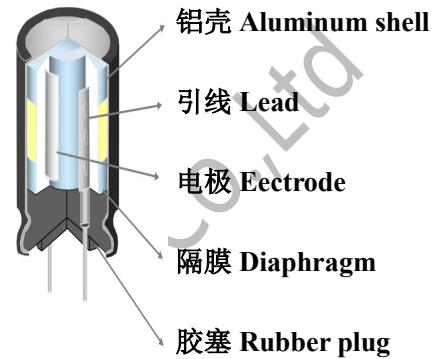
引线—为获得良好的传导性使用高纯铝，内部能量可以对外传输桥梁关系。  
Lead—Using high purity aluminum, internal energy can be transmitted externally to the bridge relationship.

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.

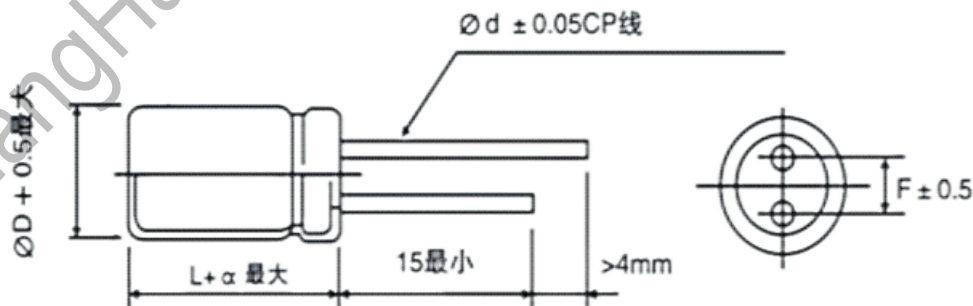
胶塞—保持端子间及与外壳间之绝缘，为一弹性体，可借机械方式将端子压紧，密封隔绝作用，防止电解液漏出蒸发。  
Rubber plug—Maintain insulation between terminals and shell, prevent electrolyte leakage and evaporation.



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<br>D ± 0.5mm | 高度 high<br>L ± 2.0mm | 引线间距 pin pitch<br>F ± 0.5mm | 引线直径 Wire diameter<br>d ± 0.05 |
|--------------------------|----------------------|-----------------------------|--------------------------------|
| 12.5                     | 20.0                 | 5.0                         | 0.6                            |

**7.基本性能范围 Basic performance range:**

| 测试项目<br>Test project |                                 | 规格/条件<br>Specifications/Conditio | 备注<br>explain  |
|----------------------|---------------------------------|----------------------------------|--|
| 1                    | 额定容量<br>capacitance             | 10F                              | $C = \frac{I \times (t_2 - t_1)}{U_1 - U_2}$           |
| 2                    | 额定电压<br>voltage                 | 3.0V                             |  |
| 3                    | 浪涌电压<br>Surge voltage           | 3.15V                            | U 浪涌=U 额定+0.15V  |
| 4                    | 工作温度<br>Working temperature     | -40°C~+105°C                     |  |
| 5                    | 常温容量偏差<br>Capacitance deviation | -10%~+30%                        |  |
| 6                    | 交流内阻<br>AC-ESR                  | ≤50mΩ                            | 1KHz   |
| 7                    | 直流内阻<br>DC-ESR                  | ≤75mΩ                            | $ESR_{DC} = \frac{U_1 - U_2}{I}$                       |
| 8                    | 自放电<br>self-discharge           | ≥2.4V                            | 25°C 24H   |
| 9                    | 额定放电电流<br>Rated current         | 2.61A                            | $I = \frac{V \cdot C}{2 \times (5 + R_{ESR} \cdot C)}$ |
| 10                   | 最大峰值电流<br>Peak current          | 8.57A                            | $I = \frac{V \cdot C}{2 \times (1 + R_{ESR} \cdot C)}$ |
| 11                   | 漏电流<br>Leakage current          | ≤20uA                            | $LC = \frac{U_V}{R} \times 10^3 \text{ mA}$            |
| 12                   | 存储能量<br>Stored energy           | 45.0 J                           | $E = \frac{1}{2} CU^2$                                 |
| 13                   | 循环寿命<br>Cycle life              | > 50 万次                          |  |
| 14                   | 产品认证<br>Product certification   | 符合 AEC-Q200                      |  |

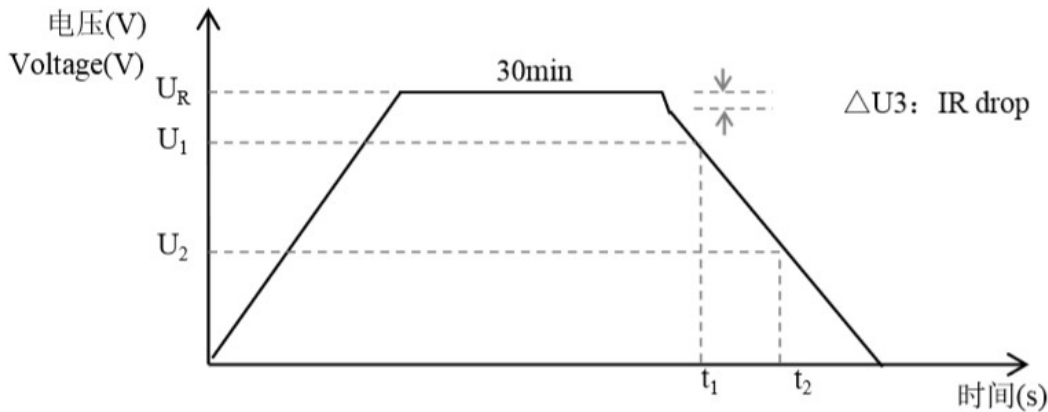
**8.可靠性能规范 Specifications:**

| 项目 project                                 | 测试方法 Test method   | 判定标准 criterion   |
|--|--|--|
| 循环寿命<br>Cycle life                         | 在 25°C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)<br>At 25 °C, the capacitor is charged and discharged in a constant current cycle between the gauge voltage and the half-rated voltage. (500000)  | 容量变化率 $\leq$ -30%<br>内阻变化率 $\leq$ 300%<br>Capacity change rate $\leq$ -30%<br>Change rate of internal resistance $\leq$ 300% |
| 高温负荷寿命<br>High temperature load life       | 在额定温度 70°C的条件下, 施加额定电压 3.0V, 进行 1000 小时测试。<br>At rated voltage of 3.0V was applied at a rated temperature of 70°C for 1000 hours.<br>或在额定温度 105°C的条件下, 施加额定电压 2.5V, 进行 1000 小时测试。<br>Or at a rated temperature of 105°C, apply a rated voltage of 2.5V for 1000 hours. | 容量变化率 $\leq$ -30%<br>内阻变化率 $\leq$ 400%<br>Capacity change rate $\leq$ -30%<br>Change rate of internal resistance $\leq$ 400% |
| 高温储存寿命<br>High temperature storage life    | 在额定温度 105°C的条件下, 不施加电压进行 1000 小时储存测试。<br>1000 h storage test without voltage applied at rated temperature of 105°C.  | 容量变化率 $\leq$ -30%<br>内阻变化率 $\leq$ 400%<br>Capacity change rate $\leq$ -30%<br>Change rate of internal resistance $\leq$ 400% |
| 温度特性<br>Temperature characteristic         | 分别在-40°C、+25°C、+105°C的条件下进行测试。<br>Tests were carried out at -40°C, +25°C and +105°C, respectively  | 容量变化率 $\leq$ -30%<br>内阻变化率 $\leq$ 300%<br>Capacity change rate $\leq$ -30%<br>Change rate of internal resistance $\leq$ 300% |
| 高温高湿<br>High temperature and high humidity | 在额定 85°C温度、85%RH 湿度 的条件下, 施加额定电压 2.5V, 进行 1000 小时测试。<br>At a rated temperature of 85°C and humidity of 85%RH, a voltage of 2.5V was applied for 1000 hours.  | 容量变化率 $\leq$ -30%<br>内阻变化率 $\leq$ 400%<br>Capacity change rate $\leq$ -30%<br>Change rate of internal resistance $\leq$ 400% |

## 9.测试方法 Testing Methods:

9.1 标称容量的计算方法 (IEC 法) : 超级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 a supercapacitor 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.



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

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); Voltage before test:  $0.8 \times U_R$  (V);

$U_2$ : 测量结束电压:  $0.4 \times U_R$  (V); Voltage after test:  $0.4 \times U_R$  (V);

$t_1$ : 放电开始到测量初始电压  $U_1$  的时间(s); Timing from discharging to  $U_1$ ;

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

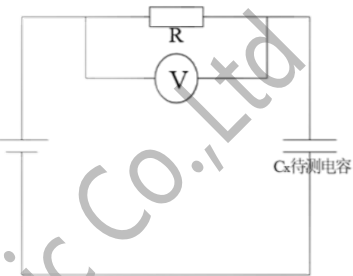


9.2 AC (ESR 交流等效串联内阻) 测试方法: 使用 LCR 电桥测试产品的 AC ESR 值, 频率: 1KHz,  
 电压: 完全放电

AC (ESR) testing methods: LCR tester Frequency: 1KHz, Voltage: no load.

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

- 1) 测试漏电流前待测超级电容器应充分放电, 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) Test when the EDLC is under no load, at least 1hour;
- 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: 
$$LC = \frac{U_V}{R} \times 10^3 \text{ mA}$$

9.4 最大峰值电流的推算 Maximum peak current calculation method:

1 秒中最大峰值电流 (A) 公式 Maximums peak current : 
$$I = \frac{V \cdot C}{2 \times (1 + R_{ESR} \cdot C)}$$

9.5 能量和功率的推算 Calculating Energy and Power methods:

最大储存能量公式 Formula for maximum stored energy: 
$$E = \frac{1}{2} CU^2$$

能量密度公式 Energy density formula: 
$$e.d = \frac{1}{2} CU^2 \frac{1}{3600 \cdot m}$$

功率密度公式 Power density formula: 
$$p.d = \frac{0.12V^2}{R_{ESR} (DC) \cdot m}$$

## 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

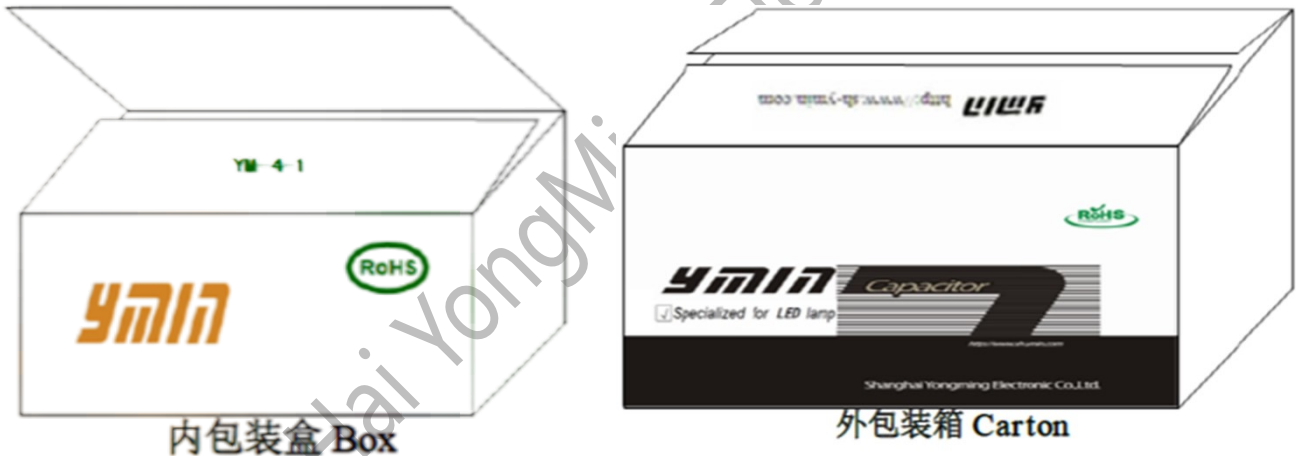
|                               |                              |                  |         |
|-------------------------------|------------------------------|------------------|---------|
| Certification 合格证             |                              |                  |         |
| Product name:<br>产品名称         | SDB_3.0V_1.0F_8*13_-10%~+30% |                  |         |
| LOT NO:<br>生产批号               | YM211102707-47               | QTY:<br>数量       | 500 PCS |
| Production date<br>生产日期       | 2022.05.03                   | Part NO:<br>产品编号 | 646852  |
| Customer Item Code:<br>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/<br>Product name:                | SDB_3.0V_1.0F_8*13_-10%~+30% |        |           |
| 产品编号/<br>Product NO:                  | 646852                       | 数量/QTY | 16000 PCS |
| 批号/LOT NO:                            | SC0280011622                 | 净重/NW  | KG        |
| 生产日期/<br>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 Packing according to the picture below



### 10.3 包装数量 pack number

| 小袋数量 pcs<br>Small bag number | 盒装数量 pcs<br>Box number | 箱装数量 pcs<br>Carton Packing quantity |
|------------------------------|------------------------|-------------------------------------|
| 100                          | 800                    | 4800                                |

## 11.使用注意事项 Notice:

11.1 超级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。

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

11.2 超级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 EDLC, it will cause electrolyte chemolysis, meanwhile the capacitance will decrease and ESR increase.

11.3 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；

EDLC 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 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；

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

11.5 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的问题：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 EDLC is used as power back up, pls consider the instantaneous voltage drop due to large inner resistance:  $\Delta V=IR$

11.6 使用环境：超级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 EDLC in humidity >85% or toxic environment.

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

11.8 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；

Soldering-1: Do not let EDLC touch the joint point when EDLC 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 EDLC body is not touching the PCB while soldering to avoid the welding material going inside the capacitor.

11.10 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；

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 的印刷电路板，焊接过程应为 260°C，时间不超过 5s；

Soldering-4: Aviode over heart while soldering. Ex: While use EDLC 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，需得到上海永铭电子股份有限公司技术的支持；

Condition of use: When EDLC are used in series connection should be assured that work voltage on each capacitor is in balance. Pls contact us when you use the EDLC in series connection.

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超级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 EDLC, pls contact Shanghai Yongming Electronic or refer the datasheet we provided.

## 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<br>Information mentioned<br>in the data sheet | 特殊信息<br>Special information you<br>need | 现在标准<br>Standard | 需求标准<br>Special requirement |
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公司名称 Company Name: \_\_\_\_\_

签名及联系方式 Sign: \_\_\_\_\_

日期 Date: \_\_\_\_\_



企业公众号



技术支持