



湖南艾华集团股份有限公司
HUNAN AIHUA GROUP CO., LTD

Tel: (0737)6184466 Fax : (0737)6180493

[Http://www.aihuaglobal.com](http://www.aihuaglobal.com)

客户Customer:海宜通

日期Date: 2019.8.28

承认书 SPECIFICATION

种 类: 叠片式聚合物固体电容器

DESCRIPTION: Multi-layer Polymer Aluminum Solid Capacitors

艾华料号AISHI P/N: SA20EM471A28R06XXX

系 列 **SERIES : A2**

产品尺寸 **PRODUCT SIZE: 7.3*4.3*2.8**

编 号**FILENUMBER: GRS-DC-1908031**

| |
|----------------|
| 批准 APPROVED BY |
| |

| 制作PREPARED BY | 审核CHECKED BY | 批准APPROVED BY |
|--|--|---|
|  肖兰 技术部 |  帅红 技术部 |  黄文彦 技术部 |

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| File Description | File number: |
| Specification-A1 | GRS-DC-1908031 |

制订/修订履历表 **Make/revised curriculum vitae**

| 编号NO. | 版本Version | 日期Date | 内容Content |
|----------------|----------------|-----------|-----------------|
| GRS-DC-1908031 | CRS-2018-A/ 01 | 2019.8.28 | Initial Release |
| | | | |

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|---------------------------|--------|--------------------|---------|-----|------|---|
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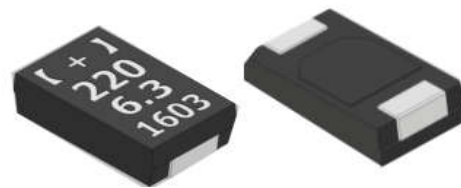
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File number

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GRS-DC-1908031

A2 Series



一. 概述 Scope

此承认书使用于含有导电高分子聚合物的叠层固态电解电容（This acknowledgement is used for a laminated solid electrolytic capacitor containing a conductive polymer .）

二. 产品介绍 Product Introduction

- 耐久性 :2000 hours at 105 °C（endurance: 2000 hours at 105 °C）
- 低等效串联电阻（Low ESR）
- RoHS无铅（RoHS Compliant and lead-free）
- 推荐应用：系统主板，显示卡，小型充电器，智能电视等等

Recommended application: system motherboard, video card, small charger, smart TV etc.

三. 规格特性表 Specification

| 序号 (N.O.) | 艾华料号 AISHI P/N | 额定工作电压 Voltage (V.DC) | 电容量 Capacitance (120Hz,20°C) (μF) | 尺寸 Size (L×W×Hmm) | 运行温度范围 Oper Temp range (°C) | 浪涌电压 Surge voltage(V.DC) |
|--------------|-----------------------------------|---|--|---------------------------------------|--|--------------------------------|
| 1 | SA20EM471A28R0 6XXX | 2.5 | 470 | 7.3*4.3*2.8 | -55~105 | 2.9 |
| | 电容量公差 Capacitance Tolerance | 阻抗 E.S.R (100KHz) (20° C)(mΩ) (max) | 最大漏电流 Leakage current (25°C)(μA max) | 损耗因数 D.F.(%) (120Hz,20°C) (max) | 纹波电流Ripple Current (100KHz,20-105°C) (mA.rms) | 寿命life(Hours) |
| | -20%~+20% | 6 | 117.5 | 6 | 3500 | 2000 |

Temperature Compensation Multipliers for Ripple Current

| ≤ 45°C | 45°C < T ≤ 85°C | 85°C < T ≤ 105°C |
|--------|-----------------|------------------|
| 1.0 | 0.7 | 0.25 |

※ 以上特性表根据不同规格而变化； The above characteristics changes according to different specifications.

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STANDARD MANUAL

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四. 电性能测试项目 Electrical performance test project

| NO. | 项目 Item | 测试方法 Test method | 判定标准 Judging standard |
|-----|--------------------------------------|--|---|
| 1 | 标称电容量范围 Capacitance Range | 测试频率 Test frequency: (120Hz) 测试温度 Test temperature: 20℃, 测试电压 Test voltage: +1Vr.m.s 测试电路: 等效串联电阻 Test circuit: equivalent series resistance | 用LCR仪测量并参照规格特性表 [Measure by LCR meter and comply with specification] |
| 2 | 损耗因数 Dissipation Factor (tan δ) | | 用LCR仪测量并参照规格特性表 [Measure by LCR meter and comply with specification] |
| 3 | 直流漏电流 DC Leakage Current | 串联电阻 Series resistor: 1000 ohm 电压: 额定电压; Voltage: Rated Voltage 充电后2分钟进行测量; Measuring after 2 minutes of application 如有疑问先按以下内容进行预测试; If there are any questions, the following contents are pretested. ▪ 温度: 室温; · Temperature: room temp. ▪ 电压: 额定电压 voltage : Rated Voltage ▪ 串联电阻: 1000 ohm; Series resistor: 1000 ohm ▪ 充电时间: 30 min. Charging time: 30 min. | 用LC仪测量并参照规格特性表 [Measure by LCR meter and comply with specification] |
| 4 | 等效串联电阻 ESR | ▪ 测试频率 Test frequency: (100KHz±10%) ▪ 测试温度 Test temperature: 20℃, ▪ 测试电压 Test voltage: +1Vr.m.s | 用LCR仪测量并参照规格特性表 [Measure by LCR meter and comply with specification] |
| 5 | 耐浪涌电压 Surge voltage | 额定浪涌电压充电30±5秒后, 在室温下放电5±0.5分钟, 共重复1000次; 每次循环的时间为6±0.5分钟; 测试温度为15℃-35℃。 After charging the capacitor at rated surge voltage for 30±5 seconds, discharge it for 5±0.5 minutes at room temperature. The time of each cycle was 6±0.5 min, the total cycle number is 1000, and the test temperature is 15 -35℃. | 漏电流 ≤ 规格值 Leakage current ≤ specified value; 容量变化率在±10%内; Capacitance change rate was ±10% 损失角 ≤ 规格值 tanδ ≤ specified value. |

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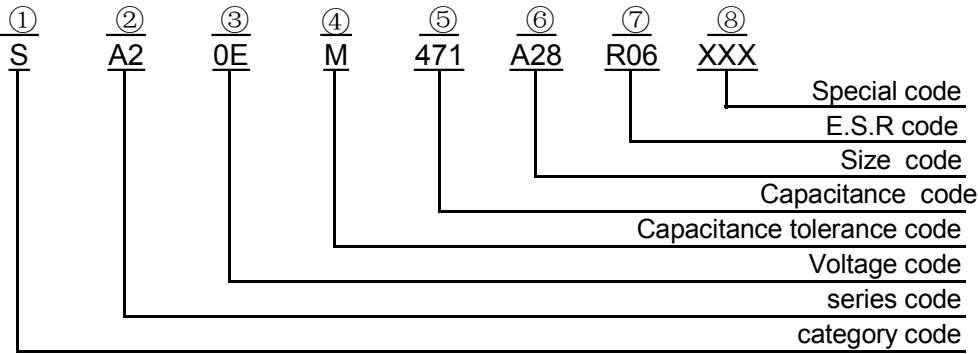
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| No. | 项目Item | 测试方法Test method | 判定标准Judging standard |
|-----|--|---|---|
| 6 | 振动试验 Vibration Test | 频率Frequency: 10 to 55Hz (1 minute interval/10→55→10Hz); 整体偏移 Specified amplitude 0.75mm 2小时/轴 (共6小时) Duration : 2 hours / axial (Total 6 hours) | 容量在30分钟内测量, 与初始值相比不应有较大的差异, 其改变在±5%以内; Compared with the initial value, capacitance tested within 30 minutes should not have greater differences, range is within ±5%. |
| 7 | 可焊性 Solderability | <ul style="list-style-type: none"> 温度Temperature : 235 ± 5 °C 持续时间Duration: 2 ± 0.5秒; | 3D显微镜: 至少95%的浸渍表面覆盖有新的焊料 3D microscope: at least 95% of surface area covered with new solder. |
| 8 | 稳态湿热(恒稳态) Resistance to damp heat(steady state) | <ul style="list-style-type: none"> 温度Temperature : 60±2°C 相对湿度Relative humidity : 90% ~ 95%; 持续时间Duration : 500 (-0/+24) hrs; 使用电压: 无负荷Applied voltage : without load | 容量变化分电压别如下Capacitance variation of the voltage is not as follows; <ul style="list-style-type: none"> <.2~2.5V DC Change rate: +70, -20%; <.4.0V DC Change rate: +60, -20%; <.6.3V~7V DC Change rate: +50, -20%; <.8.0~25V DC Change rate: +40, -20% 损失角 < 200 %初始值Initial specified value; 漏电流 ≤ 0.3CV |
| 9 | 贮存寿命测试 Storage life test | 将电容在105±2°C的烘箱中放置500小时, 然后在室温下放置2小时, 再进行测试 Store the capacitor in 105±2°C oven for 500 hours, then cool the capacitor at room temperature for 2 hours before measurements. | <ul style="list-style-type: none"> 容量变化率在±20%内; Capacitance change rate is within ±20% 损失角 ≤ 规格值的150% tanδ ≤ 150% of the initial specified value; 漏电流 ≤ 规格值; Leakage current ≤ initial specified value. |
| 10 | 负荷寿命试验 Load Life Test | 电容在105±2°C, 加载直流电2000小时后, 需在室温下放置2小时才可进行测试 Apply DC rated working voltage at 105 ± 2°C for 2000 hours continuously, then cool the capacitor at room temperature for 2 hours before measurements. | <ul style="list-style-type: none"> 容量变化率在±20%内; Capacitance change rate is within ±20% 损失角 ≤ 规格值的150% tanδ ≤ 150% of the initial specified value; 漏电流 ≤ 规格值; Leakage current ≤ initial specified value. |

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五、物料编码Material code



1. 类别编码Category Code

| | |
|-------------------|---------------------|
| 编码Code | S |
| 类别编码Category Code | 固态电容Solid Capacitor |

2. 系列编码Series Code

| | | | |
|-----------------|-----|-----|-----|
| 编码Code | AO | A1 | A2 |
| 系列编码Series Code | A09 | A19 | A28 |

3. 电压编码Voltage Code

| | | | | | | | | | | |
|-----------------------|----|-----|----|-----|----|----|----|----|----|----|
| 编码Code | 0B | 0E | 0G | 0J | 0Q | 1A | 1C | 1E | 1V | 1H |
| 电压编码Voltage Code(W.V) | 2 | 2.5 | 4 | 6.3 | 7 | 10 | 16 | 25 | 35 | 50 |

4. 电容公差Capacitance tolerance

| | | | | | | | | | | | | |
|---------------------|-------------|-------------|-------------|-------------|-------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 编码Code | Y | K | M | Q | V | A | C | J | B | W | G | L |
| 电容公差 Capacitance | -25~ +20 | -10~ +10 | -20~ +20 | -10~ +30 | -10~ +20 | -0~ +20 | -5~ +20 | +6~ +20 | -10~- 20 | -15~ +15 | -15 ~+20 | -35 ~+10 |

5. 电容量编码Capacitance Code

| | | | | | | | | | | | |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 编码Code | 4R7 | 100 | 150 | 220 | 330 | 470 | 680 | 820 | 101 | 151 | 181 |
| 电容量Capacitance (uF) | 4.7 | 10 | 15 | 22 | 33 | 47 | 68 | 82 | 100 | 150 | 180 |
| 编码Code | 201 | 221 | 331 | 471 | 561 | | | | | | |
| 电容量Capacitance (uF) | 200 | 220 | 330 | 470 | 560 | | | | | | |

6. 尺寸编码Size Code

| | | | |
|---------|---------|---------|---------|
| 编码Code | A09 | A19 | A28 |
| (L×Wmm) | 7.3×4.3 | 7.3×4.3 | 7.3×4.3 |
| 高度T(mm) | 0.9 | 1.9 | 2.8 |

7. ESR编码E.S.R Code

| | | | |
|--------|-----------|--------|-----------|
| 编码Code | E.S.R(mΩ) | 编码Code | E.S.R(mΩ) |
| R04 | 4.0 | R10 | 10 |
| R06 | 6.0 | R12 | 12 |
| R07 | 7.0 | R15 | 15 |
| R09 | 9.0 | R20 | 20 |
| RA0 | 100 | RB0 | 200 |
| RA2 | 120 | RB2 | 220 |

8. 特殊编码Special Code

| | |
|------------------|--------------|
| 编码Code | XXX |
| 特殊编码Special Code | Special Code |

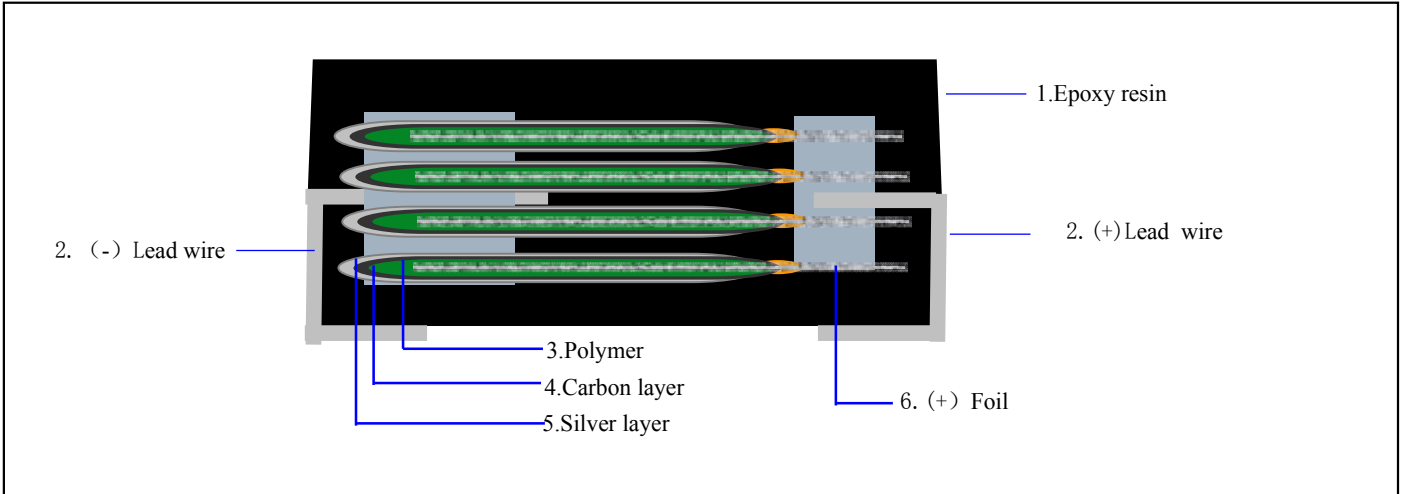
备注：此代码为预留代码，如客户有特殊要求时. 用于区分常规品与订制品，例如“F”为客户专用定制

备注：例如编码“RA0”中“A”表示百位数“1”，“0”代表十位数为0，“B”表示百位数“2”，表中未体现的ESR值以此类推。

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六. 内部结构图Internal structure diagram



内部结构说明The internal structure description:

树脂Epoxy Resin: 环氧树脂, 用作密封; Epoxy resin is used for sealing;

引线solid copper leads: 固体镀锡铜, 用作引出; Solid copper leads plate with tin;

导电高分子聚合膜: Conductive polymer film:

碳浆层: 降低阻抗, 填充聚合物的空缺; Carbon pulp layer: fill in the interspace on polymer surface and reducing ESR.

银浆层: 降低阻抗, 起连接导电作用; Silver pulp layer: connection and conduction, reducing ESR.

铝箔: (正极) 高纯铝; Aluminum foil (Anode): High pure aluminum.

七、外部结构图及尺寸; External structure and size;

| Series Code | L(±0.3) | W(±0.2) | T(±0.2) | P(±0.2) | W1(±0.2) |
|-------------|---------|---------|---------|---------|----------|
| A1 | 7.3 | 4.3 | 1.9 | 1.3 | 2.4 |

| | | | | | | |
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八. 标识Marking



1、年份代码Year code

| 代码Code | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|--------|------|------|------|------|------|------|------|------|
| 年份year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |

2、月份代码Month Code

| 代码Code | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 |
|---------|------|------|------|------|-----|------|------|------|-------|------|------|------|
| 月份Month | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sept. | Oct. | Nov. | Dec. |

3. 电压代码Voltage Code

| 代码Code | 2 | 2.5 | 4 | 6.3 | 7 | 7.5 | 16 | 25 | 35 | 50 |
|---------------------|---|-----|---|-----|---|-----|----|----|----|----|
| 电压Voltage Code(W.V) | 2 | 2.5 | 4 | 6.3 | 7 | 7.5 | 16 | 25 | 35 | 50 |

| | | | | | | |
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九. 包装Packing

1. 包装标签标示Packing Label Mark

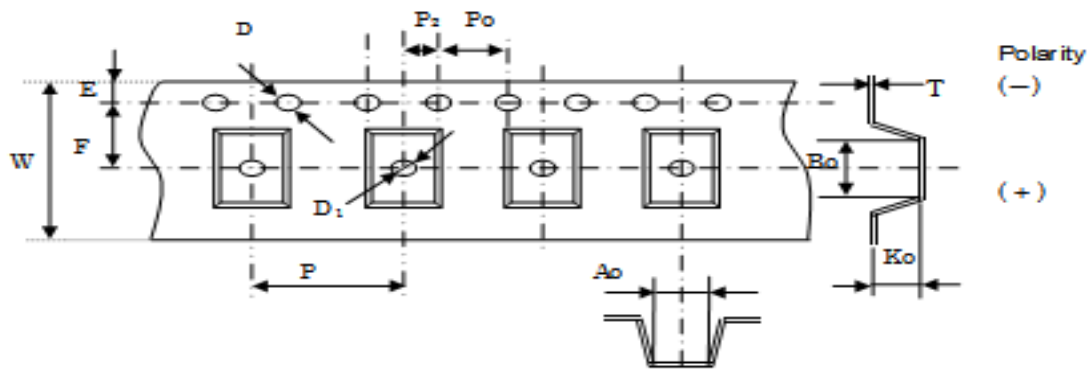
>下面的项目应该标志在标签上(the following items should be marked on the label)

(盒内或包内Inside box or bag)

1)系列series 2)料号P/N 3)额定电容Rated capacitance 4)额定电压Rated Voltage

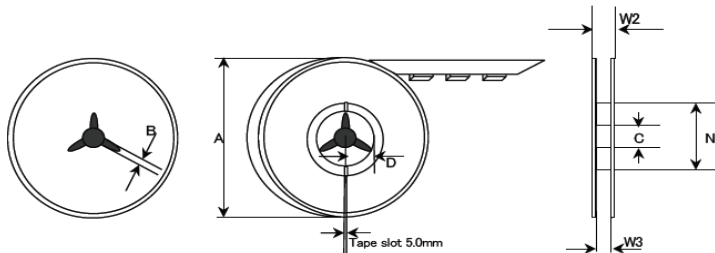
5)数量quantity 6)尺寸size; 7)批号LOT Number :

2. 盒带尺寸图 Outer dimensions (单位Unit:mm)



| Series Code | $W \pm 0.2$ | $P \pm 0.2$ | $A_0 \pm 0.1$ | $B_0 \pm 0.1$ | $K_0 \pm 0.1$ | $D \pm 0.1$ | $E \pm 0.05$ | $P_0 \pm 0.1$ | $T \pm 0.005$ | $P_2 \pm 0.1$ |
|-------------|-------------|-------------|---------------|---------------|---------------|-------------|--------------|---------------|---------------|---------------|
| A2 | 12 | 8.0 | 4.6 | 7.6 | 2.16 | 1.5 | 1.75 | 4.0 | 0.229 | 2.0 |

3. 盘装结构与尺寸Disc structure and dimensions



| Series Code | $A \pm MA$ X | $B \pm 0.18$ | $C \pm 0.2$ | $D \pm 0.1$ | $N \pm 1.0$ | $W_2 \pm 1.0$ | $W_3 \pm 1.5$ |
|-------------|-----------------|--------------|-------------|-------------|-------------|---------------|---------------|
| A2 | 330 | 2.0 | 13.0 | 11.9 | 100 | 17.5 | 13.5 |

4. 包装数量Number of packages

| | |
|-------------|------|
| Size | pcs |
| 7.3*4.3*2.8 | 2500 |

| | | | | | | |
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十. 使用注意事项Cautions for use

1. 使用注意事项Cautions for use

极性: 聚合铝电解电容器是有极性的.使用时不可反向充电. 如果反向充电,其会损坏电容氧化膜和电容器.

- 1]. Polarity: Polymer Aluminum Electrolytic Capacitors have polarity. When used, it can not be reverse charged, because it will damage the capacitor oxide film and capacitors.

允许纹波电流:纹波电流的使用不可超出"特性表"中所示的允许数值.如果超出,其会导致电容器发热并损坏电容器.电压使用总量及AC电压峰值不可超过额定电压. 电压使用总量及AC电压峰值也不允许有反向电压.

- 2]. The use of the ripple current is not beyond the allowable values shown in the "characteristic table", which can cause the capacitor to heat and damage the capacitor. The total voltage and AC voltage peak value can not exceed the rated voltage.

2.保管条件Storage condition

此产品在使用防潮袋于以下条件密封包装后的保证期为2年.; 本产品需要防潮保存, 湿度敏感等级为level 3.

- 1]. After packaging in a moisture-proof bag and under the conditions below with sealed packaging,the quality guarantee period of this product is 2 years.The products should put in the dry environment, level is 3

车间产品湿敏等级按IPC/JEDEC J-STD-20MSL Classifications3管控

建议贮存环境:室温: 5-30℃ Recommended storage environment: Room temperature: 5-30 degree

湿度不大于60%RH, Humidity: no more than 60%RH

聚合铝电解电容器需贮存在干燥环境中,避免阳光照射和水珠凝结,以下问题可能会出现:

- 2]. There is the polymerization of aluminum electrolytic capacitor storage in dry environment, avoid sunlight and dew condensation, the following problems may occur:

①在开始使用时漏电流会升高并损坏电路

At the beginning of the leakage current will increase and damage the circuit.

②树脂吸收的水汽会蒸发并于表面散热,损坏树脂;

The water vapor that is absorbed by the resin will evaporate and heat the surface of the resin..

- 3]. 开启防潮包装袋后应保持电容器的干燥度. 如果打开包装袋后在建议的贮存环境下超过1周时, 建议按以下条件进行电压充电和烘烤以分别应对以上第2]. -①-② 点所出现的问题;

The dry degree of the capacitor should be maintained after the packaging is opened. If it is opened for 1 week after opening the package, it is suggested that the voltage charge and the baking should be performed cording to the following conditions; as countermeasures against the problems ① and ② in <2> above respectively.

①建议电压条件: 电压: 额定电压, 充电时间: 30分钟, 温度: 25℃; 电流限制电阻: 1000Ω(串联)

Recommended voltage conditions: Applied voltage: rated voltage

Charging time: 30 minutes, temperature: 25, current limiting resistor: 1000 (Series)

②建议烘烤条件: 温度 60(+0, -5)℃; 烘烤时间: 168小时;

Recommended baking conditions: Temperature: 60(+0, -5) degree C Time: 168 hours

| | | | | | | |
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4.回流焊接Reflow

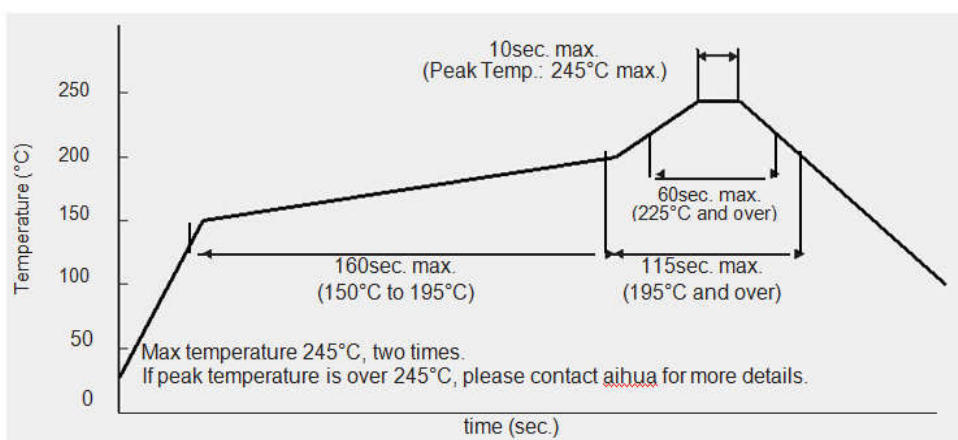
① 10.4.1回流焊的测试方法见下图，循环不超过两次

Reflow soldering is carried out according to the following conditions, The cycles of reflow soldering: Twice (max)

② 10.4.2当在插板或焊接过程中，电容器不能受到过大的挤压，这可能会损坏电极端，或导致电性能发生变化。

Please not to apply excessive force to zhe capacitor during insertion as well as after soldering , which will damage the electrode end, or/and causing changes of electrical performance.

Recommended Reflow Profile



5.处置Disposal Method

聚合铝电解电容器需按法律以工业废物进行合理处置.

Polymer aluminum electrolytic capacitors need to be in accordance with the law to the rational disposal of industrial waste.

6.建议Suggestion

- ① 在使用时请评估贵司产品贴装状态.Please evaluate your product placement status in use.
- ② 不在此规格书所提及用途之外使用此产品.This specification mentioned for purposes other than the use of this product.
- ③ 我们不变在规格书中提及生意的合同事宜,图纸及其它技术性文件. 故此,如贵司有提及我们责任范围,如品质保证期,PL,工业财产,技术文件的出口管制等,我们将视其为无效.请在基本的合同文件中单独叙述这类事宜.

We mentioned in the specification of the same business contract, drawings and other technical documents. Therefore, if you have mentioned the scope of our responsibilities, such as quality assurance, PL, industrial property, technical documents of export control, we will be considered invalid.Please describe the matters in the basic contract file alone.

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