针对客户的预防措施和指导原则

PRECAUTION FOR USE OF CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS

Select the capacitors suited to their installation and operating environment, and use them within the performance limits prescribed in their catalog or product specifications, please pay attention to the points listed below.

- Allowable operating temperature range is exceed
- PCB board cleaning conditions
- Reverse voltage
- Voltage exceeds rated working voltage
- Rapid charging and discharging
- Severe vibration or mechanical shock

Please pay attention to right circuit pattern design. When you fail to follow above precautions, you can expect the leakage of electrolyte or opening of the vent in a capacitor because of sudden heating and increased internal pressure.

CAUTION DURING CIRCUIT DESIGN

1. Rated voltage

If a voltage exceeding the capacitor's rated voltage is applied, the capacitor may be damaged as leakage current increases. When using the capacitor with AC voltage superimposed on DC voltage, care must be exercised that the peak value voltage, care must be exercised that the peak value of AC voltage does not exceed the rated voltage.

2. Operating Temperature

Do not use Aluminum Electrolytc Capacitors at temperature which exceeds the specified operating temperature range. Applying capacitors surpassing guaranteed conditions may cause destruction due to rappid characteristic det-erioration. Where, temperature of a capacitor in-cludes radiation heat of Power transistor, IC, Re-sitor, etc. and self heat by ripple current as well as ambient temperature of a set.

3. Ripple Current

Do not apply an over current that exceeds the rated ripple current specified for the capacitors. Excessive ripple current will increase heat production within the capacitors, causing the capacitors to be damaged as follows:

- Shorten lifetime
- Open pressure relief vent
- Short circuit

When the value of direct bias voltage is small, even though you apply permissible ripple current, reversed voltage can be occurred. Please take deep attention to possible reversed voltage.

导电性高分子混合型铝电解电容器的使用注意事项

使用电容器时，必须在产品目录或承认愿记载的范围内设置，使用环境选定时要注意下记事项。

- 超过允许使用温度。
- PC板清洗条件。
- 逆电压。
- 超过额定工作电压的过电压。
- 急速充放电。
- 严重的振动和机械冲击。

因上记情况发生时会造成急剧发热或内压上升，电解液漏出或安全阀打开、发热、起火的现象，可能危及人身，所以电路设计时要注意。

电路设计注意事项

1. 额定电压

如果加载的电压超过额定电压，电容器的漏电流增大破坏电容器，当在直流电压中叠加交流电压使用时，一定要注意交流电压的峰值应在额定电压以下。

2. 使用温度

不能超过规定的工作温度范围使用电容器，超过保证条件使用电容器会导致急剧的特性劣化情况。使用温度不仅要确认Set周围的温度，还包括Set内的发热体（Power TR、IC、Re-sitor等)的放射热和纹波电流造成的自发热等电容器的实际温度。

3.纹波电流

不要施加超过电容器额定纹波电流的过电流。过大的纹波电流会增加电容器内部的发热，导致电容器损坏如下：

- 缩短生命周期
- 打开泄压口
- 短路

当直流偏置电压很小时，即使在允许纹波电流下加载的直流偏置电压值很小，也可能发生引加逆电压，要在不引加逆电压的范围内使用。

4. Charge and discharge

Do not use capacitors in circuits intended for rapid charge and discharge cycle operations. If capacitors are used in the circuits that repeat a charge and discharge with a large voltage drop or a rapid charge and discharge at short interval cycle, capacitance will decrease and/or the capacitors will be damaged by internal heat generation. Consult with samyoung about specially designed capacitors for rapid charge and discharge.

5. Polarity

Capacitors are polarized.

Naver apply a reverse voltage or AC voltage. Connecting with wrong polarity will short-circuit or damage the capacitor with the pressure relief vent opening early on. To identify the polarity of a capacitor, see the relevant diagram in the catalogs or product specifications, or the polarity marking on the body of the capacitors.

6. Insulation

Aluminum case, cathode lead wire, anode lead wire and circuit pattern should be electrically isolated.

7. Usage Environment

The following environment should be avoided.

1) Direct contact with water, salt water or oil, or high condensation environment.
2) Direct sunlight.
3) Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and its compounds, bromine and its compounds and ammonium.
4) Ozone, ultraviolet rays or radiation.
5) Extreme vibration or mechanical shock that exceeds limits in the catalogs or product specifications.

8. Mounting

Capacitors contain paper separators and electric-conductive electrolyte that contains organic solvent as main solvent material, both of which are flammable. If the electrolyte leaks onto a printed circuit board, it can erode the device circuit pattern, may short-circuit the copper traces, smoke and burn. Make sure of designing a PCB board as follows:

① Provide clearance space (2mm minimum) over the pressure relief vent of a capacitor to avoid blocking the corrent opening of the pressure relief vent for 10mm case diameter of capacitor.
② Do not locate any wire or circuit pattern over the pressure relief vent of a capacitor.
③ Avoid locating any heat source components near capacitors or on the opposite side of the PCB board under capacitors.
④ Design the solder land on the PCB board in accordance with the catalog or the product specification.
⑤ For radial capacitors, design the terminal holes on the PCB board to fit the terminal dimension of the capacitor.
⑥ Do not print any copper trace under the seal (terminal) side of a capacitor. When the electrolyte leaks out, it may occur circuit pattern short-circuit, and tracking or migration. Copper traces should be 1mm (preferably 2mm or more) spaced apart from the side of the capacitor body.
⑦ In designing a double-sides PCB board, do not locate any through-hole via or unnecessary hole underneath a capacitor.
⑧ In designing a double-sides PCB board, do not print any circuit pattern underneath a capacitor.

4.充放电

不要在用于快速充电和放电周期运行的电路中使用电容器。如果在电压下降大、反复充放电或短间隔周期快速充放电的电路中使用电容器，电容会减小，或因内部发热而损坏电容器。有关快速充放电的特殊设计的电容器，请咨询本公司。

5.极性

电容器是有极性的。

不要施加反向电压或交流电压。接极性错误会使泄压口过早开启的电容器短路或损坏。辨别电容器的极性，可参考产品目录或产品说明书中的相关图解，或电容器本体上的极性标记。

6.绝缘

铝壳和负引线、正引线与电路间应电隔离。

7.使用环境

应避免以下环境。

1）直接接触水、盐水或油类，或高冷凝环境。
2）阳光直射。
3）硫化氢、硫酸、亚硝酸、氯及其化合物、溴及其化合物、铵等有毒气体。
4）臭氧、紫外线或辐射。
5）超过产品目录或产品规格限制的极端振动或机械冲击。

8.安装

电容器含有以纸绝缘纸和有机溶剂为主要溶剂的导电电解质，两者都具有易燃性。如果电解液泄露到印刷电路板上，它会腐蚀设备电路图，可能导致铜线短路，冒烟或燃烧。在设计PCB板时，应注意以下几点：

①电容器的泄压口应留有至少2mm的间隙，以免堵塞电容器外壳直径10mm的泄压口的电流口。
②不要在电容器的泄压口上放置任何电线或电路。
③避免将热源元器件放置在电容器附近或PCB板的另一侧电容器下面。
④按照目录或产品说明书设计PCB板上的焊点。
⑤对于引线电容器，在PCB板上设计端子孔以适应电容器的端子尺寸。
⑥在电容器的密封(端子)侧不要印铜痕迹。当电解液漏出时，可能会发生电路图短路、跟踪或移动。铜走线距离电容器体的侧面为1mm(最好是2mm或更多)。
⑦在设计双面PCB板时，不要在电容器下方放置任何通孔或不必要的孔。
⑧在设计双面PCB板时，不要在电容器下方打印任何电路图。

9.Using capacitors for significantly safety-oriented applications

Consult with Samyoung in advance of usage of our products in the following listed applications.
1) Aerospaceequipment, 2) Power generation equipment such as thermal power, nuclear power etc., 3) Medical equipment, 4) Transport equipment (automobiles, trains, ships, etc.,) 5) Transportation control equipment, 6) Disaster prevention / crime prevention equipment, 7) Highly publicized information processing equipment, 8) Submarine equipment, 9) Other applications that are not considered general-purpose applications

10. Other

Design device circuits taking into consideration the following conditions:
①Electrical characteristics of a capacitor depend on the temperature and frequency. In designing the device circuits, consider the change in the characteristics.
② If using more than one capacitor connected in parallel, design the device circuits to balance the current flow in individual capacitors.
③If using more than one capacitor connected in series, connect shunting resistors in parallel with the individual capacitors to balance the voltage.

9.将电容器用于非常注重安全的应用

在以下列出的应用中使用我们的产品之前，请咨询本公司。
1）航空航天设备；2）火电、核电等发电设备；
3）医疗设备；4）运输设备(汽车、火车、船舶等)；
5）运输控制设备；6）防灾/预防犯罪设备；
7）信息处理设备高度公开；8）潜艇设备；9）不被认为是通用应用的其他应用。

10.其他

根据以下条件设计设备电路：
①电容器的电特性取决于温度和频率。在设计器件电路时，要考虑特性的变化。
②如果使用多个并联电容器，设计器件电路以平衡各个电容器的电流。
③如果使用多个串联电容器，则将并联电阻与单个电容器并联以平衡电压。

INSTALLING CAPACITORS

安装电容器

1. Installing

1) Do not reuse capacitors which already assembled.
2) The capacitors may accumulate charge maturally during storage. In this case, discharge through about 1kΩ resistor before use.
3) If capacitors have been stored at any conditions more than 35℃ and 75%RH for long storage periods of time more than the limits specified in the catalogs or product specifications, they may have high leakage current. In this case make pre-conditioning by applying the rated voltage treatment through a resistor of approximately 1kΩ
4) Confirm the rated capacitance and voltage of capacitors before installation.
5) Confirm the polarity of capacitors before installation.
6) Do not try to use the capacitors that were dropped to the floor and so forth.
7) Do not deform the can case of a capacitor.
8) Verify that the lead spacing of the capacitor fits the hole spacing in the PC board before installing the capacitors.
9) Do not apply severe vibration or mechanical shock.

1.安装

1）请勿重复使用已组装好的电容器。
2）电容器在贮存过程中自然积累电荷。在这种情况下，放电通过约1kΩ电阻器后再使用。
3）电容器在35℃、75%RH以上的条件下长时间储存，超过产品目录或产品规范规定的限值，可能会产生较大的漏电流。在这种情况下，通过约1kΩ的电阻器施加额定电压处理进行预处理。
4）安装前确认电容器的额定电容和电压。
5）安装前确认电容器极性。
6）不要尝试使用掉在地板上的电容器等。
7）请勿使用电容器的罐壳变形。
8）在安装电容前，请确认电容的引线间距与PC板上的孔距吻合。
9）请勿使用剧烈振动或机械冲击。

2. Soldering

The leakage current may increase due to thermal stress that occur during soldering. Ensure the soldering conditions meet the specifications.

2-1. Soldering with a soldering iron
1) Ensure the lead spacing of the capacitor meets the hole spacing on the PCB board.
2) Ensure the soldering conditions meets the approval sheet.
3) Soldering iron should not touch the capacitor's body.

2.焊接

由于焊接过程中产生的热应力，漏泄电流可能会增加。确保焊接条件符合规范要求。

2-1.用烙铁焊接
1）确保电容的引线间距符合PCB板上的孔距。
2）确保焊接条件符合规格书要求。
3）烙铁不得接触电容器本体。

2-2. Reflow soldering

1) Reflow soldering must not be used for radial type capacitors.
2) Soldering conditions (preheat, solder temperature and reflow time) should be within the limits prescribed in the catalogs or product specifications.
3) For setting a degree of heating infrared heaters, consider that the infrared absorption may vary in the color and materials of a capacitor.
4) The allowable number of reflow passes is specified in the catalogs or product specifications.

3. Handling after soldering

1) Do not lean or twist the capacitor's body after soldering on PCB.
2) Do not pick-up or move PCB by holding the soldered capacitor.

4. Cleaning PCB boards

4-1 Agents must be avoided

1) Do not wash boards by using the following agents.
- Halogenated solvents
- Alkali system solvents
- Petroleum system solvents
- Xylene, Acetone

2) Monitor conductivity, PH, specific gravity and the water content before cleaning boards.
3) Influence of cleaning agents (Halogenated solvents) capacitors are easily affected by halogen ions, particularly by chloride ions. When halogen ions enter the inside of the capacitor, the capacitor may be failed due to corrosion of capacitor's foil.

4-2. Recommended Agents

Isopropyl Alcohol(IPA) or water cleaning method : One of immersion, vapor cleaning, ultrasonic Maximum cleaning time : 5minutes. (Chip type : 2minutes.)

* Do not use AK225AES

5. Using adhesives and coating materials

1) Do not use halogenated adhesives and coating materials.
2) Flux and cleaning agents should be removed before using adhesives or coating materials.
3) Do not cover up the whole surface of the solid capacitor. Make coverage only partial. (The sealing area 30%)

CONDITION OF STORAGE / USE

If capacitors temperatures caused by such things as direct sunlight, the life of the capacitor may be adversely affected. Storage in a high humidity atmosphere may affect the sold erability of lead wires and terminals.

1. STORAGE AREA

- Do not store capacitors at a high temperature and high humidity. Store the capacitors indoors at a temperature of 5 to 35℃ and a humidit of less than 75%RH.
- Store the capacitors in places free from water, oil or salt water
- Store the capacitors in places free from toxic gasses (hydrogen sulfide, sulrurous acid, nitrous acid, chlorine, ammonium, etc.)
- Store the capacitors in places out of ozone, ultra violet rays or radiation.
- Keep capacitors in the package

2-2.回流焊

1）引线型电容器不得使用回流焊。
2）焊接条件（预热、焊接温度、回流时间）应在产品目录或产品规定的范围内。
3）在设置加热红外线加热器的程度时，考虑到电容器的颜色和材料可能会对红外线的吸收有所不同。
4）在产品目录或产品规范中规定了回流的允许次数。

3.焊接后处理

1）焊接后,不可将PCB板上的固体电容器倾斜或扭曲。
2）焊接后,不可抓着固体电容器的本体提起或移动PCB板。

4.清洗PCB板

4-1.不可使用的清洗剂

1）请勿使用以下清洗剂清洗板材。
·卤化溶剂
·碱系溶剂
·石油系统溶剂
·二甲苯、丙酮

2）清洗基板前，请确认清洗剂的电导度、pH值、比重和含水率。
3)卤素类清洗剂的影响: 固体电容器很容易受卤素离子的影响(特别是氯离子),当卤素离子侵入到电容器的内部,由于电容 器箔的腐蚀,从而导致一些破坏性故障。

4-2.推荐代理

用异丙醇或水的清洗方法：
浸泡、蒸汽清洗、超音波
最大清洗时间：5分钟(但CHIP TYPE是2分钟)

* 不使用AK225AES

5.产品的固定剂和涂层剂

1) 请不要使用含有卤素类溶剂的固定剂和涂层剂。
2) 在固定剂和涂层剂使用前,请清洗助焊剂和清洗剂。
3) 固体电容器封口处不可全部被堵住，只能覆盖一部分(封口处的 30%以下)

保管/使用条件

电容器如果保管在直射阳光和高温场所时，会对其寿命造成坏的影响；且如果在潮湿的场所保管时，要考虑到引线和端子的焊接性会变坏。

1.保管场所

- 不要将电容器保管在高温高湿的环境中，请保管在室温5~35℃，湿度75%以下的环境中。
- 不要让水、油或盐水污染电容器。
- 不要将电容器保管在有害气体（硫化氢、亚硫酸、亚硝酸、氯、氨等）漏出的环境中。
- 不要保管在臭氧、紫外线及放射线照射的环境中。
- 请在包装完了的状态下保管。

2. CONDITIONS OF USE

The following environment should be avoided when using capacitors.

- Damp conditions such as water, saltwater spray, or oil spray or fumes, High humidity or humidity condensation situations.
- Hazardous gas/fumes such as hydrogen sulfide, sulfurous acid gas,nitrous acid, chlorine gas or ammonia.
- Exposure to ozone, ultraviolet rays or radiation.

3. VOLTAGE TREATMENT

If the capacitor is allowed to stand for a long time, its withstand voltage is liable to drop, resulting in increased leakage current.
If the rated voltage is applied to such a product, a large leakage current occurs and this generates internalheat, which damaged the capacitor.
Of the electrolytic capacitor is allowed to stand for a long time, therefore, use it after giving voltage treatment. It is recommended to apply DC rated voltage to the capacitor for a minimum of 30minutes through 1 kΩ of protective series resistor.

4. RECOVERY VOLTAGE

After discharged aluminum electrolytic capacitor, the voltage will be increasing again. This phenomenon is called by “Recovery Voltage”, it happens very often and commonly for all aluminum electrolytic capacitors. In this case, discharge through a 1 kΩ resistance before use at your process, because you may have trouble on sensitive device and frighten a person working with the capacitor.

DESTRUCTING CAPACITORS

In case of destructing our capacitors, kindly take following instructions.

- Burn capacitors up after making holes on them or scrapping. When you try to destrory them by fire, you may expect explosion in the capacitors.
- For incinerating capacitors, apply a high temperature incineration. Incinerating them at temperatures lower than that may produce toxic gases such as chlorine.
- When you do not have burning facilities, please contact special industrial wastes processing companies.

ABOUT AEC-Q200

- The Automotive Electronics Council (AEC) was originally established by American major automotive manufactures. Today, the committees are composed of representatives from the sustaining Members of manufacturing companies in automotive electrical components. It has standardized the criteria for “stress test qualification” and “reliability test” for the electronic components. AEC-Q200 is the reliability test standard for approval of passive components, it has been specified test subjects and quantity etc. for each components. Criteria of reliability tests for Capacitors are also described in this.

2. 使用条件

请不要在以下环境中使用电解电容器。

- 溅水、靠近盐水、油、潮湿、结露的环境。
- 充满有害气体（硫化氢、亚硫酸、亚硝酸、氯、氨气等）的环境。
- 臭氧、紫外线及放射线照射的环境。

3. 电压处理

电解电容器长期放置会有耐压下降、漏电流增大的倾向。如果直接给产品引加电压，会由于过大的漏电流使内部发热造成损坏；所以要对长期放置的产品进行电压处理后再使用。
电压处理是通过1kΩ左右的电阻引加直流额定电压最少30分钟。

4. 再生电压

铝电解电容器放置时，会有电压上升的现象，这种再生电压现象在铝电解电容器中是常见现象。使用电容器的敏感装置时，由于再生电压会发生故障或使作业者受惊，所以作业前请通过1kΩ的电阻使电容器放电。

废弃处理

电容器废弃处理时请按照下面方法进行。

- 因为销毁时电容器有爆破现象，所以请在电容器上打孔或充分毁坏后进行销毁。
- 对于焚烧电容器，应用高温焚烧。在低于这个温度下焚烧，它们可能会产生氯气等有毒气体。
- 电容器不能销毁时，请交给专业的工业废弃物处理厂进行处理。

关于 AEC-Q200

汽车电子委员会(AEC)原来依照美国的主要汽车制造公司设立的。如今，是由汽车电子部品生产公司的支持会员们的代表组成的。该委员会已经为电子部品的“负荷试验资格”和“信赖性试验”设立了评估标准。AEC-Q200是为了承认无源元件而形成的信赖性试验标准，其中对试验项目、数量、其他明细等进行了详细说明。铝电解电容器的信赖性试验基准也有描述。

As customer requirement, Samyoung Electronics has submits the test results according to AEC-Q200 for the Aluminum Electrolytic Capacitors used in automotive applications to increase in recent years. Please contact us for more information.

根据顾客的要求，三莹电子最近几年间，关于汽车部品适用的铝电解电容器依据AEC-Q200的基准将试验结果提出。如果有更多的信息请联系我们。

OTHERS

- Since it has possibilities for electric shock or burns, kindly discharge it at the level of 1kΩ in advance.(sufficient and safe resistance values should be considered before applying)
- Capacitor case sizes and other product standards specified in this catalog may be changed or modified without notice for improvement of quality.
- For methods of testing, refer to KS C IEC 60384-4 (JIS C 5101-1, JIS C 5101-4)

其 他

- 为防止触电或烧伤，使用前请先通过1kΩ的电阻进行放电处理。
- 为了改善品质，产品目录中规定的产品尺寸或其他产品基准变更或修改时，恕不另行通知。
- 对于其他实验规格请参照 KS C IEC 60384-4(JIS C 5101-1,JIS C 5101-4)。