

铝电解电容器的使用注意事项

Notes On The Use Of Aluminum Electrolytic Capacitors

■ 电路设计

- (1) 在确认使用及安装环境时，作为按产品样本设计说明书所规定的额定性能范围内使用的电容器，应当避免在下述情况下使用：
- a.) 高温（温度超过最高使用温度）；
- b.) 过流（电流超过额定纹波电流）；
- c.) 过压（电压超过额定电压）；
- d.) 施加反向电压或交流电压；
- e.) 使用于反复多次急剧充放电的电路中；
- 另：①在电路设计时，请选用与机器寿命相当的电容器。

- ②机器性能有特殊要求时，可与研发人员探讨，制作适用的特规电容器。
- (2) 电容器外壳、辅助引出端子与正、负以及电路板间必须完全隔离；
- (3) 当电容器套管的绝缘不能保证时，在有绝缘性能特定要求的地方，请不要使用；
- (4) 请不要在下述环境下使用电容器；
- a.) 直接与水、盐水及油类相接触、或结露的环境；
- b.) 充满有害气体的环境（硫化物、H₂SO₃、HNO₃、CL₂、氨水等）；
- c.) 置于日照、O₃、紫外线及有放射性物质的环境；
- d.) 振动及冲击条件超过了样本及说明书的规定范围的恶劣环境；
- (5) 在设计电容器的安装时，必须确认下述内容：
- a.) 电容器正、负极间距必须与线路板孔距相吻合；
- b.) 保证电容器防爆阀上方留有一定的空间；
- c.) 电容器防爆阀上方尽量避免配线及安装其他元件；
- d.) 电路板上，电容器的安装位置，请不要有其他配线；
- e.) 电容器四周及电路板上尽量避免设计、安装发热元件；
- (6) 另外，在设计电器时，必须确认以下内容：
- a.) 温度及频率的变化不至于引起电性能变化；
- b.) 双面印刷板上安装电容器时，电容器的安装位置避免多余的基板孔和过孔；
- c.) 两只以上电容器并联连接时电流均衡；
- e.) 两只以上电容器串联连接时的电压均衡。

■ 元件安装

- (1) 安装时，请遵守以上内容：
- a.) 为了对电容器进行点检,测定电气性能时,除了卸下的电容器，装入机器中通过电的电容器请不要再使用；
- b.) 当电容器产生再生电压时，需通过约 1KΩ 左右的电阻进行放电；
- c.) 若电容器长期存放，漏电流可能增大，需通过约 1KΩ 左右的电阻加压处理；
- d.) 确认规格（静电容量及额定电压等）及极性后，再安装；
- e.) 不要让电容器掉到地上，掉下的电容器请不要再使用；
- f.) 变形的电容器不要安装；
- g.) 电容器正、负极间距与电路板孔距必须相吻合；
- h.) 自动插入机的机械手力量不宜过大；
- (2) 焊接时，请确认下面内容：
- a.) 注意不要将焊锡附着在端子以外；
- b.) 焊接条件（温度、时间、次数）必须按规定说明执行；
- c.) 不要将电容器本身浸入到焊锡溶液中；
- d.) 焊接时，不要让其 他产品倒下碰到电容器上；

■ On the circuit design

- (1) While madding confirmation on the environment for operation and installation, the following conditions should be avoided forthose capacitors with rated performance range specified in theproduct catalogue and design instructiona.
- a. High temperature (The temperature exceeding the Max.Operating temperature)
- b. Over-current (The current exceeding the rated ripple current)
- c. Over-voltage(The voltage exceeding the rated voltage)
- d. Applying reverse voltage or AC voltage
- e. To be used in the circuits with repeated sudden charge and Ddischarge
- Furthermore, during the circuit design, please select capacitors which match the lifetime of the machine
- (2) The capacitor can ,the auxiliary lead terminal used forincreasing the installation strength,the positive & negative electrode and the PCB should be separated from each othertotally.
- (3) If the insulation property of the capacitor sleevecan not be ensured, please don't use it in places which specified insulation.
- (4) Please don't place the capacitors under the following operation conditions.
- a. Directly in contact with water, salt solution and oil or under the dewing environment.
- b. Under the environment full of poisonou sgases(HNO₃,H₂SO₃,CL₂,ammonia solution etc.)
- c. Expose directly to sunshine Ozone,ultraviolet rays and radiation.
- d. The vibration and impact conditions exceeded the range of the adverse circumstances specified in the catalogue and the operation instruction
- (5) The following items should be confirmed before it is inserted into the PCB.
- a. The distance between the positive and negative electrodes of the capacitor should match the distance between the holes on PCB.
- b. To ensure a proper space above the explosion-proof vent ofthe capacitor.
- c. Above the explosion-proof vent,to avoid as much as possible the arrangement of circuit lines and the installation of other components.
- d. Please don't arrange other circuit lines around the locationfor mounting capacitors.
- e. To avoid as much as possible the mounting of heat generating components around the capacitors and on the PCB.
- (6) Furthermore, the following items should be confirmed during circuit designing.
- a. The variation of temperature and frequency should not cause the variation of electrical perpert
- b. While mounting capacitors in double-side PCB,the capacitors should be away from those unnecessary base plate holes and connection holes
- c. When more than two pieces of capacitors,are parallel connected, the current should be in equilibrium.
- d. When more than two pieces of capacitors are serially connected,the voltage should be in equilibrium.

■ The mountina of capacitors

- (1) While mounting the capacitors ,the regulations below mentioned should be followed:
- a. While making regular testing of electrical property on the circuit, except those capacitors removed from the PCB.Please don't use the capacitors on the PCB after exercitation any more.
- b. When the capacitor produces regenerated voltage it is required to discharge it through a resistor of 1Ω.
- c. As for those capacitors which have been stored for long period of time ,The leakage current may increase. In this case, it is necessary to apply voltage via aresistor of 1K ohm.
- d. Please make confirmation on the specification (rated voitage and capacitance) and the polarity before mounting.
- e. Don't let the capacitor drop down to the ground from the working table, Please don't use the dropped down capacitors.
- f. Do not install deformed capacitors.
- g. The distance between the positive and negative electrodes of the capacitor must match the distance between two holes on PCB.
- h. The clip pressure of the fixture on the auto inserting machine should not be too high ,and the impact not too great.
- (1) Please make confirmation on the following items while soldering.
- a. Don't get the soldering tin out of the terminal pin area.
- b. The soldering conditions (temperature, time and frequency)should be up to the requiremment specified on the instructionc.
- c. Don't immerse the capacitor in the melted solder solution.
- d. When soldering ,don't let other components bend down to contact the capacitor.

- (3) 焊接后的处理应不产生以下的机械应力：
- a.) 电容器发生倾倒、扭转；
- b.) 电容器碰到其他线路板；
- c.) 过压（电压超过额定电压）；
- (4) 电容器不要用洗净剂洗净，不过，在有必要洗净的情况下对电容器进行洗净，必须在产品规格书规定的范围内进行；
- (5) 对有必要洗净的电容器，洗净时，须确认下列内容：
- a.) 洗净剂污染管理（电导率、PH 值、比重、水分等）；
- b.) 洗净后，不能保管在洗净液环境中及密闭容器中，要采用（最高使用温度以下的）热风干燥印刷电路板及电容器，使之不残留少洗净液成分；
- c.) 振动及冲击条件超过了样本及说明书的规定范围的恶劣环境；
- (6) 不使用含卤素的固定剂、树脂涂层剂。
- a.) 电路板与电容器之间，不能残留焊接残渣及污垢；
- b.) 固定剂、涂层剂吸附前，尽可能不残留洗净成分，进行干燥处理，使印刷孔不堵塞；
- c.) 固定剂、涂层剂热硬化条件，按规定说明书要求进行。
- d.) 电路板上，电容器的安装位置，请不要有其他配线；
- (8) 螺栓产品安装：竖直安装时，压力阀朝上，横向安装时，保证压力阀或正极端子朝上。

■ 组装使用

- (1) 组装使用中，请遵守以下内容：电容器的端子间不要直接接触，另外，不要让导体物质引起正负极短路；
- (2) 请确认所安装电容器所处环境：
- a.) 不要与水或油污接触或处于结露状态；
- b.) 不要让日光、O₃、紫外线及放射线直接照射到电容器上；
- c.) 不要处于充满有害气体的环境（硫化氢、亚硫酸、亚硝酸、氨水 CL₂ 等）；
- d.) 震动及冲击不要超过样本或规格说明中规定值；

■ 保守点检

工厂企业用的电容器，必须定期点检，定期点检项目包括外观检查及电性能的测试；

■ 意外情况

- (1) 组装使用过程中，如电容器防爆阀打开，请切断组装主电源或拔下电源线插头；
- (2) 电容器防爆阀动作时，因有超过 100℃ 高温气体喷出，脸不要接近喷出的气体进入眼睛时，立即用水清洗眼睛。不要尝电容器的电解液，电解液溅到皮肤上时，用肥皂清洗；

■ PET 套管铝电解电容器使用注意事项

PET 套管的特点耐热、环保；但其遇水及水蒸气有气胀之特性，电容器套管会有像灯笼状（起鼓）、气胀爆破及起皱现象。

- (1) 电容器不能接触水、水蒸气、酒精、助焊剂、油污等液态物质；
- (2) 若需插排 85℃ 复充电老化时，应排列疏松，防止软化粘连。

■ 储存条件

- (1) 在温度为 5~35℃，温度为 75% 以下的室内储存
- (2) 不要保存在组装使用中禁用的环境及同等条件下

■ 报废情况

废弃的电容器，请联系当地电子废弃物弃置专业人员处理。

■ 其他

客户在性能、尺寸等有特殊要求时，请与我们联系。

- (3) The treatment after soldering should not cause the following mechanical stress;
- a. The capacitors should not be inclined or twisted
- b. The capacitor touches the other PCB.
- c. Prevent other objects from hitting the capacitor.
- (4) Don't use the rinsing liquid to dean the capacitor. However, when it is necessary to do the cleaning , it should be done within the range specified inthe capacitor operation standard.
- (5) For those capacitors necessary to be cleaned , the following items shouldbe confirmed during cleaning.
- a. The pollution management for the rinsing liquid (conductivity, PH valuegravity, water content etc.)
- b. After cleaning, the capacitors can not be sealed under the environment with rinsing liquid or put into a sealed container . Use the hot air(below themax ,working temperature) to dry the PCB and capacitors and eliminate theremained rinsing liquid.
- (6) Don't use the fixing agent with halogen content and the epoxy resincoating material.
- (7) Please confirm the following items while using the fixing agent and thecoating material.
- a. No soldering residue and dirt should exist in between the PCB and thecapacitor.b. Before using the fixing agent and epoxy coating material. make the dryingtreatment to take away as much as possible the remained rinsing liquid andprevent the holes on the PCB from being blocked.c. The heat curing condition for the fixing agent and epoxy resin coatingmaterial according to the requirement of the specification.
- (8) For screwed type capacitors , When vertically assembling, make theterminal upward; When traversely assembling, make sure the positive terminal or the pressure vent is upward.

■ Durina assembling

- (1) During assembling, following points should be observed: Don't let the positive and negative electrodes to contact. No conductive material is allowed to exist between the positive and negative electrodes in order to avoid short circuit.
- (2) Please confirm the environment in which the capacitors are assembled.
- a. Don't contact the water or oil or place them under dewy environment.
- b. Don't subiect them to direct sunshine ,Ozone ,Ultraviolet ray and radiationc.
- c. Don't subject the capacitors to the environment with poisonous gas (hydrogen sulphide sulphurous acid,ammonia solution, chorine etc.).
- d. The vibration and impact should not exceed the range specified in thespecifications.theadverse circumstances specified in the catalogue and the operation instruction.

■ The routine inspection

The capacitors to be used in factories should make regular inspection, The items to be inspected include visual appearance inspection and the electrical

■ Unexpected situations

- (1) During assembling, if the explosion-proof vent opens, please turn off thepower, or pull out the plug;
- (2) When the explosion-proof vent activated, there is high temperature gas (Over 100℃) spraying out. Don't place your face close to it. In case the gas enters into your eyes, please wash your eyes with water immediately.Don't taste the electrolyte, and if there is electrolyte on your skin, please wash the skin soap.

■ Caution of PET sleeve on aluminum electrolytic capacitor

The PET sleeve is heat-resistant and environmental. But there may be some phenomenon such as Lantern-shape(bulge), inflatable blasting, and wrinkling when the PET sleeve contact with water or steam. So:

- (1) Aluminum electrolytic capacitor can't be contact with liquid materials such as water, steam, alcohol, flux and oil, etc.
- (2) If need arrange aging on 85℃, please loose arrange to prevent the PET soft and adhesion.

■ The shortage condition

- (1) Temperature: 5 to 35℃, Humidity: Below 75%。
- (2) The environment not suitable for assembling capacitors(3(2)) is also forbidden to store the capacitors.

■ The handling of reiects

The reiected capacitors , please contact local electronic waste disposal professionals for disposal.

■ The handling of reiects

Customer have specification, size request, please contact us.

铝电解电容器产品编码体系表

Product symbol system for Aluminum Electrolytic Capacitors

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Series Code		Voltage (WV)		Capacitance (μF)		Tolerance		Size Code		Terminal Code		Brand		Base		Other	
填写品种一览表 的系列名称 Fill in Serise Code Of Variety list		Voltage	Code	Cap(μF)	Code	Tolerance %	Co de	ΦD	Co de	L	Co de	Brand	Code	Base	Code		
例： Series Code VT VT JT JT		4	OQ	0.1	OR1	+5	J	3	A	5	050	KAWING	K	PPA	P		
		6.3	0J	0.22	R22	-5	K	4	B	5.4	054						
		10	1A	0.33	R33	+10	K	5	C	7.7	077						
		16	1C	0.47	R47	-10	K	6	D	9	090						
		25	1E	1	010	+15	Y	6.3	E	10.5	105						
		35	1V	2.2	2R2	+20	M	8	F	12.5	125						
		50	1H	3.3	3R3	-20	M	10	G	13.5	135						
		63	1J	4.7	4R7	+20	R	12	H	14	140						
		80	1K	10	100	-0	H	12.5	I	16.5	165						
		100	2A	22	220	+20	H	13	J	21.5	215						
		125	2B	33	330	-10	V	14	K	25	250						
		160	2C	47	470	+30	F	16	L	30	300						
		180	2Z	100	101	-0	V	18	M	35	350						
		200	2D	220	221	+30	G	19	N	40	400						
		220	2P	330	331	-10	Q	20	O	45	450						
		250	2E	390	391	+20	E	22	P	50	500						
		315	2F	470	471	-15	E	25.4	Q	55	550						
		330	2U	560	561			30	R	60	600						
		350	2V	1000	102			35	S								
		400	2G	2200	222			40	T								
		420	2M	3300	332			50	U								
		450	2W	4700	472			50.8	V								
		500	2H	10000	103			63.4	W								
				22000	223			76	X								
								89	Y								

例：VT 16V100 6.3×5.4 其料号编码为 VT1C101ME054000KPO

无铅焊料片式产品的回流焊条件

Lead Free Type Reflow Soldering Condition

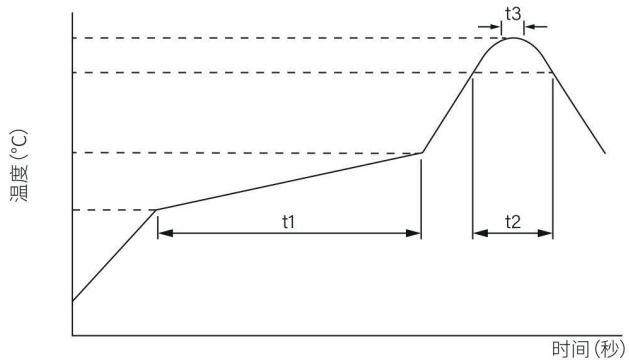
焊盘型式与适用制品尺寸 Pad Type And Applicable Product Size



焊接方法之适用性 Applicability Of Welding Method

焊接方法	回流焊	烙铁	波峰焊
可行性	可行	可行	不可行

无铅回流焊使用条件 Lead-free Reflow Welding Conditions



测试条件 Test Condition

制品别		贴片铝电解电容器					
额定电压 (V)		4~50	4~50	≥ 63	4~100	≥ 160	
制品尺寸 (ø)		4~6.3ø×4.5L	4~6.3	4~6.3	8~18	≥ 12.5	
预热	温度 (T1 ~ T2, °C)	150~180					
	时间 (t1) (最大, 秒)	120	100				
持续时间	温度 (T3, °C)	230	217	230	217	217	230
	时间 (t2) (最大, 秒)	30	90	60	60	60	30
最高温度	温度 (T4, °C)	250	260	250	240	240	
	时间 (t3,秒)	5					
回流次数		1	≤ 2				

焊锡注意事项 Solder Precautions

- 回流焊接温度的相关因素：
 - * 制品尺寸：制品尺寸较大其温度上升较缓慢。
 - * 制品安装位置：PCB 中心的温度较 PCB 边缘温度低。
 - * PCB 尺寸：PCB 尺寸或者厚度较厚上升的温度较慢。
- 反复回流
 - * 如果可以，避免回流焊 2 次。
 - * 如果反复回流是不可避免的，请第一次产品温度冷却至 5~35°C。
 - * 请勿 3 次回流焊。
- 以铬铁焊锡时请依循下列条件作业：
 - * 铬铁最高温度：350±5°C
 - * 焊接时间：3+1/-0 秒

方法如下 The Method Is As Follows

回流焊：
于焊接时请遵循使用之温度条件。如使用较高之温度时，请量测并告知电容温度及回流焊条件。

制品尺寸较大其上升的温度较缓慢。并非得依制品尺寸别调整回流焊锡炉的温度，例如：φ4 与 φ10 制品皆会安装于 PCB 过锡炉。