

Important considerations in the use of capacitors

- 1 DC electrolytic capacitors have polarity.
If the polarity is reversed and the voltage is applied, the circuit will short out and the capacitor can be broken. If the polarity can reverse or is unstable, Bi-Polar DC electrolytic capacitors should be used, but not for AC applications.
2. Do not apply voltage in excess of rated voltage.
Continuous application of excessive voltage would increase leakage current, deteriorate the capacitor's characteristics and break the capacitors. However, a brief excessive voltage is allowed up to the surge voltage.
3. Do not apply excessive ripple current.
If ripple current in excess of the rated value is applied, heat generation acutely increases, decreasing capacitance, thus shortening the service life of the capacitors. Even for use within the ripple current tolerance, a reverse current may flow the anode if there is a low DC bias voltage. Always be careful not to allow the peak voltage value to exceed the rated voltage or reverse current to be applied.
4. Use the capacitors only at proper temperature levels.
The service life of Aluminum Electrolytic Capacitors is under the strong influence of ambient temperature. In general, its life is expected to be doubled if its ambient temperature drops by 10°C. Always use the capacitors at lowest possible temperature away from its rated maximum.
5. For a circuit where sudden charge/discharge is frequently repeated, the use of normal capacitors would result in an acute increase of the heat generation, deterioration of the capacitor's characteristics, and finally irrevocable damage. For this kind of circuit, request a capacitor designed to withstand sudden electric discharge.
6. Storage of capacitors.
When a capacitor is stored for a long time, leakage current tends to increase. The higher the storage temperature, the more leakage occurs. For storage, always select a place at room temperature with normal humidity and no direct sunlight.
The leakage current will gradually decrease as voltage is applied. However, to protect a circuit from being damaged by the use of capacitors after extended period of storage, the capacitors should be subjected to aging before use.
7. Leave space for the safety vents.
Electrolytic capacitors with safety vents require at least 3mm of space around the safety vent. If such space is not provided, the safety vent will not function.
8. Do not apply excessive force on terminals and lead wires.
When excessive force is applied on terminals and lead wires, the force will cause internal damage, leading to short circuits, broken circuits or increase in leakage current. After connection to the circuit board, avoid holding or applying force to the capacitor.

9. In case of dual-surface boards.

Make sure that the capacitor mounting portion does not come in contact with the circuit pattern.

10. About soldering process.

During the soldering, the aluminum case may be exposed due to shrinkage of the external sleeves and the sleeves may be damaged.

Exercise care on the following points:

- If the capacitor's sleeve comes in contact with the circuit pattern, lead wires and metallic portion of other parts, the heat of soldering will be conducted into the capacitor, thus heating up the limited area and causing-cracks of the capacitor.
- When the capacitor is used with its side contacting the circuit board, the capacitor may be heated up by an excessive high temperature or long dipping for soldering, causing secondary shrinkage of sleeves, thus exposing aluminum casing and damaging the sleeve.

11. Hole intervals on the circuit board

When designing a circuit board, space the position holes equally to the space between lead wires.

If the capacitor is mounted into holes not adequately spaced, it will apply stress to the leads, causing short circuits, broken circuits and increased leakage current.

12. Hole positions on the circuit board

Consider hole positioning on the circuit board carefully, so that solder does not splash onto the vinyl sleeve via through-holes on the board or lead holes on post-process parts.

The use of a 5mmL capacitor in the through-hole may result in internal damage of the capacitor due to soldering heat. To float it by means of forming may eliminate the problem.

13. Circuit board cleaning

Certain types of flux cleaning solvents after soldering may damage the capacitor. Hologenated organic solvents (such as Chloroethene and Triclene) can penetrate in the capacitor body, due to their high permeability, and adversely affect capacitor functions.

Care should also be taken when using hogenous adhesive agents as well as humidity-proof and dust proofing agents.
