



Introduction

Aluminum solid electrolyte capacitors with conductive polymer are wound aluminum electrolytic capacitors that use a polythiophene electrolytic system. The conductive polymer yields extremely low ESR-values that allow for very high ripple currents at high frequencies. Typically, these types of capacitors are used in smoothing circuits of DC-DC converters and in high-frequency applications. Polymer Capacitors from Jianghai has been enlarged to voltages up to 200V, which allows the usage in many power supply applications too.

Lifetime

The lifetime of a polymer capacitor can be estimated by:

$$L = L_o \cdot 10^{\frac{T_o - T}{20}}$$

L_o = Lifetime at 105°C or 125°C

T_o = 105°C or 125°C

T = Ambient temperature

Comparison of Solid Polymer Capacitors and Liquid Electrolytic Capacitors

Besides the excellent lifetime performance, the temperature characteristics of polymer capacitors allow for a usage in a wide range of ambient temperatures. Temperatures in the range from -55°C to 105°C lead merely to capacitance changes from 10 ... 15%, while the ESR remains almost constant. Especially the stability of its low ESR-values makes the polymer capacitor attractive for smoothing circuits or for decoupling functions. Compared to tantalum electrolytic capacitors, polymer capacitors offer a more reliable solution with a similar functionality.

Handling Precautions

Please see "General Handling Precautions" at page 140.

Additional requirements for aluminum solid electrolyte capacitors with conductive polymer:

- 1) Polymer Capacitors cannot be used:
 - in circuits with frequent and/or rapid charging and discharging function,
 - in time-constant or coupling circuits,
 - in high impedance circuits or applications, where the leakage current affects the circuit operation,
 - after heavy thermal stress during soldering as the capacitance and leakage current may change,
 - under mechanical stress. Avoid mechanical vibration and shock.
 - in applications with heavy discharges / negative transients higher than 20% of U_r .
- 2) Ripple currents above the specified rating must be avoided as they may damage the capacitor.
- 3) Never apply any reverse voltages or voltages above the rated voltages.
- 4) Serial connections shall be avoided to prevent possible overvoltage conditions.
- 5) When parallel connections between polymer capacitors are planned, please take proper current balancing into account.
- 6) Use a protection circuit when the inrush current exceeds 10A.
- 7) Always consider the safety when designing circuits. Plan for worst case failures such as short circuits and open circuits.
- 8) Laminated capacitors need to be handled like non-isolated components. Please take care of a completely separation of the lead wires and the case of the capacitor.
- 9) Please follow the soldering recommendations and restrictions for Polymer capacitors. In case of any questions please contact Jianghai Europe.
- 10) Leakage Currents might increase as consequence of longer storage, critical soldering processes, overload conditions, heavy charging/discharging, mechanical stress.

Without written consent by Jianghai, Polymer capacitors should not be used in highly reliable or life sustaining applications such as: medical equipment, aviation/aerospace equipment, automotive and nuclear applications and others, where a capacitor failure may have a major impact.