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RoHS Compliant

Leakage current behavior with voltage-free storage

The oxide layer of aluminum foils used in aluminum electrolytic capacitors serves as a dielectric. Due to the special properties of this dielectric, a current will flow when DC voltage is applied. This current flow is called leakage current and settles to a low value over time. This is a normal behavior, and a low leakage current indicates a well-conditioned capacitor.

During storing without voltage, especially at higher temperatures, this oxide layer can deteriorate. A higher leakage current flow is the result when a voltage is applied again.

It is therefore recommended that capacitors be stored under the following environmental conditions to prevent deterioration:

- storage temperatures between 5 °C to 40 °C (preferable below 25 °C)
- humidity below 75 % (no condensation)

FTCAP capacitors can be stored unpowered according to their design as such:

- Design for 125 °C application up to 10 years
- Design for max 105 °C application up to 2 years
- Design for flash application up to 4 months

When the storing time exceeds this duration, a forming process should be applied.

In the case of built-in capacitors, a one-hour trouble-free start-up of the application without load can regenerate the dielectric to the point where a new storage period can begin.

If the capacitor already meets the specified leakage current, the forming process can be omitted.

Standard specification for leakage current after 5 minutes with applied voltage:

$$I_{\text{leakage}} \leq 0,006 \times C_R \times U_R + 6 \mu\text{A}$$

Forming

According to IEC 60384-4 the capacitors need to be formed before the electrical measurements are made. This leads to comparable results.

The capacitors are applied to the nominal voltage via a resistor for one hour.

The power supply should support at least a current of $10 \times I_{\text{leakage}}$.

The resistor is 100 Ω for $U_R \leq 100 \text{ V}$ and 1 kΩ for $U_R > 100 \text{ V}$.

After this the capacitors must be stored 12 to 48 h without current at room temperature.

At the latest 48 h after this the leakage current must be measured.

If the capacitor does not meet the specification for leakage current, the procedure must be repeated.