On which parameter the life of capacitor depends?

Circuit Description

The life of capacitor is affected by

- Temperature
- Voltage
- Current

Temperature : The temperature depends upon following parameters

(1) Ambient temperature at which capacitor is operated

(2) Over current flows through capacitor

(3) Dielectric and resistive power loss in the capacitor

- As the temperature increases, there is fast degradation of the dielectric.
- The life of capacitor is reduced to half for every 10 degree increases in the temperature.

- The life of capacitor reduces for faster degradation of the dielectric.
- There is expansion of impregnation and dielectric material if the temperature increases beyond its limit.
- The capacitor may be burnt in the worst condition. The classification of capacitor is done according to ambient maximum temperature operating condition.

Symbol	Maximum ambient temperature
A	40
B	45
C	50
D	55

Voltage

- If the voltage increases beyond its specific limit, the dielectric of capacitor may breakdown.
- This will result in capacitor may short circuit permanently.

Current flow through capacitor

- If the voltage increases beyond its specific limit, the capacitor current increases because the X_C of the capacitor remains same.
- This will reduce the life of capacitor.

Voltage Limit for Capacitor

+ 10%	8 hours in 24 hours
+15%	30 min in 24 hours
+20%	5 min in 24 hours
+30%	1 min in 24 hours

Current

(1) Overload current

- The over load current of capacitor is due to over voltage and harmonics. This may lead to local hot spot and internal short circuit of the capacitor.

(2) Inrush current

- When capacitor is switched on, a very high inrush current flows which may be 100 times rated current of capacitor. If the inrush current is not limited during frequent switching operation, it may leads to life of capacitor.

Thank You
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