

Film Capacitors

Life expectancy

Film capacitors reliability is determined in a similar manner as aluminum electrolytic capacitors with the exception that the applied voltage has an even greater effect on the reliability.

The allowable temperature rise from ripple/ AC current like an aluminum electrolytic capacitor should be limited to maximize the life of the capacitor. For film capacitors the temperature rise should be limited to 15°C above the ambient temperature.

The above is expressed mathematically as:

$$L2=L1*(Vr/Vo)^7*2^x$$

Where L2= life expected at ambient temperature.

L1= Load life rating of the capacitor.

Vr= Rated voltage of the capacitor.

Vo= applied voltage

$$X=(Tm-Ta-Tr)/10$$

Tm= maximum rated temperature of the capacitor.

Ta= ambient temperature.

Tr= temperature rise due to ripple current

Tr is calculated from the following formula:

$$Tr=P/BA$$

Where

$$P= I^2*ESR \text{ or } V^2*2*\pi*f*C*df$$

$$B=.001 \text{ W/}^\circ\text{C/cm}^2$$

A= Surface area of the capacitor in cm