



Life expectancy of Supercapacitors

Supercapacitors slowly degrade over time and once the capacitor has degraded beyond a specified amount, the capacitor is considered to have failed. Most capacitors are considered a failure when the capacitance has changed by 30% of its initial value.

Supercapacitors load life's ratings are generally expressed 1000 hours at their rated voltage, maximum temperature rating. This means that the capacitance of the capacitor will not change by more than the amount indicated under the load life rating when the capacitor is operated at the stated conditions. Although the life expectancies appear to be a short amount of time the following formula can increase the life expectancy of the capacitors.

$$L_2=L_12^x*2^y$$

When the capacitor is operated at temperatures other than the maximum rated temperature for the capacitor the expected life of the capacitor will increase. The rate of increase in operating life is for the life to double for every 10°C decrease in temperature.

$$X=\frac{(T_m-T_a)}{10}$$

When the capacitor is operated at voltage below their rated voltage the life expectancy will increase. The life expectancy will double for every 0.2V decrease in applied voltage.

$$Y=\frac{V_r-V_o}{0.2}$$

Where

L₂= life expected at application conditions

L₁= Load life rating of the capacitor

V_r= Rated voltage of the capacitor

V_o= applied voltage

