**CAPACITORS IN PARALLEL**

\[ C_T = C_1 + C_2 + C_3 + ... \]

**CAPACITORS IN SERIES**

\[ C_T = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + ...} \]

**CAPACITIVE REACTANCE**

\[ X_C = \frac{1}{2\pi f C} \]

**CHARGE ACROSS A CAPACITOR**

\[ Q = CV \]

**ENERGY STORED IN A CAPACITOR**

\[ J = \frac{1}{2} CV^2 \]

**EQUIVALENT SERIES RESISTANCE**

\[ ESR = DF \cdot X_c = \frac{DF}{2\pi f C} \]

**IMPEDANCE**

\[ Z = \sqrt{(ESR)^2 + (X_L - X_C)^2} \]

**PEAK CURRENT**

\[ I = C \frac{dv}{dt} \]

**POWER LOSS IN A CAPACITOR**

\[ P = (I_{ac})^2 ESR + I_{dc}V = (V_{ac})^2 2\pi f CDF + I_{dc}V \]

**SELF RESONANT FREQUENCY**

\[ f = \frac{1}{2\pi \sqrt{LC}} \]

**TEMPERATURE RISE WITHIN A CAPACITOR**

\[ \Delta t = \frac{P}{h} \quad \Delta t \leq 10^\circ C \quad \beta = 0.001 \frac{W}{cm^2 \cdot C} \]

**CAPACITOR VOLTAGE DURING CHARGE**

\[ V_c = V(1-e^{-t/RC}) \quad X = \frac{t}{RC} \]

**CAPACITOR VOLTAGE DURING DISCHARGE**

\[ V_c = Ve^{-t/RC} \quad X = \frac{t}{RC} \]