

RC Circuit

τ = time constant, amount of time for q to reach 63.2% of εC

$$q_{\max} = \varepsilon C$$

$$i_{\max} = \frac{\varepsilon}{R}$$

$$\tau = RC$$

Charging

$$q = \varepsilon C \left(1 - e^{-\frac{t}{\tau}}\right)$$

$$i = \frac{\varepsilon}{R} e^{-\frac{t}{\tau}}$$

Discharging

$$q = \varepsilon C e^{-\frac{t}{\tau}}$$

$$i = \frac{\varepsilon}{R} e^{-\frac{t}{\tau}}$$