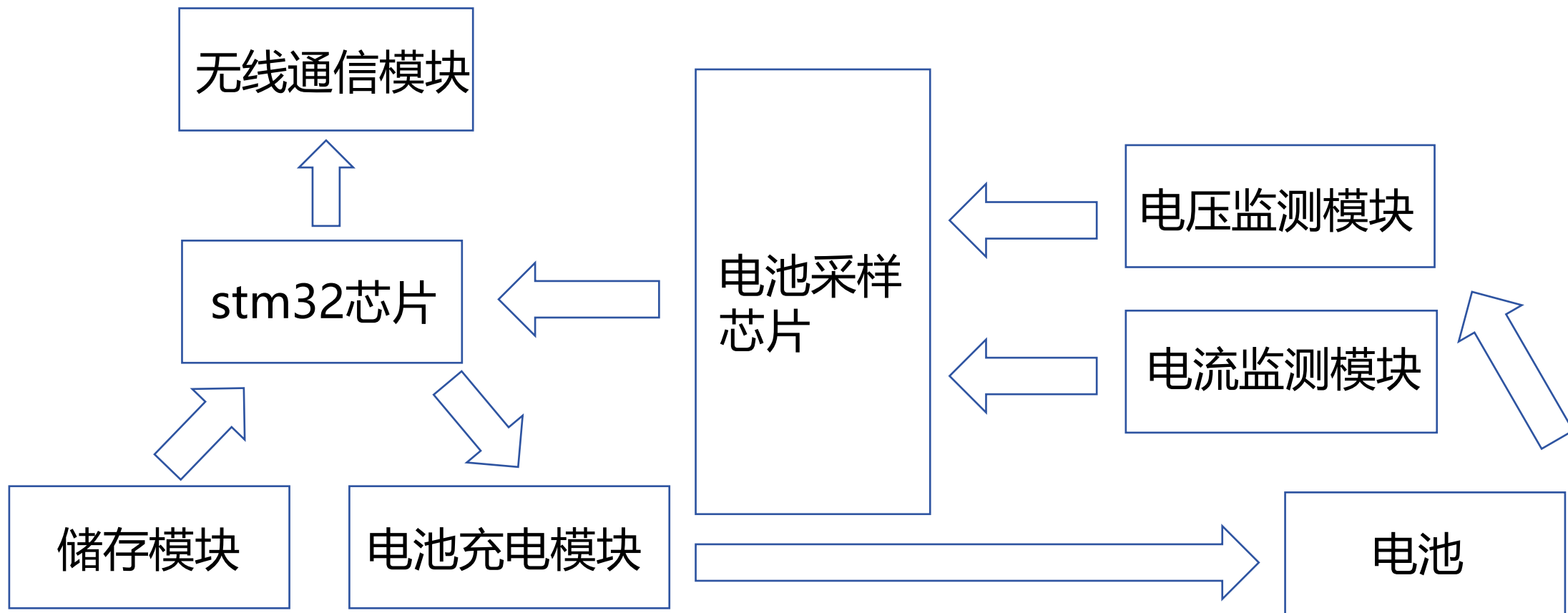


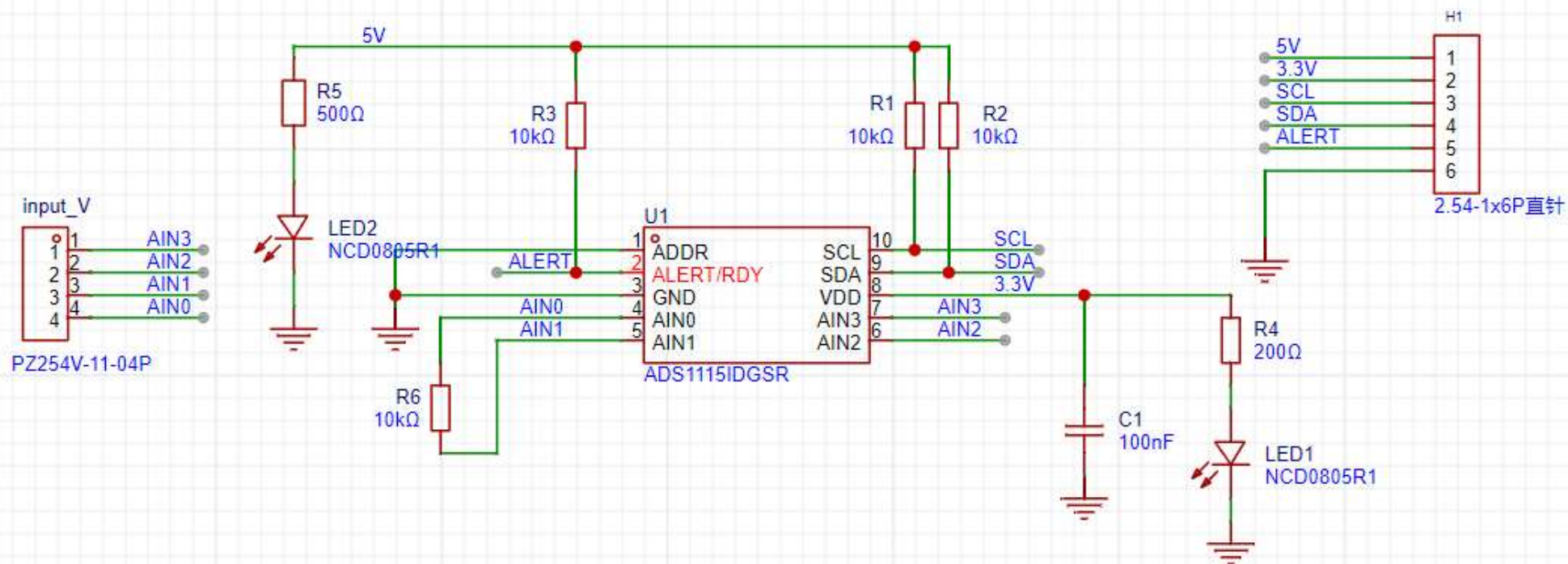
目标：测得电池的完整充放电曲线

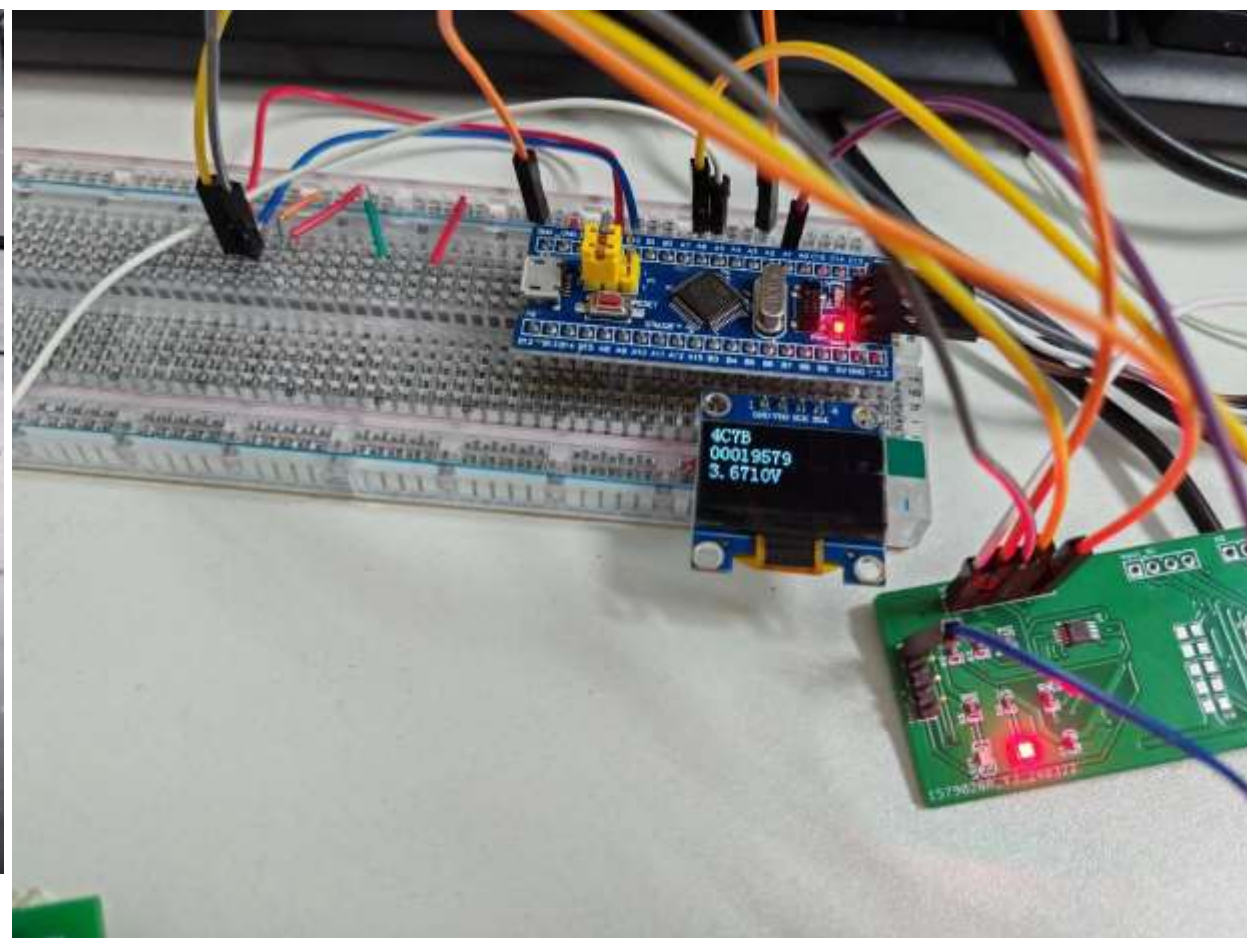
工作：搭建控制电池充放电并对电压电流采样的硬件电路



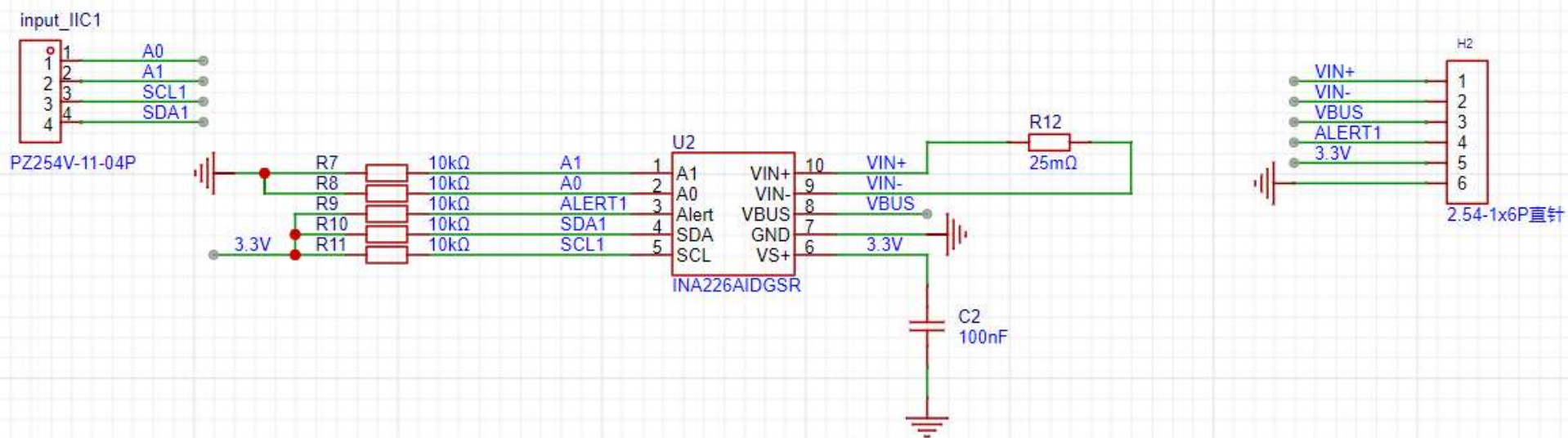
电压监测电路

电压检测电路

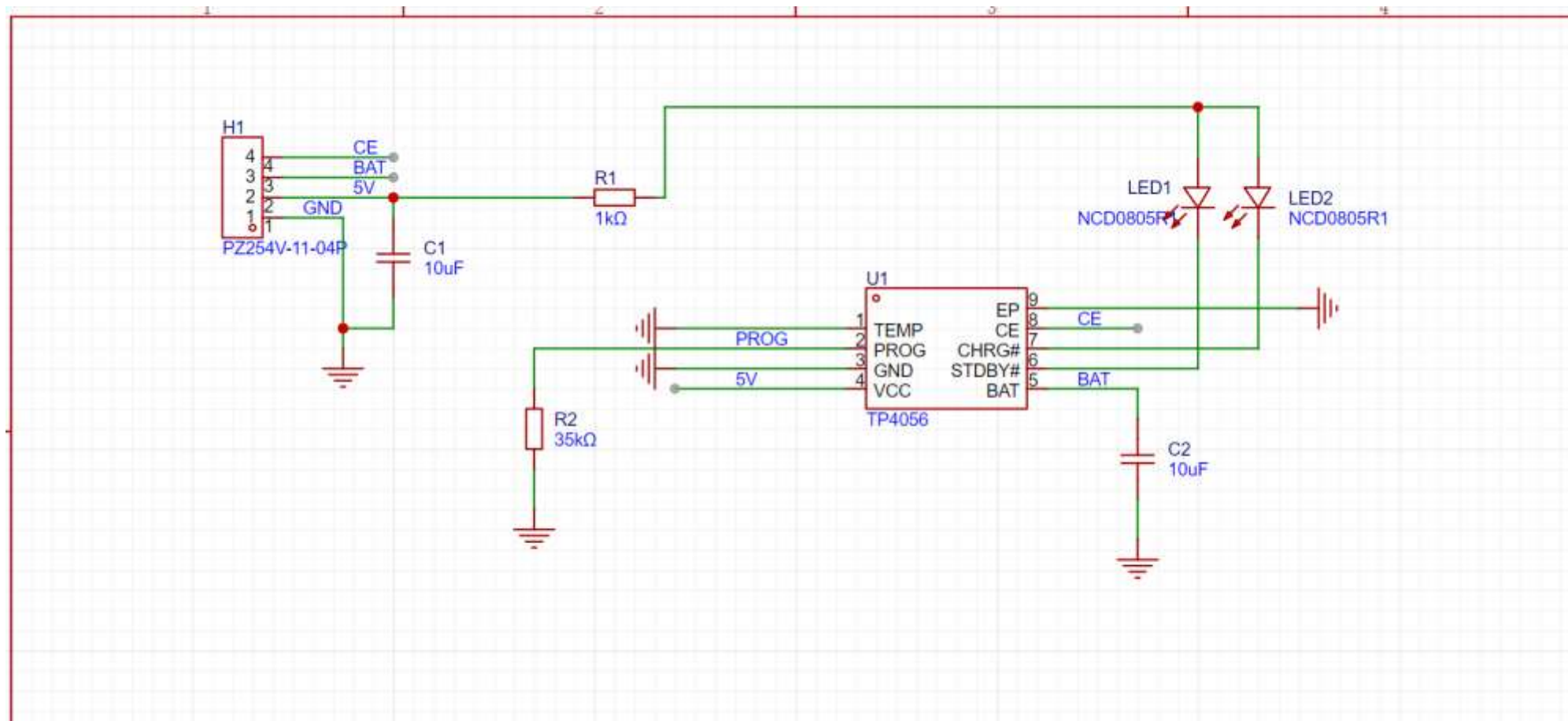




电流监测电路

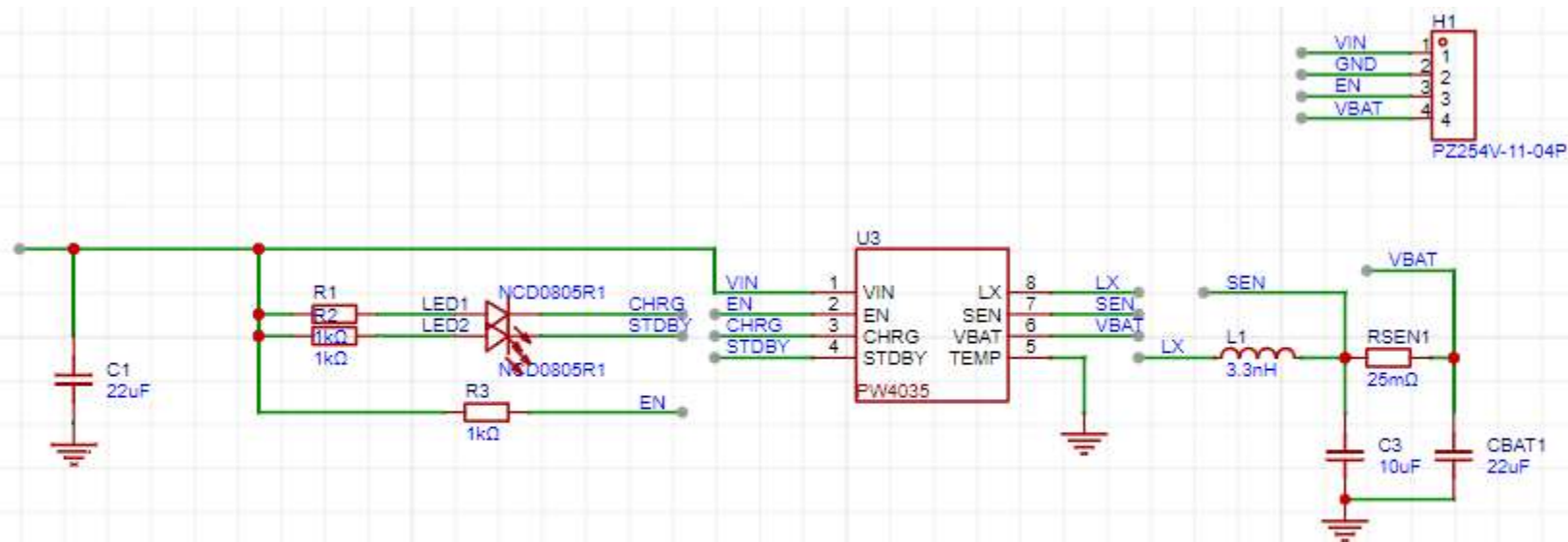


tp4056 35mA充电模块





PW4035 2A/3A充电模块



EIS测量

$$z(t) = \frac{U_{ocv} - v(t)}{\Delta I} = R_0 + \int_0^\infty \gamma(\tau) \cdot [1 - \exp(-t/\tau)] d\tau$$



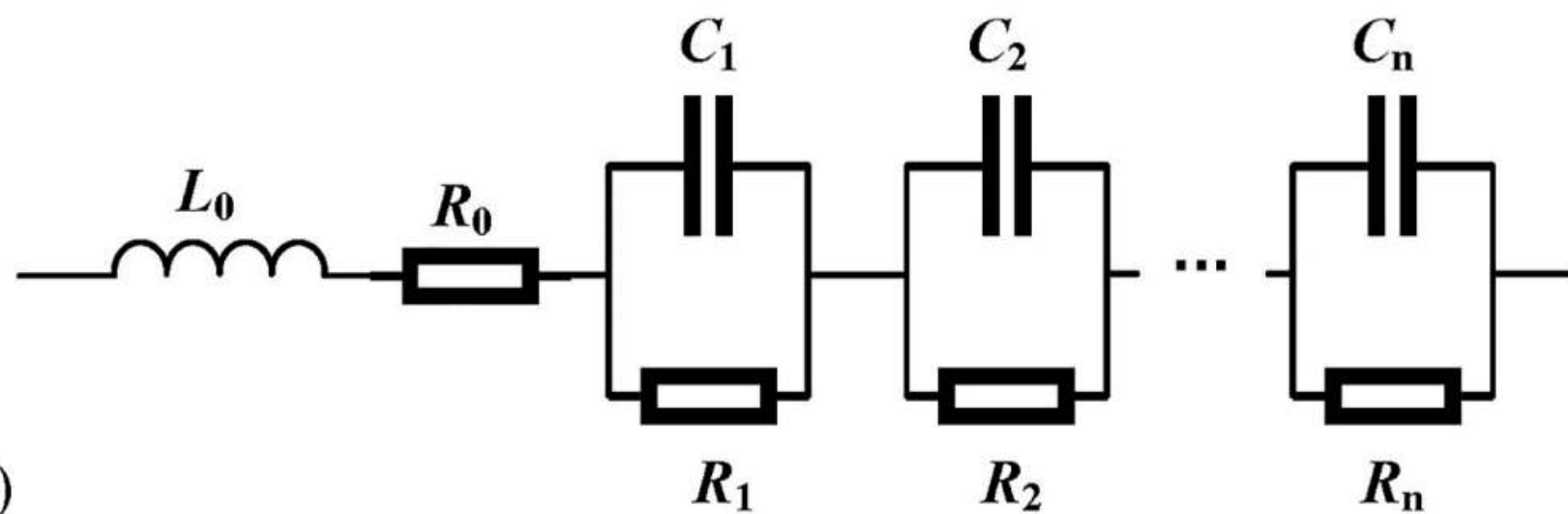
$$\frac{d}{dx} z(x) = \int_0^\infty \gamma(\zeta) \cdot [\exp(x - \zeta) - \exp(x - \zeta) \exp(-\zeta)] d\zeta$$

$$\frac{d}{dx} z(x) = \gamma(x) \otimes w(x)$$



$$R_i = \gamma(x) \cdot \Delta x$$

$$C_i = \exp(x) / R_i$$



(b)