Biasing Guidelines

- Basic guidelines for biasing a common-emitter BJT amplifier that is stable over temperature, voltage and part variations.
  1. Choose an appropriate transistor for your circuit. Make sure that $\beta \geq 100$ at the anticipated current level.
     Allows the assumption that Ic ≈ Ie and Ib ≈ 0.
  2. Choose I_e to set the transistor transconductance.
     Lessens the dependence of I_c on Beta and temperature.
  3. Choose a collector resistor to set $V_c \approx 0.5 V_{cc}$.
     Gives the greatest output voltage swing.
  4. With chosen I_e, pick R_e such that $V_e \geq 10 V_t$. Voltages from 0.5V - 1V are typical.
     Minimizes variations in I_c due to V_{be} temperature dependence.
  5. Create the base bias resistor network so that $V_b = V_e + 0.6$ with the constraint that the current through the bias resistors is $0.1Ie$. With $\beta \geq 100$, this corresponds to a bias resistor current that is $\geq 10 I_b$.
     Keeps variations in β (thus, I_b) from effecting V_b.