Electronic Circuits Laboratory

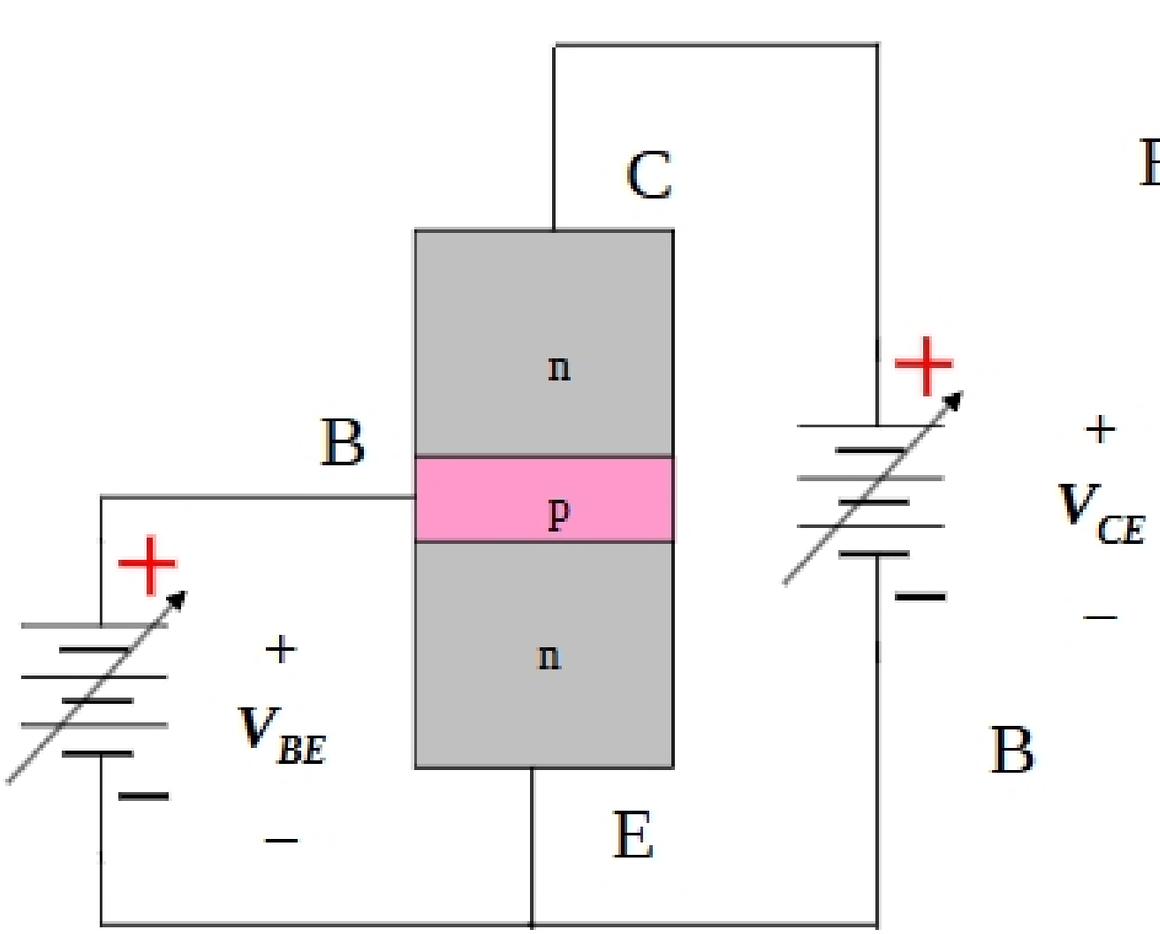
EE462G

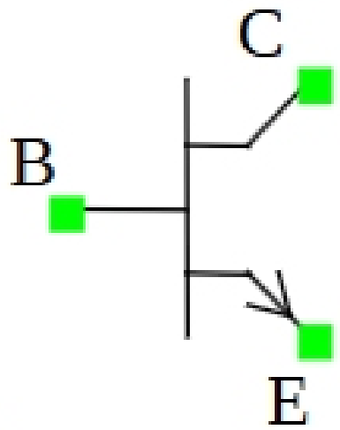
Lab #8

BJT Common Emitter Amplifier

npn Bipolar Junction Transistor

BJT in a common-emitter configuration





B – Base

C – Collector

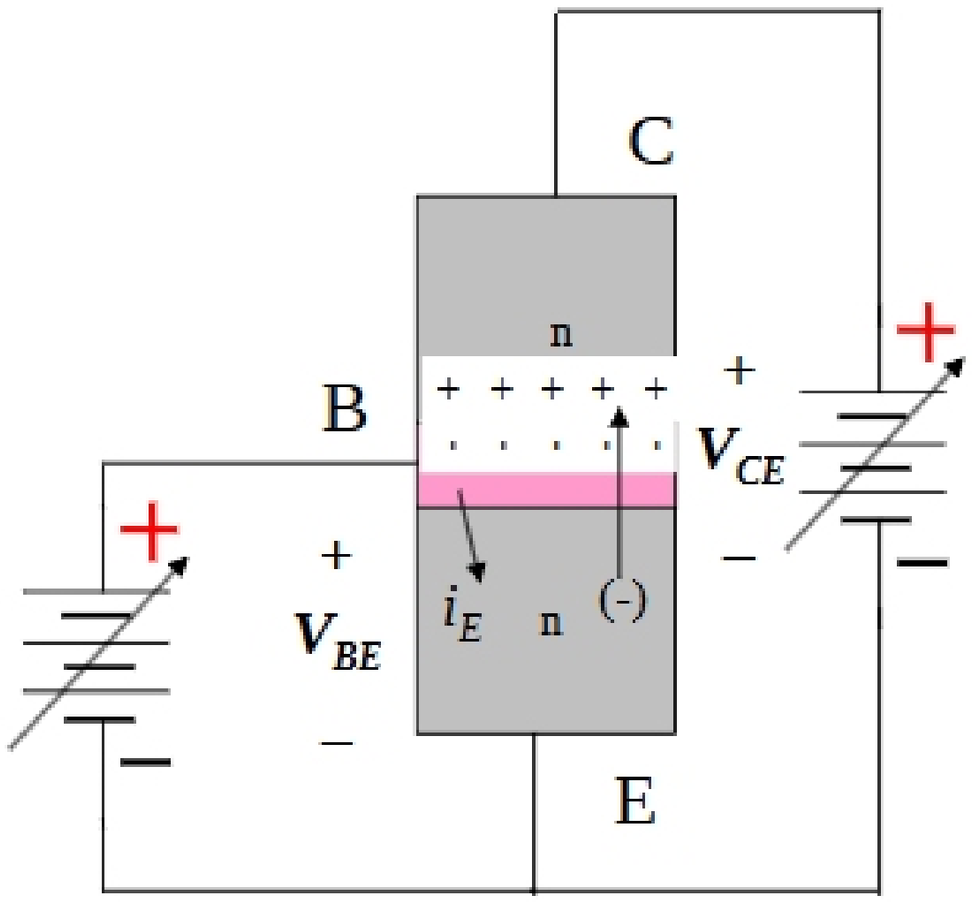
E – Emitter

For most applications the BJT is operated in the active region where:

$V_{BE} \cong 0.6\text{V}$ and $V_{CE} > V_{BE}$

npn BJT Operation

BJT in a common-emitter configuration in active region (V_{CE} > V_{BE} ~ .6V):



The *pn* junction for V_{BE} is forward biased and current i_{BE} flows according to the Shockley equation:

$$i_E = I_{ES}\left[\exp\left[\frac{V_{BE}}{V_T}\right] - 1\right]$$

where $V_T \cong .26$ mV and I_{ES} ranges from 10^{-12} to 10^{-17}.

Electrons from the emitter flow into the base and are pulled into the depletion region of the reversed biased collector-base junction.