

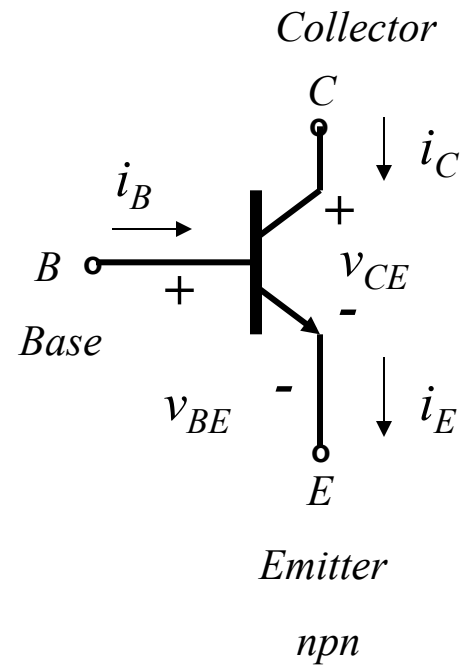
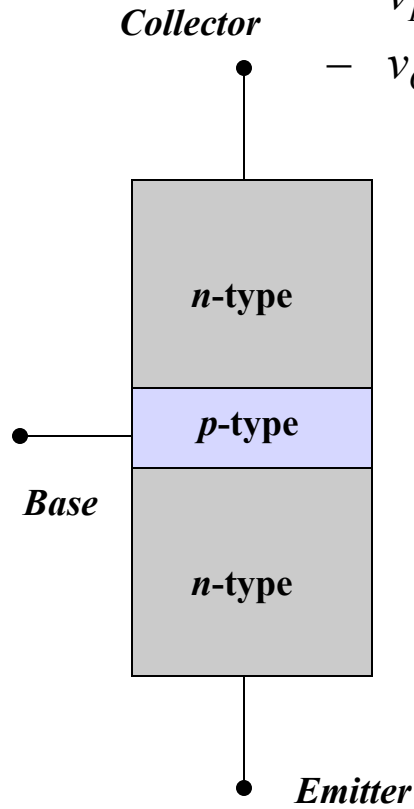
Transistors

Lesson #7

Chapter 4

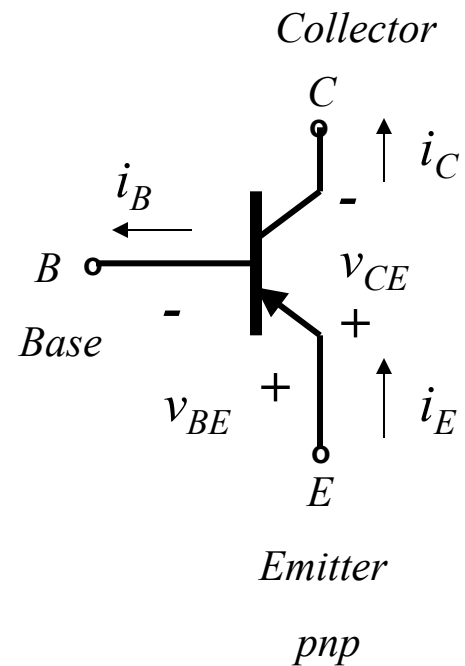
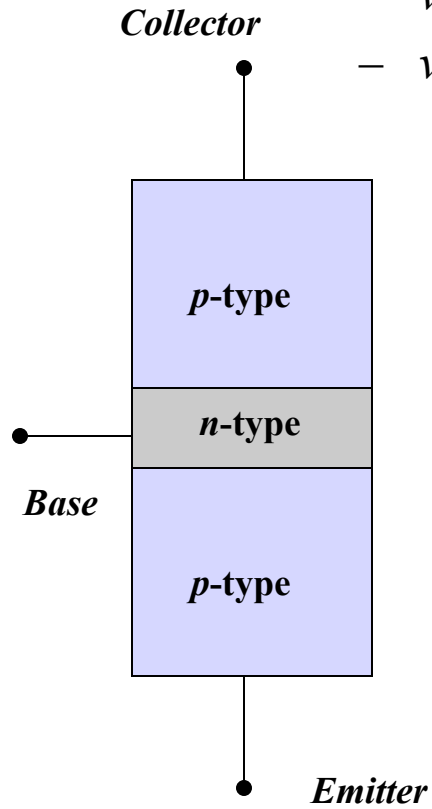
npn Bipolar Junction Transistors

- Two junctions
 - Collector-Base and Emitter-Base
- Biasing
 - v_{BE} Forward Biased
 - v_{CB} Reverse Biased



pnp Bipolar Junction Transistors

- Two junctions
 - Collector-Base and Emitter-Base
- Biasing
 - v_{BE} Forward Biased
 - v_{CB} Reverse Biased



npn (pnp) BJT Semiconductor

- Physical characteristics:
 - Base is narrower than the emitter
 - Emitter is doped more than the base
 - Free electron (hole) concentration in the emitter greater than the hole (electron) concentration in base
- Base-emitter junction is forward biased
 - There is a flow of electrons (holes) from the emitter to base and holes (electrons) from the base to emitter; however since the concentration of emitter electrons (holes) are greater than the base holes (electrons), this current is primarily made of electrons (holes)
 - These emitter electrons (holes) become minority carriers in the base; however, since the base is narrow very little electron-hole recombination occurs in the base and these electrons (holes) are drawn towards the collector-base junction
- Collector-base junction is reverse biased
 - When these emitter electrons (holes) reach the collector-base junction, they are pulled across the junction into the collector by the electric field due to the depletion region ions.
 - The ratio of the electrons (holes) reaching the collector to the electrons (holes) provided by the emitter is known as α .

*n*p*n* BJT

