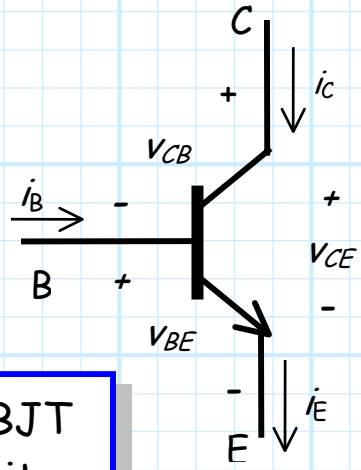
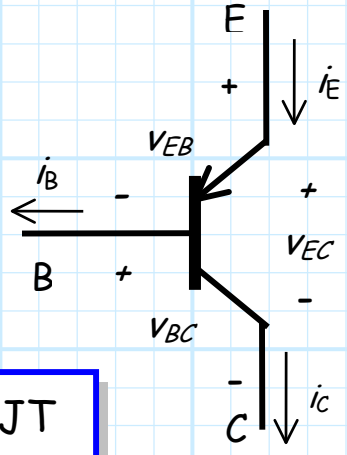
BJT Symbols and Conventions



npn BJT Circuit Symbol



pnp BJT Circuit Symbol

From KCL **only** we find:

$$i_E = i_B + i_C$$

From KVL **only** we find:

$$v_{CE} = v_{CB} + v_{BE} \quad (npn)$$

$$v_{EC} = v_{EB} + v_{BC} \quad (pnp)$$

Note that:

* The circuit **symbols** are very **similar** to MOSFETs, with *npn* like N-MOS and *pnp* like P-MOS.

* Positive **current** is defined in **opposite** directions for *npn* and for *pnp* (just like N-MOS and PMOS!).

* The **voltages** are of **opposite** polarity for *npn* and *pnp*. Specifically, for *npn* we use v_{BE}, v_{CE} and v_{CB}, whereas for *pnp* we use v_{EB}, v_{EC} and v_{BC}. This convention typically results in **positive** voltage values for **both** *npn* and *pnp* (**unlike** the MOSFET convention!).

* The **base current** i_B is **not** equal to zero, therefore $i_E \neq i_C$ (unlike MOSFETS)!