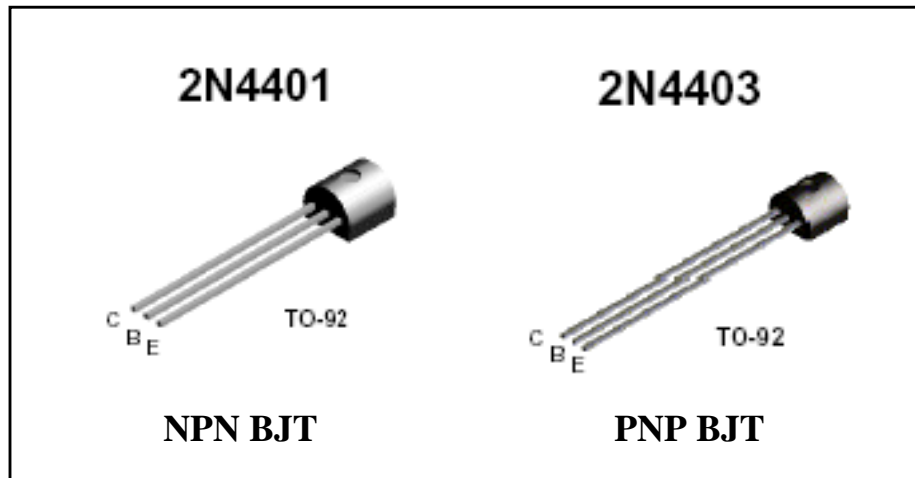
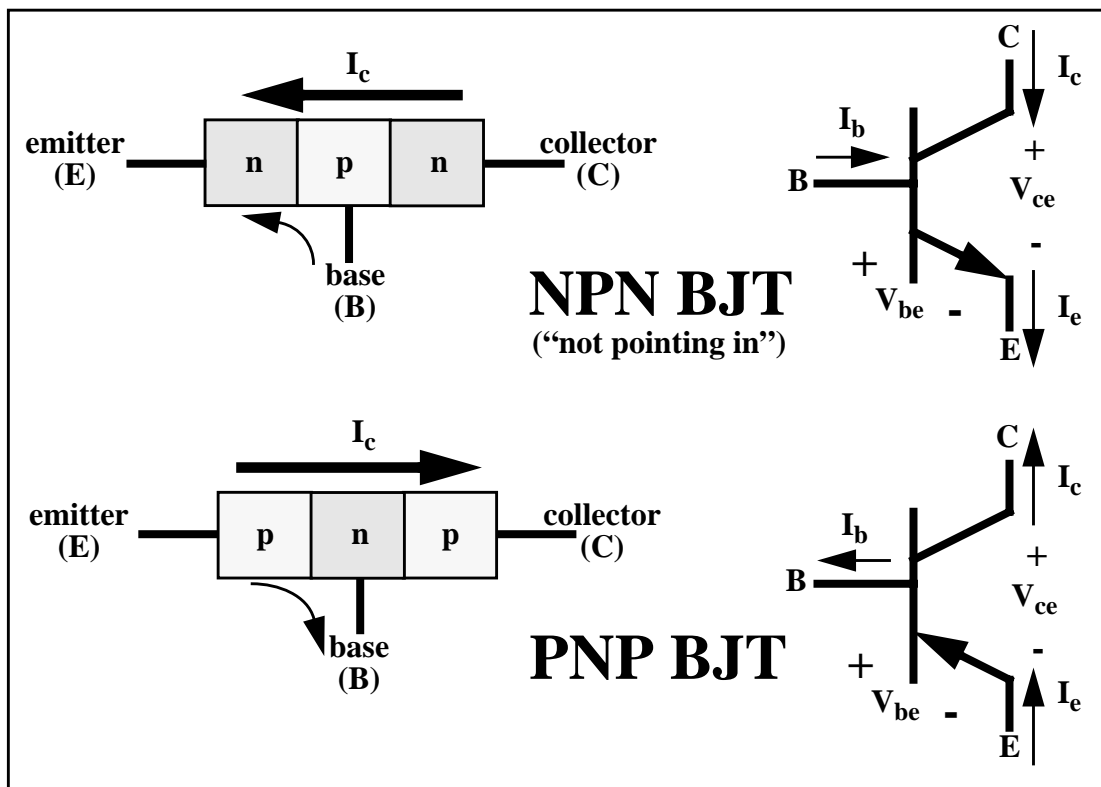


Semiconductor Devices - Transistors

Transistors provide circuit designers with a compact and efficient means of controlling a current or voltage with a separate much smaller current or voltage. They are used for two primary purposes: to electronically switch signals on and off, and to amplify signals. Below are shown two common BJTs.



The transistors we will look at are called bipolar junction transistors (BJTs). These transistors are described as *bipolar junction* because they contain two pn-junctions each one like a diode, but arranged back-to-back.



The separate PN junctions can be checked to test a BJT transistor. If the emitter-base, and collector-base junctions each show correct diode behavior, the BJT is not seriously damaged. This is a very simple test, but can form a go-no-go test for the BJT.

Shown above are the schematic symbols and reference voltage and currents for both NPN and PNP BJTs. Reference voltages and currents are defined identically for both NPN and PNP transistors, even though these symbols represent different types of transistor. You should become familiar with the voltages and currents around the BJT.

The transistors shown above are packaged in an inexpensive black epoxy body. Other transistors may be packaged in differently depending upon the amount of heat to be dissipated. The TO-92 case typically dissipates safely about one-half watt. Bigger cases, usually made of metal, can dissipate up to several hundred watts. Often the same transistor type is found in 3-4 different package styles.