



Transistors

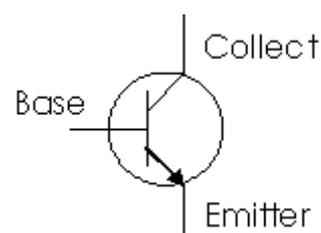
Functionality

A transistor in its simplest form is an electronic switch. It allows a small amount of current to switch on or off a much larger amount of current. There are two types of transistor NPN and PNP, the different order of the letters relate to the order of the N and P type material used to make the transistor. Both types are available in different power ratings from small signal transistors through to power transistors. The NPN transistor is the most common of the two and the one examined in this sheet.

The transistor has three legs, these are the base, collector and the emitter. The emitter is always connected to 0v and the electronics that is to be switch on is connected between the collector and the positive power supply. The base of the transistor is used to switch current through the collector and emitter. When the base is between 0V and 0.7V it is switched off and above 0.7V it is switched on allowing the current to flow from the collector to the emitter. A resistor is normally placed between the output of the integrated circuit (IC) and the base of the transistor to limit the current drawn through the IC output pin.

Schematic symbol

The symbol for an NPN type transistor is shown to the right along with the pins being labeled.



Values

Transistors don't have values, but they do have different current ratings. The style of the package also changes as the current rating goes up. Low current transistors come in a D shaped plastic package, whilst the higher current transistors are produced in metal cans that can be bolted on to heat sinks so they don't over heat. The D shape or a tag on the metal can is used to work out which pin does what. All transistors are wired differently so they have to be looked up in a catalogue to find out which pin connects where.

