Transistors Explained - How transistors work

The Engineering Mindset

This is a transistor. It is one of the most important devices ever to be invented.. transistors are small electronic components with two main functions.. It can act as a switch to control circuits and amplify signals.. each transistor is rated to handle a certain voltage and current. we're going to learn how they work in detail. In this video. a simple simple transistor circuit has a red led and a nine volt power supply across the main circuit. the base pin is connected to the DC bench power supply. we need to apply at least 0. 6volts to 0. 7volts to the base pin for the transistor to turn on. with a PNP transistor.. we again have the main circuit and the control circuit. we can see with this type that some of the current flows out of the base pin and returns to the battery. the. Current, therefore, divides in this transistor. in reality,, electrons flow from the negative into the emitter and then out of collector and base pin. we call this electron flow..

Electricity is the flow of electrons through a wire. the copper wire is the conductor and the rubber insulator is the insulator.. electrons can flow easily through the copper wire, but they can't flow through the rubber.. silicon is an example of a semiconductor which can act as both an insulator and a conductor... Each silicon atom is surrounded by four other silicon atoms. each atom wants eight electrons in its valence shell, but the silicon atoms only have four electrons in this shell. so they sneakily share an electron with their neighbouring atom to get the 8 desire.. This is known as covalent bonding. when we add the N-type material such as phosphorus, it will take the position of some of the silicon.. This means there 's now extra electrons in the material and these are free to move around with p type doping. This migration will form. a barrier with a build up of electrons and holes on opposite sides. in a NpN transistor,. We have two layers of N-type material with two junctions and two barriers.. the emitter material is heavily doped, so there are a lot of excess electrons. Here. the collector N-type is moderately doped and the base P type material is lightly doped. if we connect a battery across the base and the emitter with the positive connected to the P-type layer, This will create a forward bias. the forward bias causes the barrier to collapse as long as the voltage is at least 0. 7v., so the barrier diminishes and the electrons rush across to fill the space within the material.. some of these electrons will occupy a hole..