

Transistors

Intro

→ So, in this video, we will see **Transistors** following the four-step process on which I have already created a video, so let's start.

Transistors

→ A Transistor is a semiconductor device and it has two major functions. One is that it is used to amplify these signals and the second is that it can be used as switch.

Types of Transistors

→ The transistor is of two types, (the transistor is a lot many more types as well but what the transistor we are going to see is of two types)

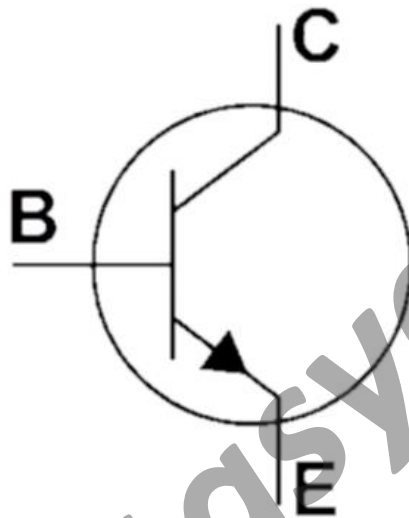
- **PNP (Positive Negative Positive)**
 - 557 ,558
- **NPN (Negative Positive Negative)**
 - 547 ,548

Circuit Symbol of Transistor

- **B – Base**
- **C – Collector**
- **E – Emitter**

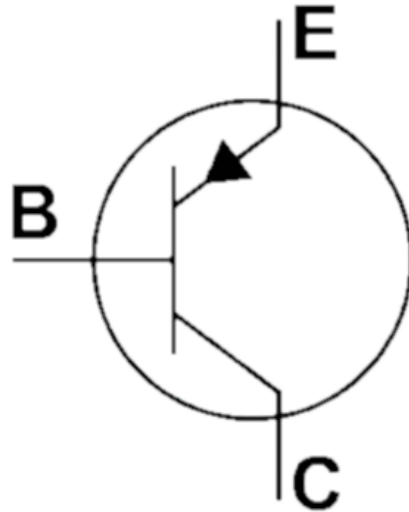
NPN

- **-1 (open)**
- **-0 (closed)**



PNP

- **-1 (closed)**
- **-0 (open)**



BC-547 Transistor

→ It is an NPN transistor

BC-548 Transistor

→ It is an PNP transistor

Real-Time Application

- Memory card
- Pen drive
- Digital Camera

Online Circuit Simulation of NPN

Note: - This is a simulation of NPN.

NPN means: Collector = Negative, Base = Positive, Emitter = Negative.

NPN will amplify a negative signal only.

→ ***Let's open our Tinker CAD, create a new project, and then simply drag some basic components like Bread Board, a Battery, a LED, and a resistor. Now I will drag a NPN transistor.***

→ ***Let's do the connections, first of all, we connect the NPN to any random strip of the Bread Board, then we will connect the terminals of the battery to their respective power rails. Then we will connect the 1st Terminal of the resistor to the positive power rail and connect the 2nd Terminal to the base of the NPN. Then we will connect the collector to the negative power rail. Then we will connect the cathode of the LED to the Emitter and connect the Anode to the positive power rail. Then we will click on "Run Simulation" and push the button and our LED should be glowing perfectly.***

Online Circuit Simulation of PNP

Note: - This is a simulation of PNP.

PNP means: Collector = Positive, Base = Negative, Emitter = Positive.

PNP will amplify a positive signal only.

→ ***Let's open our Tinker CAD, create a new project, and then simply drag some basic components like Bread Board, a Battery, a LED, and a resistor. Now I will drag a PNP transistor.***

→ *Let's do the connections, first of all, we connect the PNP to any random strip of the Bread Board, then we will connect the terminals of the battery to their respective power rails. Then we will connect the 1st Terminal of the resistor to the negative power rail and connect the 2nd Terminal to the base of the PNP. Then we will connect the collector to the positive power rail. Then we will connect the Anode of the LED to the Emitter and connect the Cathode to the negative power rail. Then we will click on "Run Simulation" and push the button and our LED should be glowing perfectly.*

Practical Experimentation of NPN

→ *Components Required:*

- *A Breadboard*
- *A Battery*
- *Some Jumper Wires*
- *A BC-547 (NPN)*
- *A Resistor (should be 1k ohms)*
- *A LED*

→ *Let's do the connections, first of all, we connect the NPN to any random strip of the Bread Board, then we will connect the terminals of the battery to their respective power rails. Then we will connect the 1st Terminal of the resistor to the positive power rail and connect the 2nd Terminal to the base of the NPN. Then we will connect the collector to the negative power rail. Then we will connect the cathode of the LED to the Emitter and connect*

the Anode to the positive power rail. Now our LED should be glowing perfectly.

Practical Experimentation of PNP

→ **Components Required:**

- **A Breadboard**
- **A Battery**
- **Some Jumper Wires**
- **A BC-547 (PNP)**
- **A Resistor (should be 1k ohms)**
- **A LED**

→ *Let's do the connections, first of all, we connect the PNP to any random strip of the Bread Board, then we will connect the terminals of the battery to their respective power rails. Then we will connect the 1st Terminal of the resistor to the negative power rail and connect the 2nd Terminal to the base of the PNP. Then we will connect the collector to the positive power rail. Then we will connect the Anode of the LED to the Emitter and connect the Cathode to the negative power rail. Now our LED should be glowing perfectly.*

Circuit Diagram of NPN

→ *First, we will draw the symbol of a battery, then the symbol of a LED, then we will draw the symbol of the resistor, we will draw the symbol of the NPN Transistor, then we will connect the positive line of the battery to the LED's positive pin, then we will*

connect the positive line of the battery to the 1st Terminal of the resistor, Then we will connect the 2nd Terminal of the resistor to the base of the NPN, then we will connect the collector of NPN to the negative line of the battery and emitter of the NPN to the Negative line of the LED, and your diagram is completed

Circuit Diagram of PNP

→ First, we will draw the symbol of a battery, then the symbol of a LED, then we will draw the symbol of the resistor, we will draw the symbol of the PNP Transistor, then we will connect the negative line of the battery to the LED's negative pin, then we will connect the negative line of the battery to the 1st Terminal of the resistor, Then we will connect the 2nd Terminal of the resistor to the base of the PNP, then we will connect the collector of PNP to the positive line of the battery and emitter of the PNP to the positive line of the LED, and your diagram is completed

Outro

→ That's all for this video and I will see you in this next one until then BYE BYE!!