

Transistor Characteristics

Spoken Tutorial Project

<https://spoken-tutorial.org>

National Mission on Education through ICT

Spoken Tutorial & FOSSEE Team

IIT Bombay

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Learning Objectives



Learning Objectives

We will learn about



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We will learn about

- **Transistor**



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- **Transistor**
- **Types of Transistors**



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We will learn about

- **Transistor**
- **Types of Transistors**
- **Transistor Voltage-Current (V-I) characteristics**



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- **Transistor Voltage-Current (V-I) characteristics**
- **Transistor as a Switch**



System Requirement



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- **Ubuntu Linux 20.04 OS**



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- **Ubuntu Linux 20.04 OS**
- **CircuitJS Application**



Pre-requisites



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To follow this tutorial, you should have a basic knowledge of

- **Electrical Circuits**



What is a Transistor?



What is a Transistor?

- **A transistor is a semiconductor device that amplifies or switches electronic signals**



What is a Transistor?

- **A transistor is a semiconductor device that amplifies or switches electronic signals**
- **The transistor forms a fundamental component in modern electronic devices**



Types of Transistors

- **Bipolar Junction Transistor (BJT)**
- **Field Effect Transistor (FET)**



Bipolar Junction Transistor (BJT)



Bipolar Junction Transistor (BJT)

- A BJT has three terminals: Base, Collector and Emitter



Bipolar Junction Transistor (BJT)

- **A BJT has three terminals: Base, Collector and Emitter**
- **There are two types of Bipolar Junction Transistors**



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 - PNP Transistor
 - NPN Transistor



Importance of NPN over PNP



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- **Electrons exhibit high mobility in semiconductor materials**



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- **An NPN transistor consists of electrons as majority charge carriers**



Importance of NPN over PNP

- **Electrons exhibit high mobility in semiconductor materials**
- **An NPN transistor consists of electrons as majority charge carriers**
- **The silicon based transistors are economically carried out using large N-type silicon wafers**



Summary

In this tutorial, we learnt about

- **Transistor**
- **Types of Transistors**
- **Transistor Voltage-Current (V-I) characteristics**
- **Transistor as a Switch**



Assignment

- 1 Follow the same steps to plot a graph of V vs I for values $V_1 = 4$ volts and $V_1 = 5$ volts



About the Spoken Tutorial Project

- Watch the video available at https://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- It summarises the Spoken Tutorial project
- If you do not have good bandwidth, you can download and watch it



Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- Conducts workshops using spoken tutorials
- Gives certificates to those who pass an online test
- For more details, please write to contact@spoken-tutorial.org



Answers for THIS Spoken Tutorial

- Questions in THIS Spoken Tutorial?
- Visit <https://forums.spoken-tutorial.org>
- Choose the minute and second where you have the question
- Explain your question briefly
- The Spoken Tutorial project will ensure an answer



Acknowledgements

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Thank You

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