

Bipolar Junction Transistor

BY -

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TRANSISTOR AND ORIGIN OF THE NAME

- ◆ When a third doped element is added to a crystal diode in such a way that two pn junctions are formed, the resulting device is known as a **TRANSISTOR**.
- ◆ **THE BASIC AMPLIFYING** action is produced by transferring a current from a low resistance to a high resistance circuit.
- ◆ Consequent the name transistor is given to the device by combining the two terms

[TRANS]FER + RES[ISTOR] = TRANSISTOR

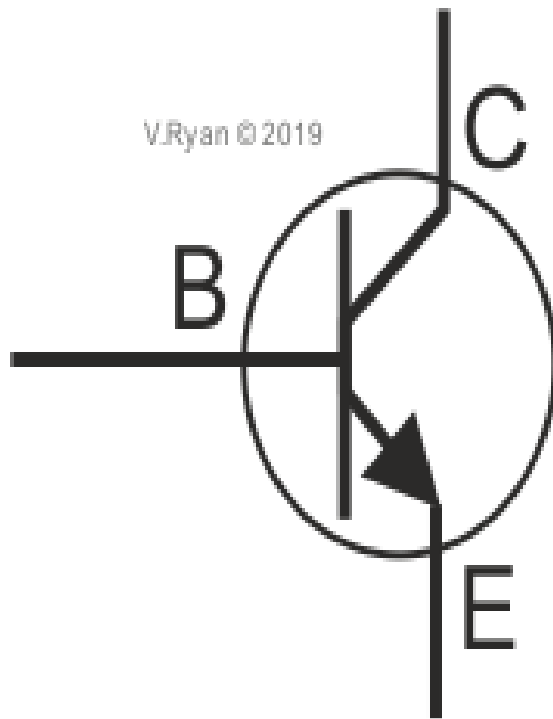
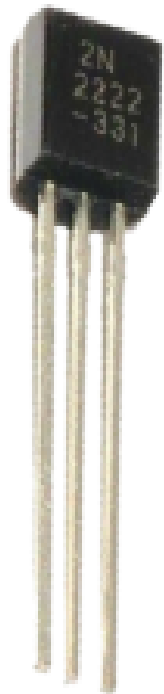
Types of Transistor

	BJT	FET
<i>Control method</i>	<i>Input current (I_B or I_E)</i>	<i>input voltage (V_{GS})</i>
<i>Bias type of input circuit at active mode</i>	<i>forward bias in base (B) & emitter (E) junction</i>	<i>reverse bias in source (S) & gate (G) junction</i>
<i>The gain</i>	<i>Example voltage gain</i>	<i>Example mutual transconductance</i>
<i>Noise level</i>	<i>high</i>	<i>Very low</i>
<i>Dependence in terms of carriers and type impurities</i>	<i>It depends on the majority and minority carriers of two types n-type and p-type</i>	<i>It depends on the majority carriers of one type n-type or p-type</i>
<i>Name</i>	<i>Bipolar</i>	<i>Unipolar</i>
<i>Dependence on transistor work</i>	<i>The minority carriers injected across the forward voltage in junction</i>	<i>Controlling with depletion region width in the channel by reverse bias</i>
<i>Current on parts</i>	<i>Current moves between emitter and base and collector (3 parts)</i>	<i>Current moves between source and drain (2 parts)</i>
<i>Input resistance</i>	<i>Lower due to forward bias</i>	<i>higher due to reverse bias</i>
<i>Thermal stability</i>	<i>less</i>	<i>best</i>

FATE DIFFERENCE

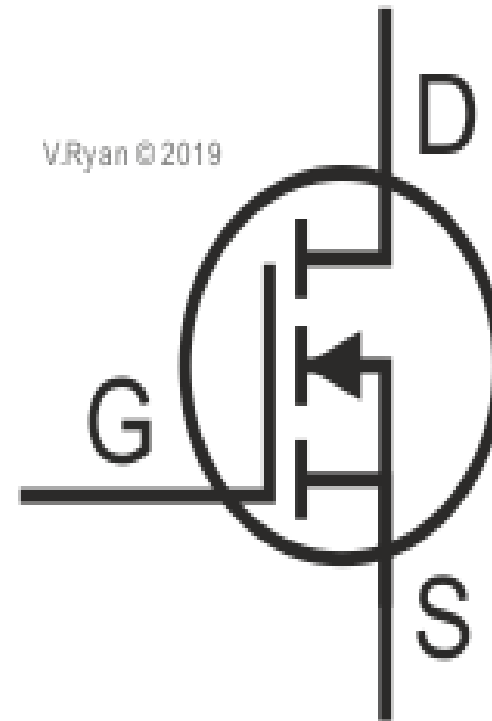
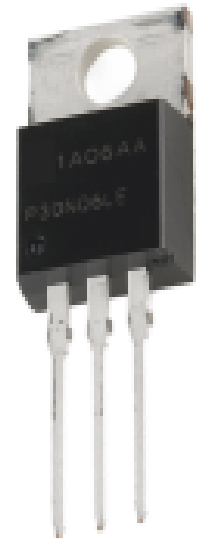
BJT

(bipolar junction transistor)



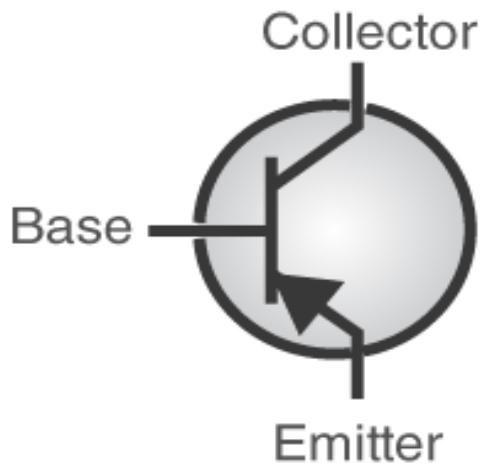
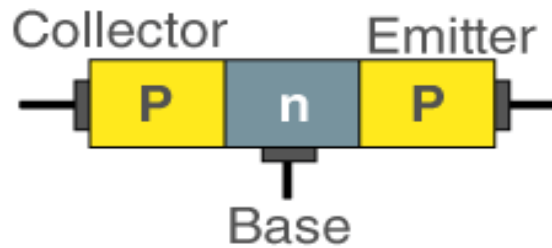
FET

(Field-Effect Transistors)

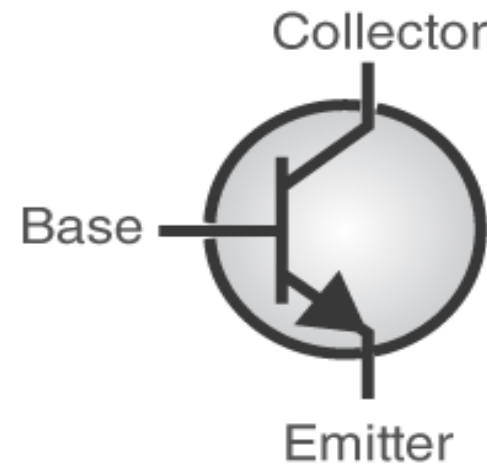
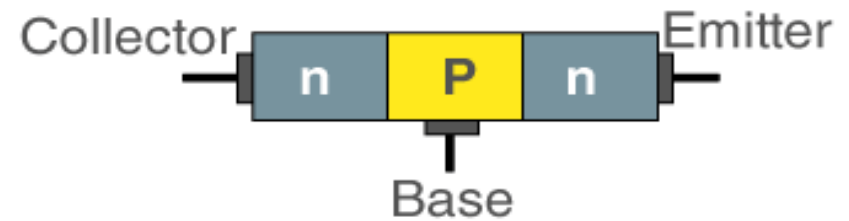


TYPES OF BJT

PNP



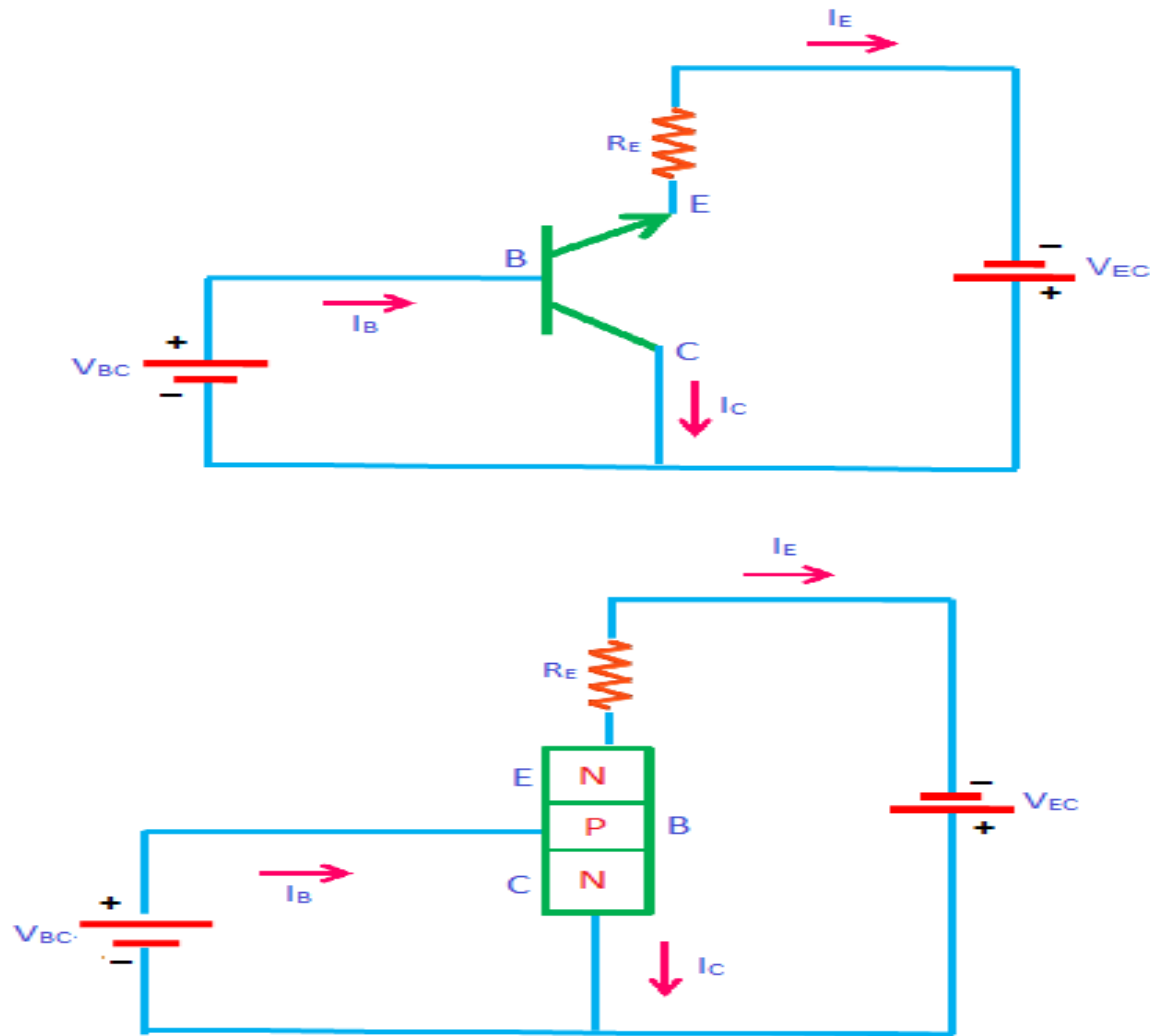
NPN



BJT CONNECTIONS

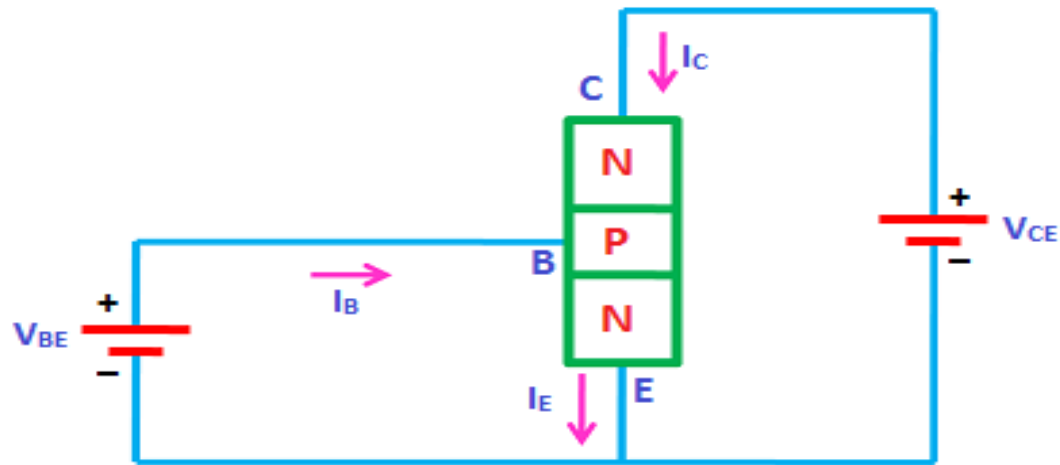
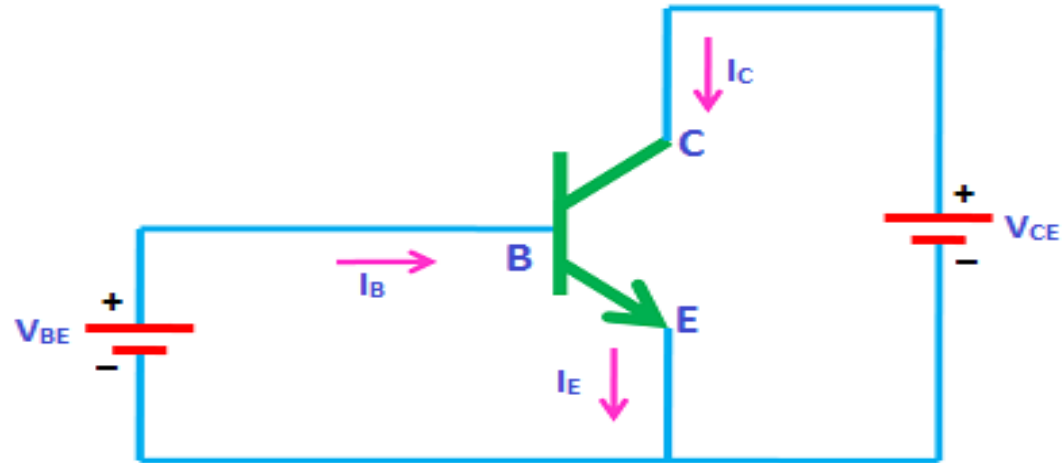
- 1. COMMON BASE CONNECTION**
- 2. COMMON EMITTER CONNECTION**
- 3. COMMON COLLECTOR**

COMMON COLLECTOR CONFIGURATION



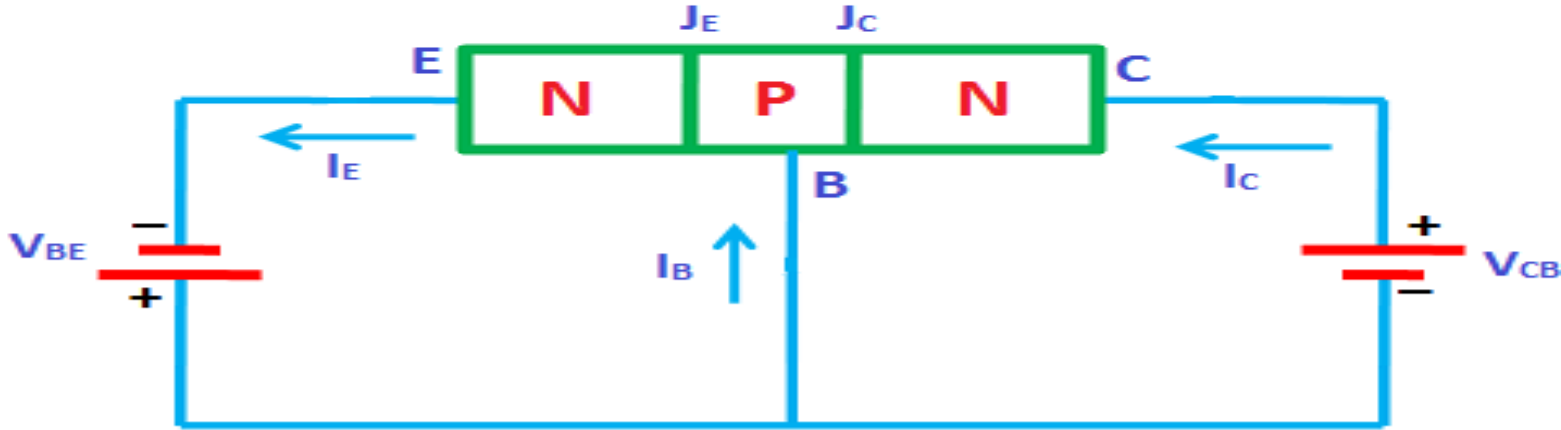
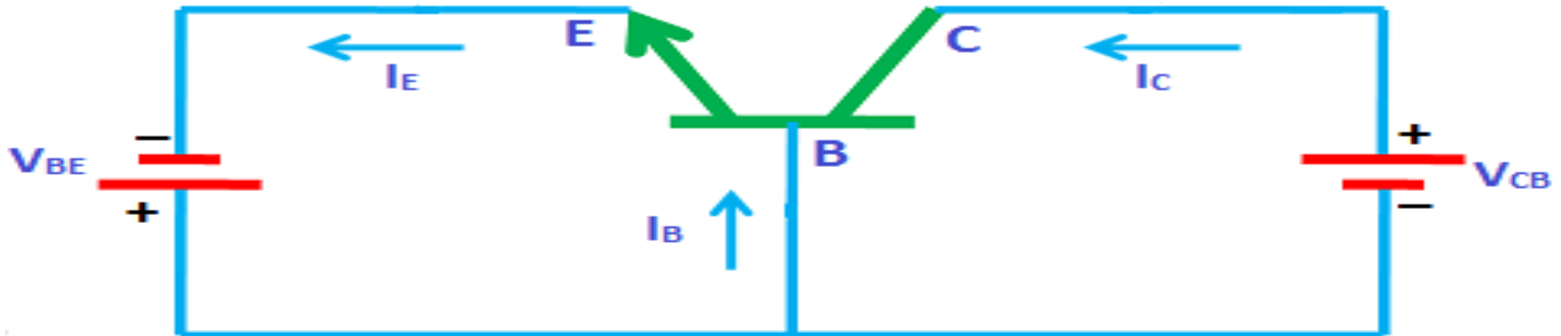
Common collector configuration

COMMON EMITTER CONFIGURATION



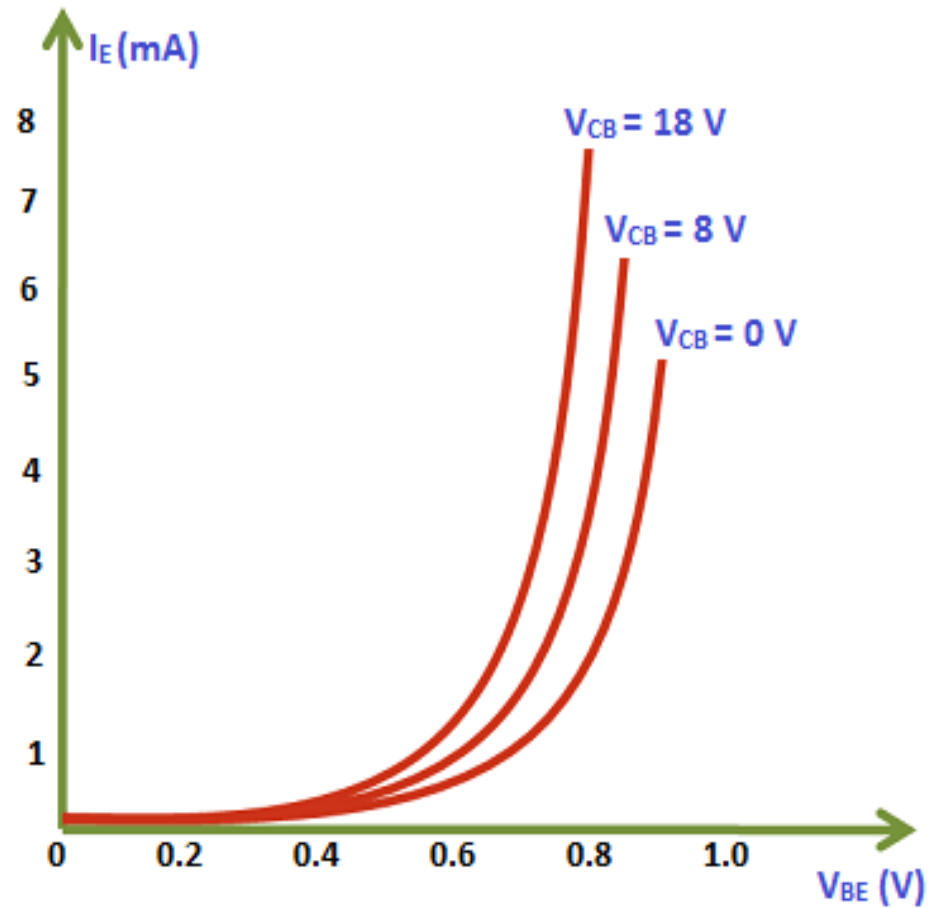
Common emitter configuration

COMMON BASE CONNECTION



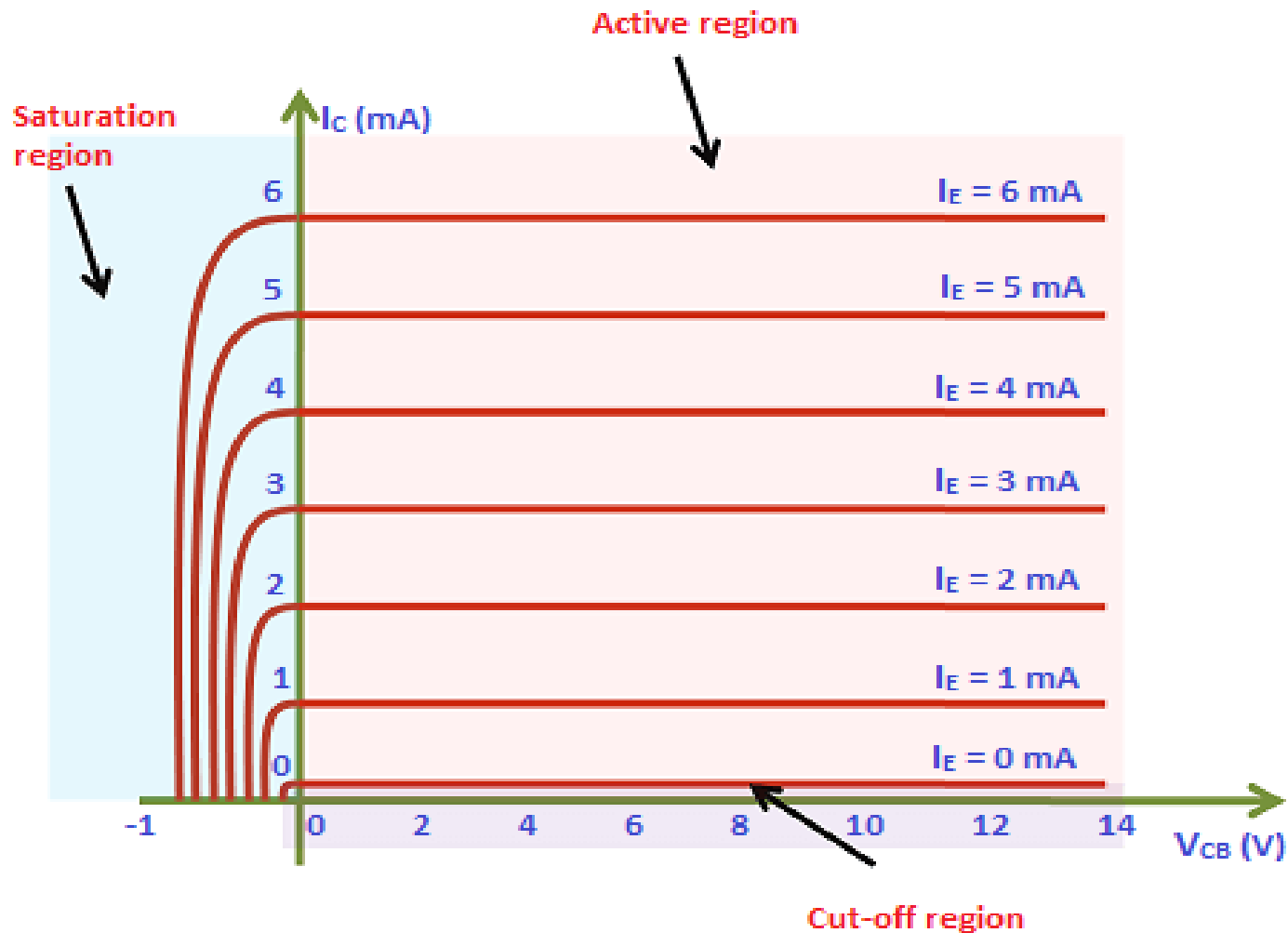
Common base configuration

Input Characteristics curve



I/p characteristics CB configuration

Output Characteristic Curve



O/P characteristics CB configuration

BJT OPERATIONS

- 1. ACTIVE MODE**
- 2. SATURATION MODE**
- 3. CUT OFF**
- 4. REVERSE ACTIVE**

COMPARISON OF TRANSISTOR CONNECTIONS

S. No.	Characteristic	Common base	Common emitter	Common collector
1.	Input resistance	Low (about 100 Ω)	Low (about 750 Ω)	Very high (about 750 k Ω)
2.	Output resistance	Very high (about 450 k Ω)	High (about 45 k Ω)	Low (about 50 Ω)
3.	Voltage gain	about 150	about 500	less than 1
4.	Applications	For high frequency applications	For audio frequency applications	For impedance matching
5.	Current gain	No (less than 1)	High (β)	Appreciable

THANK YOU

