**Bipolar Junction Transistor (BJT)**

**BJT:-**

* A.Semiconductor of to p-n junction formed by sandwiching either p-type or n-type semiconductor between a pair of opposite type semiconductor

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| N | P | N |  | P | N | P |

**Type of BJT:-**

* NPN BJT – Two blocks of N-type semiconductor are separated by a thin layer of P-Type semiconductor

Emitter Base Collector

|  |  |  |
| --- | --- | --- |
| N | P | N |

* PNP BJT - Two blocks of P-type semiconductor are separated by a thin layer of N-Type semiconductor

Emitter Base Collector

|  |  |  |
| --- | --- | --- |
| P | N | P |

**BJT Symbols :-**

1. NPN 2.PNP

**Working of NPN- BJT :-**

E B C

|  |  |  |
| --- | --- | --- |
| . N  .  . | . P  .  . | . N  .  . |

* Emitter Base junction is forward biased while collector base junction is reverse biased
* Due to FB a large number of electrons in the emitter are pushed toward the base which constitutes the emitter current
* These electrons pass thorough the base region and combine with holes
* Since base is lightly doped and very thien a few electron combine with holes and constituse bas current
* The remaining electrons comes under the influence of the poseitively biased N- region and collected by collector which constitutes collector current
* Base form a bridge between emitter and collector
* Ie=Ib+IC

**BJT Has 3 Region :-**

|  |  |  |
| --- | --- | --- |
| Region | Doping | Size |
| Emitter | Heavily | Medium |
| Collector | Medium | Large |
| Base | Less | Small |

**BJT Operating Region :-**

|  |  |  |  |
| --- | --- | --- | --- |
| Region | Emitter base junction | Collector Base Junction | Region Of Operating |
| I | FB | RB | Active |
| II | FB | FB | Saturation |
| III | RB | RB | Cut off |
| IV | RB | FB | inverted |

**Amplification factor :-**

In the ratio output current and input current

CB

CEIc/Ib

CC

**Relation between Alpha and Betta :-**

Ie=Ib+IC Equation1

Ic/Ib

Ie/Ic=Ib/Ic+IC/Ic

1/

**Relation Between Alpha and Gamma**

Ie=Ib+IC Equation1

Ie/Ib

1

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