



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai*



DEPARTMENT OF MECHATRONICS

16MC302 – INDUSTRIAL ELECTRONICS & APPLICATION *III YEAR V SEM*

UNIT 1 – INTRODUCTION TO POWER ELECTRONICS

TOPIC – IGBT

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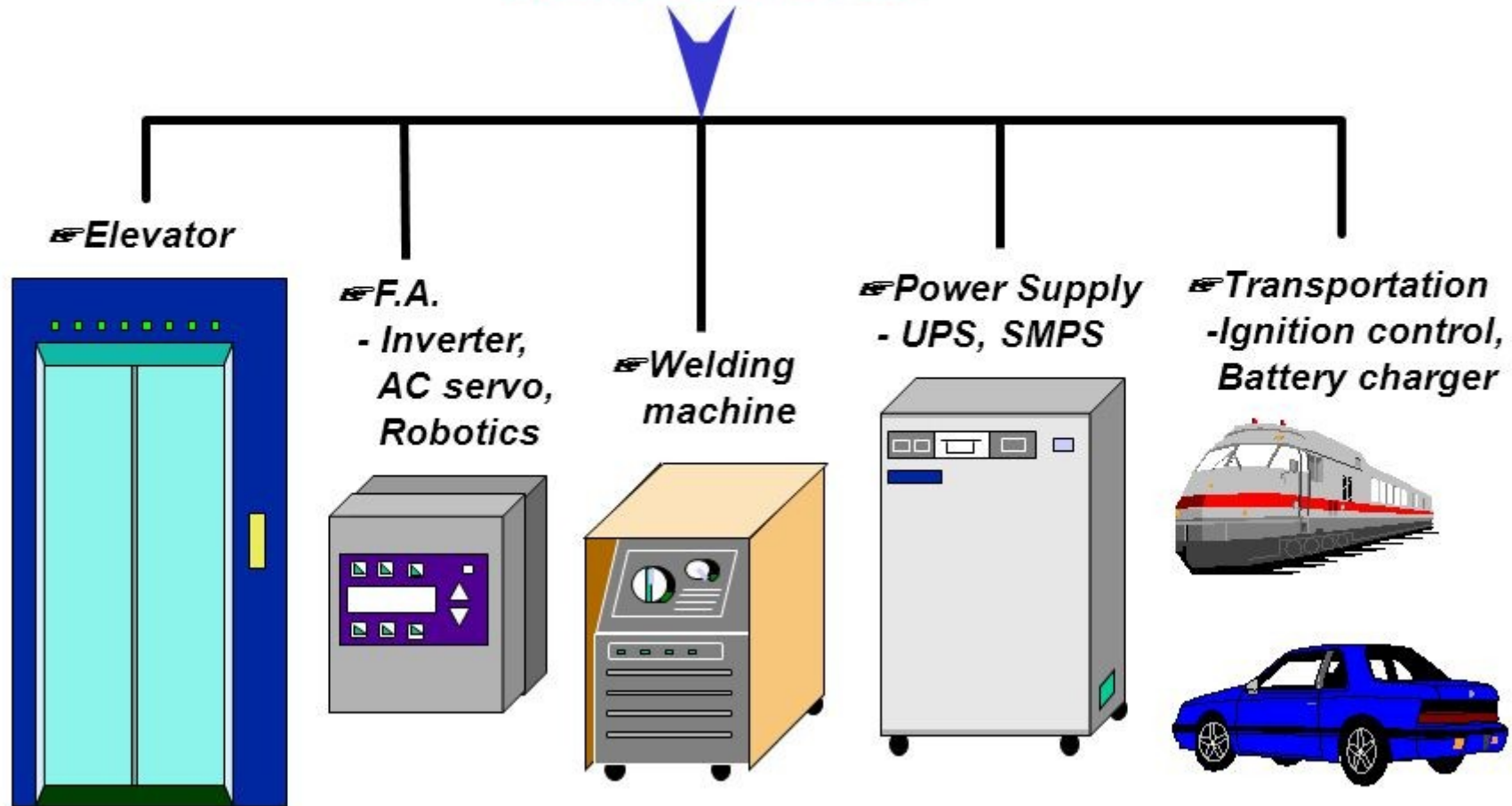
DEPARTMENT OF MECHATRONICS,

SNSCT, Coimbatore.

09/03/2024



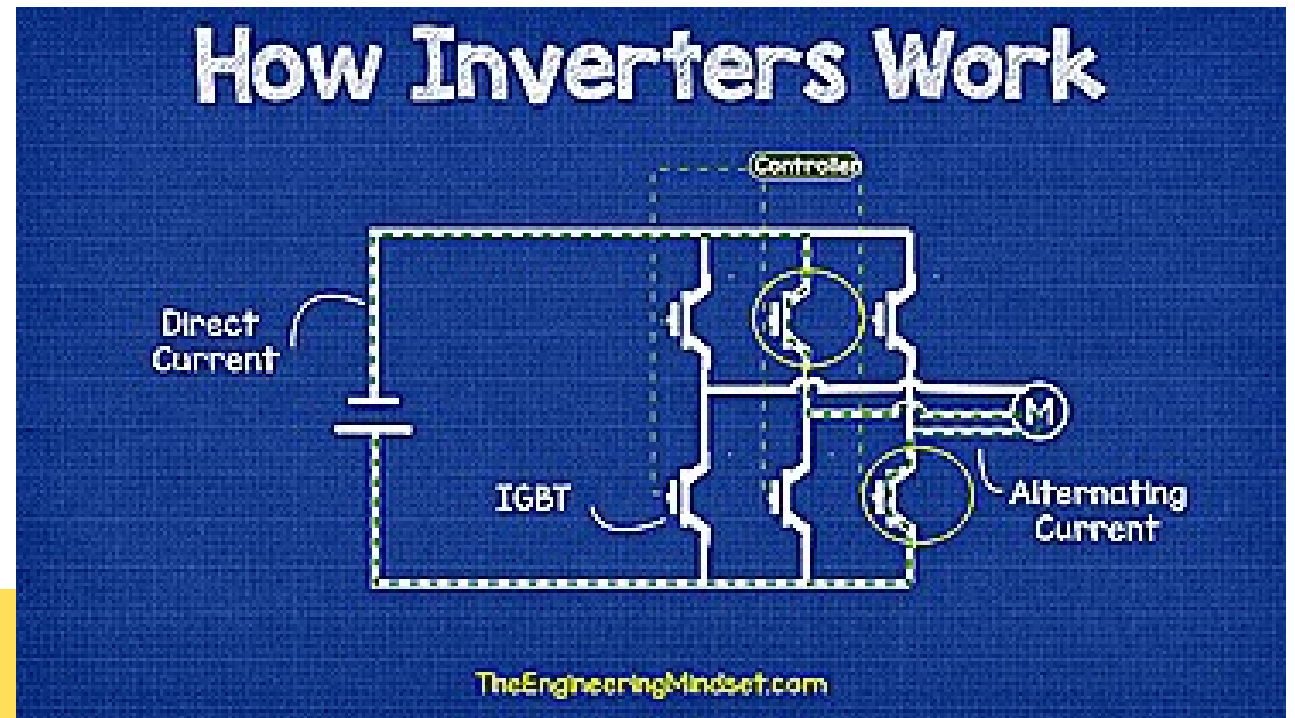
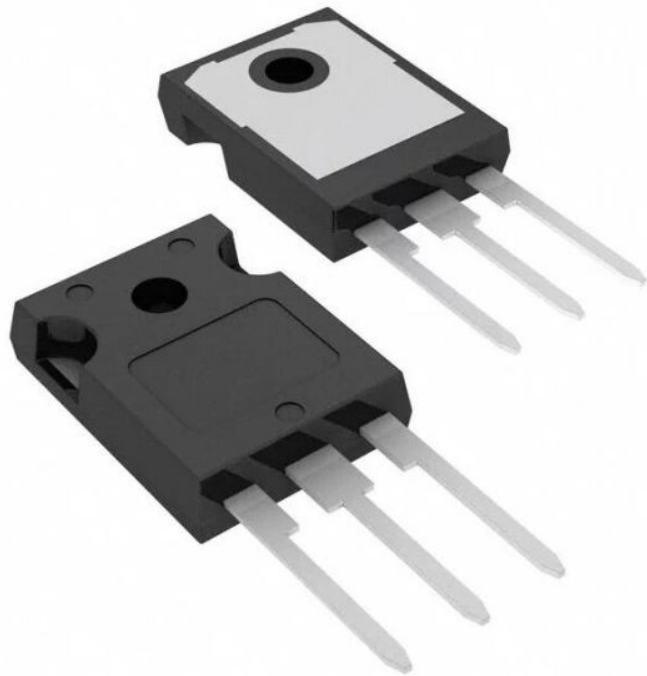
APPLICATION





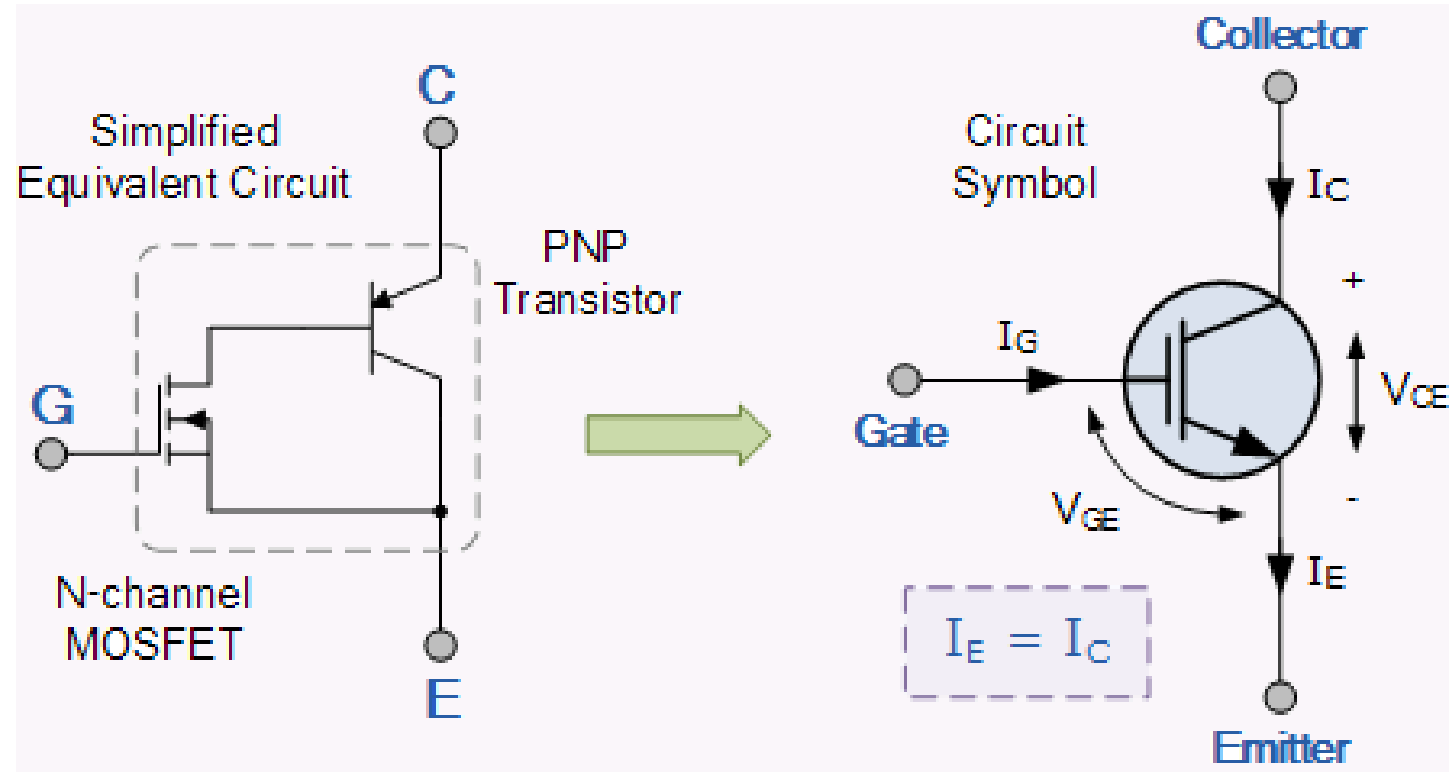
IGBT

An insulated-gate bipolar transistor (**IGBT**) is a three-terminal power semiconductor device primarily used as an electronic switch which, as it was developed, came to combine high efficiency and fast switching.



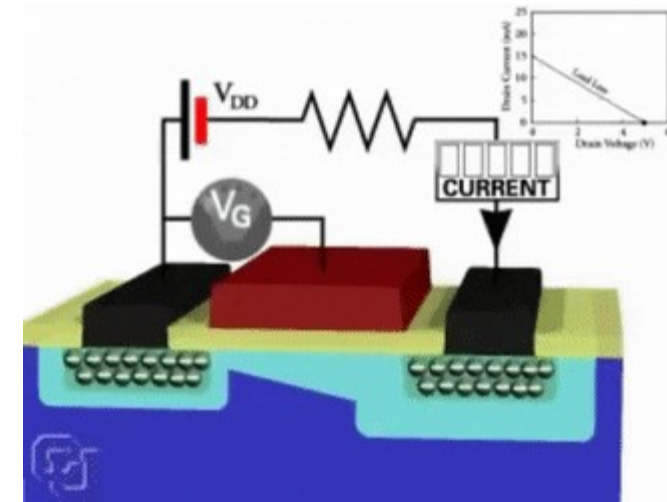
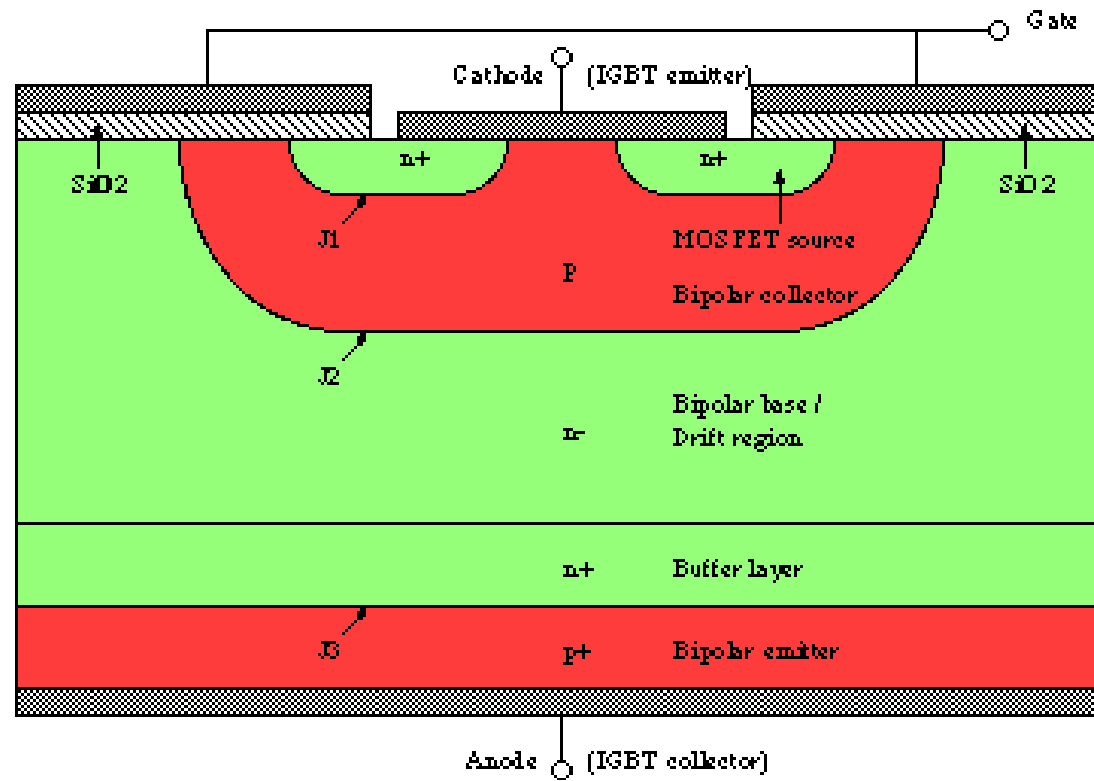


SYMBOL



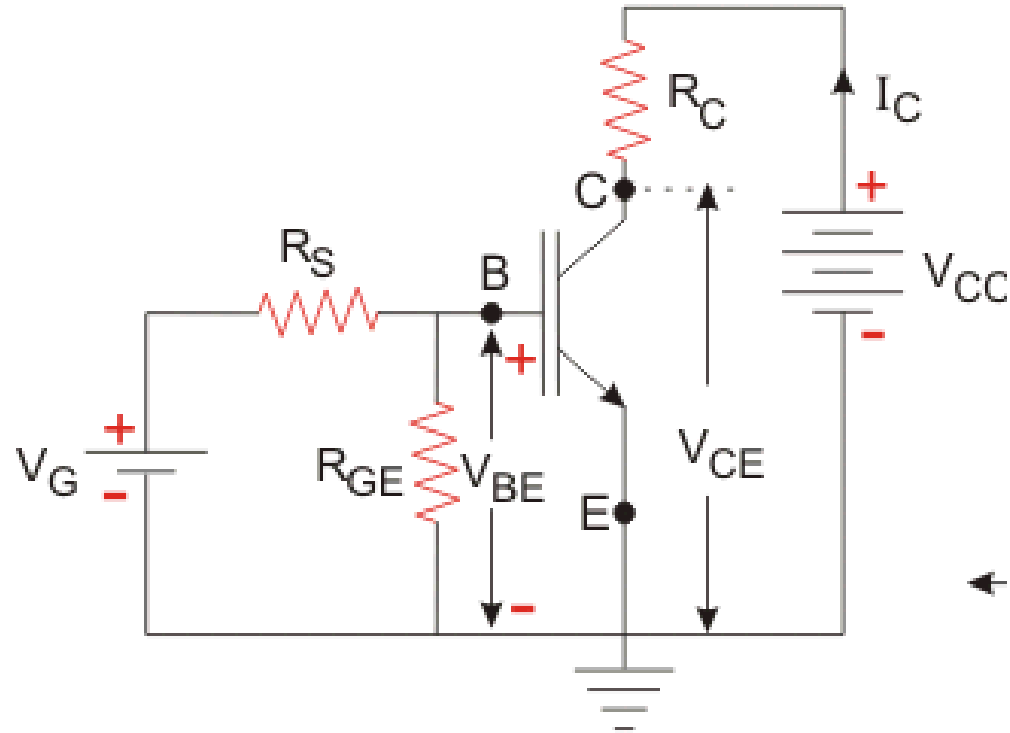


LAYER





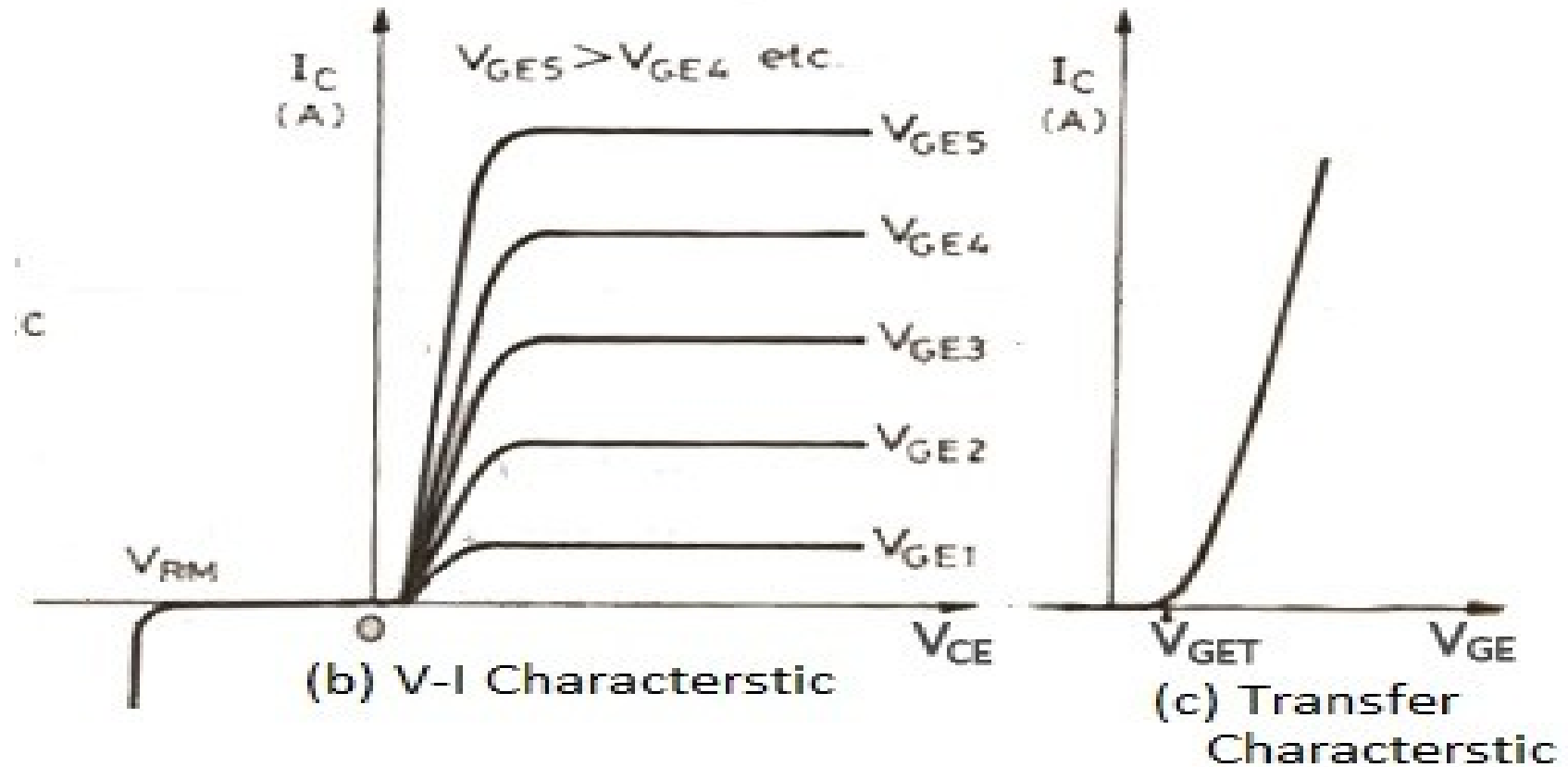
CIRCUIT DIAGRAM



<https://www.youtube.com/watch?v=VT6YWEWeMi0>



CHARACTERISTIC DIAGRAM





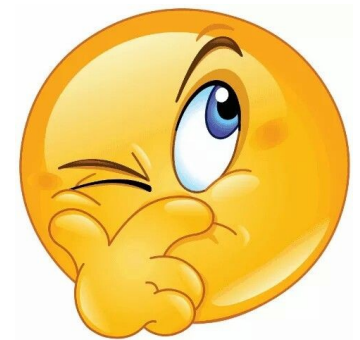
Advantages of IGBT

- The insulated gate bipolar transistor (IGBT) is easy to turn ON and OFF.
- The switching frequency is higher than that of power BJT.
- It has a low on state power dissipation.
- It has simpler driver circuit..





| Parameter | Power BJT | Power MOSFET | IGBT |
|-------------------------------|---|---|--|
| Operating frequency | 10 kHz | 100 kHz | 10 kHz |
| On-state voltage drop | < 2 volts | 4-5 volts | 3 volts |
| Trigger circuit | Current controlled needs continuous base drive. | Voltage controlled needs continuous gate drive. | Voltage controlled need continuous gate drive. |
| Maximum VI Rating | 2 kV/ 1000 A | 600 V/ 200 A | 1500 V/ 400 A |
| Voltage or Current Controlled | Current controlled | Voltage controlled | Voltage controlled |
| Parallel Operation | Equalizing circuit required. | Easy to parallel. | Easy to parallel. |





References

1. <https://components101.com/articles/what-is-igbt-working-operation-symbol-and-types>
2. <https://www.electrical4u.com/insulated-gate-bipolar-transistor-igbt/>
3. <https://www.youtube.com/watch?v=ilqhAX0I7II>
4. <https://www.youtube.com/watch?v=VT6YWEWeMi0>

