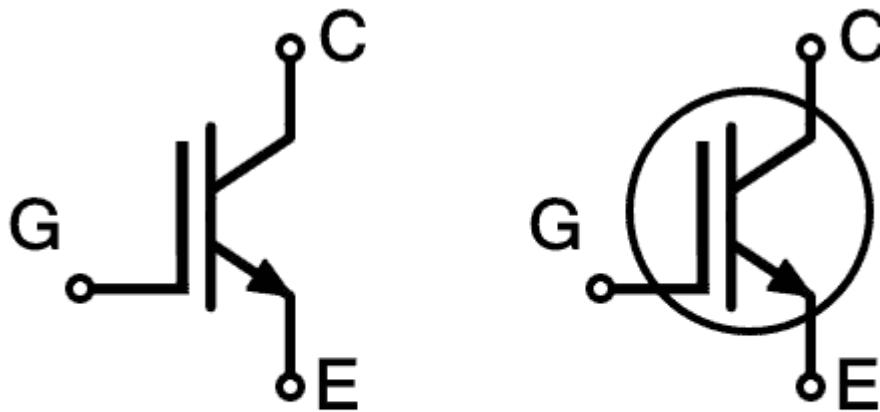


# IGBTs

## What is an igbt:

Insulated gate bipolar transistors are electronic device combining features of the BJT and MOSFET devices to better suit different applications. The *IGBT Transistor* takes the best parts of these two types of common transistors, the high input impedance and high switching speeds of a MOSFET with the low saturation voltage of a bipolar transistor and combines them together to produce another type of transistor switching device that is capable of handling large collector-emitter currents with virtually zero gate current drive.



IGBT - Insulated-Gate Bipolar Transistor  
Symbol

IGBTs are voltage-controlled devices like MOSFETs that adjust the gate to emitter voltage  $V_{GE}$  To control the output current flowing through the collector and emitter junctions. IGBTs are mainly used in power electronics applications, such as inverters, converters and power supplies. IGBTs are utilized for their combination of a higher current gain than BJTs accompanied with the low ON losses of MOSFETs but with higher voltage operations

## capabilities:

### BJT:

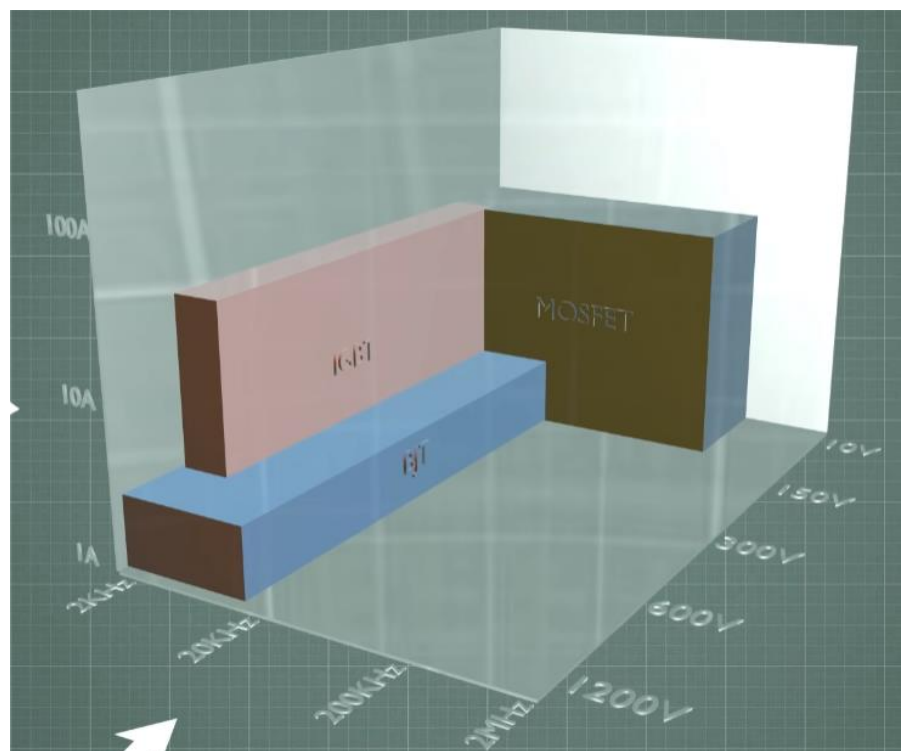
- ) high voltage
- ) low current
- ) low ON losses
- ) can be switched on at about 100KHZ
- ) complex base drive

### MOSFET:

- ) low voltage
- ) high current
- ) Low  $R_{DS}$  resistance
- ) can operate at speeds up to 500KHZ
- ) simple base drive

### IGBT:

- ) high voltage
- ) high current
- ) Low ON losses
- ) simple base drive
- ) switching speeds approx. 50KHZ



Parameters of IGBTs are relatively similar to those of BJTs but without current gain including:

-)  $I_C$  : continuous current rating

-)  $V_{CE}$  : ON-voltage

However, IGBTs have the MOSFETs' threshold voltage  $V_{GE}$  as well