Difference Between BJT and FET

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BJT vs FET

Both BJT (Bipolar Junction Transistor) and FET (Field Effect Transistor) are two types of transistors. Transistor is an electronic semiconductor device that gives a largely changing electrical output signal for small changes in small input signals. Due to this quality, the device can be used as either an amplifier or a switch. Transistor was released in 1950s and it can be considered as one of the most important invention in 20th century considering its contribution to the development of IT. Different types of architectures for transistor have been tested.

Bipolar Junction Transistor (BJT)

BJT is consists of two PN junctions (a junction made by connecting a p type semiconductor and n type semiconductor). These two junctions are formed using connecting three semiconductor pieces in the order of P-N-P or N-P-N. There for two types of BJTs known as PNP and NPN are available.

Three electrodes are connected to these three semiconductor parts and middle lead is called ‘base’. Other two junctions are ‘emitter’ and ‘collector’.

In BJT, large collector emitter (Ic) current is controlled by the small base emitter current (IB) and this property is exploited to design amplifiers or switches. There for it can be considered as a current driven device. BJT is mostly used in amplifier circuits.

Field Effect Transistor (FET)

FET is made of three terminals known as ‘Gate’, ‘Source’ and ‘Drain’. Here drain current is controlled by the gate voltage. Therefore, FETs are voltage controlled devices.

Depending on the type of semiconductor used for source and drain (in FET both of them are made of the same semiconductor type), a FET can be an N channel or P channel device. Source to drain current flow is controlled by adjusting the channel width by applying an appropriate voltage to gate. There are also two ways of controlling the channel width known as depletion and enhancement. Therefore FETs are available in four different types such as N channel or P channel with either in depletion or enhancement mode.

There are many types of FETs such as MOSFET (Metal Oxide Semiconductor FET), HEMT (High Electron Mobility Transistor) and IGBT (Insulated Gate Bipolar Transistor). CNTFET (Carbon Nanotube FET) which was resulted by the development of nanotechnology is the latest member of FET family.

Difference between BJT and FET

1. BJT is basically a current driven device, though FET is considered as a voltage controlled device.

2. Terminals of BJT are known as emitter, collector and base, whereas FET is made of gate, source and drain.

3. In most of the new applications, FETs are used than BJTs.

4. BJT uses both electrons and holes for conduction, whereas FET uses only one of them and hence referred to as unipolar transistors.

5. FETs are power efficient than BJTs.

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