

Answer on Question #50638, Engineering, Other

What is a transistor? What are its types?

What is IC's? What types are there?

Answer:

A **transistor** is a semiconductor device used to regulate current, or to amplify an input signal into a greater output signal. Transistors are also used to switch electronic signals. It is composed of semiconductor material with at least three terminals for connection to an external circuit.

The circulation of electrical current through all types of transistors is adjusted by electron addition. This process creates variations in voltage to cause proportionally larger variations in output current, creating amplification.

Types of Transistors.

There are essentially two basic types of point-contact transistors, the npn transistor and the pnp transistor, where the n and p stand for negative and positive, respectively. The only difference between the two is the arrangement of bias voltages.

There are a wide variety of transistor types that have been developed. Here's a list (not necessarily exhaustive) of various types of transistors:

- Bipolar junction transistor (BJT)
- Field-effect transistor (FET)
- Heterojunction bipolar transistor
- Unijunction transistor
- Dual-gate FET
- Avalanche transistor
- Thin-film transistor
- Darlington transistor
- Ballistic transistor
- FinFET
- Floating gate transistor
- Inverted-T effect transistor
- Spin transistor
- Photo transistor
- Insulated gate bipolar transistor
- Single-electron transistor
- Nanofluidic transistor
- Trigate transistor (Intel prototype)
- Ion-sensitive FET
- Fast-reverse epitaxial diode FET (FREDFET)
- Electrolyte-Oxide-Semiconductor FET (EOSFET)

Bipolar Transistor - A Bipolar Junction Transistor (BJT) is a three-terminal electronic device made of doped semiconductor material and may be used in amplifying or switching applications. Bipolar transistors are so named because their operation involves both electrons and holes. A bipolar transistor will have terminals that are labeled: emitter, collector, base. A small current at the base terminal (passing from the base to the emitter) can modify or switch a much larger current between the collector and emitter terminals.

Darlington Transistor - The Darlington Transistor is actually two bipolar transistors, connected in such a way that the current amplified by the first transistor is amplified even further by the second one. This model offers a higher common-emitter current gain than if both types of transistors are separated and can even take up less space because both transistors can share a collector.

IGBT Transistor - An Insulated Gate Bipolar Transistor (IGBT) is a three-terminal power semiconductor device typically used as an electronic switch. IGBT's are types of transistors that are capable of switching electric power in many modern appliances such as electric cars, trains, variable speed refrigerators, air-conditioners and even stereo systems with switching amplifiers.

MOSFET Transistor - A Metal-Oxide-Semiconductor Field-Effect Transistor (MOSFET) is used in integrated circuits to control the conductivity of a channel. MOSFETs are highly dependent on negative and positive charges. They have many purposes, including limiting a device's power levels, storing data, and being used as a switch for a wide variety of electronic devices.

What is IC's? What types are there?

An integrated circuit is defined as:

“A circuit in which all or some of the circuit elements are inseparably associated and electrically interconnected so that it is considered to be indivisible for the purposes of construction and commerce”

An **Integrated circuit** is an association (or) connection of various electronic devices such as resistors, capacitors and transistors etched (or) fabricated to a semiconductor material such as silicon or germanium. It is also called as a chip or microchip. An IC can function as an amplifier, rectifier, oscillator, counter, timer and memory. Sometime ICs are connected to various other systems to perform complex functions.

Types of ICs

ICs can be categorized into two types

- Analog or Linear ICs
- Digital ICs

Further there are certain ICs which can perform as a combination of both analog and digital functions.

Analog or Linear ICs can produce continuous output depending on the input signal. From the name of the IC we can deduce that the output is a linear function of the input signal. Op-amp (operational amplifier) is one of the types of linear ICs which are used in amplifiers, timers and counters, oscillators etc.

Unlike Analog ICs, Digital ICs never give a continuous output signal. Instead it operates only during defined states. Digital ICs are used mostly in microprocessor and various memory applications. Logic gates are the building blocks of Digital ICs which operate either at 0 or 1.

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