3.4% PlagScan by Turnitin Results of plagiarism analysis from 2023-05-09 16:00 UTC

FET (1).pdf

Date: 2023-05-09 15:59 UTC

✱ All sources **2** | Internet sources **2**

☑	[0]	worldradiohistory.com/BOOKSHELF-ARH/Author-Groups/Rufus-Turner/Beyond-the-Transistor-Rufus-Turner.pdf **2.4%** 3 matches
☑	[1]	www.mdpi.com/2673-9585/2/1/6 **1.8%** 2 matches

7 pages, 1099 words

PlagLevel: 3.4% selected / 3.4% overall

4 matches from 2 sources, of which 2 are online sources.

Settings

Data policy: *Compare with web sources, Check against my documents*

Sensitivity: *Medium*

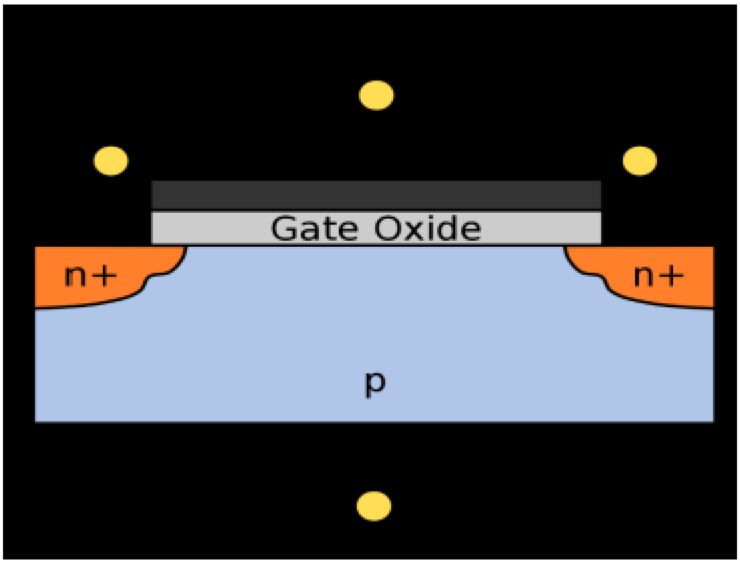
Bibliography: *Consider text*

Citation detection: *Reduce PlagLevel*

Whitelist: --

What is FET?

Basically the term 'FET' stands for Field Effect Transistor. It is a small electronic device that helps to control the flow of electrical current in a circuit. Imagine you have a faucet that controls the flow of water. Similarly, a FET(Field Effect Transistor) controls the flow of electricity.



FET has three important parts:

(a). The Source.

(b). The Drain.

(c). The Gate.[1]

When you apply a small electrical signal to the gate, it creates anelectric field that allows or blocks the flow of current between the source and the drain. This way, the FET acts like a switch, turning the current on or off, which is useful for various electronic applications like amplifying signals, switching circuits, and much more.

What is Source?

The source is like the starting point of a river for an electronic device called a Field Effect Transistor (FET). It is, from where the electrical current originates or "flows out" from. Just like a river starts from a source and flows downstream, the source in a FET is where the current begins its journey through the transistor. From the source, the current can then flow through the FET to other parts of a circuit or electronic system, depending on how the transistor is connected and controll

What is Drain?

The drain is like the endpoint or "collection point" for the electrical current in a Field Effect Transistor (FET). Just as a river flows towards a drain or a larger body of water, the drain in a FET is where the electrical current "collects" or exits the transistor. After the current has passed through the FET and performed its intended function, it reaches the drain, which acts as the final destination for the current. From there, it can continue its path through the circuit or electronic system, or it may be directed elsewhere based on the design and purpose of the overall system.

What is Gate?

The gate is like a control switch for a Field Effect Transistor (FET). It determines whether the electrical current can flow through the transistor or not. Think of it as a gate in a fence that can either be open or closed. When you apply an electrical signal to the gate of a FET, it acts like opening or closing the gate. If the gate receives a certainsignal, it allows the current to flow through the FET, just like opening the gate allows people to pass through. On the other hand, if the gate does not receive that signal, it keeps the current from flowing, just likea closed gate prevents access. The gate of a FET is responsible forcontrolling the flow of current and plays a crucial role in how the transistor operates within an electronic circuit.

Working of FET

A Field Effect Transistor (FET) works based on the principle of controlling the flow of electrical current using an electric field. There are different types of FETs, but let's focus on the most common one, known as the MOSFET (Metal-Oxide-Semiconductor Field Effect Transistor).

A MOSFET consists of three main parts: the source, the drain, and the gate. These parts are connected to a semiconductor material, which is usually silicon. The semiconductor material has regions called the source and the drain, with a thin layer in between called the channel.

The key to how a MOSFET works lies in the gate. The gate is separated from the channel by an insulating layer, typically made of oxide.[0] When a voltage is applied to the gate, an electric field is generated in the channel region.

Now, depending on the type of MOSFET, it can be either an N-channel or P-channel MOSFET. In an N-channel MOSFET, the channel is made of N-type semiconductor material (extra electrons), while in a P-channel MOSFET, the channel is made of P-type semiconductor material (extra holes).[0]

When a positive voltage is applied to the gate of an N-channel MOSFET, it creates a strong electric field that attracts electrons from the N-type channel towards the positive voltage. This electric field allows current to flow from the source to the drain. In other words, it acts as a switch that turns the current "on."[1]

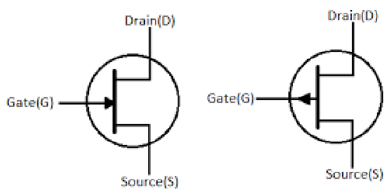
On the other hand, for a P-channel MOSFET, when a negative voltage is applied to the gate, it creates an electric field that attracts the holes from the P-type channel. This also allows current to flow from the source to the drain.

In summary, by applying a voltage to the gate, a MOSFET can either allow or block the flow of electrical current through the channel between the source and the drain. This property makes FETs useful for various applications such as amplification, switching, and digital logic circuits in electronic devices.

Types of FET

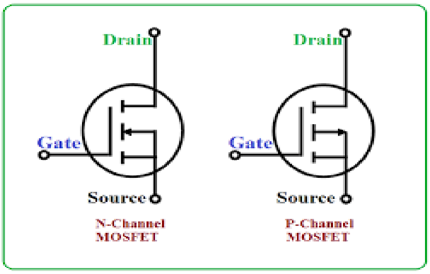
There are two types of Field Effect Transistors:

(a) Junction Field Effect Transistor (JFET).



N-channel JFET P-channel JFET

(b) Metal oxide semiconductor Field Effect Transistor (MOSFET)



Application:

Sure! Here are some common applications of Junction Field Effect Transistors (JFETs):

1. **Amplification:** JFETs can be used as voltage amplifiers in various electronic circuits. They provide high input impedance, making them suitable for amplifying weak signals without loading the source.

2. **Switching:** JFETs can act as simple electronic switches. By applying a control voltage to the gate terminal, the JFET can turn the current flow on or off in a circuit.

3. Voltage-controlled resistors: JFETs can be used as variable resistors. By varying the gate-source voltage, the channel resistance of the JFET can be changed, allowing for voltage-controlled resistance in a circuit.

4. Oscillators: JFETs can be used in oscillator circuits to generate continuous waveforms at specific frequencies. They can be used inaudio oscillators, radio frequency (RF) oscillators, and other signal generation applications.

5. Voltage regulators: JFETs can be utilized in voltage regulation circuits to maintain a stable output voltage despite variations in input voltage or load conditions. They help in providing a constant voltage supply to other components in a circuit.

6. Current sources: JFETs can be configured as constant current sources. By setting the appropriate biasing conditions, JFETs can provide a stable and precise current output for various applications, such as biasingother components or circuits.

7. Noise generators: JFETs can be employed as noise generators in electronic circuits. By using the inherent noise characteristics of JFETs, random signals can be generated for testing and measurementpurposes.

8. Analog switches: JFETs can be used as analog switches to route or control the flow of analog signals in electronic systems. They provide low resistance in the "on" state and high resistance in the "off" state, allowing for efficient signal routing.