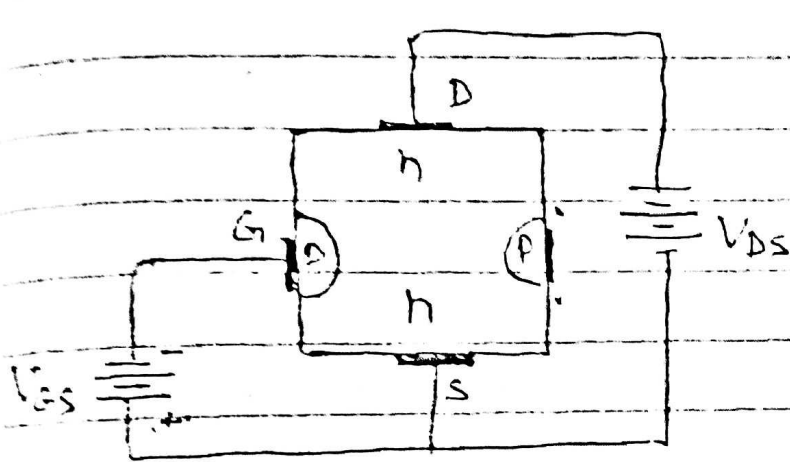
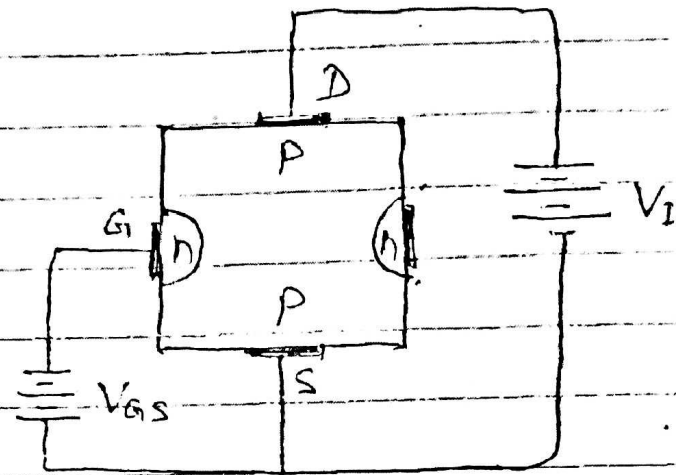


JFET. Figure (i) shows polarities of n-channel FET while figure (ii) shows p-channel.

In both cases voltage between Gate and source is such that gate is reverse biased. This is normal way of FET connection. The drain and source terminals are interchangeable.



(i) N-channel Polarities



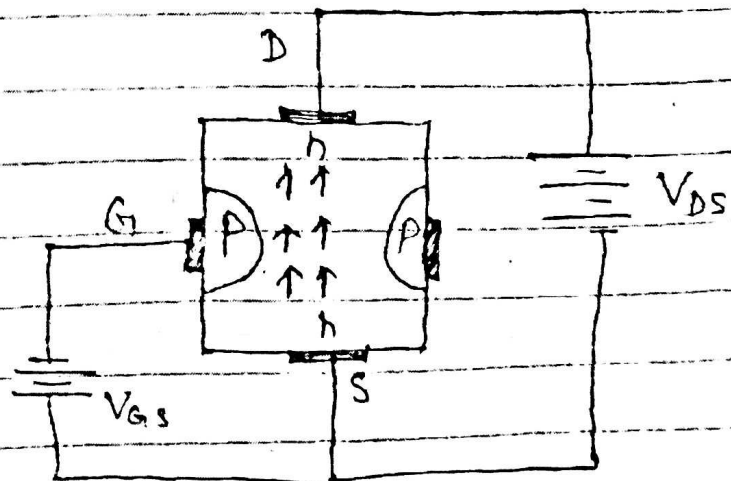
(ii) P-channel Polarities.

Working of FET :- Figure shows polarities of a n-channel FET. The circuit action given as follows -

When voltage is applied b/w drain and source and voltage on Gate is zero.

$$V_{GS} = 0$$

The two junctions at the sides of bar establish depletion layers. The electron will flow fr



Application of FET or work

from source to drain through a channel between depletion layers.

Q. When V_{GS} applied, reverse voltage applied between the gate and source the width of depletion layers increased.

This reduces the width of conducting channel. Hence current from source to drain decreased.

on the other hand if we decreased V_{GS} then, source to drain current increased.

"Hence we know that the current from source to drain can be controlled by potential on Gate."

&
"Current from source to drain can be controlled by V_{GS} ."
So it is called voltage controlling device

* Difference between FET and transistor; - Differences are given below -

1. In FET, current conduction is by only one type of carriers i.e. holes or electrons. For this reason, it is called unipolar device.

while ~~The~~ current conduction in transistors is by both types of carriers i.e. electrons and holes. For this reason it is called bipolar device.

2. The input circuit of FET is reverse biased, therefore it has high input impedance. However the input circuit of transistor is forward biased so it has low input impedance.

3. A junction field effect transistor (JFET) is used, as voltage controlled device while transistor is, used as current controlled device.

Q. In JFET there is no junctions as an ordinary transistor. The conduction is through an n-type or p-type semiconductor material. For this reason noise level in FET is very small.

•• Advantage of FET:- Field effect transistor is a three terminal, unipolar device. It is a very important semiconductor device which is used as a voltage control device. The main advantage of "FET" are given below-

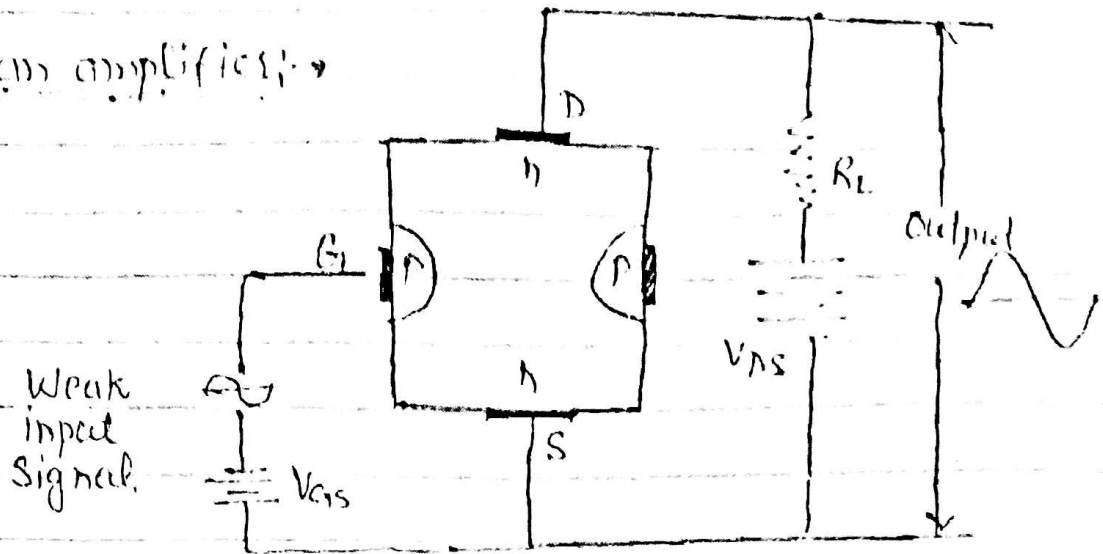
1. It has negative temperature coefficient of resistance.
2. It has very high power gain.
3. It has a small size, longer life, and high frequency efficiency.
4. It has a very high input impedance of the order of $100\text{ M}\Omega$. which provides high degree isolation between input and output circuits.
5. The operation of FET depends upon material for current conduction and do not depends upon junctions so very low noise present.

JFET is a three terminal unipolar device while transistor is a three terminal bipolar device. Means that both have three terminals.

* FET as an Amplifier :-

: Amplifier circuit of FET is given below.

* FET as an amplifier :-



FET as an Amplifier

- * The weak input signal is applied between gate and source. The amplified output is taken from drain source circuit. The input circuit is always reverse biased. The small change on reverse bias gate produces a large change in drain current. This factor makes FET capable of raising the strength of weak signal.
- * For positive half cycle reverse biased on gate decrease. Hence channel width and drain current increases. Another negative half cycle increased reverse biased on gate. Hence channel width and drain current decreases.
- * Hence small change in voltage at gate produces a large change in drain current. These large variations in drain current produce large output across load resistance R_L . In this way FET acts as an amplifier.