Date 22/02/24

B.Sc 'D III'

Paper - VI 'B'

FET (Field effect transister) —>:

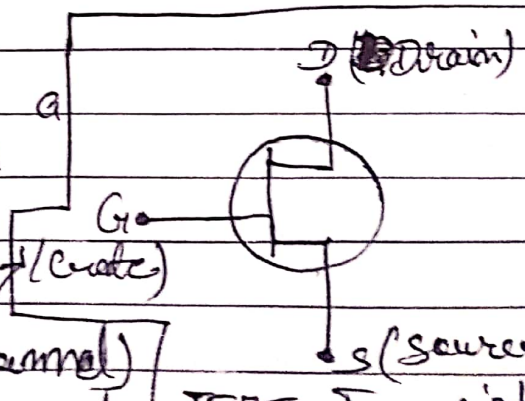
It is a type of transister. Commonly used for weak signal amplification (EX- for amplifying wireless signals). The device can amplify analog or digital signals. It can also switch DC or function as an oscillator.

It work process is current flows along a semiconductor path called the channel. At one end of the channel there is an electrode called the source. At the other end of the channel there is an electrode called the drain. The physical diameter of the channel is fixed, but its effective electrical diameter can be varied by the application of a voltage to a control electrode called the gate.

The conductivity of the FET depends at any given instant in time on the electrical diameter of the channel. A small change in gate voltage can cause a large variation in the current from the source to the drain.

FET exist in two major classifications.
(a) 'JFET' and another is (b) 'MOSFET'

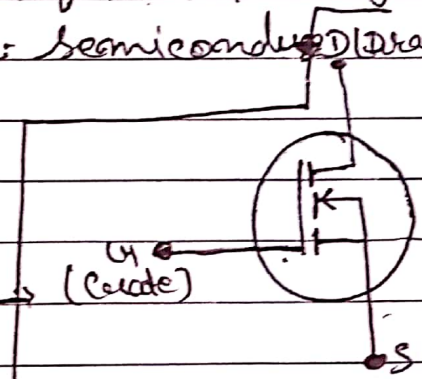
The junction FET has a channel consisting of N-type semiconductor (N-channel) or P-type semiconductor (P-channel) material. The gate is made of the opposite semiconductor type (In P-type



JFET Transister

material carried 'holes' and N-type material carried electrons). In JFET (Junction field effect transistor) the junction is the boundary between the channel and gate. This P-N junction is reverse-biased (a DC voltage is applied to it) so that no current flows between the channel and the gate. However, under some conditions there is a small current through the junction during part of the input signal cycle.

(b) MOSFET (Metal-oxide-semiconductor field effect transistor) is the either N-type and P-type semiconductor. The gate electrode is a piece of metal whose surface is oxidized. The oxide layer electrically insulates the gate from the channel. For this region the MOSFET was originally called IGFET (insulated-gate field effect transistor). But the oxide layer acts as a dielectric, there is essentially never any current between the the gate and the channel during any part of the signal cycle. This gives the MOSFET an extremely large input impedance. Because the oxide layer is extremely thin, the MOSFET is susceptible to destruction by electrostatic charge. When handling or transporting MOS device, the precaution are necessary.



MOSFET Transistor