

DEPLETION TYPE MOSFET

MOSFET stands for metal oxide semiconductor field effect transistor. There are two types of MOSFET

- Depletion type MOSFET
- Enhancement type MOSFET

2.5.1 Depletion Type MOSFET

Construction

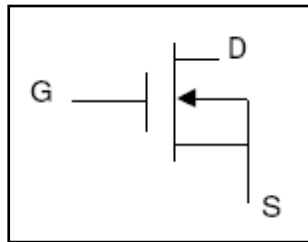


Fig.2.15 Symbol of n-channel depletion type MOSFET

It consists of a highly doped p-type substrate into which two blocks of heavily doped n-type material are diffused to form a source and drain. A n-channel is formed by diffusing between source and drain. A thin layer of SiO_2 is grown over the entire surface and holes are cut in SiO_2 to make contact with n-type blocks. The gate is also connected to a metal contact surface but remains insulated from the n-channel by the SiO_2 layer. SiO_2 layer results in an extremely high input impedance of the order of 10^{10} to $10^{15} \Omega$ for this area.

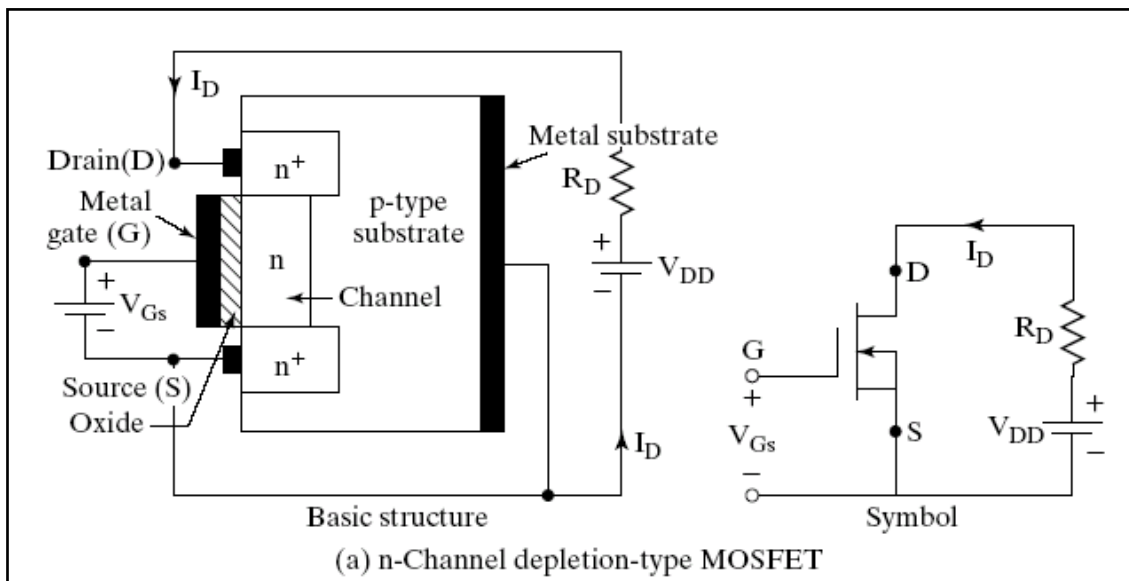


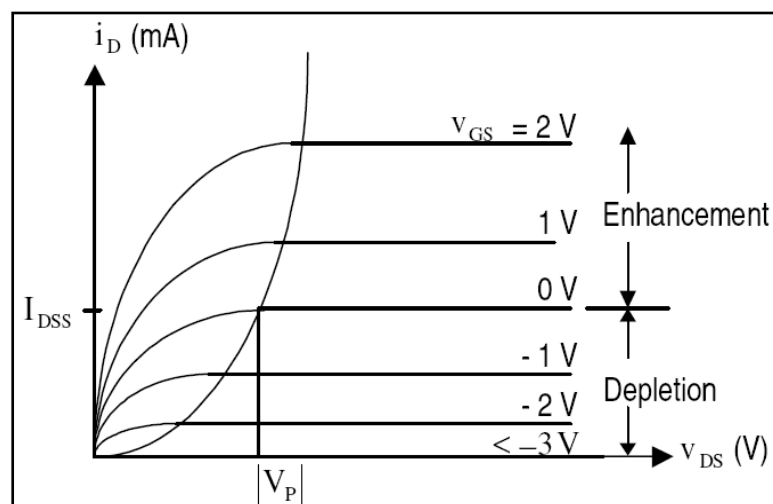
Fig.2.16: Structure of n-channel depletion type MOSFET

Operation

When $V_{GS} = 0V$ and V_{DS} is applied and current flows from drain to source similar to JFET. When $V_{GS} = -1V$, the negative potential will tend to pressure electrons towards the p-type substrate and attracts hole from p-type substrate. Therefore recombination occurs and will reduce the number of free electrons in the n-channel for conduction. Therefore with increased negative gate voltage I_D reduces.

For positive values, V_{gs} , additional electrons from p-substrate will flow into the channel and establish new carriers which will result in an increase in drain current with positive gate voltage.

Drain Characteristics



Transfer Characteristics

