MOSFET Configurations

02 July 2021 13:15

Todays topic:
MOSFET Configuration

* MOSFET configurations:

① There are three basic configurations for MOSFETs (BJT)

a) Common source (CS) (CE) (for connecting the MOSFET as an amplifier)

b) Common drain (CD) or source follower (CC)

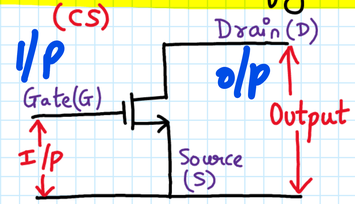
c) Common gate (CG) (CB)

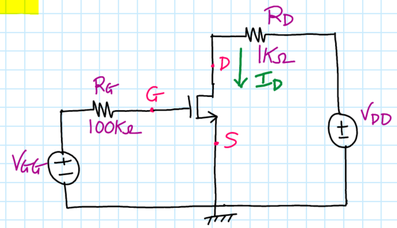
② Each configuration have its own characteristics of voltage and current gain as well as input and output impedance

③ Each of these configurations is obtained by connecting one of the three terminals of MOSFET to ground → thus creating a two-port network with the grounded terminal being common to the input and output ports

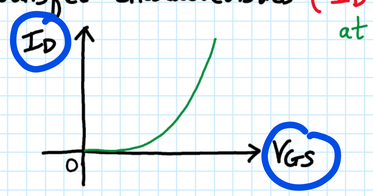
I Common source configuration (CS)

MOSFET: NMOS-E

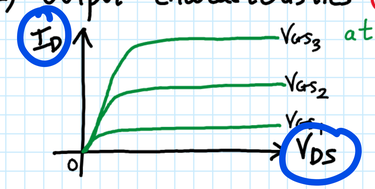




1) Transfer characteristics (I_D-V_{GS}) at constant V_{DS}



2) Output characteristics (I_D-V_{DS})

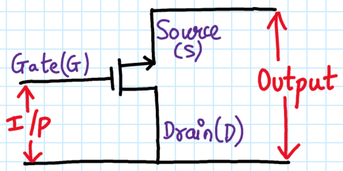


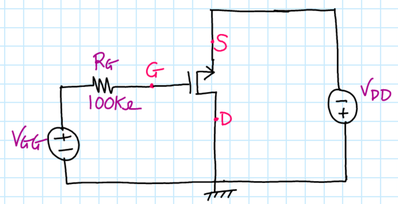
$V_{GS_3} > V_{GS_2} > V_{GS_3}$

3) CS configuration has
- i) very high input impedance
- ii) moderately high output impedance
- iii) high voltage gain
- iv) have 180° input/output phase relationship

II Common drain configuration (CD)

MOSFET: NMOS-E

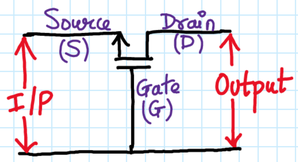


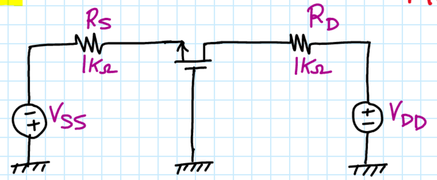


i) CD configuration has
- i) very high input impedance
- ii) very low output impedance
- iii) unity voltage gain
- iv) have 0° input/output phase relationship

III Common gate configuration (CG)

MOSFET: NMOS-E





i) CG configuration has
- i) very low input impedance
- ii) very high output impedance
- iii) high voltage gain
- iv) have 0° input/output phase relationship