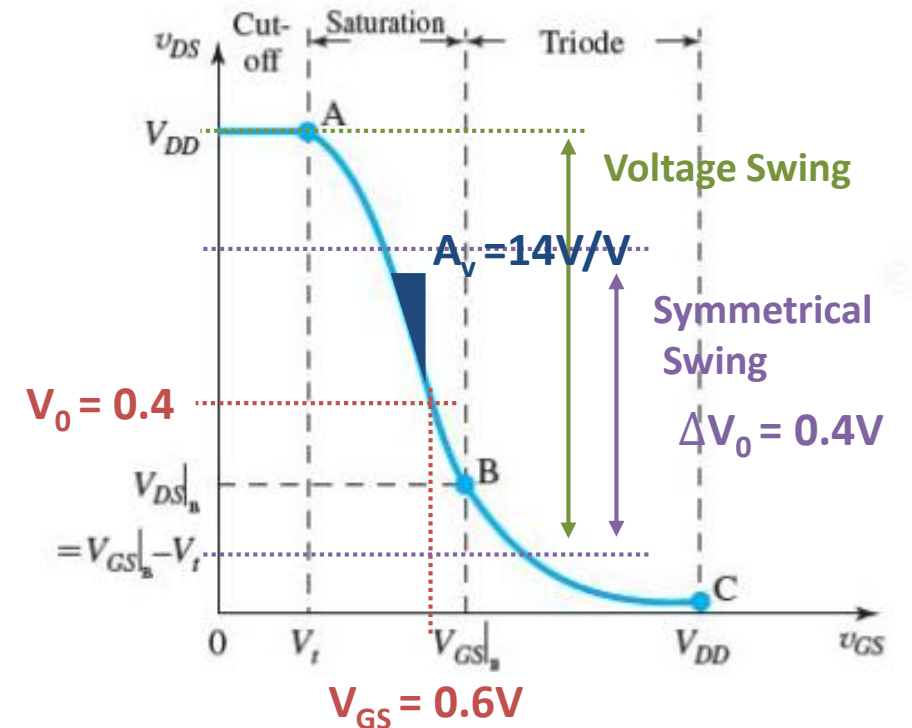
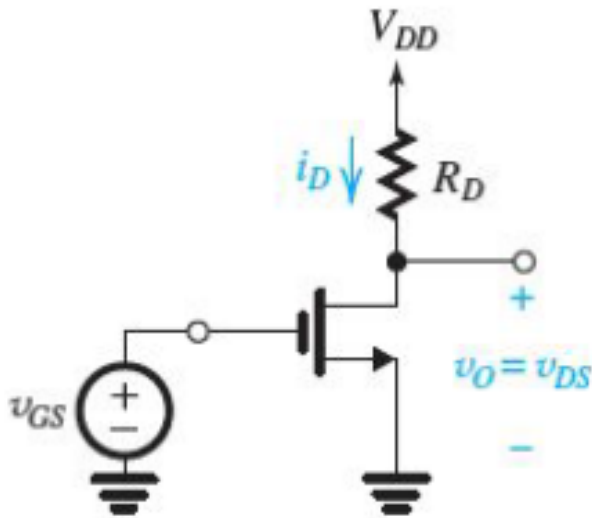


MOSFET Biasing for Amplification

11/12/2019

For the given common source amplifier, assuming is operating in the saturation region with $V_{th} = 0.4V$, $K_n = 4mA/V^2$, $V_{DD} = 1.8V$, $R_D = 17.5k\Omega$, and $\lambda = 0$,

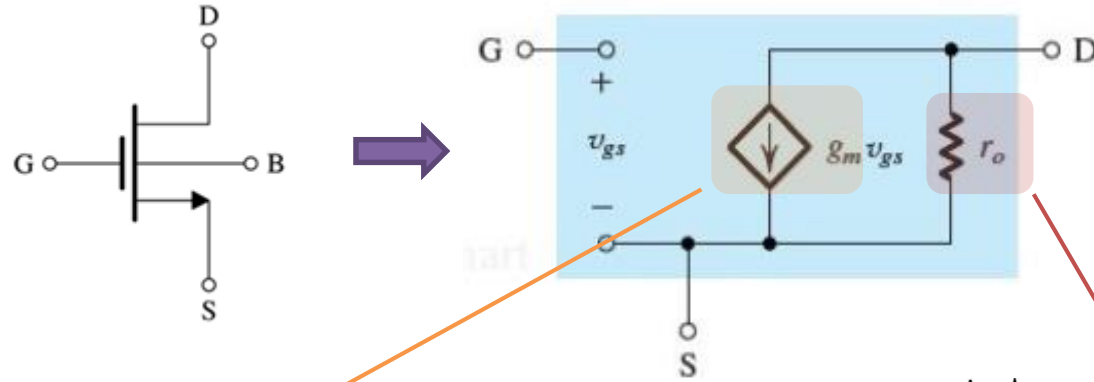
- find the bias point for a voltage gain of $-14V/V$ and
- determine the maximum symmetrical signal swing allowed at the drain.



MOSFETs Small Signal Parameters

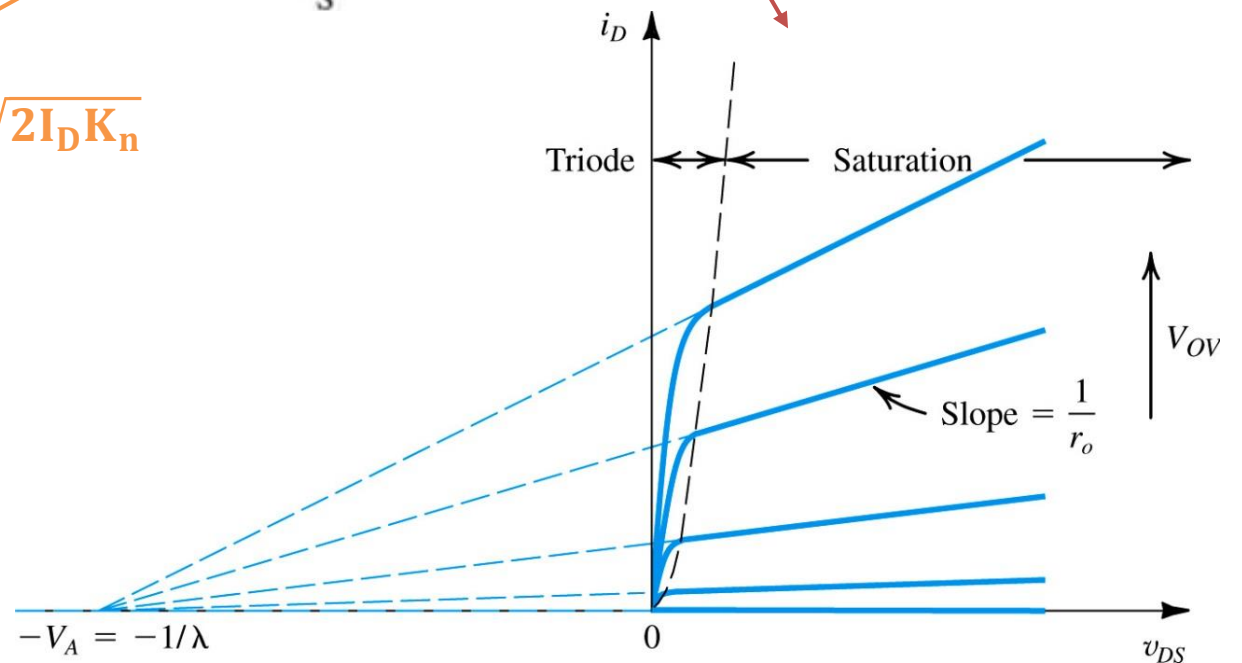
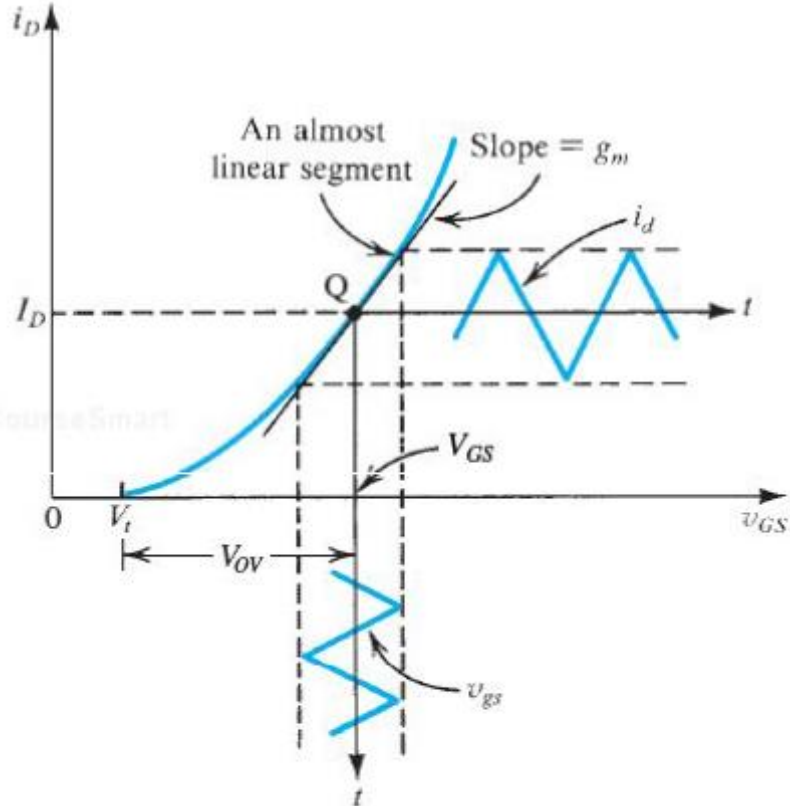
11/12/2019

- Trans-conductance (g_m)
- Output Impedance (r_o)
- Input Impedance



$$r_o = \frac{1}{\lambda I_D}$$

$$g_m = \sqrt{2I_D K_n}$$



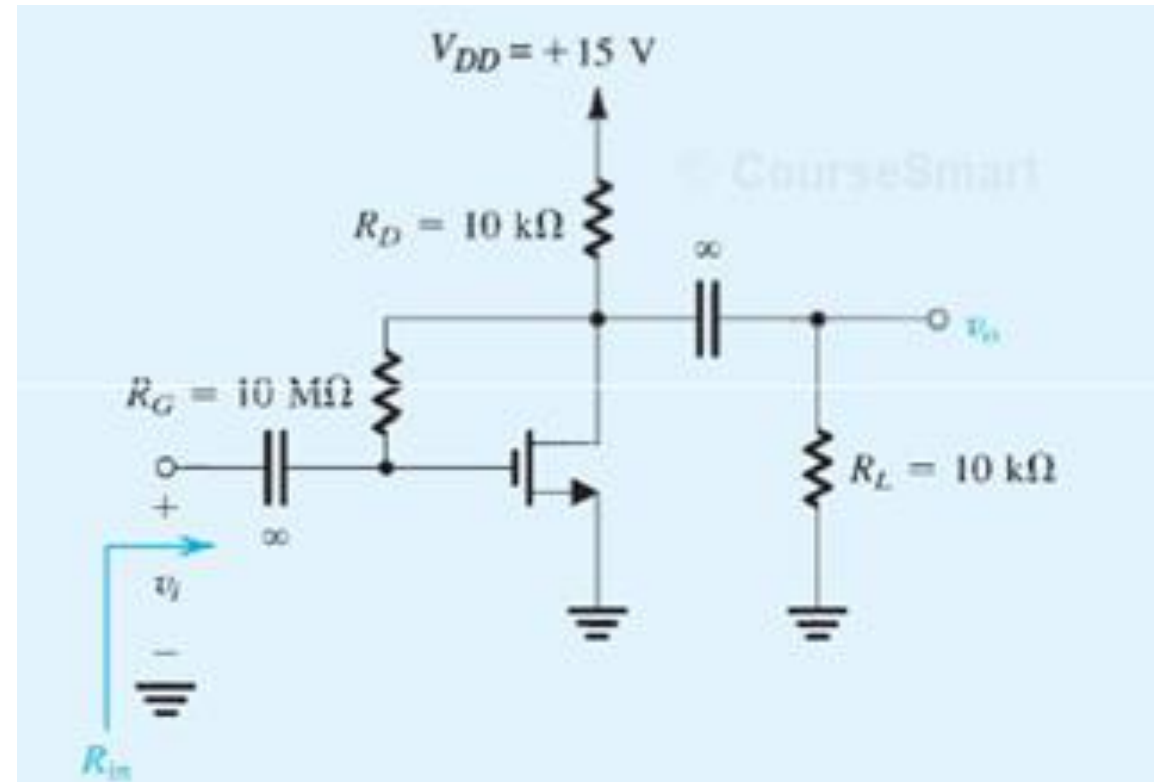
Example 5.10

11/12/2019

For the given circuit, determine the small-signal voltage gain, and its input resistance. The transistor has $V_{th} = 1.5V$, $K_n = 250\mu A/V^2$, and $\lambda = 0.02V^{-1}$.

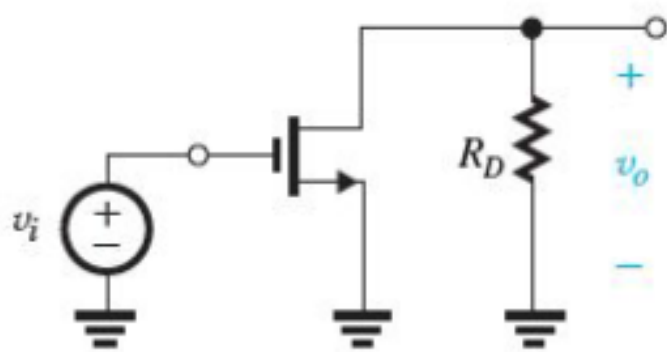
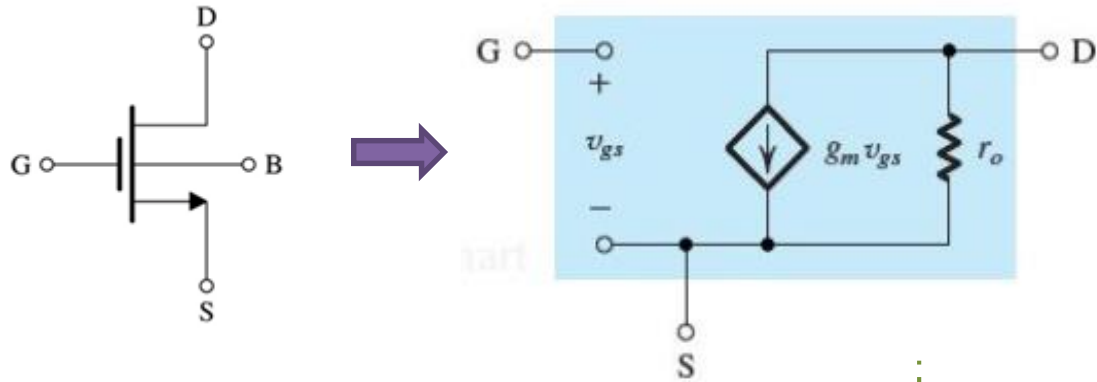
DC Bias

- $I_D = 1.06mA$
- $V_{ov} = 2.9V$

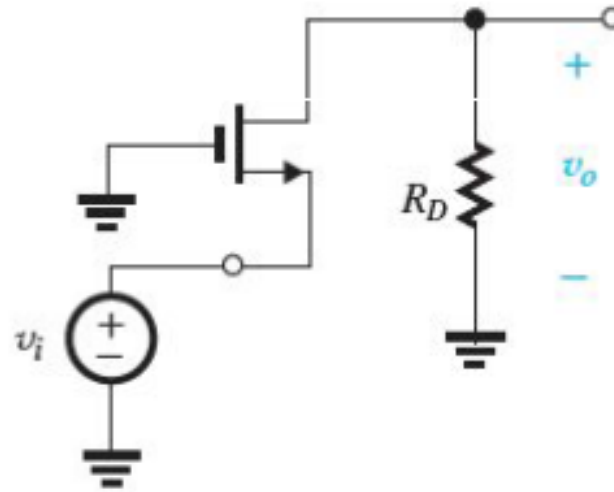


Basic MOSFETs Amplifier Configuration

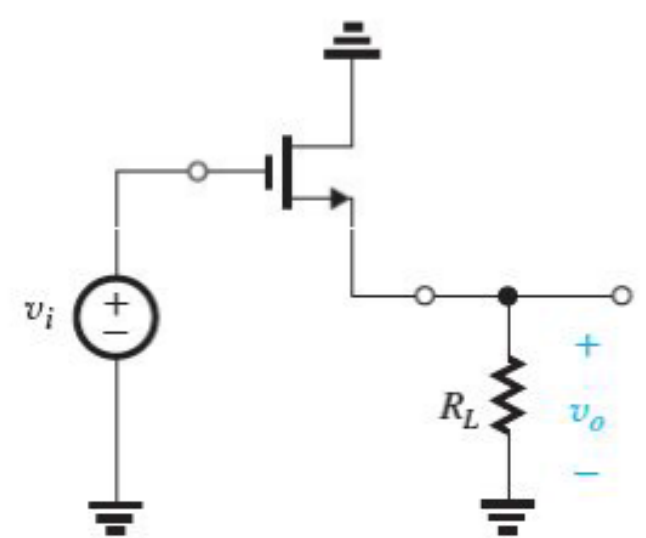
11/12/2019



(a) Common Source (CS)



(b) Common Gate (CG)



(c) Common Drain (CD)