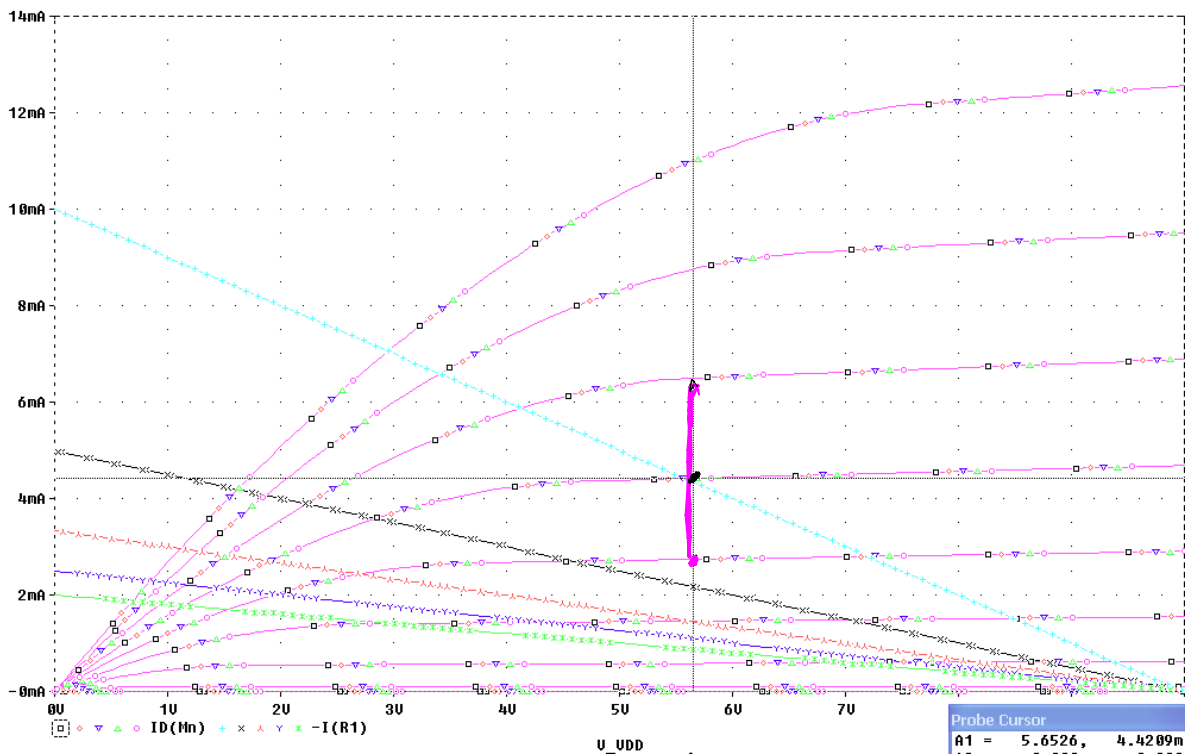


EE312
03/01/06



$R_L \Rightarrow 1K$ to $5K$ in $1K$ steps

curves for 4007 transistors

$$g_m = \left. \frac{\Delta I_D}{\Delta V_{GS}} \right|_{\text{curve}} = \frac{(6-3) \times 10^{-3}}{(7-5)V} = \frac{3}{2} \times 10^{-3} = 1.5 \text{ milli } \Omega^{-1}$$

$$\lambda = 15 \times 10^{-3}, \quad KP = 20.54 \times 10^{-6}, \quad V_{TO} = 1.3, \quad \frac{W}{L} = 144P = 8\mu$$

$$g_m = 2 \frac{I_D}{V_{GS} - V_{TO}} = \frac{2 \times 4.5 \times 10^{-3}}{6 - 1.3} = \frac{9}{4.7} \times 10^{-3} = 1.91 \times 10^{-3} \Omega^{-1}$$

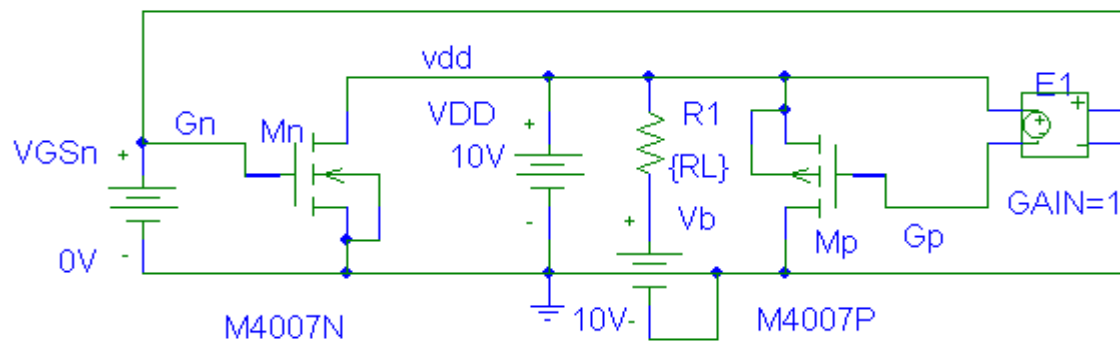
formula

$$g_o = \lambda \cdot I_D = 15 \times 10^{-3} \times 4.5 \times 10^{-3} = 67.5 \times 10^{-6} \Omega^{-1}$$

formula

$$r_o = 1/g_o = \frac{10^2 \times 10^4}{67.5} \approx 1.48 \times 10^4$$

file: e:\courses\spring2006\303\m4007_transcrvs.sch 02/10/06 RWN



DC run $0 \leq V_{DD} \leq 10\text{v}$ in 0.1v steps, nest $0 \leq V_{GSn} \leq 9\text{v}$ in 1v steps;
could also do without E with parametric sweep $0 \leq V_{SGp} \leq 9$ in 1v steps

PARAMETERS:

RL	10K
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unit for above curves