Microelectronics Circuit Analysis and Design
Homework(11st)

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10.44 Consider the MOSFET current-source circuit in Figure P10.44 with $V^+ = +2.5\text{V}$ and $R = 15\ \text{k}\Omega$. The transistor parameters are $V_{TN} = 0.5\text{V}, k_n' = 80\mu\text{A/V}^2, W/L = 80\mu\text{A}/V^2, W/L = 6$, and $\lambda = 0$. Determine I_{REF}, I_O, and $V_{DS2}(\text{sat})$.

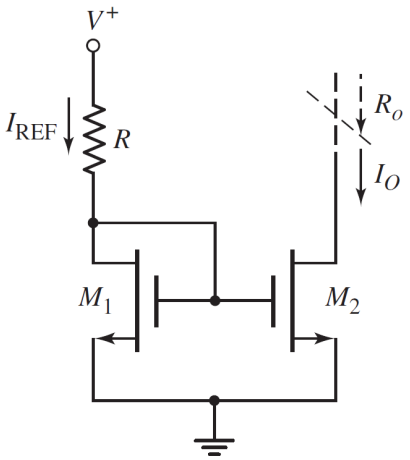

Figure 1: Problem 10.44

10.54 The transistor circuit shown in Figure P10.54 is biased at $V^+ = +5\text{V}$ and $V^- = -5$ V.The transistor parameters are $V_{TP} = -1.2V, k_p' = 80\mu A/N^2, \lambda = 0, (W/L)_1 = (W/L)_2 = 25,$ and $(W/L)_3 = (W/L)_4 = 4$. Determine I_{REF}, I_O, and $V_{SD2}(\text{sat})$.

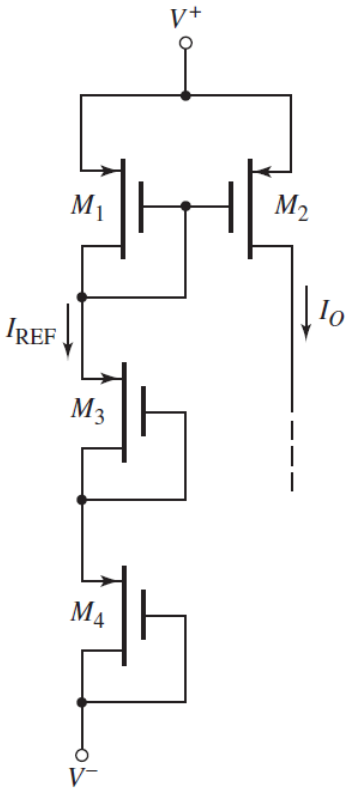

Figure 2: Problem 10.54

10.60 The transistors in the circuit shown in Figure P10.60 have parameters $V_{TN} = 0.4\text{V}, V_T P = -0.4\text{V}, k_n' = 100\mu\text{A}/N^2, k_p' = 60\mu\text{A}/\text{V}^2$,and $\lambda_n = \lambda_p = 0$. The transistor width-to-length ratios are $(W/L)_1 =$ e I_O, I_{REF},and $(W/L)_2 = 20$, $(W/L)_3 = 5$, and $(W/L)_4 = 10$. Determine $V_{DS2}(\text{sat})$. What are the values ofV_GS1, V_{GS3}, and V_{SG4}?

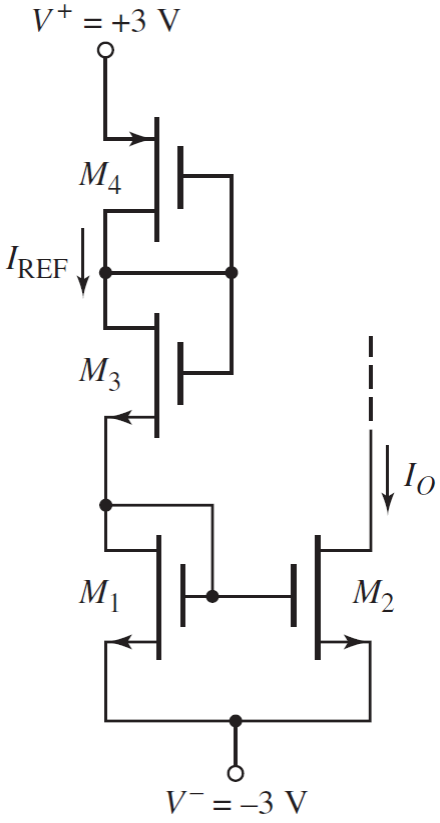

Figure 3: Problem 10.60

10.84 In the circuit in Figure P10.84, the active load circuit is replaced by Wilson current source. Assume that $\beta = 80$ for all transistors, and that $= 0.2$mA. Determine the open-circuit small-signal voltage gain.

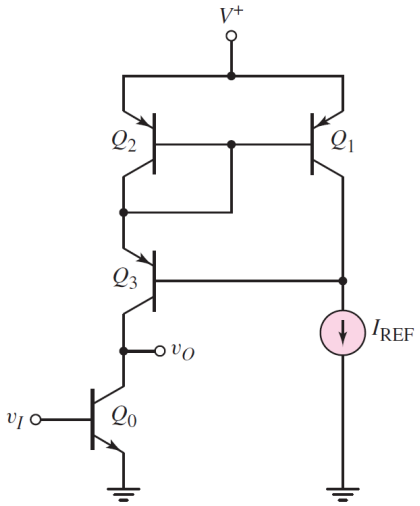

Figure 4: Problem 10.84