

PART 5

From PART 1

$$V_{DS4} = V_{GS4} = 700\text{mV}$$

$$V_{DS3} = V_{GS3} = 700\text{mV}$$

$$V_{G3} = 1.4\text{V}$$

$$V_{DS} = 700\text{mV}$$

$$V_{DS0} = 200\text{mV}$$

$$\left. \begin{array}{l} V_{DS} = 700\text{mV} \\ V_{DS0} = 200\text{mV} \end{array} \right\} V_{D0} = 900\text{mV}$$

$$R_L = \frac{550\text{mV}}{(I_{\text{TAIL}}/2)}$$

$$R_L = 3.16\text{ k}\Omega$$

$$I_{\text{TAIL}} = 348\mu\text{A}$$

$$I_{\text{REF}} = \frac{\beta}{2} \left(\frac{W}{L} \right)_3 V_{OV}^2 \left(1 + \frac{V_{DS3}}{V_A} \right)$$

$$\left(\frac{W}{L} \right)_3 = 42.48$$

$$W_3 = 10.62\mu\text{m}, L_3 = 0.25\mu\text{m}$$

$$I_{\text{REF}} = \frac{\beta}{2} \left(\frac{W}{L} \right)_4 V_{OV}^2 \left(1 + \frac{V_{DS4}}{V_A} \right)$$

$$\left(\frac{W}{L} \right)_4 = 42.48$$

$$W_4 = 10.62\mu\text{m}, L_4 = 0.25\mu\text{m}$$

$$I_{\text{REF}} = \frac{\beta}{2} \left(\frac{W}{L} \right)_5 V_{OV}^2 \left(1 + \frac{V_{DS5}}{V_A} \right)$$

$$\left(\frac{W}{L} \right)_5 = 42.48$$

$$W_5 = 10.62\mu\text{m}, L_5 = 0.25\mu\text{m}$$

$$I_{\text{REF}} = \frac{\beta}{2} \left(\frac{W}{L} \right)_0 V_{OV}^2 \left(1 + \frac{V_{DS0}}{V_A} \right)$$

$$\left(\frac{W}{L} \right)_0 = 50.35$$

$$W_0 = 12.59\mu\text{m}, L_0 = 0.25\mu\text{m}$$

FROM SIMULATION:

$$A_{cc} = 0.363\text{ mV/V}$$

$$CMRR = 20 \log \left(\frac{A_d}{A_{cm}} \right)$$

$$CMRR = 81.56\text{ dB}$$