

pH sensitivity amplification by a NP-NW sensor

Consider an accumulation-mode NP-NW transistor pair. What is the maximum pH sensitivity for such a device with AlGaN serving as the channel of the planar FET (T1) and Si-NW as the NW-FET (T2) with the following properties?

- AlGaN has a mobility of $2000 \text{ cm}^2/\text{V} \cdot \text{s}$, $T_{Ox} = 45\text{nm}$, $W = 1\mu\text{m}$ (T1)
- Si-NW has a mobility of $100 \text{ cm}^2/\text{V} \cdot \text{s}$, $T_{Ox} = 15\text{nm}$, $W = 50\text{nm}$ (T2)
- $L_1 = L_2$, $V_{DS1} = V_{DS2}$.

