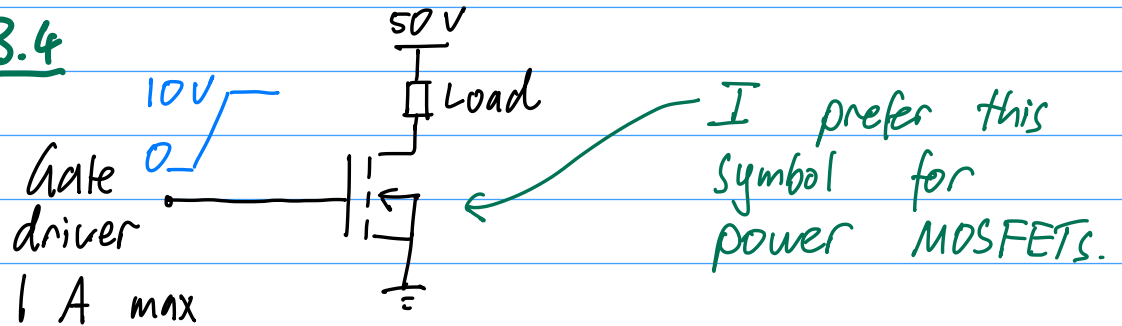# AoE 3.4



**(a)** Find switching time when treating the gate as a 200 pF load.

$$I_c = C \frac{dV}{dt} \approx C \frac{\Delta V}{\Delta t}.$$

$$\Delta t = \frac{C \Delta V}{I_c}.$$

Let $I_c = 1$ A, $\Delta V = 10$ V, $C = 200$ pF.

$\Delta t = 2$ ns.

**(b)** Find switching time to deliver $Q_G = 40$ nC.

$$I = \frac{\Delta Q}{\Delta t}$$

$$\therefore \Delta t = \frac{\Delta Q}{I} = \frac{40 \text{ nC}}{1 \text{ A}} = 40 \text{ ns.}$$

Even a 1 A drive current isn't enough to reach the claimed $\approx 25$ ns capability of the device.