

REŠENJA ZADATAKA

$$2. \ v_X(t) = \begin{cases} 5V, & \text{za } t < 0 \\ 5V \cdot e^{-\frac{t}{C_{UL} \cdot r_{dsNMOS}}} = 5V \cdot e^{-\frac{t}{5 \cdot 10^{-10} s}}, & \text{za } t \geq 0 \end{cases}$$

$$v_X(T_1) = 2,5V \Rightarrow T_1 = 5 \cdot 10^{-10} s \cdot \ln 2 = 347 \text{ ps}$$

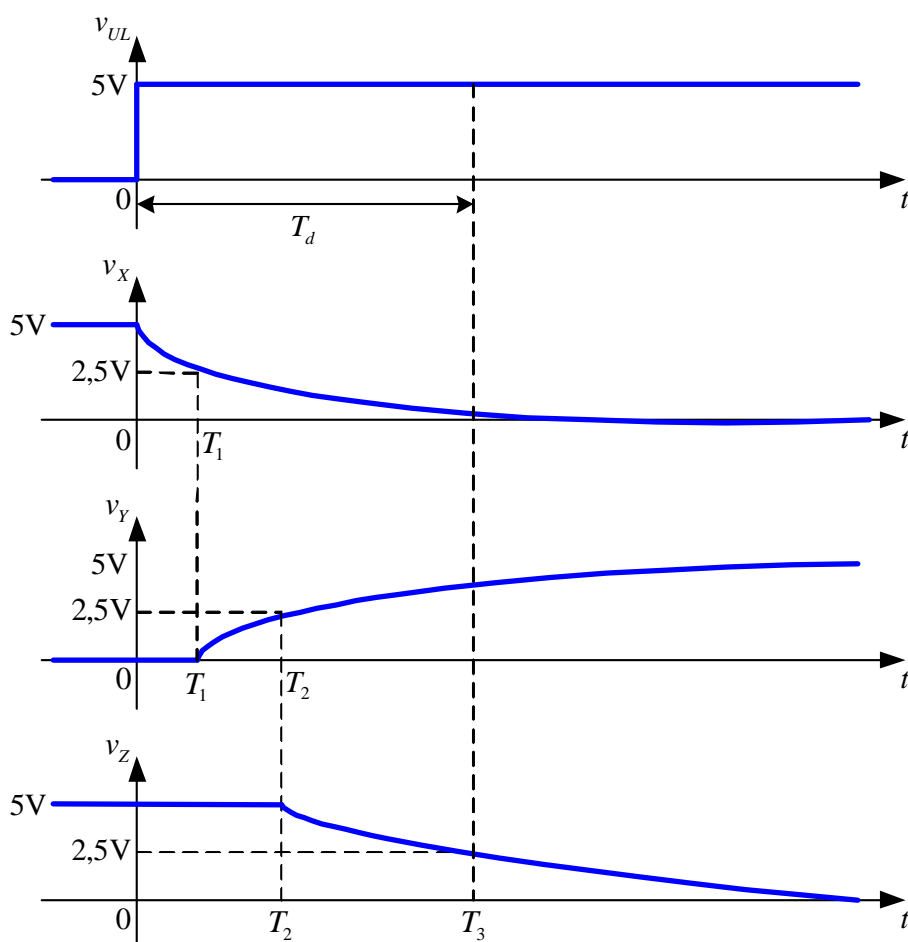
$$v_Y(t) = \begin{cases} 0, & \text{za } t < T_1 \\ 5V \cdot \left(1 - e^{-\frac{t-T_1}{C_{UL} \cdot r_{dsPMOS}}}\right) = 5V \cdot \left(1 - e^{-\frac{t-T_1}{10^{-9} s}}\right), & \text{za } t \geq T_1 \end{cases}$$

$$v_Y(T_2) = 2,5V \Rightarrow T_2 = T_1 + 10^{-9} s \cdot \ln 2 = 1,04 \text{ ns}$$

$$v_Z(t) = \begin{cases} 5V, & \text{za } t < T_2 \\ 5V \cdot e^{-\frac{t-T_2}{C_M \cdot r_{dsNMOS}}} = 5V \cdot e^{-\frac{t-T_2}{2 \cdot 10^{-9} s}}, & \text{za } t \geq T_2 \end{cases}$$

$$v_Z(T_3) = 2,5V \Rightarrow T_3 = T_2 + 2 \cdot 10^{-9} s \cdot \ln 2 = 2,426 \text{ ns}$$

$$T_d = T_3 = 2,426 \text{ ns}$$

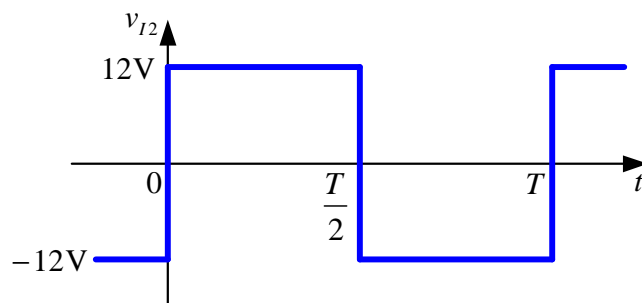
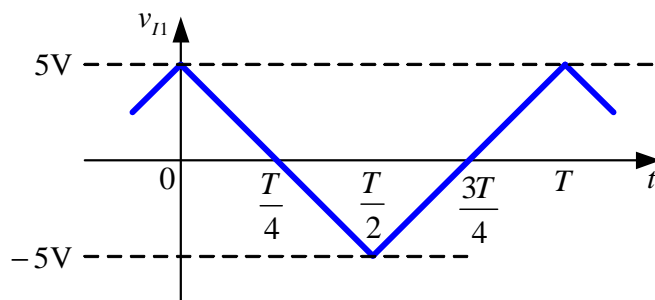


4.

$$v_{I1} = \begin{cases} -2,4 \cdot 10^5 \cdot \left(t - \frac{T}{4}\right), & \text{za } 0 \leq t \leq \frac{T}{2} \\ 2,4 \cdot 10^5 \cdot \left(t - \frac{3T}{4}\right), & \text{za } \frac{T}{2} \leq t \leq T \end{cases}, \text{ signal se dalje periodično ponša.}$$

$$T = 83,33 \mu\text{s},$$

$$f = 12 \text{ kHz}.$$



6. a) Prekidač je zatvoren za $Q_i = 0$, a otvoren za $Q_i = 1$.

b) $R_s = 0,95 \text{ k}\Omega$ $R_0 = 56 \text{ k}\Omega$ $R_1 = 26 \text{ k}\Omega$ $R_2 = 1 \text{ k}\Omega$ $R_3 = 3,5 \text{ k}\Omega$

c) $R_{bo} = 1,28 \text{ k}\Omega$ $V_{MAX} = 5,6 \text{ V}$ $V_{MIN} = -6,4 \text{ V}$