

### Exercise 1

- a)  $d=10,6\mu\text{m}$
- b)  $F = 1\text{kV/cm}$
- c)  $N_A=9,985\times 10^{15}\text{cm}^{-3}$   
 $\Delta V=V_{th}\ln(n_1/n_2)=-40\text{mV}$

### Exercise 2

- a)  $\phi_i=0,968\text{V}$        $N_D=1,37\times 10^{20}\text{cm}^{-3}$
- b)  $F_{MAX}=5,65\times 10^5\text{V/cm}$ ,  $C'(\text{depletion})=27,0\text{nF/cm}^2$
- c)  $L_n=32\mu\text{m}$  long diode in p-side       $L_p=10\mu\text{m}$  long diode
- d)  $p(x_n)=3,0\times 10^{11}\text{cm}^{-3}$        $n(-x_p)=4,1\times 10^{14}\text{cm}^{-3}$

we suppose, for simplicity, to consider constant the depletion capacitance to  $C_j'=27,0\text{nF/cm}^2$

$$C_d' = qD_n n_i^2 / N_A L_n \cdot \tau_n / V_{th} \exp(V_D / V_{th}) = C_j'$$

$$V_D=0,506\text{V}$$

### Exercise 3

- a)  $N_A=9,57\times 10^{15}\text{cm}^{-3}$
- b)  $V_T= 1,06\text{V}$
- c)  $G_{CH}=0,198\text{mA/V}$
- d) Saturation;  $g_m= 0,549\text{mS}$
- e)  $V_{DS}=0,47\text{V}$