

Digitalna tehnika

2. poglavje:

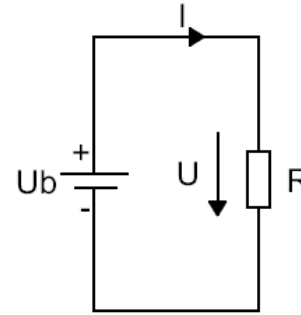
Ponovitev osnov iz elektrotehnike in elektronike



Osnovni zakoni elektrotehnike

Ohmov zakon:

Tok, ki teče skozi upor, je odvisen od njegove upornosti in nanj pritisnjene napetosti.



$$I = \frac{U_b}{R}$$

oziroma

$$U = U_b = I * R$$

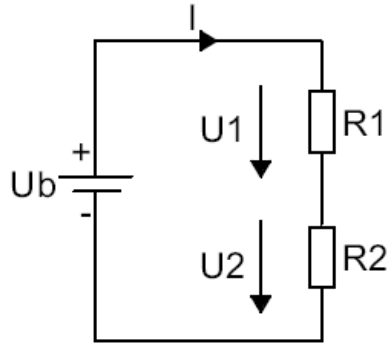
Kirchoffova zakona:

- 1. Vsota tokov, ki pritekajo v vozlišče, je enaka vsoti tokov, ki iz njega odtekajo.*
- 2. Vsota napetosti v katerem koli tokokrogu v vezju je enaka 0.*



Osnovni zakoni elektrotehnike

Osnovni vezavi upornosti:

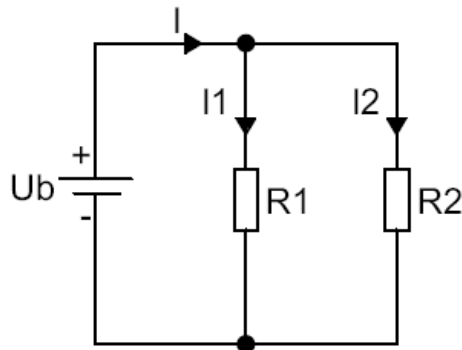


$$U_b = I * R_{nadam}$$

$$U_b = U_1 + U_2 \quad (2. \text{Kirchoffov zakon})$$

$$U_b = I * R_1 + I * R_2 = I * (R_1 + R_2)$$

$$R_{nadam} = R_1 + R_2$$



$$I = \frac{U_b}{R_{nadam}}$$

$$I = I_1 + I_2 \quad (1. \text{Kirchoffov zakon})$$

$$I = \frac{U_b}{R_1} + \frac{U_b}{R_2} = \frac{U_b * R_2 + U_b * R_1}{R_1 * R_2} =$$

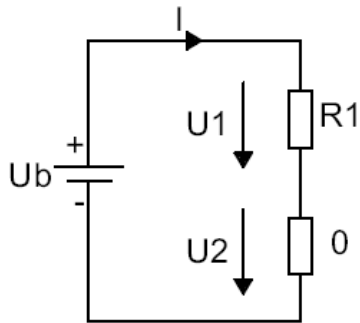
$$= U_b * \frac{R_2 + R_1}{R_1 * R_2}$$

$$R_{nadam} = \frac{R_1 * R_2}{R_1 + R_2}$$



Osnovni zakoni elektrotehnike

Upornost, spremenljiva med 0 in ∞ :

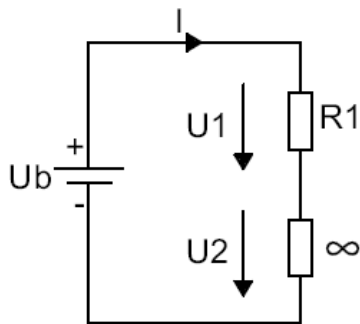


$$R_1 = R; R_2 = 0$$

$$I = \frac{U_b}{R_{nadam}} = \frac{U_b}{R_1 + R_2} = \frac{U_b}{R + 0} = \frac{U_b}{R}$$

$$U_1 = I * R_1 = I * R = \frac{U_b}{R} * R = U_b$$

$$U_2 = I * R_2 = I * 0 = \frac{U_b}{R} * 0 = 0$$

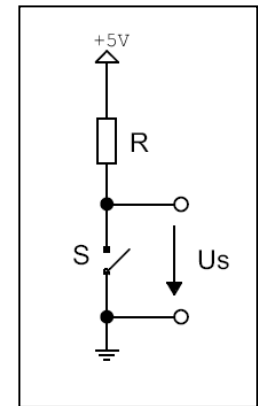


$$R_1 = R; R_2 = \infty$$

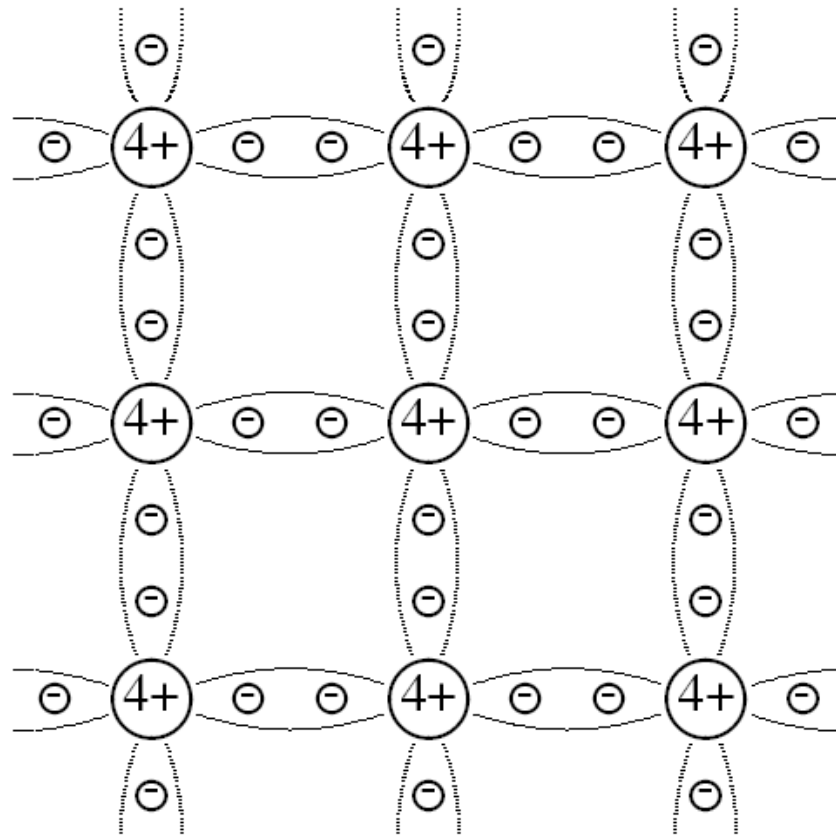
$$I = \frac{U_b}{R_{nadam}} = \frac{U_b}{R_1 + R_2} = \frac{U_b}{R + \infty} = \frac{U_b}{\infty} = 0$$

$$U_1 = I * R_1 = I * R = 0 * R = 0$$

$$U_2 = I * R_2 = \frac{U_b}{\infty} * \infty = U_b$$

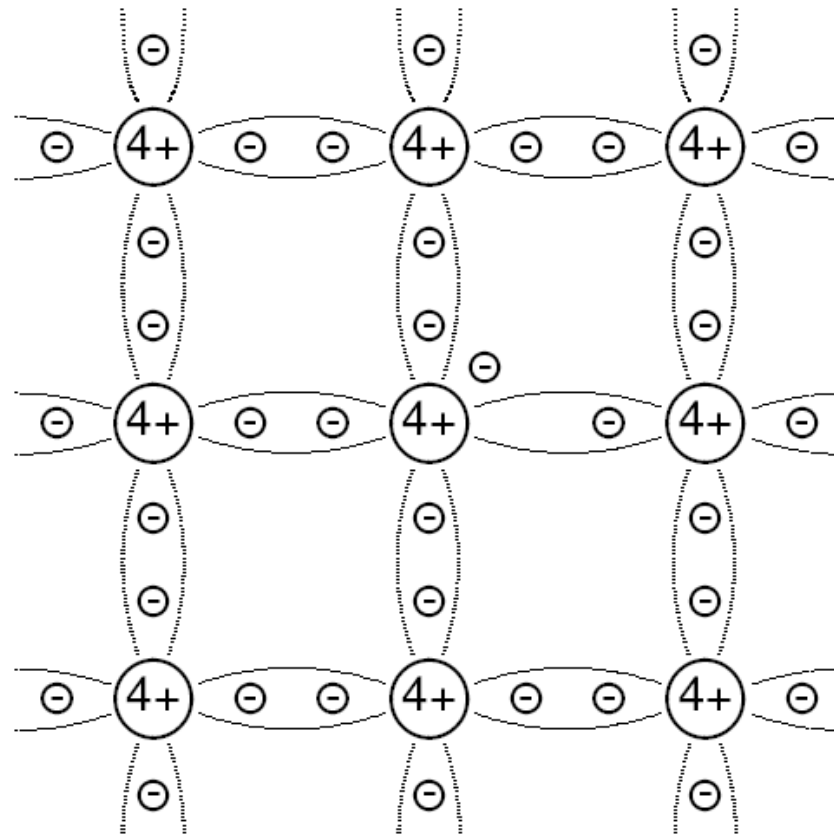


Polprevodniki



Polprevodniki

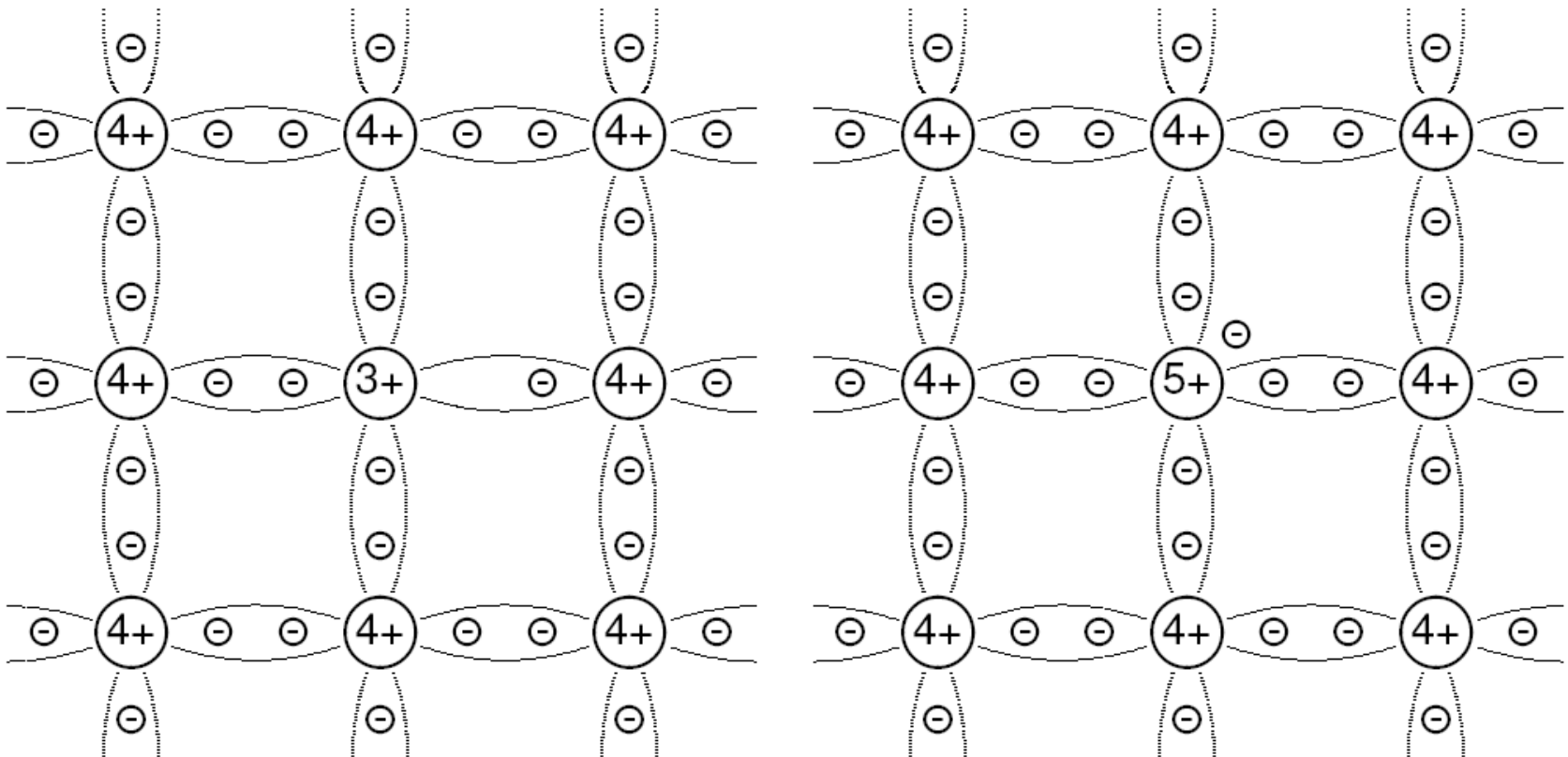
zaradi dodane energije se sprosti elektron
(en atom od 10^{12})



Polprevodniki

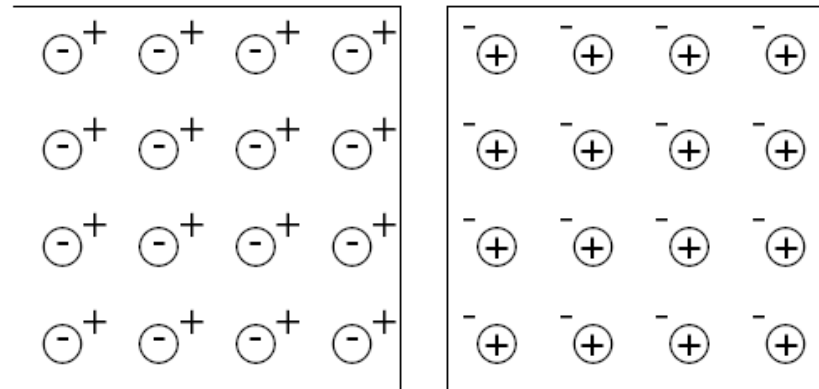
p-tip (manjka elektron \rightarrow vrzel),
v jedru proton manj \rightarrow
manj pozitivno kot druga \ominus^+


n-tip (višek elektronov),
v jedru proton več \rightarrow
bolj pozitivno kot druga \ominus^+

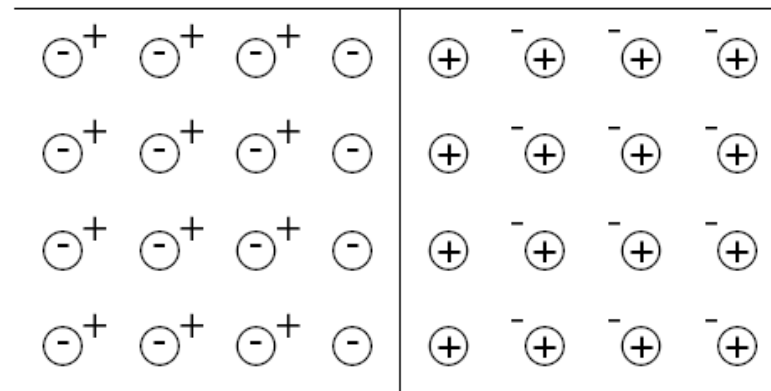


Polprevodniki

(prikazani samo atomi primesi)

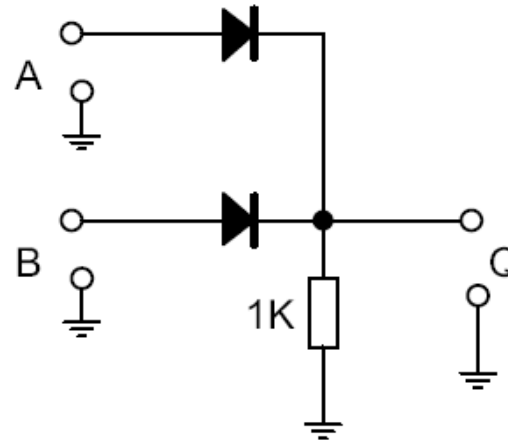
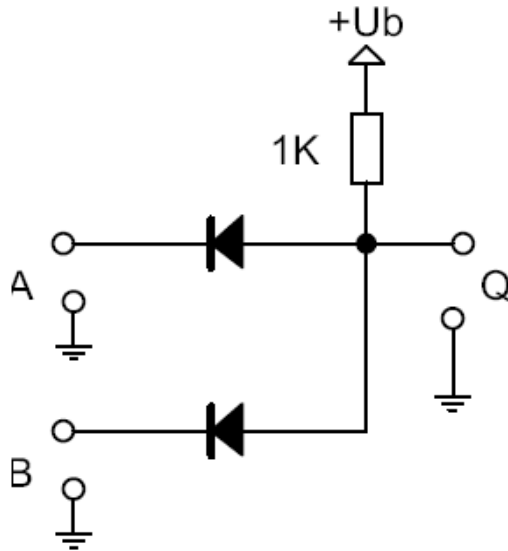


p-tip  n-tip



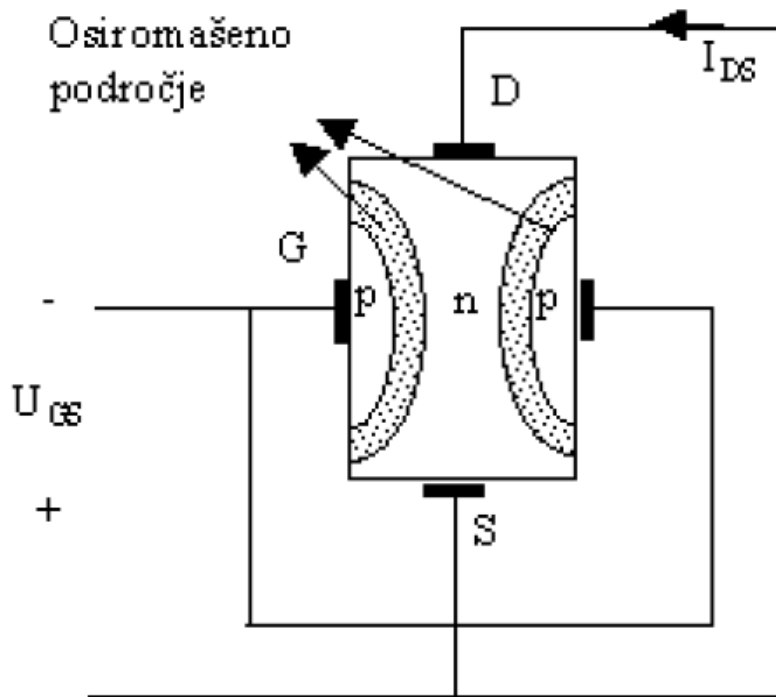
Polprevodniki

Diodna logika

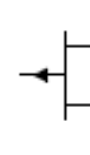


Polprevodniki

JFET tranzistor



n-kanalni JFET

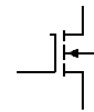
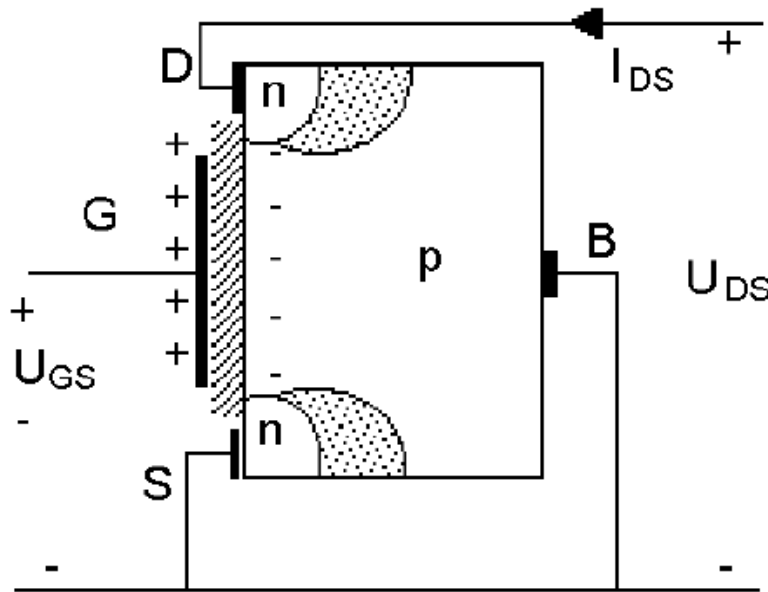


p-kanalni JFET

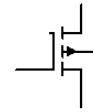


Polprevodniki

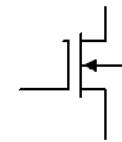
MOS FET tranzistor



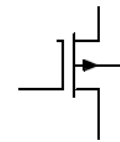
n-kanalni MOSFET
z induciranim kanalom



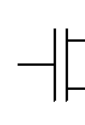
p-kanalni MOSFET
z induciranim kanalom



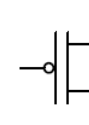
n-kanalni MOSFET
z vgrajenim kanalom



p-kanalni MOSFET
z vgrajenim kanalom



n-kanalni



p-kanalni



Polprevodniki

Primeri vezij

