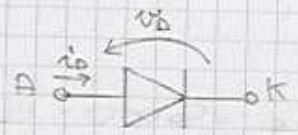
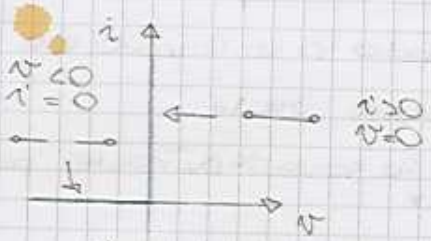
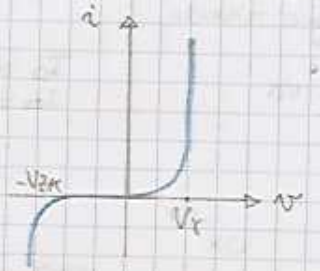
# DIODO



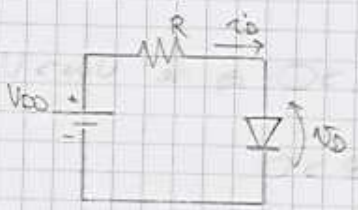




$V_\gamma = 0.7V$

$$i_D = I_S\left(e^{\frac{v}{\eta V_T}} - 1\right)$$

$I_S = 10^{-5}\ A$

$V_T = \frac{KT}{Q} = 25\ mV$



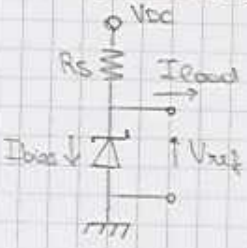

$$\begin{cases} I_D = \frac{V_{DD} - V_D}{R} \\ I_D = I_S\left(e^{\frac{V_D}{\eta V_T}} - 1\right) \end{cases}$$

dipendente dalla temperatura: $-2mV/°C$

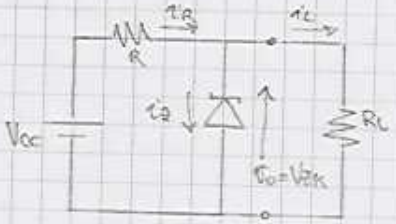
# DIODO ZENER


Lo zener lavora in zenica

La corrente di polarizzazione non deve scendere al di sotto di una soglia




$$R_S \leq \frac{V_{DC} - V_{ref}}{I_{load\,max} + I_{bias\,min}}$$




$$i_Z = i_R - i_L = \frac{V_{cc} - V_{ZK}}{R} + \frac{V_{ZK}}{R_L}$$

$$R_{min} = \frac{V_{cc} - V_Z}{I_L + I_Z}$$

R controlla la corrente di polarizzazione del diodo

$$I_Z = \frac{V_{cc} - V_{ZK}}{R} \Rightarrow R = \frac{V_{cc} - V_{ZK}}{I_Z}$$

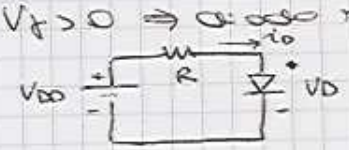
$$R_{max} = \frac{V_{cc\,min} - V_{ZK}}{I_{Z\,min} + I_{L\,max}}$$

Se ho un diodo in un circuito di rettificazione:

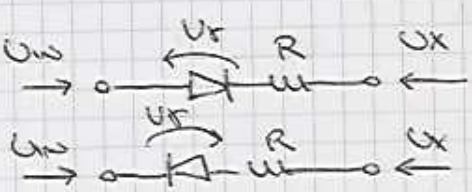
- $V_\gamma = 0 \Rightarrow$ diodo ideale

  Impongo la corrente pensante positiva e negativa e faccio i calcoli vari 2 casi

- $V_\gamma > 0 \Rightarrow$ diodo reale




$$I_D \simeq I_S e^{\frac{V_D}{n V_T}}$$
$$I_D = \frac{V_{DD} - V_D}{R}$$




ON se $V_{IN} - V_\gamma - V_X > 0 \Rightarrow$ se $V_{IN} > V_\gamma + V_X$




ON se $\frac{V_X - V_\gamma - V_{IN}}{R} > 0$

$\Rightarrow$ se $V_{IN} < V_X - V_\gamma$

x gli serve il contrario