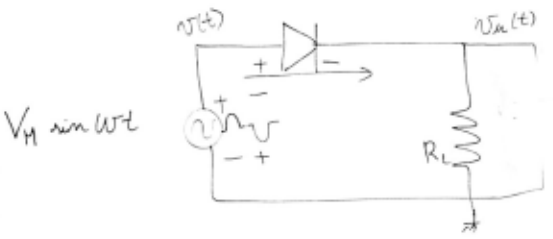
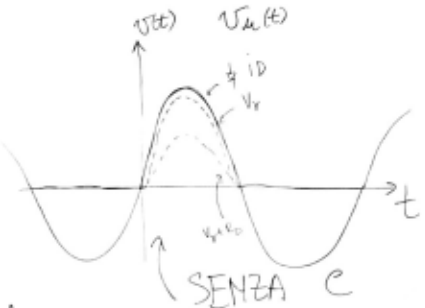


$V_M \sin \omega t$

R_{LOAD} - Rutilizz.

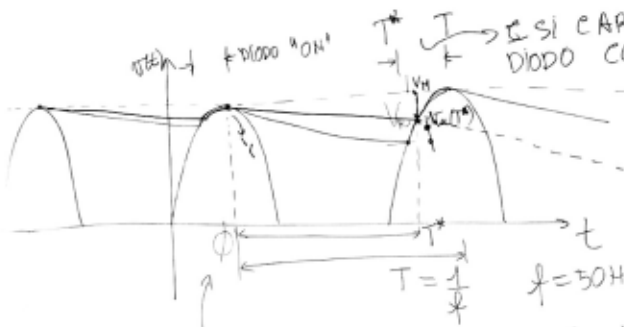


$V_R = V_M - v_u(T^*)$

$V_R = V_M - V_M e^{-\frac{T^*}{RC}}$

$V_R = V_M - \left(V_M - \frac{T^*}{RC} V_M\right) \rightarrow V_R = \cancel{V_M} - \cancel{V_M} + \frac{T^*}{RC} V_M = \frac{T^*}{RC} V_M \rightarrow V_R = \frac{T^*}{RC} V_M$

$T^* \simeq T \rightarrow V_R = \frac{T}{RC} V_M = \frac{1}{f RC} V_M$



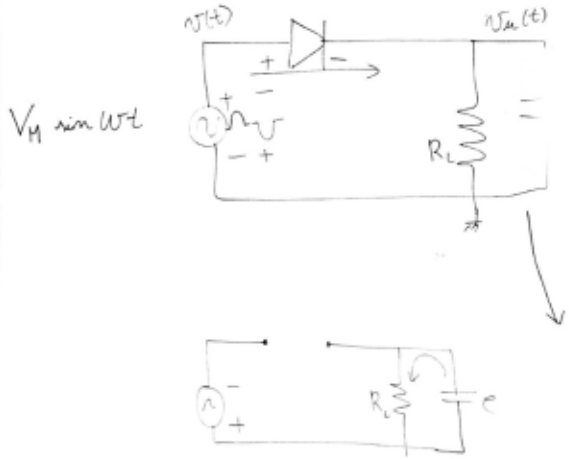
Se $R_L C$ è GRANDE

CON C

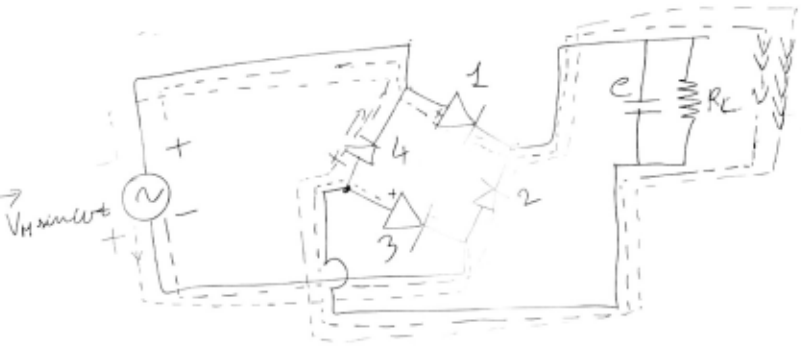
CON C più grande

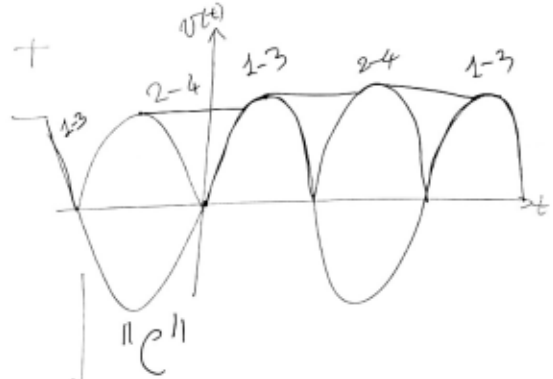
$0 < t < T^*$

$v_u(t) = V_M e^{-\frac{t}{RC}}$



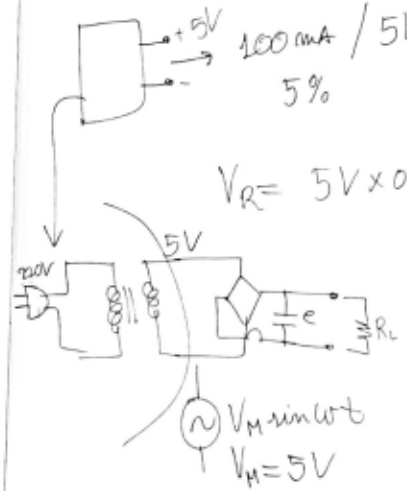
$$V_R = \frac{1}{f R_L C} \cdot V_M \quad \hookrightarrow C = \frac{1}{f R_L V_R} \cdot V_M$$





$$V_R = \frac{1}{2 f R_L C} \cdot V_M$$

$$\hookrightarrow C = \frac{1}{2 f R_L V_R} \cdot V_M$$



$R_L = 5V / 100mA = 50\Omega$.

$R_L = 100\Omega$.

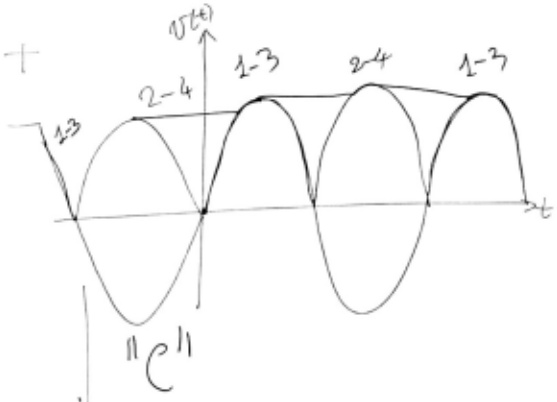
$R_L = 10\Omega$

$V_R = 5V \times 0.05 = 0.25V$

$$V_R = \frac{1}{2 f R_L C} \cdot V_M$$

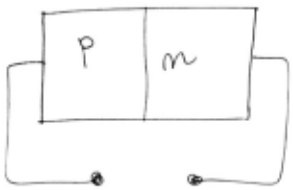
$$\hookrightarrow C = \frac{1}{2 f R_L} \cdot \frac{V_M}{V_R}$$

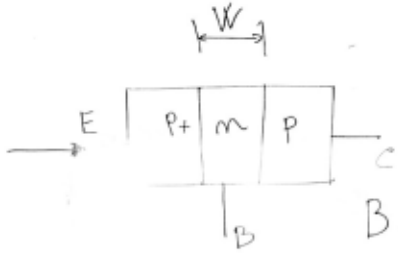
$$C = \frac{1}{2 \times 50Hz \times 50\Omega} \cdot \frac{5}{0.25} = 4\,mF$$



$$V_R = \frac{1}{2 f R_L C} \cdot V_M$$

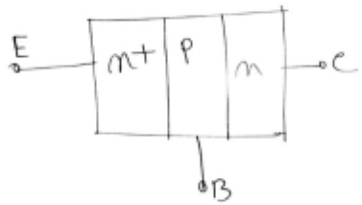
$$\hookrightarrow C = \frac{1}{2 f R_L V_R} \cdot V_M$$



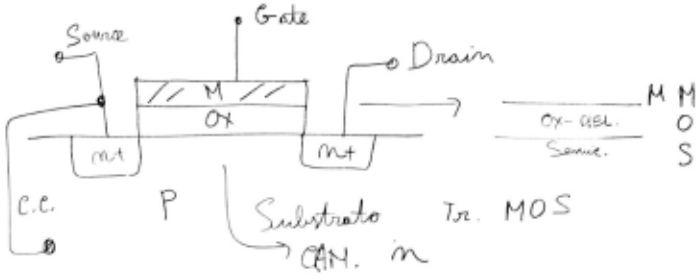


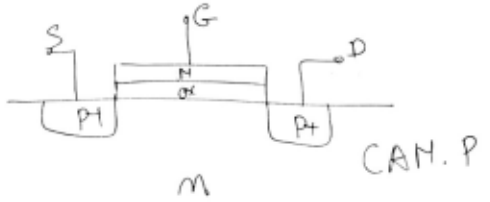
Bipolar Junction Transistor

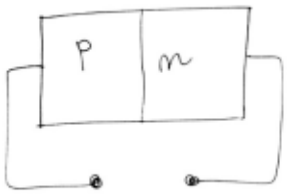
BJT - pnp



BJT - npn



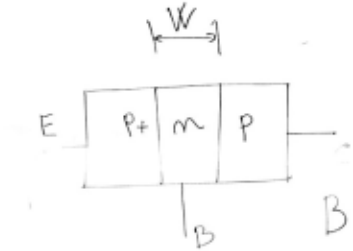




ZONA ATTIVA DIRETTA

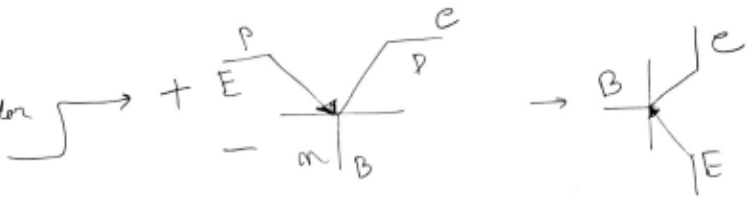
Giunz. E-B in diretta

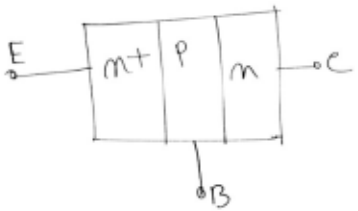
Giunz. C-B in inversa



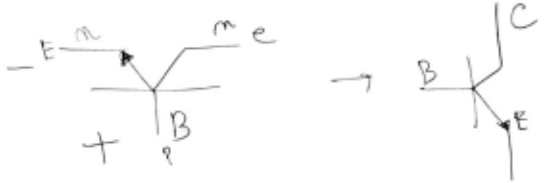
Bipolar Junction Transistor

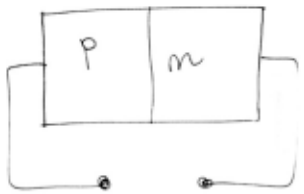
BJT-p-n-p

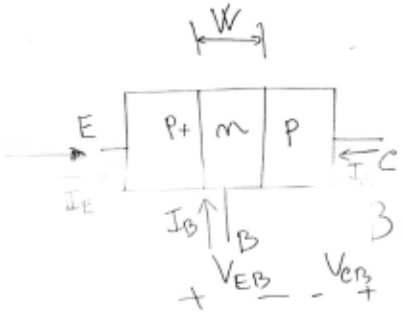




BJT-npn







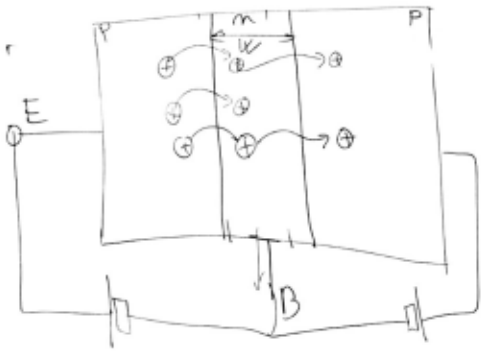
Bipolar junction Transistor

BJT - PnP

ZONA ATTIVA DIRETTA

Giunz. E-B in diretta

Giunz. C-B in inversa



GIUNZ. VICINE

I_E (mod.) $\rightarrow$ I_C mod. ($<\phi$)

$\rightarrow$ I_B mod. ($<\phi$)

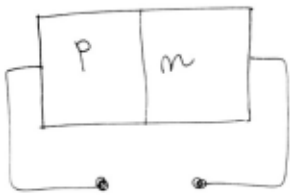
$\alpha_F = -\frac{I_C}{I_E}$ $\quad 0 < \alpha_F < 1$

FORWARD DIRETTA $\quad \alpha_F > \phi$

Se W GRANDE

Se W Piccolo ($\approx 3.5 \mu m$)

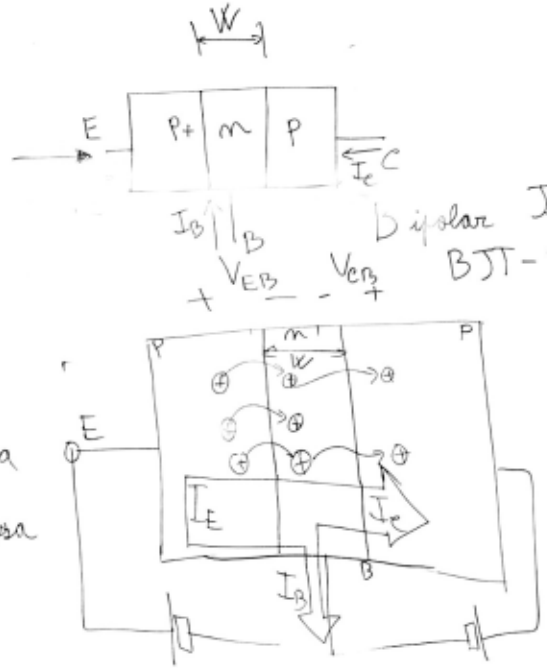
$\alpha_F = 0.9998$



ZONA ATTIVA DIRETTA

Giunz. E-B in diretta

Giunz. C-B in inversa



Bipolar Junction Transistor BJT-PNP

GIUNZ. VICINE

$I_E \rightarrow I_C$ mod. ($< \phi$)

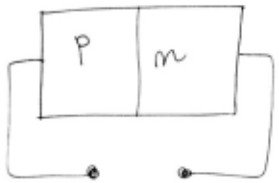
Se W PICCOLO $\rightarrow \alpha_F \approx 1$ (< 1)

$|I_E| \approx |I_C|$

$I_B + I_E + I_C = \phi \rightarrow I_B = -I_E - I_C$

$I_B = \frac{I_C}{\alpha_F} - I_C \rightarrow I_B = \frac{I_C - \alpha_F I_C}{\alpha_F} = \frac{1-\alpha_F}{\alpha_F} I_C$

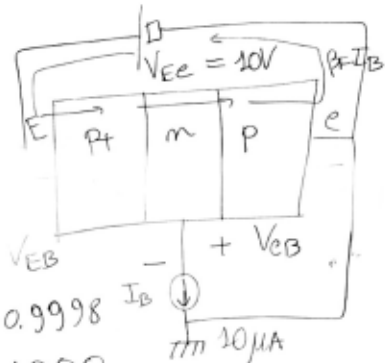
$\alpha_F = -\frac{I_C}{I_E} \quad I_E = -\frac{I_C}{\alpha_F}$



ZONA ATTIVA DIRETTA

Giunz. E-B in diretta

Giunz. C-B in inversa



$V_{EC} = V_{EB} + V_{BC}$

$\alpha_F = 0.9998$

$\beta_F = 1000$

I_B IMPOSTA → V_{EB} e V_{CB}:

$\frac{I_C}{I_B} = \beta_F \rightarrow I_C = \beta_F I_B$

$I_C = 1000 \times 10\mu = 10mA$

$\beta_{FORWARD}$ 1000

$V_{EB} > 0$ E-B DIRETTA (p n)	$V_{CB} < 0$ C-B INV. (p-n)	ZONA ATTIVA DIR.
$V_{EB} > 0$ E-B DIRETTA	$V_{CB} > 0$ C-B DIRETTA	SATURAZ. TASTO "CHIUSO"
$V_{EB} < 0$ E-B INV	$V_{CB} < 0$ C-B INV	INTERDIZIONE (TASTO "APERTO")
$V_{EB} < 0$ INVERSA	$V_{CB} > 0$ DIRETTA	ZONA ATTIVA INVERSA

V_{EB} — V_{CB}

$\beta_{INVERSO}$ 50

GIUNZ. VICINE

$I_E \rightarrow I_C$ esc. (<0)

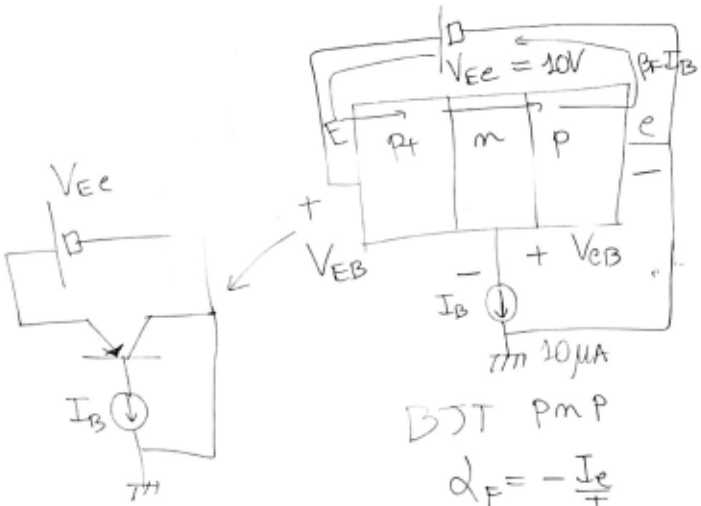
$\alpha_F = -\frac{I_C}{I_E} < 1$ (≈1, ½ PICCOLO)

$I_B = \frac{1-\alpha_F}{\alpha_F} I_C \rightarrow I_C = \frac{\alpha_F}{1-\alpha_F} I_B$

$\beta_F = \frac{\alpha_F}{1-\alpha_F} = \frac{I_C}{I_B}$ GUAD in CORRENTE

$I_B = \frac{I_E - \alpha_F I_C}{\alpha_F} = \frac{1-\alpha_F}{\alpha_F} I_C$

ZONA INVERSA \ DA EVITARE



$V_{EC} = V_{EB} + V_{BC}$

Z.A.D.

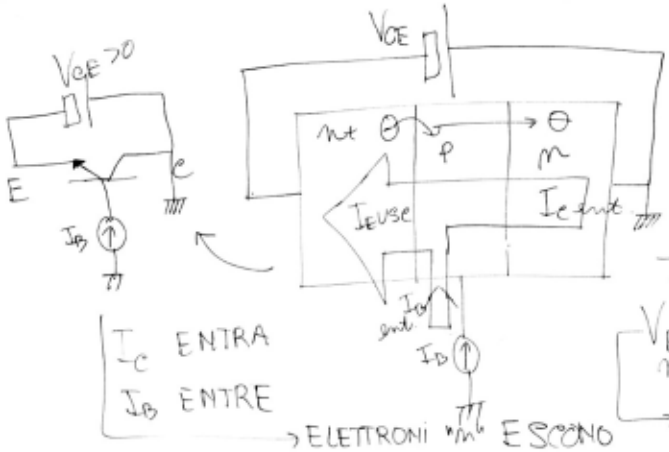
$V_{EB} > 0 \rightarrow$ DIR.

$V_{CB} < 0 \rightarrow$ INV.

BJT pnp

$\alpha_F = -\frac{I_c}{I_E}$

$\beta_F = \frac{I_c}{I_B} \rightarrow I_c = \beta_F I_B$



$V_{CE} = V_c - V_E$

I_C ENTRA

I_B ENTRE

→ ELETTRONI "n" ESCONO

$I_{E\,esce} \rightarrow$ ELETT. entrano

$\alpha_F = -\frac{I_c}{I_E}$ ent. / usc.

$\beta_F = \frac{I_c}{I_B}$ ent. / ent.

$I_c = \beta_F I_B$

Z.A.D.

$V_{EB} < 0 \rightarrow$ DIR. (n-P)

$V_{BE} > 0 \rightarrow$ DIR (P-n)

$V_{CB} > 0 \rightarrow$ INV

($V_{BC} < 0$ P-n)