

IGBT

Insulated Gate Bipolar Transistor
IGBT

MOSFET

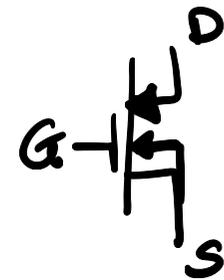
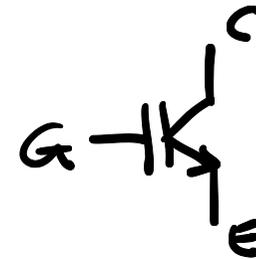
BJT

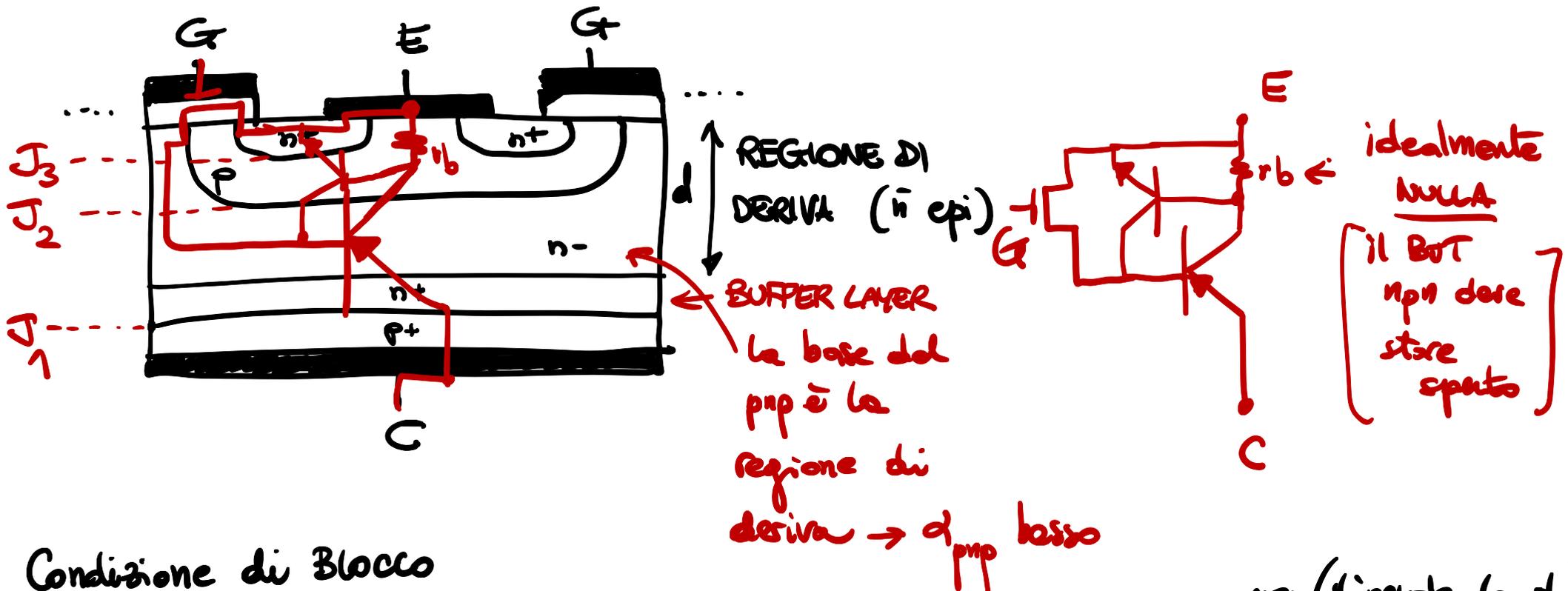
⊕ Velocità di spegnimento
(NO PLASMA)

⊖

⊖ Ron
ELEVATA
(NO PLASMA)

⊕ Ron
BASSA



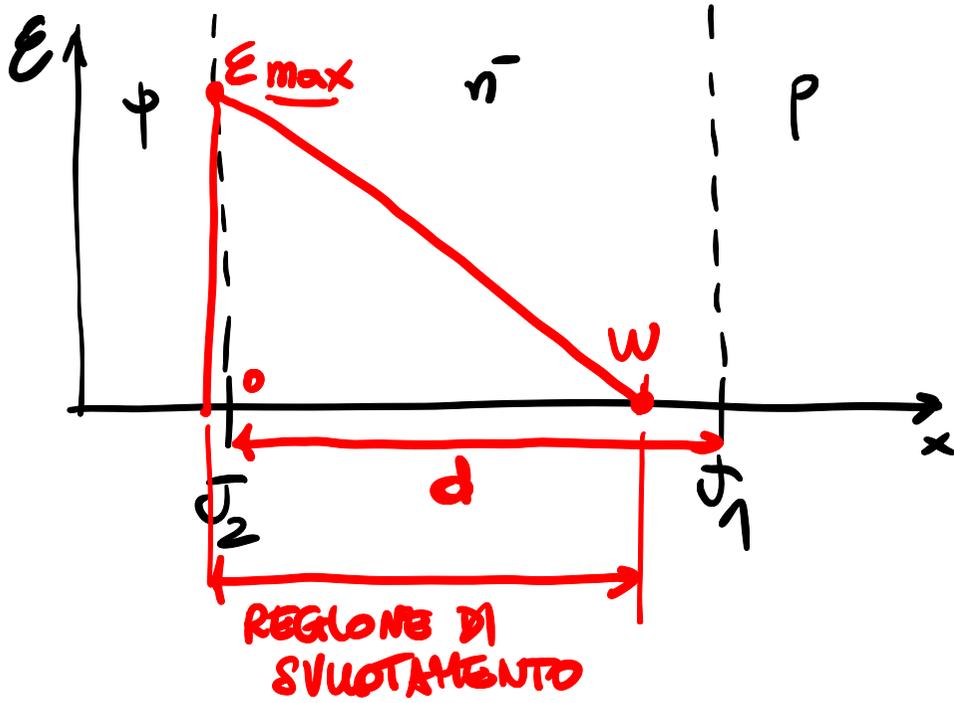


Condizione di Blocco

$V_{CB} > 0 \rightarrow J_2$ sostiene la tensione inversa \rightarrow tensione di BREAKDOWN ELEVATA (dipende da d)
 $V_{CB} < 0 \rightarrow J_1$ e J_3 sono polarizzate inversamente
 se d è il BUFFER LAYER (n^+) \rightarrow tensione di BD bassa
 se non c'è il BUFFER LAYER (n^+) \rightarrow tensioni di BD SIMMETRICHE

SENZA BUFFER LAYER

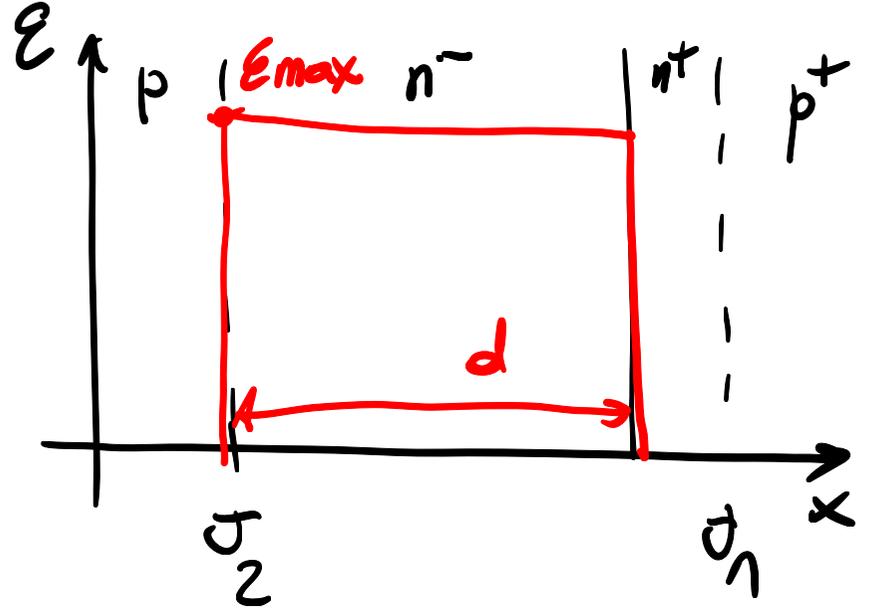
$V_{GS} > 0$



$$V_{BD} = \frac{E_{max} \cdot w}{2}$$

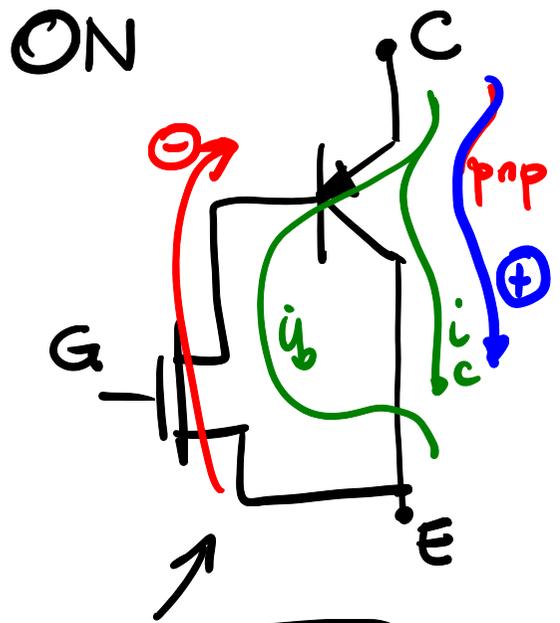
$$d > w = \frac{2V_{BD}}{E_{max}} \quad \left(\begin{array}{l} \text{per evitare} \\ \text{il} \\ \text{Reach} \\ \text{Through} \end{array} \right)$$

CON BUFFER LAYER

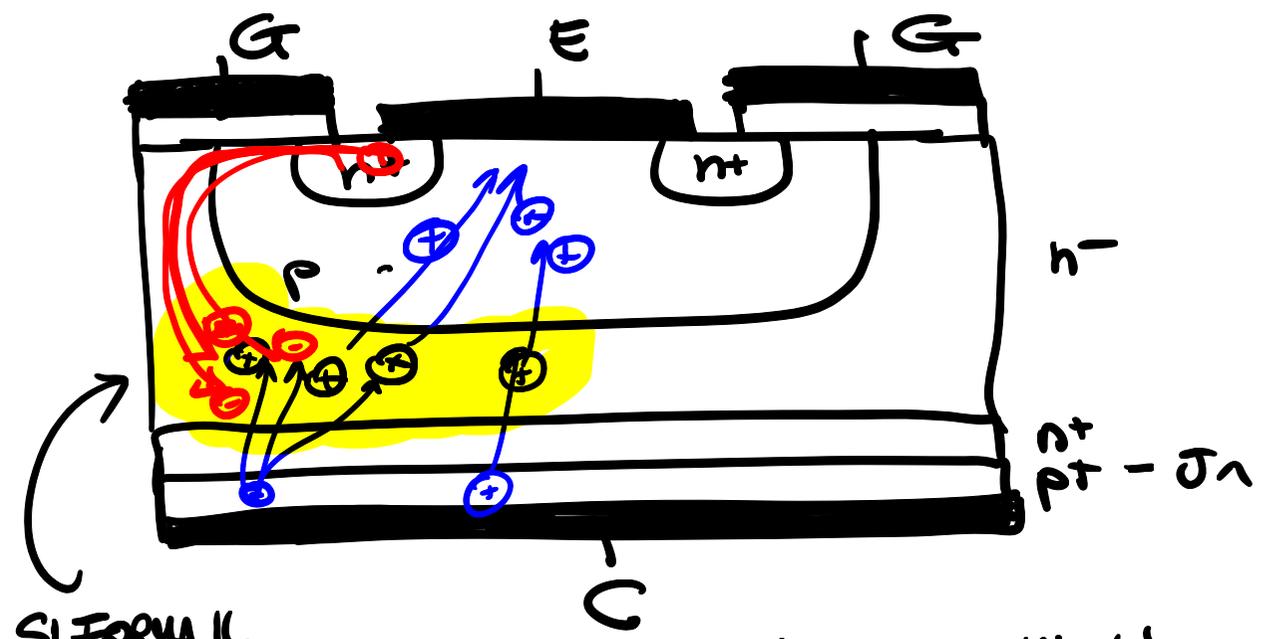


$$V_{BD} \cong E_{max} d$$

$$d = \frac{V_{BD}}{E_{max}}$$



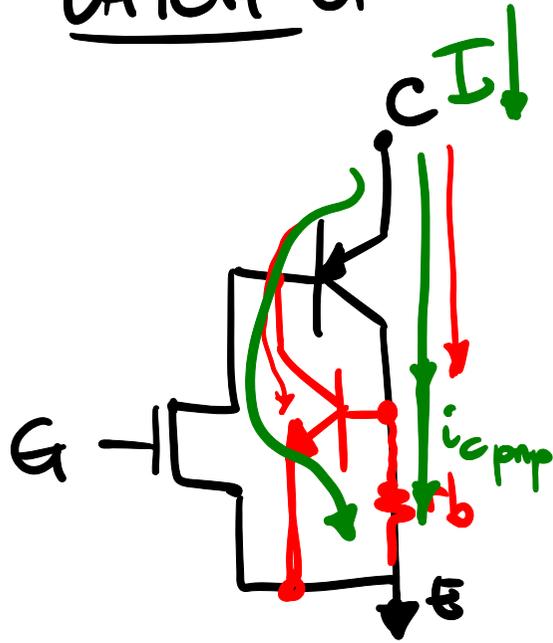
IL PNP NON VA
IN SATURAZIONE



SI FORMA IL PLASMA → Modulazione della conduttività

$$V_{ON} = V_{j_1} + R_{on} J$$

LATCH UP



I_{MAX} STATICO

$$r_b i_{c_{pnp}} < V_{BE_{TURNON}}$$

$$r_b \alpha_{pnp} I < V_{BE_{TURNON}}$$

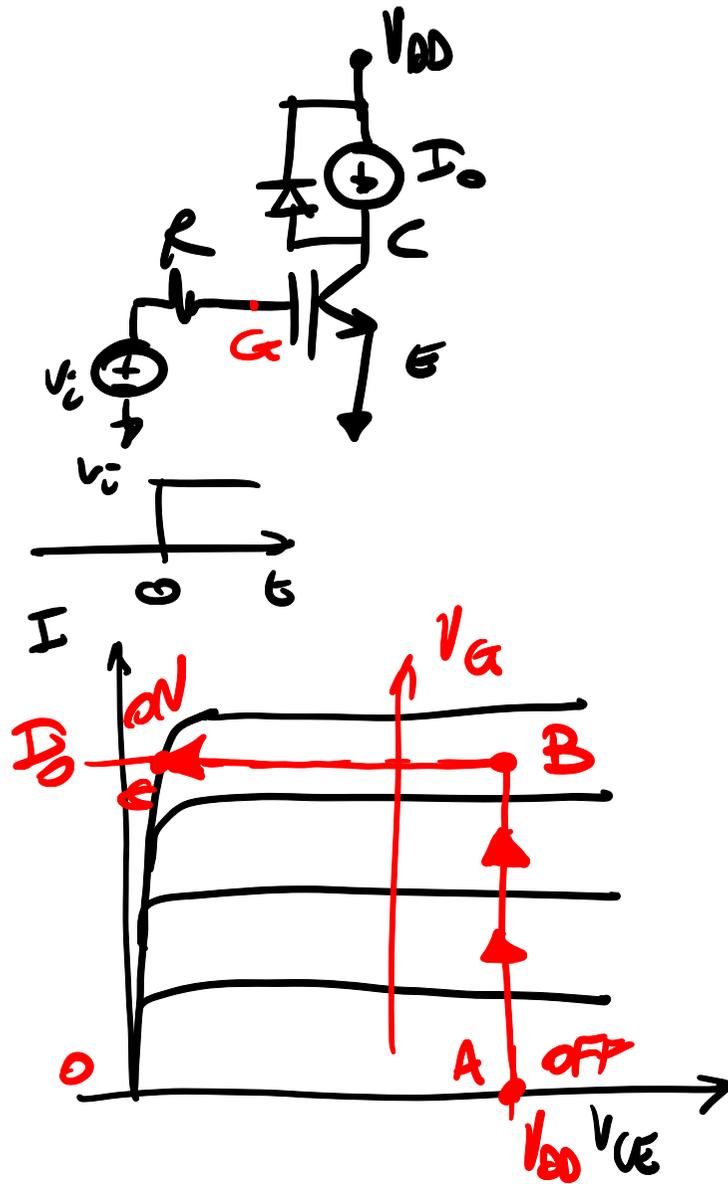
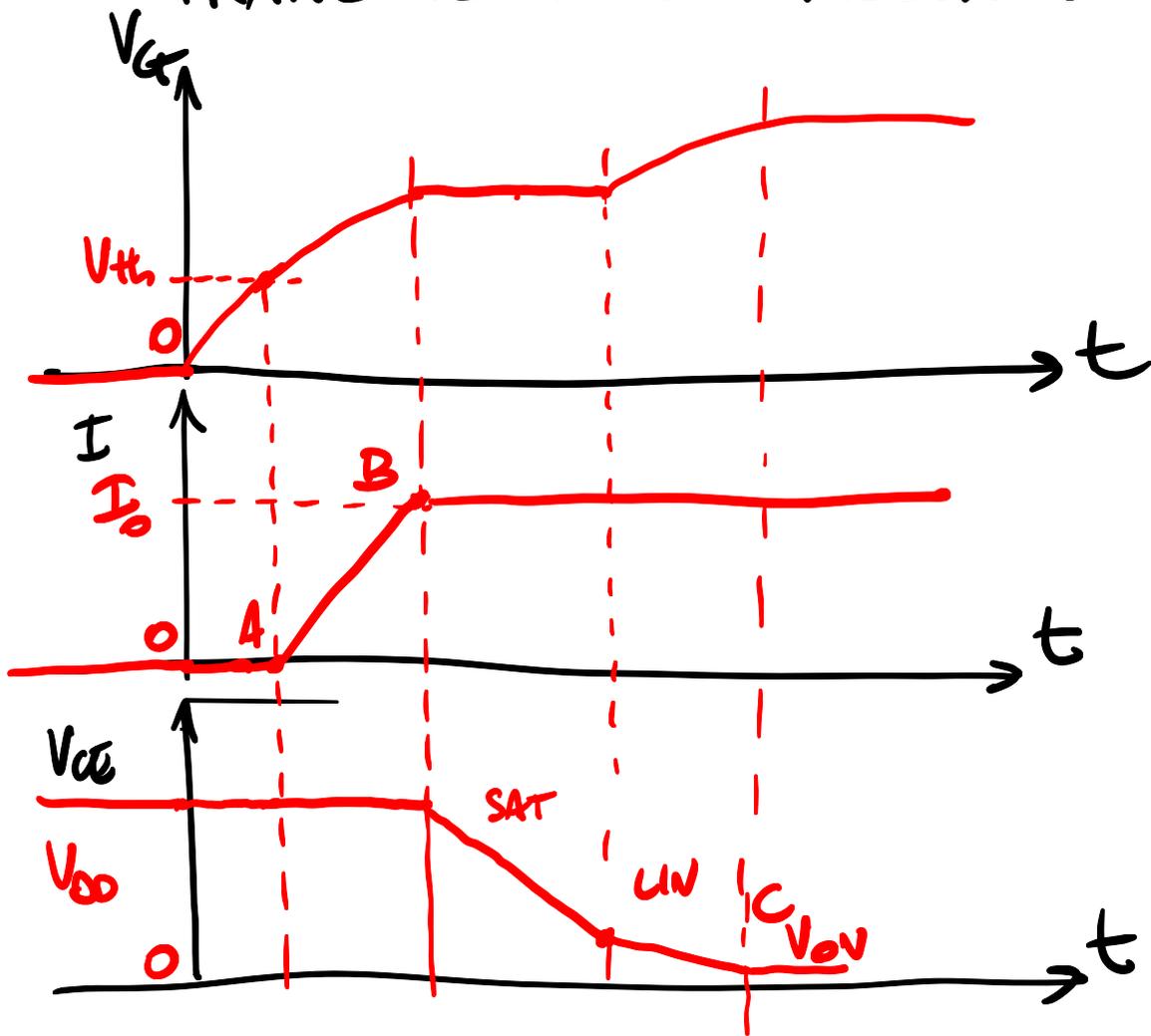
$$\underline{I} < \frac{V_{BE_{TURNON}}}{r_b \alpha_{pnp}}$$

I_{MAX} DINAMICA

$$r_b I < V_{BE_{TURNON}}$$

$$I < \frac{V_{BE_{TURNON}}}{r_b}$$

TRANSITORIO DI ACCENSIONE



TRANSITORIO DI SPEGNIMENTO

