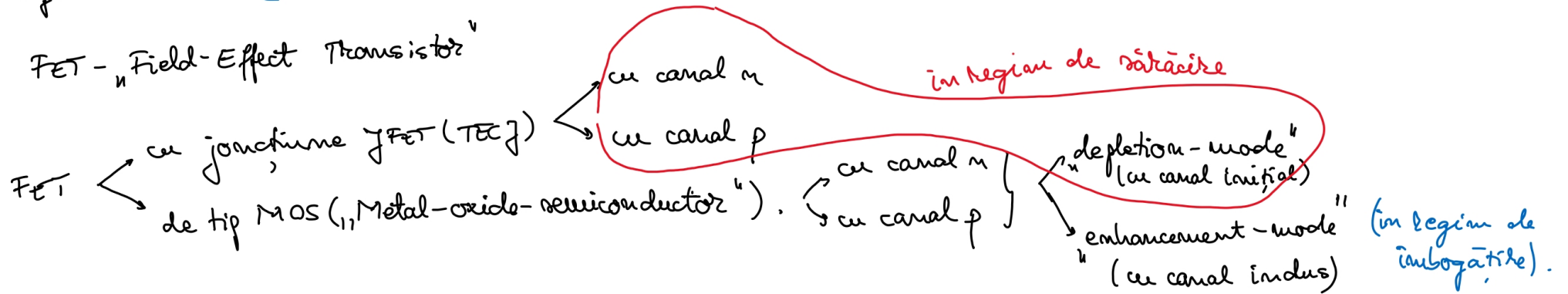


Laborator nr. 4: FT.

Transistorul cu efect de câmp: (TEC) (FET)

BJT  $\rightarrow$  curent  $I_c$  controlat de  $I_B$

FET - "Field-Effect Transistor"

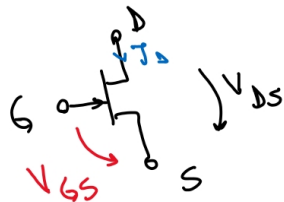


FET - curent  $I_D$  controlat de  $V_G$

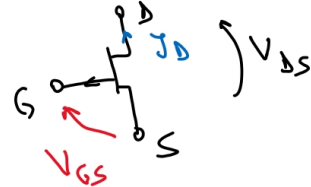
FET - dispozitive comandate în tensiune

simboluri

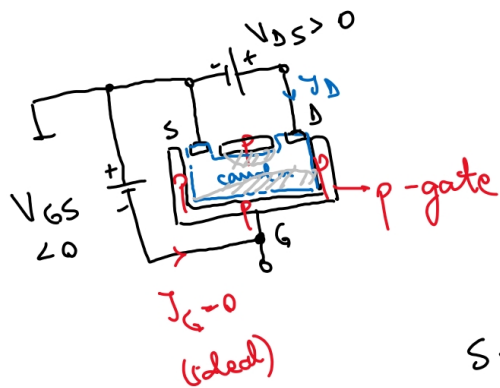
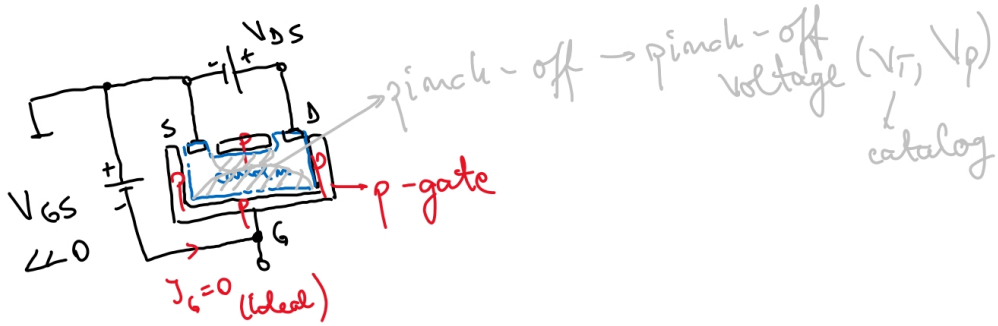
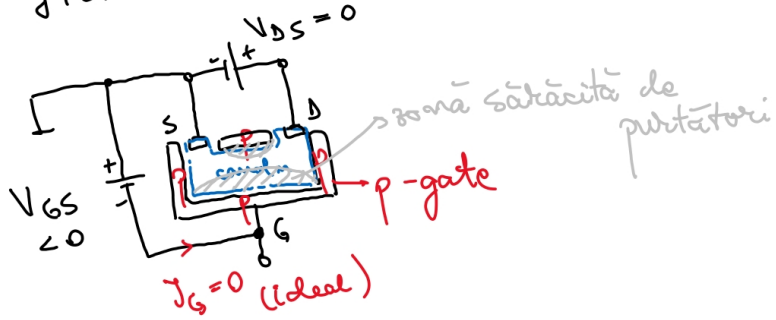
JFET cu canal n



JFET cu canal p



JFET cu canal n



$$J_D = J_{DSS} \left(1 - \frac{V_{GS}}{V_T}\right)^2$$

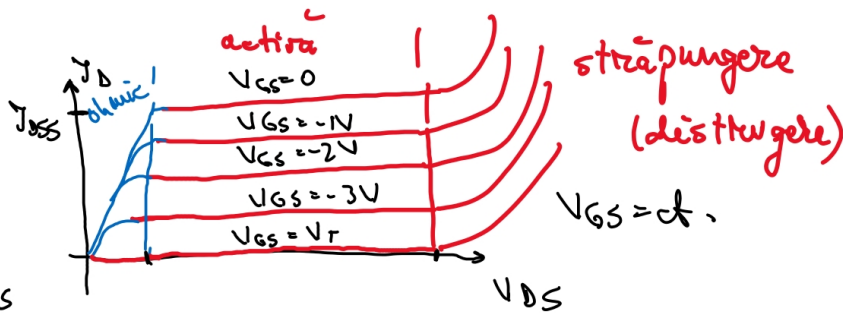
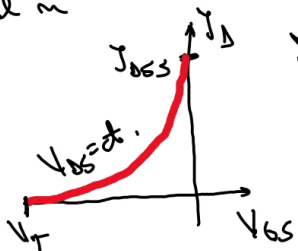
$$V_{GS} = V_T \rightarrow J_D = 0$$

$$V_{GS} = 0 \rightarrow J_D = J_{DSS}$$

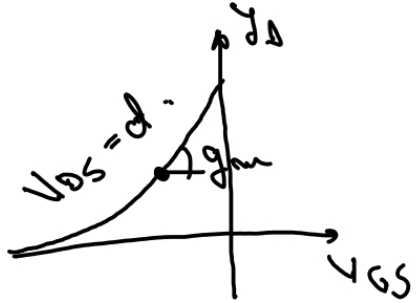
S - sursă (source) de electroni<sup>-</sup>

D - drenă (drain) de electroni<sup>-</sup>

canal n



param. de semnal mic (dinamică, AC)



$$g_m = \left. \frac{dI_D}{dV_{GS}} \right|_{V_{DS} = \text{ct.}} = |Y_{fs}| \text{ - transconductanță}$$



$$\frac{1}{r_d} = \left. \frac{dI_D}{dV_{DS}} \right|_{V_{GS} = \text{ct.}} \rightarrow |Y_{os}| = \frac{1}{r_d}$$

- rezistența de ieșire (rez. de drenă).

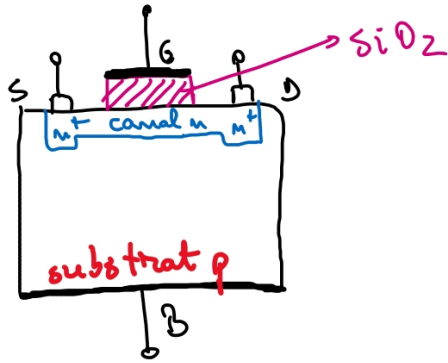
# MOSFET cu canal initial ("depletion type")

→ mai rar

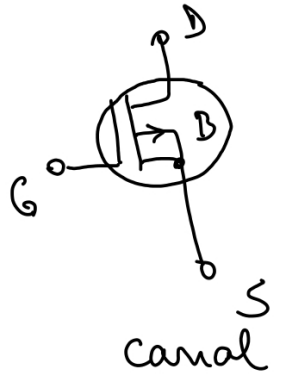
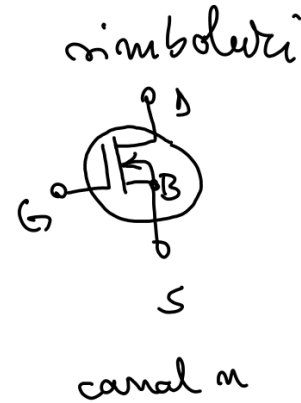
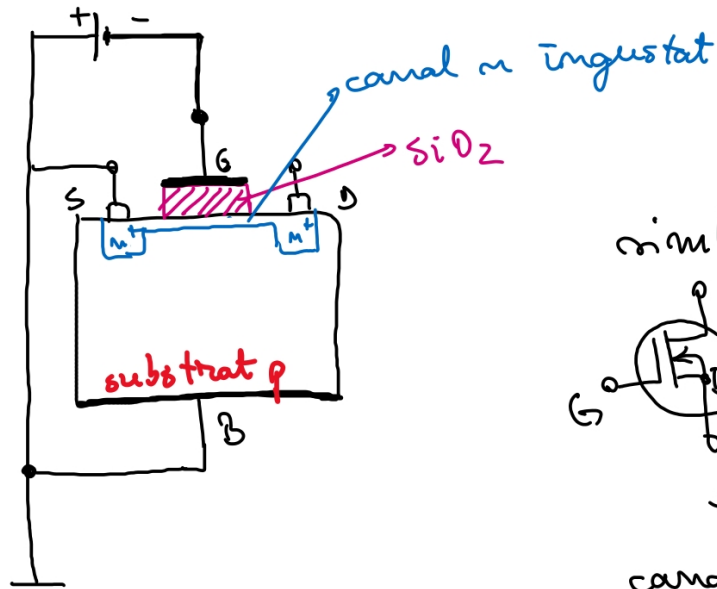
avantaje MOSFET

- canal f. mică
- dim f. mare

$V_{GS} = 0$



$V_{GS} < 0$

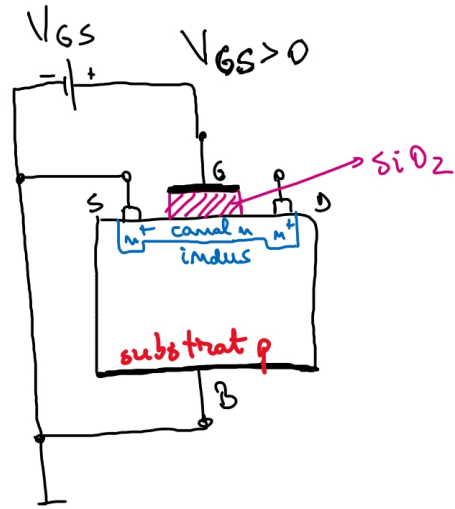
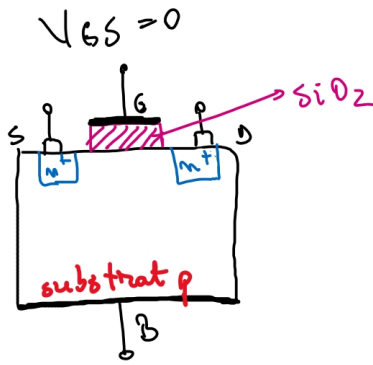


caract. asemănătoare cu JFET cu canal n.

MOSFET "depletion type" - "normally ON" ≡ scurt între D și S.

# MOSFET cu canal indus:

"enhancement type" → "normally OFF"

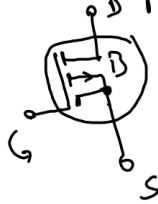


Simboluri:

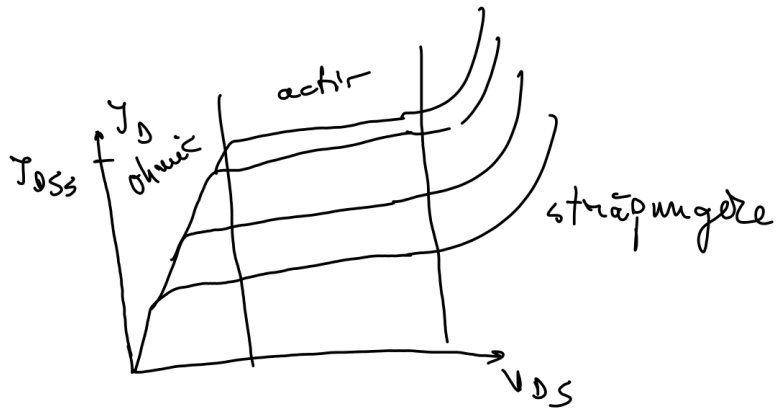
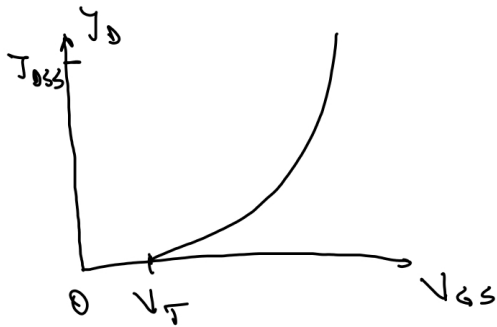
canal n



canal p



caracteristici



$V_{DS} = ct. = 5V$

$V_{DS} = ct. = 10V$

$I_D$  (mA)

$I_D$  (mA)

$V_{GS}$	$I_D$ (mA)	$I_D$ (mA)
0	11.958	11.994
-0.1	11.555	11.590
-0.2	11.152	11.187
⋮	⋮	⋮
-3.5	0	0