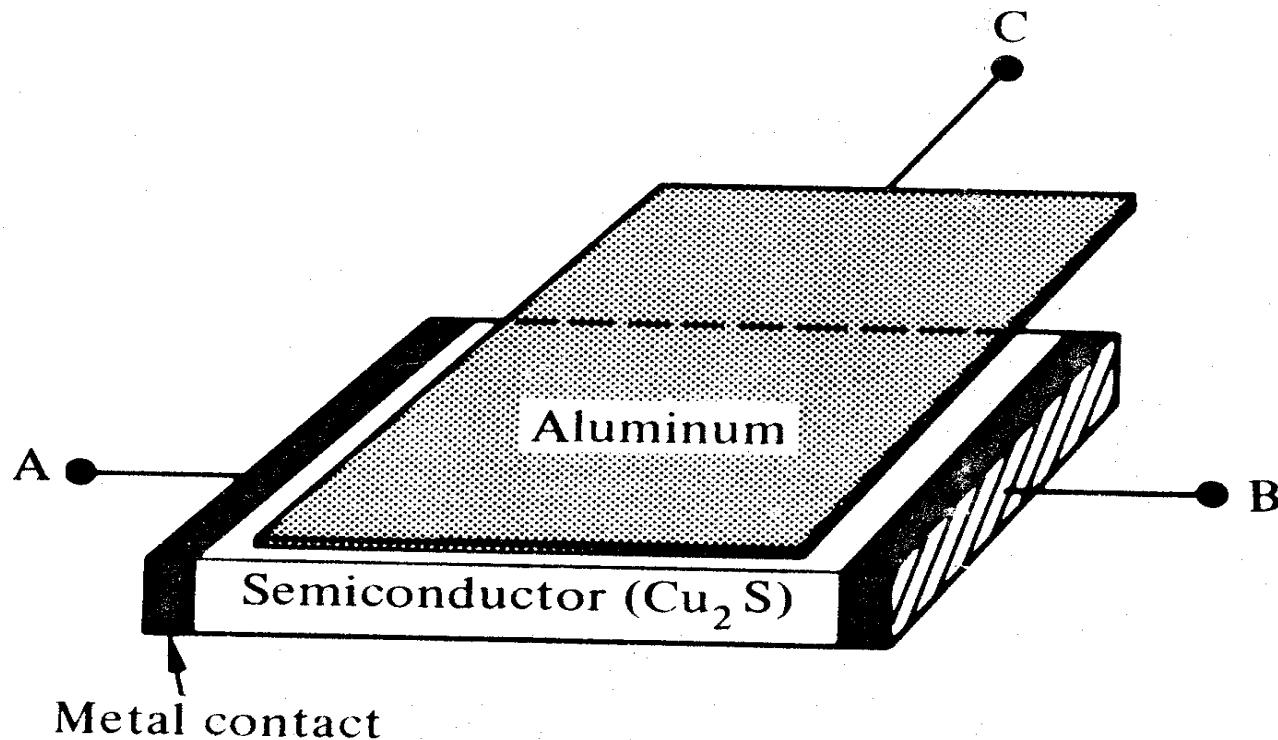


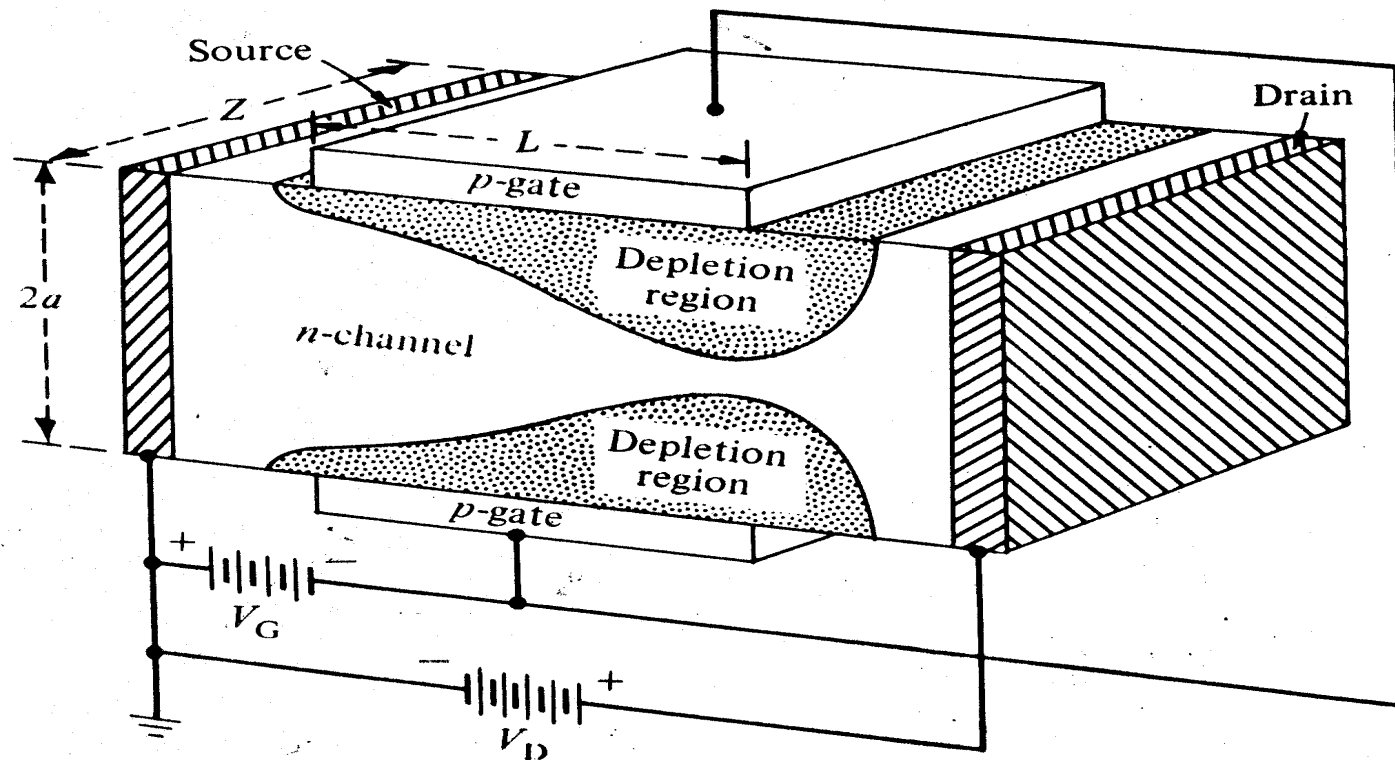
7. Transistor MOS

Histórico - transistores por efeito de campo (FET)

- Década de 30 - J.E. Lilienfeld (EUA)
conceito FET O.Heil (Alemanha)

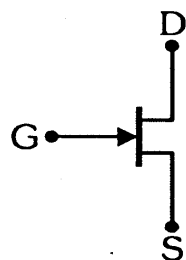
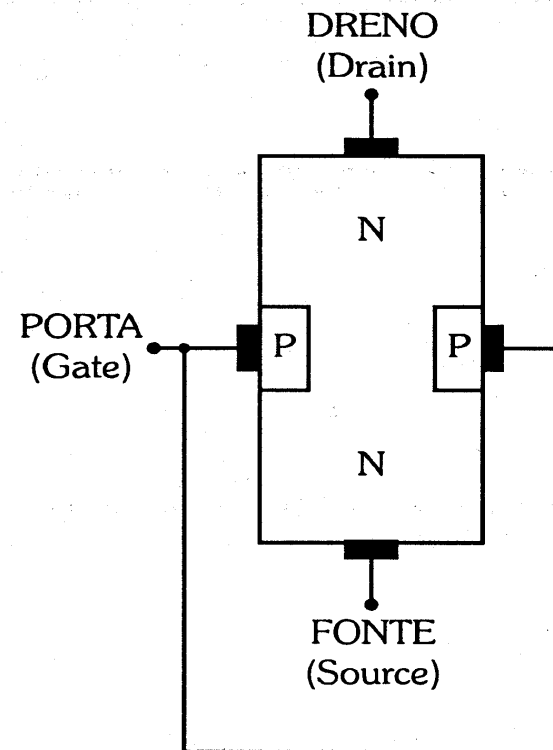


- Década de 40 - transistor bipolar
- Década de 50 - W. Shockley (52) propôs o transistor de junção - JFET
Dacey e Ross (53) experimental

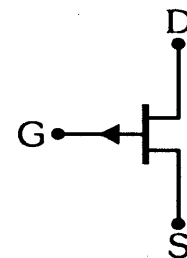
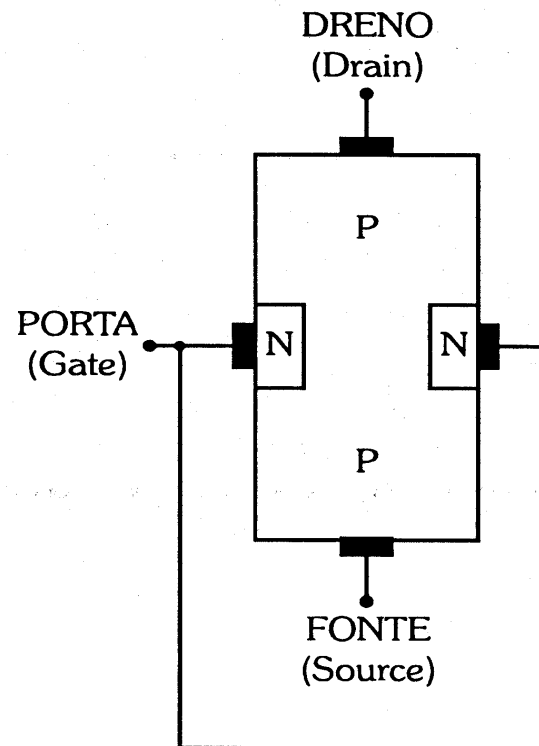


JFET

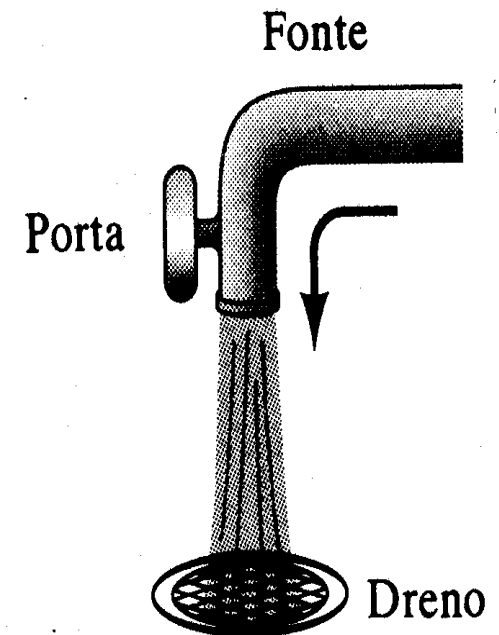
Analogia hidráulica



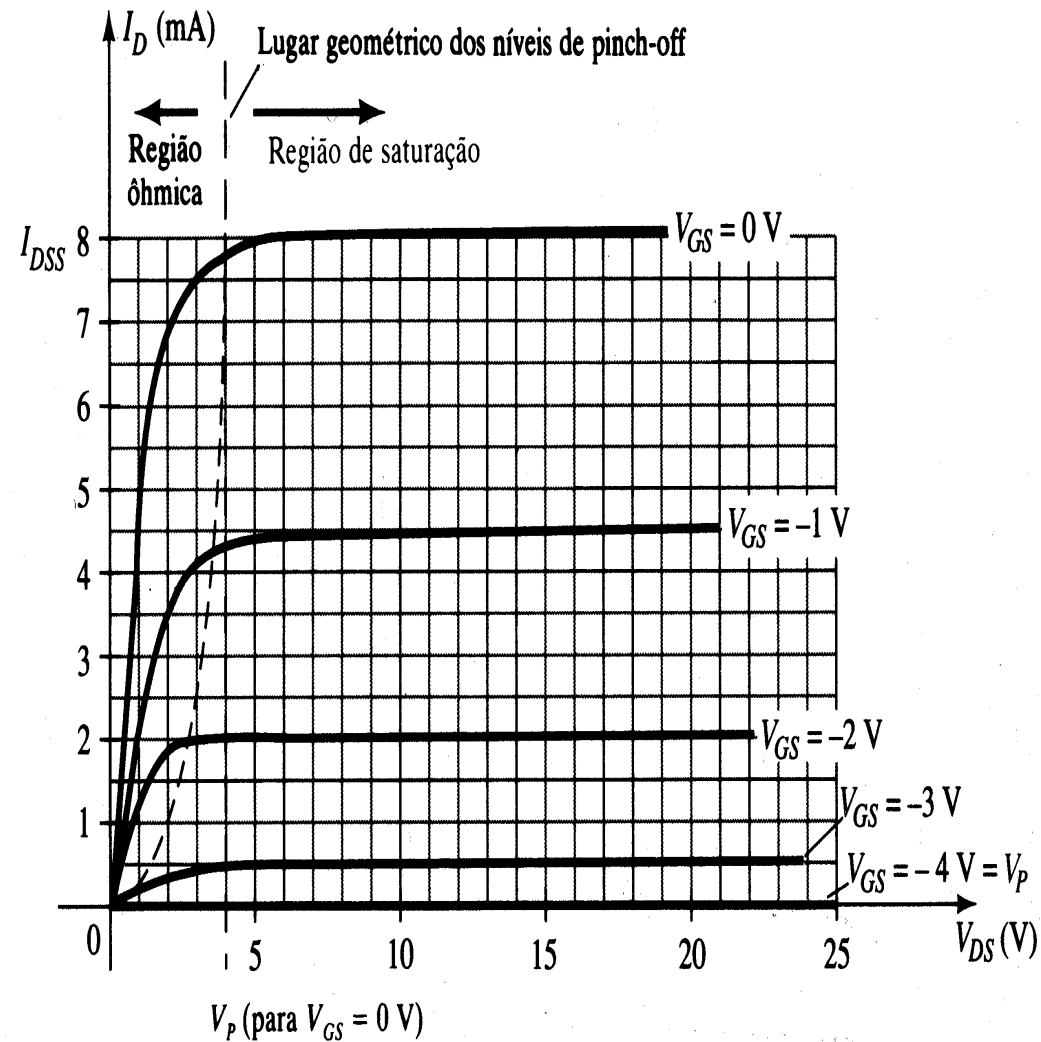
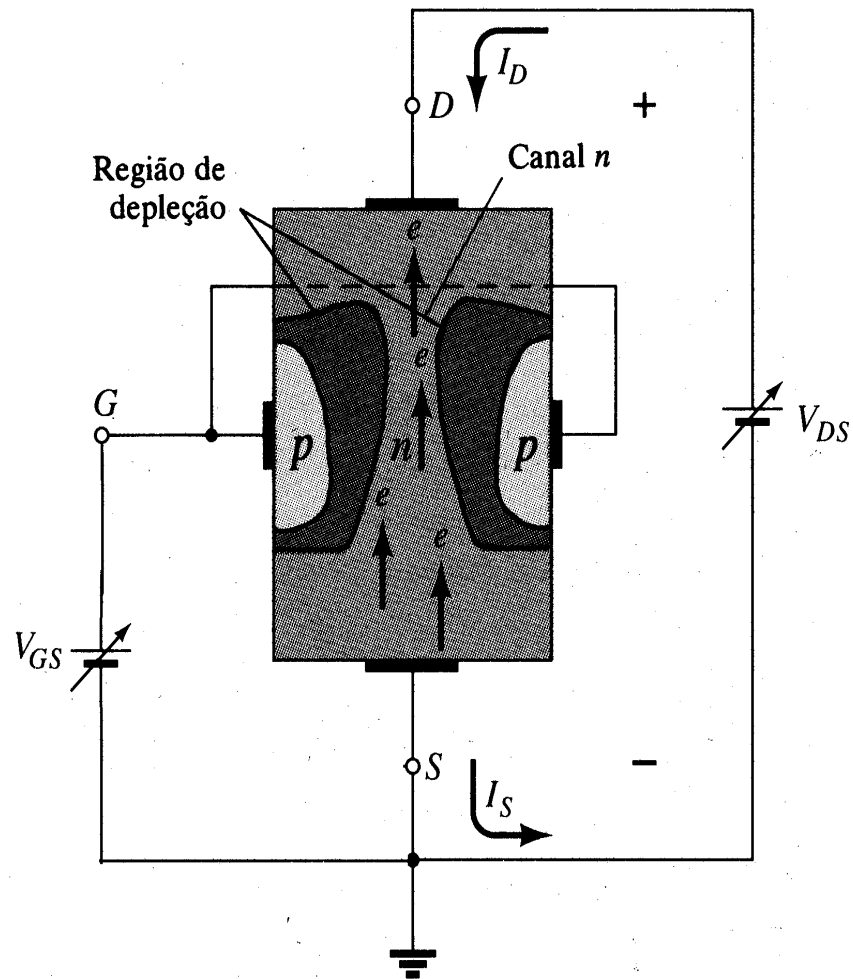
(a) Canal N



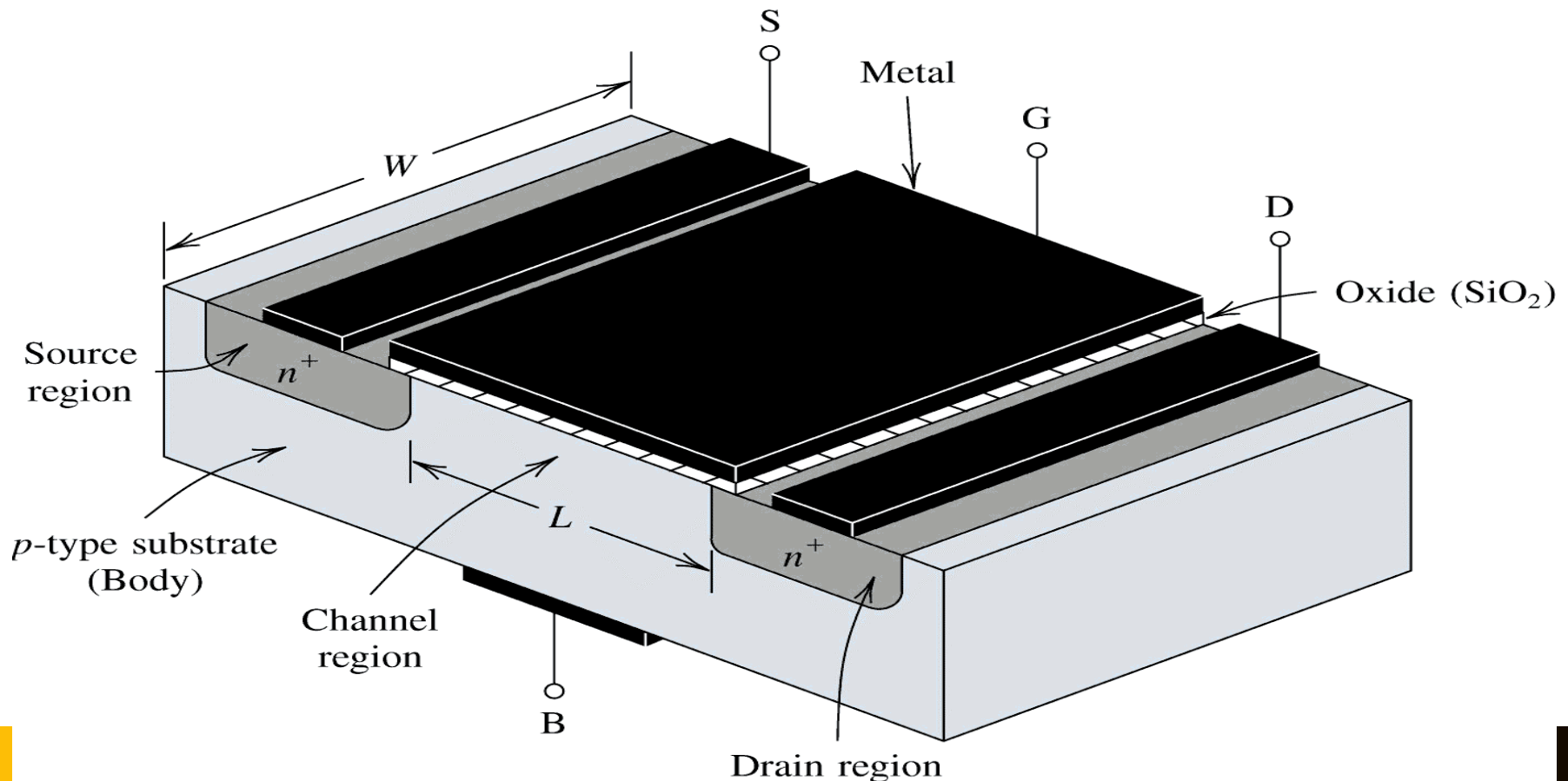
(b) Canal P



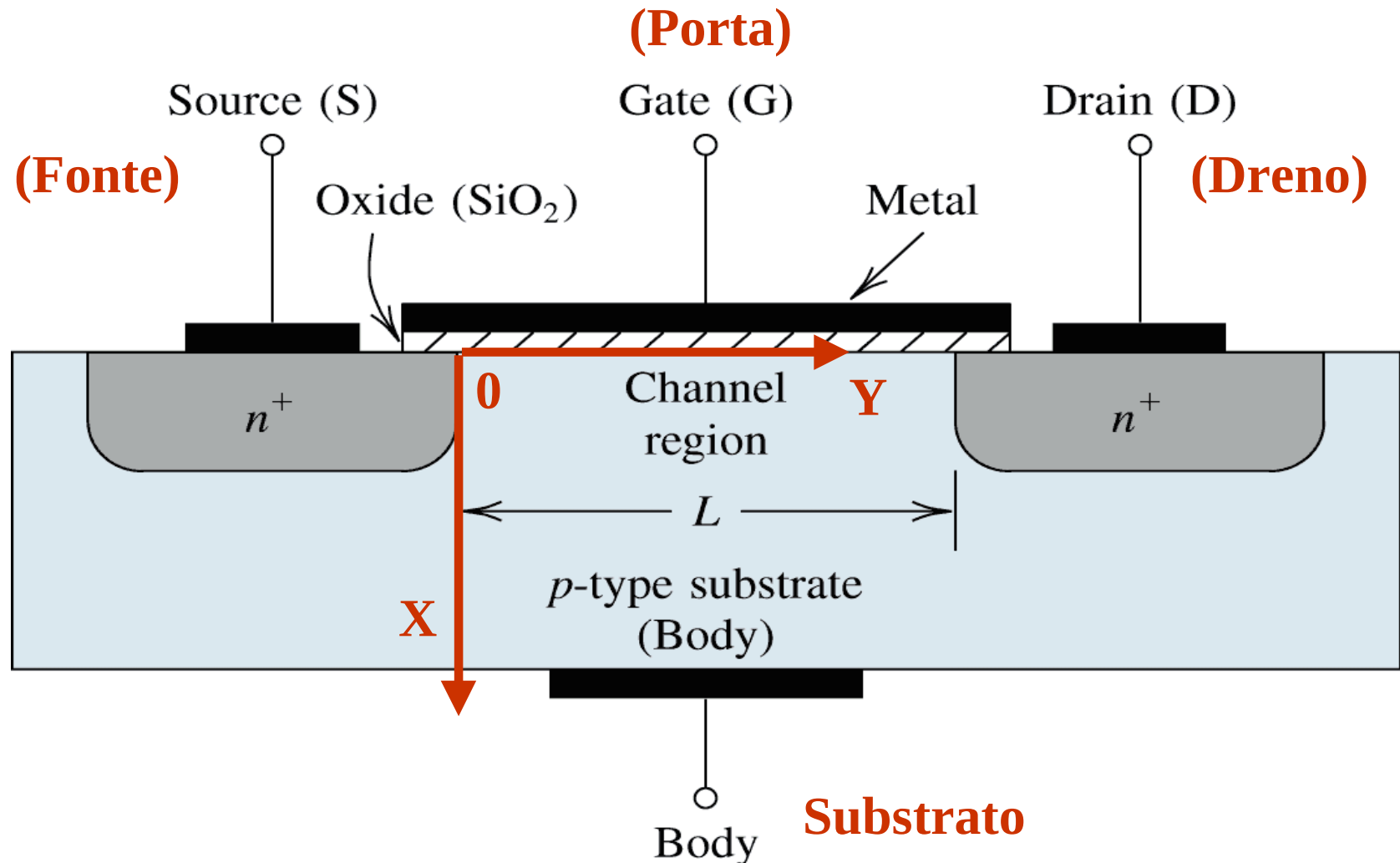
JFET



- Década de 60 - Kahng e Atalla (60) propuseram o MOSFET atual Fairchild - produção em 1964.

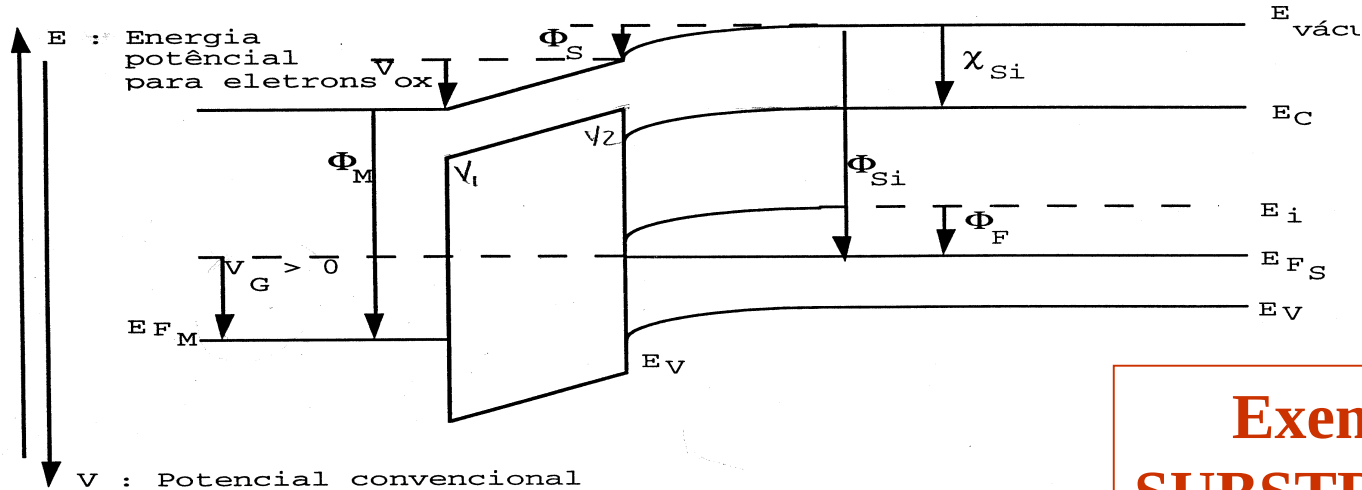


MOSFET - região de canal



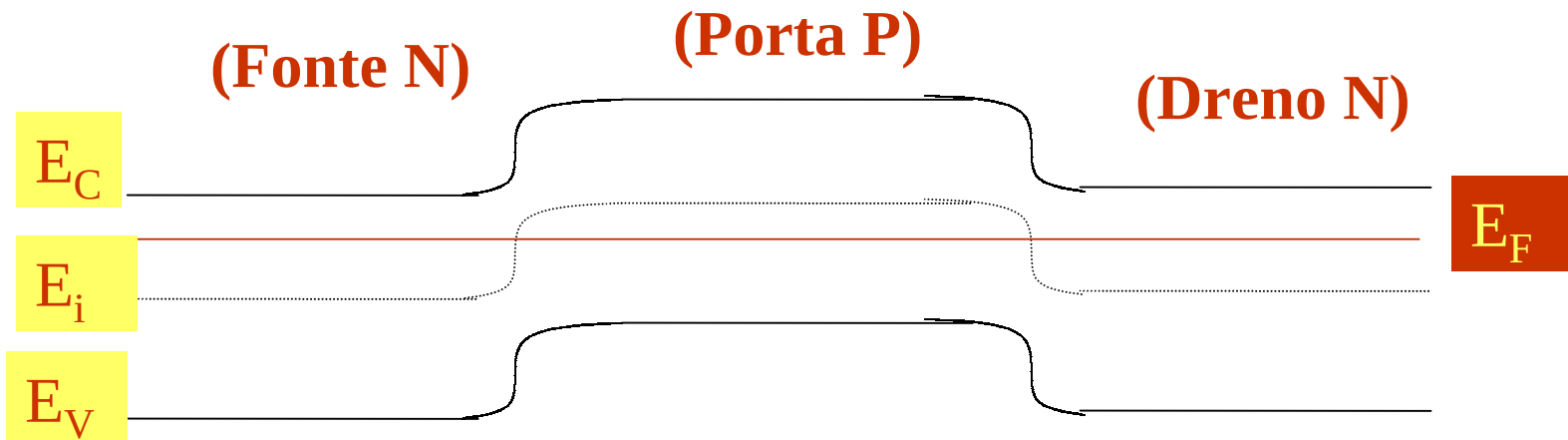
Na direção X (sob o isolante) → Cap. MOS

METAL ÓXIDO SEMICONDUTOR

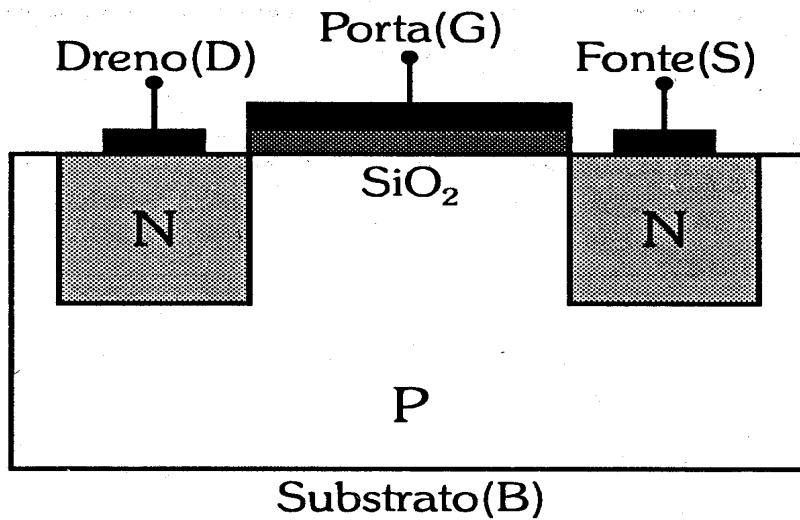


Exemplo:
SUBSTRATO P

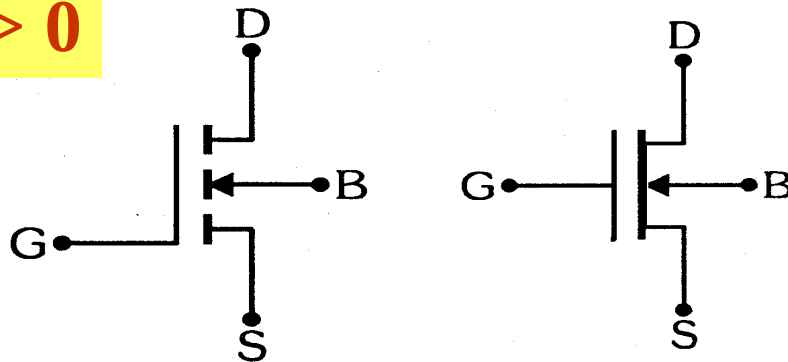
Na direção Y → Junção NPN



MOSFET- tipo enriquecimento (formar o canal)

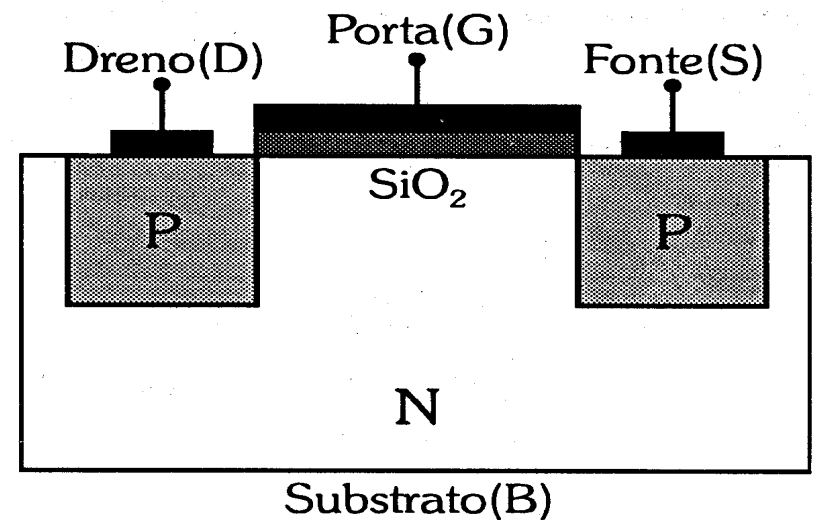


$$V_T > 0$$

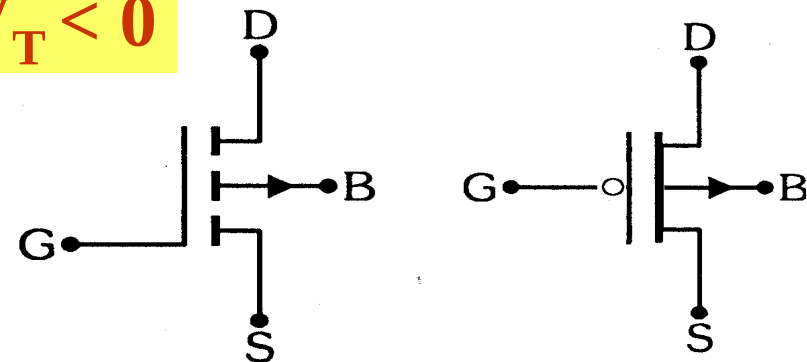


(a) Canal N

nMOSFET



$$V_T < 0$$



(b) Canal P

pMOSFET

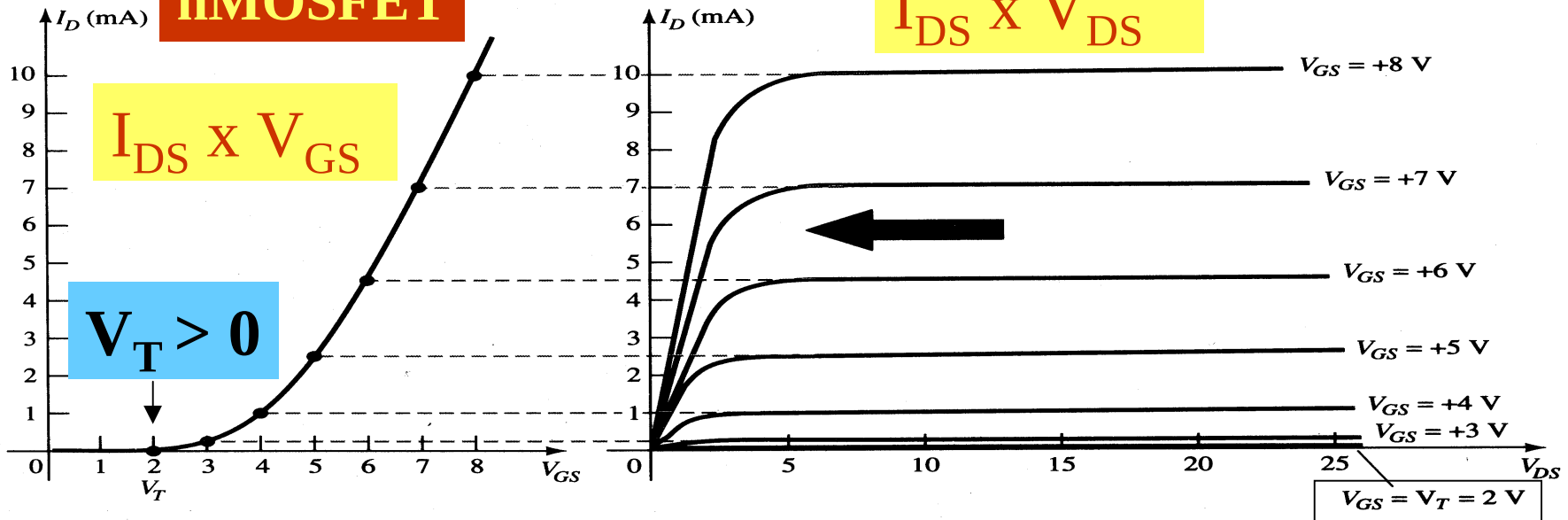
Curvas características - tipo enriquecimiento

nMOSFET

$I_{DS} \times V_{DS}$

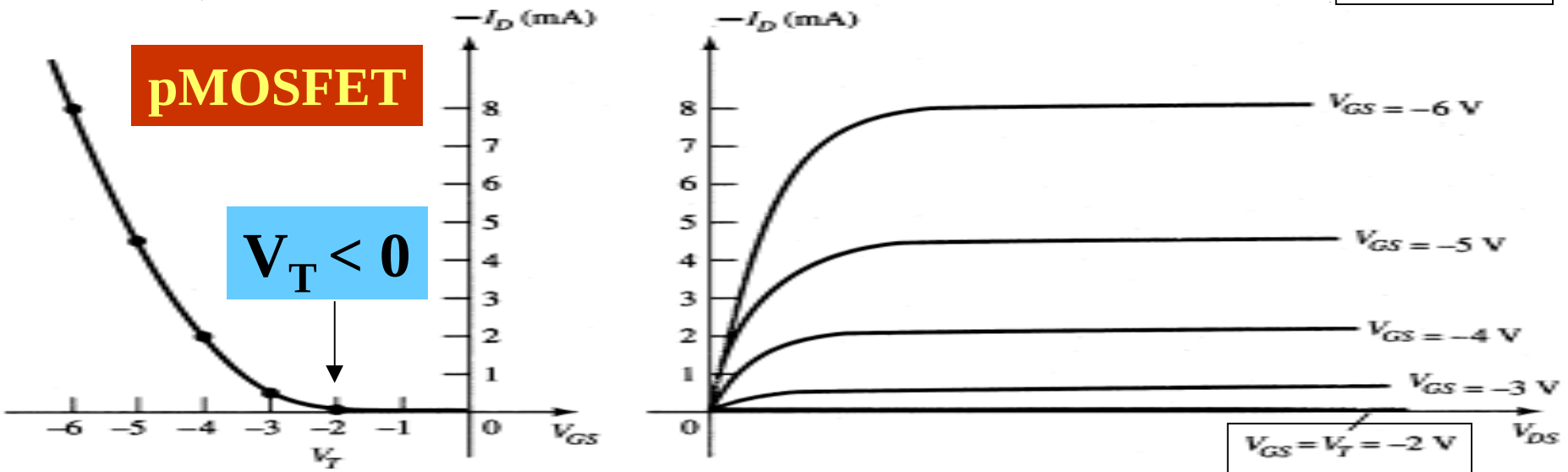
$I_{DS} \times V_{GS}$

$V_T > 0$

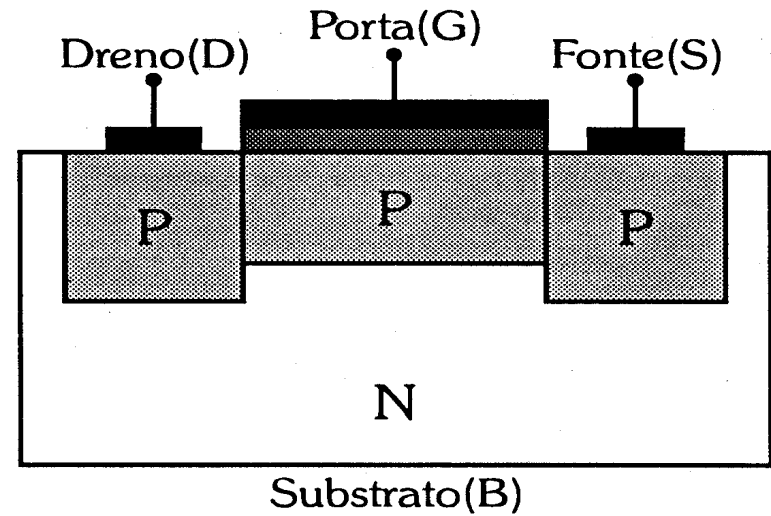
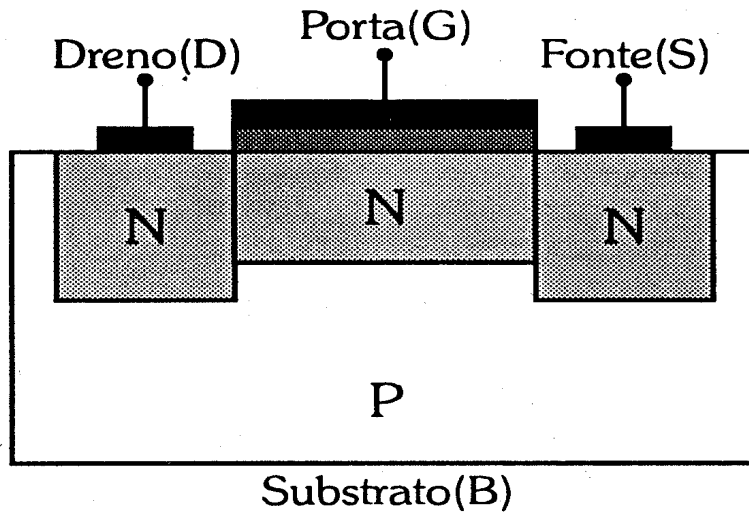


pMOSFET

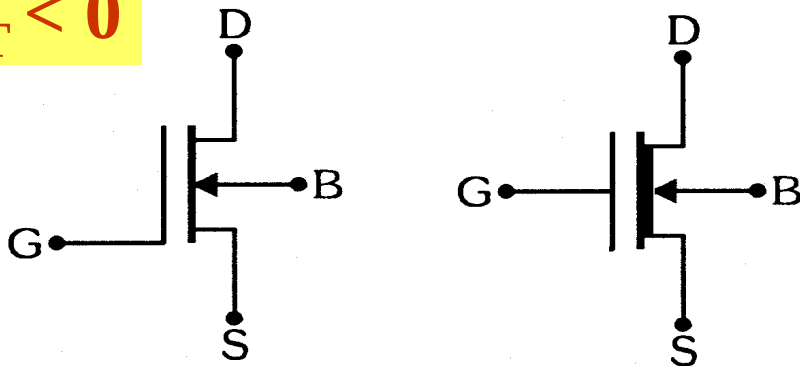
$V_T < 0$



MOSFET - tipo depleção (canal já existe)



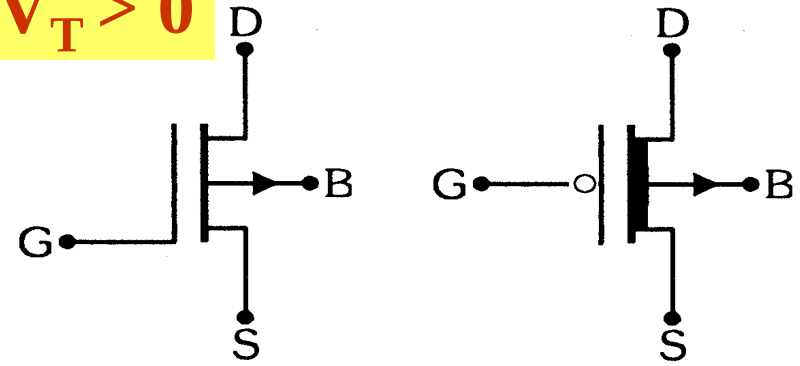
$$V_T < 0$$



(a) Canal N

nMOSFET

$$V_T > 0$$



(b) Canal P

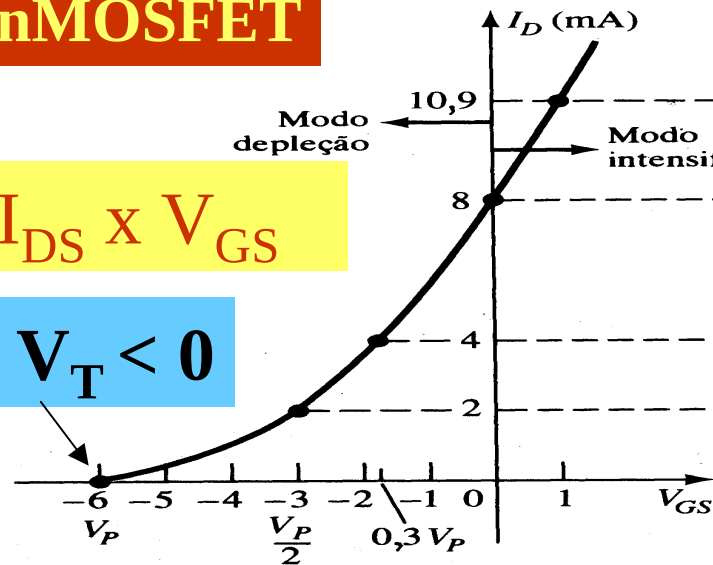
pMOSFET

Curvas características - tipo depleção

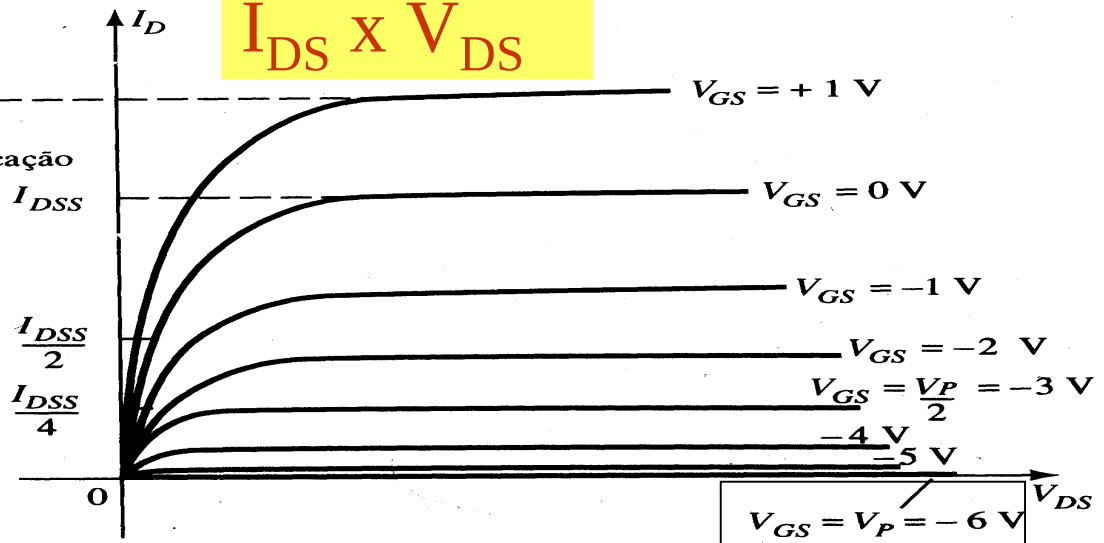
nMOSFET

$I_{DS} \times V_{GS}$

$V_T < 0$



$I_{DS} \times V_{DS}$



pMOSFET

$V_T > 0$

