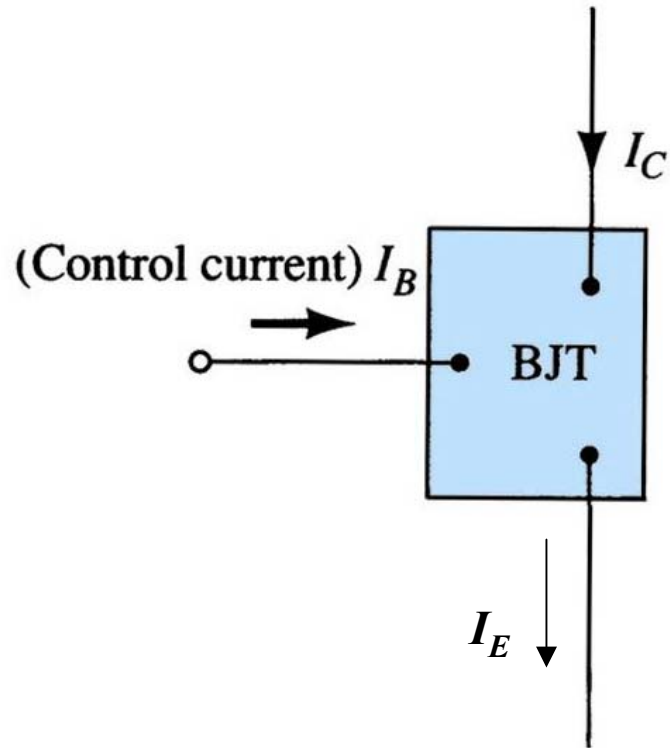


Aula 02

Curva Característica de Transferência do JFET

(pág. 179 a 186)

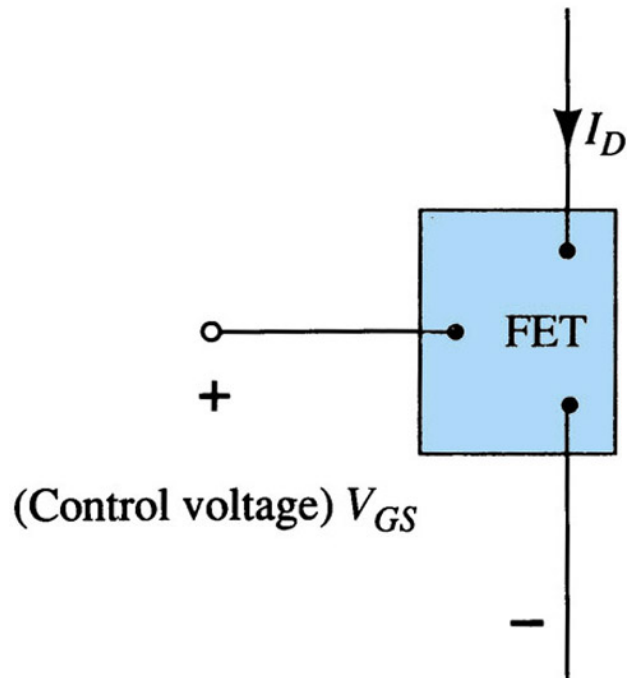
Curva de Transferência do JFET



- TBJ: controlado por corrente.

$$I_C = \beta \cdot I_B \quad [5.2]$$

Slide 2



- JFET: controlado por tensão.

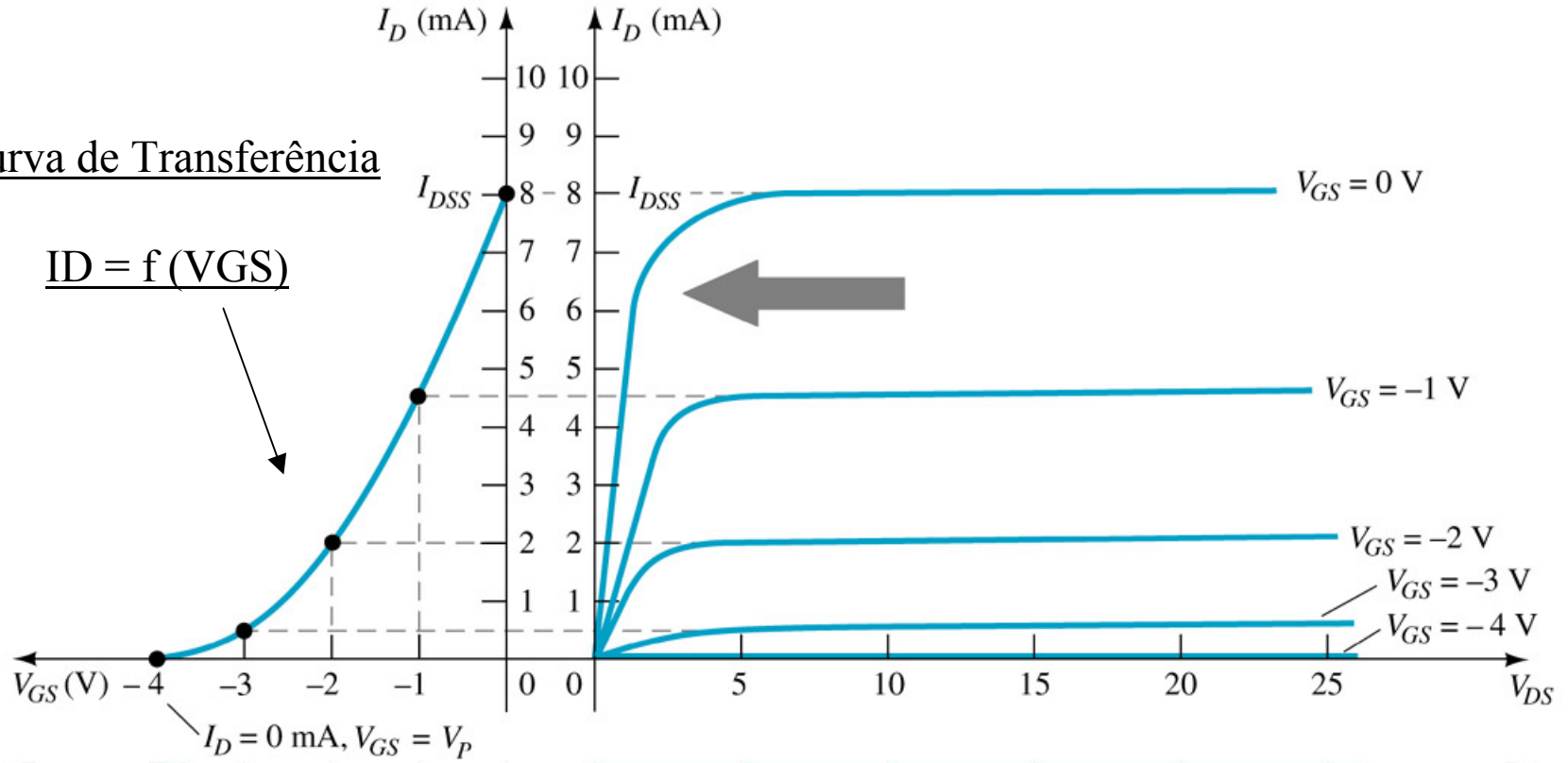
$$I_D = I_{DSS} \left(1 - \frac{V_{GS}}{V_P}\right)^2 \quad [5.3]$$

Equação de Shockley

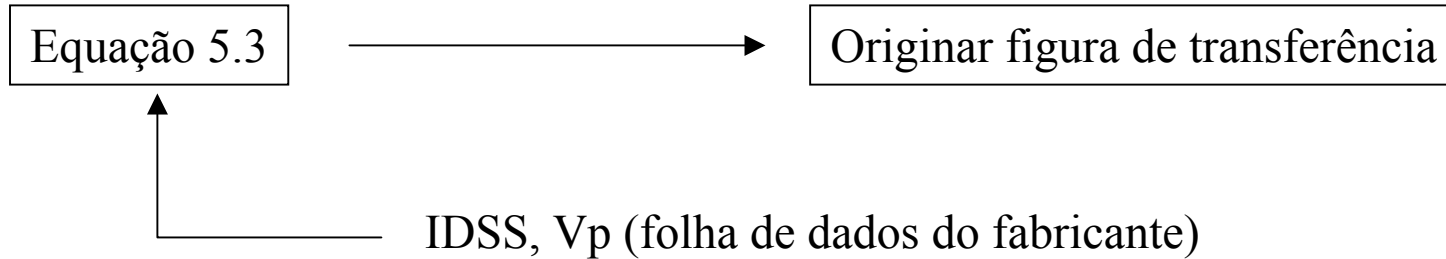
Curva de Transferência

Curva de Transferência

$I_D = f(V_{GS})$



Aplicação da Equação de Shockley



- Para $V_{GS} = 0 \text{ V}$ \longrightarrow $ID = IDSS \left(1 - \frac{0}{V_P}\right)^2$ \longrightarrow $ID = IDSS$
- Para $V_{GS} = V_p \text{ V}$ \longrightarrow $ID = IDSS \left(1 - \frac{V_P}{V_P}\right)^2$ \longrightarrow $ID = 0 \text{ A}$
- Para V_{GS} de 0 a $V_p \text{ V}$ \longrightarrow $ID = IDSS \left(1 - \frac{V_P}{V_P}\right)^2$

$$ID = IDSS \left(1 - \frac{V_P}{V_P}\right)^2 \longrightarrow V_{GS} = V_p \left(1 - \sqrt{\frac{I_D}{I_{DSS}}}\right) \quad [5.6]$$

Método Simplificado

V_{GS}	I_D
0	I_{DSS}
$0,3 V_p$	$I_{DSS}/2$
$0,5 V_p$	$I_{DSS}/4$
V_p	0

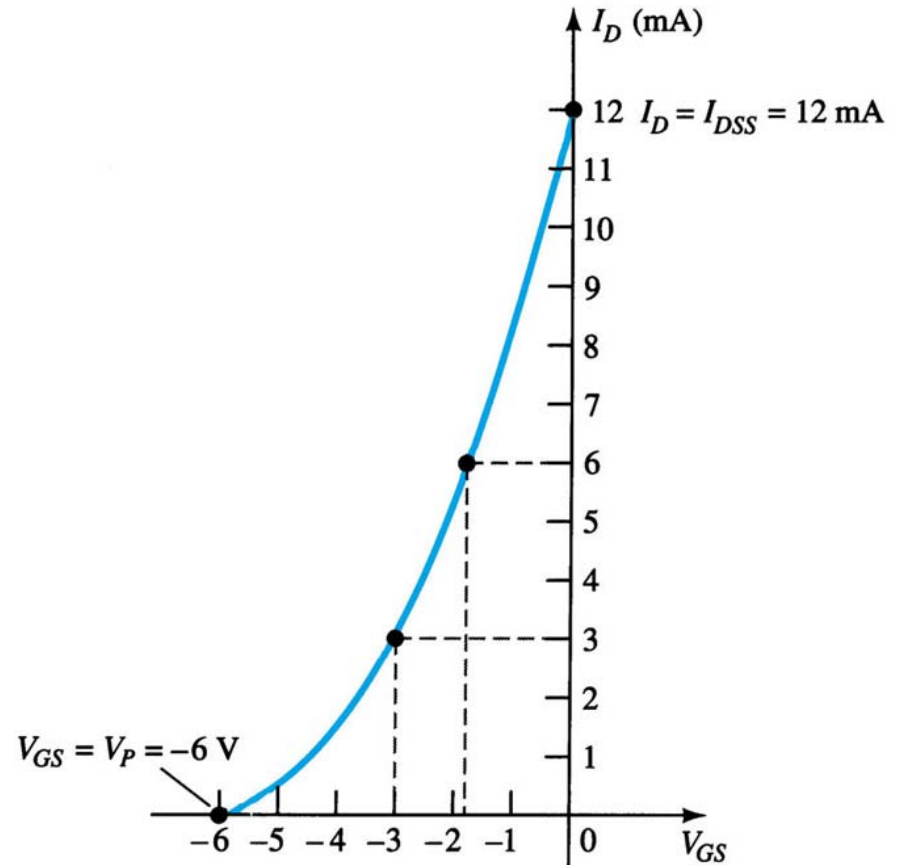
Slide 6

Exemplo 5.1: Esboce a curva de transferência definida por $I_{DSS} = 12 \text{ mA}$ e $V_p = -6 \text{ V}$.

Slide 7

Exemplo 5.1: Solução

V_{GS} (V)	I_D (mA)
0	12,0
-1,8	6,0
-3,0	3,0
-6,0	0



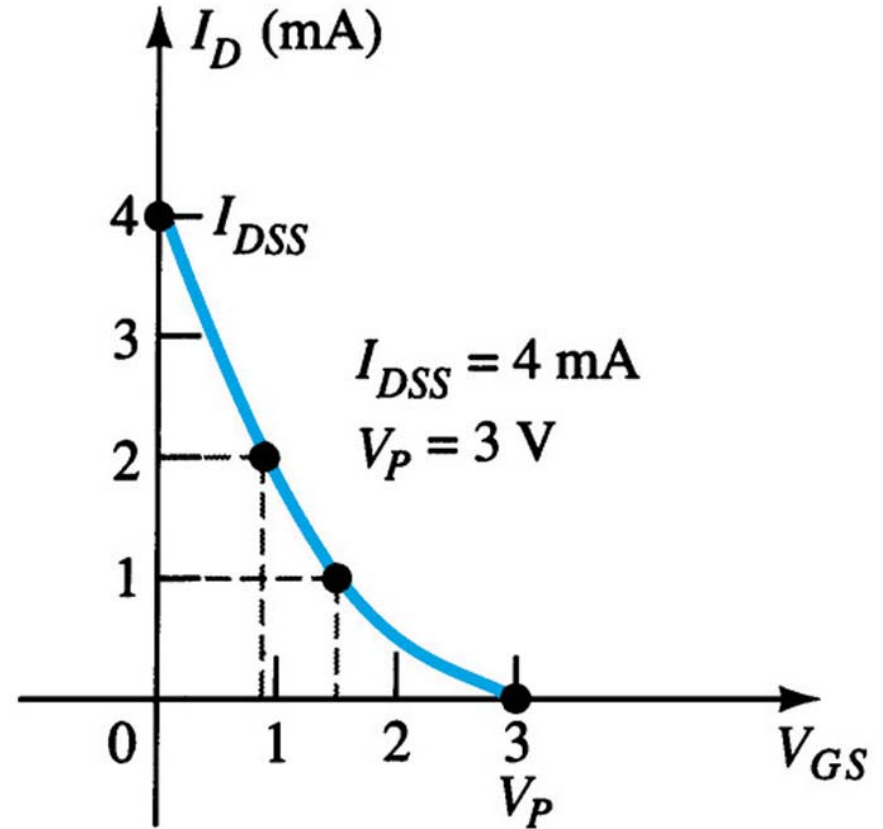
Slide 8

Exemplo 5.2: Esboce a curva de transferência para um dispositivo tipo P, definida por $I_{DSS} = 4 \text{ mA}$ e $V_p = 3 \text{ V}$.

Slide 9

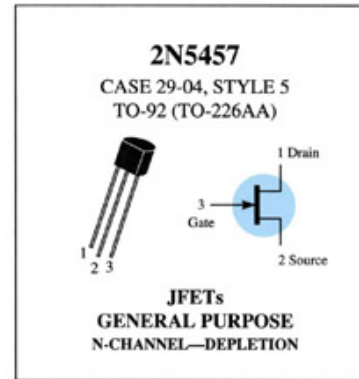
Exemplo 5.2: Solução

V_{GS} (V)	I_D (mA)
0	4,0
0,9	2,0
1,5	1,0
3,0	0



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	25	Vdc
Drain-Gate Voltage	V_{DG}	25	Vdc
Reverse Gate-Source Voltage	V_{GSR}	-25	Vdc
Gate Current	I_G	10	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	310 2.82	mW mW/°C
Junction Temperature Range	T_J	125	°C
Storage Channel Temperature Range	T_{stg}	-65 to +150	°C



Refer to 2N4220 for graphs.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Gate-Source Breakdown Voltage ($I_G = -10 \mu\text{Adc}$, $V_{DS} = 0$)	$V_{BR(GSS)}$	-25	-	-	Vdc
Gate Reverse Current ($V_{GS} = -15 \text{Vdc}$, $V_{DS} = 0$) ($V_{GS} = -15 \text{Vdc}$, $V_{DS} = 0$, $T_A = 100^\circ\text{C}$)	I_{GSS}	-	-	-1.0 -200	nAdc
Gate Source Cutoff Voltage ($V_{DS} = 15 \text{Vdc}$, $I_D = 10 \text{nAdc}$)	$V_{GS(off)}$	-0.5	-	-6.0	Vdc
Gate Source Voltage ($V_{DS} = 15 \text{Vdc}$, $I_D = 100 \mu\text{Adc}$)	V_{GS}	-	-2.5	-	Vdc

ON CHARACTERISTICS

Zero-Gate-Voltage Drain Current* ($V_{DS} = 15 \text{Vdc}$, $V_{GS} = 0$)	I_{DSS}	1.0	3.0	5.0	mAdc
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SMALL-SIGNAL CHARACTERISTICS

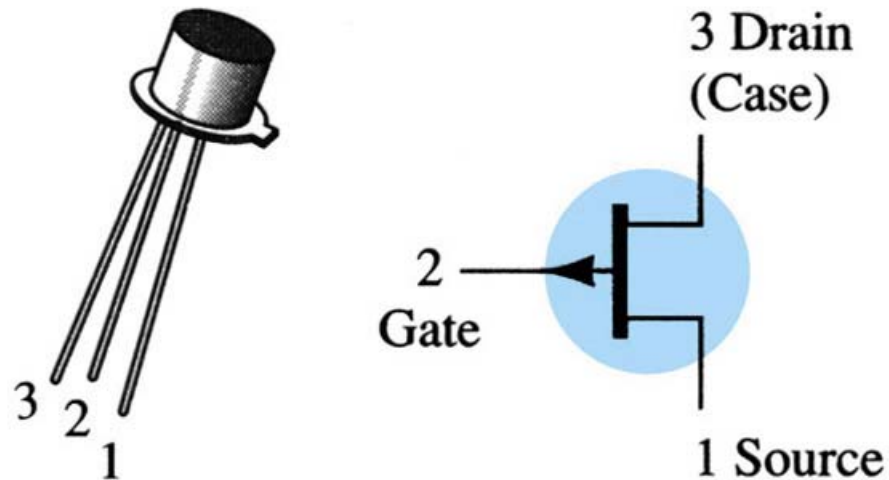
Forward Transfer Admittance Common Source* ($V_{DS} = 15 \text{Vdc}$, $V_{GS} = 0$, $f = 1.0 \text{kHz}$)	$ y_{fs} $	1000	-	5000	μmhos
Output Admittance Common Source* ($V_{DS} = 15 \text{Vdc}$, $V_{GS} = 0$, $f = 1.0 \text{kHz}$)	$ y_{os} $	-	10	50	μmhos
Input Capacitance ($V_{DS} = 15 \text{Vdc}$, $V_{GS} = 0$, $f = 1.0 \text{MHz}$)	C_{iss}	-	4.5	7.0	pF
Reverse Transfer Capacitance ($V_{DS} = 15 \text{Vdc}$, $V_{GS} = 0$, $f = 1.0 \text{MHz}$)	C_{rss}	-	1.5	3.0	pF

*Pulse Test: Pulse Width $\leq 630 \text{ns}$; Duty Cycle $\leq 10\%$

Identificação dos Terminais

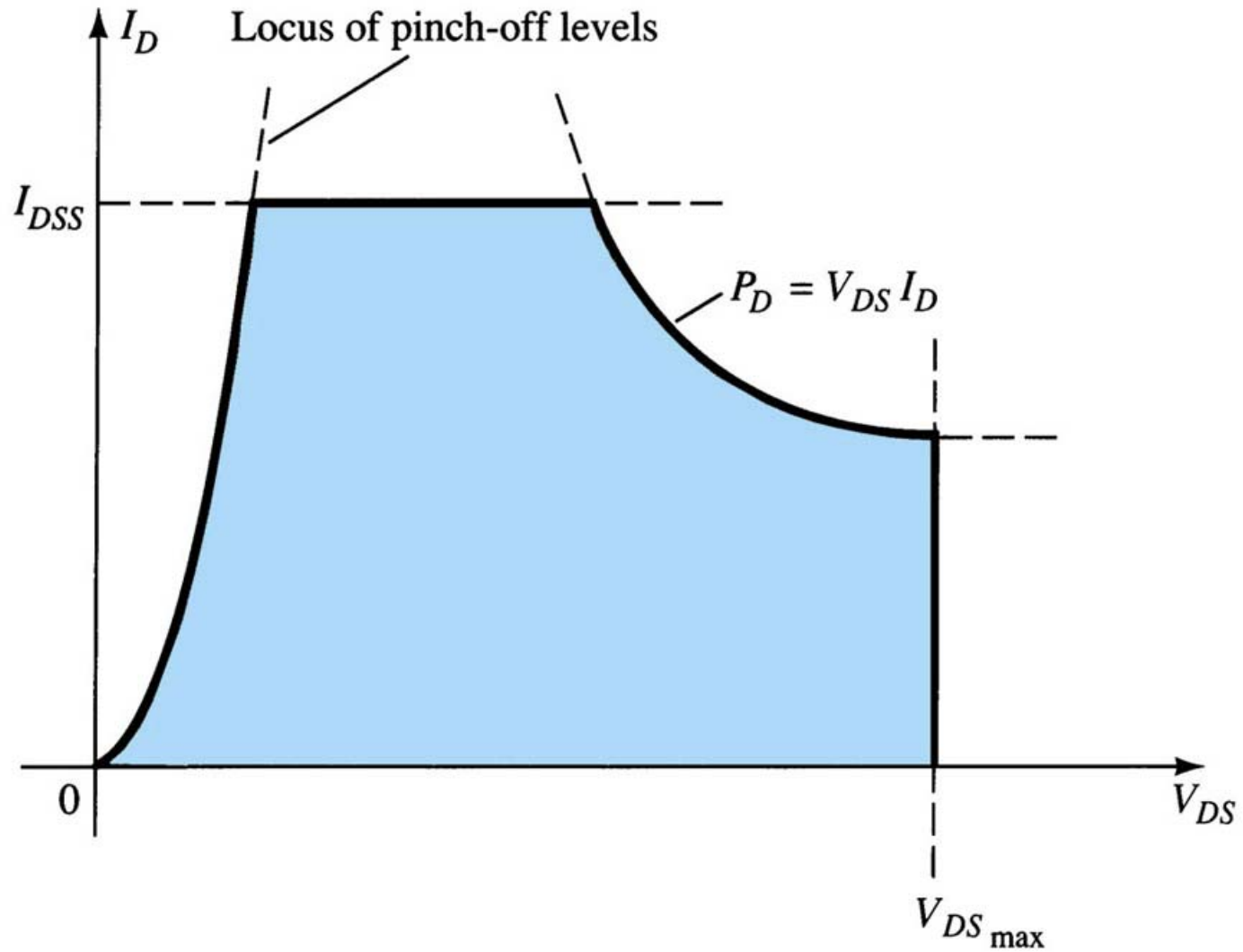
2N2844

CASE 22-03, STYLE 12
TO-18 (TO-206AA)

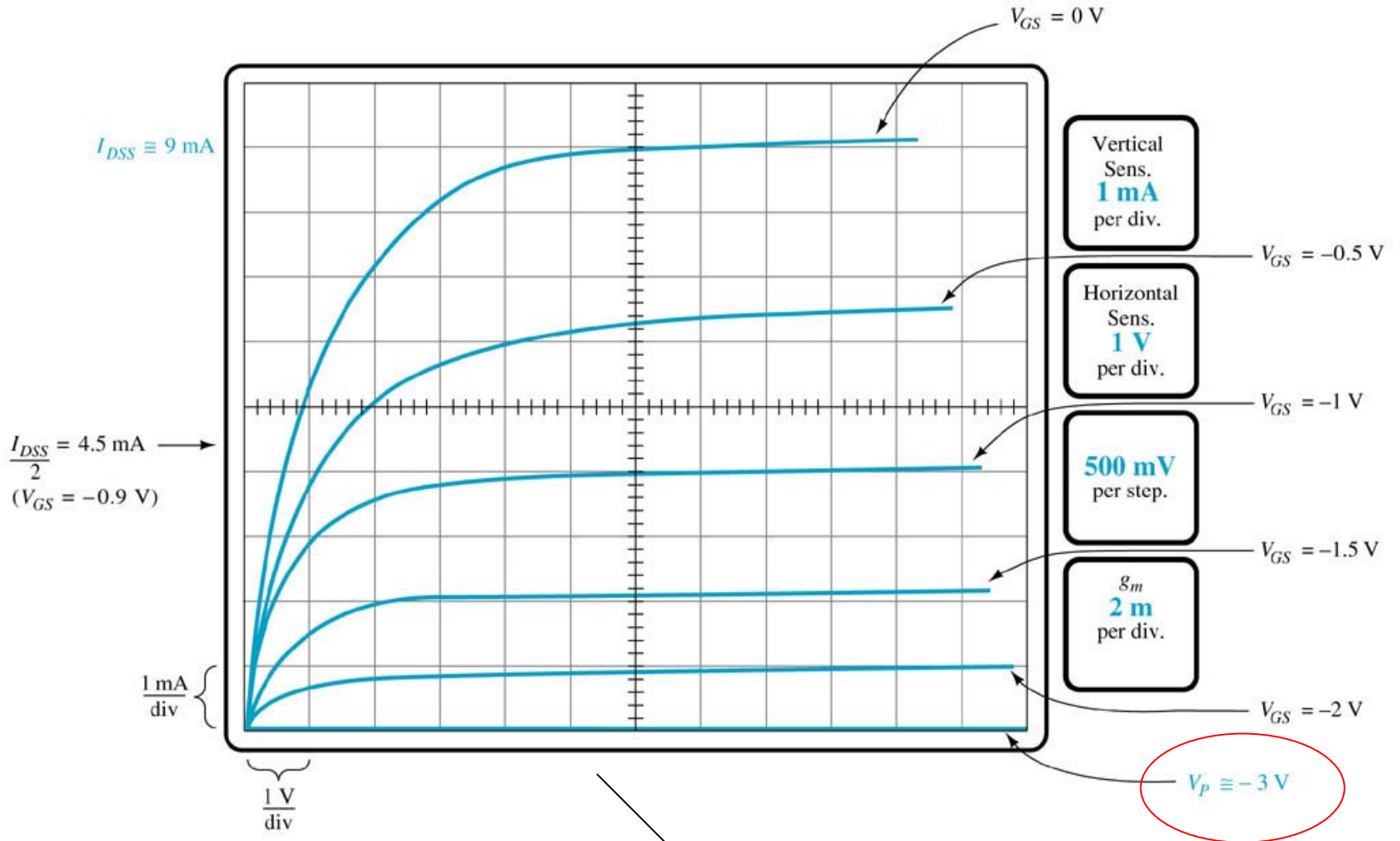


JFETs
GENERAL PURPOSE
P-CHANNEL

Região de Operação

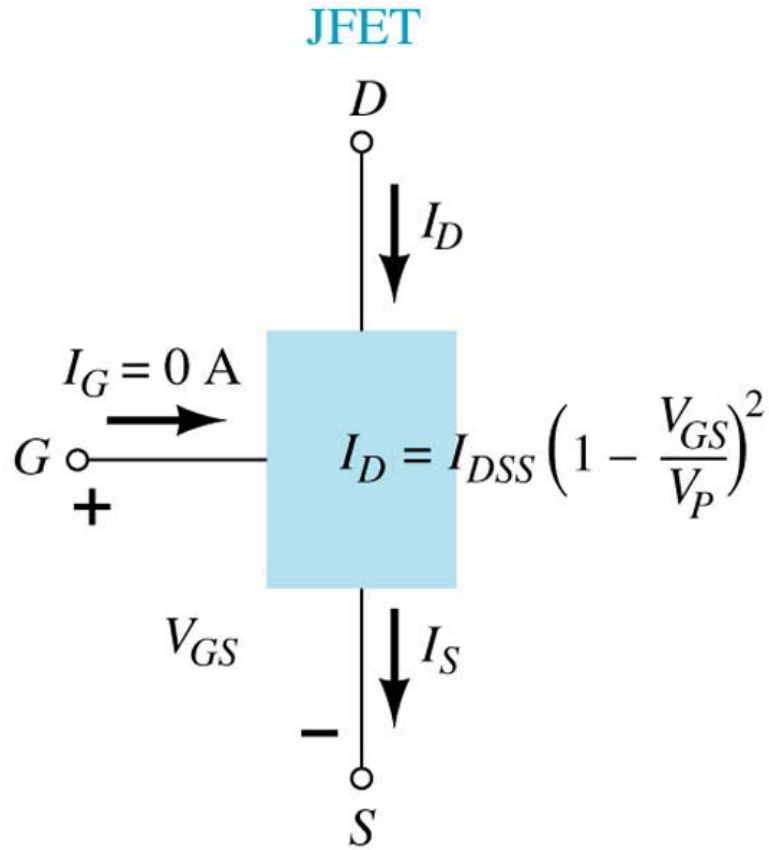


Obtenção de V_p

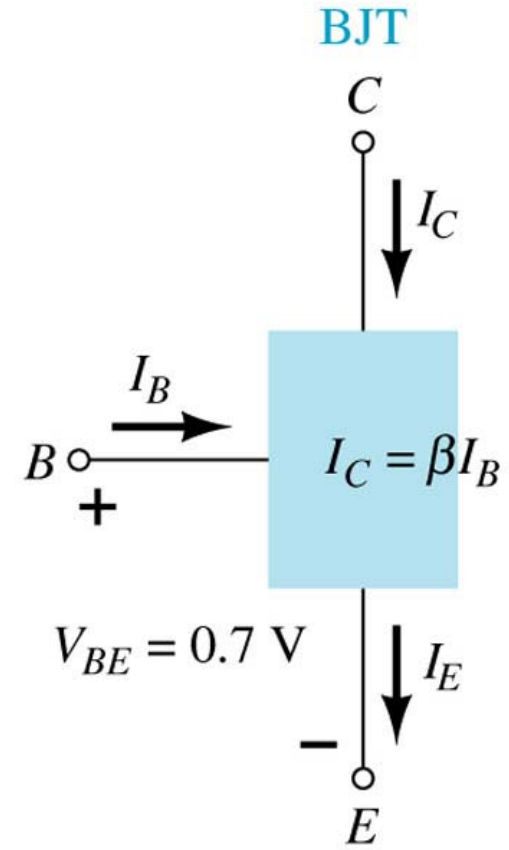


Curvas obtidas através de um Traçador

Relações Importantes



(a)



(b)

Slide 15

Fazer:

- Ex. 10 (pág. 202)
- Ex. 12 (pág. 202)