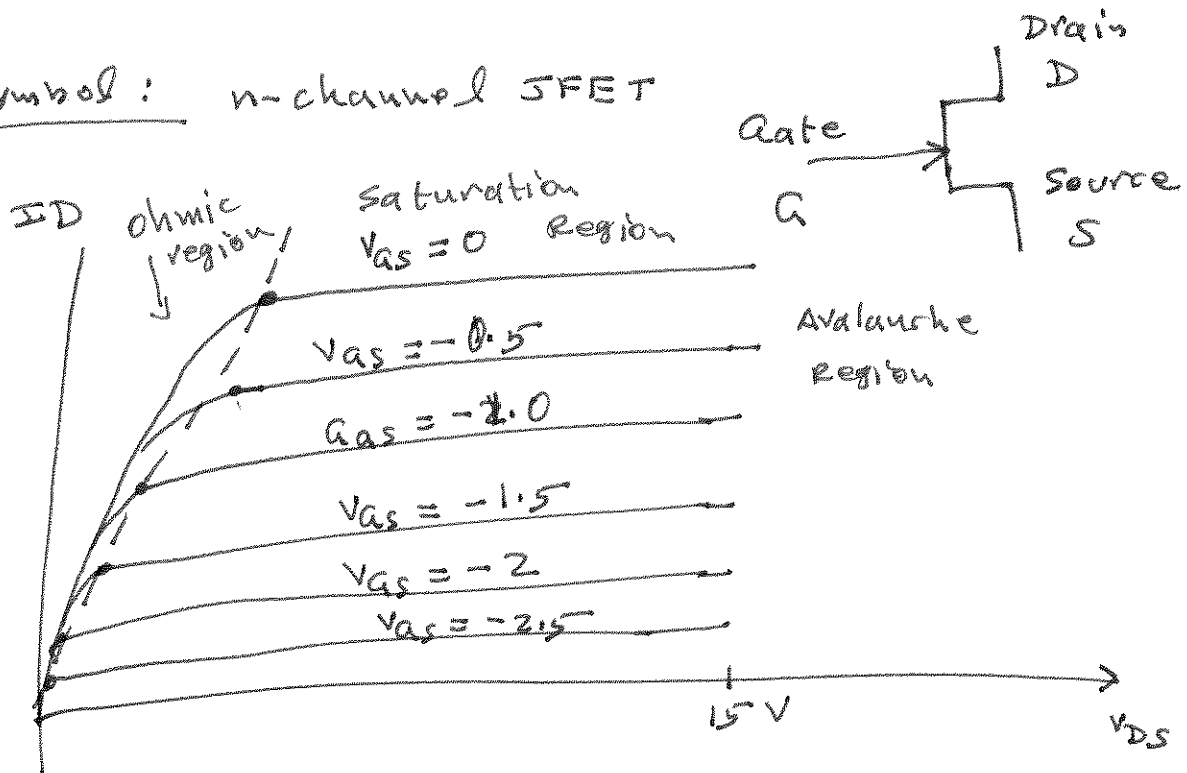


Experiment 8 The Field Effect Transistor

①

Symbol: n-channel JFET



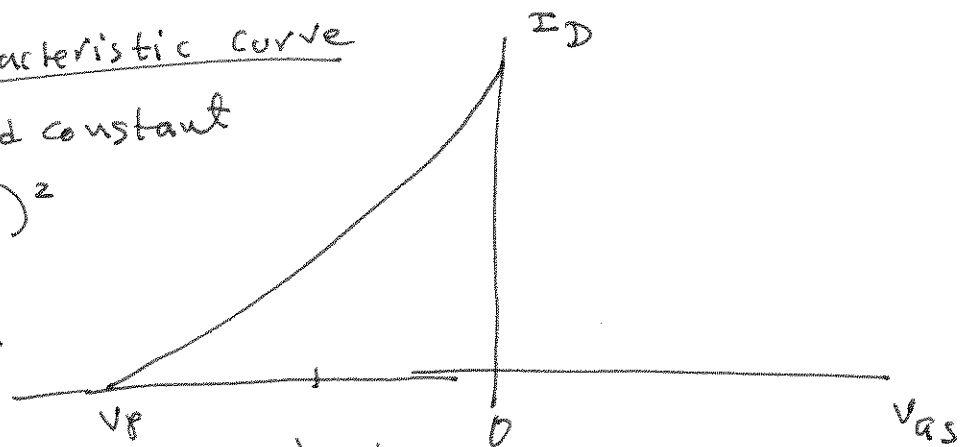
Transfer characteristic curve

when V_{DS} is held constant

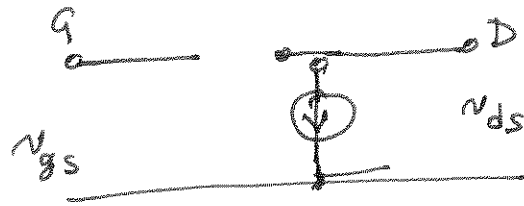
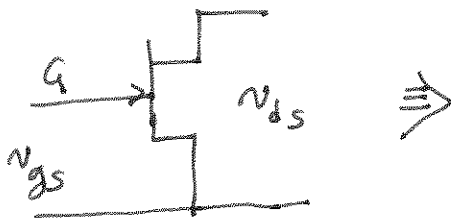
$$I_D = I_{DSS} \left(1 - \frac{V_{GS}}{V_P}\right)^2$$

I_{DSS} : Saturation current for D-S

V_P : pinchoff voltage, a threshold voltage below which the transistor turns off.



JFET Amplifier



- JFET: $i_d = g_m v_{gs}$: voltage-controlled current amplifier
- BJT: $i_c = \beta_{fe} i_b$: current-controlled current amplifier

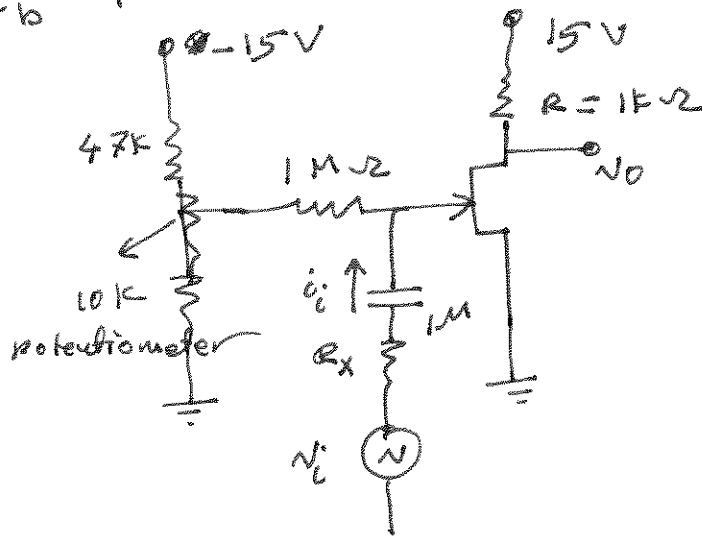
set $V_{DS} = 10V$

$R_s = 0$

$v_i = 2V$ p-p

$A_{ain} = \frac{v_o}{v_i}$

$R_{i'} = \frac{v_i}{i_i}$



Constant current source

Here, $V_{GS} = 0$

$V_{DD} = I_D R_L + V_{GS}$

$I_D R_L = V_{DD} - V_{GS}$

$I_D = \frac{V_{DD} - V_{GS}}{R_L}$

I_D will remain almost constant over a wide range of load resistance.

