

JFET CURRENT SOURCES

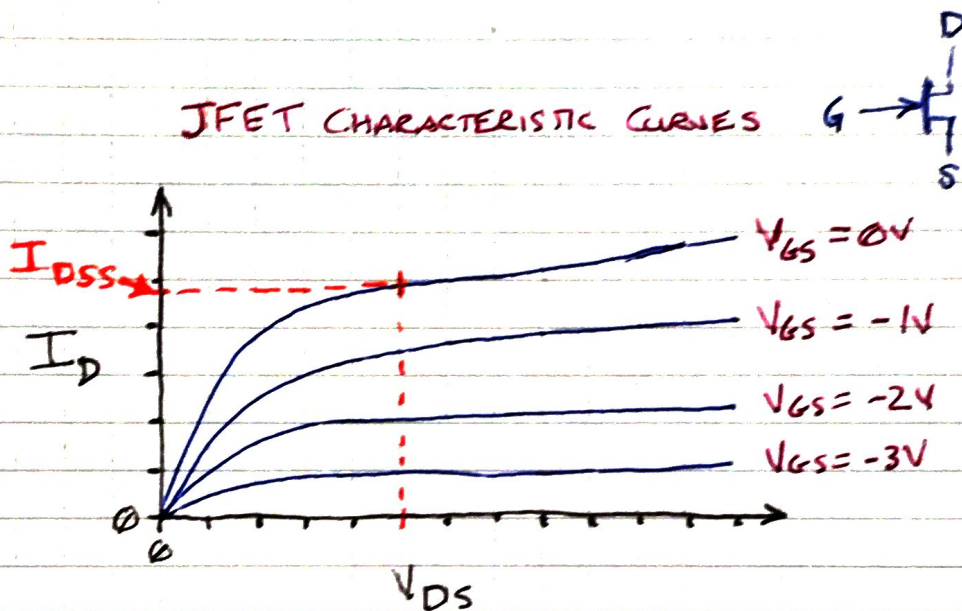
BACKGROUND VIDEOS

#219: BACK TO BASICS: INTRO TO FIELD EFFECT TRANSISTORS

#190: BACK TO BASICS: TRANSISTOR CURRENT SOURCES & MIRRORS

(AND SEE #191 - ADDRESSING A MISTAKE IN ↓)

JFET CHARACTERISTIC CURVES



JFETS MAKE SUPER-SIMPLE CURRENT SOURCES/LIMITERS!

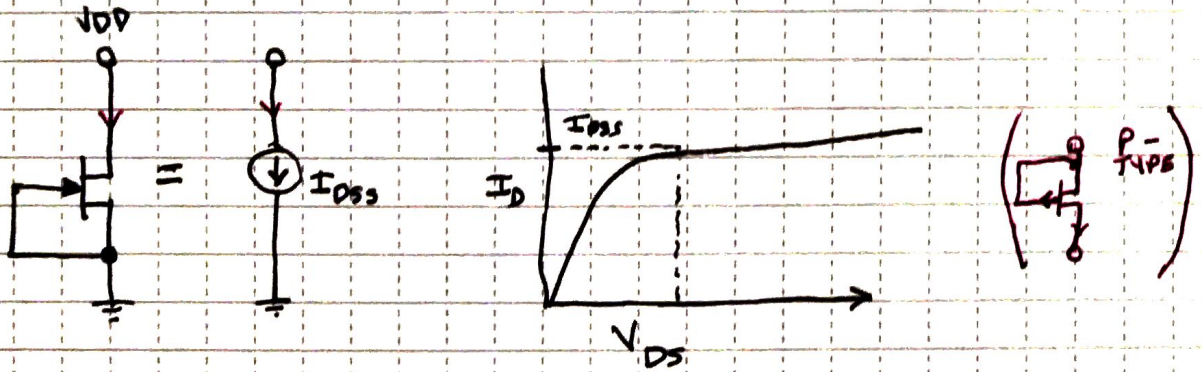
ADVANTAGES

- SIMPLE!
 - 1 OR 2 PARTS
- DECENT OUTPUT IMPEDANCE

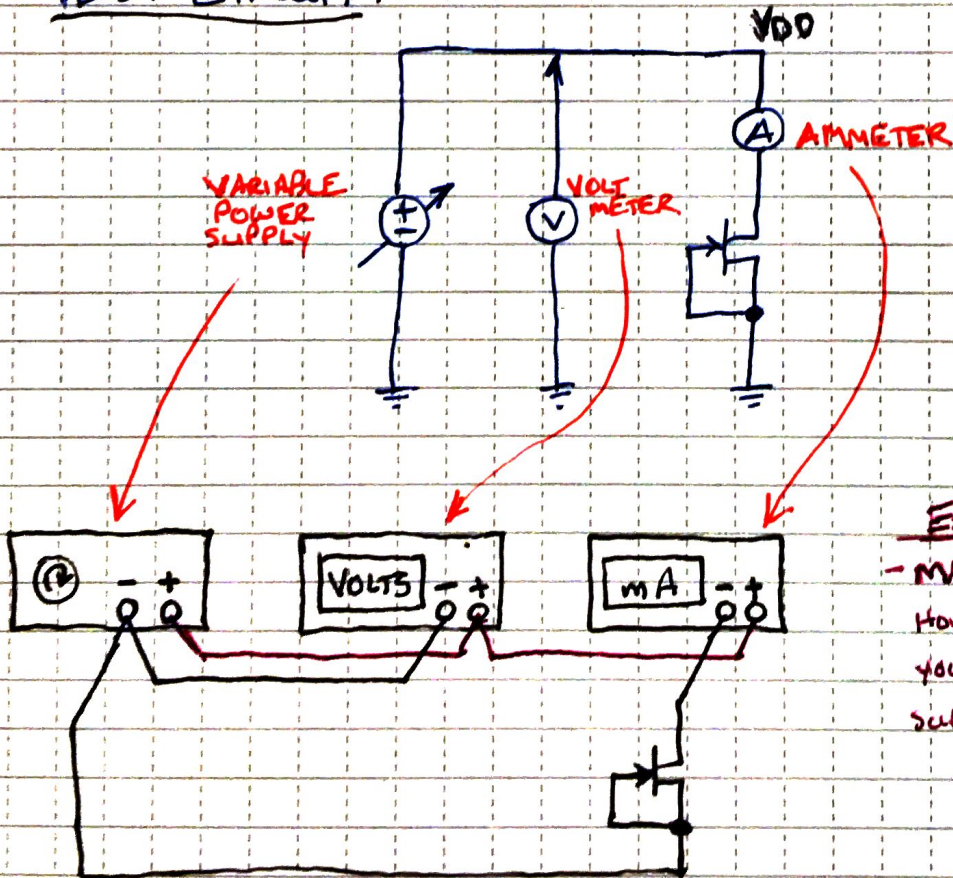
DISADVANTAGES

- PART TO PART VARIATION
- MAX CURRENT LIMITED TO I_{DSS}
- NEEDS V_{DS} TO BE "LARGE" ENOUGH (PAST THE KNEE)

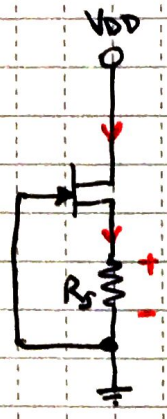
THE SIMPLEST CURRENT SOURCE / LIMITER



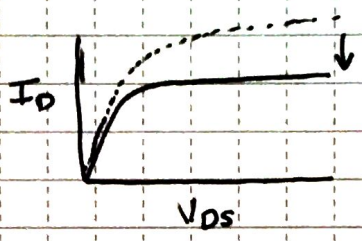
TEST CIRCUIT:



VARIABLE CURRENT SOURCE



- SOURCE RESISTOR REDUCES CURRENT
- NEGATIVE FEEDBACK
- MAKES V_{GS} MORE "NEGATIVE"
- MOVES YOU TO THE "LOWER" CURVES
- ADDS SOME MORE STABILITY

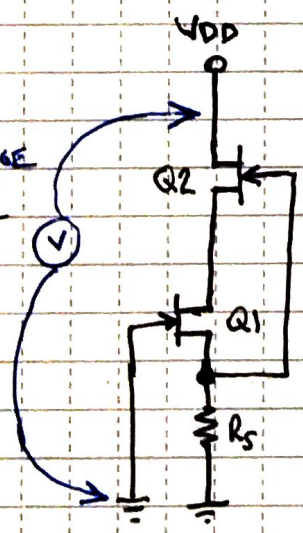


• MAKE R_S VARIABLE FOR A VARIABLE CURRENT SOURCE

MORE STABLE CURRENT SOURCE

• HIGHER OUTPUT IMPEDANCE = LESS VARIATION IN CURRENT WITH VOLTAGE CHANGE

DOWNSIDE
OVERALL VOLTAGE DROP ACROSS THE CURRENT SOURCE IS GREATER



- I_D VARIATION IN PREVIOUS CIRCUITS DUE TO VARIATION IN V_{DS} OF Q1

- Q2 KEEPS V_{DS} OF Q1 EQUAL TO V_{GS} OF Q2 AT THE I_D SET BY Q1 ...
... REGARDLESS OF VARIATION OF V_{DD}

EXERCISE:

- REPEAT MEASUREMENTS OF I_D VS V_{DD}
- NOTICE HOW MUCH LESS VARIATION OF I_D COMPARED TO SINGLE JFET VERSION