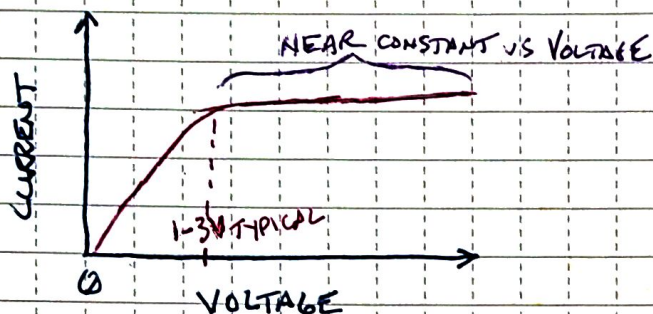


CURRENT REGULATOR DIODES (CONSTANT CURRENT DIODES)

I-V CHARACTERISTIC



- SIMILAR TO ZENER DIODES,
BUT CONSTANT CURRENT INSTEAD
OF CONSTANT VOLTAGE

- THEY ARE ACTUALLY JFETS WITH G'S CONNECTED



- SYMBOL:  CURRENT DIRECTION

SEE MY VIDEOS ON

- JFETS &

- FET CURRENT SOURCES

- AVAILABLE IN CURRENT RANGES FROM
SUB-MA TO A FEW MA

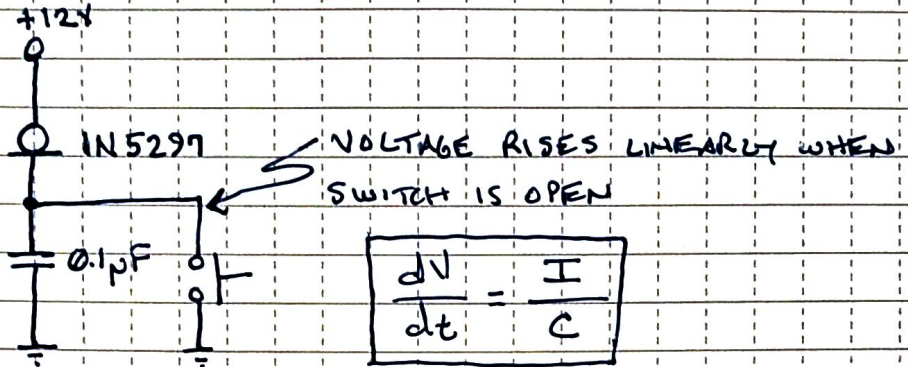
- MANY APPLICATIONS FOR CONSTANT CURRENT SOURCES

- BIAS CIRCUITS
- DEVICE DRIVE (LEDs, LASER DIODES, ETC.)
- TIMING CIRCUITS, PRECISE VOLTAGE RAMPs
- SENSOR DRIVE
- ACTIVE LOADS FOR AMPLIFIERS
- ETC...

SELECTED APPLICATIONS

W2AEW
②

LINEAR VOLTAGE RAMP

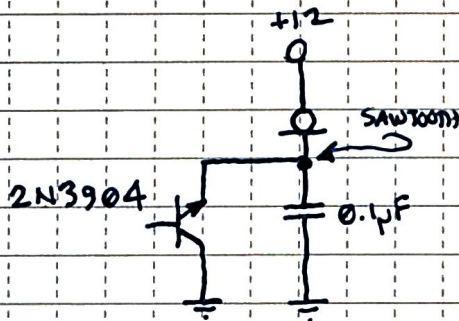


- WITH A KNOWN, CONSTANT CURRENT, YOU CAN MEASURE CAPACITANCE BY MEASURING THE SLOPE OF VOLTAGE VS TIME.

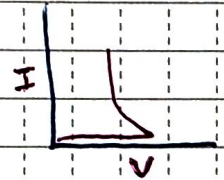
$$C = \frac{I}{V/s}$$

SAWTOOTH RELAXATION OSCILLATOR

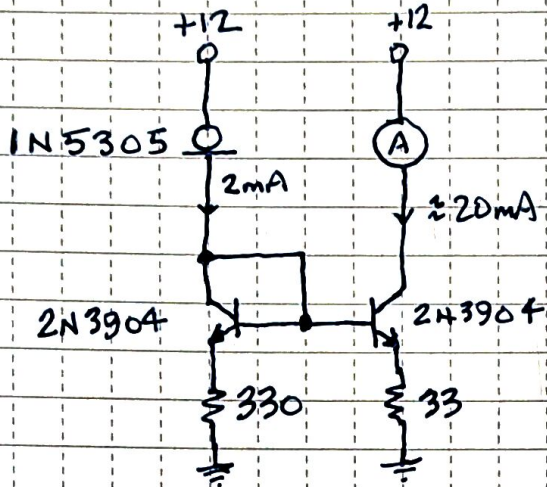
- UNUSUAL USE OF NPN TRANSISTOR (ESAKI) BREAKDOWN



- EMITTER-COLLECTOR BREAKDOWN
"NEGATIVE RESISTANCE"
- LIKE A TUNNEL DIODE



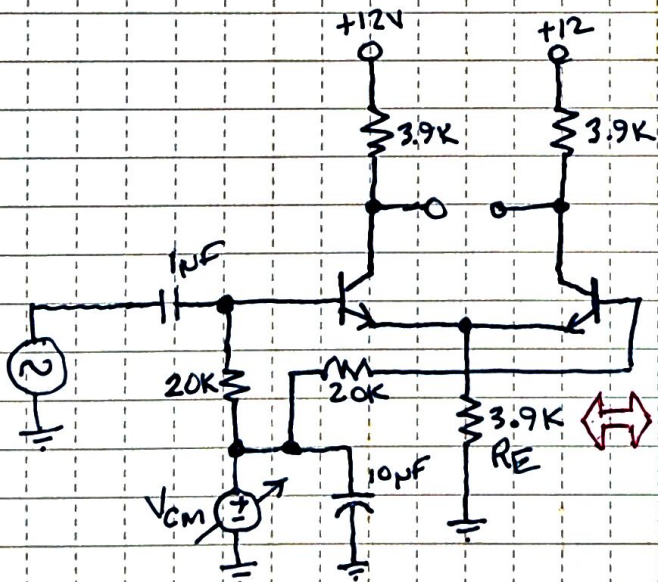
- CURRENT MIRROR / MAGNIFIER



- "MAGNIFY" THE CURRENT BY THE RESISTOR RATIO $\left(\frac{330}{33}\right)$ (APPROXIMATELY)

- DIFFERENTIAL AMPLIFIER TAIL CURRENT SOURCE

- STABILIZE GAIN VS COMMON MODE VOLTAGE



- WITH TAIL CURRENT SET BY RESISTOR R_E , GAIN WILL VARY WITH COMMON MODE VOLTAGE V_{CM}

- REPLACE R_E WITH CURRENT REGULATOR DIODE, NOW GAIN IS RELATIVELY CONSTANT WITH V_{CM} VARIATION.

- SOME MANUFACTURERS OF CURRENT REGULATOR DIODES

- MICROCHIP (MICROSEMI)
- SEMITEC
- CENTRAL SEMICONDUCTOR
- LINEAR INTEGRATED SYSTEMS
- DIOTEK SEMICONDUCTOR
- INTERFET

- AVAILABLE THRU DISTRIBUTORS LIKE DigiKEY & Mouser