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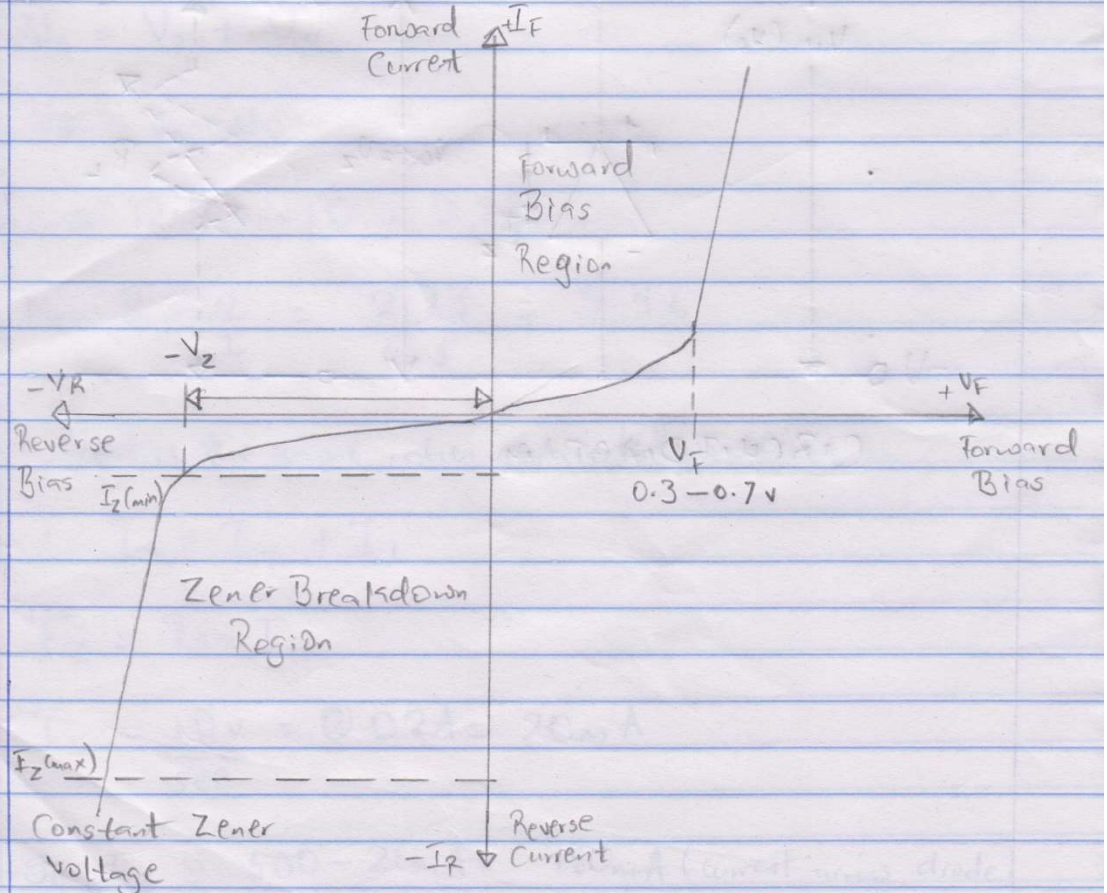
18/ENG02/031
COMPUTER ENGINEERING
ENG 222 ASSIGNMENT
BASIC ELECTRICAL ENGINEERING

1. Zener diode

The zener diode (Breakdown Diode) are basically the same as a standard PN junction diode but specially designed to have a low pre-determined Reverse Breakdown voltage that takes advantage of this high reverse voltage. It is also a simple type of voltage regulator which ~~also conducts~~ is like a general-purpose signal diode consisting of a silicon PN junction.



ZENER DIODE I-V CHARACTERISTICS

2 Given the parameters

$P_z = 5W$

$I_z = 500mA$

$V_{max} = 20volts$

V_{max} to V_{dc}

$$V_{dc} = \frac{2V_{max}}{\pi} = \frac{2 \times 20}{\pi} = 12.73V_{dc}$$

Since $P = IV$

$$V_z = \frac{P}{I} = \frac{5}{500 \times 10^{-3}} = 10V$$

$V_S = V_z + V_R$

$V_R = V_S - V_z$

$= 12.73 - 10 = 2.73v$

Now $R = \frac{V}{I} = \frac{2.73}{0.5} = 5.46$

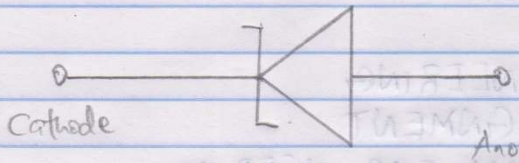
Current is the same when connected in series

$\therefore I_S = I_z + I_L$

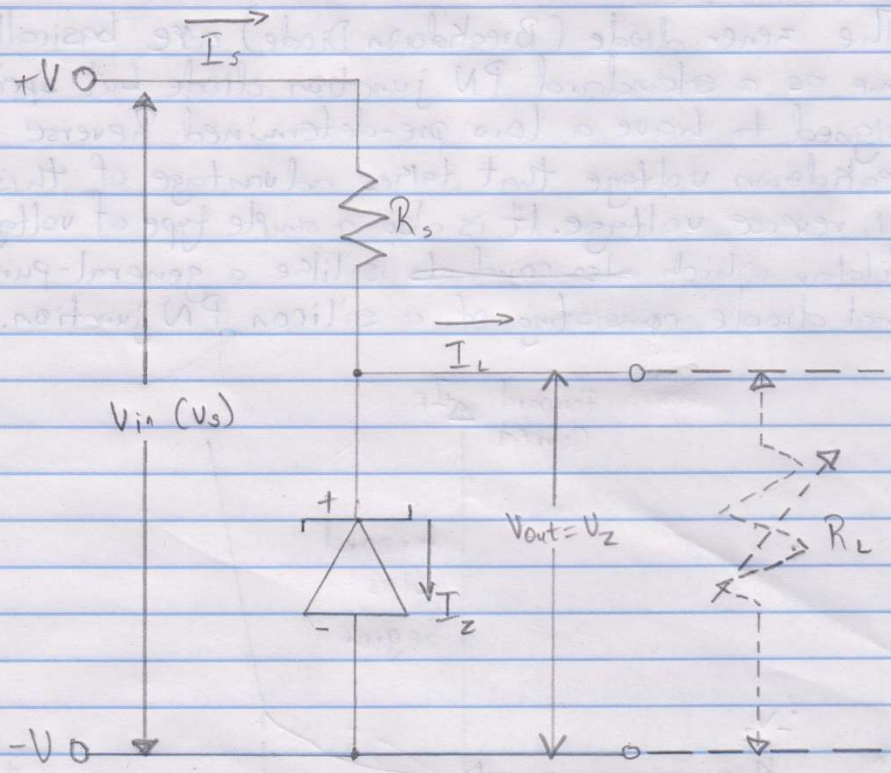
$I_z = I_S - I_L$

$I_L = \frac{10v}{500} = 0.02A = 20mA$

So $I_z = 500 - 20mA = 480mA$ (current across diode)



SYMBOL FOR ZENER DIODE



CIRCUIT DIAGRAM