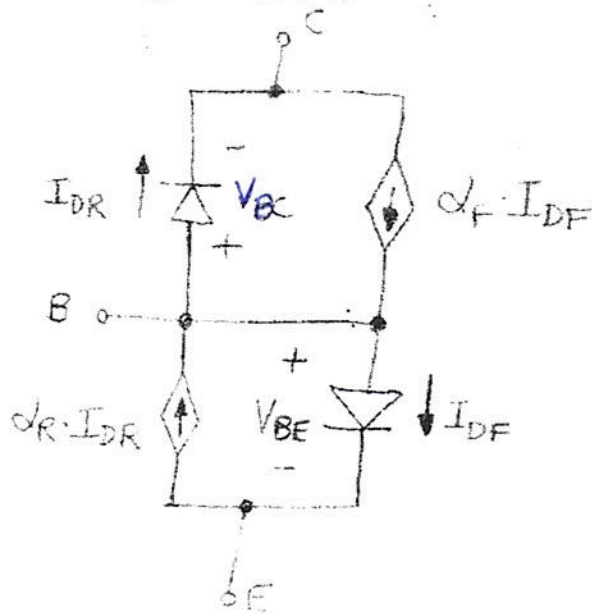
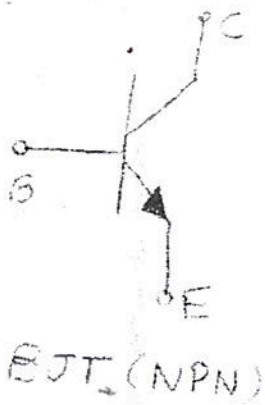


MODELO EBBERS-MOLL (SEDRA)



$$I_{DF} = I_{SF} \left[ \exp\left(\frac{V_{BE}}{V_T}\right) - 1 \right]$$

$$I_{SF} \alpha_F = I_S$$

$$I_{SR} \alpha_R = I_S$$

$$I_{DR} = I_{SR} \left[ \exp\left(\frac{V_{BC}}{V_T}\right) - 1 \right]$$

Fig. 2