

for differential BJT amp.

find the differential i/p

which allows conduction of current

$$I_{E1} = 0.8 I$$

Solution

$$I_{E1} = \frac{I}{1 + e^{-v_{id}/V_T}} = 0.8 I$$

$$V_T: V_{\text{thermal}} = \frac{kT}{q} \approx 25 \text{ mV}$$

$$1.25 = 1 + e^{-v_{id}/V_T}$$

$$0.25 = e^{-v_{id}/V_T}$$

$$V_T \ln(0.25) = -v_{id}$$

$$\boxed{v_{id} = 0.03416 \text{ V}}$$

Rules

$$I_{E1} + I_{E2} = I_{EE}$$
$$I_{E1} = \frac{I}{1 + e^{-v_{id}/V_T}}$$
$$I_{E2} = \frac{I}{1 + e^{v_{id}/V_T}}$$