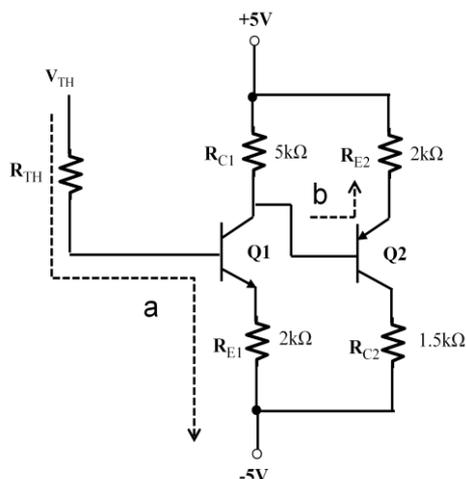
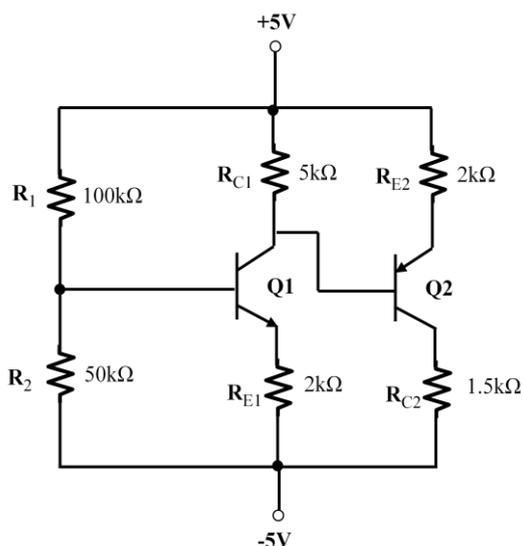


Chapter 5

雙極接面電晶體

5.5 多級電路

5.5 多極電路



1. 假設 Q1 Q2 工作在 FAR
2. 計算

由 LOOP A :

$$V_{TH} - I_{B1}R_{TH} - V_{BE1(ON)} - I_{E1}R_{E1} = -5$$

$$I_{B1} = \frac{V_{TH} - V_{BE1(ON)} + 5}{R_{TH} + (1 + \beta_1)R_{E1}}$$

$$I_{E1} = (1 + \beta_1)I_{B1}$$

$$I_{C1} = \beta_1 I_{B1}$$

由 LOOP B :

$$V_{C1} + V_{EB2(ON)} + I_{E2}R_{E2} = 5$$

$$I_{E2} = \frac{5 - V_{EB2(ON)} - V_{C1}}{R_{E2}}$$

$$I_{B2} = \frac{5 - V_{EB2(ON)} - V_{C1}}{(1 + \beta_2)R_{E2}} \quad \text{①}$$

$$I_{RC1} = \frac{5 - V_{C1}}{R_{C1}} \quad \text{②}$$

$$I_{C1} = I_{RC1} + I_{B2}$$

將①②代入上式可得 V_{C1}

$$I_{C2} = \left(\frac{\beta_2}{1 + \beta_2} \right) I_{E2}$$

$$V_{E1} - I_{E1}R_{E1} = -5$$

$$V_{E1} = I_{E1}R_{E1} - 5$$

$$V_{E2} = V_{C1} + V_{EB2(ON)}$$

$$V_{C2} = I_{C2}R_{C2} - 5$$

3. 驗證

$$I_{B1} > 0$$

$$I_{B2} > 0$$

$$V_{CE1} = V_{C1} - V_{E1} > V_{CE1(SAT)}$$

$$V_{EC2} = V_{E2} - V_{C2} > V_{EC2(SAT)}$$