EMITTER-COUPLED LOGIC

INEL4207 - Digital Electronics

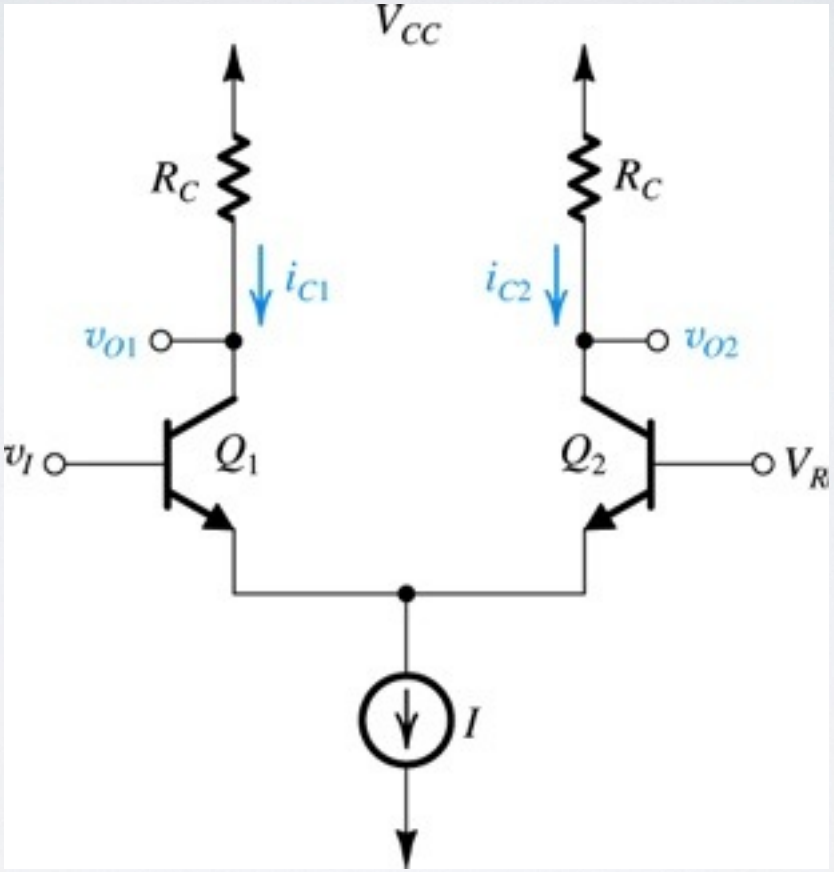
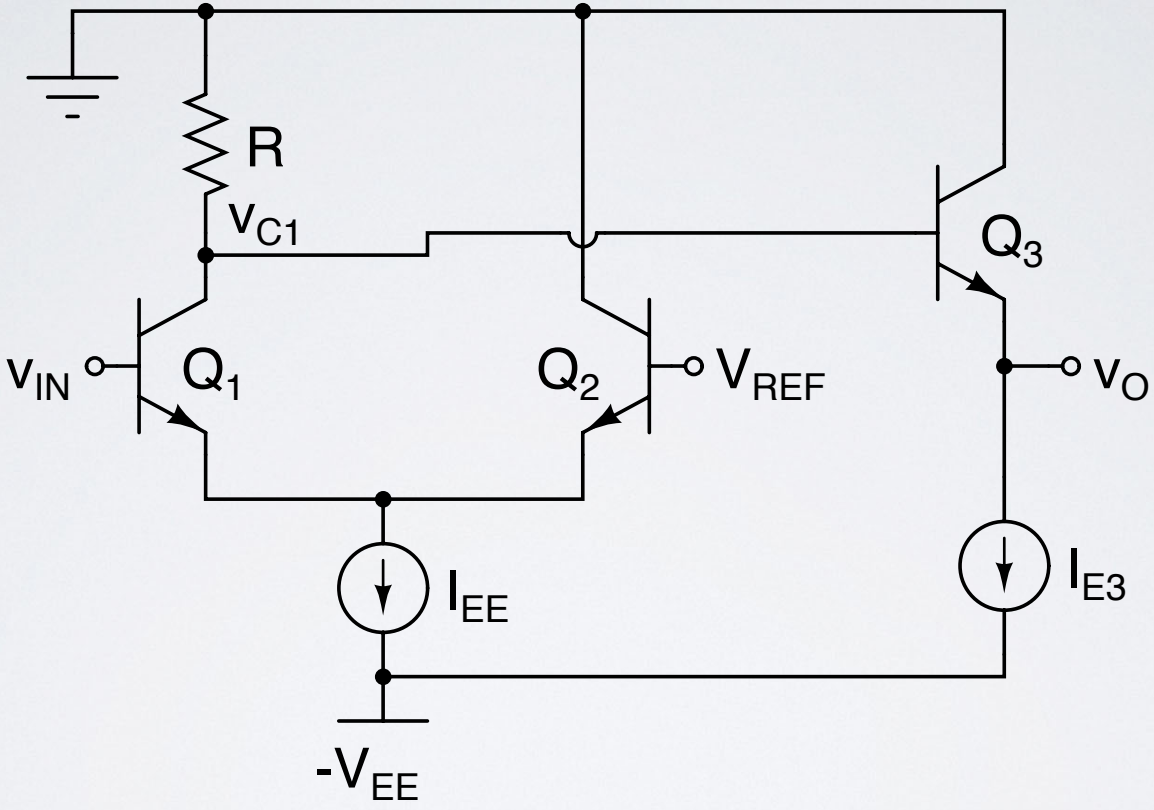


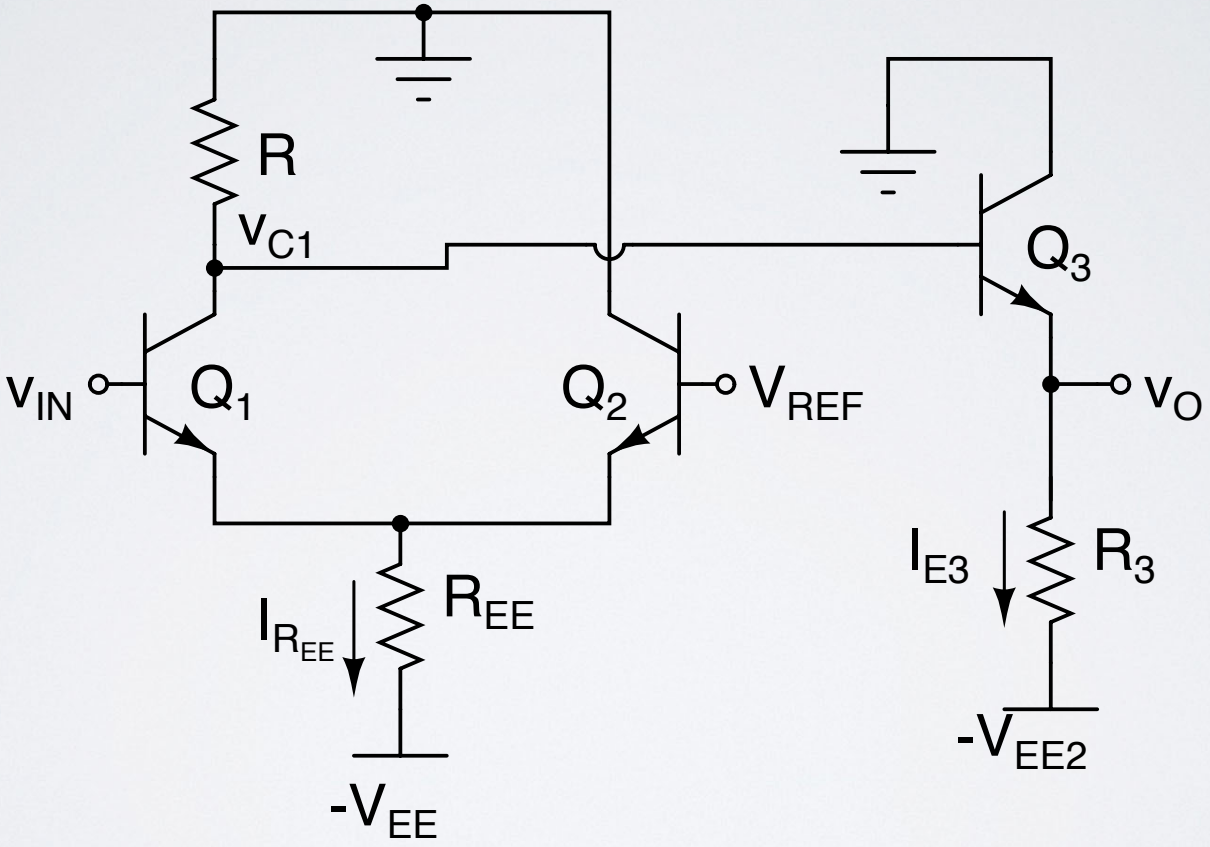
Figure 14.25 The basic element of ECL is the differential pair. Here, V_R is a reference voltage.

SIMPLIFIED ECL INVERTER

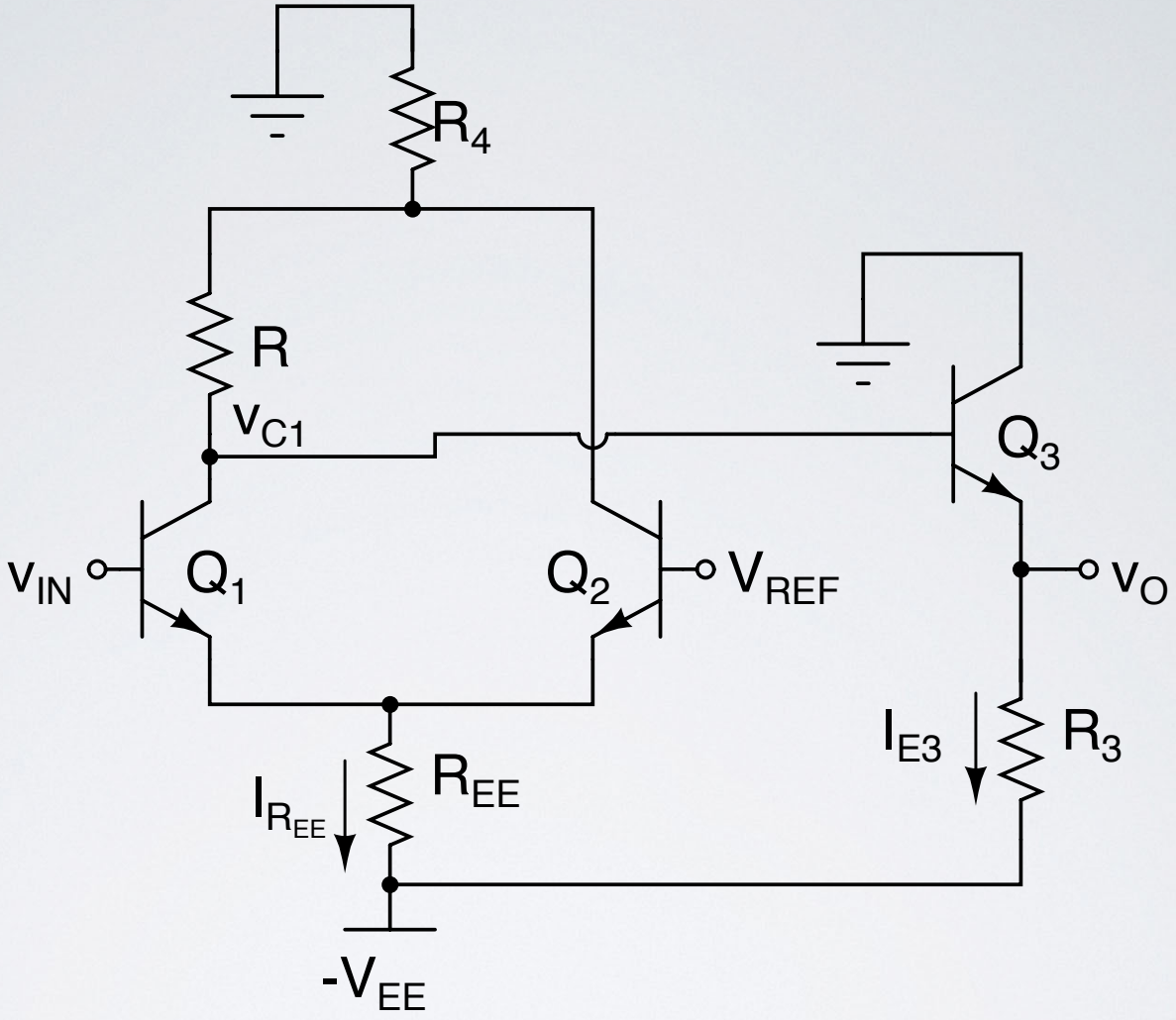


Example: Select R so that $V_L = -1.5V$. Use $I_{EE} = 0.1mA$.

ECL WITH RESISTOR BIASING



Example: Find R and R_3 if $V_{EE} = V_{EE2} = -5.2V$, $V_L = -1.3V$, $I_{EE} = 300\mu A$ and $I_{EE2} = 100\mu A$.



Example: Use the above circuit design an ECL gate for which $V_H = -1.7V$ and $V_L = -2.3V$. The average power dissipation should be less that 2mW. The supply voltage is $-5.2V$. Neglect the base currents.

Find V_R if $v_{D1} = v_{D2} = v_{BE}$ = 0.75V. Neglect i_B.

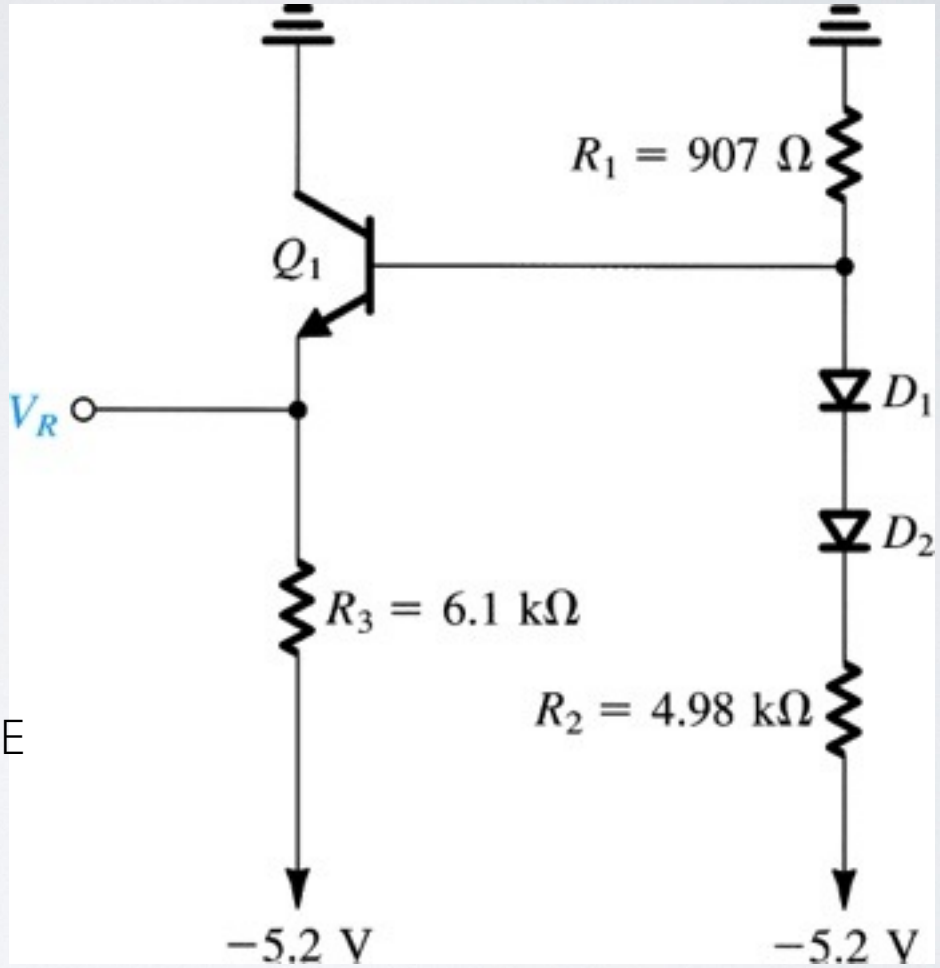


Figure E14.12

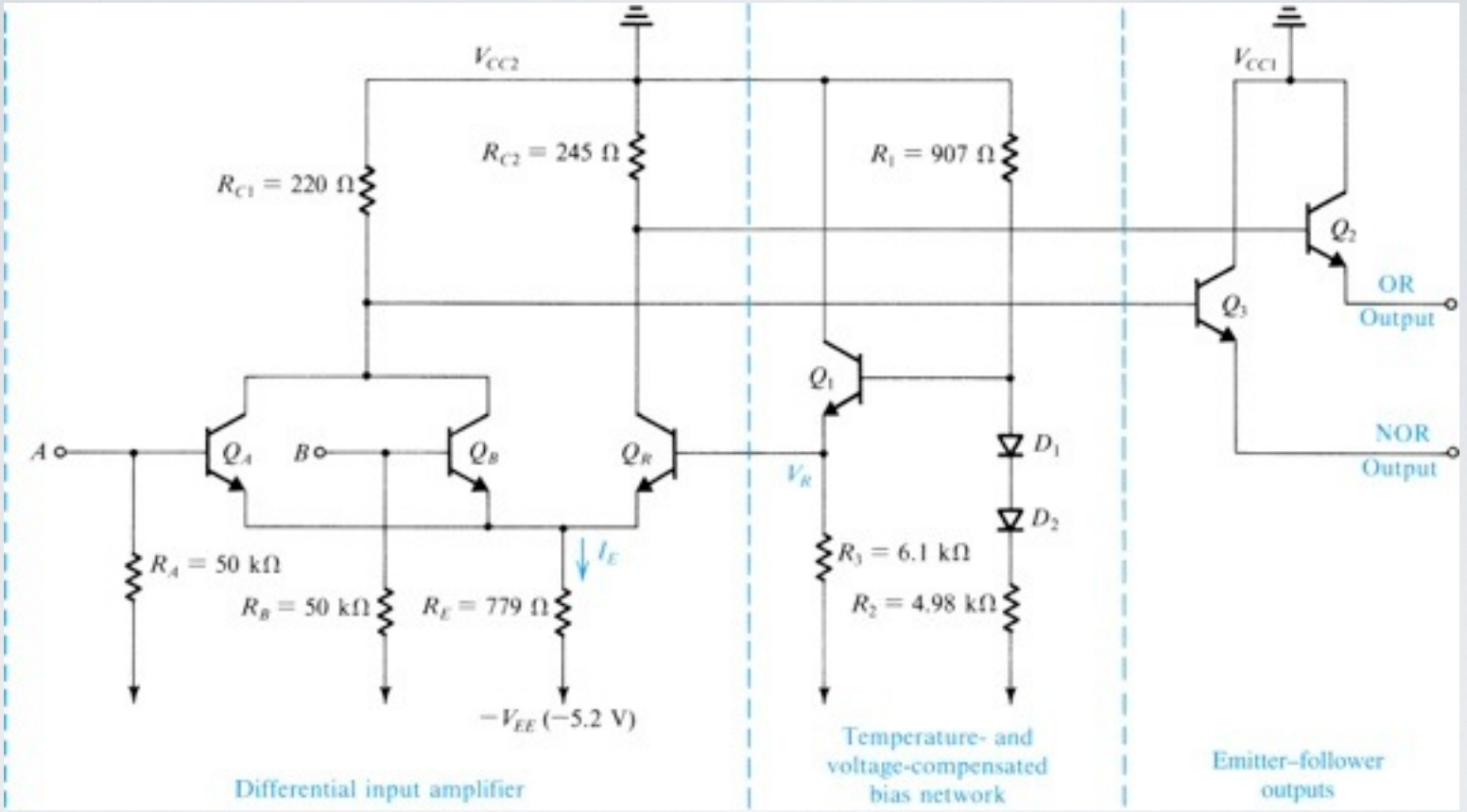


Figure 14.26 Basic circuit of the ECL 10K logic-gate family.

$t_p \approx$ 1ns, the time it takes light to travel 1 foot.

Exercise 14.13

For previous circuit, find I_E through R_E if A and B are left open. Also find $v_{C,QR}$ and $v_{CA,B}$. Use V_R = -1.32V, V_{BE}=0.75V and a very large β.

For previous circuit, find I_E through R_E if A and B are left open. Also find $v_{C,QR}$ and $v_{CA,B}$. Use V_R = -1.32V, V_{BE}=0.75V and a very large β.

Ans. 4 mA; –1 V; 0 V