



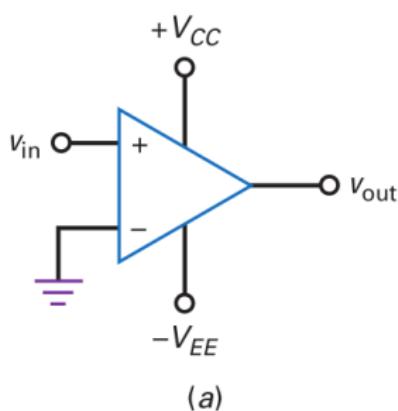
# Electronic Circuit II

Comparator

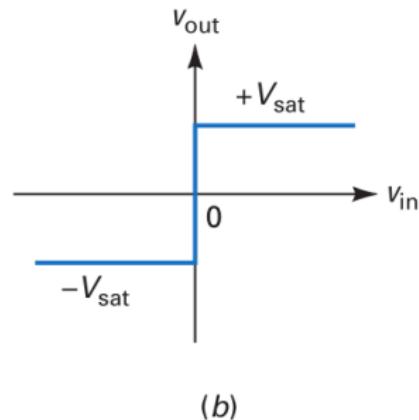
Mifta Nur Farid

# Comparators with Zero Reference

**Figure 20-1** (a) Comparator; (b) input/output response; (c) 741C response.



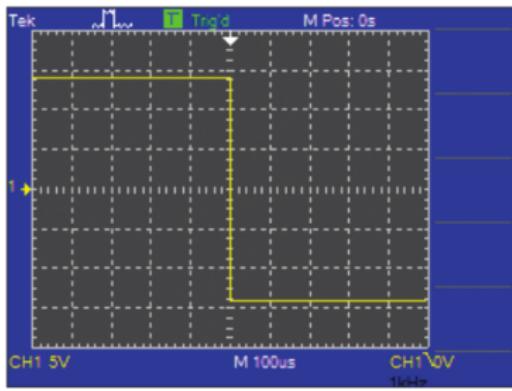
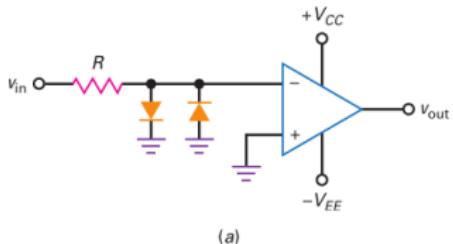
(a)



(b)

# Comparators with Zero Reference

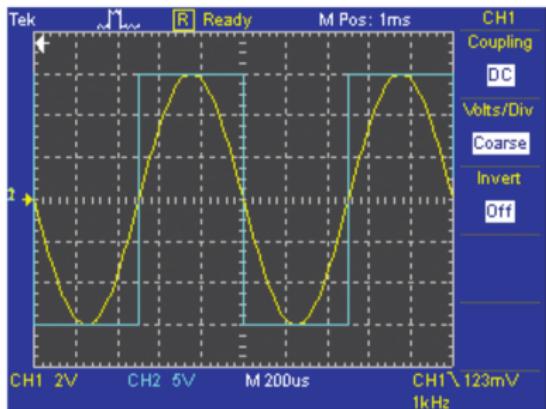
**Figure 20-2** (a) Inverting comparator with clamping diodes; (b) input/output response.



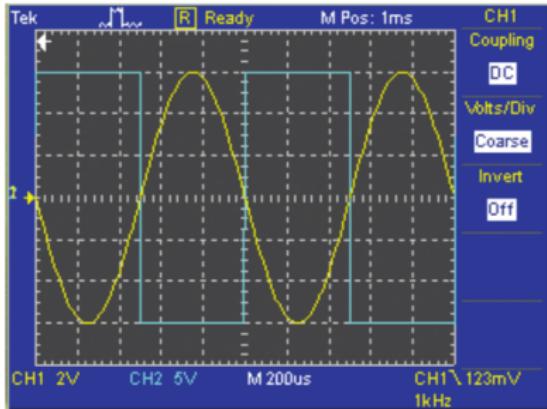
(b)

# Comparators with Zero Reference

**Figure 20-3** Comparator converts sine waves to square waves: (a) Noninverting; (b) inverting.



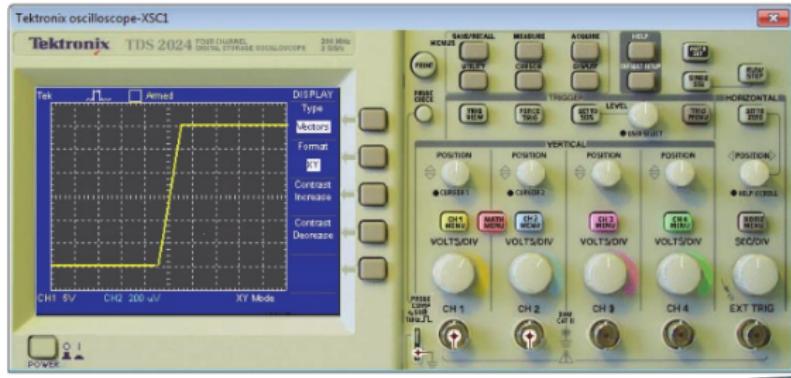
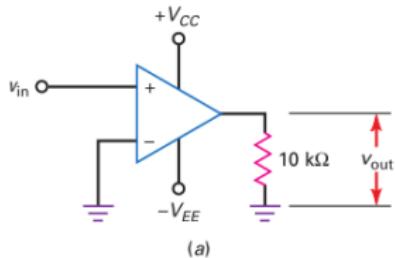
(a)



(b)

# Comparators with Zero Reference

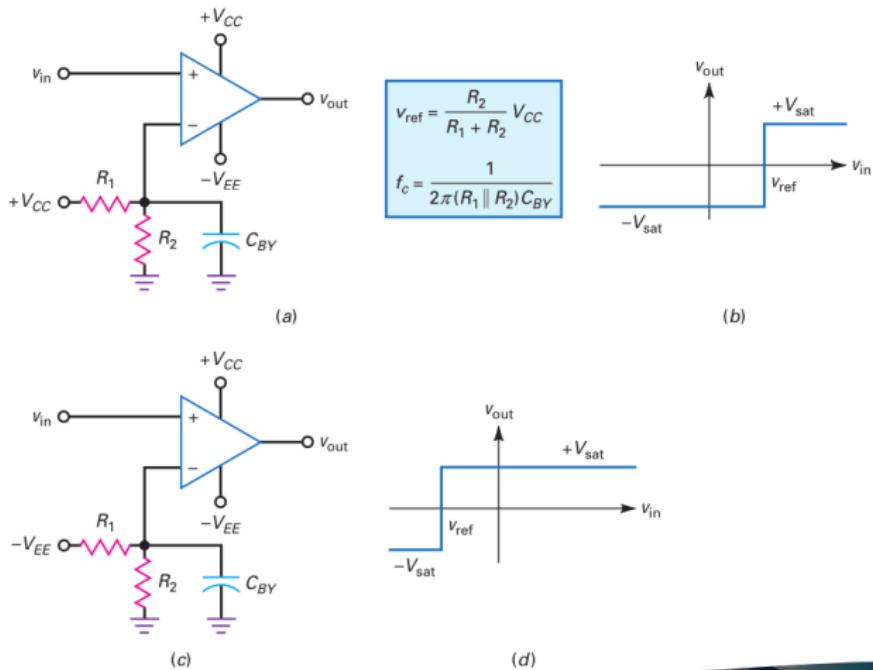
**Figure 20-4** Narrow linear region of typical comparator.



(b)

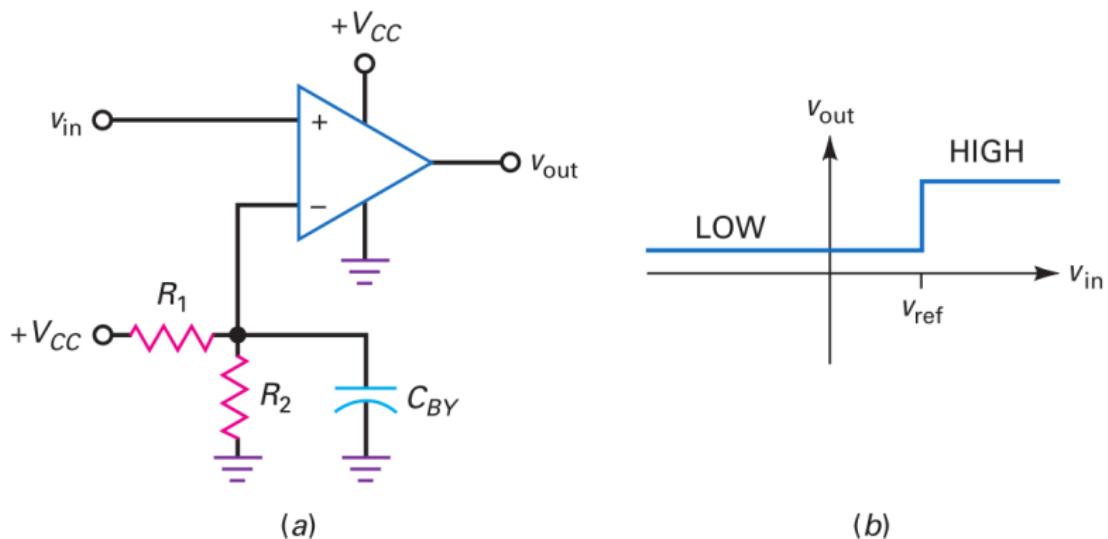
# Comparators with Nonzero Reference

**Figure 20-11** (a) Positive threshold; (b) positive input/output response; (c) negative threshold; (d) negative input/output response.



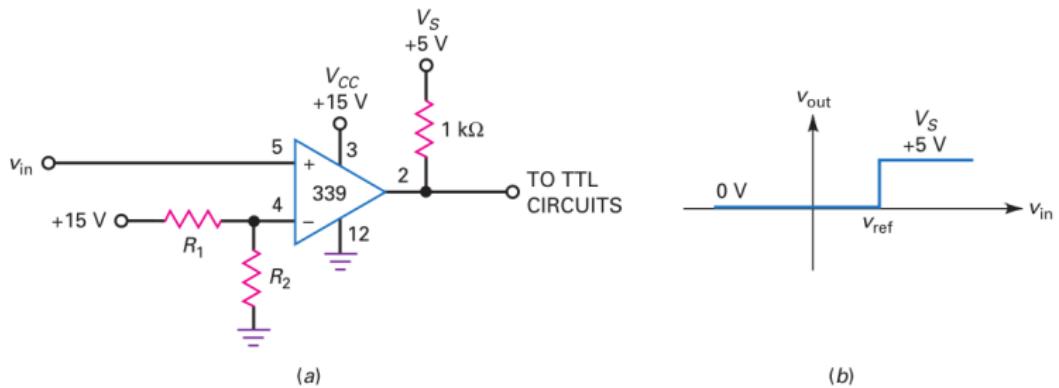
# Comparators with Nonzero Reference

**Figure 20-12** (a) Single-supply comparator; (b) input/output response.



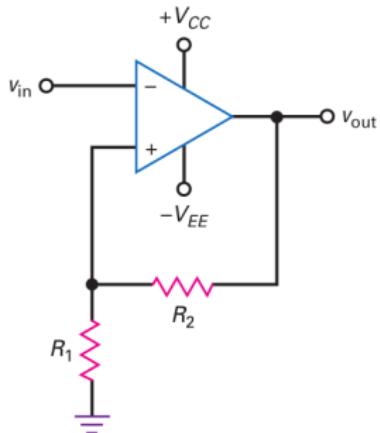
# Comparators with Nonzero Reference

**Figure 20-14** (a) LM339 comparator; (b) input/output response.



# Comparators with Hysteresis

**Figure 20-18** (a) Inverting Schmitt trigger; (b) input/output response has hysteresis.



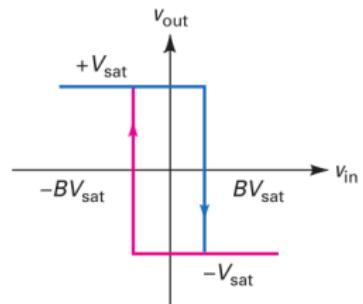
(a)

$$B = \frac{R_1}{R_1 + R_2}$$

$$\text{UTP} = BV_{sat}$$

$$\text{LTP} = -BV_{sat}$$

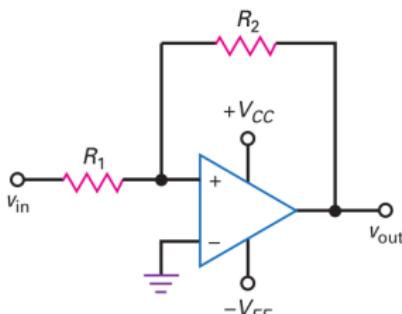
$$H = 2BV_{sat}$$



(b)

# Comparators with Hysteresis

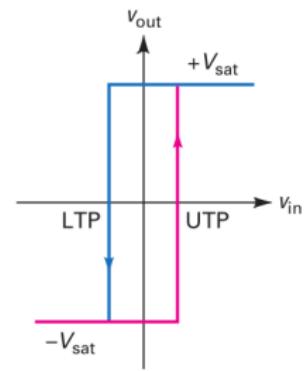
**Figure 20-19** (a) Noninverting Schmitt trigger; (b) input/output response.



(a)

$$\text{UTP} = \frac{R_1}{R_2} V_{\text{sat}}$$

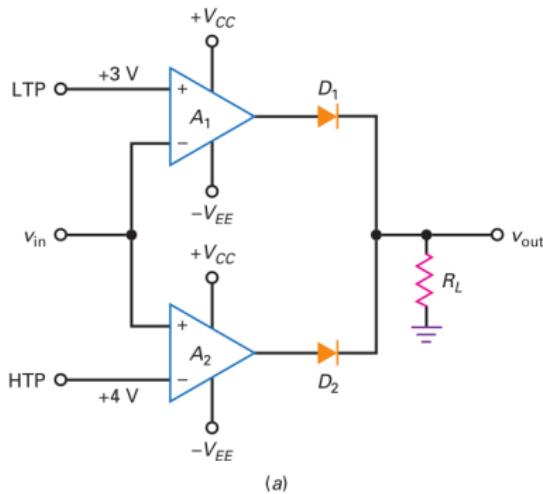
$$\text{LTP} = \frac{-R_1}{R_2} V_{\text{sat}}$$



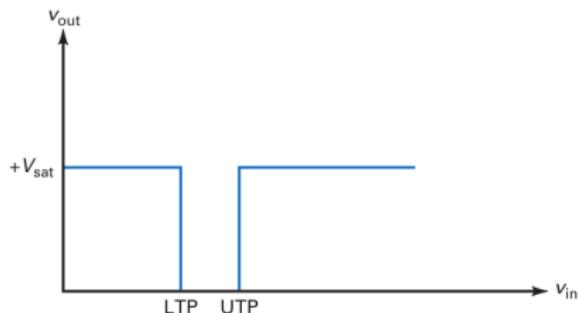
(b)

# Window Comparator

**Figure 20-22** (a) Inverting window comparator; (b) output is low when input is in window.



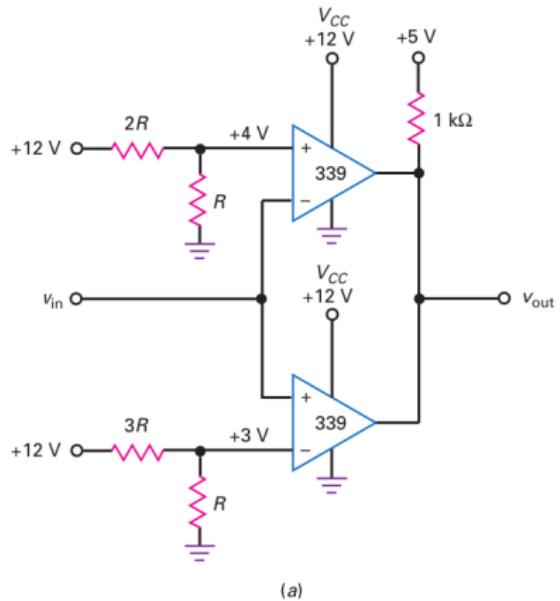
(a)



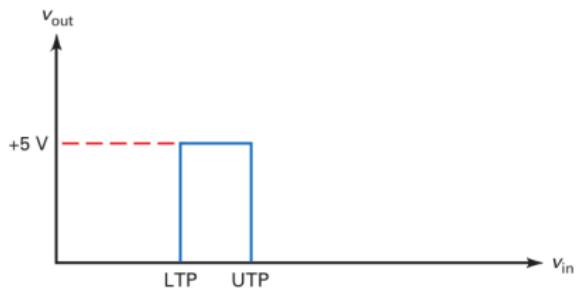
(b)

# Window Comparator

**Figure 20-23** (a) Noninverting window comparator; (b) output is high when input is in window.



(a)



(b)