Analog Electronic Circuits

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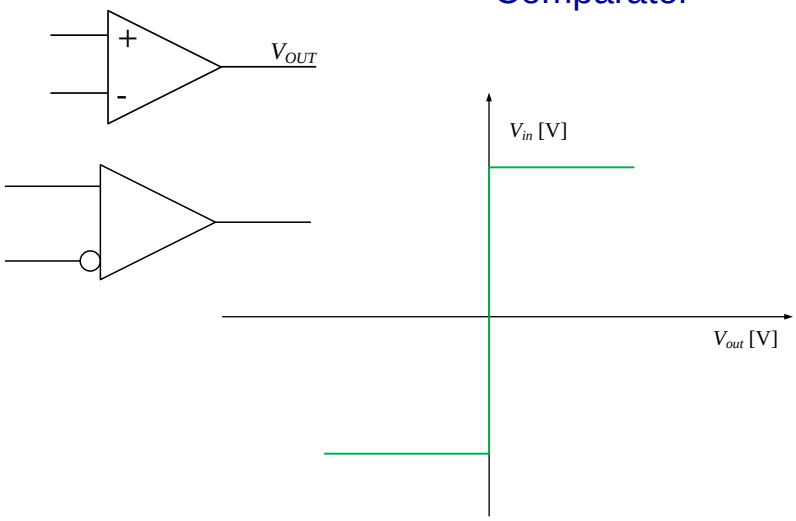
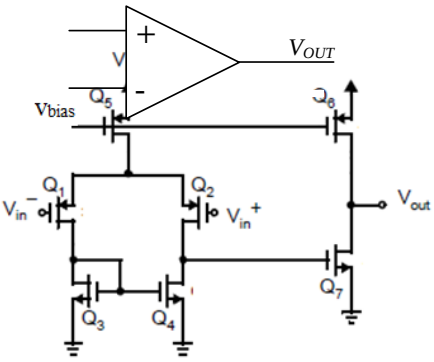
Lesson #7
Outline

- Comparators
  - Voltage comparator – basic characteristics
  - Internal circuit
  - Propagation time and overdrive
  - Output stage
- Basic applications
  - Level detection, window, counter, PWM, ON-OFF control
- Schmitt trigger
  - Inverting and noninverting
  - Single supply
- Advanced applications
  - Oscillators

Comparator



Internal circuit



Simple differential

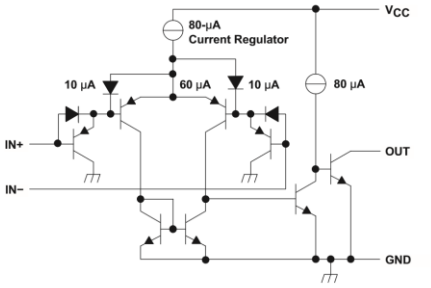
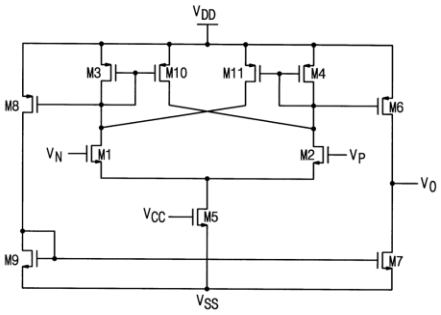
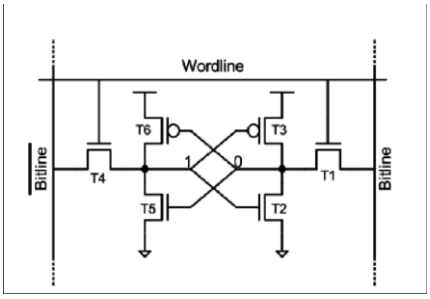


Figure 6. Schematic (Each Comparator)

LM339 (TI)

Internal circuit





Latched output

Propagation time and overdrive

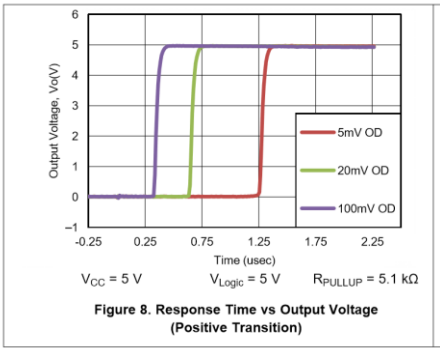


Figure 8. Response Time vs Output Voltage (Positive Transition)

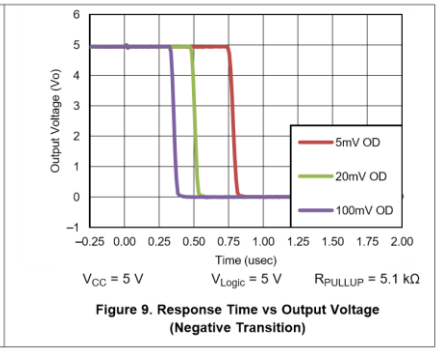
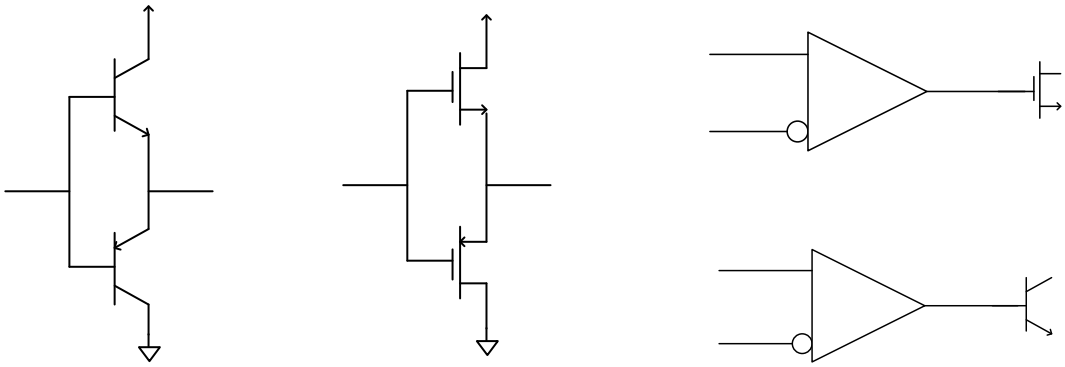


Figure 9. Response Time vs Output Voltage (Negative Transition)

(TI)

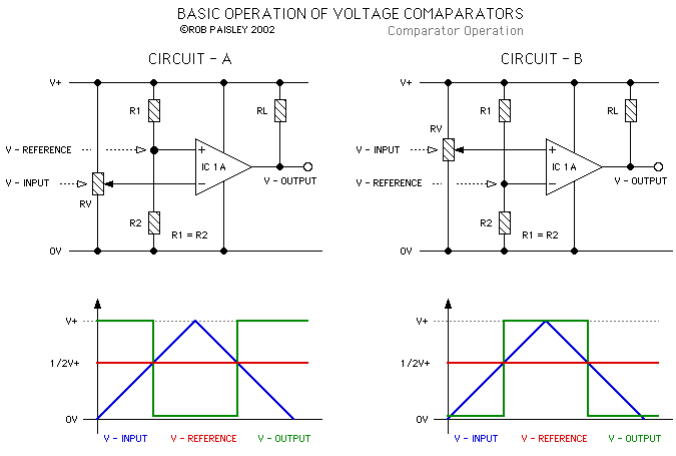
Output stage



Push-pull

Open-drain
(Open-Collector)

Basic operation



http://home.cogeco.ca/~rpaisley4/CircuitIndex.html

Applications –basic

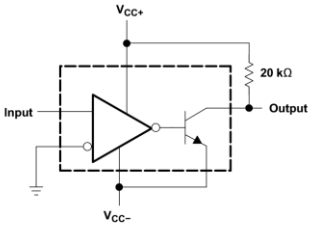


Figure 13. Zero-Crossing Detector

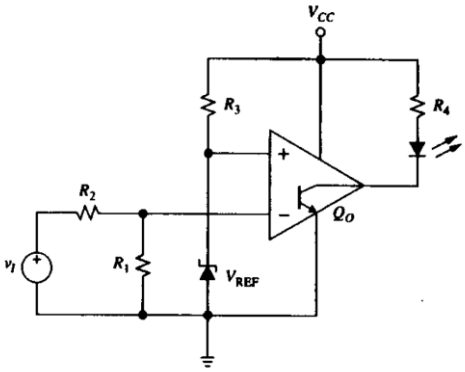


FIGURE 9.11
Basic level detector with optical indicator.

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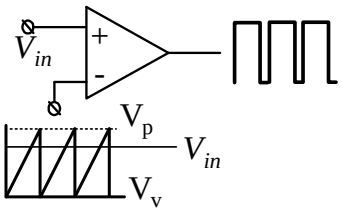
Applications –basic



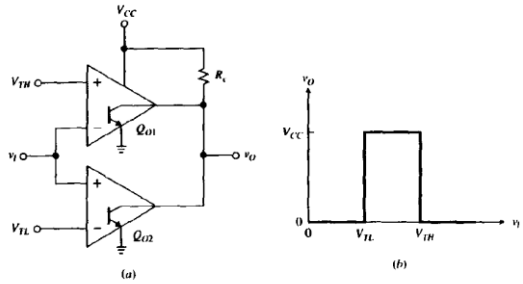


FIGURE 9.13
Window detector and its VTC.

PWM

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Applications –basic

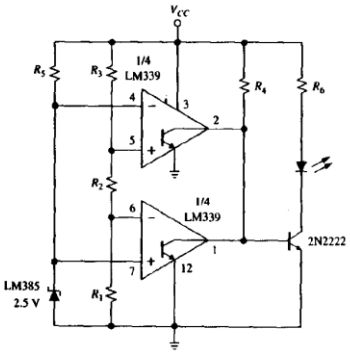
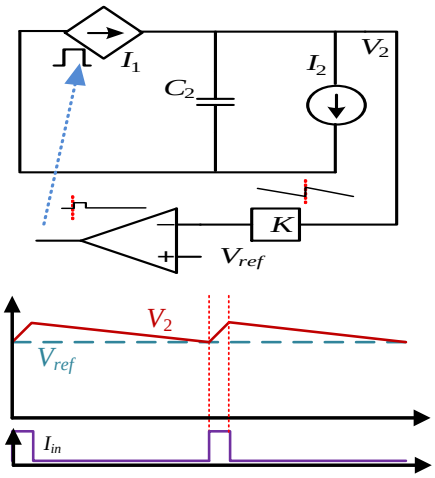


FIGURE 9.14
Power-supply monitor; LED glows as long as V_{CC} is within specification.



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