

# M5239L

## SINGLE COMPARATOR

### DESCRIPTION

The M5239L is a semiconductor circuit for a comparator designed to operate over a wide supply voltage range from 2 to 36V from a single power supply in 5-pin SIP.

A differential circuit which is equivalent to a conventional single power supply operational amplifier is used to enable operation from GND level to improve input characteristics. Power dissipation (circuit current) is low and output voltage is large.

It fits to a general-purpose comparator for a variety to electronic equipment.

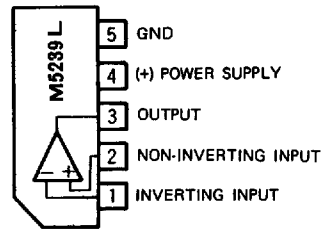
### FEATURES

- Wide operating supply voltage range . . . . . 2V ~ 36V  
Dual power supplies:  $\pm 1V \sim \pm 18V$
- Low circuit current . . . . . 0.45mA
- Wide common mode input voltage range  
. . . . . 0V ~  $V_{CC} - 1.5V$  (single power supply)
- Open collector output
- Output sink current . . . . . 25mA
- Response time . . . . . 1.3 $\mu$ sec

### APPLICATION

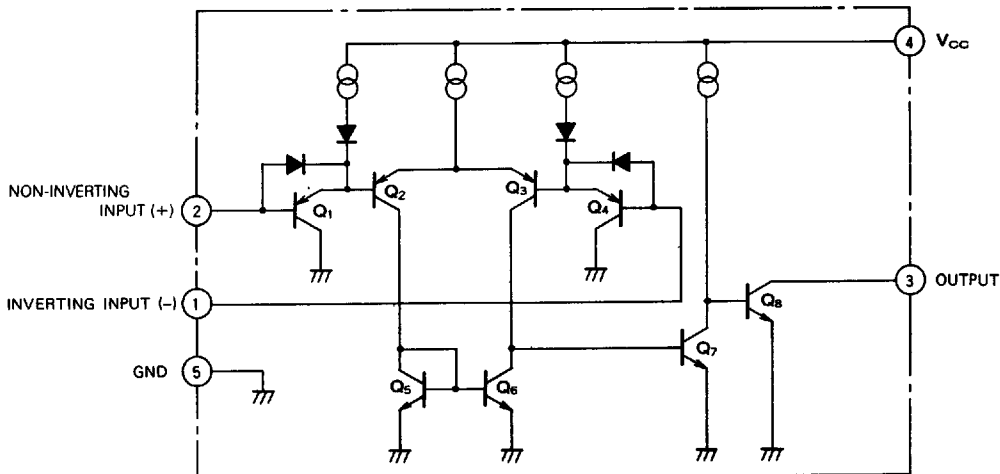
Voltage comparator, window comparator, CR timer, time delay circuit, oscillator, etc.

### PIN CONFIGURATION (TOP VIEW)



Outline 5P5T

### EQUIVALENT CIRCUIT DIAGRAM



**SINGLE COMPARATOR**

**ABSOLUTE MAXIMUM RATINGS** (Ta = 25°C, unless otherwise noted)

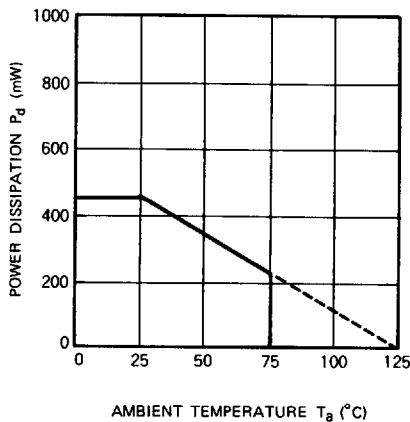
| Symbol           | Parameter                       | Conditions | Rating     | Unit |
|------------------|---------------------------------|------------|------------|------|
| V <sub>CC</sub>  | Supply voltage                  |            | 36 (±18)   | V    |
| V <sub>ID</sub>  | Differential input voltage      |            | 36         | V    |
| V <sub>ICM</sub> | Common mode input voltage range |            | -0.3 - +36 | V    |
| P <sub>d</sub>   | Power dissipation               |            | 450        | mW   |
| T <sub>opr</sub> | Operating temperature           |            | -20 - +75  | °C   |
| T <sub>stg</sub> | Storage temperature             |            | -55 - +125 | °C   |

**ELECTRICAL CHARACTERISTICS** (Ta = 25°C, V<sub>CC</sub> = 5V, unless otherwise noted)

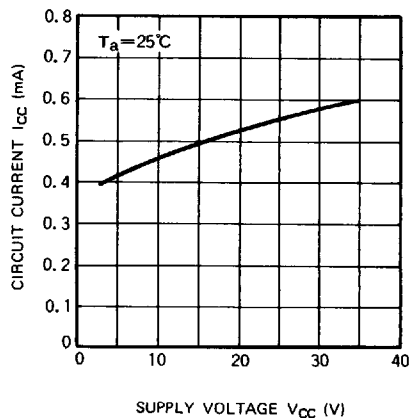
| Symbol            | Parameter                       | Test conditions   | Limits |      |                      | Unit |
|-------------------|---------------------------------|---|--------|------|----------------------|------|
|                   |                                 |   | Min    | Typ  | Max                  |      |
| V <sub>IO</sub>   | Input offset voltage            | V <sub>O</sub> = 1.4V, V <sub>REF</sub> = 1.4V, R <sub>S</sub> = 0Ω       | —      | 2    | 5                    | mV   |
| I <sub>IO</sub>   | Input offset current            |   | —      | 5    | 50                   | nA   |
| I <sub>B</sub>    | Input bias current              |   | —      | 25   | 250                  | nA   |
| V <sub>ICM</sub>  | Common mode input voltage range |   | 0      | —    | V <sub>CC</sub> -1.5 | V    |
| G <sub>V</sub>    | Voltage gain                    | R <sub>L</sub> = 15kΩ   | —      | 200  | —                    | V/mV |
| I <sub>CC</sub>   | Circuit current                 | R <sub>L</sub> = ∞  | —      | 0.45 | 0.75                 | mA   |
| t <sub>PLH</sub>  | Response time                   | R <sub>L</sub> = 5.1kΩ, V <sub>RL</sub> = 5V                              | —      | 1.3  | —                    | μsec |
| I <sub>SINK</sub> | Output sink current             | V <sub>IN(-)</sub> = 1V, V <sub>IN(+)</sub> = 0V, V <sub>O</sub> ≤ 1.5V   | 10     | 25   | —                    | mA   |
| V <sub>OL</sub>   | Output saturation voltage       | V <sub>IN(-)</sub> = 1V, V <sub>IN(+)</sub> = 0V, I <sub>SINK</sub> = 4mA | —      | 200  | 400                  | mV   |
| I <sub>OL</sub>   | Output leak current             | V <sub>IN(+)</sub> = 1V, V <sub>IN(-)</sub> = 0V, V <sub>O</sub> = 5V     | —      | 0.1  | —                    | nA   |

**TYPICAL CHARACTERISTICS**

**THERMAL DERATING  
(MAXIMUM RATING)**

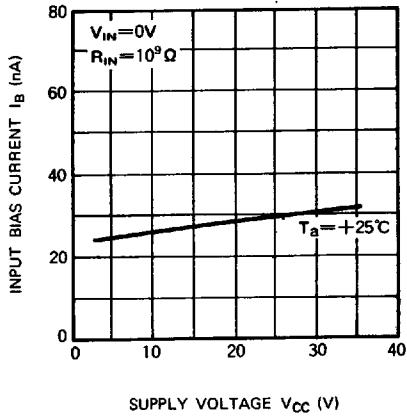


**CIRCUIT CURRENT VS.  
SUPPLY VOLTAGE**

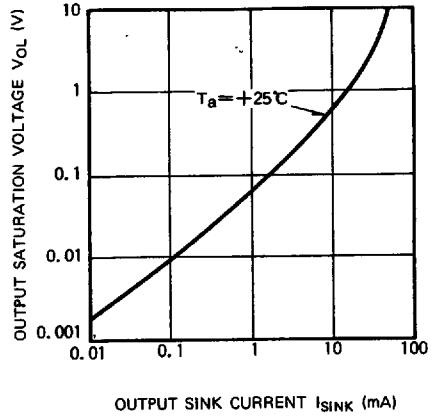


**SINGLE COMPARATOR**

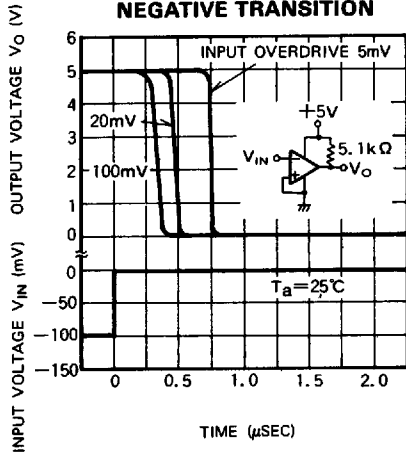
**INPUT BIAS CURRENT VS. SUPPLY VOLTAGE**



**OUTPUT SATURATION VOLTAGE VS. OUTPUT SINK CURRENT**



**RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES VS. NEGATIVE TRANSITION**



**RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES VS. NEGATIVE TRANSITION**

