

# Low Power Low Offset Voltage Quad Comparators

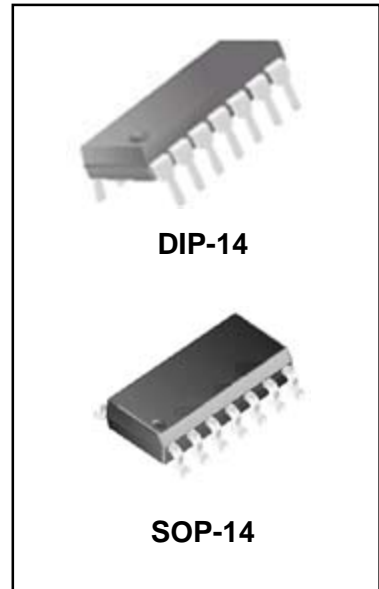
## DESCRIPTION:

The LR339 consists of four independent precision voltage comparators. These were designed specifically to operate from a signal power supply over a wide range of voltage. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. The LR339 also have a unique characteristic in that the input common-mode voltage range includes ground, even though operated from a single power supply voltage.

## FEATURE:

- Low input biasing current: 25nA(Typ.)
- Low input offset current:  $\pm 5.0\text{nA}$ (Typ.)
- Low output saturation voltage: 130mV
- Output voltage compatible with TTL,CMOS

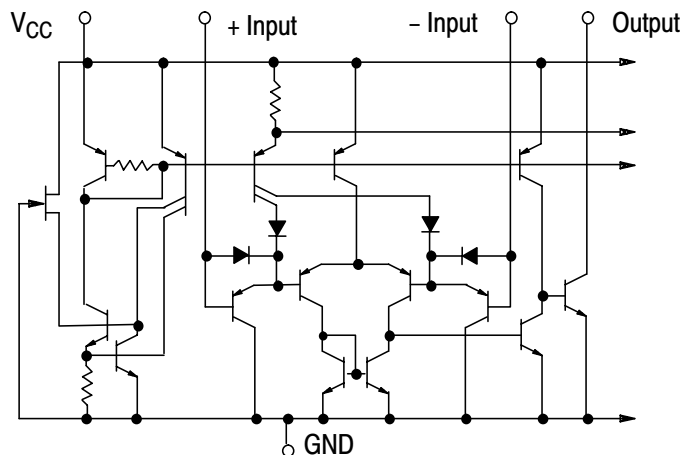
## LR339



## ORDERING INFORMATION

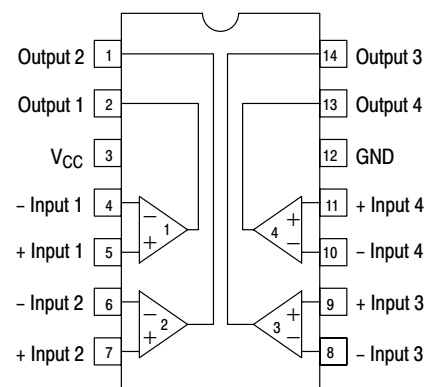
| Device | Package |
|--------|---------|
| LR339  | DIP-14  |
| LR339D | SOP-14  |

## BLOCK DIAGRAM



NOTE: Diagram shown is for 1 comparator.

## PIN CONFIGURATION



(Top View)

**PIN DESCRIPTIONS**

| No | Description    | Symbol  | No | Description | Symbol  |
|----|----------------|---------|----|-------------|---------|
| 1  | Output 2       | OUT2    | 8  | -Input3     | IN3 (-) |
| 2  | Output 1       | OUT1    | 9  | +Input3     | IN3 (+) |
| 3  | Supply Voltage | Vcc     | 10 | -Input4     | IN4 (-) |
| 4  | -Input1        | IN1 (-) | 11 | +Input4     | IN4 (+) |
| 5  | +Input1        | IN1 (+) | 12 | Ground      | GND     |
| 6  | -Input2        | IN2 (-) | 13 | Output 4    | OUT4    |
| 7  | +Input2        | IN2 (+) | 14 | Output 3    | OUT3    |

**ABSOLUTE MAXIMUM RATINGS**

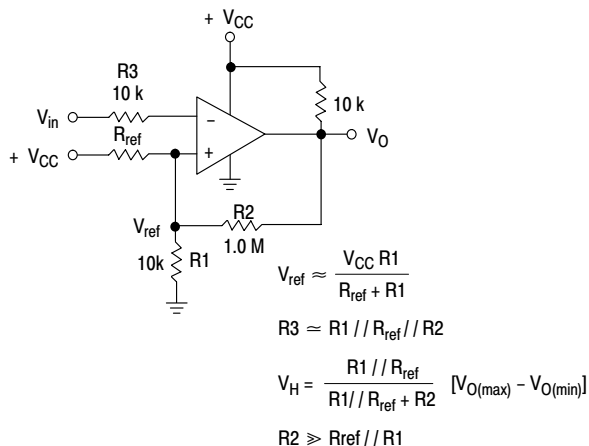
| Characteristics             | Symbol | Value          | Unit |
|-----------------------------|--------|----------------|------|
| Supply Voltage              | Vcc    | 36 or $\pm 18$ | V    |
| Differential Input Voltage  | VIDR   | 36             | V    |
| Input Voltage               | VICMR  | -0.3~Vcc       | V    |
| Input Current               | Isc    | 50             |      |
| Power Dissipation (*)       | Pd     | 1.0            | W    |
| Operating Temperature Range | Tamb   | 0~75           | °C   |
| Storage Temperature Range   | Tstg   | -65~150        | °C   |

Note (\*): Power dissipation reduces 8 mW/°C for using above Ta=25°C.

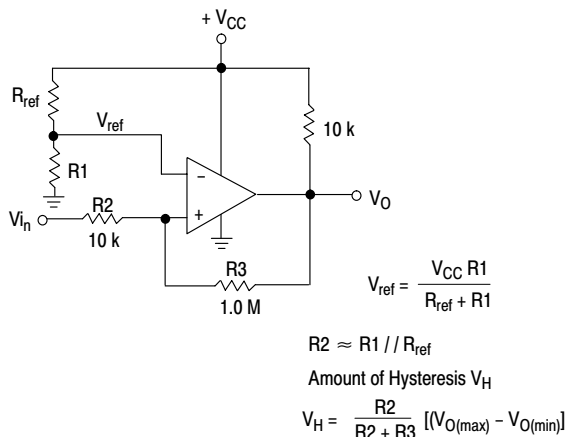
**ELECTRICAL CHARACTERISTICS** (Unless otherwise specified :Vcc=5V, Tamb=25°C)

| Characteristics                 | Test conditions  | Symbol | Mi  | Typ.      | Max       | Unit |
|---------------------------------|--|--------|-----|-----------|-----------|------|
| Input Offset Voltage            |  | Vio    |     | $\pm 2.0$ | $\pm 5.0$ | mV   |
|                                 | $0^{\circ}\text{C} \leq \text{Ta} \leq 70^{\circ}\text{C}$   |        |     |           | $\pm 9.0$ |      |
| Input Offset Current            |  | Iio    |     | $\pm 5.0$ | $\pm 50$  | nA   |
|                                 | $0^{\circ}\text{C} \leq \text{Ta} \leq 70^{\circ}\text{C}$   |        |     |           | $\pm 150$ |      |
| Input Bias Current              |  | IIB    |     | 25        | 250       | nA   |
|                                 | $0^{\circ}\text{C} \leq \text{Ta} \leq 70^{\circ}\text{C}$   |        |     |           | 400       |      |
| Input Common-mode Voltage Range |  | VICR   | 0   |           | Vcc-1.5   | V    |
|                                 | $0^{\circ}\text{C} \leq \text{Ta} \leq 70^{\circ}\text{C}$   |        | 0   |           | Vcc-2.0   |      |
| Supply Current                  | RL=∞   | Icc    |     | 0.8       | 2.0       | mA   |
|                                 | RL=∞, Vcc=30V  |        |     | 1.0       | 2.5       |      |
| Voltage Gain                    | RL ≥ 15KΩ, Vcc=15V   | Gv     | 50  | 200       |           | V/mV |
| Large Signal Response Time      | VIN=TTL Logic Swing, VREF=1.4V, VRL=5.0V, RL=5.1KΩ   | tRES   |     | 300       |           | ns   |
| Response Time                   | VRL=5.0V, RL=5.1KΩ   | tRES   |     | 1.3       |           | ns   |
| Input Differential Voltage      |  | VID    |     |           | Vcc       | V    |
| Output Sink Current             | VIN (-) ≥ 1.0V, VIN (+) = 0V, Vo ≤ 1.5V  | ISINK  | 6.0 | 16        |           | mA   |
| output saturation voltage       | VIN (-) ≥ 1.0V, VIN (+) = 0V, ISINK ≤ 4.0mA  | VSAT   |     | 130       | 400       | mV   |
|                                 | VIN (-) ≥ 1.0V, VIN (+) = 0V, ISINK ≤  |        |     |           | 700       |      |
| Output Leakage Current          | VIN (+) ≥ 1.0V, VIN (-) = 0V, Vo=5.0V  | IOL    |     | 0.1       |           | nA   |
|                                 | VIN (+) ≥ 1.0V, VIN (-) = 0V, Vo=30V<br>$0^{\circ}\text{C} \leq \text{Ta} \leq 70^{\circ}\text{C}$ |        |     |           | 1000      |      |

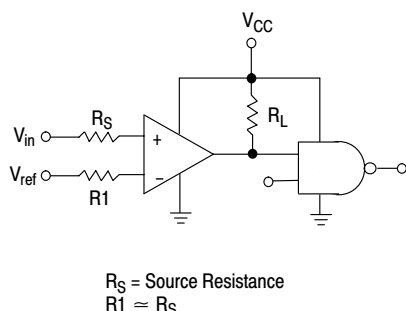
### APPLICATION CIRCUIT



**Figure 1. Inverting Comparator with Hysteresis**

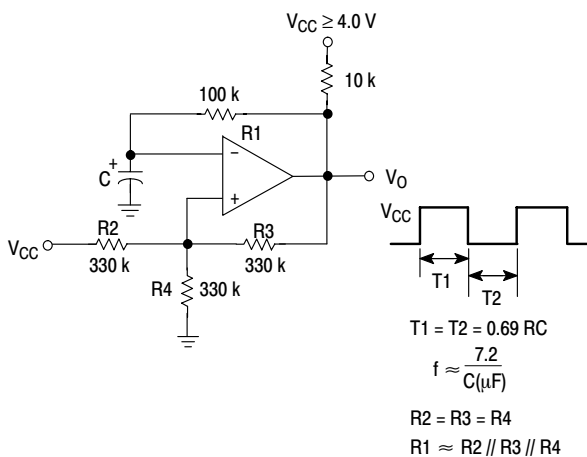


**Figure 2. Noninverting Comparator with Hysteresis**

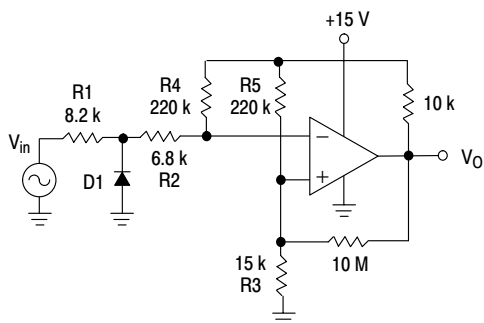


| Logic | Device      | V <sub>CC</sub> (V) | R <sub>L</sub> kΩ |
|-------|-------------|---------------------|-------------------|
| CMOS  | 1/4 MC14001 | +15                 | 100               |
| TTL   | 1/4 MC7400  | +5.0                | 10                |

**Figure 3. Driving Logic**



**Figure 4. Squarewave Oscillator**

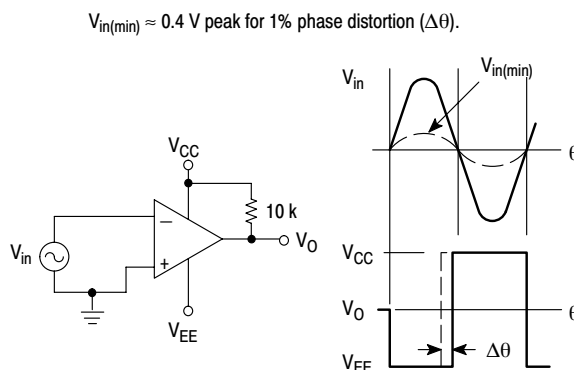


D1 prevents input from going negative by more than 0.6 V.

$$R_1 + R_2 = R_3$$

$$R_3 \leq \frac{R_5}{10} \text{ for small error in zero crossing}$$

**Figure 5. Zero Crossing Detector (Single Supply)**



**Figure 6. Zero Crossing Detector (Split Supplies)**

### TYPICAL CHARACTERISTICS CURVES

( $V_{CC} = 15\text{ Vdc}$ ,  $T_A = +25^\circ\text{C}$  (each comparator) unless otherwise noted.)

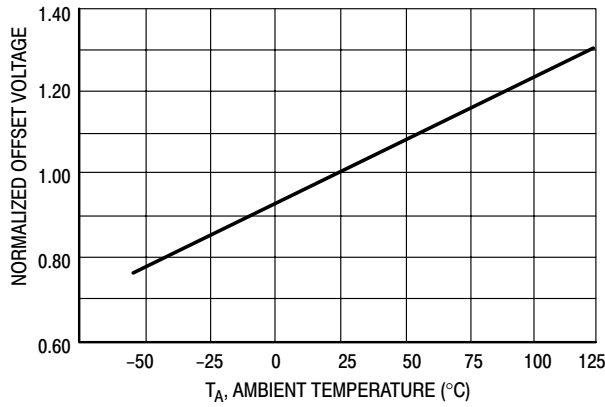


Figure 7. Normalized Input Offset Voltage

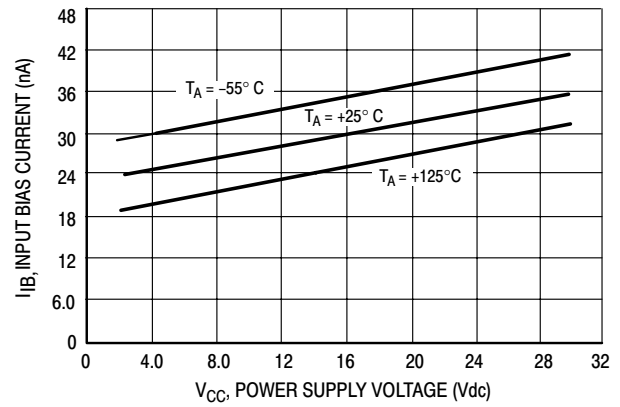


Figure 8. Input Bias Current

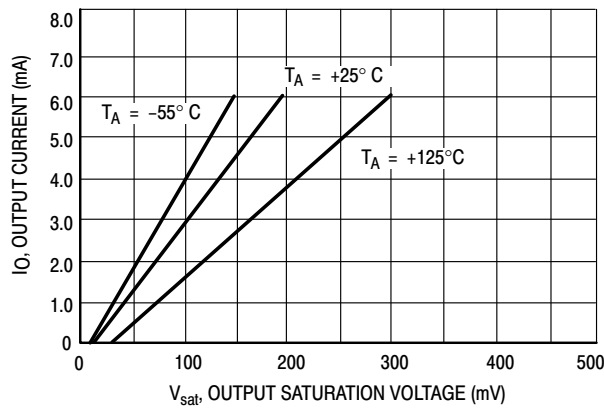
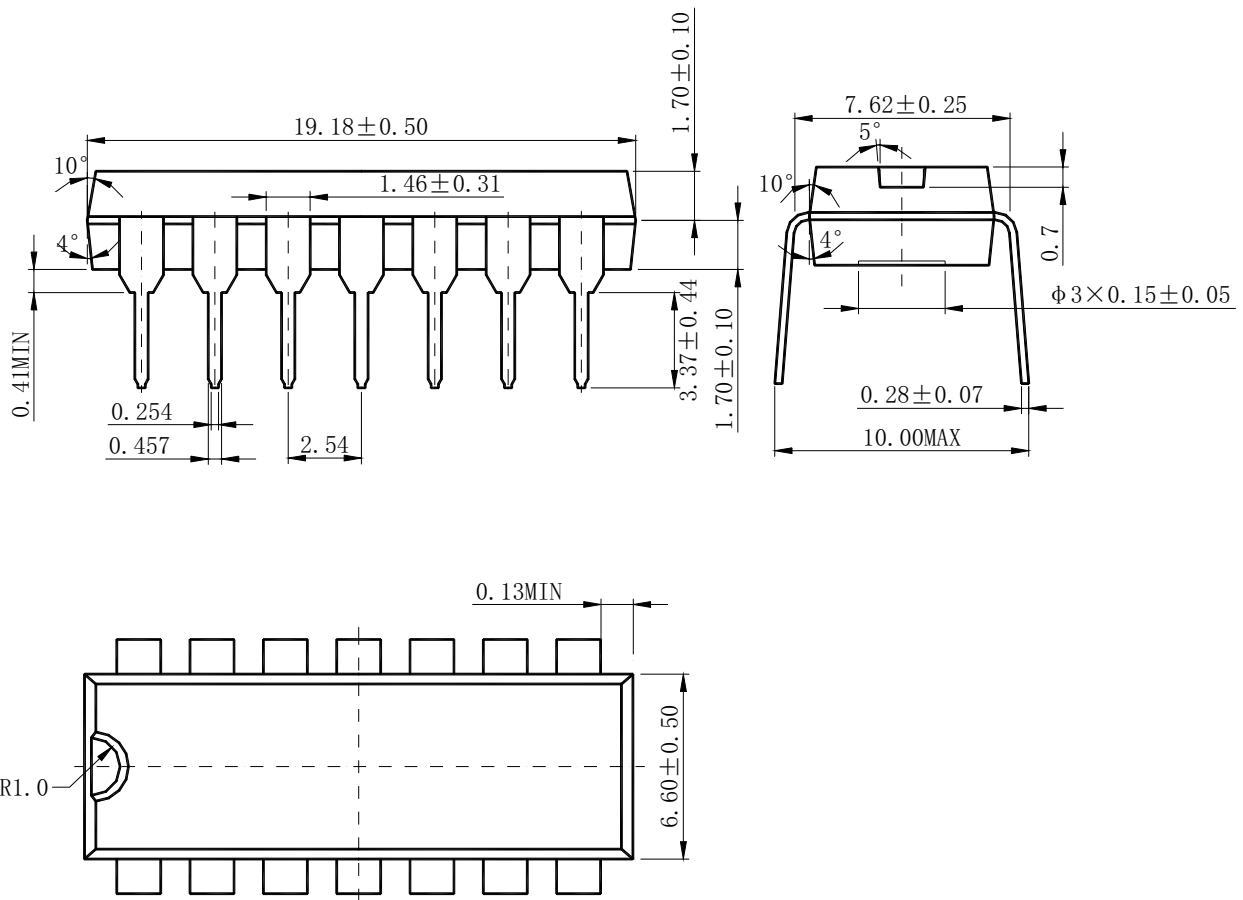


Figure 9. Output Sink Current versus Output Saturation Voltage

**Mechanical Dimensions**

**DIP-14**

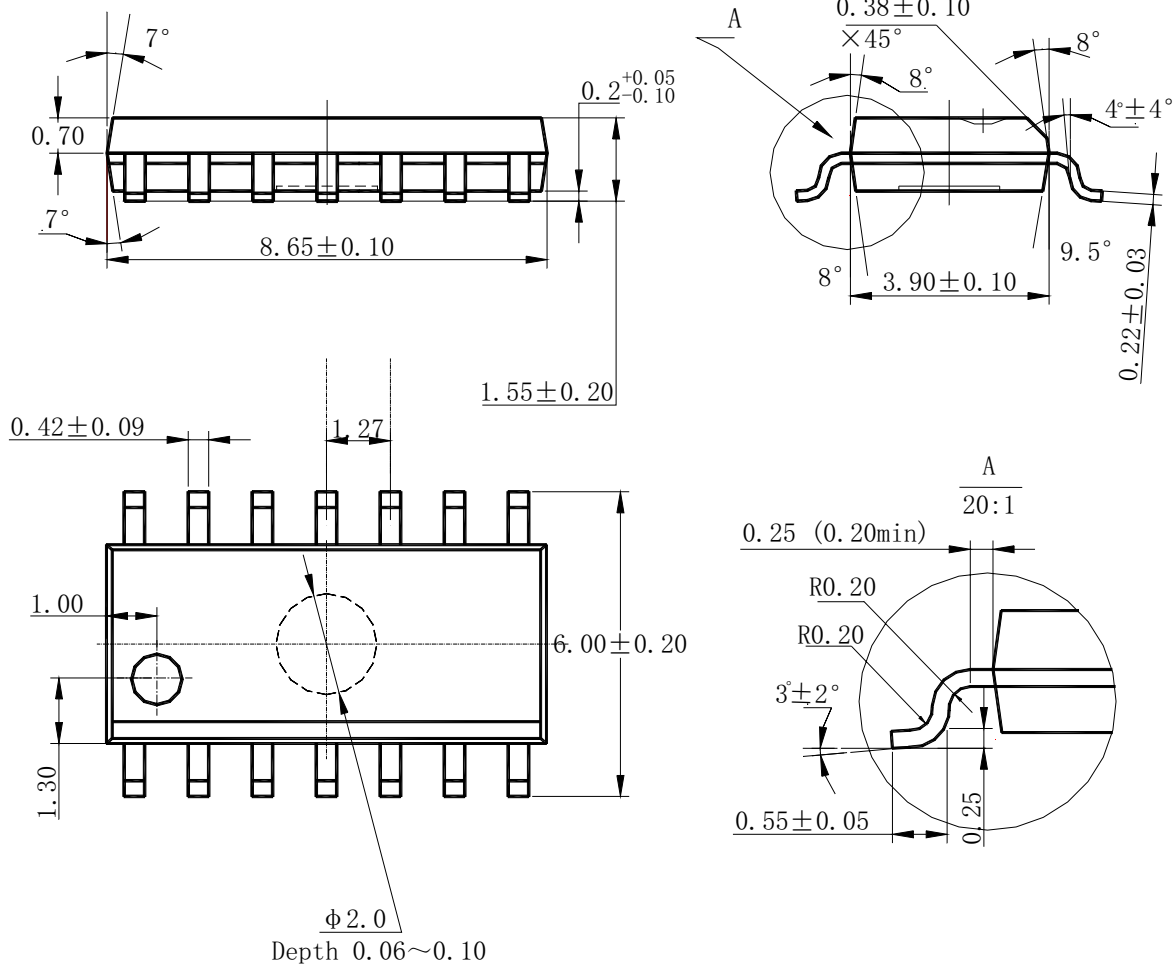
**Unit: mm**



Mechanical Dimensions (Continued)

SOP-14

Unit: mm



单击下面可查看定价，库存，交付和生命周期等信息

[>>LRC\(乐山无线电\)](#)