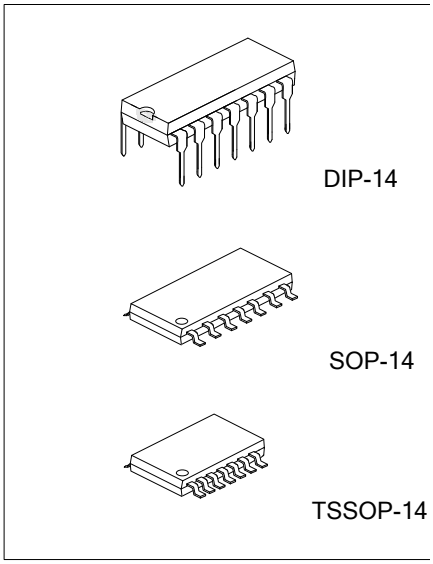
# LM339

**LINEAR INTEGRATED CIRCUIT**

# QUAD DIFFERENTIAL COMPARATOR




## ■ DESCRIPTION

The UTC **LM339** consists of four independent voltage comparators, designed specifically to operate from a single power supply over a wide voltage range.

## ■ FEATURES

*Signal or Dual Supply Operation.
*Wide Operating Supply Range ($V_{CC}$=2V~36V).
*Input Common-Mode Voltage Includes Ground.
*Low Supply Current Drain $I_F$=0.8mA (Typical).
*Open Collector Outputs for Wired and Connection.
*Low Input Bias Current $I_{BIAS}$=25nA (Typical).
*Low Output Saturation Voltage.
*Output Compatible with TTL, DTL, and CMOS Logic System.

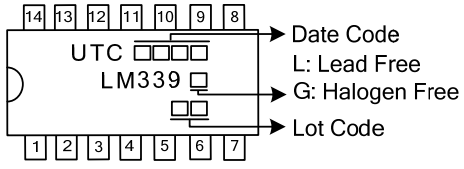
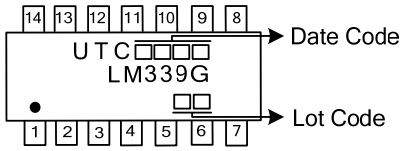
## ■ ORDERING INFORMATION

| Ordering Number | | Package | Packing |
|---|---|---|---|
| Lead Free | Halogen-Free | | |
| LM339L-D14-T | LM339G-D14-T | DIP-14 | Tube |
| - | LM339G-S14-R | SOP-14 | Tape Reel |
| - | LM339G-P14-R | TSSOP-14 | Tape Reel |

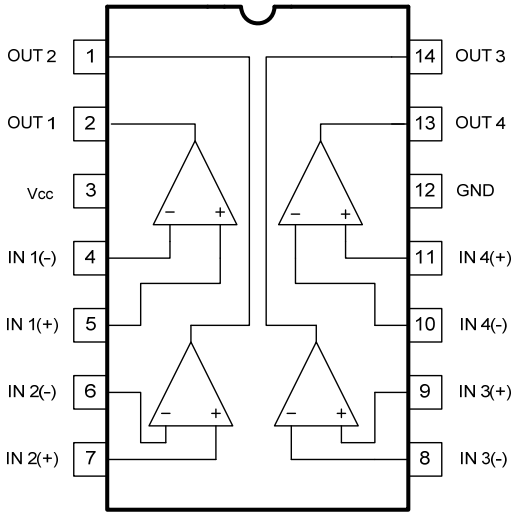
LM339L-D14-T
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) DIP: DIP-14, S14: SOP-14, P14: TSSOP-14
(3) L: Lead Free, G: Halogen Free and Lead Free

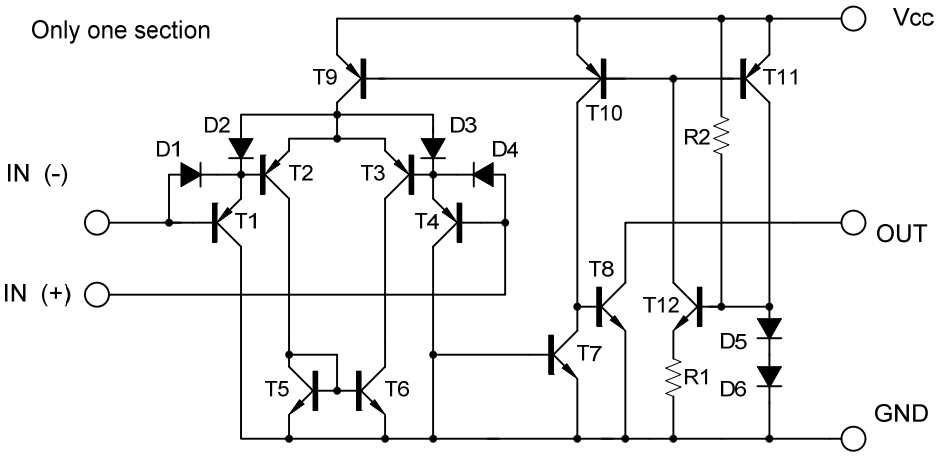
## ■ MARKING

| DIP-14 | SOP-14 / TSSOP-14 |
|---|---|
|  |  |

## ■ PIN CONFIGURATION




## ■ BLOCK DIAGRAM



## ■ ABSOLUTE MAXIMUM RATINGS ($T_A$=25°C, unless otherwise specified)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Supply Voltage | | $V_{CC}$ | ±18 or 36 | V |
| Differential input Voltage | | $V_{I(DIFF)}$ | 36 | V |
| Input Voltage | | $V_{IN}$ | -0.3~36 | V |
| Power Dissipation | DIP-14 | $P_D$ | 760 | mW |
| | SOP-14 | | 560 | mW |
| | TSSOP-14 | | 440 | mW |
| Junction Temperature | | $T_J$ | 125 | °C |
| Operating Temperature | | $T_{OPR}$ | -20 ~ +85 | °C |
| Storage Temperature | | $T_{STG}$ | -40 ~ 150 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■ ELECTRICAL CHARACTERISTICS

($V_{CC}$=5.0V, $T_A$=25°C, All voltage referenced to GND unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Input Offset Voltage | $V_{I(OFF)}$ | $V_{CM}$=0~$V_{CC}$-1.5, $V_{OUT(P)}$=1.4V, $R_S$=0 | | ±1.5 | ±3.0 | mV |
| Input Offset Current | $I_{I(OFF)}$ | | | ±2.3 | ±50 | nA |
| Input Bias Current | $I_{BIAS}$ | | | 57 | 250 | nA |
| Input Common-Mode Voltage Range | $V_{IN(R)}$ | | 0 | | $V_{CC}$-1.5 | V |
| Supply Current | $I_{CC}$ | $R_L$=∞ | | 1.1 | 2.0 | mA |
| Large Signal Voltage Gain | $G_V$ | $V_{CC}$=15V, $R_L$>15kΩ | 50 | 200 | | V/mV |
| Large Signal Response Time | $t_{RES}$ | $V_{IN}$=TTL logic wing<br>$V_{REF}$=1.4V, $V_{RL}$=5V, $R_L$=5.1kΩ | | 350 | | ns |
| Response Time | $t_{RES}$ | $V_{RL}$=5V, $R_L$=5.1kΩ | | 1400 | | ns |
| Output Sink Current | $I_{SINK}$ | $V_{IN(-)}$>1V, $V_{IN(+)}$=0V, $V_{OUT(P)}$<1.5V | 6 | 18 | | mA |
| Output Saturation Voltage | $V_{SAT}$ | $V_{IN(-)}$>1V, $V_{IN(+)}$=0V, $I_{SINK}$=4mA | | 140 | 400 | mV |
| Output Leakage Current | $I_{LEAK}$ | $V_{IN(+)}$=1V, $V_{IN(-)}$=0V, $V_{OUT(P)}$= 5V | | 0.1 | | nA |
| | | $V_{IN(+)}$=1V, $V_{IN(-)}$=0V, $V_{OUT(P)}$=30V | | | 1.0 | μA |
| Differential Input Voltage | $V_{IN(DIFF)}$ | | | | 36 | V |

## ■ TYPICAL CHARACTERISTICS

Fig.1 Supply Current

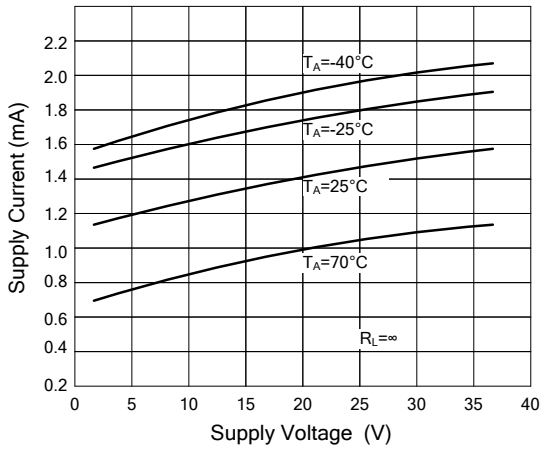



Fig.2 Input Current

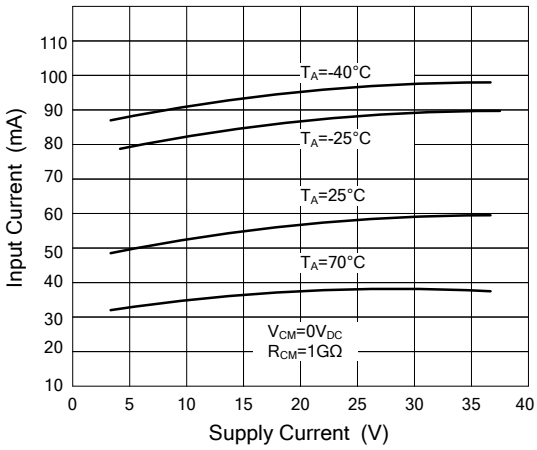



Fig.3 Output Saturation Voltage

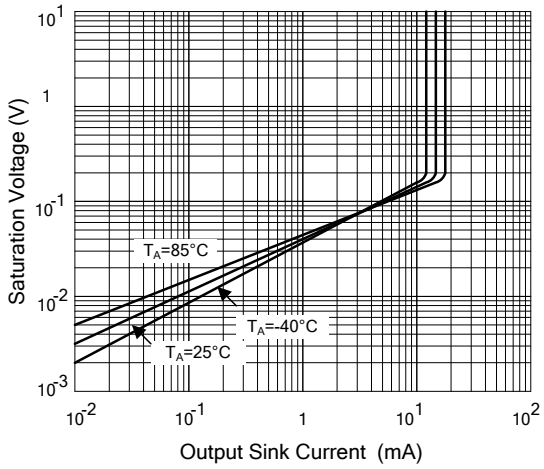



Fig.4 Reponse Time For Various Input Overdrive Negative Transition

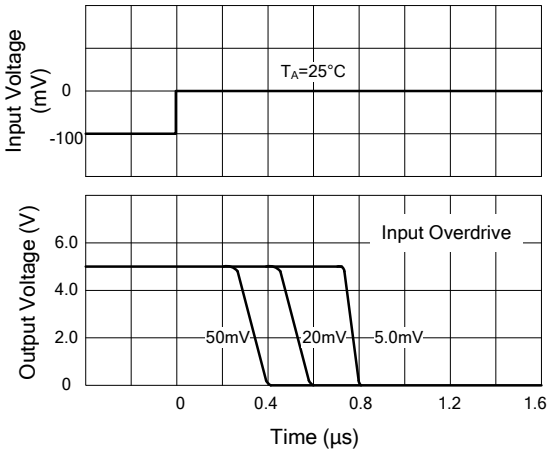



Fig.5 Reponse Time For Various Input Overdrive Positive Transition