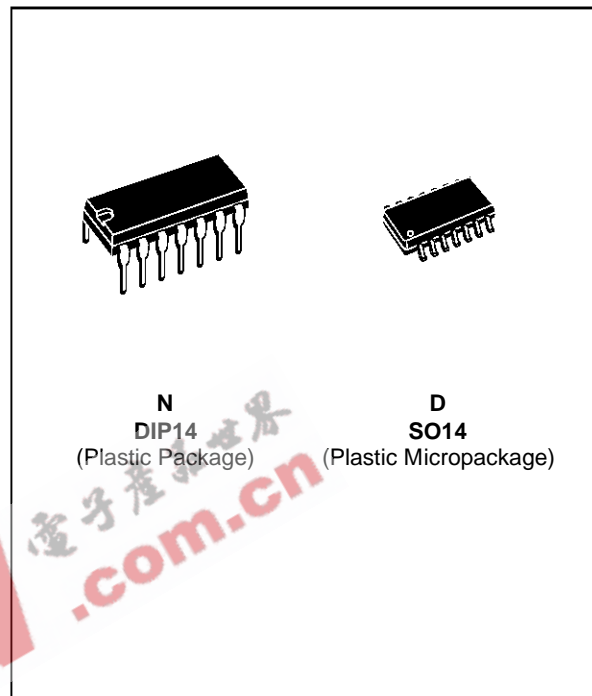


3V MICROPOWER QUAD VOLTAGE COMPARATORS

- DEDICATED TO **3.3V OR BATTERY SUPPLY**
(specified at 3V and 5V)
- EXTREMELY LOW SUPPLY CURRENT :
9 μ A typ/comparator
- WIDE SINGLE SUPPLY RANGE
2.7V to 16V
- EXTREMELY LOW INPUT CURRENTS :
1pA TYP
- INPUT COMMON-MODE VOLTAGE RANGE
INCLUDES GND
- FAST RESPONSE TIME : 2.5 μ s typ for
5mV overdrive
- PIN-TO-PIN AND FUNCTIONALLY
COMPATIBLE WITH BIPOLAR LM339



DESCRIPTION

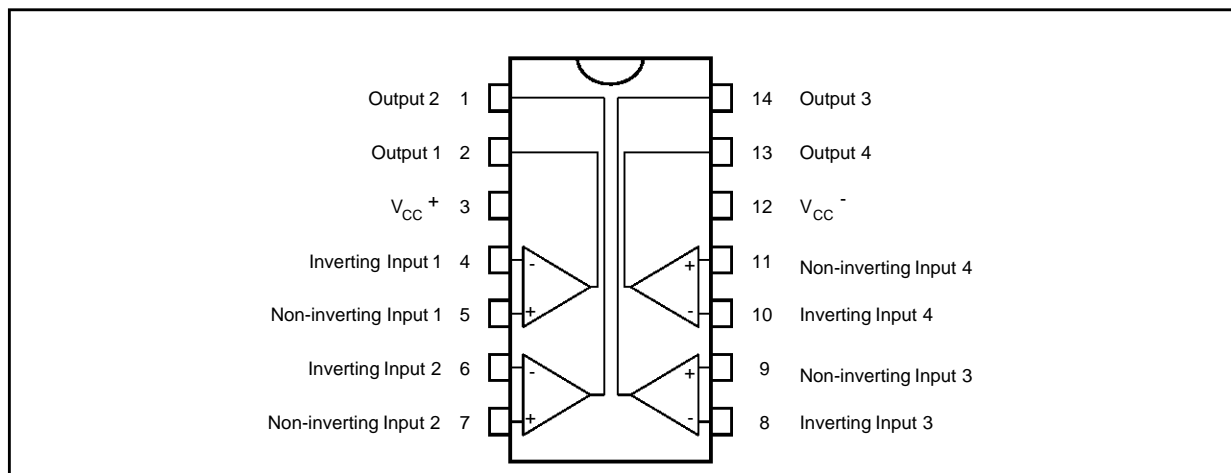
The TS3V339 is a micropower quad CMOS voltage comparator with extremely low consumption of 9 μ A typ / comparator (20 times less than bipolar LM339). Similar performances are offered by the quad micropower comparator TS3V3704 with a push-pull CMOS output.

Thus response times remain similar to the LM339.

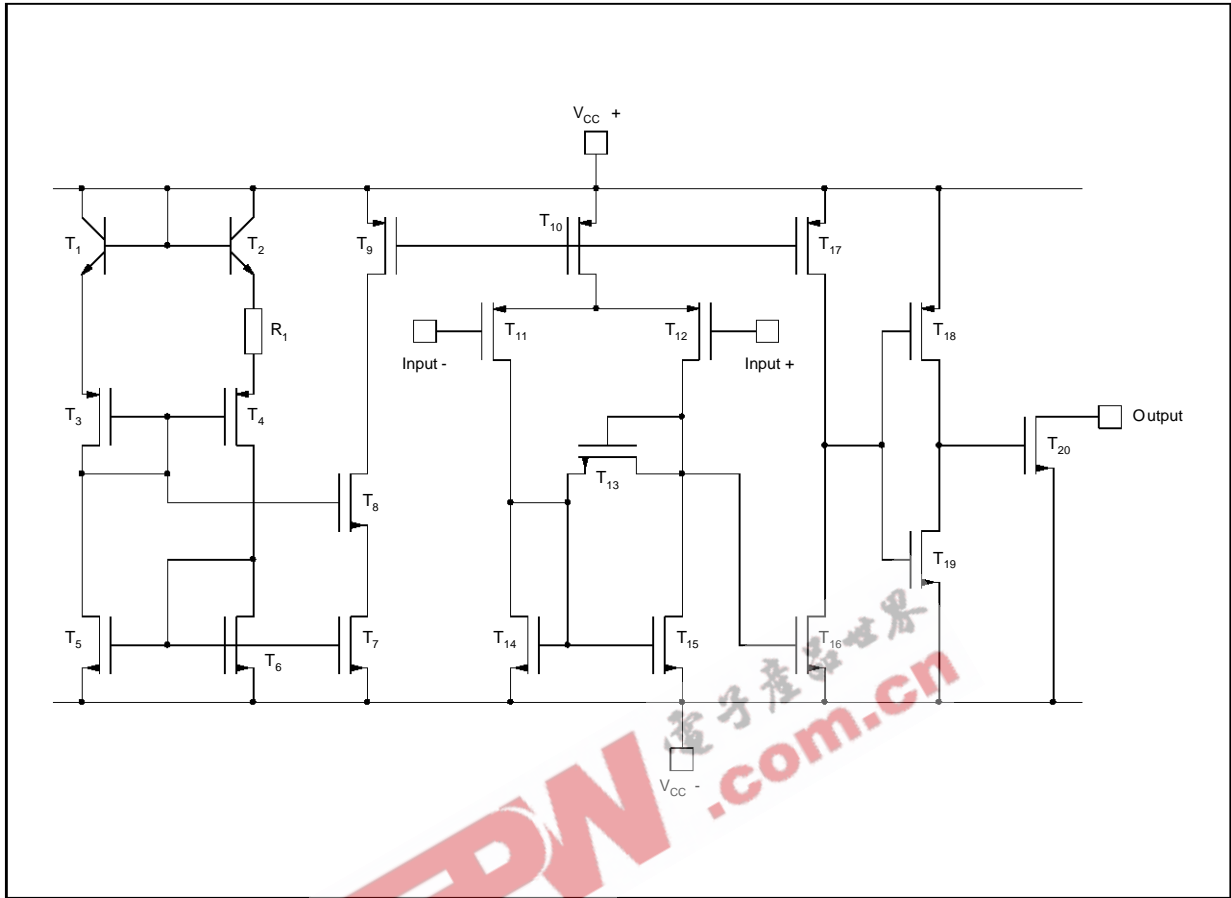
ORDER CODES

| Part Number | Temperature Range | Package | |
|-------------|-------------------|---------|---|
| | | N | D |
| TS3V339I | -40°C, +125°C | ● | ● |

PIN CONNECTIONS (top view)



SCHEMATIC DIAGRAM (for 1/4 TS3V339)



MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|------------|--|-------------|-------------|
| V_{CC}^+ | Supply Voltage - (note 1) | 18 | V |
| V_{id} | Differential Input Voltage - (note 2) | ± 18 | V |
| V_i | Input Voltage - (note 3) | 18 | V |
| V_o | Output Voltage | 18 | V |
| I_o | Output Current | 20 | mA |
| T_{oper} | Operating Free-Air Temperature Range TS3V339I | -40 to +125 | $^{\circ}C$ |
| T_{stg} | Storage Temperature Range | -65 to +150 | $^{\circ}C$ |

- Notes :**
1. All voltage values, except differential voltage, are with respect to network ground terminal.
 2. Differential voltages are the non-inverting input terminal with respect to the inverting input terminal.
 3. The magnitude of the input and the output voltages must never exceed the magnitude of the positive supply voltage.
 4. Short circuit from outputs to V_{CC}^+ can cause excessive heating and eventual destruction.

OPERATING CONDITIONS

| Symbol | Parameter | Value | Unit |
|------------|---------------------------------|-----------------------|------|
| V_{CC}^+ | Supply Voltage | 2.7 to 16 | V |
| V_{icm} | Common Mode Input Voltage Range | 0 to $V_{CC}^+ - 1.5$ | V |

ELECTRICAL CHARACTERISTICS

$V_{CC}^+ = 3V$, $V_{CC}^- = 0V$, $T_{amb} = 25^\circ C$ (unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|-----------|---|--|-------------|------------|---------|
| V_{io} | Input Offset Voltage - (note 1) $V_{ic} = 1.5V$ $T_{min.} \leq T_{amb} \leq T_{max.}$ | | | 5 6.5 | mV |
| I_{io} | Input Offset Current - (note 2) $V_{ic} = 1.5V$ $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 1 | 300 | pA |
| I_{ib} | Input Bias Current - (note 2) $V_{ic} = 1.5V$ $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 1 | 600 | pA |
| V_{icm} | Input Common Mode Voltage Range $T_{min.} \leq T_{amb} \leq T_{max.}$ | 0 to $V_{CC}^+ - 1.2$ 0 to $V_{CC}^+ - 1.5$ | | | V |
| CMR | Common-mode Rejection Ratio $V_{ic} = V_{icm\ min.}$ | | 70 | | dB |
| SVR | Supply Voltage Rejection Ratio $V_{CC}^+ = 3V$ to $5V$ | | 70 | | dB |
| I_{OH} | High Level Output Current $V_{id} = +1V$, $V_{OH} = 3V$ $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 2 | 40 1000 | nA |
| V_{OL} | Low Level Output Voltage $V_{id} = +1V$, $I_{OL} = +6mA$ $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 400 | 550 800 | mV |
| I_{CC} | Supply Current (each comparator) No load - Outputs low $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 9 | 20 25 | μA |
| t_{PLH} | Response Time Low to High $V_{ic} = 0V$, $f = 10kHz$, $R_L = 5.1k\Omega$, $C_L = 15pF$, Overdrive = 5mV TTL Input | | 1.5 0.7 | | μs |
| t_{PHL} | Response Time High to Low $V_{ic} = 0V$, $f = 10kHz$, $R_L = 5.1k\Omega$, $C_L = 15pF$, Overdrive = 5mV TTL Input | | 2.5 0.08 | | μs |

Note : 1. The specified offset voltage is the maximum value required to drive the output up to 4.5V or down to 0.3V.
2. Maximum values including unavoidable inaccuracies of the industrial test.

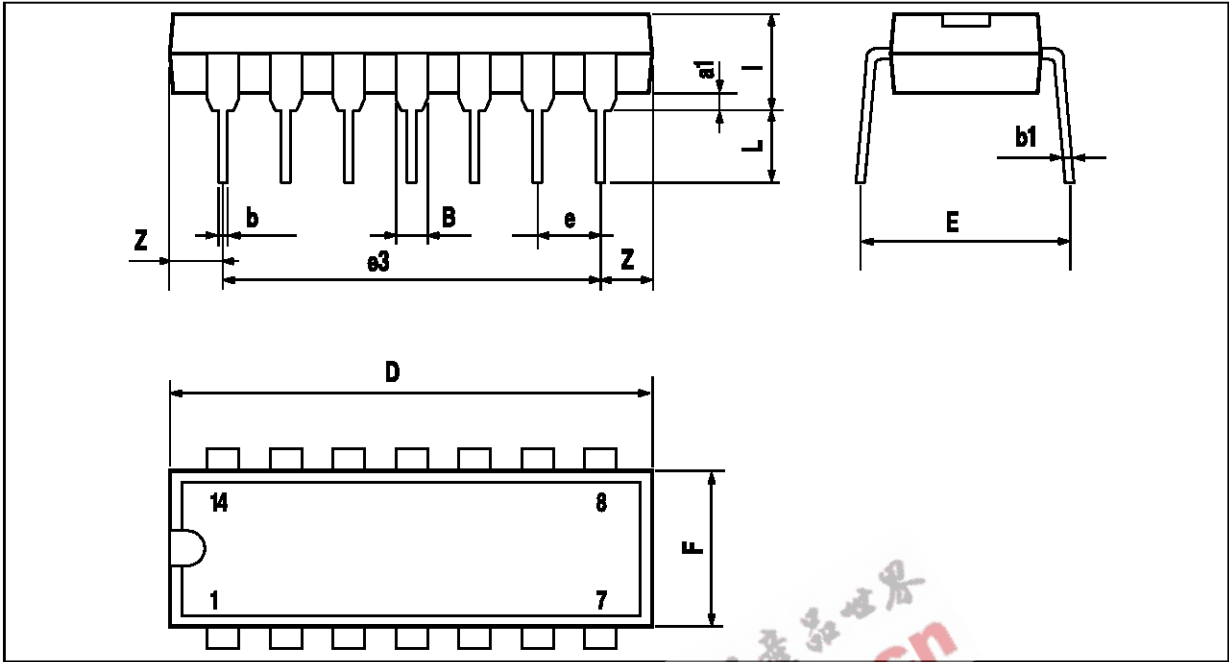
ELECTRICAL CHARACTERISTICS

$V_{CC}^+ = 5V, V_{CC}^- = 0V, T_{amb} = 25^{\circ}C$ (unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|-----------|---|--|-------------|------------|---------|
| V_{io} | Input Offset Voltage - (note 1) $V_{ic} = 2.5V$ $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 1.4 | 5 6.5 | mV |
| I_{io} | Input Offset Current - (note 2) $V_{ic} = 2.5 V$ $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 1 | 300 | pA |
| I_{ib} | Input Bias Current - (note 2) $V_{ic} = 2.5 V$ $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 1 | 600 | pA |
| V_{icm} | Input Common Mode Voltage Range $T_{min.} \leq T_{amb} \leq T_{max.}$ | 0 to $V_{CC}^+ - 1.2$ 0 to $V_{CC}^+ - 1.5$ | | | V |
| CMR | Common-mode Rejection Ratio $V_{ic} = V_{icm min.}$ | | 70 | | dB |
| SVR | Supply Voltage Rejection Ratio $V_{CC}^+ = +5V$ to $+10V$ | | 80 | | dB |
| I_{OH} | High Level Output Current $V_{id} = 1V, V_{OH} = +5V$ $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 2 | 40 1000 | nA |
| V_{OL} | Low Level Output Voltage $V_{id} = -1V, I_{OL} = 6mA$ $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 260 | 400 650 | mV |
| I_{CC} | Supply Current (each comparator) No load - Outputs low $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 10 | 20 25 | μA |
| t_{PLH} | Response Time Low to High $V_{ic} = 0V, f = 10kHz, R_L = 5.1k\Omega, C_L = 15pF,$ Overdrive = 5mV TTL Input | | 1.5 0.7 | | μs |
| t_{PHL} | Response Time High to Low $V_{ic} = 0V, f = 10kHz, R_L = 5.1k\Omega, C_L = 15pF,$ Overdrive = 5mV TTL Input | | 2.5 0.08 | | μs |

Note : 1. The specified offset voltage is the maximum value required to drive the output up to 4.5V or down to 0.3V.
2. Maximum values including unavoidable inaccuracies of the industrial test.

PACKAGE MECHANICAL DATA
 14 PINS - PLASTIC DIP

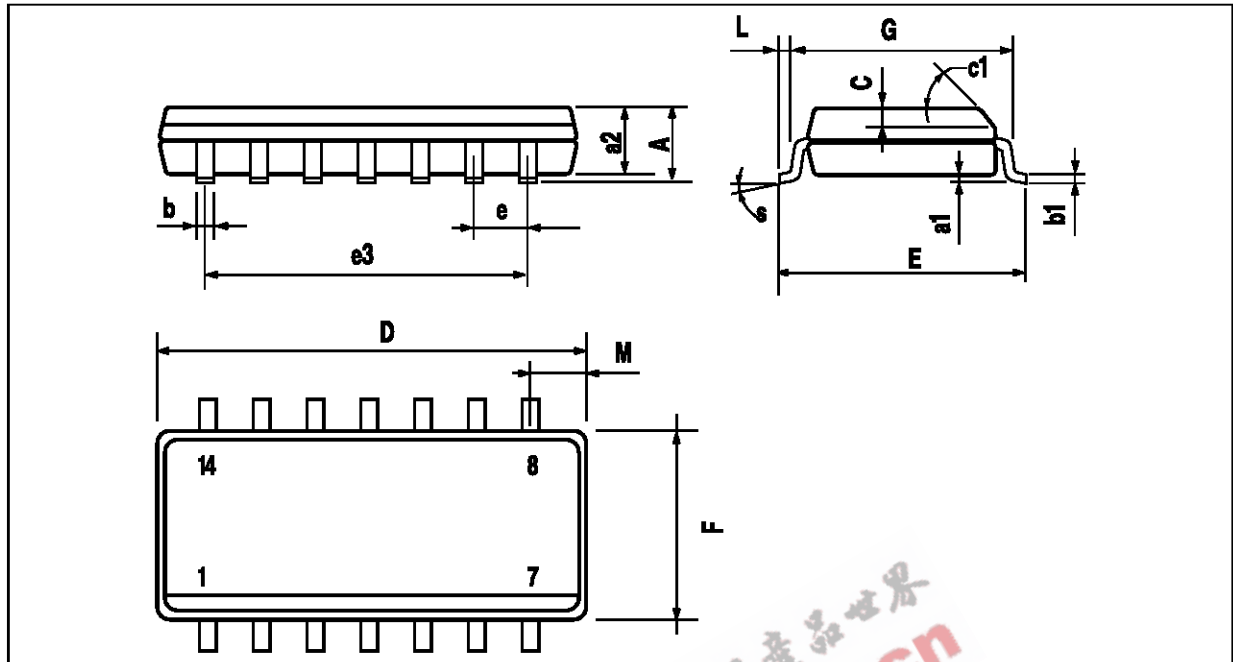


PM-DIP14.EPS

| Dim. | Millimeters | | | Inches | | |
|------|-------------|-------|------|--------|-------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| a1 | 0.51 | | | 0.020 | | |
| B | 1.39 | | 1.65 | 0.055 | | 0.065 |
| b | | 0.5 | | | 0.020 | |
| b1 | | 0.25 | | | 0.010 | |
| D | | | 20 | | | 0.787 |
| E | | 8.5 | | | 0.335 | |
| e | | 2.54 | | | 0.100 | |
| e3 | | 15.24 | | | 0.600 | |
| F | | | 7.1 | | | 0.280 |
| i | | | 5.1 | | | 0.201 |
| L | | 3.3 | | | 0.130 | |
| Z | 1.27 | | 2.54 | 0.050 | | 0.100 |

DIP14.TBL

PACKAGE MECHANICAL DATA
 14 PINS - PLASTIC MICROPACKAGE (SO)



PM-S014.EPS

| Dim. | Millimeters | | | Inches | | |
|------|-------------|------|------|--------|-------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 1.75 | | | 0.069 |
| a1 | 0.1 | | 0.2 | 0.004 | | 0.008 |
| a2 | | | 1.6 | | | 0.063 |
| b | 0.35 | | 0.46 | 0.014 | | 0.018 |
| b1 | 0.19 | | 0.25 | 0.007 | | 0.010 |
| C | | 0.5 | | | 0.020 | |
| c1 | 45° (typ.) | | | | | |
| D | 8.55 | | 8.75 | 0.336 | | 0.334 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 7.62 | | | 0.300 | |
| F | 3.8 | | 4.0 | 0.150 | | 0.157 |
| G | 4.6 | | 5.3 | 0.181 | | 0.208 |
| L | 0.5 | | 1.27 | 0.020 | | 0.050 |
| M | | | 0.68 | | | 0.027 |
| S | 8° (max.) | | | | | |

SO14.TBL

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1997 SGS-THOMSON Microelectronics – Printed in Italy – All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES
 Australia - Brazil - Canada - China - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco
 The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.

ORDER CODE :