



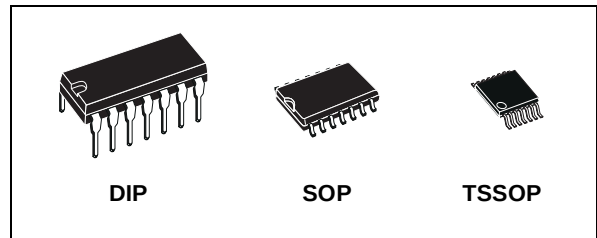
# 74ACT280

## 9 BIT PARITY GENERATOR/CHECKER

- HIGH SPEED:  $t_{PD} = 7ns$  (TYP.) at  $V_{CC} = 5V$
- LOW POWER DISSIPATION:  
 $I_{CC} = 4\mu A$  (MAX.) at  $T_A = 25^\circ C$
- COMPATIBLE WITH TTL OUTPUTS  
 $V_{IH} = 2V$  (MIN.),  $V_{IL} = 0.8V$  (MAX.)
- $50\Omega$  TRANSMISSION LINE DRIVING CAPABILITY
- SYMMETRICAL OUTPUT IMPEDANCE:  
 $|I_{OH}| = I_{OL} = 24mA$  (MIN)
- BALANCED PROPAGATION DELAYS:  
 $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:  
 $V_{CC}$  (OPR) = 4.5V to 5.5V
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 280
- IMPROVED LATCH-UP IMMUNITY

### DESCRIPTION

The 74ACT280 is an advanced high-speed CMOS 9 BIT PARITY GENERATOR CHECKER fabricated with sub-micron silicon gate and double-layer metal wiring C<sup>2</sup>MOS technology. It is composed of nine data inputs (A to I) and odd/even parity outputs ( $\Sigma ODD$  and  $\Sigma EVEN$ ). The nine data inputs control the output conditions. When the number of high level input is odd,  $\Sigma ODD$  output is kept high and  $\Sigma EVEN$  output low.



### ORDER CODES

| PACKAGE | TUBE      | T & R       |
|---------|-----------|-------------|
| DIP     | 74ACT280B |             |
| SOP     | 74ACT280M | 74ACT280MTR |
| TSSOP   |           | 74ACT280TTR |

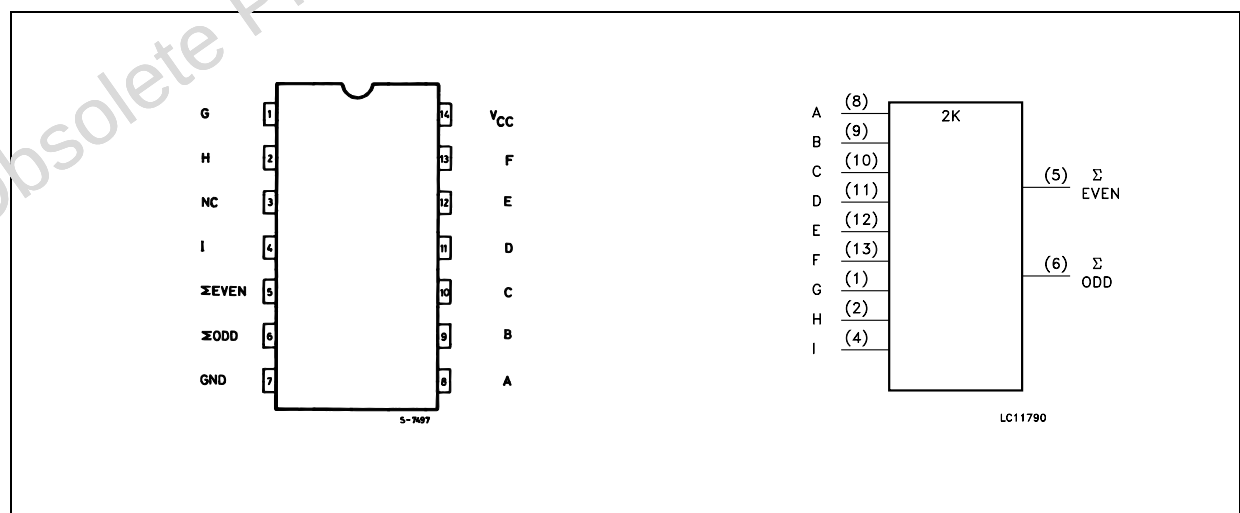
Conservely, when the output is even,  $\Sigma EVEN$  output is kept high and  $\Sigma ODD$  low.

The IC generates either odd or even parity making it flexible application. The word-length capability is easily expanded by cascading.

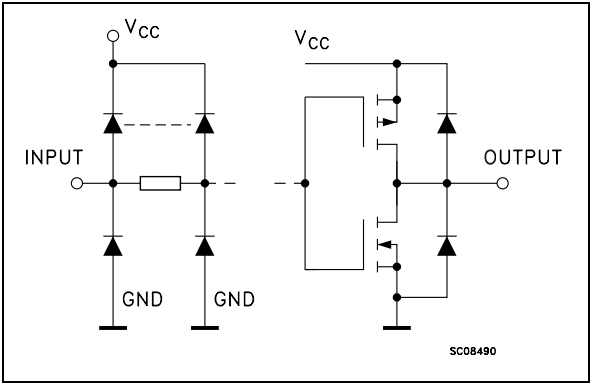
The device is designed to interface directly High Speed CMOS systems with TTL, NMOS and CMOS output voltage levels.

All inputs and outputs are equipped with protection circuits against static discharge, giving them 2KV ESD immunity and transient excess voltage.

### PIN CONNECTION AND IEC LOGIC SYMBOLS



INPUT AND OUTPUT EQUIVALENT CIRCUIT



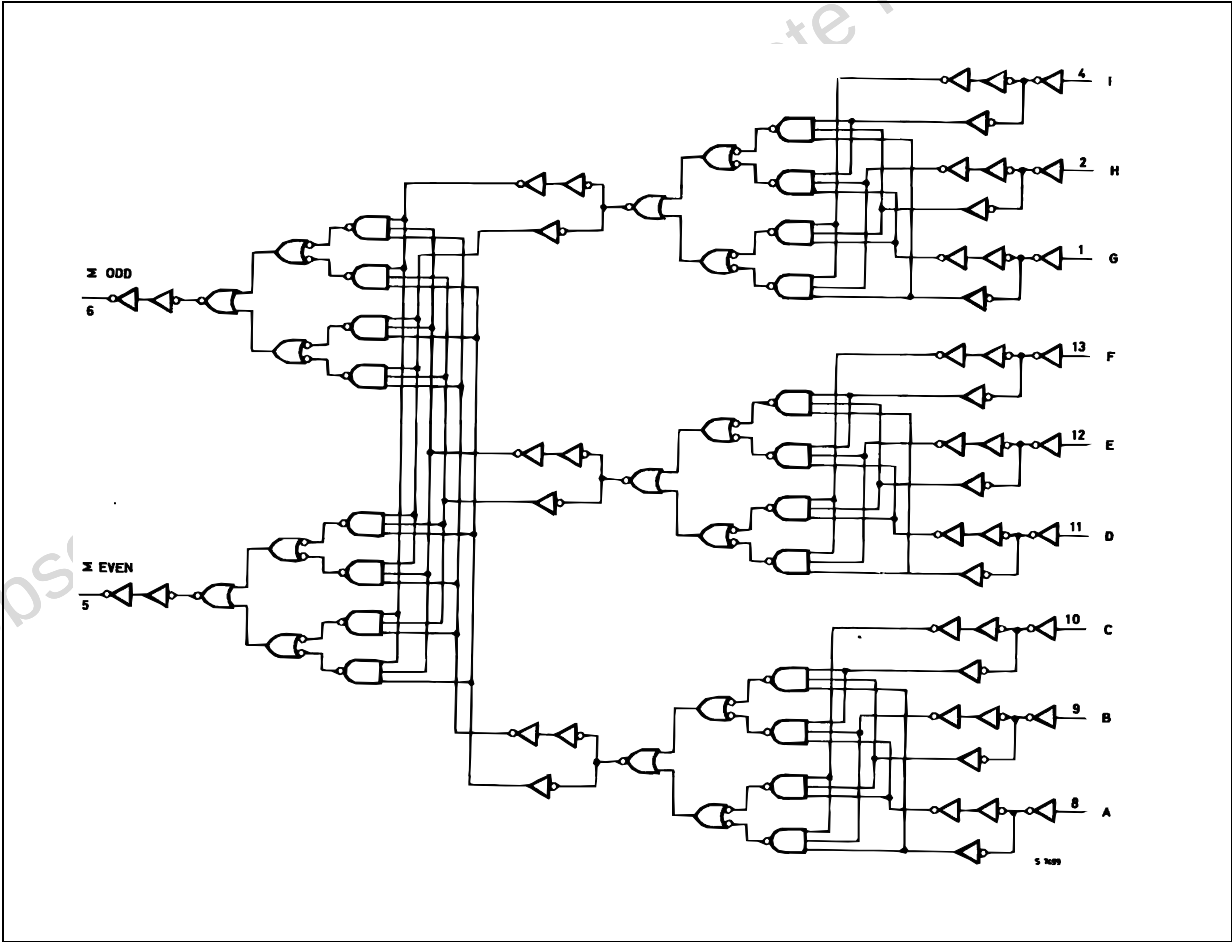
PIN DESCRIPTION

| PIN No                              | SYMBOL                        | NAME AND FUNCTION       |
|-------------------------------------|-------------------------------|-------------------------|
| 5, 6                                | $\Sigma$ EVEN<br>$\Sigma$ ODD | Parity Outputs          |
| 8, 9, 10, 11,<br>12, 13, 1, 2,<br>4 | A to I                        | Data Inputs             |
| 3                                   | NC                            | No Connection           |
| 7                                   | GND                           | Ground (0V)             |
| 14                                  | V <sub>CC</sub>               | Positive Supply Voltage |

TRUTH TABLE

| NUMBER OF INPUTS A - I THAT ARE HIGH | OUTPUT        |              |
|--------------------------------------|---------------|--------------|
|                                      | $\Sigma$ EVEN | $\Sigma$ ODD |
| 0, 2, 4, 6, 8                        | H             | L            |
| 1, 3, 5, 7, 9                        | L             | H            |

LOGIC DIAGRAM



**ABSOLUTE MAXIMUM RATINGS**

| Symbol                | Parameter                     | Value                  | Unit |
|-----------------------|-------------------------------|------------------------|------|
| $V_{CC}$              | Supply Voltage                | -0.5 to +7             | V    |
| $V_I$                 | DC Input Voltage              | -0.5 to $V_{CC} + 0.5$ | V    |
| $V_O$                 | DC Output Voltage             | -0.5 to $V_{CC} + 0.5$ | V    |
| $I_{IK}$              | DC Input Diode Current        | $\pm 20$               | mA   |
| $I_{OK}$              | DC Output Diode Current       | $\pm 20$               | mA   |
| $I_O$                 | DC Output Current             | $\pm 50$               | mA   |
| $I_{CC}$ or $I_{GND}$ | DC $V_{CC}$ or Ground Current | $\pm 200$              | mA   |
| $T_{stg}$             | Storage Temperature           | -65 to +150            | °C   |
| $T_L$                 | Lead Temperature (10 sec)     | 300                    | °C   |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

**RECOMMENDED OPERATING CONDITIONS**

| Symbol   | Parameter                                                | Value         | Unit |
|----------|----------------------------------------------------------|---------------|------|
| $V_{CC}$ | Supply Voltage                                           | 4.5 to 5.5    | V    |
| $V_I$    | Input Voltage                                            | 0 to $V_{CC}$ | V    |
| $V_O$    | Output Voltage                                           | 0 to $V_{CC}$ | V    |
| $T_{op}$ | Operating Temperature                                    | -55 to 125    | °C   |
| dt/dv    | Input Rise and Fall Time $V_{CC} = 4.5$ to 5.5V (note 1) | 8             | ns/V |

1)  $V_{IN}$  from 0.8V to 2.0V

## DC SPECIFICATIONS

| Symbol           | Parameter                          | Test Condition         |                                                    | Value                 |       |       |             |      |              | Unit |      |
|------------------|------------------------------------|------------------------|----------------------------------------------------|-----------------------|-------|-------|-------------|------|--------------|------|------|
|                  |                                    | V <sub>CC</sub><br>(V) |                                                    | T <sub>A</sub> = 25°C |       |       | -40 to 85°C |      | -55 to 125°C |      |      |
|                  |                                    |                        |                                                    | Min.                  | Typ.  | Max.  | Min.        | Max. | Min.         |      | Max. |
| V <sub>IH</sub>  | High Level Input Voltage           | 4.5                    | V <sub>O</sub> = 0.1 V or<br>V <sub>CC</sub> -0.1V | 2.0                   | 1.5   |       | 2.0         |      | 2.0          |      | V    |
|                  |                                    | 5.5                    |                                                    | 2.0                   | 1.5   |       | 2.0         |      | 2.0          |      |      |
| V <sub>IL</sub>  | Low Level Input Voltage            | 4.5                    | V <sub>O</sub> = 0.1 V or<br>V <sub>CC</sub> -0.1V |                       | 1.5   | 0.8   |             | 0.8  |              | 0.8  | V    |
|                  |                                    | 5.5                    |                                                    |                       | 1.5   | 0.8   |             | 0.8  |              | 0.8  |      |
| V <sub>OH</sub>  | High Level Output Voltage          | 4.5                    | I <sub>O</sub> =-50 μA                             | 4.4                   | 4.49  |       | 4.4         |      | 4.4          |      | V    |
|                  |                                    | 5.5                    | I <sub>O</sub> =-50 μA                             | 5.4                   | 5.49  |       | 5.4         |      | 5.4          |      |      |
|                  |                                    | 4.5                    | I <sub>O</sub> =-24 mA                             | 3.86                  |       |       | 3.76        |      | 3.7          |      |      |
|                  |                                    | 5.5                    | I <sub>O</sub> =-24 mA                             | 4.86                  |       |       | 4.76        |      | 4.7          |      |      |
| V <sub>OL</sub>  | Low Level Output Voltage           | 4.5                    | I <sub>O</sub> =50 μA                              |                       | 0.001 | 0.1   |             | 0.1  |              | 0.1  | V    |
|                  |                                    | 5.5                    | I <sub>O</sub> =50 μA                              |                       | 0.001 | 0.1   |             | 0.1  |              | 0.1  |      |
|                  |                                    | 4.5                    | I <sub>O</sub> =24 mA                              |                       |       | 0.36  |             | 0.44 |              | 0.5  |      |
|                  |                                    | 5.5                    | I <sub>O</sub> =24 mA                              |                       |       | 0.36  |             | 0.44 |              | 0.5  |      |
| I <sub>I</sub>   | Input Leakage Current              | 5.5                    | V <sub>I</sub> = V <sub>CC</sub> or GND            |                       |       | ± 0.1 |             | ± 1  |              | ± 1  | μA   |
| I <sub>CCT</sub> | Max I <sub>CC</sub> /Input         | 5.5                    | V <sub>I</sub> = V <sub>CC</sub> - 2.1V            |                       | 0.6   |       |             | 1.5  |              | 1.6  | mA   |
| I <sub>CC</sub>  | Quiescent Supply Current           | 5.5                    | V <sub>I</sub> = V <sub>CC</sub> or GND            |                       |       | 4     |             | 40   |              | 80   | μA   |
| I <sub>OLD</sub> | Dynamic Output Current (note 1, 2) | 5.5                    | V <sub>OLD</sub> = 1.65 V max                      |                       |       |       |             | 75   |              | 50   | mA   |
| I <sub>OHD</sub> |                                    |                        | V <sub>OHD</sub> = 3.85 V min                      |                       |       |       |             | -75  |              | -50  | mA   |

1) Maximum test duration 2ms, one output loaded at time

2) Incident wave switching is guaranteed on transmission lines with impedances as low as 50Ω

AC ELECTRICAL CHARACTERISTICS (C<sub>L</sub> = 50 pF, R<sub>L</sub> = 500 Ω, Input t<sub>r</sub> = t<sub>f</sub> = 3ns)

| Symbol                            | Parameter                                    | Test Condition         |  | Value                 |      |      |             |      |              | Unit |      |
|-----------------------------------|----------------------------------------------|------------------------|--|-----------------------|------|------|-------------|------|--------------|------|------|
|                                   |                                              | V <sub>CC</sub><br>(V) |  | T <sub>A</sub> = 25°C |      |      | -40 to 85°C |      | -55 to 125°C |      |      |
|                                   |                                              |                        |  | Min.                  | Typ. | Max. | Min.        | Max. | Min.         |      | Max. |
| t <sub>PLH</sub> t <sub>PHL</sub> | Propagation Delay Time (Input – ΣODD, ΣEVEN) | 5.0 <sup>(*)</sup>     |  | 3.0                   | 7.0  | 13.0 | 2.0         | 14.5 | 2.0          | 14.5 | ns   |

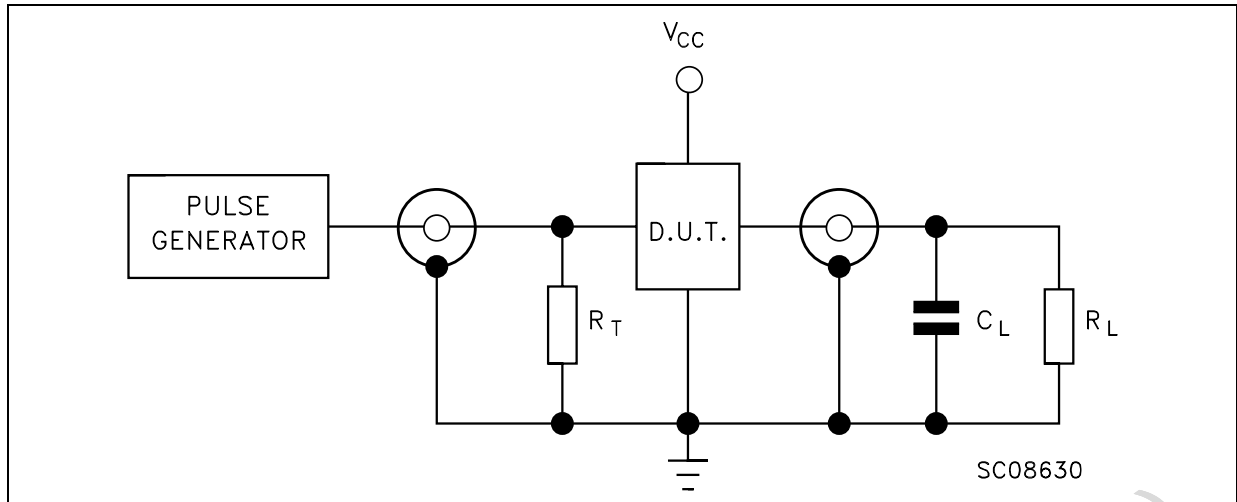
(\*) Voltage range is 5.0V ± 0.5V

## CAPACITIVE CHARACTERISTICS

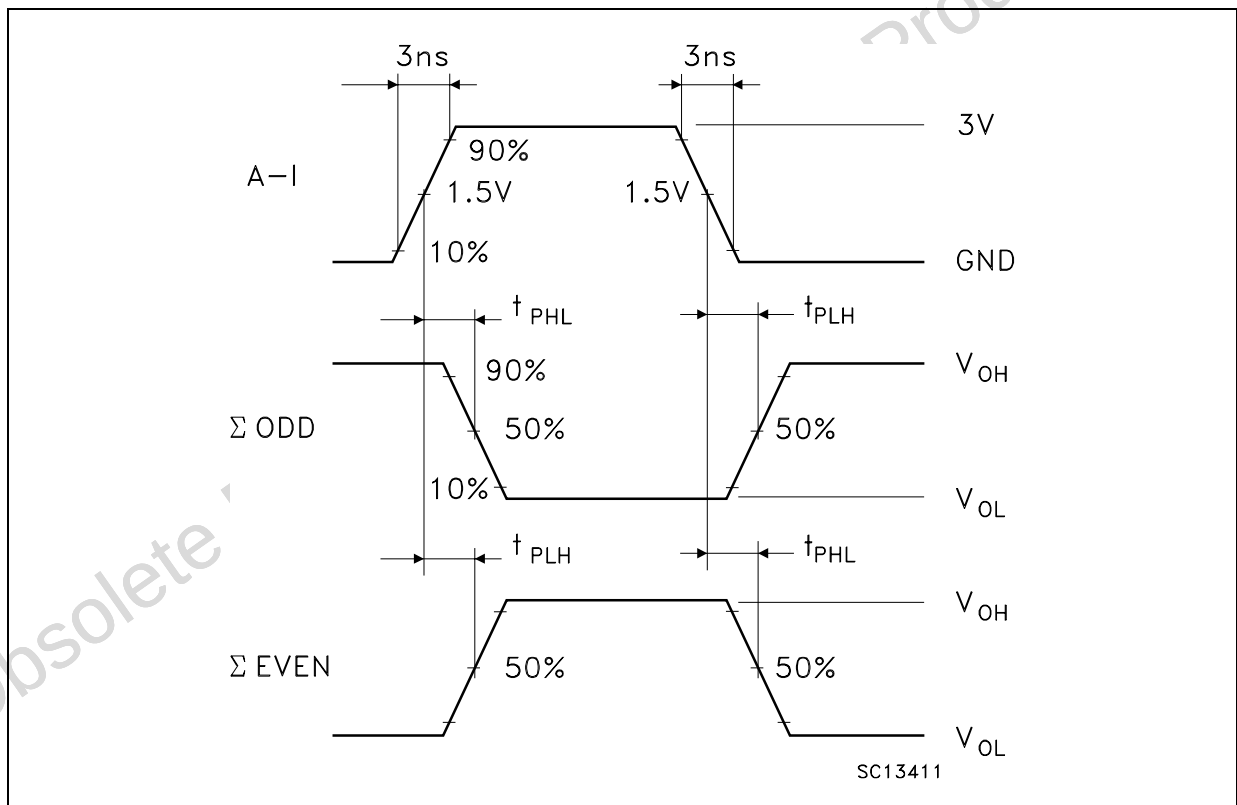
| Symbol          | Parameter                              | Test Condition         |                         | Value                 |      |      |             |      |              | Unit |      |
|-----------------|----------------------------------------|------------------------|-------------------------|-----------------------|------|------|-------------|------|--------------|------|------|
|                 |                                        | V <sub>CC</sub><br>(V) |                         | T <sub>A</sub> = 25°C |      |      | -40 to 85°C |      | -55 to 125°C |      |      |
|                 |                                        |                        |                         | Min.                  | Typ. | Max. | Min.        | Max. | Min.         |      | Max. |
| C <sub>IN</sub> | Input Capacitance                      | 5.0                    |                         |                       | 4    |      |             |      |              |      | pF   |
| C <sub>PD</sub> | Power Dissipation Capacitance (note 1) | 5.0                    | f <sub>IN</sub> = 10MHz |                       | 67   |      |             |      |              |      | pF   |

1) C<sub>PD</sub> is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. I<sub>CC(opr)</sub> = C<sub>PD</sub> × V<sub>CC</sub> × f<sub>IN</sub> + I<sub>CC</sub>/n (per circuit)

## TEST CIRCUIT

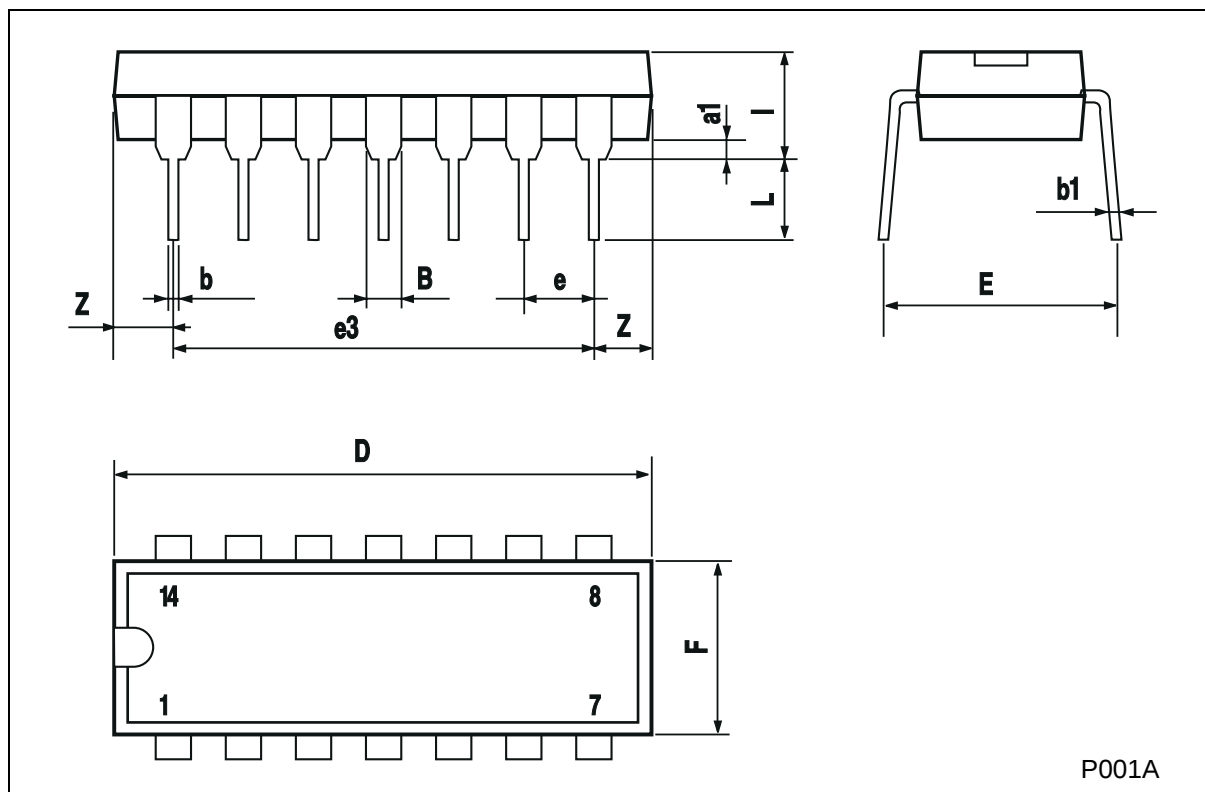


$C_L = 50\text{pF}$  or equivalent (includes jig and probe capacitance)  
 $R_L = R_1 = 500\Omega$  or equivalent  
 $R_T = Z_{OUT}$  of pulse generator (typically  $50\Omega$ )

WAVEFORM: PROPAGATION DELAYS ( $f=1\text{MHz}$ ; 50% duty cycle)

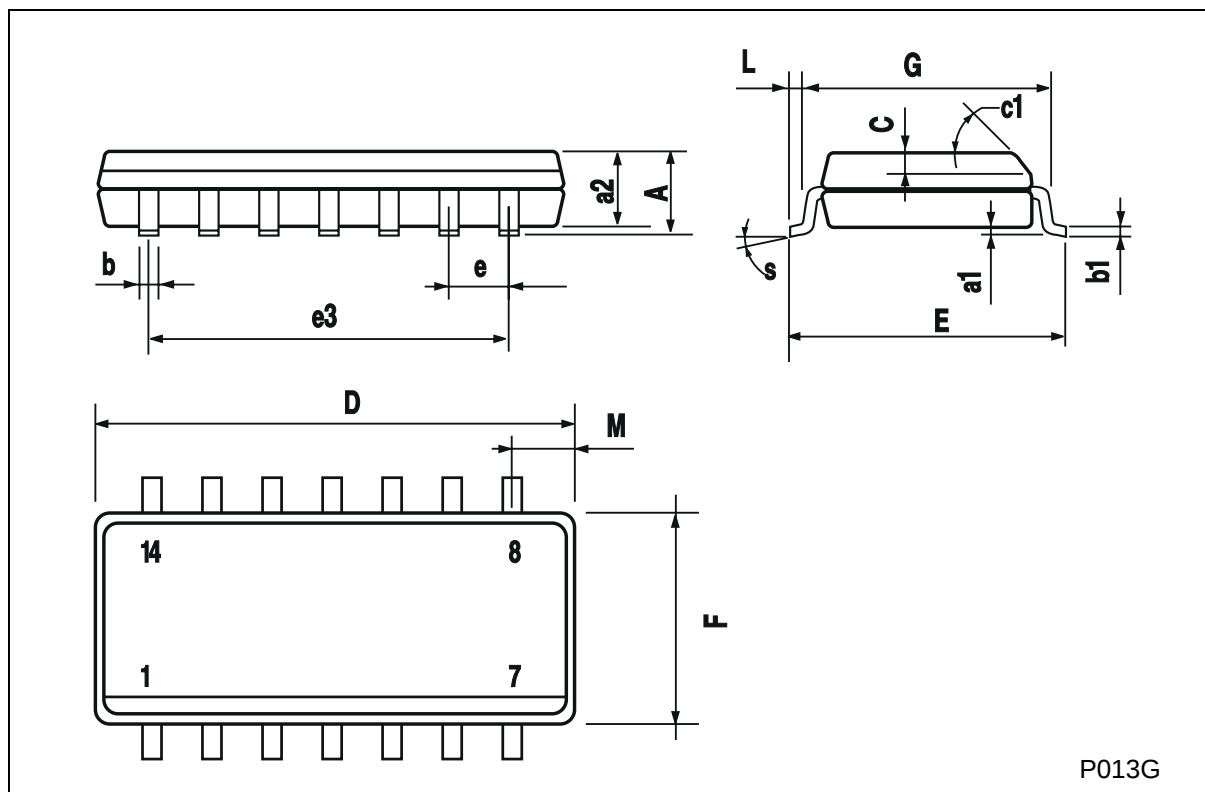
## Plastic DIP-14 MECHANICAL DATA

| DIM. | mm   |       |      | inch  |       |       |
|------|------|-------|------|-------|-------|-------|
|      | 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 |



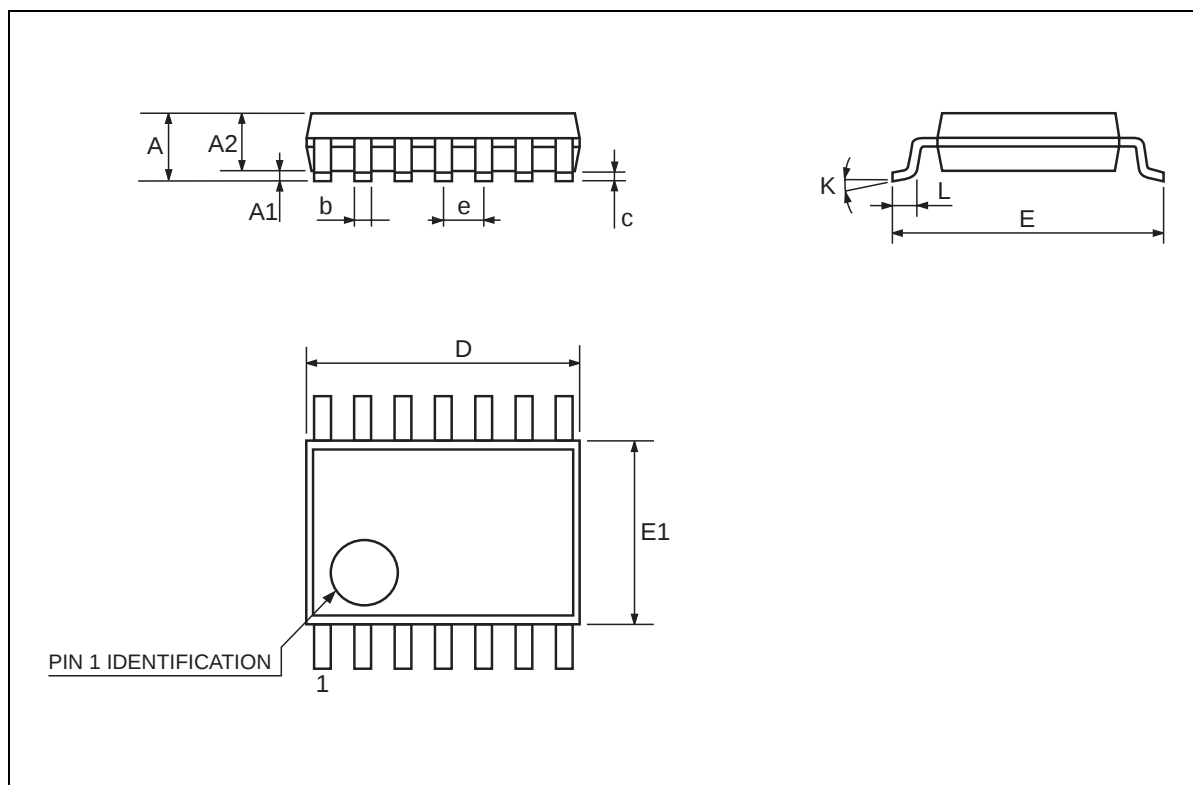
## SO-14 MECHANICAL DATA

| DIM. | mm        |      |      | inch  |       |       |
|------|-----------|------|------|-------|-------|-------|
|      | MIN.      | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |           |      | 1.75 |       |       | 0.068 |
| a1   | 0.1       |      | 0.2  | 0.003 |       | 0.007 |
| a2   |           |      | 1.65 |       |       | 0.064 |
| b    | 0.35      |      | 0.46 | 0.013 |       | 0.018 |
| b1   | 0.19      |      | 0.25 | 0.007 |       | 0.010 |
| C    |           | 0.5  |      |       | 0.019 |       |
| c1   | 45 (typ.) |      |      |       |       |       |
| D    | 8.55      |      | 8.75 | 0.336 |       | 0.344 |
| E    | 5.8       |      | 6.2  | 0.228 |       | 0.244 |
| e    |           | 1.27 |      |       | 0.050 |       |
| e3   |           | 7.62 |      |       | 0.300 |       |
| F    | 3.8       |      | 4.0  | 0.149 |       | 0.157 |
| G    | 4.6       |      | 5.3  | 0.181 |       | 0.208 |
| L    | 0.5       |      | 1.27 | 0.019 |       | 0.050 |
| M    |           |      | 0.68 |       |       | 0.026 |
| S    | 8 (max.)  |      |      |       |       |       |



## TSSOP14 MECHANICAL DATA

| DIM. | mm   |          |      | inch   |            |        |
|------|------|----------|------|--------|------------|--------|
|      | MIN. | TYP.     | MAX. | MIN.   | TYP.       | MAX.   |
| A    |      |          | 1.1  |        |            | 0.433  |
| A1   | 0.05 | 0.10     | 0.15 | 0.002  | 0.004      | 0.006  |
| A2   | 0.85 | 0.9      | 0.95 | 0.335  | 0.354      | 0.374  |
| b    | 0.19 |          | 0.30 | 0.0075 |            | 0.0118 |
| c    | 0.09 |          | 0.20 | 0.0035 |            | 0.0079 |
| D    | 4.9  | 5        | 5.1  | 0.193  | 0.197      | 0.201  |
| E    | 6.25 | 6.4      | 6.5  | 0.246  | 0.252      | 0.256  |
| E1   | 4.3  | 4.4      | 4.48 | 0.169  | 0.173      | 0.176  |
| e    |      | 0.65 BSC |      |        | 0.0256 BSC |        |
| K    | 0°   | 4°       | 8°   | 0°     | 4°         | 8°     |
| L    | 0.50 | 0.60     | 0.70 | 0.020  | 0.024      | 0.028  |



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