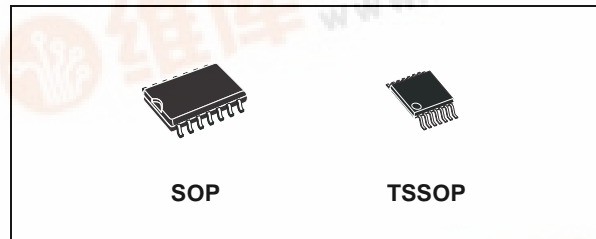




# 74LVQ280

## 9 BIT PARITY GENERATOR

- HIGH SPEED:  
 $t_{PD} = 8 \text{ ns}$  (TYP.) at  $V_{CC} = 3.3 \text{ V}$
- COMPATIBLE WITH TTL OUTPUTS
- LOW POWER DISSIPATION:  
 $I_{CC} = 2\mu\text{A}$ (MAX.) at  $T_A=25^\circ\text{C}$
- LOW NOISE:  
 $V_{OLP} = 0.3\text{V}$  (TYP.) at  $V_{CC} = 3.3\text{V}$
- $75\Omega$  TRANSMISSION LINE DRIVING CAPABILITY
- SYMMETRICAL OUTPUT IMPEDANCE:  
 $|I_{OH}| = I_{OL} = 12\text{mA}$  (MIN) at  $V_{CC} = 3.0 \text{ V}$
- PCI BUS LEVELS GUARANTEED AT 24 mA
- BALANCED PROPAGATION DELAYS:  
 $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:  
 $V_{CC}(\text{OPR}) = 2\text{V}$  to  $3.6\text{V}$
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 280
- IMPROVED LATCH-UP IMMUNITY



### ORDER CODES

PACKAGE	TUBE	T & R
SOP	74LVQ280M	74LVQ280MTR
TSSOP		74LVQ280TTR

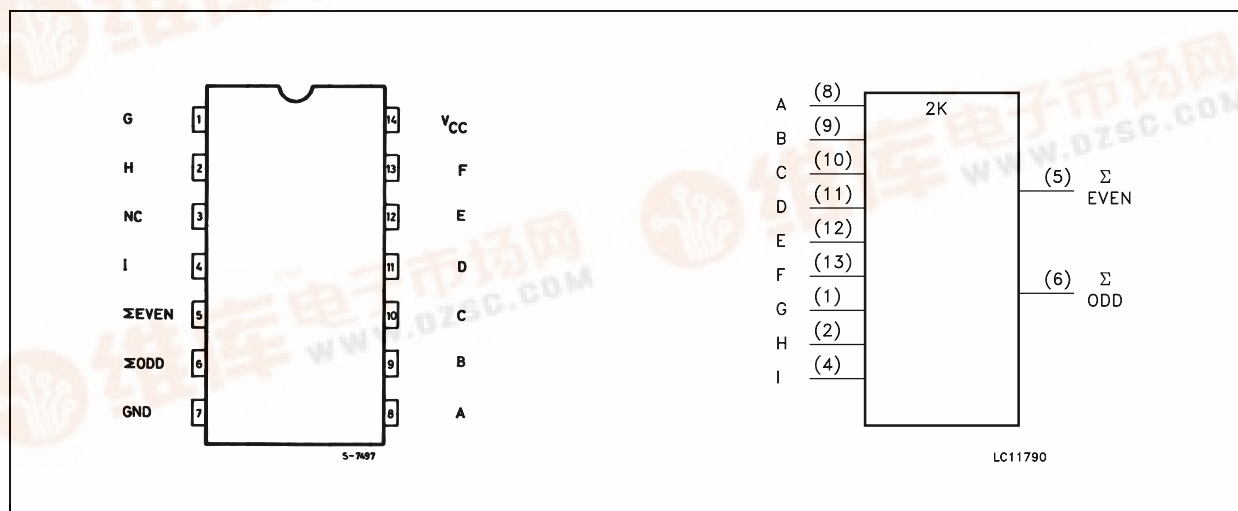
### DESCRIPTION

The 74LVQ280 is a low voltage CMOS 9 BIT PARITY GENERATOR fabricated with sub-micron silicon gate and double-layer metal wiring C<sup>2</sup>MOS technology. It is ideal for low power and low noise 3.3V applications.

It is composed of nine data inputs (A to I) and odd/even parity outputs ( $\Sigma\text{ODD}$  and  $\Sigma\text{EVEN}$ ). The nine

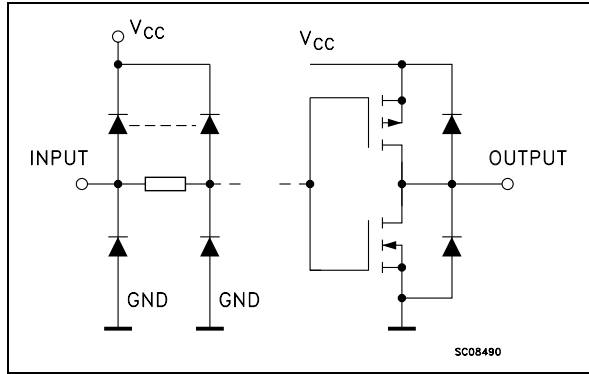
data inputs control the output conditions. When the number of high level input is odd,  $\Sigma\text{ODD}$  output is kept high and  $\Sigma\text{EVEN}$  output low. Conversely, when the number of high level is even,  $\Sigma\text{EVEN}$  output is kept high and  $\Sigma\text{ODD}$  low. The IC generates either odd or even parity making it flexible application. The word-length capability is easily expanded by cascading. 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



# 74LVQ280

## INPUT AND OUTPUT EQUIVALENT CIRCUIT



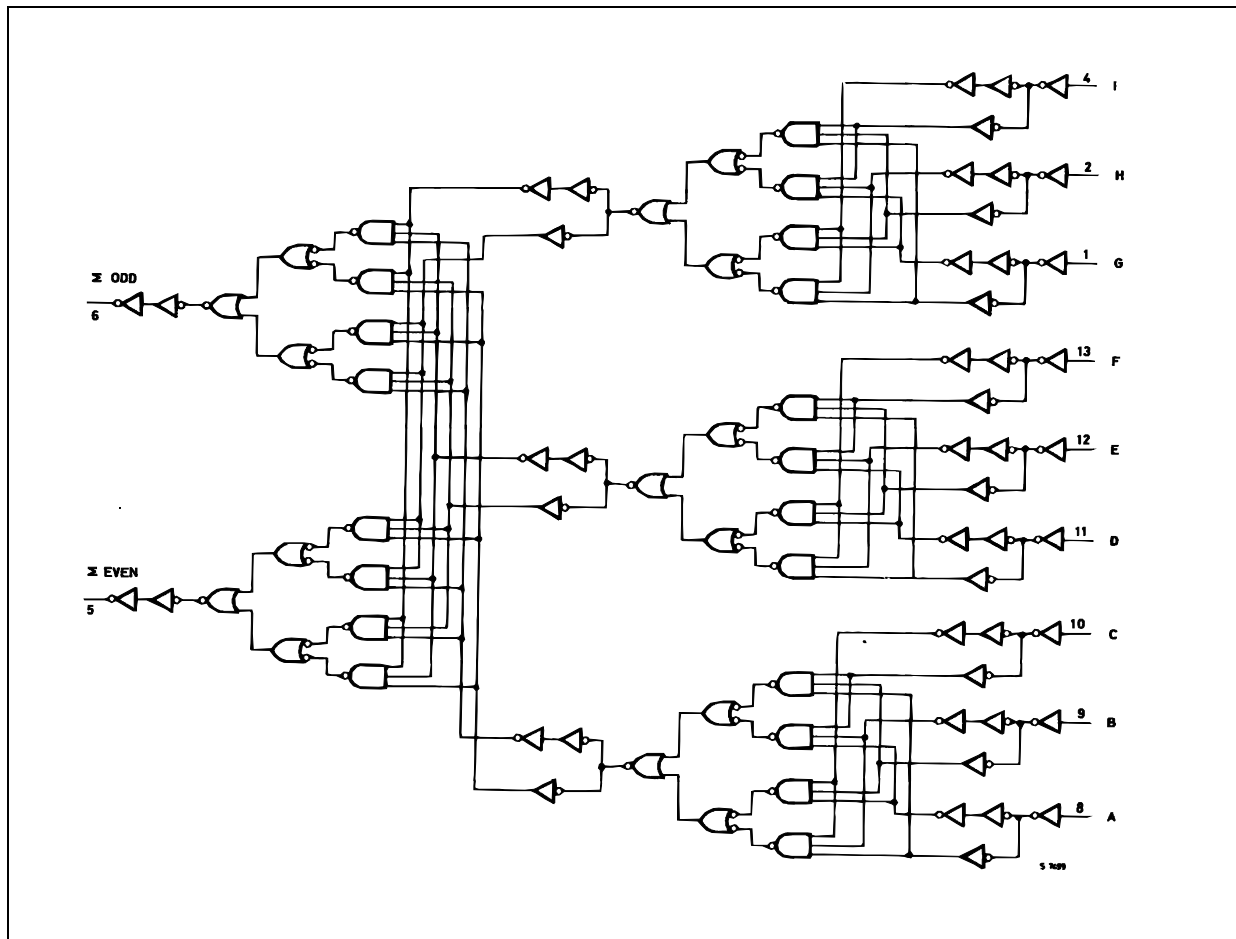
## PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
5	$\Sigma$ EVEN	Even Parity Output
6	$\Sigma$ ODD	Odd Parity Output
8, 9, 10, 11, 12, 13, 1, 2, 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	OUTPUTS	
	$\Sigma$ 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	$\pm 300$	mA
$T_{stg}$	Storage Temperature	-65 to +150	$^{\circ}C$
$T_L$	Lead Temperature (10 sec)	300	$^{\circ}C$

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 (note 1)	2 to 3.6	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	$^{\circ}C$

1) Truth Table guaranteed: 1.2V to 3.6V

**DC SPECIFICATIONS**

Symbol	Parameter	Test Condition		Value						Unit			
				$T_A = 25^{\circ}C$			-40 to 85 $^{\circ}C$		-55 to 125 $^{\circ}C$				
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.		
$V_{IH}$	High Level Input Voltage	3.0 to 3.6				2.0			2.0		2.0		V
$V_{IL}$	Low Level Input Voltage				0.8		0.8			0.8		V	
$V_{OH}$	High Level Output Voltage	3.0	$I_O = -50 \mu A$	2.9	2.99		2.9		2.9			V	
			$I_O = -12 mA$	2.58			2.48		2.48			V	
			$I_O = -24 mA$				2.2		2.2			V	
$V_{OL}$	Low Level Output Voltage	3.0	$I_O = 50 \mu A$		0.002	0.1		0.1		0.1		V	
			$I_O = 12 mA$		0	0.36		0.44		0.44		V	
			$I_O = 24 mA$					0.55		0.55		V	
$I_I$	Input Leakage Current	3.6	$V_I = V_{CC}$ or GND			$\pm 0.1$		$\pm 1$		$\pm 1$	$\mu A$		
$I_{CC}$	Quiescent Supply Current	3.6	$V_I = V_{CC}$ or GND			2		20		20	$\mu A$		
$I_{OLD}$	Dynamic Output Current (note 1, 2)	3.6	$V_{OLD} = 0.8 V$ max				36		25		mA		
$I_{OHD}$			$V_{OHD} = 2 V$ min				-25		-25		mA		

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

2) Incident wave switching is guaranteed on transmission lines with impedances as low as 75 $\Omega$

## DYNAMIC SWITCHING CHARACTERISTICS

Symbol	Parameter	Test Condition		Value						Unit	
		V <sub>CC</sub> (V)		T <sub>A</sub> = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
V <sub>OLP</sub>	Dynamic Low Voltage Quiet Output (note 1, 2)	3.3	C <sub>L</sub> = 50 pF		0.3	0.8					V
V <sub>OLV</sub>				-0.8	-0.3						
V <sub>IHD</sub>	Dynamic High Voltage Input (note 1, 3)	3.3		2						V	
V <sub>ILD</sub>	Dynamic Low Voltage Input (note 1, 3)	3.3				0.8					V

1) Worst case package.

2) Max number of outputs defined as (n). Data inputs are driven 0V to 3.3V, (n-1) outputs switching and one output at GND.

3) Max number of data inputs (n) switching. (n-1) switching 0V to 3.3V. Inputs under test switching: 3.3V to threshold (V<sub>ILD</sub>), 0V to threshold (V<sub>IHD</sub>), f=1MHz.

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> (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	2.7			9.9	16.0		19.0		22.0	ns
		3.3(*)			8.0	11.5		13.5		16.0	
t <sub>OSLH</sub> t <sub>OSSL</sub>	Output To Output Skew Time (note1, 2)	2.7			0.5	1.0		1.0		1.0	ns
		3.3(*)			0.5	1.0		1.0		1.0	

1) Skew is defined as the absolute value of the difference between the actual propagation delay for any two outputs of the same device switching in the same direction, either HIGH or LOW (t<sub>OSLH</sub> = |t<sub>PLHm</sub> - t<sub>PLHn</sub>|, t<sub>OSSL</sub> = |t<sub>PHLm</sub> - t<sub>PHLn</sub>|)

2) Parameter guaranteed by design

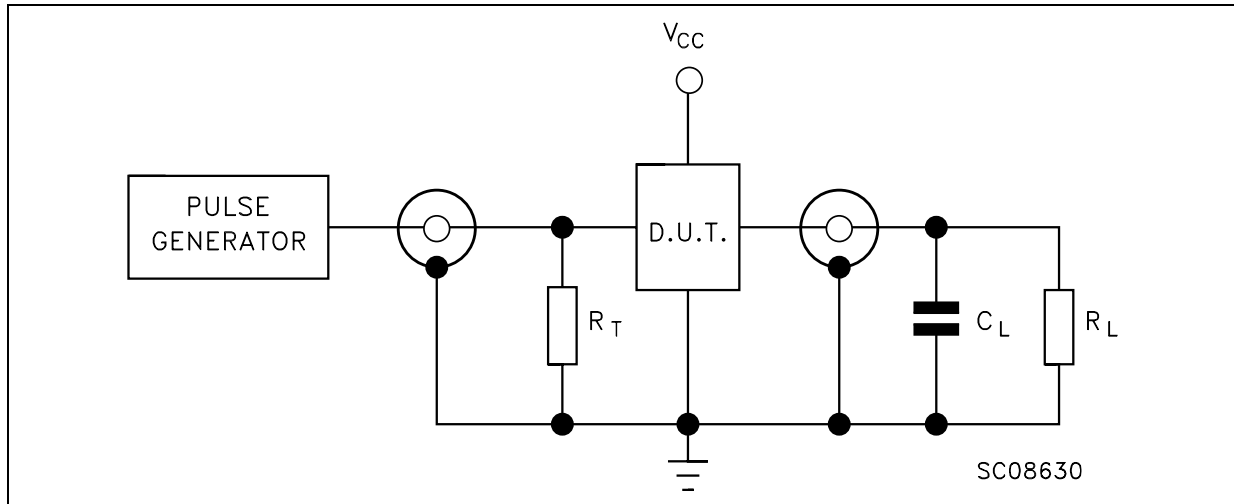
(\*) Voltage range is 3.3V ± 0.3V

## CAPACITIVE CHARACTERISTICS

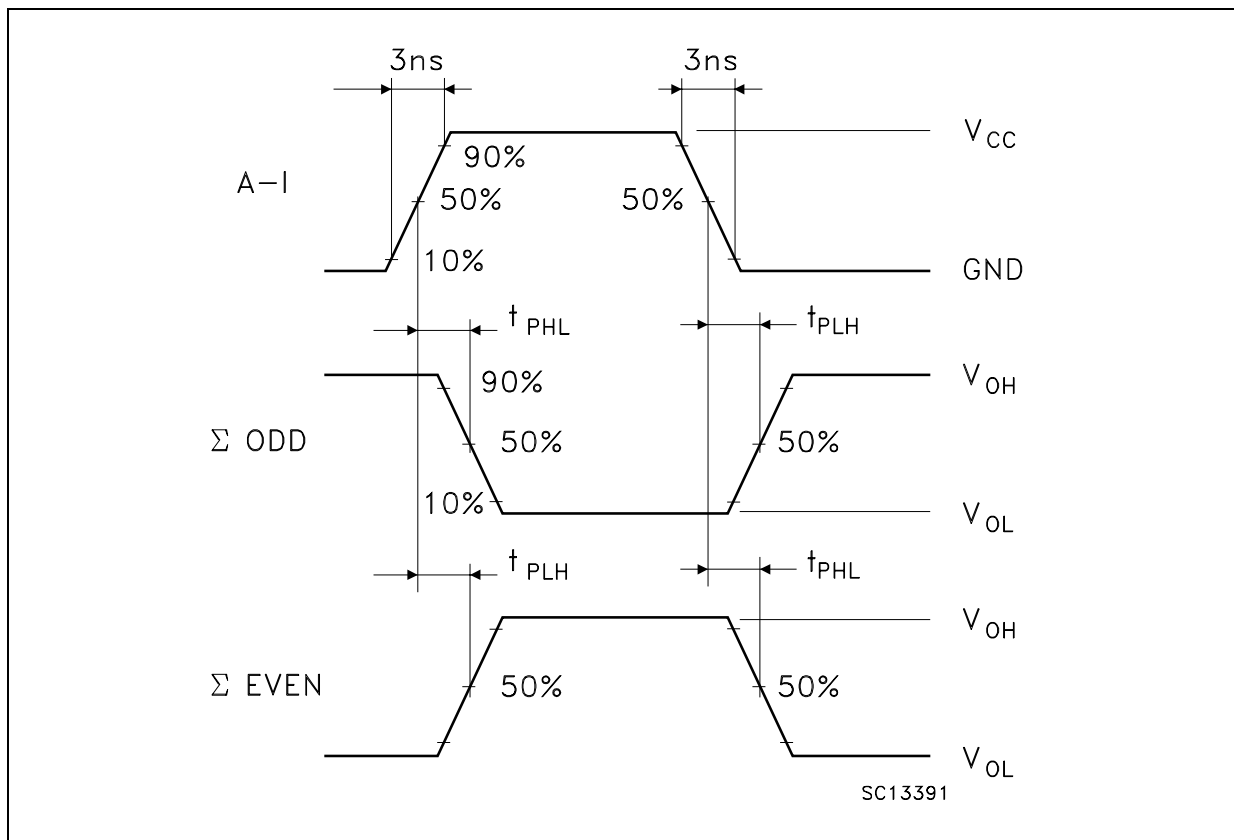
Symbol	Parameter	Test Condition		Value						Unit	
		V <sub>CC</sub> (V)		T <sub>A</sub> = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
C <sub>IN</sub>	Input Capacitance	3.3			4						pF
C <sub>PD</sub>	Power Dissipation Capacitance (note 1)	3.3	f <sub>IN</sub> = 10MHz		59						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

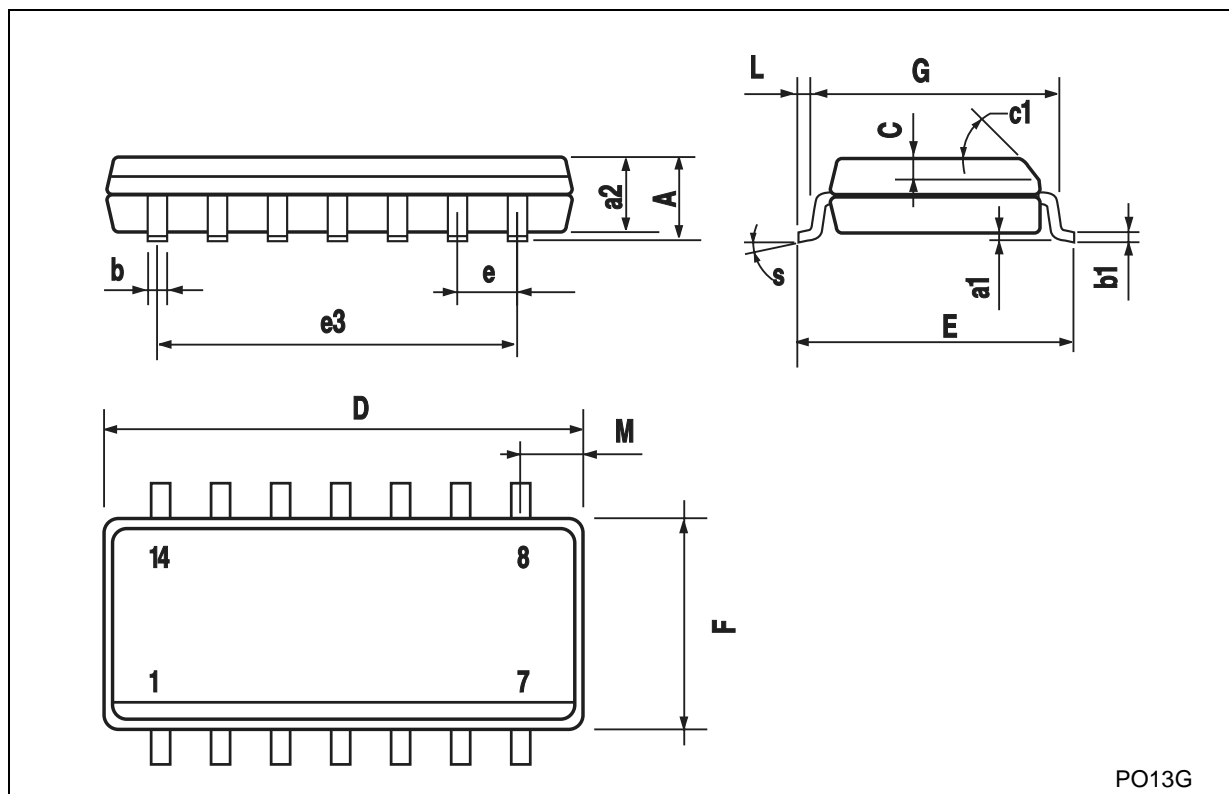


$C_L = 50\text{pF}$  or equivalent (includes jig and probe capacitance)  
 $R_L = 500\Omega$  or equivalent  
 $R_T = Z_{OUT}$  of pulse generator (typically  $50\Omega$ )

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

## SO-14 MECHANICAL DATA

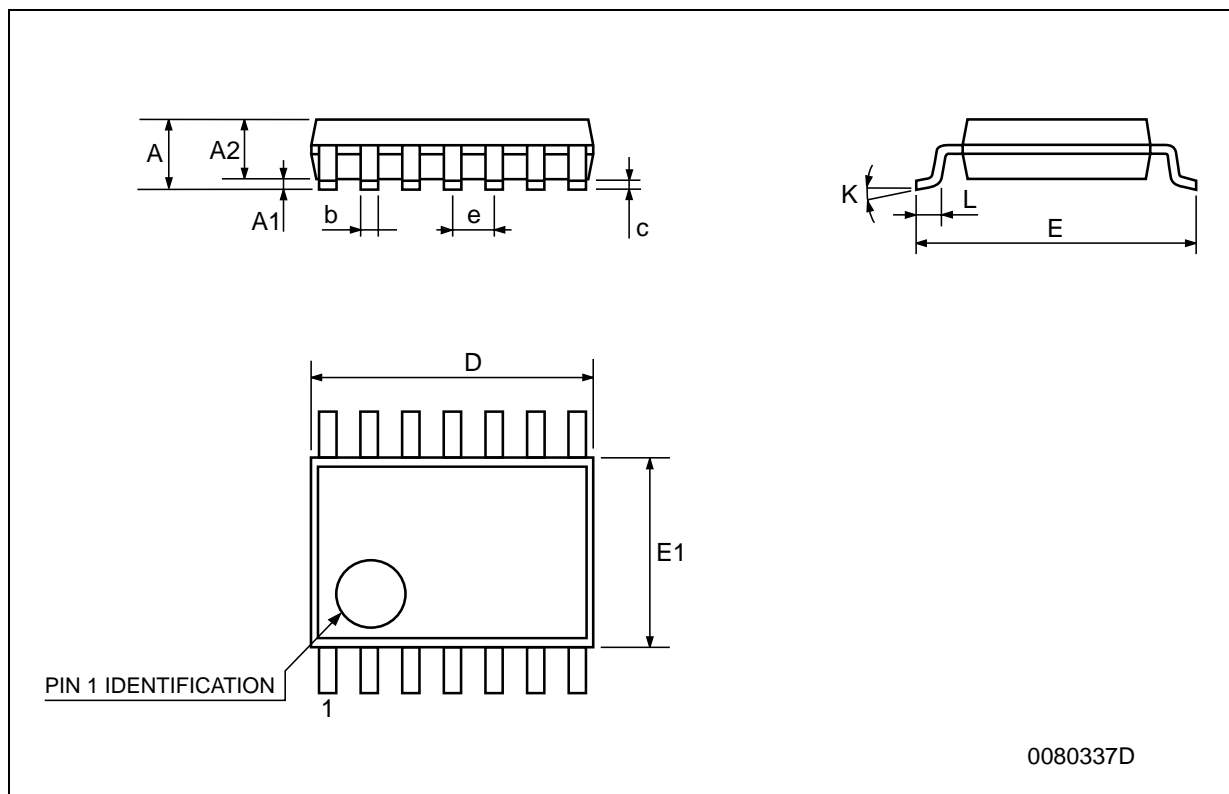
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.003		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	8.55		8.75	0.336		0.344
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		7.62			0.300	
F	3.8		4.0	0.149		0.157
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.)					



PO13G

## TSSOP14 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0089
D	4.9	5	5.1	0.193	0.197	0.201
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030



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