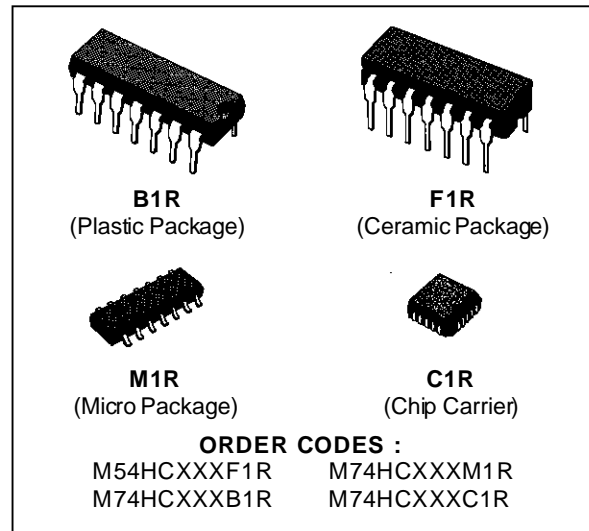


**QUAD BUS BUFFERS (3-STATE)**

- HIGH SPEED  
 $t_{PD} = 8 \text{ ns}$  (TYP.) AT  $V_{CC} = 5 \text{ V}$
- LOW POWER DISSIPATION  
 $I_{CC} = 4 \mu\text{A}$  (MAX.) AT  $25^\circ\text{C}$
- OUTPUT DRIVE CAPABILITY  
15 LSTTL LOADS
- BALANCED PROPAGATION DELAYS  
 $t_{PLH} = t_{PHL}$
- SYMMETRICAL OUTPUT IMPEDANCE  
 $I_{OL} = |I_{OH}| = 6 \text{ mA}$  (MIN.)
- HIGH NOISE IMMUNITY  
 $V_{NIH} = V_{NIL} = 28\% V_{CC}$  (MIN.)
- WIDE OPERATING VOLTAGE RANGE  
 $V_{CC} \text{ (OPR)} = 2 \text{ V TO } 6 \text{ V}$
- PIN AND FUNCTION COMPATIBLE  
WITH 54/74LS125/126



**DESCRIPTION**

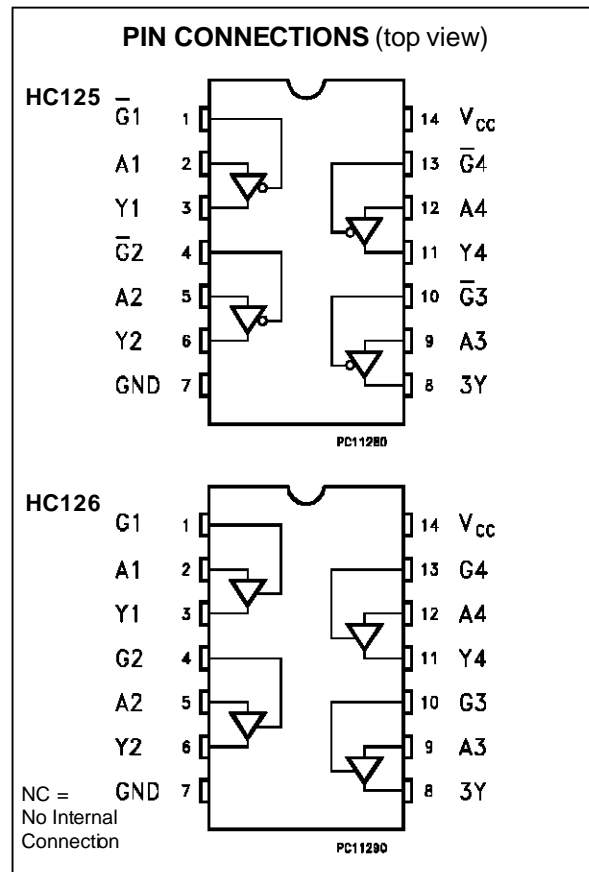
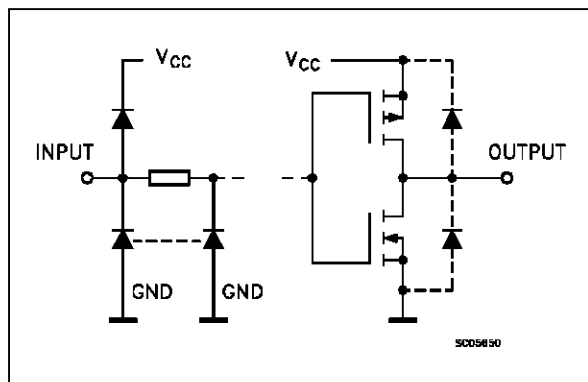
The M54/74HC125/126 are high speed CMOS QUAD BUS BUFFER (3-STATE) FABRICATED IN SILICON GATE C<sup>2</sup>MOS technology.

They have the same high speed performance of LSTTL combined with true CMOS low power consumption.

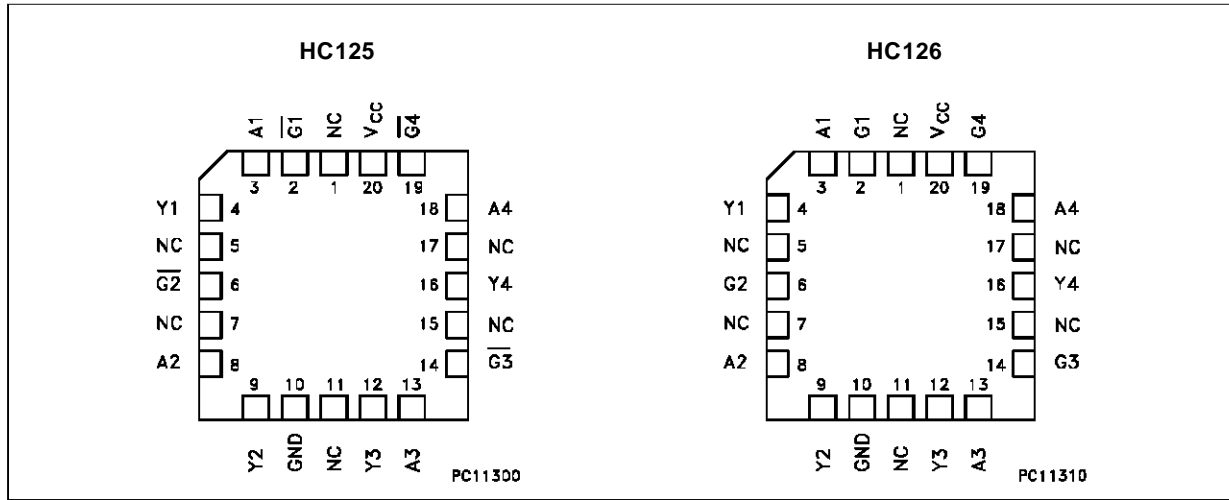
These devices require the same 3-STATE control input G to be taken high to make the output go into the high impedance state.

All inputs are equipped with protection circuits against static discharge and transient excess voltage.

**INPUT AND OUTPUT EQUIVALENT CIRCUIT**



CHIP CARRIER



TRUTH TABLE (HC125)

A	$\overline{G}$	Y
X	H	Z
L	L	L
H	L	H

TRUTH TABLE (HC126)

A	G	Y
X	L	Z
L	H	L
H	H	H

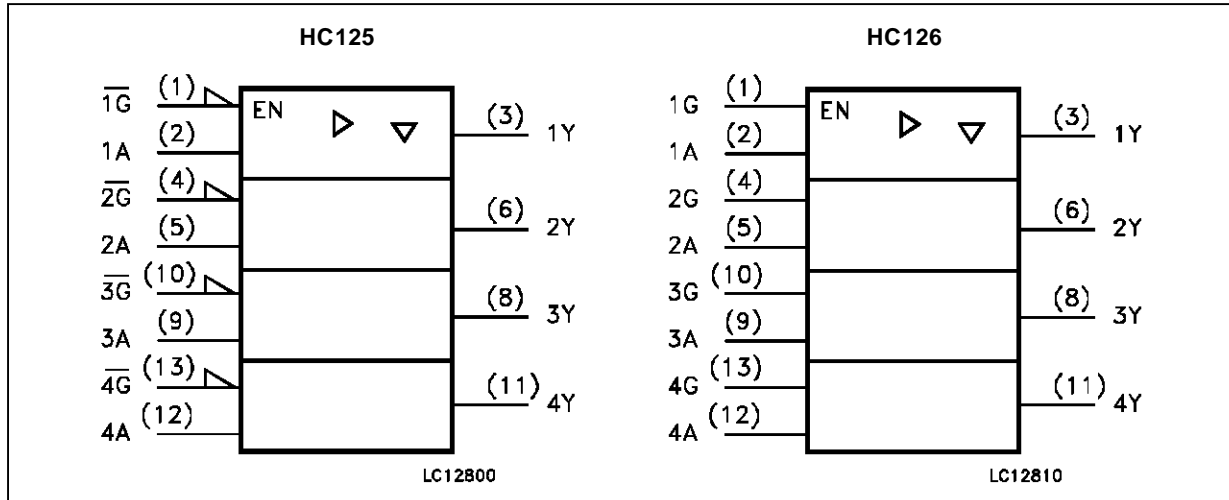
PIN DESCRIPTION (HC125)

PIN No	SYMBOL	NAME AND FUNCTION
1, 4, 10, 13	$\overline{G1}$ to $\overline{G4}$	Output Enable Input
2, 5, 9, 12	A1 to A4	Data Inputs
3, 6, 8, 11	Y1 to Y4	Data Outputs
7	GND	Ground (0V)
14	V <sub>cc</sub>	Positive Supply Voltage

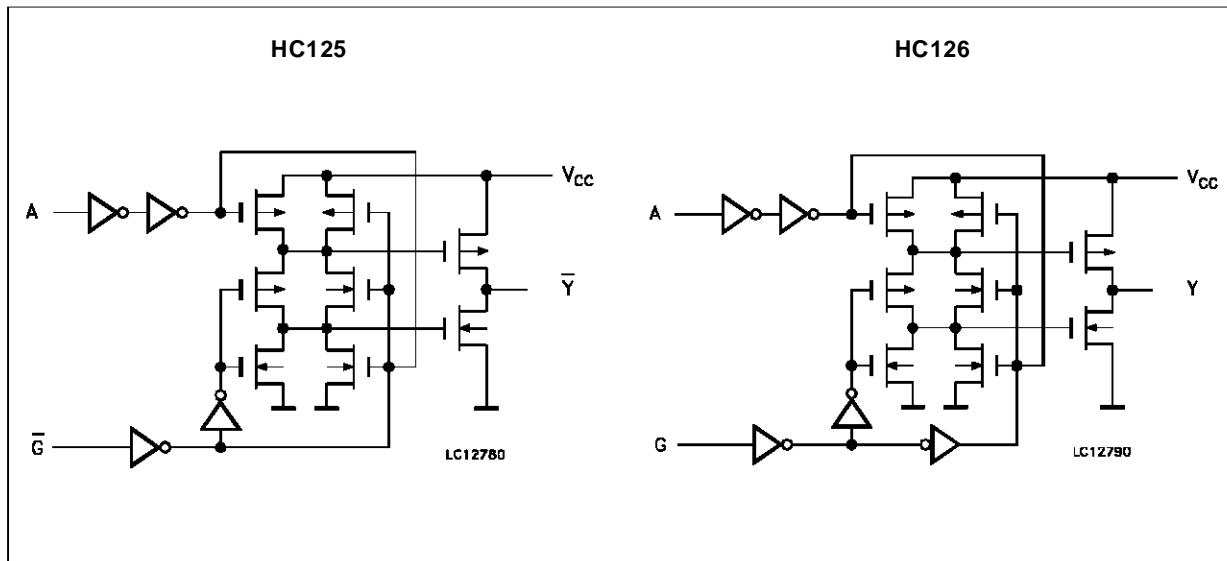
PIN DESCRIPTION (HC126)

PIN No	SYMBOL	NAME AND FUNCTION
1, 4, 10, 13	G1 to G4	Output Enable Input
2, 5, 9, 12	A1 to A4	Data Inputs
3, 6, 8, 11	Y1 to Y4	Data Outputs
7	GND	Ground (0V)
14	V <sub>cc</sub>	Positive Supply Voltage

IEC LOGIC SYMBOLS



**CIRCUIT DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	-0.5 to +7	V
V <sub>I</sub>	DC Input Voltage	-0.5 to V <sub>CC</sub> + 0.5	V
V <sub>O</sub>	DC Output Voltage	-0.5 to V <sub>CC</sub> + 0.5	V
I <sub>IK</sub>	DC Input Diode Current	± 20	mA
I <sub>OK</sub>	DC Output Diode Current	± 20	mA
I <sub>O</sub>	DC Output Source Sink Current Per Output Pin	± 35	mA
I <sub>CC</sub> or I <sub>GND</sub>	DC V <sub>CC</sub> or Ground Current	± 70	mA
P <sub>D</sub>	Power Dissipation	500 (*)	mW
T <sub>stg</sub>	Storage Temperature	-65 to +150	°C
T <sub>L</sub>	Lead Temperature (10 sec)	300	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.  
 (\*) 500 mW: ≅ 65 °C derate to 300 mW by 10mW/°C: 65 °C to 85 °C

**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	2 to 6	V
V <sub>I</sub>	Input Voltage	0 to V <sub>CC</sub>	V
V <sub>O</sub>	Output Voltage	0 to V <sub>CC</sub>	V
T <sub>op</sub>	Operating Temperature: <b>M54HC Series</b> <b>M74HC Series</b>	-55 to +125 -40 to +85	°C °C
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time	V <sub>CC</sub> = 2 V	ns
		V <sub>CC</sub> = 4.5 V	
		V <sub>CC</sub> = 6 V	

**DC SPECIFICATIONS**

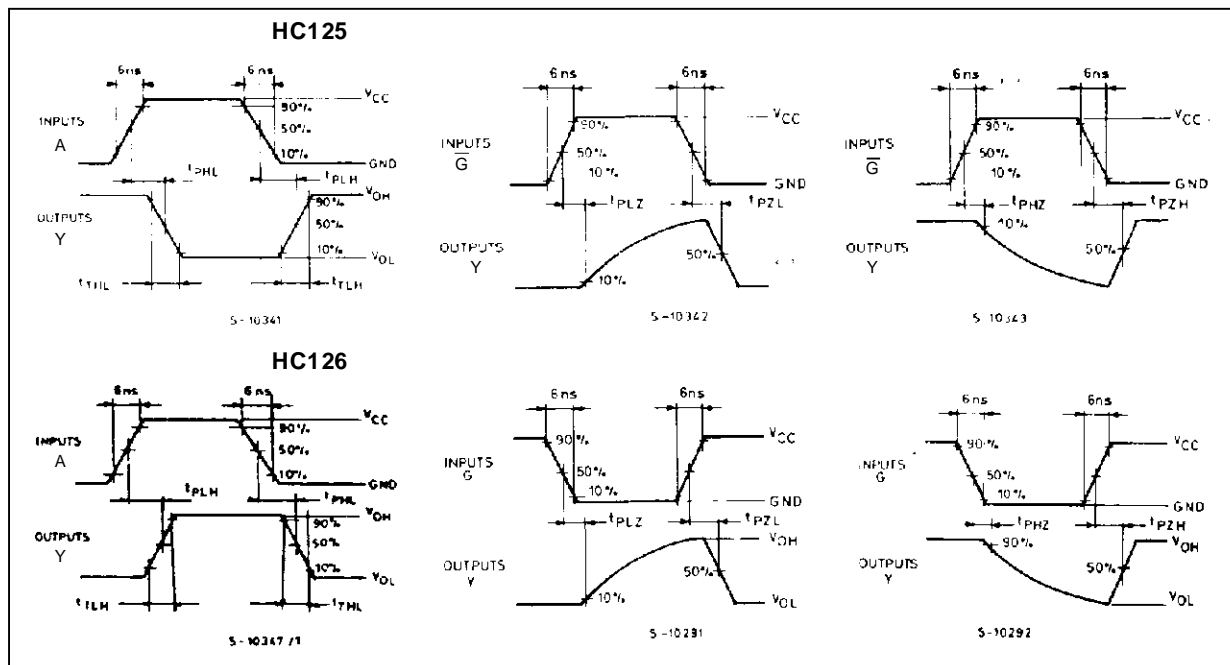
Symbol	Parameter	Test Conditions		Value						Unit		
		V <sub>CC</sub> (V)		T <sub>A</sub> = 25 °C 54HC and 74HC			-40 to 85 °C 74HC		-55 to 125 °C 54HC			
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.	
V <sub>IH</sub>	High Level Input Voltage	2.0		1.5			1.5		1.5		V	
		4.5		3.15			3.15		3.15			
		6.0		4.2			4.2		4.2			
V <sub>IL</sub>	Low Level Input Voltage	2.0				0.5		0.5		0.5	V	
		4.5				1.35		1.35		1.35		
		6.0				1.8		1.8		1.8		
V <sub>OH</sub>	High Level Output Voltage	2.0	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>O</sub> = -20 μA	1.9	2.0		1.9		1.9	V	
		4.5			4.4	4.5		4.4		4.4		
		6.0			5.9	6.0		5.9		5.9		
		4.5	I <sub>O</sub> = -6.0 mA	4.18	4.31		4.13		4.10			
		6.0		I <sub>O</sub> = -7.8 mA	5.68	5.8		5.63		5.60		
V <sub>OL</sub>	Low Level Output Voltage	2.0	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>O</sub> = 20 μA		0.0	0.1		0.1		0.1	V
		4.5				0.0	0.1		0.1		0.1	
		6.0				0.0	0.1		0.1		0.1	
		4.5	I <sub>O</sub> = 6.0 mA		0.17	0.26		0.33		0.40		
		6.0		I <sub>O</sub> = 7.8 mA		0.18	0.26		0.33		0.40	
I <sub>I</sub>	Input Leakage Current	6.0	V <sub>I</sub> = V <sub>CC</sub> or GND				±0.1		±1		±1	μA
I <sub>OZ</sub>	3 State Output Off-state Current	6.0	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> V <sub>O</sub> = V <sub>CC</sub> or GND				±0.5		±5		±10	μA
I <sub>CC</sub>	Quiescent Supply Current	6.0	V <sub>I</sub> = V <sub>CC</sub> or GND				4		40		80	μA

AC ELECTRICAL CHARACTERISTICS (Input  $t_r = t_f = 6$  ns)

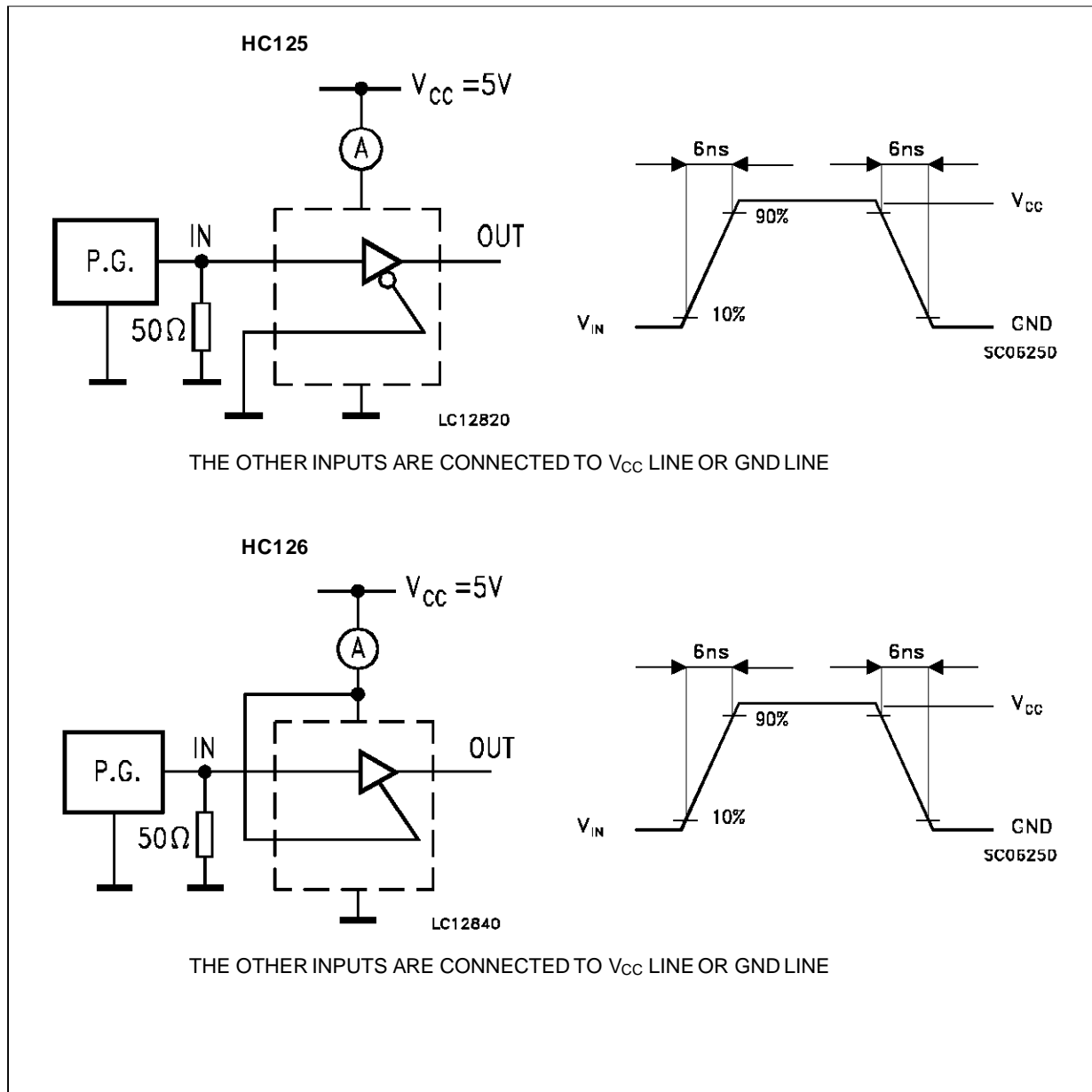
Symbol	Parameter	Test Conditions		Value						Unit	
		$V_{CC}$ (V)	$C_L$ (pF)	$T_A = 25\text{ }^\circ\text{C}$ 54HC and 74HC			$-40\text{ to }85\text{ }^\circ\text{C}$ 74HC		$-55\text{ to }125\text{ }^\circ\text{C}$ 54HC		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
$t_{TLH}$ $t_{THL}$	Output Transition Time	2.0 4.5 6.0	50		20 6 5	60 12 10		75 15 13	90 18 15	ns	
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time	2.0 4.5 6.0	50		36 9 8	75 15 13		95 19 16	110 22 19	ns	
		2.0 4.5 6.0	150		52 13 11	105 21 18		130 26 22	160 32 27	ns	
$t_{PZL}$ $t_{PZH}$	3 State Output Enable Time	2.0 4.5 6.0	50	$R_L = 1\text{ K}\Omega$	36 9 8	75 15 13		95 19 16	110 22 19	ns	
		2.0 4.5 6.0	150	$R_L = 1\text{ K}\Omega$	52 13 11	105 21 18		130 26 22	160 32 27	ns	
$t_{PLZ}$ $t_{PHZ}$	3 State Output Disable Time	2.0 4.5 6.0	50	$R_L = 1\text{ K}\Omega$	48 12 10	80 16 14		100 20 17	120 24 20	ns	
$C_{IN}$	Input Capacitance				5	10		10	10	pF	
$C_{PD}$ (*)	Power Dissipation Capacitance				35					pF	

(\*)  $C_{PD}$  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.  $I_{cc(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{cc}$

SWITCHING CHARACTERISTICS TEST WAVEFORM

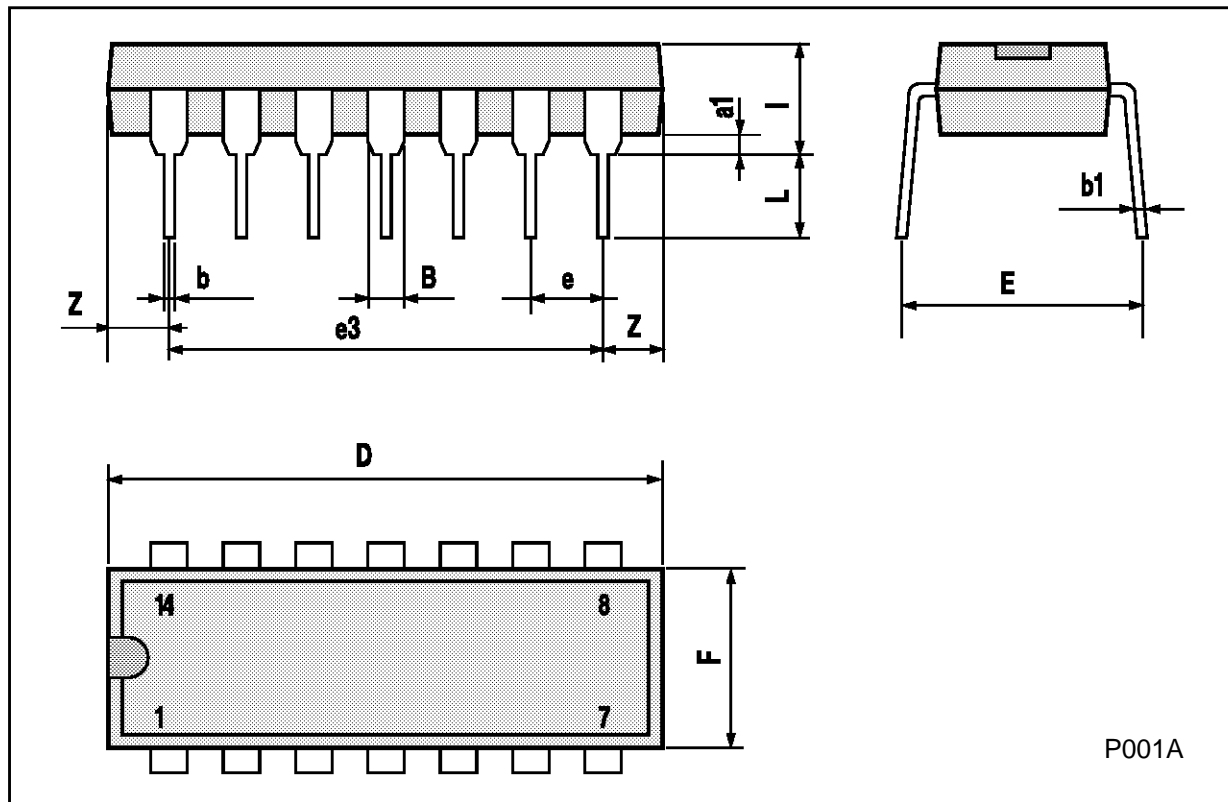


TEST CIRCUIT  $I_{CC}$  (Opr.)



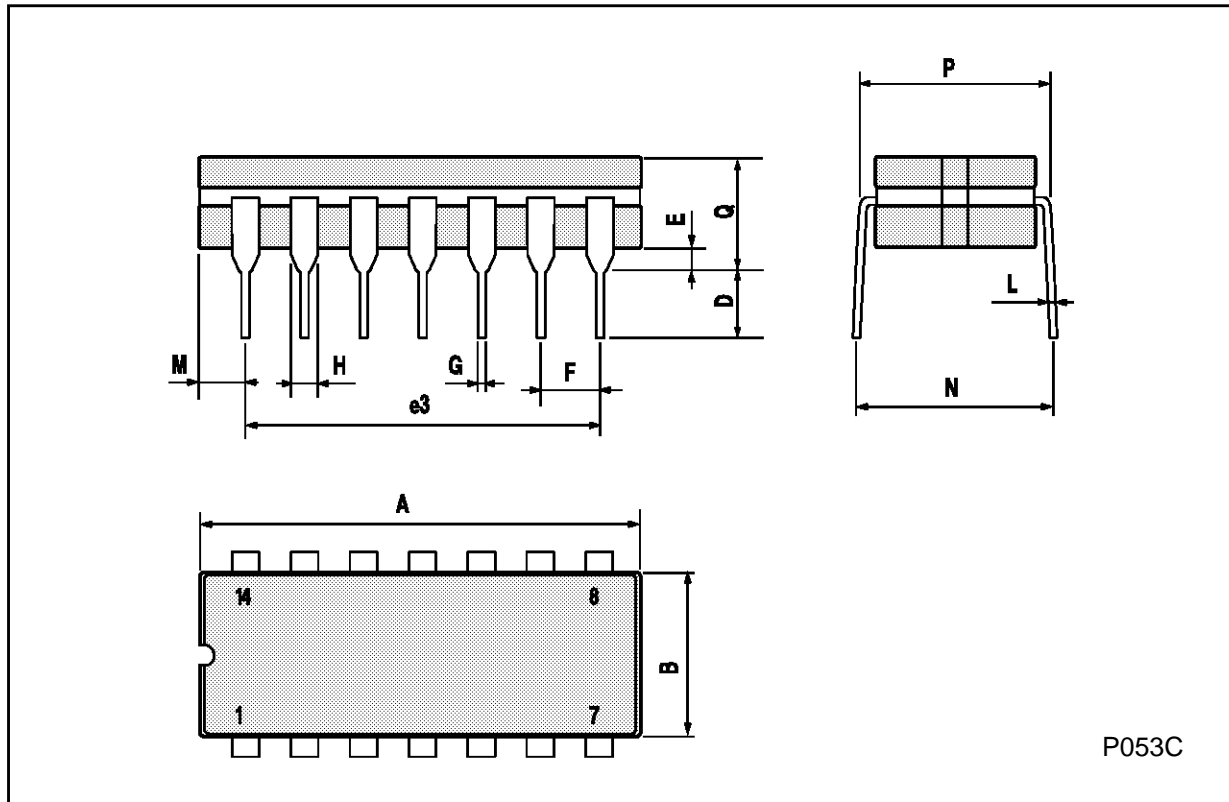
## Plastic DIP14 MECHANICAL DATA

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



**Ceramic DIP14/1 MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			20			0.787
B			7.0			0.276
D		3.3			0.130	
E	0.38			0.015		
e3		15.24			0.600	
F	2.29		2.79	0.090		0.110
G	0.4		0.55	0.016		0.022
H	1.17		1.52	0.046		0.060
L	0.22		0.31	0.009		0.012
M	1.52		2.54	0.060		0.100
N			10.3			0.406
P	7.8		8.05	0.307		0.317
Q			5.08			0.200





## SO14 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.)					



PLCC20 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	9.78		10.03	0.385		0.395
B	8.89		9.04	0.350		0.356
D	4.2		4.57	0.165		0.180
d1		2.54			0.100	
d2		0.56			0.022	
E	7.37		8.38	0.290		0.330
e		1.27			0.050	
e3		5.08			0.200	
F		0.38			0.015	
G			0.101			0.004
M		1.27			0.050	
M1		1.14			0.045	



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