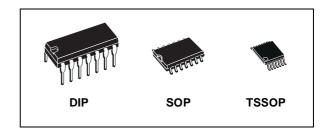


QUAD 2-INPUT NAND GATE

- HIGH SPEED: $t_{PD} = 4ns$ (TYP.) at $V_{CC} = 5V$
- LOW POWER DISSIPATION: $I_{CC} = 2\mu A(MAX.)$ at $T_A=25^{\circ}C$
- HIGH NOISE IMMUNITY: V_{NIH} = V_{NIL} = 28 % V_{CC} (MIN.)
- 50Ω 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) = 2V to 6V
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 00
- IMPROVED LATCH-UP IMMUNITY



The 74AC00 is an advanced high-speed CMOS QUAD 2-INPUT NAND GATE fabricated with sub-micron silicon gate and double-layer metal wiring C²MOS tecnology.



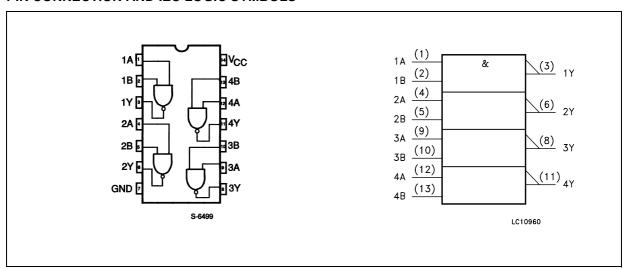
ORDER CODES

PACKAGE	TUBE	T & R
DIP	74AC00B	
SOP	74AC00M	74AC00MTR
TSSOP		74AC00TTR

The internal circuit is composed of 3 stages including buffer output, which enables high noise immunity and stable output.

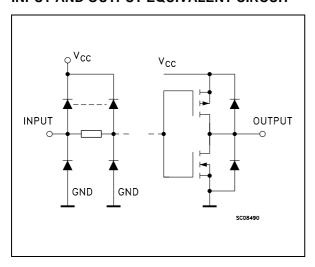
All inputs and outputs are equipped with protection circuits against static discharge, giving them 2KV ESD immunity and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS



April 2001 1/8

INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1, 4, 9, 12	1A to 4A	Data Inputs
2, 5, 10, 13	1B to 4B	Data Inputs
3, 6, 8, 11	1Y to 4Y	Data Outputs
7	GND	Ground (0V)
14	V _{CC}	Positive Supply Voltage

TRUTH TABLE

Α	В	Υ
L	L	Н
L	Н	Н
Н	L	Н
Н	Н	L

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
Vo	DC Output Voltage	-0.5 to V _{CC} + 0.5	V
I _{IK}	DC Input Diode Current	± 20	mA
I _{OK}	DC Output Diode Current	± 20	mA
I _O	DC Output Current	± 50	mA
I _{CC} or I _{GND}	DC V _{CC} or Ground Current	± 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	2 to 6	V
V _I	Input Voltage	0 to V _{CC}	V
Vo	Output Voltage	0 to V _{CC}	V
T _{op}	Operating Temperature	-55 to 125	°C
dt/dv	Input Rise and Fall Time V _{CC} = 3.0, 4.5 or 5.5V (note 1)	8	ns/V

 $\overline{$ 1) $V_{\mbox{\footnotesize{IN}}}}$ from 30% to 70% of $V_{\mbox{\footnotesize{CC}}}$

DC SPECIFICATIONS

		7	Test Condition	Value							
Symbol	Parameter	V _{CC}		Т	A = 25°	С	-40 to	85°C	-55 to	125°C	Unit
		(V)		Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
V _{IH}	High Level Input	3.0	V _O = 0.1 V or	2.1	1.5		2.1		2.1		
	Voltage	4.5	V _O = 0.1 V 01 V _{CC} -0.1V	3.15	2.25		3.15		3.15		V
		5.5	100 0.11	3.85	2.75		3.85		3.85		
V_{IL}	Low Level Input	3.0	V _O = 0.1 V or		1.5	0.9		0.9		0.9	
	Voltage	4.5	V _{CC} -0.1V		2.25	1.35		1.35		1.35	V
		5.5			2.75	1.65		1.65		1.65	
V_{OH}	High Level Output	3.0	I _O =-50 μA	2.9	2.99		2.9		2.9		
	Voltage	4.5	I _O =-50 μA	4.4	4.49		4.4		4.4		
		5.5	I _O =-50 μA	5.4	5.49		5.4		5.4		V
		3.0	I _O =-12 mA	2.56			2.46		2.4		V
		4.5	I _O =-24 mA	3.86			3.76		3.7		
		5.5	I _O =-24 mA	4.86			4.76		4.7		
V_{OL}	Low Level Output	3.0	I _O =50 μA		0.002	0.1		0.1		0.1	
	Voltage	4.5	I _O =50 μA		0.001	0.1		0.1		0.1	
		5.5	I _O =50 μA		0.001	0.1		0.1		0.1	V
		3.0	I _O =12 mA			0.36		0.44		0.5	V
		4.5	I _O =24 mA			0.36		0.44		0.5	
		5.5	I _O =24 mA			0.36		0.44		0.5	
II	Input Leakage Current	5.5	$V_I = V_{CC}$ or GND			± 0.1		± 1		± 1	μΑ
I _{CC}	Quiescent Supply Current	5.5	$V_I = V_{CC}$ or GND			2		20		40	μΑ
I _{OLD}	Dynamic Output	5.5	$V_{OLD} = 1.65 \text{ V max}$					75		50	mA
I _{OHD}	Current (note 1, 2)	5.5	V _{OHD} = 3.85 V min					-75		-50	mA

AC ELECTRICAL CHARACTERISTICS (C $_L$ = 50 pF, R_L = 500 $\Omega,$ Input t_{r} = t_{f} = 3ns)

		٦	Test Condition				Value				
Symbol Parameter		V _{CC}	V _{CC}		T _A = 25°C		-40 to 85°C		-55 to 125°C		Unit
		(V)		Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
t _{PLH} t _{PHL}	Propagation Delay	3.3 ^(*)		2	5.2	9.5	1	10	1	11	nc
	Time	5.0 ^(**)		1.5	4	8	1	8.5	1	8.5	ns

¹⁾ Maximum test duration 2ms, one output loaded at time 2) Incident wave switching is guaranteed on transmission lines with impedances as low as 50\Omega.

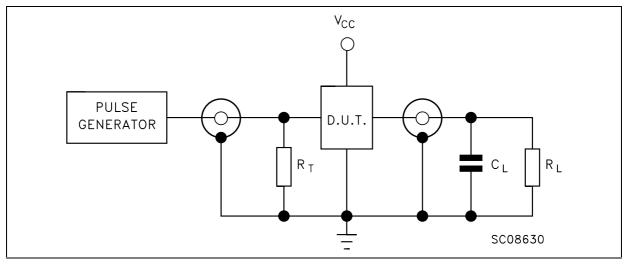
^(*) Voltage range is $3.3 \text{V} \pm 0.3 \text{V}$ (**) Voltage range is $5.0 \text{V} \pm 0.5 \text{V}$

CAPACITIVE CHARACTERISTICS

			Test Condition		Value						
Symbol	Parameter	V _{CC}		Т	_A = 25°	С	-40 to	85°C	-55 to	125°C	Unit
		(V)		Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
C _{IN}	Input Capacitance	5.0			4						pF
C _{PD}	Power Dissipation Capacitance (note 1)	5.0	f _{IN} = 10MHz		31						pF

¹⁾ 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. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/4$ (per gate)

TEST CIRCUIT

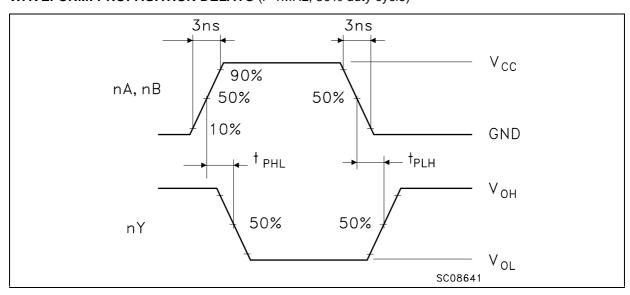


 $C_L = 50 pF$ or equivalent (includes jig and probe capacitance)

 $R_L = R_1 = 500\Omega$ or equivalent

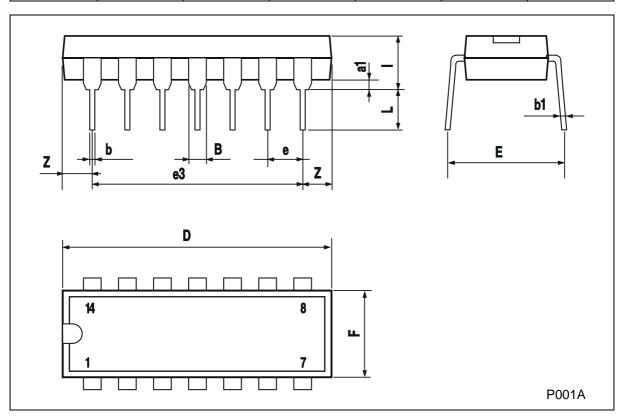
 $R_T = Z_{OUT}$ of pulse generator (typically 50 Ω)

WAVEFORM: PROPAGATION DELAYS (f=1MHz; 50% duty cycle)



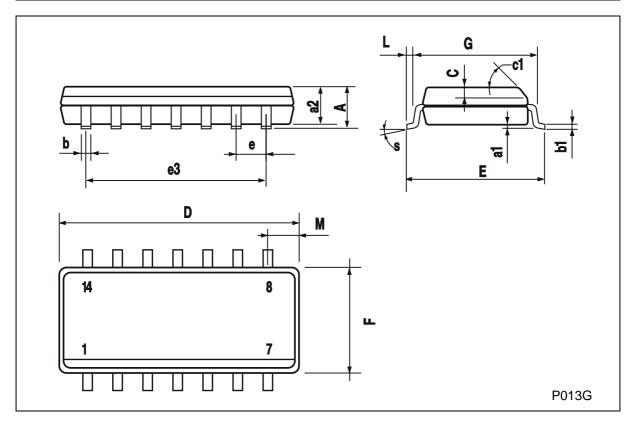
Plastic DIP-14 MECHANICAL DATA

DIM.		mm		inch				
Divis	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.		
a1	0.51			0.020				
В	1.39		1.65	0.055		0.065		
b		0.5			0.020			
b1		0.25			0.010			
D			20			0.787		
Е		8.5			0.335			
е		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		



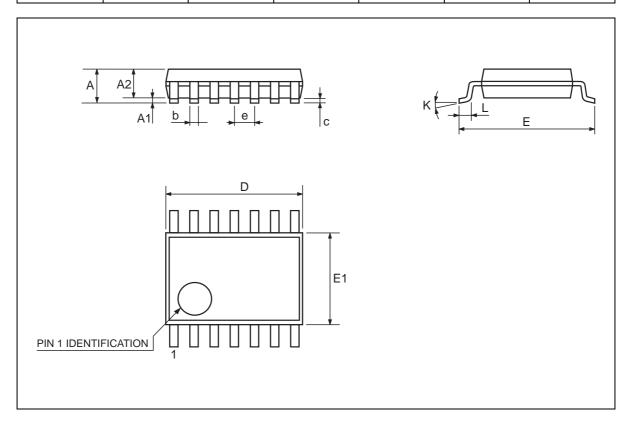
SO-14 MECHANICAL DATA

DIM.		mm			inch	
DIIVI.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
Α			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
С		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
е		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
М			0.68			0.026
S			8 (n	nax.)		



TSSOP14 MECHANICAL DATA

DIM.		mm		inch				
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.		
А			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		
С	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		
е		0.65 BSC			0.0256 BSC			
К	0°	4°	8°	0°	4°	8°		
L	0.50	0.60	0.70	0.020	0.024	0.028		



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