DATA SHEET

74ALS00A
Quad 2-Input NAND gate

Product specification

1991 Feb 08

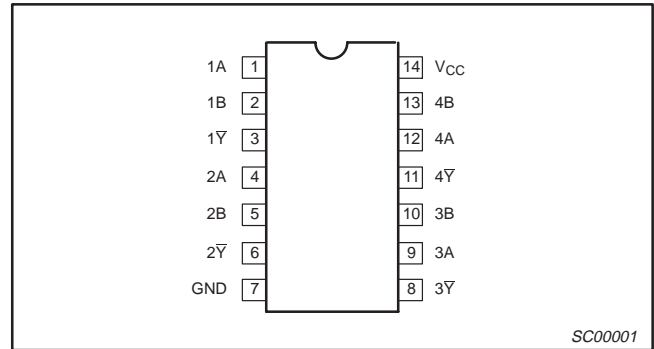IC05 Data Handbook

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Quad 2-input NAND gate   74ALS00A

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74ALS00A	4.0ns	1.0mA

PIN CONFIGURATION

SC00001

ORDERING INFORMATION

DESCRIPTION	ORDER CODE	DRAWING NUMBER
	COMMERCIAL RANGE V_{CC} = 5V ±10%, T_{amb} = 0°C to +70°C	
14-pin plastic DIP	74ALS00AN	SOT27-1
14-pin plastic SO	74ALS00AD	SOT108-1
14-pin plastic SSOP Type II	74ALS00ADB	SOT337-1

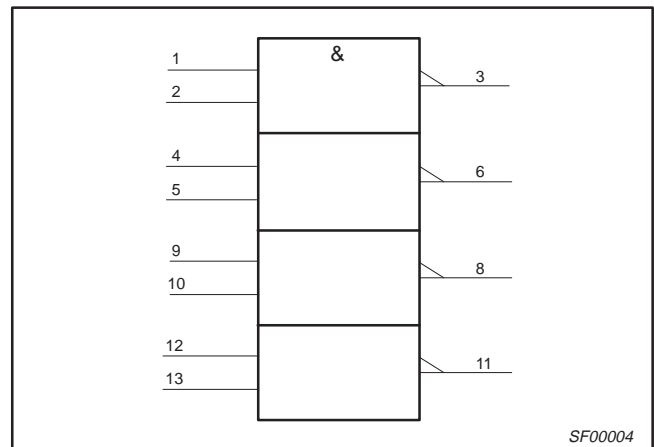## INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74ALS (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
nA, nB	Data inputs	1.0/1.0	20µA/0.1mA
n$\overline{Y}$	Data output	20/80	0.4mA/8mA

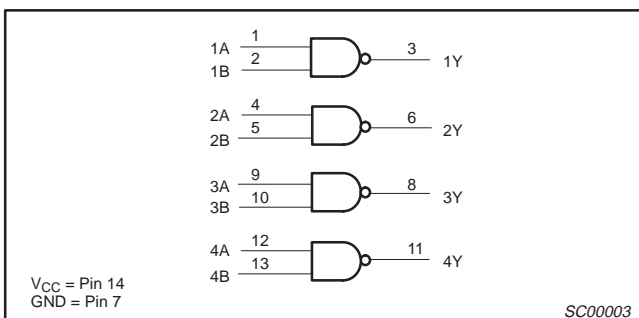**NOTE:**   One (1.0) ALS unit load is defined as: 20µA in the High state and 0.1mA in the Low state.

LOGIC SYMBOL

V_{CC} = Pin 14
GND = Pin 7

SC00002

IEC/IEEE SYMBOL

SF00004

LOGIC DIAGRAM

V_{CC} = Pin 14
GND = Pin 7

SC00003
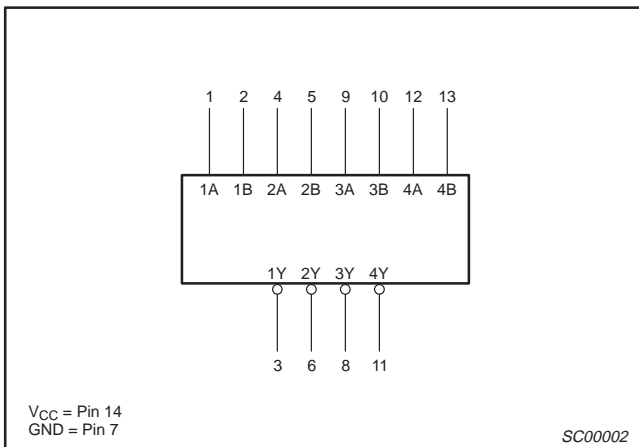
FUNCTION TABLE

INPUTS		OUTPUT
nA	**nB**	**n$\overline{Y}$**
H	H	L
L	X	H
X	L	H

H = High voltage level
L = Low voltage level
X = Don't care

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ABSOLUTE MAXIMUM RATINGS

(Operation beyond the limit set forth in this table may impair the useful life of the device.
Unless otherwise noted these limits are over the operating free-air temperature range.)

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	–0.5 to +7.0	V
V_{IN}	Input voltage	–0.5 to +7.0	V
I_{IN}	Input current	–30 to +5	mA
V_{OUT}	Voltage applied to output in High output state	–0.5 to V_{CC}	V
I_{OUT}	Current applied to output in Low output state	16	mA
T_{amb}	Operating free air temperature range	0 to +70	°C
T_{stg}	Storage temperature range	–65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5.0	5.5	V
V_{IH}	High-level input voltage	2.0			V
V_{IL}	Low-level input voltage			0.8	V
I_{Ik}	Input clamp current			–18	mA
I_{OH}	High-level output current			–0.4	mA
I_{OL}	Low-level output current			8	mA
T_{amb}	Operating free-air temperature range	0		+70	°C

DC ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS[1]		LIMITS			UNIT
				MIN	TYP[2]	MAX	
V_{OH}	High-level output voltage	$V_{CC}\pm10\%$, V_{IL} = MAX, V_{IH} = MIN, I_{OH} = –0.4mA		$V_{CC}-2$			V
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IL} = MAX, V_{IH} = MIN	I_{OL} = 4mA		0.25	0.40	V
			I_{OL} = 8mA		0.35	0.50	V
V_{IK}	Input clamp voltage	V_{CC} = MIN, $I_I = I_{IK}$			-0.73	-1.5	V
I_I	Input current at maximum input voltage	V_{CC} = MAX, V_I = 7.0V				0.1	mA
I_{IH}	High-level input current	V_{CC} = MAX, V_I = 2.7V				20	µA
I_{IL}	Low-level input current	V_{CC} = MAX, V_I = 0.5V				-0.1	mA
I_O	Output current[3]	V_{CC} = MAX, V_O = 2.25V		-30		-112	mA
I_{CC}	Supply current (total)	I_{CCH}	V_{CC} = MAX	V_I = GND		0.5	0.85	mA
		I_{CCL}		V_I = 4.5V		1.5	3.0	mA

NOTES:
1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
2. All typical values are at V_{CC} = 5V, T_{amb} = 25°C.
3. The output conditions have been chosen to produce a current that closely approximate one half of the true short-circuit output current, I_{OS}.
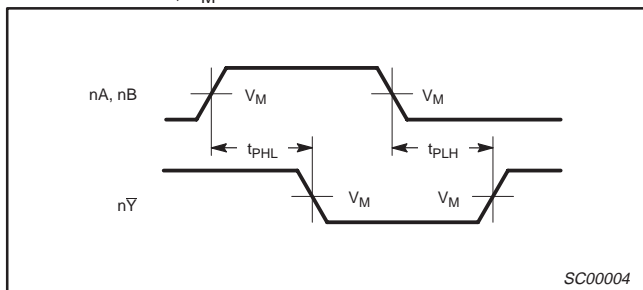
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AC ELECTRICAL CHARACTERISTICS

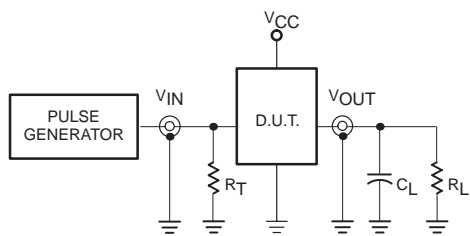| SYMBOL	PARAMETER	TEST CONDITION	LIMITS		UNIT
			T_{amb} = 0°C to +70°C V_{CC} = +5.0V ± 10% C_L = 50pF, R_L = 500Ω		
			MIN	MAX	
t_{PLH} t_{PHL}	Propagation delay nA, nB to n$\overline{Y}$	Waveform 1	2.0 2.0	11.0 8.0	ns

AC WAVEFORMS

For all waveforms, V_M = 1.3V.

SC00004

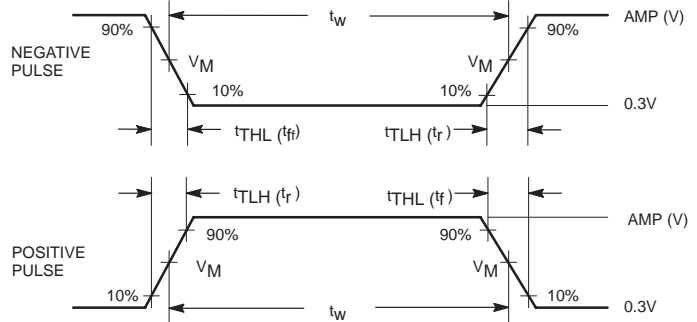**Waveform 1. Propagation Delay for Data to Output**

TEST CIRCUIT AND WAVEFORMS

Test Circuit for Totem-pole Outputs

DEFINITIONS:
R_L = Load resistor;
see AC electrical characteristics for value.
C_L = Load capacitance includes jig and probe capacitance;
see AC electrical characteristics for value.
R_T = Termination resistance should be equal to Z_{OUT} of
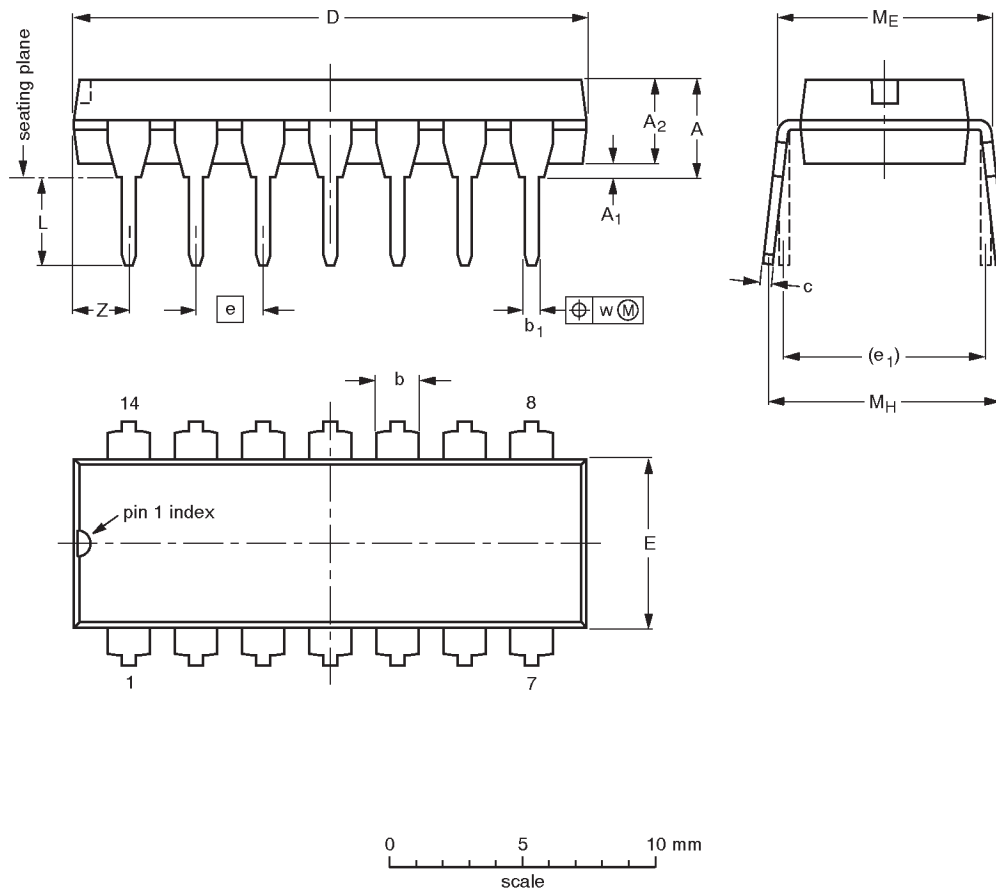pulse generators.

Input Pulse Definition

Family	INPUT PULSE REQUIREMENTS					
	Amplitude	V_M	Rep.Rate	t_w	t_{TLH}	t_{THL}
74ALS	3.5V	1.3V	1MHz	500ns	2.0ns	2.0ns

SC00005

Quad 2-input NAND gate

74ALS00A

DIP14: plastic dual in-line package; 14 leads (300 mil)

SOT27-1

DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A$_1$ min.	A$_2$ max.	b	b$_1$	c	D $^{(1)}$	E $^{(1)}$	e	e$_1$	L	M$_E$	M$_H$	w	Z $^{(1)}$ max.
mm	4.2	0.51	3.2	1.73 / 1.13	0.53 / 0.38	0.36 / 0.23	19.50 / 18.55	6.48 / 6.20	2.54	7.62	3.60 / 3.05	8.25 / 7.80	10.0 / 8.3	0.254	2.2
inches	0.17	0.020	0.13	0.068 / 0.044	0.021 / 0.015	0.014 / 0.009	0.77 / 0.73	0.26 / 0.24	0.10	0.30	0.14 / 0.12	0.32 / 0.31	0.39 / 0.33	0.01	0.087

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT27-1	050G04	MO-001AA				~~92-11-17~~ 95-03-11

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SO14: plastic small outline package; 14 leads; body width 3.9 mm

SOT108-1

0   2.5   5 mm
scale

DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A₁	A₂	A₃	bₚ	c	D⁽¹⁾	E⁽¹⁾	e	H_E	L	Lₚ	Q	v	w	y	Z⁽¹⁾	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	8.75 8.55	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8° 0°
inches	0.069	0.0098 0.0039	0.057 0.049	0.01	0.019 0.014	0.0098 0.0075	0.35 0.34	0.16 0.15	0.050	0.24 0.23	0.041	0.039 0.016	0.028 0.024	0.01	0.01	0.004	0.028 0.012	

Note

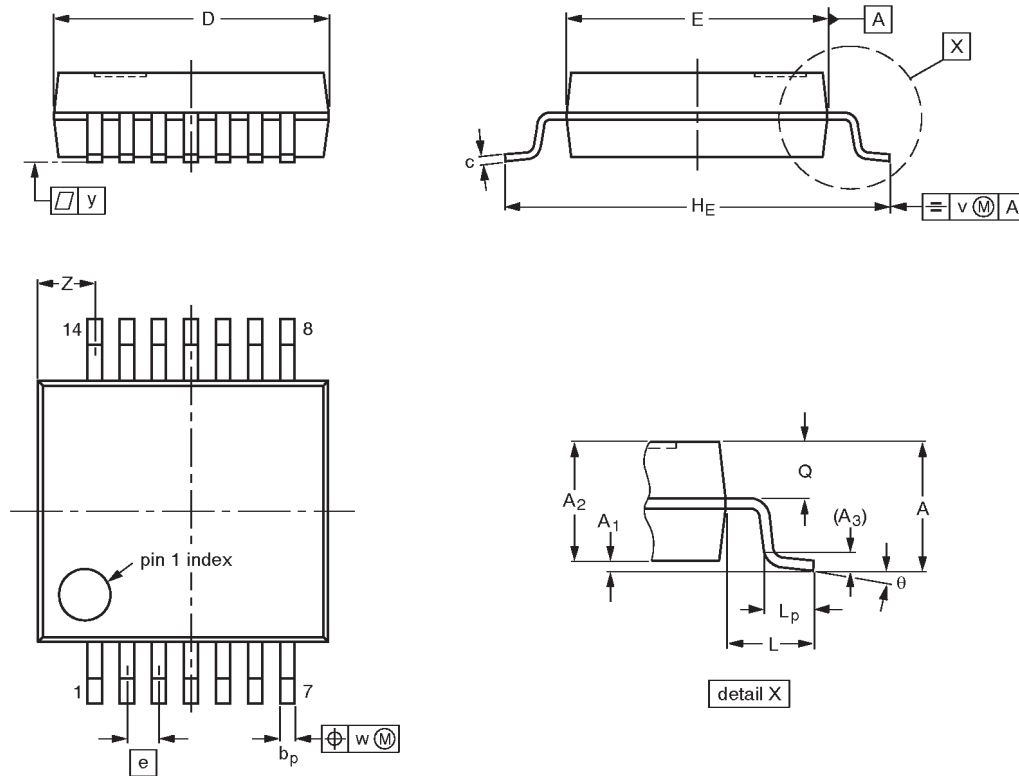1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT108-1	076E06S	MS-012AB				~~91-08-13~~ 95-01-23

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SSOP14: plastic shrink small outline package; 14 leads; body width 5.3 mm

SOT337-1

pin 1 index

detail X

0   2.5   5 mm
scale

DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A₁	A₂	A₃	bₚ	c	D⁽¹⁾	E⁽¹⁾	e	Hₑ	L	Lₚ	Q	v	w	y	Z⁽¹⁾	θ
mm	2.0	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	6.4 6.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	1.4 0.9	8° 0°

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT337-1		MO-150AB				~~95-02-04~~ 96-01-18

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DEFINITIONS

Data Sheet Identification	Product Status	Definition
Objective Specification	**Formative or in Design**	This data sheet contains the design target or goal specifications for product development. Specifications may change in any manner without notice.
Preliminary Specification	**Preproduction Product**	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product Specification	**Full Production**	This data sheet contains Final Specifications. Philips Semiconductors reserves the right to make changes at any time without notice, in order to improve design and supply the best possible product.

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