INTEGRATED CIRCUITS

DATA SHEET

74ALS38A Quad 2-Input NAND buffer (open collector)

Product specification

1991 Feb 08

IC05 Data Handbook





Quad 2-input NAND buffer (open collector)

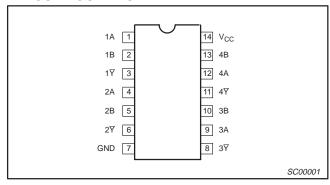
74ALS38A

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74ALS38A	7.0ns	3.5mA

ORDERING INFORMATION

	ORDER CODE		
DESCRIPTION	COMMERCIAL RANGE V_{CC} = 5V $\pm 10\%$, T_{amb} = 0°C to ± 70 °C	DRAWING NUMBER	
14-pin plastic DIP	74ALS38AN	SOT27-1	
14-pin plastic SO	74ALS38AD	SOT108-1	

PIN CONFIGURATION

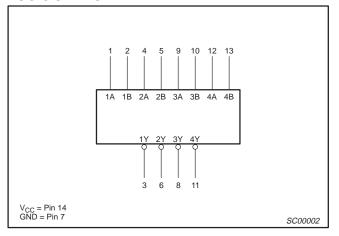


INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

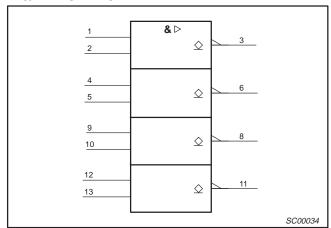
PINS	DESCRIPTION	74ALS (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
nA, nB	Data inputs	1.0/1.0	20μA/0.1mA
n₹	Data outputs	20/80	0.4mA/8mA

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

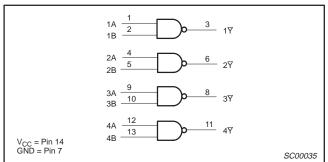
LOGIC SYMBOL



IEC/IEEE SYMBOL



LOGIC DIAGRAM



FUNCTION TABLE

INP	UTS	OUTPUT
nA	nB	nΫ
L	L	Н
L	Н	Н
Н	L	Н
Н	Н	L

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	48	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	DADAMETED		UNIT			
STWIBUL	PARAMETER	MIN	NOM	MAX	UNII	
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 _{lk}	Input clamp current			-18	mA	
V _{OH}	High-level output voltage			5.5	V	
I _{OL}	Low-level output current		·	24	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		UNIT			
STWIBUL	PARAMETER		TEST CONDITIONS	TEST CONDITIONS.			MAX	UNII
I _{OH}	High-level output current		$V_{CC} = MIN, V_{IL} = MAX, V_{IH} = MIN$	N, V _{OH} = MAX			100	μΑ
V	Low-level output voltage		V _{CC} = MIN, V _{IL} = MAX,	I _{OL} = 12mA		0.25	0.40	V
V _{OL}	Low-level output voltage		V _{IH} = MIN	I _{OL} = 24mA		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 v	oltage/	$V_{CC} = MAX, V_I = 7.0V$				0.1	mA
I _{IH}	High-level input current		$V_{CC} = MAX, V_I = 2.7V$				20	μΑ
I _{IL}	Low-level input current		$V_{CC} = MAX, V_I = 0.5V$				-0.1	mA
1	Owner has a summer of the tell	I _{CCH}	V _{CC} = MAX	V _I = GND		0.65	1.6	mA
Icc	Supply current (total) I _{CCL}			V _I = 4.5V		6.5	9.0	mA

NOTES:

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^{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.

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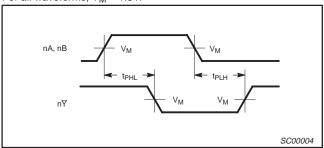
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AC ELECTRICAL CHARACTERISTICS

		PARAMETER TEST CONDITION	LIM		
SYMBOL	PARAMETER	TEST CONDITION	T _{amb} = 0°0 V _{CC} = +5. C _L = 50pF,	C to +70°C 0V ± 10% R _L = 500Ω	UNIT
			MIN	MAX	
t _{PLH} t _{PHL}	Propagation delay nA or nB to $\overline{\text{NY}}$	Waveform 1	3.0 3.0	11.0 11.0	ns

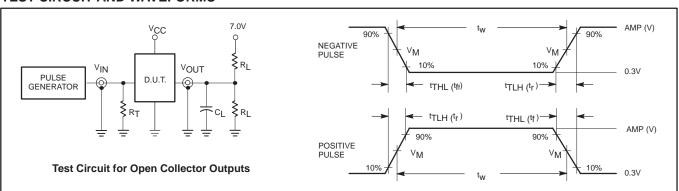
AC WAVEFORMS

For all waveforms, $V_M = 1.3V$.



Waveform 1. Propagation Delay for Data to Output

TEST CIRCUIT AND WAVEFORMS



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
IIIput	i uise	Delillilloll

Family		INPUT PULSE REQUIREMENTS									
Family	Amplitude	V_{M}	Rep.Rate	t _w	t _{TLH}	t _{THL}					
74ALS	3.5V	1.3V	1MHz	500ns	2.0ns	2.0ns					

SC00036

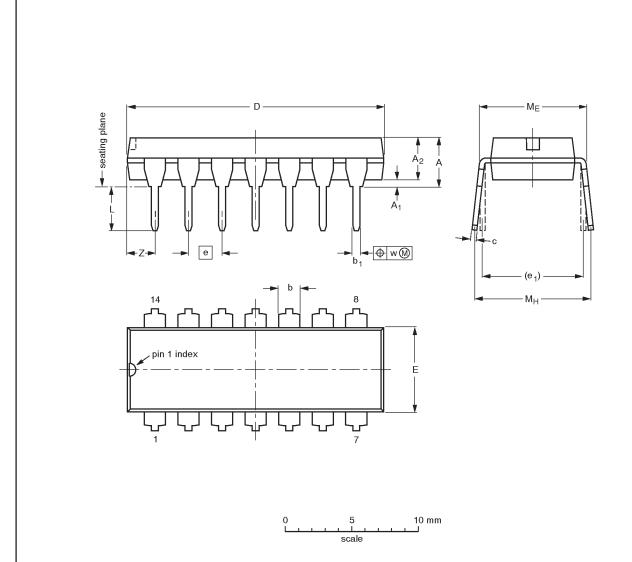
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DIP14: plastic dual in-line package; 14 leads (300 mil)

SOT27-1



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

UNIT	A max.	A ₁ min.	A ₂ max.	b	b ₁	С	D ⁽¹⁾	E ⁽¹⁾	е	e ₁	L	ME	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		REFER	RENCES	EUROPEAN	ISSUE DATE	
VERSION	IEC	JEDEC	EIAJ	PROJECTION	ISSUE DATE	
SOT27-1	050G04	MO-001AA			92-11-17 95-03-11	

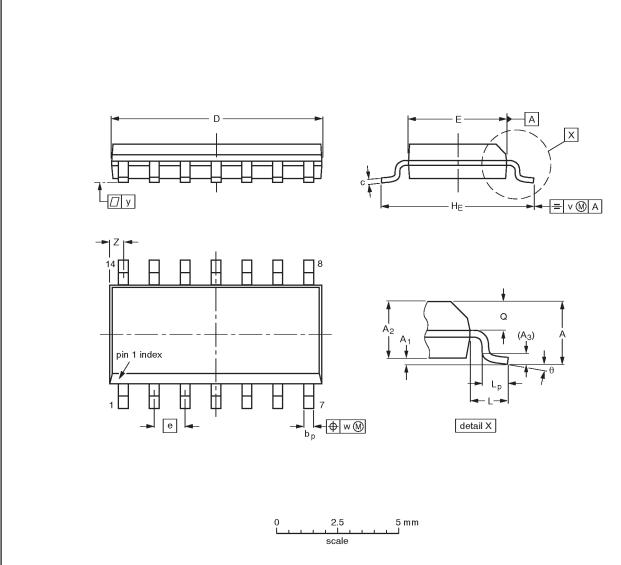
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Quad 2-input NAND buffer (open collector)

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

SOT108-1



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

UNIT	A max.	A ₁	A ₂	A ₃	bр	c	D ⁽¹⁾	E ⁽¹⁾	Φ	HE	٦	Lp	Ø	٧	w	у	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°
inches	0.069	0.0098 0.0039		0.01		0.0098 0.0075	0.35 0.34	0.16 0.15	0.050	0.24 0.23	0.041			0.01	0.01	0.004	0.028 0.012	0°

Note

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

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE	
SOT108-1	076E06\$	MS-012AB				91-08-13 95-01-23	

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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. Phillip 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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