INTEGRATED CIRCUITS

DATA SHEET

74ALS27Triple 3-Input NOR gate

Product specification

1991 Feb 08

IC05 Data Handbook





Triple 3-input NOR gate

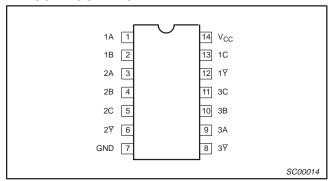
74ALS27

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74ALS27	4.0ns	1.5mA

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	74ALS27N	SOT27-1	
14-pin plastic SO	74ALS27D	SOT108-1	

PIN CONFIGURATION

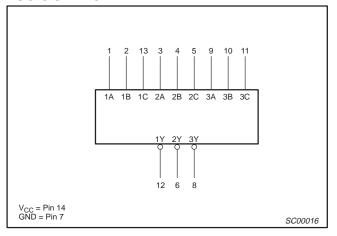


INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

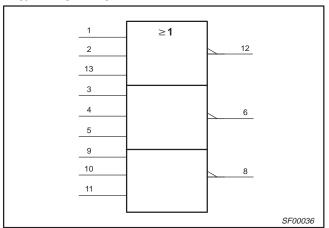
PINS	DESCRIPTION	74ALS (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
nA, nB, nC	Data inputs	1.0/1.0	20μA/0.1mA
n∀	Data output	20/80	0.4mA/8mA

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

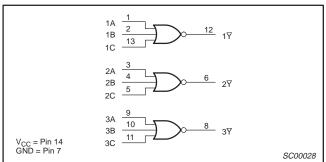
LOGIC SYMBOL



IEC/IEEE SYMBOL



LOGIC DIAGRAM



FUNCTION TABLE

	INPUTS	OUTPUT	
nA	nB	n₹	
Н	Х	Х	L
Х	Н	Х	L
Х	Х	Н	L
L	L	L	Н

H = High voltage level L = Low voltage level

X = Don't care

Triple 3-input NOR gate

74ALS27

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	DADAMETED				
STWIBUL	PARAMETER	MIN	NOM	MAX	UNIT
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
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	DADAMETED		TEST CONDITIONS		UNIT				
STIMBUL	PARAMETER	PARAMETER		TEST CONDITIONS.			MAX	UNIT	
V _{OH}	High-level output voltage		$V_{CC}\pm 10\%$, $V_{IL}=MAX$, $V_{IH}=MIN$	$I_{OH} = -0.4 \text{mA}$	V _{CC} – 2			V	
V	Low lovel output voltage		V _{CC} = MIN, V _{IL} = MAX,	$I_{OL} = 4mA$		0.25	0.40	V	
VOL	V _{OL} Low-level output voltage		V _{IH} = MIN	$I_{OL} = 8mA$		0.35	0.50	V	
V _{IK}	Input clamp voltage		$V_{CC} = MIN, I_I = I_{IK}$			-0.73	-1.5	V	
II	Input current at maximum input vo	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	
Io	Output current ³		$V_{CC} = MAX, V_O = 2.25V$		-30		-112	mA	
1	Supply ourrant (total)	I _{CCH}	V MAY	$V_I = 0V$		1.0	1.8	mA	
Icc	Supply current (total)	I _{CCL}	$V_{CC} = MAX$	V _I = 4.5V		2.0	4.0	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}.

1991 Feb 08

Triple 3-input NOR gate

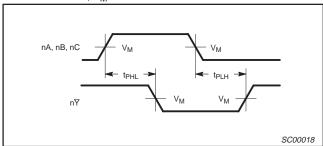
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AC ELECTRICAL CHARACTERISTICS

			LIM		
SYMBOL	PARAMETER	TEST CONDITION	T _{amb} = 0°C V _{CC} = +5. C _L = 50pF,	UNIT	
			MIN	MAX	
t _{PLH} t _{PHL}	Propagation delay nA, nB, nC to $\overline{\text{NY}}$	Waveform 1	2.0 2.0	15.0 9.0	ns

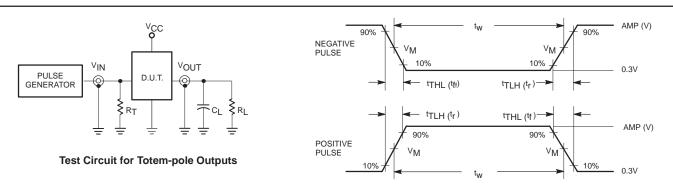
AC WAVEFORMS

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

SC00005

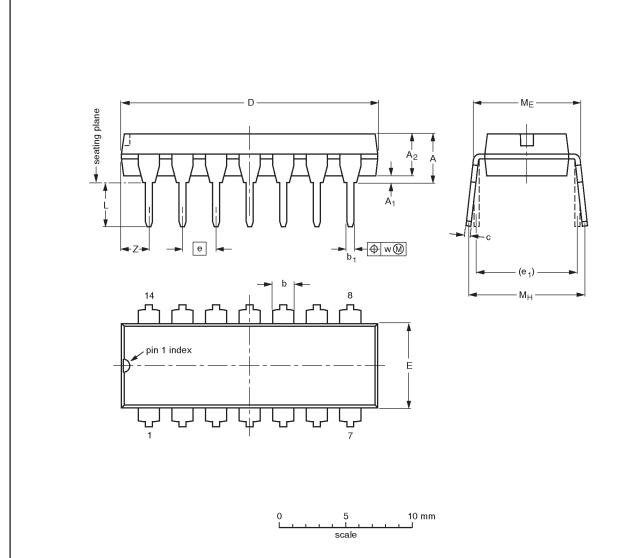
1991 Feb 08

Triple 3-input NOR gate

74ALS27

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	

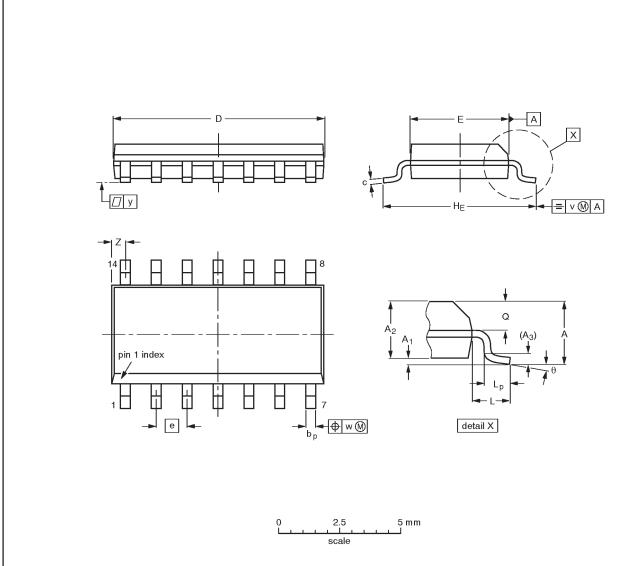
1991 Feb 08 5

Triple 3-input NOR gate

74ALS27

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.	Α1	A ₂	A ₃	bp	С	D ⁽¹⁾	E ⁽¹⁾	е	HE	L	Lp	Q	v	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	1 // //60	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	0.039 0.016	0.028 0.024	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	

1991 Feb 08 6

Triple 3-input NOR gate

74ALS27

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.				
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