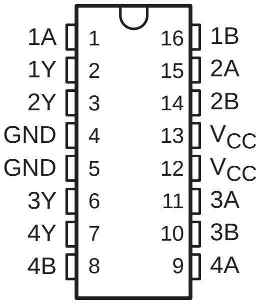
74ACT11132
QUADRUPLE POSITIVE-NAND GATE WITH SCHMITT-TRIGGER INPUTS

SCAS177 – D3974, JANUARY 1992 – REVISED APRIL 1993

- **Inputs Are TTL-Voltage Compatible**
- **Center-Pin V_{CC} and GND Pin Configurations Minimize High-Speed Switching Noise**
- ***EPIC*™ (Enhanced-Performance Implanted CMOS) 1-μm Process**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Package Options Include Plastic Small-Outline Packages and Standard Plastic 300-mil DIPs**

D OR N PACKAGE
(TOP VIEW)



description

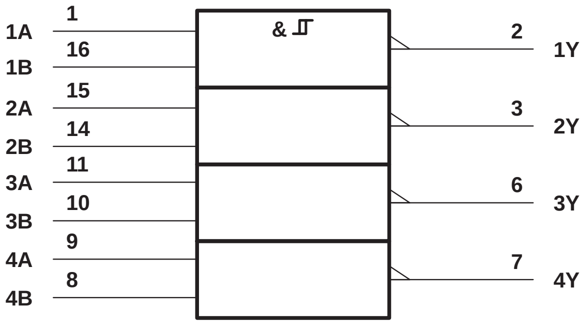
This device contains four independent 2-input NAND gates with Schmitt-trigger inputs. Because of the Schmitt action, they have different input threshold levels for positive- and negative-going signals. Each gate performs the Boolean function $Y = \overline{A \bullet B}$ or $Y = \overline{A} + \overline{B}$ in positive logic.

The 74ACT11132 is characterized for operation from –40°C to 85°C.

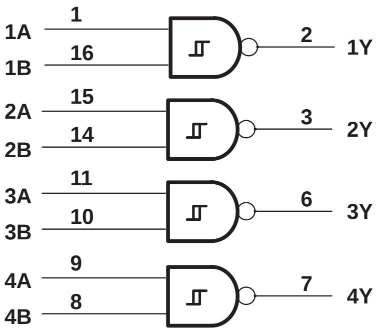
FUNCTION TABLE

INPUTS		OUTPUT Y
A	**B**	
H	H	L
L	X	H
X	L	H

logic symbol†



logic diagram (positive logic)



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† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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TEXAS INSTRUMENTS

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage range, V_{CC}	–0.5 V to 7 V
Input voltage range, V_I (see Note 1)	–0.5 V to V_{CC} + 0.5 V
Output voltage range, V_O (see Note 1)	–0.5 V to V_{CC} + 0.5 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	±20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	± 50 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	± 50 mA
Continuous current through V_{CC} or GND	±100 mA
Storage temperature range	–65°C to 150°C

[†] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

recommended operating conditions (see Note 2)

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			V
V_{IL}	Low-level input voltage			0.8	V
V_I	Input voltage	0		V_{CC}	V
V_O	Output voltage	0		V_{CC}	V
I_{OH}	High-level output current			–24	mA
I_{OL}	Low-level output current			24	mA
$\Delta t/\Delta v$	Input transition rise or fall rate	0		10	ns/V
T_A	Operating free-air temperature	–40		85	°C

NOTE 2: Unused or floating inputs must be held high or low.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C MIN	T_A = 25°C TYP	T_A = 25°C MAX	MIN	MAX	UNIT
V_{T+}		4.5 V			2		2	V
		5.5 V			2		2	
V_{T-}		4.5 V			0.8		0.8	V
		5.5 V			0.8		0.8	
V_{Hys} ($V_{T+} - V_{T-}$)		4.5 V	0.4		1.2	0.4	1.2	V
		5.5 V	0.4		1.2	0.4	1.2	
V_{OH}	$I_{OH} = -50$ µA	4.5 V	4.4			4.4		V
		5.5 V	5.4			5.4		
	$I_{OH} = -24$ mA	4.5 V	3.94			3.8		
		5.5 V	4.94			4.8		
	$I_{OH} = -75$ mA†	5.5 V				3.85		
V_{OL}	$I_{OL} =$ 50 µA	4.5 V			0.1		0.1	V
		5.5 V			0.1		0.1	
	$I_{OL} =$ 24 mA	4.5 V			0.36		0.44	
		5.5 V			0.36		0.44	
	$I_{OL} =$ 75 mA†	5.5 V					1.65	
I_I	$V_I = V_{CC}$ or GND	5.5 V			±0.1		±1	µA
I_{CC}	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			8		80	µA
ΔI_{CC}‡	One input at 3.4 V, Other inputs at V_{CC} or GND	5.5 V			0.9		1	mA
C_i	$V_I = V_{CC}$ or GND	5 V		3.5				pF

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.
‡ This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V or V_{CC}.

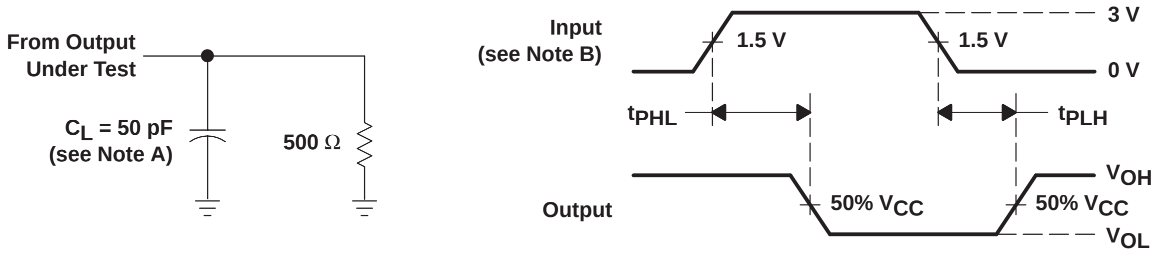
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C MIN	T_A = 25°C TYP	T_A = 25°C MAX	MIN	MAX	UNIT
t_{PLH}	A or B	Y	2.6	5.3	8	2.6	8.8	ns
t_{PHL}			3.7	6.4	8.1	3.7	9.3	

operating characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance	C_L = 50 pF, f = 1 MHz	29	pF

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT

VOLTAGE WAVEFORMS

NOTES: A. C_L includes probe and jig capacitance.
B. Input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
C. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

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