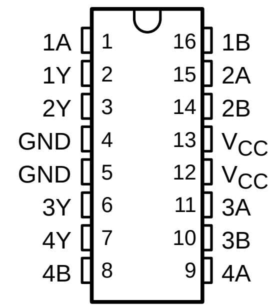
74AC11132 QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT-TRIGGER

- **Operation From Very Slow Input Transitions**
- **Temperature-Compensated Threshold Levels**
- **High Noise Immunity**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Center-Pin V_{CC} and GND 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 Both Plastic Small-Outline Packages and Standard Plastic 300-mil DIPs**

D OR N PACKAGE
(TOP VIEW)



description

Each circuit functions as a NAND gate, but because of the Schmitt action, it has different input threshold levels for positive- and negative-going signals. It performs the Boolean function $Y = \overline{A \bullet B}$ or $Y = \overline{A} + \overline{B}$ in positive logic.

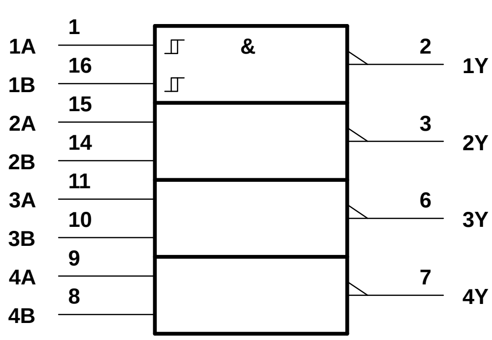
These circuits are temperature compensated and can be triggered from the slowest of input ramps and still give clean jitter-free output signals.

The 74AC11132 is characterized for operation from – 40°C to 85°C.

FUNCTION TABLE

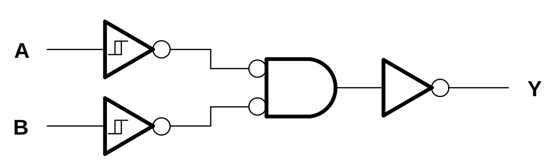
INPUTS A	INPUTS B	OUTPUT Y
H	H	L
L	X	H
X	L	H

logic symbol†



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

logic diagram (positive logic)



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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 current ratings are observed.

recommended operating conditions

			MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage		3	5	5.5	V
V_{IH}	High-level input voltage	V_{CC} = 3 V	2.2			V
		V_{CC} = 4.5 V	3.2			
		V_{CC} = 5.5 V	3.9			
V_{IL}	Low-level input voltage	V_{CC} = 3 V			0.5	mA
		V_{CC} = 4.5 V			0.9	
		V_{CC} = 5.5 V			1.1	
V_I	Input voltage				– 24	mA
V_O	Output voltage				– 24	
I_{OH}	High-level output current	V_{CC} = 3 V	0		V_{CC}	V
		V_{CC} = 4.5 V	0		V_{CC}	
		V_{CC} = 5.5 V			–4	
I_{OL}	Low-level output current	V_{CC} = 3 V			12	mA
		V_{CC} = 4.5 V			24	
		V_{CC} = 5.5 V			24	
$\Delta t/\Delta v$	Input transition rise or fall rate		0		100	ns/V
T_A	Operating free-air temperature		– 40		85	°C

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

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C MIN	TYP	MAX	MIN	MAX	UNIT
V_{T+}		3 V			2.2		2.2	V
		4.5 V			3.2		3.2	
		5.5 V			3.9		3.9	
V_{T-}		3 V	0.5			0.5		V
		4.5 V	0.9			0.9		
		5.5 V	1.1			1.1		
V_{hys} ($V_{T+} - V_{T-}$)		3 V	0.3		1.2	0.3	1.2	V
		4.5 V	0.4		1.4	0.4	1.4	
		5.5 V	0.5		1.6	0.5	1.6	
V_{OH}	I_{OH} = – 50 µA	3 V	2.9			2.9		V
		4.5 V	4.4			4.4		
		5.5 V	5.4			5.4		
	I_{OH} = – 4 mA	3 V	2.58			2.48		
	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	3 V			0.1		0.1	V
		4.5 V			0.1		0.1	
		5.5 V			0.1		0.1	
	I_{OL} = 12 mA	3 V			0.36		0.44	
	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			4		40	µA
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.

switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C MIN	TYP	MAX	MIN	MAX	UNIT
t_{PLH}	A or B	Y	2.2	6.2	9.2	2.2	10.3	ns
t_{PHL}			2.8	6.8	9.8	2.8	10.5	

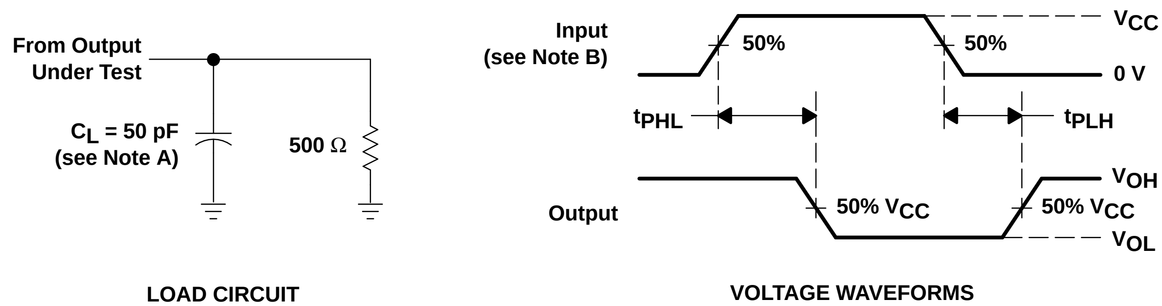
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C MIN	TYP	MAX	MIN	MAX	UNIT
t_{PLH}	A or B	Y	1.8	4.2	6.9	1.8	7.5	ns
t_{PHL}			2.3	4.8	7.3	2.3	8	

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	27	pF

PARAMETER MEASUREMENT INFORMATION



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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