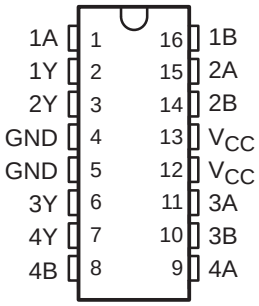
74ACT11008
QUADRUPLE 2-INPUT POSITIVE-AND GATE

SCAS013C – AUGUST 1987 – REVISED APRIL 1996

- **Inputs Are TTL-Voltage Compatible**
- **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 Plastic Small-Outline (D), Plastic Thin Shrink Small-Outline (PW), and Standard Plastic 300-mil DIPs (N) Packages**

D, N, OR PW PACKAGE
(TOP VIEW)



description

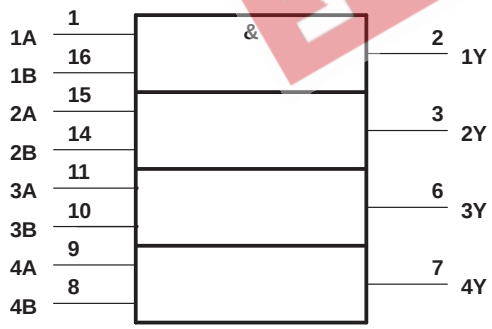
The 74ACT11008 contains four independent 2-input AND gates. It performs the Boolean function Y = A•B or $Y = \overline{\overline{A} + \overline{B}}$ in positive logic.

The 74ACT11008 is characterized for operation from –40°C to 85°C.

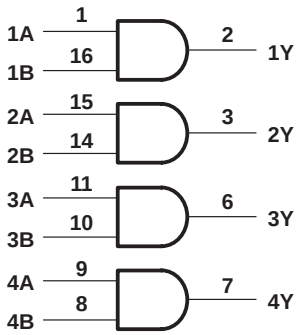
FUNCTION TABLE
(each gate)

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

logic symbol†



logic diagram (positive logic)



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

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

Supply voltage range, V_{CC} . . . . . –0.5 V to 6 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
Maximum power dissipation at T_A = 55°C (in still air) (see Note 2): D package . . . . . 1.3 W
N package . . . . . 1.1 W
PW package . . . . . 0.5 W
Storage temperature range, T_{stg} . . . . . –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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils, except for the N package, which has a trace length of zero.

recommended operating conditions

		MIN	MAX	UNIT
V_{CC}	Supply voltage	4.5	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

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

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
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			3.7		
		5.5 V	4.94			4.7		
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_{OH}†	V_O = 3.85 V	5.5 V				–75		mA
I_{OL}†	V_O = 1.65 V	5.5 V				75		mA
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
ΔI_{CC}‡	One input at 3.4 V, Other inputs at GND or V_{CC}	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 1 second.
‡ This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 or V_{CC}.

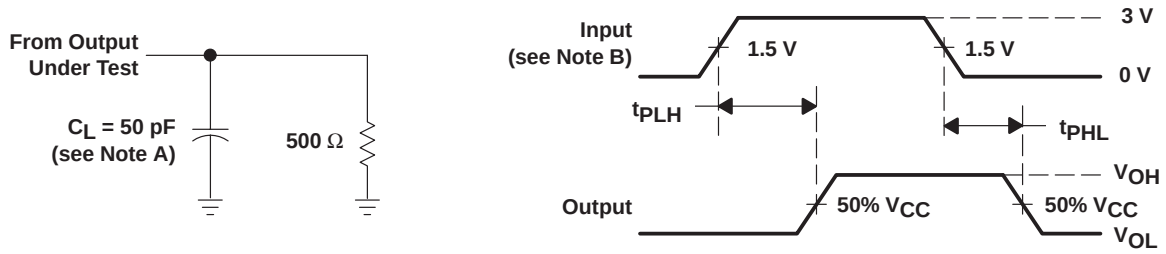
switching characteristics over recommended ranges of supply voltage and free-air temperature (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A or B	Y	1.5	5.8	8	1.5	9	ns
t_{PHL}			1.5	5.2	7.7	1.5	8.2	

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

PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance per gate	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 ≤ 1 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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