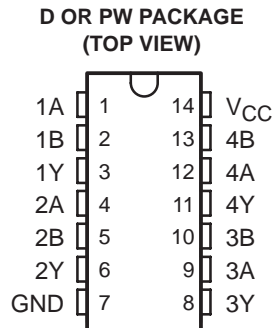


SN74AC08-Q1 QUADRUPLE 2-INPUT POSITIVE-AND GATE

SCAS789 – NOVEMBER 2004

- Qualification in Accordance With AEC-Q100†
- Qualified for Automotive Applications
- Customer-Specific Configuration Control Can Be Supported Along With Major-Change Approval
- 2-V to 6-V V_{CC} Operation
- Inputs Accept Voltages to 6 V
- Max t_{pd} of 7.5 ns at 5 V

† Contact factory for details. Q100 qualification data available on request.



description/ordering information

The SN74AC08 device is a quadruple 2-input positive-AND gate. This device performs the Boolean function $Y = A \cdot B$ or $Y = \overline{A} + \overline{B}$ in positive logic.

ORDERING INFORMATION

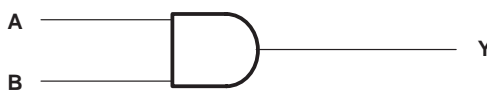
TA	PACKAGE‡		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 125°C	SOIC – D	Tape and reel	SN74AC08QDRQ1	AC08Q
	TSSOP – PW	Tape and reel	SN74AC08QPWRQ1	AC08Q

‡ Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE (each gate)

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

logic diagram, each gate (positive logic)



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
INSTRUMENTS**

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SN74AC08-Q1

QUADRUPLE 2-INPUT POSITIVE-AND GATE

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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 $V_O > V_{CC}$)	± 20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	± 50 mA
Continuous current through V_{CC} or GND	± 200 mA
Package thermal impedance, θ_{JA} (see Note 2): D package	86°C/W
PW package	113°C/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 package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions (see Note 3)

		MIN	MAX	UNIT
V_{CC}	Supply voltage	2	6	V
V_{IH}	High-level input voltage	$V_{CC} = 3$ V	2.1	V
		$V_{CC} = 4.5$ V	3.15	
		$V_{CC} = 5.5$ V	3.85	
V_{IL}	Low-level input voltage	$V_{CC} = 3$ V	0.9	V
		$V_{CC} = 4.5$ V	1.35	
		$V_{CC} = 5.5$ V	1.65	
V_I	Input voltage	0	V_{CC}	V
V_O	Output voltage	0	V_{CC}	V
I_{OH}	High-level output current	$V_{CC} = 3$ V	-12	mA
		$V_{CC} = 4.5$ V	-24	
		$V_{CC} = 5.5$ V	-24	
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		8	ns/V
T_A	Operating free-air temperature	-40	125	°C

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.



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QUADRUPLE 2-INPUT POSITIVE-AND GATE

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

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C			T _A = -40°C TO 125°C		T _A = -40°C TO 85°C		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{OH}	I _{OH} = -50 μA	3 V	2.9			2.9		2.9		V
		4.5 V	4.4			4.4		4.4		
		5.5 V	5.4			5.4		5.4		
	I _{OH} = -12 mA	3 V	2.56			2.4		2.46		
		4.5 V	3.86			3.7		3.76		
		5.5 V	4.86			4.7		4.76		
V _{OL}	I _{OL} = 50 μA	3 V	0.002		0.1		0.1		V	
		4.5 V	0.001		0.1		0.1			
		5.5 V	0.001		0.1		0.1			
	I _{OL} = 12 mA	3 V			0.36		0.5			
		4.5 V			0.36		0.5			
		5.5 V			0.36		0.5			
I _I	A or B ports	V _I = V _{CC} or GND	5.5 V			±0.1		±1		μA
			I _{CC}			2			40	
C _i		V _I = V _{CC} or GND	5 V			4.5			pF	

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			T _A = -40°C TO 125°C		T _A = -40°C TO 85°C		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Y	1.5	7.5	9.5	1	12.5	1	10	ns
t _{PHL}			1.5	7	8.5	1	11.5	1	9	

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			T _A = -40°C TO 125°C		T _A = -40°C TO 85°C		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Y	1.5	5.5	7.5	1	9	1	8.5	ns
t _{PHL}			1.5	5.5	7	1	8.5	1	7.5	

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	20	pF



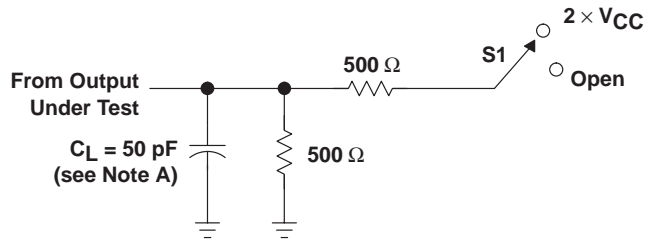
SN74AC08-Q1

QUADRUPLE 2-INPUT POSITIVE-AND GATE

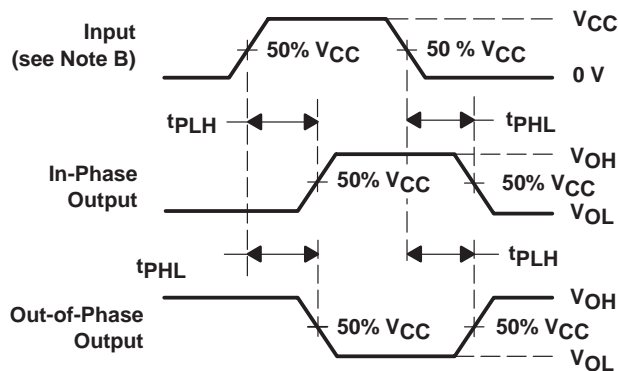
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PARAMETER MEASUREMENT INFORMATION

TEST	S1
t_{PLH}/t_{PHL}	Open



LOAD CIRCUIT



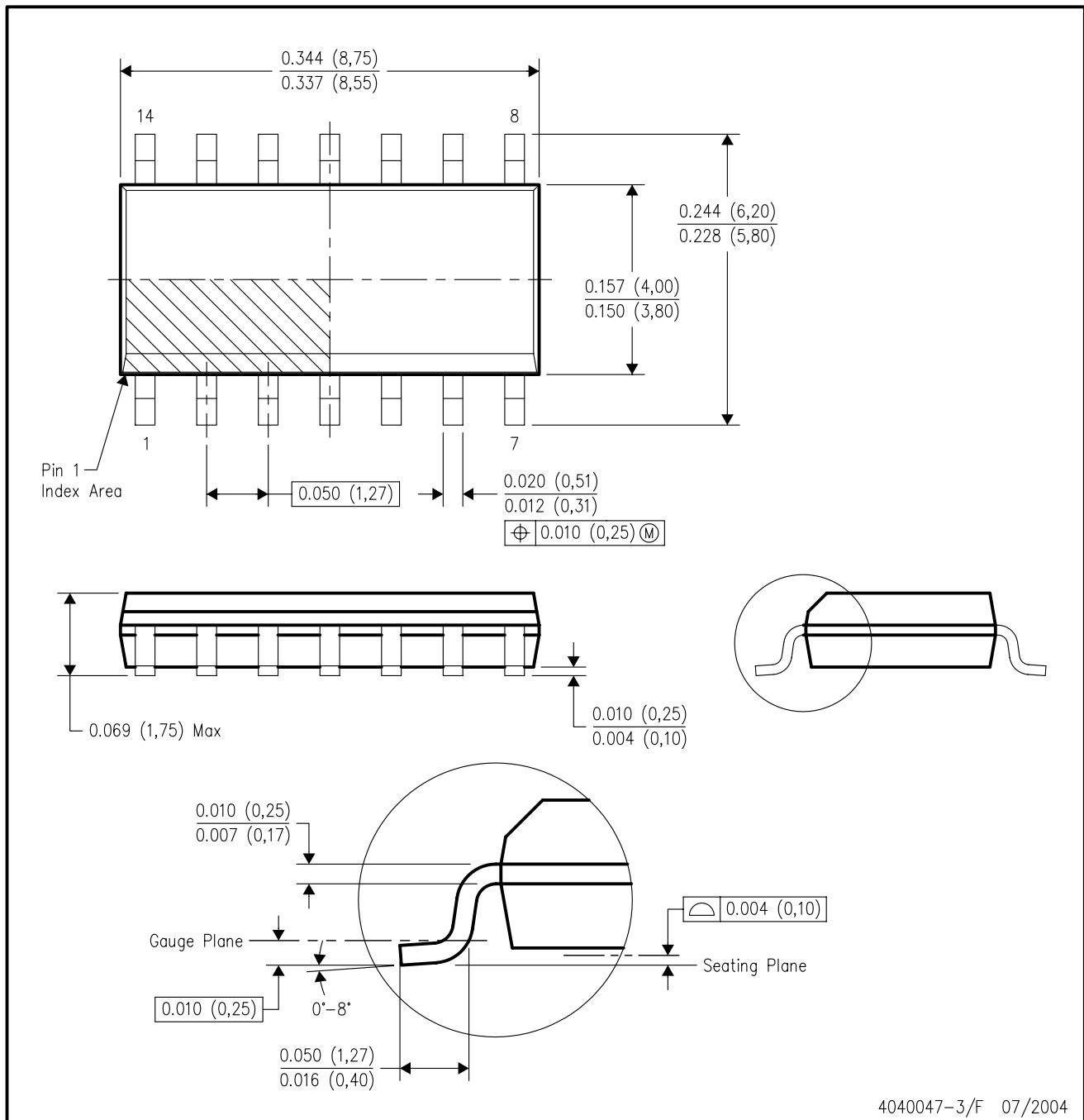
VOLTAGE WAVEFORMS

- NOTES: A. C_L includes probe and jig capacitance.
 B. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.
 C. The outputs are measured one at a time, with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

D (R-PDSO-G14)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
 - D. Falls within JEDEC MS-012 variation AB.

PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



4040064/F 01/97

- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
 D. Falls within JEDEC MO-153

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