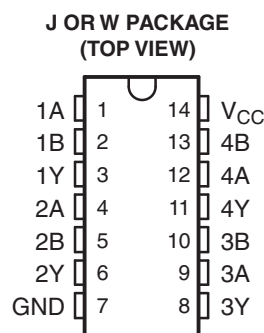


RAD-TOLERANT CLASS V, QUADRUPLE 2-INPUT POSITIVE-NAND GATE

FEATURES

- 2-V to 6-V V_{CC} Operation
- Inputs Accept Voltages to 6 V
- Max t_{pd} of 7 ns at 5 V
- Rad-Tolerant: 50 KRad(Si) TID ⁽¹⁾
 - TID Dose Rate < 2 mRad/sec
- QML-V Qualified, SMD 5962-87549

(1) Radiation tolerance is a typical value based upon initial device qualification. Radiation Lot Acceptance Testing is available - contact factory for details.



DESCRIPTION/ORDERING INFORMATION

The SN54AC00 device contains four independent 2-input NAND gates. Each gate performs the Boolean function of $Y = \bar{A} \cdot \bar{B}$ or $Y = \bar{A} + \bar{B}$ in positive logic.

ORDERING INFORMATION

T_A	PACKAGE ⁽¹⁾⁽²⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–55°C to 125°C	CDIP – J	Tube	5962-8754903VCA	5962-8754903VCA
	CFP – W	Tube	5962-8754903VDA	5962-8754903VDA

(1) Package drawings, thermal data, and symbolization are available at www.ti.com/packaging.

(2) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.

FUNCTION TABLE (Each Gate)

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

LOGIC DIAGRAM (POSITIVE LOGIC)



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

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

			MIN	MAX	UNIT
V_{CC}	Supply voltage range		-0.5	7	V
V_I	Input voltage range ⁽²⁾		-0.5	$V_{CC} + 0.5$	V
V_O	Output voltage range ⁽²⁾		-0.5	$V_{CC} + 0.5$	V
I_{IK}	Input clamp current	$V_I < 0$ or $V_I > V_{CC}$		± 20	mA
I_{OK}	Output clamp current	$V_O < 0$ or $V_O > V_{CC}$		± 20	mA
I_O	Continuous output current	$V_O = 0$ to V_{CC}		± 50	mA
	Continuous current through V_{CC} or GND			± 200	mA
θ_{JA}	Package thermal impedance ⁽³⁾	J package			°C/W
		W package			
T_{stg}	Storage temperature range		-65	150	°C

- (1) 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.
- (2) The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The package thermal impedance is calculated in accordance with JESD 51-7.

RECOMMENDED OPERATING CONDITIONS

			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		-55	125	°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	3 V	2.9			2.9		V
		4.5 V	4.4			4.4		
		5.5 V	5.4			5.4		
	I _{OH} = -12 mA	3 V	2.56			2.4		
		4.5 V	3.86			3.7		
		5.5 V	4.86			4.7		
I _{OH} = -50 mA ⁽¹⁾	5.5 V				3.85			
V _{OL}	I _{OL} = 50 μA	3 V				0.1		V
		4.5 V				0.1		
		5.5 V				0.1		
	I _{OL} = 12 mA	3 V				0.36		
		4.5 V				0.36		
		5.5 V				0.36		
I _{OL} = 24 mA	5.5 V				0.36			
I _{OL} = 50 mA ⁽¹⁾	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	2.6					pF

(1) Not more than one output should be tested at a time, and the duration of the test should not exceed 2 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	MAX	UNIT
			MIN	TYP	MAX			
t _{PLH}	A or B	Y	2	7	9.5	1	11	ns
t _{PHL}			1.5	5.5	8	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			MIN	MAX	UNIT
			MIN	TYP	MAX			
t _{PLH}	A or B	Y	1.5	6	8	1	8.5	ns
t _{PHL}			1.5	4.5	6.5	1	7	

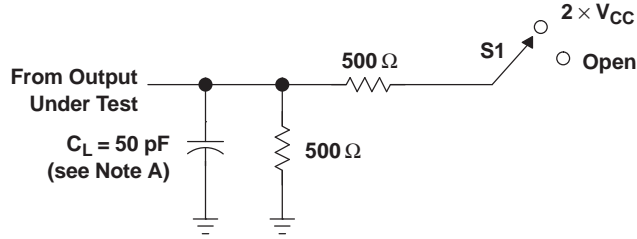
OPERATING CHARACTERISTICS

V_{CC} = 5 V, T_A = 25°C

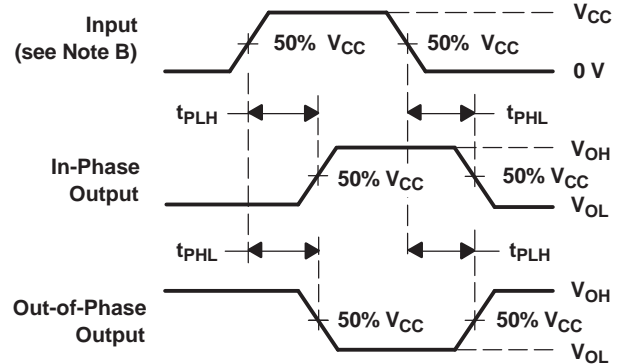
PARAMETER	TEST CONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance C _L = 50 pF, f = 1 MHz	40	pF

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

J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package is hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
 - E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only.
 - E. Falls within MIL STD 1835 GDFP1-F14 and JEDEC MO-092AB

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