

RAD-TOLERANT CLASS V, HEX SCHMITT-TRIGGER INVERTER

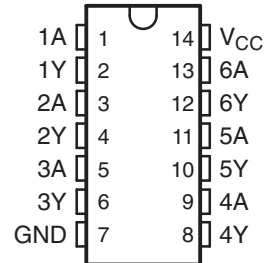
Check for Samples: [SN54AC14-SP](#)

FEATURES

- 2-V to 6-V V_{CC} Operation
- Inputs Accept Voltages to 6 V
- Max tpd of 9.5 ns at 5 V
- Rad-Tolerant: 50 kRad(Si) TID ⁽¹⁾
 - TID Dose Rate < 2mRad/sec
- QML-V Qualified, SMD 5962-87624

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

J OR W PACKAGE
(TOP VIEW)



DESCRIPTION/ORDERING INFORMATION

These Schmitt-trigger devices contain six independent inverters. They perform the Boolean function $Y = \bar{A}$. Because of the Schmitt action, they have different input threshold levels for positive-going (V_{T+}) and for negative-going (V_{T-}) signals.

These circuits are temperature compensated and can be triggered from the slowest of input ramps and still give clean, jitter-free output signals. They also have a greater noise margin than conventional inverters.

ORDERING INFORMATION⁽¹⁾

T_A	PACKAGE ⁽²⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–55°C to 125°C	CDIP – J	Tube	5962-8762402VCA	5962-8762402VCA
	CFP – W	Tube	5962-8762402VDA	5962-8762402VDA

- (1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.
- (2) Package drawings, thermal data, and symbolization are available at www.ti.com/packaging.

FUNCTION TABLE (EACH INVERTER)

INPUT A	OUTPUT Y
H	L
L	H

LOGIC DIAGRAM, EACH INVERTER (POSITIVE LOGIC)



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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	$V_O < 0$		±20 mA
I_O	Continuous output current	$V_O = 0$ to V_{CC}		±50 mA
	Continuous current through V_{CC} or GND			±200 mA
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 provided the input and output current ratings are observed.

RECOMMENDED OPERATING CONDITIONS⁽¹⁾

		MIN	MAX	UNIT
V_{CC}	Supply voltage	2	6	V
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
		$V_{CC} = 4.5$ V		-24
		$V_{CC} = 5.5$ V		-24
I_{OL}	Low-level output current	$V_{CC} = 3$ V		12
		$V_{CC} = 4.5$ V		24
		$V_{CC} = 5.5$ V		24
T_A	Operating free-air temperature	-55	125	°C

- (1) 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.

Electrical Characteristics

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

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C		T _A = –55°C TO 125°C		UNIT
			MIN	MAX	MIN	MAX	
V _{T+} Positive-going threshold		3 V		2.3		2.3	V
		4.5 V		3.2		3.2	
		5.5 V		3.9		3.9	
V _{T–} Negative-going threshold		3 V	0.5		0.5		V
		4.5 V	0.9		0.9		
		5.5 V	1.1		1.1		
ΔV_T Hysteresis (V _{T+} – V _{T–})		3 V	0.3	1.3	0.3	1.3	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 μ A	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	
	I _{OH} = –24 mA	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 μ A	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		0.5		0.5	
		4.5 V		0.5		0.5	
	I _{OL} = 24 mA	4.5 V		0.5		0.5	
		5.5 V		0.5		0.5	
	I _{OL} = 50 mA ⁽¹⁾	5.5 V				1.65	
I _I	V _I = V _{CC} or GND	5.5 V		±0.1		±1	μ A
I _{CC}	V _I = V _{CC} or GND, I _O = 0	5.5 V		4		80	μ A
C _i	V _I = V _{CC} or GND	5 V		8		8	pF

(1) 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, $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$, $C_L = 50\text{ pF}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			$T_A = -55^\circ\text{C}$ TO 125°C		UNIT
			MIN	TYP	MAX	MIN	MAX	
t_{PLH}	A	Y	1.5	6	13.5	1	16	ns
t_{PHL}			1.5	6	11.5	1	14	

SWITCHING CHARACTERISTICS

over recommended operating free-air temperature range, $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$, $C_L = 50\text{ pF}$ (unless otherwise noted) (see Figure 1)

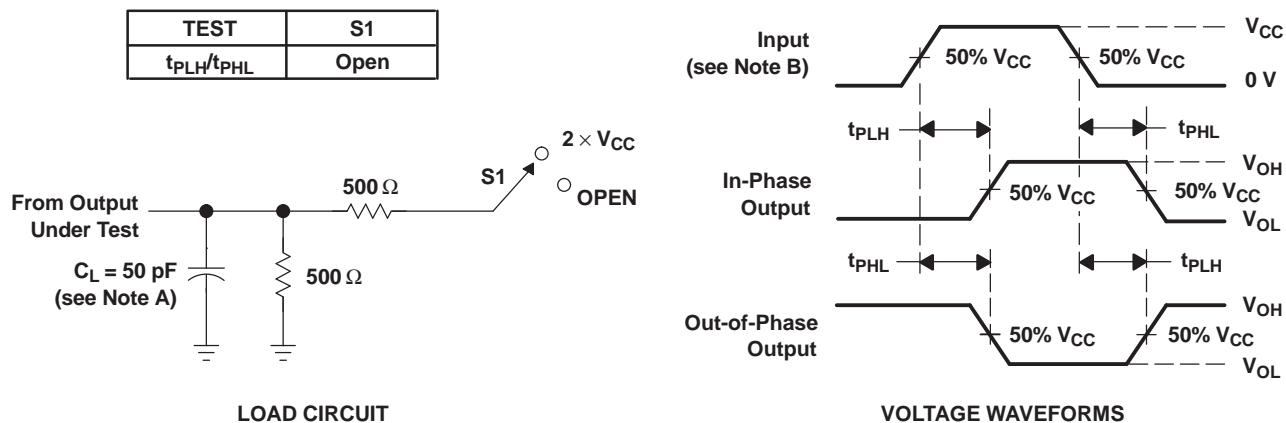
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			-55°C TO 125°C		UNIT
			MIN	TYP	MAX	MIN	MAX	
t_{PLH}	A	Y	1.5	5	10	1.5	12	ns
t_{PHL}			1.5	5	8.5	1.5	10	

OPERATING CHARACTERISTICS

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
C_{pd} Power dissipation capacitance	$C_L = 50\text{ pF}$, $f = 1\text{ MHz}$	25	pF

PARAMETER MEASUREMENT INFORMATION



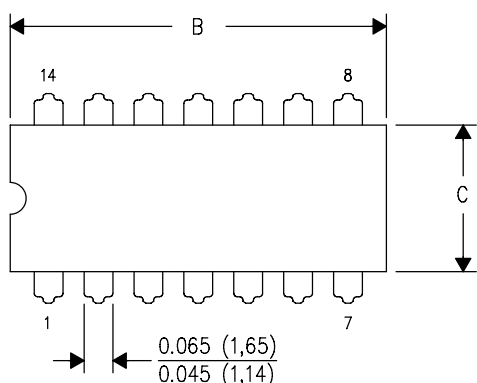
- NOTES: A. C_L includes probe and jig capacitance.
 B. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1\ \text{MHz}$, $Z_O = 50\ \Omega$, $t_r \leq 2.5\ \text{ns}$, $t_f \leq 2.5\ \text{ns}$.
 C. The outputs are measured one at a time with one input transition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

Figure 1. Load Circuit and Voltage Waveforms

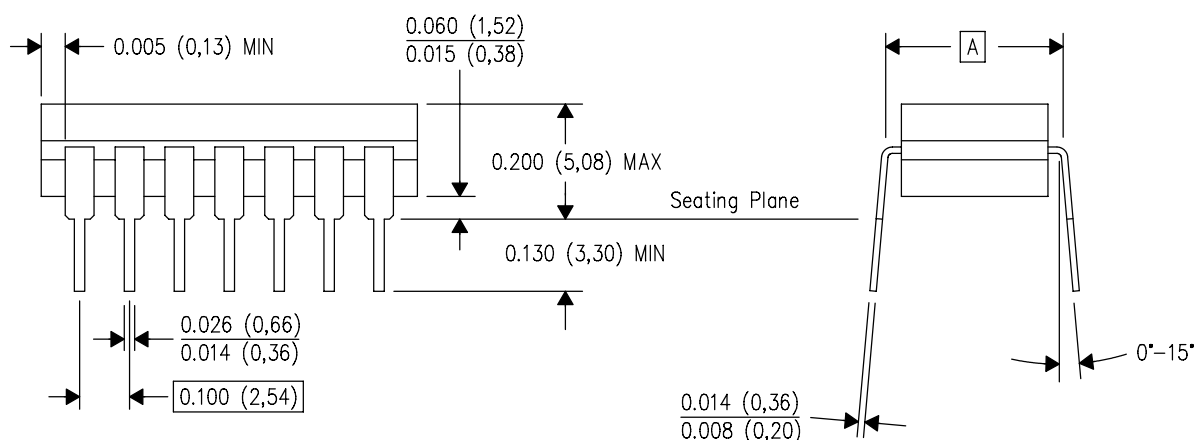
J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



PINS ** DIM	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)

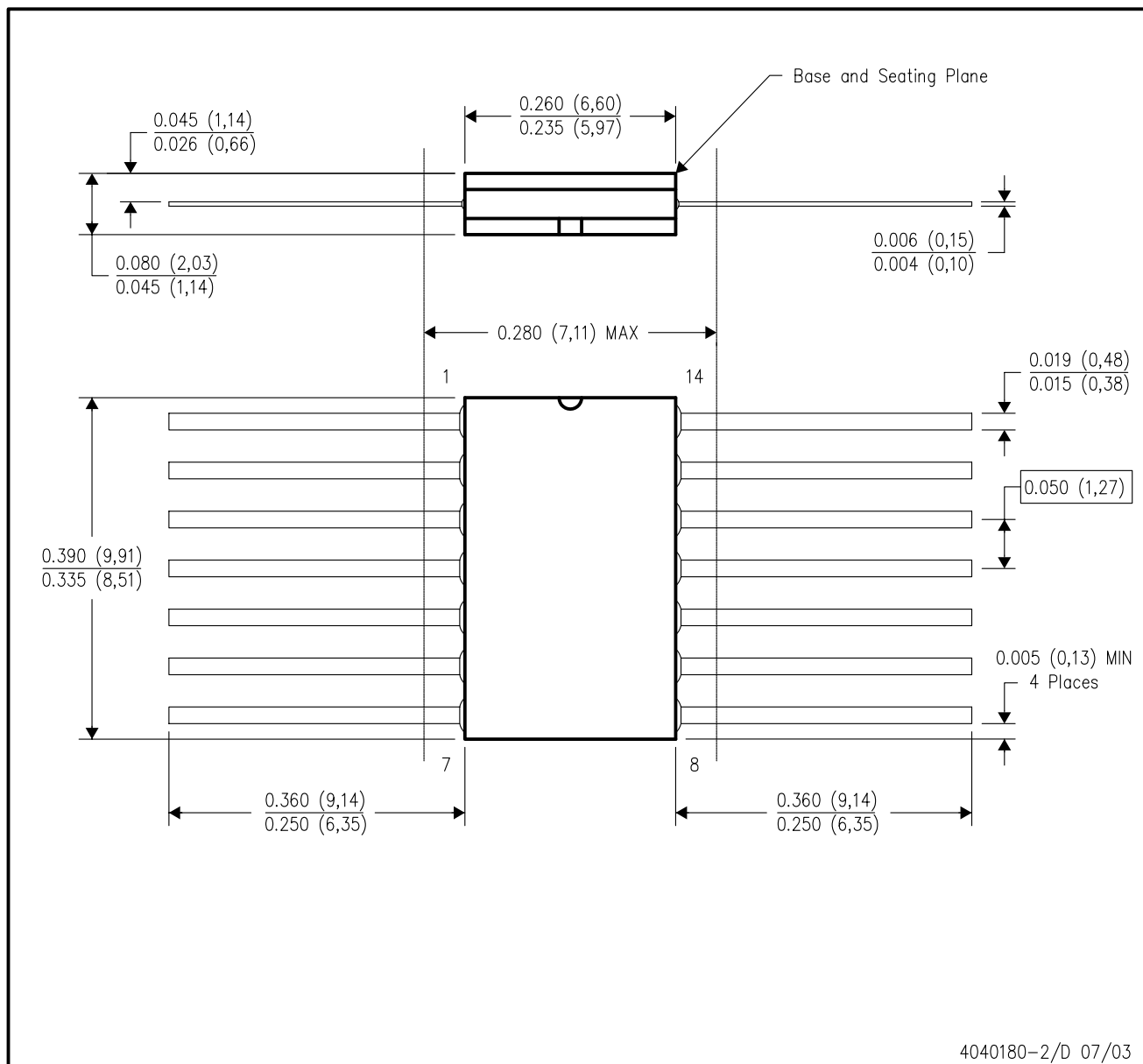


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- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package is hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal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

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