

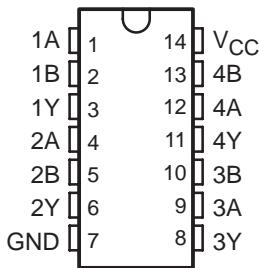
- Wide Operating Voltage Range of 2 V to 6 V
- Operation From Very Slow Input Transitions
- Same Pinouts as 'HC08
- Outputs Can Drive Up To 10 LSTTL Loads
- Low Power Consumption, 20- μ A Max I_{CC}
- Typical $t_{pd} = 14$ ns
- ± 4 -mA Output Drive at 5 V
- Low Input Current of 1 μ A Max
- Allow Design of Either RC or Crystal Oscillator Circuits
- Temperature-Compensated Threshold Levels
- High Noise Immunity

description/ordering information

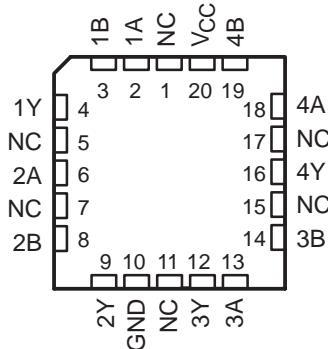
Each circuit functions as a quadruple AND gate. They perform the Boolean function $Y = A \bullet B$ or $Y = \overline{A} + \overline{B}$ in positive logic. Because of the Schmitt action, the inputs have different input threshold levels for positive- and negative-going signals.

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

SN54HC7001 . . . J OR W PACKAGE
SN74HC7001 . . . D, N, OR NS PACKAGE
(TOP VIEW)



SN54HC7001 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

ORDERING INFORMATION

T_A	PACKAGE [†]		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	PDIP – N	Tube of 25	SN74HC7001N	SN74HC7001N
	SOIC – D	Tube of 50	SN74HC7001D	HC7001
		Reel of 2500	SN74HC7001DR	
		Reel of 250	SN74HC7001DT	
	SOP – NS	Reel of 2000	SN74HC7001NSR	HC7001
-55°C to 125°C	CDIP – J	Tube of 25	SNJ54HC7001J	SNJ54HC7001J
	CFP – W	Tube of 150	SNJ54HC7001W	SNJ54HC7001W
	LCCC – FK	Tube of 55	SNJ54HC7001FK	SNJ54HC7001FK

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



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SN54HC7001, SN74HC7001
QUADRUPLE POSITIVE-AND GATES
WITH SCHMITT-TRIGGER INPUTS
 SCLS035E – MARCH 1984 – REVISED NOVEMBER 2004

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

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C			SN54HC7001		SN74HC7001		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{T+}		2 V	0.7	1.2	1.5	0.7	1.5	0.7	1.5	V
		4.5 V	1.55	2.5	3.15	1.55	3.15	1.55	3.15	
		6 V	2.1	3.3	4.2	2.1	4.2	2.1	4.2	
V _{T-}		2 V	0.3	0.6	1	0.3	1	0.3	1	V
		4.5 V	0.9	1.6	2.45	0.9	2.45	0.9	2.45	
		6 V	1.2	2	3.2	1.2	3.2	1.2	3.2	
V _{T+} – V _{T-}		2 V	0.2	0.6	1.2	0.2	1.2	0.2	1.2	V
		4.5 V	0.4	0.9	2.1	0.4	2.1	0.4	2.1	
		6 V	0.5	1.3	2.5	0.5	2.5	0.5	2.5	
V _{OH}	V _I = V _{IH} or V _{IL}	I _{OH} = -20 μA	2 V	1.9	1.998	1.9	1.9			V
			4.5 V	4.4	4.499	4.4	4.4			
			6 V	5.9	5.999	5.9	5.9			
		I _{OH} = -4 mA	4.5 V	3.98	4.3	3.7	3.84			
		I _{OH} = -5.2 mA	6 V	5.48	5.8	5.2	5.34			
V _{OL}	V _I = V _{IH} or V _{IL}	I _{OL} = 20 μA	2 V	0.002	0.1	0.1	0.1			V
			4.5 V	0.001	0.1	0.1	0.1			
			6 V	0.001	0.1	0.1	0.1			
		I _{OL} = 4 mA	4.5 V	0.17	0.26	0.4	0.33			
		I _{OL} = 5.2 mA	6 V	0.15	0.26	0.4	0.33			
I _I	V _I = V _{CC} or 0		6 V	±0.1	±100	±1000	±1000			nA
I _{CC}	V _I = V _{CC} or 0, I _O = 0		6 V		2	40	20			μA
C _i			2 V to 6 V	3	10	10	10			pF

switching characteristics over recommended operating free-air temperature range, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC7001		SN74HC7001		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A or B	Y	2 V	60	130		195		163		ns
			4.5 V	18	26		39		33		
			6 V	14	22		33		28		
t _t		Any	2 V	28	75		110		95		ns
			4.5 V	8	15		22		19		
			6 V	6	13		19		16		

operating characteristics, T_A = 25°C

PARAMETER	TEST CONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance per gate	No load	20 pF

PRODUCT PREVIEW information concerns products in the formative or design phase of development. Characteristic data and other specifications are design goals. Texas Instruments reserves the right to change or discontinue these products without notice.

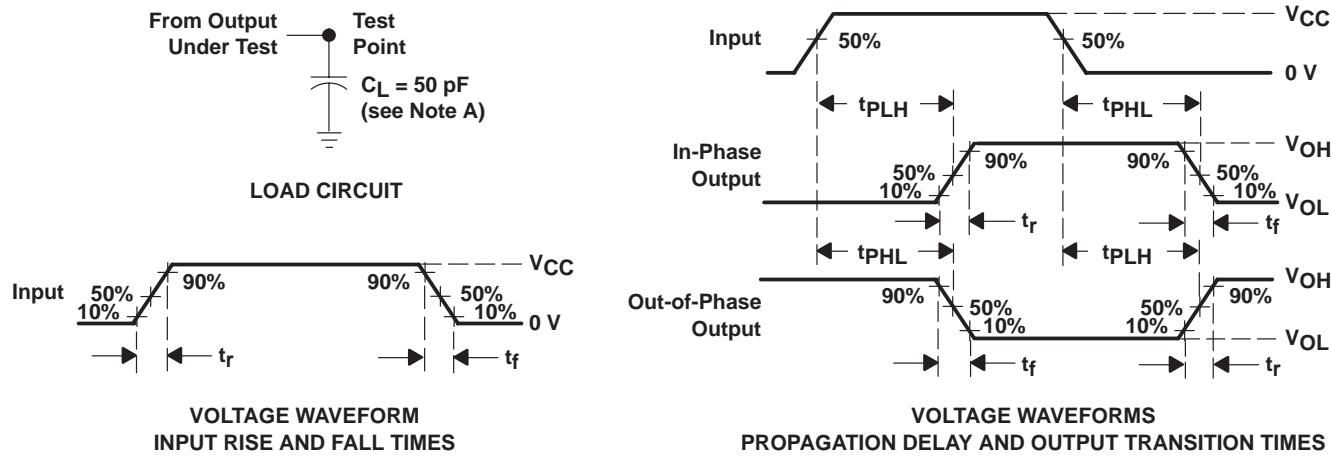
 **TEXAS
INSTRUMENTS**

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**SN54HC7001, SN74HC7001
QUADRUPLE POSITIVE-AND GATES
WITH SCHMITT-TRIGGER INPUTS**

SCLS035E – MARCH 1984 – REVISED NOVEMBER 2004

PARAMETER MEASUREMENT INFORMATION



NOTES:

- C_L includes probe and test-fixture capacitance.
- Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR $\leq 1 \text{ MHz}$, $Z_0 = 50 \Omega$, $t_r = 6 \text{ ns}$, $t_f = 6 \text{ ns}$.
- The outputs are measured one at a time, with one input transition per measurement.
- t_{PLH} and t_{PHL} are the same as t_{pd} .

Figure 1. Load Circuit and Voltage Waveforms

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PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN74HC7001D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HC7001DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HC7001DG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HC7001DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HC7001DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HC7001DRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HC7001DT	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HC7001DTE4	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HC7001DTG4	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HC7001N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74HC7001N3	OBsolete	PDIP	N	14	TBD		Call TI	Call TI
SN74HC7001NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBsolete: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

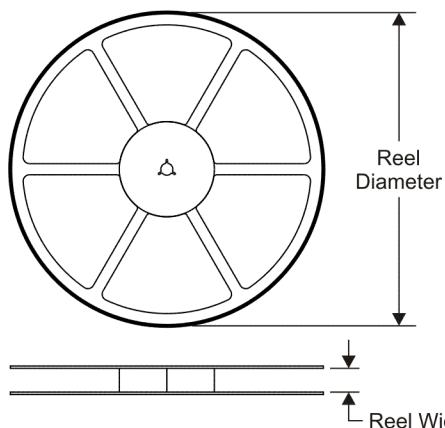
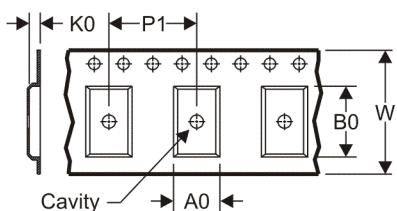
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

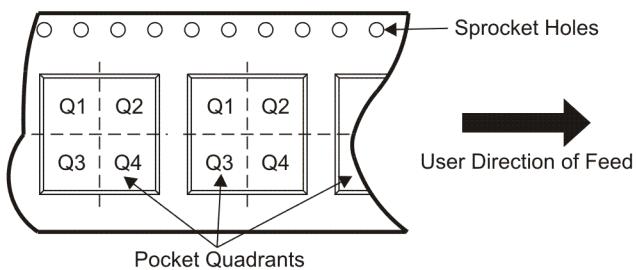
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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TAPE AND REEL INFORMATION
REEL DIMENSIONS

TAPE DIMENSIONS


A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74HC7001DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1

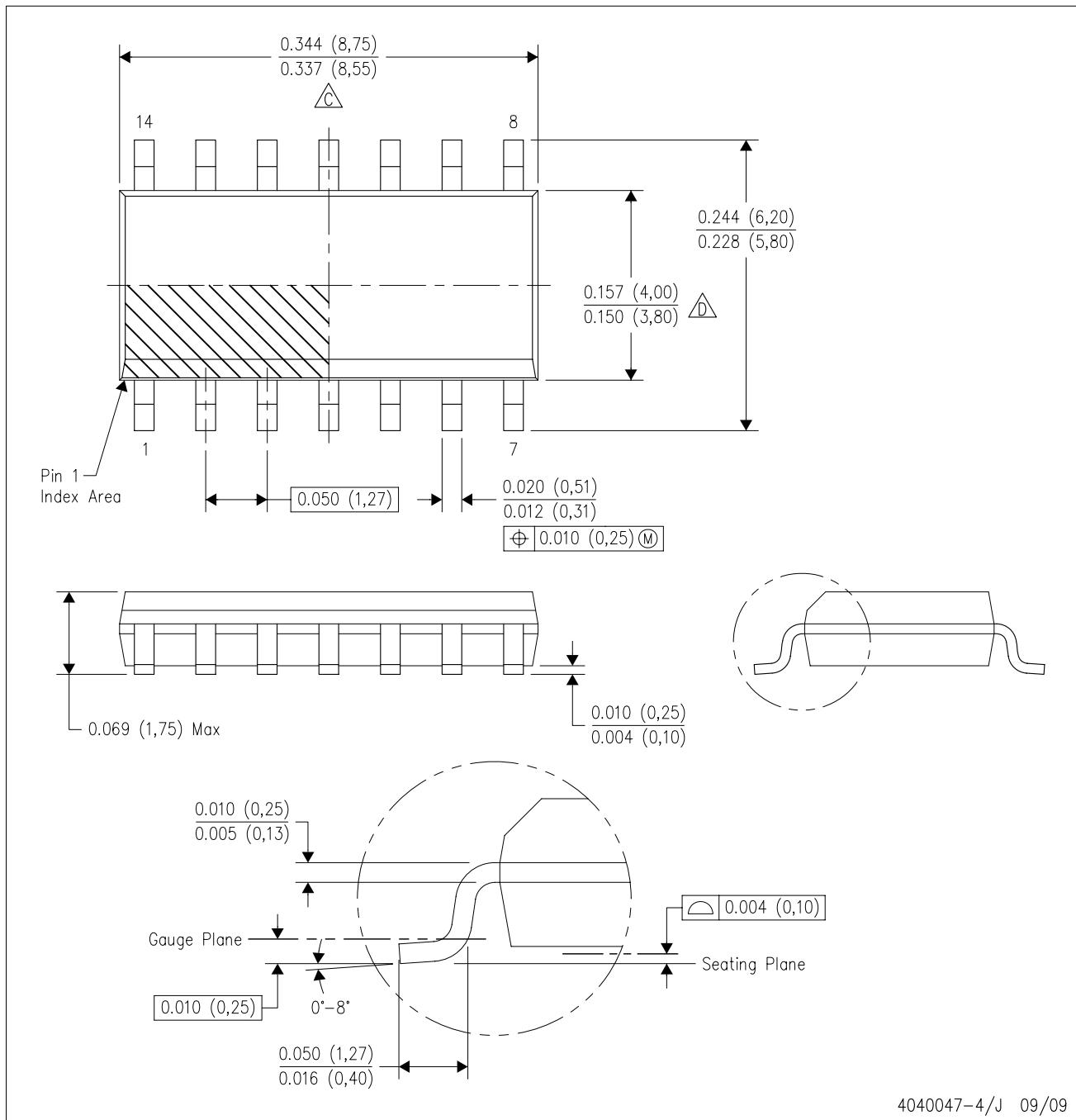
TAPE AND REEL BOX DIMENSIONS

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74HC7001DR	SOIC	D	14	2500	346.0	346.0	33.0

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 length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.

D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.

E. Reference JEDEC MS-012 variation AB.

N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE

