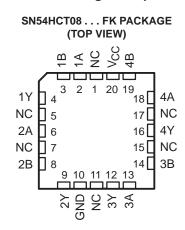
SCLS063D - NOVEMBER 1988 - REVISED AUIGUST 2003

- Operating Voltage Range of 4.5 V to 5.5 V
- Outputs Can Drive Up To 10 LSTTL Loads
- Low Power Consumption, 20-μA Max I<sub>CC</sub>

#### SN54HCT08 ... J OR W PACKAGE SN74HCT08 ... D, DB, N, NS, OR PW PACKAGE (TOP VIEW)

- Typical t<sub>pd</sub> = 13 ns
- ±4-mA Output Drive at 5 V
- Low Input Current of 1 μA Max
- Inputs Are TTL-Voltage Compatible



NC - No internal connection

#### description/ordering information

These devices contain four independent 2-input AND gates. They perform the Boolean function  $Y = A \bullet B$  or  $Y = \overline{A + B}$  in positive logic.

TA	PACKA	GET	ORDERABLE PART NUMBER	TOP-SIDE MARKING							
	PDIP – N	Tube of 25	SN74HCT08N	SN74HCT08N							
-40°C to 85°C		Tube of 50	SN74HCT08D								
	SOIC – D	Reel of 2500	SN74HCT08DR	HCT08							
		Reel of 250	SN74HCT08DT								
	SOP – NS	Reel of 2000	SN74HCT08NSR	HCT08							
	SSOP – DB	Reel of 2000	SN74HCT08DBR	HT08							
		Tube of 90	SN74HCT08PW								
	TSSOP – PW	Reel of 2000	SN74HCT08PWR	HT08							
		Reel of 250	SN74HCT08PWT								
	CDIP – J	Tube of 25	SNJ54HCT08J	SNJ54HCT08J							
–55°C to 125°C	CFP – W	Tube of 150	SNJ54HCT08W	SNJ54HCT08W							
	LCCC – FK	Tube of 55	SNJ54HCT08FK	SNJ54HCT08FK							

### **ORDERING INFORMATION**

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



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FUNCTION TABLE (each gate)										
INP	UTS	OUTPUT								
Α	В	Y								
Н	Н	Н								
L	Х	L								
Х	L	L								

### logic diagram (positive logic)



#### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>

Supply voltage range, $V_{CC}$ -0.5 V to 7 VInput clamp current, $I_{IK}$ ( $V_I < 0$ or $V_I > V_{CC}$ ) (see Note 1)±20 mAOutput clamp current, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{CC}$ ) (see Note 1)±20 mA	4 4
Continuous output current, I <sub>O</sub> (V <sub>O</sub> = 0 to V <sub>CC</sub> ) $\pm 25$ mA	
Continuous current through V <sub>CC</sub> or GND±50 mA	4
Package thermal impedance, 0, A (see Note 2): D package	V
DB package	V
N package	V
NS package	V
PW package	V
Storage temperature range, T <sub>stg</sub>	

<sup>†</sup> 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)

			SN	154HCT08	SN	174HCT08	8	UNIT
			MIN	NOM MAX	MIN	NOM	MAX	UNIT
VCC	Supply voltage		4.5	5 🔥 5.5	4.5	5	5.5	V
VIH	High-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2	N	2			V
VIL	Low-level input voltage	$V_{CC}$ = 4.5 V to 5.5 V		0.8			0.8	V
VI	Input voltage		0	Vcc	0		VCC	V
VO	Output voltage		0	S Vcc	0		VCC	V
$\Delta t/\Delta v$	Input transition rise/fall time		C	500			500	ns
Τ <sub>Α</sub>	Operating free-air temperature		-55	125	-40		85	°C

NOTE 3: All unused inputs of the device must be held at V<sub>CC</sub> 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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electrical chara	cteristics over	recommended	operating	free-air	temperature	range	(unless
otherwise noted					-	•	

PARAMETER	TEST CO	TEST CONDITIONS			A = 25°C	;	SN54H	ICT08	SN74HCT08		UNIT	
FARAMETER	1231 00				TYP	MAX	MIN	MAX	MIN	MAX	UNIT	
Ver		I <sub>OH</sub> = -20 μA	4.5 V	4.4	4.499		4.4		4.4		V	
VOH	$V_{I} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -4 \text{ mA}$	4.5 V	3.98	4.3		3.7	W	3.84		v	
		I <sub>OL</sub> = 20 μA	4.5 V		0.001	0.1		0.1		0.1	V	
VOL	VI = VIH  or  VIL	$I_{OL} = 4 \text{ mA}$	4.5 V		0.17	0.26		0.4		0.33	v	
Ц	$V_{I} = V_{CC} \text{ or } 0$		5.5 V		±0.1	±100	1	±1000		±1000	nA	
ICC	$V_{I} = V_{CC} \text{ or } 0,$	$I_{O} = 0$	5.5 V			2	22	40		20	μΑ	
∆lCC‡	One input at 0.5 V Other inputs at 0 o		5.5 V		1.4	2.4	PRO1	3		2.9	mA	
Ci			4.5 V to 5.5 V		3	10		10		10	pF	

<sup>†</sup> This is the increase in supply current for each input that is at one of the specified TTL voltage levels, rather than 0 V or V<sub>CC</sub>.

# switching characteristics over recommended operating free-air temperature range, $C_L = 50 \text{ pF}$ (unless otherwise noted) (see Figure 1)

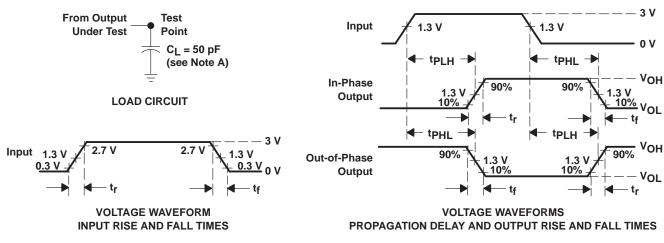
PARAMETER	FROM	TO (OUTPUT)	Vee	T <sub>A</sub> = 25°C			SN54HCT08	SN74HCT08	UNIT
	(INPUT)		Vcc	MIN	TYP	MAX	MIN MAX	MIN MAX	
t i Aor P	V	4.5 V		15	24	35	30	20	
чрd	<sup>t</sup> pd A or B	Т	5.5 V		13	22	32	27	ns
tt		V	4.5 V		9	15	22	19	
		r	5.5 V		8	14	20	17	ns

### operating characteristics, $T_{A}$ = 25°C

	PARAMETER	TEST CONDITIONS	TYP	UNIT
C <sub>pd</sub>	Power dissipation capacitance per gate	No load	20	pF



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#### PARAMETER MEASUREMENT INFORMATION

- NOTES: A. CL includes probe and test-fixture capacitance.
  - B. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, Z<sub>Ω</sub> = 50 Ω, t<sub>r</sub> = 6 ns, t<sub>f</sub> = 6 ns.
    - C. The outputs are measured one at a time with one input transition per measurement.
    - D. tPLH and tPHL are the same as tpd.

#### Figure 1. Load Circuit and Voltage Waveforms





24-Aug-2018

### **PACKAGING INFORMATION**

Orderable Device	Status	Package Type	-	Pins	-	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)		(4/5)	
SN74HCT08D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT08	Samples
SN74HCT08DBR	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT08	Samples
SN74HCT08DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT08	Samples
SN74HCT08DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT08	Samples
SN74HCT08DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT08	Samples
SN74HCT08DRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT08	Samples
SN74HCT08N	ACTIVE	PDIP	Ν	14	25	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type	-40 to 85	SN74HCT08N	Samples
SN74HCT08NE4	ACTIVE	PDIP	N	14	25	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type	-40 to 85	SN74HCT08N	Samples
SN74HCT08NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT08	Samples
SN74HCT08PW	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT08	Samples
SN74HCT08PWE4	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT08	Samples
SN74HCT08PWG4	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT08	Samples
SN74HCT08PWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT08	Samples
SN74HCT08PWRG4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT08	Samples
SN74HCT08PWT	ACTIVE	TSSOP	PW	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT08	Samples

(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.



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**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.

<sup>(2)</sup> RoHS: TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

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

<sup>(4)</sup> There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(<sup>5)</sup> Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

<sup>(6)</sup> Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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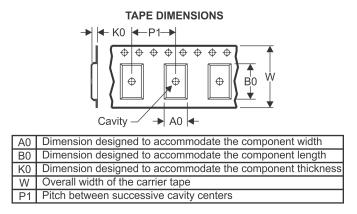
### PACKAGE MATERIALS INFORMATION

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#### TAPE AND REEL INFORMATION





### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal												
Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74HCT08DBR	SSOP	DB	14	2000	330.0	16.4	8.2	6.6	2.5	12.0	16.0	Q1
SN74HCT08DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HCT08DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HCT08NSR	SO	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74HCT08PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74HCT08PWT	TSSOP	PW	14	250	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1

TEXAS INSTRUMENTS

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### PACKAGE MATERIALS INFORMATION

24-Aug-2017



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74HCT08DBR	SSOP	DB	14	2000	367.0	367.0	38.0
SN74HCT08DR	SOIC	D	14	2500	333.2	345.9	28.6
SN74HCT08DR	SOIC	D	14	2500	367.0	367.0	38.0
SN74HCT08NSR	SO	NS	14	2000	367.0	367.0	38.0
SN74HCT08PWR	TSSOP	PW	14	2000	367.0	367.0	35.0
SN74HCT08PWT	TSSOP	PW	14	250	367.0	367.0	35.0

D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters).

- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AB.





NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
  E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



PW (R-PDSO-G14)

PLASTIC SMALL OUTLINE



A. An integration of the information o

Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.

Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.

E. Falls within JEDEC MO-153



### N (R-PDIP-T\*\*)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



NOTES:

- A. All linear dimensions are in inches (millimeters).B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- $\triangle$  The 20 pin end lead shoulder width is a vendor option, either half or full width.



### **MECHANICAL DATA**

MSSO002E - JANUARY 1995 - REVISED DECEMBER 2001

### DB (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN



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-150



### MECHANICAL DATA

#### PLASTIC SMALL-OUTLINE PACKAGE

#### 0,51 0,35 ⊕0,25⊛ 1,27 8 14 0,15 NOM 5,60 8,20 5,00 7,40 $\bigcirc$ Gage Plane ₽ 0,25 7 1 1,05 0,55 0°-10° Δ 0,15 0,05 Seating Plane — 2,00 MAX 0,10PINS \*\* 14 16 20 24 DIM 10,50 10,50 12,90 15,30 A MAX A MIN 9,90 9,90 12,30 14,70 4040062/C 03/03

NOTES: A. All linear dimensions are in millimeters.

NS (R-PDSO-G\*\*)

**14-PINS SHOWN** 

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



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