

TYPES SN5430, SN54H30, SN54L30, SN54LS30, SN54S30,  
SN7430, SN74H30, SN74LS30, SN74S30  
8-INPUT POSITIVE-NAND GATES

REVISED DECEMBER 1983

- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

**description**

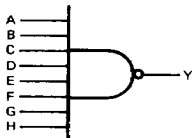
These devices contain a single 8-input NAND gate.

The SN5430, SN54H30, SN54L30, SN54LS30, and SN54S30 are characterized for operation over the full military range of -55°C to 125°C. The SN7430, SN74H30, SN74LS30, and SN74S30 are characterized for operation from 0°C to 70°C.

**FUNCTION TABLE**

INPUTS A THRU H	OUTPUT Y
All inputs H	L
One or more inputs L	H

**logic diagram**



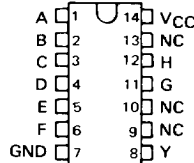
**positive logic**

$$Y = A \cdot B \cdot C \cdot D \cdot E \cdot F \cdot G \cdot H \text{ or}$$

$$Y = \overline{A + B + C + D + E + F + G + H}$$

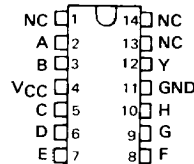
SN5430, SN54H30, SN54L30 ... J PACKAGE  
SN54LS30, SN54S30 ... J OR W PACKAGE  
SN7430, SN74H30 ... J OR N PACKAGE  
SN74LS30, SN74S30 ... D, J OR N PACKAGE

(TOP VIEW)



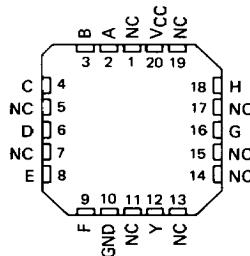
SN5430, SN54H30 ... W PACKAGE

(TOP VIEW)



SN54LS30, SN54S30 ... FK PACKAGE  
SN74LS30, SN74S30 ... FN PACKAGE

(TOP VIEW)



NC - No internal connection

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**PRODUCTION DATA**

This document contains information 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.

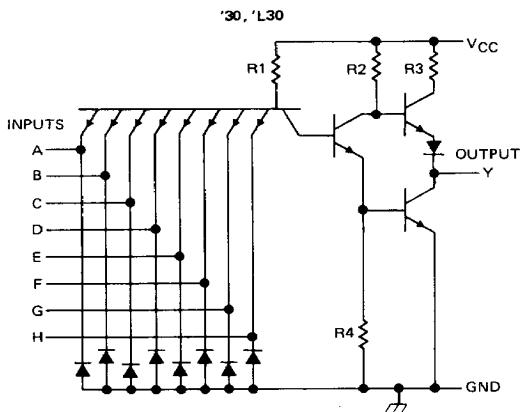


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**TYPES SN5430, SN54H30, SN54L30,  
SN7430, SN74H30  
8-INPUT POSITIVE-NAND GATES**

schematics (each gate)

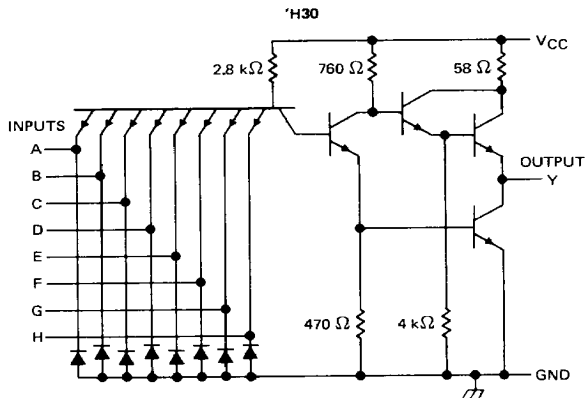


CIRCUIT	R1	R2	R3	R4
'30	4 k $\Omega$	1.6 k $\Omega$	130 $\Omega$	1 k $\Omega$
'L30	40 k $\Omega$	20 k $\Omega$	500 $\Omega$	12 k $\Omega$

Input clamp diodes not on SN54L30 circuit.

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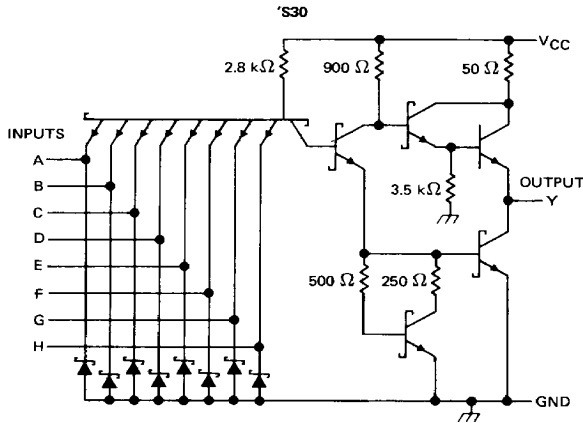
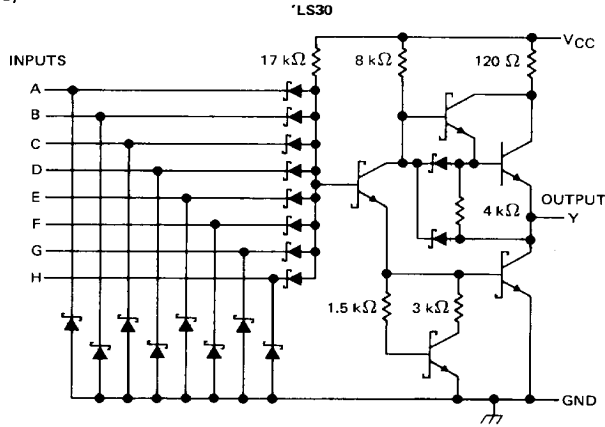
TTL DEVICES



Resistor values shown are nominal.

TYPES SN5430, SN54H30, SN54L30, SN54LS30, SN54S30,  
SN7430, SN74H30, SN74LS30, SN74S30  
8-INPUT POSITIVE-NAND GATES

schematics (each gate)



Resistor values shown are nominal.

**absolute maximum ratings over operating free-air temperature (unless otherwise noted)**

Supply voltage, $V_{CC}$ (see Note 1): '30, 'H30, 'LS30, 'S30	7 V
'L30	8 V
Input voltage: '30, 'H30, 'L30, 'S30	5.5 V
'LS30	7 V
Operating free-air temperature: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

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# TYPES SN5430, SN7430 8-INPUT POSITIVE-NAND GATES

## recommended operating conditions

	SN5430			SN7430			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage			0.8			0.8	V
I <sub>OH</sub> High-level output current			-0.4			-0.4	mA
I <sub>OL</sub> Low-level output current			16			16	mA
T <sub>A</sub> Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS †	SN5430			SN7430			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA			-1.5			-1.5	V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = -0.4 mA	2.4	3.4		2.4	3.4		V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 16 mA		0.2	0.4		0.2	0.4	V
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V			1			1	mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V			40			40	µA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V			-1.6			-1.6	mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-20		-55	-18		-55	mA
I <sub>CCH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V		1	2		1	2	mA
I <sub>CCL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 4.5 V		3	6		3	6	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time.

## switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PLH</sub>	Any	Y	R <sub>L</sub> = 400 Ω, C <sub>L</sub> = 15 pF		13	22	ns
t <sub>PHL</sub>					8	15	ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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# TYPES SN54H30, SN74H30 8-INPUT POSITIVE-NAND GATES

## recommended operating conditions

	SN54H30			SN74H30			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage	0.8			0.8			V
I <sub>OH</sub> High-level output current	-0.5			-0.5			mA
I <sub>OL</sub> Low-level output current	20			20			mA
T <sub>A</sub> Operating free-air temperature	-55			0			70 °C

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

PARAMETER	TEST CONDITIONS †	MIN	TYP ‡	MAX	UNIT	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -8 mA	-1.5			V	
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = -0.5 mA	2.4	3.5		V	
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 20 mA	0.2			0.4	V
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V	1			mA	
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V	50			µA	
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V	-2			mA	
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-40		-100	mA	
I <sub>CCH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V	2.5			4.2	mA
I <sub>CCL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 4.5 V	6.5			10	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

## switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PLH</sub>	Any	Y	R <sub>L</sub> = 280 Ω, C <sub>L</sub> = 25 pF	6.8	10		ns
t <sub>PHL</sub>				8.9	12		ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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# TYPE SN54L30

## 8-INPUT POSITIVE-NAND GATES

### recommended operating conditions

	SN54L30			UNIT
	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	V
V <sub>IH</sub> High-level input voltage	2			V
V <sub>IL</sub> Low-level input voltage				0.7 V
I <sub>OH</sub> High-level output current				-0.1 mA
I <sub>OL</sub> Low-level output current				2 mA
T <sub>A</sub> Operating free-air temperature	-55	125		°C

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

PARAMETER	TEST CONDITIONS †	SN54L30			UNIT
		MIN	TYP ‡	MAX	
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.7 V, I <sub>OH</sub> = -0.1 mA	2.4	3.3		V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 2 mA	0.15 0.3			V
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V	0.1			mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V	10			µA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.3 V	-0.18			mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-3	-15		mA
I <sub>CCH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V	0.11 0.33			mA
I <sub>CCL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 4.5 V	0.29 0.51			mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time.

### switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PLH</sub>	Any	Y	R <sub>L</sub> = 4 kΩ, C <sub>L</sub> = 50 pF	35 60		ns	
t <sub>PHL</sub>				70 100			

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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# TYPES SN54LS30, SN74LS30 8-INPUT POSITIVE-NAND GATES

## recommended operating conditions

	SN54LS30			SN74LS30			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage	0.7			0.8			V
I <sub>OH</sub> High-level output current	-0.4			-0.4			mA
I <sub>OL</sub> Low-level output current	4			8			mA
T <sub>A</sub> Operating free-air temperature	-55			125			°C

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

PARAMETER	TEST CONDITIONS †	SN54LS30		SN74LS30		UNIT
		MIN	TYP‡	MAX	MIN	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA	-1.5		-1.5		V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, I <sub>OH</sub> = -0.4 mA	2.5	3.4	2.7	3.4	V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 4 mA	0.25		0.4		V
	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 8 mA			0.25		
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V	0.1		0.1		mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V	20		20		μA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V	-0.4		-0.4		mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-20	-100	-20	-100	mA
I <sub>CCH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V	0.35		0.35		mA
I <sub>CCL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 4.5 V	0.6		0.6		mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C

§ Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

## switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PLH</sub>	Any	Y	R <sub>L</sub> = 2 kΩ, C <sub>L</sub> = 15 pF	8	15		ns
t <sub>PHL</sub>				13	20		ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.



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# TYPES SN54S30, SN74S30

## 8-INPUT POSITIVE-NAND GATES

### recommended operating conditions

	SN54S30			SN74S30			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage				0.8			V
I <sub>OH</sub> High-level output current				-1			mA
I <sub>OL</sub> Low-level output current				20			mA
T <sub>A</sub> Operating free-air temperature	-55			125			°C

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

PARAMETER	TEST CONDITIONS †	SN54S30			SN74S30			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA	-1.2			-1.2			V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = -1 mA	2.5	3.4		2.7	3.4	V	
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 20 mA	0.5			0.5			V
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V	1			1			mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V	50			50			μA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5 V	-2			-2			mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-40		-100	-40		-100	mA
I <sub>CCH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V	3			3			mA
I <sub>CCL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 4.5 V	5.5			5.5			mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

### switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t <sub>PLH</sub>	Any	Y	R <sub>L</sub> = 280 Ω,	C <sub>L</sub> = 15 pF	4	6	ns	
t <sub>PHL</sub>					4.5	7	ns	
t <sub>PLH</sub>			R <sub>L</sub> = 280 Ω,	C <sub>L</sub> = 50 pF	5.5		ns	
t <sub>PHL</sub>					6.5		ns	

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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