

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

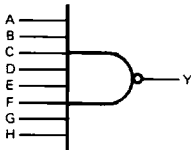
These devices contain a single 8-input NAND gate.

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

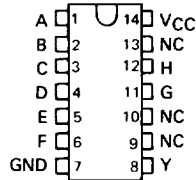


positive logic

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

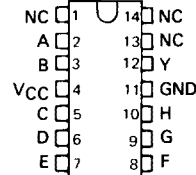
SN5430, SN54H30, SN54L30 . . . J PACKAGE
SN54LS30, SN54S30 . . . J OR W PACKAGE
SN7430, SN74H30 . . . J OR N PACKAGE
SN74LS30, SN74S30 . . . D, J OR N PACKAGE

(TOP VIEW)



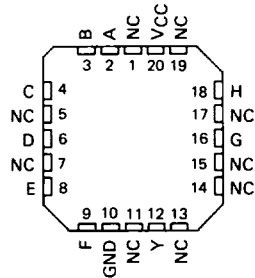
SN5430, SN54H30 . . . W PACKAGE

(TOP VIEW)



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

(TOP VIEW)



NC - No internal connection

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TTL DEVICES

PRODUCTION DATA

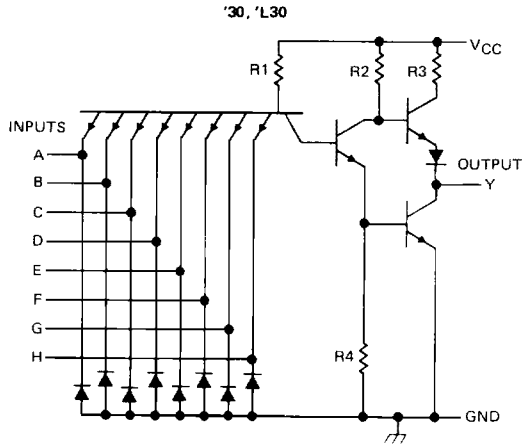
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TEXAS
INSTRUMENTS

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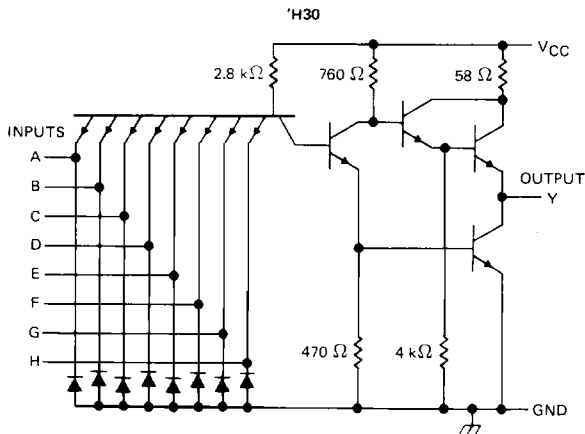
**TYPES SN5430, SN54H30, SN54L30,
SN7430, SN74H30
8-INPUT POSITIVE-NAND GATES**

schematics (each gate)



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

Input clamp diodes not on SN54L30 circuit.



Resistor values shown are nominal.

TYPES SN5430, SN7430

8-INPUT POSITIVE-NAND GATES

recommended operating conditions

	SN5430			SN7430			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage			0.8			0.8	V
I _{OH} High-level output current			-0.4			-0.4	mA
I _{OL} Low-level output current			16			16	mA
T _A 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 ‡
V _{IK}	V _{CC} = MIN, I _I = -12 mA		-1.5		-1.5	V	
V _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, I _{OH} = -0.4 mA	2.4	3.4	2.4	3.4	V	
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 16 mA		0.2	0.4	0.2	0.4	V
I _I	V _{CC} = MAX, V _I = 5.5 V			1		1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.4 V			40		40	μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V			-1.6		-1.6	mA
I _{OS} §	V _{CC} = MAX	-20		-55	-18	-55	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V		1	2	1	2	mA
I _{CCL}	V _{CC} = MAX, V _I = 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_{CC} = 5 V, T_A = 25°C.

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

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t _{PLH}	Any	Y	R _L = 400 Ω,	C _L = 15 pF		13	22	ns
t _{PHL}						8	15	ns

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

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TTL DEVICES

TYPES SN54H30, SN74H30 8-INPUT POSITIVE-NAND GATES

recommended operating conditions

	SN54H30			SN74H30			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH} High-level input voltage	2			2			V
V_{IL} Low-level input voltage			0.8			0.8	V
I_{OH} High-level output current			-0.5			-0.5	mA
I_{OL} Low-level output current			20			20	mA
T_A Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS †	MIN	TYP ‡	MAX	UNIT
V_{IK}	$V_{CC} = \text{MIN}, I_I = -8 \text{ mA}$			-1.5	V
V_{OH}	$V_{CC} = \text{MIN}, V_{IL} = 0.8 \text{ V}, I_{OH} = -0.5 \text{ mA}$	2.4	3.5		V
V_{OL}	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 20 \text{ mA}$	0.2	0.4		V
I_I	$V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$			1	mA
I_{IH}	$V_{CC} = \text{MAX}, V_I = 2.4 \text{ V}$			50	μA
I_{IL}	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$			-2	mA
$I_{OS} §$	$V_{CC} = \text{MAX}$	-40		-100	mA
I_{CCH}	$V_{CC} = \text{MAX}, V_I = 0 \text{ V}$		2.5	4.2	mA
I_{CCL}	$V_{CC} = \text{MAX}, V_I = 4.5 \text{ V}$		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 $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

§ 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, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Any	Y	$R_L = 280 \Omega, C_L = 25 \text{ pF}$	6.8		10	ns
t_{PHL}				8.9		12	ns

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

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TTL DEVICES

TYPE SN54L30

8-INPUT POSITIVE-NAND GATES

recommended operating conditions

	SN54L30			UNIT
	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	V
V _{IH} High-level input voltage	2			V
V _{IL} Low-level input voltage			0.7	V
I _{OH} High-level output current			-0.1	mA
I _{OL} Low-level output current			2	mA
T _A 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 _{OH}	V _{CC} = MIN, V _{IL} = 0.7 V, I _{OH} = -0.1 mA	2.4	3.3		V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 2 mA		0.15	0.3	V
I _I	V _{CC} = MAX, V _I = 5.5 V			0.1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.4 V			10	µA
I _{IL}	V _{CC} = MAX, V _I = 0.3 V			-0.18	mA
I _{OS} §	V _{CC} = MAX	-3		-15	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V		0.11	0.33	mA
I _{CCL}	V _{CC} = MAX, V _I = 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_{CC} = 5 V, T_A = 25°C.

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

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	Any	Y	R _L = 4 kΩ, C _L = 50 pF		35	60	ns
t _{PHL}					70	100	ns

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

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TTL DEVICES

TYPES SN54LS30, SN74LS30 8-INPUT POSITIVE-NAND GATES

recommended operating conditions

	SN54LS30			SN74LS30			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage			0.7			0.8	V
I _{OH} High-level output current			-0.4			-0.4	mA
I _{OL} Low-level output current			4			8	mA
T _A Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS †	SN54LS30			SN74LS30			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V _{IK}	V _{CC} = MIN, I _I = -18 mA			-1.5			-1.5	V
V _{OH}	V _{CC} = MIN, V _{IL} = MAX, I _{OH} = -0.4 mA	2.5	3.4		2.7	3.4		V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 4 mA		0.25	0.4			0.4	V
	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 8 mA					0.25	0.5	
I _I	V _{CC} = MAX, V _I = 7 V			0.1			0.1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V			20			20	μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V			-0.4			-0.4	mA
I _{OS} §	V _{CC} = MAX	-20		-100	-20		-100	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V		0.35	0.5		0.35	0.5	mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5 V		0.6	1.1		0.6	1.1	mA

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

‡ All typical values are at V_{CC} = 5 V, T_A = 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_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t _{PLH}	Any	Y	R _L = 2 kΩ,	C _L = 15 pF		8	15	ns
t _{PHL}						13	20	ns

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

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TTL DEVICES

TYPES SN54S30, SN74S30

8-INPUT POSITIVE-NAND GATES

recommended operating conditions

	SN54S30			SN74S30			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage			0.8			0.8	V
I _{OH} High-level output current			-1			-1	mA
I _{OL} Low-level output current			20			20	mA
T _A Operating free-air temperature	-55		125	0		70	°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 _{IK}	V _{CC} = MIN, I _I = -18 mA			-1.2			-1.2	V
V _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, I _{OH} = -1 mA	2.5	3.4		2.7	3.4		V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 20 mA			0.5			0.5	V
I _I	V _{CC} = MAX, V _I = 5.5 V			1			1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V			50			50	µA
I _{IL}	V _{CC} = MAX, V _I = 0.5 V			-2			-2	mA
I _{OS} §	V _{CC} = MAX	-40		-100	-40		-100	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V		3	5		3	5	mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5 V		5.5	10		5.5	10	mA

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

‡ All typical values are at V_{CC} = 5 V, T_A = 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_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	Any	Y	R _L = 280 Ω, C _L = 15 pF		4	6	ns
t _{PHL}					4.5	7	ns
t _{PLH}			R _L = 280 Ω, C _L = 50 pF		5.5		ns
t _{PHL}					6.5		ns

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

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TTL DEVICES