

# TYPES SN54ALS30, SN54AS30, SN74ALS30, SN74AS30 8-INPUT POSITIVE-NAND GATES

D2661, APRIL 1982—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 and perform the following Boolean functions in positive logic:

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

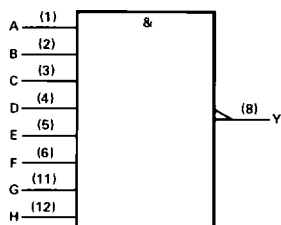
$$Y = \overline{A + B + C + D + E + F + G + H}$$

The SN54ALS30 and SN54AS30 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS30 and SN74AS30 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE

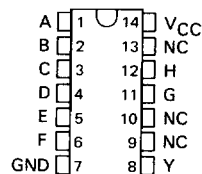
INPUTS A THRU H	OUTPUT Y
All inputs H	L
One or more inputs L	H

## logic symbol

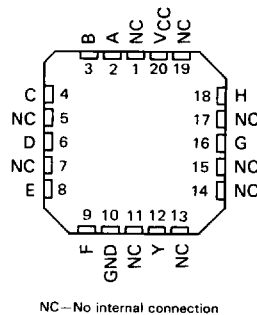


Pin numbers shown are for J and N packages.

SN54ALS30, SN54AS30 . . . J PACKAGE  
SN74ALS30, SN74AS30 . . . N PACKAGE  
(TOP VIEW)



SN54ALS30, SN54AS30 . . . FH PACKAGE  
SN74ALS30, SN74AS30 . . . FN PACKAGE  
(TOP VIEW)



NC—No internal connection

2  
ALS AND AS CIRCUITS

# TYPES SN54ALS30, SN74ALS30

## 8-INPUT POSITIVE-NAND GATES

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

Supply voltage, $V_{CC}$	7 V
Input voltage	7 V
Operating free-air temperature range: SN54ALS30	-55 °C to 125 °C
SN74ALS30	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

### recommended operating conditions

		SN54ALS30			SN74ALS30			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
$V_{CC}$	Supply voltage	4.5	5	5.5	4.5	5	5.5	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			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	SN54ALS30			SN74ALS30			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5 V, I_I = -18 mA$			-1.5			-1.5	V
$V_{OH}$	$V_{CC} = 4.5 V$ to 5.5 V, $I_{OH} = -0.4 mA$	$V_{CC}-2$			$V_{CC}-2$			V
$V_{OL}$	$V_{CC} = 4.5 V, I_{OL} = 4 mA$	0.25	0.4		0.25	0.4		V
	$V_{CC} = 4.5 V, I_{OL} = 8 mA$				0.35	0.5		
$I_I$	$V_{CC} = 5.5 V, V_I = 7 V$		0.1			0.1		mA
$I_{IH}$	$V_{CC} = 5.5 V, V_I = 2.7 V$		20			20		μA
$I_{IL}$	$V_{CC} = 5.5 V, V_I = 0.4 V$		-0.1			-0.1		mA
$I_{O\ddagger}$	$V_{CC} = 5.5 V, V_O = 2.25 V$	-30	-112		-30	-112		mA
$I_{CCH}$	$V_{CC} = 5.5 V, V_I = 0 V$	0.22	0.36		0.22	0.36		mA
$I_{CCL}$	$V_{CC} = 5.5 V, V_I = 4.5 V$	0.54	0.9		0.54	0.9		mA

† All typical values are at  $V_{CC} = 5 V, T_A = 25 °C$ .

‡ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current,  $I_{OS}$ .

### switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 V$ to 5.5 V, $C_L = 50 pF,$ $R_L = 500 \Omega,$ $T_A = MIN$ to MAX				UNIT
			SN54ALS30		SN74ALS30		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	Any	Y	3	12	3	10	ns
$t_{PHL}$	Any	Y	5	22	5	20	ns

NOTE 1: For load circuit and voltage waveforms, see page 1-12.

2 ALS AND AS CIRCUITS

# TYPES SN54AS30, SN74AS30 8-INPUT POSITIVE-NAND GATES

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

Supply voltage, $V_{CC}$ .....	7 V
Input voltage .....	7 V
Operating free-air temperature range: SN54AS30 .....	-55 °C to 125 °C
SN74AS30 .....	0 °C to 70 °C
Storage temperature range .....	-65 °C to 150 °C

recommended operating conditions

		SN54AS30			SN74AS30			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
$V_{CC}$	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
$V_{IH}$	High-level input voltage	2			2			V
$V_{IL}$	Low-level input voltage				0.8			V
$I_{OH}$	High-level output current				-2			mA
$I_{OL}$	Low-level output current				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	SN54AS30			SN74AS30			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5 V, I_I = -18 mA$				-1.2			V
$V_{OH}$	$V_{CC} = 4.5 V \text{ to } 5.5 V, I_{OH} = -2 mA$	$V_{CC}-2$			$V_{CC}-2$			V
$V_{OL}$	$V_{CC} = 4.5 V, I_{OL} = 20 mA$	0.35		0.5	0.35		0.5	V
$I_I$	$V_{CC} = 5.5 V, V_I = 7 V$	0.1			0.1			mA
$I_{IH}$	$V_{CC} = 5.5 V, V_I = 2.7 V$	20			20			$\mu A$
$I_{IL}$	$V_{CC} = 5.5 V, V_I = 0.4 V$	-0.5			-0.5			mA
$I_{O\ddagger}$	$V_{CC} = 5.5 V, V_O = 2.25 V$	-30		-112	-30		-112	mA
$I_{CCH}$	$V_{CC} = 5.5 V, V_I = 0 V$	0.9		1.5	0.9		1.5	mA
$I_{CCL}$	$V_{CC} = 5.5 V, V_I = 4.5 V$	3		4.9	3		4.9	mA

† All typical values are at  $V_{CC} = 5 V, T_A = 25 ^\circ C$ .

‡ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current,  $I_{OS}$ .

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 V \text{ to } 5.5 V,$ $C_L = 50 pF,$ $R_L = 500 \Omega,$ $T_A = \text{MIN to MAX}$				UNIT
			SN54AS30		SN74AS30		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	Any	Y	1	5.5	1	5	ns
$t_{PHL}$	Any	Y	1	5	1	4.5	ns

NOTE 1: For load circuit and voltage waveforms, see page 1-12.

2  
ALS AND AS CIRCUITS