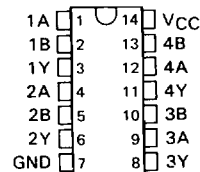


# TYPES SN54ALS1000A, SN54AS1000, SN74ALS1000A, SN74AS1000 QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS/DRIVERS

D2661, APRIL 1982—REVISED DECEMBER 1983

- 'ALS1000A is a Buffer Version of 'ALS00A
- 'AS1000 is a Driver Version of 'AS00
- 'AS1000 Offers High Capacitive Drive Capability
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

SN54ALS1000A, SN54AS1000 . . . J PACKAGE  
SN74ALS1000A, SN74AS1000 . . . N PACKAGE  
(TOP VIEW)



## description

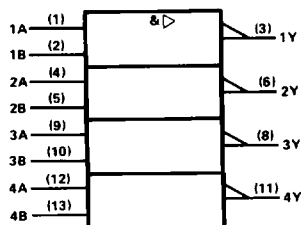
These devices contain four independent 2-input NAND buffers/drivers. They perform the Boolean functions  $Y = \overline{A \cdot B}$  or  $Y = \overline{A} + \overline{B}$  in positive logic.

The SN54ALS1000A and SN54AS1000 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS1000A and SN74AS1000 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE (each gate)

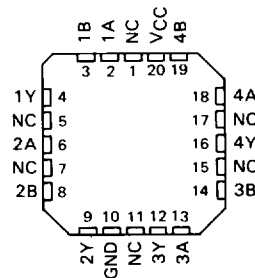
INPUTS		OUTPUT
A	B	Y
H	H	L
L	X	H
X	L	H

## logic symbol



Pin numbers shown are for J and N packages.

SN54ALS1000A, SN54AS1000 . . . FH PACKAGE  
SN74ALS1000A, SN74AS1000 . . . FN PACKAGE  
(TOP VIEW)



NC—No internal connection

ALS AND AS CIRCUITS 2

# TYPES SN54ALS1000A, SN74ALS1000A QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS

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: SN54ALS1000A .....	-55°C to 125°C
SN74ALS1000A .....	0°C to 70°C
Storage temperature range .....	-65°C to 150°C

recommended operating conditions

		SN54ALS1000A			SN74ALS1000A			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			-1			-2.6	mA
$I_{OL}$	Low-level output current			12			24	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	SN54ALS1000A			SN74ALS1000A			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5 V, I_I = -18 mA$			-1.5			-1.5	V
$V_{OH}$	$V_{CC} = 4.5 V \text{ to } 5.5 V, I_{OH} = -0.4 mA$	$V_{CC}-2$			$V_{CC}-2$			V
	$V_{CC} = 4.5 V, I_{OH} = -1 mA$	2.4	3.3					
$V_{OL}$	$V_{CC} = 4.5 V, I_{OH} = -2.6 mA$				2.4	3.2		V
	$V_{CC} = 4.5 V, I_{OL} = 12 mA$		0.25	0.4		0.25	0.4	
	$V_{CC} = 4.5 V, I_{OL} = 24 mA$					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
$I_{CCH}$	$V_{CC} = 5.5 V, V_I = 0 V$		0.86	1.6		0.86	1.6	mA
$I_{CCL}$	$V_{CC} = 5.5 V, V_I = 4.5 V$		4.8	7.8		4.8	7.8	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
			SN54ALS1000A		SN74ALS1000A		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	A or B	Y	2	10	2	8	ns
$t_{PHL}$			2	10	2	7	

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

2 ALS AND AS CIRCUITS

# TYPES SN54AS1000, SN74AS1000 QUADRUPLE 2-INPUT POSITIVE-NAND DRIVERS

**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: SN54AS1000 .....	-55 °C to 125 °C
SN74AS1000 .....	0 °C to 70 °C
Storage temperature range .....	-65 °C to 150 °C

**recommended operating conditions**

		SN54AS1000			SN74AS1000			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			-40			-48	mA
$I_{OL}$	Low-level output current			40			48	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	SN54AS1000			SN74AS1000			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5 V, I_I = -18 mA$			-1.2			-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
	$V_{CC} = 4.5 V, I_{OH} = -3 mA$	2.4	3.2		2.4	3.2		
	$V_{CC} = 4.5 V, I_{OH} = -40 mA$			2				
	$V_{CC} = 4.5 V, I_{OH} = -48 mA$						2	
$V_{OL}$	$V_{CC} = 4.5 V, I_{OL} = 40 mA$		0.25	0.5				V
	$V_{CC} = 4.5 V, I_{OL} = 48 mA$				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
$I_{IL}$	$V_{CC} = 5.5 V, V_I = 0.4 V$			-0.5			-0.5	mA
$I_{O†}$	$V_{CC} = 5.5 V, V_O = 2.25 V$			-135			-135	mA
$I_{CCH}$	$V_{CC} = 5.5 V, V_I = 0 V$		2.1	3.5		2.1	3.5	mA
$I_{CCL}$	$V_{CC} = 5.5 V, V_I = 4.5 V$		11.5	19		11.5	19	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)	$V_{CC} = 4.5 V \text{ to } 5.5 V,$ $C_L = 50 pF,$ $R_L = 500 \Omega,$ $T_A = \text{MIN to MAX}$				UNIT
			SN54AS1000		SN74AS1000		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	A or B	Y	1	4.5	1	3.5	ns
$t_{PHL}$			1	4.5	1	3.5	

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

2

ALS AND AS CIRCUITS