

# SN54ALS1003A, SN74ALS1003A QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS WITH OPEN-COLLECTOR OUTPUTS

SDAS239 - D2661, APRIL 1982 - REVISED MAY 1986

- Buffer Version of 'ALS03B
- Package Options include Plastic Small Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

## description

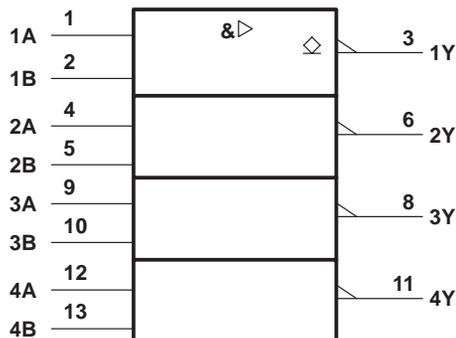
These devices contain four independent 2-input NAND buffers. They perform the Boolean functions  $Y = \overline{A \cdot B}$  or  $Y = \overline{A+B}$  in positive logic. The open-collector outputs require pullup resistors to perform correctly. They may be connected to other open-collector outputs to implement active-low wired-OR or active-high wired-AND functions. Open-collector devices are often used to generate higher  $V_{OH}$  levels.

The SN54ALS1003A is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS1003A is 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

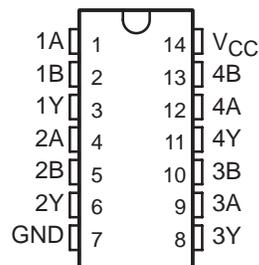
## logic symbol†



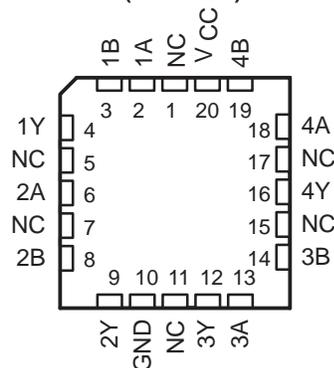
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for D, J, and N packages.

SN54ALS1003A ... J PACKAGE  
SN74ALS1003A ... D OR N PACKAGE  
(TOP VIEW)

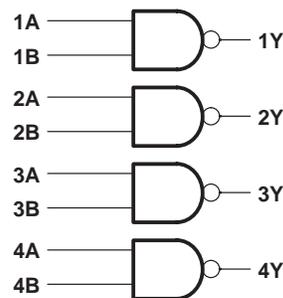


SN54ALS1003A ... FK PACKAGE  
(TOP VIEW)



NC - No internal connection

## logic diagram (positive logic)



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

Supply voltage, $V_{CC}$	7 V
Input voltage	7 V
Off-state output voltage	7 V
Operating free-air temperature range: SN54ALS1003A	-55°C to 125°C
SN74ALS1003A	0°C to 70°C
Storage temperature range	-65°C to 150°C

## recommended operating conditions

		SN54ALS1003A			SN74ALS1003A			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			0.7			0.8	V
$V_{OH}$	High-level output voltage			5.5			5.5	V
$I_{OL}$	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	SN54ALS1003A			SN74ALS1003A			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5 V$ , $I_I = -18 mA$			-1.5			-1.5	V
$V_{OL}$	$V_{CC} = 4.5 V$ , $I_{OL} = 12 mA$		0.25	0.4		0.25	0.4	V
	$V_{CC} = 4.5 V$ , $I_{OL} = 24 mA$					0.35	0.5	
$I_{OH}$	$V_{CC} = 4.5 V$ , $V_{OH} = 5.5 V$			0.1			0.1	mA
$I_I$	$V_{CC} = 5.5 V$ , $V_I = 7 V$			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
$I_{CCH}$	$V_{CC} = 5.5 V$ , $V_I = 0$		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  $V_{CC} = 5 V$ ,  $T_A = 25^\circ C$ .

## switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5 V$ , $C_L = 50 pF$ , $R_L = 680 \Omega$ , $T_A = 25^\circ C$	$V_{CC} = 4.5 V$ to $5.5 V$ , $C_L = 50 pF$ , $R_L = 680 \Omega$ , $T_A = MIN$ to $MAX$				UNIT
				'ALS1003A		SN74ALS1003A		
				TYP	MIN	MAX	MIN	
$t_{PLH}$	A or B	Y	18	10	40	10	33	ns
$t_{PHL}$	A or B	Y	7	2	18	2	12	ns

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.



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