

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

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

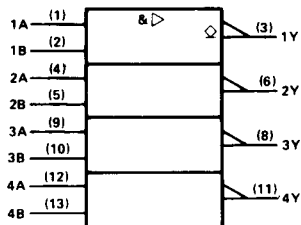
These devices contain four independent 2-input NAND buffers. They perform the Boolean functions $Y = A \cdot B$ or $Y = \overline{A} \cdot \overline{B}$ in positive logic. The open-collector outputs require pull-up resistors to perform correctly. They may be connected to other open-collector outputs 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°C to 125°C . The SN74ALS1003A is characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

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

logic symbol†

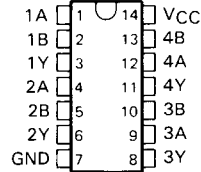


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

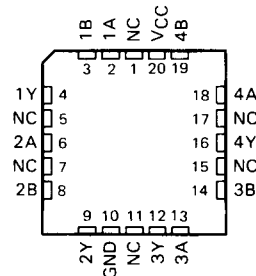
SN54ALS1003A . . . J PACKAGE
SN74ALS1003A . . . D OR N PACKAGE

(TOP VIEW)



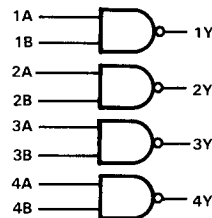
SN54ALS1003A . . . FK PACKAGE

(TOP VIEW)



NC—No internal connection

logic diagram (positive logic)



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

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
I_{OH}	$V_{CC} = 4.5$ V, $V_{OH} = 5.5$ V		0.1		0.1	mA
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_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, $V_I = 0$ 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, $T_A = 25$ °C.

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5$ V, $C_L = 50$ pF, $R_L = 680$ Ω, $T_A = 25$ °C	$V_{CC} = 4.5$ V to 5.5 V, $C_L = 50$ pF, $R_L = 680$ Ω, $T_A = \text{MIN to MAX}$		UNIT		
			'ALS1003A	SN54ALS1003A	SN74ALS1003A			
			TYP	MIN	MAX		MIN	MAX
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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ALS and AS Circuits