

SN54ALS01, SN74ALS01 QUADRUPLE 2-INPUT POSITIVE-NAND GATES WITH OPEN-COLLECTOR OUTPUTS

SDAS188 – D2661, APRIL 1982 – REVISED MAY 1986

- 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

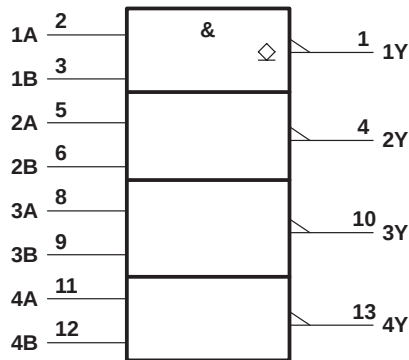
These devices contain four independent 2-input NAND gates. They perform the Boolean functions $Y = \overline{A \cdot B}$ or $Y = \overline{A + B}$ in positive logic. The open-collector outputs require pullup resistors to perform correctly. They may be connected to other open-collector outputs to implement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

The SN54ALS01 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS01 is characterized for operation from 0°C to 70°C .

FUNCTION TABLE
(each gate)

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

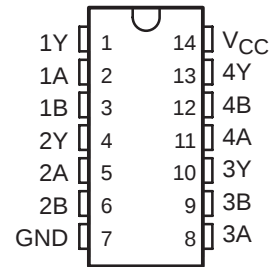
logic symbol†



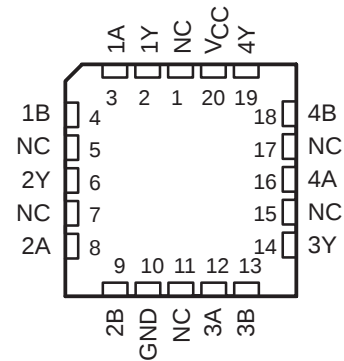
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

SN54ALS01 . . . J PACKAGE
SN74ALS01 . . . D OR N PACKAGE
(TOP VIEW)

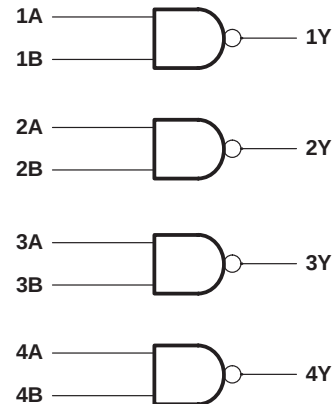


SN54ALS01 . . . FK PACKAGE
(TOP VIEW)



NC—No internal connection

logic diagram (positive logic)



SN54ALS01, SN74ALS01

QUADRUPLE 2-INPUT POSITIVE-NAND GATES

WITH OPEN-COLLECTOR OUTPUTSWITH OPEN-COLLECTOR OUTPUTS

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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: SN54ALS01	–55°C to 125°C
SN74ALS01	0°C to 70°C
Storage temperature range	–65°C to 150°C

recommended operating conditions

		SN54ALS01			SN74ALS01			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
I_{OH}	High-level output current			5.5			5.5	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		SN54ALS01			SN74ALS01			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$				–1.5			–1.5	V
V_{OL}	$V_{CC} = 4.5\text{ V}$, $I_{OL} = 4\text{ mA}$			0.25	0.4		0.25	0.4	V
	$V_{CC} = 4.5\text{ V}$, $I_{OL} = 8\text{ mA}$						0.35	0.5	
I_{OH}	$V_{CC} = 4.5\text{ V}$, $V_{OH} = 5.5\text{ mA}$				0.1			0.1	mA
I_I	$V_{CC} = 5.5\text{ V}$, $V_I = 7\text{ V}$				0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5\text{ V}$, $V_I = 2.7\text{ V}$				20			20	μA
I_{IL}	$V_{CC} = 5.5\text{ V}$, $V_I = 0.4\text{ V}$				–0.1			–0.1	mA
I_{CCH}	$V_{CC} = 5.5\text{ V}$, $V_I = 0\text{ V}$			0.43	0.85		0.43	0.85	mA
I_{CCL}	$V_{CC} = 5.5\text{ V}$, $V_I = 4.5\text{ V}$			1.62	3		1.62	3	mA

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

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 = 2 kΩ, T _A = MIN to MAX				UNIT
			SN54ALS01		SN74ALS01		
			MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Y	23	66	23	54	ns
t _{PHL}	A or B	Y	8	39	8	28	ns

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

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
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