

C10133

SN54ALS40A, SN74ALS40A DUAL 4-INPUT POSITIVE-NAND BUFFERS

D2661, APRIL 1984—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

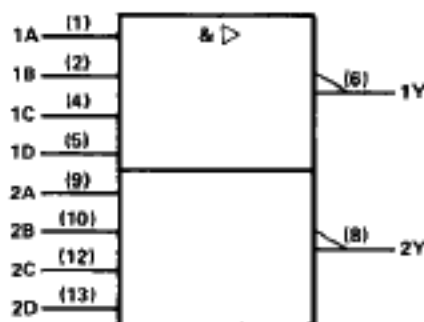
These devices contain two independent 4-input NAND buffer gates. They perform the Boolean functions $Y = \overline{A \cdot B \cdot C \cdot D}$ or $Y = \overline{\overline{A} + \overline{B} + \overline{C} + \overline{D}}$ in positive logic.

The SN54ALS40A is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS40A is characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

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

logic symbol†

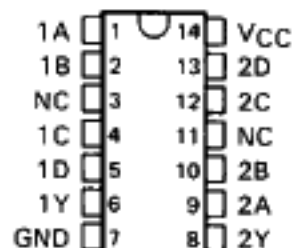


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

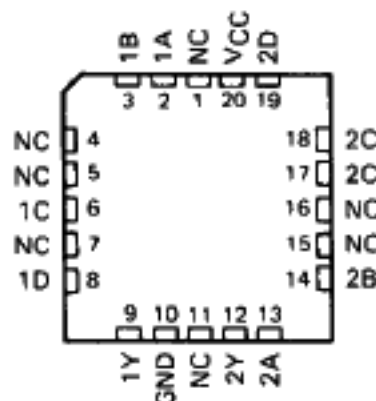
SN54ALS40A . . . J PACKAGE
SN74ALS40A . . . D OR N PACKAGE

(TOP VIEW)



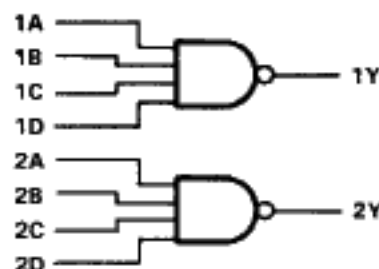
SN54ALS40A . . . FK PACKAGE

(TOP VIEW)



NC—No internal connection

logic diagram (positive logic)



PRODUCTION DATA documents contain information 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.

TEXAS
INSTRUMENTS

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SN54ALS40A, SN74ALS40A DUAL 4-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: SN54ALS40A	-55°C to 125°C
SN74ALS40A	0°C to 70°C
Storage temperature range	-65°C to 150°C

recommended operating conditions

		SN54ALS40A			SN74ALS40A			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			-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	SN54ALS40A			SN74ALS40A			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
	$V_{CC} = 4.5$ V, $I_{OH} = -1$ mA	2.4	3.3					
	$V_{CC} = 4.5$ V, $I_{OH} = -2.6$ mA				2.4	3.2		
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_{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		0.43	0.8		0.43	0.8	mA
I_{CCL}	$V_{CC} = 5.5$ V, $V_I = 4.5$ V		2.4	3.9		2.4	3.9	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)	$V_{CC} = 5$ V, $C_L = 50$ pF, $R_L = 500$ Ω, $T_A = 25$ °C		$V_{CC} = 4.5$ V to 5.5 V, $C_L = 50$ pF, $R_L = 500$ Ω, $T_A = \text{MIN to MAX}$				UNIT
			ALS40A		SN54ALS40A		SN74ALS40A		
			TYP	MIN	MAX	MIN	MAX		
t_{PLH}	Any	Y	5	2	10	2	8	ns	
t_{PHL}	Any	Y	5	2	10	2	7		

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

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ALS and AS Circuits