- **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

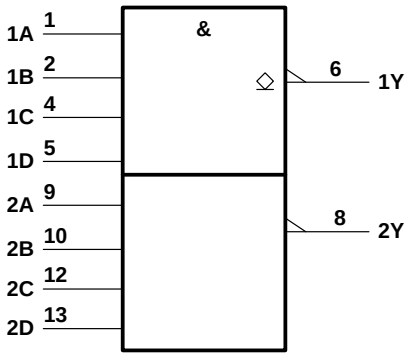
These devices contain two independent 4-input NAND gates. They perform the Boolean functions $Y = \overline{A \bullet B \bullet C \bullet D}$ or $Y = \overline{A}+\overline{B}+\overline{C}+\overline{D}$ in positive logic. The open-collector outputs require pullup resistors to perform correctly. They 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 SN54ALS22B is characterized for operation over the full military temperature range of 55°C to 125°C. The SN74ALS22B 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

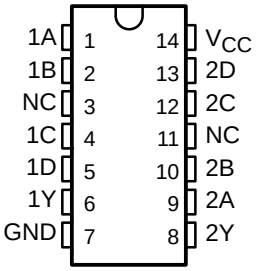
logic symbol†



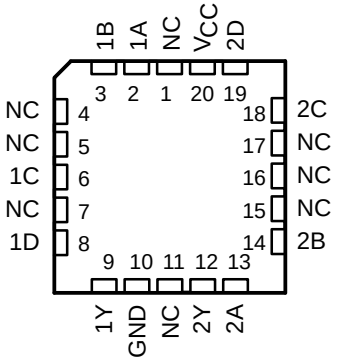
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

SN54ALS22B . . . J PACKAGE
SN74ALS22B . . . D OR N PACKAGE
(TOP VIEW)

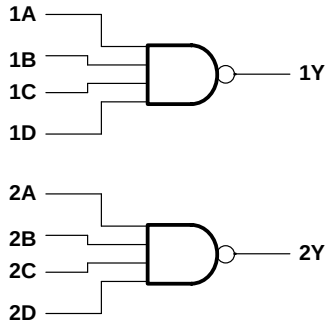


SN54ALS22B . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

logic diagram (positive logic)



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: SN54ALS22B . . . . . –55°C to 125°C
SN74ALS22B . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

recommended operating conditions

		SN54ALS22B			SN74ALS22B			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		SN54ALS22B			SN74ALS22B			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} = 4 mA		0.25	0.4		0.25	0.4	V
	V_{CC} = 4.5 V,	I_{OL} = 8 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 V		0.22	0.4		0.22	0.4	mA
I_{CCL}	V_{CC} = 5.5 V,	V_I = 4.5 V		0.8	1.5		0.8	1.5	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 = 2 kΩ, T_A = 25°C	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 2 k Ω, T_A = MIN to MAX				UNIT
			'ALS22B	SN54ALS22B		SN74ALS22B		
			TYP	MIN	MAX	MIN	MAX	
t_{PLH}	Any	Y	35	23	65	23	45	ns
t_{PHL}	Any	Y	8	4	32	4	18	ns

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

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