- **Package Options include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**
- **Dependable Texas Instruments Quality and Reliability**

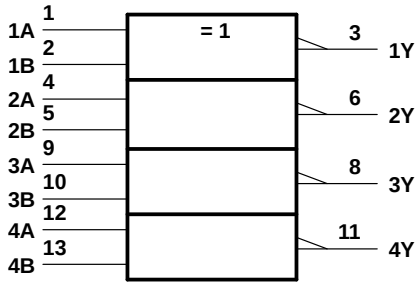
description

These devices contain four independent Exclusive-NOR gates. They perform the Boolean functions $Y = \overline{A + B} = (\overline{A} + B)\bullet(A + B)$ in positive logic.

A common application is a true/complement element. If one of the inputs is high, the other input will be reproduced in true form at the output. If one of the inputs is low, the signal on the other input will be reproduced inverted at the output.

The SN54ALS810 and SN54AS810 are characterized for operation over the full military temperature range of −55°C to 125°C. The SN74ALS810 and SN74AS810 are characterized for operation from 0°C to 70°C.

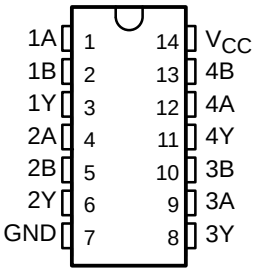
logic symbol†



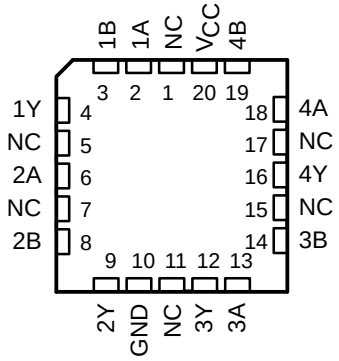
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

SN54ALS810, SN54AS810 . . . J PACKAGE
SN74ALS810, SN74AS810 . . . D OR N PACKAGE
(TOP VIEW)



SN54ALS810, SN54AS810 . . . FK PACKAGE
(TOP VIEW)



NC–No internal connection

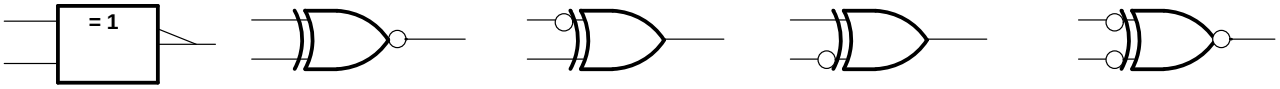
FUNCTION TABLE
(each gate)

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

exclusive-NOR logic

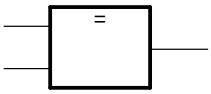
An Exclusive-NOR gate has many applications, some of which can be represented better by alternative logic symbols.

EXCLUSIVE-NOR



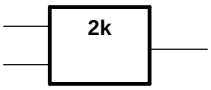
These are five equivalent Exclusive-NOR symbols valid for an ’ALS810 gate in positive logic; negation may be shown at any one port or at all three of them.

LOGIC IDENTITY ELEMENT



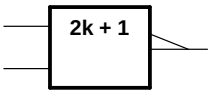
The output is active (high) if all inputs stand at the same logic level (i.e., A = B).

EVEN-PARITY



The output is active (high) if an even number of inputs (i.e., only 0 or 2) are active.

ODD-PARITY ELEMENT



The output is active (low) if an odd number of inputs (i.e., only 1 of the 2) are active.

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: SN54ALS810 . . . . . –55°C to 125°C
SN74ALS810 . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

recommended operating conditions

		SN54ALS810			SN74ALS810			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			–0.4			–0.4	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		SN54ALS810			SN74ALS810			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_{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_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‡	V_{CC} = 5.5 V,	V_O = 2.25 V	–30		–112	–30		–112	mA
I_{CC}	V_{CC} = 5.5 V,	A at 4.5 V, B at 0 V		5	7.5		5	7.5	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} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX§				UNIT
			SN54ALS810		SN74ALS810		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	5	23	5	20	ns
t_{PHL}	(other input low)		3	17	3	14	
t_{PLH}	A or B	Y	5	21	5	18	ns
t_{PHL}	(other input high)		3	17	3	14	

§ The conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of the *ALS/AS Logic Data Book*, 1986.

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: SN54AS810 . . . . . –55°C to 125°C
SN74AS810 . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

recommended operating conditions

		SN54AS810			SN74AS810			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			0.8			0.8	V
I_{OH}	High-level output current			–2			–2	mA
I_{OL}	Low-level output current			20			20	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		SN54AS810			SN74AS810			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} = –2 mA	V_{CC}–2			V_{CC}–2			V
V_{OL}	V_{CC} = 4.5 V,	I_{OL} = 20 mA		0.35	0.5		0.35	0.5	V
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			–0.5			–0.5	mA
I_O‡	V_{CC} = 5.5 V,	V_O = 2.25 V	–30		–112	–30		– 112	mA
I_{CCH}	V_{CC} = 5.5 V,	V_I = 4.5 V		20	28		20	28	mA
I_{CCL}	V_{CC} = 5.5 V,	V_{IA}= 4.5 V, V_{IB} = 0 V		29	41		29	41	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} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX§				UNIT
			SN54AS810		SN74AS810		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	1.6	6.5	1.6	5.1	ns
t_{PHL}	(other input low)		2.2	5.8	2.2	5.4	
t_{PLH}	A or B	Y	3	6.3	3	5.8	ns
t_{PHL}	(other input high)		2.3	9	2.3	9	

§ The conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of the *ALS/AS Logic Data Book*, 1986.

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