

TYPES SN54ALS10, SN54AS10, SN74ALS10, SN74AS10 TRIPLE 3-INPUT POSITIVE-NAND GATES

D2661, APRIL 1982—REVISED DECEMBER 1983

- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

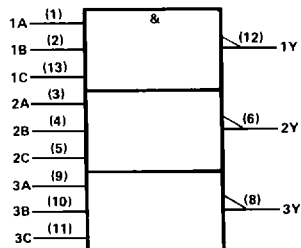
These devices contain three independent 3-input NAND gates. They perform the Boolean functions $Y = \overline{A \cdot B \cdot C}$ or $Y = \overline{\overline{A} + \overline{B} + \overline{C}}$ in positive logic.

The SN54ALS10 and SN54AS10 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS10 and SN74AS10 are characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

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

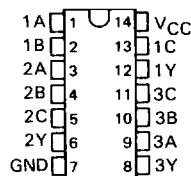
logic symbol



Pin numbers shown are for J and N packages.

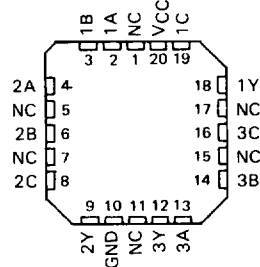
SN54ALS10, SN54AS10 . . . J PACKAGE SN74ALS10, SN74AS10 . . . N PACKAGE

(TOP VIEW)



SN54ALS10, SN54AS10 . . . FH PACKAGE SN74ALS10, SN74AS10 . . . FN PACKAGE

(TOP VIEW)



NC—No internal connection

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TYPES SN54ALS10, SN74ALS10
TRIPLE 3-INPUT POSITIVE-NAND GATES

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: SN54ALS10	-55 °C to 125 °C
SN74ALS10	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

recommended operating conditions

		SN54ALS10			SN74ALS10			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			-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		SN54ALS10			SN74ALS10			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
$I_{O\ddagger}$	$V_{CC} = 5.5 V,$	$V_O = 2.25 V$	-30		-112	-30		-112	mA
I_{CCH}	$V_{CC} = 5.5 V,$	$V_I = 0 V$		0.32	0.6		0.32	0.6	mA
I_{CCL}	$V_{CC} = 5.5 V,$	$V_I = 4.5 V$		1.2	2.2		1.2	2.2	mA

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

‡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 $5.5 V,$ $C_L = 50 pF,$ $R_L = 500 \Omega,$ $T_A = MIN$ to MAX				UNIT
			SN54ALS10		SN74ALS10		
			MIN	MAX	MIN	MAX	
t_{PLH}	Any	Y	3	14	3	11	ns
t_{PHL}	Any	Y	4	21	4	18	ns

NOTE 1: For load circuit and voltage waveforms, see page 1-12.

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**TYPES SN54AS10, SN74AS10
TRIPLE 3-INPUT POSITIVE-NAND GATES**

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: SN54AS10	-55°C to 125°C
SN74AS10	0°C to 70°C
Storage temperature range	-65°C to 150°C

recommended operating conditions

		SN54AS10			SN74AS10			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	SN54AS10			SN74AS10			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5 V, I_I = -18 mA$			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5 V \text{ to } 5.5 V, I_{OH} = -2 mA$	$V_{CC}-2$			$V_{CC}-2$			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
$I_{O\ddagger}$	$V_{CC} = 5.5 V, V_O = 2.25 V$	-30	-112		-30	-112		mA
I_{CCH}	$V_{CC} = 5.5 V, V_I = 0 V$		1.5	2.4		1.5	2.4	mA
I_{CCL}	$V_{CC} = 5.5 V, V_I = 4.5 V$		8.1	13		8.1	13	mA

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

‡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)	$V_{CC} = 4.5 V \text{ to } 5.5 V,$ $C_L = 50 pF,$ $R_L = 500 \Omega,$ $T_A = \text{MIN to MAX}$				UNIT
			SN54AS10		SN74AS10		
			MIN	MAX	MIN	MAX	
t_{PLH}	Any	Y	1	5	1	4.5	ns
t_{PHL}	Any	Y	1	5	1	4.5	ns

NOTE 1: For load circuit and voltage waveforms, see page 1-12.

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