

**SN5437, SN54LS37, SN54S37,
SN7437, SN74LS37, SN74S37**
QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS

DECEMBER 1983—REVISED MARCH 1988

- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

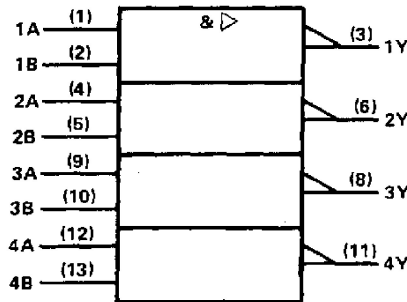
These devices contain four independent 2-input NAND buffer gates.

The SN5437, SN54LS37 and SN54S37 are characterized for operation over the full military range of -55°C to 125°C. The SN7437, SN74LS37 and SN74S37 are characterized for operation from 0°C to 70°C.

FUNCTION TABLE (each gate)

INPUTS		OUTPUT
A	B	Y
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.

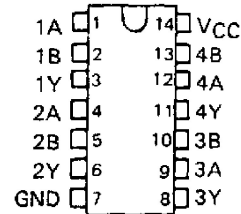
Pin numbers shown are for D, J, N, and W packages.

SN5437, SN54LS37, SN54S37 . . . J OR W PACKAGE

SN7437 . . . N PACKAGE

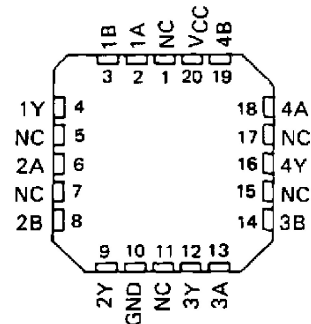
SN74LS37, SN74S37 . . . D OR N PACKAGE

(TOP VIEW)



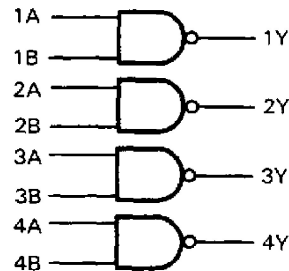
SN54LS37, SN54S37 . . . FK PACKAGE

(TOP VIEW)



NC - No internal connection

logic diagram



positive logic

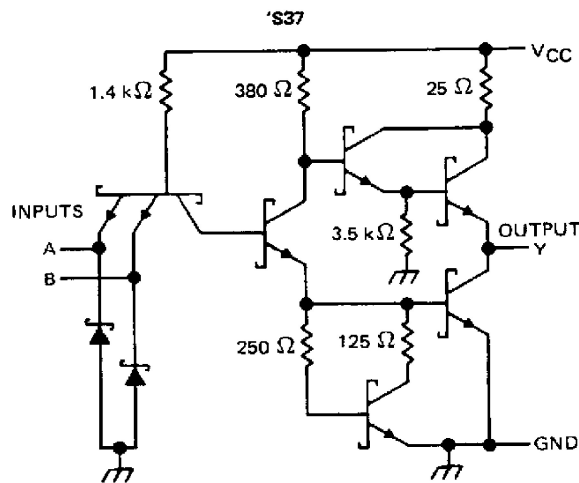
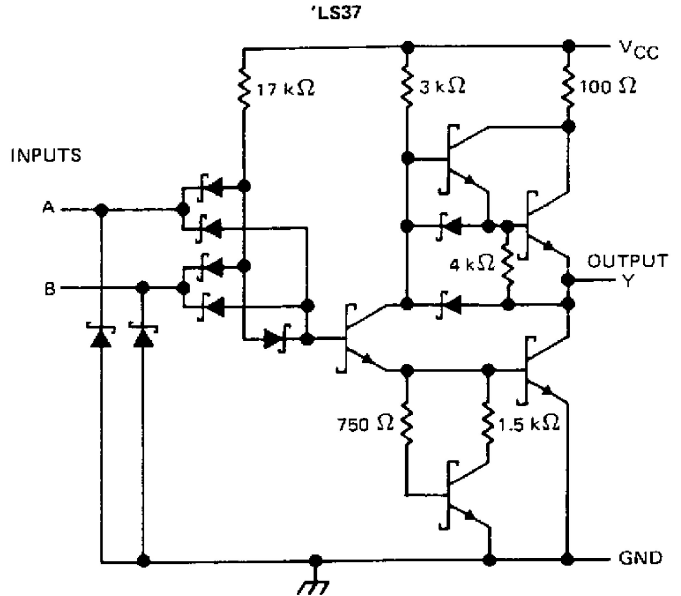
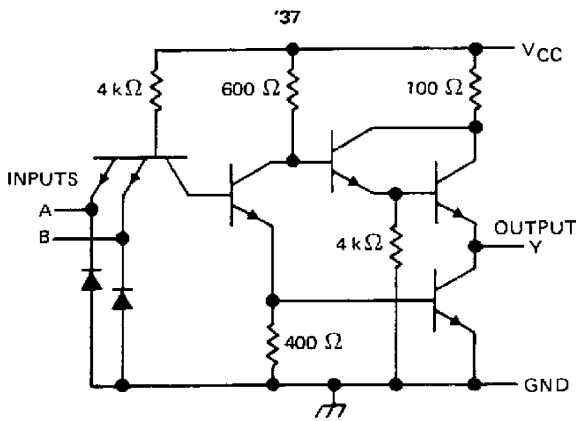
$$Y = \overline{A \cdot B} \text{ or } Y = \overline{\overline{A} + \overline{B}}$$

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**SN5437, SN54LS37, SN437
SN7437, SN74LS37, SN7437
QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS**

schematics (each gate)



Resistor values shown are nominal.

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage: '37, 'S37	5.5 V
'LS37	7 V
Operating free-air temperature: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.



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SN5437, SN7437
QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS

recommended operating conditions

	SN5437			SN7437			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	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			-1.2			-1.2	mA
I _{OL} Low-level output current			48			48	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 †	SN5437			SN7437			UNIT
		MIN	TYP ‡	MAX	MIN	TYP ‡	MAX	
V _{IK}	V _{CC} = MIN, I _I = -12 mA			-1.5			-1.5	V
V _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, I _{OH} = -1.2 mA	2.4	3.3		2.4	3.3		V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 48 mA		0.2	0.4		0.2	0.4	V
I _I	V _{CC} = MAX, V _I = 5.5 V			1			1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.4 V			40			40	µA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V			-1.6			-1.6	mA
I _{OS} §	V _{CC} = MAX	-20		-70	-18		-70	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V		9	15.5		9	15.5	mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5 V		34	54		34	54	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

§ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	A or B	Y	R _L = 133 Ω, C _L = 45 pF		13	22	ns
t _{PHL}					8	15	ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.



SN54LS37, SN74LS37 QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS

recommended operating conditions

	SN54LS37			SN74LS37			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	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			-1.2	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 †	SN54LS37			SN74LS37			UNIT
		MIN	TYP ‡	MAX	MIN	TYP ‡	MAX	
V _{IK}	V _{CC} = MIN, I _I = -18 mA			-1.5			-1.5	V
V _{OH}	V _{CC} = MIN, V _{IL} = MAX, I _{OH} = -1.2 mA	2.5	3.4		2.7	3.4		V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 12 mA		0.25	0.4		0.25	0.4	V
	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 24 mA					0.35	0.5	
I _I	V _{CC} = MAX, V _I = 7 V			0.1			0.1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V			20			20	µA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V			-0.4			-0.4	mA
I _{OS} §	V _{CC} = MAX	-30		-130	-30		-130	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V		0.9	2		0.9	2	mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5 V		6	12		6	12	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

§ Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t _{PLH}	A or B	Y	R _L = 667 Ω,	C _L = 45 pF		12	24	ns
t _{PHL}						12	24	ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

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SN54S37, SN74S37 QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS

recommended operating conditions

	SN54S37			SN74S37			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage				0.8			V
I _{OH} High-level output current				-3			mA
I _{OL} Low-level output current				60			mA
T _A Operating free-air temperature	-55			125			°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS †	SN54S37			SN74S37			UNIT
		MIN	TYP ‡	MAX	MIN	TYP ‡	MAX	
V _{IK}	V _{CC} = MIN, I _I = -18 mA	-1.2			-1.2			V
V _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, I _{OH} = -3 mA	2.5	3.4		2.7	3.4		V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 60 mA	0.5			0.5			V
I _I	V _{CC} = MAX, V _I = 5.5 V	1			1			mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V	0.1			0.1			mA
I _{IL}	V _{CC} = MAX, V _I = 0.5 V	-4			-4			mA
I _{OS} §	V _{CC} = MAX	-50		-225	-50		-225	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V	20			20			mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5	46			46			mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

§ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed 100 milliseconds.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t _{PLH}	A or B	Y	R _L = 93 Ω,	C _L = 50 pF	4	6.5		ns
t _{PHL}					4	6.5		ns
t _{PLH}			R _L = 93 Ω,	C _L = 150 pF	6			ns
t _{PHL}					6			ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.


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