

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

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 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 diagram (each gate)

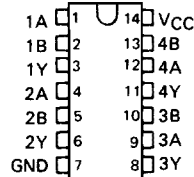


positive logic

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

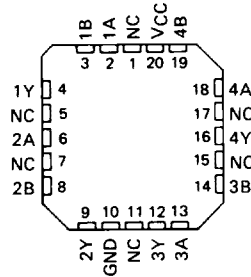
SN5437, SN54LS37, SN54S37 ... J OR W PACKAGE
SN7437 ... J OR N PACKAGE
SN74LS37, SN74S37 ... D, J OR N PACKAGE

(TOP VIEW)



SN54LS37, SN54S37 ... FK PACKAGE
SN74LS37, SN74S37 ... FN PACKAGE

(TOP VIEW)



NC - No internal connection

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PRODUCTION DATA

This document contains 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.

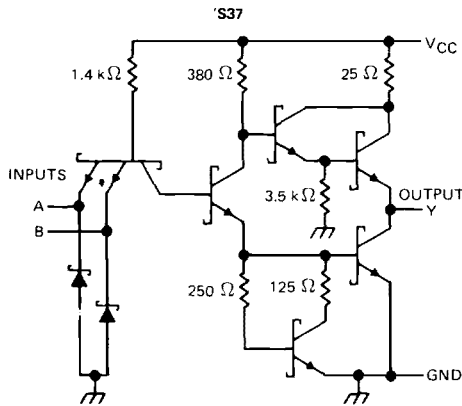
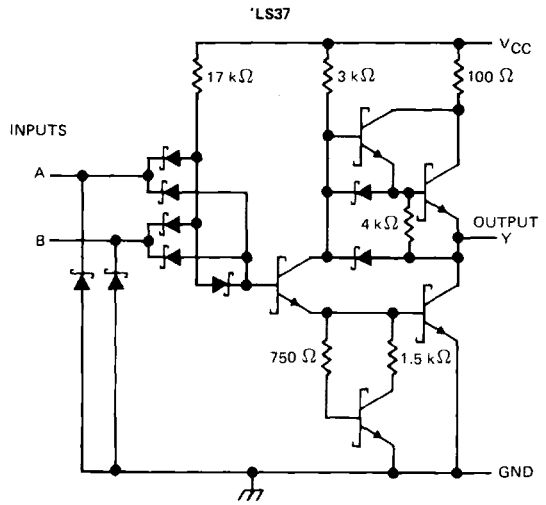
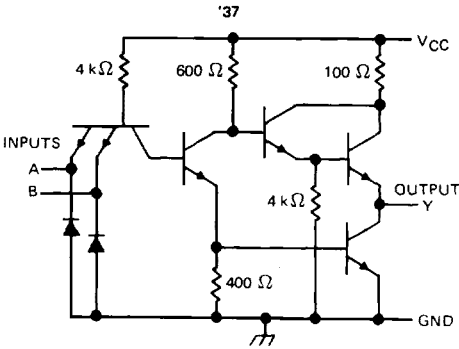
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**TYPES SN5437, SN54LS37, SN54S37,
SN7437, SN74LS37, SN74S37
QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS**

schematics (each gate)



Resistor values shown are nominal.

absolute maximum ratings over operating free-air temperature (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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TYPES 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			V
I _{OH} High-level output current				-1.2			mA
I _{OL} Low-level output current				48			mA
T _A Operating free-air temperature	-55			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			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			-18			mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V	9			9			15.5 mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5 V	34			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: See General Information Section for load circuits and voltage waveforms.

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TYPES 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			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	
V_{IK}	$V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$	-1.5		-1.5		V
V_{OH}	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}, I_{OH} = -1.2 \text{ mA}$	2.5	3.4	2.7	3.4	V
V_{OL}	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 12 \text{ mA}$	0.25	0.4	0.25	0.4	V
	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 24 \text{ mA}$			0.35	0.5	
I_I	$V_{CC} = \text{MAX}, V_I = 7 \text{ V}$	0.1		0.1		mA
I_{IH}	$V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$	20		20		µA
I_{IL}	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$	-0.4		-0.4		mA
$I_{OS} §$	$V_{CC} = \text{MAX}$	-30	-130	-30	-130	mA
I_{CCH}	$V_{CC} = \text{MAX}, V_I = 0 \text{ V}$	0.9	2	0.9	2	mA
I_{CCL}	$V_{CC} = \text{MAX}, V_I = 4.5 \text{ V}$	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 $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

§ 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, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	A or B	Y	$R_L = 667 \Omega,$	$C_L = 45 \text{ pF}$	12	24		ns
t_{PHL}					12	24		ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

TYPES 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			0.8			V
I _{OH} High-level output current	-3			-3			mA
I _{OL} Low-level output current	60			60			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 †	SN54S37		SN74S37		UNIT
		MIN	TYP ‡	MAX	MIN	
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	36	20	36	mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5	46	80	46	80	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: See General Information Section for load circuits and voltage waveforms.

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