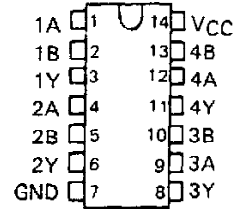


**SN5437, SN54LS37, SN54S37,  
SN7437, SN74LS37, SN74S37**  
**QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS**

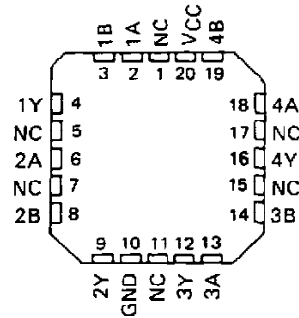
DECEMBER 1983—REVISED MARCH 1986

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

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

**description**

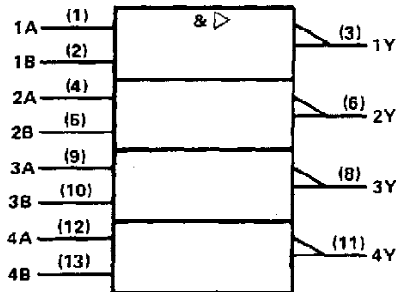
These devices contain four independent 2-input NAND buffer gates.

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)**

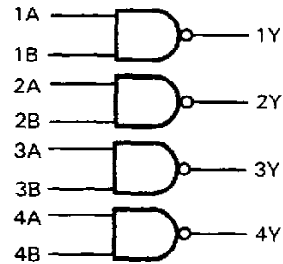
INPUTS		OUTPUT
A	B	Y
H	H	L
L	X	H
X	L	H

**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.

**logic diagram**



**positive logic**

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

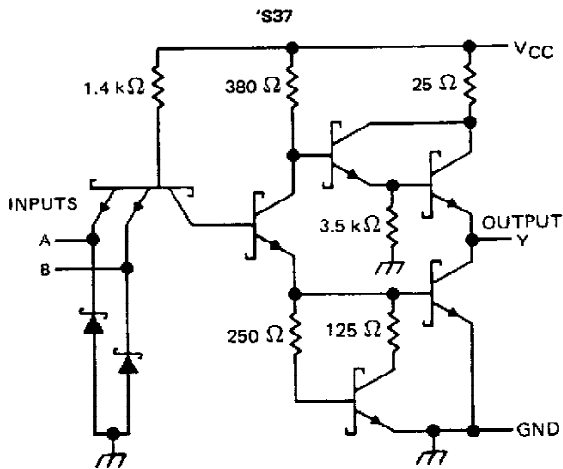
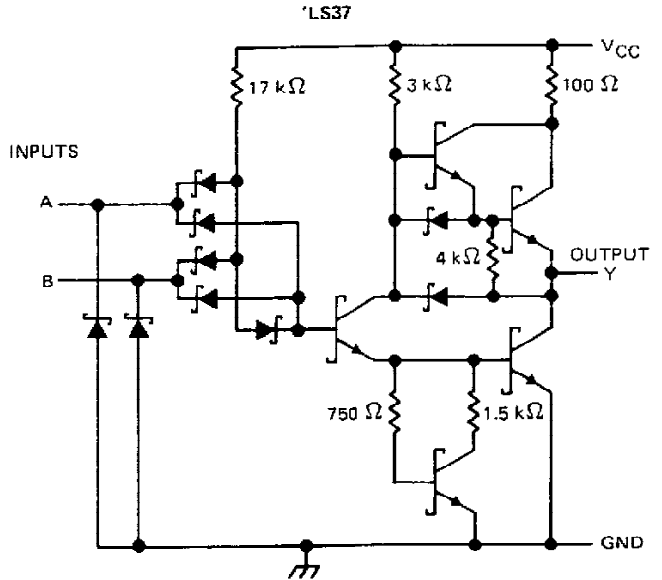
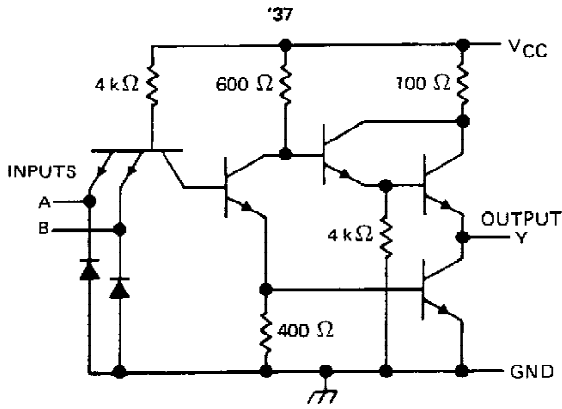
PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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**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			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	
$V_{IK}$	$V_{CC} = \text{MIN}$ , $I_I = -12 \text{ mA}$	-1.5		-1.5		V
$V_{OH}$	$V_{CC} = \text{MIN}$ , $V_{IL} = 0.8 \text{ V}$ , $I_{OH} = -1.2 \text{ mA}$	2.4	3.3	2.4	3.3	V
$V_{OL}$	$V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$ , $I_{OL} = 48 \text{ mA}$	0.2		0.2		V
$I_I$	$V_{CC} = \text{MAX}$ , $V_I = 6.5 \text{ V}$	1		1		mA
$I_{IH}$	$V_{CC} = \text{MAX}$ , $V_I = 2.4 \text{ V}$	40		40		µA
$I_{IL}$	$V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$	-1.6		-1.6		mA
$I_{OS} §$	$V_{CC} = \text{MAX}$	-20	-70	-18	-70	mA
$I_{CCH}$	$V_{CC} = \text{MAX}$ , $V_I = 0 \text{ V}$	9		9		15.5 mA
$I_{CCL}$	$V_{CC} = \text{MAX}$ , $V_I = 4.5 \text{ V}$	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  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

§ 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	$R_L = 133 \Omega$ , $C_L = 45 \text{ pF}$			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	
$V_{IK}$	$V_{CC} = \text{MIN}$ ,	$I_I = -18 \text{ mA}$			-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: 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 <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage	0.8			0.8			V
I <sub>OH</sub> High-level output current	-3			-3			mA
I <sub>OL</sub> Low-level output current	60			60			mA
T <sub>A</sub> 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 <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA	-1.2		-1.2		V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = -3 mA	2.5	3.4	2.7	3.4	V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 60 mA	0.5		0.5		V
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V	1		1		mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V	0.1		0.1		mA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5 V	-4		-4		mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-50	-225	-50	-225	mA
I <sub>CCH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V	20 36		20 36		mA
I <sub>CCL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 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<sub>CC</sub> = 5 V, T<sub>A</sub> = 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<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 2)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PLH</sub>	A or B	Y	R <sub>L</sub> = 93 Ω, C <sub>L</sub> = 50 pF	4	6.5	ns	
t <sub>PHL</sub>				4	6.5	ns	
t <sub>PLH</sub>			R <sub>L</sub> = 93 Ω, C <sub>L</sub> = 150 pF	6	ns		
t <sub>PHL</sub>				6	ns		

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



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