

# GD54/74LS132

## QUAD 2-INPUT NAND GATES WITH SCHMITT TRIGGER INPUTS

### Features

- Suitable for waveforms shaping applications
- Wide hysteresis width (0.8V typical) and high noise margin

### Description

This device contains four independent gates each of which performs the logic NAND function. Each input has hysteresis which increases the noise immunity and transforms a slowly changing input signal to a fast changing, jitter free output. When inputs A and B are high, output Y is low, and when either or both inputs are low, Y is high.

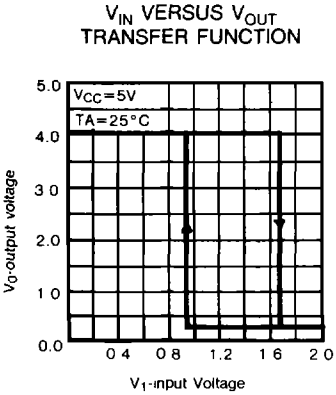
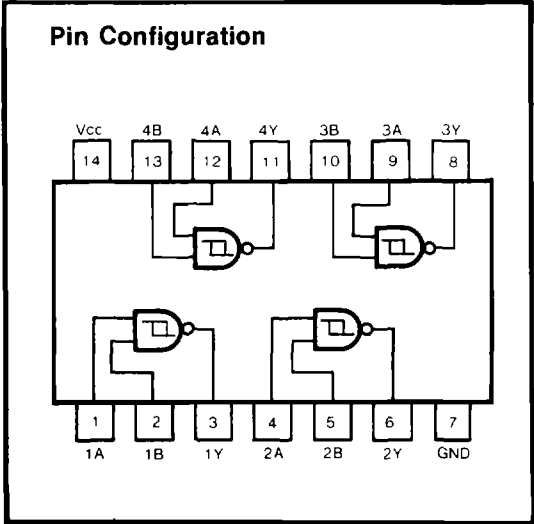


Fig. 1

### Function Table

A	B	Y
L	L	H
H	L	H
L	H	H
H	H	L

$Y = \overline{AB}$

### Absolute Maximum Ratings

- Supply voltage, V<sub>CC</sub> ..... 7V
- Input voltage ..... 7V
- Operating free-air temperature range 54LS ..... -55°C to 125°C
- 74LS ..... 0°C to 70°C
- Storage temperature range ..... -65°C to 150°C

## Recommended Operating Conditions

SYMBOL	PARAMETER		MIN	NOM	MAX	UNIT
$V_{CC}$	Supply voltage	54	4.5	5	5.5	V
		74	4.75	5	5.25	
$I_{OH}$	High-level output current	54,74			-400	$\mu$ A
$I_{OL}$	Low-level output current	54			4	mA
		74			8	
$T_A$	Operating free-air temperature	54	-55		125	$^{\circ}$ C
		74	0		70	

## Electrical Characteristics over recommended operating free-air temperature range (unless otherwise noted)

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP (Note 1)	MAX	UNIT	
$V_{T+}$	Positive-Going Input Threshold Voltage (Note 1)	$V_{CC}=5V$	1.4	1.6	1.9	V	
$V_{T-}$	Negative-Going Input Threshold Voltage (Note 1)	$V_{CC}=5V$	0.5	0.8	1	V	
$V_{IK}$	Input clamp voltage	$V_{CC}=\text{Min}$ , $I_I = -18\text{mA}$			-1.5	V	
$V_{T+}, V_{T-}$	Input Hysteresis (Note 1)	$V_{CC}=5V$	0.4	0.8		V	
$V_{OH}$	High-level output voltage	$V_{CC}=\text{Min}$	54	2.5	3.4	V	
		$I_{OH}=\text{Max}$ , $V_I=V_{T-\text{Min}}$	74	2.7	3.4		
$V_{OL}$	Low-level output voltage	$V_{CC}=\text{Min}$	54,74	0.25	0.4	V	
		$V_I=V_{T+\text{Max}}$	$I_{OL}=4\text{mA}$ $I_{OL}=8\text{mA}$	74	0.35		0.5
$I_{T+}$	Input Current at Positive-Going Threshold	$V_{CC}=5V$ , $V_I=V_{T+}$		-0.14		mA	
$I_{T-}$	Input Current at Negative-Going Threshold	$V_{CC}=5V$ , $V_I=V_{T-}$		-0.18		mA	
$I_I$	Input current at maximum input voltage	$V_{CC}=\text{Max}$ , $V_I=7V$			0.1	mA	
$I_{IH}$	High-level input current	$V_{CC}=\text{Max}$ , $V_I=2.7V$			20	$\mu$ A	
$I_{IL}$	Low-level input current	$V_{CC}=\text{Max}$ , $V_I=0.4V$			-0.4	mA	
$I_{OS}$	Short-circuit output current	$V_{CC}=\text{Max}$ (Note 2)	-20		-100	mA	
$I_{CCH}$	Supply current	Total with outputs high	$V_{CC}=\text{Max}$		5.9	11	mA
		Total with outputs low	$V_{CC}=\text{Max}$		8.2	14	mA

Note 1. All typical values are at  $V_{CC}=5V$ ,  $T_A=25^{\circ}\text{C}$ .

Note 2. Not more than one output should be shorted at a time, and the duration should not exceed one second.

Switching Characteristics,  $V_{CC}=5V$ ,  $T_A=25^{\circ}\text{C}$ 

SYMBOL	PARAMETER	TEST CONDITION#	MIN	TYP	MAX	UNIT
$t_{PLH}$	Propagation delay time, low-to-high-level output	$C_L=15\text{pF}$ , $R_L=2\text{k}\Omega$		15	22	ns
$t_{PHL}$	Propagation delay time, high-to-low-level output			15	22	ns

#For load circuit and voltage waveforms, see page 3-11.