

# GD54/74LS240

## OCTAL BUFFERS/LINE DRIVERS INVERTED 3-STATE OUTPUTS

### Feature

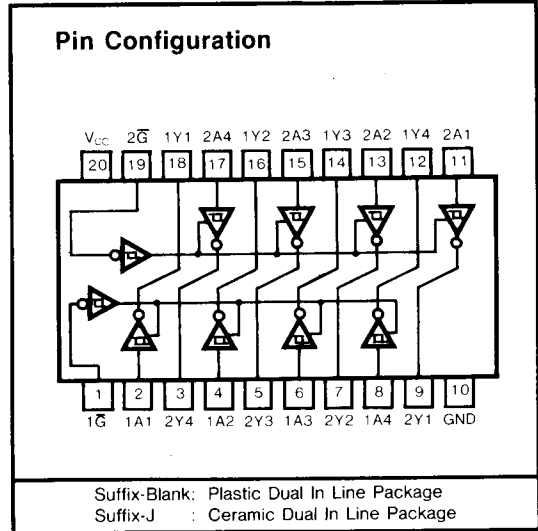
- 3-State outputs Drive Bus Lines or Buffer Memory Address Registers
- P-N-P Inputs Reduce D-C Loading
- Hysteresis at Inputs Improves Noise Margins

### Description

These octal buffers and line drivers are designed specifically to improve both the performance and density of three-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters.

This device features high fan-out, improved fan-in and 400mV noise margin.

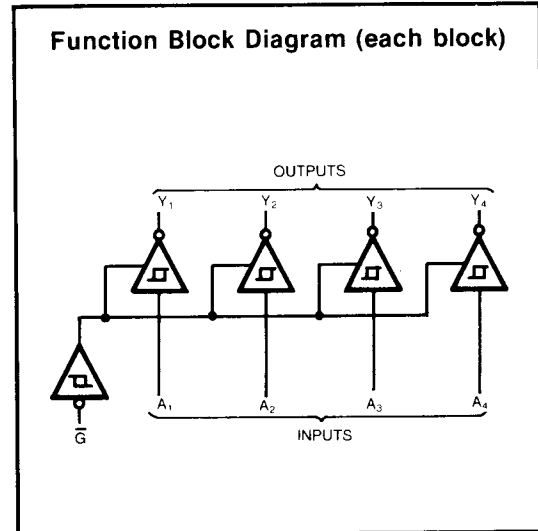
It can be used to drive terminated lines down to 133 ohms



### Function Table

INPUTS		OUTPUT
$\bar{G}$	A	Y
H	X	Z
L	H	L
L	L	H

Note: All devices have input hysteresis



### Absolute Maximum Ratings

- Supply voltage,  $V_{cc}$  ..... 7V
- Input voltage ..... 7V
- Operating free-air temperature range 54LS .....  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$   
74LS .....  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$
- Storage temperature range .....  $-65^{\circ}\text{C}$  to  $150^{\circ}\text{C}$

## 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			-12	mA
		74			-15	
$I_{OL}$	Low-level output current	54			12	mA
		74			24	
$T_A$	Operating free-air temperature	54	-55		125	°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		
$V_{IH}$	High-level input voltage			2		V		
$V_{IL}$	Low-level input voltage		54		0.7	V		
			74		0.8			
$V_{IK}$	Input clamp voltage	$V_{CC} = \text{Min}, I_I = -18\text{mA}$			-1.5	V		
$V_{T+} - V_{T-}$	Hysteresis	$V_{CC} = \text{Min}$	0.2	0.4		V		
$V_{OH}$	High-level output voltage	$V_{CC} = \text{Min}, V_{IH} = \text{Min}$ $V_{IL} = \text{Max}, I_{OH} = -1\text{mA}$	74	2.7		V		
		$V_{CC} = \text{Min}, V_{IH} = \text{Min}$ $V_{IL} = \text{Max}, I_{OH} = -3\text{mA}$	54, 74	2.4	3.4			
		$V_{CC} = \text{Min}, V_{IH} = \text{Min}$ $V_{IL} = 0.5\text{V}, I_{OH} = \text{Max}$	54, 74	2				
$V_{OL}$	Low-level output voltage	$V_{CC} = \text{Min}$ $V_{IL} = \text{Max}$ $V_{IH} = \text{Min}$	$I_{OL} = 12\text{mA}$ $I_{OL} = 24\text{mA}$	54, 74 74	0.25 0.35	0.4 0.5	V	
$I_{OZH}$	Off-state output current high-level voltage applied	$V_{CC} = \text{Max}, V_O = 2.7\text{V}$ $V_{IH} = \text{Min}, V_{IL} = \text{Max}$				20	$\mu\text{A}$	
$I_{OZL}$	Off-state output current low-level voltage applied	$V_{CC} = \text{Max}, V_O = 0.4\text{V}$ $V_{IH} = \text{Min}, V_{IL} = \text{Max}$				-20	$\mu\text{A}$	
$I_I$	Input current at maximum input voltage	$V_{CC} = \text{Max}, V_I = 7\text{V}$				0.1	mA	
$I_{IH}$	High-level input current	$V_{CC} = \text{Max}, V_I = 2.7\text{V}$				20	$\mu\text{A}$	
$I_{IL}$	Low-level input current	$V_{CC} = \text{Max}, V_I = 0.4\text{V}$				-0.2	mA	
$I_{OS}$	Short-circuit output current	$V_{CC} = \text{Max}$ (Note 2)				-40	-225	mA
$I_{CC}$	Supply Current	Outputs high				17	27	mA
		Outputs low				26	44	
		All outputs disabled				29	50	

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

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

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

SYMBOL	PARAMETER	TEST CONDITION#	MIN	TYP	MAX	UNIT
$t_{PLH}$	Propagation delay time, low-to-high-level output	$C_L = 45pF, R_L = 667\Omega$		9	14	ns
$t_{PHL}$	Propagation delay time, high-to-low-level output			12	18	ns
$t_{PZL}$	Output enable time to low level			20	30	ns
$t_{PZH}$	Output enable time to high level			15	23	ns
$t_{PLZ}$	Output disable time from low level	$C_L = 5pF, R_L = 667\Omega$		15	25	ns
$t_{PHZ}$	Output disable time from high level			10	18	ns

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