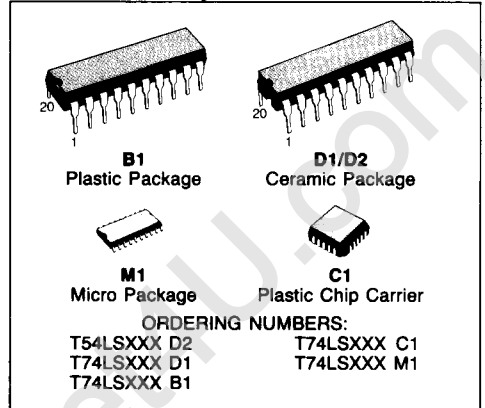


## OCTAL BUFFER/LINE DRIVERS WITH 3-STATE OUTPUTS

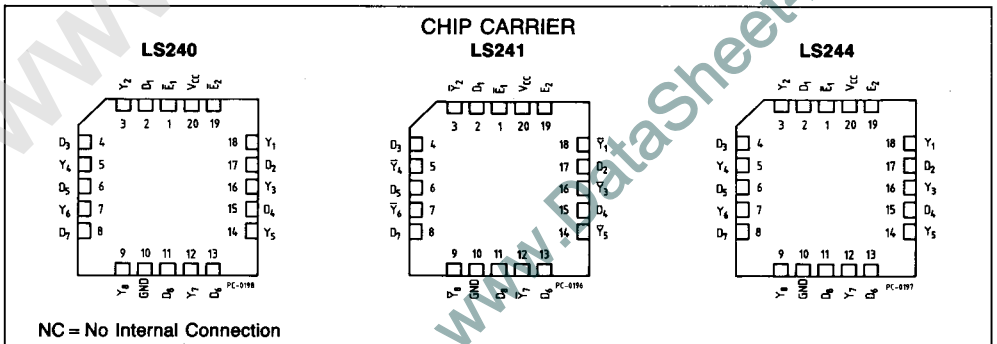
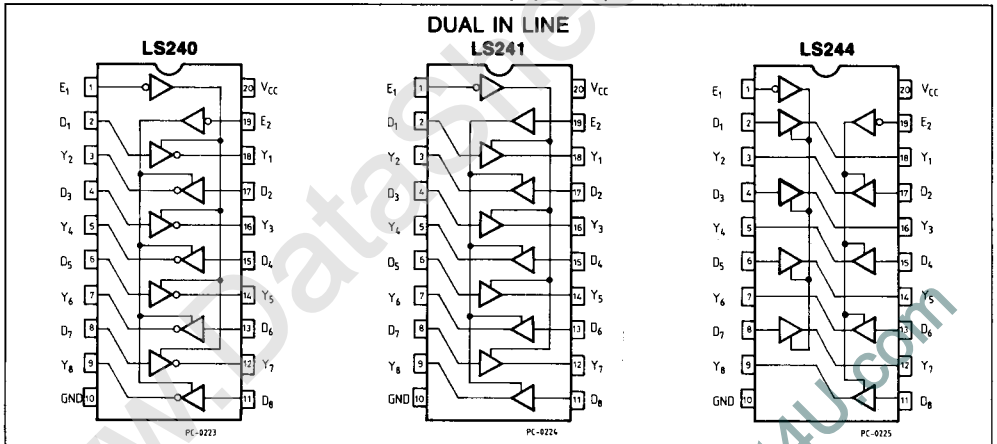
### DESCRIPTION

The T54LS/T74LS240/241/244 are Octal Buffers and Line Drivers. These devices are designed to be used with 3-state memory address drivers, etc. They are organized as two lines of 4-bit with inverting or non-inverting data.

- 3-STATE OUTPUTS DRIVE BUS LINES OR BUFFER MEMORY ADDRESS REGISTERS
- HYSTERESIS AT INPUTS TO IMPROVE NOISE MARGINS
- INPUT CLAMP DIODES LIMIT HIGH SPEED TERMINATION EFFECTS



### LOGIC DIAGRAMS AND PIN CONNECTION (top view)



NC = No Internal Connection



## TRUTH TABLE

**T54LS/T74LS240**

INPUTS			OUTPUT
$\bar{E}_1$	$\bar{E}_2$	D	
L	L	L	H
L	H	H	L
H	X	X	(Z)

**T54LS/T74LS244**

INPUTS			OUTPUT
$\bar{E}_1$	$\bar{E}_2$	D	
L	L	L	L
L	H	H	H
H	X	X	(Z)

**T54LS/T74LS241**

INPUTS		OUTPUT	INPUTS		OUTPUT
$\bar{E}_1$	D		$\bar{E}_2$	D	
L	L	L	H	L	L
L	H	H	H	H	H
H	X	(Z)	L	X	(Z)

H = HIGH Voltage Level, L = LOW Voltage Level, X = Don't Care, Z = HIGH Impedance

## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CC}$	Supply Voltage	-0.5 to 7	V
$V_I$	Input Voltage, Applied to Input	-0.5 to 15	V
$V_O$	Output Voltage, Applied to Output	0 to 10	V
$I_I$	Input Current, Into Inputs	-30 to 5	mA
$I_O$	Output Current, Into Outputs	50	mA

Stresses in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions in excess of those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## GUARANTEED OPERATING RANGES

Part Numbers	Supply Voltage			Temperature
	Min	Typ	Max	
T54LS240/241/244D2	4.5 V	5.0 V	5.5 V	-55°C to +125°C
T74LS240/241/244XX	4.75 V	5.0 V	5.25 V	0°C to +70°C

XX = package type.



### DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

Symbol	Parameter		Limits			Test Conditions (Note 1)	Units
			Min.	Typ.	Max.		
V <sub>IH</sub>	Input HIGH Voltage		2.0			Guaranteed input HIGH Voltage for all Inputs	V
V <sub>IL</sub>	Input LOW Voltage	54			0.7	Guaranteed input LOW Voltage for all Inputs	V
		74			0.8		
V <sub>CD</sub>	Input Clamp Diode Voltage			-0.65	-1.5	V <sub>CC</sub> = MIN, I <sub>IN</sub> = -18mA	V
V <sub>OH</sub>	Output HIGH Voltage	54,74	2.4	3.4		V <sub>CC</sub> = MIN, I <sub>OH</sub> = -3.0mA	V
		54,74	2.0			I <sub>OH</sub> = -12mA for 54LS I <sub>OH</sub> = -15mA for 74LS V <sub>CC</sub> = MIN	
V <sub>OL</sub>	Output LOW Voltage	54,74		0.25	0.4	I <sub>OL</sub> = 12mA V <sub>CC</sub> = MIN, V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> per Truth Table	V
		74		0.35	0.5	I <sub>OL</sub> = 24mA	
V <sub>T+</sub> - V <sub>T-</sub>	Hysteresis		0.2	0.4		V <sub>CC</sub> = MIN	V
I <sub>OZH</sub>	Output Off Current HIGH				20	V <sub>CC</sub> = MAX, V <sub>OUT</sub> = 2.7V	μA
I <sub>OZL</sub>	Output Off Current LOW				-20	V <sub>CC</sub> = MAX, V <sub>OUT</sub> = 0.4V	μA
I <sub>IH</sub>	Input HIGH Current				20	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7V V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0V	μA mA
					0.1		
I <sub>IL</sub>	Input LOW Current				-0.2	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4V	mA
I <sub>OS</sub>	Output Short Circuit Current (Note 2)		-40		-225	V <sub>CC</sub> = MAX	mA
I <sub>CC</sub>	Power Supply Current Total, Output HIGH				27	V <sub>CC</sub> = MAX	mA
	Total, Out. LOW	LS240			44		
		LS241/244			46		
	Total at HIGH Z	LS240			50		
LS241/244				54			

### AC CHARACTERISTICS: T<sub>A</sub> = 25°C

Symbol	Parameter		Limits			Test Conditions	Units
			Min.	Typ.	Max.		
t <sub>PLH</sub>	Propagation Delay, Data to Output LS240			9	14	C <sub>L</sub> = 45pF R <sub>L</sub> = 667Ω	ns
t <sub>PHL</sub>	Data to Output LS240			12	18		ns
t <sub>PLH</sub>	Propagation Delay, Data to Output LS240/241/244			12	18	C <sub>L</sub> = 45pF R <sub>L</sub> = 667Ω	ns
t <sub>PHL</sub>	Data to Output LS240/241/244			12	18		ns
t <sub>PZH</sub>	Output Enable Time to HIGH Level			15	23		ns
t <sub>PZL</sub>	Output Enable Time to LOW Level			20	30		ns
t <sub>PLZ</sub>	Output Disable Time from LOW Level			15	25	C <sub>L</sub> = 5.0pF	ns
t <sub>PHZ</sub>	Output Disable Time from HIGH Level			10	18		ns

#### Notes:

- 1) For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating ranges.
- 2) Not more than one output should be shorted at a time.
- 3) Typical values are at V<sub>CC</sub> = 5.0V, T<sub>A</sub> = 25°C



## AC WAVEFORMS

Fig. 1

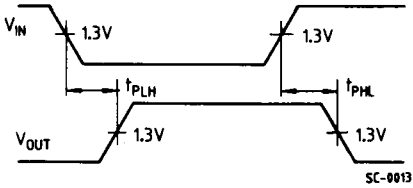


Fig. 2

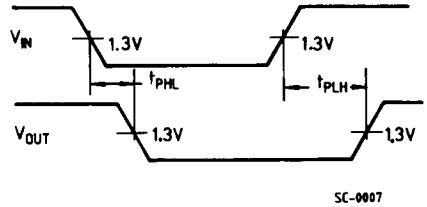


Fig. 3

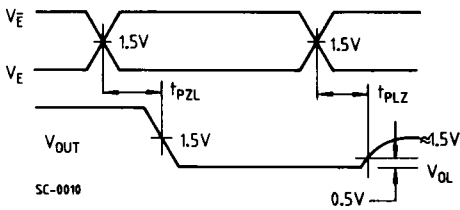


Fig. 4

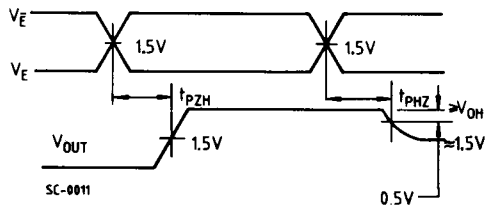
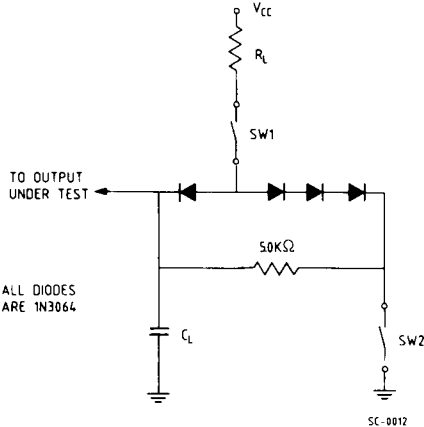


Fig. 5



### SWITCHING POSITIONS

Symbol	SW1	SW2
$t_{PZH}$	Open	Closed
$t_{PZL}$	Closed	Open
$t_{PLZ}$	Closed	Closed
$t_{PHZ}$	Closed	Closed