SGS-THOMSON MICROELECTRONICS

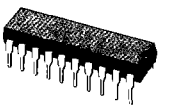
T74LS240/241 T74LS244

OCTAL BUFFER/LINE DRIVERS WITH 3-STATE OUTPUTS

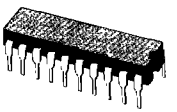
- 3-STATE OUTPUTS DRIVE BUS LINES OR BUFFER MEMORY ADDRESS REGISTERS
- HYSTERESIS AT INPUTS TO IMPROVE NOISE MARGING
- INPUT CLAMP DIODES LIMIT HIGH SPEED TERMINATION EFFECTS

DESCRIPTION

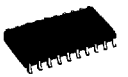
The T74LS240/241/244 are Octal Buffers and Line Drivers. These devices are designed to be used with 3-state memory address drivers, etc. They are organized as two lines of 4-bit with inverting or non-inverting data.



B1
(Plastic Package)



D1
(Ceramic Package)



M1
(Micro Package)

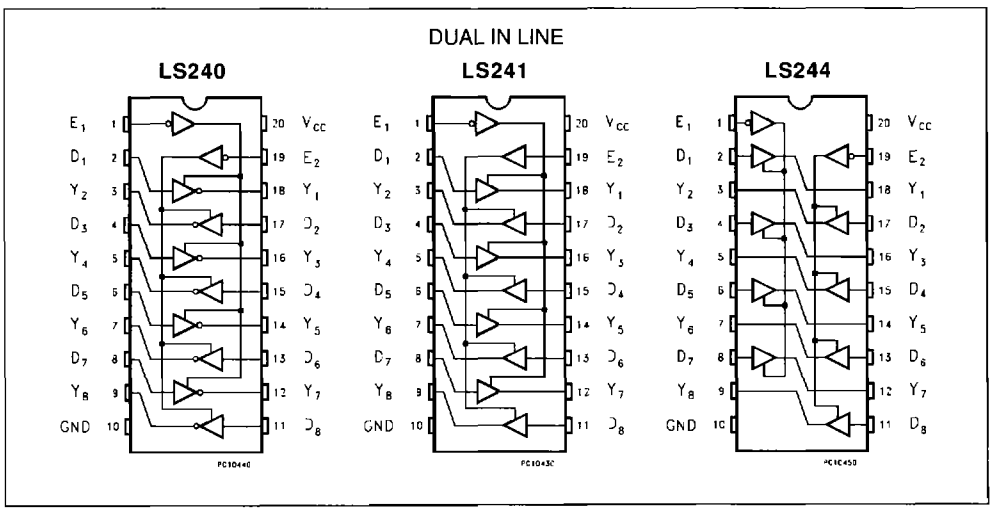
C1
(Plastic Chip Carrier)

ORDER CODES :

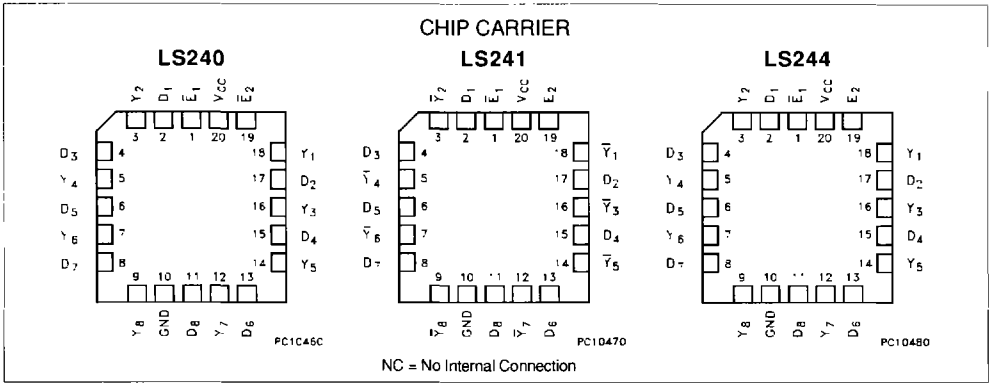
T74LSXXX D1	T74LSXXX C1
T74LSXXX B1	T74LSXXX M1

LOGIC DIAGRAM AND PIN CONNECTION (top view)

DUAL IN LINE



PIN CONNECTION (top view)



T74LS240 TRUTH TABLE

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

T74LS244 TRUTH TABLE

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

T74LS241 TRUTH TABLE

INPUTS		OUTPUT	INPUTS		OUTPUTS
$\overline{E}_1$	D		E2	D	
L	L	L	H	L	L
L	H	H	H	H	H
H	X	(Z)	L	X	(Z)

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	− 0.5 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 RANGE

Part Numbers	Supply Voltage			Temperature
	Min.	Typ.	Max.	
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 Condition (note 1)		Unit
		Min.	Typ. (*)	Max.			
V_{IH}	Input HIGH Voltage	2.0			Guaranteed Input HIGH Voltage for all Inputs		V
V_{IL}	Input LOW Voltage			0.8	Guaranteed Input LOW Voltage for all Inputs		V
V_{CD}	Input Clamp Diode Voltage		- 0.65	- 1.5	V_{CC} = MIN, I_{IN} = -18 mA		V
V_{OH}	Output HIGH Voltage	2.4 2.0	3.4		V_{CC} = MIN, I_{OH} = - 3.0 mA V_{CC} = MIN, I_{OH} = - 15 mA		V
V_{OL}	Output LOW Voltage		0.25	0.4	I_{OL} = 12 mA	V_{CC} = MIN V_{IN} = V_{IH} or V_{IL} per Truth Table	V
			0.35	0.5	I_{OL} = 24 mA		V
V_{T+} - V_{T-}	Hysteresis	0.2	0.4		V_{CC} = MIN		V
I_{OZH}	Output Off Current HIGH			20	V_{CC} = MAX, V_{IN} = 2.7 V		
I_{OZL}	Output Off Current LOW			- 20	V_{CC} = MAX, V_{IN} = 0.4 V		
I_{IH}	Input HIGH Current			20 0.1	V_{CC} = MAX, V_{IN} = 2.7 V V_{CC} = MAX, V_{IN} = 7.0 V		µA mA
I_{IL}	Input LOW Current			- 0.2	V_{CC} = MAX, V_{IN} = 0.4 V		mA
I_{OS}	Output Short Circuit Current (note 2)	- 40		- 225	V_{CC} = MAX		mA
I_{CC}	Power Supply Current Total, Output HIGH			27	V_{CC} = MAX		mA
	Total, Output LOW LS240 LS241/244			44 46			
	Total at HIGH Z LS240 LS241/244			50 54			

Notes : 1) Conditions for testing, not shown in the Table, are chosen to guarantee operation under "worst case" conditions.
2) Not more than one output should be shorted at a time.
(*) Typical values are at V_{CC} = 5.0 V, T_A = 25 °C.

AC CHARACTERISTICS: T_A = 25 °C

Symbol	Parameter	Limits			Test Conditions	Units
		Min.	Typ.	Max.		
t_{PLH} t_{PHL}	Propagation Delay, Data to Outputs LS240		9 12	14 18	CL = 45 pF RL = 667 Ω	ns
t_{PLH} t_{PHL}	Propagation Delay, Data to Outputs LS240/241/244		12 12	18 18		ns
t_{PZH}	Output Enable Time to HIGH Level		15	23		ns
t_{PZL}	Output Enable Time to LOW Level		20	30		ns
t_{PLZ}	Output Disable Time from LOW Level		15	25	CL = 5.0 pF	ns
t_{PHZ}	Output Disable Time from HIGH Level		10	18		ns

AC WAVEFORMS

Figure 1.

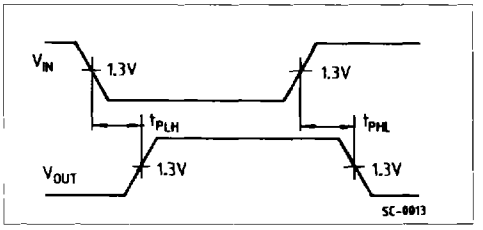


Figure 2.

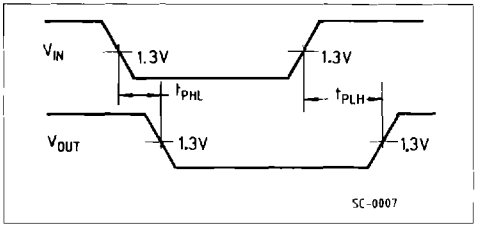


Figure 3.

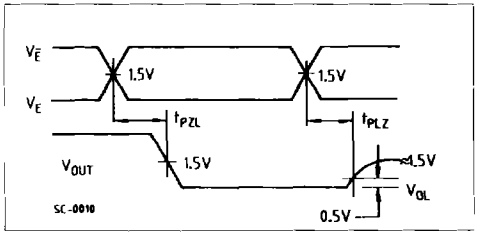
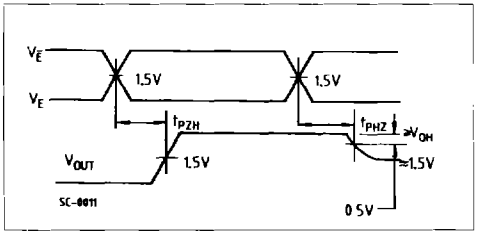
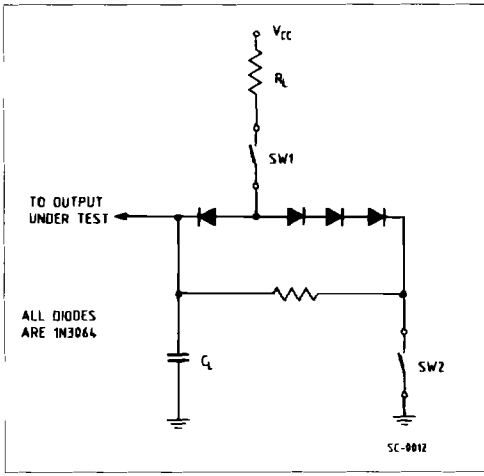


Figure 4.



AC LOAD CIRCUIT

Figure 5.



SWITCH POSITION

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