

SN74LS240, SN74LS244

Octal Buffer/Line Driver with 3-State Outputs

The SN74LS240 and SN74LS244 are Octal Buffers and Line Drivers designed to be employed as memory address drivers, clock drivers and bus-oriented transmitters/receivers which provide improved PC board density.

- Hysteresis at Inputs to Improve Noise Margins
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Input Clamp Diodes Limit High-Speed Termination Effects

GUARANTEED OPERATING RANGES

Symbol	Parameter	Min	Typ	Max	Unit
V _{CC}	Supply Voltage	4.75	5.0	5.25	V
T _A	Operating Ambient Temperature Range	0	25	70	°C
I _{OH}	Output Current – High			–3.0	mA
				–15	mA
I _{OL}	Output Current – Low			24	mA

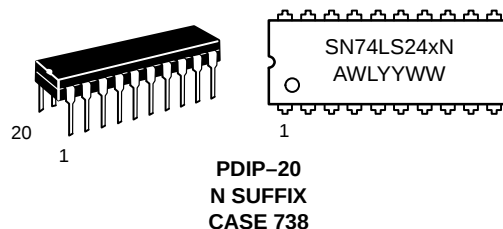


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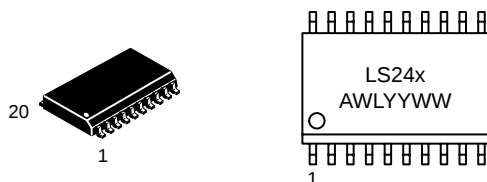
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**LOW
POWER
SCHOTTKY**

MARKING DIAGRAMS



**PDIP–20
N SUFFIX
CASE 738**



**SOIC–20
DW SUFFIX
CASE 751D**

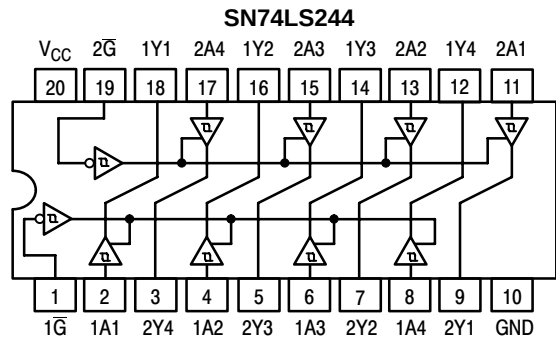
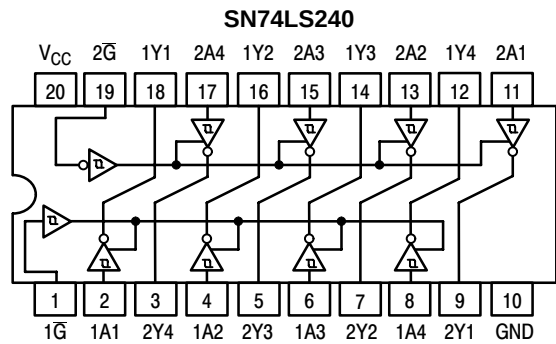
x = 0 or 4
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
SN74LS240N	PDIP–20	1440 Units/Box
SN74LS240DW	SOIC–20	2500/Tape & Reel
SN74LS244N	PDIP–20	1440 Units/Box
SN74LS244DW	SOIC–20	2500/Tape & Reel

SN74LS240, SN74LS244

LOGIC AND CONNECTION DIAGRAMS DIP (TOP VIEW)



TRUTH TABLES

SN74LS240		
INPUTS		OUTPUT
1G, 2G	D	
L	L	H
L	H	L
H	X	(Z)

SN74LS244		
INPUTS		OUTPUT
1G, 2G	D	
L	L	L
L	H	H
H	X	(Z)

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = HIGH Impedance

SN74LS240, SN74LS244

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter	Limits			Unit	Test Conditions
		Min	Typ	Max		
V_{IH}	Input HIGH Voltage	2.0			V	Guaranteed Input HIGH Voltage for All Inputs
V_{IL}	Input LOW Voltage			0.8	V	Guaranteed Input LOW Voltage for All Inputs
$V_{T+}-V_{T-}$	Hysteresis	0.2	0.4		V	$V_{CC} = \text{MIN}$
V_{IK}	Input Clamp Diode Voltage		-0.65	-1.5	V	$V_{CC} = \text{MIN}$, $I_{IN} = -18 \text{ mA}$
V_{OH}	Output HIGH Voltage	2.4	3.4		V	$V_{CC} = \text{MIN}$, $I_{OH} = -3.0 \text{ mA}$
		2.0			V	$V_{CC} = \text{MIN}$, $I_{OH} = \text{MAX}$
V_{OL}	Output LOW Voltage		0.25	0.4	V	$I_{OL} = 12 \text{ mA}$
			0.35	0.5	V	$I_{OL} = 24 \text{ mA}$
						$V_{CC} = V_{CC} \text{ MIN}$, $V_{IN} = V_{IL} \text{ or } V_{IH}$ per Truth Table
I_{OZH}	Output Off Current HIGH			20	μA	$V_{CC} = \text{MAX}$, $V_{OUT} = 2.7 \text{ V}$
I_{OZL}	Output Off Current LOW			-20	μA	$V_{CC} = \text{MAX}$, $V_{OUT} = 0.4 \text{ V}$
I_{IH}	Input HIGH Current			20	μA	$V_{CC} = \text{MAX}$, $V_{IN} = 2.7 \text{ V}$
				0.1	mA	$V_{CC} = \text{MAX}$, $V_{IN} = 7.0 \text{ V}$
I_{IL}	Input LOW Current			-0.2	mA	$V_{CC} = \text{MAX}$, $V_{IN} = 0.4 \text{ V}$
I_{OS}	Output Short Circuit Current (Note 1.)	-40		-225	mA	$V_{CC} = \text{MAX}$
I_{CC}	Power Supply Current Total, Output HIGH			27	mA	$V_{CC} = \text{MAX}$
	Total, Output LOW	LS240		44		
		LS244		46		
	Total at HIGH Z	LS240		50		
		LS244		54		

1. Not more than one output should be shorted at a time, nor for more than 1 second.

AC CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_{CC} = 5.0 \text{ V}$)

Symbol	Parameter	Limits			Unit	Test Conditions
		Min	Typ	Max		
t_{PLH} t_{PHL}	Propagation Delay, Data to Output LS240		9.0 12	14 18	ns	$C_L = 45 \text{ pF}$, $R_L = 667 \Omega$
t_{PLH} t_{PHL}	Propagation Delay, Data to Output LS244		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	ns	$C_L = 5.0 \text{ pF}$, $R_L = 667 \Omega$
t_{PHZ}	Output Disable Time from HIGH Level		10	18	ns	

AC WAVEFORMS

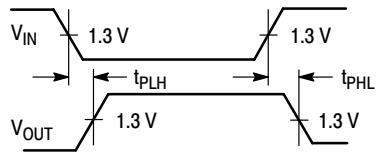


Figure 1.

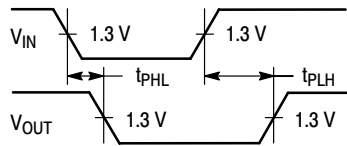


Figure 2.

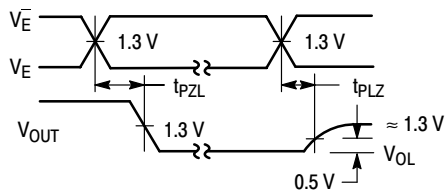


Figure 3.

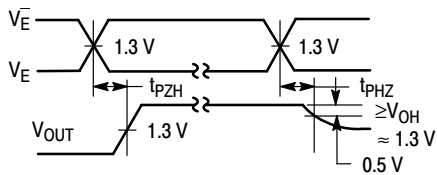
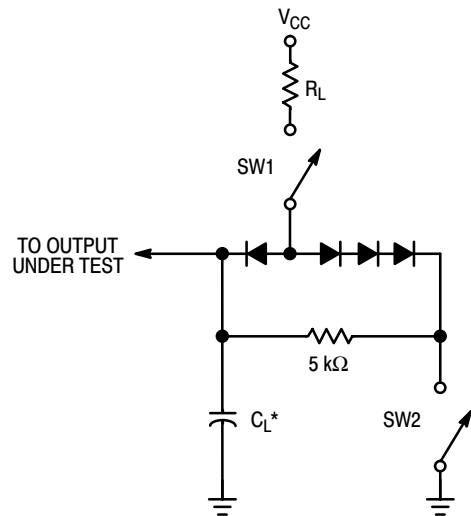


Figure 4.



SWITCH POSITIONS

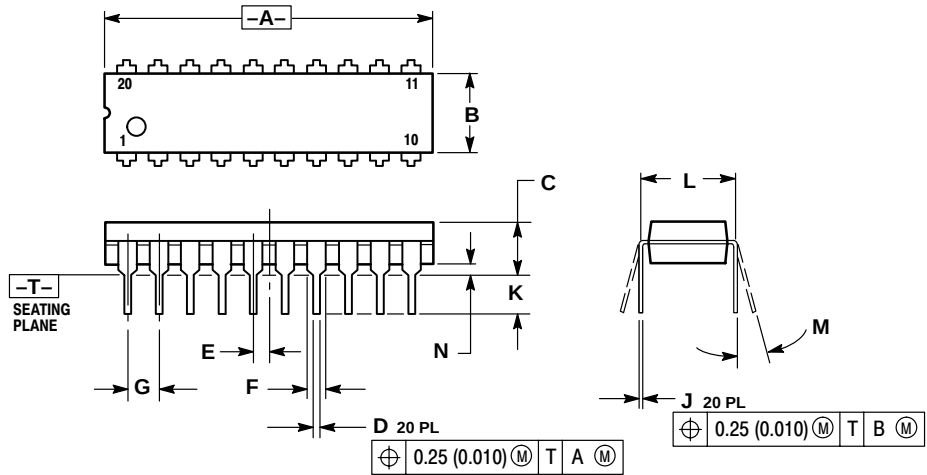
SYMBOL	SW1	SW2
t_{PZH}	Open	Closed
t_{PZL}	Closed	Open
t_{PLZ}	Closed	Closed
t_{PHZ}	Closed	Closed

Figure 5.

SN74LS240, SN74LS244

PACKAGE DIMENSIONS

N SUFFIX
PLASTIC PACKAGE
CASE 738-03
ISSUE E

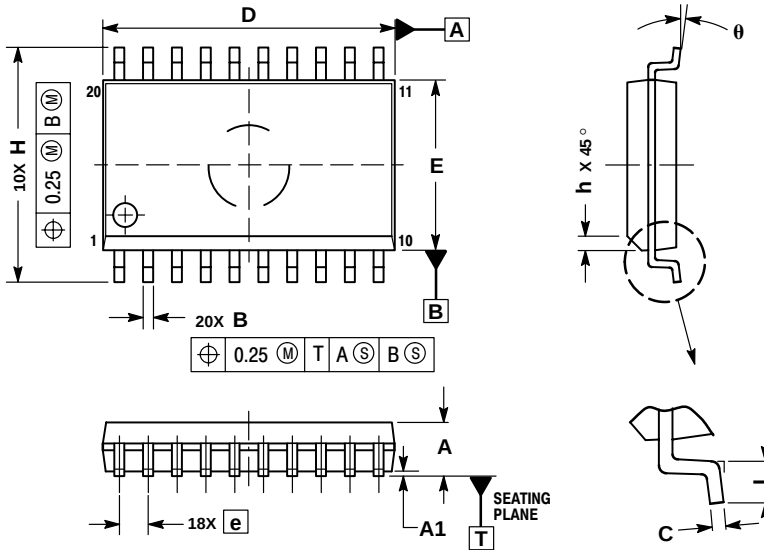


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
 4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.010	1.070	25.66	27.17
B	0.240	0.260	6.10	6.60
C	0.150	0.180	3.81	4.57
D	0.015	0.022	0.39	0.55
E	0.050 BSC		1.27 BSC	
F	0.050	0.070	1.27	1.77
G	0.100 BSC		2.54 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.140	2.80	3.55
L	0.300 BSC		7.62 BSC	
M	0°	15°	0°	15°
N	0.020	0.040	0.51	1.01

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D SUFFIX PLASTIC SOIC PACKAGE CASE 751D-05 ISSUE F



NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS	
	MIN	MAX
A	2.35	2.65
A1	0.10	0.25
B	0.35	0.49
C	0.23	0.32
D	12.65	12.95
E	7.40	7.60
e	1.27 BSC	
H	10.05	10.55
h	0.25	0.75
L	0.50	0.90
θ	0°	7°

Notes

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