

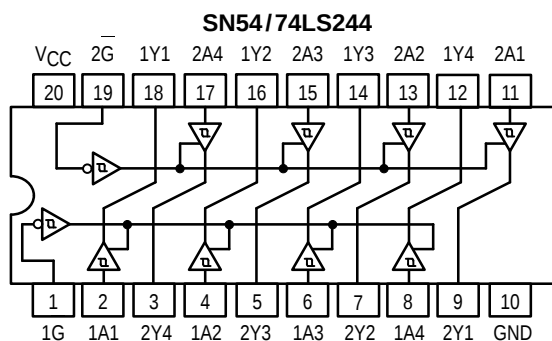
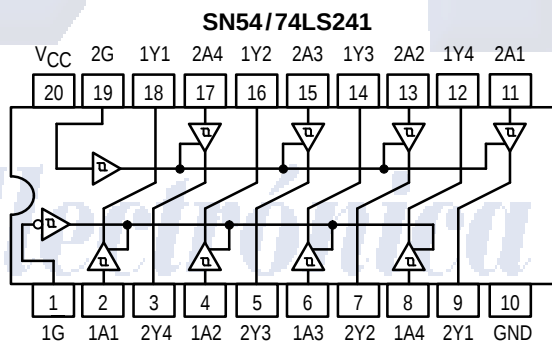
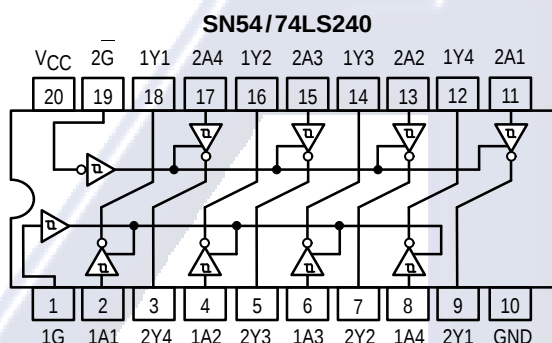

MOTOROLA

OCTAL BUFFER/LINE DRIVER WITH 3-STATE OUTPUTS

The SN54/74LS240, 241 and 244 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

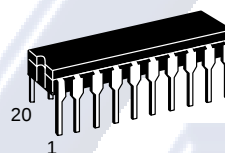
LOGIC AND CONNECTION DIAGRAMS DIP (TOP VIEW)



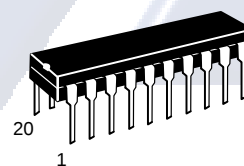
SN54/74LS240
SN54/74LS241
SN54/74LS244

**OCTAL BUFFER/LINE DRIVER
WITH 3-STATE OUTPUTS**

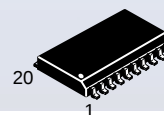
LOW POWER SCHOTTKY



J SUFFIX
CERAMIC
CASE 732-03



N SUFFIX
PLASTIC
CASE 738-03



DW SUFFIX
SOIC
CASE 751D-03

ORDERING INFORMATION

SN54LSXXXJ	Ceramic
SN74LSXXXN	Plastic
SN74LSXXXDW	SOIC

SN54/74LS240 • SN54/74LS241 • SN54/74LS244

TRUTH TABLES

SN54/74LS240

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

SN54/74LS244

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

SN54/74LS241

INPUTS		OUTPUT	INPUTS		OUTPUT
1G	D		2G	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 = Immaterial
Z = HIGH Impedance

GUARANTEED OPERATING RANGES

Symbol	Parameter		Min	Typ	Max	Unit
VCC	Supply Voltage	54 74	4.5 4.75	5.0 5.0	5.5 5.25	V
TA	Operating Ambient Temperature Range	54 74	-55 0	25 25	125 70	°C
IOH	Output Current — High	54, 74			-3.0	mA
		54 74			-12 -15	mA
IOl	Output Current — Low	54 74			12 24	mA

SN54/74LS240 • SN54/74LS241 • SN54/74LS244

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	54			0.7	V	Guaranteed Input LOW Voltage for All Inputs	
		74			0.8			
V _{T+} –V _{T–}	Hysteresis		0.2	0.4		V	V _{CC} = MIN	
V _{IK}	Input Clamp Diode Voltage			–0.65	–1.5	V	V _{CC} = MIN, I _{IN} = –18 mA	
V _{OH}	Output HIGH Voltage	54, 74	2.4	3.4		V	V _{CC} = MIN, I _{OH} = –3.0 mA	
		54, 74	2.0			V	V _{CC} = MIN, I _{OH} = MAX	
V _{OL}	Output LOW Voltage	54, 74		0.25	0.4	V	I _{OL} = 12 mA	V _{CC} = V _{CC} MIN, V _{IN} = V _{IL} or V _{IH} per Truth Table
		74		0.35	0.5	V	I _{OL} = 24 mA	
I _{OZH}	Output Off Current HIGH				20	μA	V _{CC} = MAX, V _{OUT} = 2.7 V	
I _{OZL}	Output Off Current LOW				–20	μA	V _{CC} = MAX, V _{OUT} = 0.4 V	
I _{IH}	Input HIGH Current				20	μA	V _{CC} = MAX, V _{IN} = 2.7 V	
					0.1	mA	V _{CC} = MAX, V _{IN} = 7.0 V	
I _{IL}	Input LOW Current				–0.2	mA	V _{CC} = MAX, V _{IN} = 0.4 V	
I _{OS}	Output Short Circuit Current (Note 1)		–40		–225	mA	V _{CC} = MAX	
I _{CC}	Power Supply Current Total, Output HIGH				27	mA	V _{CC} = MAX	
	Total, Output LOW	LS240			44			
		LS241/244			46			
	Total at HIGH Z	LS240			50			
		LS241/244			54			

Note 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 LS241/244		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} t_{PHZ}	Output Disable Time from LOW Level Output Disable Time from HIGH Level		15 10	25 18	ns	

SN54/74LS240 • SN54/74LS241 • SN54/74LS244

AC WAVEFORMS

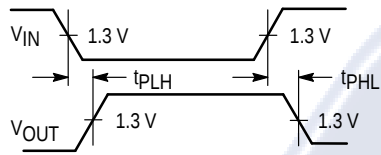


Figure 1

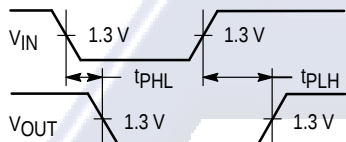


Figure 2

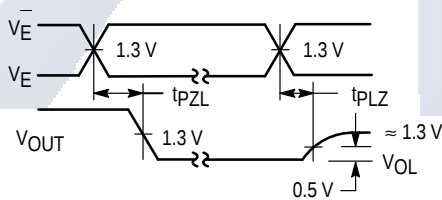


Figure 3

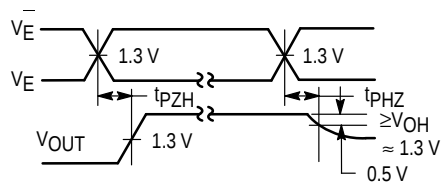
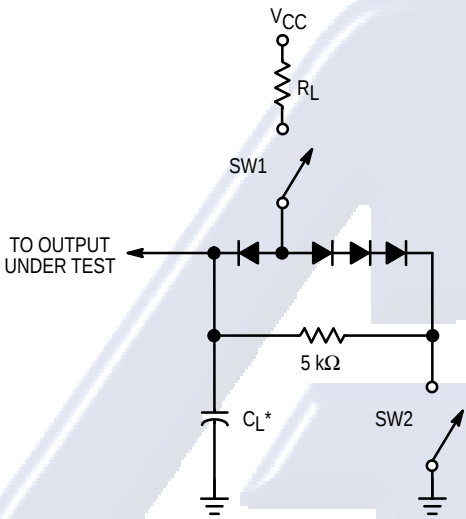


Figure 4



SWITCH POSITIONS

SYMBOL	SW1	SW2
t_PZH	Open	Closed
t_PZL	Closed	Open
t_PLZ	Closed	Closed
t_PHZ	Closed	Closed

Figure 5