

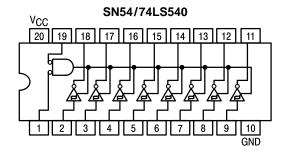
OCTAL BUFFER/LINE DRIVER WITH 3-STATE OUTPUTS

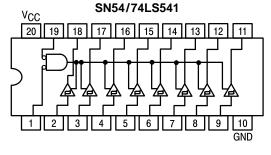
The SN54/74LS540 and SN54/74LS541 are octal buffers and line drivers with the same functions as the LS240 and LS241, but with pinouts on the opposite side of the package.

These device types are designed to be used as memory address drivers, clock drivers and bus-oriented transmitters/receivers. These devices are especially useful as output ports for the microprocessors, allowing ease of layout and greater PC board density.

- Hysteresis at Inputs to Improve Noise Margin
- PNP Inputs Reduce Loading
- 3-State Outputs Drive Bus Lines
- Inputs and Outputs Opposite Side of Package, Allowing Easier Interface to Microprocessors
- Input Clamp Diodes Limit High-Speed Termination Effects

LOGIC AND CONNECTION DIAGRAMS DIP (TOP VIEW)

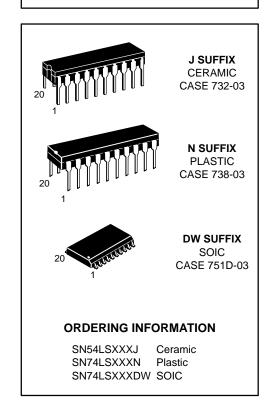




SN54/74LS540 SN54/74LS541

OCTAL BUFFER/LINE DRIVER WITH 3-STATE OUTPUTS

LOW POWER SCHOTTKY

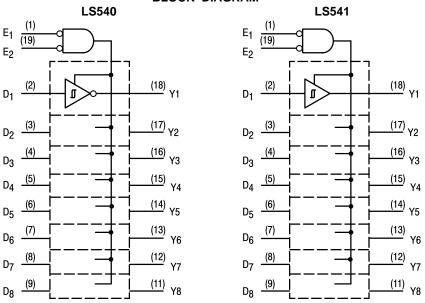


GUARANTEED OPERATING RANGES

Symbol	Parameter		Min	Тур	Max	Unit
Vcc	Supply Voltage	54 74	4.5 4.75	5.0 5.0	5.5 5.25	V
T _A	Operating Ambient Temperature Range	54 74	-55 0	25 25	125 70	°C
ЮН	Output Current — High	54 74			-12 -15	mA
lOL	Output Current — Low	54 74			12 24	mA

SN54/74LS540 • SN54/74LS541

BLOCK DIAGRAM



IN	PUTS	3	OUTI	PUTS
E ₁	E ₂	D	LS540	LS541
L	L	Н	L	Н
Н	Х	Х	Z	Z
Х	Н	Х	Z	Z
L	L	L	Н	L

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

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

			Limits					
Symbol	Parameter		Min	Тур	Max	Unit	Tes	t Conditions
VIH	Input HIGH Voltage		2.0			V	Guaranteed Input HIGH Voltage for All Inputs	
VIL	Input LOW Voltage	54			0.7	V	Guaranteed Input LOW Voltage for All Inputs	
VIL.	Input LOW Voltage	74			0.8	v		
٧ _{IK}	Input Clamp Diode Voltage			-0.65	-1.5	V	V _{CC} = MIN, I _{IN} =	-18 mA
Vou	Output HIGH Voltage	54, 74	2.4	3.4		V	V _{CC} = MIN, I _{OH}	= -3.0 mA
VOH	Output HIGH Voltage	54, 74	2.0			V	V _{CC} = MIN, I _{OH}	= MAX, V _{IL} = 0.5 V
	Output I OW/ Valtage	54, 74		0.25	0.4	V	I _{OL} = 12 mA	V _{CC} = V _{CC} MIN,
VOL	V _{OL} Output LOW Voltage	74		0.35	0.5	٧	I _{OL} = 24 mA	VIN = VIL or VIH per Truth Table
V _{T+} -V _{T-}	Hysteresis		0.2	0.4		V	V _{CC} = MIN	
lozh	Output Off Current HIGH				20	μΑ	$V_{CC} = MAX, V_{OUT} = 2.7 V$	
lozL	Output Off Current LOW				-20	μΑ	$V_{CC} = MAX, V_{OUT} = 0.4 V$	
lін	Input HIGH Current				20	μΑ	V _{CC} = MAX, V _{IN}	= 2.7 V
'IH	input i ilori cuitent				0.1	mA	V _{CC} = MAX, V _{IN}	= 7.0 V
Ι _Ι L	Input LOW Current				-0.2	mA	V _{CC} = MAX, V _{IN}	= 0.4 V
los	Short Circuit Current (Note 1)	-40		-225	mA	VCC = MAX	
	Power Supply Current Total, Output HIGH				25	mA		
		LS541			32	mA	V _{CC} = MAX	
Icc	Total, Output LOW	LS540			45	mA		
		LS541			52	mA		
	Total Output 3 State	LS540			52	mA		
	Total Output 3-State	Total Output 3-State LS541			55	mA		

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

SN54/74LS540 • SN54/74LS541

AC CHARACTERISTICS $(T_A = 25^{\circ}C)$

				Limits				
Symbol	Parameter		Min	Тур	Max	Unit	Test Conditions	
tPLH		LS540		9.0	15			
tPLH	Propagation Delay,	LS541		12	15			
tPHL	Data to Output	LS540		12	15	ns		
tPHL		LS541		12	18		V _{CC} = 5.0 V C _L = 45 pF	
4	Output Enable Time	LS540		15	25		$R_L = 667 \Omega$	
^t PZH	to HIGH Level	LS541		15	32	ns		
4	Output Enable Time	LS540		20	38			
^t PZL	to LOW Level	LS541		20	38	ns		
4	Output Disable Time	LS540		10	18			
^t PHZ	to HIGH Level	LS541		10	18	ns	0. 50.5	
4	Output Disable Time	LS540		15	25		C _L = 5.0 pF	
^t PLZ	to LOW Level	LS541		15	29	ns		

AC WAVEFORMS

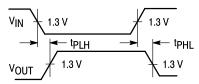


Figure 1

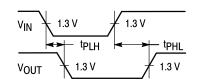


Figure 2

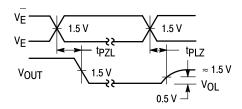


Figure 3

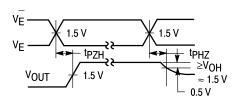
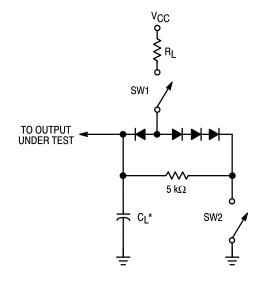


Figure 4



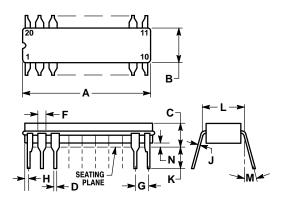
SWITCH POSITIONS

SYMBOL	SW1	SW2
^t PZH	Open	Closed
t _{PZL}	Closed	Open
^t PLZ	Closed	Closed
^t PHZ	Closed	Closed

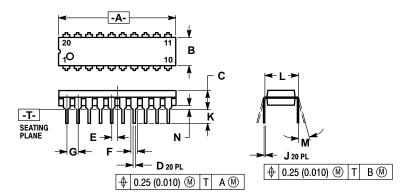
Figure 5

Case 751D-03 DW Suffix 20-Pin Plastic **SO-20 (WIDE)** -A-P 0.25 (0.010) M -B-> G < ← R X 45° -T-С SEATING PLANE Κ → D 20 PL ⊕ 0.25 (0.010) M T B S A S

Case 732-03 J Suffix 20-Pin Ceramic Dual In-Line



Case 738-03 N Suffix 20-Pin Plastic



NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982. CONTROLLING DIMENSION: MILLIMETER.
- DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
- MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER
- 751D-01, AND -02 OBSOLETE, NEW STANDARD 751D-03.

	MILLIM	ETERS	INCHES		
DIM	MIN	MAX	MIN	MAX	
Α	12.65	12.95	0.499	0.510	
В	7.40	7.60	0.292	0.299	
С	2.35	2.65	0.093	0.104	
D	0.35	0.49	0.014	0.019	
F	0.50	0.90	0.020	0.035	
G	1.27 BSC		0.050 BSC		
J	0.25	0.32	0.010	0.012	
K	0.10	0.25	0.004	0.009	
M	0°	7°	0°	7°	
P	10.05	10.55	0.395	0.415	
R	0.25	0.75	0.010	0.029	

- NOTES: 1. LEADS WITHIN 0.25 mm (0.010) DIA., TRUE POSITION AT SEATING PLANE, AT MAXIMUM MATERIAL CONDITION.
- 2. DIM L TO CENTER OF LEADS WHEN FORMED PARALLEL.
- 3. DIM A AND B INCLUDES MENISCUS.

	MILLIM	ETERS	INC	HES	
DIM	MIN	MAX	MIN	MAX	
Α	23.88	25.15	0.940	0.990	
В	6.60	7.49	0.260	0.295	
С	3.81	5.08	0.150	0.200	
D	0.38	0.56	0.015	0.022	
F	1.40	1.65	0.055	0.065	
G	2.54	BSC	0.100 BSC		
Н	0.51	1.27	0.020	0.050	
J	0.20	0.30	0.008	0.012	
K	3.18	4.06	0.125	0.160	
L	7.62 BSC		0.300 BSC		
M	0°	15°	0°	15°	
N	0.25	1.02	0.010	0.040	

NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
 DIMENSION "L" TO CENTER OF LEAD WHEN 3. FORMED PARALLEL.
- DIMENSION "B" DOES NOT INCLUDE MOLD FLASH.
- 5. 738-02 OBSOLETE, NEW STANDARD 738-03.

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

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

Literature Distribution Centers:

USA: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036.

EUROPE: Motorola Ltd.; European Literature Centre; 88 Tanners Drive, Blakelands, Milton Keynes, N JAPAN: Nippon Motorola Ltd.; 4-32-1, Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan.

ASIA PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Center, No. 2 Dai King Street, To

	SYMBOL	SW1	SW2
N	tpzu IK14 5BP, England	Open	Closed
	tPZL	Closed	Open
ıa	tPLZ	e, Tai Po, N.T., Hon Closed	Closed

