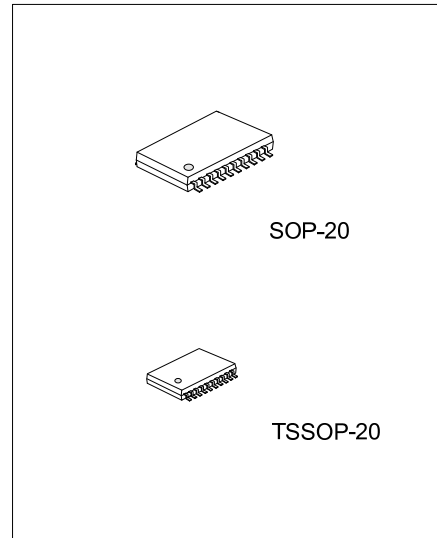




## U74HC541

CMOS IC

### OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS



#### DESCRIPTION

The **U74HC541** is a octal buffers and line drivers with 3-state outputs and 8 channels.

#### FEATURES

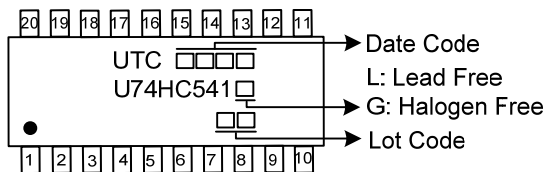
- \* Operate from 2V to 6V
- \* Max  $t_{PD}$  of 23ns at 4.5 V( $C_L=50pF$ )
- \* Typical  $V_{IH} < 3.15V$  at  $V_{CC}=4.5V, T_a=25^\circ C$
- \* Typical  $V_{IL} > 1.35V$  at  $V_{CC}=4.5V, T_a=25^\circ C$

#### ORDERING INFORMATION

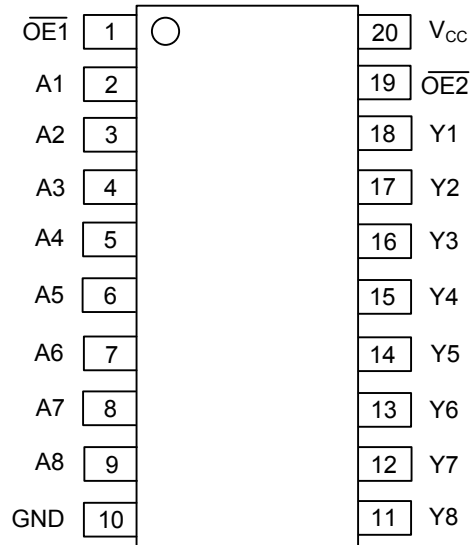
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC541L-S20-R	U74HC541G-S20-R	SOP-20	Tape Reel
U74HC541L-P20-R	U74HC541G-P20-R	TSSOP-20	Tape Reel

<p>U74HC541G-S20-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) R20: SSOP-20, P20: TSSOP-20</p> <p>(3) G: Halogen Free and Lead Free</p>
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#### MARKING



■ PIN CONFIGURATION



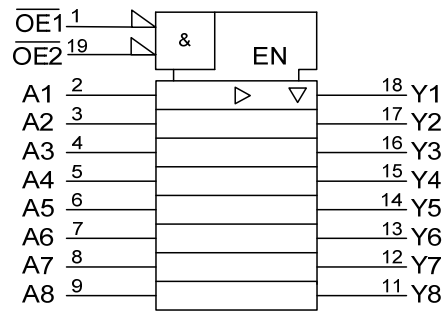
■ FUNCTION TABLE

INPUTS $\overline{OE1}$	INPUTS $\overline{OE2}$	INPUTS(A)	OUTPUT(Y)
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z

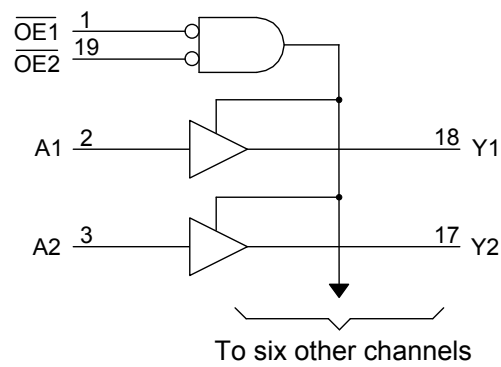
Note: H: HIGH voltage level L: LOW voltage level Z: High impedance X: Don't care

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## ■ LOGIC SYMBOL



## ■ LOGIC DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5 ~ 7	V
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 70$	mA
Output Current	$I_{OUT}$	$\pm 35$	mA
Input Clamp Current	$I_{IK}$	$\pm 20$	mA
Output Clamp Current	$I_{OK}$	$\pm 20$	mA
Operating Temperature	$T_{OPR}$	-40 ~ + 85	$^{\circ}C$
Storage Temperature	$T_{STG}$	-65 ~ + 150	$^{\circ}C$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.  
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		2		6	V
High-Level Input Voltage	$V_{IH}$	$V_{CC}=2V$	1.5			V
		$V_{CC}=4.5V$	3.15			
		$V_{CC}=6V$	4.2			
Low-Level Input Voltage	$V_{IL}$	$V_{CC}=2V$			0.5	V
		$V_{CC}=4.5V$			1.35	
		$V_{CC}=6V$			1.8	
Input Voltage	$V_{IN}$		0		$V_{CC}$	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
Input Transition Rise or Fall Rate	$t_R, t_F$	$V_{CC}=2V$			1000	ns
		$V_{CC}=4.5V$			500	
		$V_{CC}=6V$			400	

### ■ ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}C$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage High-Level	$V_{OH}$	$V_{CC}=2V, I_{OH}=-20\mu A$	1.9	1.998		V
		$V_{CC}=4.5V, I_{OH}=-20\mu A$	4.4	4.499		
		$V_{CC}=6V, I_{OH}=-20\mu A$	5.9	5.999		
		$V_{CC}=4.5V, I_{OH}=-6mA$	3.98	4.3		
		$V_{CC}=6V, I_{OH}=-7.8mA$	5.48	5.8		
Output Voltage Low-Level	$V_{OL}$	$V_{CC}=2V, I_{OL}=20\mu A$		0.002	0.1	V
		$V_{CC}=4.5V, I_{OL}=20\mu A$		0.001	0.1	
		$V_{CC}=6V, I_{OL}=20\mu A$		0.001	0.1	
		$V_{CC}=4.5V, I_{OL}=6mA$		0.17	0.26	
		$V_{CC}=6V, I_{OL}=7.8mA$		0.15	0.26	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND		$\pm 0.1$	$\pm 100$	nA
Output Off-state Current	$I_{OZ}$	$V_{CC}=6V, V_{OUT}=V_{CC}$ or GND		$\pm 0.01$	$\pm 0.5$	$\mu A$
Quiescent Supply Current	$I_Q$	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			8	$\mu A$
Input Capacitance	$C_{IN}$	$V_{CC}=2V$ to 6V		3	10	pF

■ SWITCHING CHARACTERISTICS ( $T_A=25^\circ\text{C}$ ,  $C_L=50\text{pF}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output (Y)	$t_{PLH}/t_{PHL}$	$V_{CC}=2\text{V}$		40	115	ns
		$V_{CC}=4.5\text{V}$		12	23	
		$V_{CC}=6\text{V}$		10	20	
Output Enable Time From $\overline{OE}$ to Y	$t_{PZL}/t_{PZH}$	$V_{CC}=2\text{V}$		80	150	ns
		$V_{CC}=4.5\text{V}$		17	30	
		$V_{CC}=6\text{V}$		15	26	
Output Disable Time From $\overline{OE}$ to Y	$t_{PLZ}/t_{PHZ}$	$V_{CC}=2\text{V}$		40	150	ns
		$V_{CC}=4.5\text{V}$		18	30	
		$V_{CC}=6\text{V}$		17	26	
Output Y	$t_t$	$V_{CC}=2\text{V}$		28	60	ns
		$V_{CC}=4.5\text{V}$		8	12	
		$V_{CC}=6\text{V}$		6	10	

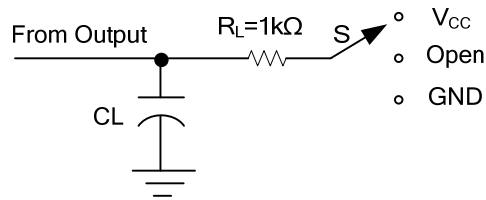
■ SWITCHING CHARACTERISTICS ( $T_A=25^\circ\text{C}$ ,  $C_L=150\text{pF}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output (Y)	$t_{PLH}/t_{PHL}$	$V_{CC}=2\text{V}$		65	165	ns
		$V_{CC}=4.5\text{V}$		16	33	
		$V_{CC}=6\text{V}$		14	28	
Output Enable Time From $\overline{OE}$ to Y	$t_{PZL}/t_{PZH}$	$V_{CC}=2\text{V}$		100	200	ns
		$V_{CC}=4.5\text{V}$		20	40	
		$V_{CC}=6\text{V}$		17	34	
Output Y	$t_t$	$V_{CC}=2\text{V}$		45	210	ns
		$V_{CC}=4.5\text{V}$		17	42	
		$V_{CC}=6\text{V}$		13	36	

■ OPERATING CHARACTERISTICS ( $T_A=25^\circ\text{C}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	No Load		35		pF

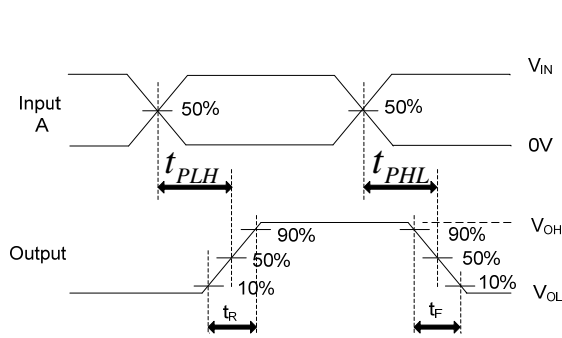
## ■ TEST CIRCUIT AND WAVEFORMS



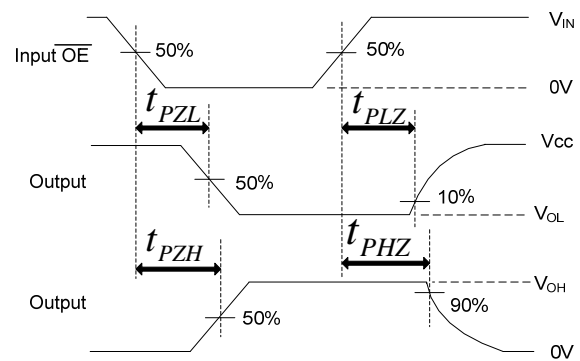
TEST CIRCUIT

TEST	S
$t_{PLH}/t_{PHL}$	Open
$t_{PHZ}/t_{PZH}$	GND
$t_{PLZ}/t_{PZL}$	$V_{CC}$

Parameter	RL	CL
$t_{en}$	1KΩ	50 pF or 150 pF
		50 pF or 150 pF
$t_{dis}$	1KΩ	50 pF
		50 pF
$t_{PD}$ or $t_t$	—	50 pF or 150 pF



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Note:  $C_L$  includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: PRR  $\leq$  1MHz,  $Z_o = 50\Omega$ ,  $t_r = 6ns$ ,  $t_f = 6ns$ .

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