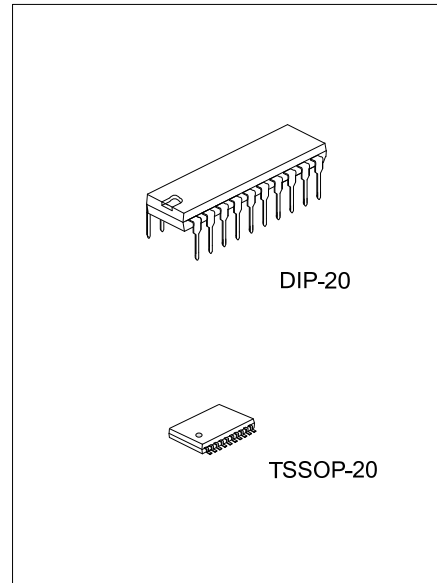




## U74HCT541

CMOS IC

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



#### DESCRIPTION

The **U74HCT541** is octal buffers and line drivers are with 3-state outputs and 8 channels.

The 3-state control gate is a 2-input NOR. If either output-enable ( $\overline{OE1}$  or  $\overline{OE2}$ ) input is high, all eight outputs are in the high-impedance state. The **U74HCT541** devices provide true data at the outputs.

#### FEATURES

- \* Operating Voltage Range of 4.5V to 5.5V
- \* High-Current 3-State Outputs Interface Directly With System Bus or Can Drive Up To 15 LSTTL Loads
- \* Low Power Consumption  $I_{CC}$ : 4 $\mu$ A (Max.)
- \* Typical  $t_{pd}$ =13ns
- \*  $\pm 6$ mA Output Drive at 5V
- \* Low Input Current of 1 $\mu$ A max
- \* Inputs Are TTL-Voltage Compatible
- \* Data Flow-Through Pinout (All Inputs on Opposite Side From Outputs)

#### ORDERING INFORMATION

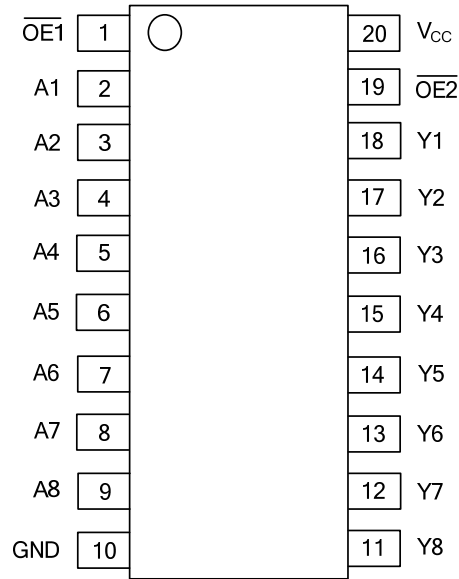
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HCT541L-D20-T	U74HCT541G-D20-T	DIP-20	Tube
U74HCT541L-P20-R	U74HCT541G-P20-R	TSSOP-20	Tape Reel

<p>U74HCT541G-D20-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) D20: DIP-20, P20: TSSOP-20 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING

DIP-20	TSSOP-20
<p>20 19 18 17 16 15 14 13 12 11            UTC □□□□ → Date Code            L: Lead Free            U74HCT541 □ → G: Halogen Free            □□ → Lot Code            1 2 3 4 5 6 7 8 9 10</p>	<p>20 19 18 17 16 15 14 13 12 11            UTC □□□□ → Date Code            L: Lead Free            U74HCT541 □ → G: Halogen Free            □□ → Lot Code            1 2 3 4 5 6 7 8 9 10</p>

■ PIN CONFIGURATION



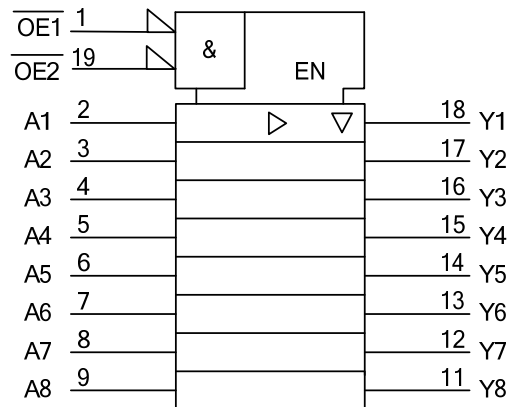
■ FUNCTION TABLE

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

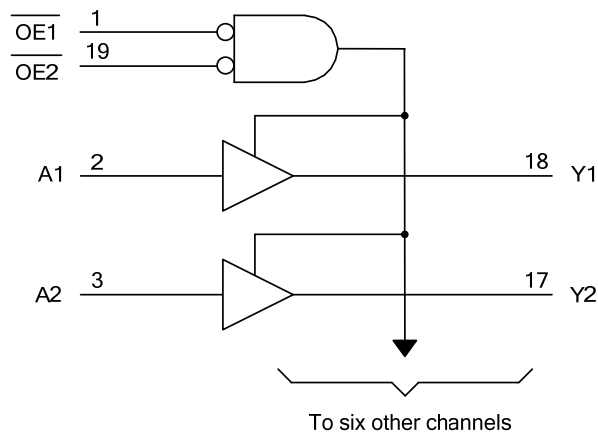
Note: H: HIGH Voltage Level L: LOW Voltage Level Z: High Impedance X: Don' Care

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■ LOGIC SYMBOL



■ LOGIC DIAGRAM



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### ■ ABSOLUTE MAXIMUM RATING

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

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-20	69	°C/W
	TSSOP-20	83	°C/W

### ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		4.5	5	5.5	V
High-level Input Voltage	$V_{IH}$	$V_{CC}=4.5V\sim 5.5V$	2			V
Low-level Input Voltage	$V_{IL}$	$V_{CC}=4.5V\sim 5.5V$			0.8	V
Input Voltage	$V_{IN}$		0		$V_{CC}$	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
Input transition Rise or Fall rate	$\Delta t/\Delta v$				500	ns

### ■ ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	$V_{OH}$	$V_{CC}=4.5V, V_I=V_{IH}$ or $V_{IL}, I_{OH}=-20\mu A$	4.4	4.499		V
		$V_{CC}=5.5V, V_I=V_{IH}$ or $V_{IL}, I_{OH}=-20\mu A$	5.4	5.499		
		$V_{CC}=4.5V, V_I=V_{IH}$ or $V_{IL}, I_{OH}=-6mA$	3.98	4.3		
Output Voltage Low-Level	$V_{OL}$	$V_{CC}=4.5V, V_I=V_{IH}$ or $V_{IL}, I_{OL}=20\mu A$		0.001	0.1	V
		$V_{CC}=5.5V, V_I=V_{IH}$ or $V_{IL}, I_{OL}=20\mu A$		0.001	0.1	
		$V_{CC}=4.5V, V_I=V_{IH}$ or $V_{IL}, I_{OL}=6mA$		0.17	0.26	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND		±0.1	±100	nA
3-state Output Off-state Current	$I_{OZ}$	$V_{CC}=5.5V, V_{OUT}=V_{CC}$ or GND, $V_I=V_{IH}$ or $V_{IL}$		±0.01	±0.5	µA
Quiescent Supply Current	$I_{CC}$	$V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			4	µA
Additional Quiescent Device Current Per Input Pin	$\Delta I_{CC}$	$V_{CC}=5.5V$ , One input at 0.5V or 2.4V Other inputs at 0 or $V_{CC}$		1.4	2.4	mA
Input Capacitance	$C_I$	$V_{CC}=4.5V\sim 5.5V$		3	10	pF

### ■ SWITCHING CHARACTERISTICS ( $C_L=50pF, T_A=25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
From A to Y	$t_{PLH}/t_{PHL}$	$V_{CC}=4.5V$		13	23	ns
		$V_{CC}=5.5V$		13	21	
From $\overline{OE}$ to Y	$t_{PZL}/t_{PZH}$	$V_{CC}=4.5V$		21	30	ns
		$V_{CC}=5.5V$		19	27	
From $\overline{OE}$ to Y	$t_{PLZ}/t_{PHZ}$	$V_{CC}=4.5V$		19	30	ns
		$V_{CC}=5.5V$		18	27	

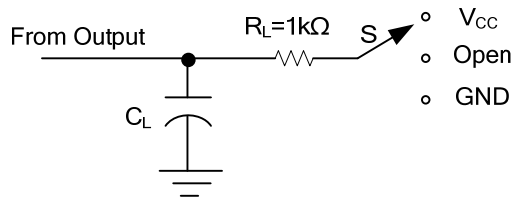
■ SWITCHING CHARACTERISTICS ( $C_L=150\text{pF}$ ,  $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Y	$t_t$	$V_{CC}=4.5\text{V}$		8	12	ns
		$V_{CC}=5.5\text{V}$		7	11	
From A to Y	$t_{PLH}/t_{PHL}$	$V_{CC}=4.5\text{V}$		20	33	ns
		$V_{CC}=5.5\text{V}$		19	30	
From $\overline{\text{OE}}$ to Y	$t_{PZL}/t_{PZH}$	$V_{CC}=4.5\text{V}$		26	40	ns
		$V_{CC}=5.5\text{V}$		25	36	
Y	$t_t$	$V_{CC}=4.5\text{V}$		17	42	ns
		$V_{CC}=5.5\text{V}$		14	38	

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

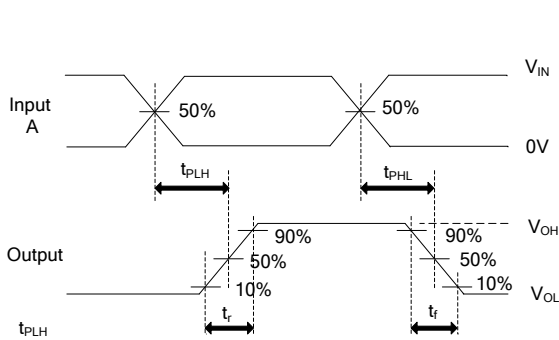
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance Per buffer/driver	$C_{PD}$	No Load		35		pF

## ■ TEST CIRCUIT AND WAVEFORMS

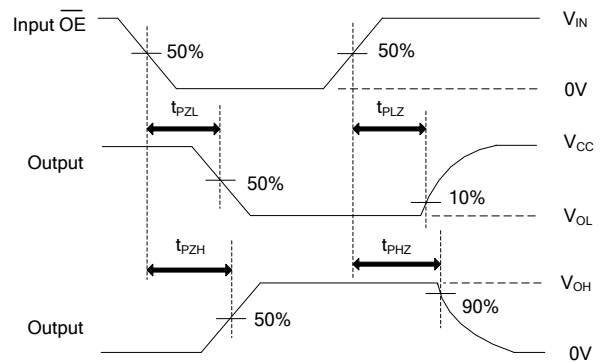


TEST	S
$t_{PLH}/t_{PHL}$	Open
$t_{PHZ}/t_{PZH}$	GND
$t_{PLZ}/t_{PZL}$	$V_{CC}$

TEST CIRCUIT



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

- Notes: 1.  $C_L$  includes probe and test-fixture capacitance.  
 2. All input pulses are supplied by generators having the following characteristics: PRR  $\leq 1\text{MHz}$ ,  $Z_o=50\Omega$ ,  $t_r=6\text{ns}$ ,  $t_f=6\text{ns}$ .

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