



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.

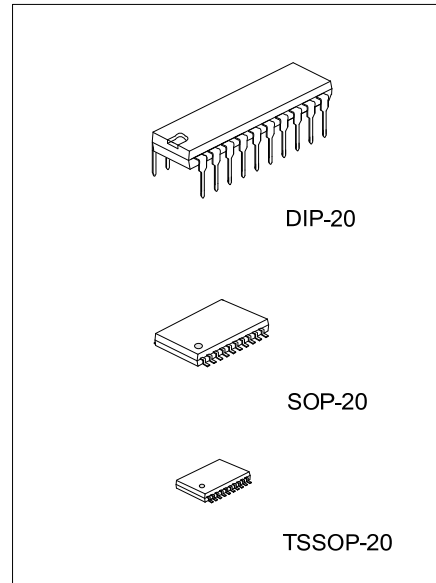
The 3-state control gate is a 2-input NOR. If either output-enable ($\overline{OE1}$ or $\overline{OE2}$) input is high, all eight outputs are in the high-impedance state. The **U74HCT541** devices provide true data at the outputs.

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 μ A (Max.)
- * Typical t_{pd} =13ns
- * ± 6 mA Output Drive at 5V
- * Low Input Current of 1uA 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-S20-R	U74HCT541G-S20-R	SOP-20	Tape Reel
U74HCT541L-P20-R	U74HCT541G-P20-R	TSSOP-20	Tape Reel

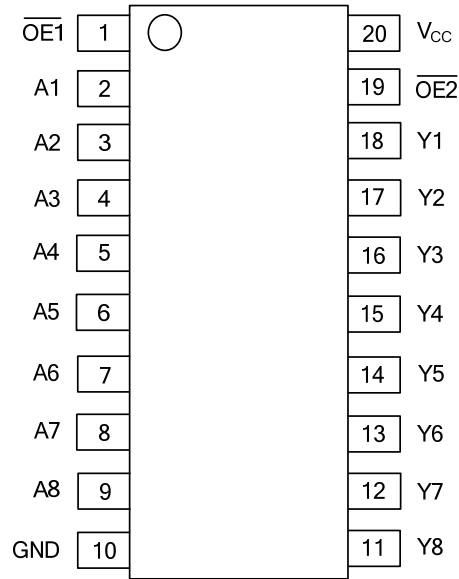


<p>U74HCT541G-D20-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) D20: DIP-20, S20: SOP-20, P20: TSSOP-20 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

DIP-20	SOP-20 / TSSOP-20
<p>UTC □□□□ → Date Code L: Lead Free U74HCT541 □ → G: Halogen Free □□ → Lot Code</p>	<p>UTC □□□□ → Date Code L: Lead Free U74HCT541 □ → G: Halogen Free □□ → Lot Code</p>

■ PIN CONFIGURATION

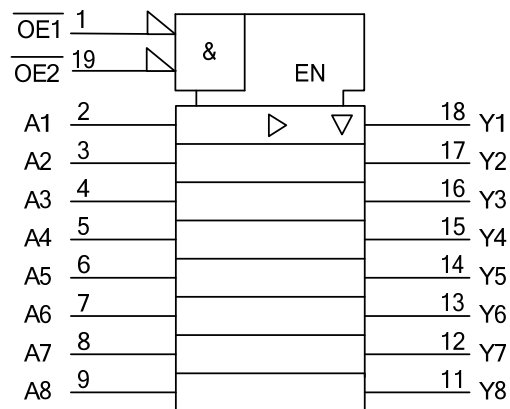


■ FUNCTION TABLE

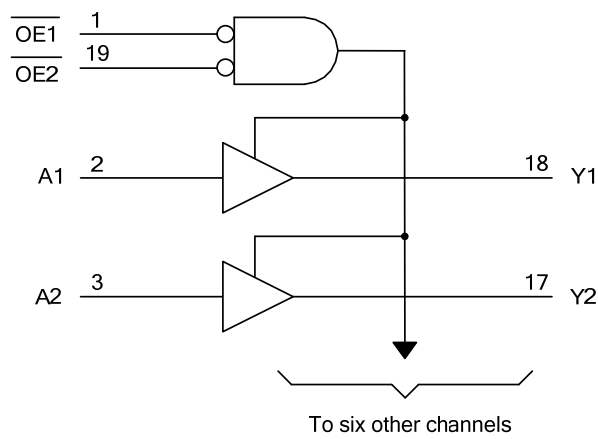
INPUTS($\overline{OE1}$)	INPUTS($\overline{OE2}$)	INPUTS(A)	OUTPUT(Y)
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z

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

■ LOGIC SYMBOL



■ LOGIC DIAGRAM



■ 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
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
	SOP-20	58	°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
Operating Temperature	T_A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, 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	ΔI_{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 ($C_L=50\text{pF}$, $T_A=25^\circ\text{C}$, unless otherwise specified)

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

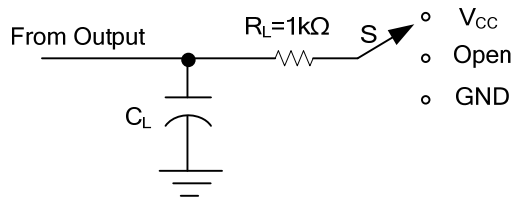
■ SWITCHING CHARACTERISTICS ($C_L=150\text{pF}$, $T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from Input (Y)	t_t	$V_{CC}=4.5\text{V}$		8	12	ns
		$V_{CC}=5.5\text{V}$		7	11	
Propagation delay from Input (A) to Output (Y)	t_{PLH}/t_{PHL}	$V_{CC}=4.5\text{V}$		20	33	ns
		$V_{CC}=5.5\text{V}$		19	30	
Propagation delay from Input $\overline{\text{OE}}$ to Output (Y)	t_{PZL}/t_{PZH}	$V_{CC}=4.5\text{V}$		26	40	ns
		$V_{CC}=5.5\text{V}$		25	36	
Propagation delay from Input (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)

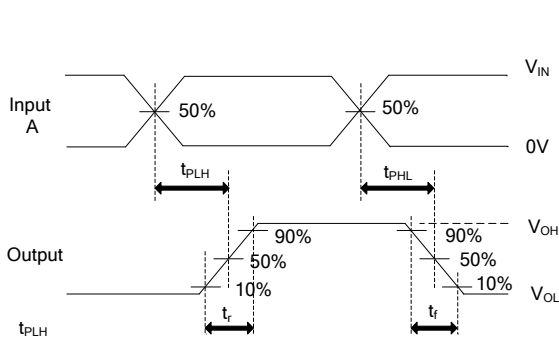
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance Per buffer/driver	C_{PD}	No Load		35		pF

■ TEST CIRCUIT AND WAVEFORMS

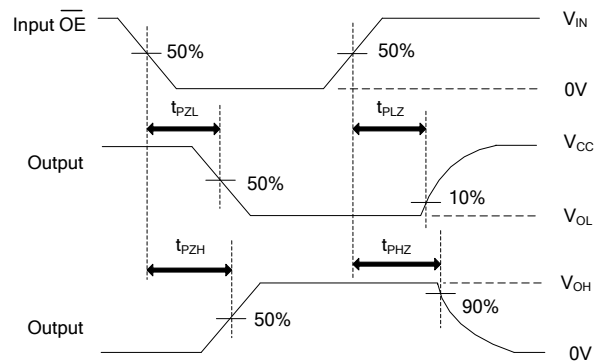


TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	V_{CC}

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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