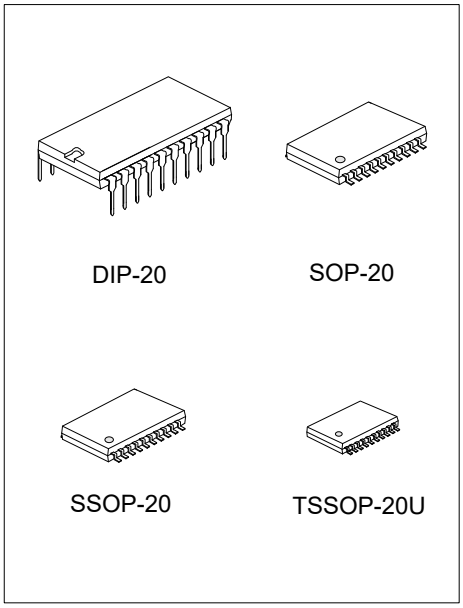
U74AHC541

CMOS IC

OCTAL BUFFERS/DRIVERS WITH 3-STATE OUTPUTS



■ DESCRIPTION

The **U74AHC541** is a octal buffers/drivers with 3-state outputs and 8 channels.

The 3-state control gate is a two-input AND gate with active-low inputs so that if either output-enable ($\overline{OE1}$ or $\overline{OE2}$) input is high, all corresponding outputs are in the high-impedance state. The outputs provide noninverted data when they are not in the high-impedance state.

To ensure the high-impedance sate during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

■ FEATURES

* Operate from 2V to 5.5V
* Balanced propagation delays
* Inputs accepts voltages higher than V_{CC}

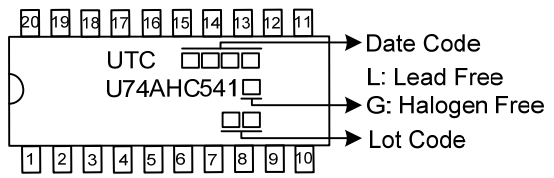
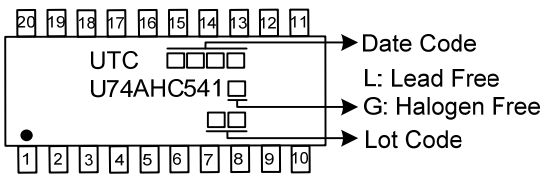
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC541L-D20-T	U74AHC541G-D20-T	DIP-20	Tube
U74AHC541L-S20-R	U74AHC541G-S20-R	SOP-20	Tape Reel
U74AHC541L-R20-R	U74AHC541G-R20-R	SSOP-20	Tape Reel
U74AHC541L-ULA-R	U74AHC541G-ULA-R	TSSOP-20U	Tape Reel

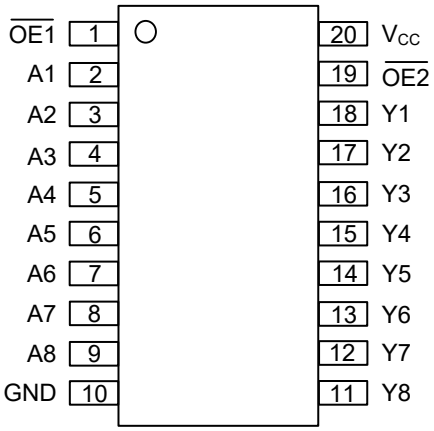
U74AHC541G-D20-T
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) D20: DIP-20, S20: SOP-20, R20: SSOP-20
ULA: TSSOP-20U
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

DIP-20	SOP-20 / SSOP-20 / TSSOP-20U
	

■ PIN CONFIGURATION

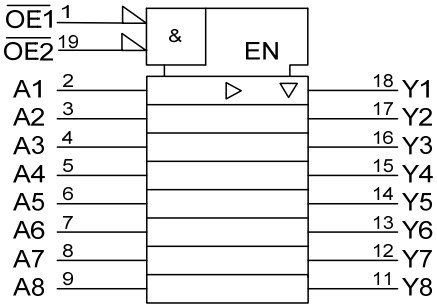


■ FUNCTION TABLE

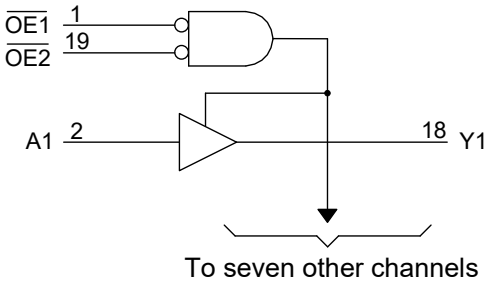
INPUTS $\overline{OE1}$	INPUTS $\overline{OE2}$	INPUTS(A)	OUTPUT(Y)
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z

H = High voltage level；L = Low voltage level；X = Don't care

■ LOGIC SYMBOL



■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ 7	V
Input Voltage	V_{IN}	V_{OUT}<0 or V_{OUT}>V_{CC}	-0.5 ~ 7	V
Output Voltage	V_{OUT}		-0.5 ~ V_{CC}+0.5	V
Continuous current through V_{CC} or GND	I_{CC}		±75	mA
Continuous Output Current	I_{OUT}	V_{OUT} <0 or V_{CC}	±25	mA
Input Clamp Current	I_{IK}	V_{IN}<0	-20	mA
Output Clamp Current	I_{OK}	V_{OUT}<0 or V_{OUT}>V_{CC}	±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.

■ RECOMMENDED OPERATING COMDITIONS

PARAMETER	SYMBOL	CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Supply Voltage	V_{CC}		2		5.5	2		5.5	V
High-Level Input Voltage	V_{IH}	V_{CC}=2V	1.5			1.5			V
		V_{CC}=3V	2.1			2.1			
		V_{CC}=5.5V	3.85			3.85			
Low-Level Input Voltage	V_{IL}	V_{CC}=2V			0.5			0.5	V
		V_{CC}=3V			0.9			0.9	
		V_{CC}=5.5V			1.65			1.65	
Input Voltage	V_{IN}		0		5.5	0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	0		Vcc	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	V_{CC}=3.3V±0.3V			100			100	ns/V
		V_{CC}=5V±0.5V			20			20	
Operating Temperature	T_A		-40		+125	-40		+125	°C

Note: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-20	θ_{JA}	90	°C/W
	SOP-20		115	°C/W
	SSOP-20		130	°C/W
	TSSOP-20U		135	°C/W

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Output Voltage	V_{OH}	V_{CC}=2V, I_{OH}=-50μA	1.9			1.9			V
		V_{CC}=3V, I_{OH}=-50μA	2.9			2.9			V
		V_{CC}=4.5V, I_{OH}=-50μA	4.4			4.4			V
		V_{CC}=3V, I_{OH}=-4mA	2.58			2.40			V
		V_{CC}=4.5V, I_{OH}=-8mA	3.94			3.70			V
Low-Level Output Voltage	V_{OL}	V_{CC}=2V, I_{OL}=50μA			0.1			0.1	V
		V_{CC}=3V, I_{OL}=50μA			0.1			0.1	V
		V_{CC}=4.5V, I_{OL}=50μA			0.1			0.1	V
		V_{CC}=3V, I_{OL}=4mA			0.36			0.55	V
		V_{CC}=4.5V, I_{OL}=8mA			0.36			0.55	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0~5.5V, V_{IN}=5.5V or GND			±0.1			±2.0	uA
Output Off-state Current	I_{OZ}	V_{CC}=5.5V, V_{IN}($\overline{OE}$)=V_{IL} or V_{IH}, V_{OUT}=V_{CC} or GND			±0.25			±10	μA
Quiescent Supply Current	I_Q	V_{CC}=5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0A			4			80	μA

■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		T_A=25°C			T_A=-40~+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A) to output (Y)	t_{PLH} / t_{PHL}	V_{CC}=3.3V±0.3V	C_L=15pF		5.0	8.0	1.0		9.0	ns
			C_L=50pF		7.5	11.5	1.0		13.5	ns
		V_{CC}=5V±0.5V	C_L=15pF		3.5	5.0	1.0		6.5	ns
			C_L=50pF		5.0	8.0	1.0		9.0	ns
Propagation delay from input ($\overline{OE}$) to output (Y)	t_{PZL} / t_{PZH}	V_{CC}=3.3V±0.3V	C_L=15pF		6.0	11.5	1.0		13.5	ns
			C_L=50pF		8.0	14	1.0		17.5	ns
		V_{CC}=5V±0.5V	C_L=15pF		4.7	7.2	1.0		9.0	ns
			C_L=50pF		6.2	9.2	1.0		11.5	ns
Output Disable Time From (A) to output (Y)	t_{PLZ} / t_{PHZ}	V_{CC}=3.3V±0.3V	C_L=15pF		7.0	11	1.0		14	ns
			C_L=50pF		9.0	15.5	1.0		19.5	ns
		V_{CC}=5V±0.5V	C_L=15pF		5.0	7.5	1.0		9.5	ns
			C_L=50pF		6.0	8.8	1.0		11	ns
Output Skew Time	$t_{SK(O)}$	V_{CC}=3.3V±0.3V	C_L=50pF			1.5			1.5	ns
		V_{CC}=5V±0.5V				1.0			1.0	ns

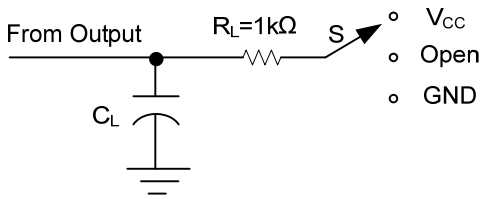
■ SWITCHING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Quiet output, maximum dynamic V_{OL}	$V_{OL(P)}$				0.8	V
Quiet output, minimum dynamic V_{OL}	$V_{OL(V)}$				-0.8	V
Quiet output, minimum dynamic V_{OH}	$V_{OH(V)}$		4.7			V
High-level dynamic input voltage	$V_{IH(D)}$		3.5			V
Low-level dynamic input voltage	$V_{IL(D)}$				1.5	V

■ OPERATING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C_{IN}	V_{CC}=5.5V, V_{IN}=V_{CC} or GND		2	10	pF
Output Capacitance	C_{OUT}	V_{CC}=5.5V, V_{OUT}=V_{CC} or GND		4		pF
Power Dissipation Capacitance per flip-flop	C_{PD}	V_{CC}=5V, f=1MHz, No load.		12		pF

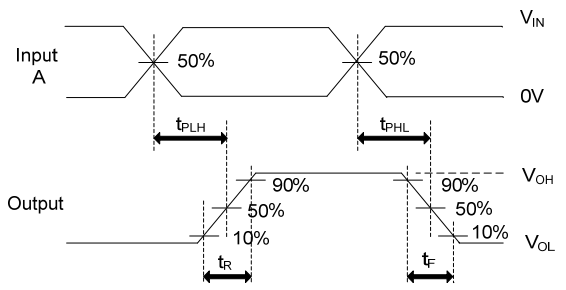
■ TEST CIRCUIT AND WAVEFORMS



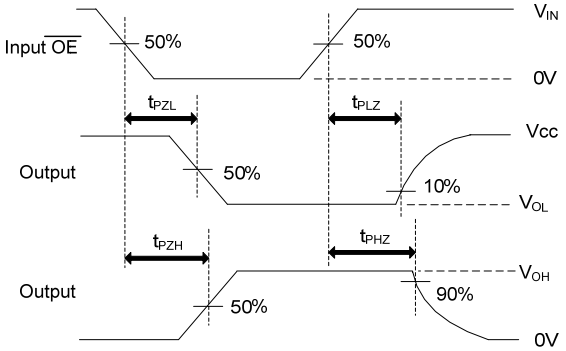
TEST CIRCUIT

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

Parameter		R_L	C_L
t_{en}	t_{PZH} t_{PZL}	1KΩ	15 pF or 50 pF
t_{dis}	t_{PZH} t_{PZL}	1KΩ	15 pF or 50 pF
t_{PD} or t_t			15 pF or 50 pF



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: PRR ≤1MHz, Z_O = 50Ω,