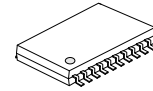


**U74LVC541****CMOS IC****OCTAL BUFFERS/DRIVERS
WITH 3-STATE OUTPUTS****DESCRIPTION**

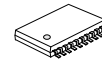
The **U74LVC541** octal buffer/driver is designed for 1.65V to 3.6V V_{CC} operation.

FEATURES

- * Operate From 1.65V to 3.6V
- * Inputs Accept Voltages to 5.5V
- * Max tpd of 5.1 ns at 3.3V
- * I_{off} Supports Partial-Power-Down Mode Operation



SOP-20

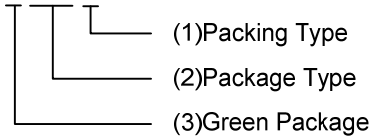


TSSOP-20U

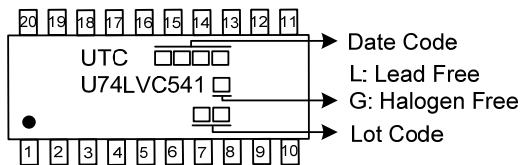
ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC541L-S20-R	U74LVC541G-S20-R	SOP-20	Tape Reel
U74LVC541L-ULA-R	U74LVC541G-ULA-R	TSSOP-20U	Tape Reel

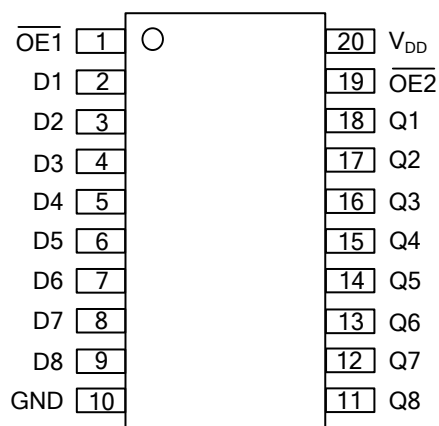
U74LVC541G-S20-R



- (1) R: Tape Reel
- (2) S20: SOP-20, ULA: TSSOP-20U
- (3) G: Halogen Free and Lead Free, L: Lead Free

MARKING

PIN CONFIGURATION

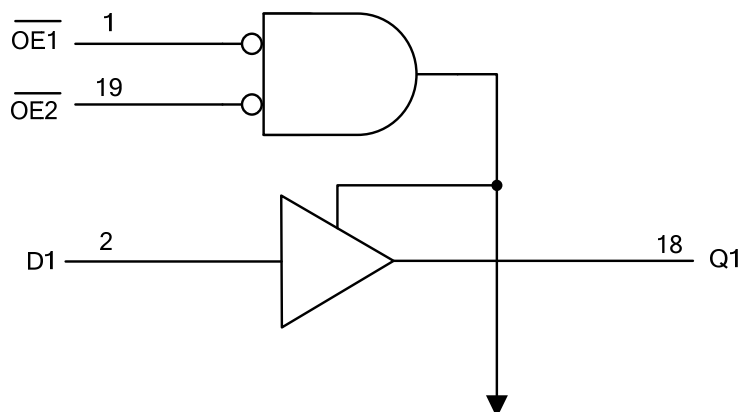


FUNCTION TABLE

INPUTS			OUTPUT
$\overline{OE1}$	$\overline{OE2}$	D	Q
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 ; Z= high impedance OFF-state

LOGIC SYMBOL



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +6.5	V
Input Voltage (Note 2)	V_{IN}		-0.5 ~ +6.5	V
Output Voltage	V_{OUT}	Output in the high or low state	-0.5 ~ $V_{CC}+0.5$	V
Continuous V_{CC} or GND Current	I_{CC}		±100	mA
Continuous Output Current	I_{OUT}		±50	mA
Input Clamp Current	I_{IK}	$V_{IN} < 0V$	-50	mA
Output Clamp Current	I_{OK}	$V_{OUT} < 0V$	-50	mA
Storage Temperature Range	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 CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		3.6	V
		Data Retention Only	1.5			V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}	High or Low State	0		V_{CC}	V
		3-State	0		5.5	V
Operating Temperature	T_A		-40		+125	°C

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note 1)	MAX	UNIT
High-level Input Voltage	V_{IH}	$V_{CC}=1.8V \pm 0.15V$	$0.65 \times V_{CC}$			V
		$V_{CC}=2.5V \pm 0.2V$	1.7			V
		$V_{CC}=3.3V \pm 0.3V$	2.0			V
Low-level Input Voltage	V_{IL}	$V_{CC}=1.8V \pm 0.15V$			$0.35 \times V_{CC}$	V
		$V_{CC}=2.5V \pm 0.2V$			0.7	V
		$V_{CC}=3.3V \pm 0.3V$			0.8	V
High-Level Output Voltage	V_{OH}	$V_{CC}=1.65V \sim 3.6V$, $I_{OH}=-100\mu A$	$V_{CC}-0.2$			V
		$V_{CC}=1.65V$, $I_{OH}=-4mA$	1.20			V
		$V_{CC}=2.3V$, $I_{OH}=-8mA$	1.7			V
		$V_{CC}=2.7V$, $I_{OH}=-12mA$	2.2			V
		$V_{CC}=3.0V$, $I_{OH}=-12mA$	2.4			V
		$V_{CC}=3.0V$, $I_{OH}=-24mA$	2.2			V
Low-Level Output Voltage	V_{OL}	$V_{CC}=1.65V \sim 3.6V$, $I_{OL}=100\mu A$			0.2	V
		$V_{CC}=1.65V$, $I_{OL}=4mA$			0.45	V
		$V_{CC}=2.3V$, $I_{OL}=8mA$			0.7	V
		$V_{CC}=2.7V$, $I_{OL}=12mA$			0.4	V
		$V_{CC}=3.0V$, $I_{OL}=24mA$			0.55	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=3.6V$, $V_{IN}=0 \sim 5.5V$ or GND			±5	μA
Power OFF Leakage Current	I_{OFF}	$V_{CC}=0V$, V_{IN} or $V_{OUT}=5.5V$			±10	μA
Output OFF-State Current	I_{OZ}	$V_{CC}=3.6V$, $V_{OUT}=0$ or $5.5V$			±10	μA
Quiescent Supply Current	I_{CC}	$V_{CC}=3.6V$, $V_{IN}=V_{CC}$ or GND, $I_{OUT}=0A$			10	μA
		$3.6V \leq V_{I} \leq 5.5V$, $I_{OUT}=0A$ (Note 2)			10	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	$V_{CC}=2.7V \sim 3.6V$, One Input at $V_{CC}-0.6V$, Other Inputs at V_{CC} or GND			500	μA

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note 1)	MAX	UNIT
Input Capacitance	C_I	$V_{CC}=3.3V$, $V_{IN}=V_{CC}$ or GND		4		pF
Output Capacitance	C_O	$V_{CC}=3.3V$, $V_{OUT}=V_{CC}$ or GND		5.5		pF

Notes: 1. All typical values are at $V_{CC}=3.3V$, $T_A=25^\circ C$.

2. This applies in the disabled state only.

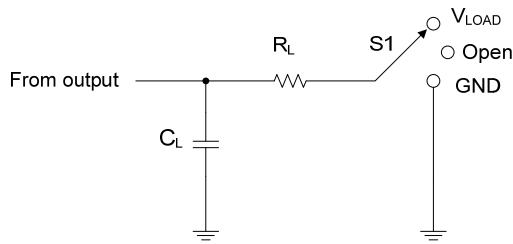
■ SWITCHING CHARACTERISTICS ($T_A=25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (Dn) to output(Qn)	t_{PD}	$V_{CC}=1.8V\pm0.15V$	1.0		15.7	ns
		$V_{CC}=2.5V\pm0.2V$	1.0		7.8	ns
		$V_{CC}=2.7V$	1.0		5.6	ns
		$V_{CC}=3.3V\pm0.3V$	1.5		5.1	ns
Propagation delay from input (OE) to output(Qn)	t_{en}	$V_{CC}=1.8V\pm0.15V$	1.0		17.5	ns
		$V_{CC}=2.5V\pm0.2V$	1.0		10.5	ns
		$V_{CC}=2.7V$	1.0		7.5	ns
		$V_{CC}=3.3V\pm0.3V$	1.5		7.0	ns
Propagation delay from input (OE) to output(Qn)	t_{dis}	$V_{CC}=1.8V\pm0.15V$	1.0		16.5	ns
		$V_{CC}=2.5V\pm0.2V$	1.0		9.0	ns
		$V_{CC}=2.7V$	1.0		7.7	ns
		$V_{CC}=3.3V\pm0.3V$	1.5		7.0	ns
Propagation delay	$t_{SK(O)}$	$V_{CC}=3.3V\pm0.3V$			1.0	ns

■ OPERATING CHARACTERISTICS ($f=10MHz$, $T_A=25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	Outputs enabled	$V_{CC}=1.8V\pm0.15V$		65		pF
		$V_{CC}=2.5V\pm0.2V$		58		pF
		$V_{CC}=3.3V\pm0.3V$		33		pF
	Outputs disabled	$V_{CC}=1.8V\pm0.15V$		2		pF
		$V_{CC}=2.5V\pm0.2V$		2		pF
		$V_{CC}=3.3V\pm0.3V$		2		pF

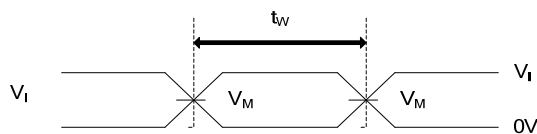
■ TEST CIRCUIT AND WAVEFORMS



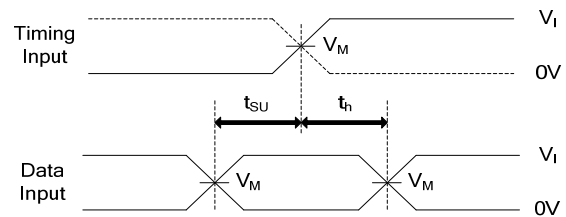
Test Circuit

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

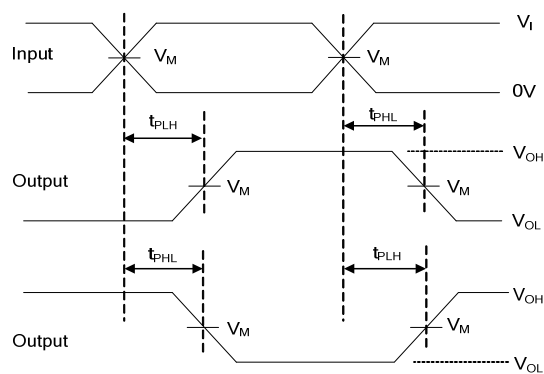
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_{IN}	t_R/t_F					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1K Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω	0.15V
2.7V	2.7V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω	0.3V
$3.3V \pm 0.3V$	2.7V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω	0.3V



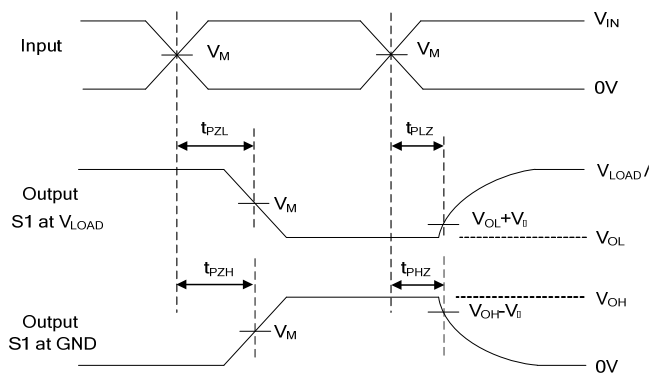
VOLTAGE WAVEFORMS PULSE DURATION



VOLTAGE WAVEFORMS SETUP AND HOLD TIMES



Voltage Waveforms Propagation Delay Times



Voltage Waveforms 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: $PRR \leq 10MHz$, $Z_0 = 50\Omega$.

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.