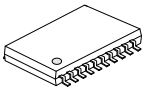
U74LVC541

CMOS IC

OCTAL BUFFERS/DRIVERS WITH 3-STATE OUTPUTS



SOP-20

TSSOP-20

■ 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

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC541L-S20-R	U74LVC541G-S20-R	SOP-20	Tape Reel
U74LVC541L-P20-R	U74LVC541G-P20-R	TSSOP-20	Tape Reel

U74LVC541G-S20-R

(1)Packing Type

(2)Package Type

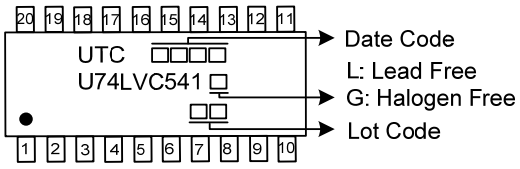
(3)Green Package

(1) R: Tape Reel

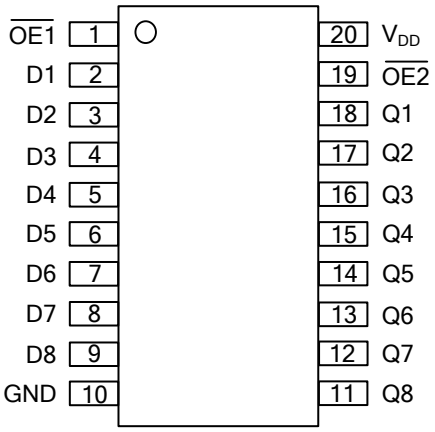
(2) R20: SSOP-20, P20: TSSOP-20

(3) G: Halogen Free and Lead Free

■ MARKING



■ PIN CONFIGURATION

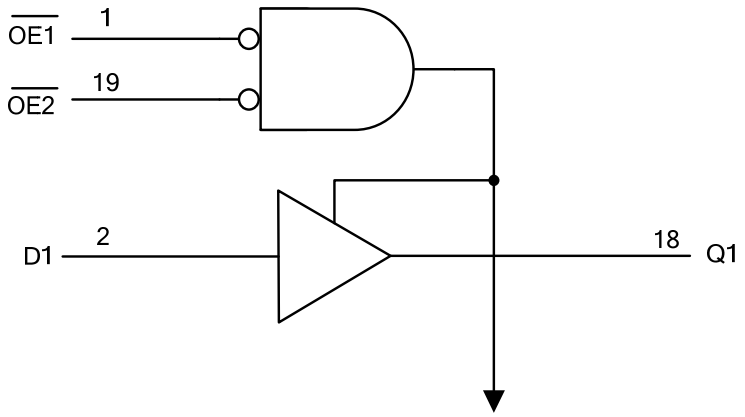


■ FUNCTION TABLE

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°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note 1)	MAX	UNIT
High-level Input Voltage	V_{IH}	V_{CC}=1.8V±0.15V	0.65×V_{CC}			V
		V_{CC}=2.5V±0.2V	1.7			V
		V_{CC}=3.3V±0.3V	2.0			V
Low-level Input Voltage	V_{IL}	V_{CC}=1.8V±0.15V			0.35×V_{CC}	V
		V_{CC}=2.5V±0.2V			0.7	V
		V_{CC}=3.3V±0.3V			0.8	V
High-Level Output Voltage	V_{OH}	V_{CC}=1.65V ~ 3.6V, I_{OH}=-100μA	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 ~ 3.6V, I_{OL}=100μA			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 ~ 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≤V_I≤5.5V, I_{OUT}=0A (Note 2)			10	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	V_{CC}=2.7V~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°C.
2. This applies in the disabled state only.

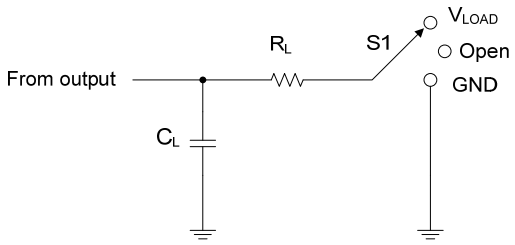
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (Dn) to output(Qn)	t_{PD}	V_{CC}=1.8V±0.15V	1.0		15.7	ns
		V_{CC}=2.5V±0.2V	1.0		7.8	ns
		V_{CC}=2.7V	1.0		5.6	ns
		V_{CC}=3.3V±0.3V	1.5		5.1	ns
Propagation delay from input ($\overline{OE}$) to output(Qn)	t_{en}	V_{CC}=1.8V±0.15V	1.0		17.5	ns
		V_{CC}=2.5V±0.2V	1.0		10.5	ns
		V_{CC}=2.7V	1.0		7.5	ns
		V_{CC}=3.3V±0.3V	1.5		7.0	ns
Propagation delay from input ($\overline{OE}$) to output(Qn)	t_{dis}	V_{CC}=1.8V±0.15V	1.0		16.5	ns
		V_{CC}=2.5V±0.2V	1.0		9.0	ns
		V_{CC}=2.7V	1.0		7.7	ns
		V_{CC}=3.3V±0.3V	1.5		7.0	ns
Propagation delay	$t_{SK(O)}$	V_{CC}=3.3V±0.3V			1.0	ns

■ OPERATING CHARACTERISTICS (f=10MHz, T_A =25°C , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	Outputs enabled	C_{PD}	V_{CC}=1.8V±0.15V		65		pF
			V_{CC}=2.5V±0.2V		58		pF
			V_{CC}=3.3V±0.3V		33		pF
	Outputs disabled		V_{CC}=1.8V±0.15V		2		pF
			V_{CC}=2.5V±0.2V		2		pF
			V_{CC}=3.3V±0.3V		2		pF

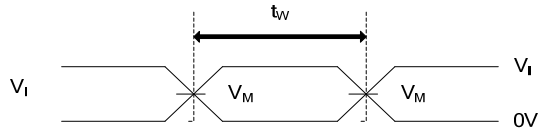
■ TEST CIRCUIT AND WAVEFORMS



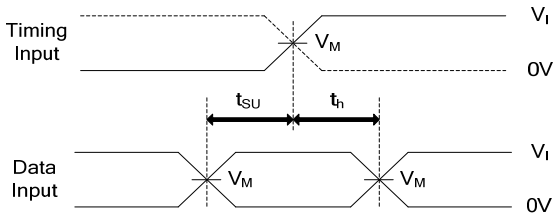
Test Circuit

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

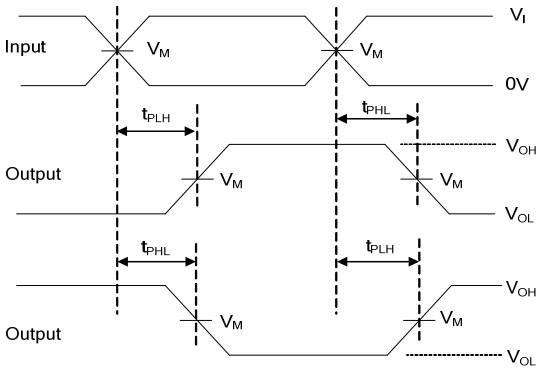
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_{IN}	t_R/t_F					
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	30pF	1KΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	30pF	500Ω	0.15V
2.7V	2.7V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
3.3V±0.3V	2.7V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V



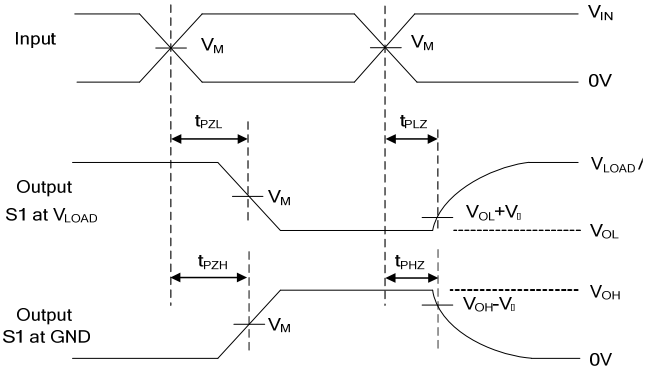
VOLTAGE WAVEFORMS PULSE DURATION



VOLTAGE WAVEFORMS SETUP AND HOLD TIMES



Voltage Waveforms Propagation Delay Times



Voltage Waveforms Enble 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 ≤10MHz, Z_O = 50Ω.