



# U74LVC241

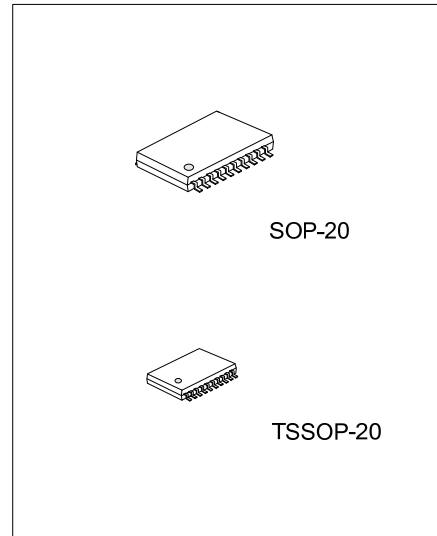
**CMOS IC**

## OCTAL BUFFER/DRIVER WITH 3-STATE OUTPUTS

### DESCRIPTION

The **U74LVC241** contains two 4-bit line drivers with separate output-enable(1 OE /2OE) inputs. When (1 OE /2OE) is low and high, the device passes data from the A to the Y. When(1 OE /2OE) is high and low, the outputs are in the high-impedance state.

The **U74LVC241** can be used in a mixed 3.3V/5V system environment. This device has power-down protective circuit, preventing device destruction when it is powered down.



### FEATURES

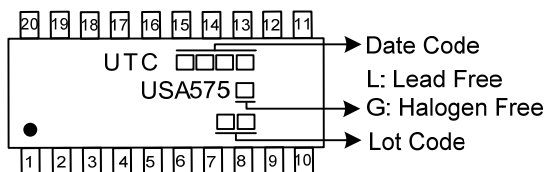
- \* Operate From 1.65V to 3.6V
- \* Input Accept Voltages to 5.5V
- \* Partial-Power-Down Mode Operation
- \* Max tpd is 6.1ns at 3.3V

### ORDERING INFORMATION

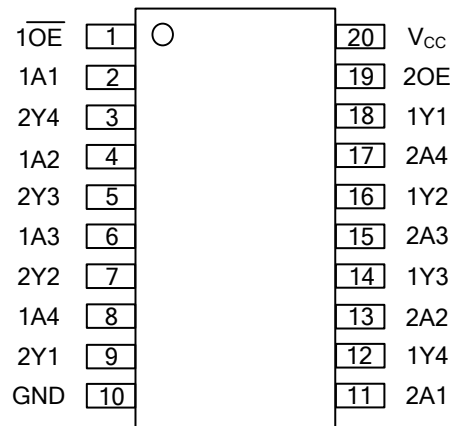
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC241L-S20-R	U74LVC241G-S20-R	SOP-20	Tape Reel
U74LVC241L-P20-R	U74LVC241G-P20-R	TSSOP-20	Tape Reel

<p>U74LVC241G-R20-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) R20: SSOP-20, P20: TSSOP-20</p> <p>(3) G: Halogen Free and Lead Free</p>
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### MARKING



■ PIN CONFIGURATION

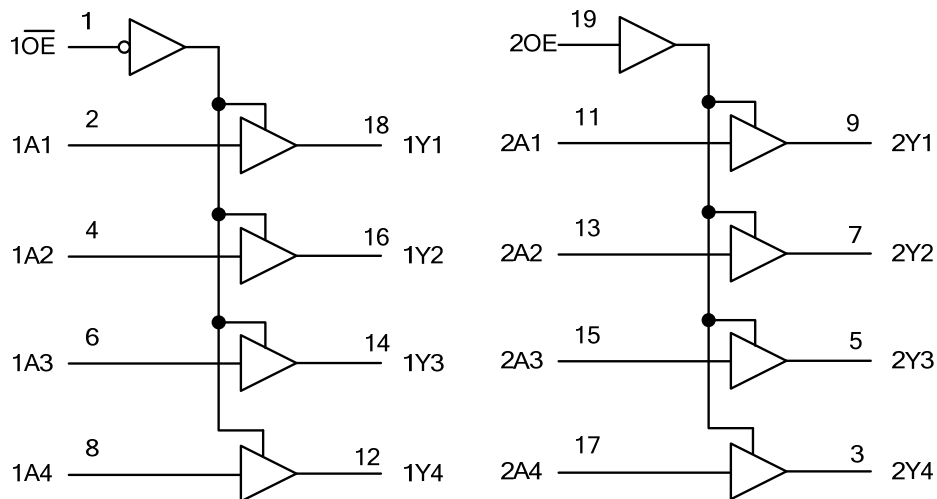


■ FUNCTION TABLE (each gate)

INPUT				OUTPUT	
$\overline{1OE}$	1An	2OE	2An	1Yn	2Yn
L	L	H	L	L	L
L	H	H	H	H	H
H	X	L	X	Z	Z

H = High voltage level ; L = Low voltage level  
 X = Don't care ; Z = High-impedance OFF-state

■ LOGIC DIAGRAM (Positive Logic)



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	$V_{CC}$		-0.5 ~ +6.5	V
Input Voltage	$V_{IN}$		-0.5 ~ +6.5	V
Output Voltage	$V_{OUT}$	Output in the high or low state	-0.5 ~ $V_{CC} + 0.5$	V
		Output in the power-off state	-0.5 ~ +6.5	V
Continuous $V_{CC}$ or GND Current	$I_{CC}$		±100	mA
Continuous Output Current	$I_{OUT}$	$V_{OUT}=0V \sim V_{CC}$	±50	mA
Input Clamp Current	$I_{IK}$	$V_{IN}<0V$	-50	mA
Output Clamp Current	$I_{OK}$	$V_{OUT}>V_{CC}$ or $V_{OUT}<0V$	-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	1.2			V
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$	High or low state	0		$V_{CC}$	V
		Power-off state	0		5.5	V
Operating Temperature	$T_A$		-40		85	°C
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=1.65V \sim 2.7V$	0		20	ns/V
		$V_{CC}=2.7V \sim 3.6V$	0		10	ns/V

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	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			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	$V_{OH}$	$V_{CC}=1.65 \sim 3.6V, I_{OH}=-100\mu A$	$V_{CC}-0.2$			V
		$V_{CC}=1.65V, I_{OH}=-4mA$	1.2			V
		$V_{CC}=2.3V, I_{OH}=-8mA$	1.7			V
		$V_{CC}=2.7V, I_{OH}=-12mA$	2.2			V
		$V_{CC}=3.0V$				
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=1.65 \sim 3.6V, I_{OH}=100\mu A$			0.2	V
		$V_{CC}=1.65V, I_{OH}=4mA$			0.45	V
		$V_{CC}=2.3V, I_{OH}=8mA$			0.7	V
		$V_{CC}=2.7V, I_{OH}=12mA$			0.4	V
		$V_{CC}=3.0V, I_{OH}=24mA$			0.55	V

### ■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=3.6V, V_{IN}=5.5V$ or GND		$\pm 0.1$	$\pm 5$	$\mu A$
Power OFF Leakage Current	$I_{off}$	$V_{CC}=0V, V_{IN}$ or $V_{OUT}=5.5V$		0.1	$\pm 10$	$\mu A$
OFF-state output current	$I_{OZ}$	$V_{CC}=3.6V, V_{IN} = V_{IH}$ or $V_{IL}, V_{OUT}=5.5V$ or GND		0.1	$\pm 10$	$\mu A$
Quiescent Supply Current	$I_{CC}$	$V_{CC}=2.7 \sim 3.6V, V_{IN}=V_{CC} - 0.6V, I_{OUT}=0A$		0.1	10	$\mu A$
Additional Quiescent Supply Current Per Input Pin	$\Delta I_{CC}$	$V_{CC}=3 \sim 5.5V$ , One input at $V_{CC}-0.6V$ , Other inputs at $V_{CC}$ or GND		5	500	$\mu A$
Input Capacitance	$C_I$	$V_{CC}=0 \sim 3.6V, V_{IN}=GND$ to $V_{CC}$		5.0		pF

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

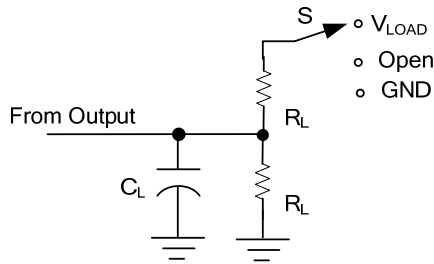
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (An) to output(Yn)	$t_{PD}$	$V_{CC}=1.8V \pm 0.15V$	1.5	5.9	14.1	ns
		$V_{CC}=2.5V \pm 0.2V$	1.0	3.2	7.3	ns
		$V_{CC}=2.7V$	1.5	3.2	7.1	ns
		$V_{CC}=3.3V \pm 0.3V$	1.5	2.7	6.1	ns
Propagation delay from input (1 $\overline{OE}$ ) to output(1Yn)	$t_{en}$	$V_{CC}=1.8V \pm 0.15V$	1.5	6.6	16.2	ns
		$V_{CC}=2.5V \pm 0.2V$	1.5	3.7	8.9	ns
		$V_{CC}=2.7V$	1.5	3.8	8.1	ns
		$V_{CC}=3.3V \pm 0.3V$	1.5	3.0	7.1	ns
Propagation delay from input (2OE) to output(2Yn)	$t_{en}$	$V_{CC}=1.8V \pm 0.15V$	2.5	5.5	13.8	ns
		$V_{CC}=2.5V \pm 0.2V$	2.1	4.2	7.4	ns
		$V_{CC}=2.7V$	1.5	3.7	8.1	ns
		$V_{CC}=3.3V \pm 0.3V$	1.5	3.4	7.1	ns
Propagation delay from input (1 $\overline{OE}$ ) to output(1Yn)	$t_{dis}$	$V_{CC}=1.8V \pm 0.15V$	2.5	4.3	10	ns
		$V_{CC}=2.5V \pm 0.2V$	1.0	3.5	5.6	ns
		$V_{CC}=2.7V$	1.5	3.2	7.0	ns
		$V_{CC}=3.3V \pm 0.3V$	1.5	3.0	6.0	ns
Propagation delay from input (2OE) to output(2Yn)	$t_{dis}$	$V_{CC}=1.8V \pm 0.15V$	1.5	3.5	9.9	ns
		$V_{CC}=2.5V \pm 0.2V$	0.5	3.1	5.6	ns
		$V_{CC}=2.7V$	1.5	3.4	7.0	ns
		$V_{CC}=3.3V \pm 0.3V$	1.5	2.6	6.0	ns

### ■ OPERATING CHARACTERISTICS

( $f=10MHz, V_{IN}=GND$  to  $V_{CC}, T_A = 25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	$V_{CC}=1.8V \pm 0.15V$		14.4		pF
		$V_{CC}=2.5V \pm 0.2V$		17.9		pF
		$V_{CC}=3.3V \pm 0.3V$		21		pF

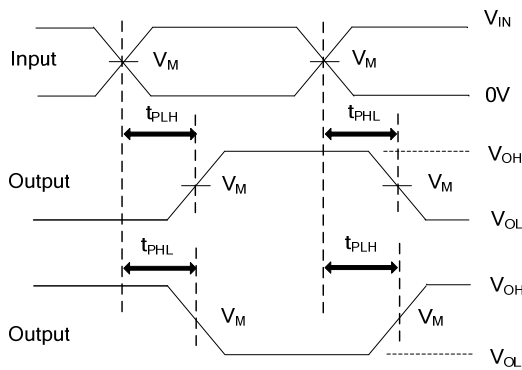
## TEST CIRCUIT AND WAVEFORMS



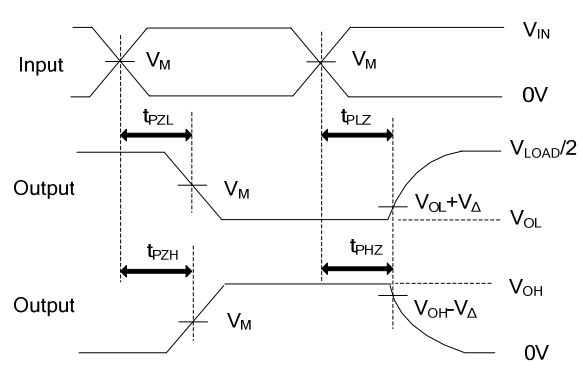
TEST	S
$t_{PLH}/t_{PHL}$	Open
$t_{PHZ}/t_{PZH}$	GND
$t_{PLZ}/t_{PZL}$	$V_{LOAD}$

TEST CIRCUIT

$V_{CC}$	$V_{IN}$	$t_R/t_F$	$V_M$	$V_{\Delta}$	$C_L$	$R_L$	$V_{EXT}$		
							$t_{PLH}/t_{PHL}$	$t_{PZH}/t_{PHZ}$	$t_{PZL}/t_{PLZ}$
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	0.15V	30pF	1K $\Omega$	OPEN	GND	$2 \times V_{CC}$
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	0.15V	30pF	500 $\Omega$	OPEN	GND	$2 \times V_{CC}$
2.7V	2.7V	$\leq 2.5ns$	1.5V	0.3V	50pF	500 $\Omega$	OPEN	GND	$2 \times V_{CC}$
$3.3V \pm 0.3V$	2.7V	$\leq 2.5ns$	1.5V	0.3V	50pF	500 $\Omega$	OPEN	GND	$2 \times V_{CC}$



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  $\leq 10MHz$ ,  $Z_O = 50\Omega$ .

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