



## U74LVC125A

CMOS IC

### QUADRUPLE BUS BUFFER GATE WITH 3-STATE OUTPUTS

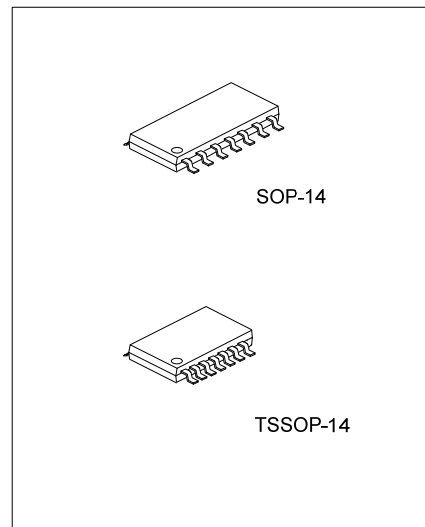
#### DESCRIPTION

The **U74LVC125A** consists of four bus buffers with 3-state output controlled by enable input ( $\overline{OE}$ ), when  $\overline{OE}$  is high, the output is disable.

Inputs can be driven from either 3.3V or 5V devices, so the device can be used in a mix 3.3V/5V system.

#### FEATURES

- \* Operation Voltage Range: 1.65~3.6V
- \* Low Power Dissipation
- \* Input Accept Voltage to 5.5V

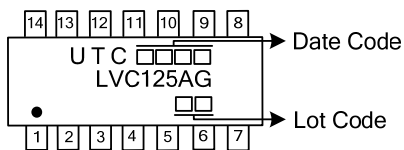


#### ORDERING INFORMATION

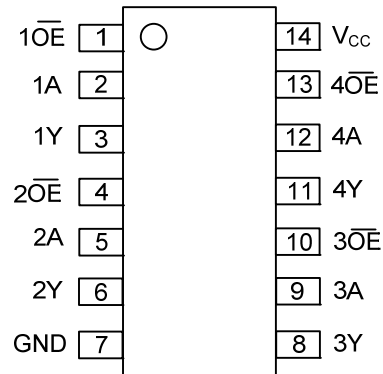
Ordering Number	Package	Packing
U74LVC125AG-S14-R	SOP-14	Tape Reel
U74LVC125AG-P14-R	TSSOP-14	Tape Reel

<p>U74LVC125AG-S14-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) S14: SOP-14, P14: TSSOP-14 (3) G: Halogen Free and Lead Free</p>
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#### MARKING



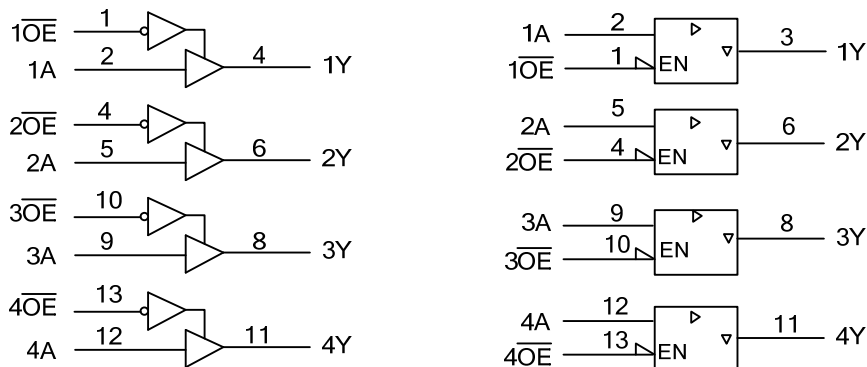
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

INPUT		OUTPUT
$\overline{OE}$	A	Y
L	L	L
L	H	H
H	X	Z

■ LOGIC DIAGRAM (positive logic)



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5~6.5	V
Input Voltage	$V_{IN}$	-0.5~6.5	V
Output Voltage(active mode)	$V_{OUT}$	-0.5~ $V_{CC}+0.5$	V
Input Clamp Current( $V_{IN}<0$ )	$I_{IK}$	-50	mA
Output Clamp Current( $V_O<0$ )	$I_{OK}$	-50	mA
Output Current	$I_{OUT}$	$\pm 50$	mA
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 100$	mA
Power Dissipation	$P_D$	500	mW
Storage Temperature	$T_{STG}$	-65 ~ +150	$^{\circ}C$

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	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	Operating	1.65		3.6	V
		Data retention only	1.5			
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
Input Rise or Fall Times	$t_R, t_F$				8	ns/V
Operating Temperature	$T_A$		-40		125	$^{\circ}C$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	$V_{IH}$	$V_{CC}=1.65V \sim 1.95V$	$0.65 \times V_{CC}$			V
		$V_{CC}=2.3V \sim 2.7V$	1.7			V
		$V_{CC}=2.7V \sim 3.6V$	2			V
Low-Level Input Voltage	$V_{IL}$	$V_{CC}=1.65V \sim 1.95V$			$0.35 \times V_{CC}$	V
		$V_{CC}=2.3V \sim 2.7V$			0.7	V
		$V_{CC}=2.7V \sim 3.6V$			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
		$V_{CC}=1.65V, I_{OH}=-4mA$	1.29			V
		$V_{CC}=2.3V, I_{OH}=-8mA$	1.9			V
		$V_{CC}=2.7V, I_{OH}=-12mA$	2.2			V
		$V_{CC}=3V, I_{OH}=-12mA$	2.4			V
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=1.65V \sim 3.6V, I_{OL}=100\mu A$			0.1	V
		$V_{CC}=1.65V, I_{OL}=4mA$			0.24	V
		$V_{CC}=2.3V, I_{OL}=8mA$			0.3	V
		$V_{CC}=2.7V, I_{OL}=12mA$			0.4	V
		$V_{CC}=3V, I_{OL}=24mA$			0.55	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=3.6V, V_{IN}=5.5V$ or GND			$\pm 1$	$\mu A$
Output OFF-State current	$I_{OZ}$	$V_{CC}=3.6V, V_{OUT}=V_{CC}$ or GND			$\pm 1$	$\mu A$
Quiescent Supply Current	$I_Q$	$V_{CC}=3.6V, V_{IN}=V_{CC}$ or GND $I_{OUT}=0$			1	$\mu A$
Additional Quiescent Supply Current	$\Delta I_Q$	$V_{CC}=2.7V \sim 3.6V$ , One input at $V_{CC}-0.6V$ , other inputs at $V_{CC}$ or GND			500	$\mu A$
Input Capacitance	$C_{IN}$	$V_{CC}=3.3V, V_{IN}=V_{CC}$ or GND		5		pF

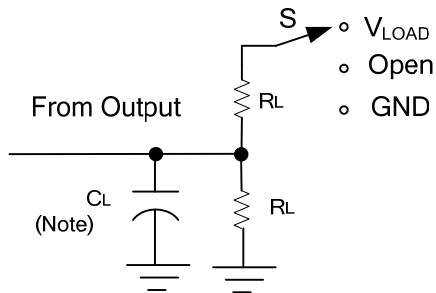
■ DYNAMIC CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A) to output (Y)	t <sub>PLH</sub> /t <sub>PHL</sub>	V <sub>CC</sub> = 1.8V±0.15V	1	4.5	11.8	ns
		V <sub>CC</sub> = 2.5V±0.2V	1	2.7	5.8	ns
		V <sub>CC</sub> = 2.7V	1	3	5.3	ns
		V <sub>CC</sub> = 3.3V±0.3V	1	2.5	4.6	ns
Output enable time from input ( $\overline{OE}$ ) to output (Y)	t <sub>PZL</sub> /t <sub>PZH</sub>	V <sub>CC</sub> = 1.8V±0.15V	1	4.3	13.8	ns
		V <sub>CC</sub> = 2.5V±0.2V	1	2.7	6.9	ns
		V <sub>CC</sub> = 2.7V	1	3.3	6.4	ns
		V <sub>CC</sub> = 3.3V±0.3V	1	2.4	5.2	ns
Output disable time from input ( $\overline{OE}$ ) to output (Y)	t <sub>PLZ</sub> /t <sub>PHZ</sub>	V <sub>CC</sub> = 1.8V±0.15V	1	4.3	10.6	ns
		V <sub>CC</sub> = 2.5V±0.2V	1	2.2	5.1	ns
		V <sub>CC</sub> = 2.7V	1	2.5	4.8	ns
		V <sub>CC</sub> = 3.3V±0.3V	1	2.4	4.4	ns

■ OPERATING CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C <sub>PD</sub>	V <sub>CC</sub> =1.8V, f=10MHz		7.4		pF
		V <sub>CC</sub> =2.5V, f=10MHz		11.3		pF
		V <sub>CC</sub> =3.3V, f=10MHz		15		pF

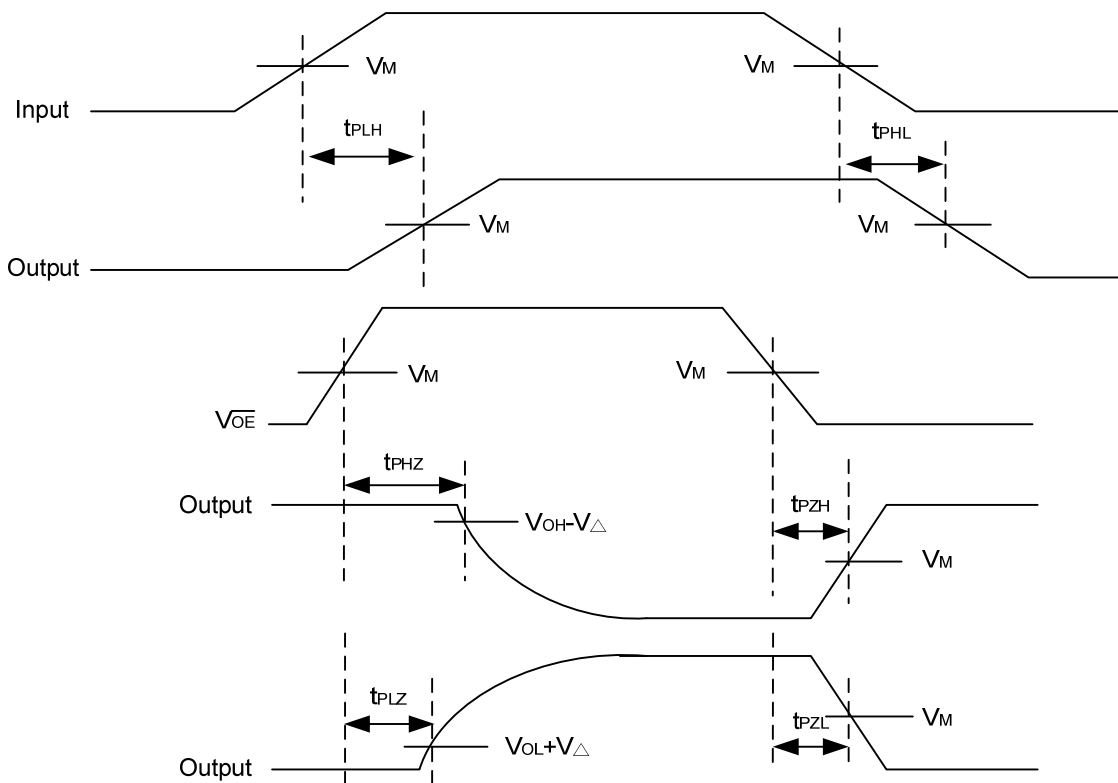
## TEST CIRCUIT AND WAVEFORMS



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

Note:  $C_L$  includes probe and jig capacitance.

$V_{CC}$	$V_{IN}$	$t_{R}/t_{F}$	$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 * V_{CC}$	30pF	1K $\Omega$	0.15V
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 * V_{CC}$	30pF	500 $\Omega$	0.15V
2.7V	2.7V	$\leq 2.5ns$	1.5V	6V	50pF	500 $\Omega$	0.3V
$3.3V \pm 0.3V$	2.7V	$\leq 2.5ns$	1.5V	6V	50pF	500 $\Omega$	0.3V



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