



## U74HCT125

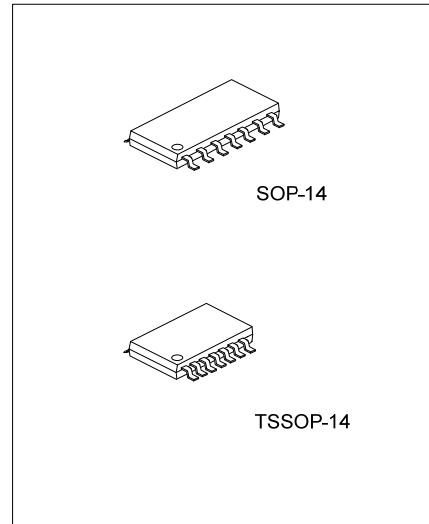
CMOS IC

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

#### DESCRIPTION

The **U74HCT125** is a quadruple bus buffer gates with 3-state output. When  $\overline{OE}$  is high, the Y outputs are in a high-impedance state. When  $\overline{OE}$  is low, the device passes noninverted data from the A input to the Y output.

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



#### FEATURES

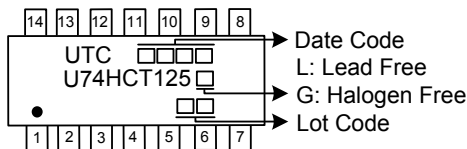
- \* TTL-Voltage Compatible
- \* Max  $t_{PD}$  of 12 ns from A to Y at 5.5 V,  $C_L = 50$  pF
- \* Low power consumption,  $I_{CC} = 8\mu A$  (Max) at 5.5V
- \*  $\pm 6mA$  output driver at 5V

#### ORDERING INFORMATION

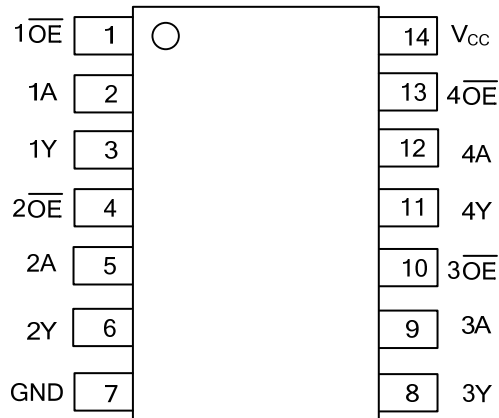
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HCT125L-S14-R	U74HCT125G-S14-R	SOP-14	Tape Reel
U74HCT125L-P14-R	U74HCT125G-P14-R	TSSOP-14	Tape Reel

<p>U74HCT125G-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, L: Lead Free</p>
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#### MARKING



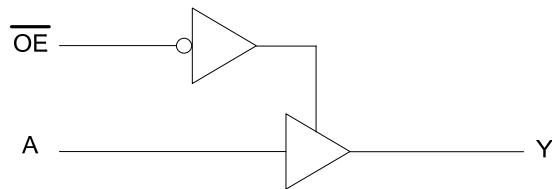
■ PIN CONFIGURATION



■ FUNCTION TABLE (each buffer)

INPUTS		OUTPUTS
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	Z

■ LOGIC DIAGRAM (each buffer)



### ■ ABSOLUTE MAXIMUM RATING (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5~7	V
Input Voltage	$V_{IN}$	-0.5~7	V
Output Voltage	$V_{OUT}$	-0.5~ $V_{CC}$ +0.5	V
Input Clamp Current ( $V_{IN}<0$ , or $V_{IN}>0$ )	$I_{IK}$	±20	mA
Output Clamp Current ( $V_{OUT}<0$ , or $V_{OUT}>V_{CC}$ )	$I_{OK}$	±20	mA
Output Current	$I_{OUT}$	±35	mA
$V_{CC}$ or GND Current	$I_{CC}$	±70	mA
Storage Temperature	$T_{STG}$	-65 ~ +150	°C

Note: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. 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	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	4.5	5	5.5	V
High-Level Input Voltage ( $V_{CC}$ =4.5V to 5.5V)	$V_{IH}$	2			V
Low-Level Input Voltage ( $V_{CC}$ = 4.5V to 5.5V)	$V_{IL}$			0.8	V
Input Voltage	$V_{IN}$	0		$V_{CC}$	V
Output Voltage	$V_{OUT}$	0		$V_{CC}$	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$			500	ns/V
Operating Temperature	$T_A$	-40	25	85	°C

### ■ ELECTRICAL CHARACTERISTICS ( $T_A$ =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	$V_{OH}$	$I_{OH} = -20\mu A, V_{CC} =4.5 V$	4.4	4.5		V
		$I_{OH} = -6 mA, V_{CC} =4.5 V$	3.98	4.3		
Low-Level Output Voltage	$V_{OL}$	$I_{OL} = 20 \mu A, V_{CC} =4.5 V$		0.001	0.1	V
		$I_{OL} = 6 mA, V_{CC} =4.5 V$		0.17	0.26	
Input Leakage Current (A or $\overline{OE}$ input)	$I_{I(LEAK)}$	$V_{IN} = 5.5V$ or GND, $V_{CC} =5.5 V$		±0.1	±100	μA
High-Impedance State Current	$I_{OZ}$	$V_{OUT} = V_{CC}$ or GND, $V_{CC} =5.5 V$		±0.01	±0.5	μA
Quiescent Supply Current	$I_{CC}$	$V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0, V_{CC} =5.5 V$			8	μA
Additional Quiescent Supply Current	$\Delta I_{CC}$	One input at 0.5V or 2.4V, $V_{CC} =5.5 V$ , other inputs at $V_{CC}$ or GND		1.4	2.4	mA
Input Capacitance	$C_{IN}$	$V_{CC} =4.5V$ to 5.5 V		3	10	pF

### ■ SWITCHING CHARACTERISTICS

( $C_L = 50 \text{ pF}$ ,  $T_A = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay from Input A to Output Y, $t_{PD}$	$t_{PLH}/t_{PHL}$	$V_{CC} = 4.5 \text{ V}$		15	26	ns
		$V_{CC} = 5.5 \text{ V}$		12	23	
Propagation Delay from Input $\overline{OE}$ to Output Y, $t_{EN}$	$t_{PZH}/t_{PZL}$	$V_{CC} = 4.5 \text{ V}$		18	28	ns
		$V_{CC} = 5.5 \text{ V}$		15	25	
Propagation delay from input OE to output Y, $t_{DIS}$	$t_{PHZ}/t_{PLZ}$	$V_{CC} = 4.5 \text{ V}$		15	26	ns
		$V_{CC} = 5.5 \text{ V}$		13	23	
Output transition (rise and fall) time, $t_T$	$t_{TLH}/t_{THL}$	$V_{CC} = 4.5 \text{ V}$		8	15	ns
		$V_{CC} = 5.5 \text{ V}$		7	14	

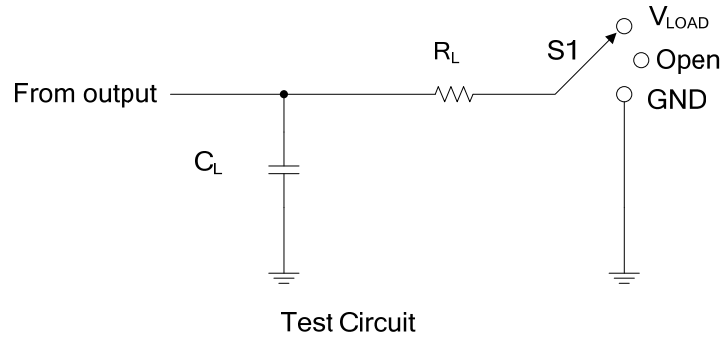
( $C_L = 150 \text{ pF}$ ,  $T_A = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay from Input A to Output Y, $t_{PD}$	$t_{PLH}/t_{PHL}$	$V_{CC} = 4.5 \text{ V}$		19	36	ns
		$V_{CC} = 5.5 \text{ V}$		16	32	
Propagation Delay from Input $\overline{OE}$ to Output Y, $t_{EN}$	$t_{PZH}/t_{PZL}$	$V_{CC} = 4.5 \text{ V}$		25	40	ns
		$V_{CC} = 5.5 \text{ V}$		21	35	
Output transition (rise and fall) time, $t_T$	$t_{TLH}/t_{THL}$	$V_{CC} = 4.5 \text{ V}$		17	42	ns
		$V_{CC} = 5.5 \text{ V}$		14	38	

### ■ OPERATING CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

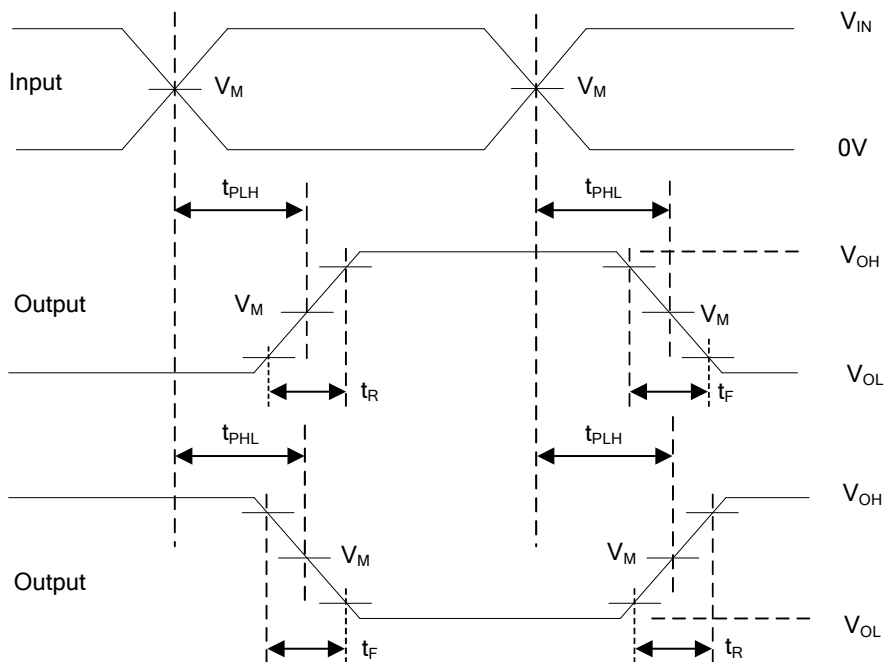
PARAMETER	SYMBOL	TEST CONDITIONS	TYP	UNIT
Power dissipation capacitance	$C_{PD}$		35	pF

■ TEST CIRCUIT AND WAVEFORMS



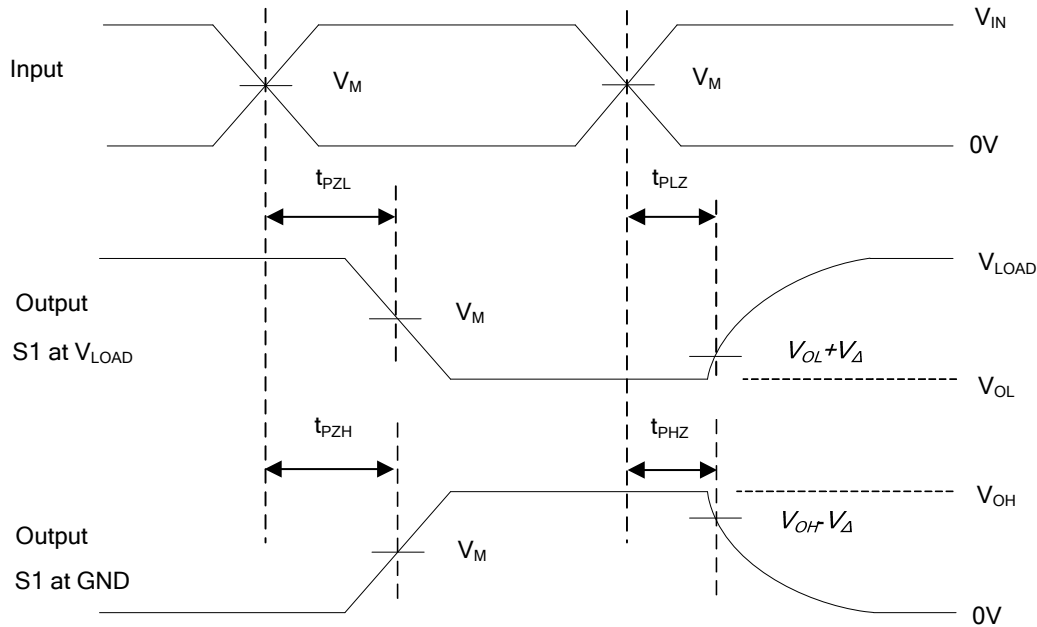
TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$V_{LOAD}$
$t_{PHZ}/t_{PZH}$	GND

$V_{CC}$	Input		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_{IN}$	$t_R, t_F$					
5V±0.5V	$V_{CC}$	≤3ns	$V_{CC}/2$	$V_{CC}$	50pF	1kΩ	0.5V
					150pF		



Voltage Waveforms Ppropagation Delay Times

■ TEST CIRCUIT AND WAVEFORMS (Cont.)



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:  $P_{RR} \leq 1\text{MHz}$ ,  $Z_O = 50\Omega$ .

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