



## U74AHC1G125

CMOS IC

### SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT

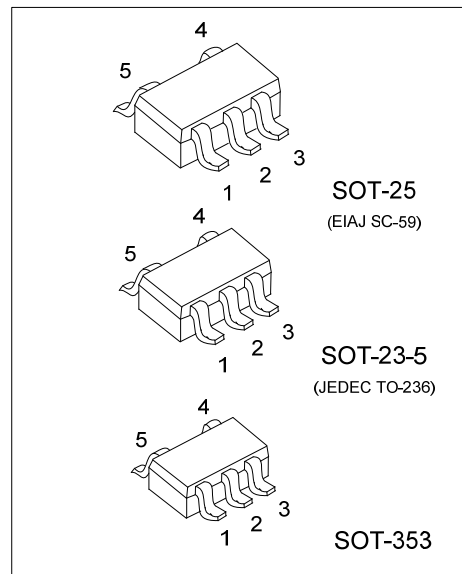
#### DESCRIPTION

The **U74AHC1G125** is a single bus buffer gate/line driver with 3-state output. When  $\overline{OE}$  is high, the Y output 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

- \* Wide supply voltage range from 2V to 5.5V
- \* Max  $t_{PD}$  of 6 ns from A to Y at 5V
- \* Low power consumption,  $I_{CC} = 1\mu A$  (Max) at 5.5V
- \*  $\pm 8mA$  output driver at 5V

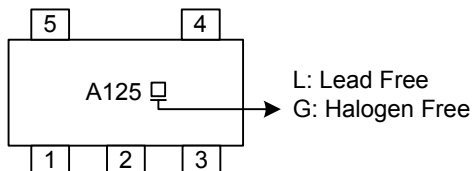


#### ORDERING INFORMATION

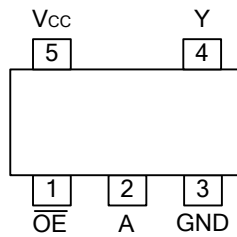
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC1G125L-AE5-R	U74AHC1G125G-AE5-R	SOT-23-5	Tape Reel
U74AHC1G125L-AF5-R	U74AHC1G125G-AF5-R	SOT-25	Tape Reel
U74AHC1G125L-AL5-R	U74AHC1G125G-AL5-R	SOT-353	Tape Reel

<p>U74AHC1G125G-AE5-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



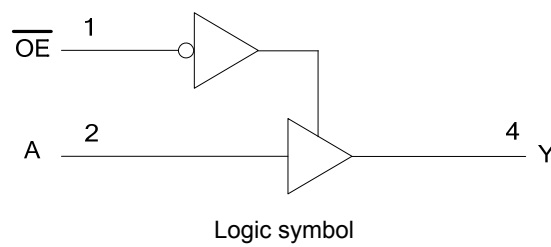
■ PIN CONFIGURATION



■ FUNCTION TABLE

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

■ LOGIC DIAGRAM (positive logic)



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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Range	$V_{CC}$	-0.5~7	V
Input Voltage Range	$V_{IN}$	-0.5~7	V
Output Voltage Range	$V_{OUT}$	-0.5~ $V_{CC}$ +0.5	V
Input Clamp Current ( $V_{IN}<0$ )	$I_{IK}$	-20	mA
Output Clamp Current ( $V_{OUT}<0$ , or $V_{OUT}>V_{CC}$ )	$I_{OK}$	±20	mA
Output Current	$I_{OUT}$	±25	mA
$V_{CC}$ or GND Current	$I_{CC}$	±50	mA
Storage Temperature	$T_{STG}$	-65 ~ +150	°C

Notes: 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.

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-5	280	°C/W
	SOT-25	230	
	SOT-353	350	

### ■ RECOMMENDED OPERATING COMDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		2		5.5	V
High-Level Input Voltage	$V_{IH}$	$V_{CC} = 2V$	1.5			V
		$V_{CC} = 3V$	2.1			
		$V_{CC} = 5.5V$	3.85			
Low-Level Input Voltage	$V_{IL}$	$V_{CC} = 2V$			0.5	V
		$V_{CC} = 3V$			0.9	
		$V_{CC} = 5.5V$			1.65	
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
High-Level Output Current	$I_{OH}$	$V_{CC} = 2V$			-50	μA
		$V_{CC} = 3.3±0.3V$			-4	mA
		$V_{CC} = 5±0.5V$			-8	
Low-Level Output Current	$I_{OL}$	$V_{CC} = 2V$			50	μA
		$V_{CC} = 3.3±0.3V$			4	mA
		$V_{CC} = 5±0.5V$			8	
Input Transition Rise or Fall Rate	$\Delta t/\Delta V$	$V_{CC} = 3.3±0.3V$			100	ns/V
		$V_{CC} = 5±0.5V$			20	
Operating Temperature	$T_A$		-40		125	°C

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> = 2V, I <sub>OH</sub> = -50 μA	1.9	2		V
		V <sub>CC</sub> = 3V, I <sub>OH</sub> = -50 μA	2.9	3		
		V <sub>CC</sub> = 4.5V, I <sub>OH</sub> = -50 μA	4.4	4.5		
		V <sub>CC</sub> = 3V, I <sub>OH</sub> = -4 mA	2.58			
		V <sub>CC</sub> = 4.5V, I <sub>OH</sub> = -8 mA	3.94			
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> = 2V, I <sub>OL</sub> = 50 μA			0.1	V
		V <sub>CC</sub> = 3V, I <sub>OL</sub> = 50 μA			0.1	
		V <sub>CC</sub> = 4.5V, I <sub>OL</sub> = 50 μA			0.1	
		V <sub>CC</sub> = 3V, I <sub>OL</sub> = 4 mA			0.36	
		V <sub>CC</sub> = 4.5V, I <sub>OL</sub> = 8 mA			0.36	
Input Leakage Current (A or $\overline{OE}$ input)	I <sub>I(LEAK)</sub>	V <sub>CC</sub> =0 to 5.5V, V <sub>IN</sub> =5.5V or GND			±0.1	μA
High-Impedance State Current	I <sub>OZ</sub>	V <sub>CC</sub> = 5.5V, V <sub>IN</sub> =V <sub>CC</sub> or GND			±0.25	μA
Quiescent Supply Current	I <sub>CC</sub>	V <sub>CC</sub> =5.5V, V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0			1	μA
Input Capacitance	C <sub>IN</sub>	V <sub>CC</sub> =5V, V <sub>IN</sub> =V <sub>CC</sub> or GND		4	10	pF
Output Capacitance	C <sub>OUT</sub>	V <sub>CC</sub> =5V, V <sub>O</sub> =V <sub>CC</sub> or GND		10		pF

■ SWITCHING CHARACTERISTICS (V<sub>CC</sub> = 3.3V ± 0.3V, T<sub>A</sub> =25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input A to output Y, t <sub>PD</sub>	t <sub>PLH</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		5.6	8	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		8.1	11.5	
	t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		5.6	8	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		8.1	11.5	
Propagation delay from input $\overline{OE}$ to output Y, t <sub>EN</sub>	t <sub>PZH</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		5.4	8	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		7.9	11.5	
	t <sub>PZL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		5.4	8	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		7.9	11.5	
Propagation delay from input $\overline{OE}$ to output Y, t <sub>DIS</sub>	t <sub>PHZ</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		7	9.7	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		9.5	13.2	
	t <sub>PLZ</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		7	9.7	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		9.5	13.2	

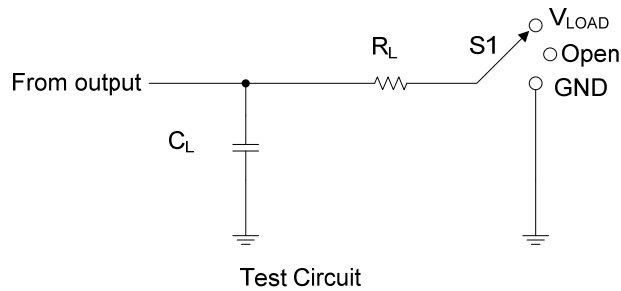
■ SWITCHING CHARACTERISTICS (V<sub>CC</sub> = 5V ± 0.5V, T<sub>A</sub> =25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input A to output Y, t <sub>PD</sub>	t <sub>PLH</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		3.8	5.5	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		5.3	7.5	
	t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		3.8	5.5	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		5.3	7.5	
Output enable time from input $\overline{OE}$ to output Y, t <sub>EN</sub>	t <sub>PZH</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		3.6	5.1	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		5.1	7.1	
	t <sub>PZL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		3.6	5.1	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		5.1	7.1	
Output disable time from input $\overline{OE}$ to output Y, t <sub>DIS</sub>	t <sub>PHZ</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		4.6	6.8	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		6.1	8.8	
	t <sub>PLZ</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		4.6	6.8	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		6.1	8.8	

■ OPERATING CHARACTERISTICS (T<sub>A</sub> =25°C)

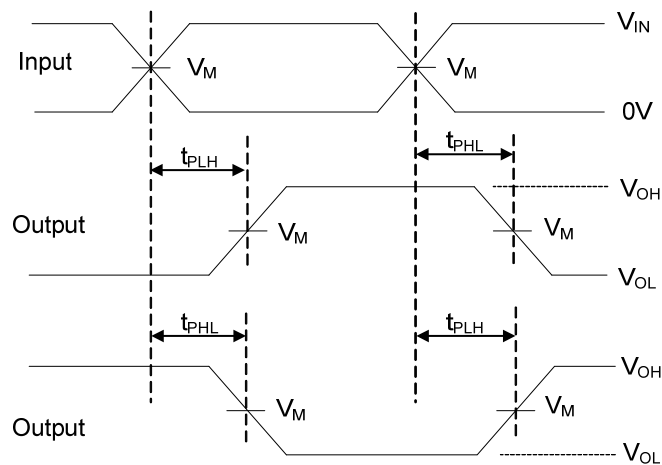
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power dissipation capacitance	C <sub>PD</sub>	V <sub>CC</sub> = 5V, f=1MHz, No load		14		pF

## ■ TEST CIRCUIT AND WAVEFORMS



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

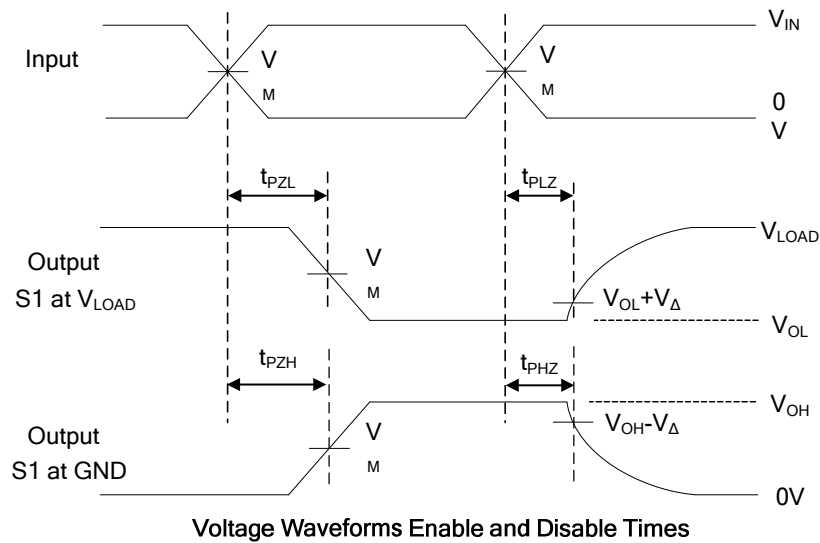
$V_{CC}$	Input		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_{IN}$	$t_R, t_F$					
3.3V±0.3V	$V_{CC}$	≤3ns	$V_{CC}/2$	$V_{CC}$	15pF	1kΩ	0.3V
					50pF		
5V±0.5V	$V_{CC}$	≤3ns	$V_{CC}/2$	$V_{CC}$	15pF	1kΩ	0.5V
					50pF		



**Voltage Waveforms Propagation Delay Times**

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■ TEST CIRCUIT AND WAVEFORMS(Cont.)



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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