



U74AUP1G125E

Preliminary

CMOS IC

LOW-POWER SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT

DESCRIPTION

The **U74AUP1G125E** bus buffer gate is a single line driver with a 3-state output. The output is disabled when the output-enable ($\overline{OE}$) input is high.

FEATURES

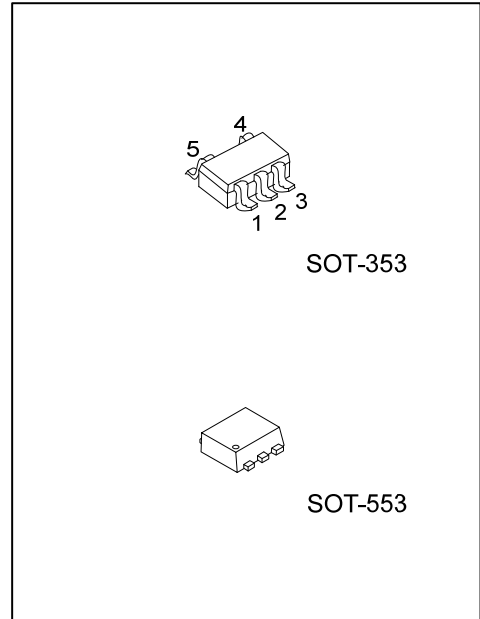
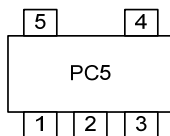
- * Operate from 0.8V to 3.6V
- * $\pm 2.7\text{mA}$ Output Drive at 3V
- * Low power consumption, $I_{CC} = 1.4 \mu\text{A}$ (Max)
- * Inputs Accept Voltages to 3.6V
- * I_{OFF} Supports Partial-Power-Down Mode Operation

ORDERING INFORMATION

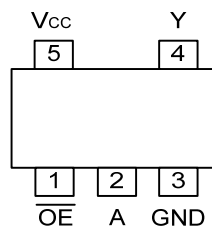
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AUP1G125EL-AF5-R	U74AUP1G125EG-AL5-R	SOT-353	Tape Reel
U74AUP1G125EL-AN5-R	U74AUP1G125EG-AN5-R	SOT-553	Tape Reel

U74AUP1G125EG-AL5-R	(1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) AL5: SOT-353, AN5: SOT-553 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING



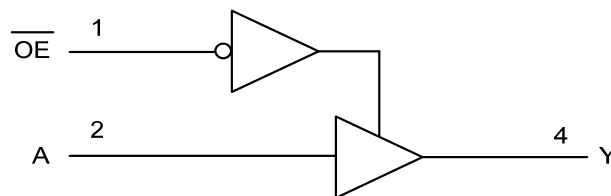
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	I/O	DESCRIPTION
1	$\overline{\text{OE}}$	I	Output enable (active low)
2	A	I	Input
3	GND		Ground
4	Y	O	Output
5	V _{CC}		Positive supply

■ BLOCK DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING ($T_A=25^{\circ}\text{C}$, unless otherwise specified) (Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ 4.6	V
Input Voltage (Note 2)	V_{IN}		-0.5 ~ 4.6	V
Voltage Applied to any Output in the High-Impedance or Power Off State (Note 2)	V_{OUT}		-0.5 ~ 4.6	V
Output Voltage In the High or Low State (Note 2)	V_{OUT}		-0.5 ~ $V_{CC}+0.5$	V
Input Clamp Current	I_{IK}	$V_{IN} < 0V$	-50	mA
Output Clamp Current	I_{OK}	$V_{OUT} < 0V$	-50	mA
Continuous Output Current	I_{OUT}		± 50	mA
Junction Temperature	T_J		+150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}		-65 ~ +150	$^{\circ}\text{C}$

Notes: 1. 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.

2. The input negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.

■ RECOMMENDED OPERATING COMDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		0.8		3.6	V
Input Voltage	V_{IN}		0		3.6	V
Output Voltage	V_{OUT}	High or low state	0		V_{CC}	V
		3-state	0		3.6	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=0.8V\sim 3.6V$			200	ns/V
Operating Temperature	T_A		-40		+125	$^{\circ}\text{C}$

Note: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-353	θ_{JA}	350	$^{\circ}\text{C/W}$
	SOT-553		370	$^{\circ}\text{C/W}$

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V _{IH}	V _{CC} =0.8V	V _{CC}			V _{CC}			V
		V _{CC} =1.1V~1.95V	0.65× V _{CC}			0.7× V _{CC}			V
		V _{CC} =2.3V~2.7V	1.6			1.6			V
		V _{CC} =3V~3.6V	2			2			V
Low-Level Input Voltage	V _{IL}	V _{CC} =0.8V			0			0	V
		V _{CC} =1.1V~1.95V			0.35× V _{CC}			0.3× V _{CC}	V
		V _{CC} =2.3V~2.7V			0.7			0.7	V
		V _{CC} =3V~3.6V			0.9			0.9	V
High-Level Output Voltage	V _{OH}	V _{CC} =0.8V~3.6V, I _{OH} =-20μA	V _{CC} -0.1			V _{CC} -0.11			V
		V _{CC} =1.1V, I _{OH} =-1.1mA	0.75× V _{CC}			0.6× V _{CC}			V
		V _{CC} =1.4V, I _{OH} =-1.7mA	1.11			0.93			V
		V _{CC} =1.65V, I _{OH} =-1.9mA	1.32			1.17			V
		V _{CC} =2.3V, I _{OH} =-2.3mA	2.05			1.77			V
		V _{CC} =2.3V, I _{OH} =-3.1mA	1.9			1.67			V
		V _{CC} =3V, I _{OH} =-2.7mA	2.72			2.4			V
		V _{CC} =3V, I _{OH} =-4mA	2.6			2.3			V
Low-Level Output Voltage	V _{OL}	V _{CC} =0.8V~3.6V, I _{OL} =20μA			0.1			0.11	V
		V _{CC} =1.1V, I _{OL} =1.1mA			0.3× V _{CC}			0.33× V _{CC}	V
		V _{CC} =1.4V, I _{OL} =1.7mA			0.31			0.41	V
		V _{CC} =1.65V, I _{OL} =1.9mA			0.31			0.39	V
		V _{CC} =2.3V, I _{OL} =2.3mA			0.31			0.36	V
		V _{CC} =2.3V, I _{OL} =3.1mA			0.44			0.5	V
		V _{CC} =3V, I _{OL} =2.7mA			0.31			0.36	V
		V _{CC} =3V, I _{OL} =4mA			0.44			0.5	V
Input Leakage Current (A or $\overline{\text{OE}}$ Input)	I _{I(LEAK)}	V _{CC} =0V~3.6V V _I = GND to 3.6V			±0.1			±0.75	μA
Power off Leakage Current	I _{OFF}	V _{CC} =0V, V _I or V _O =0V to 3.6V			±0.2			±0.75	μA
Additional Power Off Leakage Current	ΔI _{OFF}	V _{CC} =0V~0.2V, V _I or V _O =0V to 3.6V			±0.2			±0.75	μA
Output Off-State Current	I _{OZ}	V _{CC} =3.6V, V _{OUT} =V _{CC} or GND			±0.1			±0.75	μA
Quiescent Supply Current	I _{CC}	V _{CC} =0.8V~3.6V, V _{IN} =GND or (V _{CC} to 3.6V), $\overline{\text{OE}}$ =GND, I _O =0			0.5			1.4	μA
Additional Quiescent Supply Current	A Input	V _{CC} =3.3V V _I =V _{CC} -0.6V (Note 1) I _O =0			40			75	μA
	$\overline{\text{OE}}$ Input				110			180	μA
	All Inputs				1			1	μA
		V _{CC} =0.8V~3.6V V _I =GND to 3.6V $\overline{\text{OE}}$ = V _{CC} (Note 2)							

Notes: 1. One input at V_{CC} - 0.6 V, other input at V_{CC} or GND.2. To show I_{CC} is very low when the input-disable feature is enabled.

SWITCHING CHARACTERISTICS

(Over recommended operating free-air temperature range, unless otherwise specified)

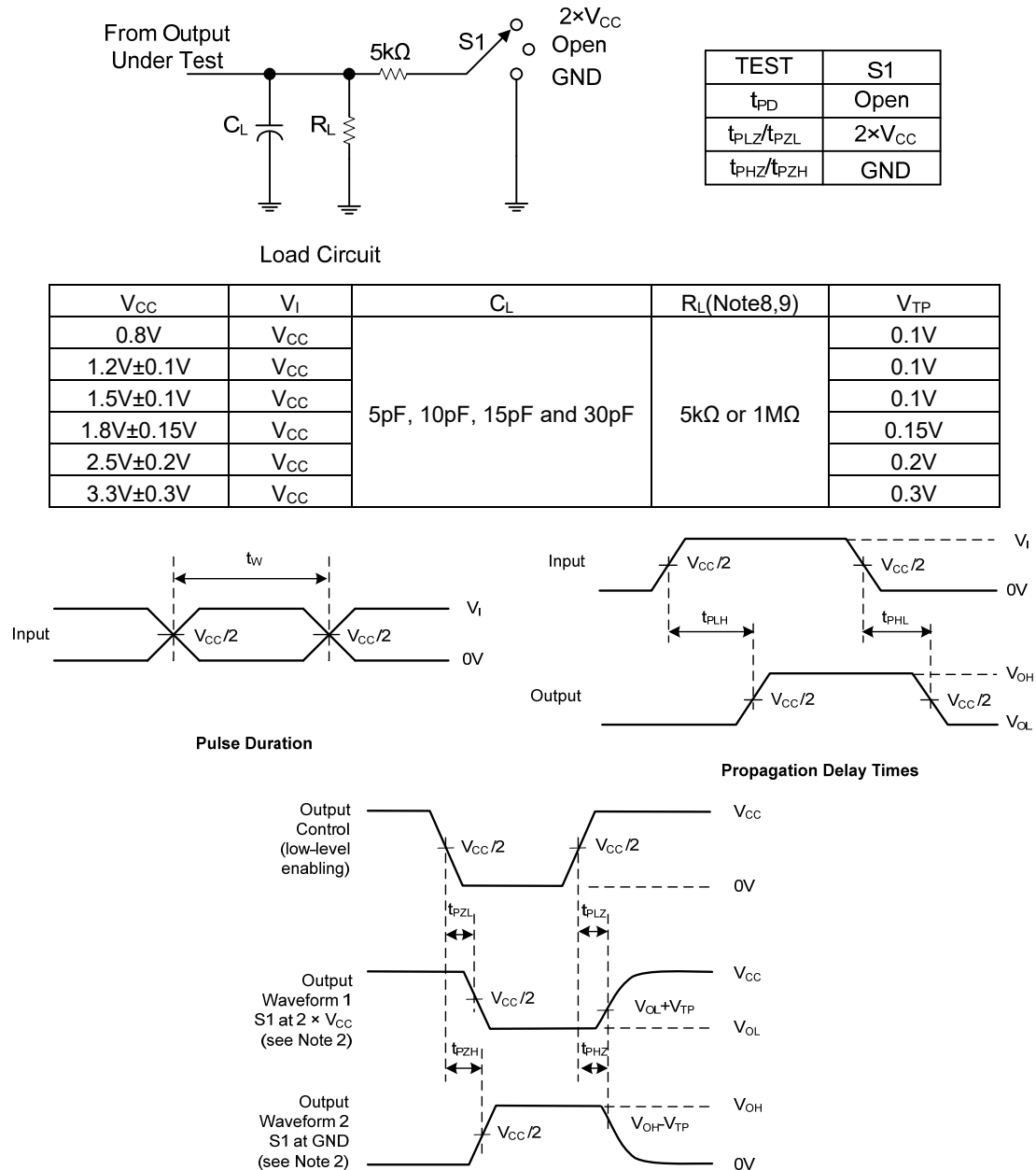
PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (A) to Output (Y)	t _{PD}	C _L =5pF	V _{CC} =0.8V		35				ns
			V _{CC} =1.2V±0.1V	1		14.6			ns
			V _{CC} =1.5V±0.1V	1		10.5			ns
			V _{CC} =1.8V±0.15V	1		8.8			ns
			V _{CC} =2.5V±0.2V	1		6.7			ns
			V _{CC} =3.3V±0.3V	1		5.8			ns
		C _L =10pF	V _{CC} =0.8V		40				ns
			V _{CC} =1.2V±0.1V	1		15.7			ns
			V _{CC} =1.5V±0.1V	1		11.3			ns
			V _{CC} =1.8V±0.15V	1		9.5			ns
			V _{CC} =2.5V±0.2V	1		7.3			ns
			V _{CC} =3.3V±0.3V	1		6.3			ns
		C _L =15pF	V _{CC} =0.8V		45				ns
			V _{CC} =1.2V±0.1V	1		17.1			ns
			V _{CC} =1.5V±0.1V	1		12.2			ns
			V _{CC} =1.8V±0.15V	1		10.3			ns
			V _{CC} =2.5V±0.2V	1		7.8			ns
			V _{CC} =3.3V±0.3V	1		6.7			ns
		C _L =30pF	V _{CC} =0.8V		60				ns
			V _{CC} =1.2V±0.1V	1		20.7			ns
			V _{CC} =1.5V±0.1V	1		14.5			ns
			V _{CC} =1.8V±0.15V	1		12.1			ns
			V _{CC} =2.5V±0.2V	1		9.2			ns
			V _{CC} =3.3V±0.3V	1		8			ns
Propagation Delay From Input (OE) to Output (Y)	t _{en}	C _L =5pF	V _{CC} =0.8V		40				ns
			V _{CC} =1.2V±0.1V			15.9			ns
			V _{CC} =1.5V±0.1V			10.5			ns
			V _{CC} =1.8V±0.15V			9.7			ns
			V _{CC} =2.5V±0.2V			8.0			ns
			V _{CC} =3.3V±0.3V			6.9			ns
		C _L =10pF	V _{CC} =0.8V		45				ns
			V _{CC} =1.2V±0.1V			16.8			ns
			V _{CC} =1.5V±0.1V			11.2			ns
			V _{CC} =1.8V±0.15V			10.2			ns
			V _{CC} =2.5V±0.2V			8.4			ns
			V _{CC} =3.3V±0.3V			7.4			ns
		C _L =15pF	V _{CC} =0.8V		50				ns
			V _{CC} =1.2V±0.1V			18.1			ns
			V _{CC} =1.5V±0.1V			12.2			ns
			V _{CC} =1.8V±0.15V			11.1			ns
			V _{CC} =2.5V±0.2V			9.1			ns
			V _{CC} =3.3V±0.3V			7.9			ns
		C _L =30pF	V _{CC} =0.8V		65				ns
			V _{CC} =1.2V±0.1V			21.8			ns
			V _{CC} =1.5V±0.1V			14.6			ns
			V _{CC} =1.8V±0.15V			13			ns
			V _{CC} =2.5V±0.2V			10.5			ns
			V _{CC} =3.3V±0.3V			9.1			ns

SWITCHING CHARACTERISTICS

(Over recommended operating free-air temperature range, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input ($\overline{OE}$) to Output (Y)	t _{dis}	C _L =5pF	V _{CC} =0.8V				20		ns
			V _{CC} =1.2V±0.1V					10.9	ns
			V _{CC} =1.5V±0.1V					8.5	ns
			V _{CC} =1.8V±0.15V					8.3	ns
			V _{CC} =2.5V±0.2V					6.7	ns
			V _{CC} =3.3V±0.3V					7.2	ns
		C _L =10pF	V _{CC} =0.8V				23		ns
			V _{CC} =1.2V±0.1V					15.7	ns
			V _{CC} =1.5V±0.1V					11.9	ns
			V _{CC} =1.8V±0.15V					10.4	ns
			V _{CC} =2.5V±0.2V					8.9	ns
			V _{CC} =3.3V±0.3V					9	ns
		C _L =15pF	V _{CC} =0.8V				26		ns
			V _{CC} =1.2V±0.1V					12.2	ns
			V _{CC} =1.5V±0.1V					9.9	ns
			V _{CC} =1.8V±0.15V					10.6	ns
			V _{CC} =2.5V±0.2V					8.3	ns
			V _{CC} =3.3V±0.3V					10.2	ns
		C _L =30pF	V _{CC} =0.8V				35		ns
			V _{CC} =1.2V±0.1V					20	ns
			V _{CC} =1.5V±0.1V					14.9	ns
			V _{CC} =1.8V±0.15V					13.8	ns
			V _{CC} =2.5V±0.2V					11.4	ns
			V _{CC} =3.3V±0.3V					13.7	ns

■ TEST CIRCUIT AND WAVEFORMS



Enable and Disable Times

Notes: 1. C_L includes probe and jig capacitance.

2. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.

3. All input pulses are supplied by generators having the following characteristics: P_{RR} ≤ 10 MHz, Z_O = 50Ω.

4. The outputs are measured one at a time, with one transition per measurement.

5. t_{PLZ} and t_{PHZ} are the same as t_{dis}.

6. t_{PZL} and t_{PZH} are the same as t_{en}.

7. t_{PLH} and t_{PHL} are the same as t_{PD}.

8. For measuring propagation delay times, R_L = 1 MΩ

9. For measuring enable and disable times, R_L = 5 kΩ

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