



U74AUP1G126

CMOS IC

SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT

DESCRIPTION

The **U74AUP1G126** is single bus buffer gate with 3-state output. The output is disabled When the output enable (OE) is low. When OE is high, true data is passed from A input to the Y output.

This device ensures a very low static and dynamic power consumption across the entire V_{CC} range from 0.8V to 3.6V.

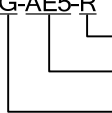
This device has power-down protective circuit, preventing device destruction when it is powered down.

FEATURES

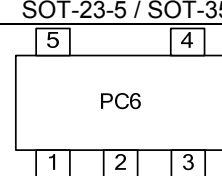

- * Wide supply voltage range from 0.8V to 3.6V
- * Inputs accept voltages up to 3.6V
- * I_{OFF} supports partial-power-down mode
- * Low static power consumption; $I_{CC}=0.5\mu A$ (Max.)
- * Optimized for 3.3V Operation

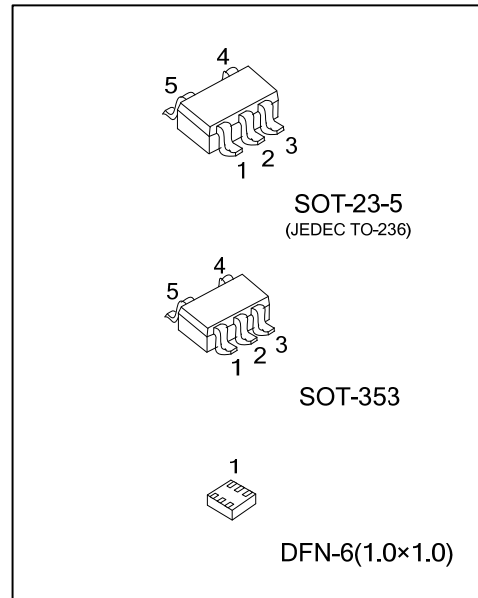
ORDERING INFORMATION

Ordering Number	Package	Packing
U74AUP1G126G-AE5-R	SOT-23-5	Tape Reel
U74AUP1G126G-AL5-R	SOT-353	Tape Reel
U74AUP1G126G-K06-1010-R	DFN-6(1.0×1.0)	Tape Reel

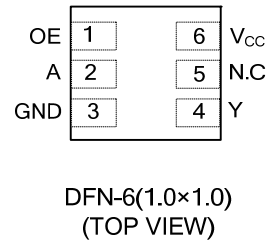
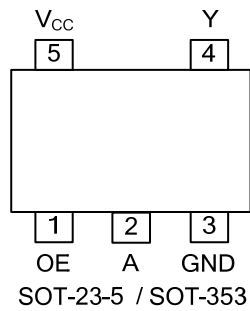
<p>U74AUP1G126G-AE5-R</p>  <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5, AL5: SOT-353, K06-1010: DFN-6(1.0×1.0) (3) G: Halogen Free and Lead Free</p>
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MARKING

SOT-23-5 / SOT-353	DFN-6(1.0×1.0)
	



■ PIN CONFIGURATION

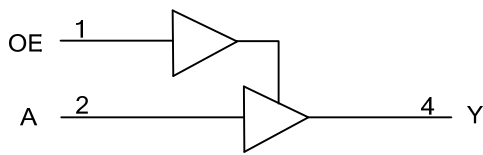


■ FUNCTION TABLE

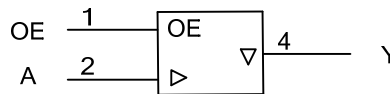
INPUT(OE)	INPUT(A)	OUTPUT(Y)
H	H	H
H	L	L
L	X	Z

Note: H: HIGH voltage level; L: LOW voltage level; X: don't care; Z: high impedance state

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +4.6	V
Input Voltage	V_{IN}		-0.5 ~ +4.6	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 ~ +4.6	V
Continuous V_{CC} or GND Current	I_{CC}		±50	mA
Continuous Output Current	I_{OUT}	$V_{OUT}=0 \sim V_{CC}$	±20	mA
Input Clamp Current	I_{IK}	$V_{IN} < 0$	-50	mA
Output Clamp Current	I_{OK}	$V_O > V_{CC}$ or $V_{OUT} < 0$	-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	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
Operating Temperature	T_A		-40		85	°C
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=0.8V \sim 3.6V$			200	ns/V

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
High-level Input Voltage	V_{IH}	$V_{CC}=0.8V$	V_{CC}		3.6	V	
		$V_{CC}=1.1V \sim 1.95V$	$0.65 \times V_{CC}$		3.6	V	
		$V_{CC}=2.3V \sim 2.7V$	1.6		3.6	V	
		$V_{CC}=3V \sim 3.6V$	2		3.6	V	
Low-level Input Voltage	V_{IL}	$V_{CC}=0.8V$			0	V	
		$V_{CC}=1.1V \sim 1.95V$	0		$0.35 \times V_{CC}$	V	
		$V_{CC}=2.3V \sim 2.7V$	0		0.7	V	
		$V_{CC}=3V \sim 3.6V$	0		0.9	V	
High-Level Output Voltage	V_{OH}	$V_{CC}=0.8 \sim 3.6V, I_{OH}=-20\mu A$	$V_{CC}-0.1$			V	
		$V_{CC}=1.1V, I_{OH}=-1.1mA$	$0.75 \times V_{CC}$			V	
		$V_{CC}=1.4V, I_{OH}=-1.7mA$	1.11			V	
		$V_{CC}=1.65V, I_{OH}=-1.9mA$	1.32			V	
		$V_{CC}=2.3V$	$I_{OH}=-2.3mA$	2.05			V
			$I_{OH}=-3.1mA$	1.9			V
		$V_{CC}=3V$	$I_{OH}=-2.7mA$	2.72			V
			$I_{OH}=-4mA$	2.6			V
Low-Level Output Voltage	V_{OL}	$V_{CC}=0.8 \sim 3.6V, I_{OH}=-20\mu A$			0.1	V	
		$V_{CC}=1.1V, I_{OH}=-1.1mA$			$0.3 \times V_{CC}$	V	
		$V_{CC}=1.4V, I_{OH}=-1.7mA$			0.31	V	
		$V_{CC}=1.65V, I_{OH}=-1.9mA$			0.31	V	
		$V_{CC}=2.3V$	$I_{OH}=2.3mA$			0.31	V
			$I_{OH}=3.1mA$			0.44	V
		$V_{CC}=3V$	$I_{OH}=2.7mA$			0.31	V
			$I_{OH}=4mA$			0.44	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0 \sim 3.6V, V_{IN}=GND \sim 3.6V$			± 0.1	μA
Power OFF Leakage Current	I_{off}	$V_{CC}=0 V, V_{IN}$ or $V_{OUT}=0 \sim 3.6V$			± 0.2	μA
Additional Power OFF Leakage Current	ΔI_{off}	$V_{CC}=0 V \sim 0.2V,$ V_{IN} or $V_{OUT}=0 \sim 3.6V$			± 0.2	μA
Quiescent Supply Current	I_{CC}	$V_{CC}=0.8 \sim 3.6V, V_{IN}=V_{CC}$ or $GND,$ $I_{OUT}=0$			0.5	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	$V_{CC}=3.3 V, V_{IN}=V_{CC}-0.6V, I_{OUT}=0$			40	μA
Input Capacitance	C_I	$V_{CC}=0V, V_{IN}=V_{CC}$ or GND		1.5		pF
		$V_{CC}=3.6V, V_{IN}=V_{CC}$ or GND		1.5		pF
Output Capacitance	C_{OUT}	$V_{CC}=0V, V_{OUT}=GND$		3		pF

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input(A) to output(Y)	t_{PD}	$C_L=5pF,$ $R_L=5K\Omega$	$V_{CC}=0.8V$		18.1		ns
			$V_{CC}=1.2\pm 0.1V$	4.3	7.4		ns
			$V_{CC}=1.5\pm 0.1V$	3.3	5.2		ns
			$V_{CC}=1.8\pm 0.15V$	2.6	4.1		ns
			$V_{CC}=2.5\pm 0.2V$	2	2.9		ns
		$C_L=10pF,$ $R_L=5K\Omega$	$V_{CC}=3.3\pm 0.3V$	1.7	2.4		ns
			$V_{CC}=0.8V$		20.5		ns
			$V_{CC}=1.2\pm 0.1V$	4.6	8.4		ns
			$V_{CC}=1.5\pm 0.1V$	3.5	5.9		ns
			$V_{CC}=1.8\pm 0.15V$	3.9	4.7		ns
		$C_L=15pF,$ $R_L=5K\Omega$	$V_{CC}=2.5\pm 0.2V$	2.3	3.4		ns
			$V_{CC}=3.3\pm 0.3V$	2.1	2.8		ns
			$V_{CC}=0.8V$		22.5		ns
			$V_{CC}=1.2\pm 0.1V$	5.8	9.3		ns
			$V_{CC}=1.5\pm 0.1V$	4.4	6.6		ns
		$C_L=30pF,$ $R_L=5K\Omega$	$V_{CC}=1.8\pm 0.15V$	3.5	5.3		ns
			$V_{CC}=2.5\pm 0.2V$	2.7	3.9		ns
			$V_{CC}=3.3\pm 0.3V$	2.4	3.2		ns
			$V_{CC}=0.8V$		29		ns
			$V_{CC}=1.2\pm 0.1V$	7.4	12		ns
$C_L=30pF,$ $R_L=5K\Omega$	$V_{CC}=1.5\pm 0.1V$	5.7	8.6		ns		
	$V_{CC}=1.8\pm 0.15V$	4.8	6.9		ns		
	$V_{CC}=2.5\pm 0.2V$	3.9	5.1		ns		
		$V_{CC}=3.3\pm 0.3V$	3.5	4.8		ns	

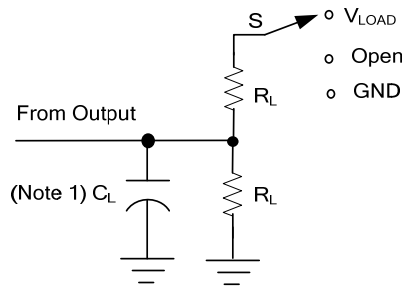
■ SWITCHING CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
Propagation delay from input(OE) to output(Y)	t_{en}	$C_L=5pF,$ $R_L=5K\Omega$	$V_{CC}=0.8V$		19.1		ns	
			$V_{CC}=1.2\pm 0.1V$	5.1	9.3		ns	
			$V_{CC}=1.5\pm 0.1V$	4.1	6.6		ns	
			$V_{CC}=1.8\pm 0.15V$	3.2	5.3		ns	
			$V_{CC}=2.5\pm 0.2V$	2.5	3.8		ns	
			$V_{CC}=3.3\pm 0.3V$	2.1	3.2		ns	
		$C_L=10pF,$ $R_L=5K\Omega$	$V_{CC}=0.8V$			21.8		ns
			$V_{CC}=1.2\pm 0.1V$	4.9	10.2		ns	
			$V_{CC}=1.5\pm 0.1V$	3.9	7.3		ns	
			$V_{CC}=1.8\pm 0.15V$	3.4	5.8		ns	
			$V_{CC}=2.5\pm 0.2V$	2.5	4.3		ns	
			$V_{CC}=3.3\pm 0.3V$	2.1	3.7		ns	
		$C_L=15pF,$ $R_L=5K\Omega$	$V_{CC}=0.8V$			25.2		ns
			$V_{CC}=1.2\pm 0.1V$	7	11.3		ns	
			$V_{CC}=1.5\pm 0.1V$	5.5	8.1		ns	
			$V_{CC}=1.8\pm 0.15V$	4.3	6.5		ns	
			$V_{CC}=2.5\pm 0.2V$	3.4	4.8		ns	
			$V_{CC}=3.3\pm 0.3V$	2.9	4.1		ns	
		$C_L=30pF,$ $R_L=5K\Omega$	$V_{CC}=0.8V$			33.4		ns
			$V_{CC}=1.2\pm 0.1V$	8.8	14.1		ns	
			$V_{CC}=1.5\pm 0.1V$	6.9	10.1		ns	
			$V_{CC}=1.8\pm 0.15V$	5.6	8.1		ns	
			$V_{CC}=2.5\pm 0.2V$	4.3	6.1		ns	
			$V_{CC}=3.3\pm 0.3V$	3.7	5.2		ns	
Propagation delay from input(OE) to output(Y)	t_{dis}	$C_L=5pF,$ $R_L=5K\Omega$	$V_{CC}=0.8V$		12.1		ns	
			$V_{CC}=1.2\pm 0.1V$	2.4	4.1		ns	
			$V_{CC}=1.5\pm 0.1V$	1.8	2.9		ns	
			$V_{CC}=1.8\pm 0.15V$	1	2.9		ns	
			$V_{CC}=2.5\pm 0.2V$	1	1.8		ns	
			$V_{CC}=3.3\pm 0.3V$	1.2	2.2		ns	
		$C_L=10pF,$ $R_L=5K\Omega$	$V_{CC}=0.8V$			13		ns
			$V_{CC}=1.2\pm 0.1V$	3.8	6.6		ns	
			$V_{CC}=1.5\pm 0.1V$	2.2	4.7		ns	
			$V_{CC}=1.8\pm 0.15V$	2.4	4.4		ns	
			$V_{CC}=2.5\pm 0.2V$	1.3	3.1		ns	
			$V_{CC}=3.3\pm 0.3V$	1.9	3.4		ns	
		$C_L=15pF,$ $R_L=5K\Omega$	$V_{CC}=0.8V$			14		ns
			$V_{CC}=1.2\pm 0.1V$	3.7	5.8		ns	
			$V_{CC}=1.5\pm 0.1V$	5.5	3.9		ns	
			$V_{CC}=1.8\pm 0.15V$	3.3	4.5		ns	
			$V_{CC}=2.5\pm 0.2V$	2.3	3.2		ns	
			$V_{CC}=3.3\pm 0.3V$	2.4	4.8		ns	
		$C_L=30pF,$ $R_L=5K\Omega$	$V_{CC}=0.8V$			17.7		ns
			$V_{CC}=1.2\pm 0.1V$	5.8	10		ns	
			$V_{CC}=1.5\pm 0.1V$	5.7	7.7		ns	
			$V_{CC}=1.8\pm 0.15V$	4.5	7.7		ns	
			$V_{CC}=2.5\pm 0.2V$	3.9	5.6		ns	
			$V_{CC}=3.3\pm 0.3V$	3.3	8.4		ns	

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance (Outputs enabled)	C_{PD}	$V_{CC}=0.8\text{V}$, $f=10\text{MHz}$		3.8		pF
		$V_{CC}=1.2\pm 0.1\text{V}$, $f=10\text{MHz}$		3.7		pF
		$V_{CC}=1.5\pm 0.1\text{V}$, $f=10\text{MHz}$		3.7		pF
		$V_{CC}=1.8\pm 0.15\text{V}$, $f=10\text{MHz}$		3.7		pF
		$V_{CC}=2.5\pm 0.2\text{V}$, $f=10\text{MHz}$		3.9		pF
		$V_{CC}=3.3\pm 0.3\text{V}$, $f=10\text{MHz}$		4		pF

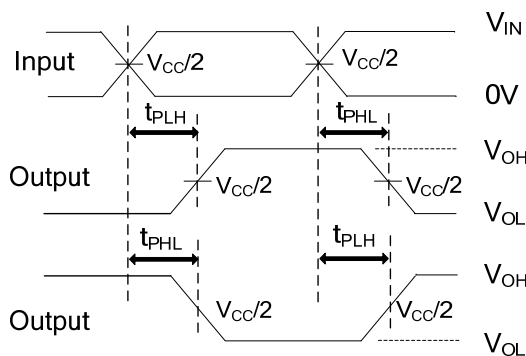
■ TEST CIRCUIT AND WAVEFORMS



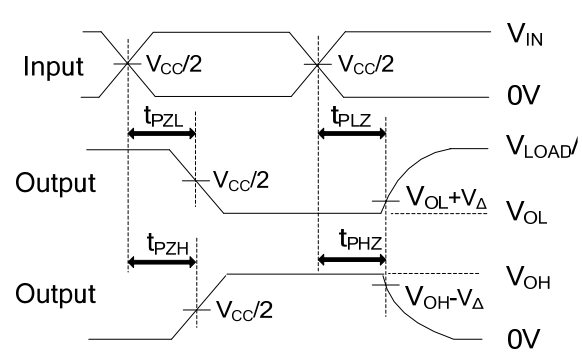
TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	$2 \times V_{CC}$

TEST CIRCUIT

V_{CC}	V_{IN}	t_R / t_F	V_M	V_{LOAD}	C_L	R_L	V_{Δ}
0.8	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.1V
$1.2 \pm 0.1V$	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.1V
$1.5 \pm 0.1V$	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.1V
$1.8 \pm 0.15V$	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.15V
$2.5 \pm 0.2V$	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.15V
$3.3 \pm 0.3V$	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.3V



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 $\leq 10MHz$, $Z_0 = 50\Omega$.

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