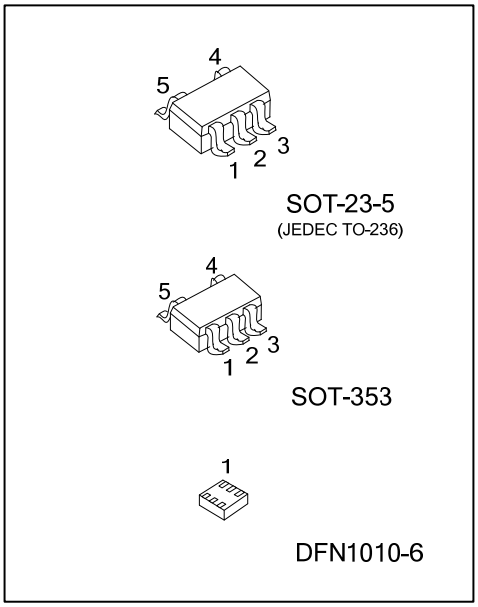
U74AUP1G126

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}=0.5μA (Max.)
* Optimized for 3.3V Operation

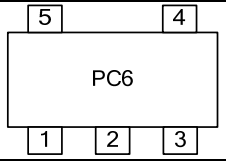
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AUP1G126L-AE5-R	U74AUP1G126G-AE5-R	SOT-23-5	Tape Reel
U74AUP1G126L-AL5-R	U74AUP1G126G-AL5-R	SOT-353	Tape Reel
U74AUP1G126L-K06-1010-R	U74AUP1G126G-K06-1010-R	DFN1010-6	Tape Reel

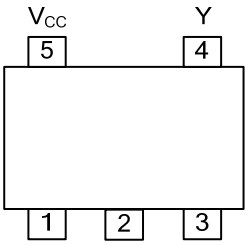
U74AUP1G126G-AE5-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) AE5: SOT-23-5, AL5: SOT-353,
K06-1010: DFN1010-6
(3) G: Halogen Free and Lead Free, L: Lead Free

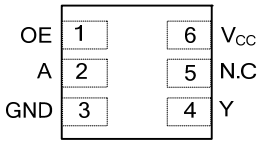
■ MARKING

SOT-23-5 / SOT-353	DFN1010-6
	

■ PIN CONFIGURATION



SOT-23-5 / SOT-353



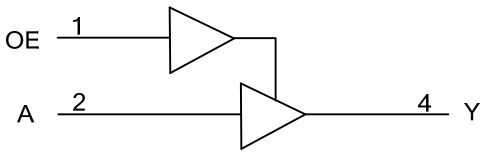
DFN1010-6
(TOP VIEW)

■ FUNCTION TABLE

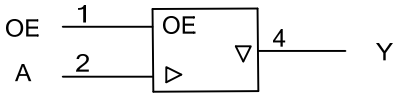
INPUT(OE)	INPUT(A)	OUTPUT(Y)
H	H	H
H	L	L
L	X	Z

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 ~ 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
Input Transition Rise or Fall Rate	Δt/Δv	V_{CC}=0.8V ~ 3.6V			200	ns/V
Operating Temperature	T_A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (T_A =25°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 ~ 1.95V		0.65×V_{CC}		3.6	V
		V_{CC}=2.3V ~2.7V		1.6		3.6	V
		V_{CC}=3V ~3.6V		2		3.6	
Low-level Input Voltage	V_{IL}	V_{CC}=0.8V				0	V
		V_{CC}=1.1V ~ 1.95V		0		0.35×V_{CC}	V
		V_{CC}=2.3V ~2.7V		0		0.7	V
		V_{CC}=3V ~3.6V		0		0.9	
High-Level Output Voltage	V_{OH}	V_{CC}=0.8 ~ 3.6V, I_{OH}=-20μA		V_{CC}-0.1			V
		V_{CC}=1.1V, I_{OH}=-1.1mA		0.75×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 ~ 3.6V, I_{OL}=20μA				0.1	V
		V_{CC}=1.1V, I_{OL}=1.1mA				0.3×V_{CC}	V
		V_{CC}=1.4V, I_{OL}=1.7mA				0.31	V
		V_{CC}=1.65V, I_{OL}=1.9mA				0.31	V
		V_{CC}=2.3V	I_{OL}=2.3mA			0.31	V
			I_{OL}=3.1mA			0.44	V
		V_{CC}=3V	I_{OL}=2.7mA			0.31	V
			I_{OL}=4mA			0.44	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0 ~ 3.6V, V_{IN}=GND ~ 3.6V			±0.1	μA
Power OFF Leakage Current	I_{off}	V_{CC}=0 V, V_{IN} or V_{OUT}=0 ~ 3.6V			±0.2	μA
Additional Power OFF Leakage Current	ΔI_{off}	V_{CC}=0 V~0.2V, V_{IN} or V_{OUT}=0 ~ 3.6V			±0.2	μA
Quiescent Supply Current	I_{CC}	V_{CC}=0.8 ~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°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=5KΩ	V_{CC}=0.8V		18.1		ns
			V_{CC}=1.2±0.1V	4.3	7.4		ns
			V_{CC}=1.5±0.1V	3.3	5.2		ns
			V_{CC}=1.8±0.15V	2.6	4.1		ns
			V_{CC}=2.5±0.2V	2	2.9		ns
			V_{CC}=3.3±0.3V	1.7	2.4		ns
		C_L=10pF, R_L=5KΩ	V_{CC}=0.8V		20.5		ns
			V_{CC}=1.2±0.1V	4.6	8.4		ns
			V_{CC}=1.5±0.1V	3.5	5.9		ns
			V_{CC}=1.8±0.15V	3.9	4.7		ns
			V_{CC}=2.5±0.2V	2.3	3.4		ns
			V_{CC}=3.3±0.3V	2.1	2.8		ns
		C_L=15pF, R_L=5KΩ	V_{CC}=0.8V		22.5		ns
			V_{CC}=1.2±0.1V	5.8	9.3		ns
			V_{CC}=1.5±0.1V	4.4	6.6		ns
			V_{CC}=1.8±0.15V	3.5	5.3		ns
			V_{CC}=2.5±0.2V	2.7	3.9		ns
			V_{CC}=3.3±0.3V	2.4	3.2		ns
		C_L=30pF, R_L=5KΩ	V_{CC}=0.8V		29		ns
			V_{CC}=1.2±0.1V	7.4	12		ns
			V_{CC}=1.5±0.1V	5.7	8.6		ns
			V_{CC}=1.8±0.15V	4.8	6.9		ns
			V_{CC}=2.5±0.2V	3.9	5.1		ns
			V_{CC}=3.3±0.3V	3.5	4.8		ns

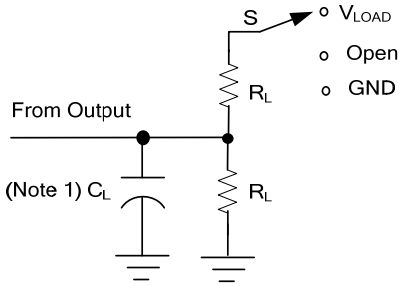
■ SWITCHING CHARACTERISTICS (Cont.)

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

■ OPERATING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

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

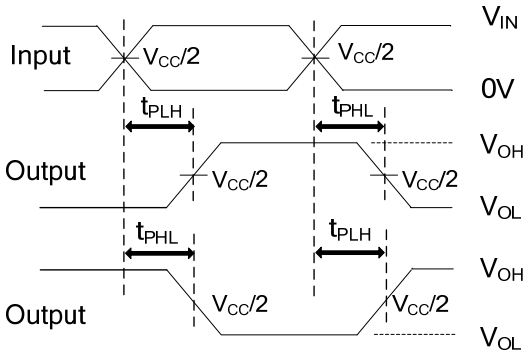
■ TEST CIRCUIT AND WAVEFORMS



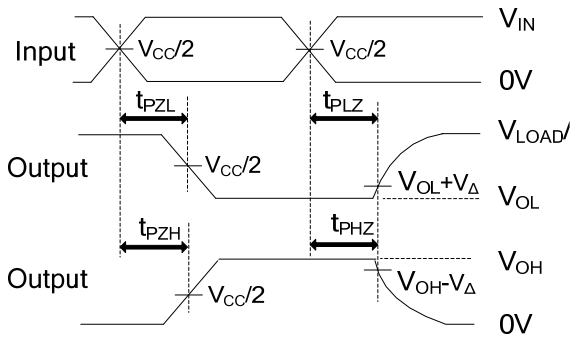
TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	$2\times V_{CC}$

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	5kΩ	0.1V
1.2±0.1V	V_{CC}	3ns	$V_{CC}/2$	$2\times V_{CC}$	5,10,15,30pF	5kΩ	0.1V
1.5±0.1V	V_{CC}	3ns	$V_{CC}/2$	$2\times V_{CC}$	5,10,15,30pF	5kΩ	0.1V
1.8±0.15V	V_{CC}	3ns	$V_{CC}/2$	$2\times V_{CC}$	5,10,15,30pF	5kΩ	0.15V
2.5±0.2V	V_{CC}	3ns	$V_{CC}/2$	$2\times V_{CC}$	5,10,15,30pF	5kΩ	0.15V
3.3±0.3V	V_{CC}	3ns	$V_{CC}/2$	$2\times V_{CC}$	5,10,15,30pF	5kΩ	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 ≤10MHz, Z_O = 50Ω.