



U74AUP1G14

CMOS IC

LOW-POWER SINGLE SCHMITT-TRIGGER INVERTER

DESCRIPTION

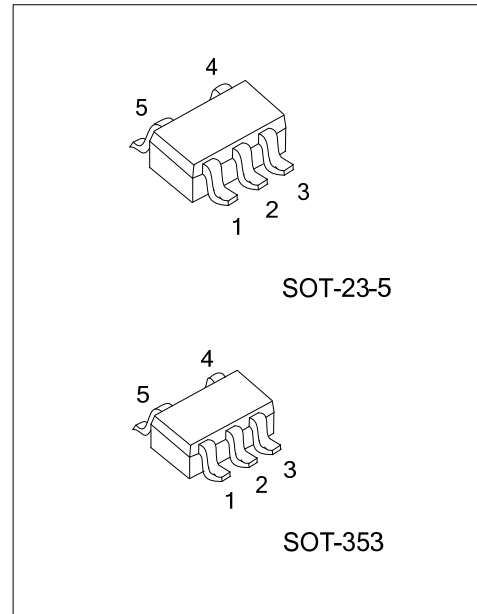
This **U74AUP1G14** functions as an independent gate with Schmitt-trigger inputs, which allows for slow input transition and better switching-noise immunity at the input.

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

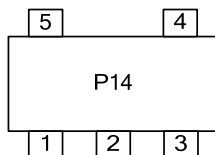


ORDERING INFORMATION

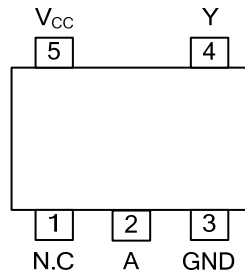
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AUP1G14L-AE5-R	U74AUP1G14G-AE5-R	SOT-23-5	Tape Reel
U74AUP1G14L-AL5-R	U74AUP1G14G-AL5-R	SOT-353	Tape Reel

<p>U74AUP1G14G-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 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



■ PIN CONFIGURATION

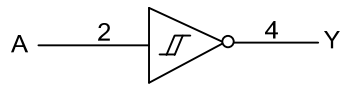


■ FUNCTION TABLE (each gate)

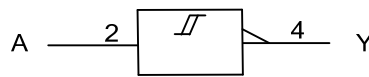
INPUT (A)	OUTPUT (Y)
L	H
H	L

Note: H: HIGH voltage level; L: LOW voltage level

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

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■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	TEST 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}	$V_{OUT} > V_{CC}$ 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	
Positive-Going Input Threshold Voltage	V_{T+}	$V_{CC}=0.8V$	0.3		0.6	V	
		$V_{CC}=1.1V$	0.53		0.9	V	
		$V_{CC}=1.4V$	0.74		1.11	V	
		$V_{CC}=1.65V$	0.91		1.29	V	
		$V_{CC}=2.3V$	1.37		1.77	V	
		$V_{CC}=3V$	1.88		2.29	V	
Negative-Going Input Threshold Voltage	V_{T-}	$V_{CC}=0.8V$	0.1		0.6	V	
		$V_{CC}=1.1V$	0.26		0.65	V	
		$V_{CC}=1.4V$	0.39		0.75	V	
		$V_{CC}=1.65V$	0.47		0.84	V	
		$V_{CC}=2.3V$	0.69		1.04	V	
		$V_{CC}=3V$	0.88		1.24	V	
Hysteresis Voltage ($V_{T+}-V_{T-}$)	ΔV_T	$V_{CC}=0.8V$	0.07		0.5	V	
		$V_{CC}=1.1V$	0.08		0.46	V	
		$V_{CC}=1.4V$	0.18		0.56	V	
		$V_{CC}=1.65V$	0.27		0.66	V	
		$V_{CC}=2.3V$	0.53		0.92	V	
		$V_{CC}=3V$	0.79		1.31	V	
High-Level Output Voltage	V_{OH}	$V_{CC}=0.8V \sim 3.6V, I_{OH}=-20\mu A$	$V_{CC}-0.1$			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		

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Low-Level Output Voltage	V _{OL}	V _{CC} =0.8V ~ 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		
Input Leakage Current	I _{I(LEAK)}	V _{CC} =0V ~ 3.6V, V _{IN} =V _{CC} or GND			±0.1	μA	
Power OFF Leakage Current	I _{OFF}	V _{CC} =0V, V _{IN} or V _{CC} =3.6V			±0.2	μA	
Additional Power OFF Leakage Current	ΔI _{off}	V _{CC} =0V~0.2V, V _{IN} or V _{OUT} =0V~3.6V			±0.2	μA	
Quiescent Supply Current	I _{CC}	V _{CC} =0.8V ~3.6V, I _{OUT} =0, V _{IN} =V _{CC} or GND			0.5	μA	
Additional Quiescent Supply Current	ΔI _{CC}	V _{CC} =3.3V, One input at V _{CC} -0.6V, other inputs at V _{CC} or GND			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		2.5		pF	

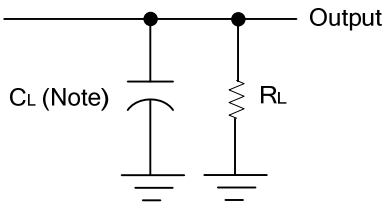
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
Propagation delay from input (A) to output(Y)	t _{PLH} /t _{PHL}	C _L =5pF, R _L =1MΩ	V _{CC} =0.8V		20.3		ns	
			V _{CC} =1.2V±0.1V	3.0	6.9		ns	
			V _{CC} =1.5V±0.1V	2.6	5.2		ns	
			V _{CC} =1.8V±0.15V	2.2	4.4		ns	
			V _{CC} =2.5V±0.2V	2.0	3.5		ns	
			V _{CC} =3.3V±0.3V	1.9	3		ns	
		C _L =10pF, R _L =1MΩ	V _{CC} =0.8V			23.9		ns
			V _{CC} =1.2V±0.1V	3.5	7.9		ns	
			V _{CC} =1.5V±0.1V	3.0	6		ns	
			V _{CC} =1.8V±0.15V	2.7	5		ns	
			V _{CC} =2.5V±0.2V	2.4	4		ns	
			V _{CC} =3.3V±0.3V	2.4	3.5		ns	
		C _L =15pF, R _L =1MΩ	V _{CC} =0.8V			27.3		ns
			V _{CC} =1.2V±0.1V	3.9	8.7		ns	
			V _{CC} =1.5V±0.1V	3.3	6.7		ns	
			V _{CC} =1.8V±0.15V	3.0	5.6		ns	
			V _{CC} =2.5V±0.2V	2.8	4.5		ns	
			V _{CC} =3.3V±0.3V	2.7	3.9		ns	
		C _L =30pF, R _L =1MΩ	V _{CC} =0.8V			25.7		ns
			V _{CC} =1.2V±0.1V	5.1	11.2		ns	
			V _{CC} =1.5V±0.1V	4.3	8.5		ns	
			V _{CC} =1.8V±0.15V	3.9	7.2		ns	
			V _{CC} =2.5V±0.2V	3.6	5.7		ns	
			V _{CC} =3.3V±0.3V	3.5	5		ns	

■ OPERATING CHARACTERISTICS (f=10MHz, T_A =25°C , unless otherwise specified)

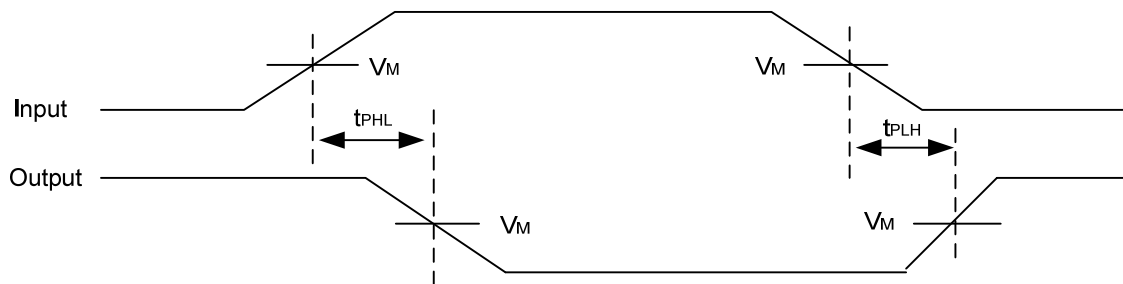
PARAMETER	SYMBOL	TEST CONDITONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{PD}	V _{CC} =0.8V		4		pF
		V _{CC} =1.2V±0.1V		4		pF
		V _{CC} =1.5V±0.1V		4.1		pF
		V _{CC} =1.8V±0.15V		4.1		pF
		V _{CC} =2.5V±0.2V		4.3		pF
		V _{CC} =3.3V±0.3V		4.4		pF

■ TEST CIRCUIT AND WAVEFORMS



Note: C_L includes probe and jig capacitance.

V_{CC}	V_{IN}	t_R / t_F	V_M	C_L	R_L
0.8V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω
1.2V \pm 0.1V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω
1.5V \pm 0.1V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω
1.8V \pm 0.15V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω
2.5V \pm 0.2V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω
3.3V \pm 0.3V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω



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