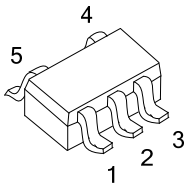
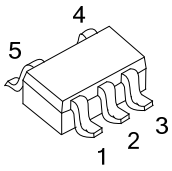
U74AUP1G14

CMOS IC

LOW-POWER SINGLE SCHMITT-TRIGGER INVERTER



SOT-23-5



SOT-353

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

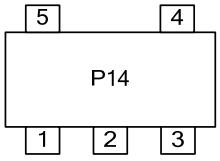
■ ORDERING INFORMATION

Ordering Number	Package	Packing
U74AUP1G14G-AE5-R	SOT-23-5	Tape Reel
U74AUP1G14G-AL5-R	SOT-353	Tape Reel

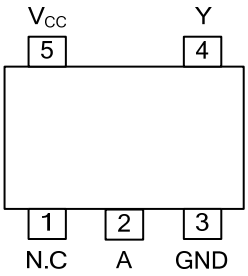
U74AUP1G14G-AE5-R
(1)Packing Type
(2)Package Type
(3)Green Package

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

■ MARKING



■ PIN CONFIGURATION

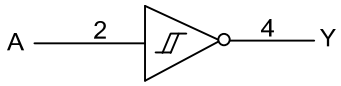


■ FUNCTION TABLE (each gate)

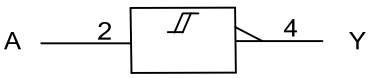
INPUT (A)	OUTPUT (Y)
L	H
H	L

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

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ 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 ~ 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	Δt/Δv	V_{CC}=0.8V ~ 3.6V			200	ns/V

■ ELECTRICAL CHARACTERISTICS (T_A =25°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-})	△V_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 ~ 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

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Low-Level Output Voltage	V_{OL}	V_{CC}=0.8V ~ 3.6V, I_{OH}=20μA				0.1	V
		V_{CC}=1.1V, I_{OH}=1.1mA				0.3×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
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

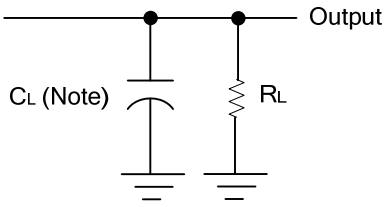
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

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 CONDTIONS	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}	≤3ns	$V_{CC}/2$	5,10,15,30pF	1MΩ
1.2V±0.1V	V_{CC}	≤3ns	$V_{CC}/2$	5,10,15,30pF	1MΩ
1.5V±0.1V	V_{CC}	≤3ns	$V_{CC}/2$	5,10,15,30pF	1MΩ
1.8V±0.15V	V_{CC}	≤3ns	$V_{CC}/2$	5,10,15,30pF	1MΩ
2.5V±0.2V	V_{CC}	≤3ns	$V_{CC}/2$	5,10,15,30pF	1MΩ
3.3V±0.3V	V_{CC}	≤3ns	$V_{CC}/2$	5,10,15,30pF	1MΩ