

1. Description

The 74AUP1G14 is a high performance single inverter with Schmitt-Trigger inputs operating from a 0.8V to 3.6V supply. This device is to achieve ultra-high speed with high output drive.

2. Features

- Designed for 0.8V to 3.6V V_{CC} Operation
- Low static power consumption; $I_{CC}=0.7\mu A$ (maximum)
- 4mA Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and are RoHS Compliant
- Tiny SC70-5, SOT23-5 and DFN6(1.0×1.5) Packages

3. Pinning information

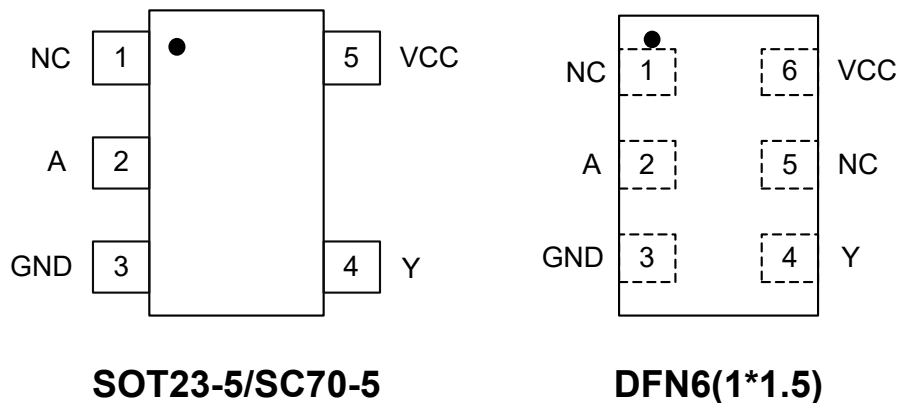


Figure1. Top View



4.Pin Function

SC70-5/ SOT23-5

Pin No.	Pin Name	Function
1	NC	No connect
2	A	Input
3	GND	Ground
4	Y	Output
5	VCC	Supply Voltage

DFN6

Pin No.	Pin Name	Function
1	NC	No connect
2	A	Input
3	GND	Ground
4	Y	Output
5	NC	No connect
6	VCC	Supply Voltage



5.Block Diagram

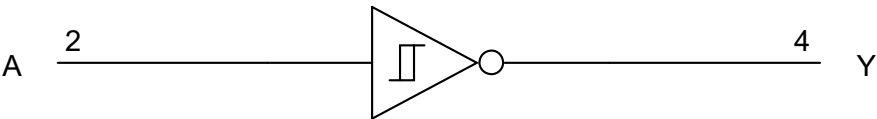


Figure2. Logic Symbol

Function Table

Input	Output
A	Y
L	H
H	L



6. Absolute Maximum Ratings

Parameter		Symbol	Value	Units
DC Supply Voltage		V_{CC}	-0.5 to 4.6	V
DC Input Voltage		V_I	$-0.5 \leq V_I \leq 4.6$	V
DC Output Voltage Output in Higher or Low State ⁽¹⁾		V_O	-0.5 to 4.6	V
DC Input Diode Current $V_I < \text{GND}$		I_{IK}	-50	mA
DC Output Diode Current $V_O < \text{GND}$, $V_O > V_{CC}$		I_{OK}	± 50	mA
DC Output Sink Current		I_O	± 20	mA
DC Supply Current per Supply Pin		I_{CC}	± 50	mA
Storage Temperature Range		T_{STG}	-65 to 150	°C
Lead Temperature, 1 mm from Case for 10 Seconds		T_L	260	°C
Max Junction Temperature		T_J	150	°C
ESD Classification	Human Body Model ⁽²⁾	V_{ESD}	± 4000	V
	Charged Device Model ⁽³⁾		± 1000	V
Max Latch up Current Above V_{CC} and GND at 125°C ⁽⁴⁾		I_{LU}	± 100	mA



7. Thermal Characteristics

Ratings	Package	Symbol	Value	Units
Thermal Characteristics, Thermal Resistance, Junction-to-Air	SC70-5	$R_{\theta JA}$	300	°C/W
	SOT23-5		250	
	DFN6(1.0x1.5)		440	
Power Dissipation in Still Air at 85°C	SC70-5	P_D	215	mW
	SOT23-5		260	
	DFN6(1.0x1.5)		150	

8. Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
DC Supply Voltage Operating	V_{CC}	0.8	3.6	V
DC input Voltage	V_{IN}	0	3.6	V
DC Output Voltage (High or Low State)	V_{OUT}	0	3.6	V
Operating Temperature Range	T_A	-40	85	°C

Notes:

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied.



9. Electrical Characteristics

DC Electrical Characteristics

Parameter	Condition	Symbol	$V_{CC}(V)$	$T_A=25^{\circ}C$			$-40^{\circ}C \leq T_A \leq 85^{\circ}C$		Units
				Min	Typ	Max	Min	Max	
Positive-going input threshold voltage		V_{T+}	0.8	0.3		0.6	0.3	0.6	V
			1.1	0.53		0.9	0.53	0.9	
			1.4	0.74		1.11	0.74	1.11	
			1.65	0.91		1.29	0.91	1.29	
			2.3	1.37		1.77	1.37	1.77	
			3	1.88		2.29	1.88	2.29	
Negative-going input threshold voltage		V_{T-}	0.8	0.1		0.6	0.1	0.6	V
			1.1	0.26		0.65	0.26	0.65	
			1.4	0.39		0.75	0.39	0.75	
			1.65	0.47		0.84	0.47	0.84	
			2.3	0.69		1.04	0.69	1.04	
			3	0.88		1.24	0.88	1.24	
High-Level Output Voltage	$I_{OH}=-20\mu A$	V_{OH}	0.8 to 3.6	$V_{CC}-0.1$			$V_{CC}-0.1$		V
	$I_{OH}=-1.1mA$		1.1	0.82	1.02		0.77		
	$I_{OH}=-1.7\mu A$		1.4	1.11	1.32		1.03		
	$I_{OH}=-1.9mA$		1.65	1.32	1.58		1.30		
	$I_{OH}=-2.3mA$		2.3	2.05	2.24		1.97		
	$I_{OH}=-3.1mA$			1.9	2.22		1.85		
	$I_{OH}=-2.7mA$		3	2.72	2.95		2.67		
	$I_{OH}=-4.0mA$			2.6	2.92		2.55		



Parameter	Condition	Symbol	$V_{CC}(V)$	$T_A=25^{\circ}C$			$-40^{\circ}C \leq T_A \leq 85^{\circ}C$		Units
				Min	Typ	Max	Min	Max	
Low-Level Output Voltage	$I_{OL}=20\mu A$	V_{OL}	0.8 to 3.6			0.1		0.1	V
	$I_{OL}=1.1mA$		1.1		0.11	0.33		0.33	
	$I_{OL}=1.7mA$		1.4		0.12	0.31		0.37	
	$I_{OL}=1.9mA$		1.65		0.11	0.31		0.35	
	$I_{OL}=2.3mA$		2.3		0.14	0.31		0.33	
	$I_{OL}=3.1mA$				0.19	0.44		0.45	
	$I_{OL}=2.7mA$		3		0.11	0.31		0.33	
	$I_{OL}=4.0mA$				0.16	0.44		0.45	
Input Leakage Current	$V_{IN}=V_{CC}$ or GND	I_{IN}	0 to 3.6			0.1		0.2	μA
Power Off Leakage Current	$V_{IN}=3.6V$ or $V_{OUT}=3.6V$	I_{OFF}	0			0.2		0.5	μA
Quiescent Supply Current	$V_{IN}=3.6V$ or GND	I_{CC}	3.6			0.2		0.7	μA



10.AC Electrical Characteristics

$t_r = t_f = 2.5\text{ns}$

Parameter	Condition	Symbol	V _{CC} (V)	T _A =25°C			-40°C≤T _A ≤85°C		Units
				Min	Typ	Max	Min	Max	
Propagation Delay (Figure3 And 4)	C _L =5pF ⁽⁵⁾	t _{PHL}	0.8		16.3				ns
			1.2	4.2	6.9	11.7	0.9	15	
			1.5	3.7	5.2	8.4	1.7	10.7	
			1.8	3.3	4.4	6.9	1.9	8.5	
			2.5	2.8	3.5	4.8	1.8	6.1	
			3.3	2.5	3	4	1.7	4.9	
	C _L =10pF ⁽⁵⁾		0.8		18.4				ns
			1.2	4.6	7.9	13.4	1.3	16.7	
			1.5	4	6	9.6	2.2	11.8	
			1.8	3.6	5	7.9	2.4	9.5	
			2.5	3.2	4	5.5	2.3	6.8	
			3.3	2.9	3.5	4.6	2.1	5.6	
	C _L =15pF ⁽⁵⁾	t _{PLH}	0.8		20.1				ns
			1.2	5.5	8.7	14	2.5	17.3	
			1.5	4.7	6.7	10	3	12.5	
			1.8	4.2	5.6	8.3	3	10.1	
			2.5	3.6	4.5	5.9	2.7	7.4	
			3.3	3.3	3.9	5	2.5	6.1	
	C _L =30pF ⁽⁵⁾		0.8		25.7				ns
			1.2	7.4	11.2	17.1	4.5	20.5	
			1.5	6.1	8.5	12.3	4.6	14.7	
			1.8	5.4	7.2	10.3	4.1	12	
			2.5	4.7	5.7	7.4	3.7	8.8	
			3.3	4.2	5	6.2	3.5	7.3	

Notes: (5) C_L includes probe and jig capacitance.



11.Capacitance Characteristics

Parameter	Symbol	Condition		Typ	Units
Input Capacitance	C _{IN}	V _{CC} =3.6V, V _I = 0 V or V _{CC}		2	pF
output capacitance	C _O	V _{CC} = 0V, V _{OUT} =GND		3	pF
Power Dissipation Capacitance ⁽⁶⁾	C _{PD}	1MHz, V _I =0 V to V _{CC}	V _{CC} =0.8V	4	pF
			V _{CC} =1.2V	4	
			V _{CC} =1.5V	4.1	
			V _{CC} =1.8V	4.1	
			V _{CC} =2.5V	4.3	
			V _{CC} =3.3V	4.4	

Notes:

(6) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: I_{CC(OPR)}=C_{PD}×V_{CC}×f_{in}+I_{CC}×C_{PD} is used to determine the no-load dynamic power consumption; P_D=C_{PD}×V_{CC}² ×f_{in}+I_{CC}×V_{CC}×Fig.

12.Waveform and Test Circuit

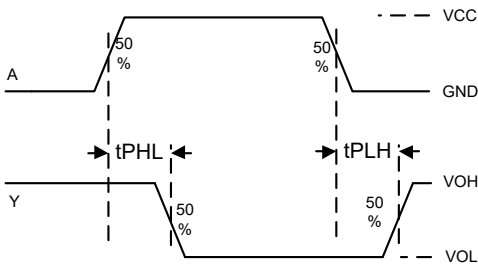


Figure3. Switching Waveform

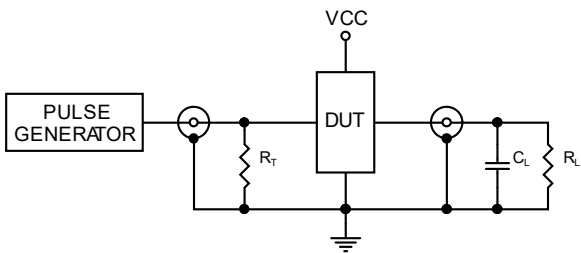
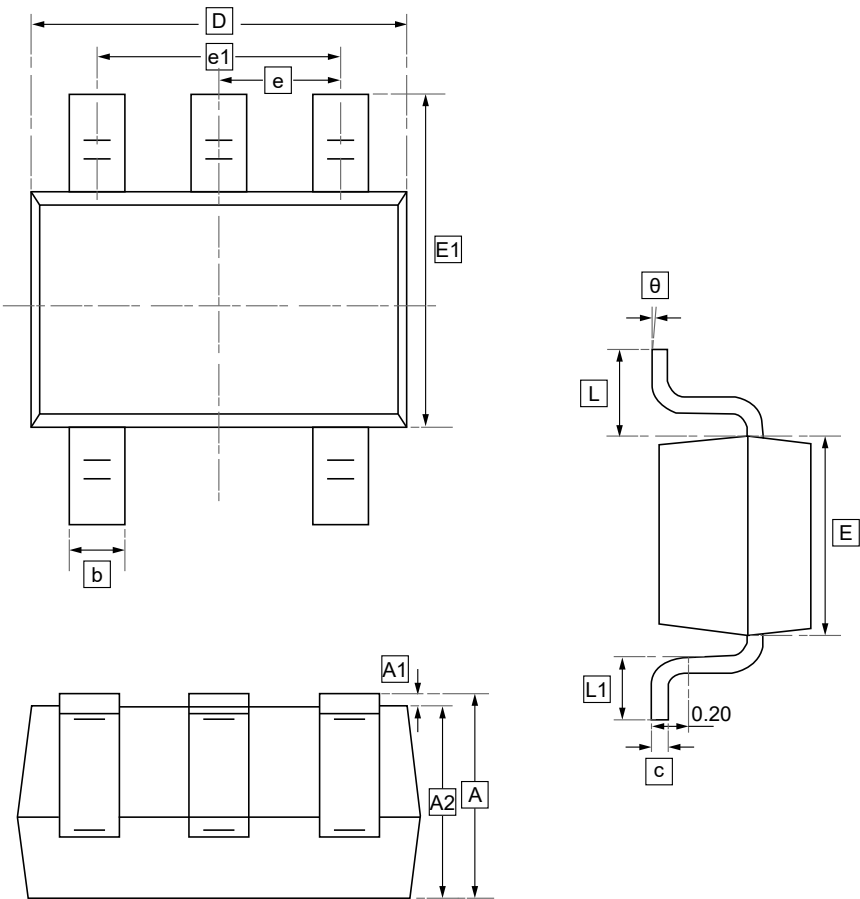


Figure4. Test Circuit



13.1SC70-5 Package Outline Dimensions

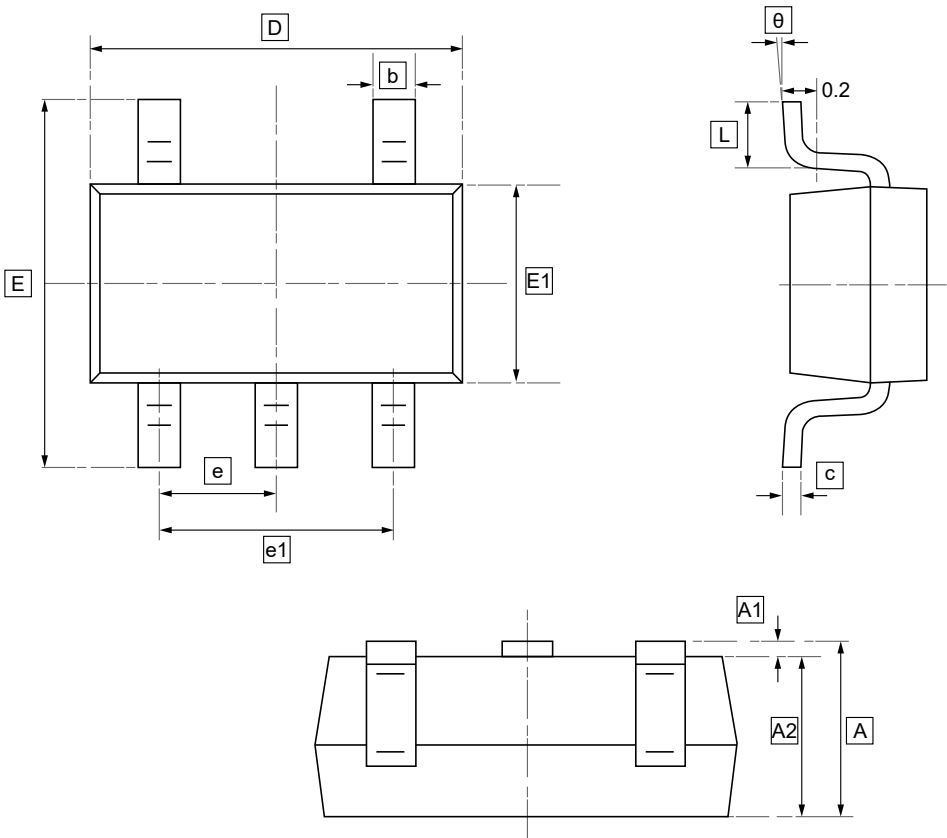


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	e1	L	θ
Min	0.90	0.00	0.90	0.15	0.08	2.05	1.15	2.15	0.65	1.20	0.26	7°
Max	1.10	0.10	1.00	0.35	0.15	2.25	1.35	2.45	TYP	1.40	0.46	REF.



13.2SOT-23-5 Package Outline Dimensions

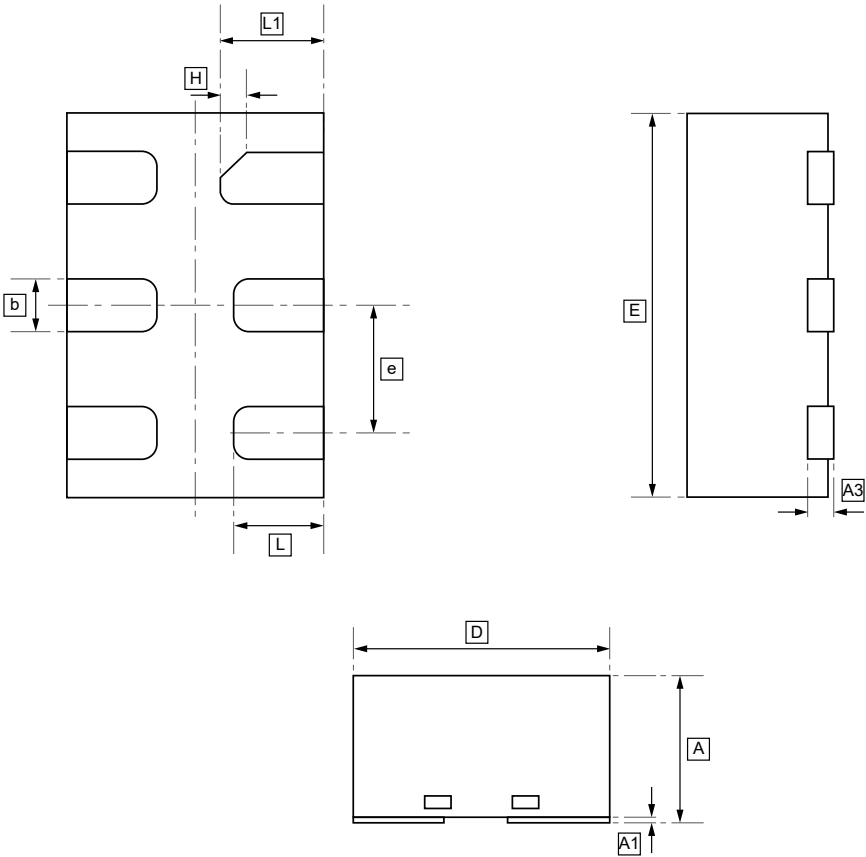


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E1	E	e	e1	L	θ
Min	1.050	0.000	1.050	0.300	0.100	2.820	1.500	2.650	0.950	1.800	0.300	0°
Max	1.250	0.100	1.150	0.500	0.200	3.020	1.700	2.950	BSC	2.000	0.600	8°



13.3DFN6(1*1.5) Package Outline Dimensions

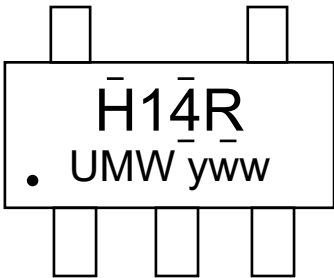


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A3	b	D	E	e	H	L	L1
Min	0.50	0	0.10	0.15	0.90	1.40	0.40	0.10	0.30	0.35
Max	0.60	0.05	REF	0.25	1.10	1.60	0.60	REF	0.40	0.45



14.Ordering information



yww: Batch Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW SN74AUP1G14DCKR	HF5	SC70-5	3000	Tape and reel
UMW SN74AUP1G14DBVR	H14R	SOT23-5	3000	Tape and reel
UMW SN74AUP1G14DRYR	HF	DFN6(1*1.5)	5000	Tape and reel



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