

1.Description

The 74AUP1G04 is a high performance single inverter operating from 0.8V to 3.6V supply. This device is fabricated with advanced CMOS technology 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

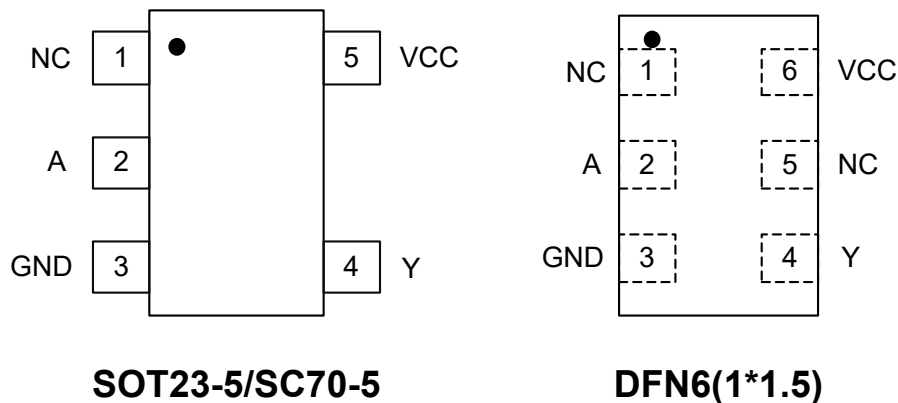


Figure1. Top View



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

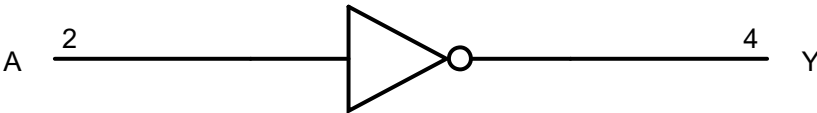


Figure2. Logic Symbol

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
Input Rise and Fall Time	$V_{CC}=0.8V$ to 3.6V	t_r, t_f	0	20	ns/V

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	
High-Level Input Voltage		V_{IH}	0.8V	$0.75V_{CC}$			$0.75V_{CC}$		V
			0.9 to 1.95	$0.7V_{CC}$			$0.7V_{CC}$		
			2.3 to 2.7	1.6			1.6		
			3 to 3.6	2			2		
Low-Level Input Voltage		V_{IL}	0.8			$0.25V_{CC}$		$0.25V_{CC}$	V
			0.9 to 1.95			$0.3V_{CC}$		$0.3V_{CC}$	
			2.3 to 2.7			0.7		0.7	
			3.0 to 3.6			0.9		0.9	
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		
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		15.6				ns
			1.2	3.3	5.9	10.8	2.1	13.5	
			1.5	2.5	4.2	7	1.6	8.8	
			1.8	2.2	3.4	5.9	1.4	7	
			2.5	1.7	2.5	4	1.3	4.9	
			3.3	1.4	2.1	3.2	1.2	3.9	
	C _L =10pF ⁽⁵⁾		0.8		17.7				ns
			1.2	3.9	6.9	12.2	3.1	15	
			1.5	3	5	8.1	2.5	9.9	
			1.8	2.6	4	6.9	2.1	7.9	
			2.5	2.1	3	4.6	1.7	5.6	
			3.3	1.8	2.5	3.8	1.5	4.5	
	C _L =15pF ⁽⁵⁾	t _{PLH}	0.8		19.5				ns
			1.2	4.7	7.8	13	3.8	15.9	
			1.5	3.7	5.6	8.6	3.1	10.6	
			1.8	3.2	4.6	7.4	2.6	8.5	
			2.5	2.5	3.5	5.1	2.1	6.1	
			3.3	2.2	2.9	4.2	1.9	5	
	C _L =30pF ⁽⁵⁾		0.8		25.4				ns
			1.2	6.8	10.4	16	6.1	19	
			1.5	5.3	7.6	10.8	4.8	12.9	
			1.8	4.6	6.3	9.2	4.1	10.5	
			2.5	3.6	4.8	6.5	3.3	7.6	
			3.3	3.2	4	5.4	2.9	6.2	

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



11.Capacitance Characteristics

Parameter	Symbol	Condition		Typ	Units
Input Capacitance	C_{IN}	$V_{CC}=3.6V$, $V_I=0V$ or V_{CC}		2	pF
output capacitance	C_O	$V_{CC}=0V$, $V_{OUT}=GND$		3	pF
Power Dissipation Capacitance ⁽⁶⁾	C_{PD}	1MHz, $V_I=0V$ to V_{CC}	$V_{CC}=0.8V$	7.6	pF
			$V_{CC}=1.2V$	8.1	
			$V_{CC}=1.5V$	8.5	
			$V_{CC}=1.8V$	8.6	
			$V_{CC}=2.5V$	9	
			$V_{CC}=3.3V$	9.6	

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: $I_{CC(OPR)}=C_{PD} \times V_{CC} \times f_{in} + I_{CC} \times C_{PD}$ is used to determine the no-load dynamic power consumption; $P_D=C_{PD} \times V_{CC}^2 \times f_{in} + I_{CC} \times V_{CC} \times Fig.$



12. Waveform and Test Circuit

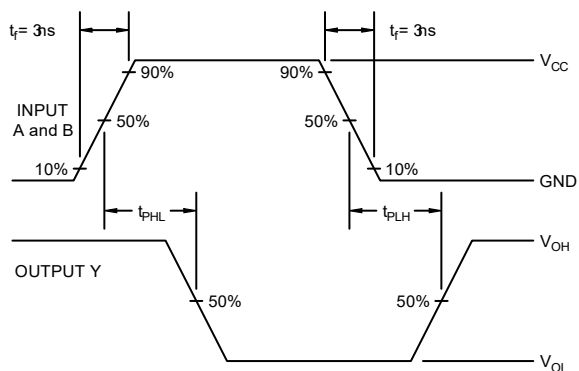


Figure3. Switching Waveform

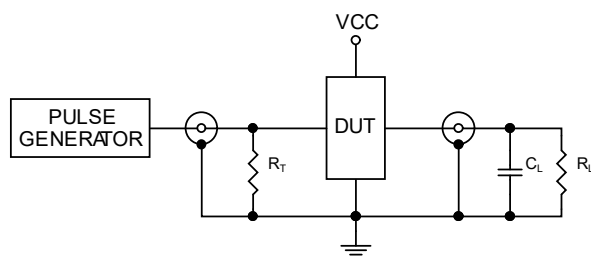
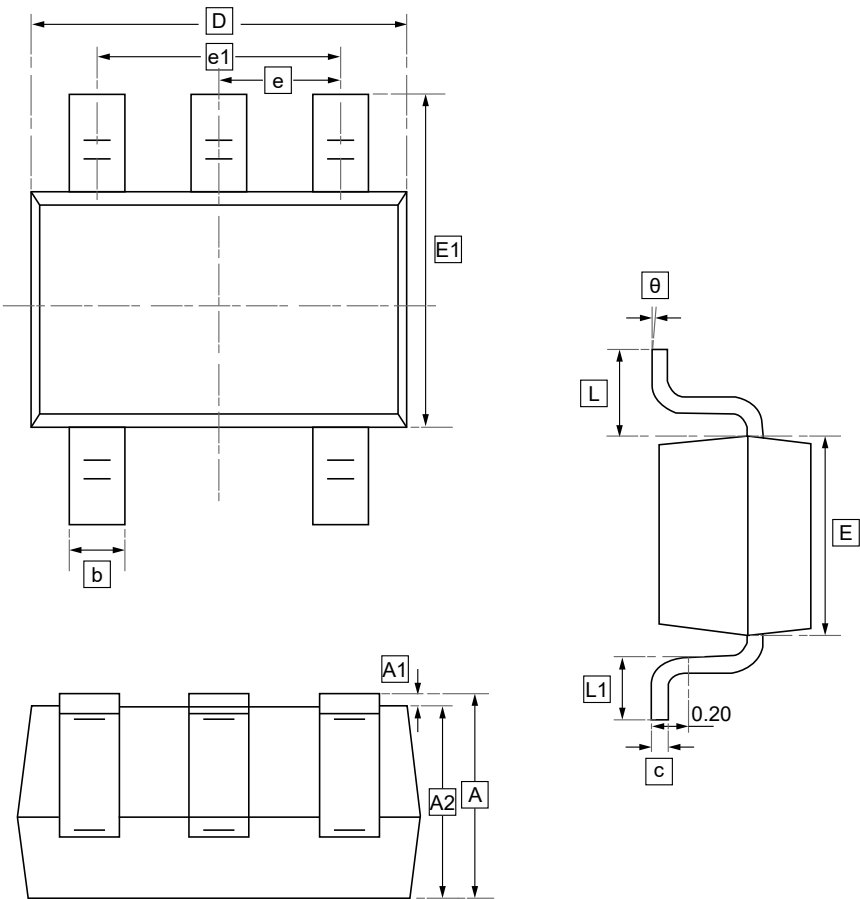


Figure4. Test Circuit



13.1SC70-5 Package Outline Dimensions

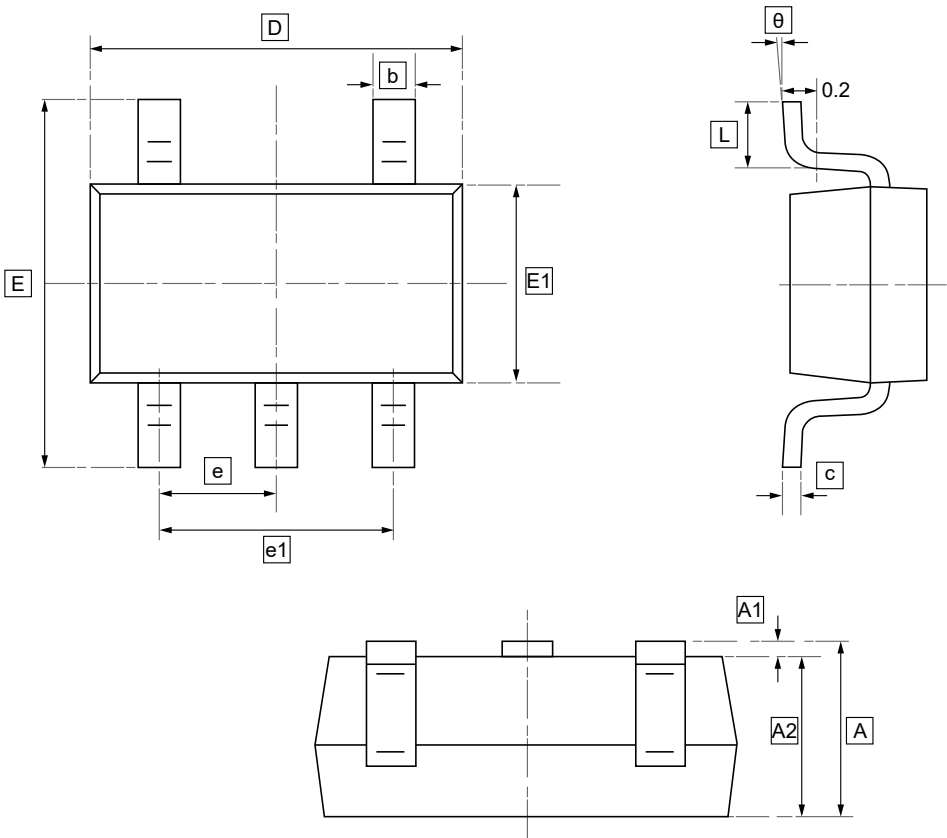


DIMENSIONS (mm are the original dimensions)

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

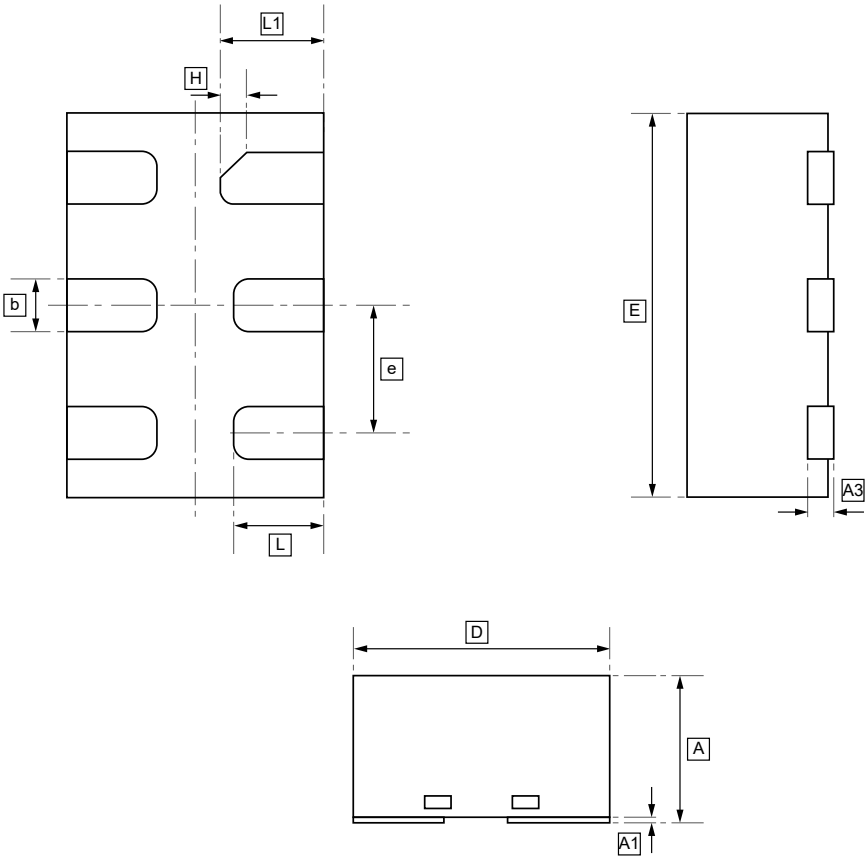


DIMENSIONS (mm are the original dimensions)

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

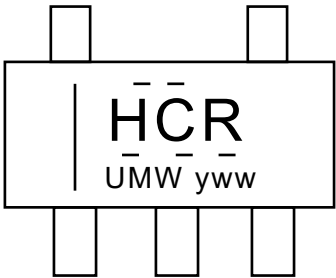


DIMENSIONS (mm are the original dimensions)

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 SN74AUP1G04DCKR	HCR	SC70-5	3000	Tape and reel
UMW SN74AUP1G04DBVR	H04F	SOT23-5	3000	Tape and reel
UMW SN74AUP1G04DRYR	HC	DFN6(1*1.5)	5000	Tape and reel



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