



# U74AHC3G04

CMOS IC

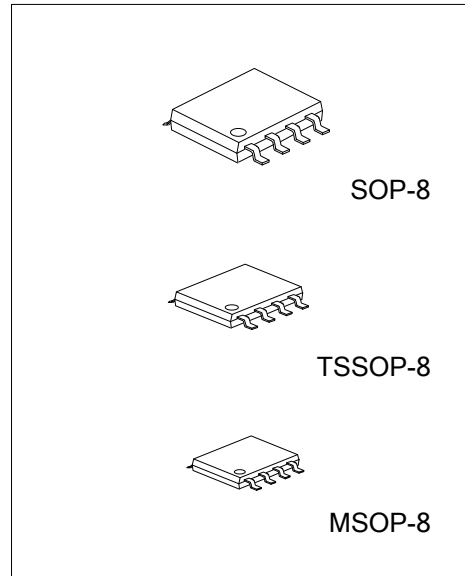
## INVERTER

### DESCRIPTION

The **U74AHC3G04** are high-speed Si-gate CMOS devices providing three inverting buffers with the function  $Y = \bar{A}$ .

### FEATURES

- \* Low Power Dissipation
- \* Symmetrical Output Impedance
- \* Balanced Propagation Delays
- \* High Noise Immunity



### ORDERING INFORMATION

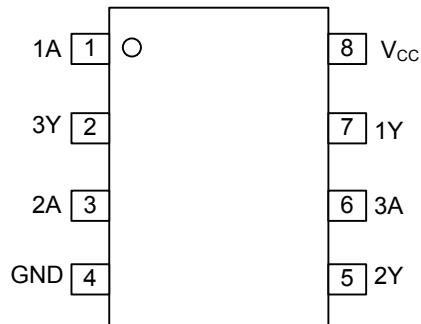
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC3G04G-P08-R	U74AHC3G04G-P08-R	TSSOP-8	Tape Reel
U74AHC3G04G-S08-R	U74AHC3G04G-S08-R	SOP-8	Tape Reel
U74AHC3G04G-SM1-R	U74AHC3G04G-SM1-R	MSOP-8	Tape Reel

<p>U74AHC3G04G-P08-R</p>	<p>(1) R: Tape Reel                  (2) P08: TSSOP-8, S08: SOP-8, SM1:MSOP-8                  (3) G: Halogen Free and Lead Free</p>
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### MARKING

SOP-8 / MSOP-8	TSSOP-8

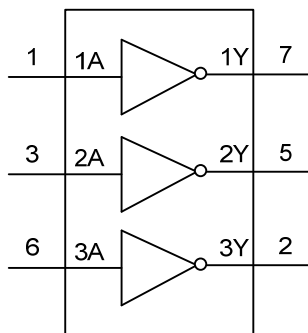
■ PIN CONFIGURATION



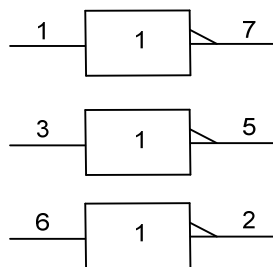
■ FUNCTION TABLE (each gate)

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

■ LOGIC DIAGRAM (each gate)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub> = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>		-0.5 ~ 7.0	V
Input Voltage	V <sub>IN</sub>		-0.5 ~ 7.0	V
Output Voltage	V <sub>OUT</sub>		-0.5 ~ V <sub>CC</sub> + 0.5	V
V <sub>CC</sub> or GND Current	I <sub>CC</sub>		±75	mA
Output Current	I <sub>OUT</sub>	-0.5V < V <sub>OUT</sub> < V <sub>CC</sub> + 0.5V	±25	mA
Input Clamp Current	I <sub>IK</sub>	V <sub>IN</sub> < -0.5V	-20	mA
Output Clamp Current	I <sub>OK</sub>	V <sub>OUT</sub> < -0.5V or V <sub>OUT</sub> > + 0.5V	±20	mA
Operating Temperature	T <sub>OPR</sub>		-40 ~ + 85	°C
Storage Temperature	T <sub>STG</sub>		-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	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V <sub>CC</sub>		2.0	5.0	5.5	V
Input Voltage	V <sub>IN</sub>		0		5.5	V
Output Voltage	V <sub>OUT</sub>		0		V <sub>CC</sub>	V
Operating Temperature	T <sub>A</sub>		-40		85	°C
Input Rise or Fall Times	t <sub>R</sub> , t <sub>F</sub>	V <sub>CC</sub> = 3.3 ± 0.3V			100	ns/V
		V <sub>CC</sub> = 5.0 ± 0.5V			20	

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level input voltage	V <sub>IH</sub>	V <sub>CC</sub> =2.0V	1.5			V
		V <sub>CC</sub> =3.0V	2.1			
		V <sub>CC</sub> =5.5V	3.85			
Low-Level input voltage	V <sub>IL</sub>	V <sub>CC</sub> =2.0V			0.5	V
		V <sub>CC</sub> =3.0V			0.9	
		V <sub>CC</sub> =5.5V			1.65	
High-Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> =2.0V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =-50μA	1.9	2.0		V
		V <sub>CC</sub> =3.0V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =-50μA	2.9	3.0		
		V <sub>CC</sub> =4.5V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =-50μA	4.4	4.5		
		V <sub>CC</sub> =3.0V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =-4.0mA	2.58			
		V <sub>CC</sub> =4.5V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =-8.0mA	3.94			
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> =2.0V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =50μA			0.1	V
		V <sub>CC</sub> =3.0V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =50μA			0.1	
		V <sub>CC</sub> =4.5V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =50μA			0.1	
		V <sub>CC</sub> =3.0V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =4.0mA			0.36	
		V <sub>CC</sub> =4.5V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =8.0mA			0.36	
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>CC</sub> =5.5V, V <sub>IN</sub> =V <sub>CC</sub> or GND			0.1	μA
Quiescent Supply Current	I <sub>CC</sub>	V <sub>CC</sub> =5.5V, V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0			10	μA
Input Capacitance	C <sub>IN</sub>	V <sub>IN</sub> =V <sub>CC</sub> or GND		1.5	10	pF

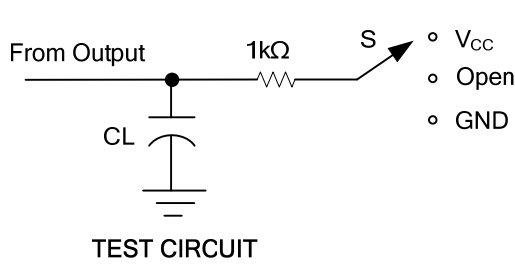
■ SWITCHING CHARACTERISTICS ( $t_R = t_F \leq 3.0 \text{ ns}$ ,  $T_A = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (A) to output(Y)	$t_{PLH} / t_{PHL}$	$C_L = 15\text{pF}$	$V_{CC} = 3.0 \sim 3.6\text{V}$			7.1	ns
			$V_{CC} = 3.3\text{V}$		4.3		ns
			$V_{CC} = 4.5 \sim 5.5\text{V}$			5.5	ns
			$V_{CC} = 5\text{V}$		3.1		ns
		$C_L = 50\text{pF}$	$V_{CC} = 3.0 \sim 3.6\text{V}$			10.6	ns
			$V_{CC} = 3.3\text{V}$		6.1		ns
			$V_{CC} = 4.5 \sim 5.5\text{V}$			7.5	ns
			$V_{CC} = 5\text{V}$		4.5	-	ns

■ OPERATING CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

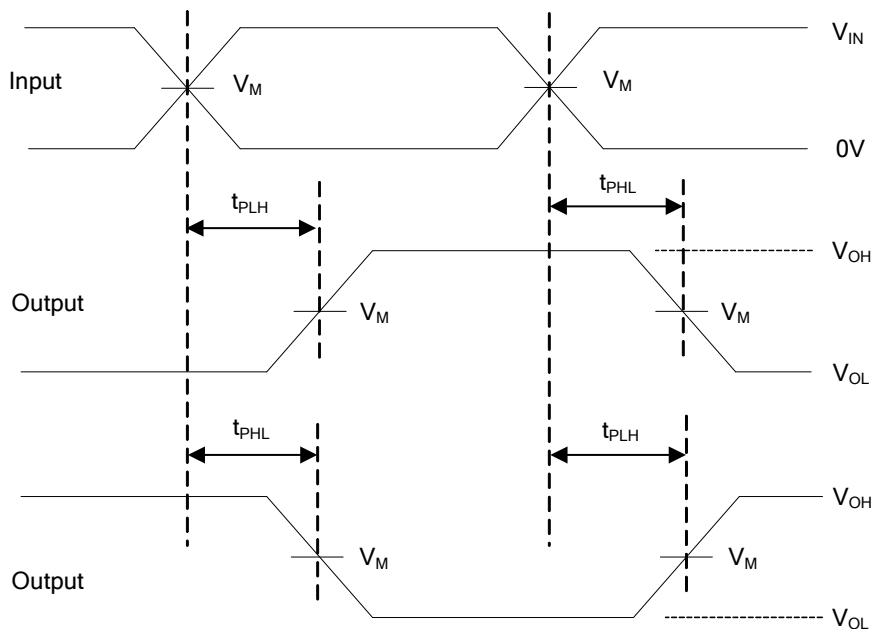
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	$C_L = 50\text{pF}$ , $f = 1\text{MHz}$ , $V_{IN} = \text{GND or } V_{CC}$		9		pF

## ■ TEST CIRCUIT AND WAVEFORMS



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

$V_I$ INPUT REQUIREMENTS	$V_M$ INPUT	$V_M$ OUTPUT
GND to $V_{CC}$	$50\%V_{CC}$	$50\%V_{CC}$



Propagation delay times  
Inverting and noninverting outputs

Note:  $C_L$  includes probe and jig capacitance.  
 $P_{RR} \leq 1\text{MHz}$ ,  $Z_O = 50\Omega$ ,  $t_R \leq 3\text{ns}$ ,  $t_F \leq 3\text{ns}$ .

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