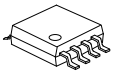
# U74AHC3G04

**CMOS IC**

## INVERTER



MSOP-8

TSSOP-8

## ■ DESCRIPTION

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

## ■ FEATURES

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

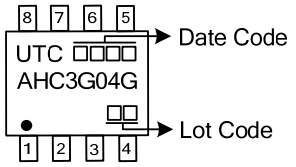
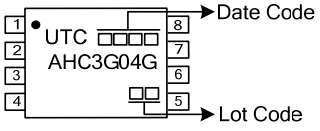
## ■ ORDERING INFORMATION

| Ordering Number | Package | Packing |
|---|---|---|
| U74AHC3G04G-SM1-R | MSOP-8 | Tape Reel |
| U74AHC3G04G-P08-R | TSSOP-8 | Tape Reel |

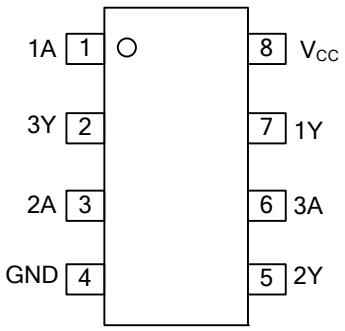
U74AHC3G04G-P08-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) P08: TSSOP-8, SM1:MSOP-8
(3) G: Halogen Free and Lead Free

## ■ MARKING

| MSOP-8 | TSSOP-8 |
|---|---|
|  |  |

## ■ PIN CONFIGURATION




For TSSOP-8, MSOP-8

## ■ FUNCTION TABLE (each gate)

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

## ■ LOGIC DIAGRAM (each gate)

## ■ ABSOLUTE MAXIMUM RATING ($T_A$ = 25°C, unless otherwise specified)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | -0.5 ~ 7.0 | V |
| Input Voltage | $V_{IN}$ | -0.5 ~ 7.0 | V |
| Output Voltage | $V_{OUT}$ | -0.5 ~ $V_{CC}$ +0.5 | V |
| $V_{CC}$ or GND Current | $I_{CC}$ | ±75 | mA |
| Output Current | $I_{OUT}$ | ±25 | mA |
| Input Clamp Current | $I_{IK}$ | -20 | mA |
| Output Clamp Current | $I_{OK}$ | ±20 | mA |
| Operating Temperature | $T_{OPR}$ | -40 ~ + 85 | °C |
| Storage Temperature | $T_{STG}$ | -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 | CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | | 2.0 | 5.0 | 5.5 | V |
| Input Voltage | $V_{IN}$ | | 0 | | 5.5 | V |
| Output Voltage | $V_{OUT}$ | | 0 | | $V_{CC}$ | V |
| Input Rise or Fall Times | $t_R$, $t_F$ | $V_{CC}$ = 3.3 ± 0.3V | | | 100 | ns/V |
| | | $V_{CC}$ = 5.0 ± 0.5V | | | 20 | |

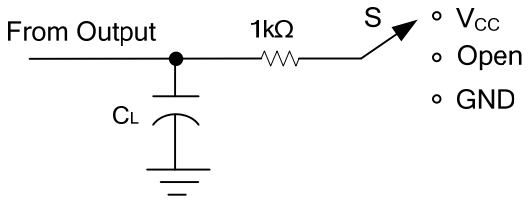
## ■ ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C, unless otherwise specified)

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

■ SWITCHING CHARACTERISTICS ($t_R = t_F \leq 3.0$ ns, $T_A = 25°C$)

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

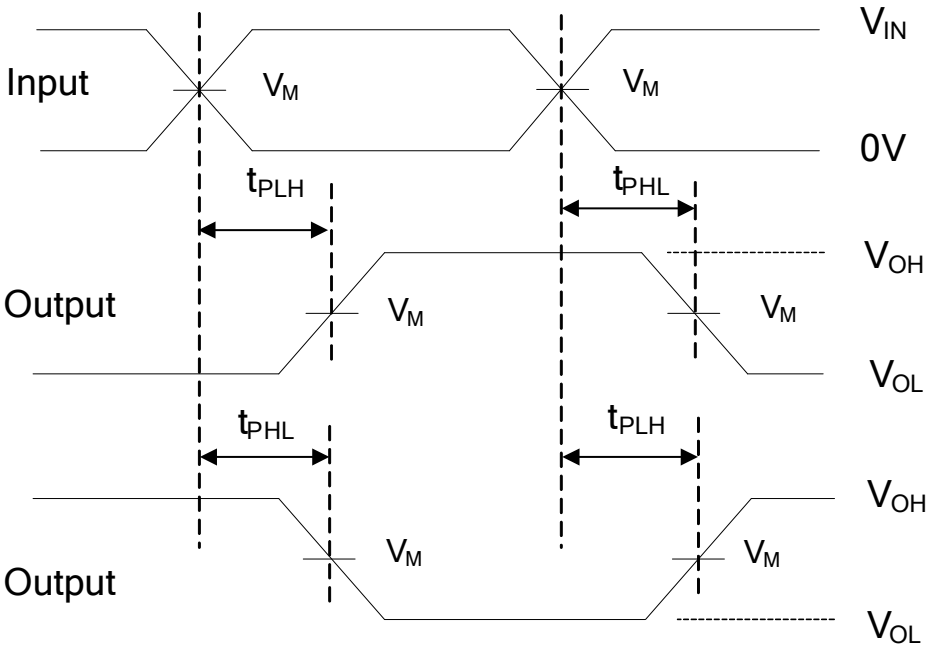
## ■ TEST CIRCUIT AND WAVEFORMS




TEST CIRCUIT

| 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.
$P_{RR}$ ≤1MHz, $Z_O$ = 50Ω, $t_R$ ≤3ns, $t_F$ ≤3ns.