



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# MC74HCT04A

## Hex Inverter

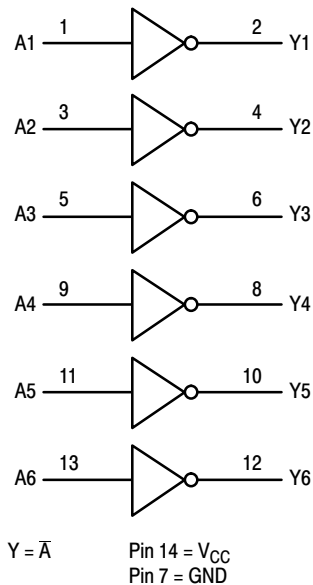
### With LSTTL-Compatible Inputs High-Performance Silicon-Gate CMOS

The MC74HCT04A may be used as a level converter for interfacing TTL or NMOS outputs to High-Speed CMOS inputs. The HCT04A is identical in pinout to the LS04.

#### Features

- Output Drive Capability: 10 LSTTL Loads
- TTL/NMOS-Compatible Input Levels
- Outputs Directly Interface to CMOS, NMOS and TTL
- Operating Voltage Range: 4.5 to 5.5 V
- Low Input Current: 1  $\mu$ A
- In Compliance With the JEDEC Standard No. 7 A Requirements
- Chip Complexity: 48 FETs or 12 Equivalent Gates
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### LOGIC DIAGRAM



ON Semiconductor®

[www.onsemi.com](http://www.onsemi.com)

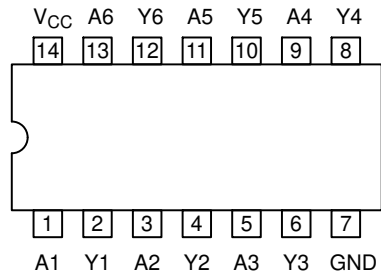


SOIC-14 NB  
D SUFFIX  
CASE 751A



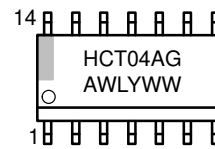
TSSOP-14  
DT SUFFIX  
CASE 948G

#### PIN ASSIGNMENT

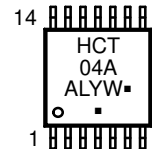


14-Lead (Top View)

#### MARKING DIAGRAMS



SOIC-14 NB



TSSOP-14

- A = Assembly Location
- L, WL = Wafer Lot
- Y, YY = Year
- W, WW = Work Week
- G or  $\blacksquare$  = Pb-Free Package

(Note: Microdot may be in either location)

#### FUNCTION TABLE

Inputs	Outputs
A	Y
L	H
H	L

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

# MC74HCT04A

## MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CC}$	DC Supply Voltage (Referenced to GND)	-0.5 to +7.0	V
$V_{in}$	DC Input Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
$V_{out}$	DC Output Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
$I_{in}$	DC Input Current, per Pin	$\pm 20$	mA
$I_{out}$	DC Output Current, per Pin	$\pm 25$	mA
$I_{CC}$	DC Supply Current, $V_{CC}$ and GND Pins	$\pm 50$	mA
$P_D$	Power Dissipation in Still Air SOIC Package† TSSOP Package†	500 450	mW
$T_{stg}$	Storage Temperature Range	-65 to +150	°C
$T_L$	Lead Temperature, 1 mm from Case for 10 Seconds SOIC or TSSOP Package	260	°C

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation,  $V_{in}$  and  $V_{out}$  should be constrained to the range  $GND \leq (V_{in} \text{ or } V_{out}) \leq V_{CC}$ . Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or  $V_{CC}$ ). Unused outputs must be left open.

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

†Derating: SOIC Package: -7 mW/°C from 65° to 125°C  
TSSOP Package: -6.1 mW/°C from 65° to 125°C

## RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
$V_{CC}$	DC Supply Voltage (Referenced to GND)	4.5	5.5	V
$V_{in}, V_{out}$	DC Input Voltage, Output Voltage (Referenced to GND)	0	$V_{CC}$	V
$T_A$	Operating Temperature Range, All Package Types	-55	+125	°C
$t_r, t_f$	Input Rise/Fall Time (Figure 1)	0	500	ns

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

## DC CHARACTERISTICS (Voltages Referenced to GND)

Symbol	Parameter	Condition	$V_{CC}$ V	Guaranteed Limit			Unit
				-55 to 25°C	≤85°C	≤125°C	
$V_{IH}$	Minimum High-Level Input Voltage	$V_{out} = 0.1V$ $ I_{out}  \leq 20\mu A$	4.5	2.0	2.0	2.0	V
			5.5	2.0	2.0	2.0	
$V_{IL}$	Maximum Low-Level Input Voltage	$V_{out} = V_{CC} - 0.1V$ $ I_{out}  \leq 20\mu A$	4.5	0.8	0.8	0.8	V
			5.5	0.8	0.8	0.8	
$V_{OH}$	Minimum High-Level Output Voltage	$V_{in} = V_{IL}$ $ I_{out}  \leq 20\mu A$	4.5	4.4	4.4	4.4	V
			5.5	5.4	5.4	5.4	
$V_{OL}$	Maximum Low-Level Output Voltage	$V_{in} = V_{IH}$ $ I_{out}  \leq 20\mu A$	4.5	0.1	0.1	0.1	V
			5.5	0.1	0.1	0.1	
$I_{in}$	Maximum Input Leakage Current	$V_{in} = V_{CC}$ or GND	4.5	0.26	0.33	0.40	$\mu A$
			5.5	±0.1	±1.0	±1.0	
$I_{CC}$	Maximum Quiescent Supply Current (per Package)	$V_{in} = V_{CC}$ or GND $I_{out} = 0\mu A$	4.5	1	10	40	$\mu A$
			5.5	1	10	40	
$\Delta I_{CC}$	Additional Quiescent Supply Current	$V_{in} = 2.4V$ , Any One Input $V_{in} = V_{CC}$ or GND, Other Inputs $I_{out} = 0\mu A$	5.5	≥ -55°C	25 to 125°C		mA
				2.9	2.4		

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Total Supply Current =  $I_{CC} + \Sigma \Delta I_{CC}$ .

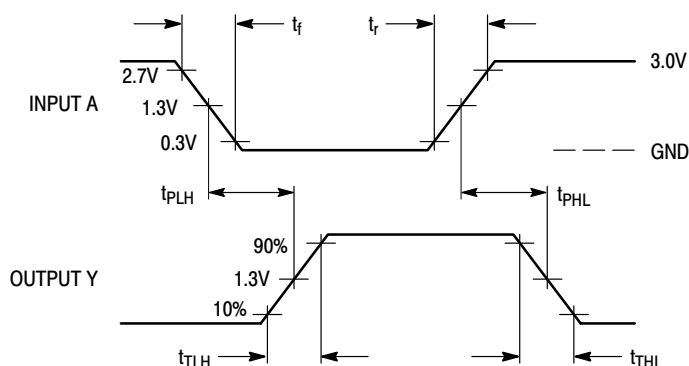
# MC74HCT04A

**AC CHARACTERISTICS** ( $V_{CC} = 5.0V \pm 10\%$ ,  $C_L = 50pF$ , Input  $t_r = t_f = 6ns$ )

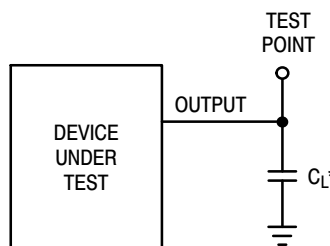
Symbol	Parameter	Guaranteed Limit			Unit
		-55 to 25°C	≤85°C	≤125°C	
$t_{PLH}$ , $t_{PHL}$	Maximum Propagation Delay, Input A to Output Y (Figures 1 and 2)	15 17	19 21	22 26	ns
$t_{TLH}$ , $t_{THL}$	Maximum Output Transition Time, Any Output (Figures 1 and 2)	15	19	22	ns
$C_{in}$	Maximum Input Capacitance	10	10	10	pF

$C_{PD}$	Power Dissipation Capacitance (Per Inverter)*	Typical @ 25°C, $V_{CC} = 5.0 V$		pF
		22		

\* Used to determine the no-load dynamic power consumption:  $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$ .

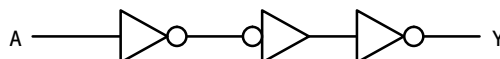


**Figure 1. Switching Waveforms**



\*Includes all probe and jig capacitance

**Figure 2. Test Circuit**



**Figure 3. Expanded Logic Diagram**  
(1/6 of the Device Shown)

## ORDERING INFORMATION

Device	Package	Shipping†
MC74HCT04ADG	SOIC-14 NB (Pb-Free)	55 Units / Rail
MC74HCT04ADR2G	SOIC-14 NB (Pb-Free)	2500 / Tape & Reel
MC74HCT04ADTR2G	TSSOP-14 (Pb-Free)	2500 / Tape & Reel
NLV74HCT04ADG*	SOIC-14 NB (Pb-Free)	55 Units / Rail
NLV74HCT04ADR2G*	SOIC-14 NB (Pb-Free)	2500 / Tape & Reel
NLV74HCT04ADTR2G*	TSSOP-14 (Pb-Free)	2500 / Tape & Reel

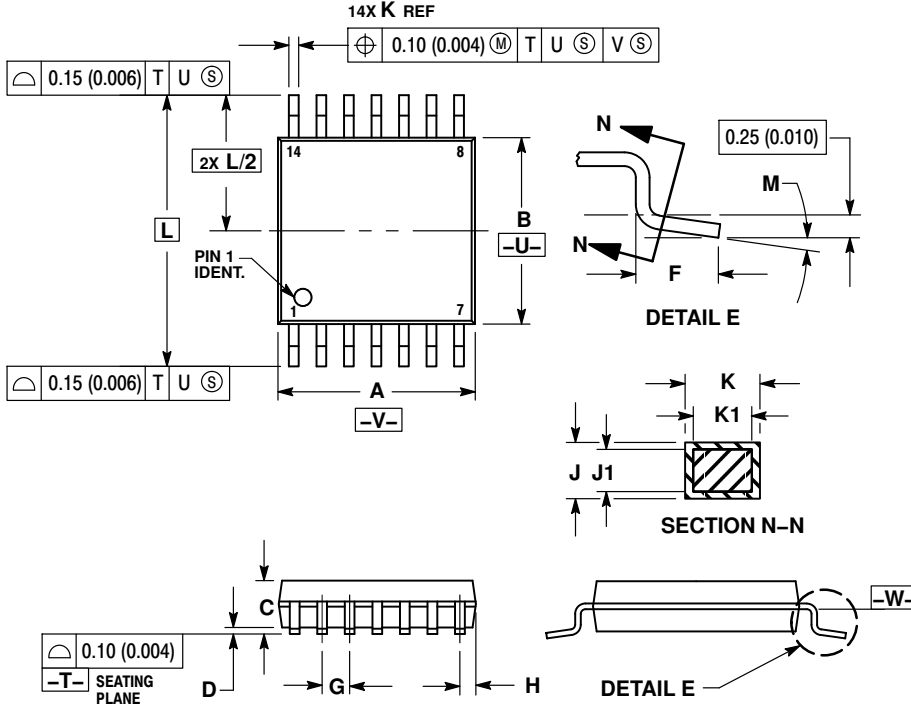
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

\*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

# MC74HCT04A

## PACKAGE DIMENSIONS

TSSOP-14  
CASE 948G  
ISSUE B

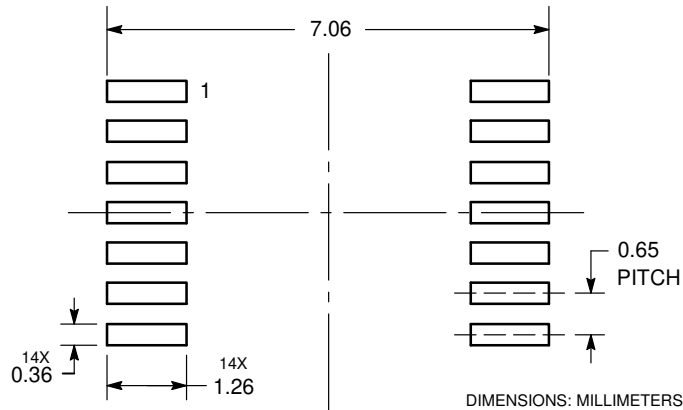


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.90	5.10	0.193	0.200
B	4.30	4.50	0.169	0.177
C	—	1.20	—	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.50	0.60	0.020	0.024
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0° - 8°		0° - 8°	

### SOLDERING FOOTPRINT\*

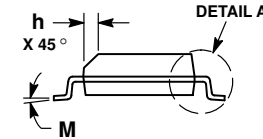
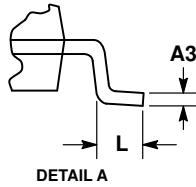
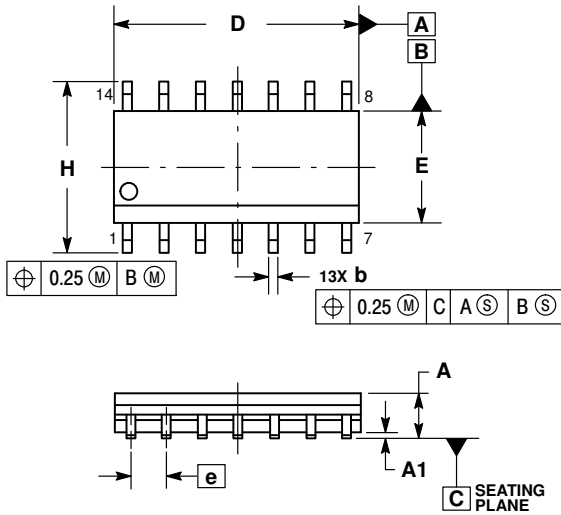


\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# MC74HCT04A

## PACKAGE DIMENSIONS

### SOIC-14 NB CASE 751A-03 ISSUE K

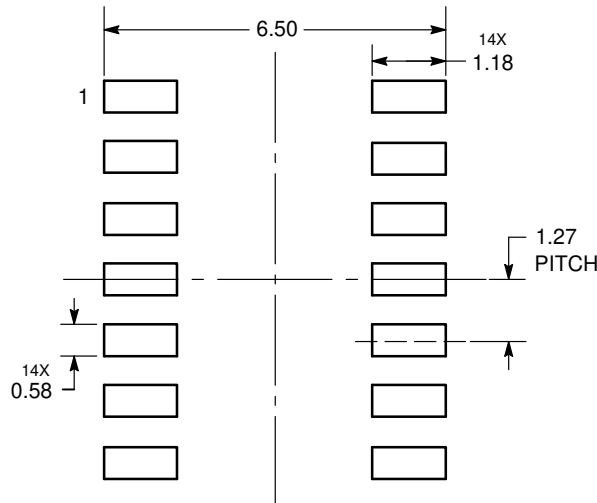


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF AT MAXIMUM MATERIAL CONDITION.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSIONS.
5. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.054	0.068
A1	0.10	0.25	0.004	0.010
A3	0.19	0.25	0.008	0.010
b	0.35	0.49	0.014	0.019
D	8.55	8.75	0.337	0.344
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.019
L	0.40	1.25	0.016	0.049
M	0°	7°	0°	7°

### SOLDERING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ON Semiconductor and the are registered trademarks of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries. SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

### PUBLICATION ORDERING INFORMATION

**LITERATURE FULFILLMENT:**  
Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative