

Quad 2-Input NAND Gate

MM74HCT00

General Description

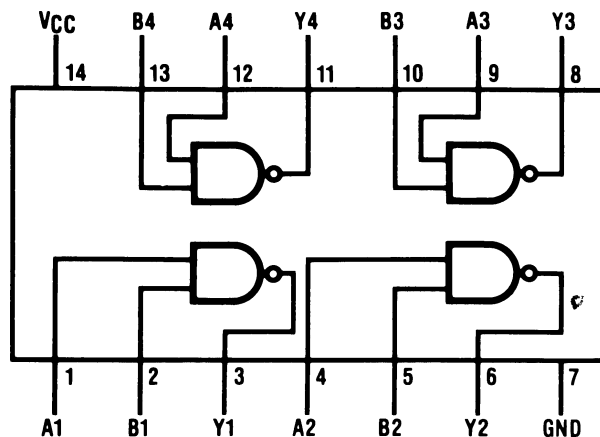
The MM74HCT00 is a NAND gates fabricated using advanced silicon-gate CMOS technology which provides the inherent benefits of CMOS—low quiescent power and wide power supply range. This device is input and output characteristic and pin-out compatible with standard 74LS logic families. All inputs are protected from static discharge damage by internal diodes to VCC and ground.

MM74HCT devices are intended to interface between TTL and NMOS components and standard CMOS devices. These parts are also plug-in replacements for LS-TTL devices and can be used to reduce power consumption in existing designs.

Features

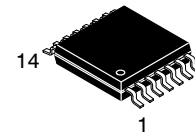
- TTL, LS Pin-out and Threshold Compatible
- Fast Switching: t_{PLH} , t_{PHL} = 14 ns (typ.)
- Low Power: 5 μ W at DC
- High Fan Out, 10 LS-TTL Loads
- This Device is Pb-Free and Halide Free

Connection Diagram



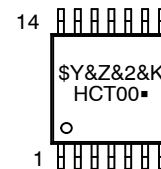
Top View

Figure 1. Pin Assignments for TSSOP



TSSOP-14,
CASE 948G

MARKING DIAGRAM

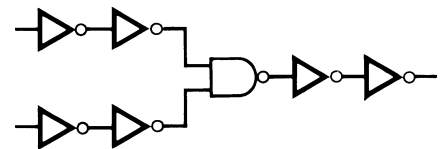


\$Y	= Logo
&Z	= Assembly Plant Code
&2	= 2-Digit Date Code (Year and Week)
&K	= 2-Digit Lot Run Traceability Code
HCT00	= Device Code

(Note: Microdot may be in either location)

LOGIC DIAGRAM

(1 of 4 gates)



ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

MM74HCT00

ABSOLUTE MAXIMUM RATINGS (Note 1)

Symbol	Parameter	Rating	Unit
V_{CC}	Supply Voltage	-0.5 to +7.0	V
V_{IN}	DC Input Voltage	-0.5 to V_{CC} +0.5	V
V_{OUT}	DC Output Voltage	-0.5 to V_{CC} +0.5	V
I_{IK}, I_{OK}	Clamp Diode Current	±20	mA
I_{OUT}	DC Output Current, per pin	±25	mA
I_{CC}	DC V_{CC} or GND Current, per pin	±50	mA
T_{STG}	Storage Temperature Range	-65 to +150	°C
T_L	Lead Temperature (Soldering 10 seconds)	260	°C

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.

1. Unless otherwise specified all voltages are referenced to ground.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply Voltage	4.5	5.5	V
V_{IN}, V_{OUT}	DC Input or Output Voltage	0	V_{CC}	V
T_A	Operating Temperature Range	-55	+125	°C
t_r, t_f	Input Rise or Fall Times	–	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.

MM74HCT00

DC ELECTRICAL CHARACTERISTICS ($V_{CC} = 5\text{ V} \pm 10\%$ (unless otherwise specified))

Symbol	Parameter	Conditions	T _A = 25°C		T _A = −40°C to 85°C	T _A = −55°C to 125°C	Unit
			Typ.	Guaranteed Limits			
V _{IH}	Minimum HIGH Level Input Voltage		–	2.0	2.0	2.0	V
V _{IL}	Maximum LOW Level Input Voltage		–	0.8	0.8	0.8	V
V _{OH}	Minimum HIGH Level Output Voltage	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = 20 μA	V _{CC}	V _{CC} − 0.1	V _{CC} − 0.1	V _{CC} − 0.1	V
		V _{IN} = V _{IH} or V _{IL} , I _{OUT} = 4.0 mA, V _{CC} = 4.5 V	4.2	3.98	3.84	3.7	
		V _{IN} = V _{IH} or V _{IL} , I _{OUT} = 4.8 mA, V _{CC} = 5.5 V	5.2	4.98	4.84	4.7	
V _{OL}	Maximum LOW Level Voltage	V _{IN} = V _{IH} I _{OUT} = 20 μA	0	0.1	0.1	0.1	V
		V _{IN} = V _{IH} I _{OUT} = 4.0 mA V _{CC} = 4.5 V	0.2	0.26	0.33	0.4	
		V _{IN} = V _{IH} I _{OUT} = 4.8 mA V _{CC} = 5.5 V	0.2	0.26	0.33	0.4	
I _{IN}	Maximum Input Current	V _{IN} = V _{CC} or GND, V _{IH} or V _{IL}	–	±0.05	±0.5	±1.0	μA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND, I _{OUT} = 0 μA	–	1.0	10	40	μA
		V _{IN} = 2.4 V or 0.5 V (Note 2)	0.18	0.3	0.4	0.5	mA

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.

2. This is measured per input with all other inputs held at V_{CC} or ground.

MM74HCT00

AC ELECTRICAL CHARACTERISTICS

($V_{CC} = 5.0\text{ V}$, $t_r = t_f = 6\text{ ns}$, $C_L = 15\text{ pF}$, $T_A = 25^\circ\text{C}$ (unless otherwise specified))

Symbol	Parameter	Conditions	Typ.	Guaranteed Limit	Unit
t_{PLH} , t_{PHL}	Maximum Propagation Delay		14	18	ns

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.

AC ELECTRICAL CHARACTERISTICS

($V_{CC} = 5.0\text{ V} \pm 10\%$, $t_r = t_f = 6\text{ ns}$, $C_L = 50\text{ pF}$ (unless otherwise specified))

Symbol	Parameter	Conditions	$T_A = 25^\circ\text{C}$		$T_A = -40^\circ\text{C}$ to 85°C	$T_A = -55^\circ\text{C}$ to 125°C	Unit
			Typ.	Guaranteed Limits			
t_{PLH} , t_{PHL}	Maximum Propagation Delay		18	23	29	35	ns
t_{THL} , t_{TLH}	Maximum Output Rise and Fall Time		8	15	19	22	ns
C_{PD}	Power Dissipation Capacitance	(Note 3)	30	–	–	–	pF
C_{IN}	Input Capacitance		5	10	10	10	pF

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.

3. C_{PD} determines the no load dynamic power consumption, $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$, and the no load dynamic current consumption, $I_S = C_{PD} V_{CC} f + I_{CC}$.

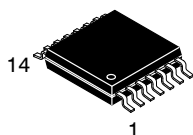
ORDERING INFORMATION

Device	Package	Shipping [†]
MM74HCT00MTCX	TSSOP-14 WB, Case 948G (Pb-Free and Halide Free)	2500 Units / 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](#).

NOTE: All packages are lead free per JEDEC: J-STD-020B standard.

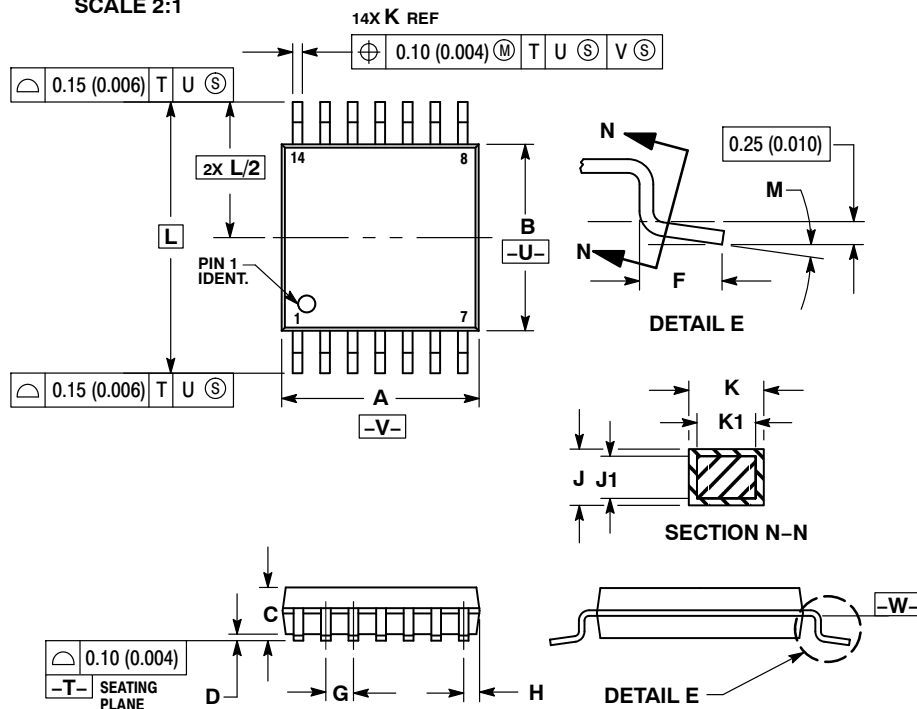
MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SCALE 2:1

TSSOP-14 WB CASE 948G ISSUE C

DATE 17 FEB 2016

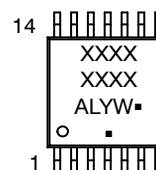


NOTES:

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°

GENERIC MARKING DIAGRAM*



- A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

SOLDERING FOOTPRINT



DOCUMENT NUMBER: 98ASH70246A

Electronic versions are uncontrolled except when accessed directly from the Document Repository.
Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.

DESCRIPTION: TSSOP-14 WB

PAGE 1 OF 1

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi 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. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales