

MC74HC14A

Hex Schmitt-Trigger Inverter

High-Performance Silicon-Gate CMOS

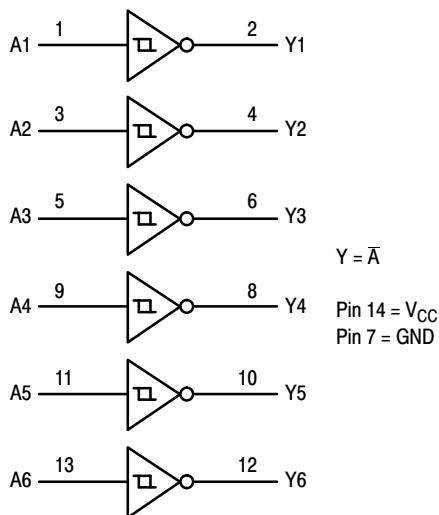
The MC74HC14A is identical in pinout to the LS14, LS04 and the HC04. The device inputs are compatible with Standard CMOS outputs; with pullup resistors, they are compatible with LSTTL outputs.

The HC14A is useful to “square up” slow input rise and fall times. Due to hysteresis voltage of the Schmitt trigger, the HC14A finds applications in noisy environments.

Features

- Output Drive Capability: 10 LSTTL Loads
- Outputs Directly Interface to CMOS, NMOS and TTL
- Operating Voltage Range: 2.0 to 6.0 V
- Low Input Current: 1.0 μ A
- High Noise Immunity Characteristic of CMOS Devices
- In Compliance With the JEDEC Standard No. 7.0 A Requirements
- Chip Complexity: 60 FETs or 15 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®

<http://onsemi.com>

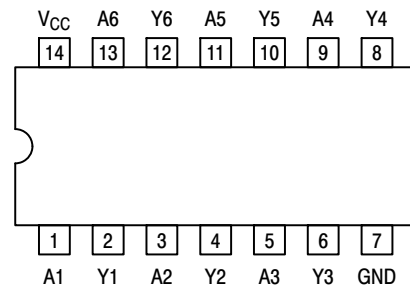


SOIC-14 NB
D SUFFIX
CASE 751A



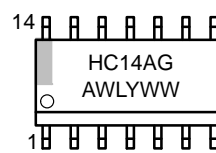
TSSOP-14
DT SUFFIX
CASE 948G

PIN ASSIGNMENT

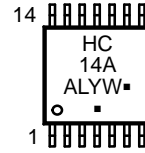


14-Lead (Top View)

MARKING DIAGRAMS



SOIC-14 NB



TSSOP-14

A = Assembly Location
L, WL = Wafer Lot
Y, YY = Year
W, WW = Work Week
G or ■ = 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 5 of this data sheet.

MC74HC14A

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	± 20	mA
I_{out}	DC Output Current, per Pin	± 25	mA
I_{CC}	DC Supply Current, V_{CC} and GND Pins	± 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 Plastic DIP, 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)	2.0	6.0	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)	$V_{CC} = 2.0 \text{ V}$ $V_{CC} = 4.5 \text{ V}$ $V_{CC} = 6.0 \text{ V}$	0 0 0	No Limit* No Limit* No Limit*	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.

*When $V_{in} = 50\% V_{CC}$, $I_{CC} > 1\text{mA}$

MC74HC14A

DC CHARACTERISTICS (Voltages Referenced to GND)

Symbol	Parameter	Condition	V _{CC} V	Guaranteed Limit			Unit
				-55 to 25°C	≤85°C	≤125°C	
V _{T+} max	Maximum Positive-Going Input Threshold Voltage (Figure 3)	V _{out} = 0.1V I _{out} ≤ 20μA	2.0	1.50	1.50	1.50	V
			3.0	2.15	2.15	2.15	
			4.5	3.15	3.15	3.15	
			6.0	4.20	4.20	4.20	
V _{T+} min	Minimum Positive-Going Input Threshold Voltage (Figure 3)	V _{out} = 0.1V I _{out} ≤ 20μA	2.0	1.0	0.95	0.95	V
			3.0	1.5	1.45	1.45	
			4.5	2.3	2.25	2.25	
			6.0	3.0	2.95	2.95	
V _{T-} max	Maximum Negative-Going Input Threshold Voltage (Figure 3)	V _{out} = V _{CC} - 0.1V I _{out} ≤ 20μA	2.0	0.9	0.95	0.95	V
			3.0	1.4	1.45	1.45	
			4.5	2.0	2.05	2.05	
			6.0	2.6	2.65	2.65	
V _{T-} min	Minimum Negative-Going Input Threshold Voltage (Figure 3)	V _{out} = V _{CC} - 0.1V I _{out} ≤ 20μA	2.0	0.3	0.3	0.3	V
			3.0	0.5	0.5	0.5	
			4.5	0.9	0.9	0.9	
			6.0	1.2	1.2	1.2	
V _H max (Note 1)	Maximum Hysteresis Voltage (Figure 3)	V _{out} = 0.1V or V _{CC} - 0.1V I _{out} ≤ 20μA	2.0	1.20	1.20	1.20	V
			3.0	1.65	1.65	1.65	
			4.5	2.25	2.25	2.25	
			6.0	3.00	3.00	3.00	
V _H min (Note 1)	Minimum Hysteresis Voltage (Figure 3)	V _{out} = 0.1V or V _{CC} - 0.1V I _{out} ≤ 20μA	2.0	0.20	0.20	0.20	V
			3.0	0.25	0.25	0.25	
			4.5	0.40	0.40	0.40	
			6.0	0.50	0.50	0.50	
V _{OH}	Minimum High-Level Output Voltage	V _{in} ≤ V _{T-} min I _{out} ≤ 20μA	2.0	1.9	1.9	1.9	V
			4.5	4.4	4.4	4.4	
			6.0	5.9	5.9	5.9	
			V _{in} ≤ V _{T-} min I _{out} ≤ 2.4mA I _{out} ≤ 4.0mA I _{out} ≤ 5.2mA	3.0	2.48	2.34	
V _{OL}	Maximum Low-Level Output Voltage	V _{in} ≥ V _{T+} max I _{out} ≤ 20μA	2.0	0.1	0.1	0.1	V
			4.5	0.1	0.1	0.1	
			6.0	0.1	0.1	0.1	
			V _{in} ≥ V _{T+} max I _{out} ≤ 2.4mA I _{out} ≤ 4.0mA I _{out} ≤ 5.2mA	3.0	0.26	0.33	
I _{in}	Maximum Input Leakage Current	V _{in} = V _{CC} or GND	2.0	0.1	0.1	0.1	μA
			3.0	0.1	0.1	0.1	
			4.5	0.1	0.1	0.1	
			6.0	0.1	0.1	0.1	
I _{CC}	Maximum Quiescent Supply Current (per Package)	V _{in} = V _{CC} or GND I _{out} = 0μA	6.0	1.0	10	40	μA

1. V_Hmin > (V_{T+} min) - (V_{T-} max); V_Hmax = (V_{T+} max) - (V_{T-} min).

AC CHARACTERISTICS (C_L = 50pF, Input t_r = t_f = 6ns)

Symbol	Parameter	V _{CC} V	Guaranteed Limit			Unit
			-55 to 25°C	≤85°C	≤125°C	
t _{PLH} , t _{PHL}	Maximum Propagation Delay, Input A or B to Output Y (Figures 1 and 2)	2.0	75	95	110	ns
		3.0	30	40	55	
		4.5	15	19	22	
		6.0	13	16	19	
t _{TLH} , t _{THL}	Maximum Output Transition Time, Any Output (Figures 1 and 2)	2.0	75	95	110	ns
		3.0	27	32	36	
		4.5	15	19	22	
		6.0	13	16	19	
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}²f + I_{CC} V_{CC}.

MC74HC14A

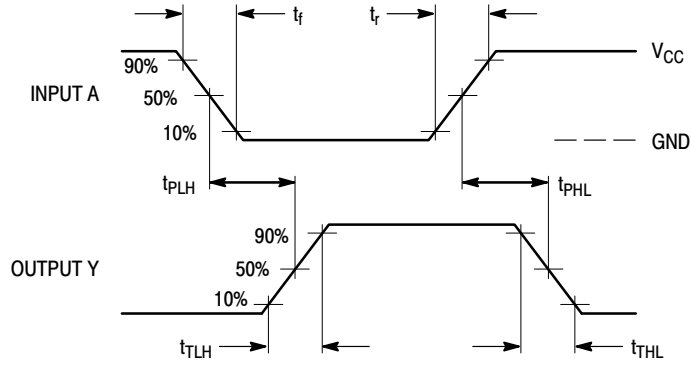
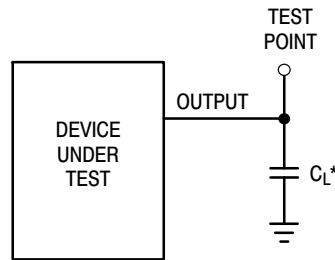


Figure 1. Switching Waveforms



*Includes all probe and jig capacitance

Figure 2. Test Circuit

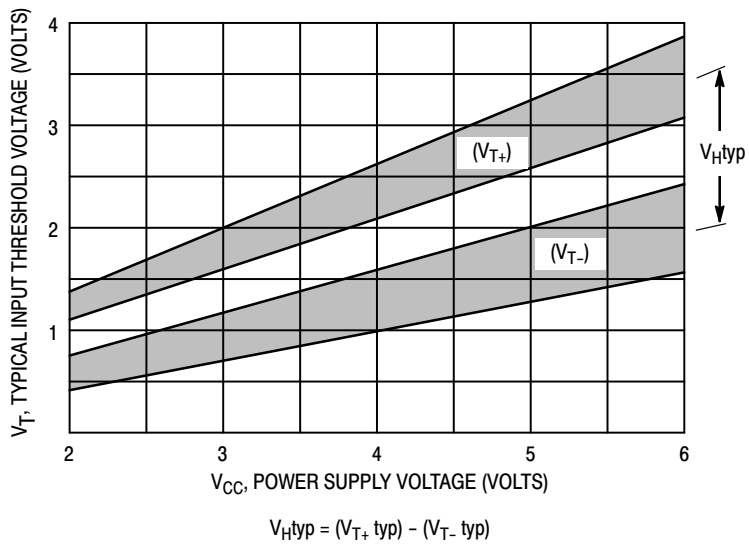
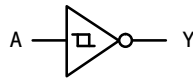
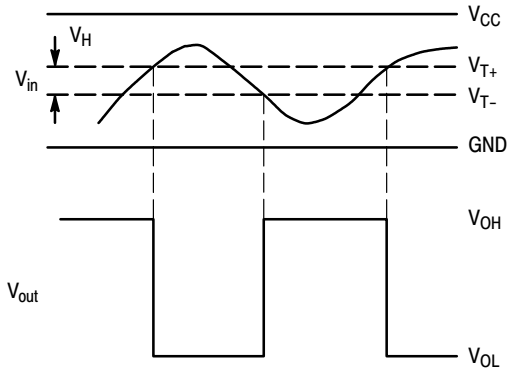


Figure 3. Typical Input Threshold, V_{T+} , V_{T-} versus Power Supply Voltage

MC74HC14A



(a) A Schmitt-Trigger Squares Up Inputs With Slow Rise and Fall Times



(b) A Schmitt-Trigger Offers Maximum Noise Immunity

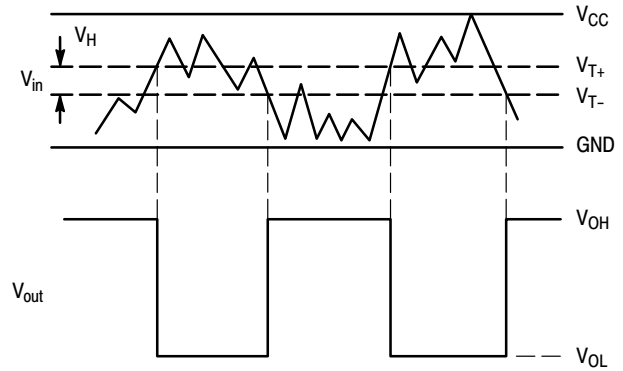


Figure 4. Typical Schmitt-Trigger Applications

ORDERING INFORMATION

Device	Package	Shipping [†]
MC74HC14ADG	SOIC-14 NB (Pb-Free)	55 Units / Rail
MC74HC14ADR2G	SOIC-14 NB (Pb-Free)	2500 / Tape & Reel
MC74HC14ADTG	TSSOP-14 (Pb-Free)	96 Units / Rail
MC74HC14ADTR2G	TSSOP-14 (Pb-Free)	2500 / Tape & Reel
NLV74HC14ADG*	SOIC-14 NB (Pb-Free)	55 Units / Rail
NLV74HC14ADR2G*	SOIC-14 NB (Pb-Free)	2500 / Tape & Reel
NLV74HC14ADTG*	TSSOP-14 (Pb-Free)	96 Units / Rail
NLV74HC14ADTR2G*	TSSOP-14 (Pb-Free)	2500 / Tape & Reel

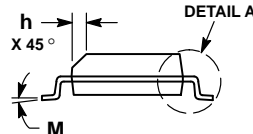
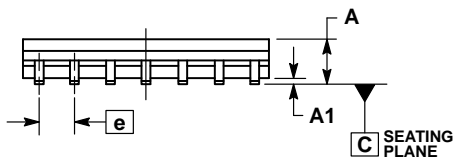
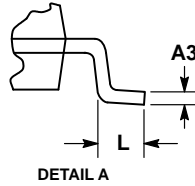
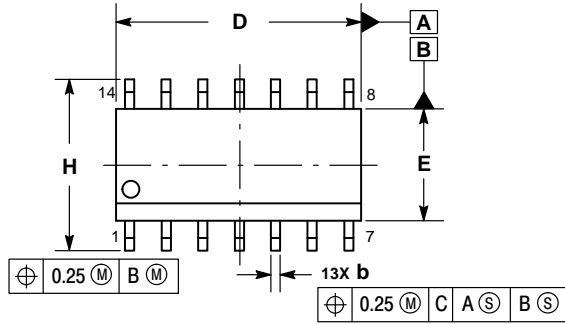
[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

MC74HC14A

PACKAGE DIMENSIONS

SOIC-14 NB
CASE 751A-03
ISSUE K

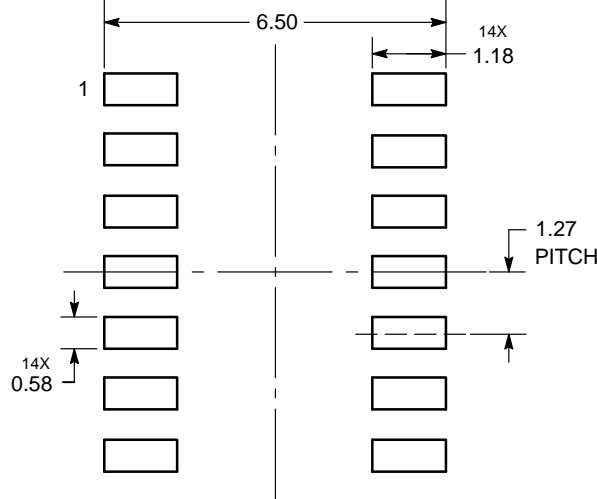


NOTES:

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. 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
P.O. Box 5163, Denver, Colorado 80217 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

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

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

For additional information, please contact your local Sales Representative

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».



JONHON

«**JONHON**» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«**FORSTAR**» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А