onsemi

Hex Inverter with Schmitt Trigger Input

74AC14, 74ACT14

General Description

The 74AC14 and 74ACT14 contain six inverter gates each with a Schmitt trigger input. They are capable of transforming slowly changing input signals into sharply defined, jitter–free output signals. In addition, they have a greater noise margin than conventional inverters.

The 74AC14 and 74ACT14 have hysteresis between the positive-going and negative-going input thresholds (typically 1.0 V) which is determined internally by transistor ratios and is essentially insensitive to temperature and supply voltage variations.

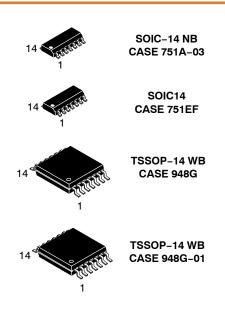
Features

- I_{CC} Reduced by 50%
- Outputs Source/Sink 24 mA
- 74ACT14 has TTL-Compatible Inputs
- These are Pb-Free Devices

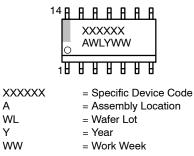
ABSOLUTE MAXIMUM RATINGS

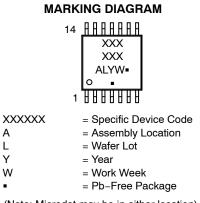
Parameter	Symbol	Value	Unit
Supply Voltage	V _{CC}	-0.5 to +6.5	V
DC Input Diode Current $V_I = -0.5 V$ $V_I = V_{CC} + 1.5 V$	Ι _{ΙΚ}	-20 +20	mA
DC Input Voltage	VI	–0.5 to V _{CC} + 1.5	V
DC Output Diode Current $V_O = -0.5 V$ $V_O = V_{CC} + 0.5 V$	Ι _{ΟΚ}	-20 +20	mA
DC Output Voltage	V _O	–0.5 to V _{CC} + 0.5	V
DC Output Source or Sink Current	Ι _Ο	±50	mA
DC V _{CC} or Ground Current per Output Pin	I_{CC} or I_{GND}	±50	mA
Storage Temperature Range	T _{STG}	−65 to +150	°C
Junction Temperature	TJ	140	°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.









(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

74AC14, 74ACT14

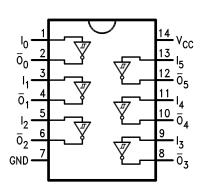


Figure 1. Connection Diagram

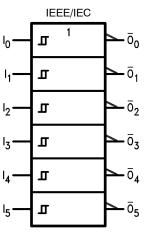


Figure 2. Logic Symbol

PIN DESCRIPTION

Pin	Description
A _n	Inputs
\overline{O}_n	Outputs

FUNCTION TABLE

Input	Output
А	ō
L	Н
Н	L

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	Supply Voltage AC ACT	2.0 4.5	6.0 5.5	V
VI	Input Voltage	0	V _{CC}	V
Vo	Output Voltage	0	V _{CC}	V
T _A	Operating Temperature	-40	+85	°C

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 ELECTRICAL CHARACTERISTICS FOR AC

				T _A = +25°C		T _A = -40°C to +85°C	
Symbol	Parameter	V _{CC} (V)	Conditions	Тур	G	uaranteed Limits	Unit
V _{OH}	Minimum HIGH Level	3.0	I _{OUT} = -50 μA	2.99	2.9	2.9	V
	Output Voltage	4.5		4.49	4.4	4.4	
		5.5		5.49	5.4	5.4	
		3.0	I _{OH} = 12 mA	-	2.56	2.46	
		4.5	I _{OH} = 24 mA	-	3.86	3.76	1
		5.5	I _{OH} = 24 mA (Note 1)	-	4.86	4.76	1
V _{OL}	Maximum LOW Level	3.0	I _{OUT} = 50 μA	0.002	0.1	0.1	V
Output voitage	Output Voltage	4.5		0.001	0.1	0.1	
		5.5	7	0.001	0.1	0.1	1
		3.0	I _{OL} = 12 mA	-	0.36	0.44	1
		4.5	I _{OL} = 24 mA	-	0.36	0.44	1
		5.5	I _{OL} = 24 mA (Note 1)	-	0.36	0.44	1
I _{IN} (Note 3)	Maximum Input Leakage Current	5.5	V _I = V _{CC} , GND	-	±0.1	±1.0	μΑ
V _{t+}	Maximum Positive Threshold	3.0	T _A = Worst Case	-	2.2	2.2	V
		4.5		-	3.2	3.2	
		5.5		-	3.9	3.9	1
V _{t-}	Minimum Negative 3.0 T _A = Worst Case	T _A = Worst Case	-	0.5	0.5	V	
	Threshold	4.5	1	-	0.9	0.9	1
		5.5	7	-	1.1	1.1	1
V _{H(MAX)}	Maximum Hysteresis	3.0	T _A = Worst Case	-	1.2	1.2	V
		4.5		-	1.4	1.4	1
		5.5		-	1.6	1.6	1
V _{H(MIN)}	Minimum Hysteresis	3.0	T _A = Worst Case	-	0.3	0.3	V
		4.5		-	0.4	0.4	1
		5.5	1	-	0.5	0.5	1
I _{OLD}	Minimum Dynamic	5.5	V _{OLD} = 1.65 V Max.	-	-	75	mA
I _{OHD}	Output Current (Note 2)	5.5	V _{OHD} = 3.85 V Min.	-	-	-75	mA
I _{CC} (Note 3)	Maximum Quiescent Supply Current	5.5	$V_{IN} = V_{CC}$ or GND	-	2.0	20.0	μA

All outputs loaded; thresholds on input associated with output under test.
Maximum test duration 2.0 ms, one output loaded at a time.
I_{IN} and I_{CC} at 3.0 V are guaranteed to be less than or equal to the respective limit at 5.5 V V_{CC}.

DC ELECTRICAL CHARACTERISTICS FOR ACT

				TA = -	+25°C	T _A = -40°C to +85°C	
Symbol	Parameter	V _{CC} (V)	Conditions	Тур	G	uaranteed Limits	Unit
VIH	Minimum HIGH Level	4.5	V _{OUT} = 0.1 V	1.5	2.0	2.0	V
	Input Voltage	5.5	or V _{CC} – 0.1 V	1.5	2.0	2.0	1
V _{IL}	Maximum LOW Level	4.5	V _{OUT} = 0.1 V	1.5	0.8	0.8	V
Input	Input Voltage	5.5	or V _{CC} – 0.1 V	1.5	0.8	0.8	1
V _{OH}	Minimum HIGH Level	4.5	I _{OUT} = -50 μA	4.49	4.34	4.4	V
	Output Voltage	5.5		5.49	5.4	5.4	1
	4.5	$V_{IN} = V_{IL} \text{ or } V_{IH,}$ $I_{OH} = -24 \text{ mA}$	_	3.86	3.76		
		5.5	V _{IN} = V _{IL} or V _{IH,} I _{OH} = -24 mA (Note 4)	-	4.86	4.76	
V _{OL}		4.5	I _{OUT} = 50 μA	0.001	0.1	0.1	V
	Output Voltage	5.5	1	0.001	0.1	0.1	1
		4.5	$V_{IN} = V_{IL} \text{ or } V_{IH,}$ $I_{OL} = 24 \text{ mA}$	-	0.36	0.44	
		5.5	V _{IN} = V _{IL} or V _{IH,} I _{OL} = 24 mA (Note 4)	-	0.36	0.44	
I _{IN}	Maximum Input Leakage Current	5.5	V _I = V _{CC} , GND	-	±0.1	±1.0	μA
V _{H(MAX)}	Maximum Hysteresis	4.5	T _A = Worst Case	-	1.4	1.4	V
		5.5		-	1.6	1.6	1
V _{H(MIN)}	Minimum Hysteresis	4.5	T _A = Worst Case	-	0.4	0.4	V
		5.5		-	0.5	0.5	1
V _{t+}	Maximum Positive	4.5	T _A = Worst Case	-	2.0	2.0	V
	Threshold	5.5	1	-	2.0	2.0	1
V _{t-}	Minimum Negative	4.5	T _A = Worst Case	-	0.8	0.8	V
	Threshold	5.5]	-	0.8	0.8	1
ICCT	Maximum I _{CC} /Input	5.5	V _I = V _{CC} – 2.1 V	0.6	-	1.5	mA
I _{OLD}	Minimum Dynamic	5.5	V _{OLD} = 1.65 V Max.	-	-	75	m/
I _{OHD}	Output Current (Note 5)	5.5	V _{OHD} = 3.85 V Min.	-	-	-75	mA
I _{CC}	Maximum Quiescent Supply Current	5.5	$V_{IN} = V_{CC}$ or GND	-	2.0	20.0	μA

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. 4. All outputs loaded; thresholds on input associated with output under test.

5. Maximum test duration 2.0 ms, one output loaded at a time.

74AC14, 74ACT14

AC ELECTRICAL CHARACTERISTICS FOR AC

			$T_A = +25^{\circ}C, C_L = 50 \text{ pF}$		$_{A}$ = +25°C, C _L = 50 pF T_{A} = -40°C to +85°C, C _L = 50 pF		$T_A = -40^{\circ}C$ to +85°C, $C_L = 50 \text{ pF}$	
Symbol	Parameter	V _{CC} (V) (Note 6)	Min	Тур	Max	Min	Max	Unit
t _{PLH}	Propagation Delay	3.3	1.5	9.5	13.5	1.5	15.0	ns
		5.0	1.5	7.0	10.0	1.5	11.0	
t _{PHL}	Propagation Delay	3.3	1.5	7.5	11.5	1.5	13.0	ns
		5.0	1.5	6.0	8.5	1.5	9.5	

6. Voltage range 3.3 is 3.3 V + 0.3 V. Voltage range 5.0 is 5.0 V + 0.5 V.

AC ELECTRICAL CHARACTERISTICS FOR ACT

			T _A = +25°C, C _L = 50 pF		$T_A = -40^{\circ}C$ to +85°C, $C_L = 50$ pF			
Symbol	Parameter	V _{CC} (V) (Note 7)	Min	Тур	Max	Min	Max	Unit
t _{PLH}	Propagation Delay	5.0	3.0	8.0	10.0	3.0	11.0	ns
t _{PLH}	Propagation Delay	5.0	3.0	8.0	10.0	3.0	11.0	ns

7. Voltage range 5.0 is 5.0 V + 0.5 V.

CAPACITANCE

Symbol	Parameter	Conditions	Тур	Unit
C _{IN}	Input Capacitance	V _{CC} = OPEN	4.5	pF
C _{PD}	Power Dissipation Capacitance AC ACT	V _{CC} = 5.0 V	25.0 80	pF

ORDERING INFORMATION

Order Number	Marking	Package	Shipping [†]
74AC14SC	AC14	SOIC-14	55 Units / Rail
74AC14SCX	AC14	SOIC-14	2500 / Tape & Reel
74AC14MTCX	AC 14	TSSOP-14	2500 / Tape & Reel
74ACT14MTC	ACT 14	TSSOP-14	96 Units / Rail
74ACT14MTCX	ACT 14	TSSOP-14	2500 / Tape & Reel
74ACT14SCX	ACT14	SOIC-14	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.

DUSEM

0.068

0.019

0.344

0.244



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.

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DATE 03 FEB 2016

STYLE 1: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. NO CONNECTION 5. ANODE/CATHODE 6. NO CONNECTION 7. ANODE/CATHODE 8. ANODE/CATHODE 9. ANODE/CATHODE 10. NO CONNECTION 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON ANODE	STYLE 2: CANCELLED	STYLE 3: PIN 1. NO CONNECTION 2. ANODE 3. ANODE 4. NO CONNECTION 5. ANODE 6. NO CONNECTION 7. ANODE 8. ANODE 9. ANODE 10. NO CONNECTION 11. ANODE 12. ANODE 13. NO CONNECTION 14. COMMON CATHODE	STYLE 4: PIN 1. NO CONNECTION 2. CATHODE 3. CATHODE 4. NO CONNECTION 5. CATHODE 6. NO CONNECTION 7. CATHODE 9. CATHODE 10. NO CONNECTION 11. CATHODE 12. CATHODE 13. NO CONNECTION 14. COMMON ANODE
STYLE 5: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. ANODE/CATHODE 5. ANODE/CATHODE 6. NO CONNECTION 7. COMMON ANODE 8. COMMON CATHODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON ANODE	STYLE 6: PIN 1. CATHODE 2. CATHODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE 7. CATHODE 8. ANODE 9. ANODE 10. ANODE 11. ANODE 12. ANODE 13. ANODE 14. ANODE	STYLE 7: PIN 1. ANODE/CATHODE 2. COMMON ANODE 3. COMMON CATHODE 4. ANODE/CATHODE 5. ANODE/CATHODE 7. ANODE/CATHODE 8. ANODE/CATHODE 10. ANODE/CATHODE 11. COMMON CATHODE 12. COMMON ANODE 13. ANODE/CATHODE 14. ANODE/CATHODE	STYLE 8: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. NO CONNECTION 5. ANODE/CATHODE 6. ANODE/CATHODE 7. COMMON ANODE 8. COMMON ANODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. NO CONNECTION 12. ANODE/CATHODE 13. ANODE/CATHODE 14. COMMON CATHODE

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SOIC14 CASE 751EF **ISSUE O** DATE 30 SEP 2016 8.75 8.50 Α 0.65 7.62 14 8 14 8 В 4.00 6.00 5.60 3.80 ╞ 1.70 7 **PIN #1** 1,27 7 0.51 **IDENT.** 1.27 0.35 (0.33) \oplus 0.25 (M) С В Α LAND PATTERN RECOMMENDATION TOP VIEW 1.75 MAX 0.25 С 0.19 0.10 С 1.50 0.25 0.10 1.25 SIDE VIEW **FRONT VIEW** NOTES: A. CONFORMS TO JEDEC MS-012, VARIATION AB, ISSUE C **B. ALL DIMENSIONS ARE IN MILLIMETERS** 0.50 0.25 × 45° C. DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS LAND PATTERN STANDARD: R0.10 GAGE D. SOIC127P600X145-14M PLANE R0.10 E. CONFORMS TO ASME Y14.5M, 2009 0.36 8° 0° 0.90 0.50 SEATING PLANE (1.04)DETAIL A SCALE 16 : 1 Electronic versions are uncontrolled except when accessed directly from the Document Repository. DOCUMENT NUMBER: 98AON13739G Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. **DESCRIPTION:** SOIC14 PAGE 1 OF 1

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