onsemi

Quad 2-Input NAND Gate

74AC00, 74ACT00

Description

The AC00/ACT00 contains four, 2−input NAND gates.

Features

- ICC Reduced by 50%
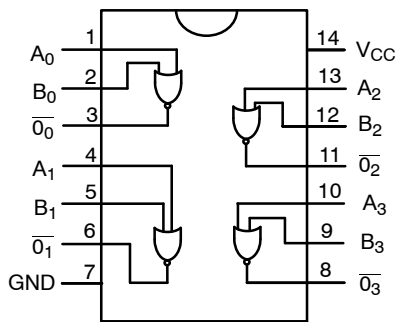- Outputs Source/Sink 24 mA
- ACT00 Has TTL−Compatible Inputs

SOIC−14
CASE 751EF
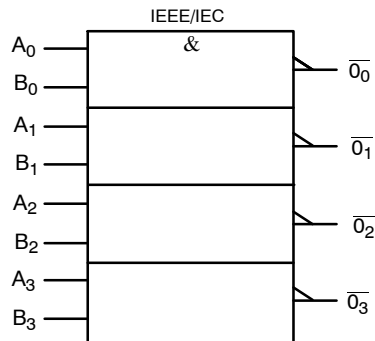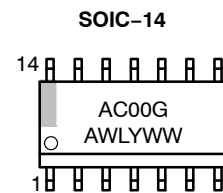

TSSOP−14 WB
CASE 948G

MARKING DIAGRAM

SOIC−14

AC00G
AWLYWW

AC00	= Specific Device Code
A	= Assembly Location
WL	= Wafer Lot
Y	= Year
WW	= Work Week
G	= Pb−Free Package

TSSOP−14 WB
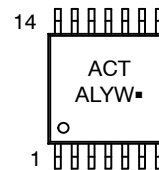
ACT
ALYW■

ACT	= Specific Device Code
A	= Assembly Location
L	= Wafer Lot
Y	= Year
W	= Work Week
■	= Pb−Free Package

(Note: Microdot may be in either location)

Figure 1. Connection Diagram

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

Figure 2. Logic Symbol

PIN DESCRIPTION

Pin Name	Pin Description
A_n, B_n	Inputs
$\overline{O_n}$	Outputs

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating
V_{CC}	Supply Voltage	−0.5 V to +7.0 V
I_{IK}	DC Input Diode Current V_I = −0.5 V	−20 mA
	$V_I = V_{CC}$ + 0.5	+20 mA
V_I	DC Input Voltage	−0.5 V to V_{CC} + 0.5 V
I_{OK}	DC Output Diode Current V_O = −0.5 V	−20 mA
	$V_O = V_{CC}$ + 0.5 V	+20 mA
V_O	DC Output Voltage	−0.5 V to V_{CC} + 0.5 V
I_O	DC Output Source or Sink Current	±50mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current per Output Pin	±50mA
T_{STG}	Storage Temperature	−65°C to +150°C
T_J	Junction Temperature	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.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Rating
VCC	Supply Voltage AC	2.0 V to 6.0 V
	ACT	4.5 V to 5.5 V
V_I	Input Voltage	0 V to V_{CC}
V_O	Output Voltage	0 V to V_{CC}
T_A	Operating Temperature	−40°C to +85°C
ΔV / Δt	Minimum Input Edge Rate, AC Devices: V_{IN} from 30% to 70% of V_{CC}, V_{CC} @ 3.3 V, 4.5 V, 5.5 V	125 mV/ns
ΔV / Δt	Minimum Input Edge Rate, ACT Devices: V_{IN} from 0.8 V to 2.0 V, V_{CC} @ 4.5 V, 5.5 V	125 mV/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 ELECTRICAL CHARACTERISTICS FOR AC

Symbol	Parameter	V_{CC} (V)	Conditions	T_A = +25°C Typ.	T_A = +25°C Guaranteed Limits	T_A = −40°C to +85°C Guaranteed Limits	Unit
V_{IH}	Minimum HIGH Level Input Voltage	3.0	V_{OUT} = 0.1 V or V_{CC} − 0.1 V	1.5	2.1	2.1	V
		4.5		2.25	3.15	3.15	
		5.5		2.75	3.85	3.85	
V_{IL}	Maximum LOW Level Input Voltage	3.0	V_{OUT} = 0.1 V or V_{CC} − 0.1 V	1.5	0.9	0.9	V
		4.5		2.25	1.35	1.35	
		5.5		2.75	1.65	1.65	
V_{OH}	Minimum HIGH Level Output Voltage	3.0	I_{OUT} = −50 μA	2.99	2.9	2.9	V
		4.5		4.49	4.4	4.4	
		5.5		5.49	5.4	−5.4	
		3.0	V_{IN} = V_{IL} or V_{IH}, I_{OH} = −12 mA	−	2.56	2.46	
		4.5	V_{IN} = V_{IL} or V_{IH}, I_{OH} = −24 mA	−	3.86	3.76	
		5.5	V_{IN} = V_{IL} or V_{IH}, I_{OH} = −24 mA (Note 1)	−	4.86	4.76	
V_{OL}	Maximum LOW Level Output Voltage	3.0	I_{OUT} = 50 μA	0.002	0.1	0.1	V
		4.5		0.001	0.1	0.1	
		5.5		0.001	0.1	0.1	
		3.0	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 12 mA	−	0.36	0.44	
		4.5	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 24 mA	−	0.36	0.44	
		5.5	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 24 mA (Note 1)	−	0.36	0.44	
I_{IN} (Note 3)	Maximum Input Leakage Current	5.5	V_I = V_{CC}, GND	−	±0.1	±1.0	μA
I_{OLD}	Minimum Dynamic Output Current (Note 2)	5.5	V_{OLD} = 1.65 V Max.	−	−	75	mA
I_{OHD}		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

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

DC ELECTRICAL CHARACTERISTICS FOR ACT

Symbol	Parameter	V_CC (V)	Conditions	T_A = +25°C Typ.	T_A = +25°C Guaranteed Limits	T_A = −40°C to +85°C Guaranteed Limits	Unit
V_{IH}	Minimum HIGH Level Input Voltage	4.5	$V_{OUT} = 0.1$ V or $V_{CC} - 0.1$ V	1.5	2.0	2.0	V
		5.5		1.5	2.0	2.0	
V_{IL}	Maximum LOW Level Input Voltage	4.5	$V_{OUT} = 0.1$ V or $V_{CC} - 0.1$ V	1.5	0.8	0.8	V
		5.5		1.5	0.8	0.8	
V_{OH}	Minimum HIGH Level Output Voltage	4.5	$I_{OUT} = -50$ μA	4.49	4.4	4.4	V
		5.5		5.49	5.4	5.4	
		4.5	$V_{IN} = V_{IL}$ or V_{IH}, $I_{OH} = -24$ 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}	Maximum LOW Level Output Voltage	4.5	$I_{OUT} = 50$ μA	0.001	0.1	0.1	V
		5.5		0.001	0.1	0.1	
		4.5	$V_{IN} = V_{IL}$ or V_{IH}, $I_{OL} = 24$ 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
I_{CCT}	Maximum I_{CC}/Input	5.5	$V_I = V_{CC} - 2.1$ V	0.6	–	1.5	mA
I_{OLD}	Minimum Dynamic Output Current (Note 5)	5.5	$V_{OLD} = 1.65$ V Max.	–	–	75	mA
I_{OHD}		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.

AC ELECTRICAL CHARACTERISTICS FOR AC

Symbol	Parameter	V_CC (V) (Note 6)	T_A = +25°C C_L = 50 pF Min.	T_A = +25°C C_L = 50 pF Typ.	T_A = +25°C C_L = 50 pF Max.	T_A = −40°C to +85°C C_L = 50 pF Min.	T_A = −40°C to +85°C C_L = 50 pF Max.	Unit
t_{PLH}	Propagation Delay	3.3	2.0	7.0	9.5	2.0	10.0	ns
		5.0	1.5	6.0	8.0	1.5	8.5	
t_{PHL}	Propagation Delay	3.3	1.5	5.5	8.0	1.0	8.5	ns
		5.0	1.5	4.5	6.5	1.0	7.0	

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.
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

Symbol	Parameter	V_CC (V) (Note 7)	T_A = +25°C C_L = 50 pF Min.	T_A = +25°C C_L = 50 pF Typ.	T_A = +25°C C_L = 50 pF Max.	T_A = −40°C to +85°C C_L = 50 pF Min.	T_A = −40°C to +85°C C_L = 50 pF Max.	Unit
t_{PLH}	Propagation Delay	5.0	1.5	5.5	9.0	1.0	9.5	ns
t_{PHL}	Propagation Delay	5.0	1.5	4.0	7.0	1.0	8.0	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.
7. Voltage Range 5.0 is 5.0 V ±0.5 V.

CAPATICANCE

Symbol	Parameter	Conditions	Typ.	Unit
C_{IN}	Input Capacitance	V_{CC} = OPEN	4.5	pF
C_{PD}	Power Dissipation Capacitance	V_{CC} = 5.0 V	30.0	pF

ORDERING INFORMATION

Order Number	Package	Shipping (Qty / Packing)[†]
74AC00MTCX	TSSOP−14 (Pb−Free/Halogen Free)	2500 / Tape & Reel
74ACT00MTCX	TSSOP−14 (Pb−Free/Halogen Free)	2500 / Tape & Reel
74AC00SCX	SOIC−14 (Pb−Free/Halogen Free)	2500 / Tape & Reel
74ACT00SCX	SOIC−14 (Pb−Free/Halogen 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.

SOIC14
CASE 751EF
ISSUE O

DATE 30 SEP 2016

8.75
8.50

A

7.62

14   8

B

6.00

4.00
3.80

1   7

PIN #1
IDENT.

1.27

0.51
0.35

(0.33)

TOP VIEW

⊕ | 0.25 Ⓜ | C | B | A

LAND PATTERN RECOMMENDATION

14   0.65   8

5.60

1.70

1   7

1.27

1.75 MAX

A

0.25
0.19

1.50
1.25

0.25
0.10

△ | 0.10 | C

C

FRONT VIEW

SIDE VIEW
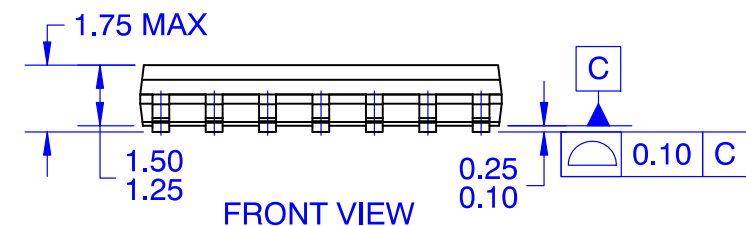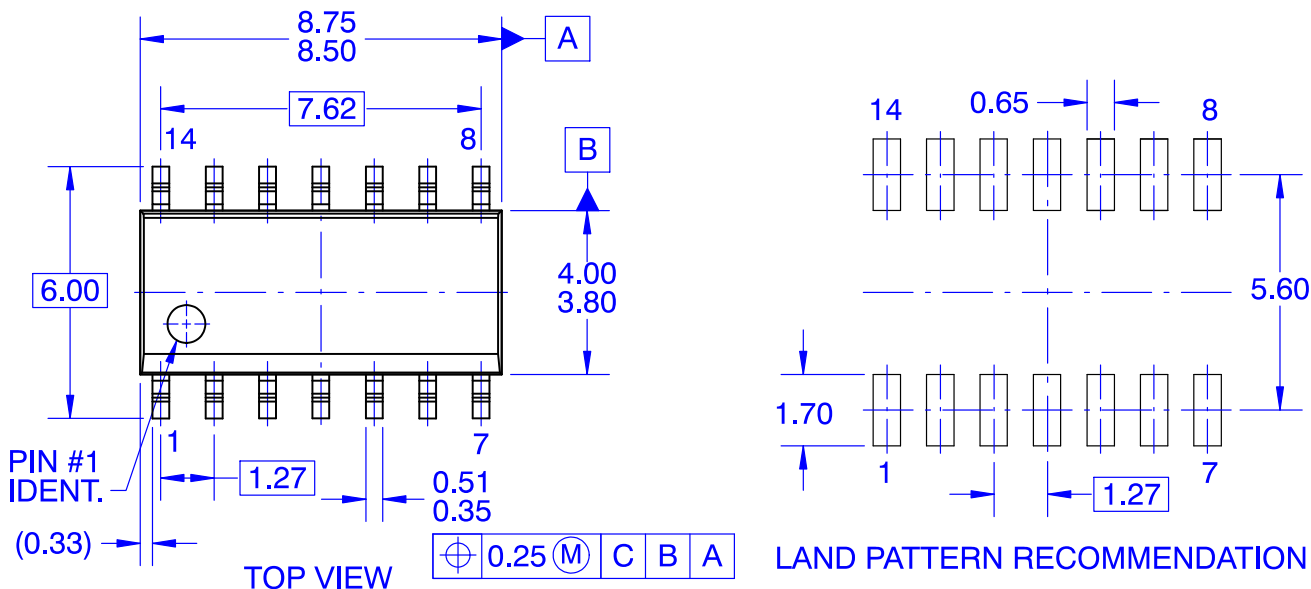
NOTES:
A. CONFORMS TO JEDEC MS−012, VARIATION AB, ISSUE C
B. ALL DIMENSIONS ARE IN MILLIMETERS
C. DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS
D. LAND PATTERN STANDARD: SOIC127P600X145−14M
E. CONFORMS TO ASME Y14.5M, 2009

0.50
0.25 x 45°

R0.10

GAGE
PLANE

R0.10

0.36

8°
0°

0.90
0.50

(1.04)

SEATING PLANE

DETAIL A
SCALE 16 : 1
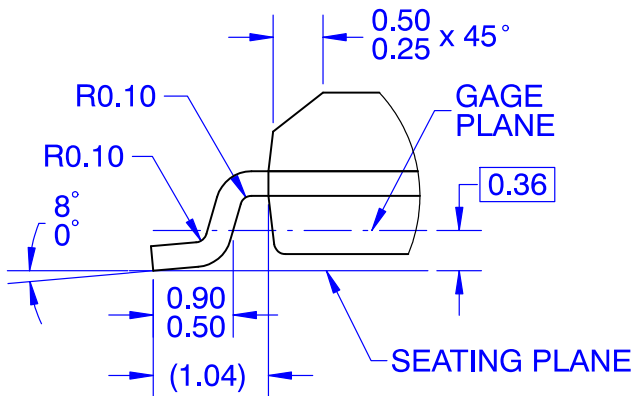
DOCUMENT NUMBER:	98AON13739G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.	
DESCRIPTION:	SOIC14		PAGE 1 OF 1

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

onsemi™

TSSOP−14 WB
CASE 948G
ISSUE C

DATE 17 FEB 2016

14

SCALE 2:1

1

14X **K** REF

⊕ | 0.10 (0.004) Ⓜ | T | U Ⓢ | V Ⓢ

◯ 0.15 (0.006) T U Ⓢ

2X **L/2**

L

PIN 1
IDENT.

◯ 0.15 (0.006) T U Ⓢ

14 ... 8

B
−U−

1 ... 7

A
−V−

N

0.25 (0.010)

M

N

F

DETAIL E

K
K1

J **J1**

SECTION N−N

C

◯ 0.10 (0.004)
−T− SEATING
PLANE

D **G** **H**

DETAIL E

−W−

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***

14

XXXX
XXXX
ALYW■

1

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

7.06

1

0.65
PITCH

14X
0.36

14X
1.26

DIMENSIONS: MILLIMETERS

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DESCRIPTION:	TSSOP−14 WB		PAGE 1 OF 1

PUBLICATION ORDERING INFORMATION

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