

# Quad 2-Input OR Gate

## 74AC32, 74ACT32

### General Description

The AC32/ACT32 contains four, 2-input OR gates.

### Features

- $I_{CC}$  Reduced by 50% on 74AC Only
- Outputs Source/Sink 24 mA
- ACT32 Has TTL-Compatible Inputs
- These are Pb-Free and Halide Free Devices

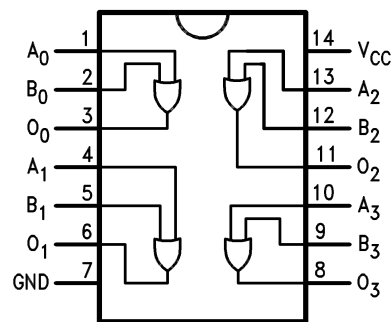


Figure 1. Connection Diagram

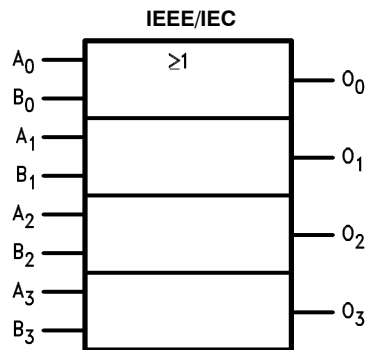
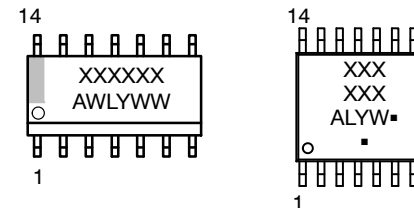


Figure 2. Logic Symbol

### PIN DESCRIPTION

Pin Names	Description
$A_n, B_n$	Inputs
$O_n$	Outputs

### MARKING DIAGRAMS



XXX = Specific Device Code  
 A = Assembly Location  
 WL, L = Wafer Lot  
 Y = Year  
 WW, W = Work Week  
 G or ■ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

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

## 74AC32, 74ACT32

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
$V_{CC}$	Supply Voltage		- 0.5 to + 6.5	V
$I_{IK}$	DC Input Diode Current	$V_I = -0.5\text{ V}$	- 20	mA
		$V_I = V_{CC} + 0.5\text{ V}$	+20	mA
$V_I$	DC Input Voltage		- 0.5 to $V_{CC} + 0.5$	V
$I_{OK}$	DC Output Diode Current	$V_O = -0.5\text{ V}$	-20	mA
$I_{OK}$	DC Output Diode Current	$V_O = V_{CC} + 0.5\text{ V}$	+20	mA
$V_O$	DC Output Voltage		- 0.5 to $V_{CC} + 0.5$	V
$I_O$	DC Output Source or Sink Current		$\pm 50$	mA
$I_{CC}$ or $I_{GND}$	DC $V_{CC}$ or Ground Current per Output Pin		$\pm 50$	mA
$T_{STG}$	Storage Temperature		- 65 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		Min	Max	Unit
$V_{CC}$	Supply Voltage	AC	2.0	6.0	V
		ACT	4.5	5.5	
$V_I$	Input Voltage		0	$V_{CC}$	V
$V_O$	Output Voltage		0	$V_{CC}$	V
$T_A$	Operating Temperature		-40	+85	°C
$\Delta V / \Delta t$	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
$\Delta V / \Delta t$	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.

# 74AC32, 74ACT32

## DC CHARACTERISTICS FOR AC

Symbol	Parameter	V <sub>CC</sub> (V)	Conditions	T <sub>A</sub> = +25°C		T <sub>A</sub> = -40°C to +85°C	Unit
				Typ	Guaranteed Limits		
V <sub>IH</sub>	Minimum High Level Input Voltage	3.0	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> - 0.1 V	1.5	2.1	2.1	V
		4.5		2.25	3.15	3.15	V
		5.5		2.75	3.85	3.85	V
V <sub>IL</sub>	Maximum Low Level Input Voltage	3.0	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> - 0.1 V	1.5	0.9	0.9	V
		4.5		2.25	1.35	1.35	V
		5.5		2.75	1.65	1.65	V
V <sub>OH</sub>	Minimum High Level Output Voltage	3.0	I <sub>OUT</sub> = -50 μA	2.99	2.9	2.9	V
		4.5		4.49	4.4	4.4	V
		5.5		5.49	5.4	5.4	V
		3.0	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = -12 mA		2.56	2.46	V
		4.5	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = -24 mA		3.86	3.76	
		5.5	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = -24 mA (Note 1)		4.86	4.76	
V <sub>OL</sub>	Maximum Low Level Output Voltage	3.0	I <sub>OUT</sub> = 50 μA	0.002	0.1	0.1	V
		4.5		0.001	0.1	0.1	V
		5.5		0.001	0.1	0.1	V
		3.0	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 12 mA		0.36	0.44	V
		4.5	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 24 mA		0.36	0.44	
		5.5	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 24 mA (Note 1)		0.36	0.44	
I <sub>IN</sub> (Note 3)	Maximum Input Leakage Current	5.5	V <sub>I</sub> = V <sub>CC</sub> , GND	-	±0.1	±1.0	μA
I <sub>OLD</sub>	Minimum Dynamic Output Current (Note 2)	5.5	V <sub>OLD</sub> = 1.65 V Max	-	-	75	mA
I <sub>OHD</sub>		5.5	V <sub>OHD</sub> = 3.85 V Min	-	-	-75	mA
I <sub>CC</sub> (Note 3)	Maximum Quiescent Supply Current	5.5	V <sub>IN</sub> = V <sub>CC</sub> 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<sub>IN</sub> and I<sub>CC</sub> @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V<sub>CC</sub>.

# 74AC32, 74ACT32

## DC CHARACTERISTICS FOR ACT

Symbol	Parameter	V <sub>CC</sub> (V)	Conditions	T <sub>A</sub> = +25°C		T <sub>A</sub> = -40°C to +85°C	Unit
				Typ	Guaranteed Limits		
V <sub>IH</sub>	Minimum High Level Input Voltage	4.5	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V	1.5	2.0	2.0	V
		5.5		1.5	2.0	2.0	V
V <sub>IL</sub>	Maximum Low Level Input Voltage	4.5	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V	1.5	0.8	0.8	V
		5.5		1.5	0.8	0.8	V
V <sub>OH</sub>	Minimum High Level Output Voltage	4.5	I <sub>OUT</sub> = –50 µA	4.49	4.4	4.4	V
		5.5		5.49	5.4	5.4	V
		4.5	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = –24 mA		3.86	3.76	V
		5.5	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = –24 mA (Note 4)		4.86	4.76	
V <sub>OL</sub>	Maximum Low Level Output Voltage	4.5	I <sub>OUT</sub> = 50 µA	0.001	0.1	0.1	V
		5.5		0.001	0.1	0.1	V
		4.5	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 24 mA		0.36	0.44	V
		5.5	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 24 mA (Note 4)		0.36	0.44	
I <sub>IN</sub>	Maximum Input Leakage Current	5.5	V <sub>I</sub> = V <sub>CC</sub> , GND	–	±0.1	±1.0	µA
I <sub>CCT</sub>	Maximum I <sub>CC</sub> /Input	5.5	V <sub>I</sub> = V <sub>CC</sub> – 2.1 V	0.6	–	1.5	mA
I <sub>OLD</sub>	Minimum Dynamic Output Current (Note 5)	5.5	V <sub>OLD</sub> = 1.65 V Max	–	–	75	mA
I <sub>OHD</sub>		5.5	V <sub>OHD</sub> = 3.85 V Min	–	–	–75	mA
I <sub>CC</sub>	Maximum Quiescent Supply Current	5.5	V <sub>IN</sub> = V <sub>CC</sub> or GND	–	4.0	40.0	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.

## 74AC32, 74ACT32

### AC CHARACTERISTICS FOR AC

Symbol	Characteristics	V <sub>CC</sub> (V) (Note 6)	T <sub>A</sub> = +25°C, C <sub>L</sub> = 50 pF			T <sub>A</sub> = -40°C to +85°C, C <sub>L</sub> = 50 pF		Unit
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay	3.3	1.5	7.5	9.0	1.5	10.0	ns
		5.0	1.5	5.5	7.5	1.0	8.5	
t <sub>PHL</sub>	Propagation Delay	3.3	1.5	7.0	8.5	1.0	9.0	ns
		5.0	1.5	5.0	7.0	1.0	7.5	

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

### AC CHARACTERISTICS FOR ACT

Symbol	Characteristics	V <sub>CC</sub> (V) (Note 6)	T <sub>A</sub> = +25°C, C <sub>L</sub> = 50 pF			T <sub>A</sub> = -40°C to +85°C, C <sub>L</sub> = 50 pF		Unit
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay	5.0	1.0	6.5	9.0	1.0	10.0	ns
t <sub>PHL</sub>	Propagation Delay	5.0	1.0	6.5	9.0	1.0	10.0	ns

7. Voltage Range 5.0 is 5.0 V ± 0.5 V.

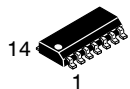
### CAPACITANCE

Symbol	Parameter	Test Conditions	Typ	Unit
C <sub>IN</sub>	Input Capacitance	V <sub>CC</sub> = Open	4.5	pF
C <sub>PD</sub>	Power Dissipation Capacitance	V <sub>CC</sub> = 5.0 V	20.0	pF

### ORDERING INFORMATION

Device	Marking	Package	Shipping <sup>†</sup>
74AC32SCX	AC32	SOIC14, Case 751EF (Pb-Free)	2500 / Tape & Reel
74AC32MTCX	AC 32	TSSOP-14 WB, Case 948G (Pb-Free)	2500 / Tape & Reel
74ACT32SC	ACT32	SOIC-14 NB, Case 751A-03 (Pb-Free)	55 Units / Tube
74ACT32SCX	ACT32	SOIC14, Case 751EF (Pb-Free)	2500 / Tape & Reel
74ACT32MTCX	ACT 32	TSSOP-14 WB, Case 948G (Pb-Free)	2500 / Tape & Reel

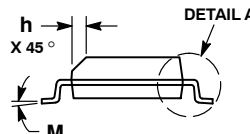
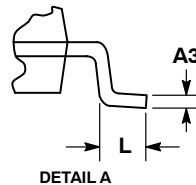
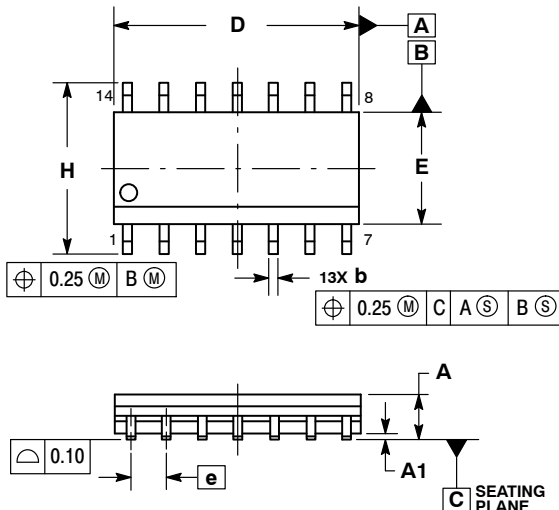
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).



SCALE 1:1

SOIC-14 NB  
CASE 751A-03  
ISSUE L

DATE 03 FEB 2016

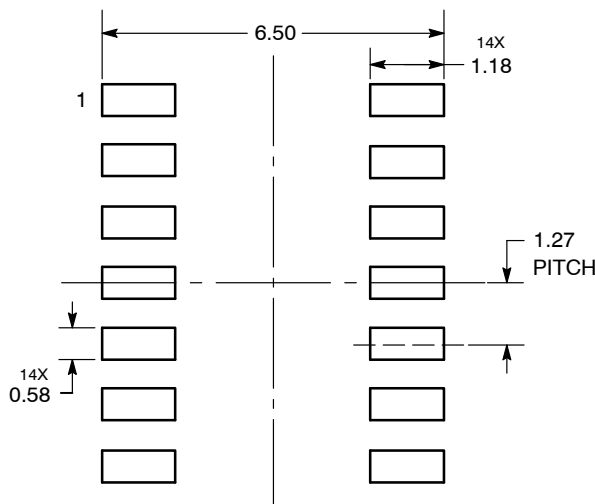


NOTES:

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°

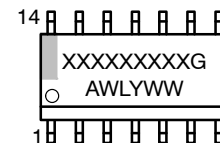
SOLDERING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

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

GENERIC  
MARKING DIAGRAM\*



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

\*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.

STYLES ON PAGE 2

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SOIC-14  
CASE 751A-03  
ISSUE L

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  
8. 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  
6. ANODE/CATHODE  
7. ANODE/CATHODE  
8. ANODE/CATHODE  
9. ANODE/CATHODE  
10. ANODE/CATHODE  
11. COMMON CATHODE  
12. COMMON ANODE  
13. ANODE/CATHODE  
14. ANODE/CATHODE

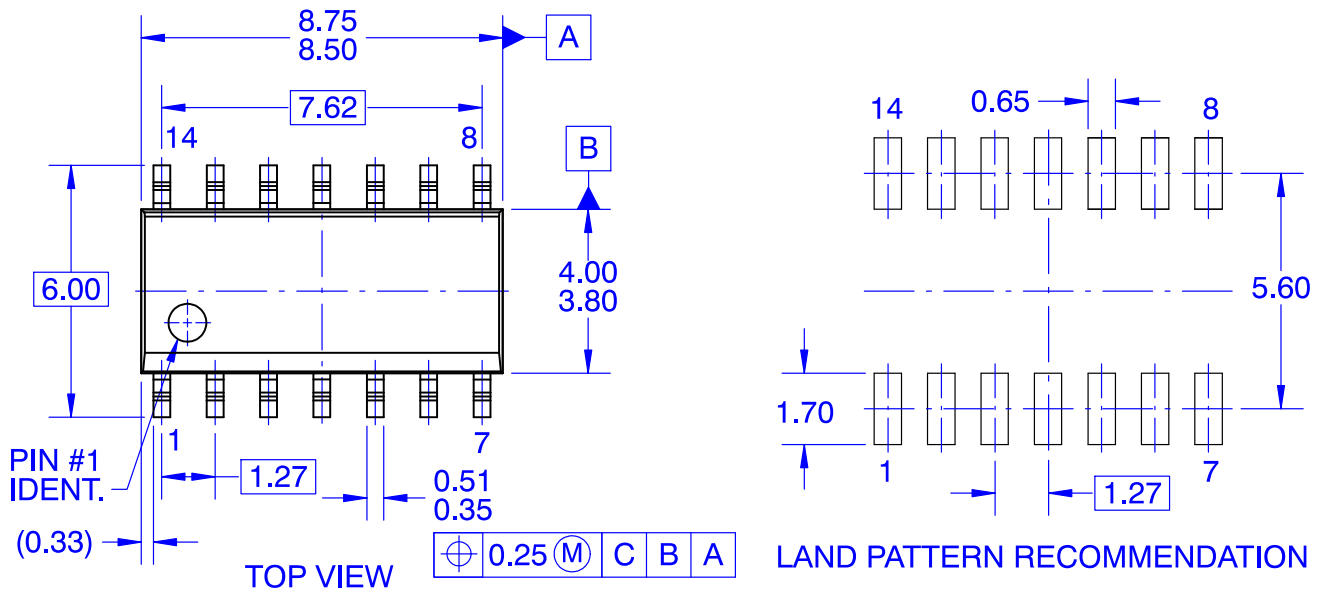
STYLE 8:  
PIN 1. COMMON CATHODE  
2. ANODE/CATHODE  
3. ANODE/CATHODE  
4. NO CONNECTION  
5. ANODE/CATHODE  
6. ANODE/CATHODE  
7. COMMON ANODE  
8. COMMON ANODE  
9. ANODE/CATHODE  
10. ANODE/CATHODE  
11. NO CONNECTION  
12. ANODE/CATHODE  
13. ANODE/CATHODE  
14. COMMON CATHODE

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**SOIC14**  
**CASE 751EF**  
**ISSUE O**

DATE 30 SEP 2016



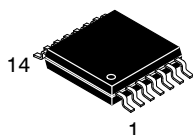
**NOTES:**

- 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

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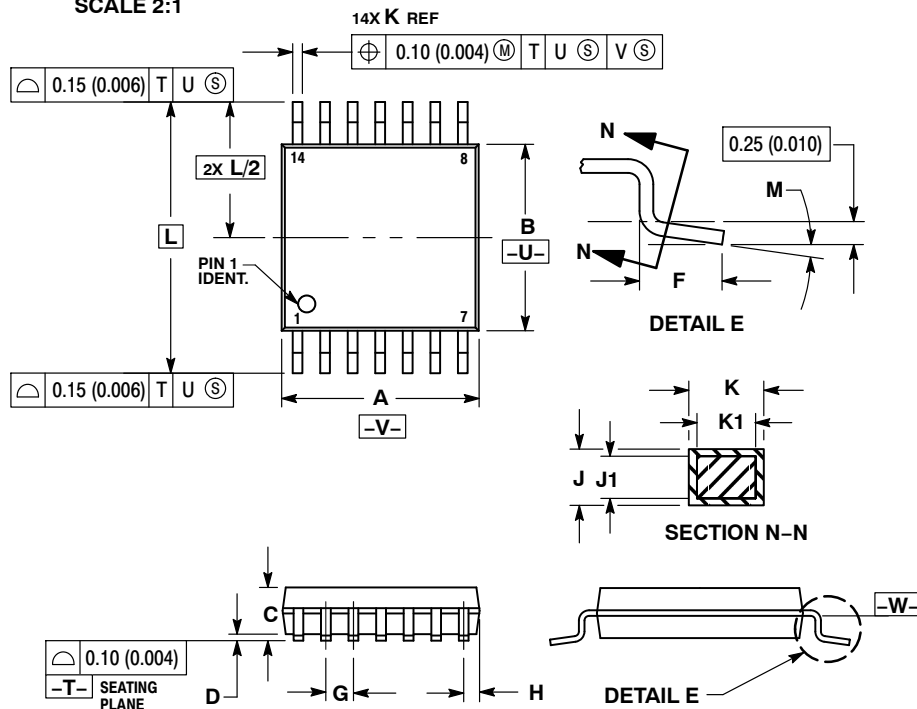
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



**TSSOP-14 WB**  
CASE 948G  
ISSUE C

DATE 17 FEB 2016

SCALE 2:1

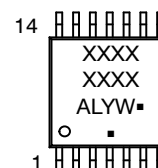


## NOTES:

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\*

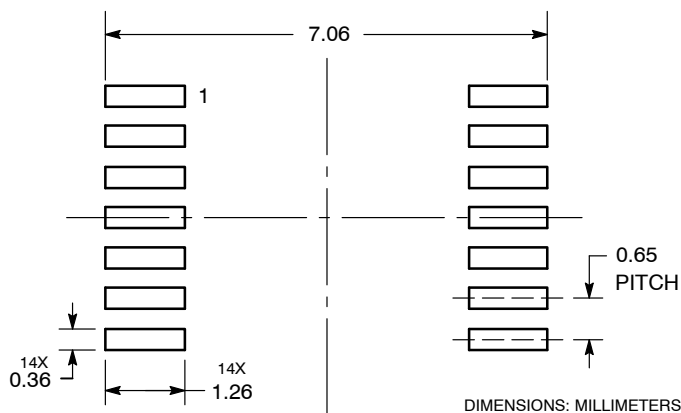


- A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week  
▪ = Pb-Free Package

(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



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DESCRIPTION: TSSOP-14 WB

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