

Hex Inverter

MC14069UB

The MC14069UB hex inverter is constructed with MOS P-channel and N-channel enhancement mode devices in a single monolithic structure. These inverters find primary use where low power dissipation and/or high noise immunity is desired. Each of the six inverters is a single stage to minimize propagation delays.

Features

- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Capable of Driving Two Low-Power TTL Loads or One Low-Power Schottky TTL Load Over the Rated Temperature Range
- Triple Diode Protection on All Inputs
- Pin-for-Pin Replacement for CD4069UB
- Meets JEDEC UB Specifications
- 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 and are RoHS Compliant

MAXIMUM RATINGS (Voltages Referenced to V_{SS})

Symbol	Parameter	Value	Unit
V_{DD}	DC Supply Voltage Range	-0.5 to +18.0	V
V_{in}, V_{out}	Input or Output Voltage Range (DC or Transient)	-0.5 to $V_{DD} + 0.5$	V
I_{in}, I_{out}	Input or Output Current (DC or Transient) per Pin	± 10	mA
P_D	Power Dissipation, per Package (Note 1)	500	mW
T_A	Ambient Temperature Range	-55 to +125	$^{\circ}\text{C}$
T_{stg}	Storage Temperature Range	-65 to +150	$^{\circ}\text{C}$
T_L	Lead Temperature (8-Second Soldering)	260	$^{\circ}\text{C}$

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.

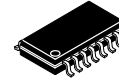
1. Temperature Derating: "D/DW" Packages: -7.0 mW/ $^{\circ}\text{C}$ From 65 $^{\circ}\text{C}$ To 125 $^{\circ}\text{C}$

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 $V_{SS} \leq (V_{in} \text{ or } V_{out}) \leq V_{DD}$.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V_{SS} or V_{DD}). Unused outputs must be left open.



SOIC-14
D SUFFIX
CASE 751A

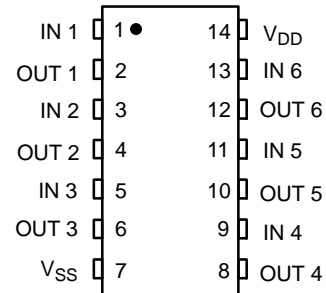


SOEIAJ-14
F SUFFIX
CASE 965

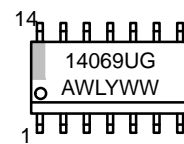


TSSOP-14
DT SUFFIX
CASE 948G

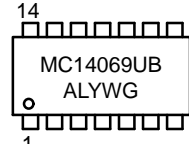
PIN ASSIGNMENT



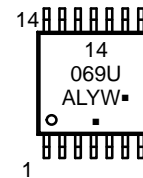
MARKING DIAGRAMS



SOIC-14



SOEIAJ-14



TSSOP-14

- A = Assembly Location
- WL, L = Wafer Lot
- YY, 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 in the package dimensions section on page 2 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 2.

MC14069UB

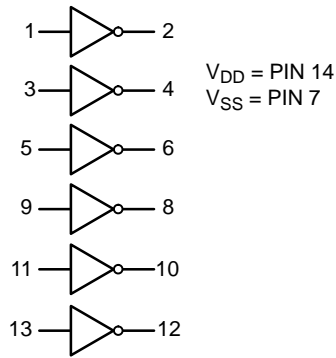
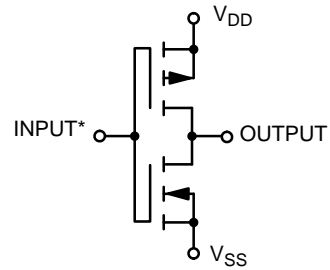


Figure 1. Logic Diagram



* Double diode protection on all inputs not shown (1/6 of circuit shown)

Figure 2. Circuit Schematic

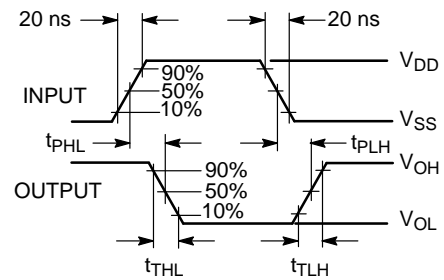
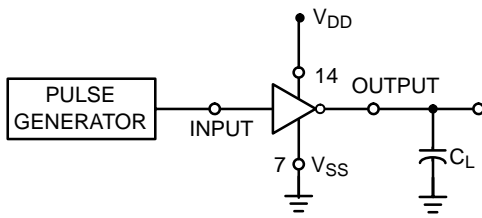


Figure 3. Switching Time Test Circuit and Waveforms

ORDERING INFORMATION

Device	Package	Shipping†
MC14069UBDG	SOIC-14 (Pb-Free)	55 Units / Rail
MC14069UBDR2G	SOIC-14 (Pb-Free)	2500 Units / Tape & Reel
NLV14069UBDR2G*	SOIC-14 (Pb-Free)	2500 Units / Tape & Reel
MC14069UBDTR2G	TSSOP-14 (Pb-Free)	2500 Units / Tape & Reel
NLV14069UBDTR2G*	TSSOP-14 (Pb-Free)	2500 Units / Tape & Reel

DISCONTINUED (Note 2)

NLV14069UBDG*	SOIC-14 (Pb-Free)	55 Units / Rail
MC14069UBFELG	SOEIAJ-14 (Pb-Free)	2000 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](#).

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

2. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on www.onsemi.com.

MC14069UB

ELECTRICAL CHARACTERISTICS (Voltages Referenced to V_{SS})

Characteristic	Symbol	V _{DD} Vdc	-55 °C		25 °C			125 °C		Unit
			Min	Max	Min	Typ (Note 3)	Max	Min	Max	
Output Voltage V _{in} = V _{DD} V _{in} = 0	"0" Level V _{OL}	5.0	-	0.05	-	0	0.05	-	0.05	Vdc
		10	-	0.05	-	0	0.05	-	0.05	
		15	-	0.05	-	0	0.05	-	0.05	
	"1" Level V _{OH}	5.0	4.95	-	4.95	5.0	-	4.95	-	Vdc
		10	9.95	-	9.95	10	-	9.95	-	
		15	14.95	-	14.95	15	-	14.95	-	
Input Voltage (V _O = 4.5 Vdc) (V _O = 9.0 Vdc) (V _O = 13.5 Vdc) (V _O = 0.5 Vdc) (V _O = 1.0 Vdc) (V _O = 1.5 Vdc)	"0" Level V _{IL}	5.0	-	1.0	-	2.25	1.0	-	1.0	Vdc
		10	-	2.0	-	4.50	2.0	-	2.0	
		15	-	2.5	-	6.75	2.5	-	2.5	
	"1" Level V _{IH}	5.0	4.0	-	4.0	2.75	-	4.0	-	Vdc
		10	8.0	-	8.0	5.50	-	8.0	-	
		15	12.5	-	12.5	8.25	-	12.5	-	
Output Drive Current (V _{OH} = 2.5 Vdc) (V _{OH} = 4.6 Vdc) (V _{OH} = 9.5 Vdc) (V _{OH} = 13.5 Vdc) (V _{OL} = 0.4 Vdc) (V _{OL} = 0.5 Vdc) (V _{OL} = 1.5 Vdc)	Source I _{OH}	5.0	-3.0	-	-2.4	-4.2	-	-1.7	-	mAdc
		5.0	-0.64	-	-0.51	-0.88	-	-0.36	-	
		10	-1.6	-	-1.3	-2.25	-	-0.9	-	
		15	-4.2	-	-3.4	-8.8	-	-2.4	-	
	Sink I _{OL}	5.0	0.64	-	0.51	0.88	-	0.36	-	mAdc
		10	1.6	-	1.3	2.25	-	0.9	-	
15		4.2	-	3.4	8.8	-	2.4	-		
Input Current	I _{in}	15	-	±0.1	-	±0.00001	±0.1	-	±1.0	μAdc
Input Capacitance (V _{in} = 0)	C _{in}	-	-	-	-	5.0	7.5	-	-	pF
Quiescent Current (Per Package)	I _{DD}	5.0	-	0.25	-	0.0005	0.25	-	7.5	μAdc
		10	-	0.5	-	0.0010	0.5	-	15	
		15	-	1.0	-	0.0015	1.0	-	30	
Total Supply Current (Notes 4 and 5) (Dynamic plus Quiescent, Per Gate) (C _L = 50 pF)	I _T	5.0	I _T = (0.3 μA/kHz) f + I _{DD} /6							μAdc
		10	I _T = (0.6 μA/kHz) f + I _{DD} /6							
		15	I _T = (0.9 μA/kHz) f + I _{DD} /6							
Output Rise and Fall Times (Note 4) (C _L = 50 pF) t _{TLH} , t _{THL} = (1.35 ns/pF) C _L + 33 ns t _{TLH} , t _{THL} = (0.60 ns/pF) C _L + 20 ns t _{TLH} , t _{THL} = (0.40 ns/pF) C _L + 20 ns	t _{TLH} , t _{THL}	5.0	-	-	-	100	200	-	-	ns
		10	-	-	-	50	100	-	-	
		15	-	-	-	40	80	-	-	
		15	-	-	-	40	80	-	-	
Propagation Delay Times (Note 4) (C _L = 50 pF) t _{PLH} , t _{PHL} = (0.90 ns/pF) C _L + 20 ns t _{PLH} , t _{PHL} = (0.36 ns/pF) C _L + 22 ns t _{PLH} , t _{PHL} = (0.26 ns/pF) C _L + 17 ns	t _{PLH} , t _{PHL}	5.0	-	-	-	65	125	-	-	ns
		10	-	-	-	40	75	-	-	
		15	-	-	-	30	55	-	-	
		15	-	-	-	30	55	-	-	

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. Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

4. The formulas given are for the typical characteristics only at 25 °C.

5. To calculate total supply current at loads other than 50 pF:

$$I_T(C_L) = I_T(50 \text{ pF}) + (C_L - 50) \text{ Vfk}$$

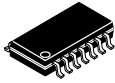
where: I_T is in μA (per package), C_L in pF, V = (V_{DD} - V_{SS}) in volts, f in kHz is input frequency, and k = 0.002.

MC14069UB

REVISION HISTORY

Revision	Description of Changes	Date
12	Rebranded the Data Sheet to onsemi format. NLV14069UBDG and MC14069UBFELG OPNs Marked as Discontinued.	8/26/2025

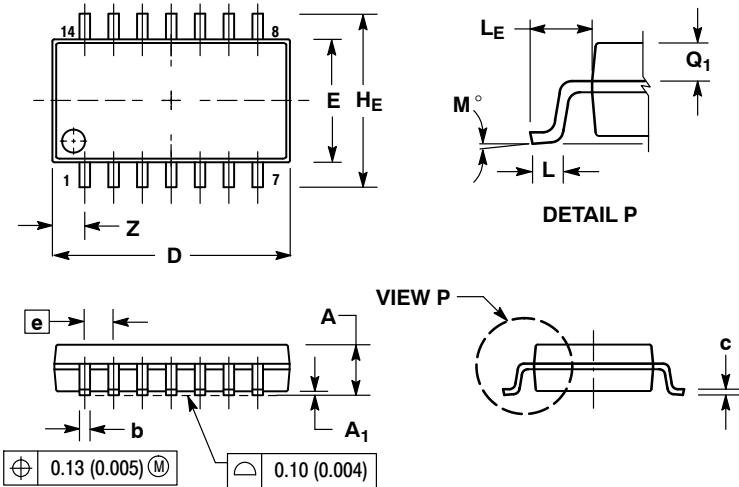
This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.



SCALE 1:1

SOEIAJ-14
CASE 965-01
ISSUE B

DATE 29 FEB 2008



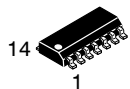
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	---	2.05	---	0.081
A ₁	0.05	0.20	0.002	0.008
b	0.35	0.50	0.014	0.020
c	0.10	0.20	0.004	0.008
D	9.90	10.50	0.390	0.413
E	5.10	5.45	0.201	0.215
e	1.27 BSC		0.050 BSC	
H _E	7.40	8.20	0.291	0.323
L	0.50	0.85	0.020	0.033
L _E	1.10	1.50	0.043	0.059
M	0 °	10 °	0 °	10 °
Q ₁	0.70	0.90	0.028	0.035
Z	---	1.42	---	0.056

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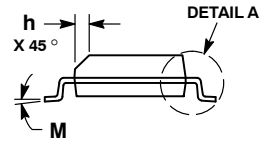
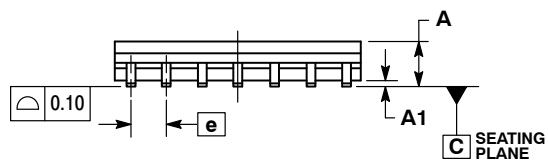
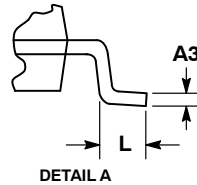
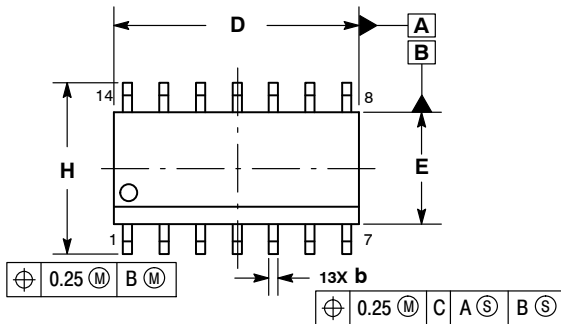
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SCALE 1:1

SOIC-14 NB
CASE 751A-03
ISSUE L

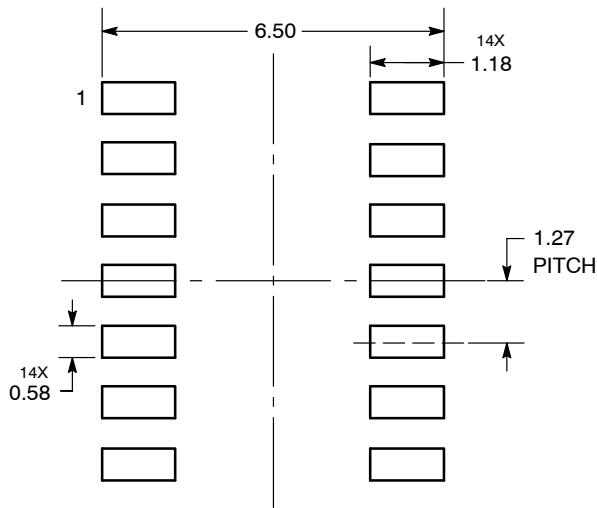
DATE 03 FEB 2016



- 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°

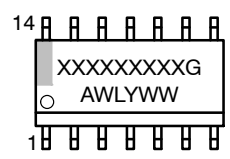
SOLDERING FOOTPRINT*



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

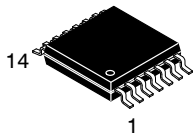
STYLE 6:
 PIN 1. CATHODE
 2. CATHODE
 3. CATHODE
 4. CATHODE
 5. CATHODE
 6. CATHODE
 7. CATHODE
 8. ANODE
 9. ANODE
 10. ANODE
 11. ANODE
 12. ANODE
 13. ANODE
 14. ANODE

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

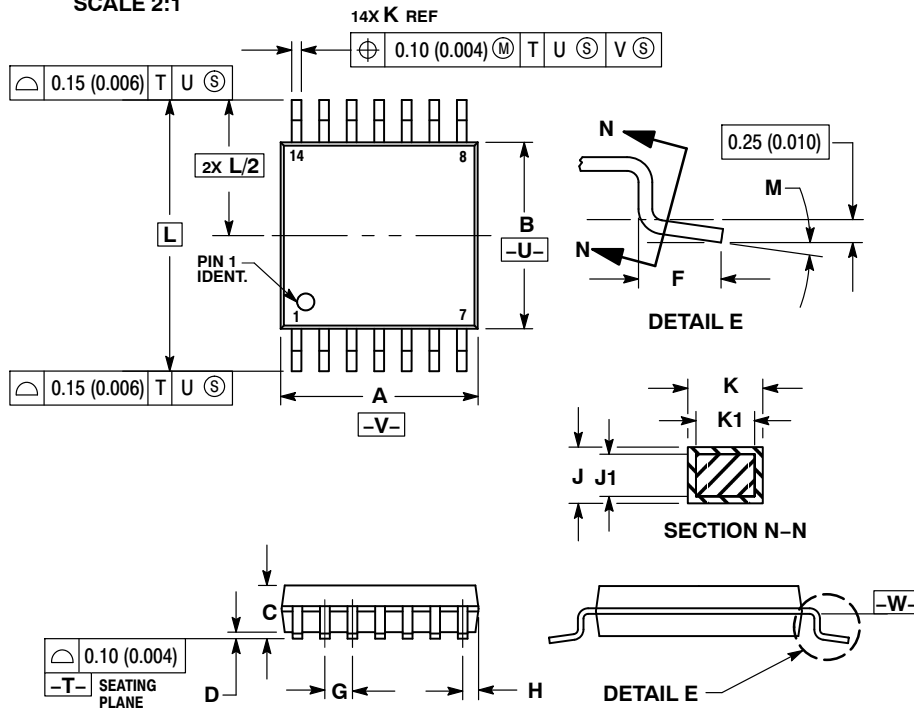
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TSSOP-14 WB
CASE 948G
ISSUE C

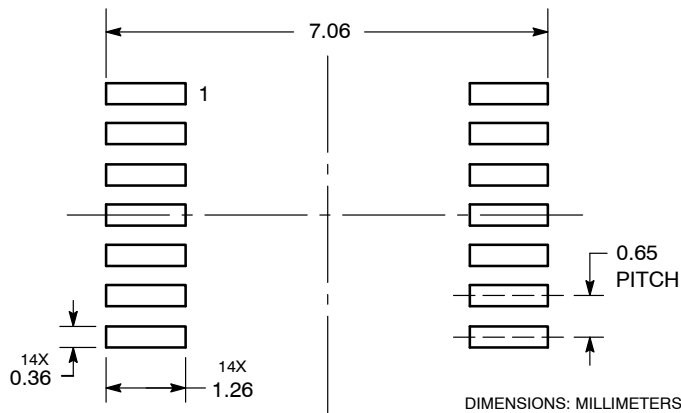
DATE 17 FEB 2016



- NOTES:
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 - CONTROLLING DIMENSION: MILLIMETER.
 - 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.
 - DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
 - 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.
 - TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
 - DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

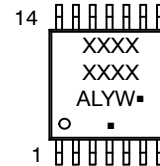
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.90	5.10	0.193	0.200
B	4.30	4.50	0.169	0.177
C	---	1.20	---	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.50	0.60	0.020	0.024
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0°	8°	0°	8°

RECOMMENDED
SOLDERING FOOTPRINT*



*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*



- 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.

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