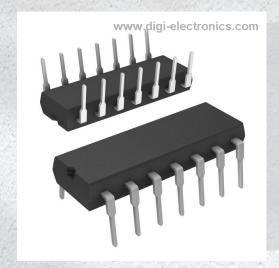


# MC74AC86N Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number MC74AC86N-DG

Manufacturer onsemi

Manufacturer Product Number MC74AC86N

Description IC GATE XOR 4CH 2-INP 14DIP

Detailed Description XOR (Exclusive OR) IC 4 Channel 14-PDIP



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.



# **Purchase and inquiry**

Manufacturer Product Number:	Manufacturer:
MC74AC86N	onsemi
Series:	Product Status:
74AC	Obsolete
Logic Type:	Number of Circuits:
XOR (Exclusive OR)	4
Number of Inputs:	Features:
2	
Voltage - Supply:	Current - Quiescent (Max):
2V ~ 6V	4 μΑ
Current - Output High, Low:	Input Logic Level - Low:
24mA, 24mA	0.9V ~ 1.65V
Input Logic Level - High:	Max Propagation Delay @ V, Max CL:
2.1V ~ 3.85V	8.5ns @ 5V, 50pF
Operating Temperature:	Mounting Type:
-40°C ~ 85°C	Through Hole
Supplier Device Package:	Package / Case:
14-PDIP	14-DIP (0.300", 7.62mm)
Base Product Number:	
74AC86	

# **Environmental & Export classification**

8542.39.0001

RoHS Status:	Moisture Sensitivity Level (MSL):
RoHS non-compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	

1

**MARKING** 



www.onsemi.com

# **Quad 2-Input Exclusive-OR Gate**

**High-Performance Silicon-Gate CMOS** 

# **MC74AC86, MC74ACT86**

#### **Features**

- Outputs Source/Sink 24 mA
- These are Pb-Free Devices

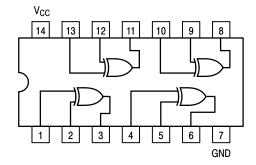


Figure 1. Pinout: 14-Lead Packages Conductors
(Top View)

# DIAGRAMS 14 ARRENTE

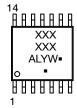


SOIC-14 D SUFFIX CASE 751A





TSSOP-14 DT SUFFIX CASE 948G



XXXXXX = Specific Device Code
A = Assembly Location

 $WL ext{ or } L = Wafer Lot$  Y = Year $WW ext{ or } W = Work Week$ 

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 5 of this data sheet.

#### **MAXIMUM RATINGS**

Parameter	Value	Unit
DC Supply Voltage	- 0.5 to +6.5	V
DC Input Voltage	$-0.5 \le V_{I} \le V_{CC} + 0.5$	V
DC Output Voltage (Note 1)	$-0.5 \le V_{O} \le V_{CC} + 0.5$	V
DC Input Diode Current	± 20	mA
DC Output Diode Current	± 50	mA
DC Output Sink/Source Current	± 50	mA
DC Supply Current per Output Pin	± 50	mA
DC Ground Current per Output Pin	± 50	mA
Storage Temperature Range	-65 to +150	°C
Lead temperature, 1 mm from Case for 10 Seconds	260	°C
Junction temperature under Bias	+ 150	°C
Thermal Resistance (Note 2) SOIC TSSOP	116 150	°C/W
Power Dissipation in Still Air at 25°C SOIC TSSOP	1077 833	mW
Moisture Sensitivity	Level 1	
Flammability Rating Oxygen Index: 30% – 35%	UL 94 V-0 @ 0.125 in	
ESD Withstand Voltage Human Body Model (Note 3) Charged Device Model (Note 4)	> 2000 > 1000	٧
Latch-Up Performance Above V <sub>CC</sub> and Below GND at 85°C (Note 5)	±100	mA
	DC Supply Voltage  DC Input Voltage  DC Output Voltage  (Note 1)  DC Input Diode Current  DC Output Diode Current  DC Output Sink/Source Current  DC Supply Current per Output Pin  DC Ground Current per Output Pin  Storage Temperature Range  Lead temperature, 1 mm from Case for 10 Seconds  Junction temperature under Bias  Thermal Resistance (Note 2)  SOIC TSSOP  Power Dissipation in Still Air at 25°C  Moisture Sensitivity  Flammability Rating  Oxygen Index: 30% – 35%  ESD Withstand Voltage  Human Body Model (Note 3)  Charged Device Model (Note 4)	DC Supply Voltage $-0.5 \text{ to } +6.5$ DC Input Voltage $-0.5 \leq V_{l} \leq V_{CC} +0.5$ DC Output Voltage $(Note \ 1) \qquad -0.5 \leq V_{O} \leq V_{CC} +0.5$ DC Input Diode Current $\pm 20$ DC Output Diode Current $\pm 50$ DC Output Sink/Source Current $\pm 50$ DC Supply Current per Output Pin $\pm 50$ DC Ground Current per Output Pin $\pm 50$ Storage Temperature Range $-65 \text{ to } +150$ Lead temperature, 1 mm from Case for 10 Seconds $260$ Junction temperature under Bias $+150$ Thermal Resistance (Note 2) $SOIC \\ TSSOP \\ 150$ Power Dissipation in Still Air at 25°C $SOIC \\ TSSOP \\ 833$ Moisture Sensitivity $Level \ 1$ Flammability Rating $Oxygen \ Index: 30\% - 35\% \\ Charged Device Model (Note 3) \\ Charged Device Model (Note 4) > 2000 \\ > 1000$

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. IO absolute maximum rating must be observed.
- The package thermal impedance is calculated in accordance with JESD51–7.
   Tested to EIA/JESD22–A114–A.
- 4. Tested to JESD22-C101-A.
- 5. Tested to EIA/JESD78.

#### RECOMMENDED OPERATING CONDITIONS

Symbol	l Parameter		Min	Тур	Max	Unit
.,	O and Mallana	′AC	2.0	5.0	6.0	.,,
V <sub>CC</sub>	Supply Voltage	'ACT	4.5	5.0	5.5	٧
V <sub>in</sub> , V <sub>out</sub>	DC Input Voltage, Output Voltage (Ref. to GND)		0		V <sub>CC</sub>	٧
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time (Note 1)  'AC Devices except Schmitt Inputs	V <sub>CC</sub> @ 3.0 V	-	150	-	
		V <sub>CC</sub> @ 4.5 V	-	40	-	ns/V
		V <sub>CC</sub> @ 5.5 V	-	25	-	
	Input Rise and Fall Time (Note 2)	V <sub>CC</sub> @ 4.5 V	-	10	-	0./
t <sub>r</sub> , t <sub>f</sub>	'ACT Devices except Schmitt Inputs	V <sub>CC</sub> @ 5.5 V	-	8.0	-	ns/V
T <sub>A</sub>	Operating Ambient Temperature Range		-40	25	85	°C
I <sub>OH</sub>	Output Current – High		_	-	-24	mA
I <sub>OL</sub>	Output Current – Low		-	-	24	mA

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.

1. V<sub>in</sub> from 30% to 70% V<sub>CC</sub>; see individual Data Sheets for devices that differ from the typical input rise and fall times.

2. V<sub>in</sub> from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

#### DC CHARACTERISTICS

			74	AC	74AC		
		V <sub>cc</sub>	T <sub>A</sub> =	+25°C	T <sub>A</sub> = -40°C to +85°C		
Symbol	Parameter	(V)	Тур	Guar	anteed Limits	Unit	Conditions
V <sub>IH</sub>	Minimum High Level Input Voltage	3.0 4.5 5.5	1.5 2.25 2.75	2.1 3.15 3.85	2.1 3.15 3.85	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V
V <sub>IL</sub>	Maximum Low Level Input Voltage	3.0 4.5 5.5	1.5 2.25 2.75	0.9 1.35 1.65	0.9 1.35 1.65	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V
V <sub>OH</sub>	Minimum High Level Output Voltage	3.0 4.5 5.5	2.99 4.49 5.49	2.9 4.4 5.4	2.9 4.4 5.4	V	I <sub>OUT</sub> = -50 μA
		3.0 4.5 5.5		2.56 3.86 4.86	2.46 3.76 4.76	V	$*V_{IN} = V_{IL} \text{ or } V_{IH}$ $-12 \text{ mA}$ $I_{OH} -24 \text{ mA}$ $-24 \text{ mA}$
V <sub>OL</sub>	Maximum Low Level Output Voltage	3.0 4.5 5.5	0.002 0.001 0.001	0.1 0.1 0.1	0.1 0.1 0.1	V	Ι <sub>ΟUT</sub> = 50 μΑ
		3.0 4.5 5.5	- -	0.36 0.36 0.36	0.44 0.44 0.44	V	$\label{eq:VIN} \begin{split} \text{*V}_{\text{IN}} = \text{V}_{\text{IL}} \text{ or V}_{\text{IH}} \\ \text{12 mA} \\ \text{I}_{\text{OL}} & \text{24 mA} \\ \text{24 mA} \end{split}$
I <sub>IN</sub>	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μΑ	V <sub>I</sub> = V <sub>CC</sub> , GND
I <sub>OLD</sub>	†Minimum Dynamic	5.5	-	_	75	mA	V <sub>OLD</sub> = 1.65 V Max
I <sub>OHD</sub>	Output Current	5.5	-	_	-75	mA	V <sub>OHD</sub> = 3.85 V Min
I <sub>CC</sub>	Maximum Quiescent Supply Current	5.5	-	4.0	40	μΑ	V <sub>IN</sub> = V <sub>CC</sub> or GND

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

NOTE: 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>.

#### **AC CHARACTERISTICS**

			74AC			74AC		
		v <sub>cc</sub> *		գ = +25° Ել = 50 p		T <sub>A</sub> = - to +8 C <sub>L</sub> = 9	35°C	
Symbol	Parameter	(v)	Min	Тур	Max	Min	Max	Unit
t <sub>PLH</sub>	Propagation Delay Inputs to Outputs	3.3 5.0	2.0 1.5	6.0 4.5	11.5 8.5	1.5 1.0	12.5 9.0	ns
t <sub>PHL</sub>	Propagation Delay Inputs to Outputs	3.3 5.0	2.0 1.5	6.5 4.5	11.5 8.5	1.5 1.0	12.5 9.5	ns

<sup>\*</sup>Voltage Range 3.3 V is 3.3 V  $\pm 0.3$  V Voltage Range 5.0 V is 5.0 V  $\pm 0.5$  V.

<sup>†</sup>Maximum test duration 2.0 ms, one output loaded at a time.

#### **DC CHARACTERISTICS**

			74	CT	74ACT		
		V <sub>cc</sub>	T <sub>A</sub> = -	+25°C	T <sub>A</sub> = -40°C to +85°C		
Symbol	Parameter	(V)	Тур	Guar	anteed Limits	Unit	Conditions
V <sub>IH</sub>	Minimum High Level Input Voltage	4.5 5.5	1.5 1.5	2.0 2.0	2.0 2.0	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V
V <sub>IL</sub>	Maximum Low Level Input Voltage	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V
V <sub>OH</sub>	Minimum High Level Output Voltage	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	٧	I <sub>OUT</sub> = -50 μA
		4.5 5.5		3.86 4.86	3.76 4.76	٧	$\label{eq:VIN} \begin{split} ^{*}V_{IN} = V_{IL} \text{ or } V_{IH} \\ -24 \text{ mA} \\ I_{OH} & -24 \text{ mA} \end{split}$
V <sub>OL</sub>	Maximum Low Level Output Voltage	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	٧	I <sub>OUT</sub> = 50 μA
		4.5 5.5	- -	0.36 0.36	0.44 0.44	٧	$^{*V_{IN} = V_{IL} \text{ or } V_{IH}}_{I_{OL}} = ^{24 \text{ mA}}_{24 \text{ mA}}$
I <sub>IN</sub>	Maximum Input Leakage Current	5.5		±0.1	±1.0	μΑ	V <sub>I</sub> = V <sub>CC</sub> , GND
$\Delta I_{CCT}$	Additional Max. I <sub>CC</sub> /Input	5.5	0.6	-	1.5	mA	$V_{I} = V_{CC} - 2.1 \text{ V}$
I <sub>OLD</sub>	†Minimum Dynamic	5.5	-	_	75	mA	V <sub>OLD</sub> = 1.65 V Max
I <sub>OHD</sub>	Output Current	5.5	-	-	-75	mA	V <sub>OHD</sub> = 3.85 V Min
Icc	Maximum Quiescent Supply Current	5.5	-	4.0	40	μΑ	V <sub>IN</sub> = V <sub>CC</sub> or GND

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.

\*All outputs loaded; thresholds on input associated with output under test.
†Maximum test duration 2.0 ms, one output loaded at a time.

#### **AC CHARACTERISTICS**

			74ACT  T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF		74ACT  T <sub>A</sub> = -40°C  to +85°C  C <sub>L</sub> = 50 pF			
		V <sub>CC</sub> *						
Symbol	Parameter	(V)	Min	Тур	Max	Min	Max	Unit
t <sub>PLH</sub>	Propagation Delay	5.0	1.5	8.5	9.5	1.0	10.0	ns
t <sub>PHL</sub>	Propagation Delay	5.0	1.5	7.0	9.5	1.0	10.5	ns

<sup>\*</sup>Voltage Range 5.0 V is 5.0 V  $\pm$ 0.5 V.

#### **CAPACITANCE**

Symbol	Parameter	Value Typ	Unit	Test Conditions
C <sub>IN</sub>	Input Capacitance	4.5	pF	V <sub>CC</sub> = 5.0 V
C <sub>PD</sub>	Power Dissipation Capacitance	35	pF	V <sub>CC</sub> = 5.0 V

#### **ORDERING INFORMATION**

Device	Marking	Package	Shipping <sup>†</sup>
MC74AC86DG	AC86	SOIC-14 (Pb-Free)	55 Units / Rail
MC74AC86DR2G	AC86	SOIC-14 (Pb-Free)	2500 / Tape & Reel
MC74AC86DTR2G	AC 86	TSSOP-14 (Pb-Free)	2500 / Tape & Reel
MC74ACT86DR2G	ACT86	SOIC-14 (Pb-Free)	2500 / Tape & Reel
MC74ACT86DTR2G	ACT 86	TSSOP-14 (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.

# **MECHANICAL CASE OUTLINE**

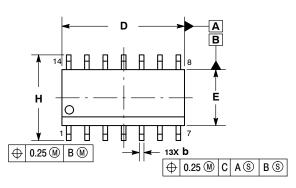
PACKAGE DIMENSIONS

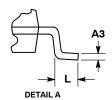


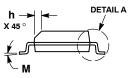
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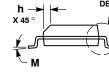
SOIC-14 NB CASE 751A-03 ISSUE L

**DATE 03 FEB 2016** 





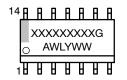




- NOTES:
  1. DIMENSIONING AND TOLERANCING PER
  - ASME Y14.5M, 1994.
    CONTROLLING DIMENSION: MILLIMETERS.
- DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF AT
- MAXIMUM MATERIAL CONDITION.
  DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSIONS.
- 5. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE

	MILLIN	IETERS	INCHES		
DIM	MIN	MAX	MIN	MAX	
Α	1.35	1.75	0.054	0.068	
A1	0.10	0.25	0.004	0.010	
АЗ	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	
Е	3.80	4.00	0.150	0.157	
е	1.27	1.27 BSC		BSC	
Н	5.80	6.20	0.228	0.244	
h	0.25	0.50	0.010	0.019	
Ĺ	0.40	1.25	0.016	0.049	
М	0 °	7°	0 °	7°	

#### **GENERIC MARKING DIAGRAM\***



XXXXX = Specific Device Code Α = Assembly Location

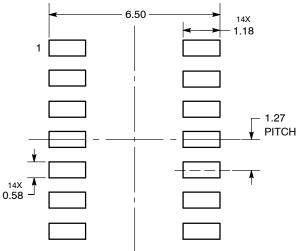
WL = Wafer Lot Υ = Year

WW = Work Week = 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.

#### **SOLDERING FOOTPRINT\***

C SEATING PLANE



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.

#### **STYLES ON PAGE 2**

DOCUMENT NUMBER:	98ASB42565B	Electronic versions are uncontrolled except when accessed directly from Printed versions are uncontrolled except when stamped "CONTROLLED"	
DESCRIPTION:	SOIC-14 NB		PAGE 1 OF 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

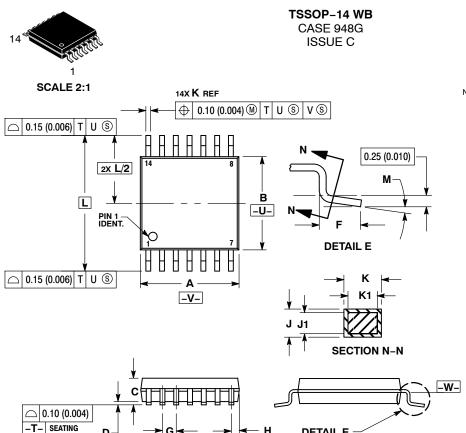
DOCUMENT NUMBER:	98ASB42565B	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.		
DESCRIPTION:	SOIC-14 NB		PAGE 2 OF 2	

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## **MECHANICAL CASE OUTLINE**

PACKAGE DIMENSIONS

**DATE 17 FEB 2016** 



- NOTES.

  1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

  2. CONTROLLING DIMENSION: MILLIMETER.

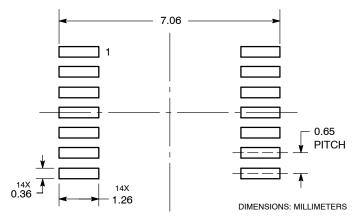
  3. DIMENSION A DOES NOT INCLUDE MOLD
- FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
  DIMENSION B DOES NOT INCLUDE
- INTERLEAD FLASH OR PROTRUSION.
  INTERLEAD FLASH OR PROTRUSION SHALL
- INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) 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 DEFERENCE ONLY
- REFERENCE ONLY.
  DIMENSION A AND B ARE TO BE
- DETERMINED AT DATUM PLANE -W-

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
Α	4.90	5.10	0.193	0.200
В	4.30	4.50	0.169	0.177
С		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	
Н	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	
м	o °	8 °	o °	a °

#### **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\***



= Assembly Location

= Wafer Lot = Year = Work Week W

= 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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