

# Low Voltage Quad Buffer with 5 V Tolerant Inputs and Outputs

## 74LCX126

### General Description

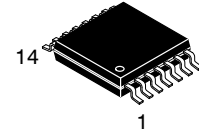
The LCX126 contains four independent non-inverting buffers with 3-STATE outputs. Each output is disabled when the associated output-enable (OE) input is LOW. The inputs tolerate voltages up to 7 V allowing the interface of 5 V systems to 3 V systems.

The 74LCX126 is fabricated with an advanced CMOS technology to achieve high speed operation while maintaining CMOS low power dissipation.

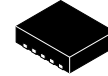
### Features

- 5 V Tolerant Inputs and Outputs
- 2.3 V – 3.6 V  $V_{CC}$  Specifications Provided
- 5.5 ns  $t_{PD}$  max ( $V_{CC} = 3.3$  V), 10  $\mu$ A  $I_{CC}$  max.
- Power Down High Impedance Inputs and Outputs
- Supports Live Insertion / Withdrawal\*
- $\pm 24$  mA Output Drive ( $V_{CC} = 3.0$  V)
- Implements Proprietary Noise / EMI Reduction Circuitry
- Latch-up Performance Exceeds JEDEC 78 Conditions
- ESD Performance:
  - ◆ Human Body Model >2000 V
  - ◆ Machine Model >100 V
- Leadless QFN Package
- These Devices are Pb-Free, Halide Free and are RoHS Compliant

\* To ensure the high-impedance state during power up or power down, OE should be tied to  $V_{CC}$  through a pull-up resistor; the minimum value of the resistor is determined by the current-sourcing capability of the driver.

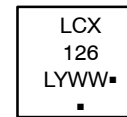


TSSOP-14 WB  
CASE 948G



QFN14, 3.0X2.5, 0.5P  
CASE 510CB

### MARKING DIAGRAM



LCX126 = Specific Device Code  
 L = Wafer Lot  
 Y = Year  
 WW = Work Week  
 ■ = Pb-Free Package  
 (Note: Microdot may be in either location)

### ORDERING INFORMATION

See detailed ordering and shipping information on page 7 of this data sheet.

CONNECTION DIAGRAMS

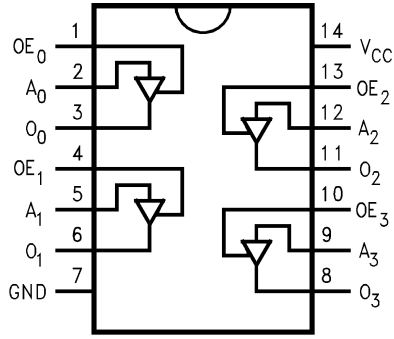


Figure 1. Pin Assignments for SOIC, SOP and TSSOP

LOGIC SYMBOL

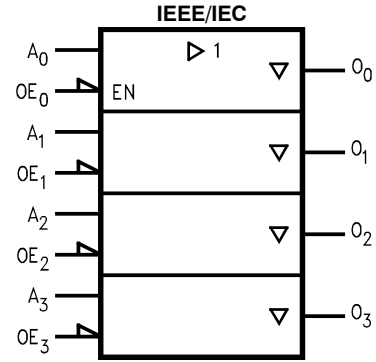
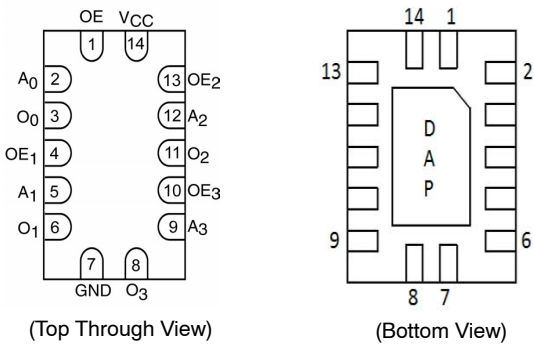


Figure 3. IEEE/IEC



(Top Through View)

(Bottom View)

Figure 2. Pad Assignments for DQFN

PIN DESCRIPTION

Pin Names	Description
$A_n$	Inputs
$OE_n$	Output Enable Inputs
$O_n$	Outputs
DAP	No Connect

NOTE: DAP (Die Attach Pad)

TRUTH TABLE

Inputs		Output
$OE_n$	$A_n$	$O_n$
H	L	L
H	H	H
L	X	Z

NOTES:

- H = HIGH Voltage Level
- L = LOW Voltage Level
- Z = High Impedance
- X = Immaterial

# 74LCX126

## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit	
$V_{CC}$	DC Supply Voltage	-0.5 to +6.5	V	
$V_I$	DC Input Voltage (Note 1)	-0.5 to +6.5	V	
$V_O$	DC Output Voltage (Note 1) Active-Mode (High or Low State) Tri-State Mode Power-Down Mode ( $V_{CC} = 0$ V)	-0.5 to $V_{CC} + 6.5$ -0.5 to +6.5 -0.5 to +6.5	V	
$I_{IK}$	DC Input Diode Current $V_I < GND$	-50	mA	
$I_{OK}$	DC Output Diode Current $V_O < GND$	-50	mA	
$I_O$	DC Output Source/Sink Current	$\pm 50$	mA	
$I_{CC}$ or $I_{GND}$	DC Supply Current per Supply Pin or Ground Pin	$\pm 100$	mA	
$T_{STG}$	Storage Temperature Range	-65 to +150	$^{\circ}C$	
$T_L$	Lead Temperature, 1 mm from Case for 10 secs	260	$^{\circ}C$	
$T_J$	Junction Temperature Under Bias	+150	$^{\circ}C$	
$\theta_{JA}$	Thermal Resistance (Note 1)	SOIC-14 QFN14 TSSOP-14	116 130 150	$^{\circ}C/W$
$P_D$	Power Dissipation in Still Air at 125 $^{\circ}C$	SOIC-14 QFN14 TSSOP-14	1077 962 833	mW
MSL	Moisture Sensitivity	Level 1	-	
$F_R$	Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in	-
$V_{ESD}$	ESD Withstand Voltage (Note 3)	Human Body Model Charged Device Model	4000 2000	V
$I_{latchup}$	Latchup Performance (Note 4)		$\pm 100$	mA

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. Operating the device outside its recommended conditions, but still within its maximum rated limits may not cause immediate damage. However, doing so can lead to reduced performance, unpredictable behavior, and potentially shorten the device's lifespan or reliability.

- $I_O$  absolute maximum rating must be observed.
- Measured with minimum pad spacing on an FR4 board, using 76 mm-by-114 mm, 2-ounce copper trace no air flow per JESD51-7.
- HBM tested to EIA / JESD22-A114-A. CDM tested to JESD22-C101-A. JEDEC recommends that ESD qualification to EIA/JESD22-A115A (Machine Model) be discontinued.
- Tested to EIA/JESD78 Class II.

## RECOMMENDED OPERATING CONDITIONS (Note 5)

Symbol	Parameter	Min.	Max.	Unit	
$V_{CC}$	Supply Voltage	Operating	2.0	3.6	V
		Data Retention	1.5	3.6	
$V_I$	Input Voltage	0	5.5	V	
$V_O$	Output Voltage	HIGH or LOW State	0	$V_{CC}$	V
		3-STATE	0	5.5	
$I_{OH} / I_{OL}$	Output Current	$V_{CC} = 3.0$ V - 3.6 V		$\pm 24$	mA
		$V_{CC} = 2.7$ V - 3.0 V		$\pm 12$	
		$V_{CC} = 2.3$ V - 2.7 V		$\pm 8$	
$T_A$	Free-Air Operating Temperature	-40	85	$^{\circ}C$	
$\Delta t / \Delta V$	Input Edge Rate, $V_{IN} = 0.8$ V - 2.0 V, $V_{CC} = 3.0$ V	0	10	ns / V	

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.

- Unused inputs must be held HIGH or LOW. They may not float.

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## DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	V <sub>CC</sub> (V)	Conditions	T <sub>A</sub> = -40 °C to +85 °C		Unit
				Min	Max	
V <sub>IH</sub>	HIGH Level Input Voltage	2.3 – 2.7		1.7		V
		2.7 – 3.6		2.0		
V <sub>IL</sub>	LOW Level Input Voltage	2.3 – 2.7			0.7	V
		2.7 – 3.6			0.8	
V <sub>OH</sub>	HIGH Level Output Voltage	2.3 – 3.6	I <sub>OH</sub> = -100 μA	V <sub>CC</sub> - 0.2		V
		2.3	I <sub>OH</sub> = -8 mA	1.8		
		2.7	I <sub>OH</sub> = -12 mA	2.2		
		3.0	I <sub>OH</sub> = -18 mA	2.4		
			I <sub>OH</sub> = -24 mA	2.2		
V <sub>OL</sub>	LOW Level Output Voltage	2.3 – 3.6	I <sub>OL</sub> = 100 μA		0.2	V
		2.3	I <sub>OL</sub> = 8 mA		0.6	
		2.7	I <sub>OL</sub> = 12 mA		0.4	
		3.0	I <sub>OL</sub> = 16 mA		0.4	
			I <sub>OL</sub> = 24 mA		0.55	
I <sub>I</sub>	Input Leakage Current	2.3 – 3.6	0 ≤ V <sub>I</sub> ≤ 5.5 V		±5.0	μA
I <sub>OZ</sub>	3-STATE Output Leakage	2.3 – 3.6	0 ≤ V <sub>I</sub> ≤ 5.5 V, V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>		±5.0	μA
I <sub>OFF</sub>	Power--Off Leakage Current	0	V <sub>I</sub> or V <sub>O</sub> = 5.5 V		10	μA
I <sub>CC</sub>	Quiescent Supply Current	2.3 – 3.6	V <sub>I</sub> = V <sub>CC</sub> or GND		10	
			3.6 V ≤ V <sub>I</sub> , V <sub>O</sub> ≤ 5.5 V (Note 5)		±10	
ΔI <sub>CC</sub>	Increase in I <sub>CC</sub> per Input	2.3 – 3.6	V <sub>IH</sub> = V <sub>CC</sub> - 0.6 V		500	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.

6. Outputs disabled or 3-STATE only.

## AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	T <sub>A</sub> = -40 °C to +85 °C, R <sub>L</sub> = 500 Ω						Unit
		V <sub>CC</sub> = 3.3 V ± 0.3 V, C <sub>L</sub> = 50 pF		V <sub>CC</sub> = 2.7 V, C <sub>L</sub> = 50 pF		V <sub>CC</sub> = 2.5 V ± 0.2 V, C <sub>L</sub> = 30 pF		
		Min.	Max.	Min.	Max.	Min.	Max.	
t <sub>PHL</sub> , t <sub>PLH</sub>	Propagation Delay	1.5	5.5	1.5	6.0	1.5	6.6	ns
t <sub>PZL</sub> , t <sub>PZH</sub>	Output Enable Time	1.5	6.0	1.5	7.0	1.5	7.8	ns
t <sub>PLZ</sub> , t <sub>PHZ</sub>	Output Disable Time	1.5	5.5	1.5	6.5	1.5	6.6	ns
t <sub>OSSL</sub> , t <sub>OSLH</sub>	Output to Output Skew (Note 7)		1.0					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. Skew is defined as the absolute value of the difference between the actual propagation delay for any two separate outputs of the same device. The specification applies to any outputs switching in the same direction, either HIGH-to-LOW (t<sub>OSSL</sub>) or LOW-to-HIGH (t<sub>OSLH</sub>).

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## DYNAMIC SWITCHING CHARACTERISTICS

Symbol	Parameter	V <sub>CC</sub> (V)	Conditions	T <sub>A</sub> = 25 °C	Unit
				Typical	
V <sub>OLP</sub>	Quiet Output Dynamic Peak V <sub>OL</sub>	3.3	C <sub>L</sub> = 50 pF, V <sub>IH</sub> = 3.3 V, V <sub>IL</sub> = 0 V	0.8	V
		2.5	C <sub>L</sub> = 30 pF, V <sub>IH</sub> = 2.5 V, V <sub>IL</sub> = 0 V	0.6	
V <sub>OLV</sub>	Quiet Output Dynamic Peak V <sub>OL</sub>	3.3	C <sub>L</sub> = 50 pF, V <sub>IH</sub> = 3.3 V, V <sub>IL</sub> = 0 V	-0.8	V
		2.5	C <sub>L</sub> = 30 pF, V <sub>IH</sub> = 2.5 V, V <sub>IL</sub> = 0 V	-0.6	

## CAPACITANCE

Symbol	Parameter	Conditions	Typical	Unit
C <sub>IN</sub>	Input Capacitance	V <sub>CC</sub> = Open, V <sub>I</sub> = 0 V or V <sub>CC</sub>	7.0	pF
C <sub>OUT</sub>	Output Capacitance	V <sub>CC</sub> = 3.3 V, V <sub>I</sub> = 0 V or V <sub>CC</sub>	8.0	pF
C <sub>PD</sub>	Power Dissipation Capacitance	V <sub>CC</sub> = 3.3 V, V <sub>I</sub> = 0 V or V <sub>CC</sub> , f = 10 MHz	25.0	pF

AC LOADING AND WAVEFORMS (Generic for LCX Family)

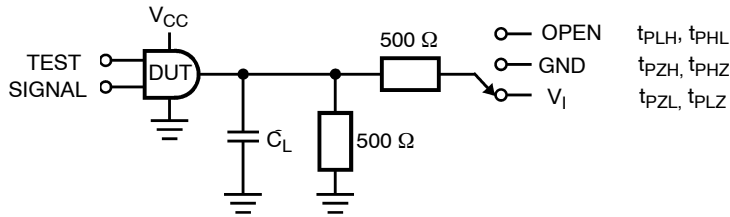
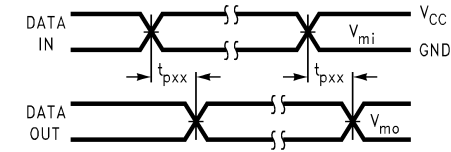


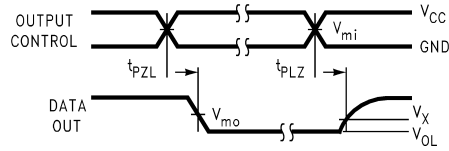
Figure 4. Test Circuit ( $C_L$  Includes Probe and Jig Capacitance)

Table 1. TEST CIRCUIT TABLE

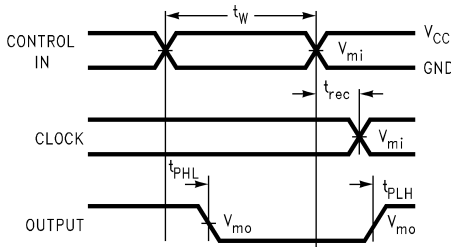
Test	Switch Position
$t_{PLH}, t_{PHL}$	Open
$t_{PZL}, t_{PLZ}$	6 V at $V_{CC} = 3.3 \pm 0.3$ V $V_{CC} \times 2$ at $V_{CC} = 2.5 \pm 0.2$ V
$t_{PZH}, t_{PHZ}$	GND



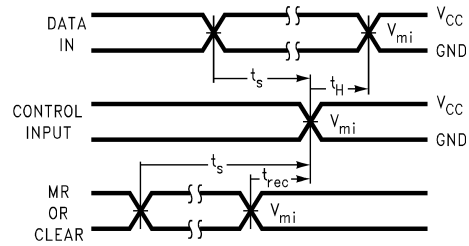
WAVEFORM FOR INVERTING AND NON-INVERTING FUNCTIONS



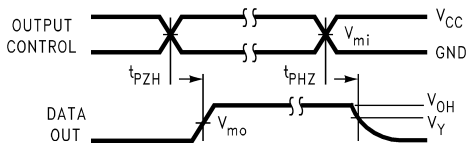
3-STATE OUTPUT HIGH ENABLE AND DISABLE TIMES FOR LOGIC



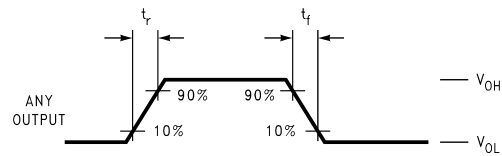
PROPAGATION DELAY, PULSE WIDTH AND  $t_{rec}$  WAVEFORMS



SETUP TIME, HOLD TIME AND RECOVERY TIME FOR LOGIC



3-STATE OUTPUT LOW ENABLE AND DISABLE TIMES FOR LOGIC



$T_{rise}$  AND  $T_{fall}$

Figure 5. Waveforms (Input Characteristics;  $f = 1$  MHz,  $t_r = t_f = 3$  ns)

Table 2. SWITCHING WAVEFORMS TABLE

Symbol	$V_{CC}$		
	$3.3\text{ V} \pm 0.3\text{ V}$	$2.7\text{ V}$	$2.5\text{ V} \pm 0.2\text{ V}$
$V_{mi}$	1.5 V	1.5 V	$V_{CC}/2$
$V_{mo}$	1.5 V	1.5 V	$V_{CC}/2$
$V_x$	$V_{OL} + 0.3\text{ V}$	$V_{OL} + 0.3\text{ V}$	$V_{OL} + 0.15\text{ V}$
$V_y$	$V_{OH} - 0.3\text{ V}$	$V_{OH} - 0.3\text{ V}$	$V_{OH} - 0.15\text{ V}$

# 74LCX126

## SCHEMATIC DIAGRAM (Generic for LCX Family)

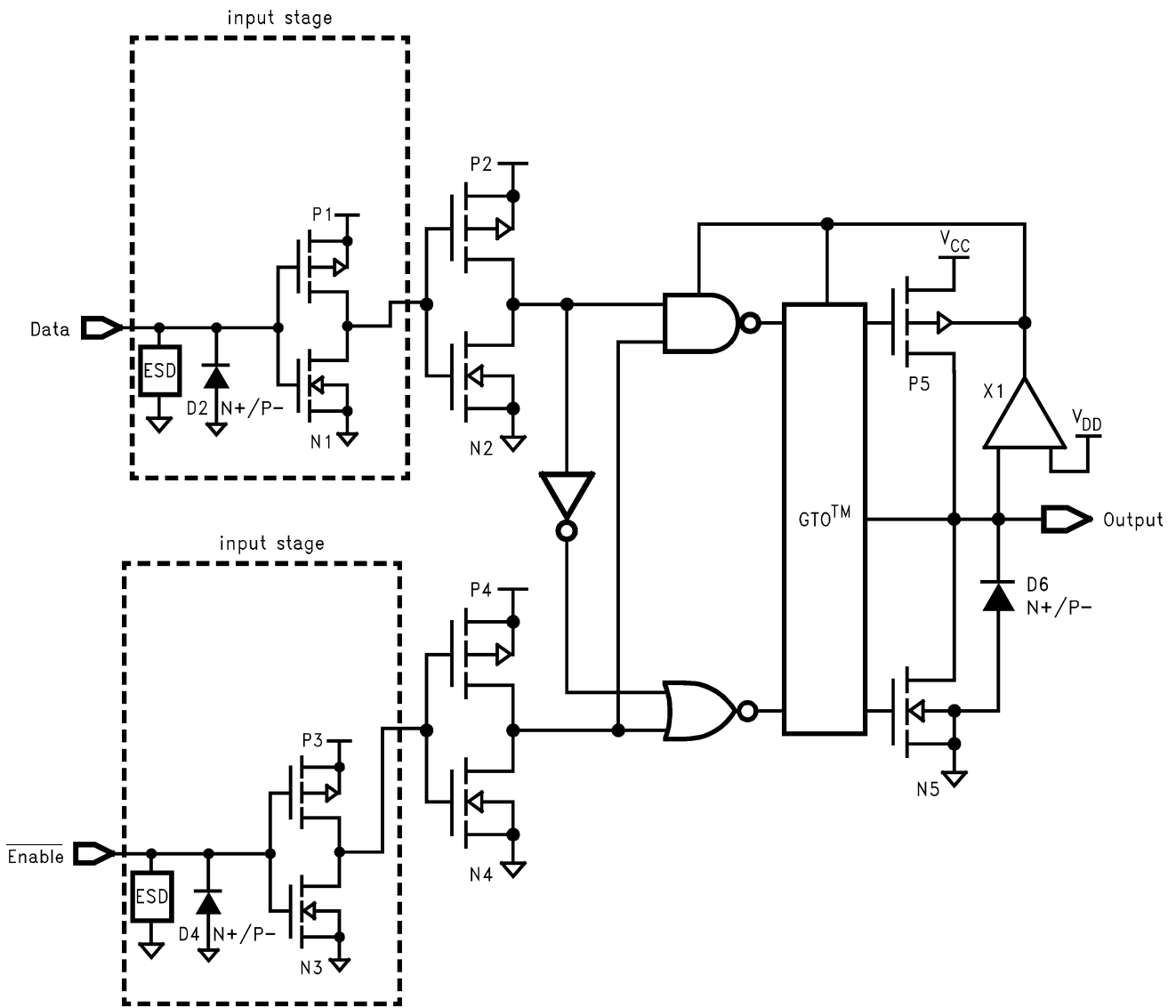


Figure 6. Schematic Diagram

### ORDERING INFORMATION

Product Number	Package	Marking	Shipping <sup>†</sup>
74LCX126BQX	QFN-14 (Pb-Free/Halide Free)	LCX126	3000 / Tape and Reel
74LCX126MTCX	TSSOP-14 (Pb-Free/Halide Free)	LCX 126	2500 / Tape and 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](#).

\* DQFN package available in Tape and Reel only.

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering number

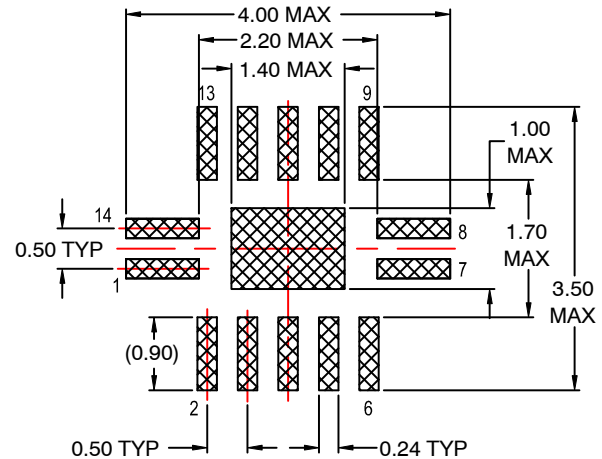
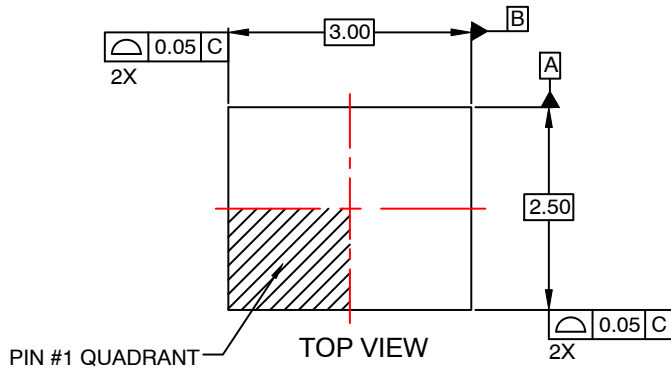
**REVISION HISTORY**

Revision	Description of Changes	Date
2	Converted the Data Sheet to <b>onsemi</b> format.	5/12/2026

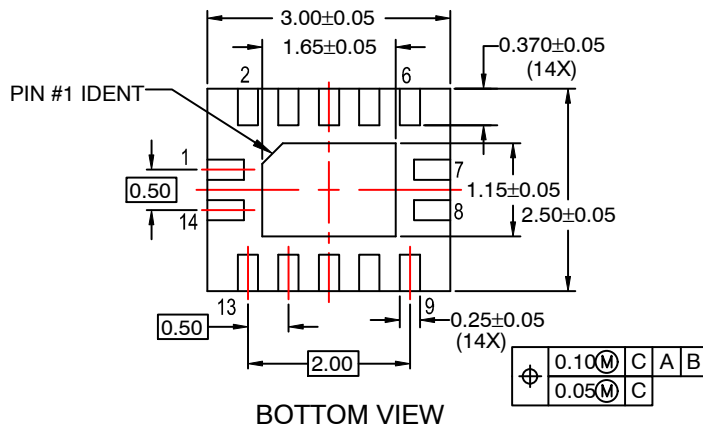
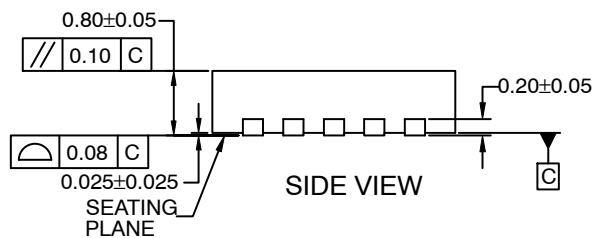
This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

**QFN14 3.0x2.5, 0.5P**  
CASE 510CB  
ISSUE O

DATE 31 AUG 2016



RECOMMENDED LAND PATTERN

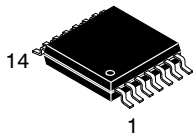


**NOTES:**

- A. CONFORMS TO JEDEC REGISTRATION MO-241, VARIATION AA
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 2009.
- D. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN.

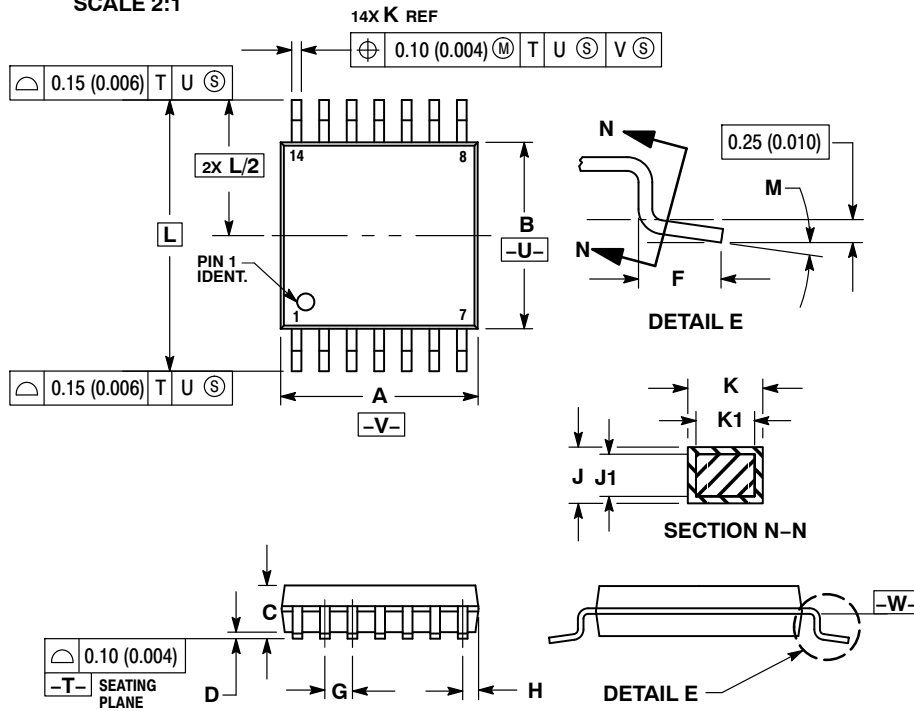
<b>DOCUMENT NUMBER:</b>	<b>98AON13643G</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>QFN14 3.0X2.5, 0.5P</b>	<b>PAGE 1 OF 1</b>

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TSSOP-14 WB  
CASE 948G  
ISSUE C

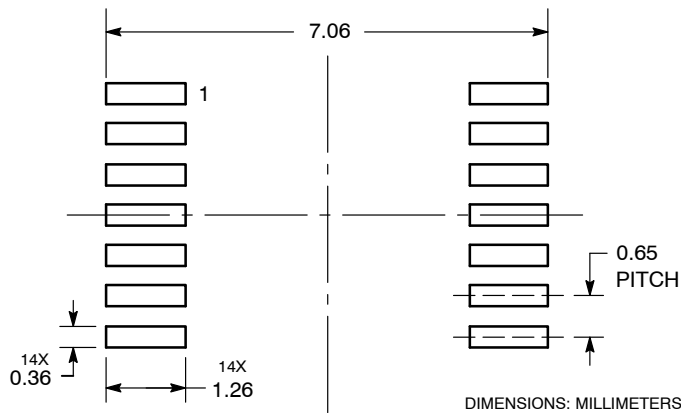
DATE 17 FEB 2016



- 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-.

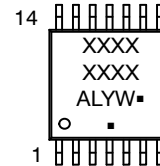
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.90	5.10	0.193	0.200
B	4.30	4.50	0.169	0.177
C	---	1.20	---	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.50	0.60	0.020	0.024
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010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