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74LCX126

Low Voltage Quad Buffer with 5V Tolerant Inputs and Outputs

Features

- 5V tolerant inputs and outputs
- 2.3V–3.6V V_{CC} specifications provided
- 5.5ns t_{PD} max. ($V_{CC} = 3.3V$), 10 μ A I_{CC} max.
- Power down high impedance inputs and outputs
- Supports live insertion/withdrawal⁽¹⁾
- $\pm 24mA$ output drive ($V_{CC} = 3.0V$)
- Implements proprietary noise/EMI reduction circuitry
- Latch-up performance exceeds JEDEC 78 conditions
- ESD performance:
 - Human body model > 2000V
 - Machine model > 100V
- Leadless DQFN package

Note:

1. To ensure the high-impedance state during power up or 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.

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 7V allowing the interface of 5V systems to 3V systems.

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

Ordering Information

Order Number	Package Number	Package Description
74LCX126M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74LCX126SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74LCX126BQX ⁽²⁾	MLP14A	14-Terminal Depopulated Quad Very-Thin Flat Pack No Leads (DQFN), JEDEC MO-241, 2.5 x 3.0mm
74LCX126MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

Note:

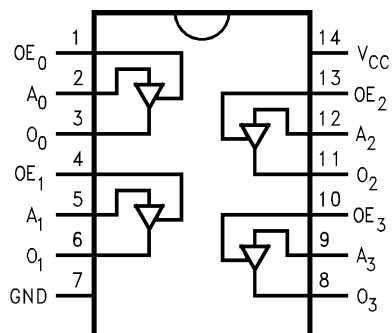
2. DQFN package available in Tape and Reel only.
- Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering number.



All packages are lead free per JEDEC: J-STD-020B standard.

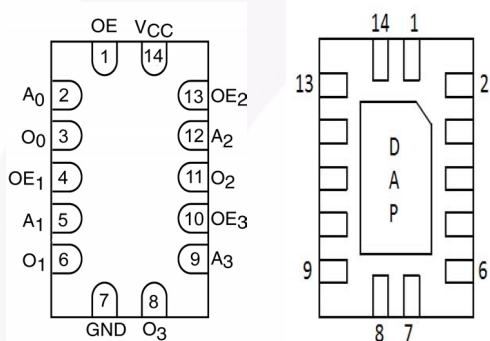
Connection Diagrams

Pin Assignments for SOIC, SOP, and TSSOP



(Top View)

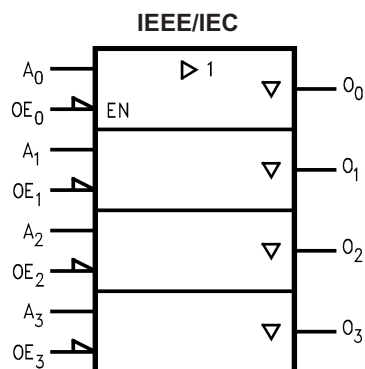
Pad Assignments for DQFN



(Top Through View)

(Bottom View)

Logic Symbol



Truth Table

Inputs		Output
OE _n	A _n	O _n
H	L	L
H	H	H
L	X	Z

H = HIGH Voltage Level

L = LOW Voltage Level

Z = High Impedance

X = Immaterial

Pin Description

Pin Names	Description
A _n	Inputs
OE _n	Output Enable Inputs
O _n	Outputs
DAP	No Connect

Note: DAP (Die Attach Pad)

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating
V_{CC}	Supply Voltage	−0.5V to +7.0V
V_I	DC Input Voltage	−0.5V to +7.0V
V_O	DC Output Voltage, Output in 3-STATE	−0.5V to +7.0V
	Output in HIGH or LOW State ⁽³⁾	−0.5V to $V_{CC} + 0.5V$
I_{IK}	DC Input Diode Current, $V_I < GND$	−50mA
I_{OK}	DC Output Diode Current $V_O < GND$	−50mA
	$V_O > V_{CC}$	+50mA
I_O	DC Output Source/Sink Current	±50mA
I_{CC}	DC Supply Current per Supply Pin	±100mA
I_{GND}	DC Ground Current per Ground Pin	±100mA
T_{STG}	Storage Temperature	−65°C to +150°C

Note:

3. I_O Absolute Maximum Rating must be observed.

Recommended Operating Conditions⁽⁴⁾

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

Symbol	Parameter	Min.	Max.	Units
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 $V_{CC} = 3.0V-3.6V$		±24	mA
	$V_{CC} = 2.7V-3.0V$		±12	
	$V_{CC} = 2.3V-2.7V$		±8	
T_A	Free-Air Operating Temperature	−40	85	°C
$\Delta t / \Delta V$	Input Edge Rate, $V_{IN} = 0.8V-2.0V$, $V_{CC} = 3.0V$	0	10	ns/V

Note:

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

DC Electrical Characteristics

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

Note:

5. Outputs disabled or 3-STATE only.

AC Electrical Characteristics

Symbol	Parameter	T _A = −40°C to +85°C, R _L = 500Ω						Units
		V _{CC} = 3.3V ± 0.3V, C _L = 50 pF		V _{CC} = 2.7V, C _L = 50 pF		V _{CC} = 2.5V ± 0.2V, C _L = 30 pF		
		Min.	Max.	Min.	Max.	Min.	Max.	
t _{PHL} , t _{PLH}	Propagation Delay	1.5	5.5	1.5	6.0	1.5	6.6	ns
t _{PZL} , t _{PZH}	Output Enable Time	1.5	6.0	1.5	7.0	1.5	7.8	ns
t _{PLZ} , t _{PHZ}	Output Disable Time	1.5	5.5	1.5	6.5	1.5	6.6	ns
t _{OSHL} , t _{OSLH}	Output to Output Skew ⁽⁶⁾		1.0					ns

Note:

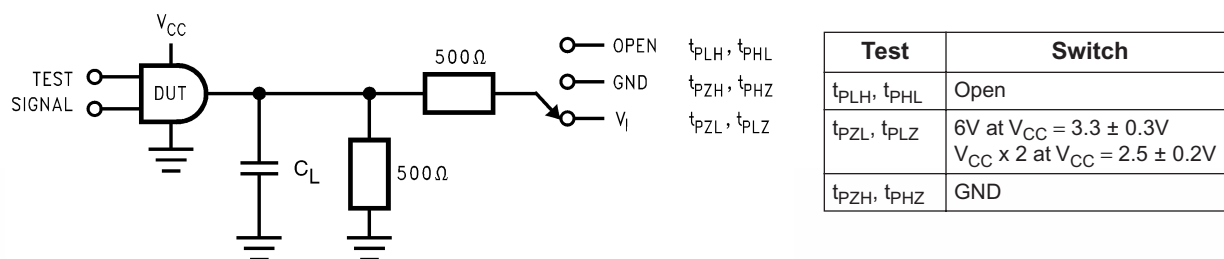
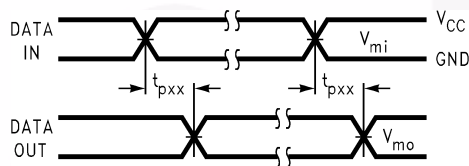
6. Skew is defined as the absolute value of the difference between the actual propagation delay for any two separate outputs of the same device. The specification applies to any outputs switching in the same direction, either HIGH-to-LOW (t_{OSHL}) or LOW-to-HIGH (t_{OSLH}).

Dynamic Switching Characteristics

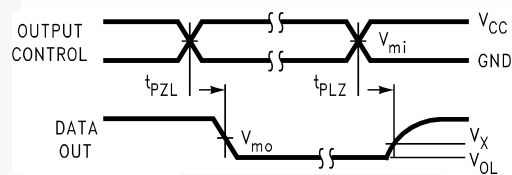
Symbol	Parameter	V_{CC} (V)	Conditions	$T_A = 25^\circ\text{C}$	Unit
				Typical	
V_{OLP}	Quiet Output Dynamic Peak V_{OL}	3.3	$C_L = 50\text{pF}$, $V_{IH} = 3.3\text{V}$, $V_{IL} = 0\text{V}$	0.8	V
		2.5	$C_L = 30\text{pF}$, $V_{IH} = 2.5\text{V}$, $V_{IL} = 0\text{V}$	0.6	
V_{OLV}	Quiet Output Dynamic Valley V_{OL}	3.3	$C_L = 50\text{pF}$, $V_{IH} = 3.3\text{V}$, $V_{IL} = 0\text{V}$	-0.8	V
		2.5	$C_L = 30\text{pF}$, $V_{IH} = 2.5\text{V}$, $V_{IL} = 0\text{V}$	-0.6	

Capacitance

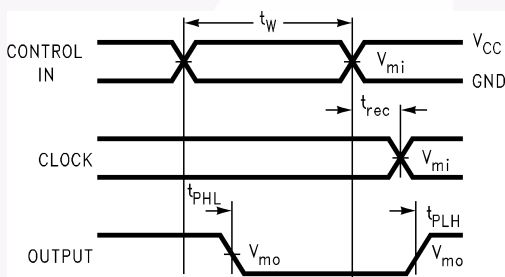
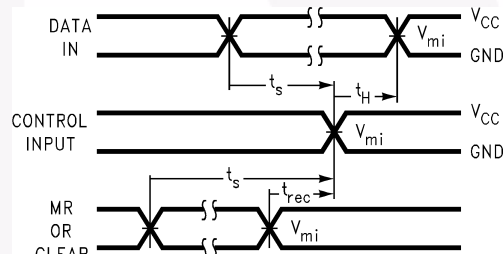
Symbol	Parameter	Conditions	Typical	Units
C_{IN}	Input Capacitance	$V_{CC} = \text{Open}$, $V_I = 0\text{V}$ or V_{CC}	7	pF
C_{OUT}	Output Capacitance	$V_{CC} = 3.3\text{V}$, $V_I = 0\text{V}$ or V_{CC}	8	pF
C_{PD}	Power Dissipation Capacitance	$V_{CC} = 3.3\text{V}$, $V_I = 0\text{V}$ or V_{CC} , $f = 10\text{MHz}$	25	pF

AC Loading and Waveforms (Generic for LCX Family)Figure 1. AC Test Circuit (C_L includes probe and jig capacitance)

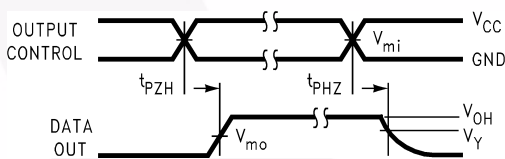
Waveform for Inverting and Non-Inverting Functions



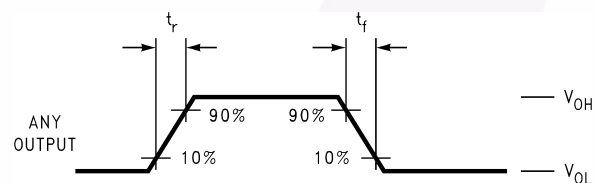
3-STATE Output High Enable and Disable Times for Logic

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}

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

Figure 2. Waveforms (Input Characteristics; $f = 1MHz$, $t_r = t_f = 3ns$)

The schematic diagram illustrates a 1-bit full adder implemented using a GTO (General Purpose Transistor) block. The circuit features two input stages, each enclosed in a dashed box labeled "input stage".

Input Stages:

- Top Input Stage:** Receives a "Data" input. It includes an ESD (Electrostatic Discharge) protection diode (D2) connected to ground and an N+/P- junction (N1) connected to ground. The input signal is connected to the gates of PMOS (P1) and NMOS (N1) transistors.
- Bottom Input Stage:** Receives an "Enable" input. It includes an ESD protection diode (D4) connected to ground and an N+/P- junction (N3) connected to ground. The input signal is connected to the gates of PMOS (P3) and NMOS (N3) transistors.

Logic and Output:

- The outputs of the input stages are connected to the gates of PMOS (P2, P4) and NMOS (N2, N4) transistors.
- The PMOS (P2) and NMOS (N2) transistors are connected to the inputs of a 2-input AND gate.
- The PMOS (P4) and NMOS (N4) transistors are connected to the inputs of a 2-input OR gate.
- The outputs of the AND and OR gates are connected to the inputs of a GTO block.
- The GTO block has two outputs: one connected to the output of the AND gate and another connected to the output of the OR gate.
- The GTO block is connected to the output of a 2-input AND gate (X1) and the output of a 2-input OR gate (X2).
- The output of the AND gate (X1) is connected to the output of the OR gate (X2) and is labeled "Output".
- The output of the OR gate (X2) is connected to the output of the AND gate (X1) and is labeled "Output".
- The output of the AND gate (X1) is connected to the output of the OR gate (X2) and is labeled "Output".
- The output of the OR gate (X2) is connected to the output of the AND gate (X1) and is labeled "Output".

Power and Protection:

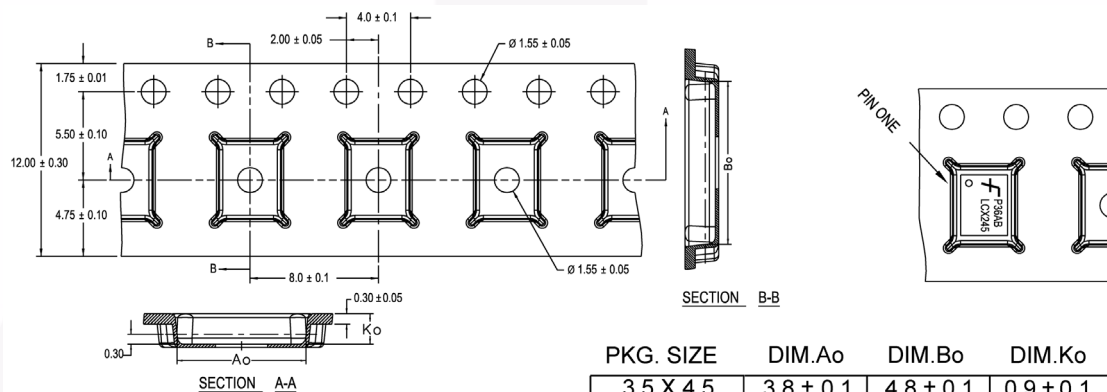
- The circuit is powered by V_{CC} and V_{DD} .
- ESD protection diodes (D2, D4) and N+/P- junctions (N1, N3) are used for input protection.
- The output is protected by a diode (D6) connected to ground.

Tape and Reel Specification

Tape Format for DQFN

Package Designator	Tape Section	Number of Cavities	Cavity Status	Cover Tape Status
BQX	Leader (Start End)	125 (Typ.)	Empty	Sealed
	Carrier	3000	Filled	Sealed
	Trailer (Hub End)	75 (Typ.)	Empty	Sealed

Tape Dimensions inches (millimeters)



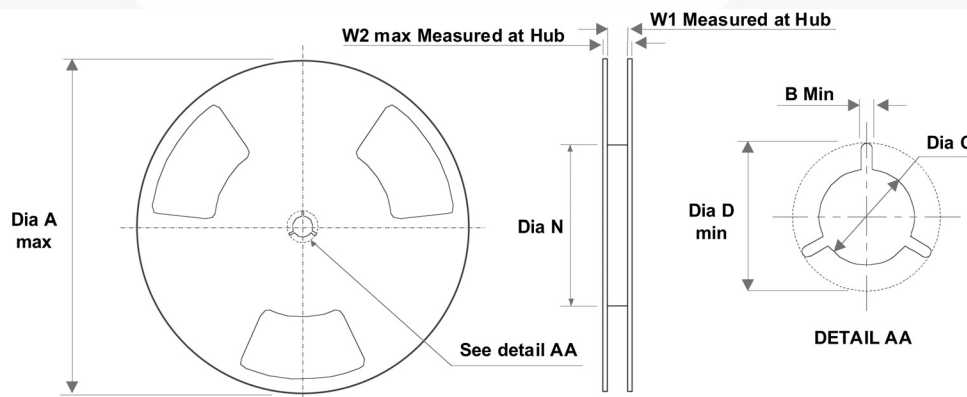
PKG. SIZE	DIM.Ao	DIM.Bo	DIM.Ko
3.5 X 4.5	3.8 ± 0.1	4.8 ± 0.1	0.9 ± 0.1
3.0 X 3.0	3.3 ± 0.1	3.3 ± 0.1	0.9 ± 0.1
2.5 X 4.5	2.8 ± 0.1	4.8 ± 0.1	0.9 ± 0.1
2.5 X 3.5	2.8 ± 0.1	3.8 ± 0.1	0.9 ± 0.1
2.5 X 3.0	2.8 ± 0.1	3.3 ± 0.1	0.9 ± 0.1
2.5 X 2.5	2.8 ± 0.1	2.8 ± 0.1	0.9 ± 0.1

DIMENSIONS ARE IN MILLIMETERS

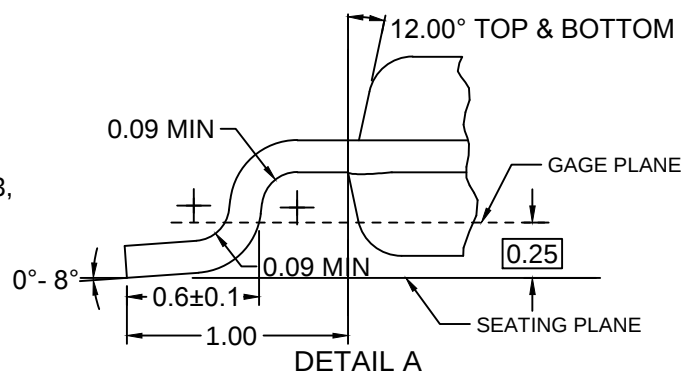
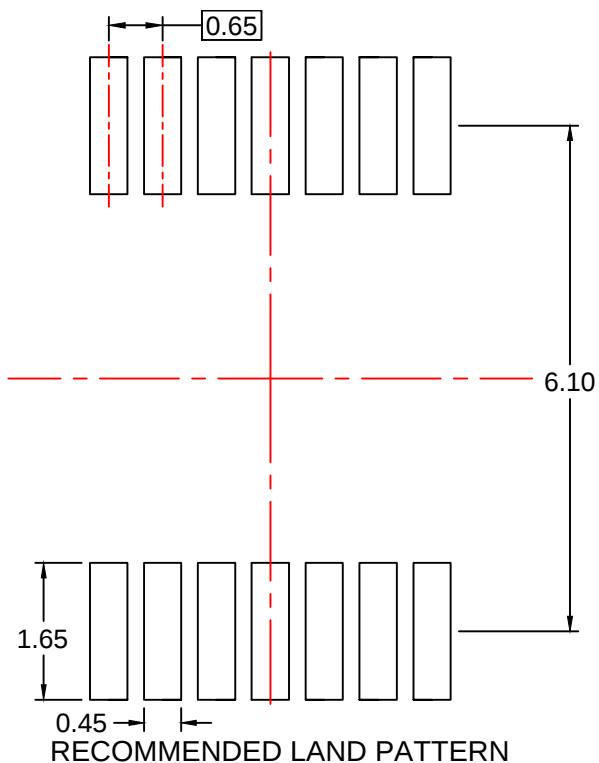
NOTES: unless otherwise specified

1. Cumulative pitch for feeding holes and cavities (chip pockets) not to exceed 0.008[0.20] over 10 pitch span.
2. Smallest allowable bending radius.
3. Thru hole inside cavity is centered within cavity.
4. Tolerance is $\pm 0.002[0.05]$ for these dimensions on all 12mm tapes.
5. Ao and Bo measured on a plane 0.120[0.30] above the bottom of the pocket.
6. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
7. Pocket position relative to sprocket hole measured as true position of pocket. Not pocket hole.
8. Controlling dimension is millimeter. Dimension in inches rounded.

Reel Dimensions inches (millimeters)



Tape Size	A	B	C	D	N	W1	W2
12mm	13.0 (330.0)	0.059 (1.50)	0.512 (13.00)	0.795 (20.20)	2.165 (55.00)	0.488 (12.4)	0.724 (18.4)



NOTES:

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- DIMENSIONING AND TOLERANCES PER ANSI Y14.5M, 2009.
- LANDPATTERN STANDARD: SOP65P640X110-14M.
- DRAWING FILE NAME: MKT-MTC14rev7.





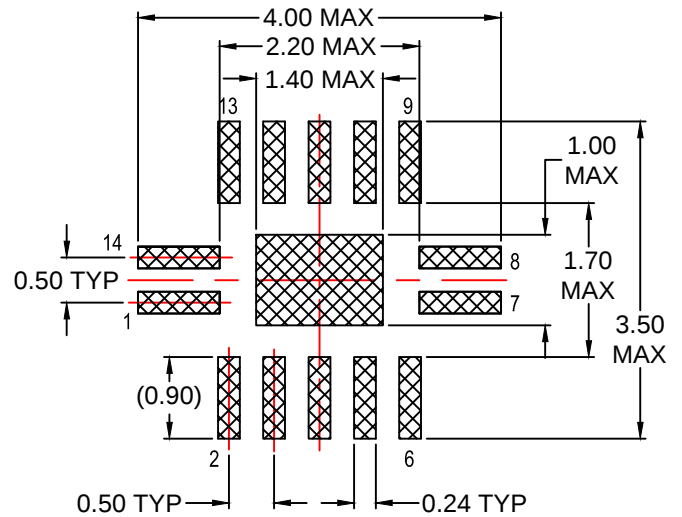
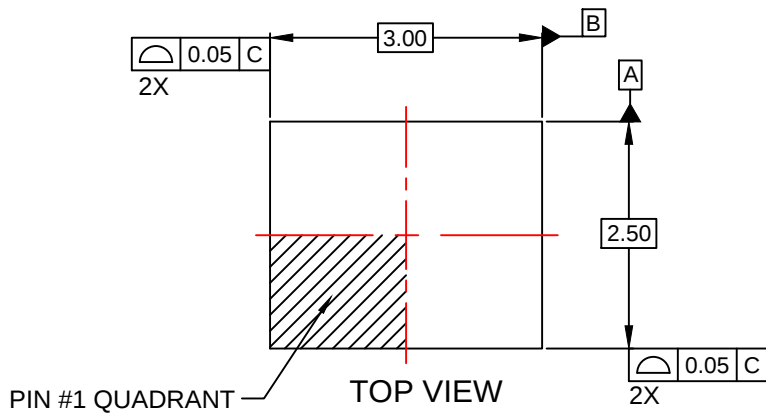
NOTES:

- 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
- D. DRAWING FILENAME: MKT-M14Arev14

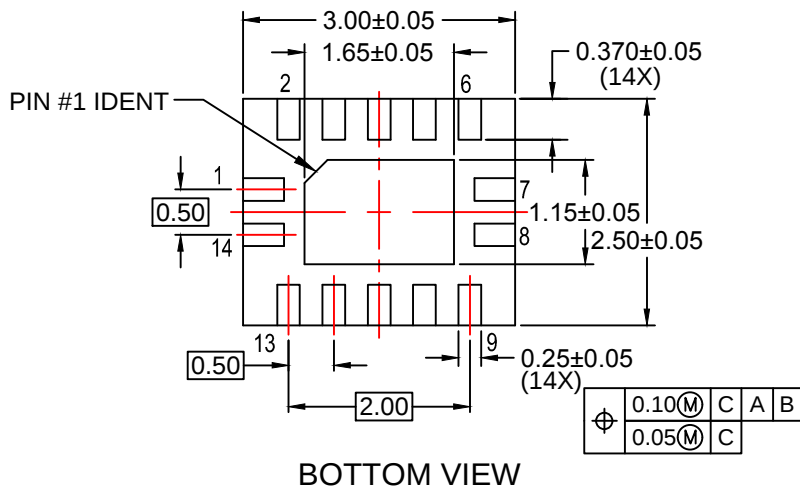
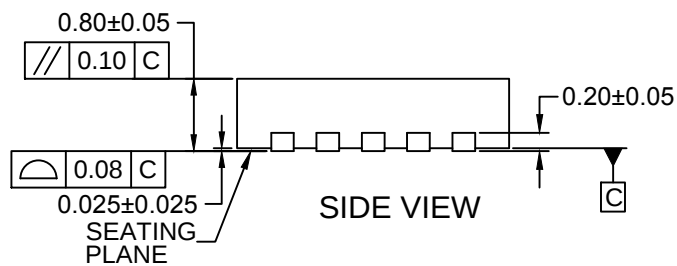


DETAIL A
SCALE 16 : 1





RECOMMENDED LAND PATTERN



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Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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