

## SNx4LVC08A 四通道双输入正与门

### 1 特性

- 闩锁性能超过 250mA，符合 JESD 17 规范
- ESD 保护性能超过 JESD 22 规范要求
  - 2000V 人体放电模型 (A114-A)
  - 1000V 充电器件模型 (C101)
  - 对于符合 MIL-PRF-38535 标准的产品，所有参数均经过测试，除非另外注明。对于所有其他产品，生产流程不一定包含对所有参数的测试。
- SN74LVC08A 的工作电压范围为 1.65V 至 3.6V
- SN54LVC08A 的工作电压范围为 2.0V 至 3.6V
- SNx4LVC08A 的额定工作温度范围为  $-40^{\circ}\text{C}$  至  $+85^{\circ}\text{C}$  和  $-40^{\circ}\text{C}$  至  $+125^{\circ}\text{C}$
- SN54LVC08A 的额定工作温度范围为  $-55^{\circ}\text{C}$  至  $+125^{\circ}\text{C}$
- 输入电压高达 5.5V
- 电压为 3.3V 时， $t_{pd}$  最大值为 4.1ns
- $V_{OLP}$  (输出接地反弹) 典型值  $< 0.8\text{V}$  ( $V_{CC} = 3.3\text{V}$ 、 $T_A = 25^{\circ}\text{C}$ )
- $V_{OHV}$  (输出  $V_{OH}$  下冲) 典型值  $> 2\text{V}$  ( $V_{CC} = 3.3\text{V}$ 、 $T_A = 25^{\circ}\text{C}$ )

### 2 应用

- 服务器
- LED 显示屏
- 网络交换机
- I/O 扩展器
- 基站处理器板

### 3 说明

SN54LVC08A 四通道双输入正与门旨在 2.7V 至 3.6V  $V_{CC}$  下运行，SN74LVC08A 四通道双输入正与门旨在 1.65V 至 3.6V  $V_{CC}$  下运行。

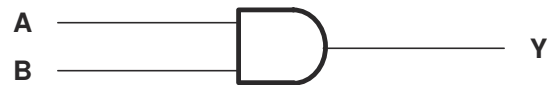
SNx4LVC08A 器件以正逻辑执行布尔函数  $Y = A \cdot B$  或  $Y = \overline{A + B}$ 。

输入可以由 3.3V 或 5V 器件驱动。此功能允许在 3.3V/5V 的混合系统环境中将此类器件用作转换器。

#### 器件信息

器件型号	封装 <sup>(1)</sup>	封装尺寸 <sup>(2)</sup>	本体尺寸 <sup>(3)</sup>
SNx4LVC08A	BQA (WQFN, 14)	3mm × 2.5mm	3mm × 2.5mm
	D (SOIC, 14)	8.65mm × 6mm	8.65mm × 3.91mm
	DB (SSOP, 14)	6.2mm × 7.8mm	6.20mm × 5.30mm
	NS (SOP, 14)	10.2mm × 7.8mm	10.30mm × 5.30mm
	PW (TSSOP, 14)	5mm × 4.4mm	5.00mm × 4.40mm
	RGY (VQFN, 14)	3.5mm × 3.5mm	3.50mm × 3.50mm
	FK (LCCC, 20)	8.9mm × 8.9mm	8.89mm × 8.89mm
	J (CDIP, 14)	19.55mm × 7.9mm	19.55mm × 6.7mm
W (CFP, 14)	9.21mm × 9mm	9.21mm × 6.28mm	

- (1) 如需了解更多信息，请参阅第 11 节。
- (2) 封装尺寸 (长 × 宽) 为标称值，并包括引脚 (如适用)。
- (3) 本体尺寸 (长 × 宽) 为标称值，不包括引脚。



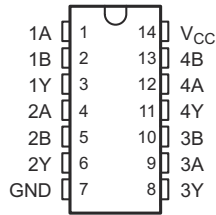
逻辑图，每个逻辑门  
(正逻辑)



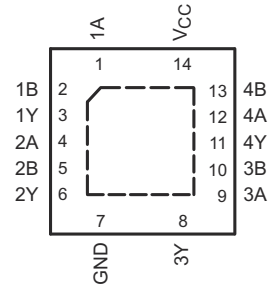
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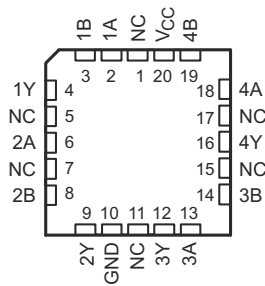
## 4 Pin Configuration and Functions



**图 4-1. D, DB, NS, J, W, or PW Package 14-Pin SOIC, SSOP, SOP, CDIP, or TSSOP (Top View)**



**图 4-2. BQA or RGY Package 14-Pin WQFN or VQFN (Top View)**



**图 4-3. FK Package 20-Pin LCCC (Top View)**

表 4-1. Pin Functions

NAME	PIN		TYPE	DESCRIPTION
	SOIC, SSOP, SOP, CDIP, TSSOP, VQFN,WQFN	LCCC		
1A	1	2	I	Channel 1 input A
1B	2	3	I	Channel 1 input B
1Y	3	4	O	Channel 1 output
2A	4	6	I	Channel 2 input A
2B	5	8	I	Channel 2 input B
2Y	6	9	O	Channel 2 output
GND	7	10	Ground	Ground
3Y	8	12	O	Channel 3 output
3A	9	13	I	Channel 3 input A
3B	10	14	I	Channel 3 input B
4Y	11	16	O	Channel 4 output
4A	12	18	I	Channel 4 input A
4B	13	19	I	Channel 4 input B
V <sub>CC</sub>	14	20	Power	Positive supply
Thermal Information <sup>(1)</sup>			—	The thermal pad can be connected to GND or left floating. Do not connect to any other signal or supply.
NC <sup>(2)</sup>	—	1	—	No connect
		5		
		7		
		11		
		15		
		17		

(1) For BQA package only.

(2) NC – No internal connection

## 5 Specifications

### 5.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

		MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage	-0.5	6.5	V
V <sub>I</sub>	Input voltage <sup>(2)</sup>	-0.5	6.5	V
V <sub>O</sub>	Output voltage <sup>(2) (3)</sup>	-0.5	V <sub>CC</sub> + 0.5	V
I <sub>IK</sub>	Input clamp current	V <sub>I</sub> < 0		-50 mA
I <sub>OK</sub>	Output clamp current	V <sub>O</sub> < 0		-50 mA
I <sub>O</sub>	Continuous output current			±50 mA
	Continuous current through V <sub>CC</sub> or GND			±100 mA
P <sub>tot</sub>	Power dissipation <sup>(4) (5)</sup>	T <sub>A</sub> = -40°C to +125°C		500 mW
T <sub>J</sub>	Junction temperature	-65	150	°C
T <sub>stg</sub>	Storage temperature	-65	150	°C

- (1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The value of V<sub>CC</sub> is provided in the *Recommended Operating Conditions* table.
- (4) For the D package: above 70°C, the value of P<sub>tot</sub> derates linearly with 8 mW/K.
- (5) For the DB, NS, and PW packages: above 60°C, the value of P<sub>tot</sub> derates linearly with 5.5 mW/K.

### 5.2 ESD Ratings

		VALUE	UNIT
V <sub>(ESD)</sub>	Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001 <sup>(1)</sup>	±2000
		Charged-device model (CDM), per JEDEC specification JESD22-C101 <sup>(2)</sup>	±1000
		Machine Model (MM) A115-A	200

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

### 5.3 Recommended Operating Conditions, SN54LVC08A

over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

		SN54LVC08A		UNIT
		-55°C to +125°C		
		MIN	MAX	
V <sub>CC</sub>	Supply voltage	Operating	2	3.6
		Data retention only	1.5	
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 2.7V to 3.6V		2
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 2.7V to 3.6V		0.8
V <sub>I</sub>	Input voltage	0	5.5	V
V <sub>O</sub>	Output voltage	0	V <sub>CC</sub>	V
I <sub>OH</sub>	High-level output current	V <sub>CC</sub> = 2.7V	-12	
		V <sub>CC</sub> = 3V	-24	
I <sub>OL</sub>	Low-level output current	V <sub>CC</sub> = 2.7V	12	
		V <sub>CC</sub> = 3V	24	
Δt/Δv	Input transition rise or fall rate	8		ns/V

- (1) All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. See *Implications of Slow or Floating CMOS Inputs*, SCBA004.

### 5.4 Recommended Operating Conditions, SN74LVC08A

over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

		SN74LVC08A						UNIT		
		T <sub>A</sub> = 25°C		–40°C to +85°C		–40°C to +125°C				
		MIN	MAX	MIN	MAX	MIN	MAX			
V <sub>CC</sub>	Supply voltage	Operating		1.65	3.6	1.65	3.6	1.65	3.6	V
		Data retention only		1.5		1.5		1.5		
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 1.65V to 1.95V		0.65 × V <sub>CC</sub>		0.65 × V <sub>CC</sub>		0.65 × V <sub>CC</sub>		V
		V <sub>CC</sub> = 2.3V to 2.7V		1.7		1.7		1.7		
		V <sub>CC</sub> = 2.7V to 3.6V		2		2		2		
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 1.65V to 1.95V		0.35 × V <sub>CC</sub>		0.35 × V <sub>CC</sub>		0.35 × V <sub>CC</sub>		V
		V <sub>CC</sub> = 2.3V to 2.7V		0.7		0.7		0.7		
		V <sub>CC</sub> = 2.7V to 3.6V		0.8		0.8		0.8		
V <sub>I</sub>	Input voltage	0	5.5	0	5.5	0	5.5	0	5.5	V
V <sub>O</sub>	Output voltage	0	V <sub>CC</sub>	0	V <sub>CC</sub>	0	V <sub>CC</sub>	0	V <sub>CC</sub>	V
I <sub>OH</sub>	High-level output current	V <sub>CC</sub> = 1.65V		–4		–4		–4		mA
		V <sub>CC</sub> = 2.3V		–8		–8		–8		
		V <sub>CC</sub> = 2.7 V		–12		–12		–12		
		V <sub>CC</sub> = 3V		–24		–24		–24		
I <sub>OL</sub>	Low-level output current	V <sub>CC</sub> = 1.65V		4		4		4		mA
		V <sub>CC</sub> = 2.3V		8		8		8		
		V <sub>CC</sub> = 2.7V		12		12		12		
		V <sub>CC</sub> = 3V		24		24		24		
Δt/Δv	Input transition rise or fall rate		8		8		8		8	ns/V

(1) All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. See [Implications of Slow or Floating CMOS Inputs](#), SCBA004.

### 5.5 Thermal Information

THERMAL METRIC <sup>(1)</sup>		SN74LVC08A						UNIT
		BQA (WQFN)	D (SOIC)	DB (SSOP)	NS (SO)	PW (TSSOP)	RGY (LCCC)	
		14 PINS	14 PINS	14 PINS	14 PINS	14 PINS	14 PINS	
R <sub>θJA</sub>	Junction-to-ambient thermal resistance	102.3	127.8	140.4	123.8	150.8	92.1	°C/W
R <sub>θJC(top)</sub>	Junction-to-case (top) thermal resistance	96.8	81.9	65.3	52.7	56.0	56.6	°C/W
R <sub>θJB</sub>	Junction-to-board thermal resistance	70.9	84.4	60.2	53.9	69.5	27.5	°C/W
ψ <sub>JT</sub>	Junction-to-top characterization parameter	16.6	39.6	25.3	17.9	8.9	4.5	°C/W
ψ <sub>JB</sub>	Junction-to-board characterization parameter	70.9	83.9	59.6	53.6	68.9	27.7	°C/W
R <sub>θJC(bot)</sub>	Junction-to-case (bottom) thermal resistance	50.1	N/A	N/A	N/A	N/A	19.1	°C/W

(1) For more information about traditional and new thermal metrics, see the [Semiconductor and IC Package Thermal Metrics](#) application report.

## 5.6 Electrical Characteristics, SN54LVC08A

over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	SN54LVC08A			UNIT
			–55°C to +125°C			
			MIN	TYP <sup>(1)</sup>	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = –100 μA	2.7V to 3.6V	V <sub>CC</sub> – 0.2			V
	I <sub>OH</sub> = –12 mA	2.7V	2.2			
		3V	2.4			
	I <sub>OH</sub> = –24 mA	3V	2.2			
V <sub>OL</sub>	I <sub>OL</sub> = 100 μA	2.7V to 3.6V	0.2			V
	I <sub>OL</sub> = 12 mA	2.7V	0.4			
	I <sub>OL</sub> = 24 mA	3V	0.55			
I <sub>I</sub>	V <sub>I</sub> = 5.5 V or GND	3.6V	±5			μA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	3.6V	10			μA
ΔI <sub>CC</sub>	One input at V <sub>CC</sub> – 0.6 V, Other inputs at V <sub>CC</sub> or GND	2.7V to 3.6V	500			μA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	3.3V	5			pF

(1) T<sub>A</sub> = 25°C

## 5.7 Electrical Characteristics, SN74LVC08A

over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	SN74LVC08A						UNIT	
			T <sub>A</sub> = 25°C			–40°C to +85°C		–40°C to +125°C		
			MIN	TYP	MAX	MIN	MAX	MIN		MAX
V <sub>OH</sub>	I <sub>OH</sub> = –100 μA	1.65V to 3.6V	V <sub>CC</sub> – 0.2			V <sub>CC</sub> – 0.2		V <sub>CC</sub> – 0.3		V
	I <sub>OH</sub> = –4 mA	1.65V	1.29			1.2		1.05		
		2.3V	1.9			1.7		1.55		
	I <sub>OH</sub> = –12 mA	2.7V	2.2			2.2		2.05		
		3V	2.4			2.4		2.25		
	I <sub>OH</sub> = –24 mA	3V	2.3			2.2		2		
V <sub>OL</sub>	I <sub>OL</sub> = 100 μA	1.65V to 3.6V	0.1			0.2		0.3		V
	I <sub>OL</sub> = 4 mA	1.65V	0.24			0.45		0.6		
		2.3V	0.3			0.7		0.75		
	I <sub>OL</sub> = 12 mA	2.7V	0.4			0.4		0.6		
		3V	0.55			0.55		0.8		
	I <sub>OL</sub> = 24 mA	3V	0.55			0.55		0.8		
I <sub>I</sub>	V <sub>I</sub> = 5.5 V or GND	3.6V	±1			±5		±20		μA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	3.6V	1			10		40		μA
ΔI <sub>CC</sub>	One input at V <sub>CC</sub> – 0.6 V, Other inputs at V <sub>CC</sub> or GND	2.7V to 3.6V	500			500		5000		μA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	3.3V	5							pF

### 5.8 Switching Characteristics, SN54LVC08A

over recommended operating free-air temperature range (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub>	SN54LVC08A		UNIT
				-55°C to +125°C		
				MIN	MAX	
t <sub>pd</sub>	A or B	Y	2.7V	4.8		ns
			3.3V ± 0.3V	1	4.1	

### 5.9 Switching Characteristics, SN74LVC08A

over recommended operating free-air temperature range (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

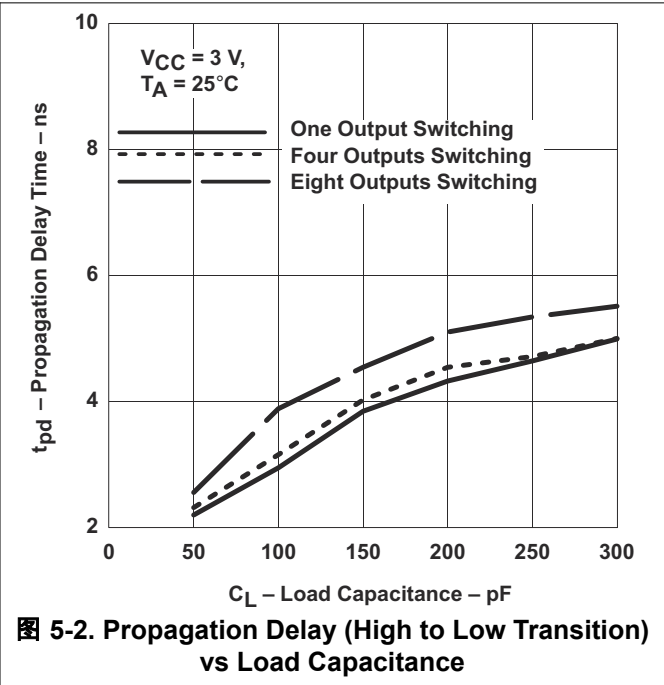
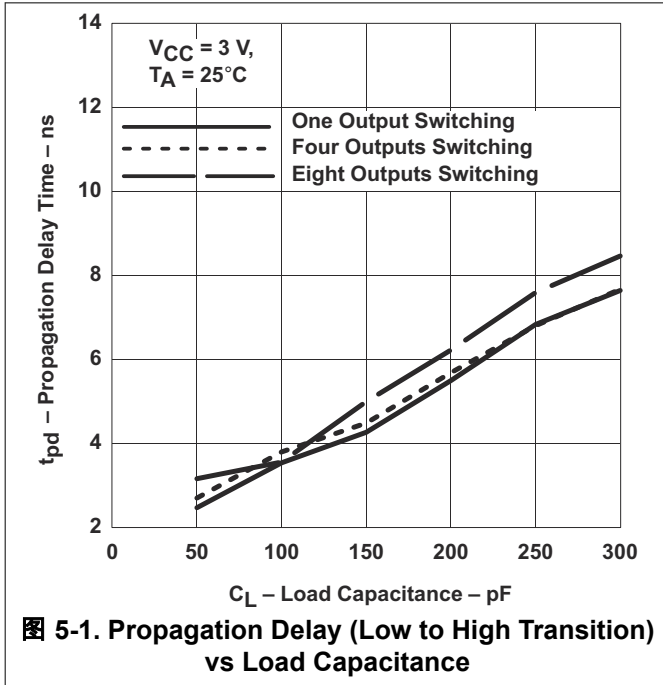
PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub>	SN74LVC08A						UNIT	
				T <sub>A</sub> = 25°C			-40°C to +85°C		-40°C to +125°C		
				MIN	TYP	MAX	MIN	MAX	MIN		MAX
t <sub>pd</sub>	A or B	Y	1.8V ± 0.15V	1	5	9.3	1	9.8	1	11.3	ns
			2.5V ± 0.2V	1	2.9	6.4	1	6.9	1	9	
			2.7V	1	3	4.6	1	4.8	1	6	
			3.3V ± 0.3V	1	2.6	3.9	1	4.1	1	5.5	
t <sub>sk(o)</sub>			3.3V ± 0.3V					1		1.5	ns

### 5.10 Operating Characteristics

T<sub>A</sub> = 25°C

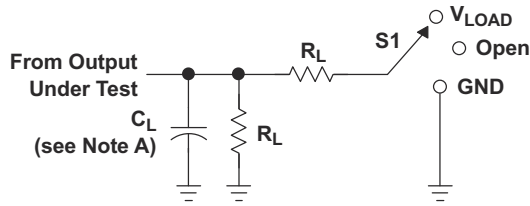
PARAMETER		TEST CONDITIONS	V <sub>CC</sub>	TYP	UNIT
C <sub>pd</sub>	Power dissipation capacitance per gate	f = 10 MHz	1.8 V	7	pF
			2.5 V	9.8	
			3.3 V	10	

### 5.11 Typical Characteristics



## 6 Parameter Measurement Information

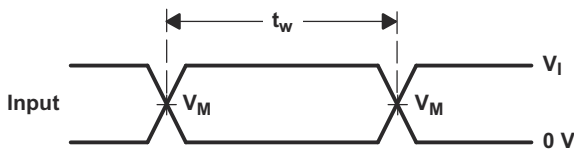
### Load Circuit and Voltage Waveforms



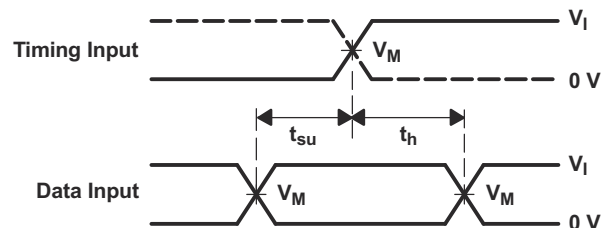
LOAD CIRCUIT

TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$V_{LOAD}$
$t_{PHZ}/t_{PZH}$	GND

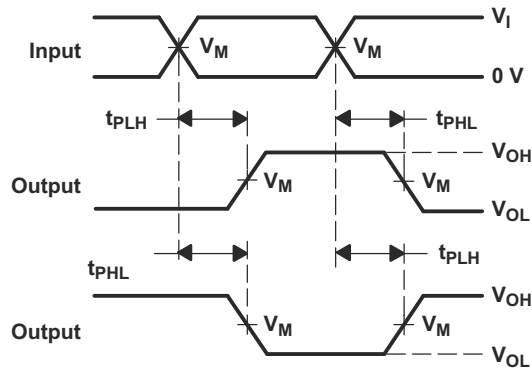
$V_{CC}$	INPUTS		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_D$
	$V_I$	$t_r/t_f$					
$1.8\text{ V} \pm 0.15\text{ V}$	$V_{CC}$	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	1 k $\Omega$	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	$V_{CC}$	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	500 $\Omega$	0.15 V
2.7 V	2.7 V	$\leq 2.5\text{ ns}$	1.5 V	6 V	50 pF	500 $\Omega$	0.3 V
$3.3\text{ V} \pm 0.3\text{ V}$	2.7 V	$\leq 2.5\text{ ns}$	1.5 V	6 V	50 pF	500 $\Omega$	0.3 V



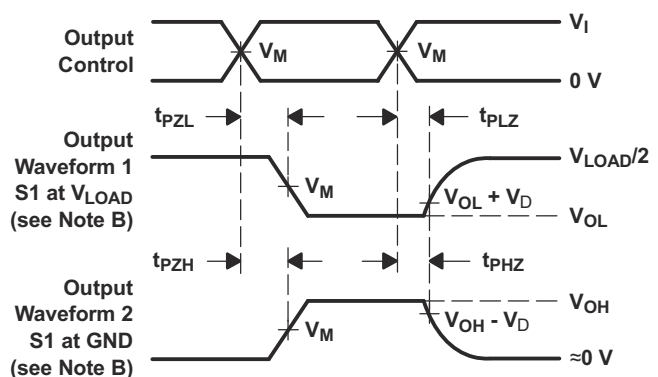
VOLTAGE WAVEFORMS  
PULSE DURATION



VOLTAGE WAVEFORMS  
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS  
PROPAGATION DELAY TIMES  
INVERTING AND NONINVERTING OUTPUTS



VOLTAGE WAVEFORMS  
ENABLE AND DISABLE TIMES  
LOW- AND HIGH-LEVEL ENABLING

- NOTES:
- A.  $C_L$  includes probe and jig capacitance.
  - B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
  - C. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 10\text{ MHz}$ ,  $Z_O = 50\ \Omega$ .
  - D. The outputs are measured one at a time, with one transition per measurement.
  - E.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .
  - F.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .
  - G.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .
  - H. All parameters and waveforms are not applicable to all devices.

## 7 Detailed Description

### 7.1 Overview

The SN74LVC08 device contains four 2-input positive AND gate device and performs the Boolean function  $Y = A \times B$ . This device is useful when multiple AND function is used in the system.

### 7.2 Functional Block Diagram

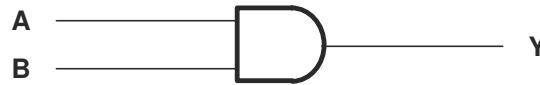


图 7-1. Logic Diagram, Each Gate (Positive Logic)

### 7.3 Feature Description

#### 7.3.1 Balanced High-Drive CMOS Push-Pull Outputs

A balanced output allows the device to sink and source similar currents. The high drive capability of this device creates fast edges into light loads so routing and load conditions should be considered to prevent ringing. Additionally, the outputs of this device are capable of driving larger currents than the device can sustain without being damaged. It is important for the power output of the device to be limited to avoid thermal runaway and damage due to over-current. The electrical and thermal limits defined in the 5.1 must be followed at all times.

#### 7.3.2 Standard CMOS Inputs

Standard CMOS inputs are high impedance and are typically modelled as a resistor in parallel with the input capacitance given in the 5.6 and 5.7. The worst case resistance is calculated with the maximum input voltage, given in the 5.1, and the maximum input leakage current, given in the 5.6 and 5.7, using ohm's law ( $R = V \div I$ ).

Signals applied to the inputs need to have fast edge rates, as defined by  $\Delta t/\Delta v$  in 5.3 and 5.4 to avoid excessive currents and oscillations. If a slow or noisy input signal is required, a device with a Schmitt-trigger input should be utilized to condition the input signal prior to the standard CMOS input.

#### 7.3.3 Clamp Diodes

The inputs to this device have negative clamping diodes. The outputs to this device have both positive and negative clamping diodes as shown in 图 7-2.

**小心**

Voltages beyond the values specified in the 5.1 table can cause damage to the device. The input negative-voltage and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

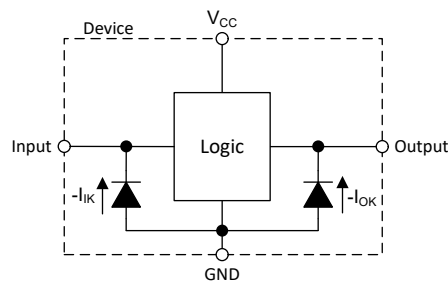


图 7-2. Electrical Placement of Clamping Diodes for Each Input and Output

### 7.3.4 Over-voltage Tolerant Inputs

Input signals to this device can be driven above the supply voltage so long as they remain below the maximum input voltage value specified in the [§ 5.1](#).

### 7.4 Device Functional Modes

[表 7-1](#) lists the functional modes for the SN54LVC08A and SN74LVC08A devices.

**表 7-1. Truth Table**

INPUTS		OUTPUT
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

## 8 Application and Implementation

### 备注

以下应用部分中的信息不属于 TI 器件规格的范围，TI 不担保其准确性和完整性。TI 的客户应负责确定器件是否适用于其应用。客户应验证并测试其设计，以确保系统功能。

### 8.1 Application Information

The SN74LVC08A is used to drive CMOS device and used for implementing AND logic. The LVC family can support current drive of about 24 mA at 3-V  $V_{CC}$ . The inputs for SN74LVC08A are 5.5-V tolerant allowing it to translate down to  $V_{CC}$ .

### 8.2 Typical Application

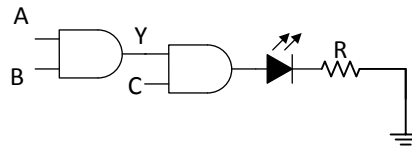


图 8-1. Three Input AND Gate Implementation and Driving LED

#### 8.2.1 Design Requirements

This device uses CMOS technology and has balanced output drive. Take care to avoid bus contention because it can drive currents that would exceed maximum limits. The high drive will also create fast edges into light loads so routing and load conditions should be considered to prevent ringing.

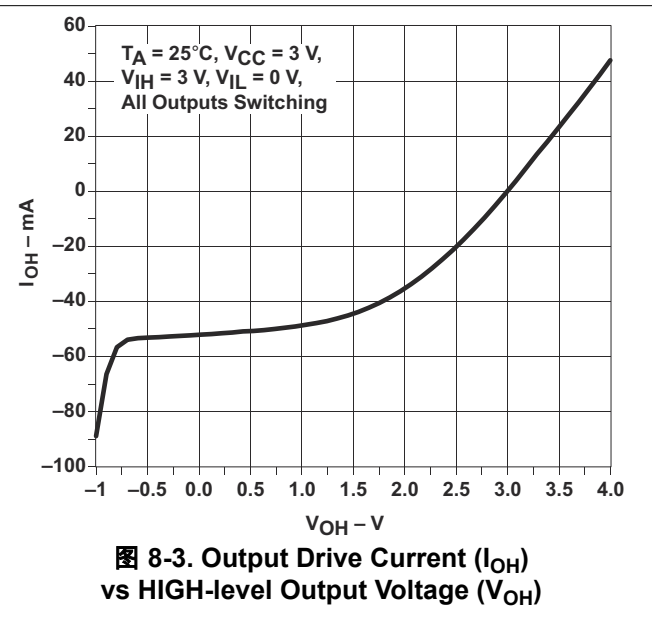
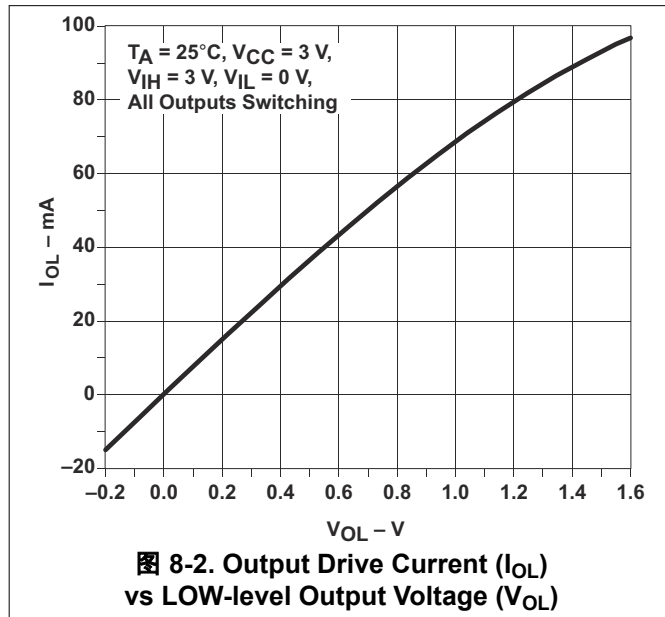
#### 8.2.2 Detailed Design Procedure

SN74LVC08A contains four AND gates in one package which can be used for individual AND function or to implement complex Boolean logic. 图 8-1 shows an example of implementing 3input AND function. AB are inputs for AND gate which are connected to another AND gate.  $Z = A \times B \times C$ . SN74LVC08A support high drive current of 24 mA which can be used to drive LEDs of even Drive low current signal FETs, an example is shown in 图 8-1 TI recommends to use a series resistance to limit the current. If  $V_{CC}$  is 3 V, and LED current should be 10 mA, and the forward-voltage of LED is 2.5 V, then R as shown in 图 8-1 is calculated using 方程式 1:

$$R = (V_{CC} - V_{LED}) / I \quad (1)$$

$$R = (3 - 2.5) / 0.01 = 50 \Omega$$

### 8.2.3 Application Curves



### Power Supply Recommendations

The power supply can be any voltage between the minimum and maximum supply voltage rating located in the [Recommended Operating Conditions](#) table.

The  $V_{CC}$  pin must have a good bypass capacitor to prevent power disturbance. TI recommends to use a 0.1- $\mu\text{F}$  capacitor. It is ok to parallel multiple bypass capacitors to reject different frequencies of noise. 0.1- $\mu\text{F}$  and 1- $\mu\text{F}$  capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power pin as possible for best results.

## 8.3 Layout

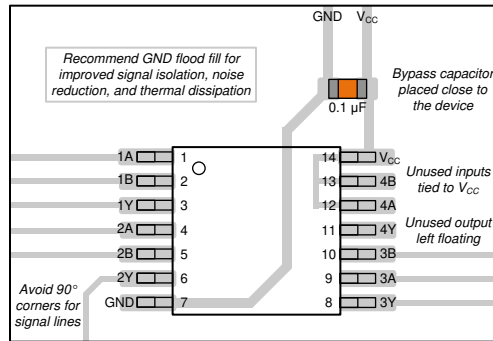
### 8.3.1 Layout Guidelines

When using multiple bit logic devices, inputs should not float. In many cases, functions or parts of functions of digital logic devices are unused. Some examples are when only two inputs of a triple-input AND gate are used, or when only 3 of the 4-buffer gates are used. Such input pins should not be left unconnected because the undefined voltages at the outside connections result in undefined operational states.

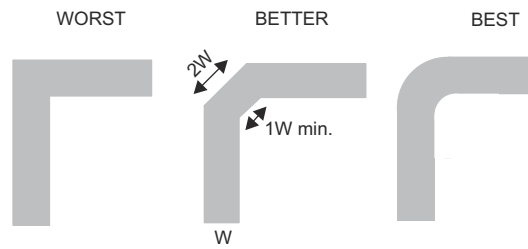
Specified in [图 8-4](#) are rules that must be observed under all circumstances. All unused inputs of digital logic devices must be connected to a high or low bias to prevent them from floating. The logic level that should be applied to any particular unused input depends on the function of the device. Generally they will be tied to GND or VCC, whichever makes more sense or is more convenient.

Even low data rate digital signals can have high frequency signal components due to fast edge rates. When a PCB trace turns a corner at a 90° angle, a reflection can occur. A reflection occurs primarily because of the change of width of the trace. At the apex of the turn, the trace width increases to 1.414 times the width. This increase upsets the transmission-line characteristics, especially the distributed capacitance and self-inductance of the trace which results in the reflection. Not all PCB traces can be straight and therefore some traces must turn corners. [图 8-5](#) shows progressively better techniques of rounding corners. Only the last example (BEST) maintains constant trace width and minimizes reflections.

### 8.3.2 Layout Examples



**图 8-4. Example Layout**



**图 8-5. Trace Example**

## 9 Device and Documentation Support

### 9.1 Documentation Support (Analog)

#### 9.1.1 Related Documentation

For related documentation see the following:

[Implications of Slow or Floating CMOS Inputs](#), SCBA004

#### 9.1.2 Related Links

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to order now.

表 9-1. Related Links

PARTS	PRODUCT FOLDER	ORDER NOW	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
SN54LVC08A	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>
SN74LVC08A	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>

### 9.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. In the upper right corner, click on *Alert me* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

### 9.3 支持资源

TI E2E™ 中文支持论坛是工程师的重要参考资料，可直接从专家处获得快速、经过验证的解答和设计帮助。搜索现有解答或提出自己的问题，获得所需的快速设计帮助。

链接的内容由各个贡献者“按原样”提供。这些内容并不构成 TI 技术规范，并且不一定反映 TI 的观点；请参阅 TI 的使用条款。

#### 9.3.1 Community Resources

### 9.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

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### 9.5 静电放电警告



静电放电 (ESD) 会损坏这个集成电路。德州仪器 (TI) 建议通过适当的预防措施处理所有集成电路。如果不遵守正确的处理和安装程序，可能会损坏集成电路。

ESD 的损坏小至导致微小的性能降级，大至整个器件故障。精密的集成电路可能更容易受到损坏，这是因为非常细微的参数更改都可能会导致器件与其发布的规格不相符。

### 9.6 术语表

#### TI 术语表

本术语表列出并解释了术语、首字母缩略词和定义。

## 10

注：以前版本的页码可能与当前版本的页码不同

### Changes from Revision V (May 2024) to Revision W (July 2024)

Page

- |  |   |
|--|---|
| • Updated thermal values for D package from RθJA = 98.6 to 127.8, RθJC(top) = 56.0 to 81.9, RθJB = 53.3 to 84.4, ΨJT = 16.4 to 39.6, ΨJB = 53.0 to 83.9, RθJC(bot) = N/A, all values in °C/W ..... | 6 |
|--|---|

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<b>Changes from Revision U (March 2024) to Revision V (May 2024)</b>	<b>Page</b>
• Updated R $\theta$ JA values: DB = 112.8 to 140.4, PW = 127.7 to 150.8, RGY = 51.1 to 92.1, NS = 95.1 to 123.8; updated DB, PW, RGY, and NS packages for R $\theta$ JC(top), R $\theta$ JB, $\Psi$ JT, $\Psi$ JB, and R $\theta$ JC(bot), all values in $^{\circ}$ C/W.....	<b>6</b>

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## 11 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

**PACKAGING INFORMATION**

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
<a href="#">5962-9753401Q2A</a>	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9753401Q2A SNJ54LVC 08AFK
<a href="#">5962-9753401QCA</a>	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9753401QC A SNJ54LVC08AJ
<a href="#">5962-9753401QDA</a>	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9753401QD A SNJ54LVC08AW
<a href="#">SN74LVC08ABQAR</a>	Active	Production	WQFN (BQA)   14	3000   LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08ABQAR.A	Active	Production	WQFN (BQA)   14	3000   LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	LVC08A
<a href="#">SN74LVC08AD</a>	Active	Production	SOIC (D)   14	50   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08AD.B	Active	Production	SOIC (D)   14	50   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
<a href="#">SN74LVC08ADBR</a>	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08ADBR.A	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08ADBR.B	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08ADBRE4	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08ADE4	Active	Production	SOIC (D)   14	50   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08ADG4	Active	Production	SOIC (D)   14	50   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
<a href="#">SN74LVC08ADR</a>	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU   SN	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08ADR.A	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08ADR.B	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08ADRE4	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
<a href="#">SN74LVC08ADRG3</a>	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08ADRG3.B	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	LVC08A
<a href="#">SN74LVC08ADRG4</a>	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08ADRG4.B	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
<a href="#">SN74LVC08ADT</a>	Active	Production	SOIC (D)   14	250   SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08ADT.B	Active	Production	SOIC (D)   14	250   SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
<a href="#">SN74LVC08ANSR</a>	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN74LVC08ANSR.A	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08ANSR.B	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
SN74LVC08ANSRE4	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LVC08A
<a href="#">SN74LVC08APW</a>	Active	Production	TSSOP (PW)   14	90   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08APW.B	Active	Production	TSSOP (PW)   14	90   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08APWG4	Active	Production	TSSOP (PW)   14	90   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
<a href="#">SN74LVC08APWR</a>	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU   SN	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08APWR.A	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08APWR.B	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08APWRE4	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
<a href="#">SN74LVC08APWRG3</a>	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08APWRG3.B	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	LC08A
<a href="#">SN74LVC08APWRG4</a>	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08APWRG4.A	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08APWRG4.B	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
<a href="#">SN74LVC08APWT</a>	Active	Production	TSSOP (PW)   14	250   SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08APWT.B	Active	Production	TSSOP (PW)   14	250   SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
SN74LVC08APWTG4	Active	Production	TSSOP (PW)   14	250   SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LC08A
<a href="#">SN74LVC08ARGYR</a>	Active	Production	VQFN (RGY)   14	3000   LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	LC08A
SN74LVC08ARGYR.A	Active	Production	VQFN (RGY)   14	3000   LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	LC08A
SN74LVC08ARGYR.B	Active	Production	VQFN (RGY)   14	3000   LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	LC08A
SN74LVC08ARGYRG4	Active	Production	VQFN (RGY)   14	3000   LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	LC08A
<a href="#">SNJ54LVC08AFK</a>	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9753401Q2A SNJ54LVC08AFK
<a href="#">SNJ54LVC08AJ</a>	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9753401QC A SNJ54LVC08AJ
<a href="#">SNJ54LVC08AW</a>	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9753401QD A SNJ54LVC08AW

(1) **Status:** For more details on status, see our [product life cycle](#).

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "-" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

**Important Information and Disclaimer:**The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

**OTHER QUALIFIED VERSIONS OF SN54LVC08A, SN74LVC08A :**

- Catalog : [SN74LVC08A](#)
- Automotive : [SN74LVC08A-Q1](#), [SN74LVC08A-Q1](#)
- Enhanced Product : [SN74LVC08A-EP](#), [SN74LVC08A-EP](#)
- Military : [SN54LVC08A](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications
- Military - QML certified for Military and Defense Applications

**TAPE AND REEL INFORMATION**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC08ABQAR	WQFN	BQA	14	3000	180.0	12.4	2.8	3.3	1.1	4.0	12.0	Q1
SN74LVC08ADBR	SSOP	DB	14	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1
SN74LVC08ADR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74LVC08ADRG3	SOIC	D	14	2500	330.0	16.8	6.5	9.5	2.1	8.0	16.0	Q1
SN74LVC08ADRG4	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74LVC08ADT	SOIC	D	14	250	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74LVC08ANSR	SOP	NS	14	2000	330.0	16.4	8.45	10.55	2.5	12.0	16.2	Q1
SN74LVC08ANSR	SOP	NS	14	2000	330.0	16.4	8.1	10.4	2.5	12.0	16.0	Q1
SN74LVC08APWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74LVC08APWRG3	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74LVC08APWRG4	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74LVC08APWT	TSSOP	PW	14	250	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74LVC08ARGYR	VQFN	RGY	14	3000	330.0	12.4	3.75	3.75	1.15	8.0	12.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC08ABQAR	WQFN	BQA	14	3000	210.0	185.0	35.0
SN74LVC08ADBR	SSOP	DB	14	2000	353.0	353.0	32.0
SN74LVC08ADR	SOIC	D	14	2500	353.0	353.0	32.0
SN74LVC08ADRG3	SOIC	D	14	2500	364.0	364.0	27.0
SN74LVC08ADRG4	SOIC	D	14	2500	353.0	353.0	32.0
SN74LVC08ADT	SOIC	D	14	250	213.0	191.0	35.0
SN74LVC08ANSR	SOP	NS	14	2000	353.0	353.0	32.0
SN74LVC08ANSR	SOP	NS	14	2000	353.0	353.0	32.0
SN74LVC08APWR	TSSOP	PW	14	2000	353.0	353.0	32.0
SN74LVC08APWRG3	TSSOP	PW	14	2000	364.0	364.0	27.0
SN74LVC08APWRG4	TSSOP	PW	14	2000	353.0	353.0	32.0
SN74LVC08APWT	TSSOP	PW	14	250	353.0	353.0	32.0
SN74LVC08ARGYR	VQFN	RGY	14	3000	360.0	360.0	36.0

**TUBE**


\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
5962-9753401Q2A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-9753401QDA	W	CFP	14	25	506.98	26.16	6220	NA
SN74LVC08AD	D	SOIC	14	50	506.6	8	3940	4.32
SN74LVC08AD.B	D	SOIC	14	50	506.6	8	3940	4.32
SN74LVC08ADE4	D	SOIC	14	50	506.6	8	3940	4.32
SN74LVC08ADG4	D	SOIC	14	50	506.6	8	3940	4.32
SN74LVC08APW	PW	TSSOP	14	90	530	10.2	3600	3.5
SN74LVC08APW.B	PW	TSSOP	14	90	530	10.2	3600	3.5
SN74LVC08APWG4	PW	TSSOP	14	90	530	10.2	3600	3.5
SNJ54LVC08AFK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54LVC08AW	W	CFP	14	25	506.98	26.16	6220	NA

W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package can be hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only.
  - E. Falls within MIL STD 1835 GDFP1-F14

# DB0014A



# PACKAGE OUTLINE

## SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



### NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. Reference JEDEC registration MO-150.

# EXAMPLE BOARD LAYOUT

DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



4220762/A 05/2024

NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE: 10X

4220762/A 05/2024

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

## GENERIC PACKAGE VIEW

**FK 20**

**LCCC - 2.03 mm max height**

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

This image is a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



4229370VA\

J 14

**GENERIC PACKAGE VIEW**  
**CDIP - 5.08 mm max height**  
CERAMIC DUAL IN LINE PACKAGE



Images above are just a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.

4040083-5/G

J0014A



# PACKAGE OUTLINE

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



4214771/A 05/2017

NOTES:

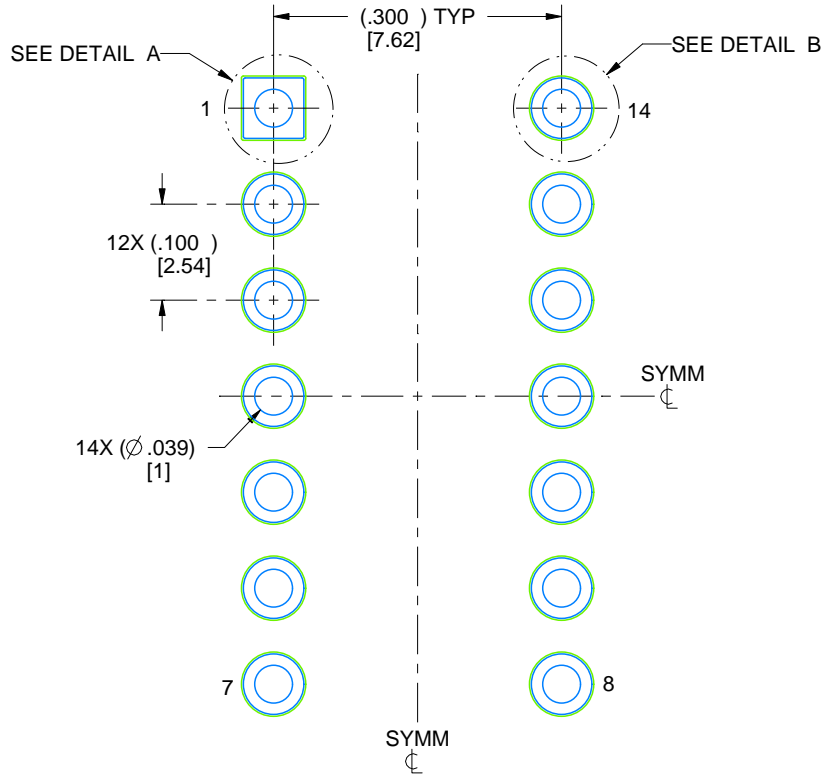
1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermetically sealed with a ceramic lid using glass frit.
4. Index point is provided on cap for terminal identification only and on press ceramic glass frit seal only.
5. Falls within MIL-STD-1835 and GDIP1-T14.

# EXAMPLE BOARD LAYOUT

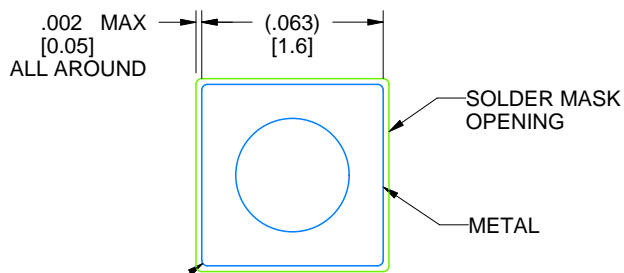
J0014A

CDIP - 5.08 mm max height

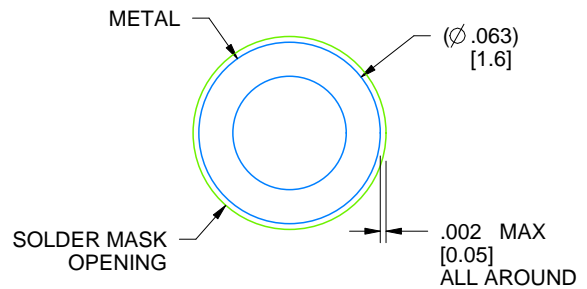
CERAMIC DUAL IN LINE PACKAGE



LAND PATTERN EXAMPLE  
NON-SOLDER MASK DEFINED  
SCALE: 5X



DETAIL A  
SCALE: 15X



DETAIL B  
13X, SCALE: 15X

4214771/A 05/2017



4220202/B 12/2023

NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-153.

# EXAMPLE BOARD LAYOUT

PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



4220202/B 12/2023

NOTES: (continued)

- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE: 10X

4220202/B 12/2023

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

## GENERIC PACKAGE VIEW

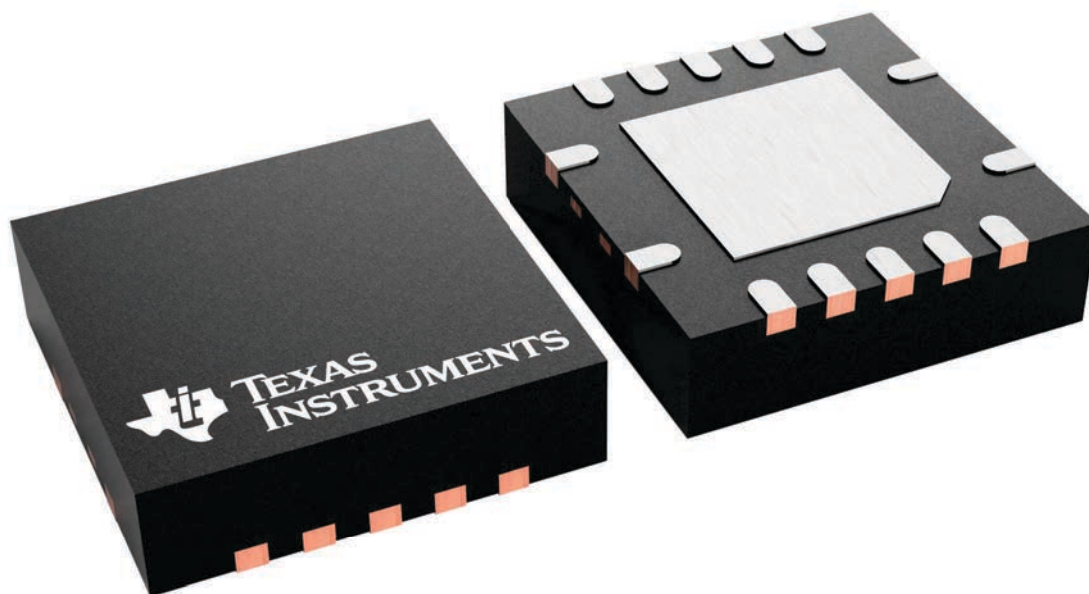
**RGY 14**

**VQFN - 1 mm max height**

3.5 x 3.5, 0.5 mm pitch

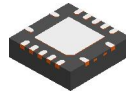
PLASTIC QUAD FLATPACK - NO LEAD

This image is a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



4231541/A

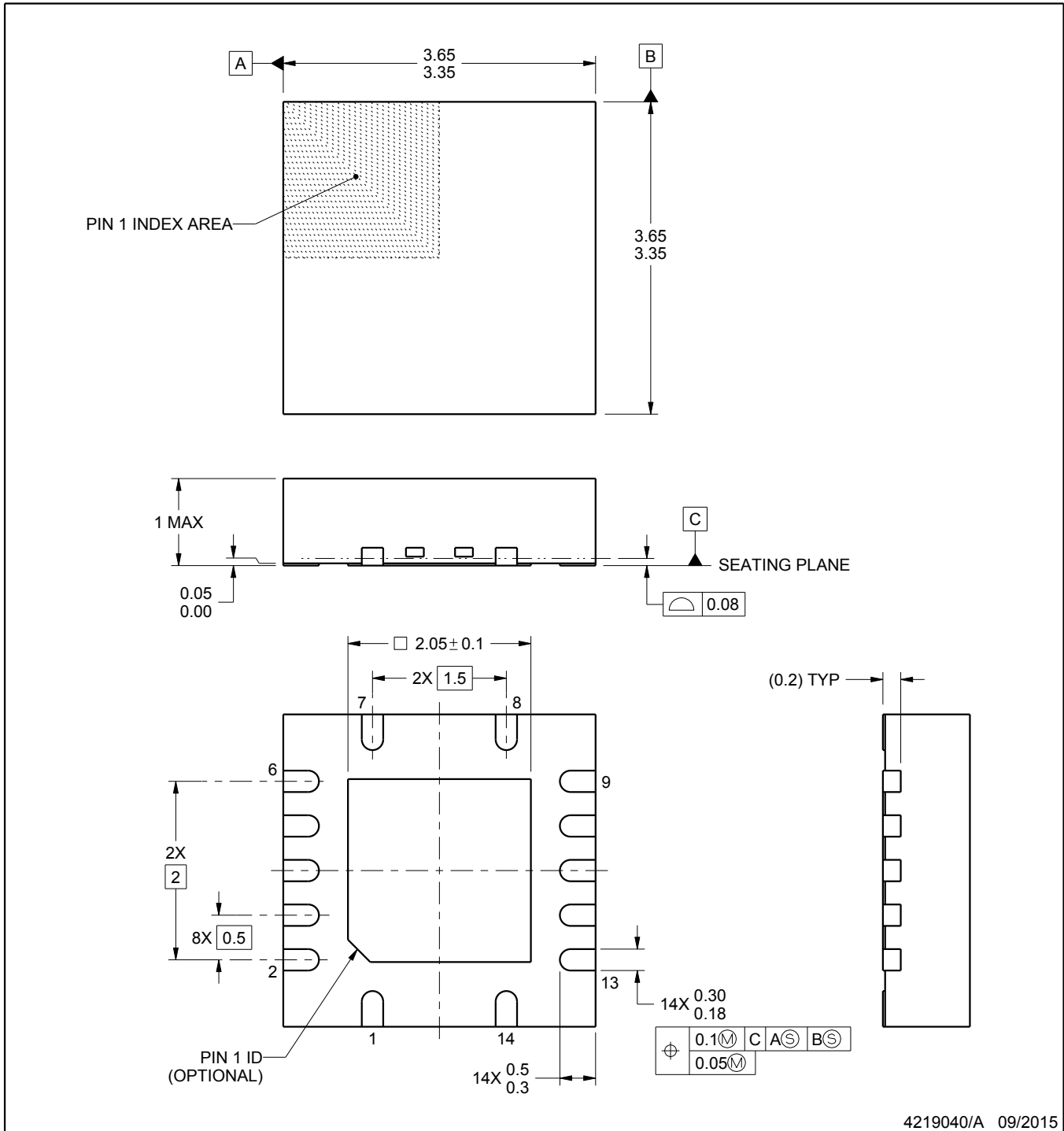
RGY0014A



PACKAGE OUTLINE

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



4219040/A 09/2015

NOTES:

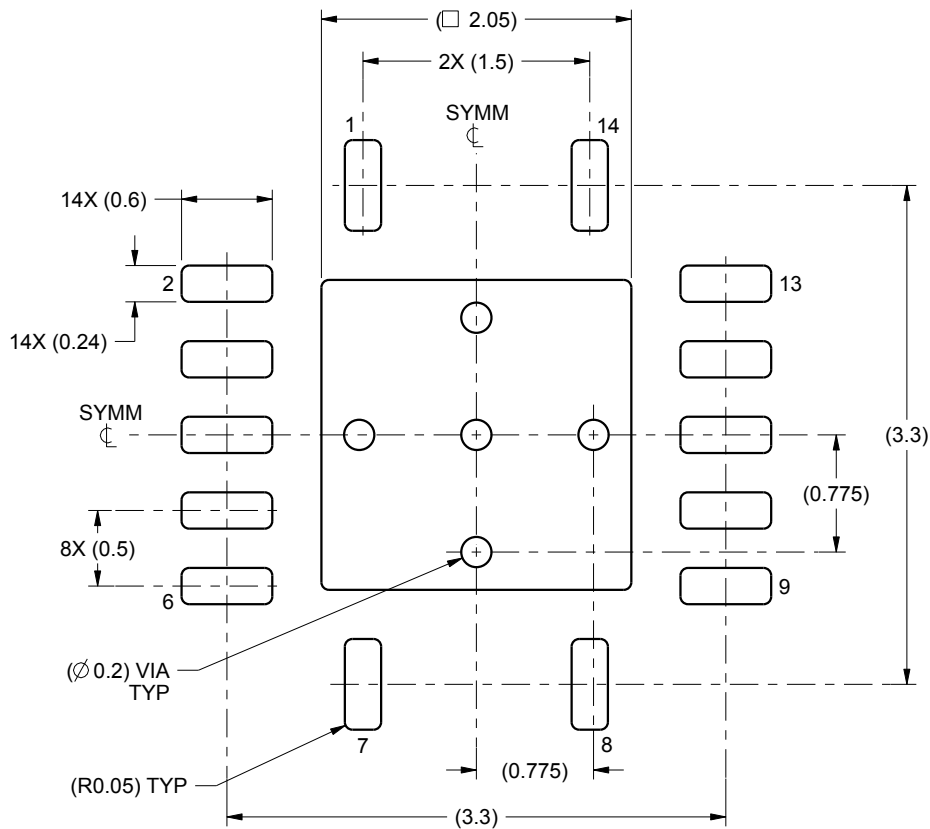
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

# EXAMPLE BOARD LAYOUT

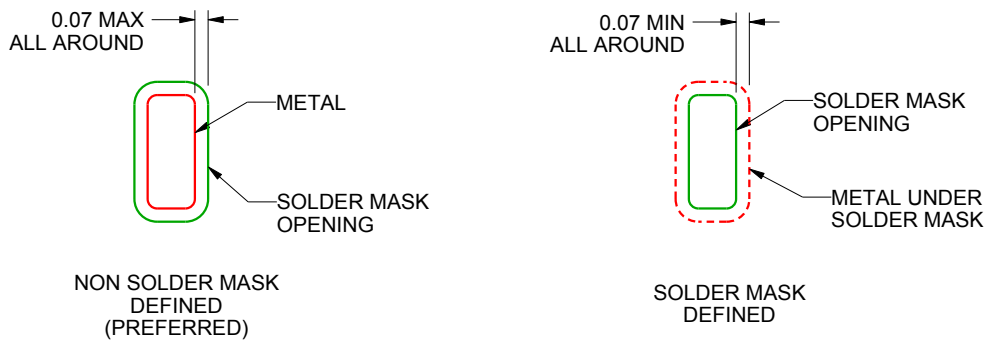
RGY0014A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE  
SCALE:20X



SOLDER MASK DETAILS

4219040/A 09/2015

NOTES: (continued)

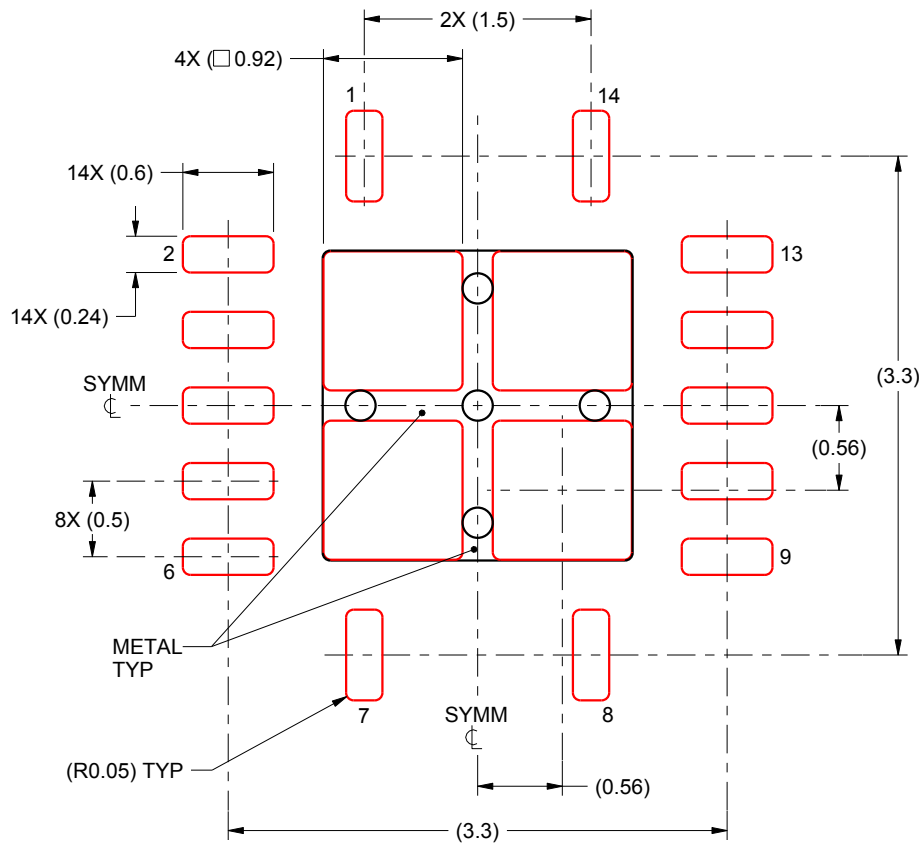
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/slua271](http://www.ti.com/lit/slua271)).

# EXAMPLE STENCIL DESIGN

RGY0014A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



**SOLDER PASTE EXAMPLE**  
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD  
80% PRINTED SOLDER COVERAGE BY AREA  
SCALE:20X

4219040/A 09/2015

NOTES: (continued)

5. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.



# D0014A

# PACKAGE OUTLINE

## SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



4220718/A 09/2016

### NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm, per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm, per side.
5. Reference JEDEC registration MS-012, variation AB.

# EXAMPLE BOARD LAYOUT

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



LAND PATTERN EXAMPLE  
SCALE:8X



SOLDER MASK DETAILS

4220718/A 09/2016

NOTES: (continued)

- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:8X

4220718/A 09/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

## GENERIC PACKAGE VIEW

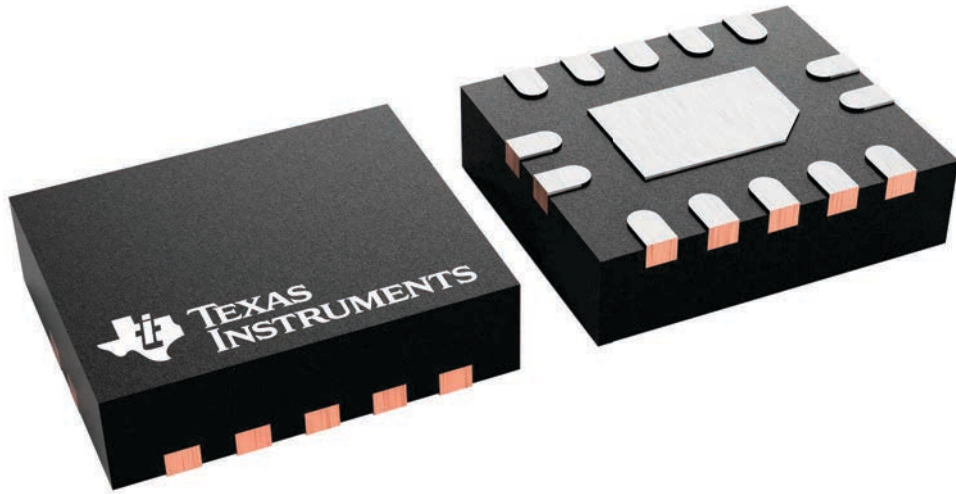
**BQA 14**

**WQFN - 0.8 mm max height**

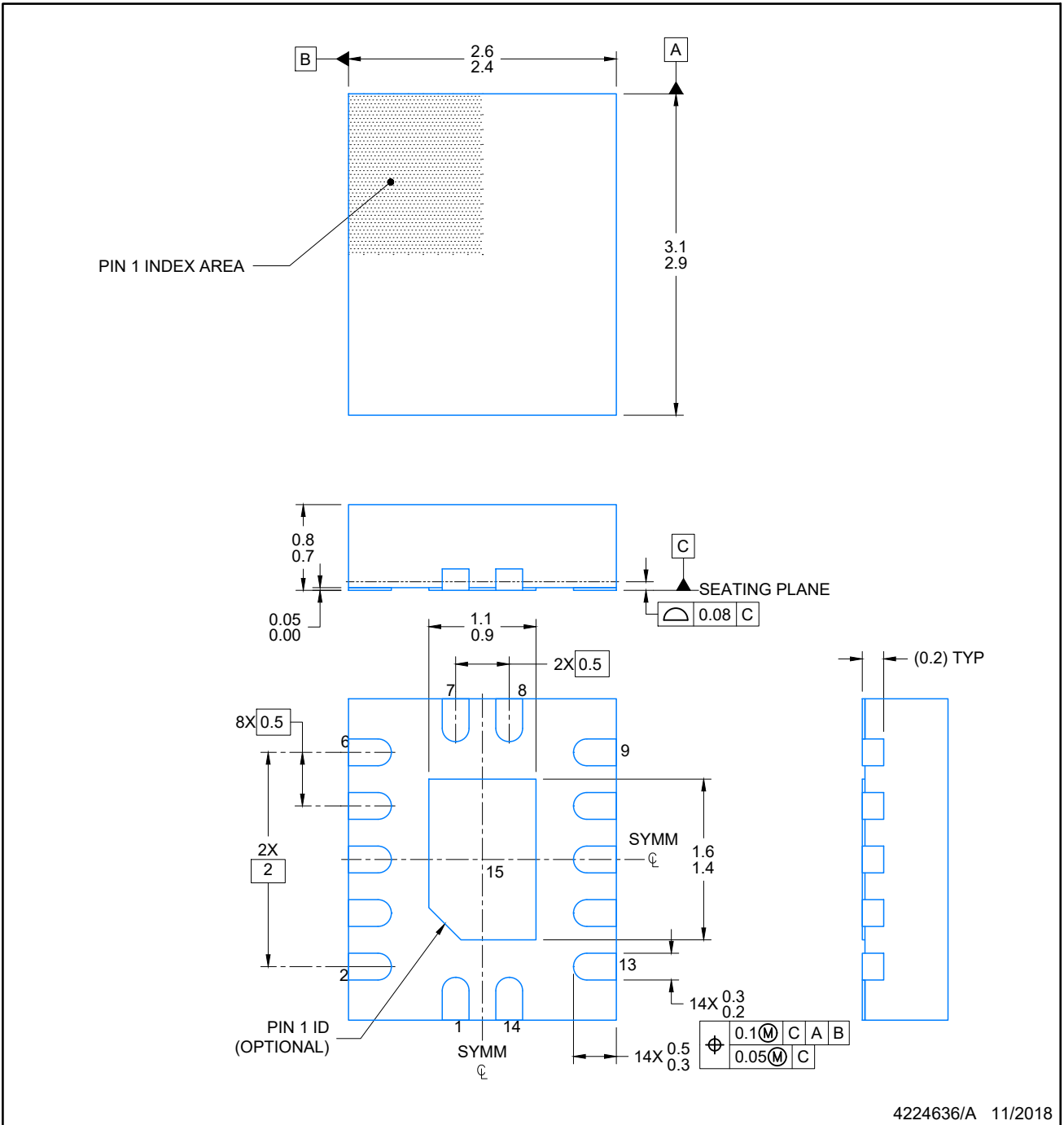
2.5 x 3, 0.5 mm pitch

PLASTIC QUAD FLATPACK - NO LEAD

This image is a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



4227145/A



**NOTES:**

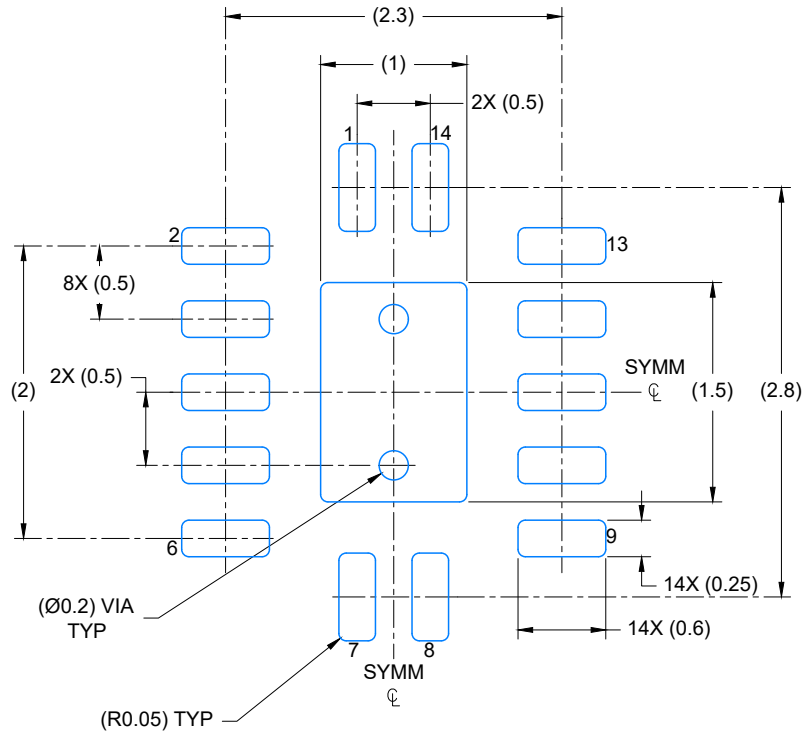
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for optimal thermal and mechanical performance.

# EXAMPLE BOARD LAYOUT

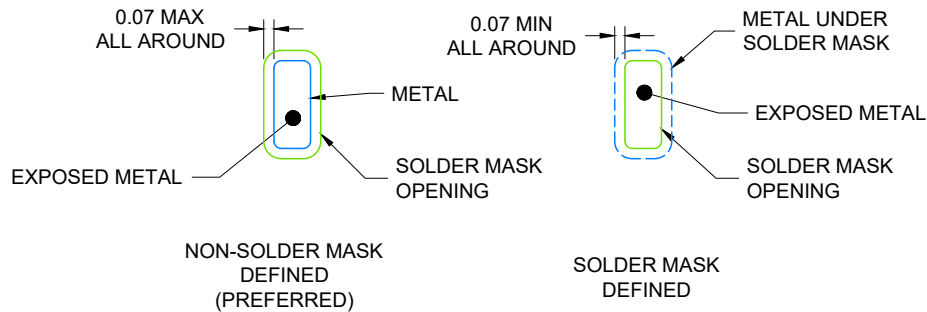
WQFN - 0.8 mm max height

BQA0014A

PLASTIC QUAD FLAT PACK-NO LEAD



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 20X



4224636/A 11/2018

NOTES: (continued)

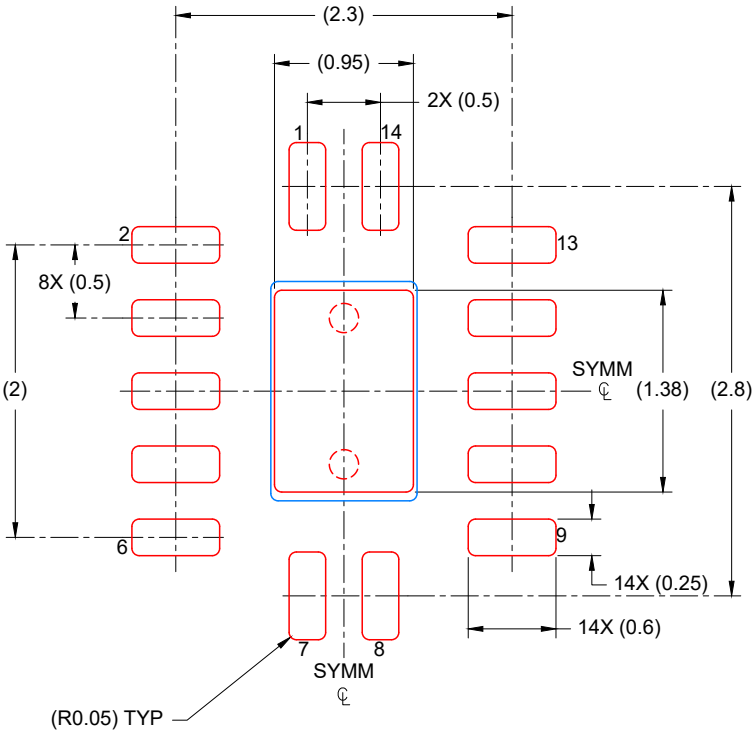
- This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/slua271](http://www.ti.com/lit/slua271)).
- Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

# EXAMPLE STENCIL DESIGN

BQA0014A

WQFN - 0.8 mm max height

PLASTIC QUAD FLAT PACK-NO LEAD



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD  
88% PRINTED COVERAGE BY AREA  
SCALE: 20X

4224636/A 11/2018

NOTES: (continued)

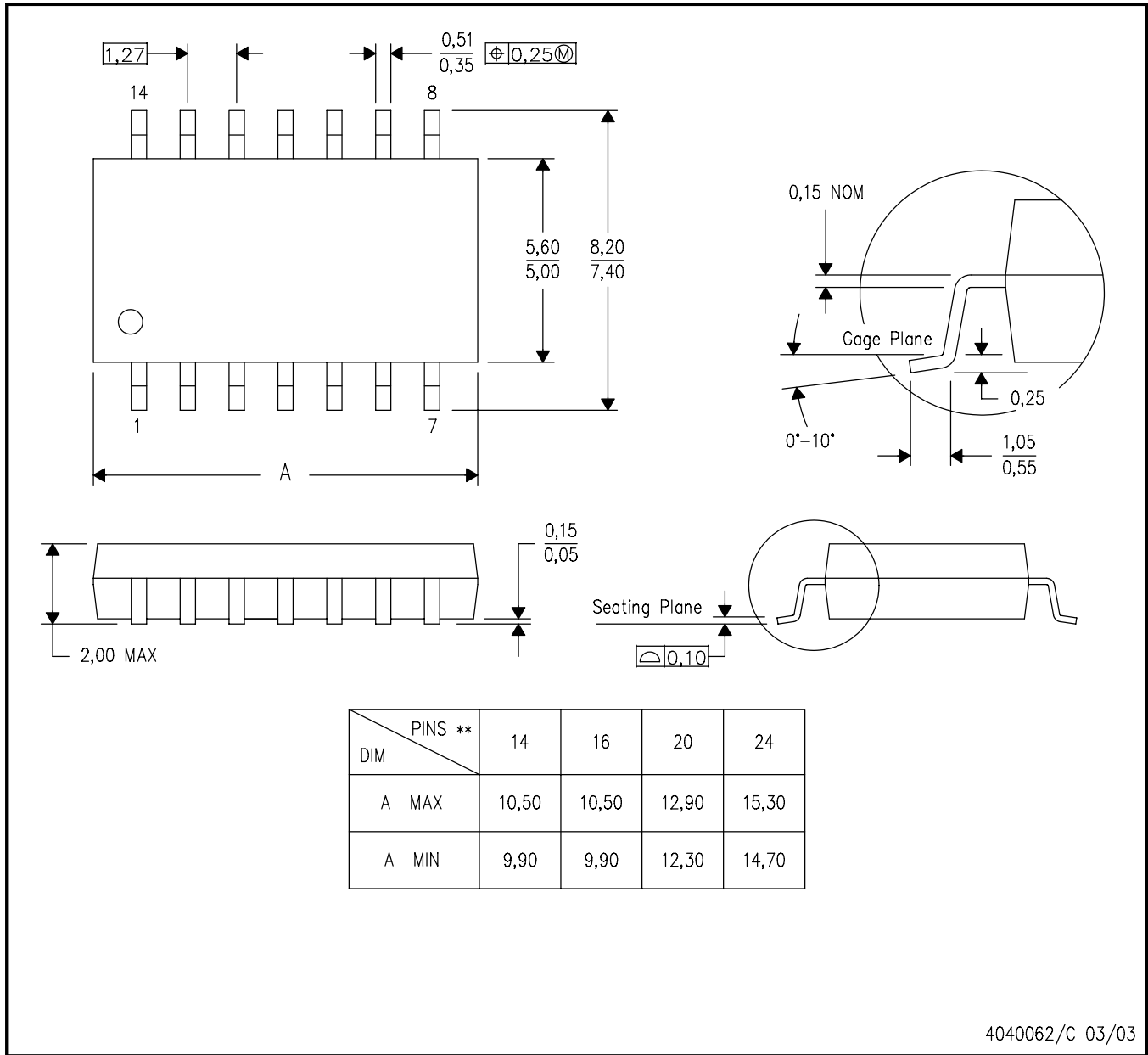
- 6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

# MECHANICAL DATA

NS (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

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