

## SN74LV08A Quadruple 2-Input Positive-AND Gates

### 1 Features

- 2V to 5.5V  $V_{CC}$  operation
- Max  $t_{pd}$  of 7ns at 5V
- Typical  $V_{OLP}$  (output ground bounce)  $< 0.8V$  at  $V_{CC} = 3.3V$ ,  $T_A = 25^\circ C$
- Typical  $V_{OHV}$  (output  $V_{OH}$  undershoot)  $> 2.3V$  at  $V_{CC} = 3.3V$ ,  $T_A = 25^\circ C$
- Support mixed-mode voltage operation on all ports
- $I_{off}$  supports live insertion, partial-power-down mode, and back-drive protection
- Latch-up performance exceeds 250mA per JESD 17

### 2 Applications

- [Servers](#)
- [Telecom Infrastructure](#)
- [PCs and Notebooks](#)
- [Combining Power Good Signals](#)

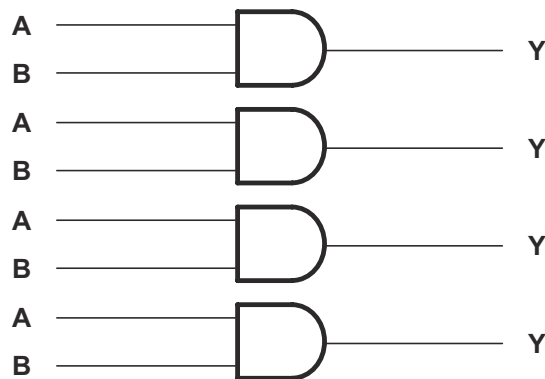
### 3 Description

This quadruple 2-input positive-AND gate is designed for 2V to 5.5V  $V_{CC}$  operation. The SN74LV08A device performs the Boolean function  $Y = A \cdot B$  or  $Y = \overline{A} + \overline{B}$  in positive logic.

#### Device Information (1)

| PART NUMBER | PACKAGE         | BODY SIZE (NOM) |
|-------------|-----------------|-----------------|
| SN74LV08A   | DGV (TVSOP, 14) | 3.60mm × 4.40mm |
|             | D (SOIC, 14)    | 8.65mm × 3.91mm |
|             | RGY (VQFN, 14)  | 3.50mm × 3.50mm |
|             | DB (SSOP, 14)   | 6.20mm × 5.30mm |
|             | PW (TSSOP, 14)  | 5.00mm × 4.40mm |

(1) For all available packages, see the orderable addendum at the end of the data sheet.



**Figure 3-1. Simplified Schematic**

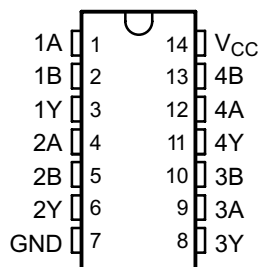


## Table of Contents

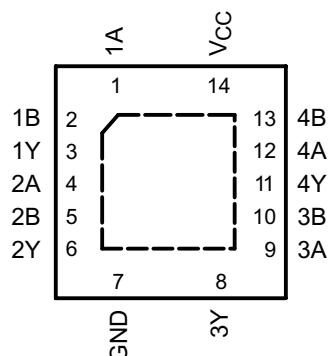
|                                                               |          |                                                                  |           |
|---------------------------------------------------------------|----------|------------------------------------------------------------------|-----------|
| <b>1 Features</b> .....                                       | <b>1</b> | 7.1 Overview.....                                                | <b>9</b>  |
| <b>2 Applications</b> .....                                   | <b>1</b> | 7.2 Functional Block Diagram.....                                | <b>9</b>  |
| <b>3 Description</b> .....                                    | <b>1</b> | 7.3 Feature Description.....                                     | <b>9</b>  |
| <b>4 Pin Configuration and Functions</b> .....                | <b>3</b> | 7.4 Device Functional Modes.....                                 | <b>9</b>  |
| <b>5 Specifications</b> .....                                 | <b>4</b> | <b>8 Application and Implementation</b> .....                    | <b>10</b> |
| 5.1 Absolute Maximum Ratings.....                             | <b>4</b> | 8.1 Application Information.....                                 | <b>10</b> |
| 5.2 ESD Ratings.....                                          | <b>4</b> | 8.2 Typical Application.....                                     | <b>10</b> |
| 5.3 Recommended Operating Conditions.....                     | <b>5</b> | 8.3 Power Supply Recommendations.....                            | <b>12</b> |
| 5.4 Thermal Information.....                                  | <b>5</b> | 8.4 Layout.....                                                  | <b>12</b> |
| 5.5 Electrical Characteristics.....                           | <b>6</b> | <b>9 Device and Documentation Support</b> .....                  | <b>13</b> |
| 5.6 Switching Characteristics, $V_{CC} = 2.5V \pm 0.2V$ ..... | <b>6</b> | 9.1 Receiving Notification of Documentation Updates....          | <b>13</b> |
| 5.7 Switching Characteristics, $V_{CC} = 3.3V \pm 0.3V$ ..... | <b>6</b> | 9.2 Support Resources.....                                       | <b>13</b> |
| 5.8 Switching Characteristics, $V_{CC} = 5V \pm 0.5V$ .....   | <b>6</b> | 9.3 Trademarks.....                                              | <b>13</b> |
| 5.9 Noise Characteristics .....                               | <b>7</b> | 9.4 Electrostatic Discharge Caution.....                         | <b>13</b> |
| 5.10 Operating Characteristics.....                           | <b>7</b> | 9.5 Glossary.....                                                | <b>13</b> |
| 5.11 Typical Characteristics.....                             | <b>7</b> | <b>10 Revision History</b> .....                                 | <b>13</b> |
| <b>6 Parameter Measurement Information</b> .....              | <b>8</b> | <b>11 Mechanical, Packaging, and Orderable Information</b> ..... | <b>13</b> |
| <b>7 Detailed Description</b> .....                           | <b>9</b> |                                                                  |           |

## 4 Pin Configuration and Functions

**SN74LV08A . . . D, DB, DGV, NS,  
OR PW PACKAGE  
(TOP VIEW)**



**SN74LV08A . . . RGY PACKAGE  
(TOP VIEW)**



**Table 4-1. Pin Functions**

| NAME            | PIN       |                            | TYPE <sup>(1)</sup> | DESCRIPTION |
|-----------------|-----------|----------------------------|---------------------|-------------|
|                 | SN74LV08A | D, DB, DGV,<br>NS, PW, RGY |                     |             |
| 1A              | 1         |                            | I                   | 1A Input    |
| 1B              | 2         |                            | I                   | 1B Input    |
| 1Y              | 3         |                            | O                   | 1Y Output   |
| 2A              | 4         |                            | I                   | 2A Input    |
| 2B              | 5         |                            | I                   | 2B Input    |
| 2Y              | 6         |                            | O                   | 2Y Output   |
| 3Y              | 8         |                            | O                   | 3Y Output   |
| 3A              | 9         |                            | I                   | 3A Input    |
| 3B              | 10        |                            | I                   | 3B Input    |
| 4Y              | 11        |                            | O                   | 4Y Output   |
| 4A              | 12        |                            | I                   | 4A Input    |
| 4B              | 13        |                            | I                   | 4B Input    |
| GND             | 7         |                            | —                   | Ground Pin  |
| V <sub>CC</sub> | 14        |                            | —                   | Power Pin   |

(1) Signal Types: I = Input, O = Output, I/O = Input or Output.

## 5 Specifications

### 5.1 Absolute Maximum Ratings

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

|           |                                                                                             | MIN                   | MAX            | UNIT |
|-----------|---------------------------------------------------------------------------------------------|-----------------------|----------------|------|
| $V_{CC}$  | Supply voltage range                                                                        | -0.5                  | 7              | V    |
| $V_I$     | Input voltage range <sup>(2)</sup>                                                          | -0.5                  | 7              | V    |
| $V_O$     | Voltage range applied to any output in the high-impedance or power-off state <sup>(2)</sup> | -0.5                  | 7              | V    |
| $V_O$     | Output voltage range <sup>(2) (3)</sup>                                                     | -0.5                  | $V_{CC} + 0.5$ | V    |
| $I_{IK}$  | Input clamp current                                                                         | $V_I < 0$             | -20            | mA   |
| $I_{OK}$  | Output clamp current                                                                        | $V_O < 0$             | -50            | mA   |
| $I_O$     | Continuous output current                                                                   | $V_O = 0$ to $V_{CC}$ | ±25            | mA   |
|           | Continuous current through $V_{CC}$ or GND                                                  |                       | ±50            | mA   |
| $T_J$     | Junction temperature                                                                        |                       | 150            | °C   |
| $T_{stg}$ | Storage temperature range                                                                   | -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) This value is limited to 5.5V maximum.

### 5.2 ESD Ratings

|             |                         |                                                                                         | VALUE | UNIT |
|-------------|-------------------------|-----------------------------------------------------------------------------------------|-------|------|
| $V_{(ESD)}$ | Electrostatic discharge | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins <sup>(1)</sup>             | ±2000 | V    |
|             |                         | Charged device model (CDM), per JEDEC specification JESD22C101, all pins <sup>(2)</sup> | ±1000 |      |
|             |                         | Machine Model                                                                           | ±200  |      |

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

## 5.3 Recommended Operating Conditions

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

|                 |                                     |                                | SN74LV08A             |                         | UNIT |
|-----------------|-------------------------------------|--------------------------------|-----------------------|-------------------------|------|
|                 |                                     |                                | MIN                   | MAX                     |      |
| V <sub>CC</sub> | Supply voltage                      |                                | 2                     | 5.5                     | V    |
| V <sub>IH</sub> | High-level input voltage            | V <sub>CC</sub> = 2V           | 1.5                   |                         | V    |
|                 |                                     | V <sub>CC</sub> = 2.3V to 2.7V | V <sub>CC</sub> × 0.7 |                         |      |
|                 |                                     | V <sub>CC</sub> = 3V to 3.6V   | V <sub>CC</sub> × 0.7 |                         |      |
|                 |                                     | V <sub>CC</sub> = 4.5V to 5.5V | V <sub>CC</sub> × 0.7 |                         |      |
| V <sub>IL</sub> | Low-level input voltage             | V <sub>CC</sub> = 2V           |                       | 0.5                     | V    |
|                 |                                     | V <sub>CC</sub> = 2.3V to 2.7V |                       | V <sub>CC</sub> × 0.3   |      |
|                 |                                     | V <sub>CC</sub> = 3V to 3.6V   |                       | V <sub>CC</sub> × 0.3   |      |
|                 |                                     | V <sub>CC</sub> = 4.5V to 5.5V |                       | V <sub>CC</sub> × 0.3 5 |      |
| 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> = 2V           |                       | –50                     | μA   |
|                 |                                     | V <sub>CC</sub> = 2.3V to 2.7V |                       | –2                      | mA   |
|                 |                                     | V <sub>CC</sub> = 3V to 3.6V   |                       | –6                      |      |
|                 |                                     | V <sub>CC</sub> = 4.5V to 5.5V |                       | –12                     |      |
| I <sub>OL</sub> | Low-level output current            | V <sub>CC</sub> = 2V           |                       | 50                      | μA   |
|                 |                                     | V <sub>CC</sub> = 2.3V to 2.7V |                       | 2                       | mA   |
|                 |                                     | V <sub>CC</sub> = 3V to 3.6V   |                       | 6                       |      |
|                 |                                     | V <sub>CC</sub> = 4.5V to 5.5V |                       | 12                      |      |
| Δt/Δv           | Input transition rise and fall rate | V <sub>CC</sub> = 2.3V to 2.7V |                       | 200                     | ns/V |
|                 |                                     | V <sub>CC</sub> = 3V to 3.6V   |                       | 100                     |      |
|                 |                                     | V <sub>CC</sub> = 4.5V to 5.5V |                       | 20                      |      |
| T <sub>A</sub>  | Operating free-air temperature      |                                | –40                   | 125                     | °C   |

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

## 5.4 Thermal Information

| THERMAL METRIC <sup>(1)</sup> |                                              | SN74LV08A |         |         |         |         |         |         | UNIT |
|-------------------------------|----------------------------------------------|-----------|---------|---------|---------|---------|---------|---------|------|
|                               |                                              | D         | DB      | DGV     | N       | NS      | PW      | RGY     |      |
|                               |                                              | 14 PINS   | 14 PINS | 14 PINS | 14 PINS | 14 PINS | 14 PINS | 14 PINS |      |
| R <sub>θJA</sub>              | Junction-to-ambient thermal resistance       | 90.6      | 107.1   | 129.0   | 57.4    | 90.7    | 122.6   | 57.5    | °C/W |
| R <sub>θJC(top)</sub>         | Junction-to-case (top) thermal resistance    | 50.9      | 59.6    | 52.1    | 44.9    | 48.3    | 51.4    | 70.8    |      |
| R <sub>θJB</sub>              | Junction-to-board thermal resistance         | 44.8      | 54.4    | 62.0    | 37.2    | 49.4    | 64.4    | 33.6    |      |
| ψ <sub>JT</sub>               | Junction-to-top characterization parameter   | 14.7      | 20.5    | 6.5     | 30.1    | 14.6    | 6.7     | 3.4     |      |
| ψ <sub>JB</sub>               | Junction-to-board characterization parameter | 44.5      | 53.8    | 61.3    | 37.1    | 49.1    | 63.8    | 33.7    |      |
| R <sub>θJC(bot)</sub>         | Junction-to-case (bottom) thermal resistance | –         | –       | –       | –       | –       | –       | 13.9    |      |

- (1) For more information about traditional and new thermal metrics, see the *IC Package Thermal Metrics* application report (SPRA953).

## 5.5 Electrical Characteristics

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

| PARAMETER        |                                        | TEST CONDITIONS                                             | V <sub>CC</sub> | SN74LV08A<br>–40°C to 85°C |     |     | SN74LV08A<br>–40°C to 125°C |     |     | UNIT |
|------------------|----------------------------------------|-------------------------------------------------------------|-----------------|----------------------------|-----|-----|-----------------------------|-----|-----|------|
|                  |                                        |                                                             |                 | MIN                        | TYP | MAX | MIN                         | TYP | MAX |      |
| V <sub>OH</sub>  | High-level output voltage              | I <sub>OH</sub> = –50μA                                     | 2V to 5.5V      | V <sub>CC</sub> – 0.1      |     |     | V <sub>CC</sub> – 0.1       |     |     | V    |
|                  |                                        | I <sub>OH</sub> = –2mA                                      | 2.3V            | 2                          |     |     | 2                           |     |     |      |
|                  |                                        | I <sub>OH</sub> = –6mA                                      | 3V              | 2.48                       |     |     | 2.48                        |     |     |      |
|                  |                                        | I <sub>OH</sub> = –12mA                                     | 4.5V            | 3.8                        |     |     | 3.8                         |     |     |      |
| V <sub>OL</sub>  | Low-level output voltage               | I <sub>OL</sub> = 50μA                                      | 2V to 5.5V      | 0.1                        |     |     | 0.1                         |     |     | V    |
|                  |                                        | I <sub>OL</sub> = 2mA                                       | 2.3V            | 0.4                        |     |     | 0.4                         |     |     |      |
|                  |                                        | I <sub>OL</sub> = 6mA                                       | 3V              | 0.44                       |     |     | 0.44                        |     |     |      |
|                  |                                        | I <sub>OL</sub> = 12mA                                      | 4.5V            | 0.55                       |     |     | 0.55                        |     |     |      |
| I <sub>I</sub>   | Input leakage current VI               | V <sub>I</sub> = 5.5V or GND                                | 0 to 5.5V       | ±1                         |     |     | ±1                          |     |     | μA   |
| I <sub>CC</sub>  | Static supply current                  | V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0 | 5.5V            | 20                         |     |     | 20                          |     |     | μA   |
| I <sub>off</sub> | Input/Output Power-Off Leakage Current | V <sub>I</sub> or V <sub>O</sub> = 0 to 5.5V                | 0               | 5                          |     |     | 5                           |     |     | μA   |
| C <sub>i</sub>   | Input capacitance                      | V <sub>I</sub> = V <sub>CC</sub> or GND                     | 3.3V            | 3.3                        |     |     | 3.3                         |     |     | pF   |
|                  |                                        |                                                             | 5V              | 3.3                        |     |     | 3.3                         |     |     |      |

## 5.6 Switching Characteristics, V<sub>CC</sub> = 2.5V ± 0.2V

over recommended operating free-air temperature range (unless otherwise noted) (see [Parameter Measurement Information](#))

| PARAMETER       | FROM<br>(INPUT) | TO<br>(OUTPUT) | LOAD<br>CAPACITANCE   | T <sub>A</sub> = 25°C |     |     | SN74LV08A<br>–40°C to 85°C |     | SN74LV08A<br>–40°C to 125°C |     | UNIT |
|-----------------|-----------------|----------------|-----------------------|-----------------------|-----|-----|----------------------------|-----|-----------------------------|-----|------|
|                 |                 |                |                       | MIN                   | TYP | MAX | MIN                        | MAX | MIN                         | MAX |      |
| t <sub>pd</sub> | A or B          | Y              | C <sub>L</sub> = 15pF | 7.9 <sup>(1)</sup>    |     |     | 1                          | 16  | 1                           | 17  | ns   |
|                 |                 |                | C <sub>L</sub> = 50pF | 10.5                  |     |     | 1                          | 20  | 1                           | 21  |      |

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested.

## 5.7 Switching Characteristics, V<sub>CC</sub> = 3.3V ± 0.3V

over recommended operating free-air temperature range (unless otherwise noted) (see [Parameter Measurement Information](#))

| PARAMETER       | FROM<br>(INPUT) | TO<br>(OUTPUT) | LOAD<br>CAPACITANCE   | T <sub>A</sub> = 25°C |     |     | SN74LV08A<br>–40°C to 85°C |      | SN74LV08A<br>–40°C to 125°C |      | UNIT |
|-----------------|-----------------|----------------|-----------------------|-----------------------|-----|-----|----------------------------|------|-----------------------------|------|------|
|                 |                 |                |                       | MIN                   | TYP | MAX | MIN                        | MAX  | MIN                         | MAX  |      |
| t <sub>pd</sub> | A or B          | Y              | C <sub>L</sub> = 15pF | 5.6 <sup>(1)</sup>    |     |     | 1                          | 10.5 | 1                           | 11.5 | ns   |
|                 |                 |                | C <sub>L</sub> = 50pF | 7.5                   |     |     | 1                          | 14   | 1                           | 15   |      |

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested.

## 5.8 Switching Characteristics, V<sub>CC</sub> = 5V ± 0.5V

over recommended operating free-air temperature range (unless otherwise noted) (see [Parameter Measurement Information](#))

| PARAMETER       | FROM<br>(INPUT) | TO<br>(OUTPUT) | LOAD<br>CAPACITANCE   | T <sub>A</sub> = 25°C |     |     | SN74LV08A<br>–40°C to 85°C |     | SN74LV08A<br>–40°C to 125°C |     | UNIT |
|-----------------|-----------------|----------------|-----------------------|-----------------------|-----|-----|----------------------------|-----|-----------------------------|-----|------|
|                 |                 |                |                       | MIN                   | TYP | MAX | MIN                        | MAX | MIN                         | MAX |      |
| t <sub>pd</sub> | A or B          | Y              | C <sub>L</sub> = 15pF | 4.1 <sup>(1)</sup>    |     |     | 1                          | 7   | 1                           | 8   | ns   |
|                 |                 |                | C <sub>L</sub> = 50pF | 5.5                   |     |     | 1                          | 9   | 1                           | 10  |      |

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested.

## 5.9 Noise Characteristics

$V_{CC} = 3.3V$ ,  $C_L = 50pF$ ,  $T_A = 25^\circ C$

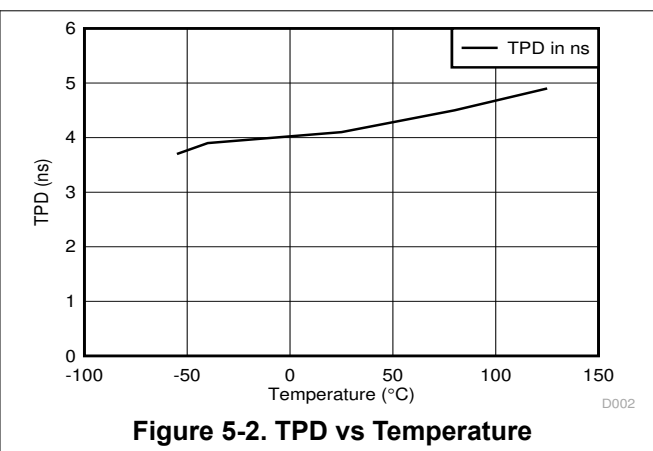
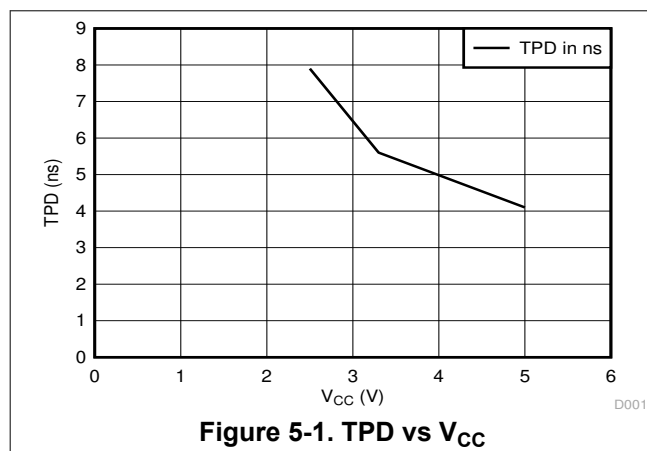
| PARAMETER   |                                        | SN74LV08A |      |      | UNIT |
|-------------|----------------------------------------|-----------|------|------|------|
|             |                                        | MIN       | TYP  | MAX  |      |
| $V_{OL(P)}$ | Quiet output, maximum dynamic $V_{OL}$ |           | 0.2  | 0.8  | V    |
| $V_{OL(V)}$ | Quiet output, minimum dynamic $V_{OL}$ |           | –0.1 | –0.8 | V    |
| $V_{OH(V)}$ | Quiet output, minimum dynamic $V_{OH}$ |           | 3.1  |      | V    |
| $V_{IH(D)}$ | High-level dynamic input voltage       | 2.31      |      |      | V    |
| $V_{IL(D)}$ | Low-level dynamic input voltage        |           |      | 0.99 | V    |

## 5.10 Operating Characteristics

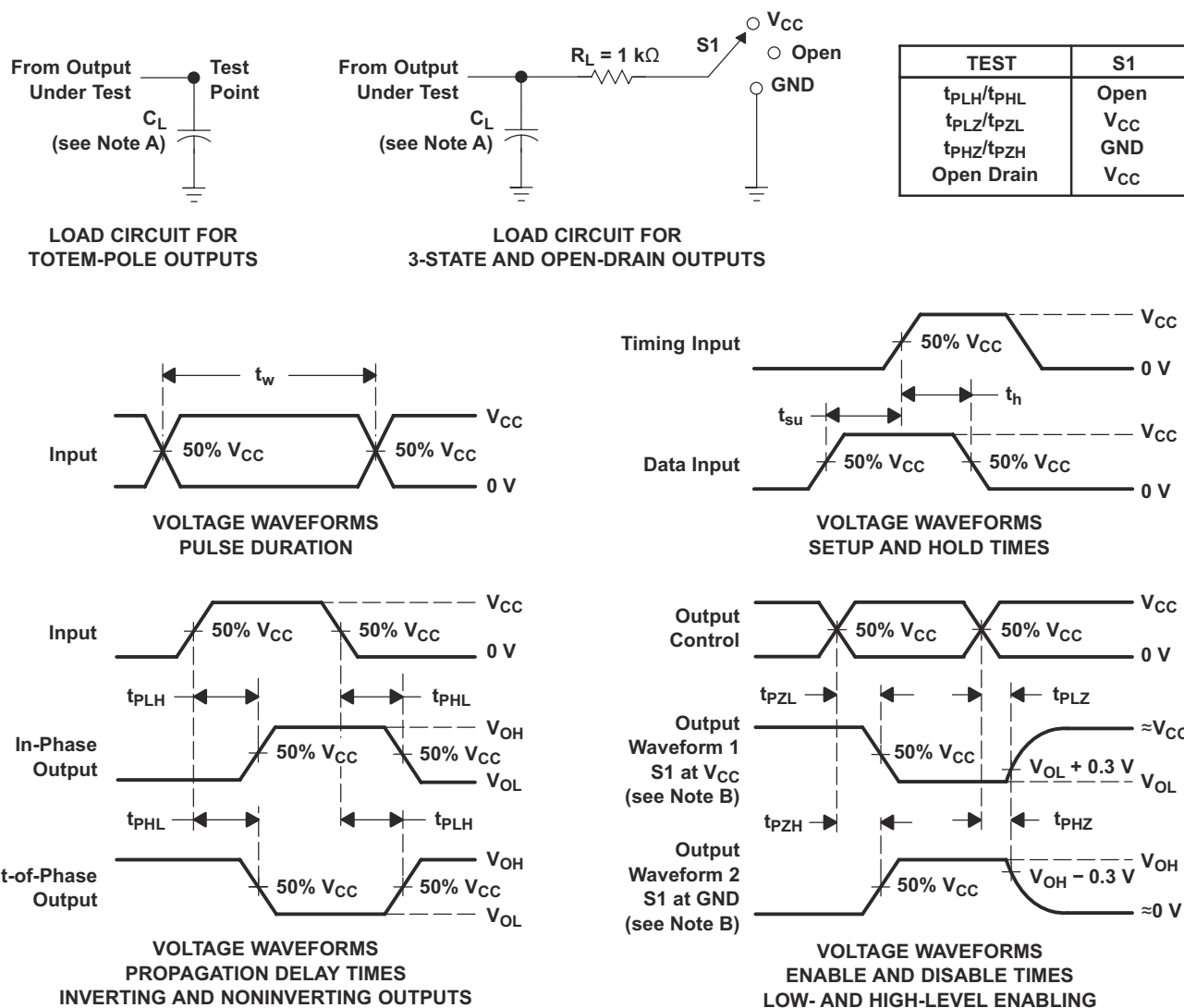
$T_A = 25^\circ C$

| PARAMETER |                               | TEST CONDITIONS               |  | $V_{CC}$ | TYP | UNIT |
|-----------|-------------------------------|-------------------------------|--|----------|-----|------|
| $C_{pd}$  | Power dissipation capacitance | $C_L = 50pF$ ,<br>$f = 10MHz$ |  | 3.3V     | 8   | pF   |
|           |                               |                               |  | 5V       | 10  |      |

## 5.11 Typical Characteristics



## 6 Parameter Measurement Information



- $C_L$  includes probe and jig capacitance.
- 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.
- All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1\text{ MHz}$ ,  $Z_O = 50\ \Omega$ ,  $t_r \leq 3\text{ ns}$ ,  $t_f \leq 3\text{ ns}$ .
- The outputs are measured one at a time, with one input transition per measurement.
- $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .
- $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .
- $t_{PHL}$  and  $t_{PLH}$  are the same as  $t_{pd}$ .
- All parameters and waveforms are not applicable to all devices.

**Figure 6-1. Load Circuit and Voltage Waveforms**



## 7 Detailed Description

### 7.1 Overview

This quadruple 2-input positive-AND gate is designed for 2V to 5.5V  $V_{CC}$  operation. The SN74LA08A device performs the Boolean function  $Y = A \cdot B$  or  $Y = \overline{A + B}$  in positive logic.

This device is fully specified for partial-power-down application using  $I_{off}$ . The  $I_{off}$  circuitry disables the outputs, preventing damaging current backflow through the devices when they are powered down.

### 7.2 Functional Block Diagram



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

### 7.3 Feature Description

- Wide operating voltage range
  - Operates From 2V to 5.5V
- Allows down voltage translation
  - Inputs accept voltages to 5.5V
- $I_{off}$  feature
  - Allows voltages on the input or output when  $V_{CC}$  is 0V

### 7.4 Device Functional Modes

**Table 7-1. Function Table  
(Each Gate)**

| INPUTS <sup>(1)</sup> |   | OUTPUT <sup>(2)</sup> |
|-----------------------|---|-----------------------|
| A                     | B | Y                     |
| H                     | H | H                     |
| L                     | X | L                     |
| X                     | L | L                     |

- (1) H = High Voltage Level, L = Low Voltage Level, X = Don't Care
- (2) H = Driving High, L = Driving Low, Z = High Impedance State

## 8 Application and Implementation

### Note

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes, as well as validating and testing their design implementation to confirm system functionality.

### 8.1 Application Information

The SN74LV08A is a low-drive CMOS device that can be used for a multitude of bus interface type applications where output ringing is a concern. The low drive and slow edge rates will minimize overshoot and undershoot on the outputs. The inputs can accept voltages up to 5.5V at any valid  $V_{CC}$ , thus making it ideal for down translation.

### 8.2 Typical Application

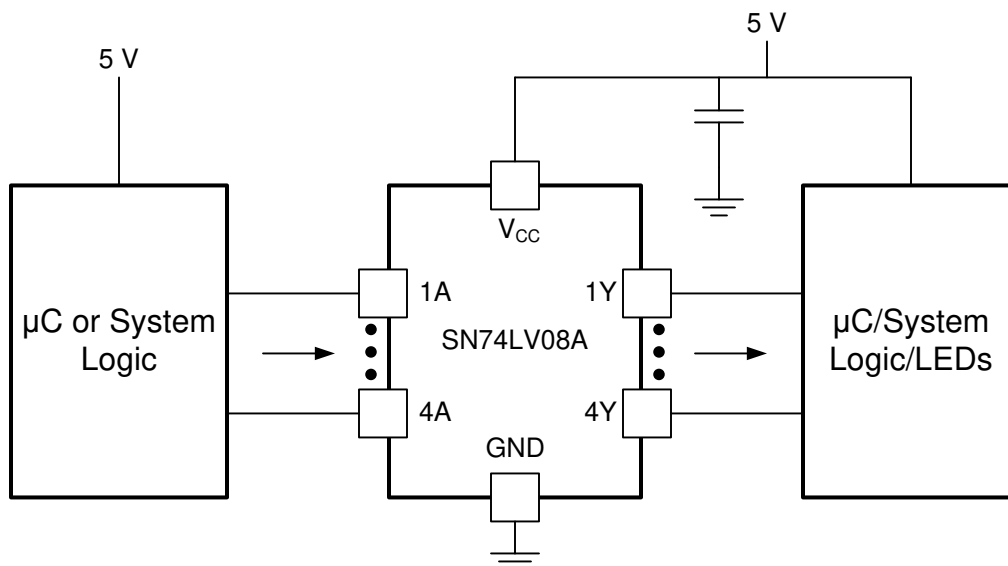


Figure 8-1. Application Diagram

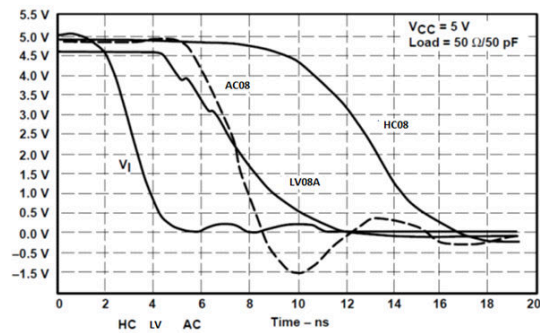
#### 8.2.1 Design Requirements

This device uses CMOS technology and has balanced output drive. Care should be taken 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

- Recommended Input Conditions:
  - For specified high and low levels, see  $V_{IH}$  and  $V_{IL}$  in [Section 5.3](#) table.
  - Inputs are overvoltage tolerant allowing them to go as high as 5.5V at any valid  $V_{CC}$ .
- Recommend Output Conditions:
  - Load currents should not exceed 25mA per output and 50mA total for the part.
  - Outputs should not be pulled above  $V_{CC}$ .

### 8.2.3 Application Curves



**Figure 8-2. Application Curves**

### 8.3 Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply voltage rating located in the [Section 5.3](#) table.

Each  $V_{CC}$  terminal should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, a  $0.1\mu\text{F}$  capacitor is recommended. If there are multiple  $V_{CC}$  terminals then  $0.01\mu\text{F}$  or  $0.022\mu\text{F}$  capacitors are recommended for each power terminal. It is ok to parallel multiple bypass capacitors to reject different frequencies of noise.  $0.1\mu\text{F}$  and  $1.0\mu\text{F}$  capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for the best results.

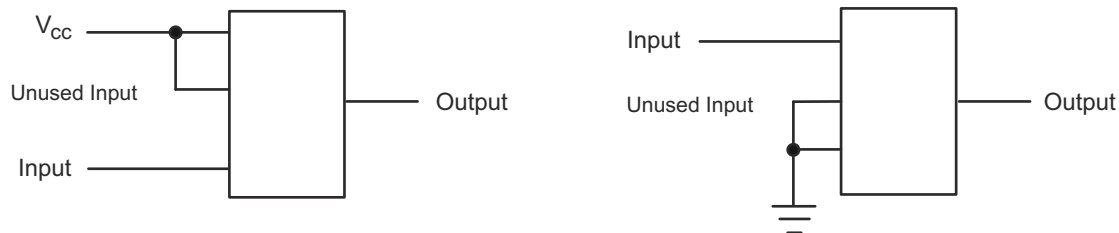
### 8.4 Layout

#### 8.4.1 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 [Figure 8-3](#) 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  $V_{CC}$ , whichever makes more sense or is more convenient. It is acceptable to float outputs unless the part is a transceiver. If the transceiver has an output enable pin, it will disable the outputs section of the part when asserted. This will not disable the input section of the I/Os so they also cannot float when disabled.

#### 8.4.2 Layout Example



**Figure 8-3. Layout Diagram**

## 9 Device and Documentation Support

### 9.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](http://ti.com). Click on *Notifications* 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.

### 9.2 Support Resources

[TI E2E™ support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

### 9.3 Trademarks

TI E2E™ is a trademark of Texas Instruments.  
All trademarks are the property of their respective owners.

### 9.4 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

### 9.5 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

## 10 Revision History

| Changes from Revision M (October 2014) to Revision N (September 2025)                                                                          | Page              |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| • Updated the numbering, formatting, tables, figures, and cross-references throughout the document to reflect modern data sheet standards..... | <a href="#">1</a> |
| • Added –40°C to 85°C temperature range.....                                                                                                   | <a href="#">4</a> |

| Changes from Revision L (October 2010) to Revision M (October 2014)                          | Page               |
|----------------------------------------------------------------------------------------------|--------------------|
| • Updated document to new TI data sheet format.....                                          | <a href="#">1</a>  |
| • Deleted Ordering Information table.....                                                    | <a href="#">1</a>  |
| • Deleted SN54LV08A device from data sheet.....                                              | <a href="#">1</a>  |
| • Added Applications.....                                                                    | <a href="#">1</a>  |
| • Added Pin Functions table.....                                                             | <a href="#">3</a>  |
| • Changed MAX operating temperature to 125°C in Recommended Operating Conditions table. .... | <a href="#">5</a>  |
| • Added Thermal Information table.....                                                       | <a href="#">5</a>  |
| • Added Typical Characteristics.....                                                         | <a href="#">7</a>  |
| • Added Application and Implementation section.....                                          | <a href="#">10</a> |
| • Added Power Supply Recommendations and Layout sections.....                                | <a href="#">12</a> |

## 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<br>(1) | Material type<br>(2) | Package   Pins   | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6) |
|--------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| <a href="#">SN74LV08AD</a>     | Obsolete      | Production           | SOIC (D)   14    | -                     | -           | Call TI                              | Call TI                           | -40 to 125   | LV08A               |
| <a href="#">SN74LV08ADBR</a>   | Active        | Production           | SSOP (DB)   14   | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| SN74LV08ADBR.A                 | Active        | Production           | SSOP (DB)   14   | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| SN74LV08ADBR.B                 | Active        | Production           | SSOP (DB)   14   | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| <a href="#">SN74LV08ADGVR</a>  | Active        | Production           | TVSOP (DGV)   14 | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| SN74LV08ADGVR.A                | Active        | Production           | TVSOP (DGV)   14 | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| <a href="#">SN74LV08ADR</a>    | Active        | Production           | SOIC (D)   14    | 2500   LARGE T&R      | Yes         | NIPDAU   SN                          | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| SN74LV08ADR.A                  | Active        | Production           | SOIC (D)   14    | 2500   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| <a href="#">SN74LV08ANSR</a>   | Active        | Production           | SOP (NS)   14    | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | 74LV08A             |
| SN74LV08ANSR.A                 | Active        | Production           | SOP (NS)   14    | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | 74LV08A             |
| <a href="#">SN74LV08APW</a>    | Obsolete      | Production           | TSSOP (PW)   14  | -                     | -           | Call TI                              | Call TI                           | -40 to 125   | LV08A               |
| <a href="#">SN74LV08APWR</a>   | Active        | Production           | TSSOP (PW)   14  | 2000   LARGE T&R      | Yes         | NIPDAU   SN                          | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| SN74LV08APWR.A                 | Active        | Production           | TSSOP (PW)   14  | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| <a href="#">SN74LV08APWRG3</a> | Active        | Production           | TSSOP (PW)   14  | 2000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| SN74LV08APWRG3.A               | Active        | Production           | TSSOP (PW)   14  | 2000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| <a href="#">SN74LV08APWRG4</a> | Active        | Production           | TSSOP (PW)   14  | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| SN74LV08APWRG4.A               | Active        | Production           | TSSOP (PW)   14  | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | LV08A               |
| <a href="#">SN74LV08APWT</a>   | Obsolete      | Production           | TSSOP (PW)   14  | -                     | -           | Call TI                              | Call TI                           | -40 to 125   | LV08A               |
| <a href="#">SN74LV08ARGYR</a>  | Active        | Production           | VQFN (RGY)   14  | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | LV08A               |
| SN74LV08ARGYR.A                | Active        | Production           | VQFN (RGY)   14  | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | LV08A               |
| SN74LV08ARGYRG4                | Active        | Production           | VQFN (RGY)   14  | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | LV08A               |

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

<sup>(2)</sup> **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.

<sup>(3)</sup> **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.

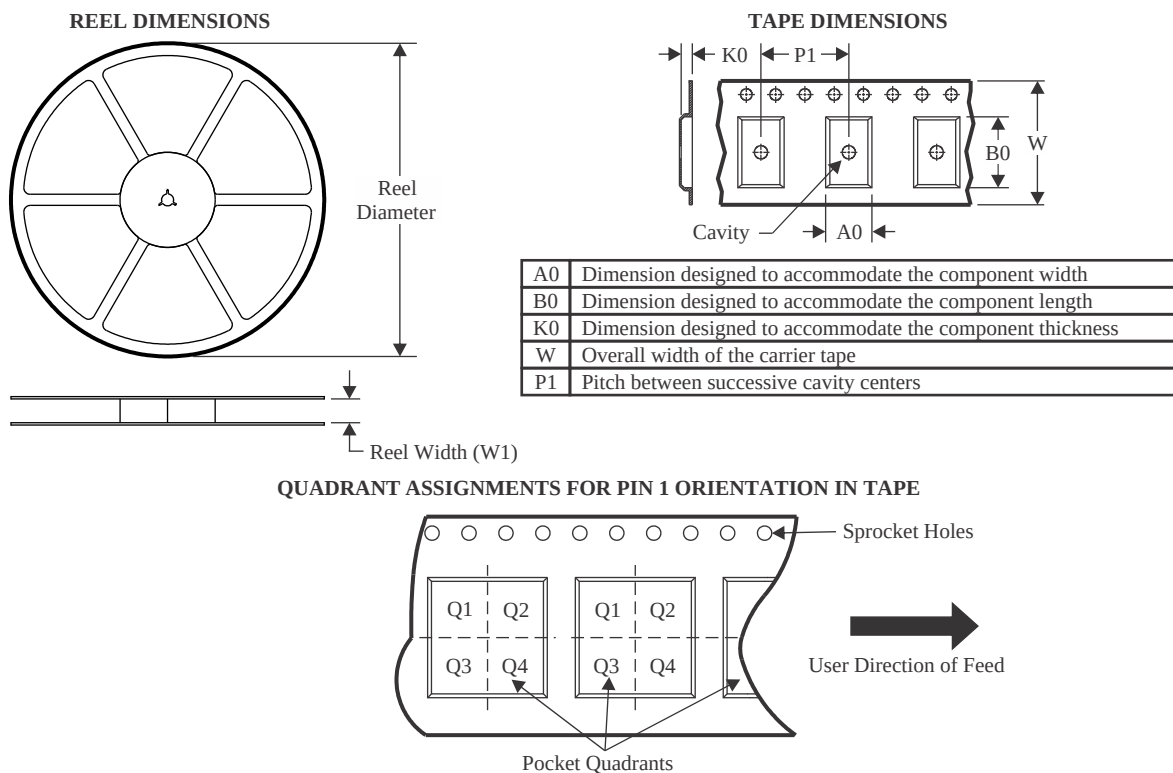
**OTHER QUALIFIED VERSIONS OF SN74LV08A :**

- Automotive : [SN74LV08A-Q1](#)
- Enhanced Product : [SN74LV08A-EP](#)

NOTE: Qualified Version Definitions:

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

## TAPE AND REEL INFORMATION

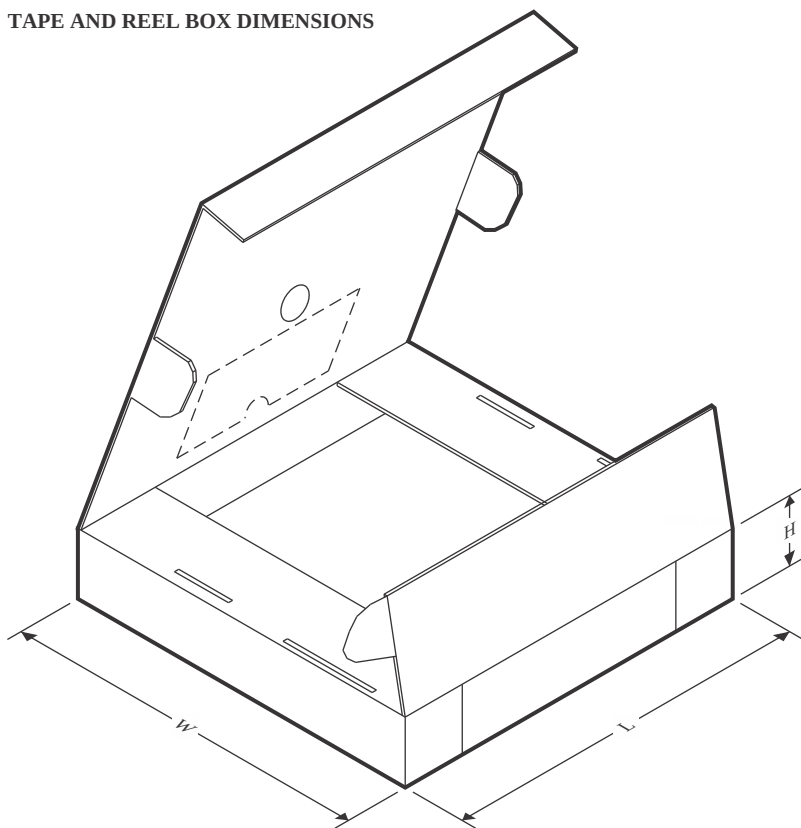


\*All dimensions are nominal

| 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 |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LV08ADBR   | SSOP         | DB              | 14   | 2000 | 330.0              | 16.4               | 8.35    | 6.6     | 2.4     | 12.0    | 16.0   | Q1            |
| SN74LV08ADGVR  | TVSOP        | DGV             | 14   | 2000 | 330.0              | 12.4               | 6.8     | 4.0     | 1.6     | 8.0     | 12.0   | Q1            |
| SN74LV08ADR    | SOIC         | D               | 14   | 2500 | 330.0              | 16.4               | 6.5     | 9.0     | 2.1     | 8.0     | 16.0   | Q1            |
| SN74LV08ANSR   | SOP          | NS              | 14   | 2000 | 330.0              | 16.4               | 8.1     | 10.4    | 2.5     | 12.0    | 16.0   | Q1            |
| SN74LV08APWR   | TSSOP        | PW              | 14   | 2000 | 330.0              | 12.4               | 6.9     | 5.6     | 1.6     | 8.0     | 12.0   | Q1            |
| SN74LV08APWRG3 | TSSOP        | PW              | 14   | 2000 | 330.0              | 12.4               | 6.9     | 5.6     | 1.6     | 8.0     | 12.0   | Q1            |
| SN74LV08APWRG4 | TSSOP        | PW              | 14   | 2000 | 330.0              | 12.4               | 6.9     | 5.3     | 1.6     | 8.0     | 12.0   | Q1            |
| SN74LV08APWRG4 | TSSOP        | PW              | 14   | 2000 | 330.0              | 12.4               | 6.9     | 5.6     | 1.6     | 8.0     | 12.0   | Q1            |
| SN74LV08ARGYR  | VQFN         | RGY             | 14   | 3000 | 330.0              | 12.4               | 3.75    | 3.75    | 1.15    | 8.0     | 12.0   | Q1            |

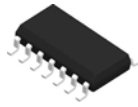


## TAPE AND REEL BOX DIMENSIONS

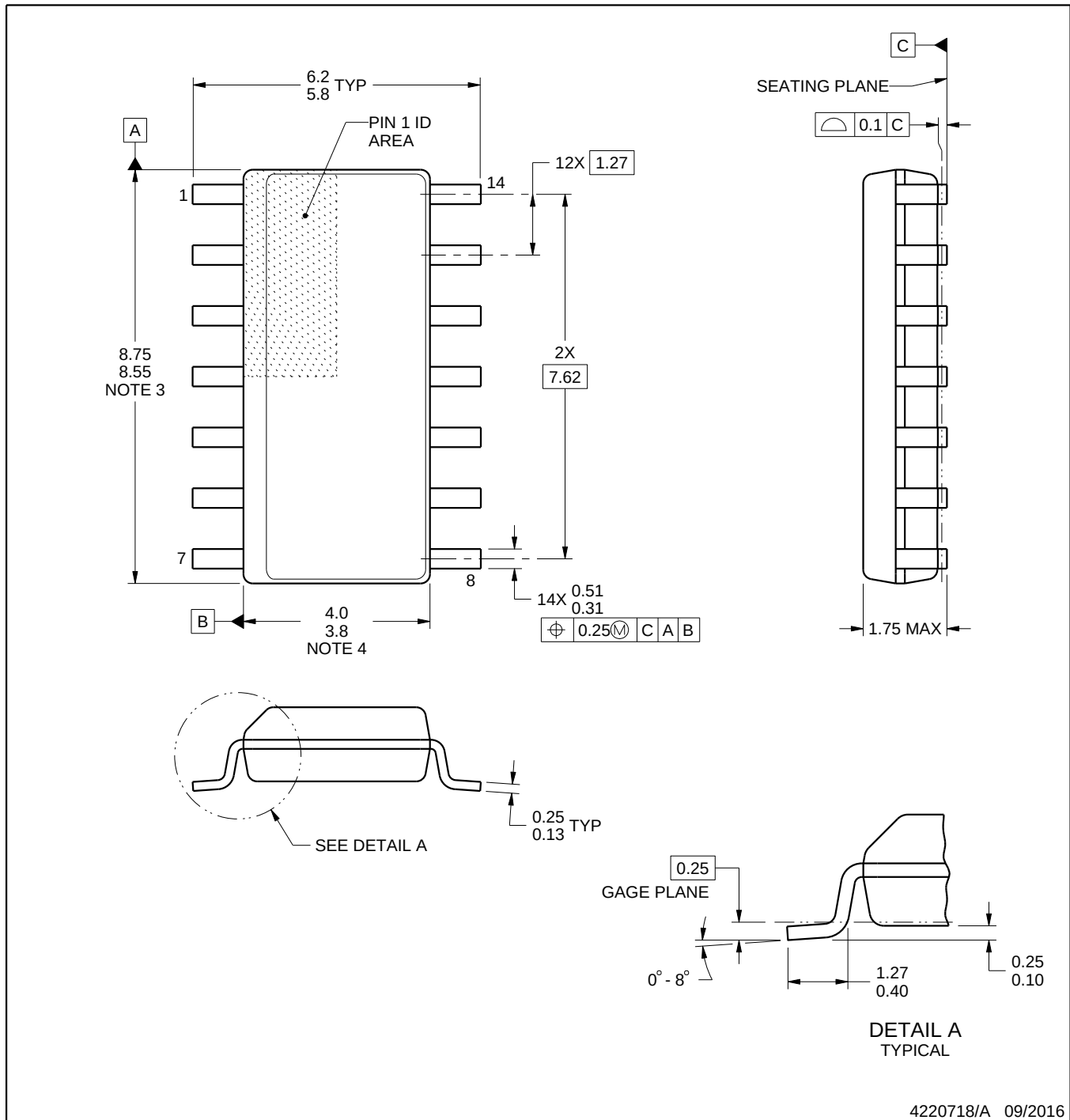


\*All dimensions are nominal

| Device         | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LV08ADBR   | SSOP         | DB              | 14   | 2000 | 353.0       | 353.0      | 32.0        |
| SN74LV08ADGVR  | TVSOP        | DGV             | 14   | 2000 | 353.0       | 353.0      | 32.0        |
| SN74LV08ADR    | SOIC         | D               | 14   | 2500 | 353.0       | 353.0      | 32.0        |
| SN74LV08ANSR   | SOP          | NS              | 14   | 2000 | 353.0       | 353.0      | 32.0        |
| SN74LV08APWR   | TSSOP        | PW              | 14   | 2000 | 356.0       | 356.0      | 35.0        |
| SN74LV08APWRG3 | TSSOP        | PW              | 14   | 2000 | 364.0       | 364.0      | 27.0        |
| SN74LV08APWRG4 | TSSOP        | PW              | 14   | 2000 | 367.0       | 367.0      | 35.0        |
| SN74LV08APWRG4 | TSSOP        | PW              | 14   | 2000 | 353.0       | 353.0      | 32.0        |
| SN74LV08ARGYR  | VQFN         | RGY             | 14   | 3000 | 353.0       | 353.0      | 32.0        |

**D0014A****PACKAGE OUTLINE****SOIC - 1.75 mm max height**

SMALL OUTLINE INTEGRATED CIRCUIT

**NOTES:**

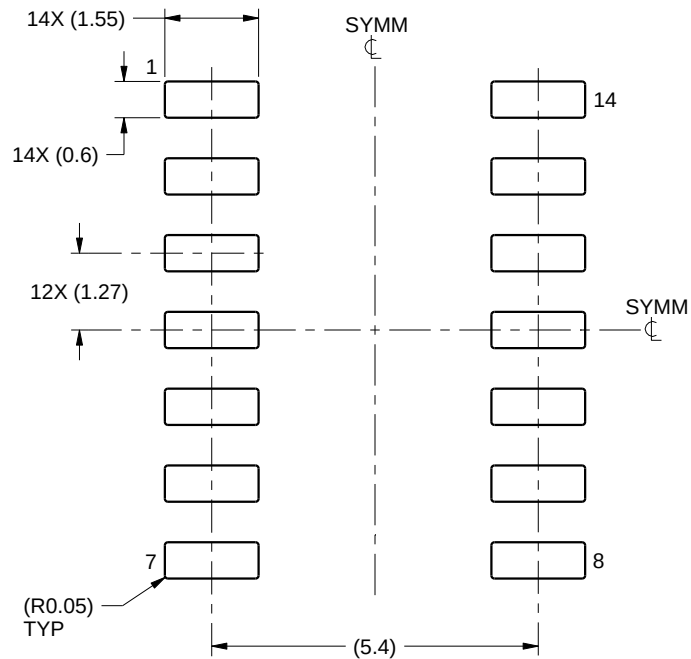
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate 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

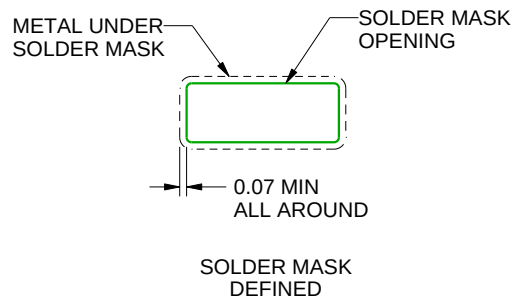
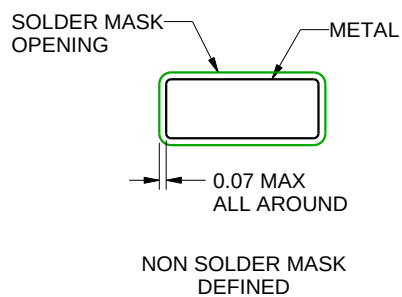
D0014A

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.

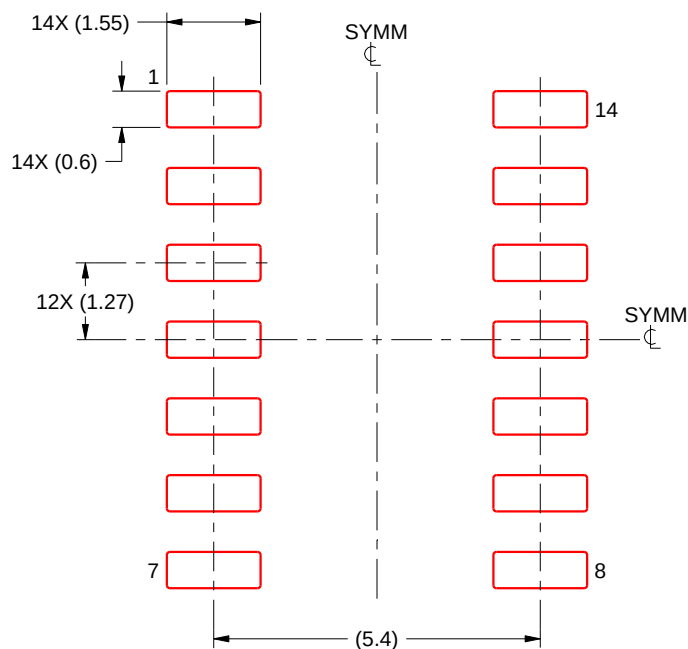
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

## 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)

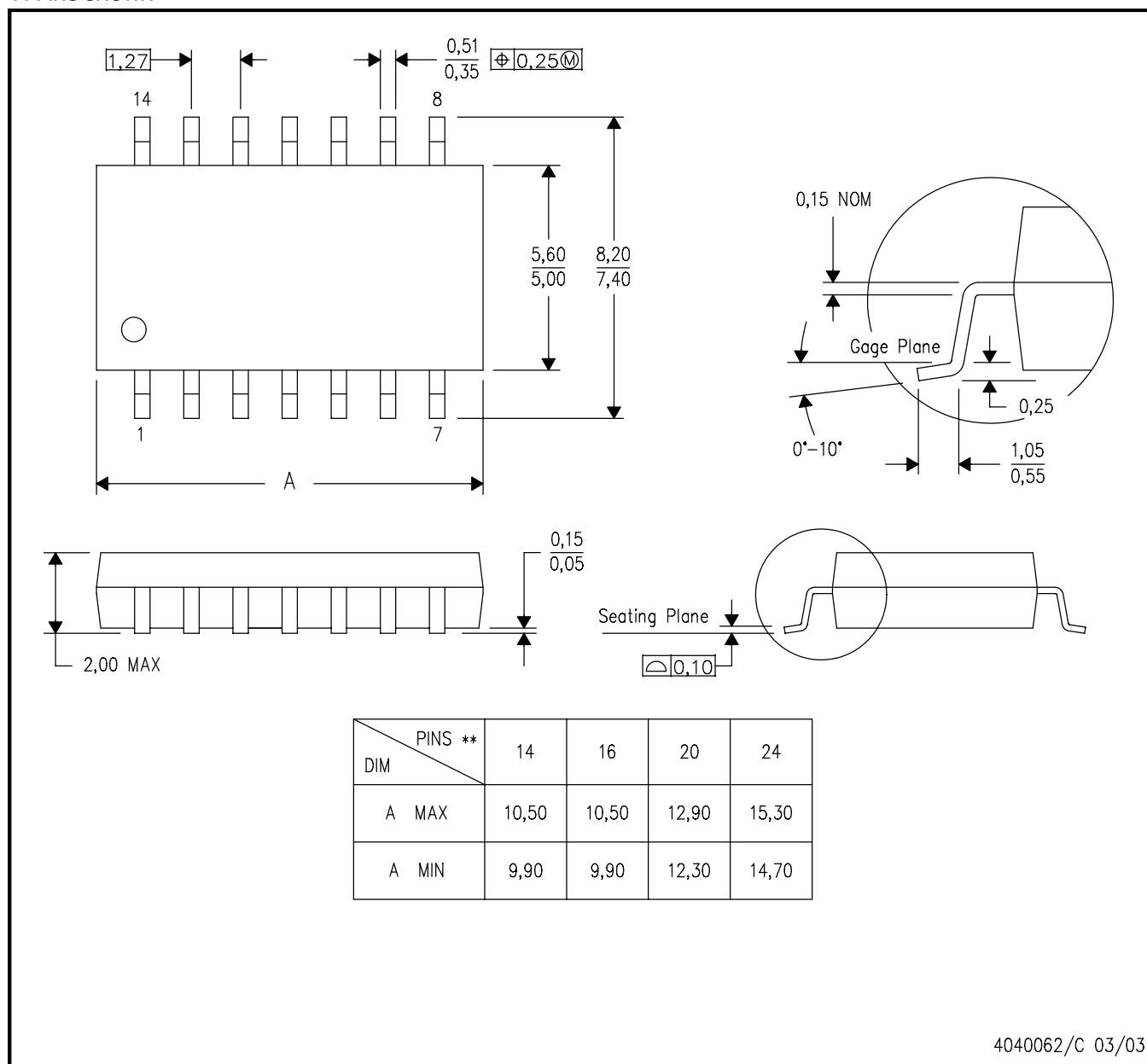
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

# MECHANICAL DATA

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

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN

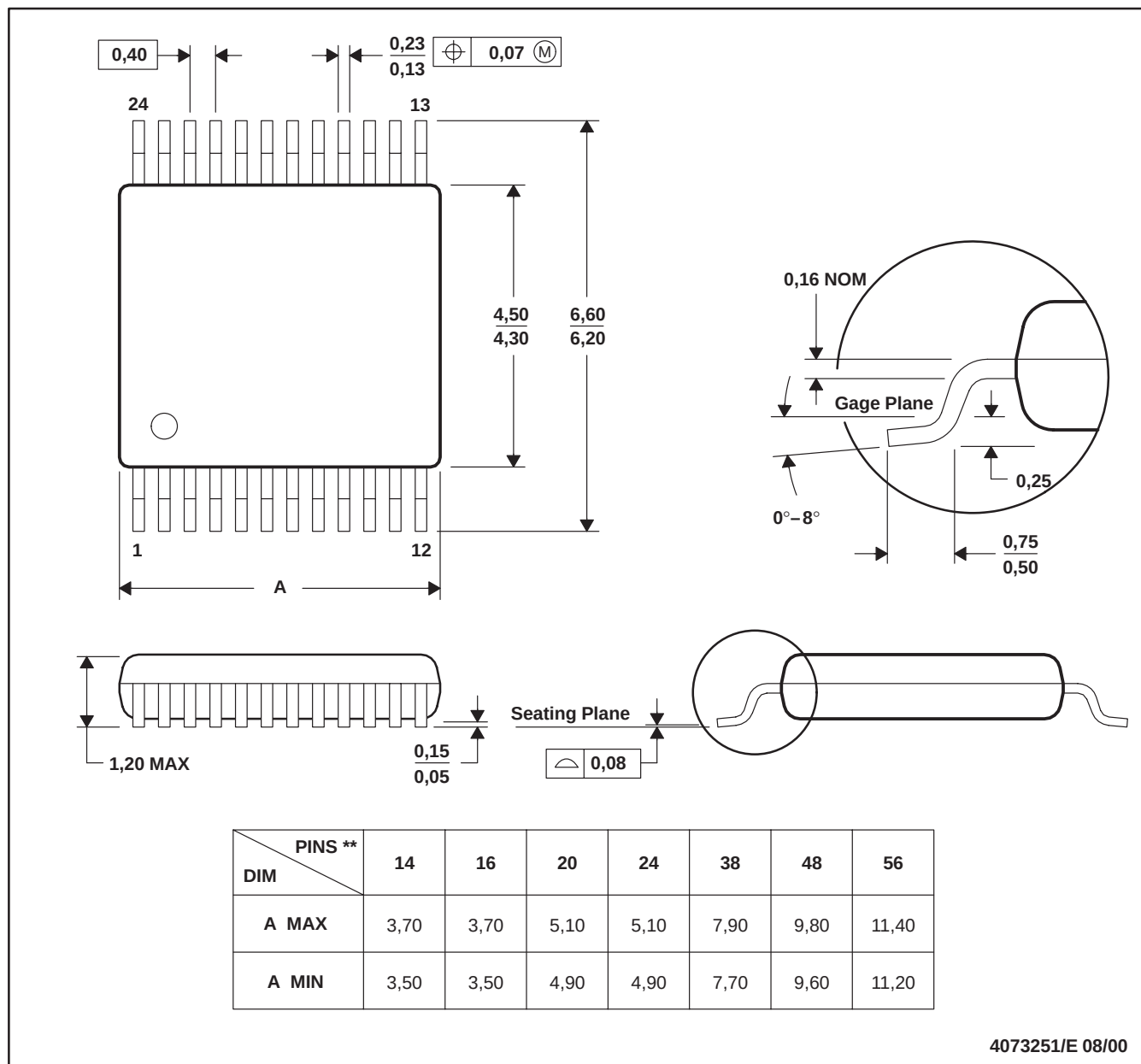


- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

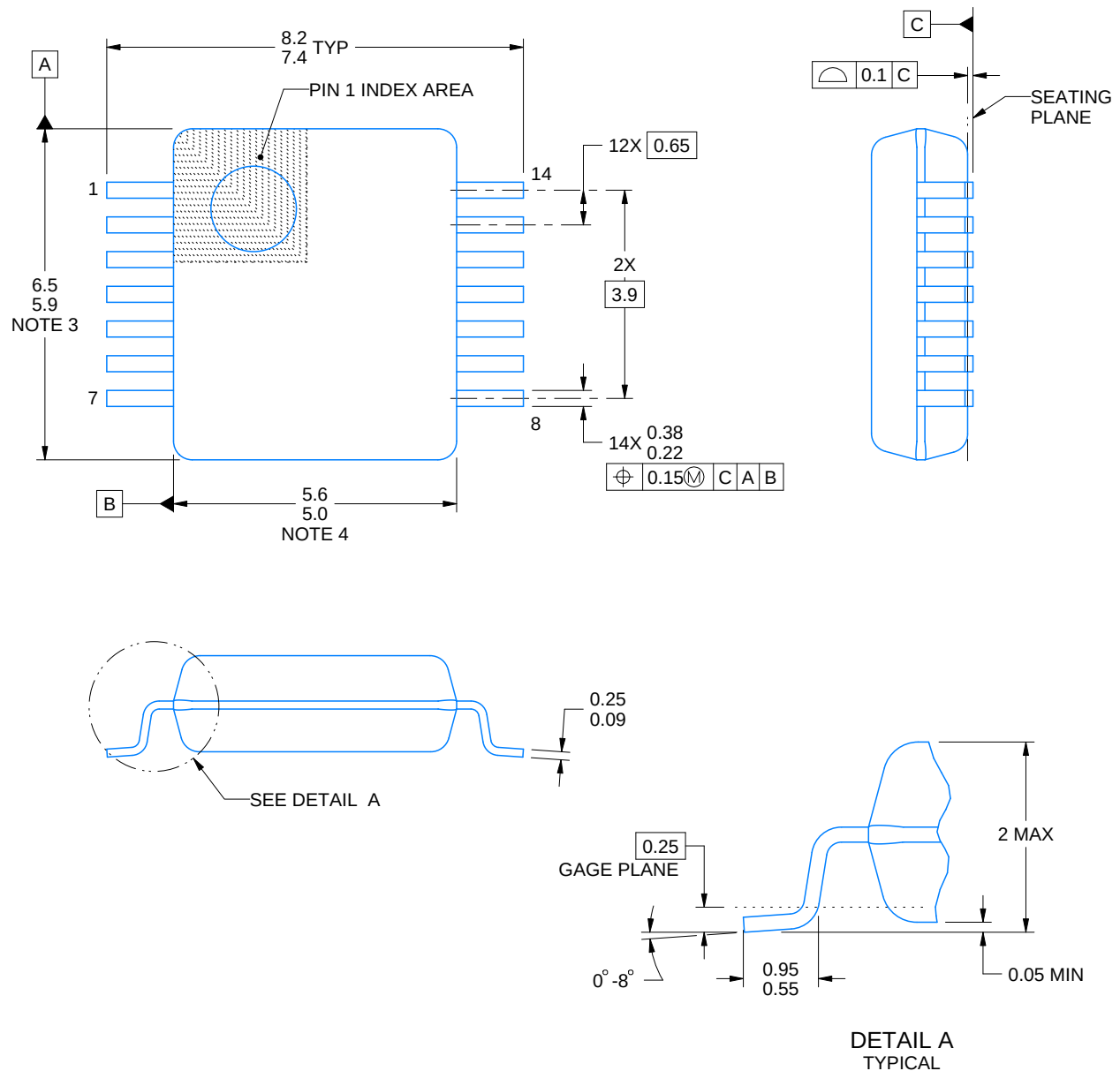
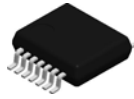
## DGV (R-PDSO-G\*\*)

## PLASTIC SMALL-OUTLINE

24 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 per side.  
 D. Falls within JEDEC: 24/48 Pins – MO-153  
 14/16/20/56 Pins – MO-194



4220762/A 05/2024

## NOTES:

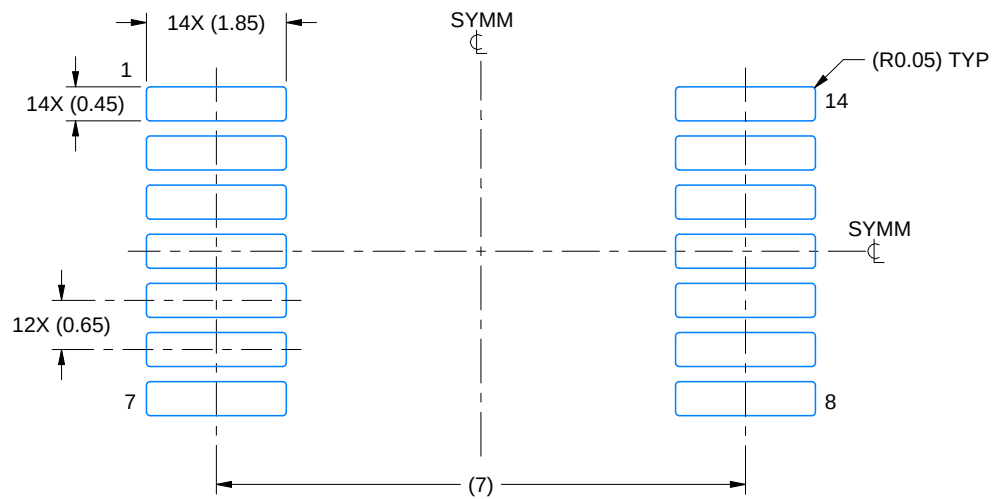
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or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

# EXAMPLE BOARD LAYOUT

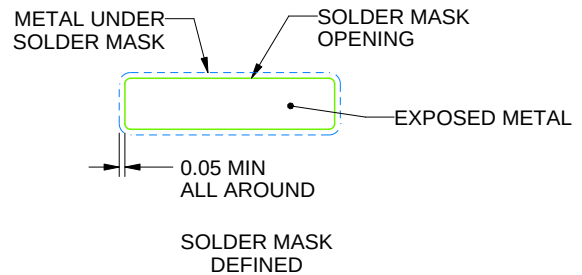
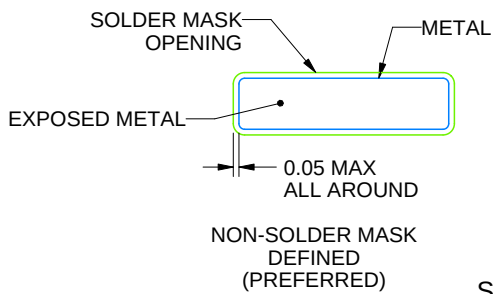
DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



SOLDER MASK DETAILS

4220762/A 05/2024

NOTES: (continued)

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

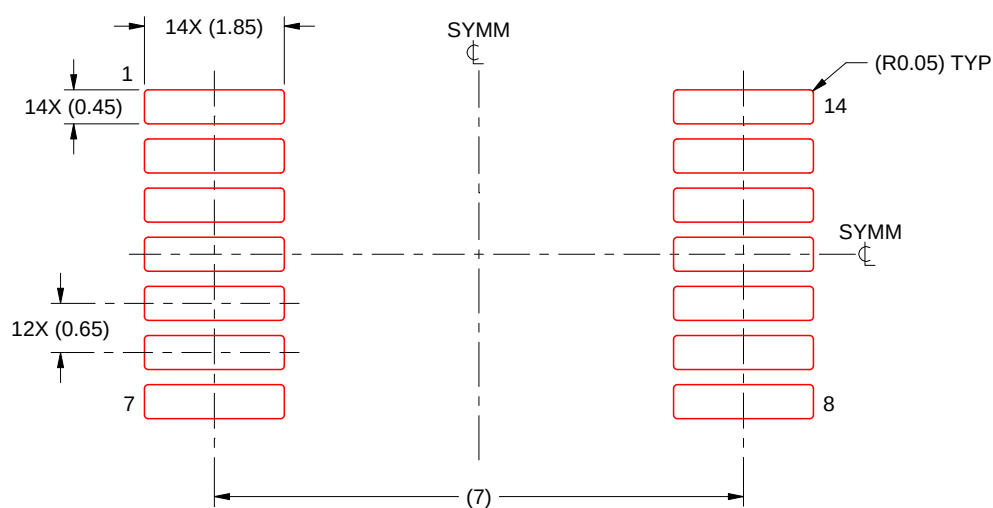


# EXAMPLE STENCIL DESIGN

DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE

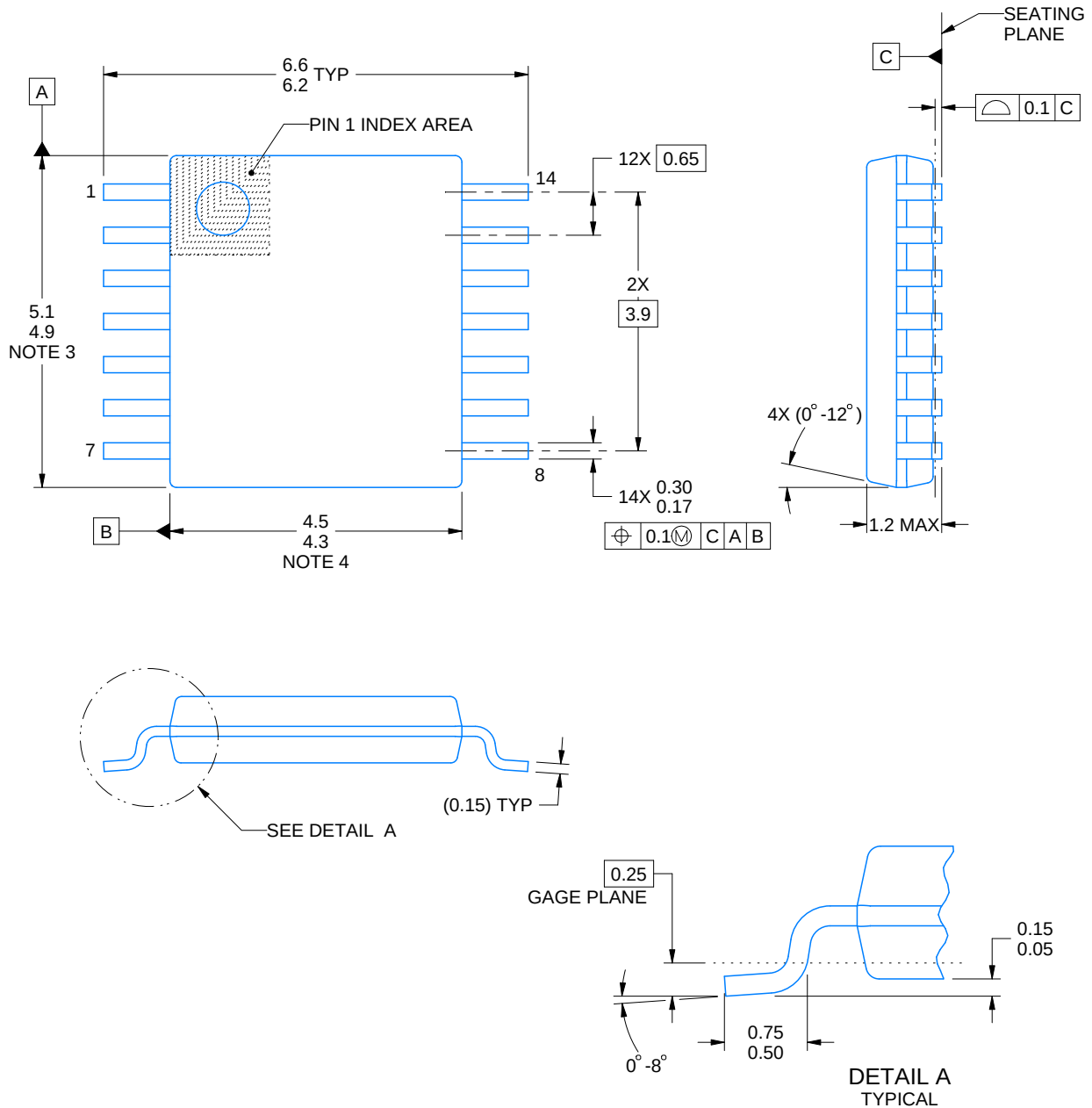
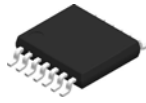


SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE: 10X

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.



4220202/B 12/2023

## NOTES:

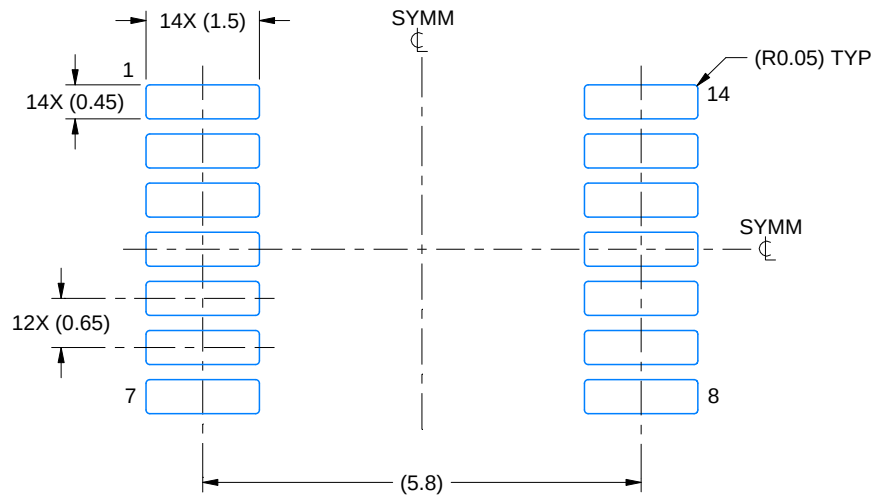
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or 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

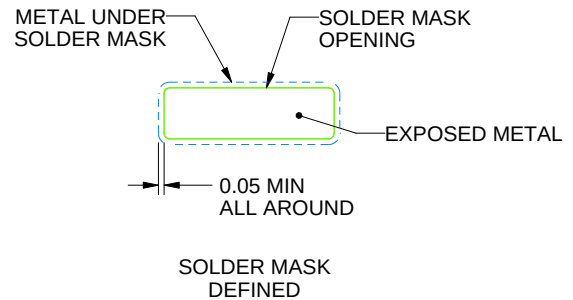
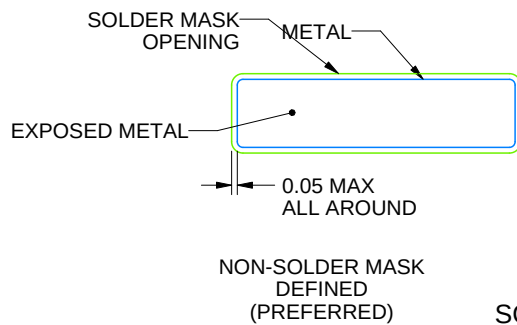
PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



SOLDER MASK DETAILS

4220202/B 12/2023

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

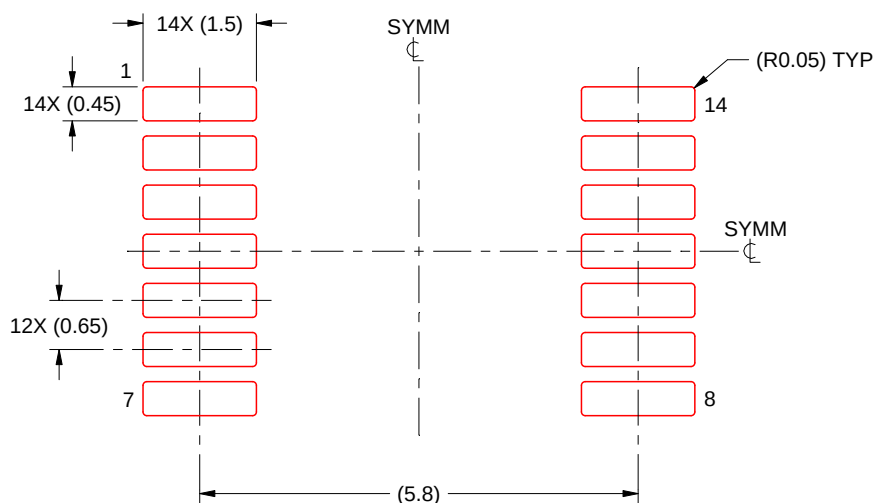
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# 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

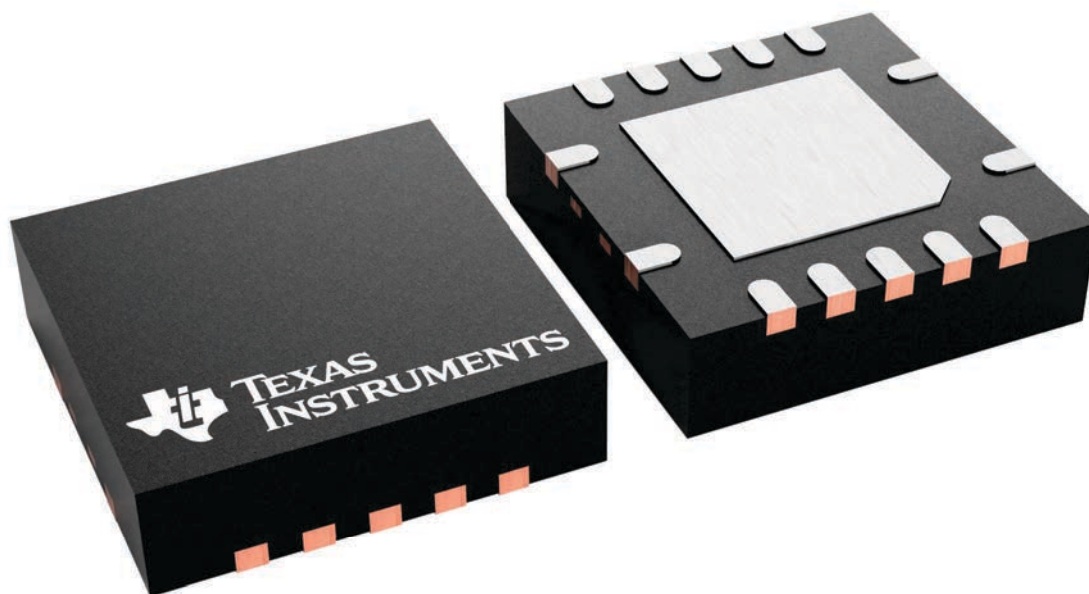
**RGY 14**

**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



### VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



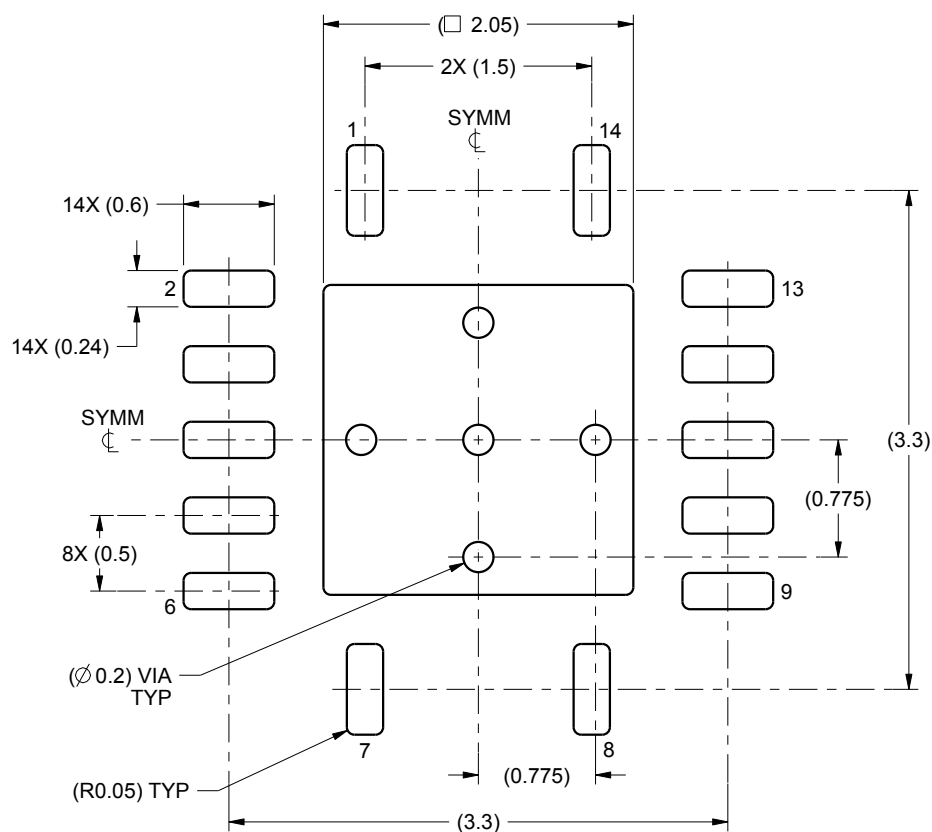
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

# EXAMPLE BOARD LAYOUT

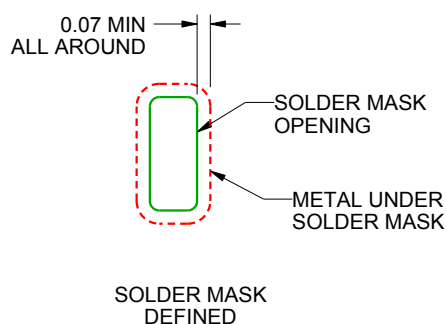
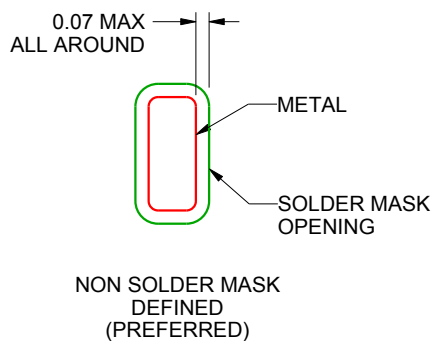
RGY0014A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE  
SCALE:20X



SOLDER MASK DETAILS

4219040/A 09/2015

NOTES: (continued)

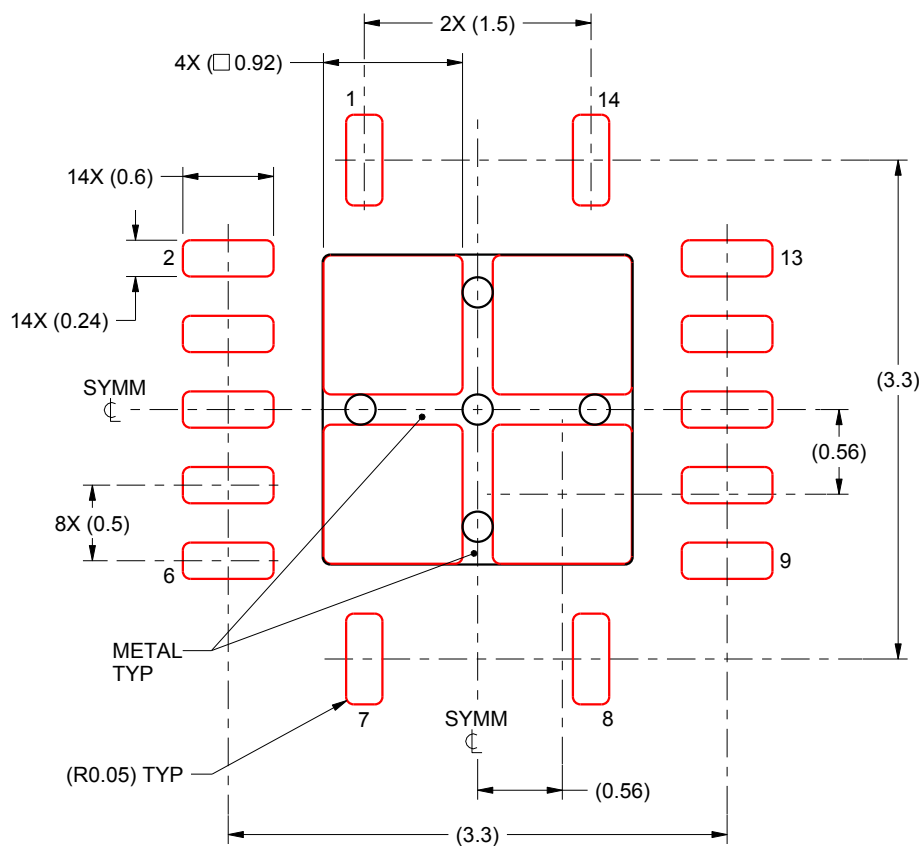
- This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/sluea271](http://www.ti.com/lit/sluea271)).

# 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.



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