

SNx4LVC00A 四路双输入正与非门

1 特性

- ESD 保护性能超过 JESD 22 规范要求
 - 2000V 人体放电模型
 - 1000V 充电器件模型
- SN74LVC00A 的工作电压范围为 1.65V 至 3.6V
- SN54LVC00A 的工作电压范围为 2V 至 3.6V
- SNx4LVC00A 的额定工作温度范围为 -40°C 至 $+85^{\circ}\text{C}$ 以及 -40°C 至 $+125^{\circ}\text{C}$
- SN54LVC00A 的额定工作温度范围为 -55°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 4.3ns
- 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 $> 2\text{V}$ ($V_{CC} = 3.3\text{V}$ 、 $T_A = 25^{\circ}\text{C}$)
- 闩锁性能超过 250mA, 符合 JESD 17 规范
- 对于符合 MIL-PRF-38535 标准的产品, 所有参数均经过测试, 除非另有说明。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。

2 应用

- AV 接收器
- 音频接口盒: 便携
- 蓝光播放器与家庭影院
- MP3 播放器或录像机
- 个人数字助理 (PDA)
- 电源: 电信或服务器交流/直流电源: 单控制器: 模拟和数字
- 固态硬盘 (SSD): 客户端和企业级
- 电视: LCD 电视、数字电视和高清电视 (HDTV)
- 平板电脑: 企业级
- 视频分析: 服务器
- 无线耳机、键盘和鼠标

3 说明

SN54LVC00A 四路双输入正与非门可在 2.7V 至 3.6V V_{CC} 下运行, SN74LVC00A 四路双输入正与非门可在 1.65V 至 3.6V V_{CC} 下运行。

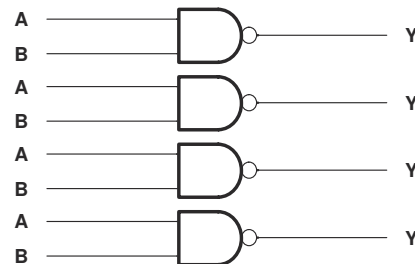
SNx4LVC00A 器件以正逻辑执行布尔函数 $Y = \overline{A \cdot B}$ 或 $Y = \overline{A} + \overline{B}$ 。

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这些器件用作转换器。

器件信息

| 器件型号 | 封装 ⁽¹⁾ | 封装尺寸 ⁽²⁾ | 封装尺寸 ⁽³⁾ |
|-------------|-------------------|---------------------|---------------------|
| SNx4LVC00A | 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 |
| | RGV (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 | |

- 更多信息, 请参阅第 11 节。
- 封装尺寸 (长 × 宽) 为标称值, 并包括引脚 (如适用)。
- 封装尺寸 (长 × 宽) 为标称值, 不包括引脚。



简化原理图



Table of Contents

| | | | |
|--|---|--|----|
| 1 特性 | 1 | 7 Detailed Description | 9 |
| 2 应用 | 1 | 7.1 Overview..... | 9 |
| 3 说明 | 1 | 7.2 Functional Block Diagram..... | 9 |
| 4 Pin Configuration and Functions | 3 | 7.3 Feature Description..... | 9 |
| 5 Specifications | 4 | 7.4 Device Functional Modes..... | 10 |
| 5.1 Absolute Maximum Ratings..... | 4 | 8 Application and Implementation | 11 |
| 5.2 ESD Ratings..... | 4 | 8.1 Application Information..... | 11 |
| 5.3 Recommended Operating Conditions, SN54LVC00A..... | 4 | 8.2 Typical Application..... | 11 |
| 5.4 Recommended Operating Conditions, SN74LVC00A..... | 5 | 8.3 Layout..... | 12 |
| 5.5 Thermal Information..... | 5 | 9 Device and Documentation Support | 13 |
| 5.6 Electrical Characteristics, SN54LVC00A..... | 6 | 9.1 Related Links..... | 13 |
| 5.7 Electrical Characteristics, SN74LVC00A..... | 6 | 9.2 Receiving Notification of Documentation Updates... 13 | |
| 5.8 Switching Characteristics, SN54LVC00A..... | 6 | 9.3 支持资源..... | 13 |
| 5.9 Switching Characteristics, SN74LVC00A..... | 7 | 9.4 Trademarks..... | 13 |
| 5.10 Operating Characteristics..... | 7 | 9.5 静电放电警告..... | 13 |
| 5.11 Typical Characteristics..... | 7 | 9.6 术语表..... | 13 |
| 6 Parameter Measurement Information | 8 | 11 Mechanical, Packaging, and Orderable Information | 14 |

4 Pin Configuration and Functions

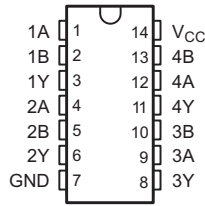
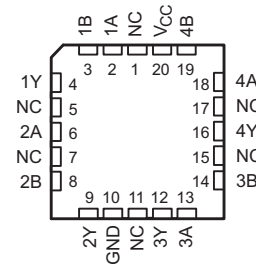


图 4-1. SN54LVC00A J or W Package; SN74LVC00A D, DB, NS, or PW Package 14-Pin CDIP, CFP SOIC, SSOP, SO, or TSSOP (Top View)



NC - No internal connection
图 4-2. SN54LVC00A FK Package 20-Pin LCCC (Top View)

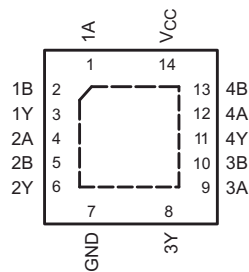


图 4-3. SN74LVC00A BQA or RGY Package 14-Pin WQFN or VQFN (Top View)

表 4-1. Pin Functions

| NAME | PIN | | | | TYPE | DESCRIPTION |
|-----------------|---------------|----------|------------|----|------|-----------------|
| | SN74LVC00A | | SN54LVC00A | | | |
| | D, DB, NS, PW | BQA, RGY | J, W | FK | | |
| 1A | 1 | 1 | 1 | 2 | I | Gate 1 input |
| 1B | 2 | 2 | 2 | 3 | I | Gate 1 input |
| 1Y | 3 | 3 | 3 | 4 | O | Gate 1 output |
| 2A | 4 | 4 | 4 | 6 | I | Gate 2 input |
| 2B | 5 | 5 | 5 | 8 | I | Gate 2 input |
| 2Y | 6 | 6 | 6 | 9 | O | Gate 2 output |
| GND | 7 | 7 | 7 | 10 | I | Ground Pin |
| 3Y | 8 | 8 | 8 | 12 | O | Gate 3 output |
| 3A | 9 | 9 | 9 | 13 | I | Gate 3 input |
| 3B | 10 | 10 | 10 | 14 | I | Gate 3 input |
| 4Y | 11 | 11 | 11 | 16 | O | Gate 4 output |
| 4A | 12 | 12 | 12 | 18 | I | Gate 4 input |
| 4B | 13 | 13 | 13 | 19 | I | Gate 4 input |
| V _{CC} | 14 | 14 | 14 | 20 | — | Positive supply |
| NC | — | — | — | 1 | — | No Connection |
| | | | | 5 | | |
| | | | | 7 | | |
| | | | | 11 | | |
| | | | | 15 | | |
| | | | | 17 | | |

5 Specifications

5.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

| | | MIN | MAX | UNIT | |
|------------------|--------------------------------------|----------------------------------|-----------------------|------|----|
| V _{CC} | Supply voltage | -0.5 | 6.5 | V | |
| V _I | Input voltage ⁽²⁾ | -0.5 | 6.5 | V | |
| V _O | Output voltage ^{(2) (3)} | -0.5 | V _{CC} + 0.5 | V | |
| I _{IK} | Input clamp current | V _I < 0 | -50 | mA | |
| I _{OK} | Output clamp current | V _O < 0 | -50 | mA | |
| I _O | Continuous output current | | ±50 | mA | |
| V _{CC} | Continuous current through GND | | ±100 | mA | |
| P _{tot} | Power dissipation ^{(4) (5)} | T _A = -40°C to +125°C | 500 | mW | |
| T _J | Junction temperature | | 150 | °C | |
| T _{stg} | 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_{CC} is provided in the *Recommended Operating Conditions* table.
- (4) For the D package: above 70°C, the value of P_{tot} derates linearly with 8 mW/K.
- (5) For the DB, NS, and PW packages: above 60°C, the value of P_{tot} derates linearly with 5.5 mW/K.

5.2 ESD Ratings

| | | VALUE | UNIT |
|--|---|-------|------|
| V _(ESD) | Electrostatic discharge | | |
| | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001 ⁽¹⁾ | ±2000 | V |
| Charged device model (CDM), per JEDEC specification JESD22-C101 ⁽²⁾ | ±1000 | | |

- (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, SN54LVC00A

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

| | | SN54LVC00A | | UNIT | |
|-----------------|---------------------------|----------------------------------|-----------------|------|---|
| | | -55°C to +125°C | | | |
| | | MIN | MAX | | |
| V _{CC} | Supply voltage | Operating | 2 | 3.6 | V |
| | | Data retention only | 1.5 | | |
| V _{IH} | High-level input voltage | V _{CC} = 2.7 V to 3.6 V | | V | |
| V _{IL} | Low-level input voltage | V _{CC} = 2.7 V to 3.6 V | | V | |
| V _I | Input voltage | 0 | 5.5 | V | |
| V _O | Output voltage | 0 | V _{CC} | V | |
| I _{OH} | High-level output current | V _{CC} = 2.7 V | -12 | mA | |
| | | V _{CC} = 3 V | -24 | | |
| I _{OL} | Low-level output current | V _{CC} = 2.7 V | 12 | mA | |
| | | V _{CC} = 3 V | 24 | | |

- (1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. See [Implications of Slow or Floating CMOS Inputs](#), SCBA004.

5.4 Recommended Operating Conditions, SN74LVC00A

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

| | | SN74LVC00A | | | | | | UNIT | | |
|-----------------|---------------------------|------------------------------------|-----------------|------------------------|-----------------|------------------------|-----------------|------------------------|-----------------|----|
| | | T _A = 25°C | | –40°C to 85°C | | –40°C to 125°C | | | | |
| | | MIN | MAX | MIN | MAX | MIN | MAX | | | |
| V _{CC} | 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 _{IH} | High-level input voltage | V _{CC} = 1.65 V to 1.95 V | | 0.65 × V _{CC} | | 0.65 × V _{CC} | | 0.65 × V _{CC} | | V |
| | | V _{CC} = 2.3 V to 2.7 V | | 1.7 | | 1.7 | | 1.7 | | |
| | | V _{CC} = 2.7 V to 3.6 V | | 2 | | 2 | | 2 | | |
| V _{IL} | Low-level input voltage | V _{CC} = 1.65 V to 1.95 V | | 0.35 × V _{CC} | | 0.35 × V _{CC} | | 0.35 × V _{CC} | | V |
| | | V _{CC} = 2.3 V to 2.7 V | | 0.7 | | 0.7 | | 0.7 | | |
| | | V _{CC} = 2.7 V to 3.6 V | | 0.8 | | 0.8 | | 0.8 | | |
| V _I | Input voltage | 0 | 5.5 | 0 | 5.5 | 0 | 5.5 | 0 | 5.5 | V |
| V _O | Output voltage | 0 | V _{CC} | 0 | V _{CC} | 0 | V _{CC} | 0 | V _{CC} | V |
| I _{OH} | High-level output current | V _{CC} = 1.65 V | | –4 | | –4 | | –4 | | mA |
| | | V _{CC} = 2.3 V | | –8 | | –8 | | –8 | | |
| | | V _{CC} = 2.7 V | | –12 | | –12 | | –12 | | |
| | | V _{CC} = 3 V | | –24 | | –24 | | –24 | | |
| I _{OL} | Low-level output current | V _{CC} = 1.65 V | | 4 | | 4 | | 4 | | mA |
| | | V _{CC} = 2.3 V | | 8 | | 8 | | 8 | | |
| | | V _{CC} = 2.7 V | | 12 | | 12 | | 12 | | |
| | | V _{CC} = 3 V | | 24 | | 24 | | 24 | | |

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

5.5 Thermal Information

| THERMAL METRIC ⁽¹⁾ | | SN74LVC00A | | | | | | UNIT |
|-------------------------------|--|------------|----------|-----------|----------|------------|------------|------|
| | | BQA (WQFN) | D (SOIC) | DB (SSOP) | NS (SOP) | PW (TSSOP) | RGY (VQFN) | |
| | | 14 PINS | 14 PINS | 14 PINS | 14 PINS | 14 PINS | 14 PINS | |
| R _{θJA} | Junction-to-ambient thermal resistance | 102.3 | 127.8 | 140.4 | 123.8 | 150.8 | 92.1 | °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, SN54LVC00A

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

| PARAMETER | TEST CONDITIONS | V _{CC} | SN54LVC00A | | UNIT |
|------------------|--|-----------------|-----------------------|-----|------|
| | | | –55°C to +125°C | | |
| | | | MIN | MAX | |
| V _{OH} | I _{OH} = –100 μA | 2.7 V to 3.6 V | V _{CC} – 0.2 | | V |
| | I _{OH} = –12 mA | 2.7 V | 2.2 | | |
| | I _{OH} = –24 mA | 3 V | 2.4 | | |
| V _{OL} | I _{OL} = 100 μA | 2.7 V to 3.6 V | 0.2 | | V |
| | I _{OL} = 12 mA | 2.7 V | 0.4 | | |
| | I _{OL} = 24 mA | 3 V | 0.55 | | |
| I _I | V _I = 5.5 V or GND | 3.6 V | ±5 | | μA |
| I _{CC} | V _I = V _{CC} or GND, I _O = 0 | 3.6 V | 10 | | μA |
| ΔI _{CC} | One input at V _{CC} – 0.6 V, Other inputs at V _{CC} or GND | 2.7 V to 3.6 V | 500 | | μA |

5.7 Electrical Characteristics, SN74LVC00A

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

| PARAMETER | TEST CONDITIONS | V _{CC} | SN74LVC00A | | | | | | UNIT | |
|--------------------------|--|-----------------|-----------------------|-----|-----|-----------------------|-----|-----------------------|------|-----|
| | | | T _A = 25°C | | | –40°C to +85°C | | –40°C to +125°C | | |
| | | | MIN | TYP | MAX | MIN | MAX | MIN | | MAX |
| V _{OH} | I _{OH} = –100 μA | 1.65 V to 3.6 V | V _{CC} – 0.2 | | | V _{CC} – 0.2 | | V _{CC} – 0.3 | | V |
| | I _{OH} = –4 mA | 1.65 V | 1.29 | | | 1.2 | | 1.05 | | |
| | I _{OH} = –8 mA | 2.3 V | 1.9 | | | 1.7 | | 1.55 | | |
| | I _{OH} = –12 mA | 2.7 V | 2.2 | | | 2.2 | | 2.05 | | |
| | | 3 V | 2.4 | | | 2.4 | | 2.25 | | |
| I _{OH} = –24 mA | 3 V | 2.3 | | | 2.2 | | 2 | | | |
| V _{OL} | I _{OL} = 100 μA | 1.65 V to 3.6 V | | | | 0.1 | | 0.2 | | V |
| | I _{OL} = 4 mA | 1.65 V | | | | 0.24 | | 0.45 | | |
| | I _{OL} = 8 mA | 2.3 V | | | | 0.3 | | 0.7 | | |
| | I _{OL} = 12 mA | 2.7 V | | | | 0.4 | | 0.6 | | |
| | I _{OL} = 24 mA | 3 V | | | | 0.55 | | 0.55 | | |
| I _I | V _I = 5.5 V or GND | 3.6 V | | | | ±1 | | ±5 | | μA |
| I _{CC} | V _I = V _{CC} or GND, I _O = 0 | 3.6 V | | | | 1 | | 10 | | μA |
| ΔI _{CC} | One input at V _{CC} – 0.6 V, Other inputs at V _{CC} or GND | 2.7 V to 3.6 V | | | | 500 | | 500 | | μA |
| C _i | V _I = V _{CC} or GND | 3.3 V | | | | 5 | | | | pF |

5.8 Switching Characteristics, SN54LVC00A

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

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V _{CC} | SN54LVC00A | | UNIT |
|-----------------|--------------|-------------|-----------------|-----------------|-----|------|
| | | | | –55°C to +125°C | | |
| | | | | MIN | MAX | |
| t _{pd} | A or B | Y | 2.7 V | 5.1 | | ns |
| | | | 3.3 V ± 0.3 V | 1 | 4.3 | |

5.9 Switching Characteristics, SN74LVC00A

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

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V _{CC} | SN74LVC00A | | | | | | UNIT | |
|--------------------|--------------|-------------|-----------------|-----------------------|-----|-----|----------------|------|-----------------|------|-----|
| | | | | T _A = 25°C | | | -40°C to +85°C | | -40°C to +125°C | | |
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | | MAX |
| t _{pd} | A or B | Y | 1.8 V ± 0.15 V | 1 | 6 | 12 | 1 | 12.5 | 1 | 14 | ns |
| | | | 2.5 V ± 0.2 V | 1 | 4.6 | 5.9 | 1 | 6.4 | 1 | 7.9 | |
| | | | 2.7 V | 1 | 4.3 | 4.9 | 1 | 5.1 | 1 | 6.5 | |
| | | | 3.3 V ± 0.3 V | 1 | 3.5 | 4.1 | 1 | 4.3 | 1 | 5.5 | |
| t _{sk(o)} | | | 3.3 V ± 0.3 V | | | | | 1 | | 1.5 | ns |

5.10 Operating Characteristics

T_A = 25°C

| PARAMETER | | TEST CONDITIONS | V _{CC} | TYP | UNIT |
|-----------------|--|-----------------|-----------------|-----|------|
| C _{pd} | Power dissipation capacitance per gate | f = 10 MHz | 1.8 V | 18 | pF |
| | | | 2.5 V | 18 | |
| | | | 3.3 V | 19 | |

5.11 Typical Characteristics

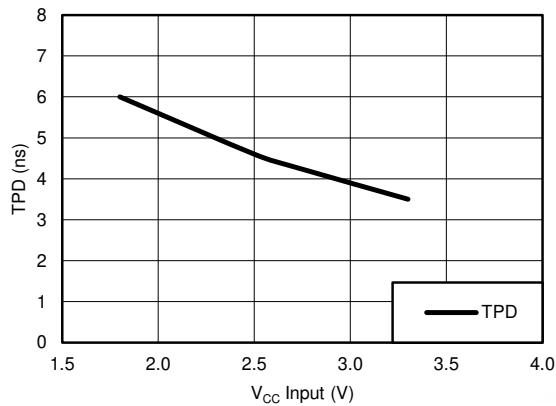
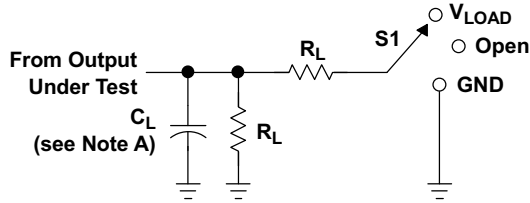


图 5-1. TPD vs V_{CC} (T_A = 25°C)

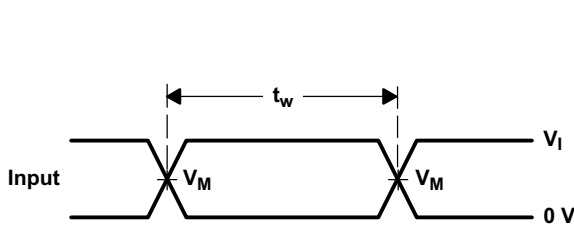
6 Parameter Measurement Information



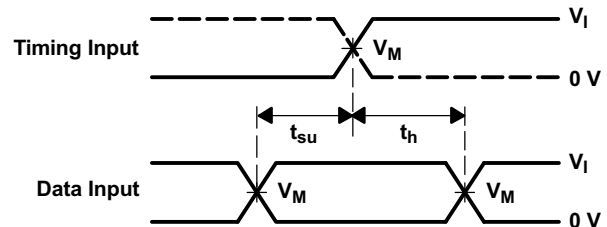
LOAD CIRCUIT

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

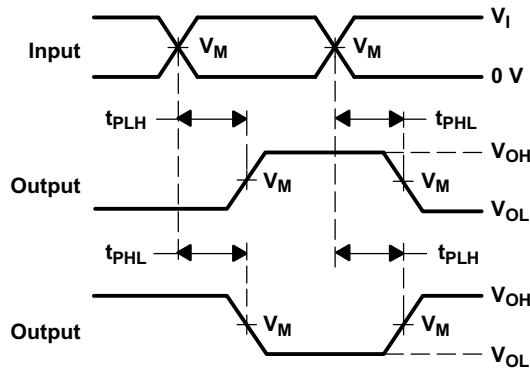
| V_{CC} | INPUTS | | V_M | V_{LOAD} | C_L | R_L | V_{Δ} |
|----------------------------------|----------|----------------------|------------|-------------------|-------|--------------|--------------|
| | V_I | t_r/t_f | | | | | |
| $1.8\text{ V} \pm 0.15\text{ V}$ | V_{CC} | $\leq 2\text{ ns}$ | $V_{CC}/2$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



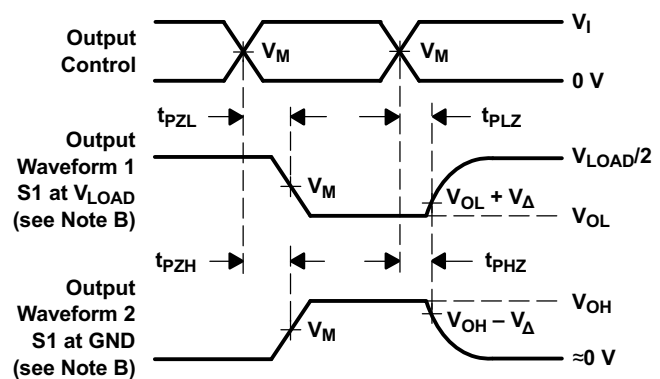
VOLTAGE WAVEFORMS
PULSE DURATION



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.

图 6-1. Load Circuit and Voltage Waveforms

7 Detailed Description

7.1 Overview

The maximum sink and source current is 24 mA.

Inputs can be driven from 1.8-V, 2.5-V, 3.3-V (LVTTTL), or 5-V (CMOS) devices. This feature allows the use of this device as translators in a mixed-system environment.

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 and outputs to this device have negative clamping diodes.

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.

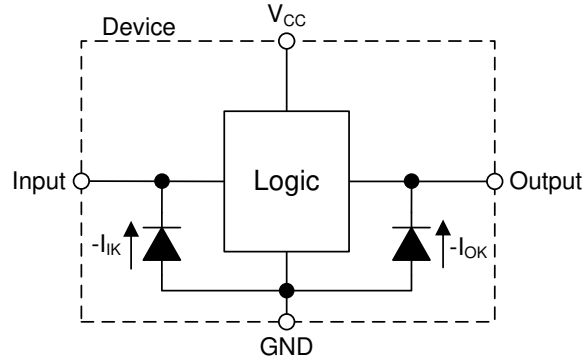


图 7-2. Electrical Placement of Clamping Diodes for Each Input and Output

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 of SN54LVC00A and SN74LVC00A.

表 7-1. Function Table
(Each Gate)

| INPUTS | | OUTPUT |
|--------|---|--------|
| A | B | Y |
| H | H | L |
| L | X | H |
| X | L | 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

SN74LVC00A is a high-drive CMOS device that can be used for a multitude of buffer-type functions. It can produce 24 mA of drive current at 3.3 V. Therefore, this device is ideal for driving multiple inputs and for high-speed applications up to 100 MHz. The inputs and outputs are 5.5-V tolerant allowing the device to allowing the device to perform mixed-voltage input down translation. For example the A input can be 3.3 V and the B input can be 5 V, while $V_{CC} = 2.5$ V and the device will operate properly to output a 2.5 V signal.

8.2 Typical Application

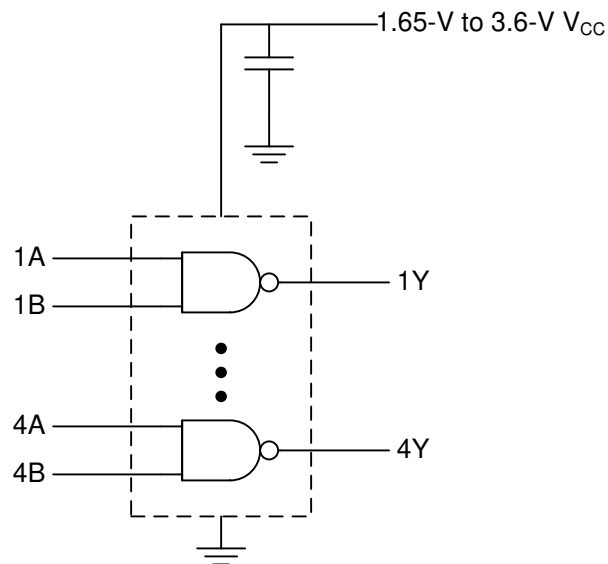


图 8-1. Typical NAND Gate Application and Supply Voltage

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; therefore, routing and load conditions should be considered to prevent ringing.

8.2.2 Detailed Design Procedure

- Recommended Input Conditions
 - Rise time and fall time specs: See $(\Delta t/\Delta V)$ in the [§ 5.4](#) table.
 - Specified high and low levels: See $(V_{IH}$ and $V_{IL})$ in the [§ 5.4](#) table.
 - Inputs are overvoltage tolerant allowing them to go as high as 5.5 V at any valid V_{CC} .
- Recommended Output Conditions
 - Load currents should not exceed 25 mA per output and 50 mA total for the part.
 - Outputs should not be pulled above 5.5 V.

8.2.3 Application Curve

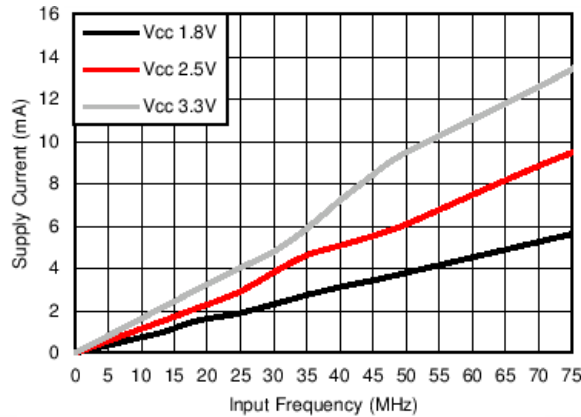


图 8-2. I_{CC} vs Frequency

Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply voltage rating located in the [表 5.4](#) table.

Each V_{CC} pin should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, 0.1 μF is recommended; if there are multiple V_{CC} pins, then 0.01 μF or 0.022 μF is recommended for each power pin. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. A 0.1 μF and a 1 μF 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 never float.

In many cases, functions or parts of functions of digital logic devices are unused, for example, when only two inputs of a triple-input AND gate are used or 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. [节 8.3.2](#) specifies the 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 generally acceptable to float outputs, unless the part is a transceiver.

8.3.2 Layout Example

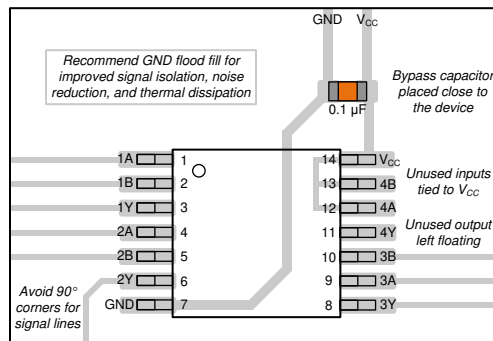


图 8-3. Layout Diagram for the SNx4LVC00A

9 Device and Documentation Support

9.1 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 |
|------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| SN54LVC00A | Click here | Click here | Click here | Click here | Click here |
| SN74LVC00A | Click here | Click here | Click here | Click here | Click here |

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 T (May 2024) to Revision U (July 2024) | Page |
|--|------|
| • Updated R θ JA values: D = 86 to 127.8, all values in °C/W..... | 5 |
| • Added <i>Typical Characteristics</i> | 7 |

| Changes from Revision S (March 2024) to Revision T (May 2024) | Page |
|--|------|
| • Updated R θ JA values: DB = 96 to 140.4, NS = 76 to 123.8, PW = 113 to 150.8, RGY = 47 to 92.1; Updated DB, NS, PW, and RGY packages for R θ JC(top), R θ JB, Ψ JT, Ψ JB, and R θ JC(bot), all values in °C/W..... | 5 |

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) |
|---------------------------------|---------------|----------------------|-----------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|--|
| 5962-9753301Q2A | Active | Production | LCCC (FK) 20 | 55 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962- 9753301Q2A SNJ54LVC 00AFK |
| 5962-9753301QCA | Active | Production | CDIP (J) 14 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9753301QC A SNJ54LVC00AJ |
| 5962-9753301QDA | Active | Production | CFP (W) 14 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9753301QD A SNJ54LVC00AW |
| 5962-9753301VDA | Active | Production | CFP (W) 14 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9753301VD A SNV54LVC00AW |
| SN74LVC00ABQAR | Active | Production | WQFN (BQA) 14 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ABQAR.A | Active | Production | WQFN (BQA) 14 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00AD | Active | Production | SOIC (D) 14 | 50 TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00AD.B | Active | Production | SOIC (D) 14 | 50 TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ADBR | Active | Production | SSOP (DB) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00ADBR.A | Active | Production | SSOP (DB) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00ADBR.B | Active | Production | SSOP (DB) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00ADBRG4 | Active | Production | SSOP (DB) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00ADE4 | Active | Production | SOIC (D) 14 | 50 TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ADR | Active | Production | SOIC (D) 14 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ADR.A | Active | Production | SOIC (D) 14 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ADR.B | Active | Production | SOIC (D) 14 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ADRG4 | Active | Production | SOIC (D) 14 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ADT | Active | Production | SOIC (D) 14 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ADT.B | Active | Production | SOIC (D) 14 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ANSR | Active | Production | SOP (NS) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ANSR.A | Active | Production | SOP (NS) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00ANSR.B | Active | Production | SOP (NS) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |

| 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) |
|---------------------------------|---------------|----------------------|-----------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|-------------------------------------|
| SN74LVC00ANSRG4 | Active | Production | SOP (NS) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC00A |
| SN74LVC00APW | Active | Production | TSSOP (PW) 14 | 90 TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APW.B | Active | Production | TSSOP (PW) 14 | 90 TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWE4 | Active | Production | TSSOP (PW) 14 | 90 TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWG4 | Active | Production | TSSOP (PW) 14 | 90 TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWR | Active | Production | TSSOP (PW) 14 | 2000 LARGE T&R | Yes | Call TI Sn Nipdau | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWR.A | Active | Production | TSSOP (PW) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWR.B | Active | Production | TSSOP (PW) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWRE4 | Active | Production | TSSOP (PW) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWRG4 | Active | Production | TSSOP (PW) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWRG4.A | Active | Production | TSSOP (PW) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWRG4.B | Active | Production | TSSOP (PW) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWT | Active | Production | TSSOP (PW) 14 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00APWT.B | Active | Production | TSSOP (PW) 14 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC00A |
| SN74LVC00ARGYR | Active | Production | VQFN (RGY) 14 | 3000 LARGE T&R | Yes | NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | LC00A |
| SN74LVC00ARGYR.A | Active | Production | VQFN (RGY) 14 | 3000 LARGE T&R | Yes | NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | LC00A |
| SN74LVC00ARGYR.B | Active | Production | VQFN (RGY) 14 | 3000 LARGE T&R | Yes | NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | LC00A |
| SN74LVC00ARGYRG4 | Active | Production | VQFN (RGY) 14 | 3000 LARGE T&R | Yes | NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | LC00A |
| SN74LVC00ARGYRG4.A | Active | Production | VQFN (RGY) 14 | 3000 LARGE T&R | Yes | NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | LC00A |
| SN74LVC00ARGYRG4.B | Active | Production | VQFN (RGY) 14 | 3000 LARGE T&R | Yes | NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | LC00A |
| SNJ54LVC00AFK | Active | Production | LCCC (FK) 20 | 55 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9753301Q2A SNJ54LVC00AFK |
| SNJ54LVC00AJ | Active | Production | CDIP (J) 14 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9753301QC A SNJ54LVC00AJ |
| SNJ54LVC00AW | Active | Production | CFP (W) 14 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9753301QD A SNJ54LVC00AW |

(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 SN54LVC00A, SN54LVC00A-SP, SN74LVC00A :

- Catalog : [SN74LVC00A](#), [SN54LVC00A](#)
- Automotive : [SN74LVC00A-Q1](#), [SN74LVC00A-Q1](#)
- Enhanced Product : [SN74LVC00A-EP](#), [SN74LVC00A-EP](#)
- Military : [SN54LVC00A](#)
- Space : [SN54LVC00A-SP](#)

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
- Space - Radiation tolerant, ceramic packaging and qualified for use in Space-based application

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 |
|------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LVC00ABQAR | WQFN | BQA | 14 | 3000 | 180.0 | 12.4 | 2.8 | 3.3 | 1.1 | 4.0 | 12.0 | Q1 |
| SN74LVC00ADBR | SSOP | DB | 14 | 2000 | 330.0 | 16.4 | 8.35 | 6.6 | 2.4 | 12.0 | 16.0 | Q1 |
| SN74LVC00ADR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74LVC00ADT | SOIC | D | 14 | 250 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74LVC00ANSR | SOP | NS | 14 | 2000 | 330.0 | 16.4 | 8.1 | 10.4 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74LVC00APWR | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74LVC00APWR | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74LVC00APWRG4 | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74LVC00APWT | TSSOP | PW | 14 | 250 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74LVC00ARGYR | VQFN | RGY | 14 | 3000 | 330.0 | 12.4 | 3.75 | 3.75 | 1.15 | 8.0 | 12.0 | Q1 |
| SN74LVC00ARGYRG4 | 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) |
|------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LVC00ABQAR | WQFN | BQA | 14 | 3000 | 210.0 | 185.0 | 35.0 |
| SN74LVC00ADBR | SSOP | DB | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74LVC00ADR | SOIC | D | 14 | 2500 | 353.0 | 353.0 | 32.0 |
| SN74LVC00ADT | SOIC | D | 14 | 250 | 213.0 | 191.0 | 35.0 |
| SN74LVC00ANSR | SOP | NS | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74LVC00APWR | TSSOP | PW | 14 | 2000 | 356.0 | 356.0 | 35.0 |
| SN74LVC00APWR | TSSOP | PW | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74LVC00APWRG4 | TSSOP | PW | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74LVC00APWT | TSSOP | PW | 14 | 250 | 353.0 | 353.0 | 32.0 |
| SN74LVC00ARGYR | VQFN | RGY | 14 | 3000 | 360.0 | 360.0 | 36.0 |
| SN74LVC00ARGYRG4 | VQFN | RGY | 14 | 3000 | 353.0 | 353.0 | 32.0 |

TUBE


*All dimensions are nominal

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|-----------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| 5962-9753301Q2A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| 5962-9753301QDA | W | CFP | 14 | 25 | 506.98 | 26.16 | 6220 | NA |
| 5962-9753301VDA | W | CFP | 14 | 25 | 506.98 | 26.16 | 6220 | NA |
| SN74LVC00AD | D | SOIC | 14 | 50 | 506.6 | 8 | 3940 | 4.32 |
| SN74LVC00AD.B | D | SOIC | 14 | 50 | 506.6 | 8 | 3940 | 4.32 |
| SN74LVC00ADE4 | D | SOIC | 14 | 50 | 506.6 | 8 | 3940 | 4.32 |
| SN74LVC00APW | PW | TSSOP | 14 | 90 | 530 | 10.2 | 3600 | 3.5 |
| SN74LVC00APW.B | PW | TSSOP | 14 | 90 | 530 | 10.2 | 3600 | 3.5 |
| SN74LVC00APWE4 | PW | TSSOP | 14 | 90 | 530 | 10.2 | 3600 | 3.5 |
| SN74LVC00APWG4 | PW | TSSOP | 14 | 90 | 530 | 10.2 | 3600 | 3.5 |
| SNJ54LVC00AFK | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| SNJ54LVC00AW | W | CFP | 14 | 25 | 506.98 | 26.16 | 6220 | NA |

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

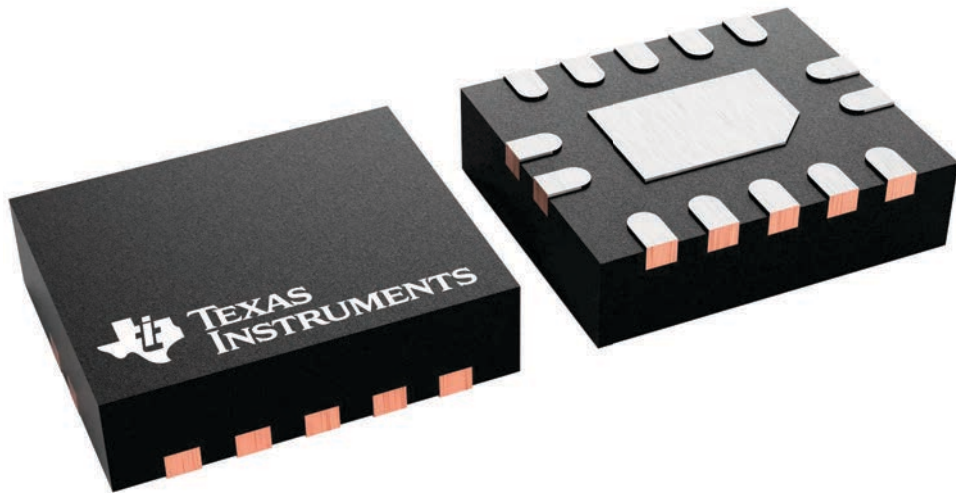
BQA 14

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

EXAMPLE BOARD LAYOUT

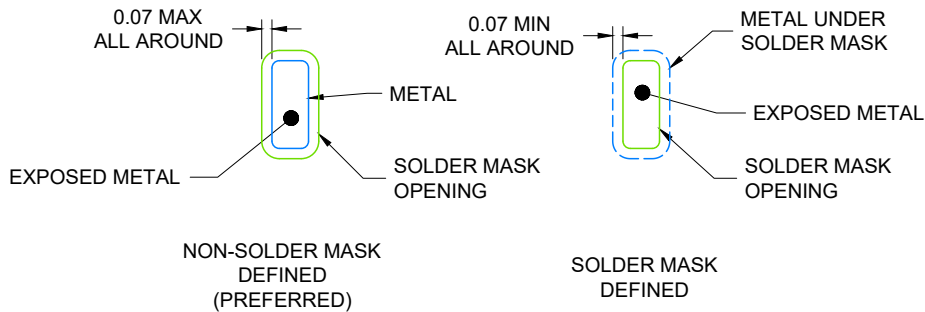
WQFN - 0.8 mm max height

BQA0014A

PLASTIC QUAD FLAT PACK-NO LEAD



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 20X



4224636/A 11/2018

NOTES: (continued)

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).
5. 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.

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

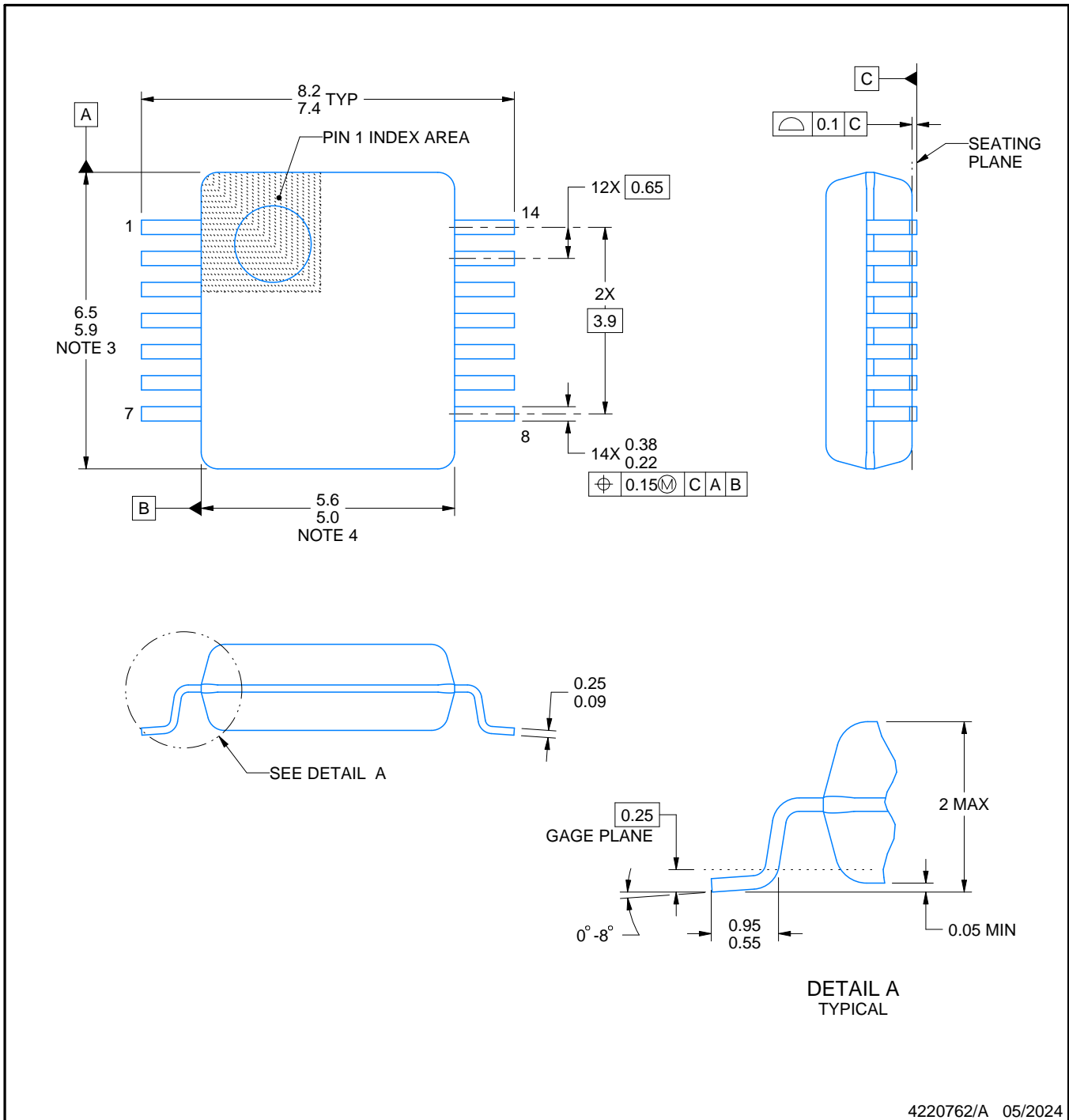
DB0014A



PACKAGE OUTLINE

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



4220762/A 05/2024

NOTES:

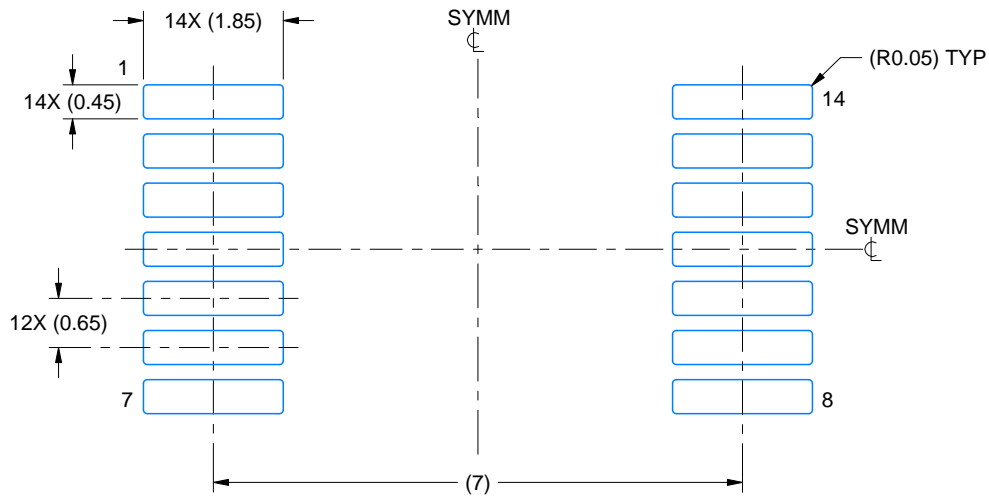
- All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
- This drawing is subject to change without notice.
- This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate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

EXAMPLE BOARD LAYOUT

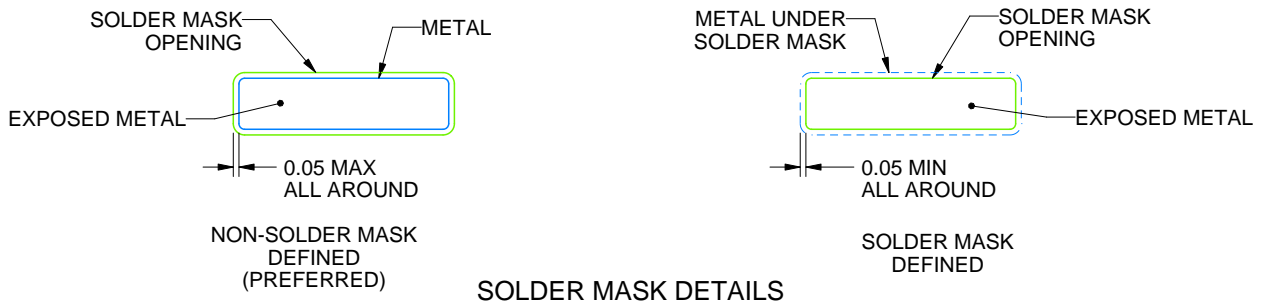
DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



4220762/A 05/2024

NOTES: (continued)

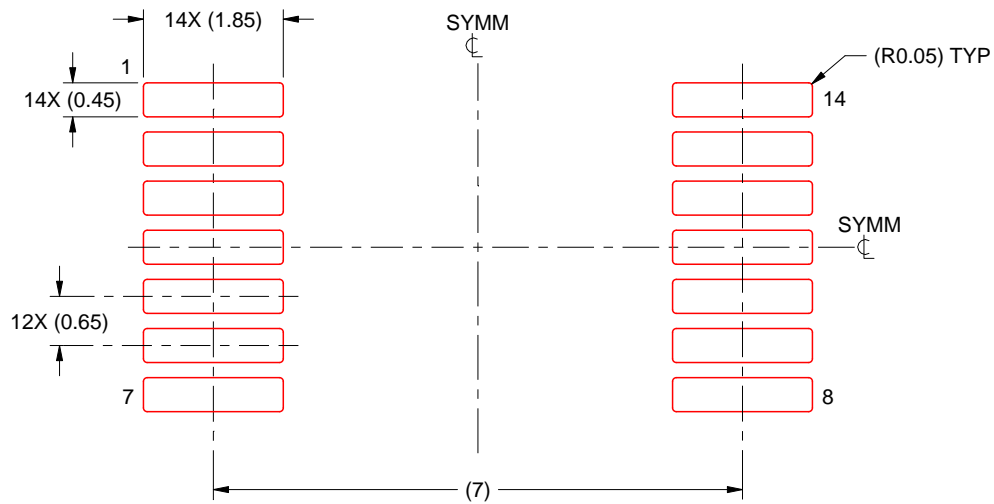
5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

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

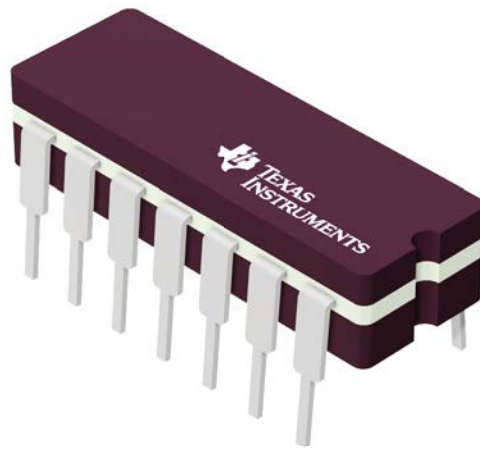
This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.



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

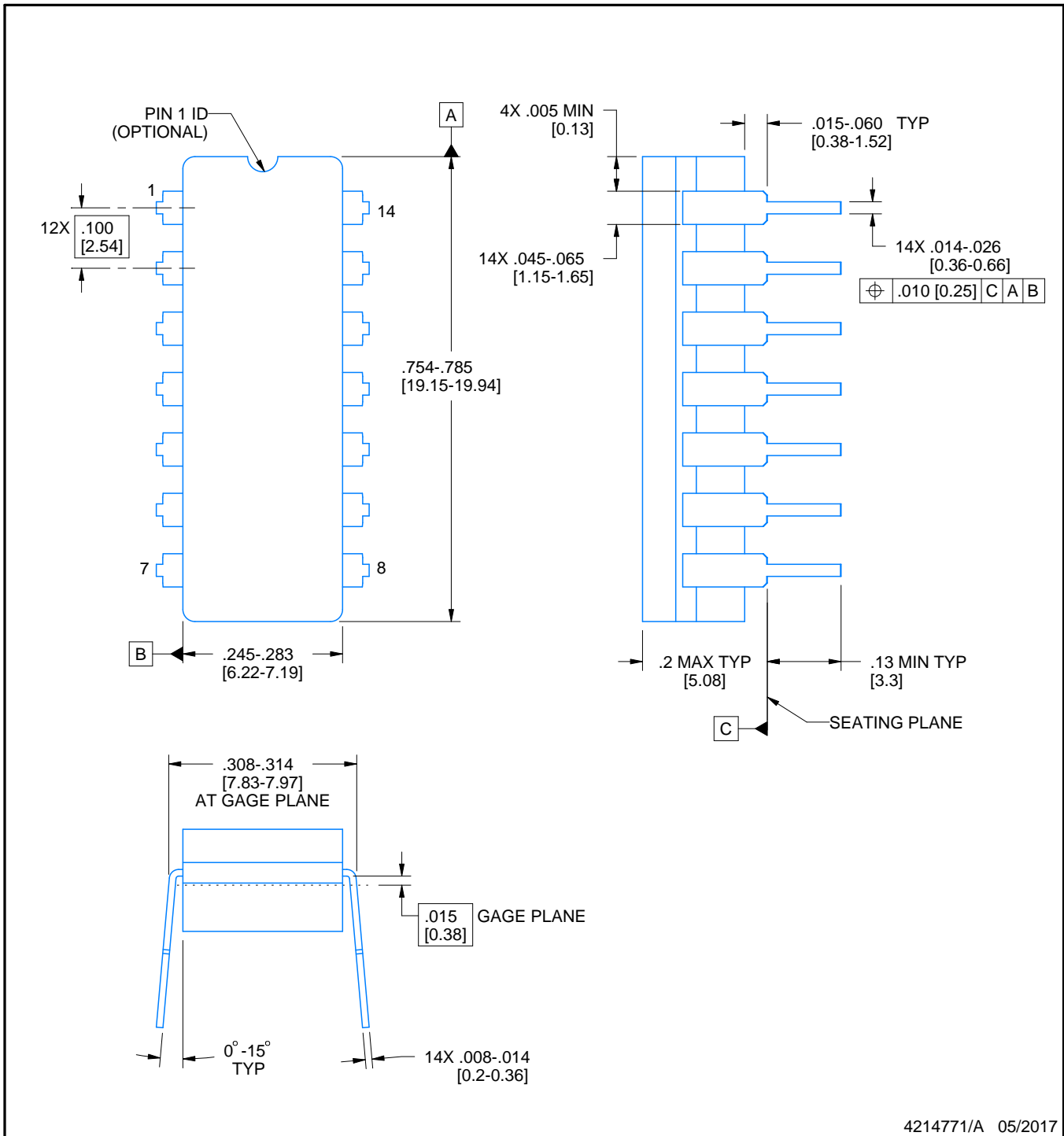
J0014A



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

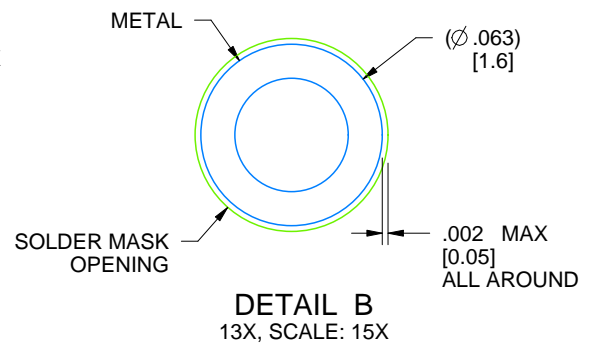
J0014A

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE

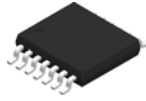


LAND PATTERN EXAMPLE
NON-SOLDER MASK DEFINED
SCALE: 5X



4214771/A 05/2017

PW0014A



PACKAGE OUTLINE
TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



4220202/B 12/2023

NOTES:

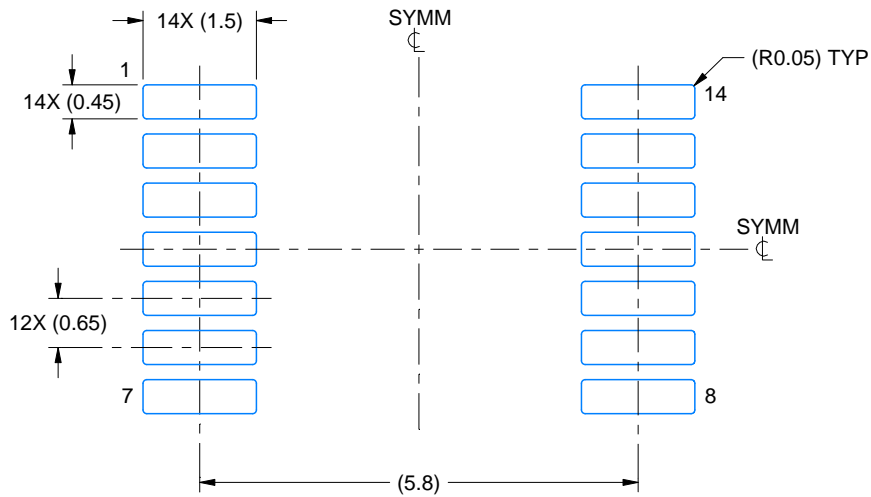
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or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

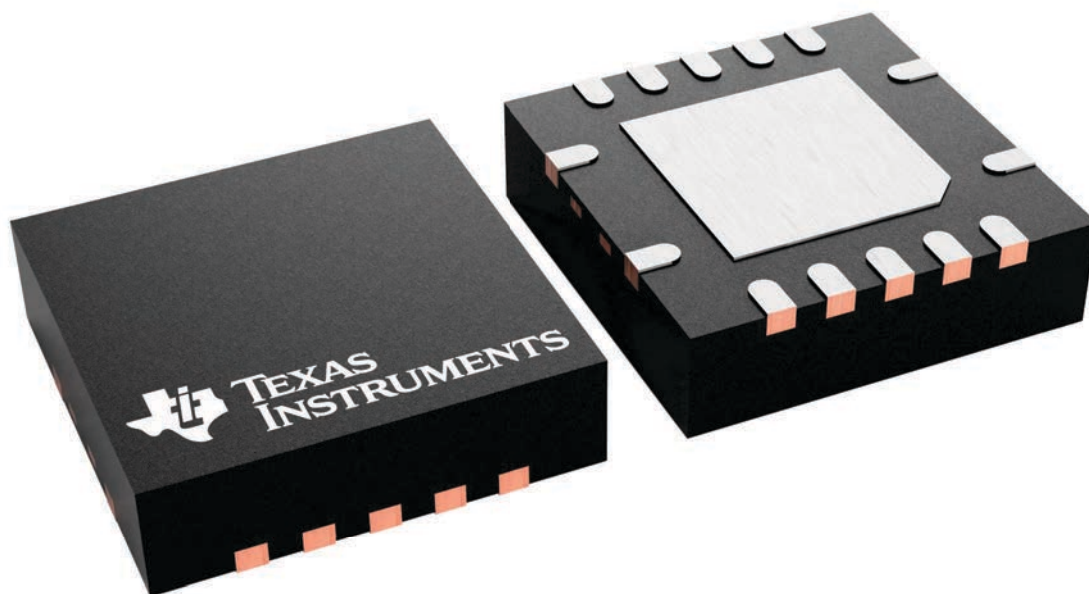
RGY 14

VQFN - 1 mm max height

3.5 x 3.5, 0.5 mm pitch

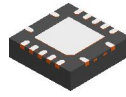
PLASTIC QUAD FLATPACK - NO LEAD

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



4231541/A

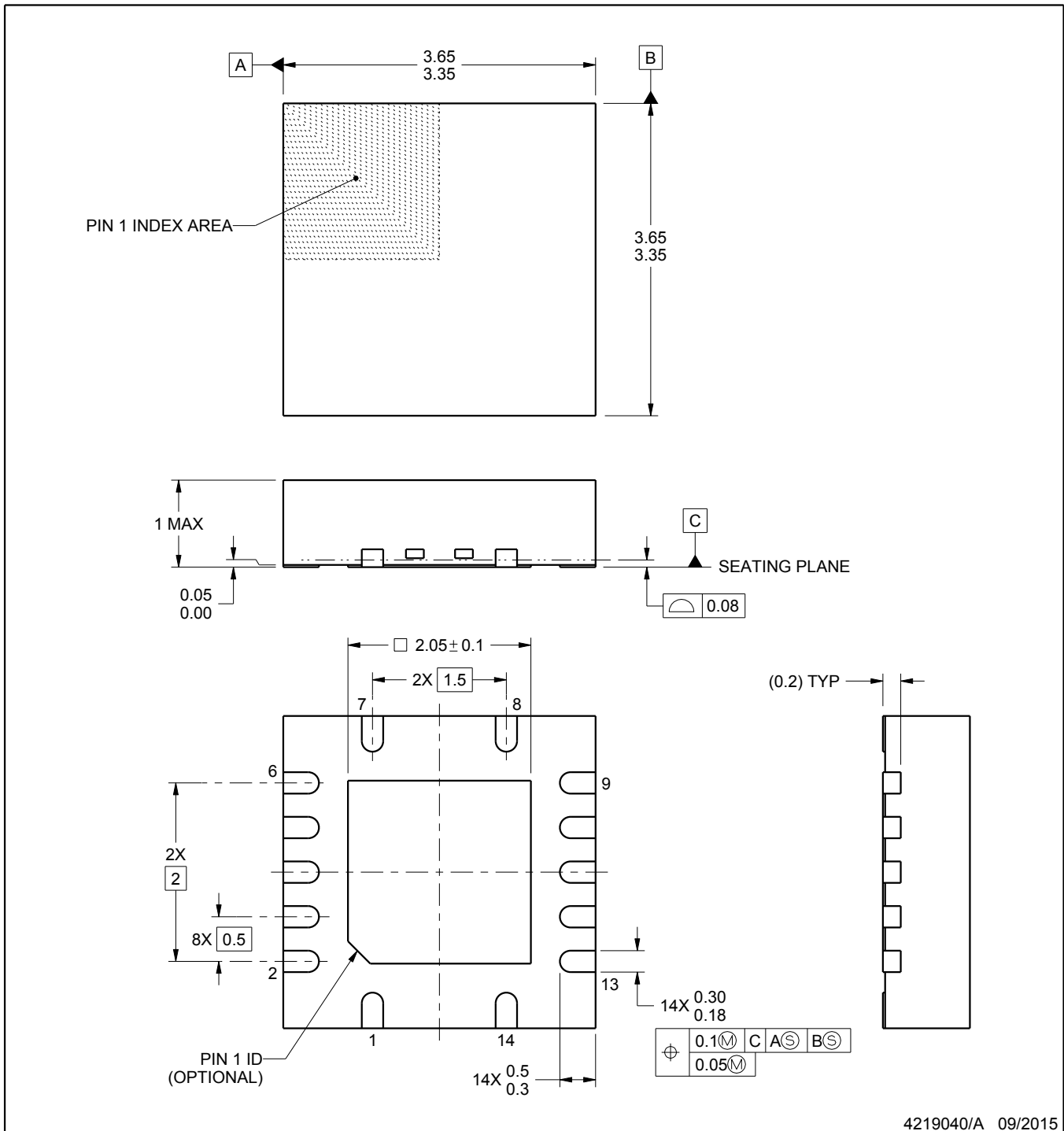
RGY0014A



PACKAGE OUTLINE

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



4219040/A 09/2015

NOTES:

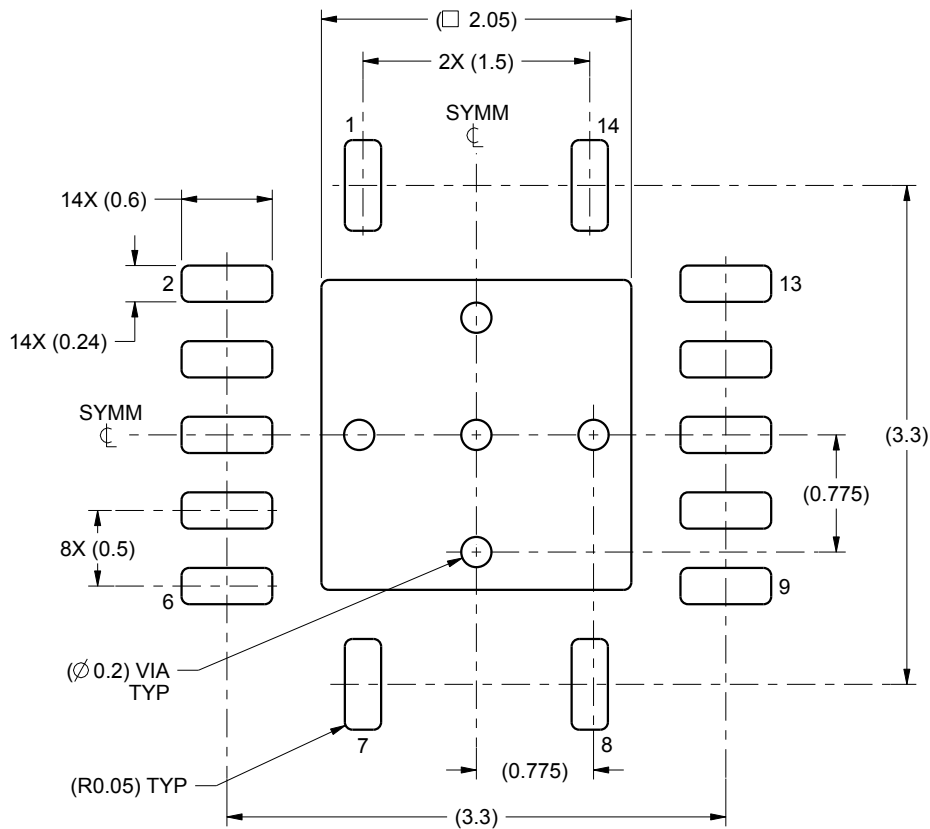
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

EXAMPLE BOARD LAYOUT

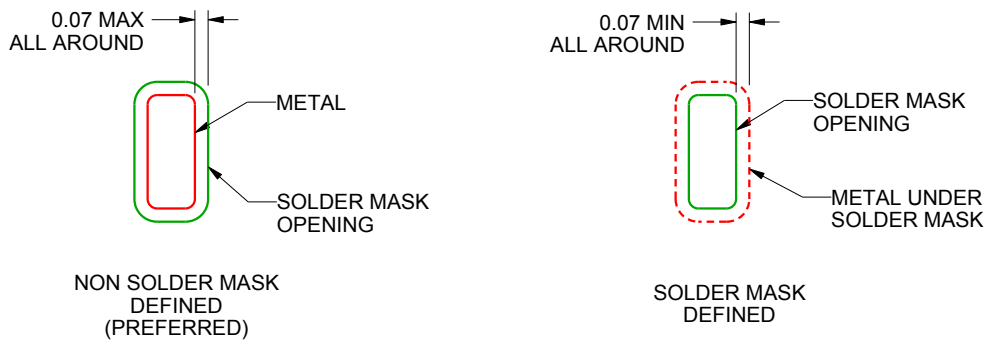
RGY0014A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE
SCALE:20X



SOLDER MASK DETAILS

4219040/A 09/2015

NOTES: (continued)

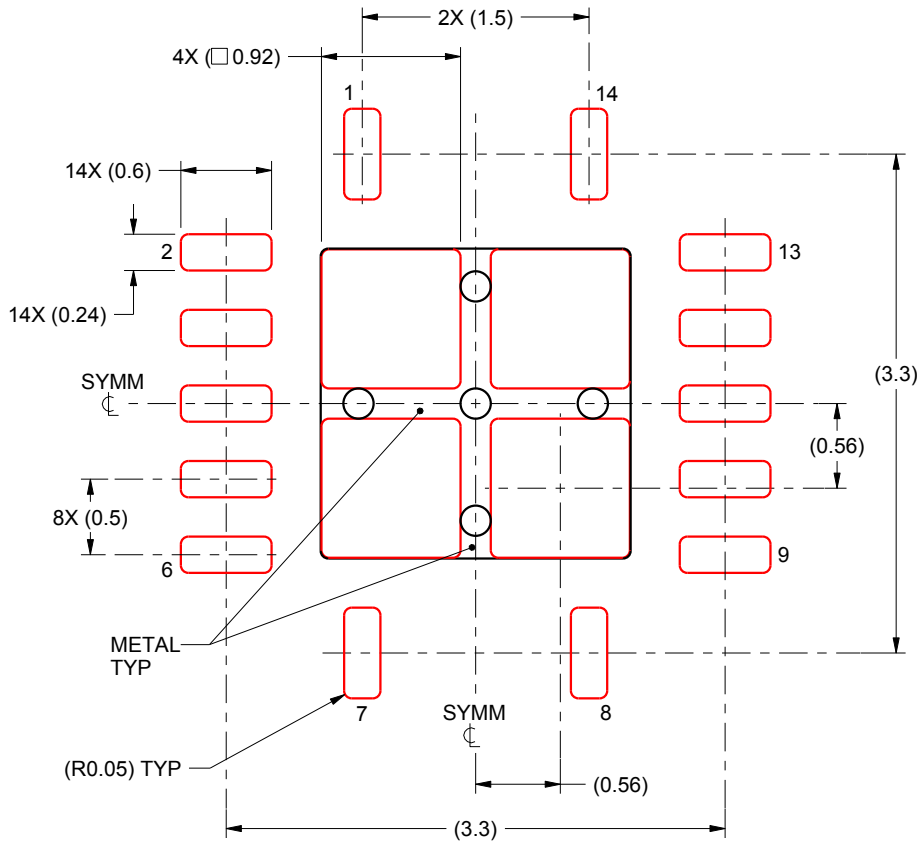
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).

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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