# SNx4AHCT86 クワッド、2 入力排他 OR (EXOR) ゲート

## 1 特長

- 入力は TTL 電圧互換
- JESD 17 準拠で 250mA 超のラッチアップ性能
- MIL-PRF-38535 準拠の製品については、特に記述のない限り、すべてのパラメータはテスト済みです。
  その他のすべての製品については、量産プロセスにすべてのパラメータのテストが含まれているとは限りません。
- JESD 22 を超える ESD 保護
  - 2000V、人体モデル (A114-A)
  - 200V、マシン・モデル (A115-A)

## 2 アプリケーション

- サーバー
- PC およびノートパソコン
- ネットワーク・スイッチ
- ウェアラブルなヘルスケア / フィットネス機器
- テレコム・インフラストラクチャ
- レジ用電子機器

## 3 概要

SNx4AHCT86 デバイスは、クワッド 2 入力排他 OR ゲートです。これらのデバイスは、ブール関数 Y = A × B または Y = $\overline{A}$B + A$\overline{B}$ を正論理で実行します。

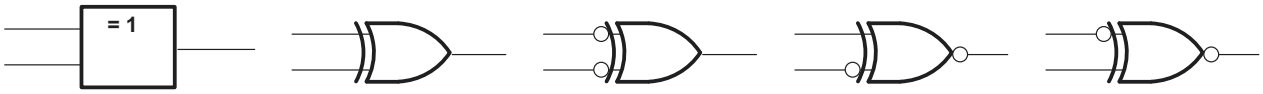
**パッケージ情報** (1)

| 部品番号 | パッケージ | 本体サイズ (公称) |
|---|---|---|
| SN54AHCT86 | J (CDIP、14) | 19.56mm × 6.67mm |
| | W (CFP、14) | 13.09mm × 6.92mm |
| | FK (LCCC、20) | 8.89mm × 8.89mm |
| SN74AHCT86 | N (PDIP、14) | 19.3mm × 6.35mm |
| | D (SOIC、14) | 8.65mm × 3.91mm |
| | NS (SOP、14) | 10.30mm × 5.30mm |
| | DB (SSOP、14) | 6.20mm × 5.30mm |
| | PW (TSSOP、14) | 5.00mm × 4.40mm |
| | DGV (TVSOP、14) | 3.60mm × 4.40mm |
| | RGY (VQFN、14) | 3.50mm × 3.50mm |
| | BQA (WQFN、14) | 3.00mm × 2.50mm |

(1) 利用可能なパッケージについては、このデータシートの末尾にある注文情報を参照してください。

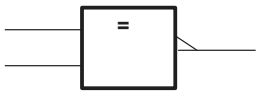
An exclusive-OR gate has many applications, some of which can be represented better by alternative logic symbols.

**EXCLUSIVE OR**



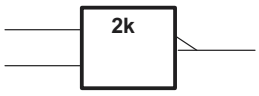

These are five equivalent exclusive-OR symbols valid for an SN74AHCT86 gate in positive logic; negation may be shown at any two ports.

**LOGIC-IDENTITY ELEMENT**



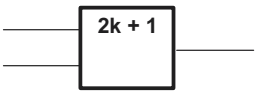

The output is active (low) if all inputs stand at the same logic level (that is, A = B).

**EVEN-PARITY ELEMENT**




The output is active (low) if an even number of inputs (that is, 0 or 2) are active.

**ODD-PARITY ELEMENT**




The output is active (high) if an odd number of inputs (that is, only 1 of the 2) are active.

**概略回路図**

このリソースの元の言語は英語です。 翻訳は概要を便宜的に提供するもので、自動化ツール (機械翻訳) を使用していることがあり、TI では翻訳の正確性および妥当性につきましては一切保証いたしません。 実際の設計などの前には、ti.com で必ず最新の英語版をご参照くださいますようお願いいたします。

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## 4 Revision History

資料番号末尾の英字は改訂を表しています。その改訂履歴は英語版に準じています。

| Changes from Revision O (May 2023) to Revision P (October 2023) | Page |
|---|---|
| • Updated RθJA values: D = 97.5 to 124.5, PW = 125.1 to 147.7; Updated D and PW packages for RθJC(top), RθJB, ΨJT, ΨJB, and RθJC(bot), all values in °C/W | 6 |

| Changes from Revision N (August 2014) to Revision O (May 2023) | Page |
|---|---|
| • ドキュメント全体にわたって表、図、相互参照の採番方法を更新 | 1 |
| • 「パッケージ情報」表を更新 | 1 |
| • データシートに BQA パッケージを追加 | 1 |


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## 5 Pin Configuration and Functions

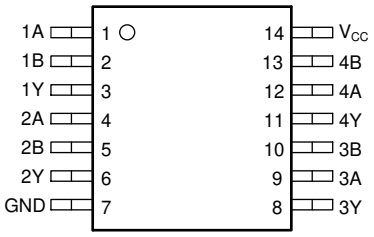



**図 5-1. SN54AHCT86 J or W Package, 14-Pin (Top View)**
**SN74AHCT86 D, DB, DGV, N, NS, or PW Package, 14-Pin (Top View)**

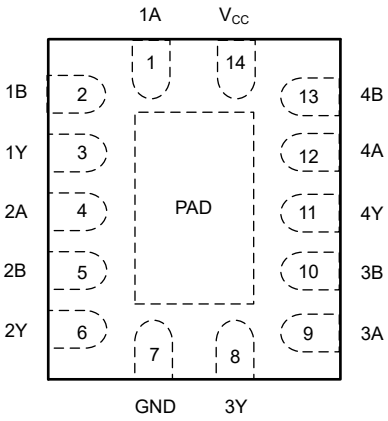



**図 5-2. SN74AHCT86 RGY or BQA Package, 14-Pin (Top View)**

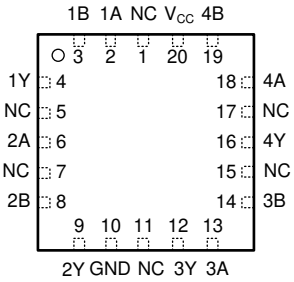



**図 5-3. SN54AHCT86 FK Package, 20-Pin (Top View)**

**表 5-1. Pin Functions**

| PIN | | | | | TYPE[1] | DESCRIPTION |
|---|---|---|---|---|---|---|
| NAME | SN74AHCT86 | | SN54AHCT86 | | | |
| | D, DB, DGV, N, NS, PW | RGY, BQA | J, W | FK | | |
| 1A | 1 | 1 | 1 | 2 | I | 1A Input |
| 1B | 2 | 2 | 2 | 3 | I | 1B Input |
| 1Y | 3 | 3 | 3 | 4 | O | 1Y Output |
| 2A | 4 | 4 | 4 | 6 | I | 2A Input |
| 2B | 5 | 5 | 5 | 8 | I | 2B Input |
| 2Y | 6 | 6 | 6 | 9 | O | 2Y Output |
| 3Y | 8 | 8 | 8 | 12 | O | 3Y Output |
| 3A | 9 | 9 | 9 | 13 | I | 3A Input |
| 3B | 10 | 10 | 10 | 14 | I | 3B Input |
| 4Y | 11 | 11 | 11 | 16 | O | 4Y Output |
| 4A | 12 | 12 | 12 | 18 | I | 4A Input |
| 4B | 13 | 13 | 13 | 19 | I | 4B Input |
| GND | 7 | 7 | 7 | 10 | — | Ground Pin |
| NC | — | — | — | 1, 5, 7, 11, 15, 17 | — | No Connection |
| $V_{CC}$ | 14 | 14 | 14 | 20 | — | Power Pin |

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**表 5-1. Pin Functions (続き)**

| PIN | | | | | TYPE[1] | DESCRIPTION |
|---|---|---|---|---|---|---|
| NAME | SN74AHCT86 | | SN54AHCT86 | | | |
| | D, DB, DGV, N, NS, PW | RGY, BQA | J, W | FK | | |
| Thermal Pad | — | PAD | — | — | — | Thermal Pad |

(1) I = input, O = output


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# 6 Specifications

## 6.1 Absolute Maximum Ratings

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

| | | | MIN | MAX | UNIT |
|---|---|---|---|---|---|
| $V_{CC}$ | Supply voltage range | | –0.5 | 7 | V |
| $V_I$ | Input voltage range(2) | | –0.5 | 7 | V |
| $V_O$ | Output voltage range(2) | | –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 or $V_O$ > $V_{CC}$ | | ±20 | mA |
| $I_O$ | Continuous output current | $V_O$ = 0 to $V_{CC}$ | | ±25 | mA |
| | Continuous current through $V_{CC}$ or GND | | | ±50 | mA |

(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 voltage ratings may be exceeded if the input and output current ratings are observed.

## 6.2 ESD Ratings

| | | | MIN | MAX | UNIT |
|---|---|---|---|---|---|
| $T_{stg}$ | Storage temperature range | | –65 | 150 | °C |
| $V_{(ESD)}$ | Electrostatic discharge | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins(1) | 0 | 2000 | V |
| | | Charged device model (CDM), per ANSI/ESDA/JEDEC JS-002, all pins(2) | 0 | 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.

## 6.3 Recommended Operating Conditions

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

| | | SN54AHCT86 | | SN74AHCT86 | | UNIT |
|---|---|---|---|---|---|---|
| | | MIN | MAX | MIN | MAX | |
| $V_{CC}$ | Supply voltage | 4.5 | 5.5 | 4.5 | 5.5 | V |
| $V_{IH}$ | High-level input voltage | 2 | | 2 | | V |
| $V_{IL}$ | Low-level input voltage | | 0.8 | | 0.8 | V |
| $V_I$ | Input voltage | 0 | 5.5 | 0 | 5.5 | V |
| $V_O$ | Output voltage | 0 | $V_{CC}$ | 0 | $V_{CC}$ | V |
| $I_{OH}$ | High-level output current | | –8 | | –8 | mA |
| $I_{OL}$ | Low-level output current | | 8 | | 8 | mA |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | | 20 | | 20 | ns/V |
| $T_A$ | Operating free-air temperature | –55 | 125 | –40 | 125 | °C |

(1) All unused inputs of the device must be held at $V_{CC}$ or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs* (SCBA004).

## 6.4 Thermal Information

| THERMAL METRIC(1) | | SNx4AHCT86 | | | | | | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | D | DB | DGV | N | NS | PW | RGY | BQA | |
| | | 14 PINS | | | | | | | | |
| $R_{\theta JA}$ | Junction-to-ambient thermal resistance | 124.5 | 109.5 | 133.3 | 59.7 | 92.2 | 147.7 | 59.0 | 88.3 | °C/W |
| $R_{\theta JC(top)}$ | Junction-to-case (top) thermal resistance | 78.8 | 62.1 | 55.6 | 47.3 | 49.8 | 77.4 | 72.5 | 90.9 | |
| $R_{\theta JB}$ | Junction-to-board thermal resistance | 81 | 56.9 | 66.3 | 39.5 | 51.0 | 90.9 | 35.0 | 56.8 | |
| $\psi_{JT}$ | Junction-to-top characterization parameter | 37 | 22.6 | 7.8 | 32.4 | 15.7 | 27.2 | 3.9 | 9.9 | |
| $\psi_{JB}$ | Junction-to-board characterization parameter | 80.6 | 56.3 | 56.6 | 39.4 | 50.6 | 90.2 | 35.1 | 56.7 | |
| $R_{\theta JC(bot)}$ | Junction-to-case (bottom) thermal resistance | N/A | N/A | N/A | N/A | N/A | N/A | 15.4 | 33.4 | |

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

## 6.5 Electrical Characteristics

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

| PARAMETER | TEST CONDITIONS | $V_{CC}$ | $T_A$ = 25°C | | | SN54AHCT86 | | –40°C to 85°C SN74AHCT86 | | –40°C to 125°C SN74AHCT86 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| $V_{OH}$ | $I_{OH}$ = −50 µA | 4.5 V | 4.4 | 4.5 | | 4.4 | | 4.4 | | 4.4 | | V |
| | $I_{OH}$ = −8 mA | | 3.94 | | | 3.8 | | 3.8 | | 3.8 | | |
| $V_{OL}$ | $I_{OL}$ = 50 µA | 4.5 V | | | 0.1 | | 0.1 | | 0.1 | | 0.1 | V |
| | $I_{OL}$ = 8 mA | | | | 0.36 | | 0.44 | | 0.44 | | 0.44 | |
| $I_I$ | $V_I$ = 5.5 V or GND | 0 V to 5.5 V | | | ±0.1 | | ±1(1) | | ±1 | | ±1 | µA |
| $I_{CC}$ | $V_I$ = $V_{CC}$ or GND, $I_O$ = 0 | 5.5 V | | | 2 | | 20 | | 20 | | 20 | µA |
| $\Delta I_{CC}$ (2) | One input at 3.4 V, Other inputs at $V_{CC}$ or GND | 5.5 V | | | 1.35 | | 1.5 | | 1.5 | | 1.5 | mA |
| $C_i$ | $V_I$ = $V_{CC}$ or GND | 5 V | | 4 | 10 | | | | 10 | | | pF |

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested at $V_{CC}$ = 0 V.
(2) This is the increase in supply current for each input at one of the specified TTL voltage levels, rather than 0 V or $V_{CC}$.

## 6.6 Switching Characteristics

over recommended operating free-air temperature range, $V_{CC}$ = 5 V ± 0.5 V (unless otherwise noted) (see 図 7-1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | LOAD CAPACITANCE | $T_A$ = 25°C | | | –55°C to 125°C SN54AHCT86 | | –40°C to 85°C SN74AHCT86 | | –40°C to 125°C SN74AHCT86 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | A or B | Y | $C_L$ = 15 pF | | 5(1) | 6.9(1) | 1(1) | 8(1) | 1 | 8 | 1 | 9 | ns |
| $t_{PHL}$ | | | | | 5(1) | 6.9(1) | 1(1) | 8(1) | 1 | 8 | 1 | 9 | |
| $t_{PLH}$ | A or B | Y | $C_L$ = 50 pF | | 5.5 | 8.8 | 1 | 10 | 1 | 9 | 1 | 11 | ns |
| $t_{PHL}$ | | | | | 5.5 | 8.8 | 1 | 10 | 1 | 9 | 1 | 11 | |

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


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## 6.7 Noise Characteristics

$V_{CC}$ = 5 V, $C_L$ = 50 pF, $T_A$ = 25°C(1)

| PARAMETER | | SN74AHCT86 | | | UNIT |
|---|---|---|---|---|---|
| | | MIN | TYP | MAX | |
| $V_{OL(P)}$ | Quiet output, maximum dynamic $V_{OL}$ | | 0.4 | 0.8 | V |
| $V_{OL(V)}$ | Quiet output, minimum dynamic $V_{OL}$ | | –0.4 | –0.8 | V |
| $V_{OH(V)}$ | Quiet output, minimum dynamic $V_{OH}$ | 4.4 | | | V |
| $V_{IH(D)}$ | High-level dynamic input voltage | 2 | | | V |
| $V_{IL(D)}$ | Low-level dynamic input voltage | | | 0.8 | V |

(1) Characteristics are for surface-mount packages only.

## 6.8 Operating Characteristics

$V_{CC}$ = 5 V, $T_A$ = 25°C

| PARAMETER | | TEST CONDITIONS | | TYP | UNIT |
|---|---|---|---|---|---|
| $C_{pd}$ | Power dissipation capacitance | No load, | f = 1 MHz | 18 | pF |

## 6.9 Typical Characteristics

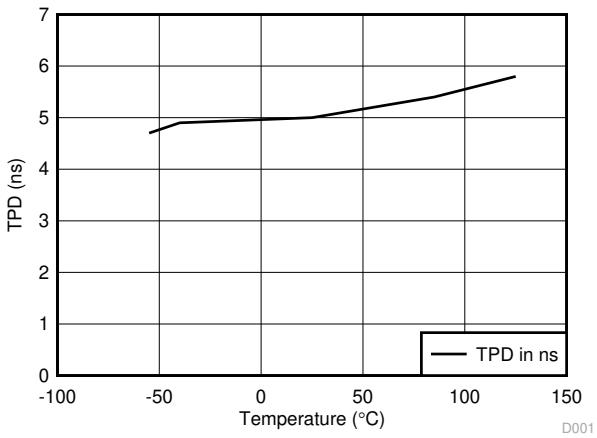
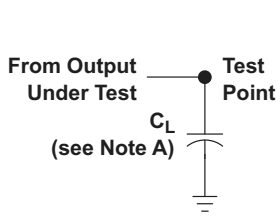
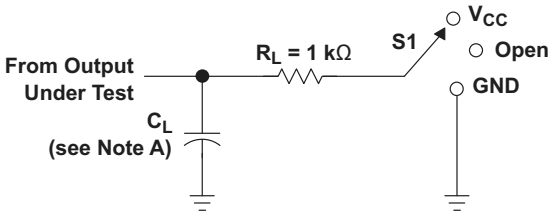



図 6-1. TPD vs Temperature

## 7 Parameter Measurement Information

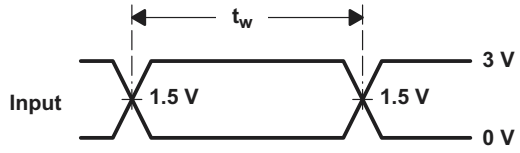



LOAD CIRCUIT FOR
TOTEM-POLE OUTPUTS

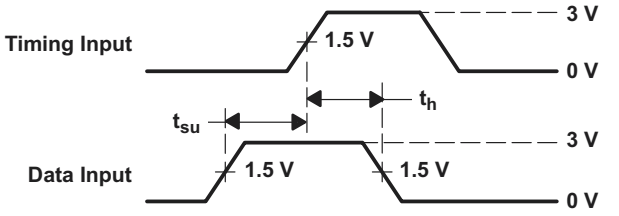



| TEST | S1 |
|---|---|
| $t_{PLH}/t_{PHL}$ | Open |
| $t_{PLZ}/t_{PZL}$ | $V_{CC}$ |
| $t_{PHZ}/t_{PZH}$ | GND |
| Open Drain | $V_{CC}$ |

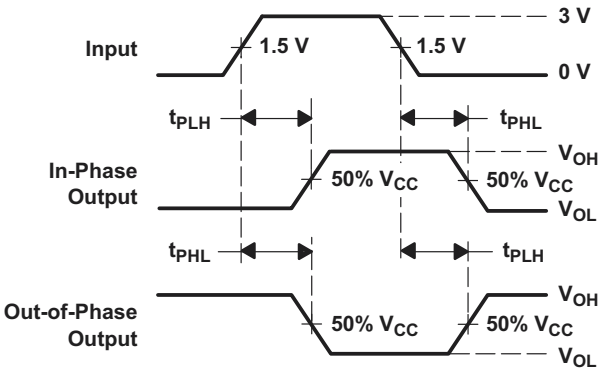
LOAD CIRCUIT FOR
3-STATE AND OPEN-DRAIN OUTPUTS



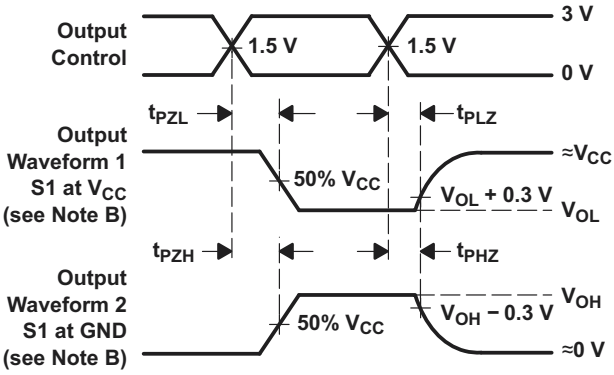

VOLTAGE WAVEFORMS
PULSE DURATION




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 ≤ 1 MHz, $Z_O$ = 50 Ω, $t_r$ ≤ 3 ns, $t_f$ ≤ 3 ns.
D. The outputs are measured one at a time with one input transition per measurement.
E. All parameters and waveforms are not applicable to all devices.

**図 7-1. Load Circuit and Voltage Waveforms**


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# 8 Detailed Description

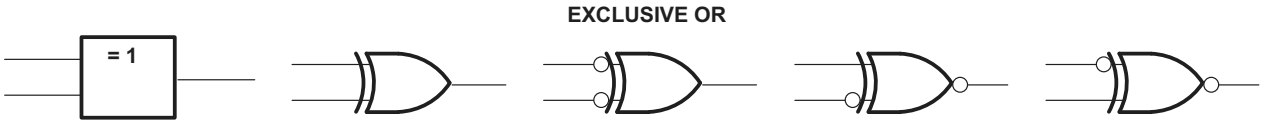
## 8.1 Overview

The SNx4AHCT86 devices are quadruple 2-input exclusive-OR gates. These devices perform the Boolean function $Y = A \times B$ or $Y = \overline{A}B + A\overline{B}$ in positive logic.

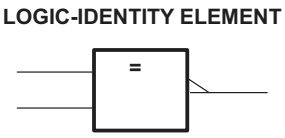
The inputs are TTL compatible allowing 3.3 V to 5 V translation.

## 8.2 Functional Block Diagram

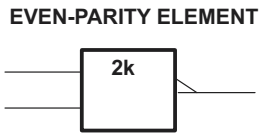
An exclusive-OR gate has many applications, some of which can be represented better by alternative logic symbols.



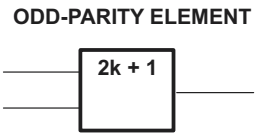

These are five equivalent exclusive-OR symbols valid for an SN74AHCT86 gate in positive logic; negation may be shown at any two ports.




The output is active (low) if all inputs stand at the same logic level (that is, A = B).




The output is active (low) if an even number of inputs (that is, 0 or 2) are active.




The output is active (high) if an odd number of inputs (that is, only 1 of the 2) are active.

**図 8-1. Exclusive-OR Logic**

## 8.3 Feature Description

- TTL inputs
  - Lowered switching threshold allows up translation 3.3 V to 5 V
- Slow edges reduce output ringing

## 8.4 Device Functional Modes

**表 8-1. Function Table (Each Gate)**

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

# 9 Application and Implementation

**注**

以下のアプリケーション情報は、TI の製品仕様に含まれるものではなく、TI ではその正確性または完全性を保証いたしません。個々の目的に対する製品の適合性については、お客様の責任で判断していただくことになります。お客様は自身の設計実装を検証しテストすることで、システムの機能を確認する必要があります。

## 9.1 Application Information

The SNx4AHCT86 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 input switching levels have been lowered to accommodate TTL inputs of 0.8-V $V_{IL}$ and 2-V $V_{IH}$. This feature makes the device ideal for translating up from 3.3 V to 5 V. 図 9-2 shows this type of translation.

## 9.2 Typical Application

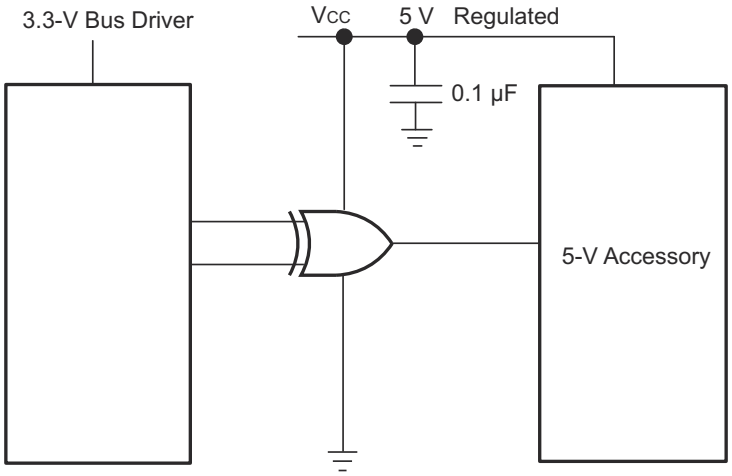



**図 9-1. Typical Application Schematic**

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

### 9.2.2 Detailed Design Procedure

1. Recommended input conditions:
   - Rise time and fall time specs: see (Δt/ΔV) in the *Recommended Operating Conditions* table.
   - Specified High and low levels: see ($V_{IH}$ and $V_{IL}$) in the *Recommended Operating Conditions* table.
   - Inputs are overvoltage tolerant allowing them to go as high as 5.5 V at any valid $V_{CC}$
2. Recommend output conditions:
   - Load currents should not exceed 25 mA per output and 75 mA total for the part
   - Outputs should not be pulled above $V_{CC}$


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### 9.2.3 Application Curves

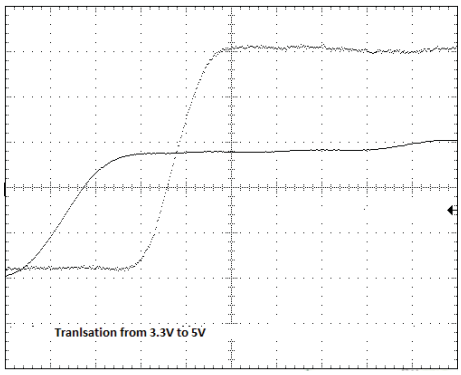



**図 9-2. Up Translation**

## 9.3 Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply voltage rating located in the *Recommended Operating Conditions* 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, 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 1 µF are commonly used in parallel. The bypass capacitor should be installed as close to the power pin as possible for best results.

## 9.4 Layout

### 9.4.1 Layout Guidelines

When using multiple bit logic devices inputs should not ever 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. Specified in 図 9-3 are 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. 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 IOs so they cannot float when disabled.

### 9.4.2 Layout Example

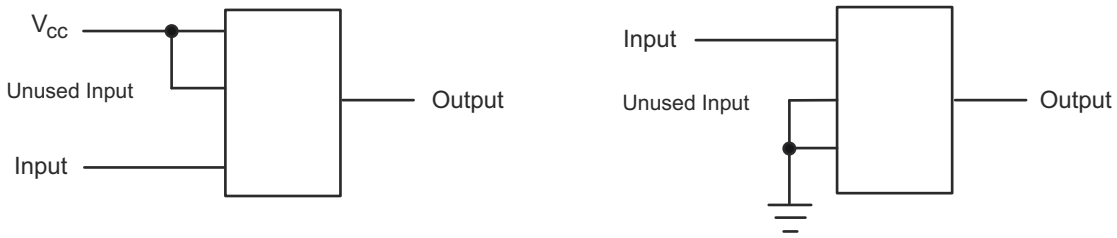



**図 9-3. Layout Diagram**

# 10 Device and Documentation Support

## 10.1 ドキュメントの更新通知を受け取る方法

ドキュメントの更新についての通知を受け取るには、ti.com のデバイス製品フォルダを開いてください。「更新の通知を受け取る」をクリックして登録すると、変更されたすべての製品情報に関するダイジェストを毎週受け取れます。変更の詳細については、修正されたドキュメントに含まれている改訂履歴をご覧ください。

## 10.2 サポート・リソース

TI E2E™ サポート・フォーラムは、エンジニアが検証済みの回答と設計に関するヒントをエキスパートから迅速かつ直接得ることができる場所です。既存の回答を検索したり、独自の質問をしたりすることで、設計で必要な支援を迅速に得ることができます。

リンクされているコンテンツは、該当する貢献者により、現状のまま提供されるものです。これらは TI の仕様を構成するものではなく、必ずしも TI の見解を反映したものではありません。TI の使用条件を参照してください。

## 10.3 Trademarks

TI E2E™ is a trademark of Texas Instruments.
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## 10.4 静電気放電に関する注意事項



この IC は、ESD によって破損する可能性があります。テキサス・インスツルメンツは、IC を取り扱う際には常に適切な注意を払うことを推奨します。正しい取り扱いおよび設置手順に従わない場合、デバイスを破損するおそれがあります。

ESD による破損は、わずかな性能低下からデバイスの完全な故障まで多岐にわたります。精密な IC の場合、パラメータがわずかに変化するだけで公表されている仕様から外れる可能性があるため、破損が発生しやすくなっています。

## 10.5 用語集

テキサス・インスツルメンツ用語集　この用語集には、用語や略語の一覧および定義が記載されています。

# 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.


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## 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) |
|---|---|---|---|---|---|---|---|---|---|
| 5962-9681701Q2A | Last Time Buy | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9681701Q2A SNJ54AHCT 86FK |
| 5962-9681701QCA | Active | Production | CDIP (J) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9681701QCA SNJ54AHCT86J |
| SN74AHCT86BQAR | Active | Production | WQFN (BQA) \| 14 | 3000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | AHCT86 |
| SN74AHCT86BQAR.A | Active | Production | WQFN (BQA) \| 14 | 3000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | AHCT86 |
| SN74AHCT86D | Obsolete | Production | SOIC (D) \| 14 | - | - | Call TI | Call TI | -40 to 85 | AHCT86 |
| SN74AHCT86DBR | Active | Production | SSOP (DB) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HB86 |
| SN74AHCT86DBR.A | Active | Production | SSOP (DB) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HB86 |
| SN74AHCT86DGVR | Active | Production | TVSOP (DGV) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HB86 |
| SN74AHCT86DGVR.A | Active | Production | TVSOP (DGV) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HB86 |
| SN74AHCT86DR | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | AHCT86 |
| SN74AHCT86DR.A | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | AHCT86 |
| SN74AHCT86N | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 125 | SN74AHCT86N |
| SN74AHCT86N.A | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 125 | SN74AHCT86N |
| SN74AHCT86NSR | Active | Production | SOP (NS) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | AHCT86 |
| SN74AHCT86NSR.A | Active | Production | SOP (NS) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | AHCT86 |
| SN74AHCT86PW | Obsolete | Production | TSSOP (PW) \| 14 | - | - | Call TI | Call TI | -40 to 125 | HB86 |
| SN74AHCT86PWR | Active | Production | TSSOP (PW) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU \| SN | Level-1-260C-UNLIM | -40 to 125 | HB86 |
| SN74AHCT86PWR.A | Active | Production | TSSOP (PW) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HB86 |
| SN74AHCT86RGYR | NRND | Production | VQFN (RGY) \| 14 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | HB86 |
| SN74AHCT86RGYR.A | NRND | Production | VQFN (RGY) \| 14 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | HB86 |
| SN74AHCT86RGYRG4 | NRND | Production | VQFN (RGY) \| 14 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | HB86 |
| SNJ54AHCT86FK | Last Time Buy | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9681701Q2A SNJ54AHCT 86FK |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| SNJ54AHCT86FK.A | Last Time Buy | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9681701Q2A SNJ54AHCT 86FK |
| SNJ54AHCT86J | Active | Production | CDIP (J) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9681701QC A SNJ54AHCT86J |
| SNJ54AHCT86J.A | Active | Production | CDIP (J) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9681701QC A SNJ54AHCT86J |

(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.

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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 SN54AHCT86, SN74AHCT86 :**

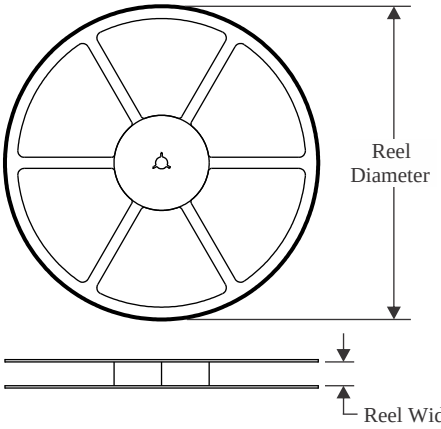
- Catalog : SN74AHCT86
- Military : SN54AHCT86

NOTE: Qualified Version Definitions:

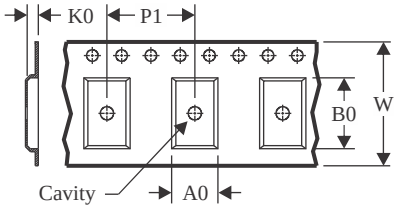
- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**

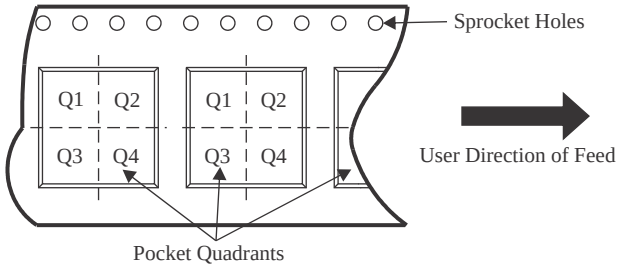



**TAPE DIMENSIONS**




| | |
|---|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

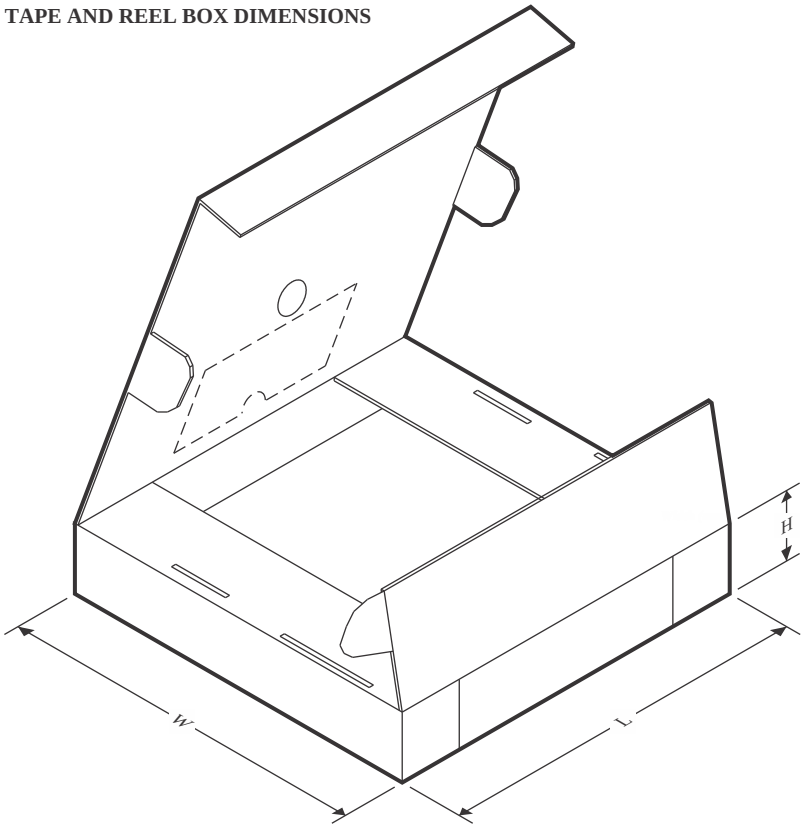
**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**




*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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SN74AHCT86BQAR | WQFN | BQA | 14 | 3000 | 180.0 | 12.4 | 2.8 | 3.3 | 1.1 | 4.0 | 12.0 | Q1 |
| SN74AHCT86DBR | SSOP | DB | 14 | 2000 | 330.0 | 16.4 | 8.35 | 6.6 | 2.4 | 12.0 | 16.0 | Q1 |
| SN74AHCT86DGVR | TVSOP | DGV | 14 | 2000 | 330.0 | 12.4 | 6.8 | 4.0 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74AHCT86DR | SOIC | D | 14 | 2500 | 330.0 | 12.4 | 3.75 | 3.75 | 1.15 | 8.0 | 12.0 | Q1 |
| SN74AHCT86NSR | SOP | NS | 14 | 2000 | 330.0 | 16.4 | 8.1 | 10.4 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74AHCT86PWR | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74AHCT86RGYR | VQFN | RGY | 14 | 3000 | 330.0 | 12.4 | 3.75 | 3.75 | 1.15 | 8.0 | 12.0 | Q1 |

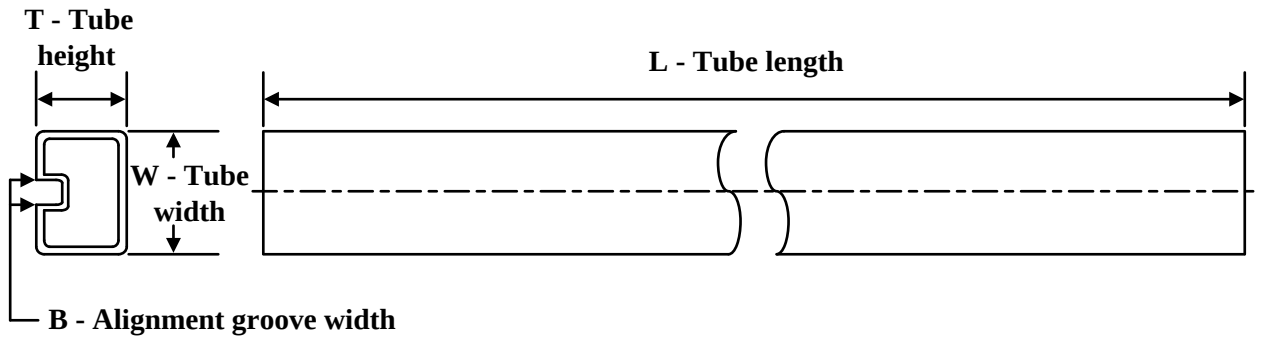
TAPE AND REEL BOX DIMENSIONS




*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| SN74AHCT86BQAR | WQFN | BQA | 14 | 3000 | 210.0 | 185.0 | 35.0 |
| SN74AHCT86DBR | SSOP | DB | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74AHCT86DGVR | TVSOP | DGV | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74AHCT86DR | SOIC | D | 14 | 2500 | 353.0 | 353.0 | 32.0 |
| SN74AHCT86NSR | SOP | NS | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74AHCT86PWR | TSSOP | PW | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74AHCT86RGYR | 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) |
|---|---|---|---|---|---|---|---|---|
| 5962-9681701Q2A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| SN74AHCT86N | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74AHCT86N | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74AHCT86N.A | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74AHCT86N.A | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SNJ54AHCT86FK | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| SNJ54AHCT86FK.A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |

# GENERIC PACKAGE VIEW

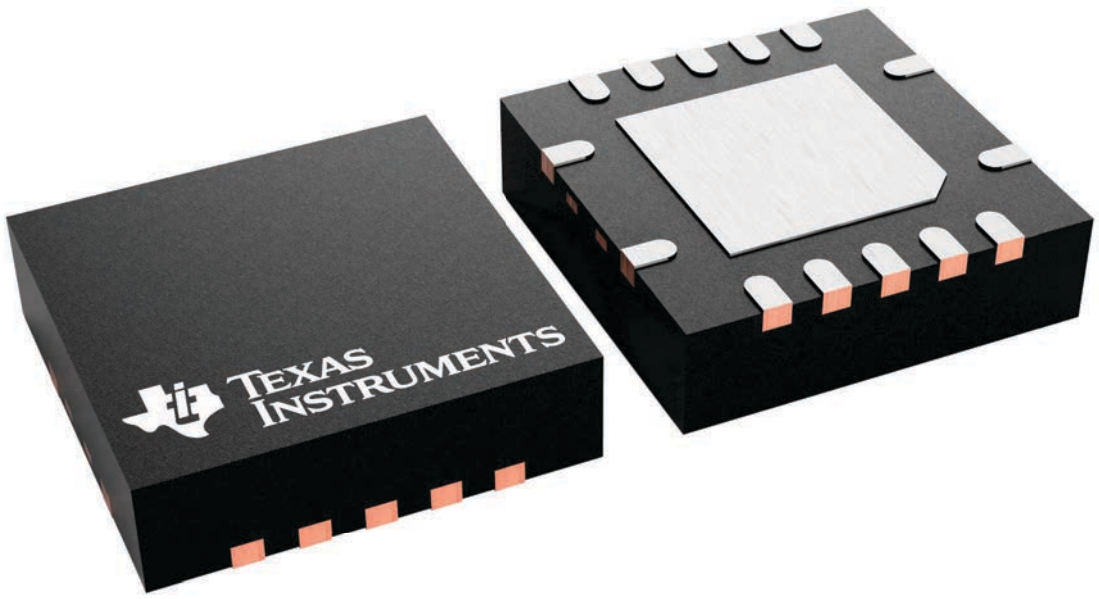
## RGY 14

## VQFN - 1 mm max height

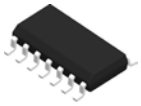
**3.5 x 3.5, 0.5 mm pitch**

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

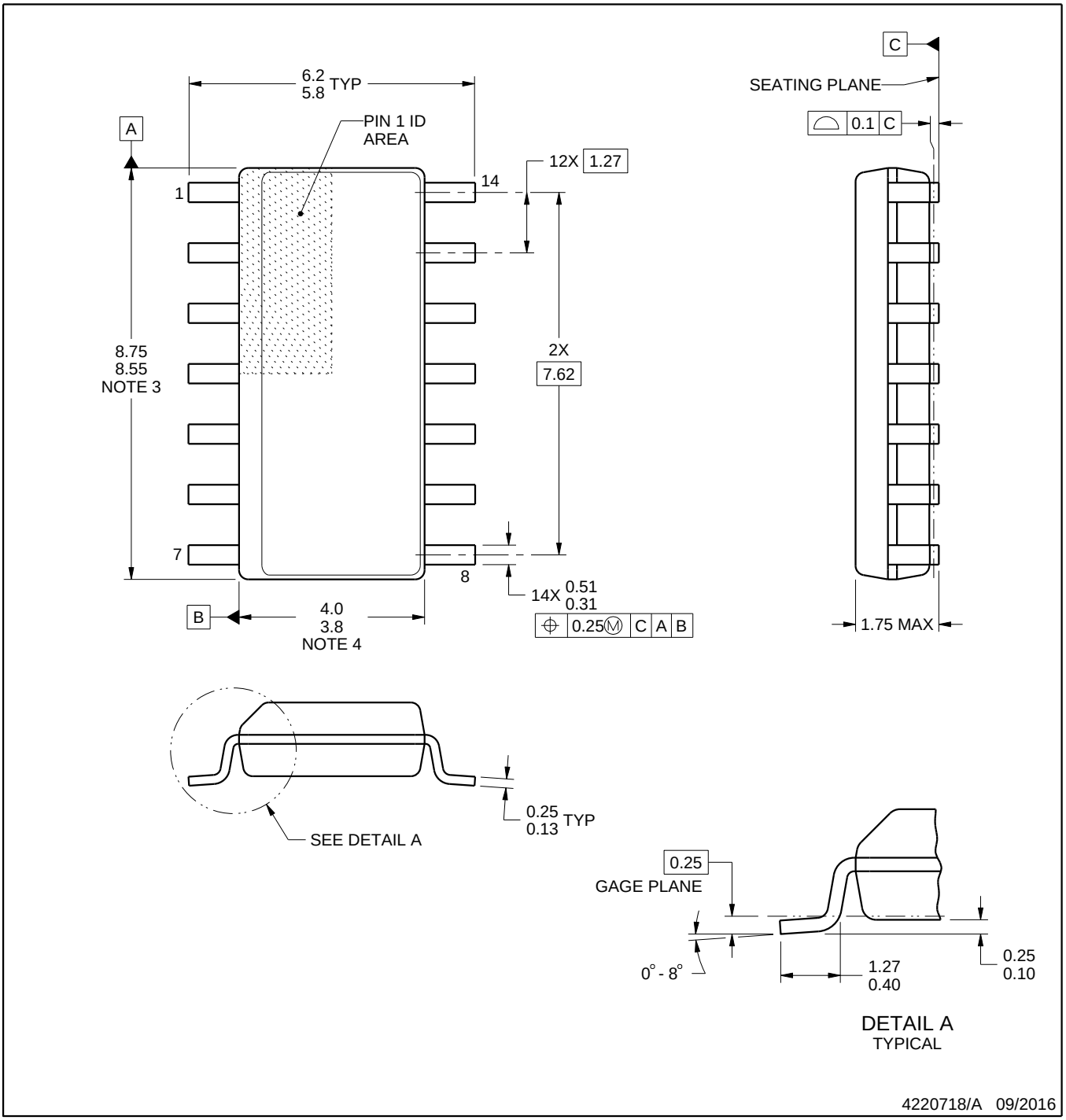


# PACKAGE OUTLINE

## D0014A

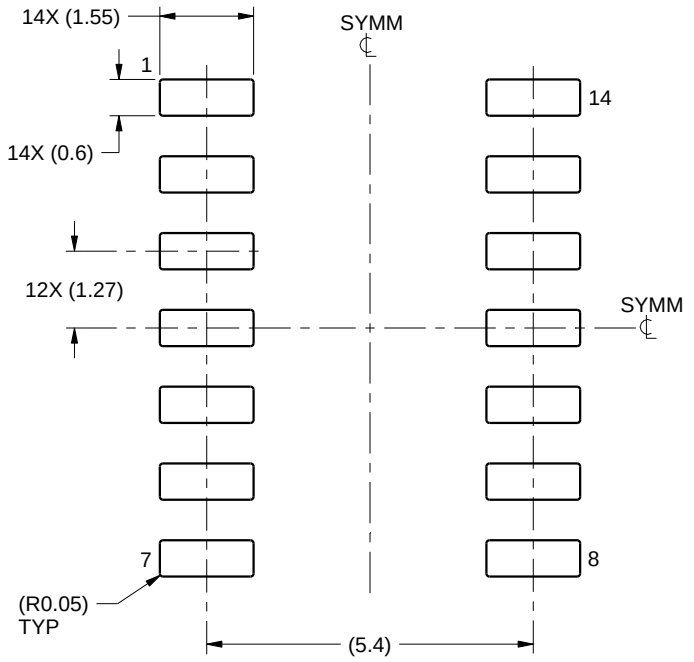
## SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT

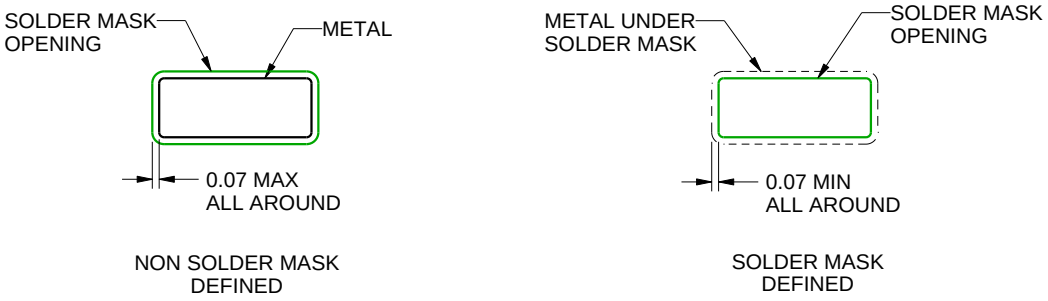



NOTES:

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.




LAND PATTERN EXAMPLE
SCALE:8X




SOLDER MASK DETAILS

4220718/A 09/2016

NOTES: (continued)

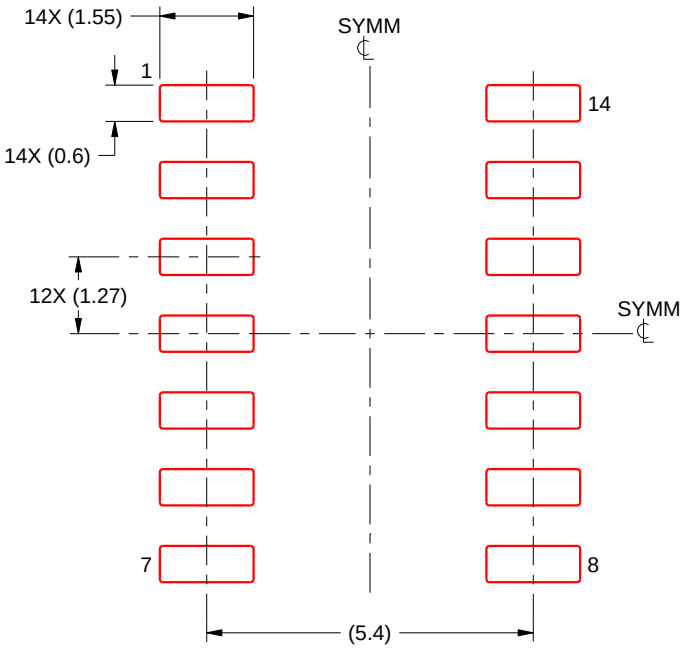
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# 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

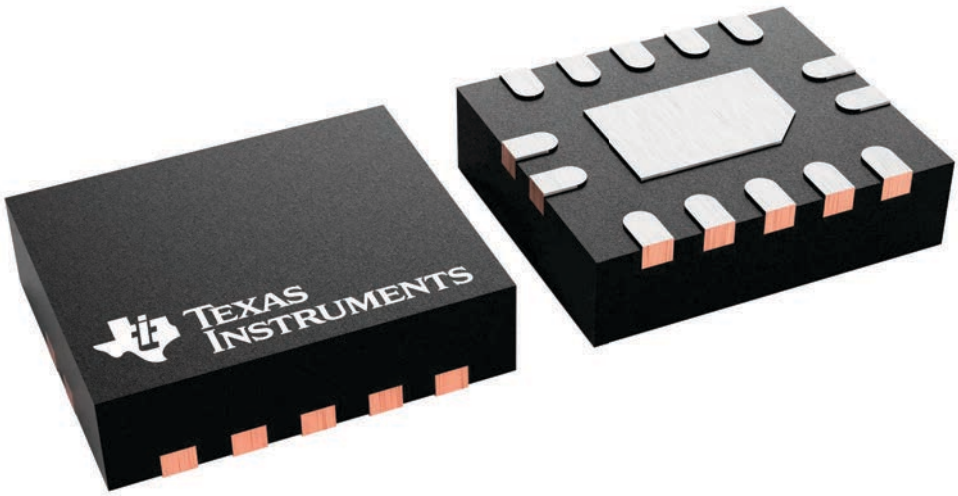
## BQA 14

## 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.

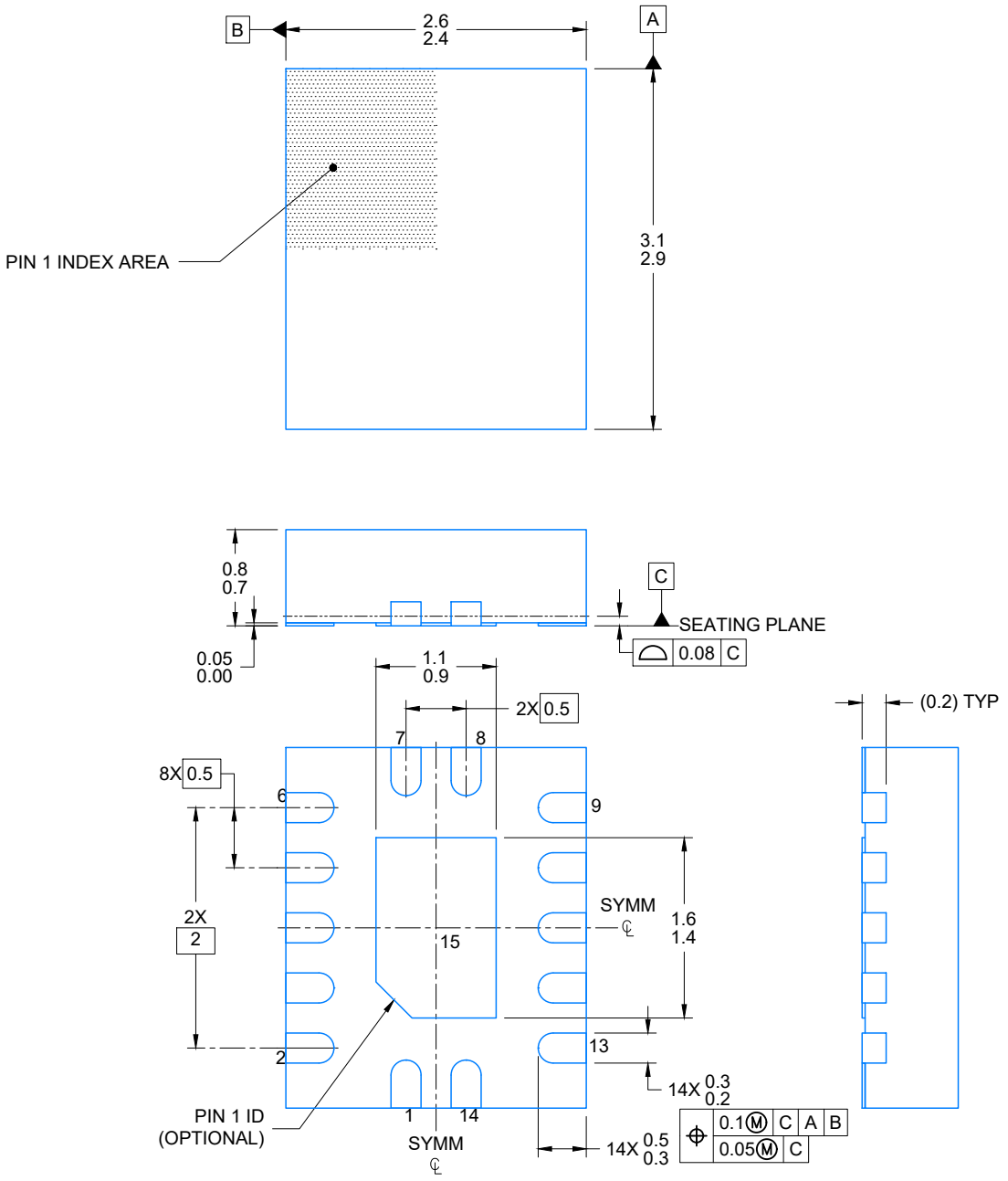


# PACKAGE OUTLINE

## BQA0014A

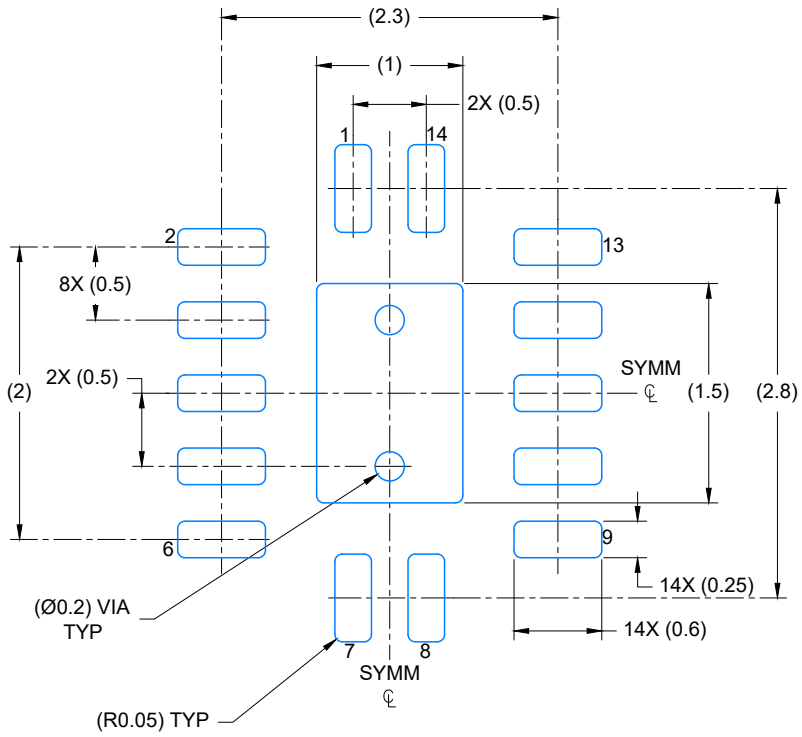
### WQFN - 0.8 mm max height

PLASTIC QUAD FLAT PACK-NO LEAD

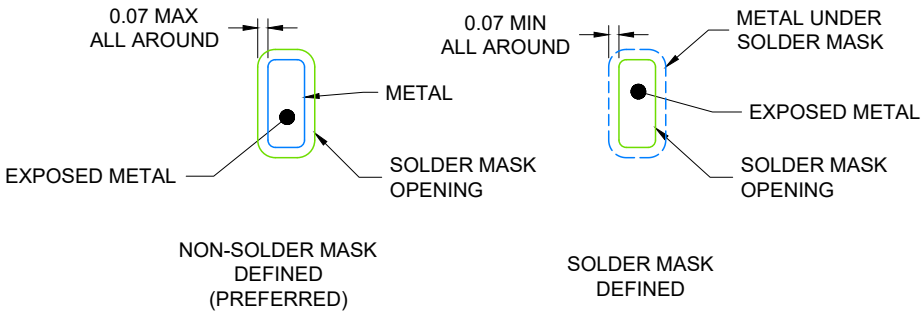



NOTES:

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



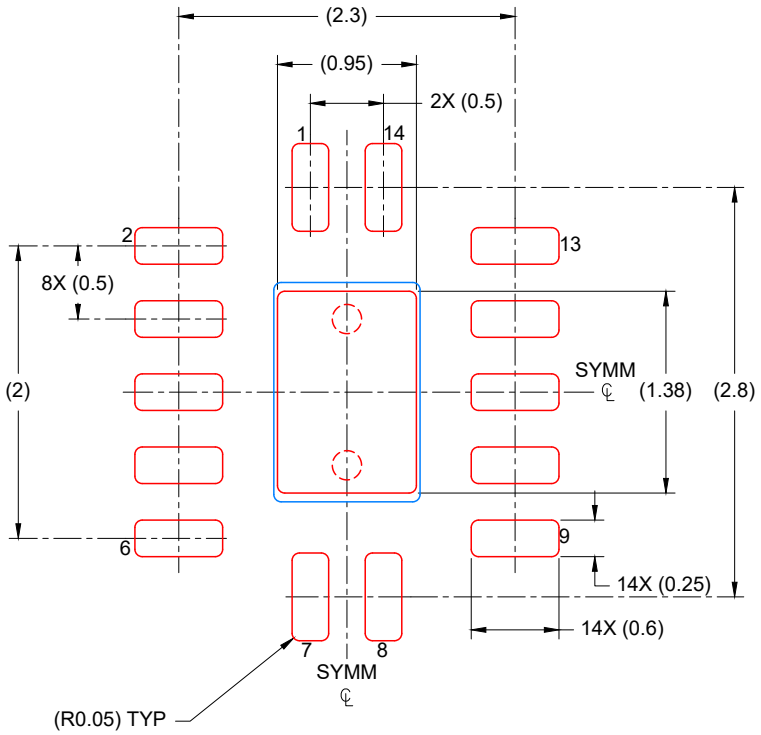

LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 20X




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.




SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

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

4224636/A 11/2018

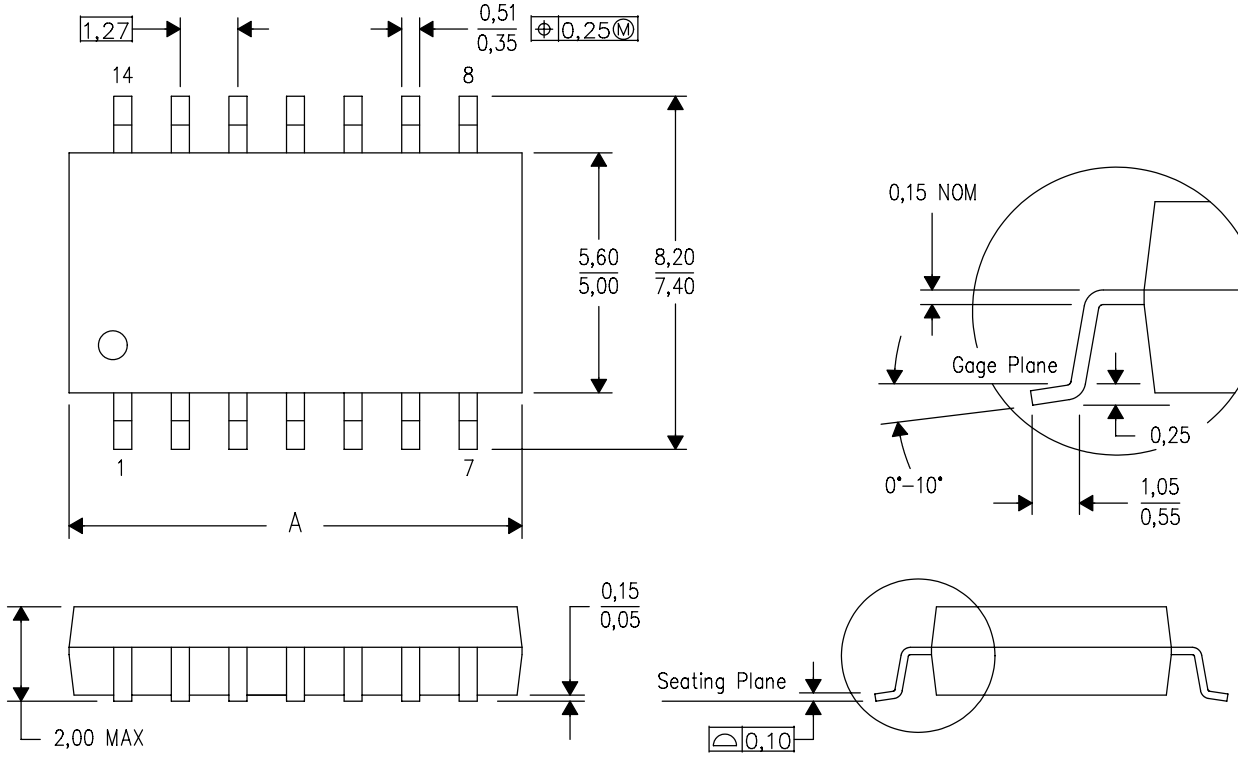
NOTES: (continued)

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**




| DIM \ PINS ** | 14 | 16 | 20 | 24 |
|---|---|---|---|---|
| A MAX | 10,50 | 10,50 | 12,90 | 15,30 |
| A MIN | 9,90 | 9,90 | 12,30 | 14,70 |

4040062/C 03/03

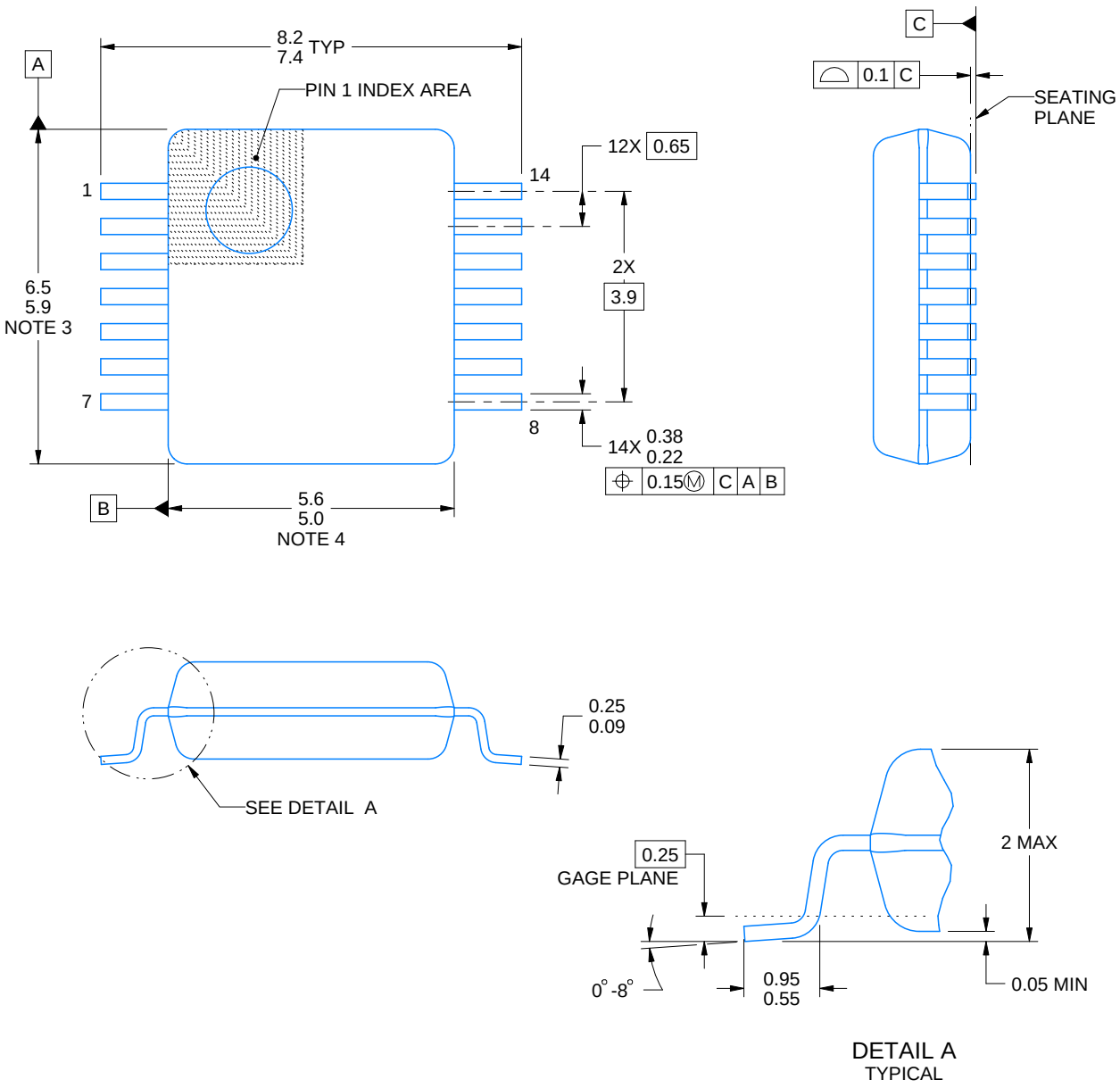
NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

# PACKAGE OUTLINE

## DB0014A

## SSOP - 2 mm max height

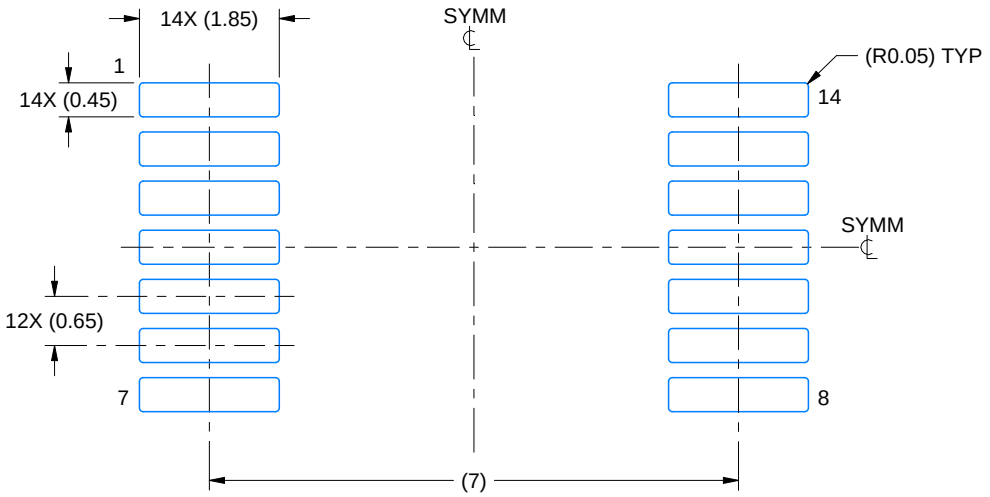
SMALL OUTLINE PACKAGE



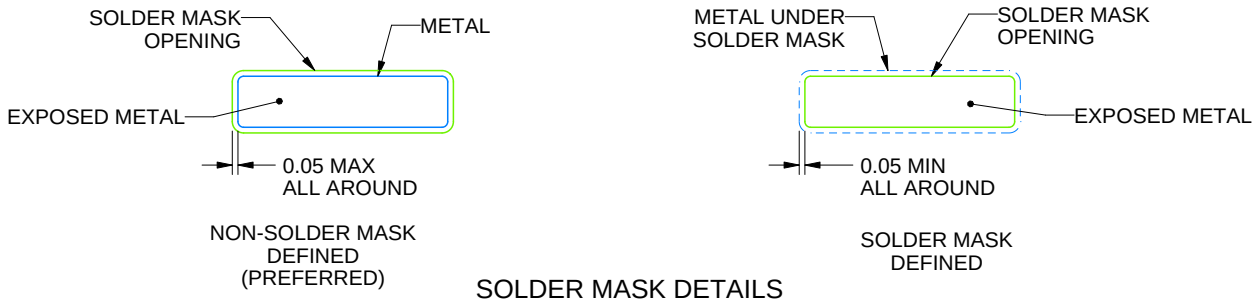

4220762/A 05/2024

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.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

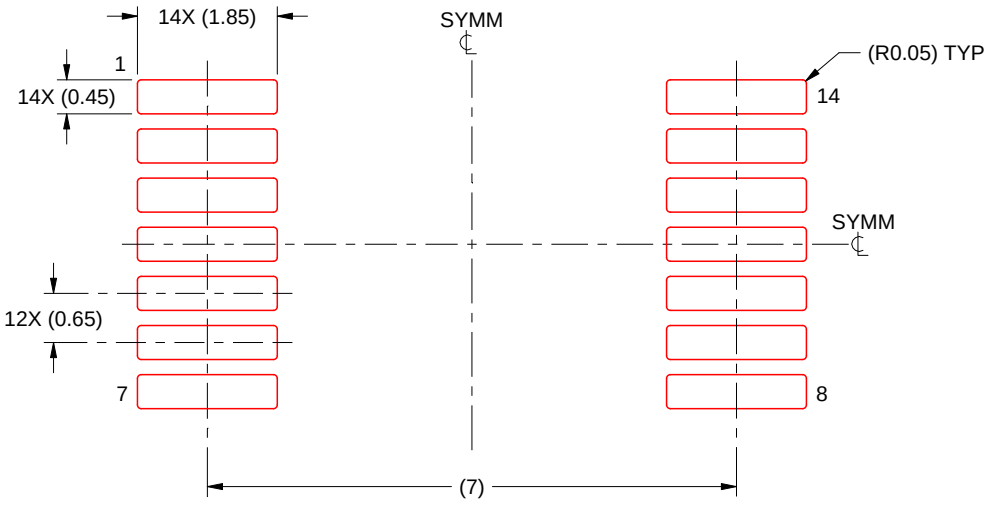



SOLDER MASK DETAILS

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.




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

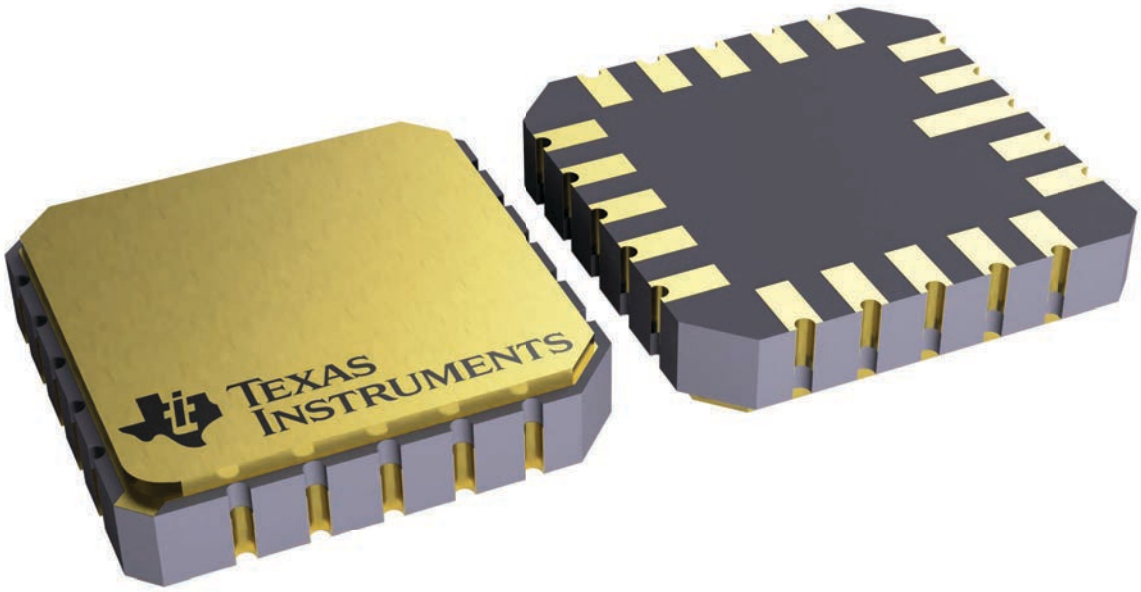
## FK 20

## 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.

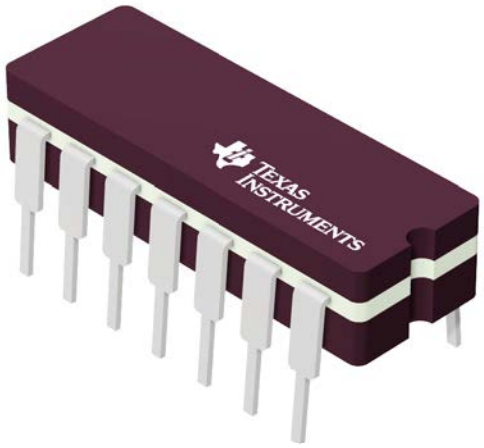



4229370VA\

# GENERIC PACKAGE VIEW

## J 14 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

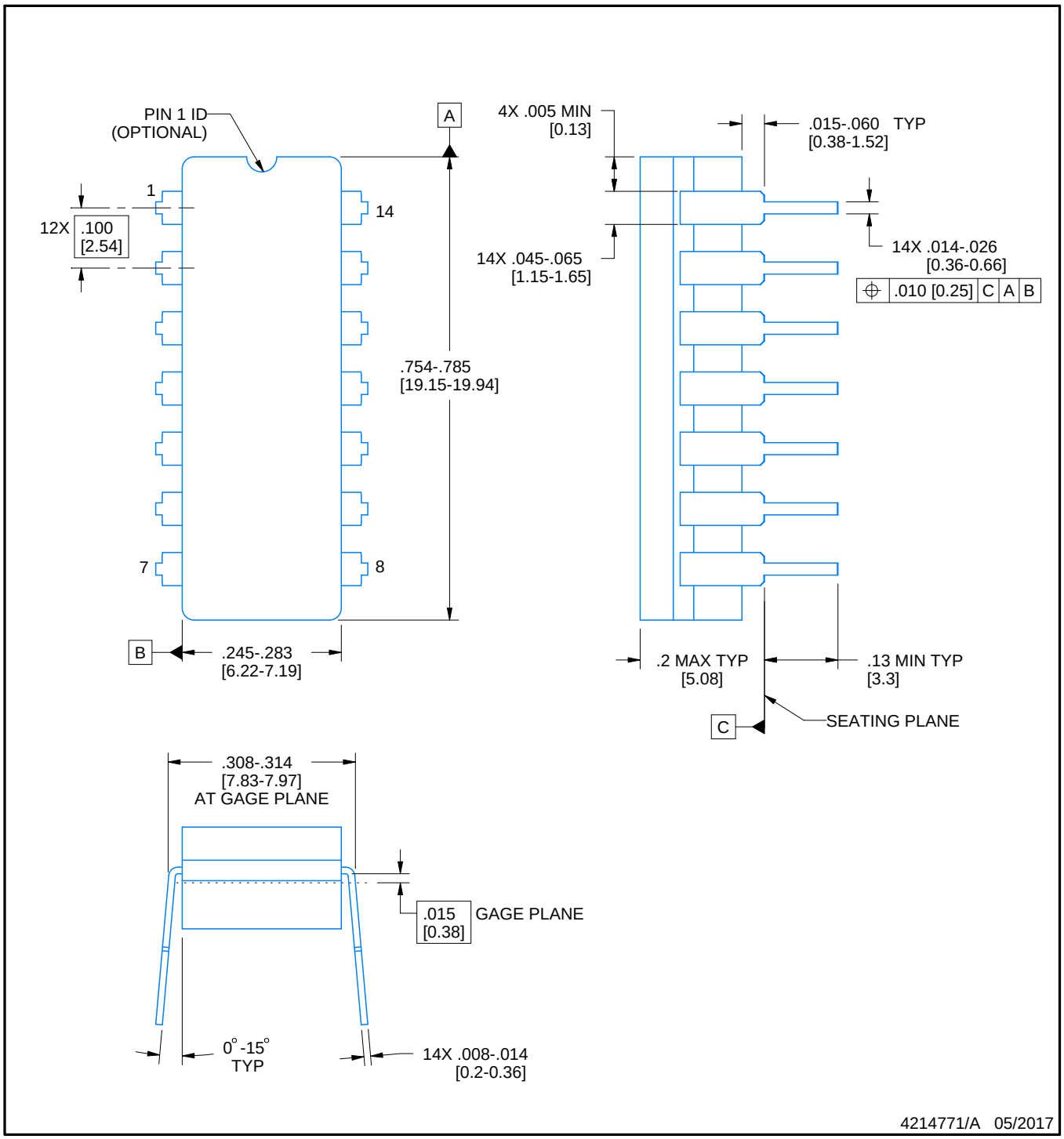


# PACKAGE OUTLINE

## J0014A

## CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE




NOTES:

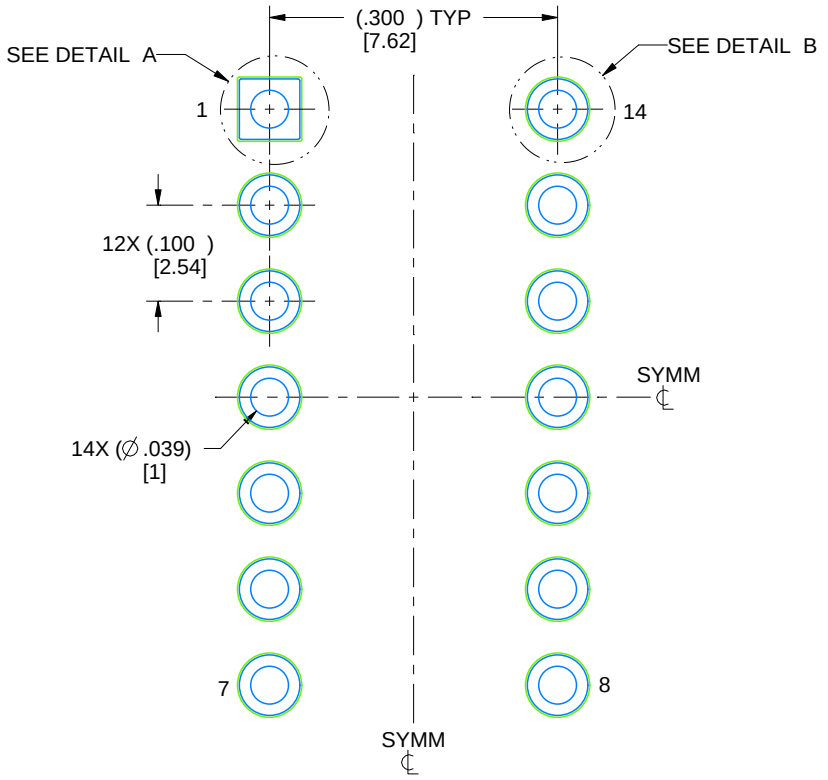
1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermitically sealed with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

# EXAMPLE BOARD LAYOUT

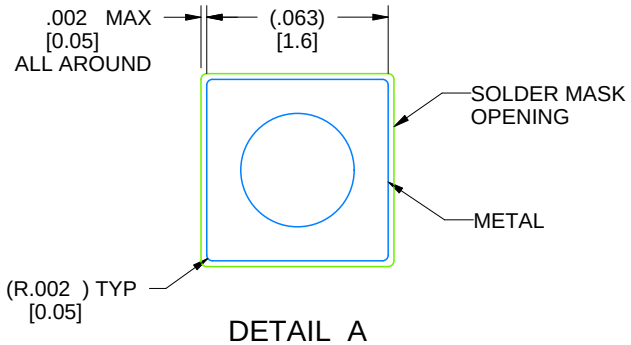
## J0014A

## CDIP - 5.08 mm max height

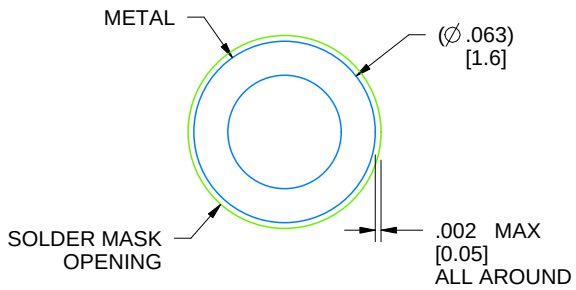
CERAMIC DUAL IN LINE PACKAGE




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




DETAIL A
SCALE: 15X



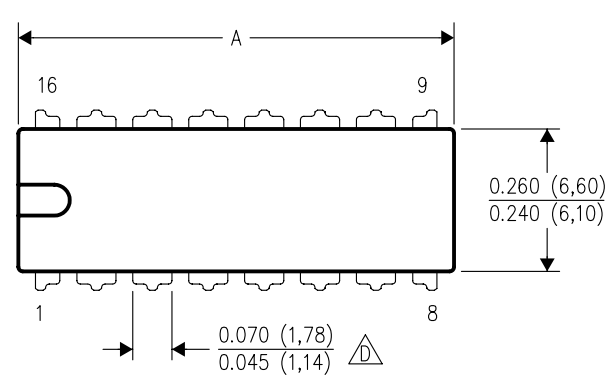

DETAIL B
13X, SCALE: 15X

4214771/A 05/2017

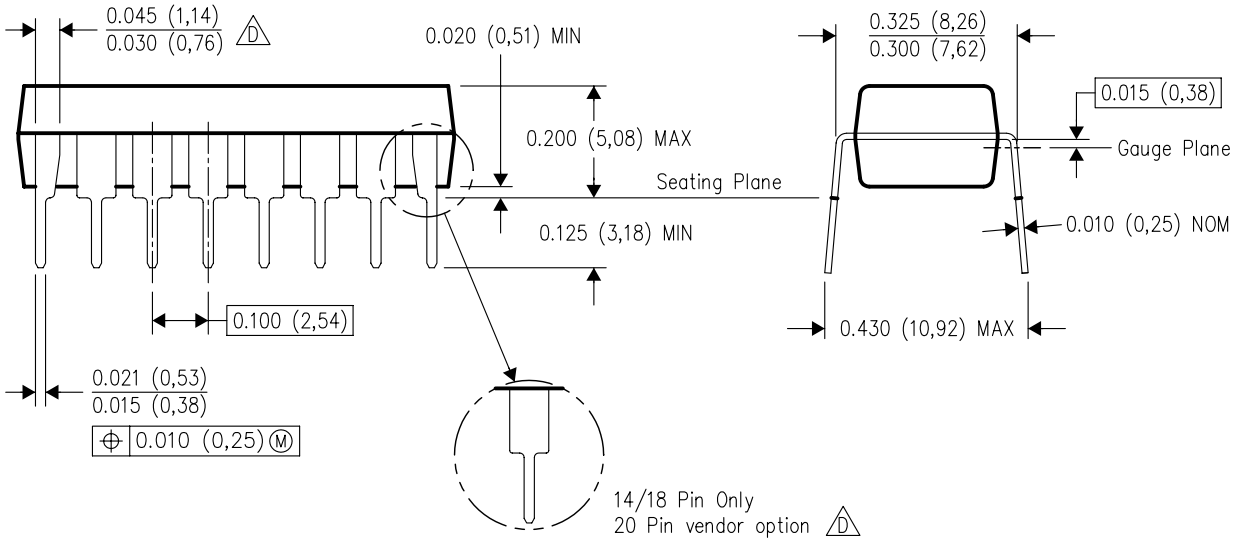
## N (R–PDIP–T**)

## PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN




| DIM \ PINS ** | 14 | 16 | 18 | 20 |
|---|---|---|---|---|
| A MAX | 0.775 (19,69) | 0.775 (19,69) | 0.920 (23,37) | 1.060 (26,92) |
| A MIN | 0.745 (18,92) | 0.745 (18,92) | 0.850 (21,59) | 0.940 (23,88) |
| MS–001 VARIATION (C) | AA | BB | AC | AD |




4040049/E 12/2002

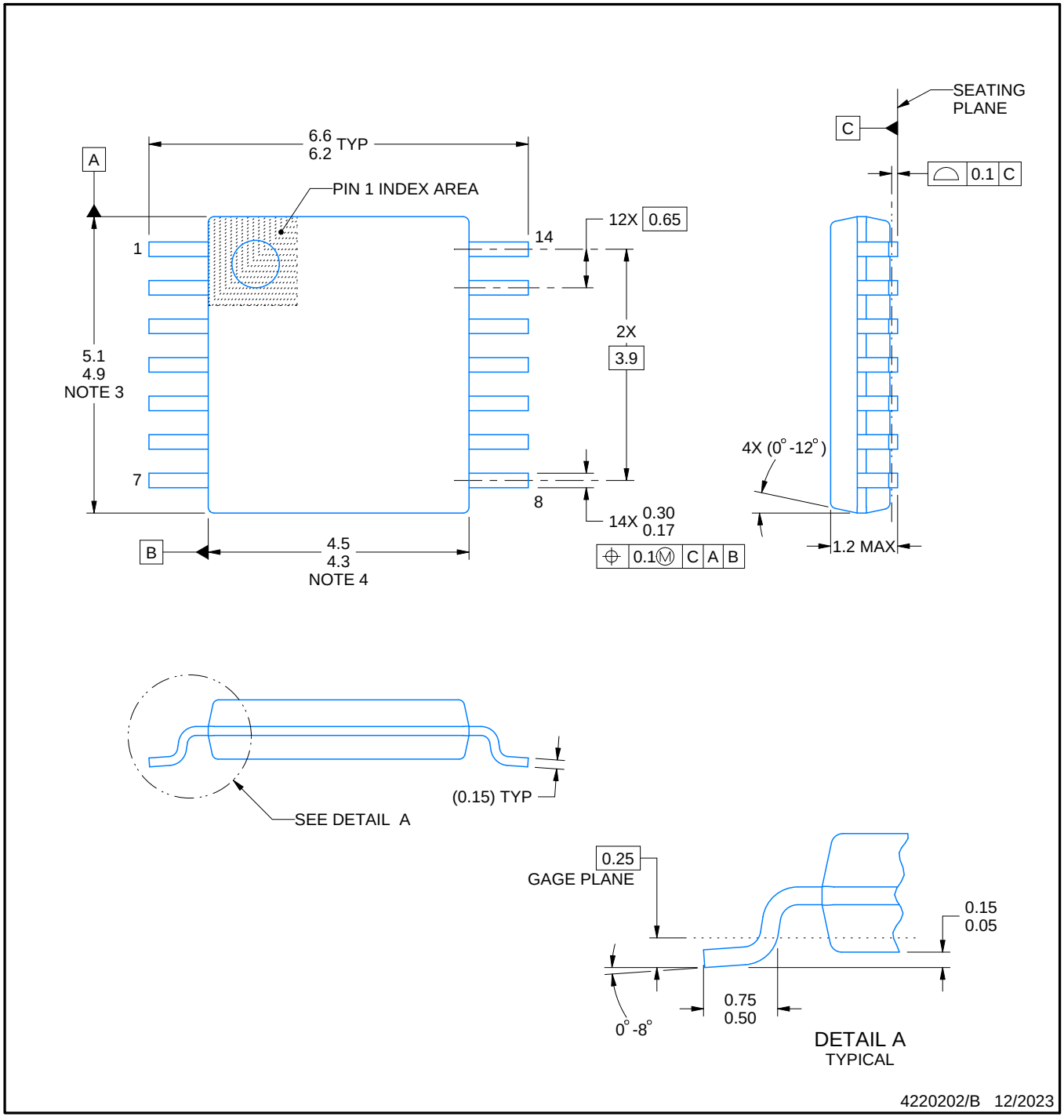
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS–001, except 18 and 20 pin minimum body length (Dim A).
D. The 20 pin end lead shoulder width is a vendor option, either half or full width.

# PACKAGE OUTLINE

## PW0014A

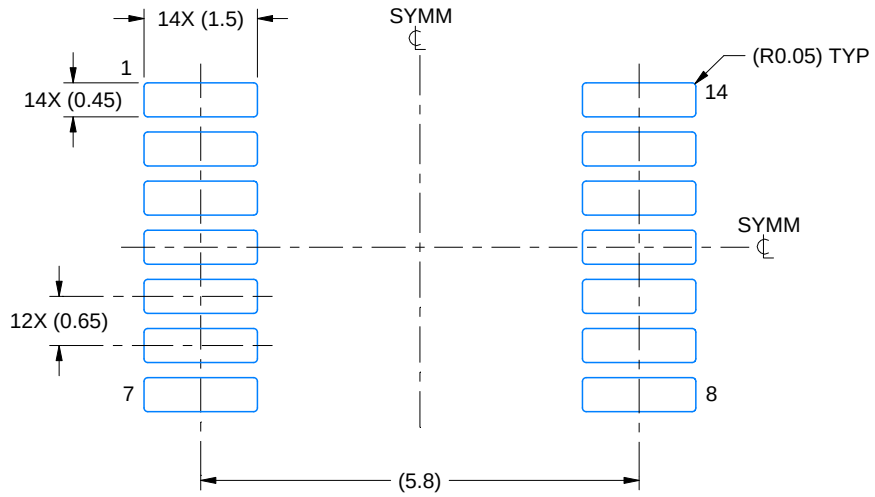
## TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE

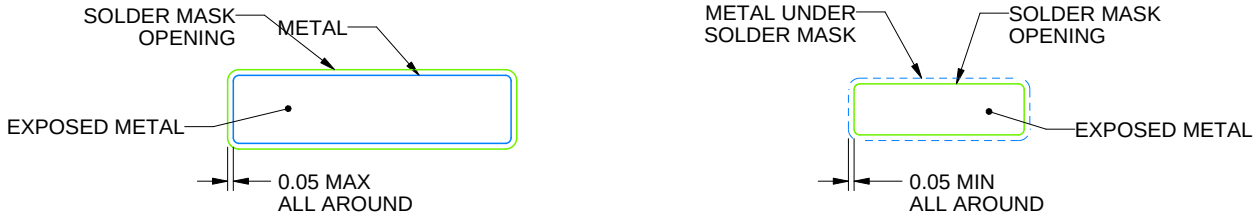



NOTES:

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




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

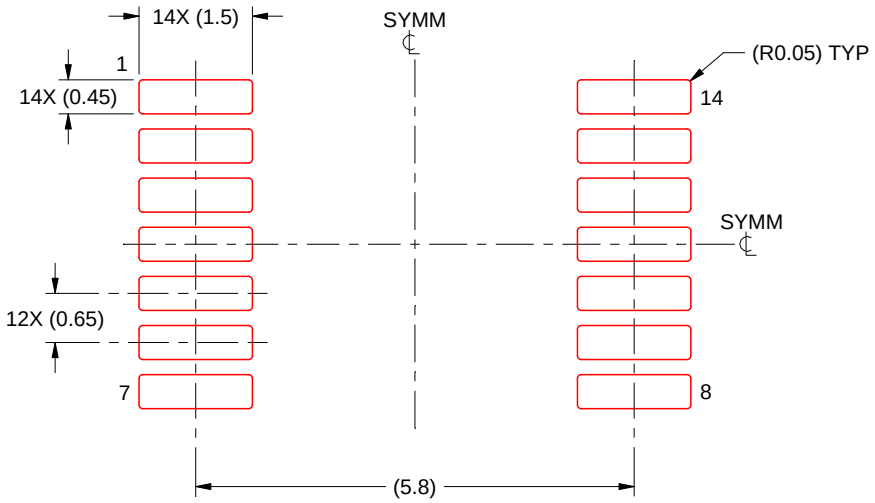



SOLDER MASK DETAILS

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.




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.

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最終更新日：2025 年 10 月