# SNx4AC245 具有三态输出的八路总线收发器

## 1 特性

- $V_{CC}$ 工作范围为 2V 至 6V
- 输入电压高达 6V
- 5V 时，$t_{pd}$ 最大值为 7ns

## 2 应用

- 专业音频
- 视频和标牌
- 电器
- 工厂自动化与控制

## 3 说明

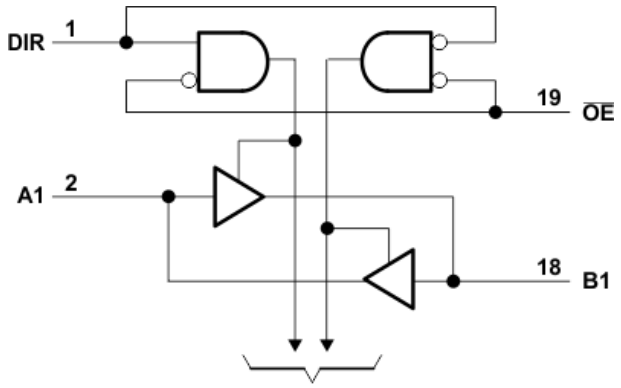
'AC245 八通道总线收发器专为数据总线之间的异步双向通信而设计。控制功能的实施可更大限度地降低外部时序要求。

根据方向控制 (DIR) 输入上的逻辑电平，此类器件将数据从 A 总线发送至 B 总线，或者将数据从 B 总线发送至 A 总线。输出使能 (OE) 输入可用于禁用器件，这样可有效隔离总线。

**器件信息**

| 器件型号 | 封装(1) | 封装尺寸(2) | 本体尺寸(3) |
|---|---|---|---|
| SNx4AC245 | DB（SSOP，20） | 7.2mm × 7.8mm | 7.2mm × 5.3mm |
| | DGS（VSSOP，20） | 5.1mm × 4.9mm | 5.1mm × 3mm |
| | DW（SOIC，20） | 12.8mm × 10.3mm | 12.8mm × 7.5mm |
| | N（PDIP，20） | 24.33mm × 9.4mm | 24.33mm × 6.35mm |
| | NS（SO，20） | 12.6mm × 7.8mm | 12.6mm × 5.3mm |
| | PW（TSSOP，20） | 6.5mm × 6.4mm | 6.5mm × 4.4mm |
| | RKS（VQFN，20） | 4.5mm × 2.5mm | 4.5mm × 2.5mm |

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




**逻辑图（正逻辑）**

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## 4 Pin Configuration and Functions

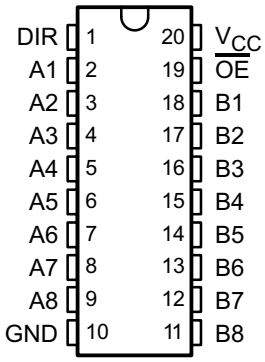



**图 4-1. SN54AC245 J or W Package; SN74AC245 DB, DGS, DW, N, NS, or PW Package Top View**

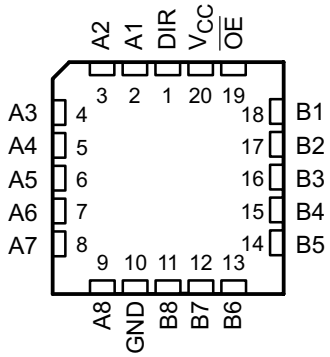



**图 4-2. SN54AC245 FK Package Top View**

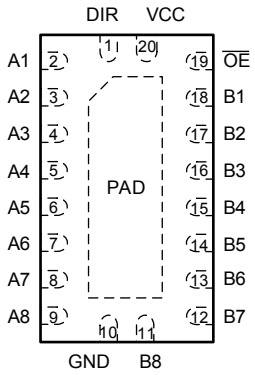



**图 4-3. SN54AC245 RKS Package Top View**

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## Pin Functions

| PIN | | TYPE[1] | DESCRIPTION |
|---|---|---|---|
| NO. | NAME | | |
| 1 | DIR | I/O | Direction Pin |
| 2 | A1 | I/O | A1 Input/Output |
| 3 | A2 | I/O | A2 Input/Output |
| 4 | A3 | I/O | A3 Input/Output |
| 5 | A4 | I/O | A4 Input/Output |
| 6 | A5 | I/O | A5 Input/Output |
| 7 | A6 | I/O | A6 Input/Output |
| 8 | A7 | I/O | A7 Input/Output |
| 9 | A8 | I/O | A8 Input/Output |
| 10 | GND | — | Ground Pin |
| 11 | B8 | I/O | B8 Input/Output |
| 12 | B7 | I/O | B7 Input/Output |
| 13 | B6 | I/O | B6 Input/Output |
| 14 | B5 | I/O | B5 Input/Output |
| 15 | B4 | I/O | B4 Input/Output |
| 16 | B3 | I/O | B3 Input/Output |
| 17 | B2 | I/O | B2 Input/Output |
| 18 | B1 | I/O | B1 Input/Output |
| 19 | OE | I/O | Output Enable |
| 20 | VCC | — | Power Pin |

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


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# 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 V to $V_{CC}$ + 0.5 V | −0.5 | 7 | V |
| $V_I$ | Input voltage(2) | −0.5 V to $V_{CC}$ + 0.5 V | | | V |
| $V_O$ | Output voltage(2) | −0.5 V to $V_{CC}$ + 0.5 V | | | V |
| $I_{IK}$ | Input clamp current | $V_I$ < 0 or $V_I$ > $V_{CC}$ | | ±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 $V_{CC}$ | –65 | ±50 | mA |
| | Continuous current through $V_{CC}$ or GND | | | ±200 | mA |
| $T_{stg}$ | 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 voltage ratings may be exceeded if the input and output current ratings are observed.

## 5.2 ESD Ratings

| | | | VALUE | UNIT |
|---|---|---|---|---|
| $V_{(ESD)}$ | Electrostatic discharge | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001(1) | ±3000 | 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

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

| | | | SN54AC245 | | SN74AC245 | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | MIN | MAX | MIN | MAX | |
| $V_{CC}$ | Supply voltage | | 2 | 6 | 2 | 6 | V |
| $V_{IH}$ | High-level input voltage | $V_{CC}$ = 3 V | 2.1 | | 2.1 | | V |
| | | $V_{CC}$ = 4.5 V | 3.15 | | 3.15 | | |
| | | $V_{CC}$ = 5.5 V | 3.85 | | 3.85 | | |
| $V_{IL}$ | Low-level input voltage | $V_{CC}$ = 3 V | | 0.9 | | 0.9 | V |
| | | $V_{CC}$ = 4.5 V | | 1.35 | | 1.35 | |
| | | $V_{CC}$ = 5.5 V | | 1.65 | | 1.65 | |
| $V_I$ | Input voltage | | 0 | $V_{CC}$ | 0 | $V_{CC}$ | V |
| $V_O$ | Output voltage | | 0 | $V_{CC}$ | 0 | $V_{CC}$ | V |
| $I_{OH}$ | High-level output current | $V_{CC}$ = 3 V | | −12 | | −12 | mA |
| | | $V_{CC}$ = 4.5 V | | −24 | | −24 | |
| | | $V_{CC}$ = 5.5 V | | −24 | | −24 | |
| $I_{OL}$ | Low-level output current | $V_{CC}$ = 3 V | | 12 | | 12 | mA |
| | | $V_{CC}$ = 4.5 V | | 24 | | 24 | |
| | | $V_{CC}$ = 5.5 V | | 24 | | 24 | |
| t/v | Input transition rise or fall rate | | | 8 | | 8 | ns/V |

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

| | | SN54AC245 | | SN74AC245 | | UNIT |
|---|---|---|---|---|---|---|
| | | MIN | MAX | MIN | MAX | |
| $T_A$ | Operating free-air temperature | –55 | 125 | –40 | 85 | °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,* literature number SCBA004.

## 5.4 Thermal Information

| THERMAL METRIC(1) | | SNx4AC245 | | | | | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | DB (SSOP) | DGS (VSSOP) | DW (SOIC) | N (PDIP) | NS (SOP) | PW (TSSOP) | RKS (VQFN) | |
| | | 20 PINS | | | | | | | |
| $R_{\theta JA}$ | Junction-to-ambient thermal resistance | 70 | 123.5 | 98.6 | 69 | 60 | 126.6 | 67.7 | °C/W |

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

## 5.5 Electrical Characteristics

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

| PARAMETER | | TEST CONDITIONS | $V_{CC}$ | $T_A$ = 25°C | | | SN54AC245 | | SN74AC245 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $V_{OH}$ | | $I_{OH}$ = −50 µA | 3 V | 2.9 | | | 2.9 | | 2.9 | | V |
| | | | 4.5 V | 4.4 | | | 4.4 | | 4.4 | | |
| | | | 5.5 V | 5.4 | | | 5.4 | | 5.4 | | |
| | | $I_{OH}$ = −12 mA | 3 V | 2.56 | | | 2.4 | | 2.46 | | |
| | | $I_{OH}$ = −24 mA | 4.5 V | 3.86 | | | 3.7 | | 3.76 | | |
| | | | 5.5 V | 4.86 | | | 4.7 | | 4.76 | | |
| | | $I_{OH}$ = 50 mA[1] | 5.5 V | | | | 3.85 | | | | |
| | | $I_{OH}$ = −75 mA[1] | 5.5 V | | | | | | 3.85 | | |
| $V_{OL}$ | | $I_{OL}$ = 50 µA | 3 V | | 0.002 | 0.1 | | 0.1 | | 0.1 | V |
| | | | 4.5 V | | 0.001 | 0.1 | | 0.1 | | 0.1 | |
| | | | 5.5 V | | 0.001 | 0.1 | | 0.1 | | 0.1 | |
| | | $I_{OL}$ = 12 mA | 3 V | | | 0.36 | | 0.5 | | 0.44 | |
| | | $I_{OL}$ = 24 mA | 4.5 V | | | 0.36 | | 0.5 | | 0.44 | |
| | | | 5.5 V | | | 0.36 | | 0.5 | | 0.44 | |
| | | $I_{OL}$ = 50 mA[1] | 5.5 V | | | | | 1.65 | | | |
| | | $I_{OL}$ = 75 mA[1] | 5.5 V | | | | | | | 1.65 | |
| $I_I$ | A or B ports[2] | $V_I$ = $V_{CC}$ or 0 | 5.5 V | | | ±0.1 | | ± 1 | | ± 1 | µA |
| | $\overline{OE}$ or DIR | | | | | ±0.1 | | ± 1 | | ± 1 | |
| $I_{OZ}$ | | $V_O$ = $V_{CC}$ or GND, $V_I$(OE) = $V_{IL}$ or $V_{IH}$ | 5.5 V | | | ±0.5 | | ±10 | | ±5 | µA |
| $I_{CC}$ | | $V_I$ = $V_{CC}$ or GND, $I_O$ = 0 | 5.5 V | | | 4 | | 80 | | 40 | µA |
| $C_i$ | | $V_I$ = $V_{CC}$ or GND | 5 V | | 4.5 | | | | | | pF |
| $C_{io}$ | | $V_O$ = $V_{CC}$ or GND | 5 V | | 15 | | | | | | pF |

1. Not more than one output should be tested at a time, and the duration of the test should not exceed 2 ms.
2. For I/O ports, the parameter IOZ includes the input leakage current.


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## 5.6 Switching Characteristics, $V_{CC}$ = 3.3 V 0.3 V

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

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $T_A$ = 25°C | | | SN54AC245 | | SN74AC245 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | A or B | B or A | 1.5 | 5 | 8.5 | 1 | 11.5 | 1 | 9 | ns |
| $t_{PHL}$ | | | 1.5 | 5 | 8.5 | 1 | 10 | 1 | 9 | |
| $t_{PZH}$ | $\overline{OE}$ | A or B | 2.5 | 7 | 11.5 | 1 | 13.5 | 2 | 12.5 | ns |
| $t_{PZL}$ | | | 2.5 | 7.5 | 12 | 1 | 14.5 | 2 | 13.5 | |
| $t_{PHZ}$ | $\overline{OE}$ | A or B | 2 | 6.5 | 12 | 1 | 13.5 | 1 | 12.5 | ns |
| $t_{PLZ}$ | | | 2 | 7 | 11.5 | 1 | 14 | 1.5 | 13 | |

## 5.7 Switching Characteristics, $V_{CC}$ = 5 V 5 V

over recommended operating free-air temperature range (unless otherwise noted)
(see 节 6)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $T_A$ = 25°C | | | SN54AC245 | | SN74AC245 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | A or B | B or A | 1.5 | 3.5 | 6.5 | 1 | 8.5 | 1 | 7 | ns |
| $t_{PHL}$ | | | 1.5 | 3.5 | 6 | 1 | 7.5 | 1 | 7 | |
| $t_{PZH}$ | $\overline{OE}$ | A or B | 1.5 | 5 | 8.5 | 1 | 10 | 1 | 9 | ns |
| $t_{PZL}$ | | | 1.5 | 5.5 | 9 | 1 | 10.5 | 1 | 9.5 | |
| $t_{PHZ}$ | $\overline{OE}$ | A or B | 1.5 | 5.5 | 9 | 1 | 10.5 | 1 | 10 | ns |
| $t_{PLZ}$ | | | 1.5 | 5.5 | 9 | 1 | 10.5 | 1 | 10 | |

## 5.8 Operating Characteristics

$V_{CC}$ = 5 V, $T_A$ = 25°C

| PARAMETER | | TEST CONDITIONS | TYP | UNIT |
|---|---|---|---|---|
| $C_{pd}$ | Power dissipation capacitance per transceiver | CL = 50 pF, f = 1 MHz | 45 | pF |

## 5.9 Typical Characteristics

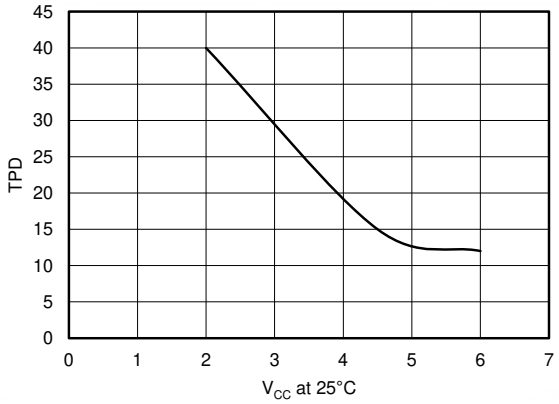



图 5-1. TPD vs $V_{CC}$ at 25°C

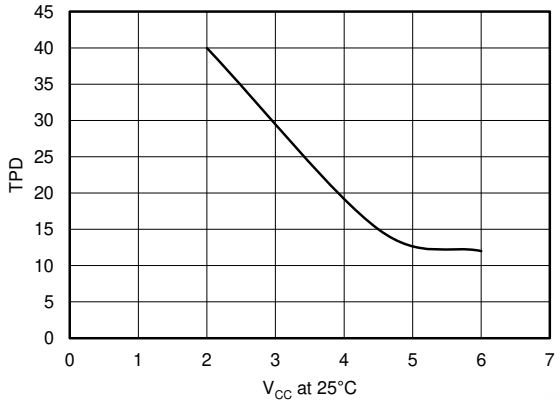
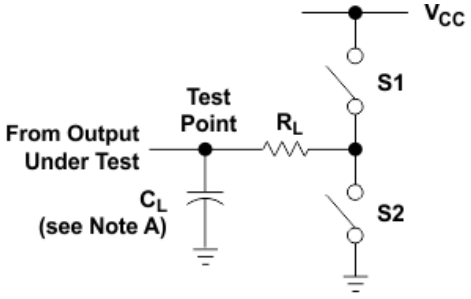



图 5-2. TPD vs $V_{CC}$ at 25°C

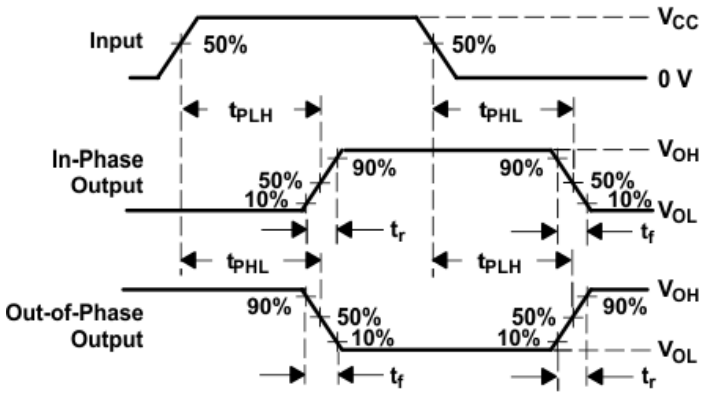
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## 6 Parameter Measurement Information

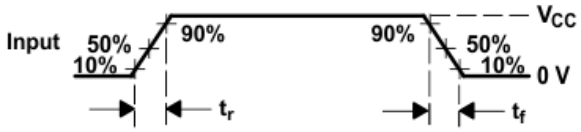



LOAD CIRCUIT

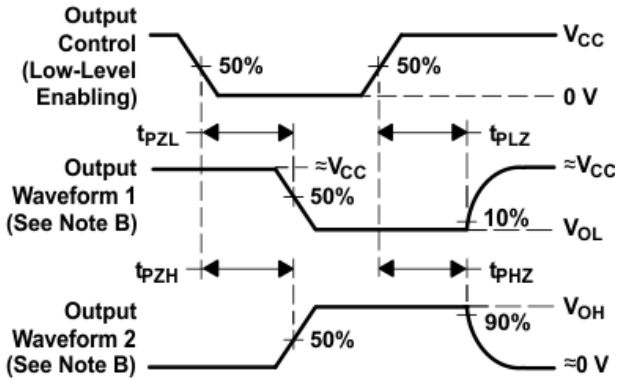
| PARAMETER | | $R_L$ | $C_L$ | S1 | S2 |
|---|---|---|---|---|---|
| $t_{en}$ | $t_{PZH}$ | 1 kΩ | 50 pF or 150 pF | Open | Closed |
| | $t_{PZL}$ | | | Closed | Open |
| $t_{dis}$ | $t_{PHZ}$ | 1 kΩ | 50 pF | Open | Closed |
| | $t_{PLZ}$ | | | Closed | Open |
| $t_{pd}$ or $t_t$ | | -- | 50 pF or 150 pF | Open | Open |




VOLTAGE WAVEFORMS
PROPAGATION DELAY AND OUTPUT TRANSITION TIMES




VOLTAGE WAVEFORM
INPUT RISE AND FALL TIMES




VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES FOR 3-STATE OUTPUTS

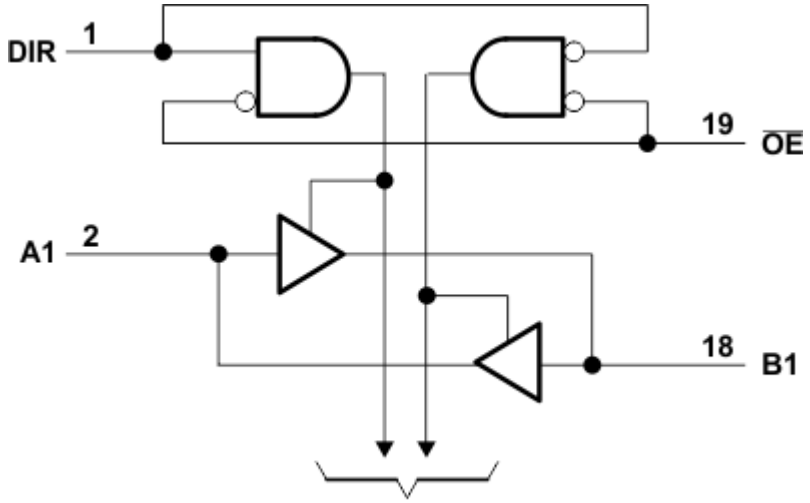

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# 7 Detailed Description

## 7.1 Overview

These octal bus transceivers are designed for asynchronous two-way communication between data buses. The control-function implementation minimizes external timing requirements. The SNx4AC245 devices allow data transmission from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable (OE) input can be used to disable the device so that the buses are effectively isolated. To ensure the high-impedance state during power up or power down, OE should be tied to $V_{CC}$ through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

## 7.2 Functional Block Diagram




**Logic Diagram (Positive Logic)**

## 7.3 Feature Description

The SNx4AC245 devices have a wide operating $V_{CC}$ range from 2 V to 6 V with slower edge rates to minimize output ringing.

## 7.4 Device Functional Modes

表 7-1 lists the function modes of the SNx4AC245.

**表 7-1. Function Table**

| INPUTS(1) | | OPERATION |
|---|---|---|
| $\overline{OE}$ | DIR | |
| L | L | B data to A bus |
| L | H | A data to B bus |
| H | X | Isolation |

(1) H = High Voltage Level, L = Low Voltage Level, X = Don't Care

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# 8 应用信息免责声明

**备注**

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

## 8.1 Application Information

The SNx4AC245 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.

## 8.2 Typical Application

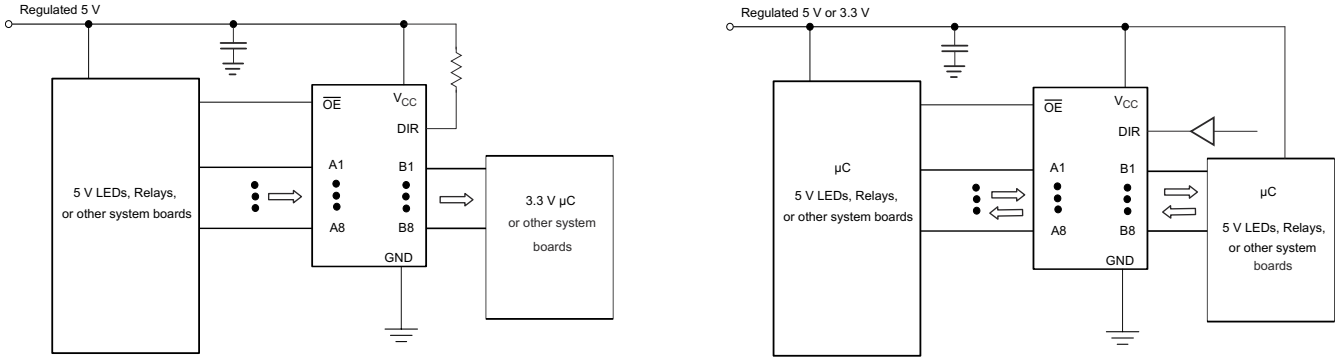



**图 8-1. Typical Application Schematic**

### 8.2.1 Design Requirements

This device uses CMOS technology and has balanced output drive. Care should be taken to avoid bus contention because it can drive currents that would exceed maximum limits. Outputs can be combined to produce higher drive but the high drive will also create faster edges into light loads, so routing and load conditions should be considered to prevent ringing.

### 8.2.2 Detailed Design Procedure

1. Recommended Input Conditions
   - Rise time and fall time specs: See (Δt/ΔV) in the *节 5.3*.
   - Specified high and low levels: See ($V_{IH}$ and $V_{IL}$) in the *节 5.3*.
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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## 8.3 Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply voltage rating located in the 节 5.3.

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.

## 8.4 Layout

### 8.4.1 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 8.4.2 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. If the transceiver has an output enable pin, it will disable the output section of the part when asserted. This will not disable the input section of the IOs, so they cannot float when disabled.

### 8.4.2 Layout Example

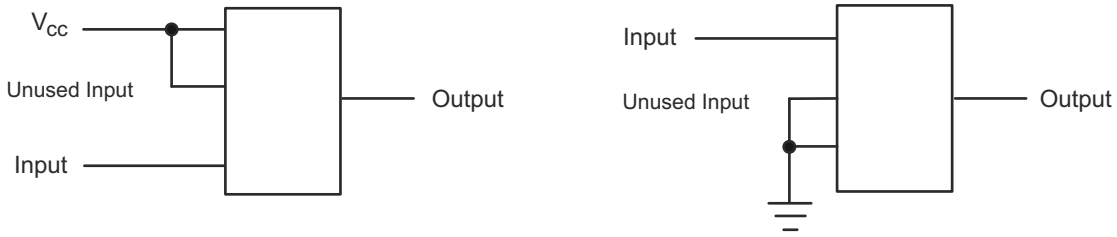



**图 8-2. Layout Diagram**

# 9 Device and Documentation Support

## 9.1 Documentation Support

### 9.1.1 Related Links

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

**表 9-1. Related Links**

| PARTS | PRODUCT FOLDER | SAMPLE & BUY | TECHNICAL DOCUMENTS | TOOLS & SOFTWARE | SUPPORT & COMMUNITY |
|---|---|---|---|---|---|
| SN54AC245 | Click here | Click here | Click here | Click here | Click here |
| SN74AC245 | Click here | Click here | Click here | Click here | Click here |

## 9.2 接收文档更新通知

要接收文档更新通知，请导航至 ti.com 上的器件产品文件夹。点击*通知*进行注册，即可每周接收产品信息更改摘要。有关更改的详细信息，请查看任何已修订文档中包含的修订历史记录。

## 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。

## 9.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.
所有商标均为其各自所有者的财产。

## 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 Revision History

注：以前版本的页码可能与当前版本的页码不同

| Changes from Revision H (March 2024) to Revision I (April 2024) | Page |
|---|---|
| • Updated thermal values for RθJA: DW = 58 to 98.6, PW = 83 to 126.6, all values in °C/W | 6 |

| Changes from Revision G (January 2023) to Revision H (March 2024) | Page |
|---|---|
| • 向*器件信息*表、*引脚配置和功能*部分和*热性能信息*表中添加了 DGS 和 RKS 封装 | 1 |
| • 将*封装信息*更改为*器件信息*并向表中添加了封装尺寸 | 1 |


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## 11 Mechanical, Packaging, and Orderable Information

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

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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) |
|---|---|---|---|---|---|---|---|---|---|
| 5962-87758012A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-87758012A SNJ54AC 245FK |
| 5962-8775801RA | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-8775801RA SNJ54AC245J |
| 5962-8775801SA | Active | Production | CFP (W) \| 20 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-8775801SA SNJ54AC245W |
| SN74AC245DBR | Active | Production | SSOP (DB) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245DBR.A | Active | Production | SSOP (DB) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245DGSR | Active | Production | VSSOP (DGS) \| 20 | 5000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245DGSR.A | Active | Production | VSSOP (DGS) \| 20 | 5000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245DW | Obsolete | Production | SOIC (DW) \| 20 | - | - | Call TI | Call TI | -40 to 85 | AC245 |
| SN74AC245DWR | Active | Production | SOIC (DW) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245DWR.A | Active | Production | SOIC (DW) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245DWRE4 | Active | Production | SOIC (DW) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245N | NRND | Production | PDIP (N) \| 20 | 20 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | SN74AC245N |
| SN74AC245N.A | NRND | Production | PDIP (N) \| 20 | 20 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | SN74AC245N |
| SN74AC245NE4 | NRND | Production | PDIP (N) \| 20 | 20 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | SN74AC245N |
| SN74AC245NSR | Active | Production | SOP (NS) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245NSR.A | Active | Production | SOP (NS) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245PW | Obsolete | Production | TSSOP (PW) \| 20 | - | - | Call TI | Call TI | -40 to 85 | AC245 |
| SN74AC245PWR | Active | Production | TSSOP (PW) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245PWR.A | Active | Production | TSSOP (PW) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245RKSR | Active | Production | VQFN (RKS) \| 20 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SN74AC245RKSR.A | Active | Production | VQFN (RKS) \| 20 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AC245 |
| SNJ54AC245FK | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-87758012A SNJ54AC 245FK |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| SNJ54AC245FK.A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-87758012A SNJ54AC 245FK |
| SNJ54AC245J | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-8775801RA SNJ54AC245J |
| SNJ54AC245J.A | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-8775801RA SNJ54AC245J |
| SNJ54AC245W | Active | Production | CFP (W) \| 20 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-8775801SA SNJ54AC245W |
| SNJ54AC245W.A | Active | Production | CFP (W) \| 20 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-8775801SA SNJ54AC245W |

(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 SN54AC245, SN74AC245 :**

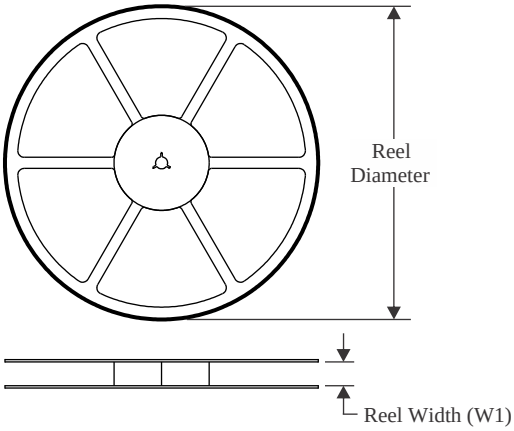
- Catalog : SN74AC245
- Automotive : SN74AC245-Q1, SN74AC245-Q1
- Enhanced Product : SN74AC245-EP, SN74AC245-EP
- Military : SN54AC245
- Space : SN54AC245-SP

NOTE: Qualified Version Definitions:

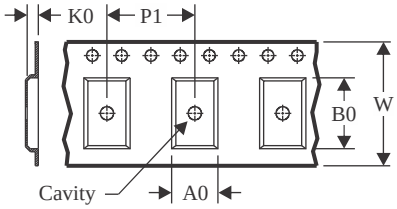
- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications
- Military - QML certified for Military and Defense Applications
- Space - Radiation tolerant, ceramic packaging and qualified for use in Space-based application

## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**

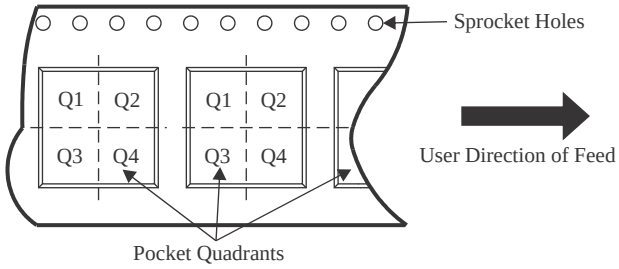



**TAPE DIMENSIONS**




| | |
|---|---|
| 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 |

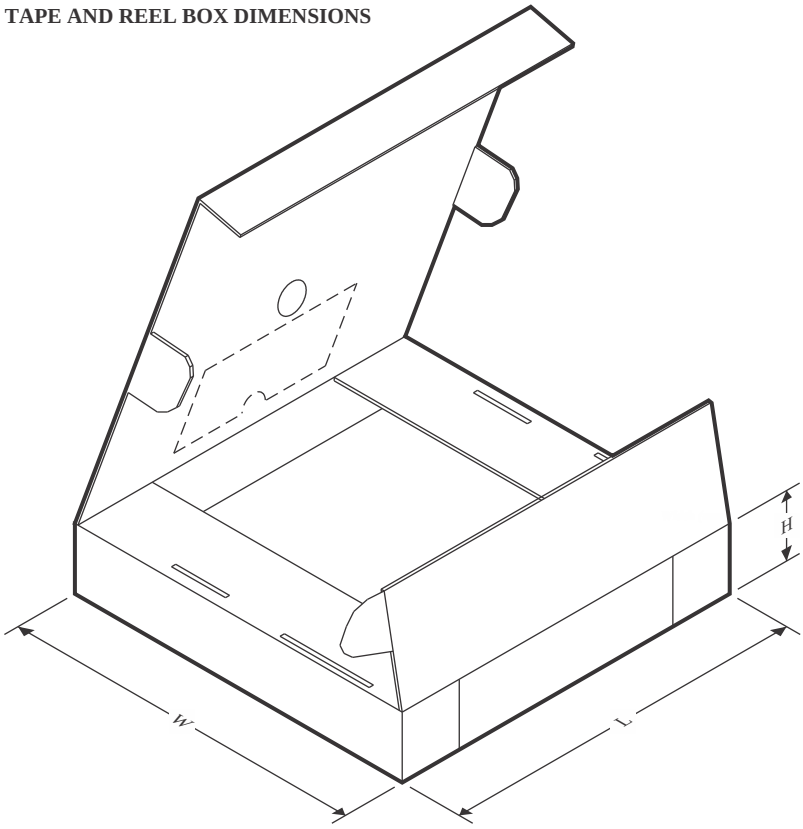
**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**




*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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SN74AC245DBR | SSOP | DB | 20 | 2000 | 330.0 | 16.4 | 8.2 | 7.5 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74AC245DGSR | VSSOP | DGS | 20 | 5000 | 330.0 | 16.4 | 5.4 | 5.4 | 1.45 | 8.0 | 16.0 | Q1 |
| SN74AC245DWR | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.9 | 13.3 | 2.7 | 12.0 | 24.0 | Q1 |
| SN74AC245NSR | SOP | NS | 20 | 2000 | 330.0 | 24.4 | 8.4 | 13.0 | 2.5 | 12.0 | 24.0 | Q1 |
| SN74AC245PWR | TSSOP | PW | 20 | 2000 | 330.0 | 16.4 | 6.95 | 7.0 | 1.4 | 8.0 | 16.0 | Q1 |
| SN74AC245RKSR | VQFN | RKS | 20 | 3000 | 180.0 | 12.4 | 2.8 | 4.8 | 1.2 | 4.0 | 12.0 | Q1 |

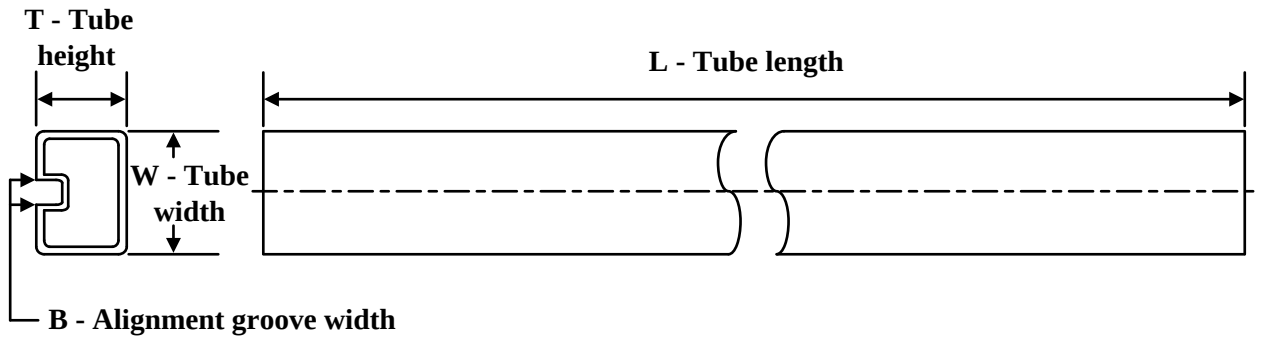
TAPE AND REEL BOX DIMENSIONS




*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| SN74AC245DBR | SSOP | DB | 20 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74AC245DGSR | VSSOP | DGS | 20 | 5000 | 353.0 | 353.0 | 32.0 |
| SN74AC245DWR | SOIC | DW | 20 | 2000 | 356.0 | 356.0 | 45.0 |
| SN74AC245NSR | SOP | NS | 20 | 2000 | 356.0 | 356.0 | 45.0 |
| SN74AC245PWR | TSSOP | PW | 20 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74AC245RKSR | VQFN | RKS | 20 | 3000 | 210.0 | 185.0 | 35.0 |

## TUBE



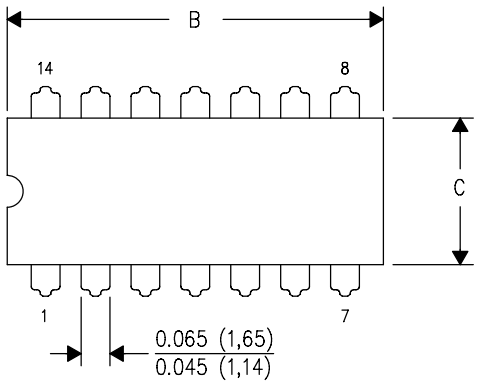

*All dimensions are nominal

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (µm) | B (mm) |
|---|---|---|---|---|---|---|---|---|
| 5962-87758012A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| 5962-8775801SA | W | CFP | 20 | 25 | 506.98 | 26.16 | 6220 | NA |
| SN74AC245N | N | PDIP | 20 | 20 | 506 | 13.97 | 11230 | 4.32 |
| SN74AC245N.A | N | PDIP | 20 | 20 | 506 | 13.97 | 11230 | 4.32 |
| SN74AC245NE4 | N | PDIP | 20 | 20 | 506 | 13.97 | 11230 | 4.32 |
| SNJ54AC245FK | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| SNJ54AC245FK.A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| SNJ54AC245W | W | CFP | 20 | 25 | 506.98 | 26.16 | 6220 | NA |
| SNJ54AC245W.A | W | CFP | 20 | 25 | 506.98 | 26.16 | 6220 | NA |

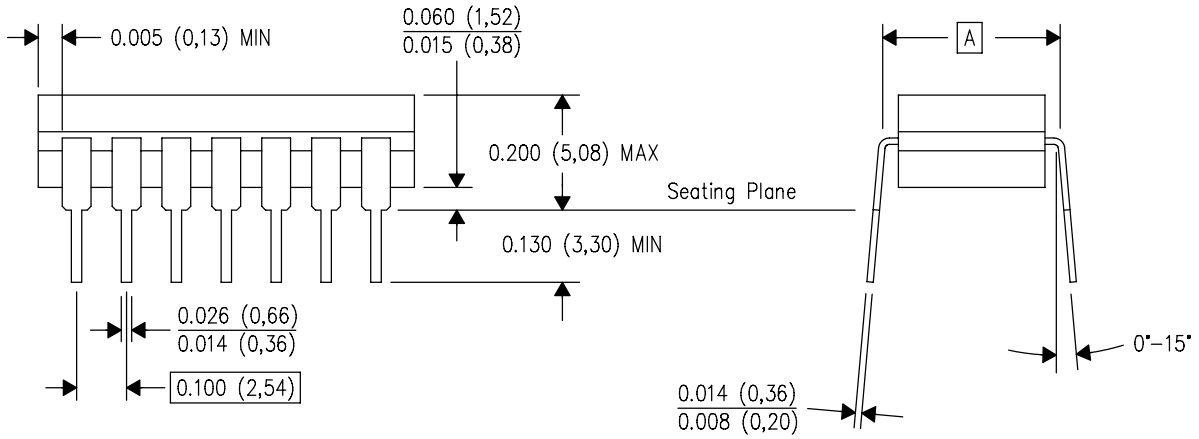
J (R–GDIP–T**)

14 LEADS SHOWN

# CERAMIC DUAL IN–LINE PACKAGE




| DIM \ PINS ** | 14 | 16 | 18 | 20 |
|---|---|---|---|---|
| A | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC |
| B MAX | 0.785 (19,94) | .840 (21,34) | 0.960 (24,38) | 1.060 (26,92) |
| B MIN | — | — | — | — |
| C MAX | 0.300 (7,62) | 0.300 (7,62) | 0.310 (7,87) | 0.300 (7,62) |
| C MIN | 0.245 (6,22) | 0.245 (6,22) | 0.220 (5,59) | 0.245 (6,22) |




4040083/F 03/03

NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package is hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
E. Falls within MIL STD 1835 GDIP1–T14, GDIP1–T16, GDIP1–T18 and GDIP1–T20.

# GENERIC PACKAGE VIEW

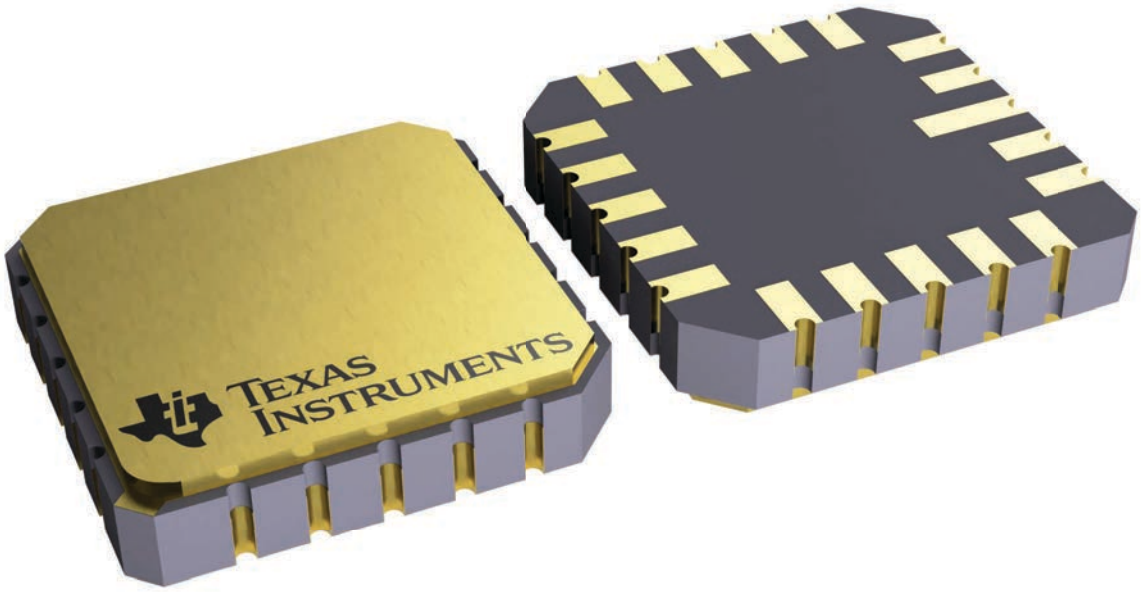
## FK 20

## 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.

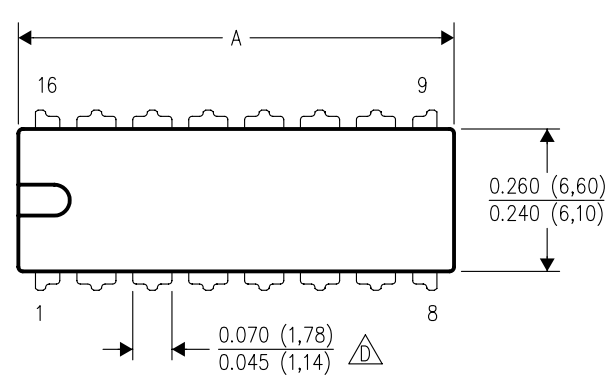



4229370VA\

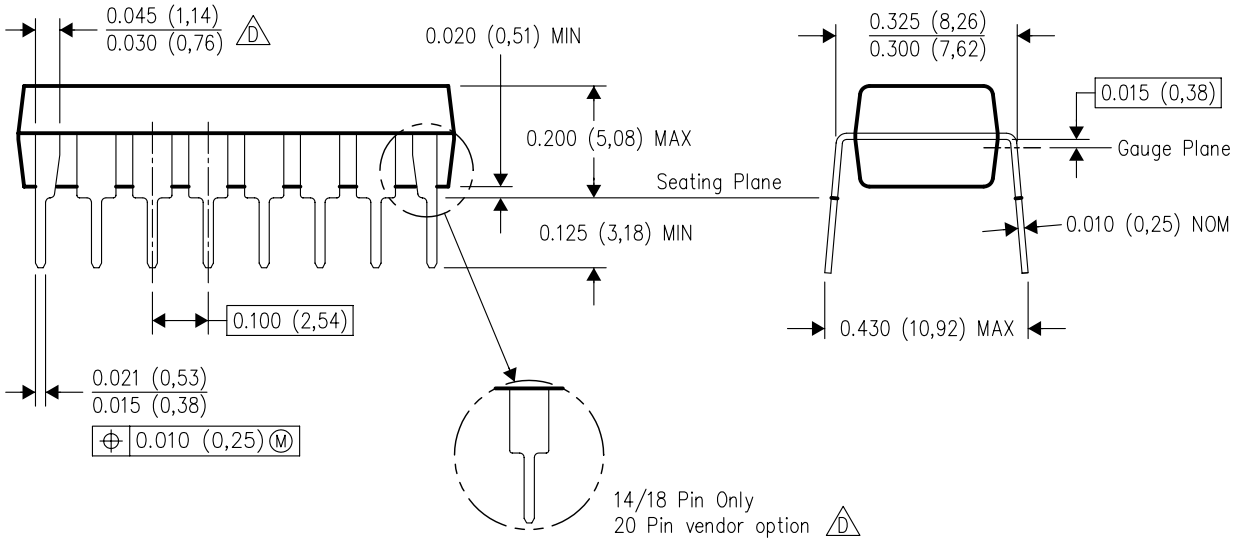
## N (R–PDIP–T**)

## PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN

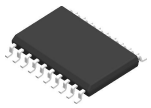



| DIM \ PINS ** | 14 | 16 | 18 | 20 |
|---|---|---|---|---|
| A MAX | 0.775 (19,69) | 0.775 (19,69) | 0.920 (23,37) | 1.060 (26,92) |
| A MIN | 0.745 (18,92) | 0.745 (18,92) | 0.850 (21,59) | 0.940 (23,88) |
| MS–001 VARIATION (C) | AA | BB | AC | AD |




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.

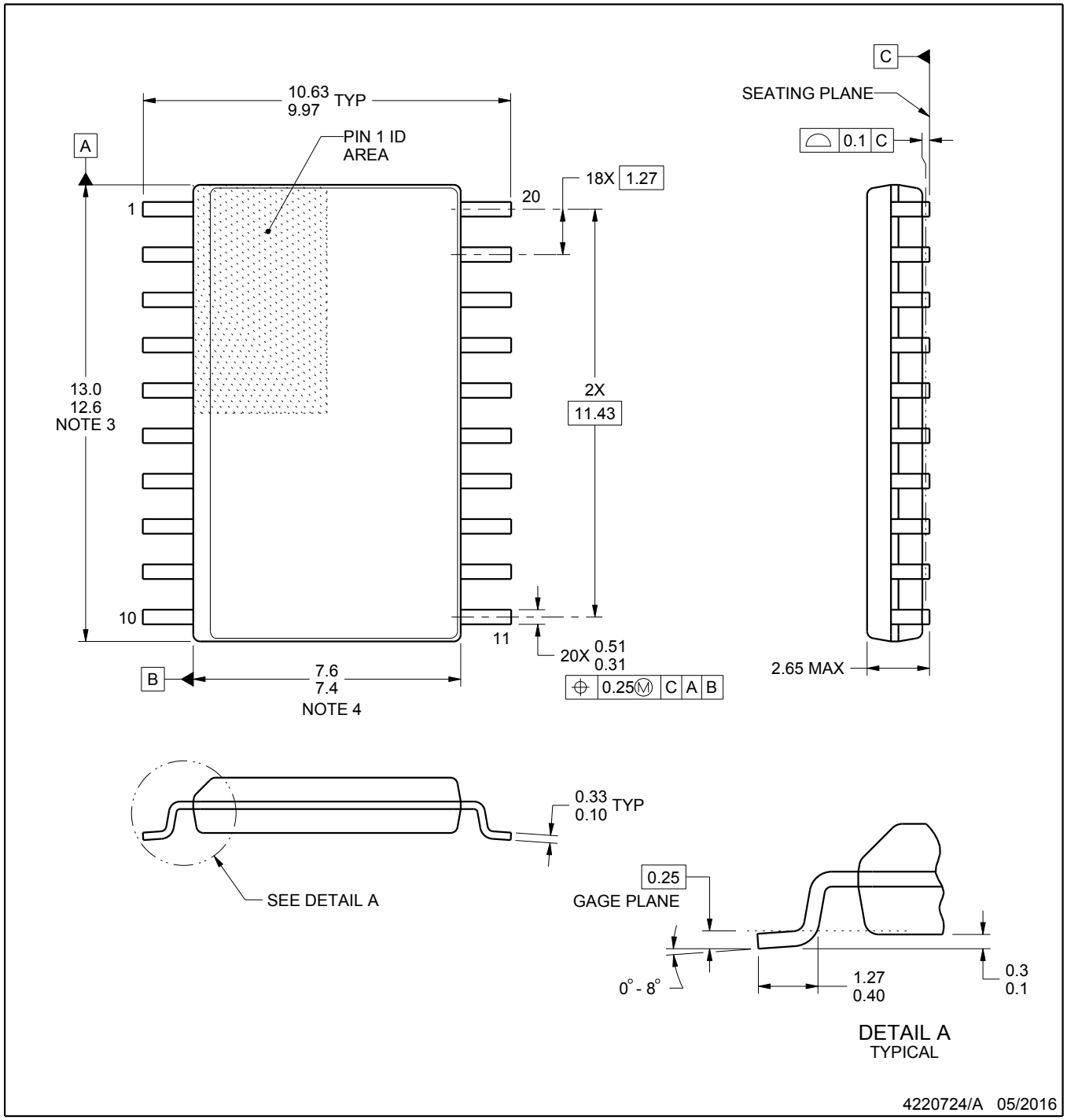


# PACKAGE OUTLINE

## DW0020A

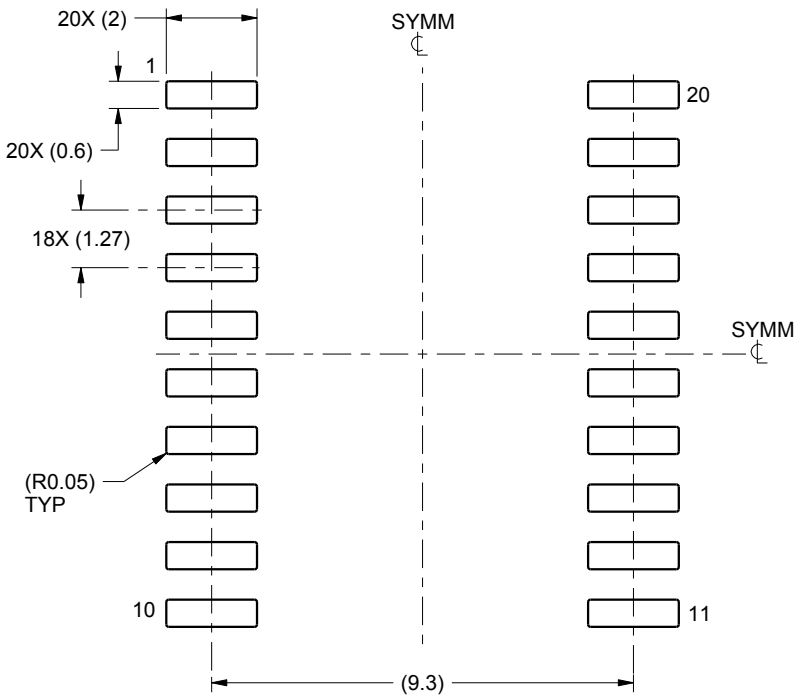
## SOIC - 2.65 mm max height

SOIC

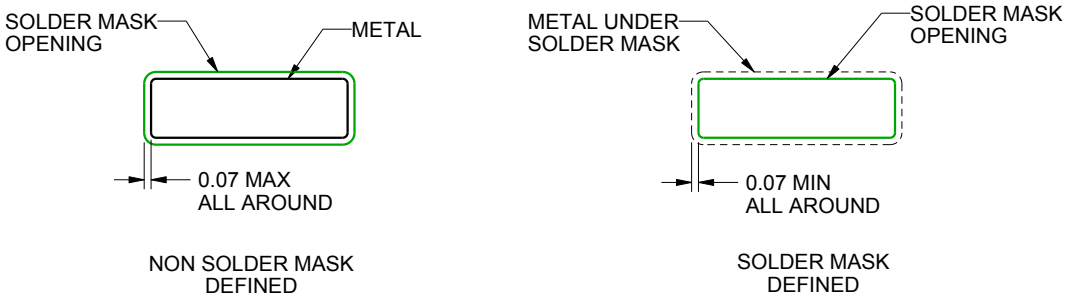



NOTES:

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-013.




LAND PATTERN EXAMPLE
SCALE:6X

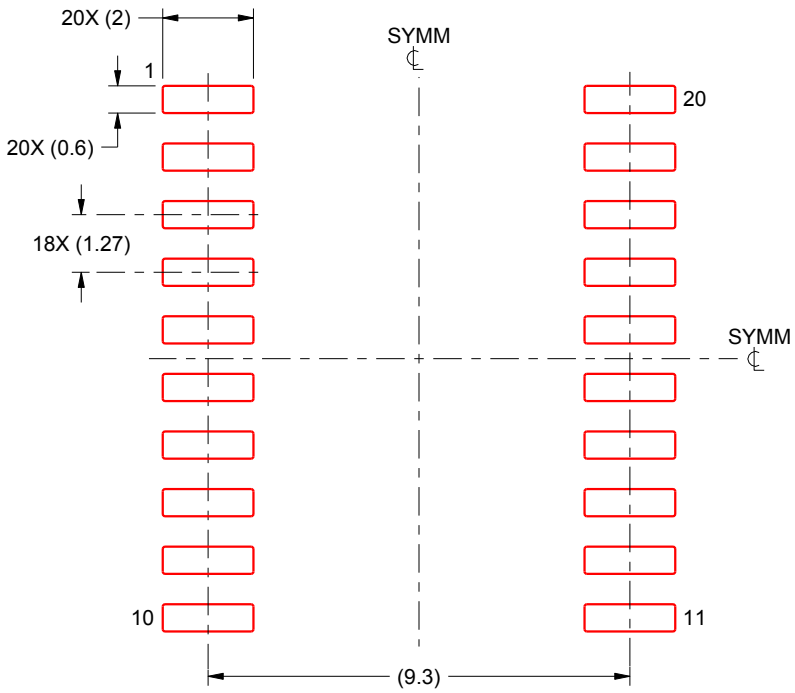



SOLDER MASK DETAILS

4220724/A 05/2016

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.



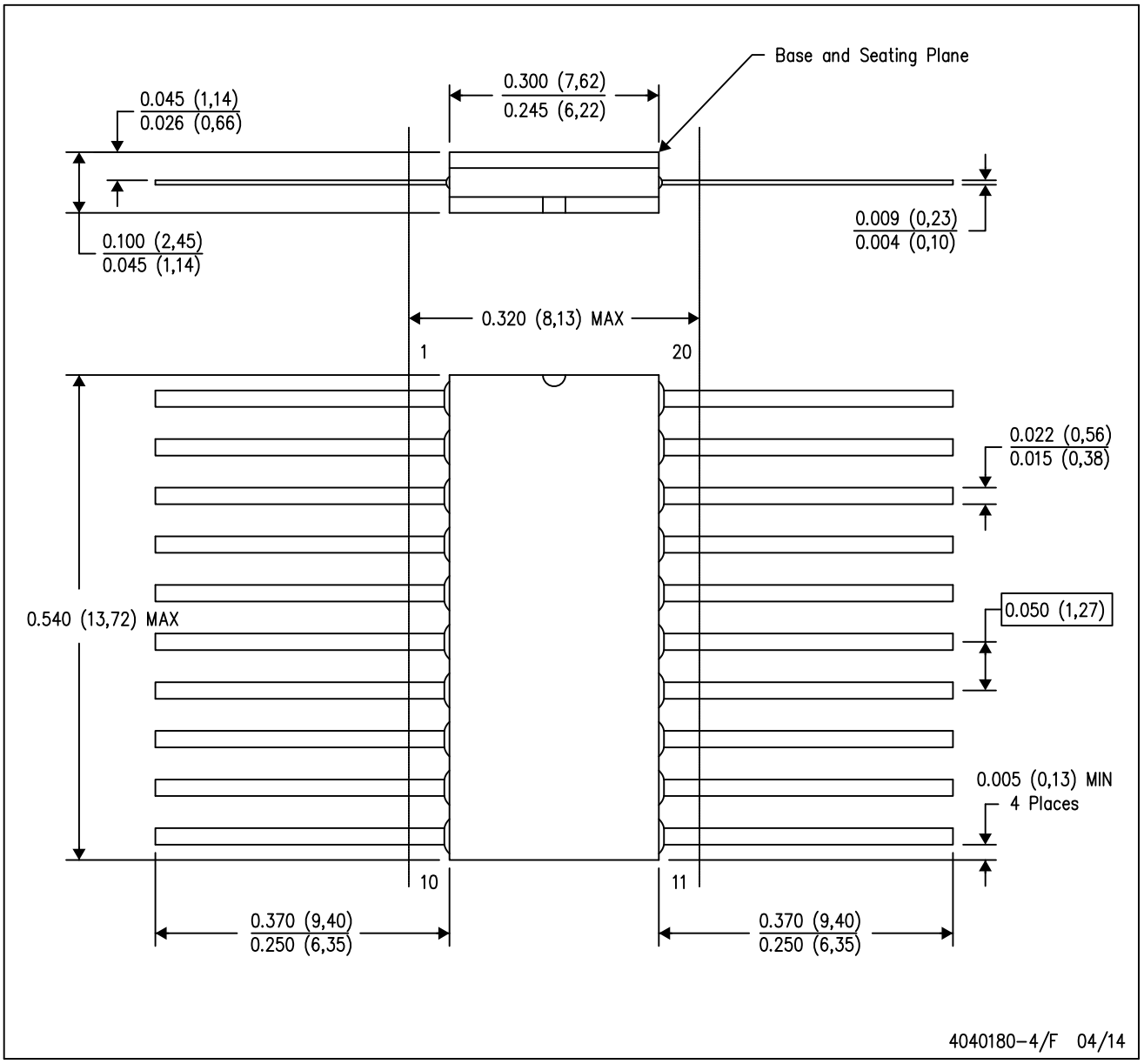

SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:6X

4220724/A 05/2016

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.

W (R–GDFP–F20) CERAMIC DUAL FLATPACK



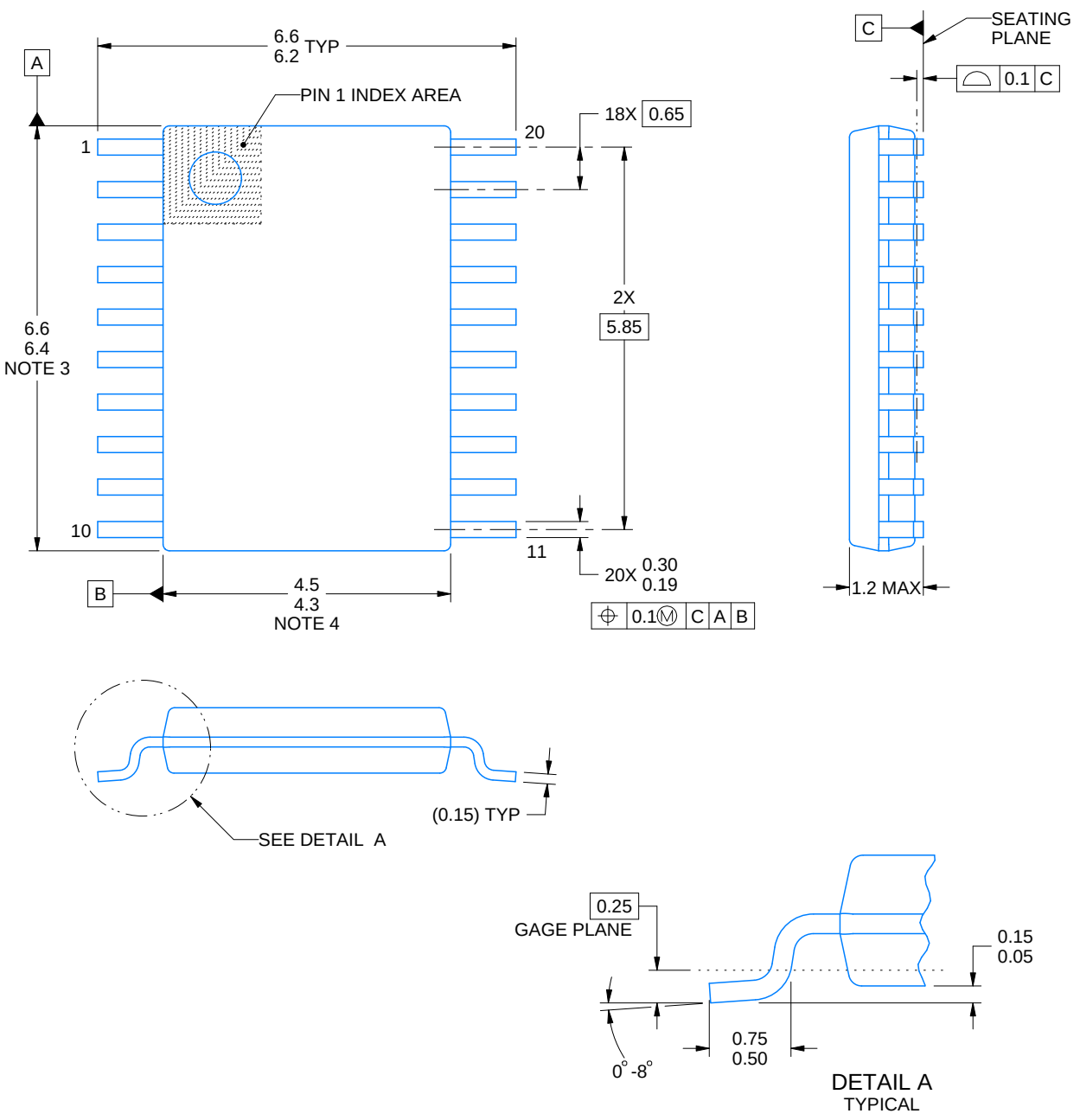

NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only.
E. Falls within Mil–Std 1835 GDFP2–F20

# PACKAGE OUTLINE

## PW0020A

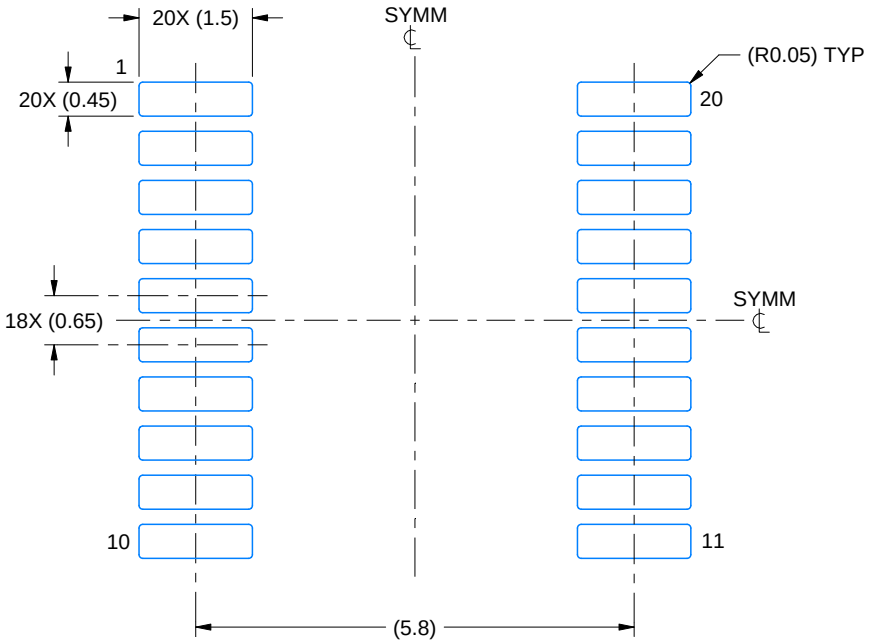
## TSSOP - 1.2 mm max height

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

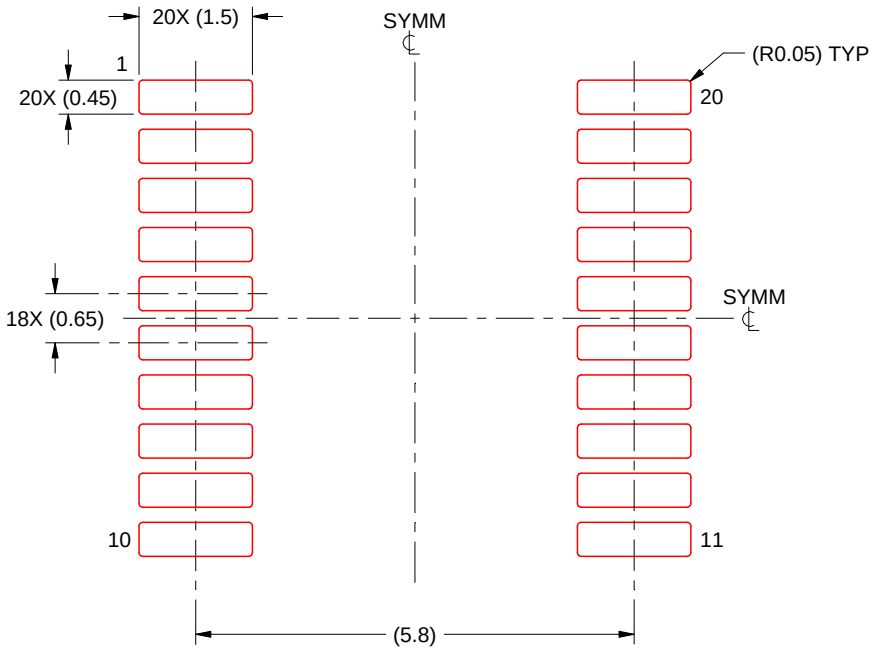



SOLDER MASK DETAILS

4220206/A 02/2017

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

4220206/A 02/2017

NOTES: (continued)

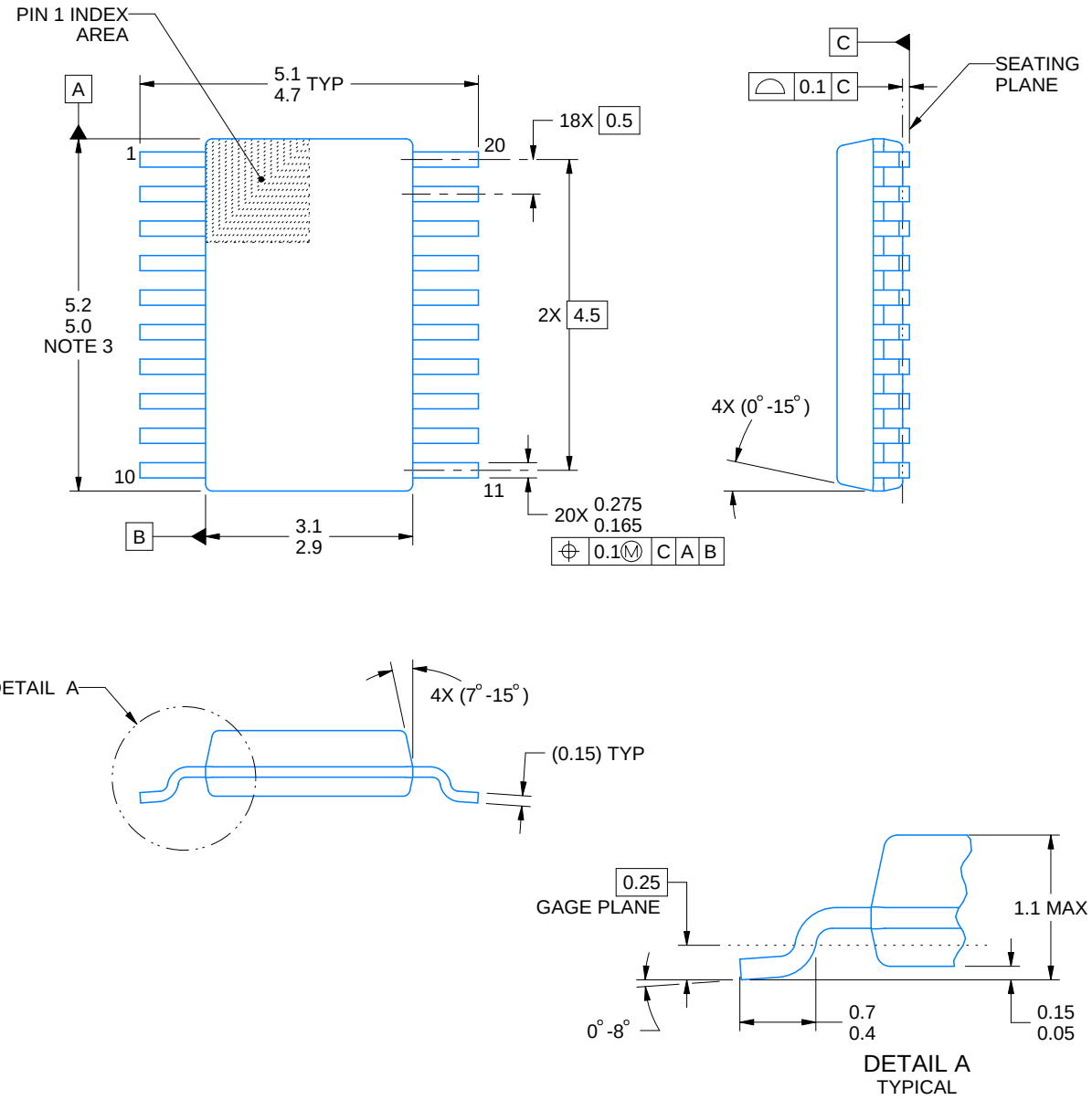
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

# PACKAGE OUTLINE

## DGS0020A

## VSSOP - 1.1 mm max height

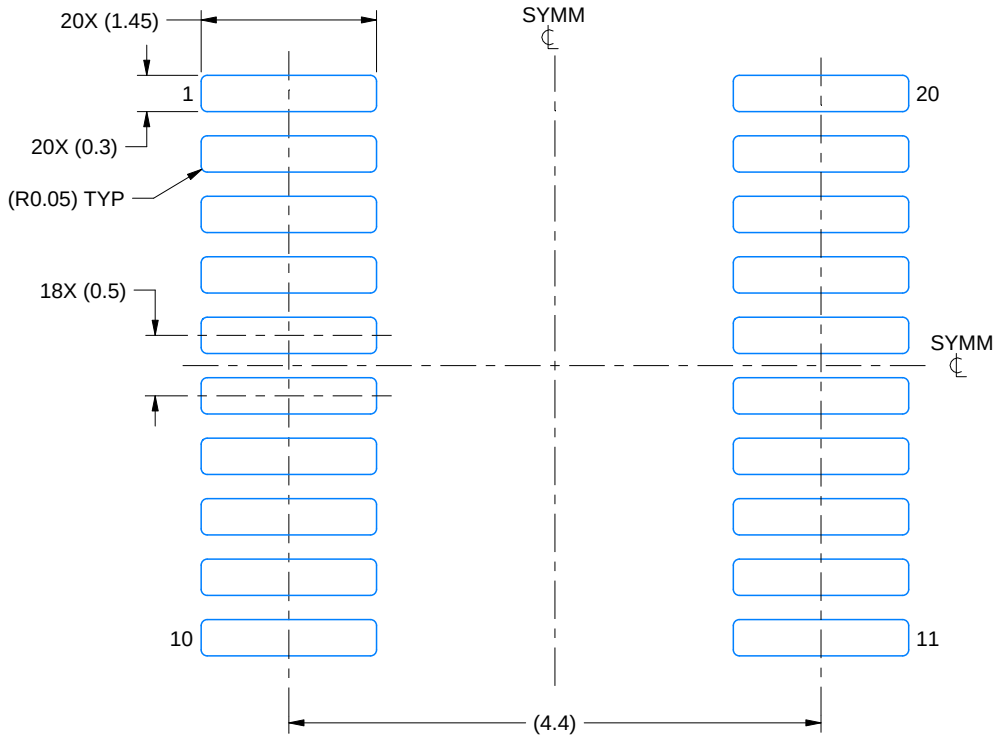
SMALL OUTLINE PACKAGE



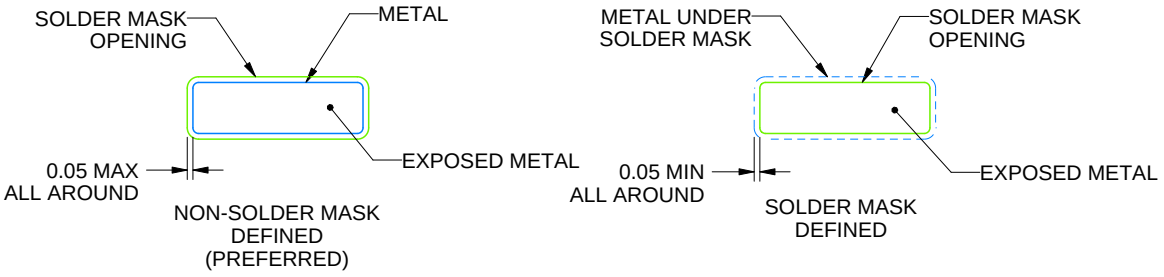

PowerPAD is a trademark of Texas Instruments.

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. No JEDEC registration as of September 2020.
5. Features may differ or may not be present.




LAND PATTERN EXAMPLE
SCALE: 16X

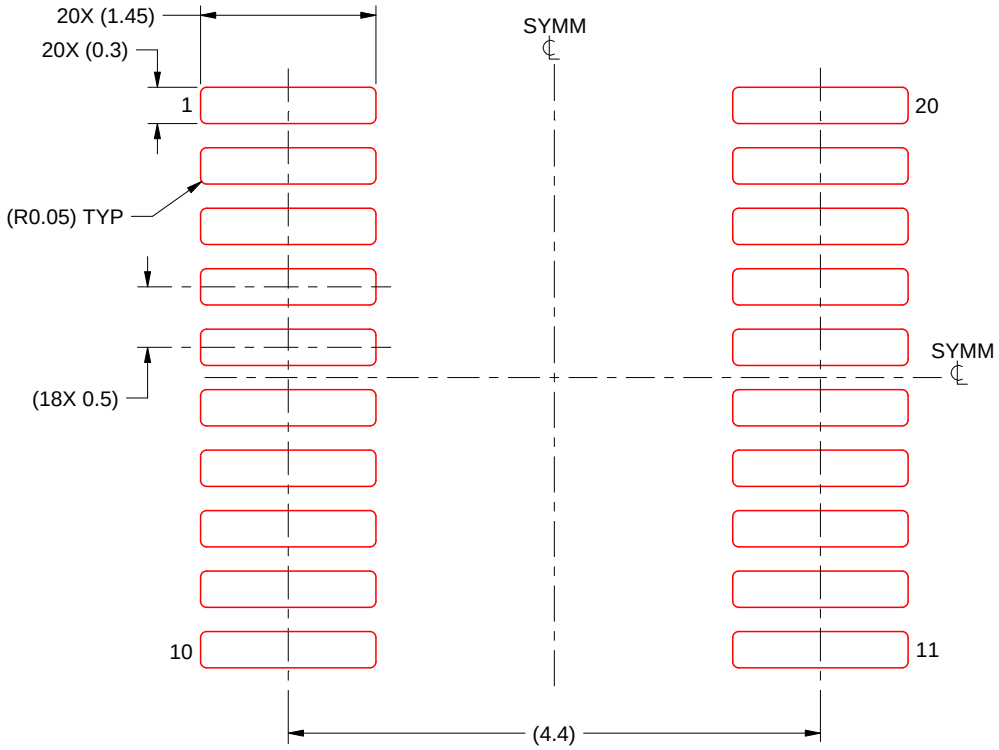



SOLDER MASK DETAILS

4226367/A 10/2020

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.
8. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature numbers SLMA002 (www.ti.com/lit/slma002) and SLMA004 (www.ti.com/lit/slma004).
9. Size of metal pad may vary due to creepage requirement.
10. Vias are optional depending on application, refer to device data sheet. It is recommended that vias under paste be filled, plugged or tented.




SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 16X

4226367/A 10/2020

NOTES: (continued)

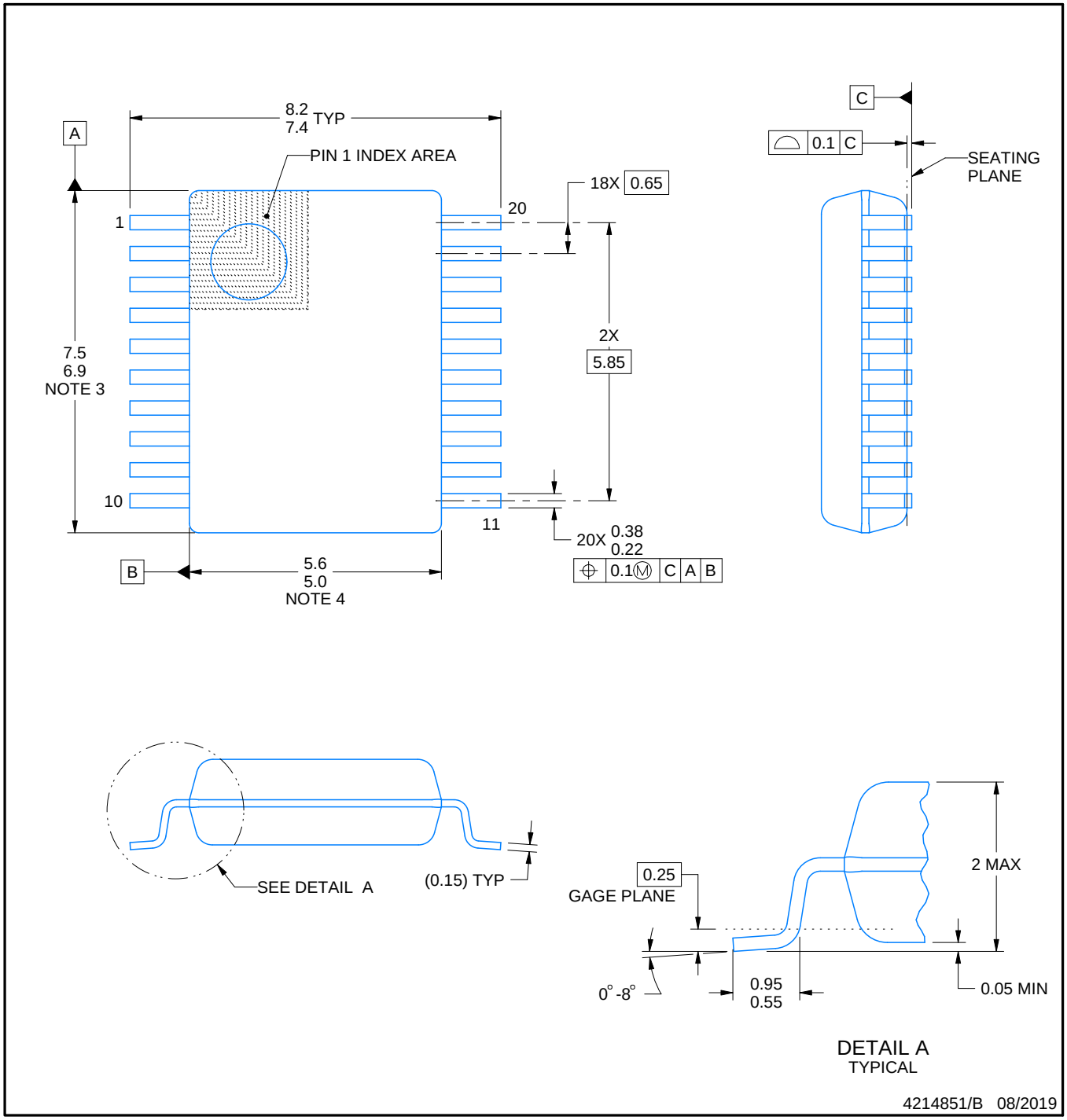
11. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
12. Board assembly site may have different recommendations for stencil design.

# PACKAGE OUTLINE

## DB0020A

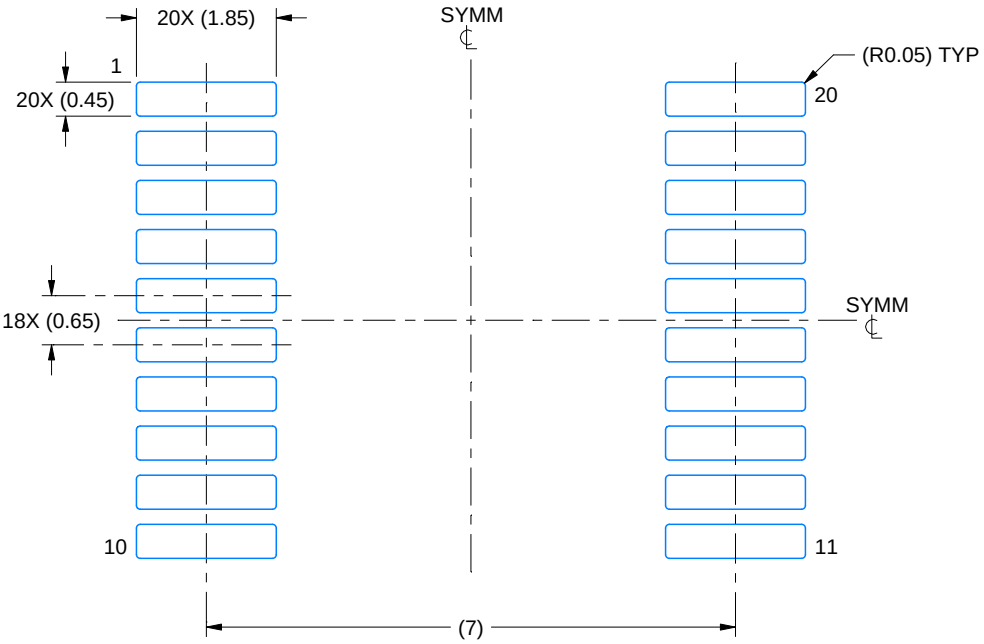
## SSOP - 2 mm max height

SMALL OUTLINE PACKAGE

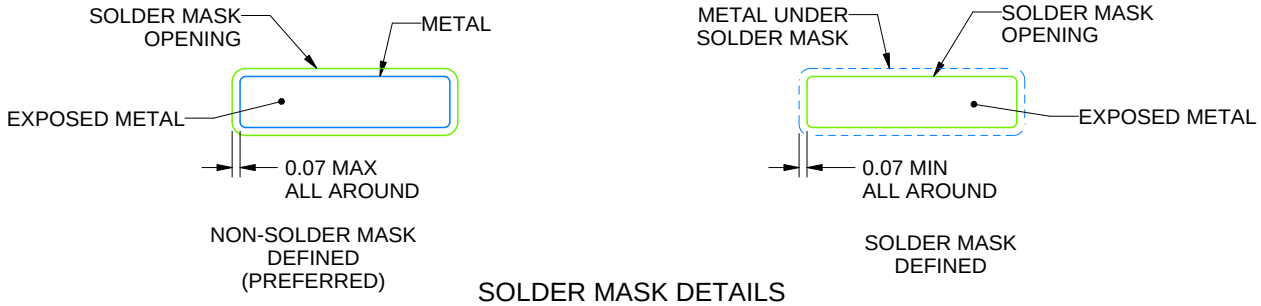



NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-150.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X




SOLDER MASK DETAILS

4214851/B 08/2019

NOTES: (continued)

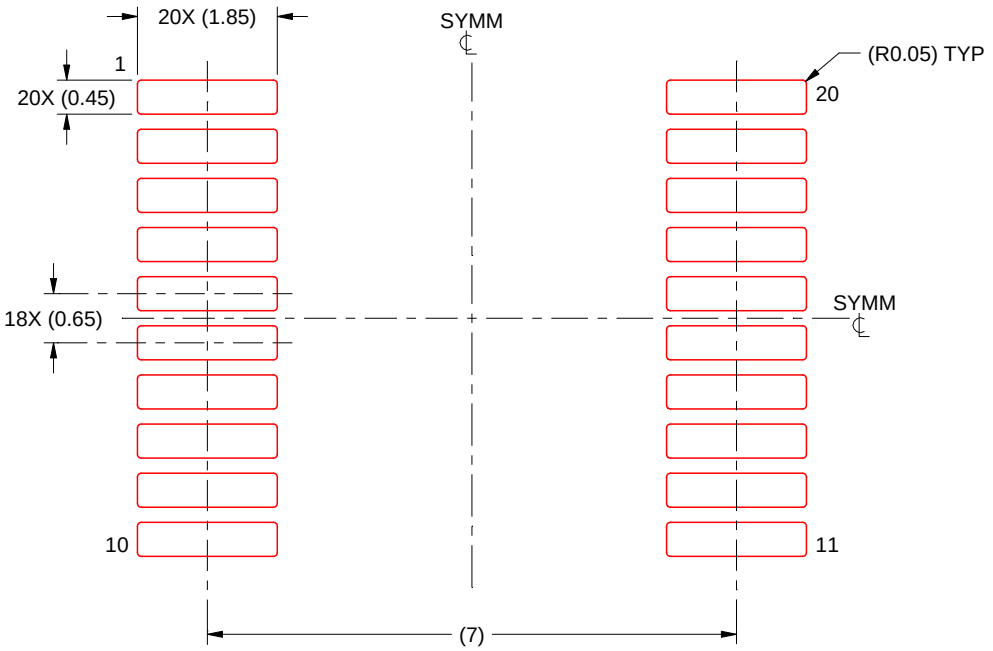
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

## DB0020A

## SSOP - 2 mm max height

SMALL OUTLINE PACKAGE




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

4214851/B 08/2019

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

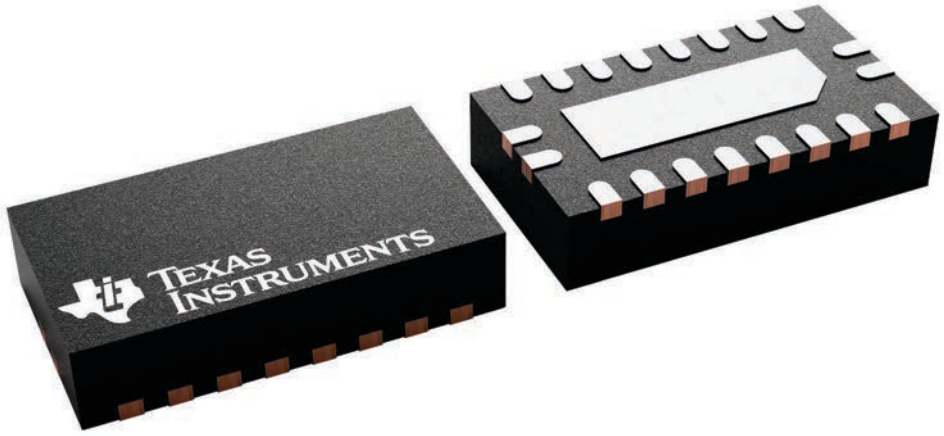
## RKS 20

## VQFN - 1 mm max height

**2.5 x 4.5, 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.

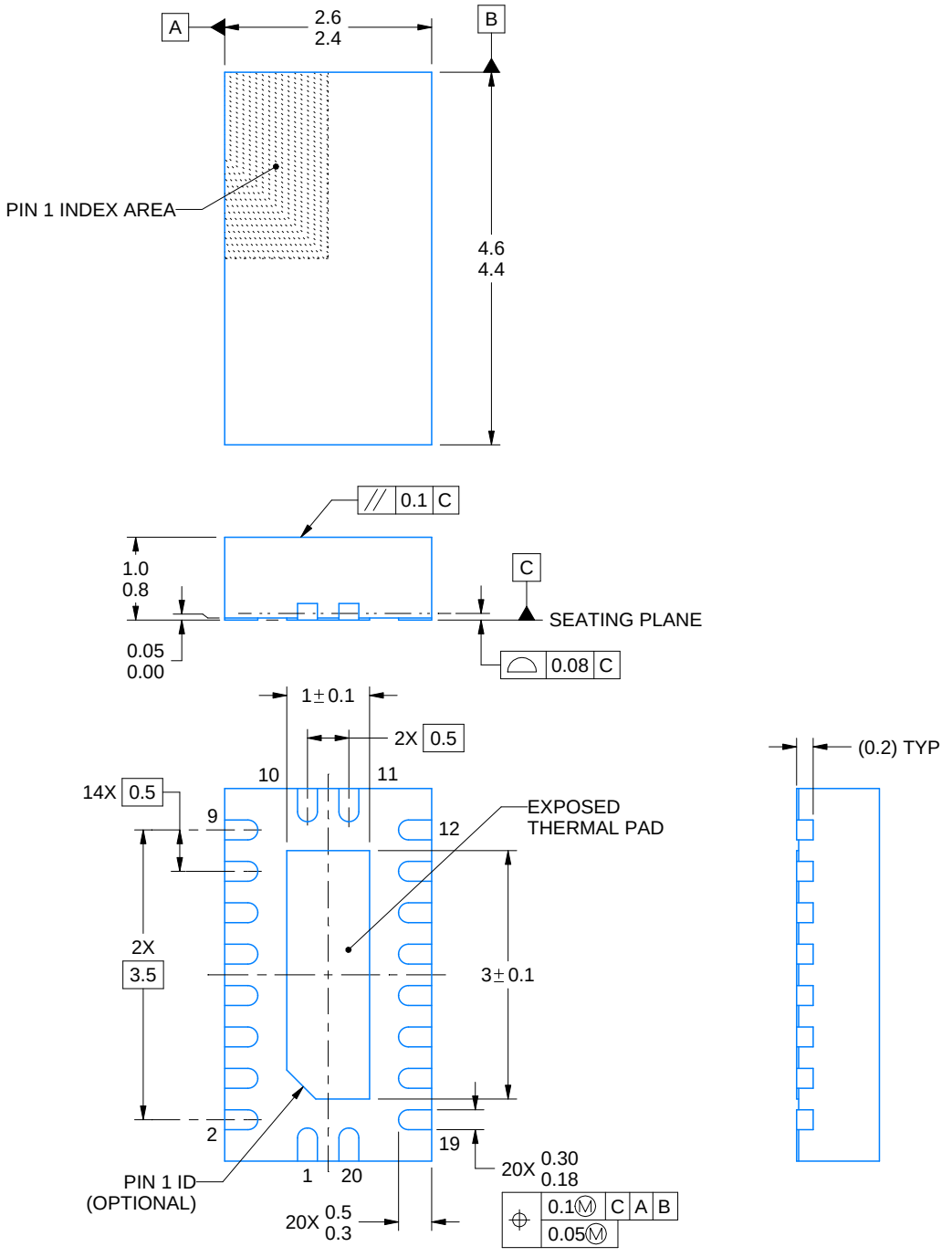


# PACKAGE OUTLINE

## RKS0020A

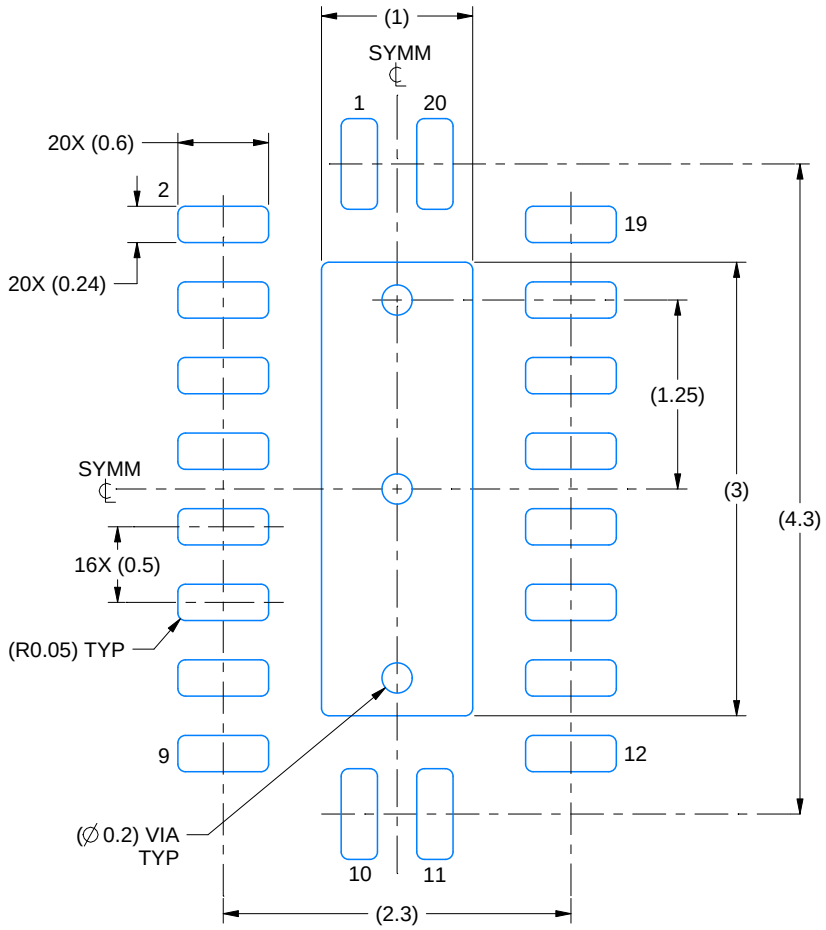
## VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD

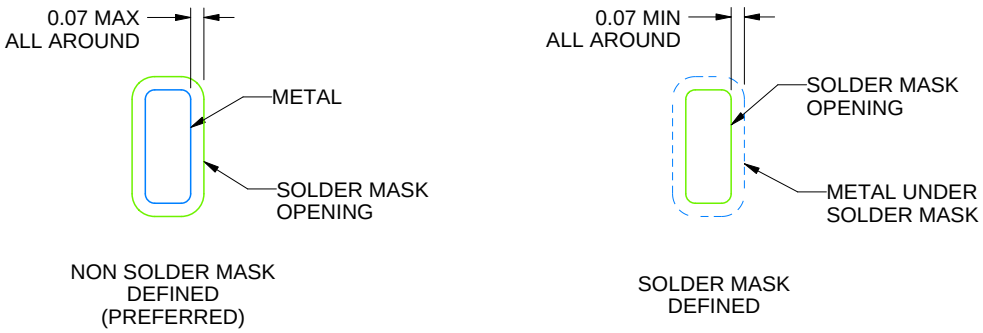



NOTES:

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 thermal and mechanical performance.




LAND PATTERN EXAMPLE
SCALE:20X

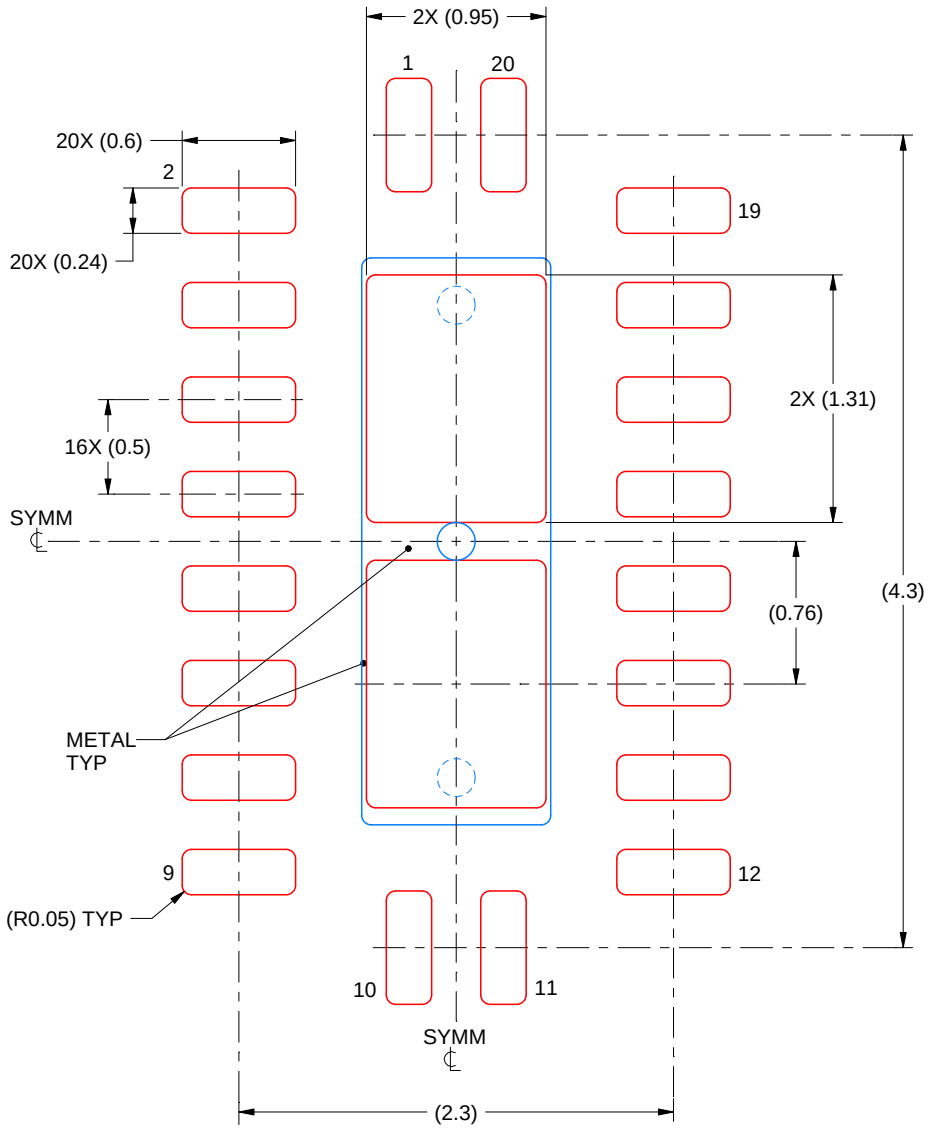



SOLDER MASK DETAILS

4222490/B 02/2021

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 some or all are implemented, recommended via locations are shown.




SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD
83% PRINTED SOLDER COVERAGE BY AREA
SCALE:25X

4222490/B 02/2021

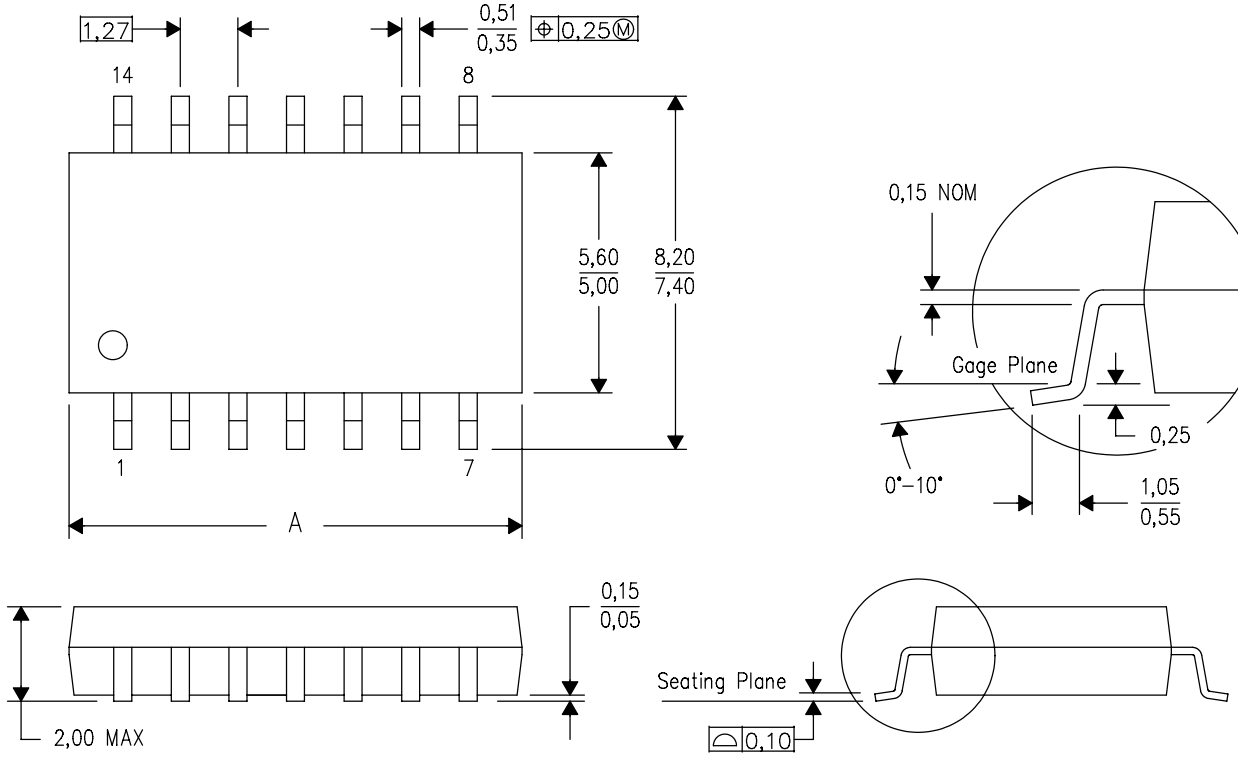
NOTES: (continued)

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.

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