

# SN74AHCT245-Q1 Automotive Octal Bus Transceivers With 3-State Outputs

## 1 Features

- AEC-Q100 qualified for automotive applications:
  - Temperature grade 1:  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $T_A$
- Inputs are TTL-voltage compatible
- Latch-up performance exceeds 250mA per JESD 17

## 2 Applications

- Enable or disable a digital signal
- Hold a signal during a controller reset
- Debounce a switch

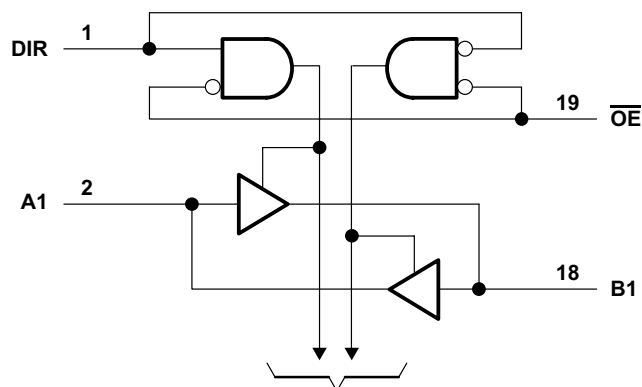
### 3 Description

The SN74AHCT245-Q1 octal bus transceivers are designed for asynchronous two-way communication between data buses. These parts operate from 4.5V to 5.5V.

## Package Information

| PART NUMBER    | PACKAGE <sup>(1)</sup> | PACKAGE SIZE <sup>(2)</sup> | BODY SIZE (NOM) <sup>(3)</sup> |
|----------------|------------------------|-----------------------------|--------------------------------|
| SN74AHCT245-Q1 | PW (TSSOP, 20)         | 6.5mm × 6.4mm               | 6.5mm × 4.4mm                  |
|                | DGS (VSSOP, 20)        | 5.1mm × 4.9mm               | 5.1mm × 3mm                    |

- (1) For all available packages, see [Section 13](#).
- (2) The package size (length  $\times$  width) is a nominal value and includes pins, where applicable.
- (3) The body size (length  $\times$  width) is a nominal value and does not include pins.



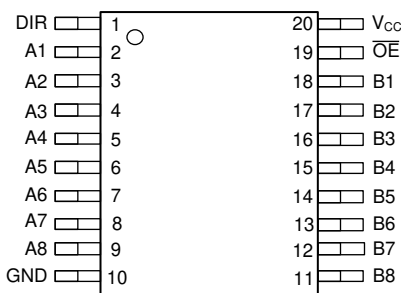
### To Seven Other Channels

### Simplified Schematic

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## 4 Pin Configuration and Functions



**Figure 4-1. SN74AHCT245-Q1: PW or DGS Package, 20-Pin TSSOP or VSSOP (Top View)**

**Table 4-1. Pin Functions**

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

(1) I = Input, O = Output, P= Positive Supply, G = Ground

## 5 Specifications

### 5.1 Absolute Maximum Ratings

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

|                  |   |  | MIN  | MAX                   | UNIT |
|------------------|---|--|------|-----------------------|------|
| V <sub>CC</sub>  | Supply voltage range                              |  | –0.5 | 7                     | V    |
| V <sub>I</sub>   | Input voltage range <sup>(2)</sup>                | Control inputs   | –0.5 | 7                     | V    |
| V <sub>O</sub>   | Output voltage range <sup>(2)</sup>               |  | –0.5 | V <sub>CC</sub> + 0.5 | V    |
| I <sub>IK</sub>  | Input clamp current                               | V <sub>I</sub> < 0                                     |      | –20                   | mA   |
| I <sub>OK</sub>  | Output clamp current                              | V <sub>O</sub> < 0 or V <sub>O</sub> > V <sub>CC</sub> |      | ±20                   | mA   |
| I <sub>O</sub>   | Continuous output current                         | V <sub>O</sub> = 0 to V <sub>CC</sub>                  |      | ±25                   | mA   |
|                  | Continuous current through V <sub>CC</sub> or GND |  |      | ±75                   | mA   |
| T <sub>stg</sub> | Storage temperature                               |  | –65  | 150                   | °C   |

- (1) Operation outside the *Absolute Maximum Rating* may cause permanent device damage. *Absolute Maximum Rating* do not imply functional operation of the device at these or any other conditions beyond those listed under *Recommended Operating Condition*. If used outside the *Recommended Operating Condition* but within the *Absolute Maximum Rating*, the device may not be fully functional, and this may affect device reliability, functionality, performance, and shorten the device lifetime.
- (2) The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

### 5.2 ESD Ratings

|                    |                         |  | MIN | MAX   | UNIT |
|--------------------|-------------------------|--|-----|-------|------|
| V <sub>(ESD)</sub> | Electrostatic discharge | Human body model (HBM), per AEC Q100-002 HBM ESD Classification Level 2 <sup>(1)</sup> |     | ±2000 | V    |
|                    |                         | Charged device model (CDM), per AEC Q100-011 CDM ESD Classification Level C4B          |     | ±1000 |      |

- (1) AEC Q100-002 indicate that HBM stressing shall be in accordance with the ANSI/ESDA/JEDEC JS-001 specification.

### 5.3 Recommended Operating Conditions

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

|                 |                                     | SN74AHCT245-Q1 |                 | UNIT |
|-----------------|-------------------------------------|----------------|-----------------|------|
|                 |                                     | MIN            | MAX             |      |
| V <sub>CC</sub> | Supply voltage                      | 4.5            | 5.5             | V    |
| V <sub>IH</sub> | High-level input voltage            | 2              |                 | V    |
| V <sub>IL</sub> | Low-level Input voltage             |                | 0.8             | V    |
| V <sub>I</sub>  | Input voltage                       | 0              | 5.5             | V    |
| V <sub>O</sub>  | Output voltage                      | 0              | V <sub>CC</sub> | V    |
| I <sub>OH</sub> | High-level output current           |                | –8              | mA   |
| I <sub>OL</sub> | Low-level output current            |                | 8               | mA   |
| Δt/Δv           | Input Transition rise and fall rate |                | 20              | ns/V |
| T <sub>A</sub>  | Operating free-air temperature      | –40            | 125             | °C   |

- (1) All unused inputs of the device must be held at V<sub>CC</sub> or GND for 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 <sup>(1)</sup> |  | SN74AHCT245-Q1 |         | UNIT |
|-------------------------------|--|----------------|---------|------|
|                               |  | PW             | DGS     |      |
|                               |  | 20 PINS        | 20 PINS |      |
| R <sub>θJA</sub>              | Junction-to-ambient thermal resistance       | 102.8          | 118.4   | °C/W |
| R <sub>θJC(top)</sub>         | Junction-to-case (top) thermal resistance    | 36.8           | 57.7    |      |
| R <sub>θJB</sub>              | Junction-to-board thermal resistance         | 53.8           | 73.1    |      |
| ψ <sub>JT</sub>               | Junction-to-top characterization parameter   | 2.5            | 5.7     |      |
| ψ <sub>JB</sub>               | Junction-to-board characterization parameter | 53.3           | 72.7    |      |
| R <sub>θJC(bot)</sub>         | Junction-to-case (bottom) thermal resistance | n/a            | n/a     |      |

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

## 5.5 Electrical Characteristics

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

| PARAMETER                       |                              | TEST CONDITIONS   | V <sub>CC</sub> | T <sub>A</sub> = 25°C |     |      | –40°C to 125°C |      | UNIT |
|---------------------------------|------------------------------|---|-----------------|-----------------------|-----|------|----------------|------|------|
|                                 |                              |   |                 | MIN                   | TYP | MAX  | MIN            | MAX  |      |
| V <sub>OH</sub>                 |                              | I <sub>OH</sub> = –50 μA                                    | 4.5 V           | 4.4                   | 4.5 |      | 4.4            |      | V    |
|                                 |                              | I <sub>OH</sub> = –8 mA                                     |                 | 3.94                  |     |      | 3.7            |      |      |
| V <sub>OL</sub>                 |                              | I <sub>OL</sub> = 50 μA                                     | 4.5 V           |                       |     | 0.1  |                | 0.1  | V    |
|                                 |                              | I <sub>OH</sub> = 8 mA                                      |                 |                       |     | 0.36 |                | 0.44 |      |
| I <sub>I</sub>                  | OE or DIR                    | V <sub>I</sub> = 5.5 V or GND                               | 0 to 5.5 V      |                       |     | ±0.1 |                | ±1   | μA   |
| I <sub>OZ</sub>                 | A or B inputs <sup>(1)</sup> | V <sub>O</sub> = V <sub>CC</sub> or GND                     | 5.5 V           |                       |     | ±25  |                | ±2.5 | μA   |
| I <sub>CC</sub>                 |                              | V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0 | 5.5 V           |                       |     | 4    |                | 40   | μA   |
| ΔI <sub>CC</sub> <sup>(2)</sup> |                              | One input at 3.4 V, Other inputs at V <sub>CC</sub> or GND  | 5.5 V           |                       |     | 1.35 |                | 1.5  | mA   |
| C <sub>I</sub>                  | OE or DIR                    | V <sub>I</sub> = V <sub>CC</sub> or GND                     | 5 V             |                       | 2.5 | 10   |                |      | pF   |
| C <sub>io</sub>                 | A or B inputs                | V <sub>I</sub> = V <sub>CC</sub> or GND                     | 5 V             |                       | 4   |      |                |      | pF   |

- (1) For I/O ports, the parameter I<sub>OZ</sub> includes the input leakage current.  
(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<sub>CC</sub>.

## 5.6 Switching Characteristics

over recommended operating free-air temperature range,  $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$  (unless otherwise noted)

| PARAMETER   | FROM<br>(INPUT) | TO<br>(OUTPUT) | LOAD<br>CAPACITANCE  | $T_A = 25^\circ\text{C}$ |      | $-40^\circ\text{C to } 125^\circ\text{C}$ |      | UNIT |
|-------------|-----------------|----------------|----------------------|--------------------------|------|---|------|------|
|             |                 |                |                      | TYP                      | MAX  | MIN                                       | MAX  |      |
| $t_{PLH}$   | A or B          | B or A         | $C_L = 15\text{ pF}$ | 4.5                      | 7.7  | 1   | 10   | ns   |
| $t_{PHL}$   |                 |                |                      | 4.5                      | 7.7  | 1   | 10   |      |
| $t_{PZH}$   | $\overline{OE}$ | A or B         | $C_L = 15\text{ pF}$ | 8.9                      | 13.8 | 1   | 16   | ns   |
| $t_{PZL}$   |                 |                |                      | 8.9                      | 13.8 | 1   | 16   |      |
| $t_{PHZ}$   | $\overline{OE}$ | A or B         | $C_L = 15\text{ pF}$ | 9.2                      | 14.4 | 1   | 16.5 | ns   |
| $t_{PLZ}$   |                 |                |                      | 9.2                      | 14.4 | 1   | 16.5 |      |
| $t_{PLH}$   | A or B          | B or A         | $C_L = 50\text{ pF}$ | 5.3                      | 8.7  | 1   | 11   | ns   |
| $t_{PHL}$   |                 |                |                      | 5.3                      | 8.7  | 1   | 11   |      |
| $t_{PZH}$   | $\overline{OE}$ | A or B         | $C_L = 50\text{ pF}$ | 9.7                      | 14.8 | 1   | 17   | ns   |
| $t_{PZL}$   |                 |                |                      | 9.7                      | 14.8 | 1   | 17   |      |
| $t_{PHZ}$   | $\overline{OE}$ | A or B         | $C_L = 50\text{ pF}$ | 10                       | 15.4 | 1   | 17.5 | ns   |
| $t_{PLZ}$   |                 |                |                      | 10                       | 15.4 | 1   | 17.5 |      |
| $t_{sk(o)}$ |                 |                | $C_L = 50\text{ pF}$ |                          | 1    |   |      | ns   |

## 5.7 Noise Characteristics

$V_{CC} = 5\text{ V}$ ,  $C_L = 50\text{ pF}$ ,  $T_A = 25^\circ\text{C}$ <sup>(1)</sup>

| PARAMETER   |  | SN74AHCT245-Q1 |     |     | UNIT |
|-------------|--|----------------|-----|-----|------|
|             |  | MIN            | TYP | MAX |      |
| $V_{OH(V)}$ | Quiet output, minimum dynamic $V_{OH}$ |                | 4   |     | V    |
| $V_{IH(D)}$ | High-level dynamic input voltage       | 2              |     |     | V    |
| $V_{IL(D)}$ | Low-level dynamic input voltage        |                |     | 0.8 | V    |

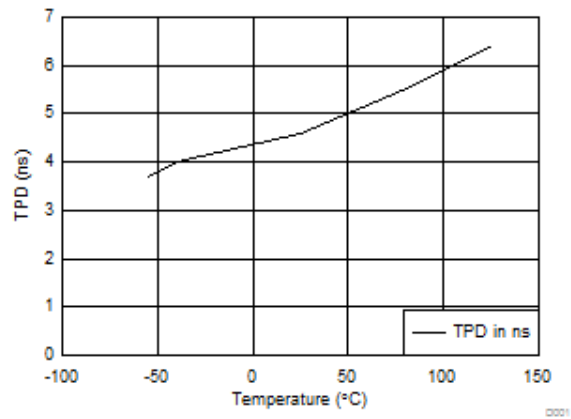
(1) Characteristics are for surface-mount packages only.

## 5.8 Operating Characteristics

$V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$

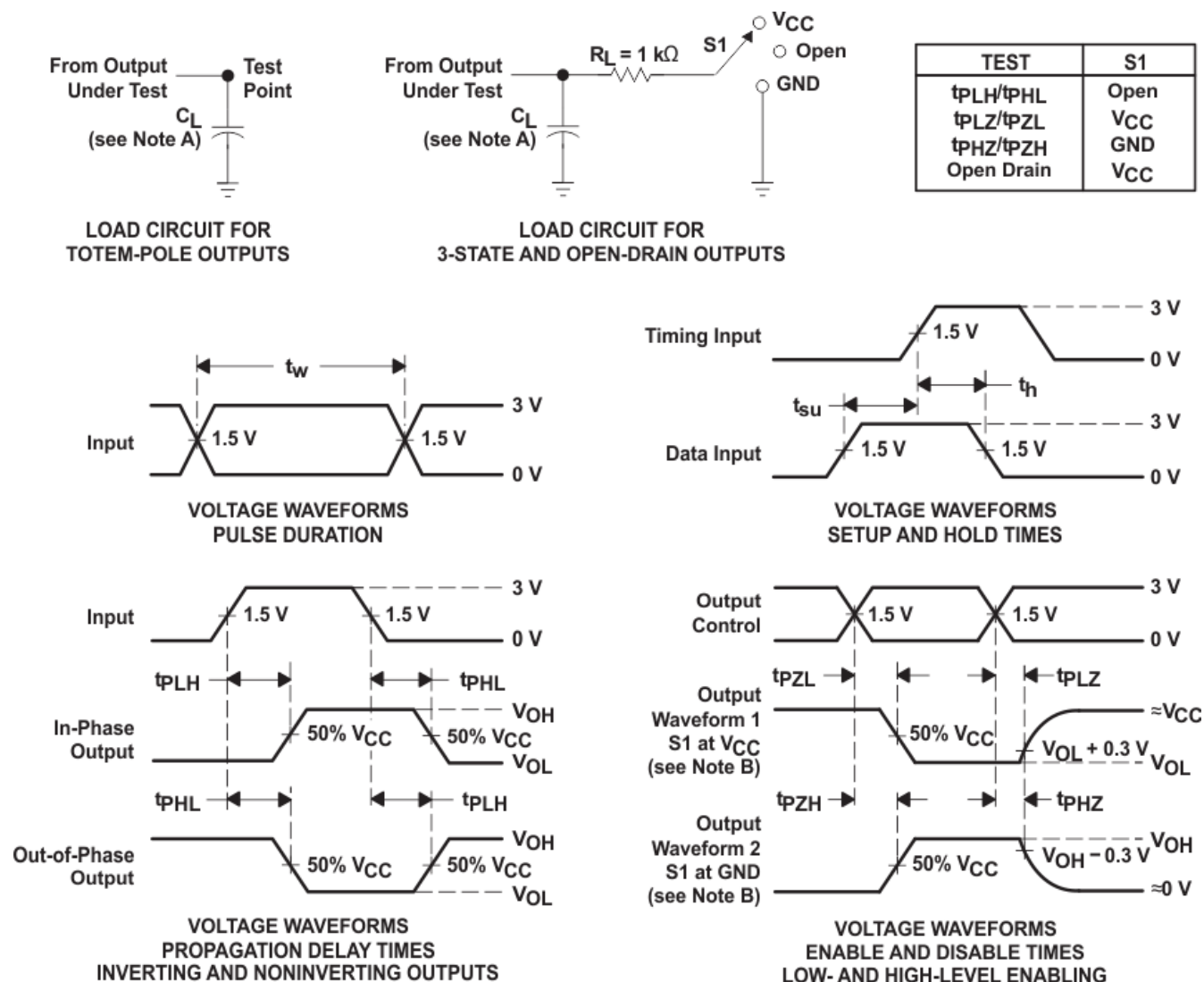
| PARAMETER |                               | TEST CONDITIONS             | TYP | UNIT |
|-----------|-------------------------------|-----------------------------|-----|------|
| $C_{pd}$  | Power dissipation capacitance | No load, $f = 1\text{ MHz}$ | 13  | pF   |

## 5.9 Typical Characteristics



**Figure 5-1. SN74AHCT245-Q1 TPD vs Temperature, 15 pF Load**

## 6 Parameter Measurement Information



- A.  $C_L$  includes probe and jig capacitance.
- B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
- C. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1\text{ MHz}$ ,  $Z_O = 50\text{ }\Omega$ ,  $t_r \leq 3\text{ ns}$ ,  $t_f \leq 3\text{ ns}$ .
- 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.

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





## 8 Application and Implementation

### Note

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

### 8.1 Application Information

The SN74AHCT245 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 it ideal for translating up from 3.3 V to 5 V. The following figure shows this type of translation.

### 8.2 Typical Application

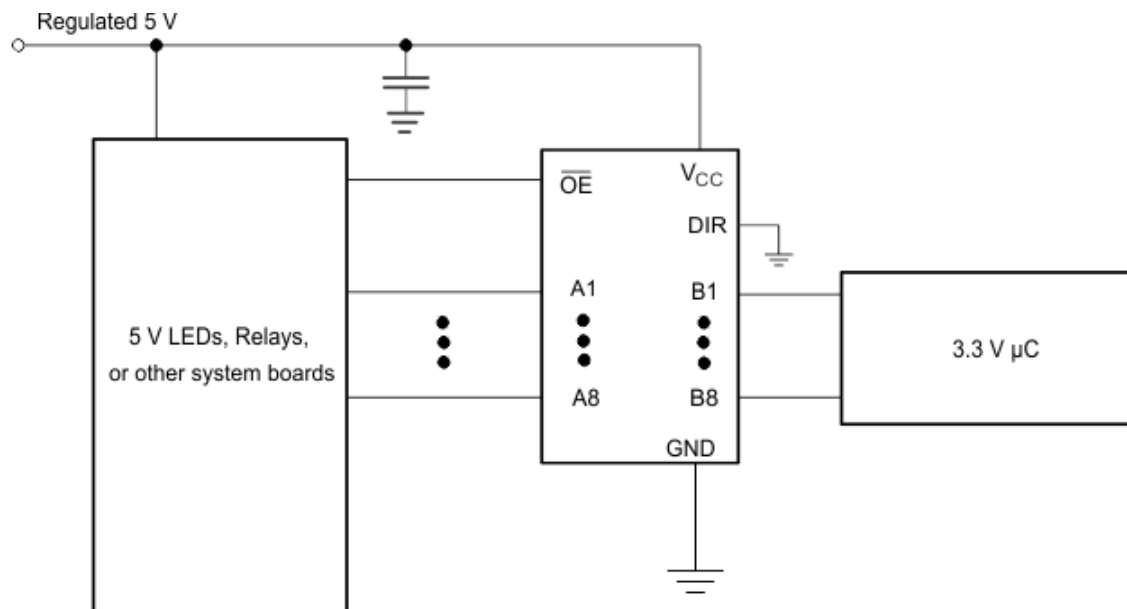


Figure 8-1. Typical Application Diagram

#### 8.2.1 Design Requirements

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

#### 8.2.2 Detailed Design Procedure

- Recommended input conditions:
  - Specified high and low levels. See ( $V_{IH}$  and  $V_{IL}$ ) 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  $V_{CC}$ .
- Recommend output conditions:
  - Load currents should not exceed 25 mA per output and 50 mA total for the part.
  - Outputs should not be pulled above  $V_{CC}$ .

### 8.2.3 Application Curves

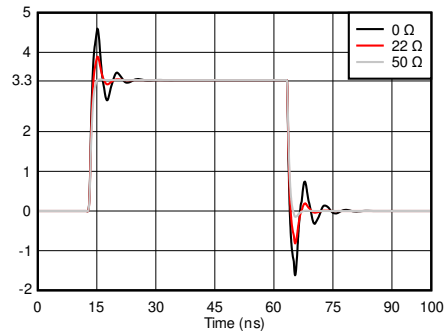


Figure 8-2. Typical Application Curve

## 9 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 VCC pin should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, 0.1  $\mu\text{f}$  is recommended; if there are multiple VCC pins, then 0.01  $\mu\text{f}$  or 0.022  $\mu\text{f}$  is recommended for each power pin. It is acceptable to parallel multiple bypass capacitors to reject different frequencies of noise. A 0.1  $\mu\text{f}$  and a 1  $\mu\text{f}$  are commonly used in parallel. The bypass capacitor should be installed as close to the power pin as possible for best results.

## 10 Layout

### 10.1 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. [Figure 10-1](#) 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 I/Os, so they cannot float when disabled.

### 10.2 Layout Example

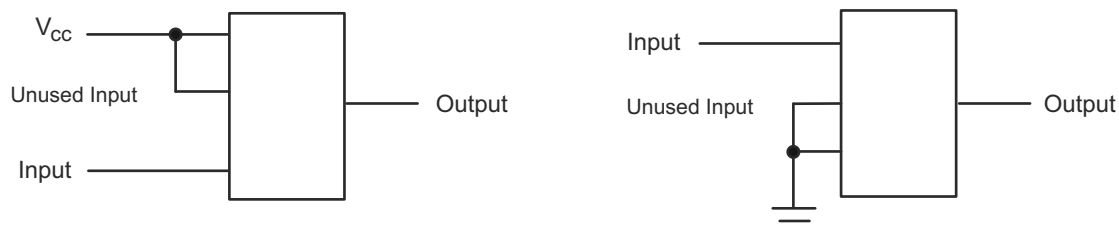


Figure 10-1. Layout Diagram

## 11 Device and Documentation Support

### 11.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](https://www.ti.com). Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

### 11.2 Support Resources

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

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

### 11.3 Trademarks

TI E2E™ is a trademark of Texas Instruments.

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### 11.4 Electrostatic Discharge Caution



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

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

### 11.5 Glossary

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

## 12 Revision History

| Changes from Revision * (April 2023) to Revision A (June 2025) | Page |
|--|------|
| • Added DGS package.....                                       | 1    |

## 13 Mechanical, Packaging, and Orderable Information

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

## PACKAGING INFORMATION

| Orderable part number              | Status<br>(1) | Material type<br>(2) | Package   Pins   | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6) |
|------------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| <a href="#">SN74AHCT245QDGSRQ1</a> | Active        | Production           | VSSOP (DGS)   20 | 5000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | CT245Q              |
| <a href="#">SN74AHCT245QPWRQ1</a>  | Active        | Production           | TSSOP (PW)   20  | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | AHCT245Q            |
| SN74AHCT245QPWRQ1.A                | Active        | Production           | TSSOP (PW)   20  | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | AHCT245Q            |

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

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

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

<sup>(4)</sup> **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.

<sup>(5)</sup> **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.

<sup>(6)</sup> **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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### OTHER QUALIFIED VERSIONS OF SN74AHCT245-Q1 :

- Catalog : [SN74AHCT245](#)

- Enhanced Product : [SN74AHCT245-EP](#)

- Military : [SN54AHCT245](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Enhanced Product - Supports Defense, Aerospace and Medical Applications
- Military - QML certified for Military and Defense Applications

## TAPE AND REEL INFORMATION



\*All dimensions are nominal

| Device             | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|--------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74AHCT245QDGSRQ1 | VSSOP        | DGS             | 20   | 5000 | 330.0              | 16.4               | 5.4     | 5.4     | 1.45    | 8.0     | 16.0   | Q1            |
| SN74AHCT245QPWRQ1  | TSSOP        | PW              | 20   | 2000 | 330.0              | 16.4               | 6.95    | 7.0     | 1.4     | 8.0     | 16.0   | Q1            |

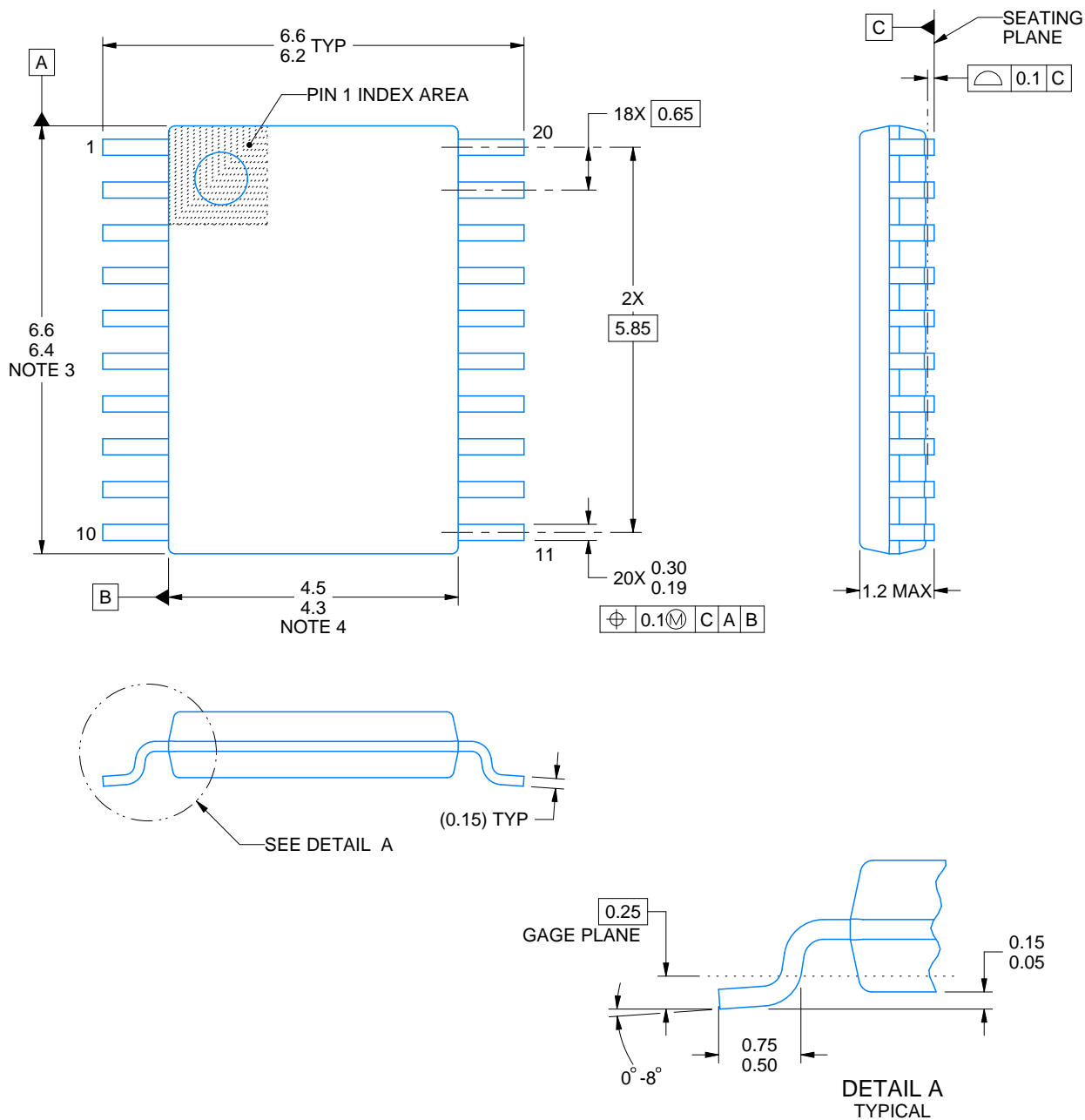
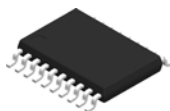
## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

| Device             | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|--------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74AHCT245QDGSRQ1 | VSSOP        | DGS             | 20   | 5000 | 353.0       | 353.0      | 32.0        |
| SN74AHCT245QPWRQ1  | TSSOP        | PW              | 20   | 2000 | 353.0       | 353.0      | 32.0        |





4220206/A 02/2017

## NOTES:

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

# EXAMPLE BOARD LAYOUT

PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



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.

## EXAMPLE STENCIL DESIGN

PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE

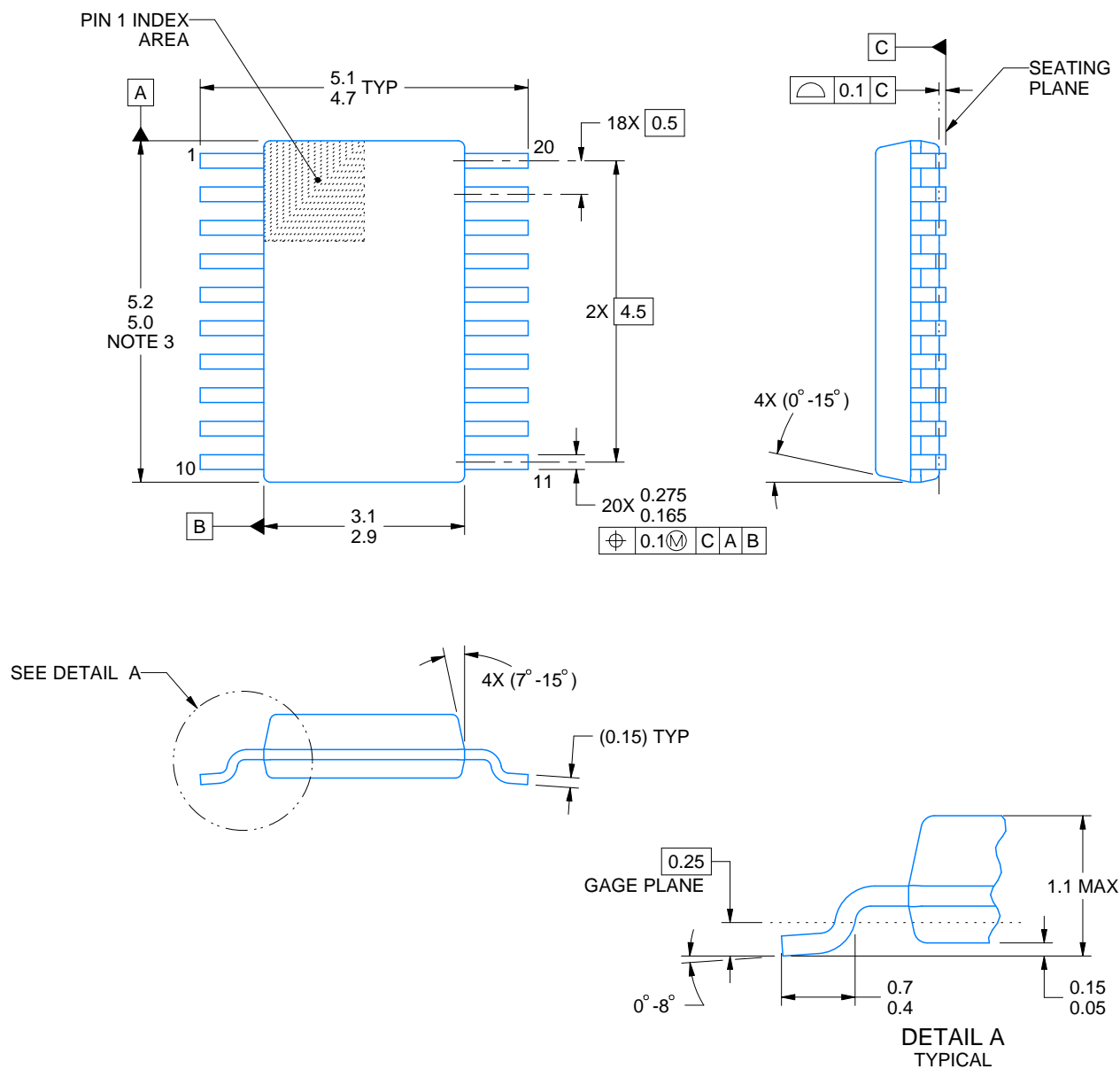
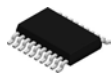


SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE: 10X

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.



4226367/A 10/2020

## NOTES:

PowerPAD is a trademark of Texas Instruments.

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.

# EXAMPLE BOARD LAYOUT

DGS0020A

VSSOP - 1.1 mm max height

SMALL OUTLINE PACKAGE



4226367/A 10/2020

NOTES: (continued)

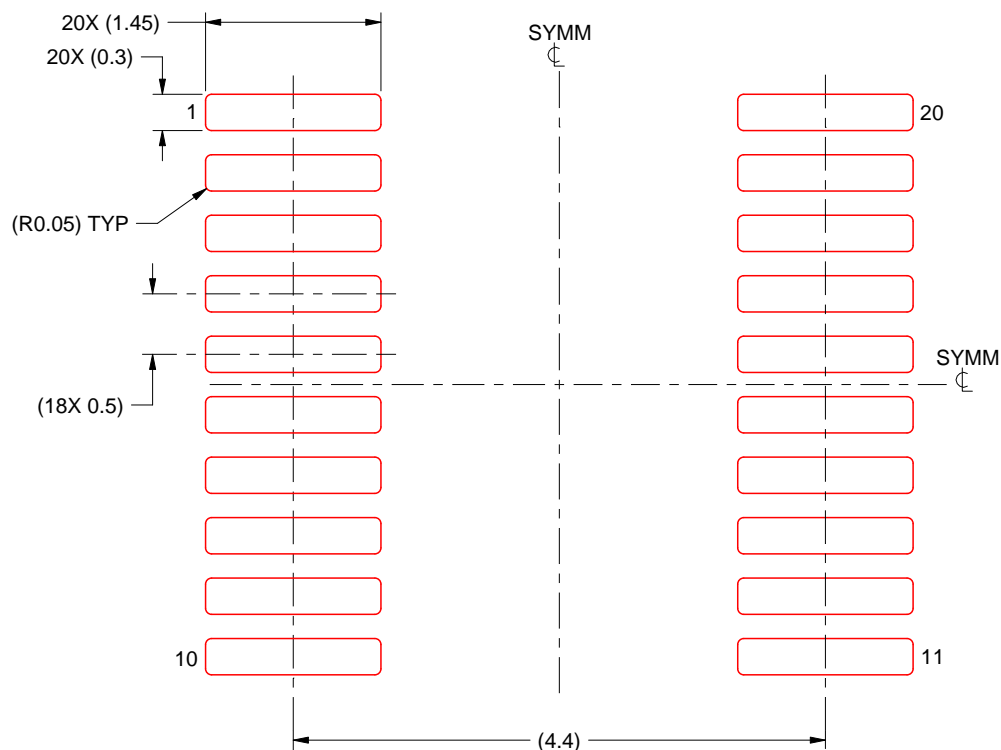
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.
8. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature numbers SLMA002 ([www.ti.com/lit/slma002](http://www.ti.com/lit/slma002)) and SLMA004 ([www.ti.com/lit/slma004](http://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.

# EXAMPLE STENCIL DESIGN

DGS0020A

VSSOP - 1.1 mm max height

SMALL OUTLINE PACKAGE



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.

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