

## SNx4AHCT245 3 ステート出力、オクタール・バス・トランシーバ

### 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。

### 2 アプリケーション

- デジタル信号のイネーブルまたはディセーブル
- コントローラ・リセット時の信号保持
- スイッチのデバウンス

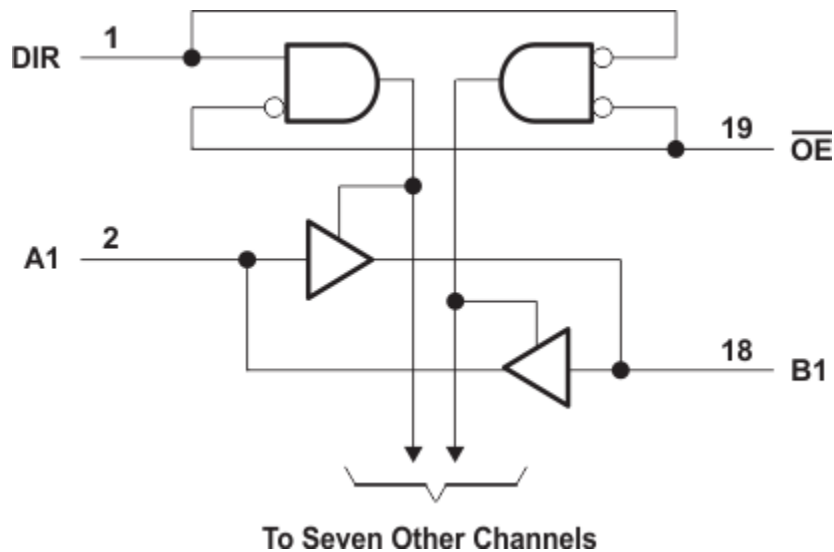
### 3 概要

SNx4AHCT245 オクタール・バス・トランシーバは、データ・バス間の非同期双方向通信用に設計されています。これらの部品は、4.5V~5.5V で動作します。

#### パッケージ情報 (1)

部品番号	パッケージ	本体サイズ (公称)
SN54AHCT245	J (CDIP, 20)	24.2mm × 6.92mm
	W (CFP, 20)	13.09mm × 6.92mm
	FK (LCCC, 20)	8.89mm × 8.89mm
SN74AHCT245	RGY (VQFN, 20)	4.50mm × 3.50mm
	N (PDIP, 20)	25.40mm × 6.35mm
	NS (SOP, 20)	12.60mm × 5.30mm
	DB (SSOP, 20)	7.50mm × 5.30mm
	DGV (TVSOP, 20)	5.00mm × 4.40mm
	DW (SOIC, 20)	12.80mm × 7.50mm
	PW (TSSOP, 20)	6.50mm × 4.40mm
	RKS (VQFN, 20)	4.50mm × 2.50mm
	DGS (VSSOP, 20)	5.10mm × 3.00mm

(1) 利用可能なすべてのパッケージについては、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。



概略回路図



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### 4

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 R (April 2023) to Revision S (July 2023) Page

- Updated R $\theta$ JA values: DB = 96.0 to 113.1, DW = 79.8 to 96.2, PW = 102.8 to 122.3; Updated DB, DW, and PW packages for R $\theta$ JC(top), R $\theta$ JB,  $\Psi$ JT,  $\Psi$ JB, and R $\theta$ JC(bot), all values in °C/W..... 5

#### Changes from Revision Q (December 2022) to Revision R (April 2023) Page

- 「アプリケーション」セクションを更新..... 1
- 「パッケージ情報」表、「ピン構成および機能」、「熱に関する情報」に DGS パッケージの情報を追加..... 1
- 「パッケージ情報」表を更新..... 1

#### Changes from Revision P (July 2014) to Revision Q (December 2022) Page

- 「パッケージ情報」表、「ピン構成および機能」、「熱に関する情報」に RKS パッケージの情報を追加..... 1

## 5 Pin Configuration and Functions

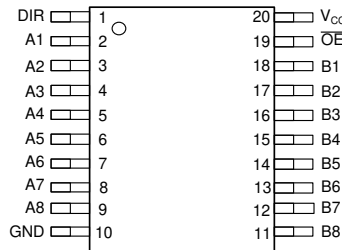


图 5-1. SN54AHCT245: J or W SN74AHCT245: DB, DGV, DW, N, NS, PW or DGS Package, 20-Pin CDIP, CFP, SSOP, TVSOP, SOIC, PDIP, SOP, TSSOP, or VSSOP (Top View)

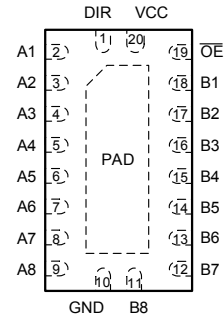


图 5-2. SN74AHCT245: RGY or RKS Package, 20-Pin VQFN (Top View)

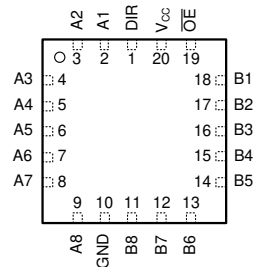


图 5-3. SN54AHCT245: FK Package, 20-Pin LCCC (Top View)

表 5-1. 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

## 6 Specifications

### 6.1 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.

### 6.2 ESD Ratings

			MIN	MAX	UNIT
V <sub>(ESD)</sub>	Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001 <sup>(1)</sup>		±2000	V
		Charged-device model (CDM), per ANSI/ESDA/JEDEC JS-002 <sup>(2)</sup>		±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)<sup>(1)</sup>

		SN54AHCT245		SN74AHCT245		UNIT
		MIN	MAX	MIN	MAX	
V <sub>CC</sub>	Supply voltage	4.5	5.5	4.5	5.5	V
V <sub>IH</sub>	High-level input voltage	2		2		V
V <sub>IL</sub>	Low-level Input voltage		0.8		0.8	V
V <sub>I</sub>	Input voltage	0	5.5	0	5.5	V
V <sub>O</sub>	Output voltage	0	V <sub>CC</sub>	0	V <sub>CC</sub>	V
I <sub>OH</sub>	High-level output current		-8		-8	mA
I <sub>OL</sub>	Low-level output current		8		8	mA
Δt/Δv	Input Transition rise and fall rate		20		20	ns/V
T <sub>A</sub>	Operating free-air temperature	-55	125	-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](#).

## 6.4 Thermal Information

THERMAL METRIC <sup>(1)</sup>		SN74AHCT245									UNIT
		DB	DGV	DW	N	NS	PW	RGY	RKS	DGS	
		20 PINS									
R <sub>θJA</sub>	Junction-to-ambient thermal resistance	113.1	116.1	96.2	51.5	77.1	122.3	35.1	67.7	118.4	°C/W
R <sub>θJC(top)</sub>	Junction-to-case (top) thermal resistance	72.9	31.3	63.6	38.2	43.6	64.8	43.3	72.4	57.7	
R <sub>θJB</sub>	Junction-to-board thermal resistance	67.9	57.6	64.7	32.4	44.6	73.3	12.9	40.4	73.1	
Ψ <sub>JT</sub>	Junction-to-top characterization parameter	39.3	1.0	40.5	24.6	17.2	19	0.9	10.3	5.7	
Ψ <sub>JB</sub>	Junction-to-board characterization parameter	67.5	56.9	64.3	32.3	44.2	73	12.9	40.4	72.7	
R <sub>θJC(bot)</sub>	Junction-to-case (bottom) thermal resistance	n/a	n/a	n/a	n/a	n/a	n/a	7.9	24.1	n/a	

(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 <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54AHCT245 –55°C TO 125°C		SN74AHCT245 –40°C TO 85°C		Recommended SN74AHCT245 –40°C TO 125°C		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = –50 μA	4.5 V	4.4	4.5		4.4		4.4		4.4	V	
	I <sub>OH</sub> = –8 mA		3.94			3.8		3.8		3.7		
V <sub>OL</sub>	I <sub>OL</sub> = 50 μA	4.5 V			0.1		0.1		0.1		0.1	V
	I <sub>OH</sub> = 8 mA				0.36		0.44		0.44		0.44	
I <sub>I</sub>	$\overline{\text{OE}}$ or DIR	V <sub>I</sub> = 5.5 V or GND			±0.1		±1 <sup>(1)</sup>		±1		±1	μA
I <sub>OZ</sub>	A or B inputs <sup>(2)</sup>	V <sub>O</sub> = V <sub>CC</sub> or GND			±25		±2.5		±2.5		±2.5	μA
I <sub>CC</sub>		V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0			4		40		40		40	μA
ΔI <sub>CC</sub> <sup>(3)</sup>		One input at 3.4 V, Other inputs at V <sub>CC</sub> or GND			1.35		1.5		1.5		1.5	mA
C <sub>i</sub>	$\overline{\text{OE}}$ or DIR	V <sub>I</sub> = V <sub>CC</sub> or GND		2.5	10				10			pF
C <sub>io</sub>	A or B inputs	V <sub>I</sub> = V <sub>CC</sub> or GND		4								pF

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested at V<sub>CC</sub> = 0 V.

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

(3) 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>.

## 6.6 Switching Characteristics

over recommended operating free-air temperature range,  $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$  (unless otherwise noted) (see <sup>(1)</sup>)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	$T_A = 25^\circ\text{C}$		SN54AHCT245 –55°C TO 125°C		SN74AHCT245 –40°C TO 85°C		Recommended SN74AHCT245 –40°C TO 125°C		UNIT
				TYP	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{PLH}$	A or B	B or A	$C_L = 15\text{ pF}$	4.5 <sup>(1)</sup>	7.7 <sup>(1)</sup>	1 <sup>(1)</sup>	10 <sup>(1)</sup>	1	8.5	1	10	ns
$t_{PHL}$				4.5 <sup>(1)</sup>	7.7 <sup>(1)</sup>	1 <sup>(1)</sup>	10 <sup>(1)</sup>	1	8.5	1	10	
$t_{PZH}$	$\overline{OE}$	A or B	$C_L = 15\text{ pF}$	8.9 <sup>(1)</sup>	13.8 <sup>(1)</sup>	1 <sup>(1)</sup>	16 <sup>(1)</sup>	1	15	1	16	ns
$t_{PZL}$				8.9 <sup>(1)</sup>	13.8 <sup>(1)</sup>	1 <sup>(1)</sup>	16 <sup>(1)</sup>	1	15	1	16	
$t_{PHZ}$	$\overline{OE}$	A or B	$C_L = 15\text{ pF}$	9.2 <sup>(1)</sup>	14.4 <sup>(1)</sup>	1 <sup>(1)</sup>	16.5 <sup>(1)</sup>	1	15.5	1	16.5	ns
$t_{PLZ}$				9.2 <sup>(1)</sup>	14.4 <sup>(1)</sup>	1 <sup>(1)</sup>	16.5 <sup>(1)</sup>	1	15.5	1	16.5	
$t_{PLH}$	A or B	B or A	$C_L = 50\text{ pF}$	5.3	8.7	1	11	1	9.5	1	11	ns
$t_{PHL}$				5.3	8.7	1	11	1	9.5	1	11	
$t_{PZH}$	$\overline{OE}$	A or B	$C_L = 50\text{ pF}$	9.7	14.8	1	17	1	16	1	17	ns
$t_{PZL}$				9.7	14.8	1	17	1	16	1	17	
$t_{PHZ}$	$\overline{OE}$	A or B	$C_L = 50\text{ pF}$	10	15.4	1	17.5	1	16.5	1	17.5	ns
$t_{PLZ}$				10	15.4	1	17.5	1	16.5	1	17.5	
$t_{sk(o)}$			$C_L = 50\text{ pF}$		1 <sup>(2)</sup>				1			ns

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

## 6.7 Noise Characteristics

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

PARAMETER		SNx4AHCT245			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

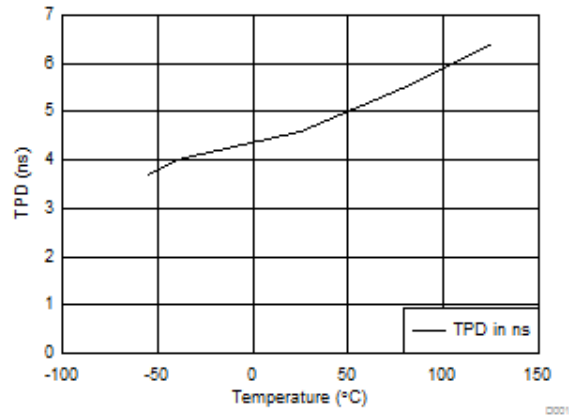
- (1) Characteristics are for surface-mount packages only.

## 6.8 Operating Characteristics

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

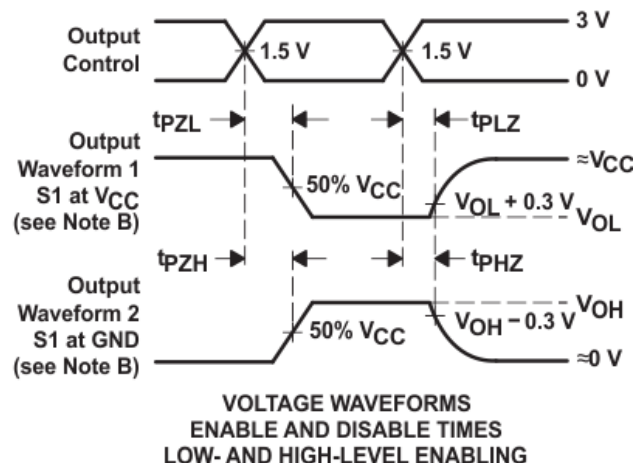
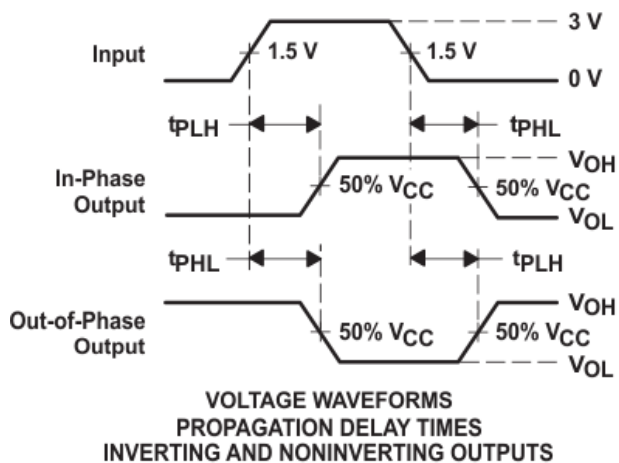
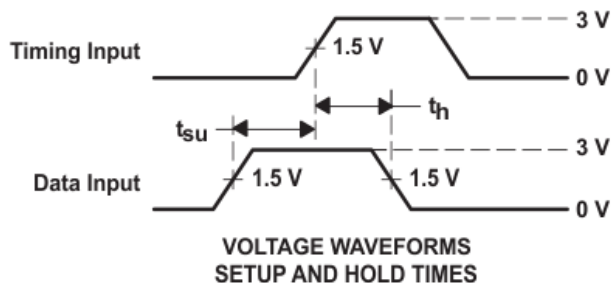
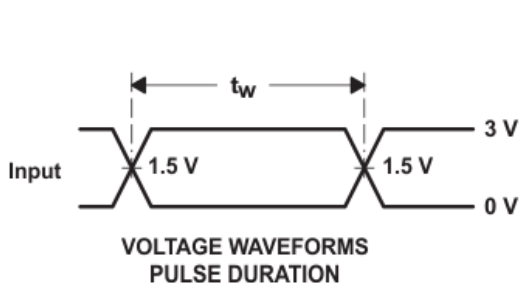
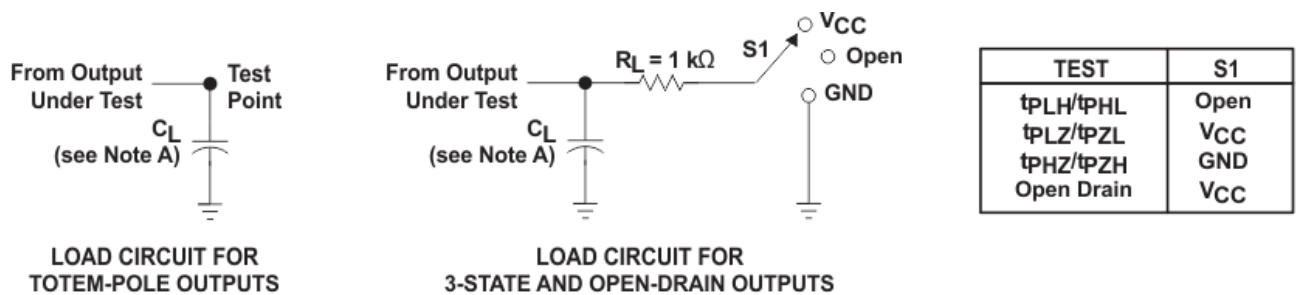
PARAMETER	TEST CONDITIONS	TYP	UNIT
$C_{pd}$	Power dissipation capacitance No load, $f = 1\text{ MHz}$	13	pF

## 6.9 Typical Characteristics



**6-1. SNx4AHCT245 TPD vs Temperature, 15 pF Load**

## 7 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:  $PRR \leq 1$  MHz,  $Z_O = 50 \Omega$ ,  $t_r \leq 3$  ns,  $t_f \leq 3$  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.

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

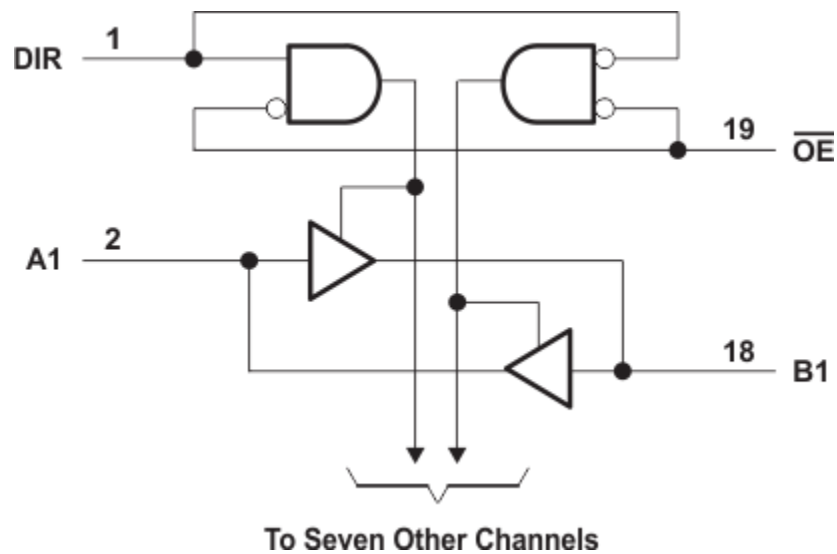


## 8 Detailed Description

### 8.1 Overview

The SNx7AHT245 octal bus transceivers are designed for asynchronous two-way communication between data buses. The control-function implementation minimizes external timing requirements. The SNx4AHT245 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 ( $\overline{OE}$ ) input can be used to disable the device so that the buses effectively are isolated. For the high-impedance state during power up or power down,  $\overline{OE}$  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.

### 8.2 Functional Block Diagram



☒ 8-1. Logic Diagram (Positive Logic)

### 8.3 Feature Description

- $V_{CC}$  is optimized at 5 V
- Allows up voltage translation from 3.3 V to 5 V
  - Inputs accept  $V_{IH}$  levels of 2 V
- Slow edge rates minimize output ringing

### 8.4 Device Functional Modes

表 8-1. Function Table  
(Each Transceiver)

INPUTS		OPERATION
$\overline{OE}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

## 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となります。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 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  $0.8 V_{IL}$  and  $2 V_{IH}$ . This feature makes it ideal for translating up from 3.3 V to 5 V. The following figure shows this type of translation.

### 9.2 Typical Application

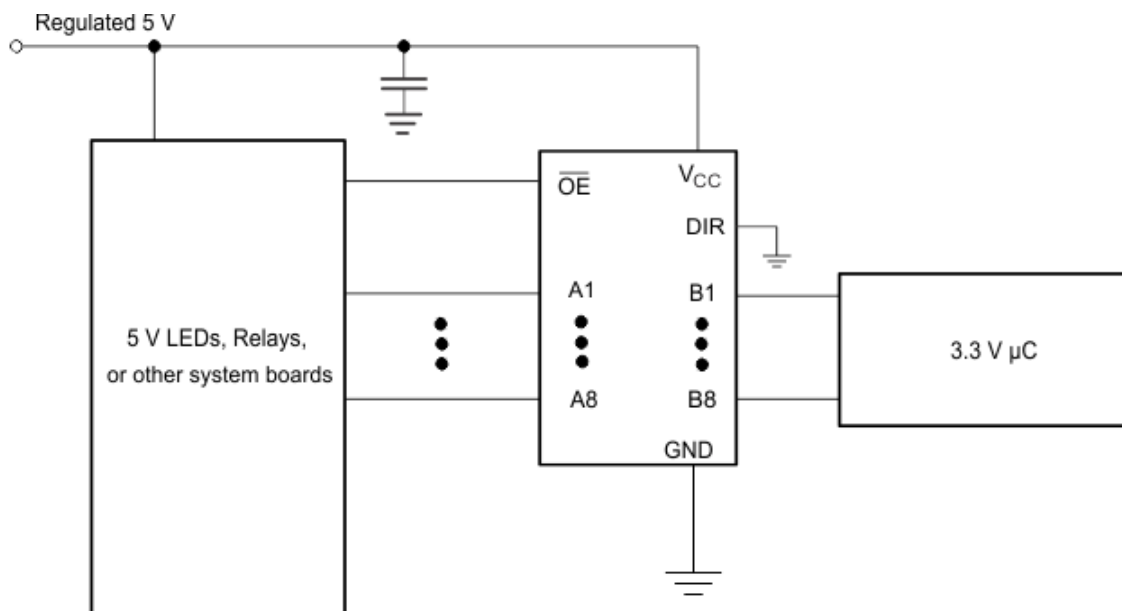


図 9-1. Typical Application Diagram

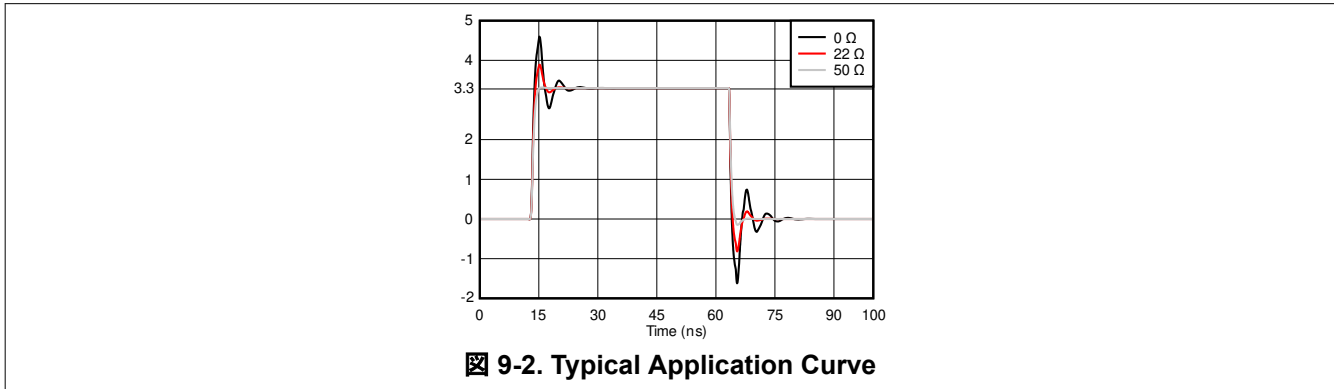
#### 9.2.1 Design Requirements

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.

#### 9.2.2 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  $V_{CC}$ .

### 9.2.3 Application Curves



### 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 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.

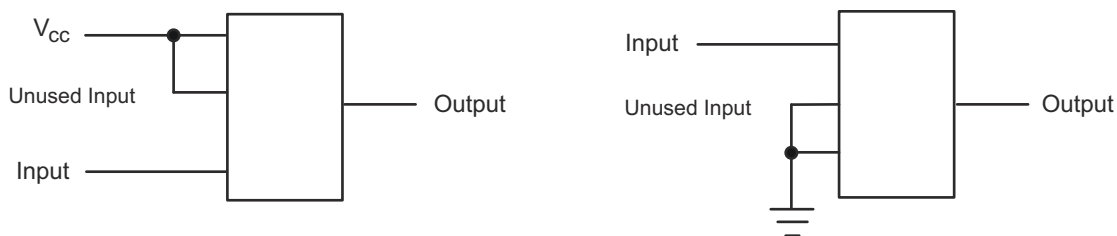
### 9.4 Layout

#### 9.4.1 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. [9-3](#) 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.

#### 9.4.2 Layout Example



**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](http://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、設計に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.

すべての商標は、それぞれの所有者に帰属します。

### 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.

**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)
<a href="#">5962-9681901Q2A</a>	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9681901Q2A SNJ54AHCT 245FK
<a href="#">5962-9681901QRA</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9681901QR A SNJ54AHCT245J
<a href="#">5962-9681901QSA</a>	Active	Production	CFP (W)   20	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9681901QS A SNJ54AHCT245W
<a href="#">SN74AHCT245DBR</a>	Active	Production	SSOP (DB)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245DBR.A</a>	Active	Production	SSOP (DB)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245DBRG4</a>	Active	Production	SSOP (DB)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245DGSR</a>	Active	Production	VSSOP (DGS)   20	5000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245DGSR.A</a>	Active	Production	VSSOP (DGS)   20	5000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245DGVR</a>	Active	Production	TVSOP (DGV)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245DGVR.A</a>	Active	Production	TVSOP (DGV)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245DW</a>	Obsolete	Production	SOIC (DW)   20	-	-	Call TI	Call TI	-40 to 125	AHCT245
<a href="#">SN74AHCT245DWR</a>	Active	Production	SOIC (DW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHCT245
<a href="#">SN74AHCT245DWR.A</a>	Active	Production	SOIC (DW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHCT245
<a href="#">SN74AHCT245N</a>	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHCT245N
<a href="#">SN74AHCT245N.A</a>	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHCT245N
<a href="#">SN74AHCT245NSR</a>	Active	Production	SOP (NS)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHCT245
<a href="#">SN74AHCT245NSR.A</a>	Active	Production	SOP (NS)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHCT245
<a href="#">SN74AHCT245PW</a>	Obsolete	Production	TSSOP (PW)   20	-	-	Call TI	Call TI	-40 to 125	HB245
<a href="#">SN74AHCT245PWR</a>	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245PWR.A</a>	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245PWRE4</a>	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245PWRG3</a>	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245PWRG3.A</a>	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245PWRG4</a>	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245

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)
SN74AHCT245PWRG4.A	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HB245
<a href="#">SN74AHCT245RGYR</a>	Active	Production	VQFN (RGY)   20	3000   LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	HB245
SN74AHCT245RGYR.A	Active	Production	VQFN (RGY)   20	3000   LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	HB245
<a href="#">SN74AHCT245RKSR</a>	Active	Production	VQFN (RKS)   20	3000   LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	AHCT245
SN74AHCT245RKSR.A	Active	Production	VQFN (RKS)   20	3000   LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	AHCT245
<a href="#">SNJ54AHCT245FK</a>	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9681901Q2A SNJ54AHCT 245FK
SNJ54AHCT245FK.A	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9681901Q2A SNJ54AHCT 245FK
<a href="#">SNJ54AHCT245J</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9681901QR A SNJ54AHCT245J
SNJ54AHCT245J.A	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9681901QR A SNJ54AHCT245J
<a href="#">SNJ54AHCT245W</a>	Active	Production	CFP (W)   20	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9681901QS A SNJ54AHCT245W
SNJ54AHCT245W.A	Active	Production	CFP (W)   20	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9681901QS A SNJ54AHCT245W

(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.

<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.

**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 SN54AHCT245, SN74AHCT245 :**

- Catalog : [SN74AHCT245](#)
- Automotive : [SN74AHCT245-Q1](#), [SN74AHCT245-Q1](#)
- Enhanced Product : [SN74AHCT245-EP](#), [SN74AHCT245-EP](#)
- Military : [SN54AHCT245](#)

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

**TAPE AND REEL INFORMATION**

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


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74AHCT245DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74AHCT245DGSR	VSSOP	DGS	20	5000	330.0	16.4	5.4	5.4	1.45	8.0	16.0	Q1
SN74AHCT245DGVR	TVSOP	DGV	20	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74AHCT245DWR	SOIC	DW	20	2000	330.0	24.4	10.9	13.3	2.7	12.0	24.0	Q1
SN74AHCT245NSR	SOP	NS	20	2000	330.0	24.4	8.4	13.0	2.5	12.0	24.0	Q1
SN74AHCT245PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1
SN74AHCT245PWRG3	TSSOP	PW	20	2000	330.0	16.4	6.95	7.1	1.6	8.0	16.0	Q1
SN74AHCT245PWRG4	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1
SN74AHCT245PWRG4	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1
SN74AHCT245RGYR	VQFN	RGY	20	3000	330.0	12.4	3.71	4.71	1.1	8.0	12.0	Q1
SN74AHCT245RKSR	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)
SN74AHCT245DBR	SSOP	DB	20	2000	353.0	353.0	32.0
SN74AHCT245DGSR	VSSOP	DGS	20	5000	353.0	353.0	32.0
SN74AHCT245DGVR	TVSOP	DGV	20	2000	353.0	353.0	32.0
SN74AHCT245DWR	SOIC	DW	20	2000	356.0	356.0	45.0
SN74AHCT245NSR	SOP	NS	20	2000	356.0	356.0	45.0
SN74AHCT245PWR	TSSOP	PW	20	2000	353.0	353.0	32.0
SN74AHCT245PWRG3	TSSOP	PW	20	2000	364.0	364.0	27.0
SN74AHCT245PWRG4	TSSOP	PW	20	2000	353.0	353.0	32.0
SN74AHCT245PWRG4	TSSOP	PW	20	2000	353.0	353.0	32.0
SN74AHCT245RGYR	VQFN	RGY	20	3000	353.0	353.0	32.0
SN74AHCT245RKSR	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)
5962-9681901Q2A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-9681901QSA	W	CFP	20	25	506.98	26.16	6220	NA
SN74AHCT245N	N	PDIP	20	20	506	13.97	11230	4.32
SN74AHCT245N.A	N	PDIP	20	20	506	13.97	11230	4.32
SNJ54AHCT245FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AHCT245FK.A	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AHCT245W	W	CFP	20	25	506.98	26.16	6220	NA
SNJ54AHCT245W.A	W	CFP	20	25	506.98	26.16	6220	NA

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK



4040180-4/F 04/14

- 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

PW0020A



# PACKAGE OUTLINE

## TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



4220206/A 02/2017

### NOTES:

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



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.

# 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.

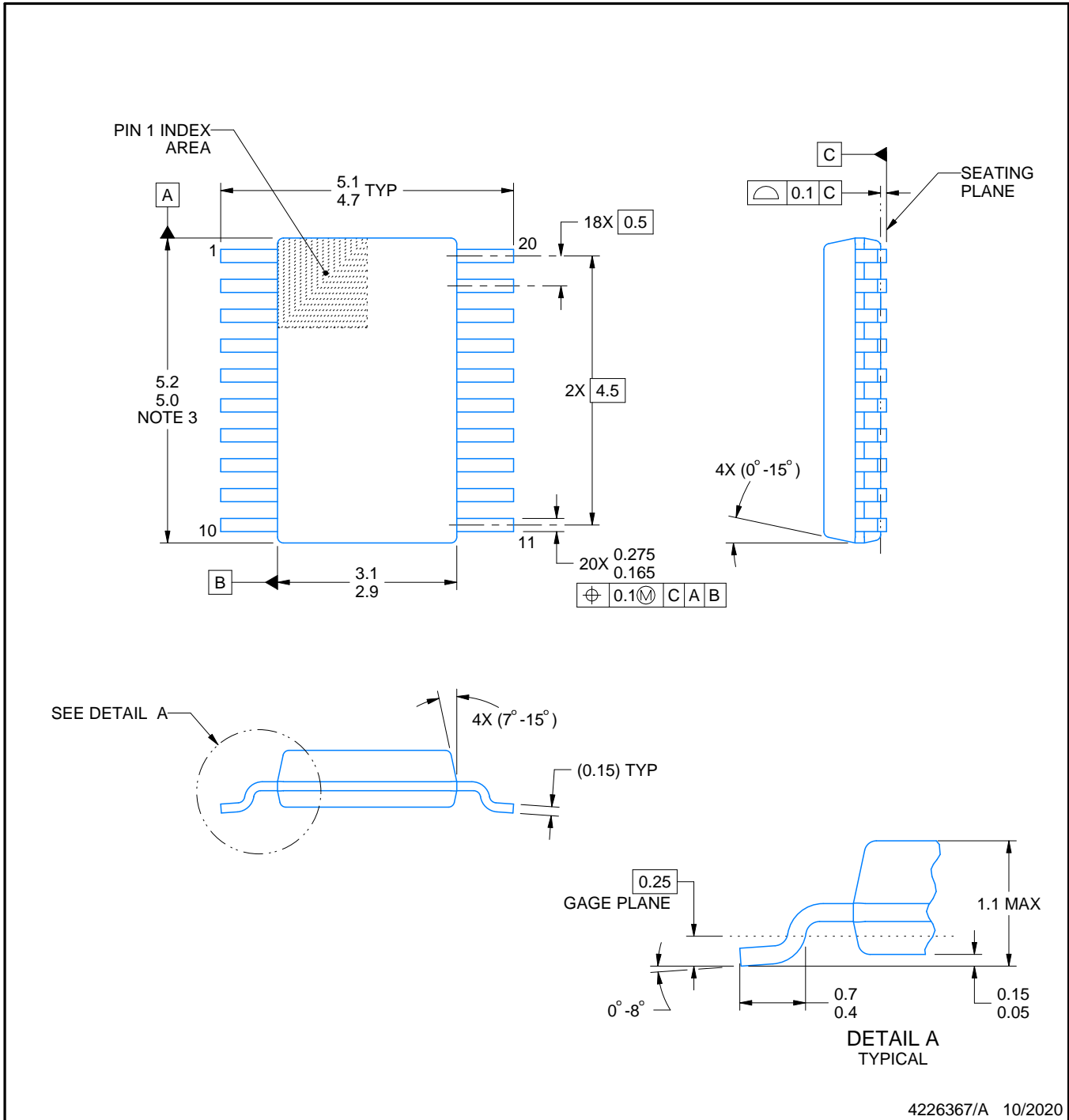
# DGS0020A



# PACKAGE OUTLINE

VSSOP - 1.1 mm max height

SMALL OUTLINE PACKAGE



**NOTES:**

PowerPAD is a trademark of Texas Instruments.

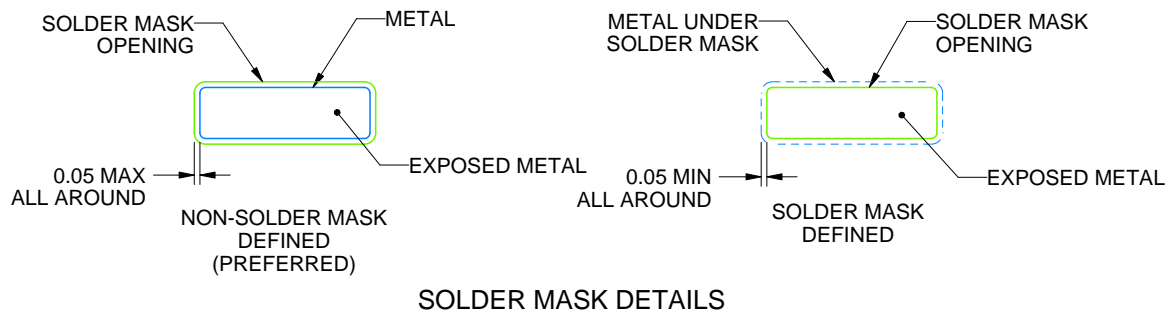
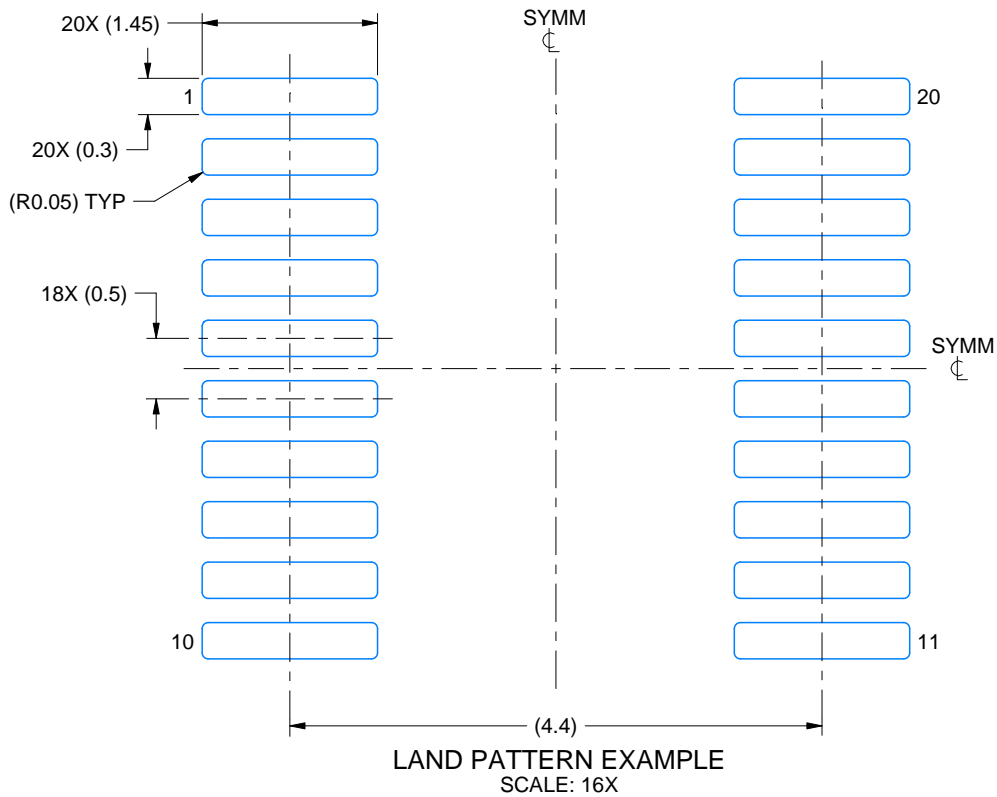
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or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

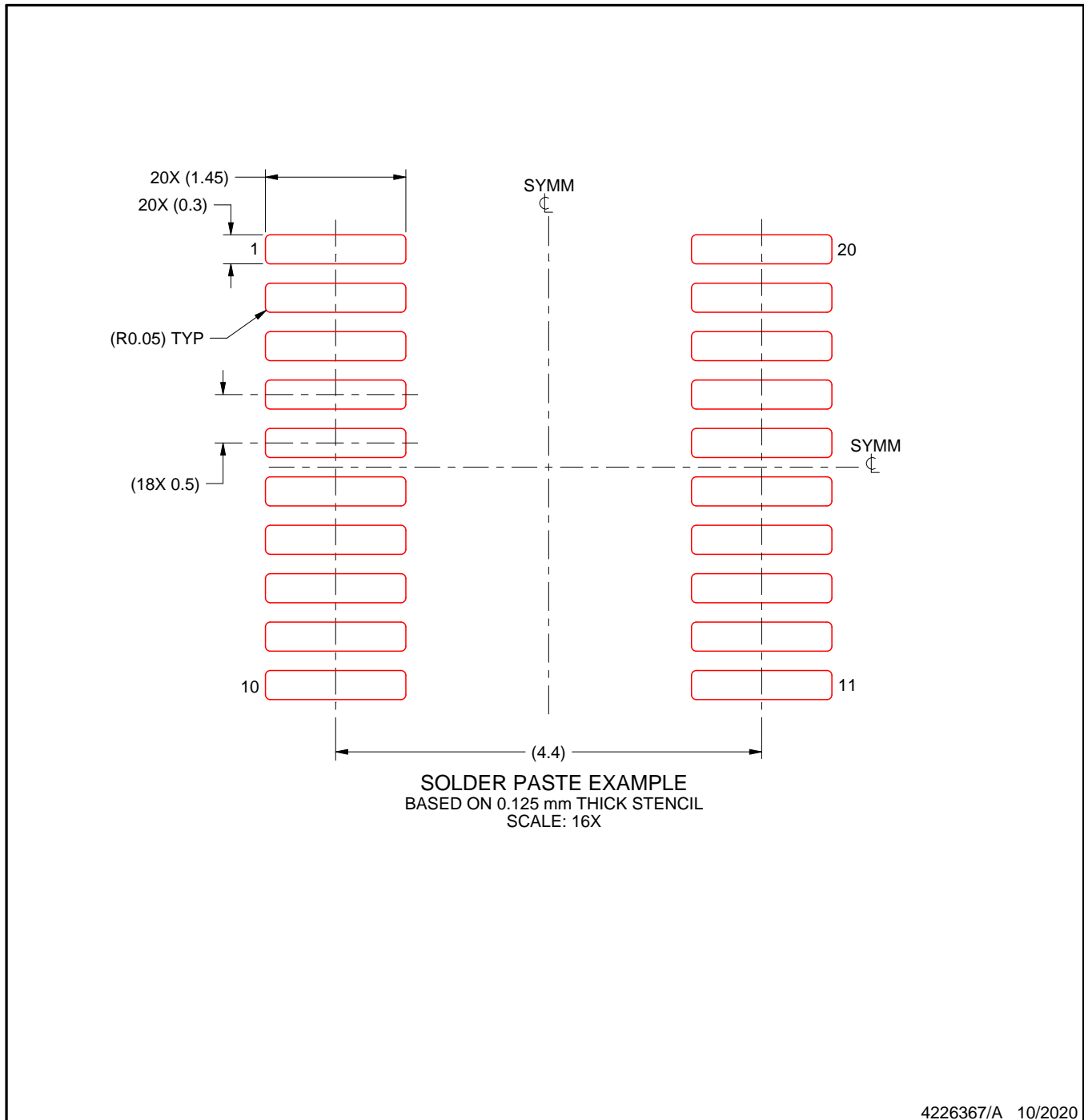


# EXAMPLE STENCIL DESIGN

DGS0020A

VSSOP - 1.1 mm max height

SMALL OUTLINE PACKAGE



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.

# DB0020A



# PACKAGE OUTLINE

## SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



4214851/B 08/2019

### 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.

# EXAMPLE BOARD LAYOUT

DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



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

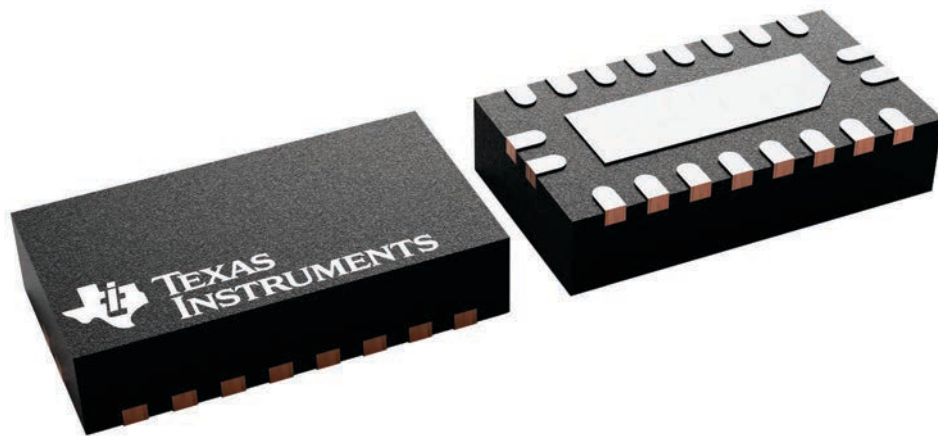
**RKS 20**

**VQFN - 1 mm max height**

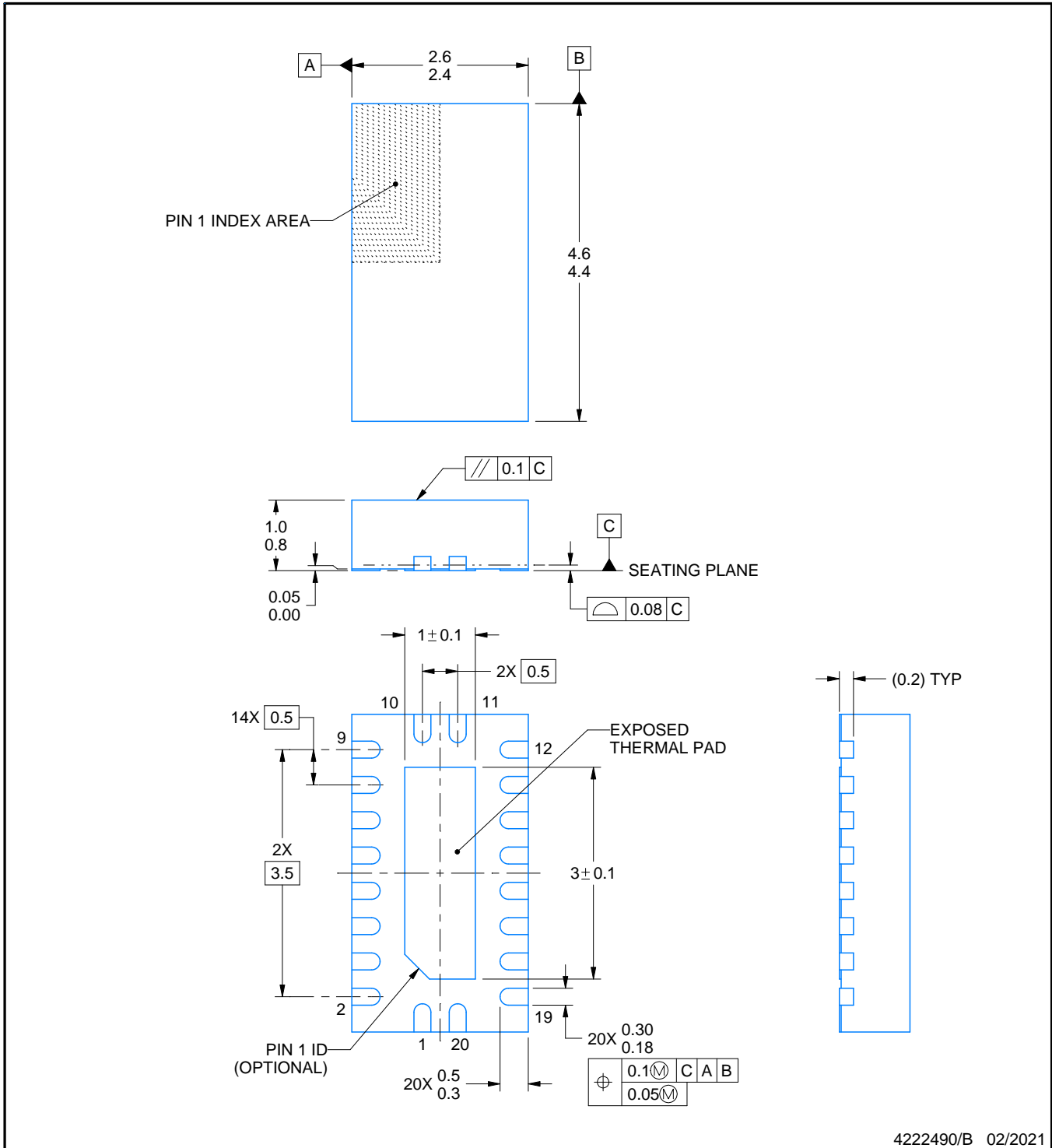
2.5 x 4.5, 0.5 mm pitch

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.



4226872/A



NOTES:

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

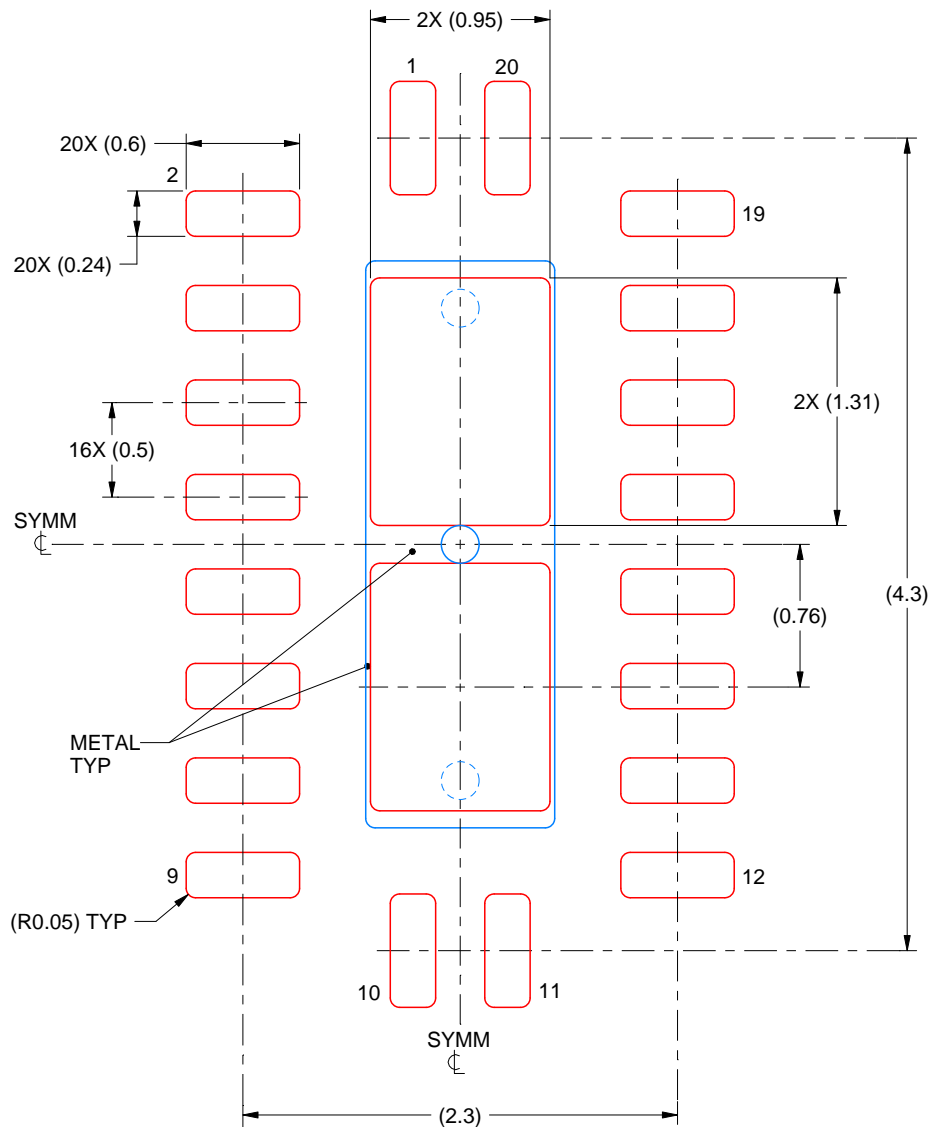


# EXAMPLE STENCIL DESIGN

RKS0020A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



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



- 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.

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

## GENERIC PACKAGE VIEW

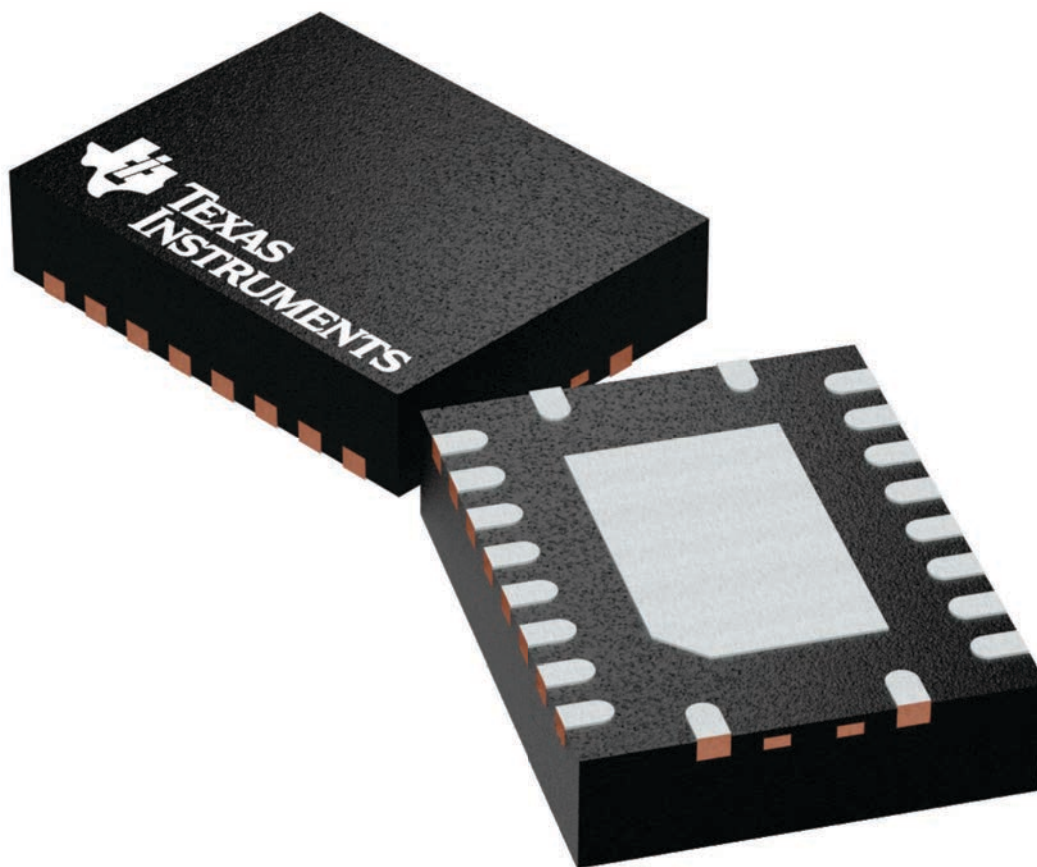
**RGY 20**

**VQFN - 1 mm max height**

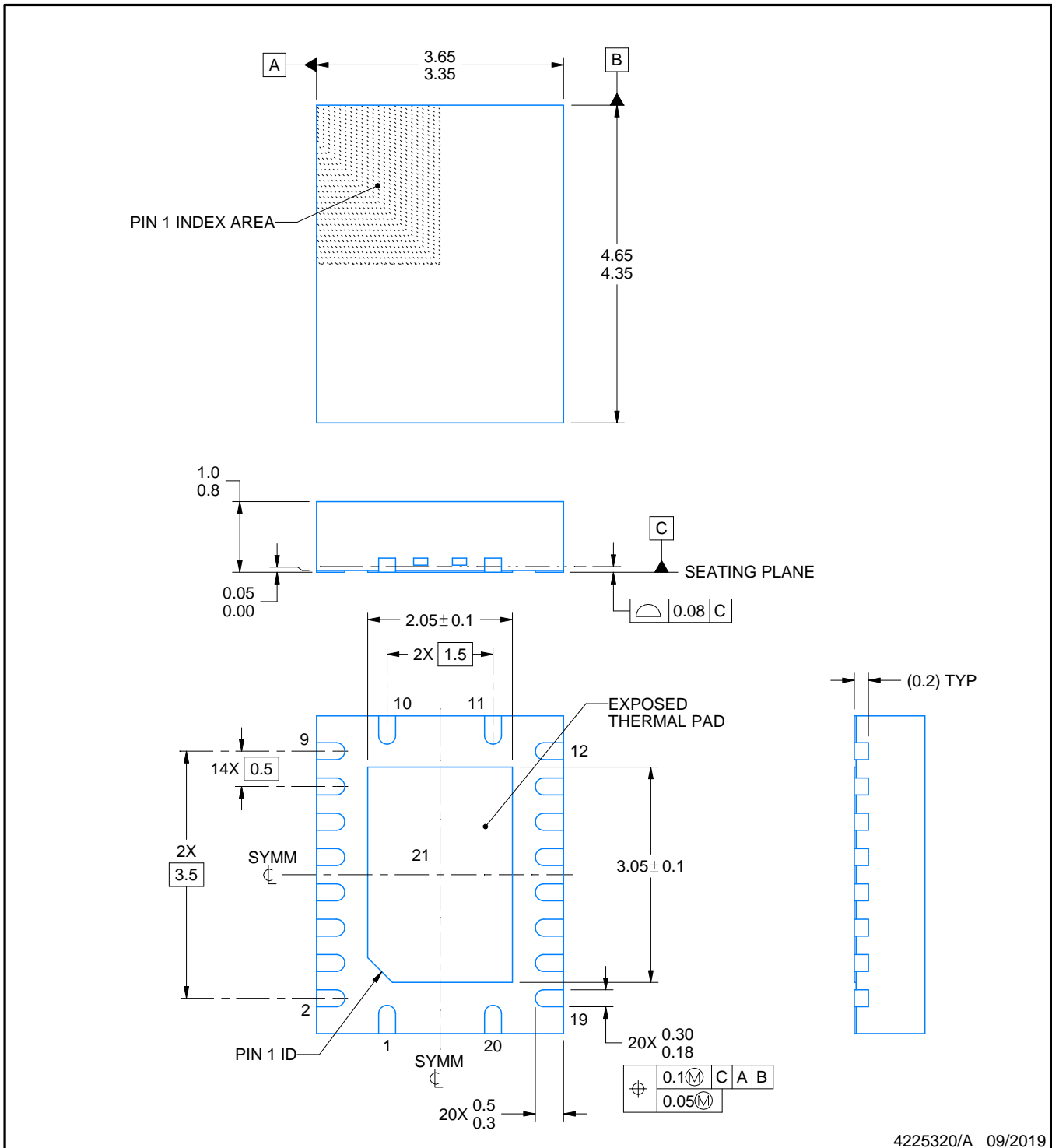
3.5 x 4.5, 0.5 mm pitch

PLASTIC QUAD FGLATPACK - NO LEAD

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



4225264/A



NOTES:

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

# EXAMPLE BOARD LAYOUT

RGY0020A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



**LAND PATTERN EXAMPLE**  
EXPOSED METAL SHOWN  
SCALE:18X



4225320/A 09/2019

NOTES: (continued)

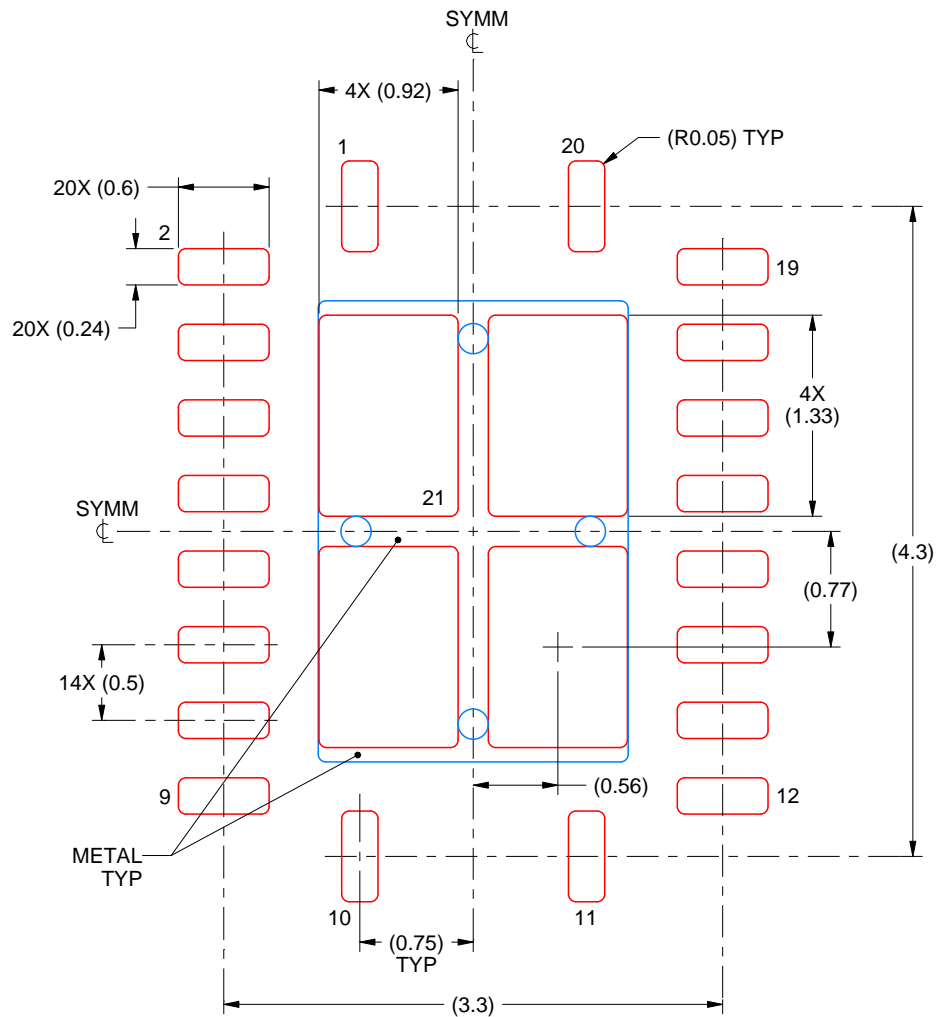
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/sluea271](http://www.ti.com/lit/sluea271)).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

# EXAMPLE STENCIL DESIGN

RGY0020A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



**SOLDER PASTE EXAMPLE**  
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD 21  
78% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE  
SCALE:20X

4225320/A 09/2019

NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

## 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



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



# DW0020A



# PACKAGE OUTLINE

## 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.

# EXAMPLE BOARD LAYOUT

DW0020A

SOIC - 2.65 mm max height

SOIC



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.

# EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



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.

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