TEXAS INSTRUMENTS
SN74HCS273
JAJSLJ5D – MARCH 2021 – REVISED JANUARY 2023

SN74HCS273 シュミット・トリガ入力および非同期クリア、オクタル D タイプ・フリップ・フロップ

1 特長

- 広い動作電圧範囲:2V～6V
- シュミット・トリガ入力により低速の入力信号またはノイズの多い入力信号に対応
- 低消費電力
  - I_{CC}:100nA (標準値)
  - 入力リーク電流:±100nA (標準値)
- 6V で±7.8mA の出力駆動能力
- 拡張周囲温度範囲:-40℃～+125℃、T_A

2 アプリケーション

- データをクロックに同期
- シンプルなメモリ - 8 ビット

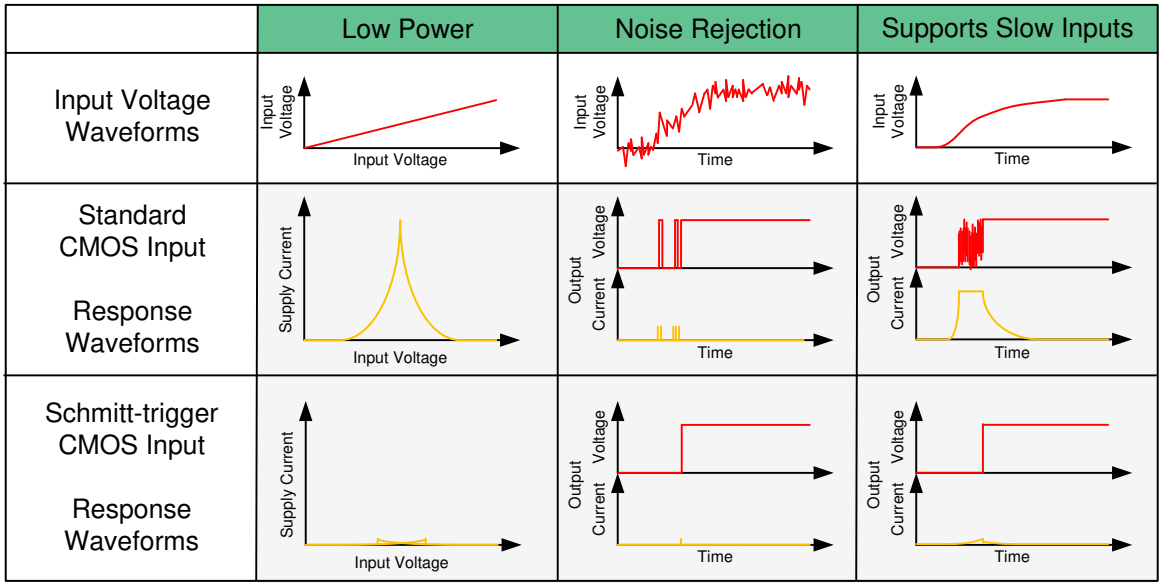
3 概要

SN74HCS273 デバイスはポジティブ・エッジ・トリガ 8 出力 D タイプ・フリップ・フロップで、シュミット・トリガ入力、共有の非同期アクティブ LOW クリア (CLR) 入力、および共有の立ち上がりエッジ・トリガのクロック (CLK) 入力を備えています。

製品情報

部品番号	パッケージ(1)	本体サイズ (公称)
SN74HCS273	PW (TSSOP、20)	6.50mm × 4.40mm
	RKS (VQFN、20)	4.50mm × 2.50mm
	DGS (VSSOP、20)	5.10mm × 3.00mm

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



シュミット・トリガ入力の利点

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4 Revision History

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

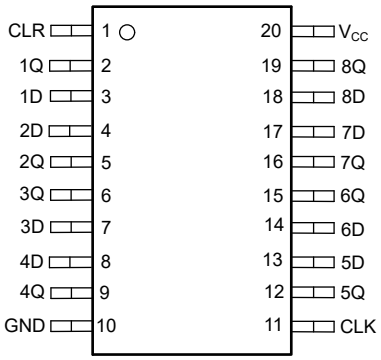
Changes from Revision C (December 2022) to Revision D (January 2023)	Page
• Updated the *PW or DGS Package 20-Pin TSSOP or VSSOP (Top View)*	3

Changes from Revision B (October 2021) to Revision C (December 2022)	Page
• 「製品情報」表に DGS デバイスを追加	1
• Added DGS package to pinout image and table	3
• Added DGS package Thermal Information	4

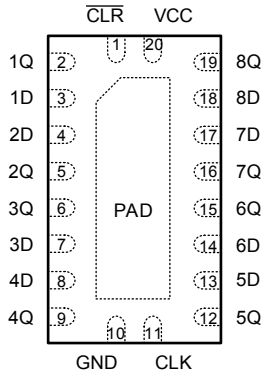
Changes from Revision A (June 2021) to Revision B (October 2021)	Page
• 「製品情報」表に RKS デバイスを追加	1
• Added RKS package to pinout image and table	3
• Added RKS package to specification tables	4
• Added example layout for the RKS package	14

Changes from Revision * (March 2021) to Revision A (June 2021)	Page
• Updated the *Detailed Design Procedure* section	13

5 Pin Configuration and Functions



PW or DGS Package
20-Pin TSSOP or VSSOP
(Top View)



RKS Package
20-Pin VQFN
(Top View)

表 5-1. Pin Functions

PIN		TYPE	DESCRIPTION
NAME	NO.		
$\overline{CLR}$	1	Input	Clear for all channels, active low
1Q	2	Output	Output for channel 1
1D	3	Input	Input for channel 1
2D	4	Input	Input for channel 2
2Q	5	Output	Output for channel 2
3Q	6	Output	Output for channel 3
3D	7	Input	Input for channel 3
4D	8	Input	Input for channel 4
4Q	9	Output	Output for channel 4
GND	10	—	Ground
CLK	11	Input	Clock for all channels, rising edge triggered
5Q	12	Output	Output for channel 5
5D	13	Input	Input for channel 5
6D	14	Input	Input for channel 6
6Q	15	Output	Output for channel 6
7Q	16	Output	Output for channel 7
7D	17	Input	Input for channel 7
8D	18	Input	Input for channel 8
8Q	19	Output	Output for channel 8
V_{CC}	20	—	Postive supply
Thermal Pad(1)		—	The thermal pad can be connect to GND or left floating. Do not connect to any other signal or supply.

(1) RKS package only.

6 Specifications

6.1 Absolute Maximum Ratings

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

			MIN	MAX	UNIT
V_{CC}	Supply voltage		–0.5	7	V
I_{IK}	Input clamp current(2)	$V_I < 0$ or $V_I > V_{CC}$		±20	mA
I_{OK}	Output clamp current(2)	$V_O < 0$ or $V_O > V_{CC}$		±20	mA
I_O	Continuous output current	$V_O = 0$ to V_{CC}		±35	mA
I_{CC}	Continuous current through V_{CC} or GND			±70	mA
T_J	Junction temperature			150	°C
T_{stg}	Storage temperature		–65	150	°C

(1) Operation outside the *Absolute Maximum Ratings* may cause permanent device damage. Absolute maximum ratings do not imply functional operation of the device at these or any other conditions beyond those listed under *Recommended Operating Conditions*. If briefly operating outside the *Recommended Operating Conditions* but within the *Absolute Maximum Ratings*, the device may not sustain damage, but it may not be fully functional. Operating the device in this manner 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

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001(1)	±4000	V
		Charged-device model (CDM), per ANSI/ESDA/JEDEC JS-002(2)	±1500	

(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)

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	2		6	V
V_I	Input voltage	0		V_{CC}	V
V_O	Output voltage	0		V_{CC}	V
T_A	Ambient temperature	–40		125	°C

6.4 Thermal Information

THERMAL METRIC(1)		SN74HCS273			UNIT
		RKS (VQFN)	PW (TSSOP)	DGS (VSSOP)	
		20 PINS	20 PINS	20 PINS	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	83.2	134.9	130.6	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	82.6	74.6	68.7	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	57.4	86	85.4	°C/W
Ψ_{JT}	Junction-to-top characterization parameter	14.5	22.5	10.5	°C/W
Ψ_{JB}	Junction-to-board characterization parameter	56.4	85.6	85.0	°C/W
$R_{\theta JC(bot)}$	Junction-to-case (bottom) thermal resistance	40.0	N/A	N/A	°C/W

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

6.5 Electrical Characteristics

over operating free-air temperature range; typical values measured at T_A = 25°C (unless otherwise noted).

PARAMETER		TEST CONDITIONS		V_{CC}	MIN	TYP	MAX	UNIT
V_{T+}	Positive switching threshold			2 V	0.7		1.5	V
				4.5 V	1.7		3.15	
				6 V	2.1		4.2	
V_{T-}	Negative switching threshold			2 V	0.3		1	V
				4.5 V	0.9		2.2	
				6 V	1.2		3	
ΔV_T	Hysteresis (V_{T+} - V_{T-})			2 V	0.2		1	V
				4.5 V	0.4		1.4	
				6 V	0.6		1.6	
V_{OH}	High-level output voltage	V_I = V_{IH} or V_{IL}	I_{OH} = -20 µA	2 V to 6 V	V_{CC} – 0.1	V_{CC} – 0.002		V
			I_{OH} = -6 mA	4.5 V	4	4.3		
			I_{OH} = -7.8 mA	6 V	5.4	5.75		
V_{OL}	Low-level output voltage	V_I = V_{IH} or V_{IL}	I_{OL} = 20 µA	2 V to 6 V		0.002	0.1	V
			I_{OL} = 6 mA	4.5 V		0.18	0.3	
			I_{OL} = 7.8 mA	6 V		0.22	0.33	
I_I	Input leakage current	V_I = V_{CC} or 0		6 V		±100	±1000	nA
I_{CC}	Supply current	V_I = V_{CC} or 0, I_O = 0		6 V		0.1	2	µA
C_i	Input capacitance			2 V to 6 V			5	pF

6.6 Timing Characteristics

over operating free-air temperature range (unless otherwise noted), C_L = 50 pF

PARAMETER		CONDITION	V_{CC}	MIN	MAX	UNIT
f_{clock}	Clock Frequency		2 V		49	MHz
			4.5 V		120	
			6 V		135	
t_w	Pulse duration	$\overline{CLR}$ low	2 V	12		ns
			4.5 V	6		
			6 V	6		
		CLK high or low	2 V	12		ns
			4.5 V	6		
			6 V	6		
t_{su}	Setup time	Data before CLK ↑	2 V	18		ns
			4.5 V	6		
			6 V	6		
		$\overline{CLR}$ inactive	2 V	18		ns
			4.5 V	6		
			6 V	6		
t_h	Hold time, data after CLK ↑		2 V	0		ns
			4.5 V	0		
			6 V	0		

6.7 Switching Characteristics

over operating free-air temperature range; typical values measured at T_A = 25°C (unless otherwise noted). See *Parameter Measurment Information*. C_L = 50 pF.

PARAMETER		FROM (INPUT)	TO (OUTPUT)	V_{CC}	MIN	TYP	MAX	UNIT
f_{max}	Max frequency			2 V	49			MHz
				4.5 V	120			
				6 V	135			
t_{dis}	Disable time	$\overline{CLR}$	Any Q	2 V		27.3	31.2	ns
				4.5 V		13.3	14.8	
				6 V		11.7	13.2	
t_{pd}	Propagation delay	CLK	Any Q	2 V		29.1	34.6	ns
				4.5 V		13.9	16.4	
				6 V		12.1	14.3	
t_t	Transition-time		Any Q	2 V		14.6	19.4	ns
				4.5 V		7.7	9.6	
				6 V		7.4	10.4	

6.8 Operating Characteristics

over operating free-air temperature range; typical values measured at T_A = 25°C (unless otherwise noted).

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
C_{pd}	Power dissipation capacitance per gate	No load		20		pF

6.9 Typical Characteristics

T_A = 25°C

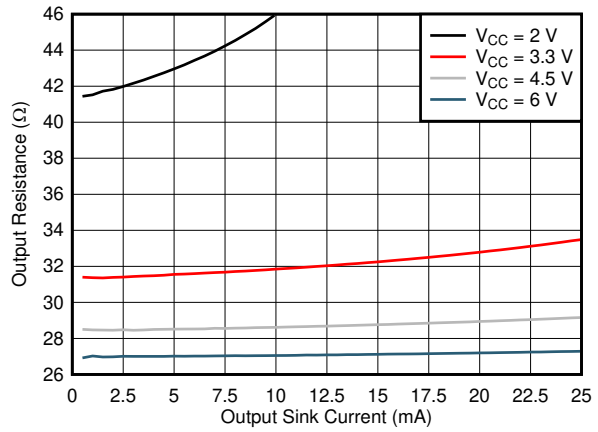


図 6-1. Output Driver Resistance in LOW State

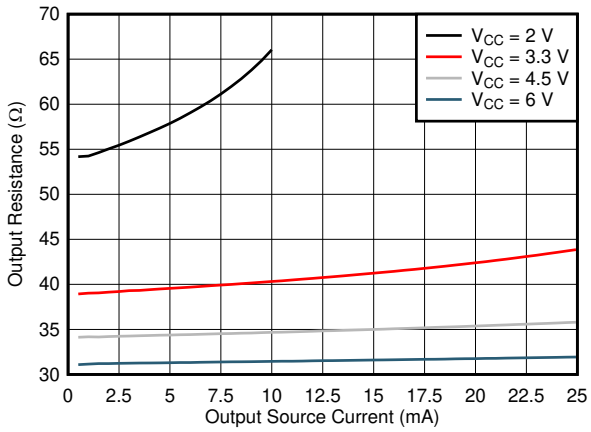


図 6-2. Output Driver Resistance in HIGH State

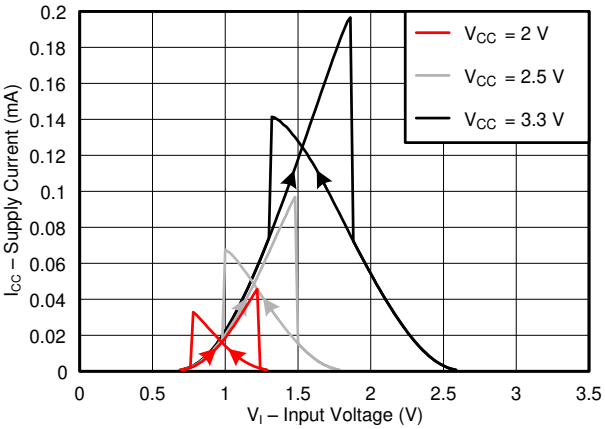


図 6-3. Supply Current Across Input Voltage, 2-, 2.5-, and 3.3-V Supply

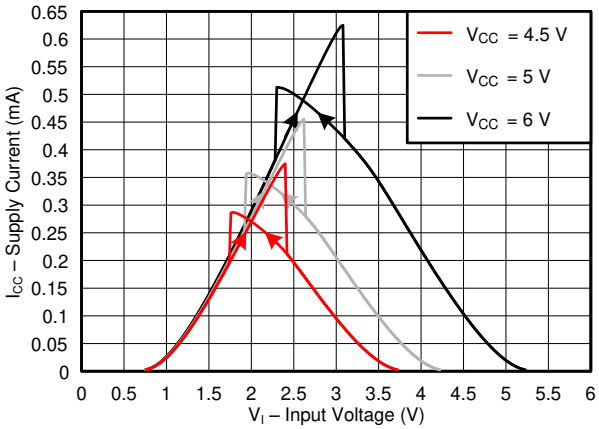


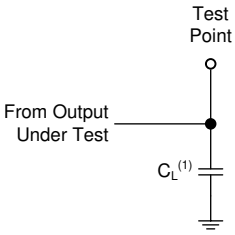
図 6-4. Supply Current Across Input Voltage, 4.5-, 5-, and 6-V Supply

7 Parameter Measurement Information

Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, Z_O = 50 Ω, t_t < 2.5 ns.

For clock inputs, f_{max} is measured when the input duty cycle is 50%.

The outputs are measured one at a time with one input transition per measurement.



(1) C_L includes probe and test-fixture capacitance.

図 7-1. Load Circuit for Push-Pull Outputs

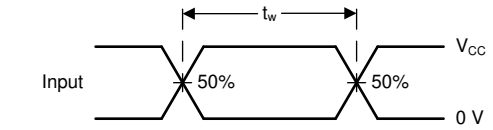


図 7-2. Voltage Waveforms, Pulse Duration

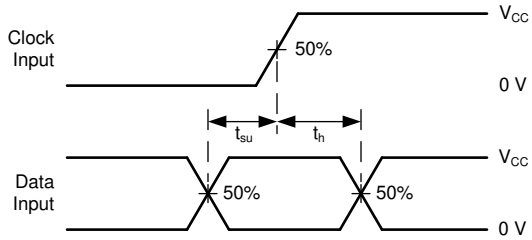
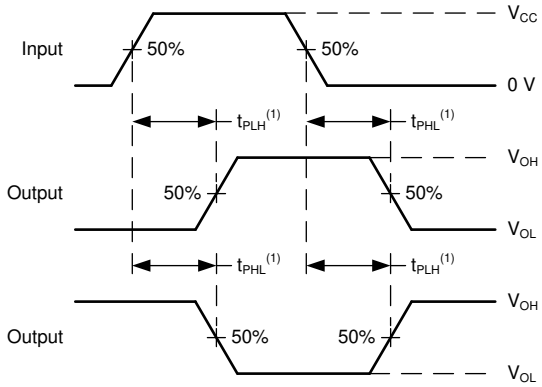
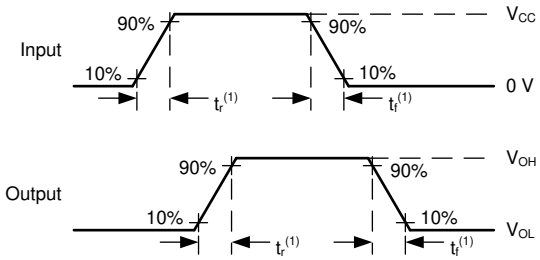


図 7-3. Voltage Waveforms, Setup and Hold Times



(1) The greater between t_{PLH} and t_{PHL} is the same as t_{pd}.

図 7-4. Voltage Waveforms Propagation Delays



(1) The greater between t_r and t_f is the same as t_t.

図 7-5. Voltage Waveforms, Input and Output Transition Times

8 Detailed Description

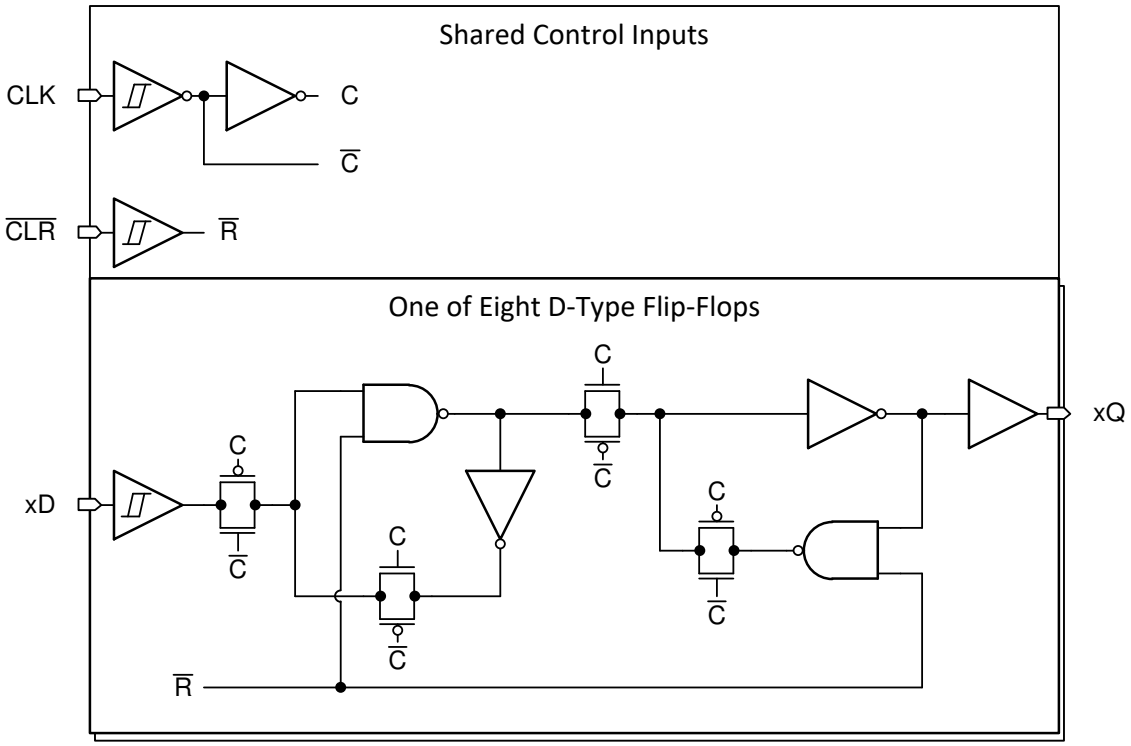
8.1 Overview

The SN74HCS273 contains 8 positive-edge-triggered D-type flip-flops with shared direct active low clear ($\overline{CLR}$) input.

Information at the data (D) inputs meeting the setup time requirements is transferred to the (Q) outputs on the positive-going edge of the clock (CLK) pulse. Clock triggering occurs at a particular voltage level and is not related directly to the transition time of the positive-going pulse. When CLK is at either the high or low level or transitioning from a high level to a low level, the D input has no effect at the output.

Information at the data (Q) outputs can be asychronously cleared with a low level input through the clear ($\overline{CLR}$) pin.

8.2 Functional Block Diagram



8.3 Feature Description

8.3.1 Balanced CMOS Push-Pull Outputs

This device includes balanced CMOS push-pull outputs. The term *balanced* indicates that the device can sink and source similar currents. The drive capability of this device may create fast edges into light loads, so routing and load conditions should be considered to prevent ringing. Additionally, the outputs of this device are capable of driving larger currents than the device can sustain without being damaged. It is important for the output power of the device to be limited to avoid damage due to overcurrent. The electrical and thermal limits defined in the *Absolute Maximum Ratings* must be followed at all times.

Unused push-pull CMOS outputs should be left disconnected.

8.3.2 CMOS Schmitt-Trigger Inputs

This device includes inputs with the Schmitt-trigger architecture. These inputs are high impedance and are typically modeled as a resistor in parallel with the input capacitance given in the *Electrical Characteristics* table from the input to ground. The worst case resistance is calculated with the maximum input voltage, given in the *Absolute Maximum Ratings* table, and the maximum input leakage current, given in the *Electrical Characteristics* table, using Ohm's law (R = V ÷ I).

The Schmitt-trigger input architecture provides hysteresis as defined by ΔV_T in the *Electrical Characteristics* table, which makes this device extremely tolerant to slow or noisy inputs. While the inputs can be driven much slower than standard CMOS inputs, it is still recommended to properly terminate unused inputs. Driving the inputs with slow transitioning signals will increase dynamic current consumption of the device. For additional information regarding Schmitt-trigger inputs, please see *Understanding Schmitt Triggers*.

8.3.3 Clamp Diode Structure

As shown in 図 8-1, the inputs and outputs to this device have both positive and negative clamping diodes.

> **注意**
>
> Voltages beyond the values specified in the *Absolute Maximum Ratings* table can cause damage to the device. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

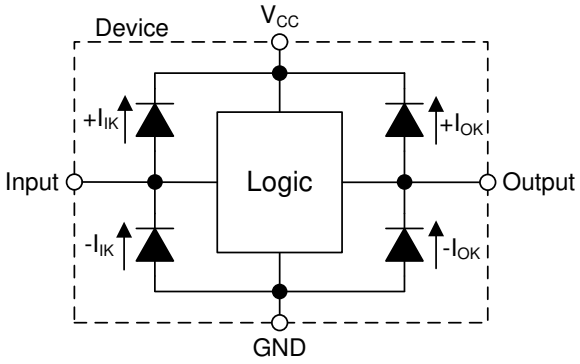


図 8-1. Electrical Placement of Clamping Diodes for Each Input and Output

8.4 Device Functional Modes

表 8-1. Function Table

INPUTS(1)			OUTPUT(2)
$\overline{CLR}$	CLK	D	Q
L	X	X	L
H	L, H, ↓	X	Q_0
H	↑	L	L
H	↑	H	H

(1) L = input low, H = input high, ↑ = input transitioning from low to high, ↓ = input transitioning from high to low, X = do not care
(2) L = output low, H = output high, Q_0 = previous state

9 Application and Implementation

注

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.

9.1 Application Information

In this application, the SN74HCS273 is used to synchronize incoming data to the system clock on an 8-bit bus.

9.2 Typical Application

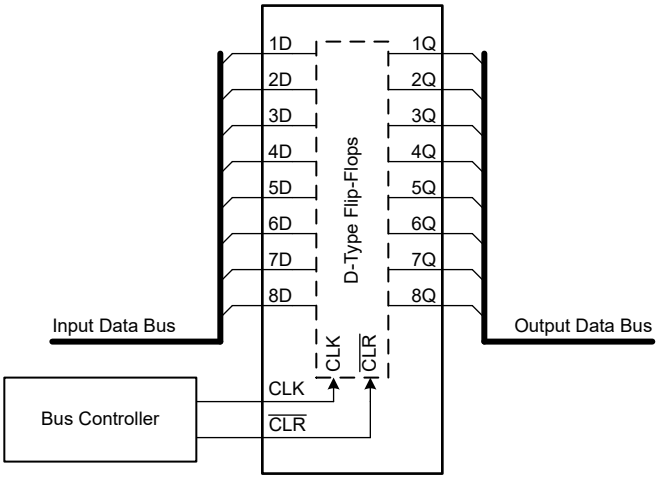


図 9-1. Typical Application Diagram

9.2.1 Design Requirements

9.2.1.1 Power Considerations

Ensure the desired supply voltage is within the range specified in the *Recommended Operating Conditions*. The supply voltage sets the device's electrical characteristics as described in the *Electrical Characteristics* section.

The positive voltage supply must be capable of sourcing current equal to the total current to be sourced by all outputs of the SN74HCS273 plus the maximum static supply current, I_{CC}, listed in the *Electrical Characteristics*, and any transient current required for switching. The logic device can only source as much current that is provided by the positive supply source. Be sure to not exceed the maximum total current through V_{CC} listed in the *Absolute Maximum Ratings*.

The ground must be capable of sinking current equal to the total current to be sunk by all outputs of the SN74HCS273 plus the maximum supply current, I_{CC}, listed in the *Electrical Characteristics*, and any transient current required for switching. The logic device can only sink as much current that can be sunk into its ground connection. Be sure to not exceed the maximum total current through GND listed in the *Absolute Maximum Ratings*.

The SN74HCS273 can drive a load with a total capacitance less than or equal to 50 pF while still meeting all of the data sheet specifications. Larger capacitive loads can be applied; however, it is not recommended to exceed 50 pF.

The SN74HCS273 can drive a load with total resistance described by $R_L \geq V_O / I_O$, with the output voltage and current defined in the *Electrical Characteristics* table with V_{OH} and V_{OL}. When outputting in the HIGH state, the output voltage in the equation is defined as the difference between the measured output voltage and the supply voltage at the V_{CC} pin.

Total power consumption can be calculated using the information provided in *CMOS Power Consumption and Cpd Calculation*.

Thermal increase can be calculated using the information provided in *Thermal Characteristics of Standard Linear and Logic (SLL) Packages and Devices*.

> 注意
> The maximum junction temperature, $T_{J(max)}$ listed in the *Absolute Maximum Ratings*, is an additional limitation to prevent damage to the device. Do not violate any values listed in the *Absolute Maximum Ratings*. These limits are provided to prevent damage to the device.

9.2.1.2 Input Considerations

Input signals must cross $V_{t-(min)}$ to be considered a logic LOW, and $V_{t+(max)}$ to be considered a logic HIGH. Do not exceed the maximum input voltage range found in the *Absolute Maximum Ratings*.

Unused inputs must be terminated to either V_{CC} or ground. The unused inputs can be directly terminated if the input is completely unused, or they can be connected with a pull-up or pull-down resistor if the input will be used sometimes, but not always. A pull-up resistor is used for a default state of HIGH, and a pull-down resistor is used for a default state of LOW. The drive current of the controller, leakage current into the SN74HCS273 (as specified in the *Electrical Characteristics*), and the desired input transition rate limits the resistor size. A 10-kΩ resistor value is often used due to these factors.

The SN74HCS273 has no input signal transition rate requirements because it has Schmitt-trigger inputs.

Another benefit to having Schmitt-trigger inputs is the ability to reject noise. Noise with a large enough amplitude can still cause issues. To know how much noise is too much, please refer to the $\Delta V_{T(min)}$ in the *Electrical Characteristics*. This hysteresis value will provide the peak-to-peak limit.

Unlike what happens with standard CMOS inputs, Schmitt-trigger inputs can be held at any valid value without causing huge increases in power consumption. The typical additional current caused by holding an input at a value other than V_{CC} or ground is plotted in the *Typical Characteristics*.

Refer to the *Feature Description* section for additional information regarding the inputs for this device.

9.2.1.3 Output Considerations

The positive supply voltage is used to produce the output HIGH voltage. Drawing current from the output will decrease the output voltage as specified by the V_{OH} specification in the *Electrical Characteristics*. The ground voltage is used to produce the output LOW voltage. Sinking current into the output will increase the output voltage as specified by the V_{OL} specification in the *Electrical Characteristics*.

Push-pull outputs that could be in opposite states, even for a very short time period, should never be connected directly together. This can cause excessive current and damage to the device.

Two channels within the same device with the same input signals can be connected in parallel for additional output drive strength.

Unused outputs can be left floating. Do not connect outputs directly to V_{CC} or ground.

Refer to the *Feature Description* section for additional information regarding the outputs for this device.

9.2.2 Detailed Design Procedure

1. Add a decoupling capacitor from V_{CC} to GND. The capacitor needs to be placed physically close to the device and electrically close to both the V_{CC} and GND pins. An example layout is shown in the *Layout* section.
2. Ensure the capacitive load at the output is ≤ 50 pF. This is not a hard limit; it will, however, ensure optimal performance. This can be accomplished by providing short, appropriately sized traces from the SN74HCS273 to one or more of the receiving devices.
3. Ensure the resistive load at the output is larger than (V_{CC} / $I_{O(max)}$) Ω. This will ensure that the maximum output current from the *Absolute Maximum Ratings* is not violated. Most CMOS inputs have a resistive load measured in MΩ; much larger than the minimum calculated previously.
4. Thermal issues are rarely a concern for logic gates; the power consumption and thermal increase, however, can be calculated using the steps provided in the application report, *CMOS Power Consumption and Cpd Calculation*.

9.2.3 Application Curve

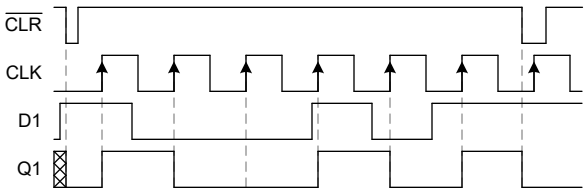


図 9-2. Application Timing Diagram, One Data Channel Shown

10 Power Supply Recommendations

The power supply can be any voltage between the minimum and maximum supply voltage rating located in the *Recommended Operating Conditions*. Each V_{CC} terminal should have a good bypass capacitor to prevent power disturbance. A 0.1-µF capacitor is recommended for this device. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. The 0.1-µF and 1-µF capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results, as shown in the following layout example.

11 Layout

11.1 Layout Guidelines

When using multiple-input and multiple-channel logic devices, inputs must never be left floating. 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 unused input pins must not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. All unused inputs of digital logic devices must be connected to a logic high or logic low voltage, as defined by the input voltage specifications, to prevent them from floating. The logic level that must be applied to any particular unused input depends on the function of the device. Generally, the inputs are tied to GND or V_{CC}, whichever makes more sense for the logic function or is more convenient.

11.2 Layout Example

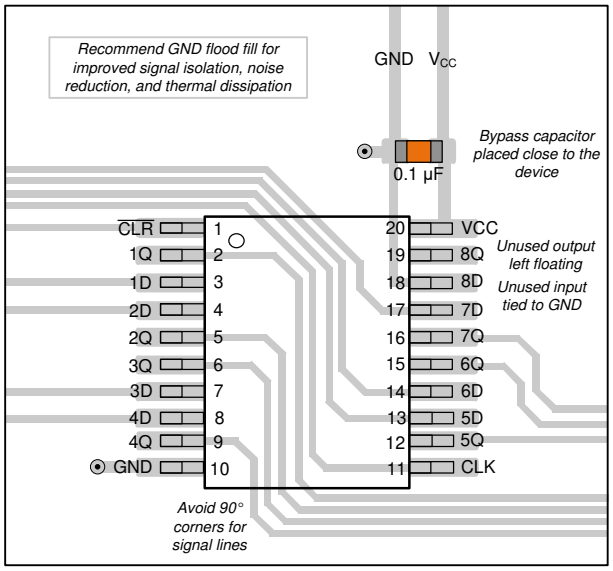


図 11-1. Example Layout for the SN74HCS273 PW Package

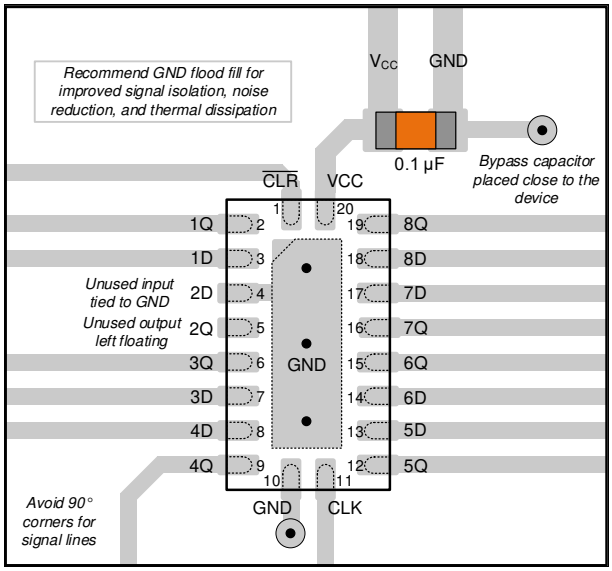


図 11-2. Example Layout for the SN74HCS273 RKS Package

12 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

12.1 Documentation Support

12.1.1 Related Documentation

For related documentation, see the following:

- Texas Instruments, *HCMOS Design Considerations* application report
- Texas Instruments, *CMOS Power Consumption and C_{pd} Calculation* application report
- Texas Instruments, *Designing With Logic* application report

12.2 ドキュメントの更新通知を受け取る方法

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

12.3 サポート・リソース

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

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12.4 Trademarks

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12.5 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。

12.6 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。

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 Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
SN74HCS273DGSR	ACTIVE	VSSOP	DGS	20	5000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HS273	Samples
SN74HCS273PWR	ACTIVE	TSSOP	PW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HCS273	Samples
SN74HCS273RKSR	ACTIVE	VQFN	RKS	20	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HCS273	Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices 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.

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 SN74HCS273 :

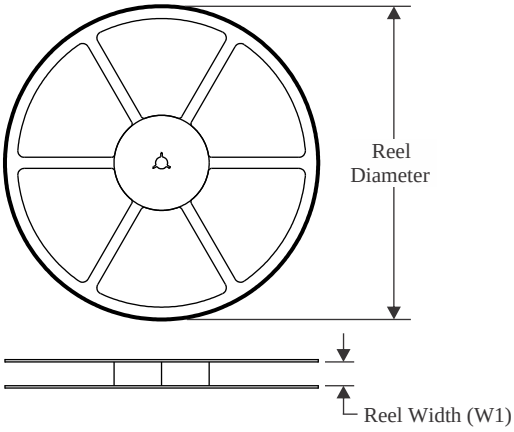
- Automotive : SN74HCS273-Q1

NOTE: Qualified Version Definitions:

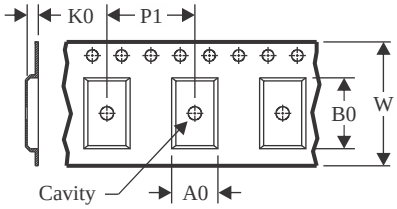
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

TAPE AND REEL INFORMATION

REEL DIMENSIONS

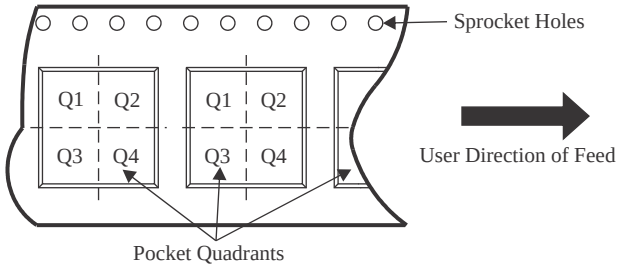


TAPE DIMENSIONS



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

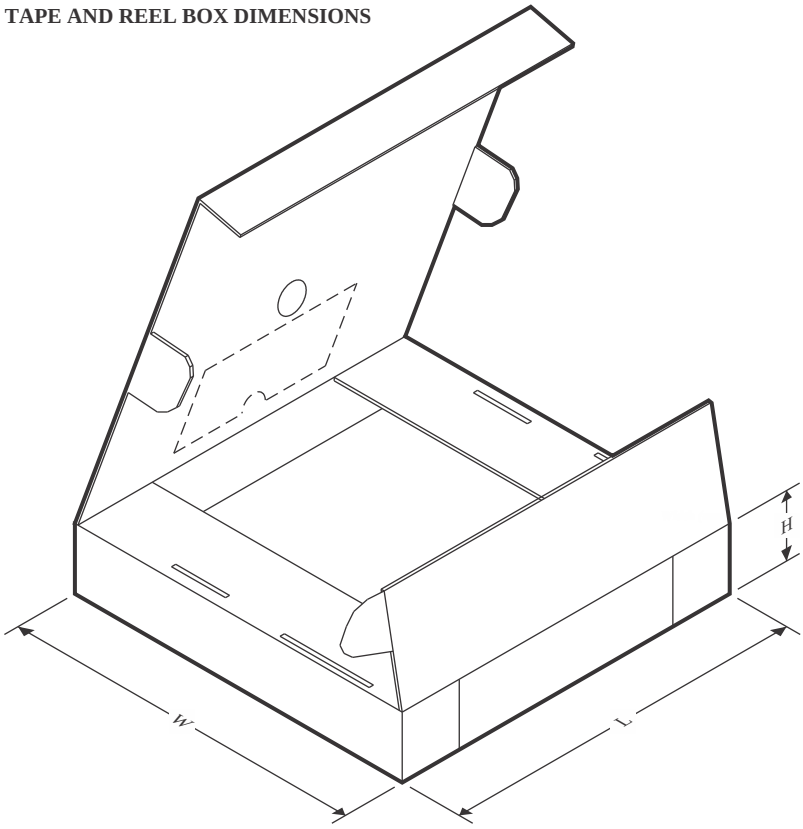
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
SN74HCS273DGSR	VSSOP	DGS	20	5000	330.0	16.4	5.4	5.4	1.45	8.0	16.0	Q1
SN74HCS273PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1
SN74HCS273RKSR	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)
SN74HCS273DGSR	VSSOP	DGS	20	5000	356.0	356.0	35.0
SN74HCS273PWR	TSSOP	PW	20	2000	356.0	356.0	35.0
SN74HCS273RKSR	VQFN	RKS	20	3000	210.0	185.0	35.0

GENERIC PACKAGE VIEW

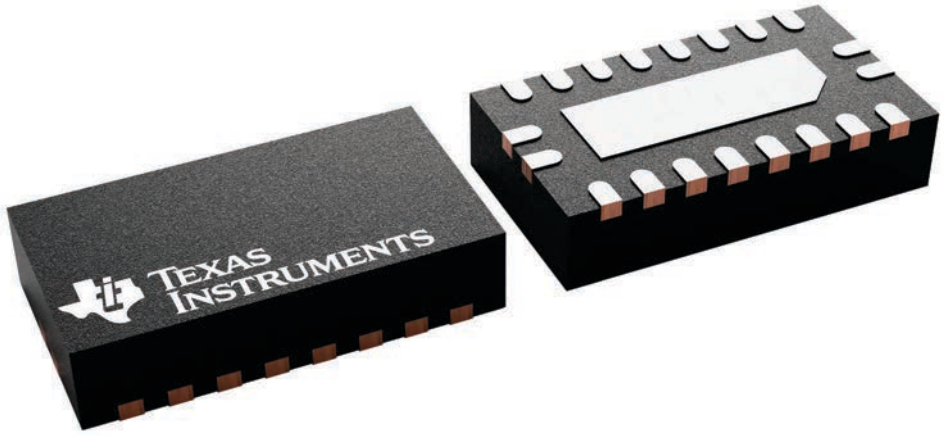
RKS 20

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.

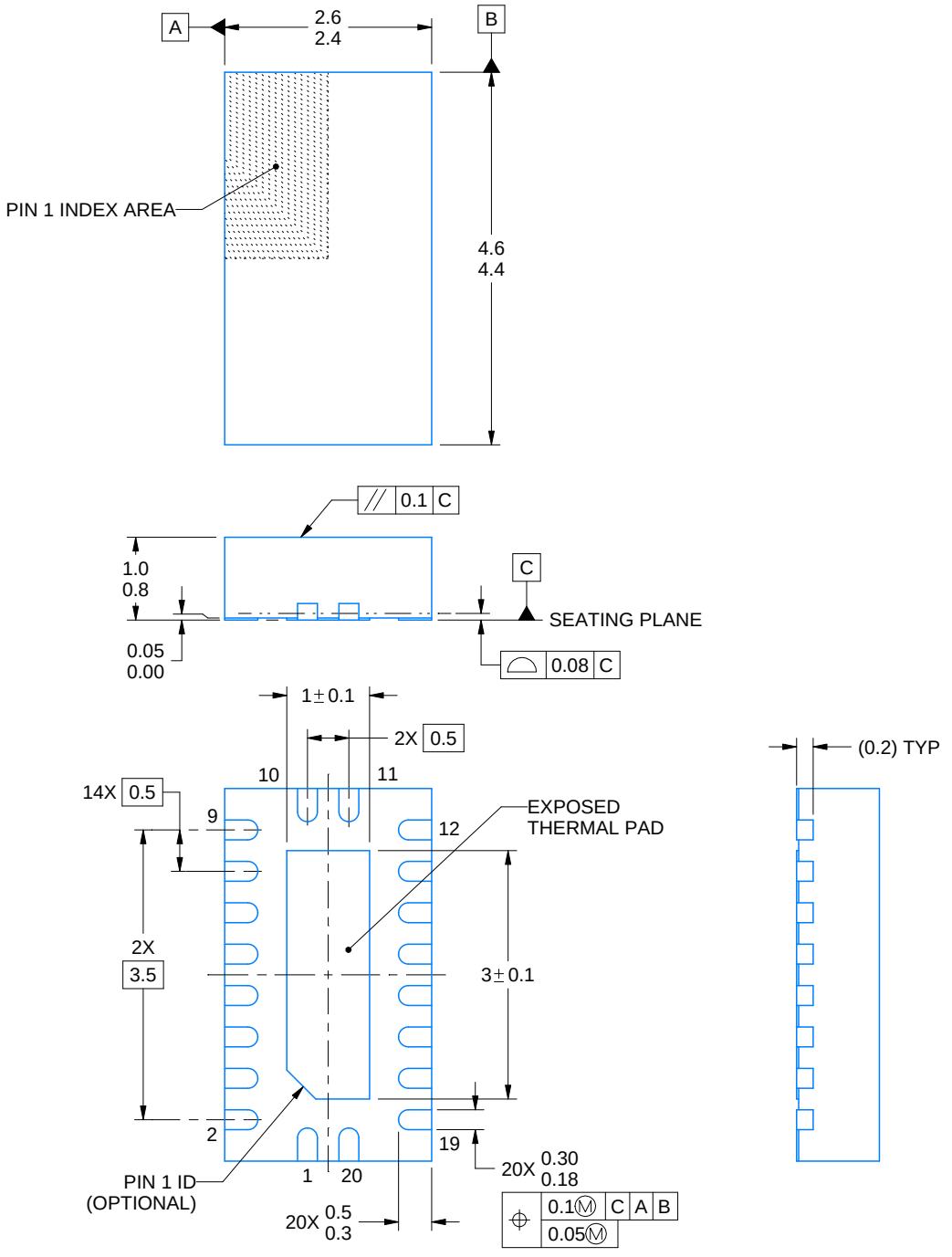


PACKAGE OUTLINE

RKS0020A

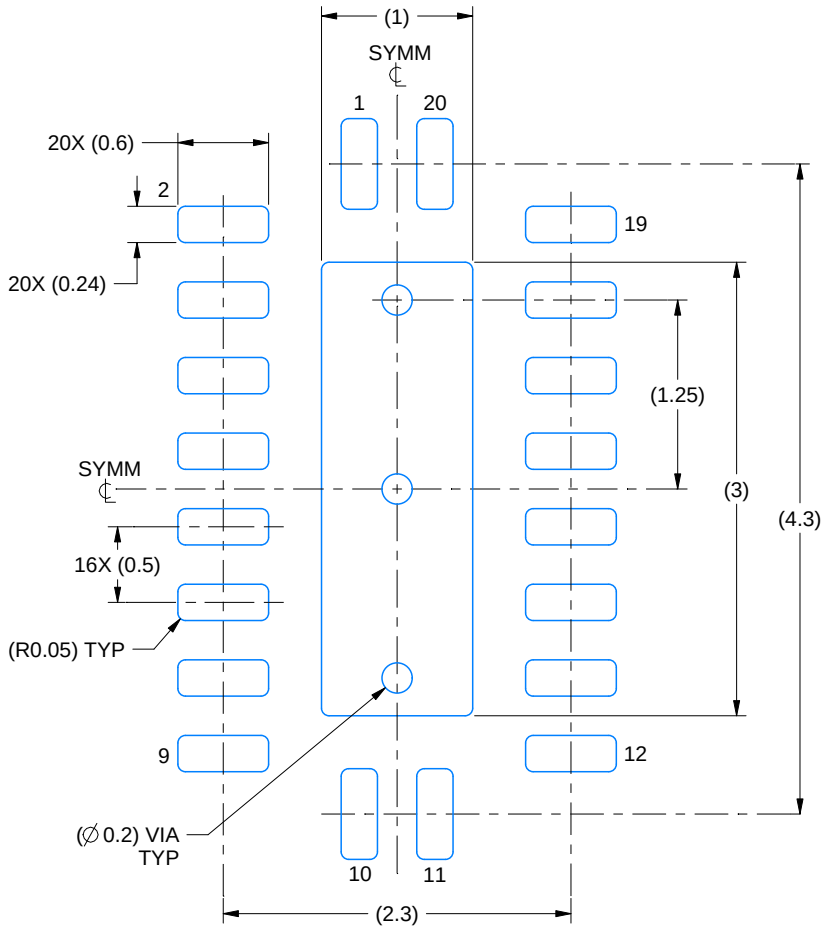
VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD

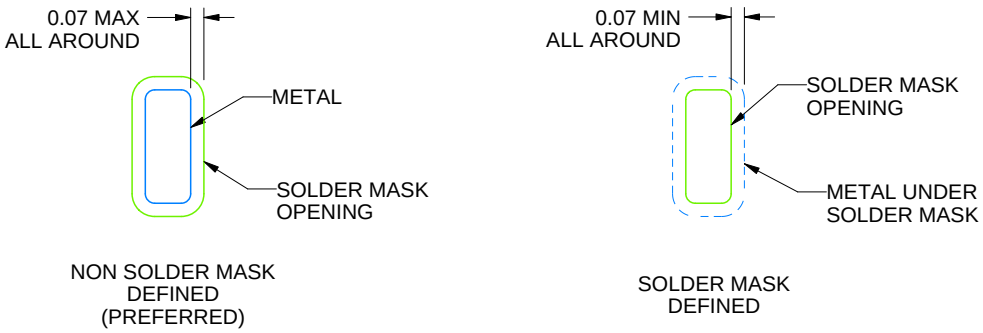


NOTES:

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

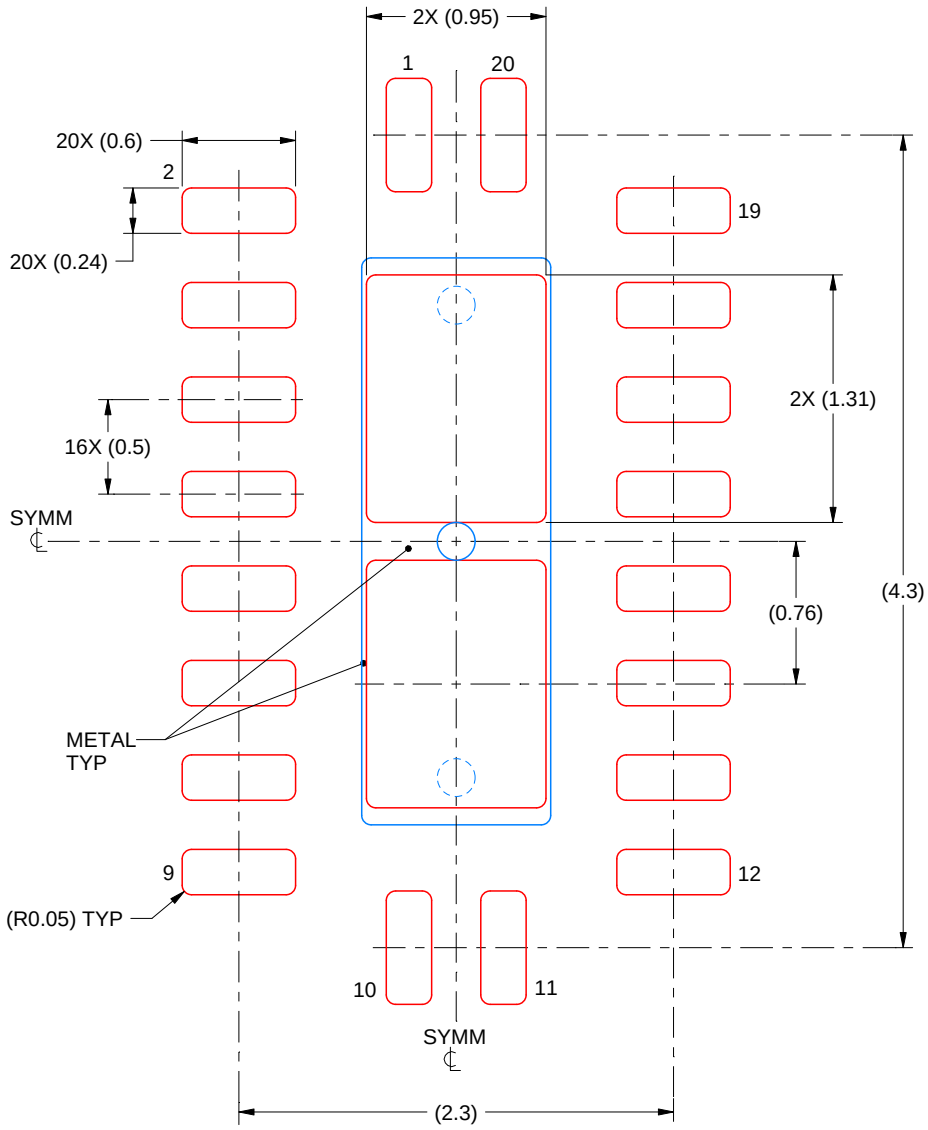


SOLDER MASK DETAILS

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)

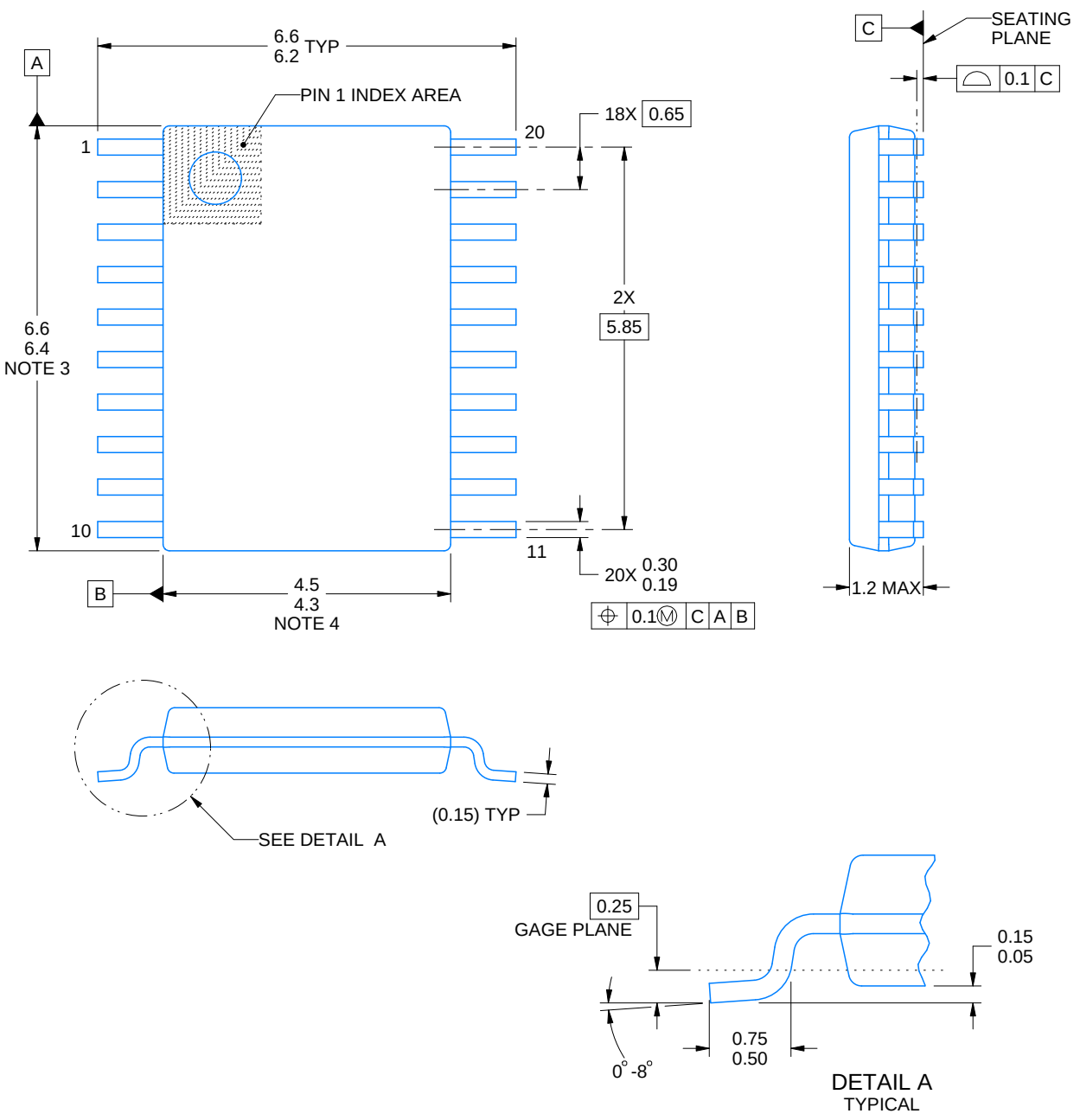
6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

PACKAGE OUTLINE

PW0020A

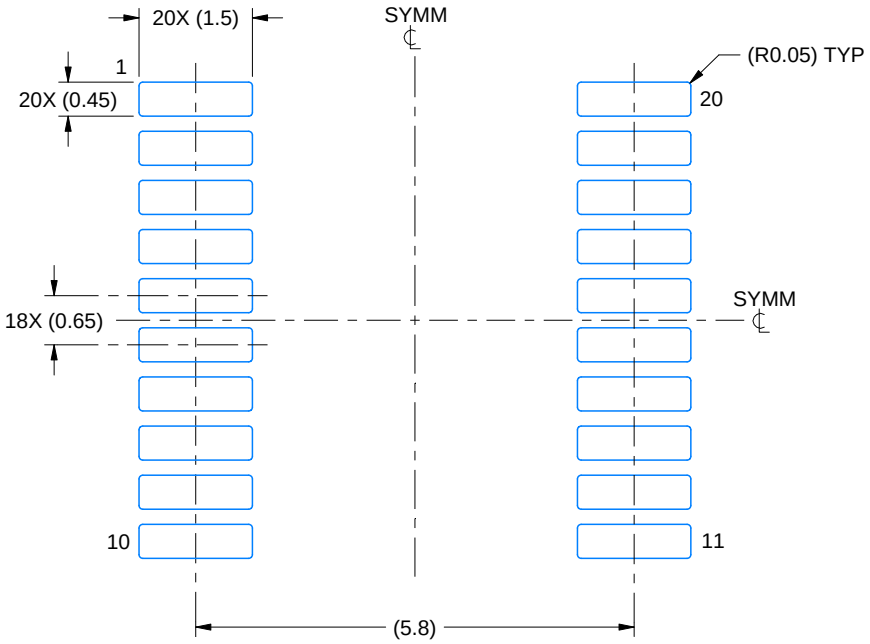
TSSOP - 1.2 mm max height

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.



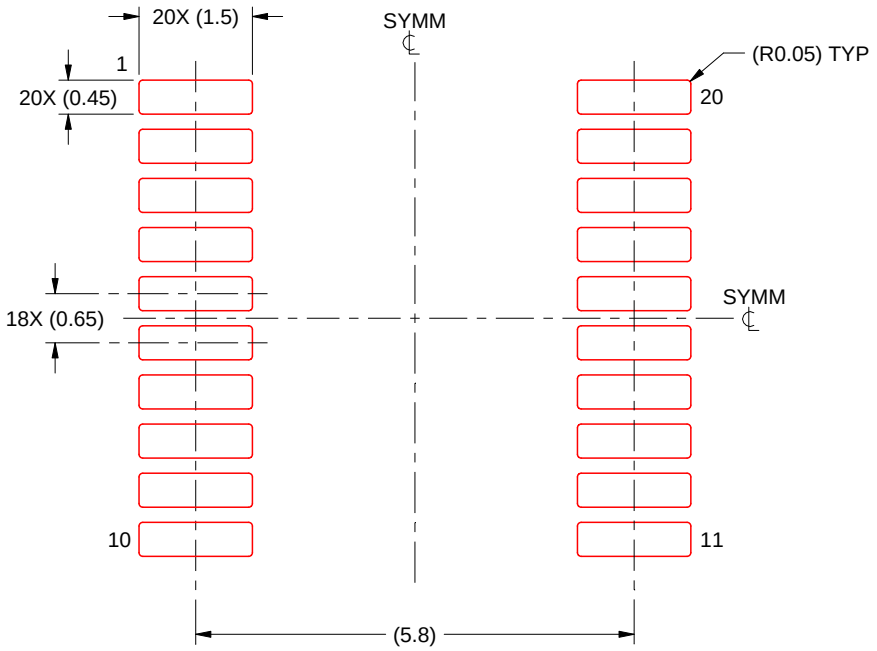
LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

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)

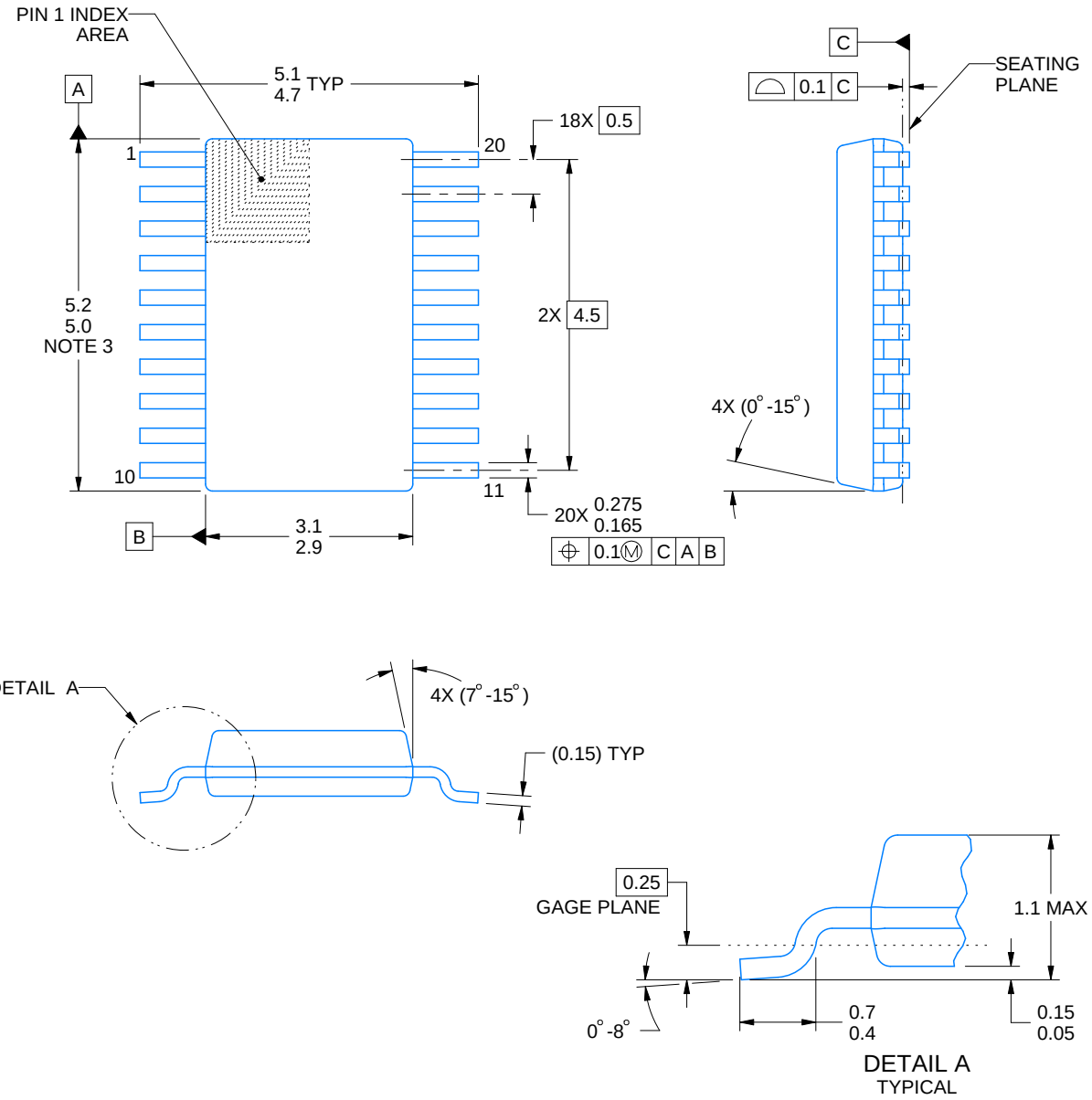
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

PACKAGE OUTLINE

DGS0020A

VSSOP - 1.1 mm max height

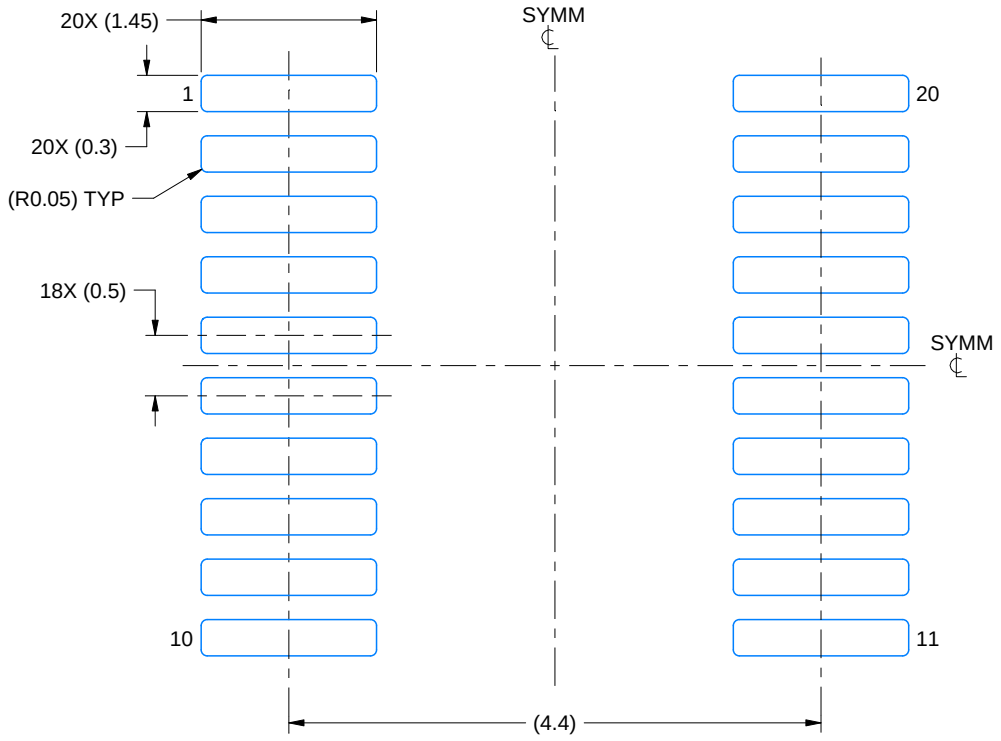
SMALL OUTLINE PACKAGE



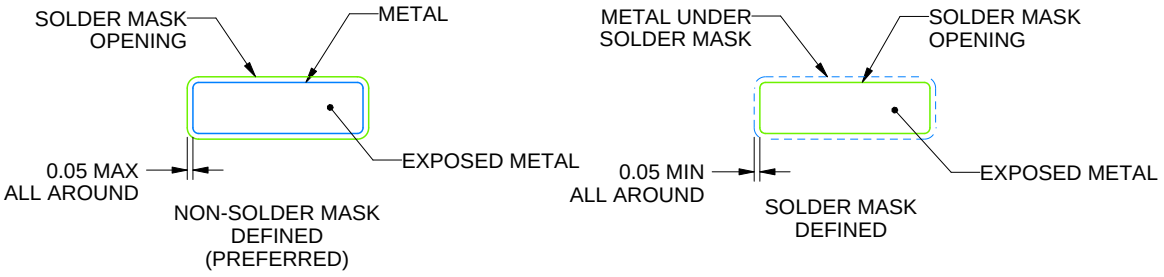
PowerPAD is a trademark of Texas Instruments.

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

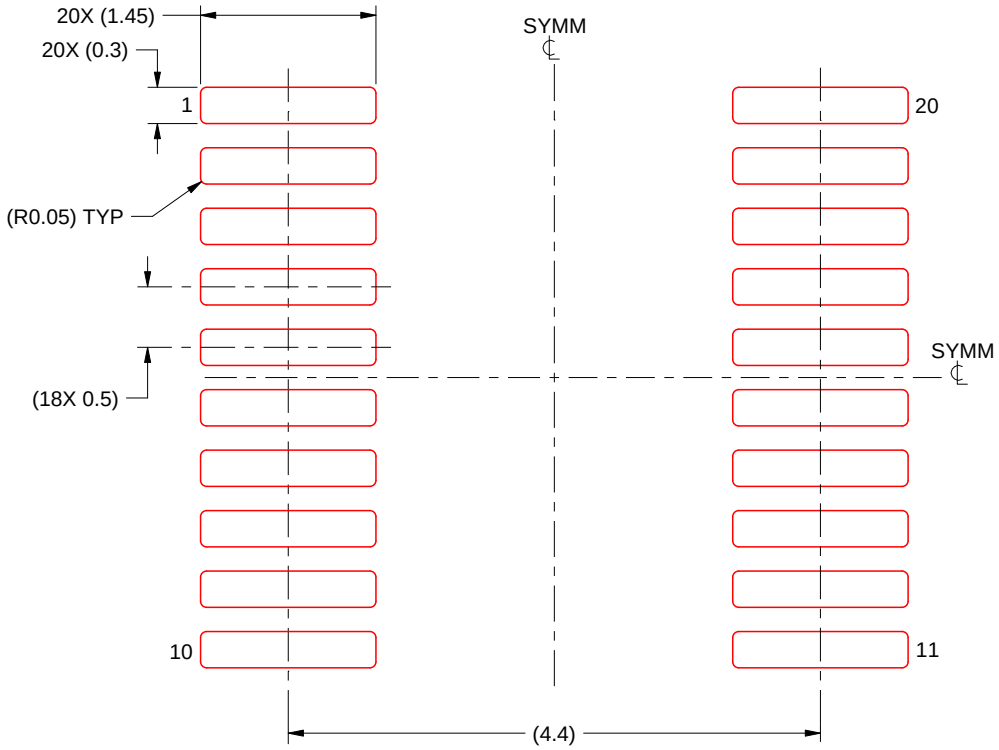


SOLDER MASK DETAILS

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.

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