

SN74LVC2G74 シングル・ポジティブ・エッジ・トリガ D タイプ・フリップ・フロップ クリア/プリセット付き

1 特長

- テキサス・インスツルメンツの NanoFree™ パッケージで提供
- 5V V_{CC} 動作をサポート
- 5.5V までの入力電圧に対応
- 最大 t_{pd} 5.9ns (3.3 V 時)
- 低消費電力、最大 I_{CC} : 10 μ A
- 3.3V で ± 24 mA の出力駆動能力
- 標準 V_{OLP} (出力グランド・バウンス) < 0.8V ($V_{CC} = 3.3$ V, $T_A = 25^\circ$ C)
- 標準 V_{OHV} (出力 V_{OH} アンダーシュート) > 2V ($V_{CC} = 3.3$ V, $T_A = 25^\circ$ C)
- I_{off} により活線挿抜、部分的パワーダウン・モード、バック・ドライブ保護をサポート
- JESD 78、Class II 準拠で 100mA 超のラッチアップ性能
- JESD 22 を超える ESD 保護
 - 人体モデルで 2000V
 - マシン・モデルで 200V
 - 荷電デバイス・モデルで 1000V

2 アプリケーション

- サーバー
- LED ディスプレイ
- ネットワーク・スイッチ
- 通信インフラ
- モーター・ドライバ
- I/O エクスパンダ

3 概要

このシングル・ポジティブ・エッジ・トリガ D タイプ・フリップ・フロップは、1.65V～5.5V の V_{CC} で動作するように設計されています。

ダイをパッケージとして使用する NanoFree™ パッケージ技術は、IC パッケージの概念を大きく覆すものです。

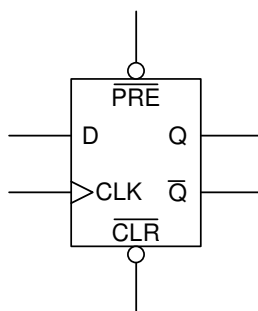
プリセット ($\overline{PRE}$) またはクリア ($\overline{CLR}$) 入力が Low レベルの場合、他の入力のレベルに関係なく、出力をセットまたはリセットします。 $\overline{PRE}$ と $\overline{CLR}$ が非アクティブ (High) の場合、セットアップ時間の要件を満たすデータ (D) 入力のデータは、クロック (CLK) パルスの正方向エッジで出力に転送されます。クロックのトリガは電圧レベルで発生し、クロック・パルスの立ち上がり時間とは直接関係しません。ホールド時間が経過した後、D 入力のデータは、出力のレベルに影響を及ぼさずに変化させることができます。

このデバイスは、 I_{off} を使用する部分的パワーダウン・アプリケーション用に完全に動作が規定されています。 I_{off} 回路が出力をディセーブルにするため、電源切断時にデバイスに電流が逆流して損傷に至ることを回避できます。

製品情報⁽¹⁾

部品番号	パッケージ	本体サイズ
SN74LVC2G74	SM8 (8)	2.95mm × 2.80mm
	VSSOP (8)	2.30mm × 2.00mm
	DSBGA (8)	1.91mm × 0.91mm

(1) 利用可能なすべての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。



概略回路図



Table of Contents

1 特長.....	1	8.1 Overview.....	9
2 アプリケーション.....	1	8.2 Functional Block Diagram.....	9
3 概要.....	1	8.3 Feature Description.....	9
4 Revision History.....	2	8.4 Device Functional Modes.....	9
5 Pin Configuration and Functions.....	3	9 Application and Implementation.....	10
6 Specifications.....	4	9.1 Application Information.....	10
6.1 Absolute Maximum Ratings.....	4	9.2 Typical Power Button Circuit.....	10
6.2 ESD Ratings.....	4	10 Power Supply Recommendations.....	11
6.3 Recommended Operating Conditions.....	5	11 Layout.....	12
6.4 Thermal Information.....	5	11.1 Layout Guidelines.....	12
6.5 Electrical Characteristics.....	6	11.2 Layout Example.....	12
6.6 Timing Requirements, –40°C to +85°C.....	6	12 Device and Documentation Support.....	13
6.7 Timing Requirements, –40°C to +125°C.....	6	12.1 Receiving Notification of Documentation Updates.....	13
6.8 Switching Characteristics, –40°C to +85°C.....	7	12.2 サポート・リソース.....	13
6.9 Switching Characteristics, –40°C to +125°C.....	7	12.3 Trademarks.....	13
6.10 Operating Characteristics.....	7	12.4 Electrostatic Discharge Caution.....	13
6.11 Typical Characteristics.....	7	12.5 Glossary.....	13
7 Parameter Measurement Information.....	8	13 Mechanical, Packaging, and Orderable Information.....	13
8 Detailed Description.....	9		

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。

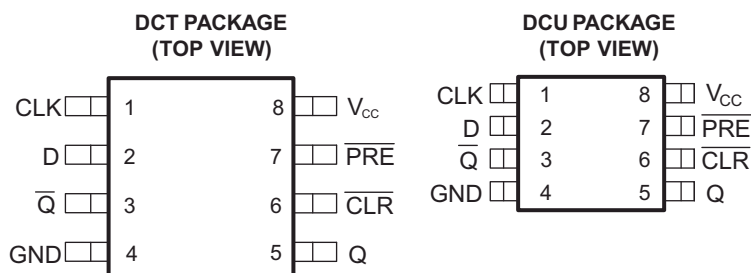
Changes from Revision P (July 2016) to Revision Q (September 2021)	Page
• 文書全体にわたって表、図、相互参照の採番方法を更新.....	1
• Updated the <i>Application and Information</i> section.....	10
• Updated the <i>Device Power Button Circuit</i> figure in the <i>Typical Power Button Circuit</i> section.....	10

Changes from Revision O (January 2015) to Revision P (July 2016)	Page
• 「製品情報」表で SSOP を SM8 へ変更.....	1
• Updated pinout images to new format.....	3
• Added pin number for DSBGA package in <i>Pin Functions</i> table.....	3
• Changed 6 PINS to 8 PINS in <i>Thermal Information</i> table.....	5
• Changed 23 to 2.3 for t_{su} data in <i>Timing Requirements, –40°C to +125°C</i>	6

Changes from Revision N (July 2013) to Revision O (January 2015)	Page
• 「アプリケーション」セクション、「製品情報」表、「端子機能」表、「ESD 定格」表、「熱に関する情報」表、「代表的特性」セクション、「機能説明」セクション、「デバイスの機能モード」セクション、「アプリケーションと実装」セクション、「電源に関する推奨事項」セクション、「レイアウト」セクション、「デバイスおよびドキュメントのサポート」セクション、「メカニカル、パッケージ、および注文情報」セクションを追加.....	1

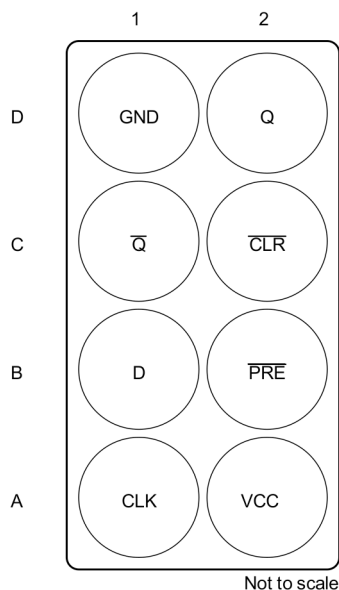
Changes from Revision M (February 2007) to Revision N (July 2013)	Page
• 「特長」の I_{off} の説明を変更.....	1
• Added parameter values for –40 to +125°C temperature ratings in <i>Electrical Characteristics</i> table.....	6
• Changed <i>Timing Requirements, –40°C to +85°C</i> table.....	6
• Added <i>Timing Requirements, –40°C to +125°C</i> table.....	6
• Changed <i>Switching Characteristics, –40°C to +85°C</i> table.....	7
• Added <i>Switching Characteristics, –40°C to +125°C</i> table.....	7

5 Pin Configuration and Functions



See mechanical drawings for dimensions.

✎ 5-1. DCT 8-Pin SM8 and DCU 8-Pin VSSOP Package Top View



See mechanical drawings for dimensions.

✎ 5-2. YZP Package 8-Pin DSBGA Bottom View

表 5-1. Pin Functions

PIN			TYPE	DESCRIPTION
NAME	VSSOP, SM8	DSBGA		
CLK	1	A1	I	Clock input
$\overline{CLR}$	6	C2	I	Clear input – Pull low to set Q output low
D	2	B1	I	Input
GND	4	D1	—	Ground
$\overline{PRE}$	7	B2	I	Preset input – Pull low to set Q output high
Q	5	D2	O	Output
$\overline{Q}$	3	C1	O	Inverted output
V_{CC}	8	A2	—	Supply

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	6.5	V
V _I	Input voltage ⁽²⁾	−0.5	6.5	V
V _O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾	−0.5	6.5	V
V _O	Voltage range applied to any output in the high or low state ^{(2) (3)}	−0.5	V _{CC} + 0.5	V
I _{IK}	Input clamp current	V _I < 0		−50 mA
I _{OK}	Output clamp current	V _O < 0		−50 mA
I _O	Continuous output current			±50 mA
	Continuous current through V _{CC} or GND			±100 mA
T _{stg}	Storage temperature	−65	150	°C

- (1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under セクション 6.3 is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input negative-voltage and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
- (3) The value of V_{CC} is provided in セクション 6.3 table.

6.2 ESD Ratings

PARAMETER	DEFINITION	VALUE	UNIT
V _(ESD) Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins ⁽¹⁾	2000	V
	Charged device model (CDM), per JEDEC specification JESD22-C101, all pins ⁽²⁾	1000	

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

6.3 Recommended Operating Conditions

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

			MIN	MAX	UNIT
V _{CC}	Supply voltage	Operating	1.65	5.5	V
		Data retention only	1.5		
V _{IH}	High-level input voltage	V _{CC} = 1.65 V to 1.95 V	0.65 × V _{CC}		V
		V _{CC} = 2.3 V to 2.7 V	1.7		
		V _{CC} = 3 V to 3.6 V	2		
		V _{CC} = 4.5 V to 5.5 V	0.7 × V _{CC}		
V _{IL}	Low-level input voltage	V _{CC} = 1.65 V to 1.95 V		0.35 × V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V		0.7	
		V _{CC} = 3 V to 3.6 V		0.8	
		V _{CC} = 4.5 V to 5.5 V		0.3 × V _{CC}	
V _I	Input voltage		0	5.5	V
V _O	Output voltage		0	V _{CC}	V
I _{OH}	High-level output current	V _{CC} = 1.65 V		–4	mA
		V _{CC} = 2.3 V		–8	
		V _{CC} = 3 V		–16	
				–24	
		V _{CC} = 4.5 V		–32	
I _{OL}	Low-level output current	V _{CC} = 1.65 V		4	mA
		V _{CC} = 2.3 V		8	
		V _{CC} = 3 V		16	
				24	
		V _{CC} = 4.5 V		32	
Δt/Δv	Input transition rise or fall rate	V _{CC} = 1.8 V ± 0.15 V, 2.5 V ± 0.2 V		20	ns/V
		V _{CC} = 3.3 V ± 0.3 V		10	
		V _{CC} = 5 V ± 0.5 V		5	
T _A	Operating free-air temperature		–40	125	°C

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

6.4 Thermal Information

THERMAL METRIC ⁽¹⁾		SN74LVC2G74			UNIT
		DCT	DCU	YZP	
		8 PINS			
R _{θJA}	Junction-to-ambient thermal resistance ⁽²⁾	220	227	102	°C/W

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

(2) The package thermal impedance is calculated in accordance with JESD 51-7.

6.5 Electrical Characteristics

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

PARAMETER	TEST CONDITIONS	V _{CC}	–40°C to +85°C			–40°C to +125°C			UNIT
						Recommended			
			MIN	TYP ⁽¹⁾	MAX	MIN	TYP	MAX	
V _{OH}	I _{OH} = –100 μA	1.65 V to 5.5 V	V _{CC} – 0.1			V _{CC} – 0.1			V
	I _{OH} = –4 mA	1.65 V	1.2			1.2			
	I _{OH} = –8 mA	2.3 V	1.9			1.85			
	I _{OH} = –16 mA	3 V	2.4			2.4			
	I _{OH} = –24 mA		2.3			2.3			
	I _{OH} = –32 mA	4.5 V	3.8			3.8			
V _{OL}	I _{OL} = 100 μA	1.65 V to 5.5 V	0.1			0.1			V
	I _{OL} = 4 mA	1.65 V	0.45			0.45			
	I _{OL} = 8 mA	2.3 V	0.3			0.3			
	I _{OL} = 16 mA	3 V	0.4			0.4			
	I _{OL} = 24 mA		0.55			0.55			
	I _{OL} = 32 mA	4.5 V	0.55			0.55			
I _I Data or control inputs	V _I = 5.5 V or GND	0 to 5.5 V	±5			±5			μA
I _{off}	V _I or V _O = 5.5 V	0	±10			±10			μA
I _{CC}	V _I = 5.5 V or GND, I _O = 0	1.65 V to 5.5 V	10			10			μA
ΔI _{CC}	One input at V _{CC} – 0.6 V, Other inputs at V _{CC} or GND	3 V to 5.5 V	500			500			μA
C _i	V _I = V _{CC} or GND	3.3 V	5			5			pF

(1) All typical values are at V_{CC} = 3.3 V, T_A = 25°C.

6.6 Timing Requirements, –40°C to +85°C

over recommended operating free-air temperature range (unless otherwise noted) (see [7-1](#))

PARAMETER	FROM	TO	–40°C to +85°C								UNIT
			V _{CC} = 1.8 V ± 0.15 V		V _{CC} = 2.5 V ± 0.2 V		V _{CC} = 3.3 V ± 0.3 V		V _{CC} = 5 V ± 0.5 V		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
f _{clock}			80		175		175		200		MHz
t _w	CLK		6.2		2.7		2.7		2		ns
	PRE or $\overline{\text{CLR}}$ low		6.2		2.7		2.7		2		
t _{su}	Data		2.9		1.7		1.3		1.1		ns
	PRE or $\overline{\text{CLR}}$ inactive		1.9		1.4		1.2		1		
t _h			0		0.3		1.2		0.5		ns

6.7 Timing Requirements, –40°C to +125°C

over recommended operating free-air temperature range (unless otherwise noted) (see [7-1](#))

PARAMETER	FROM	TO	–40°C to +125°C								UNIT
			V _{CC} = 1.8 V ± 0.15 V		V _{CC} = 2.5 V ± 0.2 V		V _{CC} = 3.3 V ± 0.3 V		V _{CC} = 5 V ± 0.5 V		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
f _{clock}			80		120		120		140		MHz
t _w	CLK		6.2		3.5		3.5		3.3		ns
	PRE or CLR low		6.2		3.5		3.5		3.3		
t _{su}	Data		2.9		2.3		1.9		1.7		ns
	PRE or CLR inactive		1.9		2		1.8		1.6		
t _h			0		0.3		0.5		0.5		ns

6.8 Switching Characteristics, –40°C to +85°C

over recommended operating free-air temperature range (unless otherwise noted) (see [7-1](#))

PARAMETER	FROM	TO	–40°C to +85°C								UNIT
			V _{CC} = 1.8 V ± 0.15 V		V _{CC} = 2.5 V ± 0.2 V		V _{CC} = 3.3 V ± 0.3 V		V _{CC} = 5 V ± 0.5 V		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
f _{max}			80		175		175		200		MHz
t _{pd}	CLK	Q	4.8	13.4	2.2	7.1	2.2	5.9	1.4	4.1	ns
		$\overline{Q}$	6	14.4	3	7.7	2.6	6.2	1.6	4.4	
	PRE or CLR low	Q or Q	4.4	12.9	2.3	7	1.7	5.9	1.6	4.1	

6.9 Switching Characteristics, –40°C to +125°C

over recommended operating free-air temperature range (unless otherwise noted) (see [7-1](#))

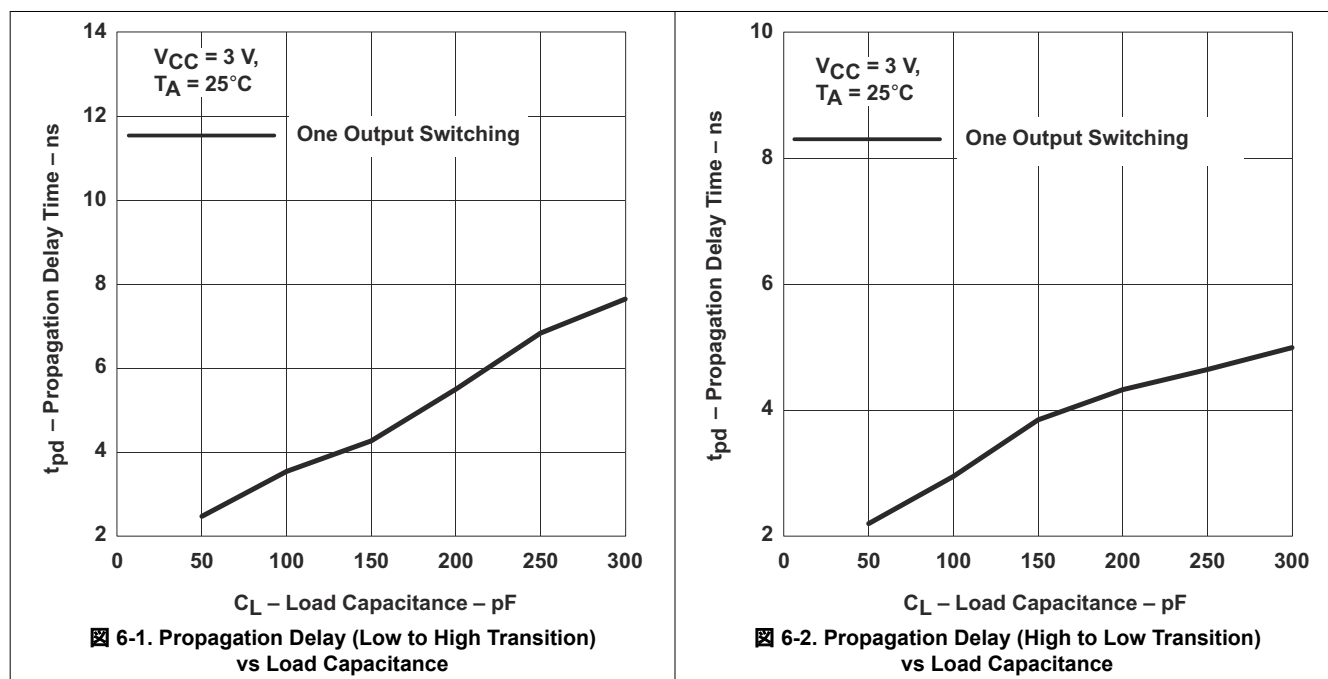
–40°C to +125°C												UNIT
PARAMETER	FROM	TO	V _{CC} = 1.8 V ± 0.15 V		V _{CC} = 2.5 V ± 0.2 V		V _{CC} = 3.3 V ± 0.3 V		V _{CC} = 5 V ± 0.5 V			
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
f _{max}			80		120		120		140		MHz	
t _{pd}	CLK	Q	4.8	14.4	2.2	8.1	2.2	6.9	1.4	5.1	ns	
		$\overline{Q}$	6	16	3	9.7	2.6	7.2	1.6	5.4		
	PRE or CLR low	Q or Q	4.4	14.9	2.3	9.5	1.7	7.9	1.6	6.1		

6.10 Operating Characteristics

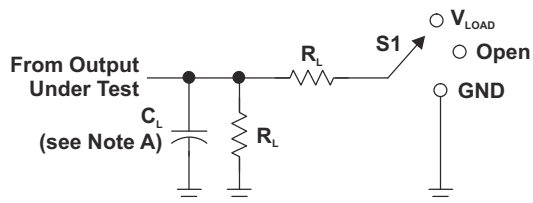
$T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	$V_{CC} = 1.8\text{ V}$	$V_{CC} = 2.5\text{ V}$	$V_{CC} = 3.3\text{ V}$	$V_{CC} = 5\text{ V}$	UNIT
			TYP	TYP	TYP	TYP	
C_{pd}	Power dissipation capacitance	$f = 10\text{ MHz}$	35	35	37	40	pF

6.11 Typical Characteristics



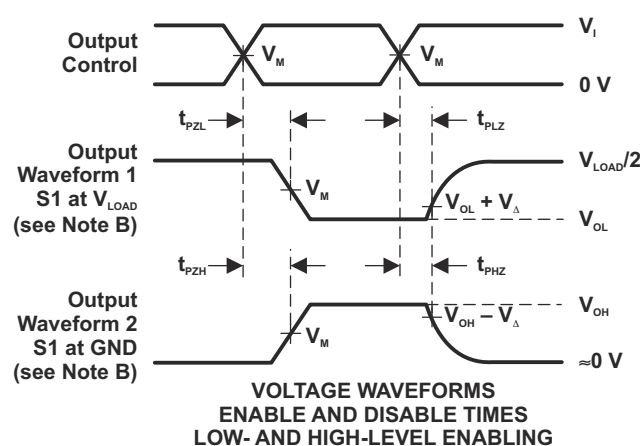
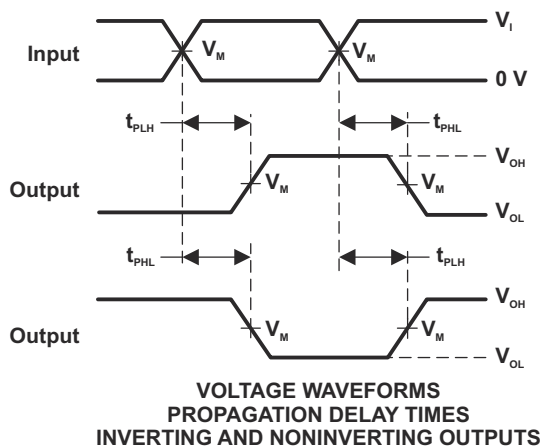
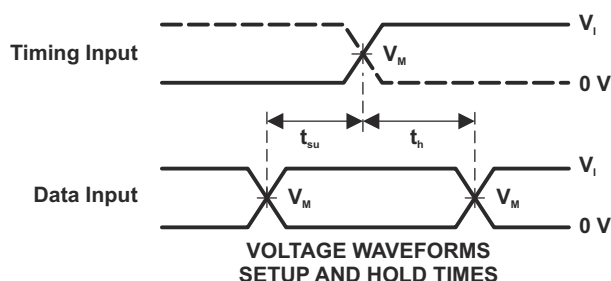
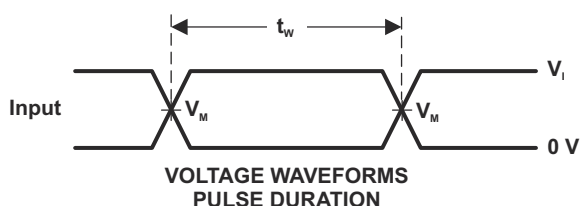
7 Parameter Measurement Information



LOAD CIRCUIT

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
$1.8\text{ V} \pm 0.15\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	1 k Ω	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	500 Ω	0.15 V
$3.3\text{ V} \pm 0.3\text{ V}$	3 V	$\leq 2.5\text{ ns}$	1.5 V	6 V	50 pF	500 Ω	0.3 V
$5\text{ V} \pm 0.5\text{ V}$	V_{CC}	$\leq 2.5\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	50 pF	500 Ω	0.3 V



- NOTES:
- C_L includes probe and jig capacitance.
 - 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.
 - All input pulses are supplied by generators having the following characteristics: PRR $\leq 10\text{ MHz}$, $Z_o = 50\ \Omega$.
 - The outputs are measured one at a time, with one transition per measurement.
 - t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - t_{PZL} and t_{PZH} are the same as t_{en} .
 - t_{PLH} and t_{PHL} are the same as t_{pd} .
 - All parameters and waveforms are not applicable to all devices.

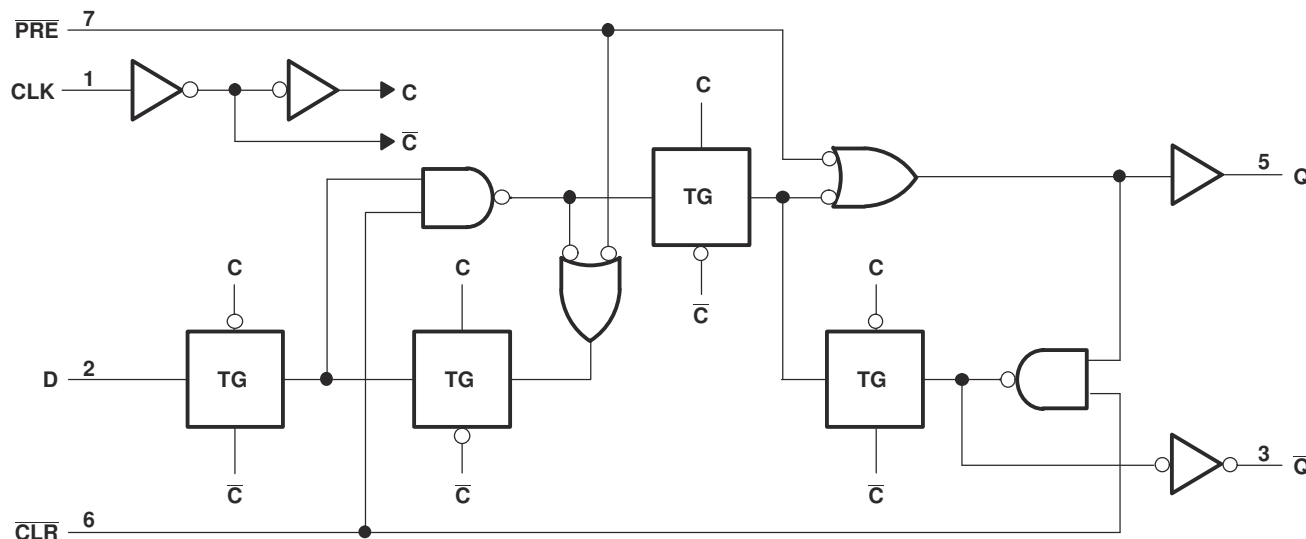
 7-1. Load Circuit and Voltage Waveforms

8 Detailed Description

8.1 Overview

This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

8.2 Functional Block Diagram



8.3 Feature Description

- Allows down voltage translation
 - 5 V to 3.3 V
 - 5 V or 3.3 V to 1.8 V
- Inputs accept voltage levels up to 5.5 V
- I_{off} Feature
 - Can prevent backflow current that can damage device when powered down.

8.4 Device Functional Modes

表 8-1 shows the functional modes of SN74LVC2G74.

表 8-1. Function Table

INPUTS				OUTPUTS	
PRE	CLR	CLK	D	Q	$\bar{Q}$
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H ⁽¹⁾	H ⁽¹⁾
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	X	Q ₀	$\bar{Q}_0$

(1) This configuration is non-stable; that is, it does not persist when PRE or CLR returns to its inactive (high) level.

9 Application and Implementation

Note

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

9.1 Application Information

A low level at the preset ($\overline{\text{PRE}}$) or clear ($\overline{\text{CLR}}$) input sets or resets the outputs, regardless of the levels of the other inputs. When $\overline{\text{PRE}}$ and $\overline{\text{CLR}}$ are inactive (high), data at the data (D) input meeting the setup time requirements is transferred to the outputs on the positive-going edge of the clock pulse. Clock triggering occurs at a voltage level and is not related directly to the rise time of the clock pulse. Following the hold-time interval, data at the D input can be changed without affecting the levels at the outputs.

The 330 Ω resistor and 22 pF capacitor shown in [Figure 9-1](#) produce enough delay to meet the hold time requirement of the D input. To calculate the delay for a particular RC combination, use [Equation 1](#). The delay with this RC combination is 5.03 ns

$$t_{\text{delay}} = -RC \ln(0.5) \approx 0.693 RC \quad (1)$$

To ensure proper operation, check that the transition time of the RC circuit meets the transition time requirements of the device inputs listed in the Recommended Operating Conditions table. Transition time for an RC can be approximated with [Equation 2](#).

$$t_t \approx 2.2 RC \quad (2)$$

In this case, transition time is 18.15 ns, which equates to a 4.54 ns / V input transition rate at $V_{CC} = 5$ V, and is below the 5 ns / V maximum requirement for recommended operation.

9.2 Typical Power Button Circuit

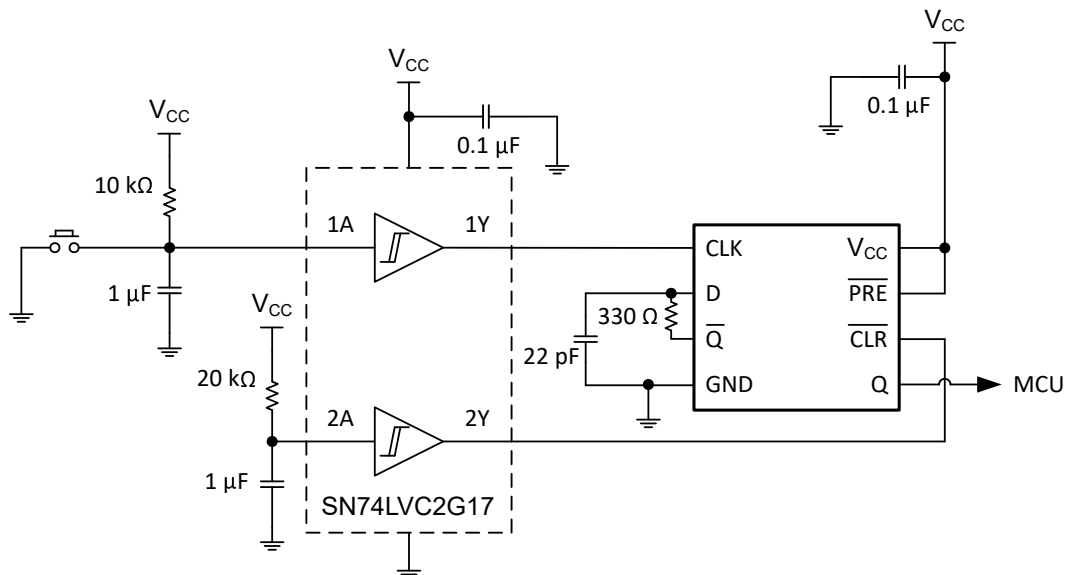


Figure 9-1. Device Power Button Circuit

9.2.1 Design Requirements

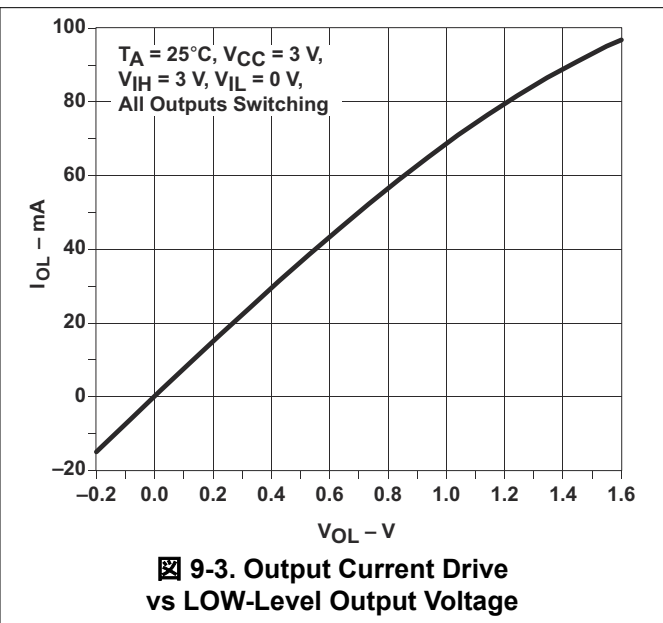
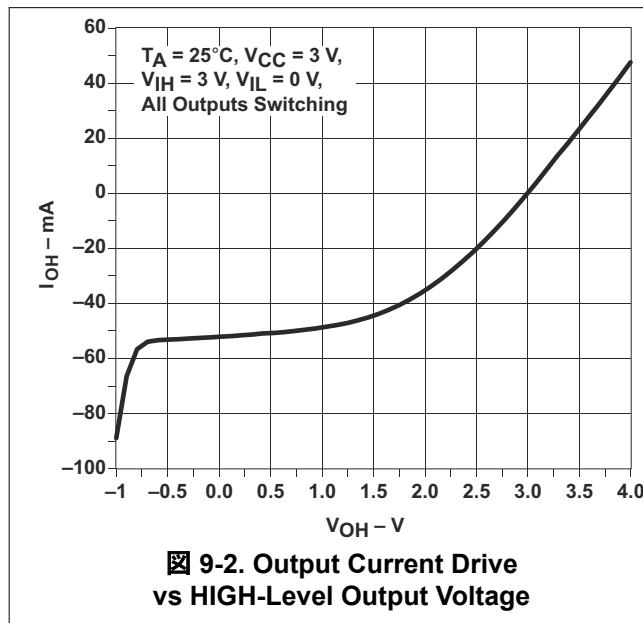
This device uses CMOS technology and has balanced output drive. Care should be taken to avoid bus contention because it can drive currents that would exceed maximum limits. Outputs can be combined to

produce higher drive but the high drive will also create faster edges into light loads so routing and load conditions should be considered to prevent ringing.

9.2.2 Detailed Design Procedure

1. Recommended Input Conditions:
 - For rise time and fall time specifications, see ($\Delta t/\Delta V$) in the [Recommended Operating Conditions](#) table.
 - For specified high and low levels, see (V_{IH} and V_{IL}) in the [Recommended Operating Conditions](#) table.
 - Inputs are overvoltage tolerant allowing them to go as high as 5.5 V at any valid V_{CC}
2. Recommend Output Conditions:
 - Load currents should not exceed 50 mA per output and 100 mA total for the part.
 - Series resistors on the output may be used if the user desires to slow the output edge signal or limit the output current.

9.2.3 Application Curves



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](#) table. Each V_{CC} terminal should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, a 0.1- μ F capacitor is recommended and if there are multiple V_{CC} terminals then .01- μ F or .022- μ F capacitors are recommended for each power terminal. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. The 0.1- μ F and 1- μ F capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results.

11 Layout

11.1 Layout Guidelines

When using multiple bit logic devices, inputs should not float. In many cases, functions or parts of functions of digital logic devices are unused. Some examples are when only two inputs of a triple-input AND gate are used, or when only 3 of the 4-buffer gates are used. Such input pins should not be left unconnected because the undefined voltages at the outside connections result in undefined operational states.

Specified in [Figure 11-1](#) are 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 acceptable to float outputs unless the part is a transceiver. If the transceiver has an output enable pin, it will disable the outputs section of the part when asserted. This will not disable the input section of the I/Os so they also cannot float when disabled.

11.2 Layout Example

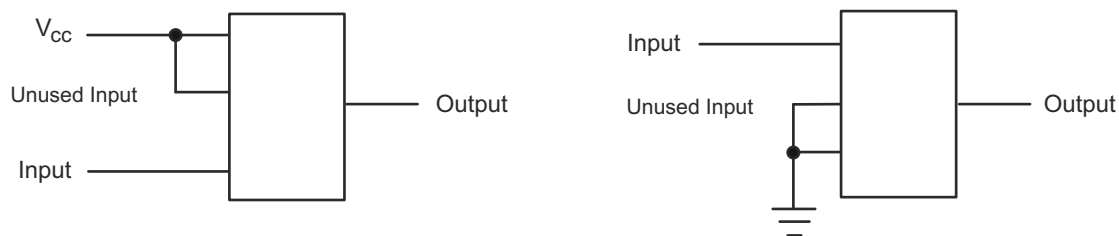


FIG 11-1. Layout Diagram

12 Device and Documentation Support

12.1 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 *Subscribe to updates* 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.

12.2 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。

12.3 Trademarks

NanoFree™ is a trademark of Texas Instruments.

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。

12.4 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.

12.5 Glossary

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

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 (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)
SN74LVC2G74DCTR	Active	Production	SSOP (DCT) 8	3000 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	(2WS5, C74) Z
SN74LVC2G74DCTR.B	Active	Production	SSOP (DCT) 8	3000 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	(2WS5, C74) Z
SN74LVC2G74DCTRE4	Active	Production	SSOP (DCT) 8	3000 null	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C74 Z
SN74LVC2G74DCTRE4.B	Active	Production	SSOP (DCT) 8	3000 null	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C74 Z
SN74LVC2G74DCTRG4	Active	Production	SSOP (DCT) 8	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C74 Z
SN74LVC2G74DCTRG4.B	Active	Production	SSOP (DCT) 8	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C74 Z
SN74LVC2G74DCUR	Active	Production	VSSOP (DCU) 8	3000 LARGE T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 125	(74, C74J, C74Q, C 74R) CZ
SN74LVC2G74DCUR.B	Active	Production	VSSOP (DCU) 8	3000 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	(74, C74J, C74Q, C 74R) CZ
SN74LVC2G74DCURE4	Active	Production	VSSOP (DCU) 8	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C74R
SN74LVC2G74DCURG4	Active	Production	VSSOP (DCU) 8	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C74R
SN74LVC2G74DCURG4.B	Active	Production	VSSOP (DCU) 8	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C74R
SN74LVC2G74DCUT	Active	Production	VSSOP (DCU) 8	250 SMALL T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 125	(C74J, C74Q, C74R)
SN74LVC2G74DCUT.B	Active	Production	VSSOP (DCU) 8	250 SMALL T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	(C74J, C74Q, C74R)
SN74LVC2G74DCUTE4	Active	Production	VSSOP (DCU) 8	250 SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C74R
SN74LVC2G74DCUTG4	Active	Production	VSSOP (DCU) 8	250 SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C74R
SN74LVC2G74DCUTG4.B	Active	Production	VSSOP (DCU) 8	250 SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C74R
SN74LVC2G74YZPR	Active	Production	DSBGA (YZP) 8	3000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 85	CPN
SN74LVC2G74YZPR.B	Active	Production	DSBGA (YZP) 8	3000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 85	CPN

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

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

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

(4) Lead finish/Ball material: Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) MSL rating/Peak reflow: The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) Part marking: There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN74LVC2G74 :

- Automotive : [SN74LVC2G74-Q1](#)
- Enhanced Product : [SN74LVC2G74-EP](#)

NOTE: Qualified Version Definitions:

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

TAPE AND REEL INFORMATION



*All dimensions are nominal

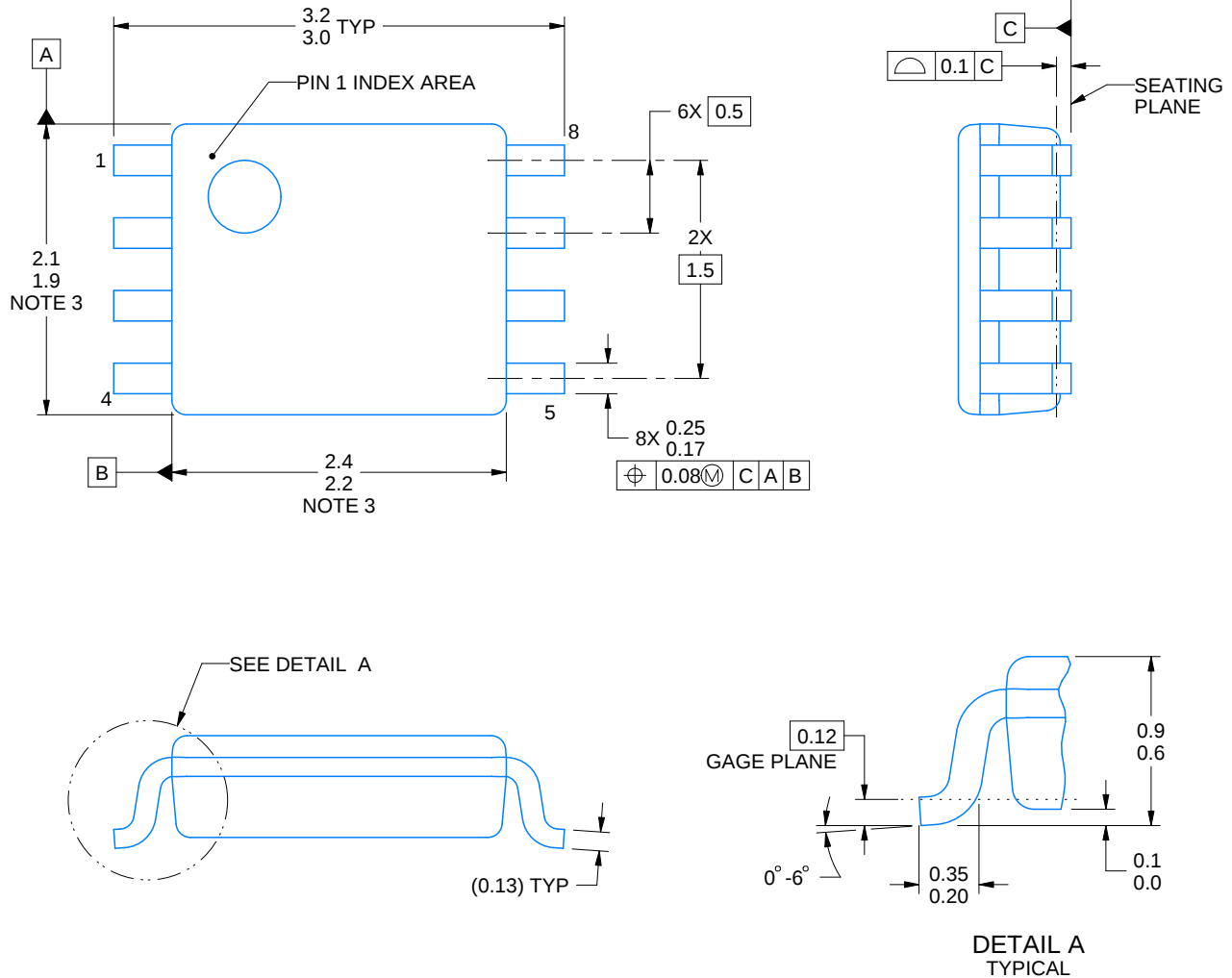
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC2G74DCTR	SSOP	DCT	8	3000	180.0	12.4	3.15	4.35	1.55	4.0	12.0	Q3
SN74LVC2G74DCTRG4	SSOP	DCT	8	3000	180.0	13.0	3.35	4.5	1.55	4.0	12.0	Q3
SN74LVC2G74DCUR	VSSOP	DCU	8	3000	178.0	9.0	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC2G74DCURG4	VSSOP	DCU	8	3000	180.0	8.4	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC2G74DCUT	VSSOP	DCU	8	250	178.0	9.0	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC2G74DCUTG4	VSSOP	DCU	8	250	180.0	8.4	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC2G74YZPR	DSBGA	YZP	8	3000	178.0	9.2	1.02	2.02	0.63	4.0	8.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC2G74DCTR	SSOP	DCT	8	3000	190.0	190.0	30.0
SN74LVC2G74DCTRG4	SSOP	DCT	8	3000	182.0	182.0	20.0
SN74LVC2G74DCUR	VSSOP	DCU	8	3000	180.0	180.0	18.0
SN74LVC2G74DCURG4	VSSOP	DCU	8	3000	202.0	201.0	28.0
SN74LVC2G74DCUT	VSSOP	DCU	8	250	180.0	180.0	18.0
SN74LVC2G74DCUTG4	VSSOP	DCU	8	250	202.0	201.0	28.0
SN74LVC2G74YZPR	DSBGA	YZP	8	3000	220.0	220.0	35.0



4225266/A 09/2014

NOTES:

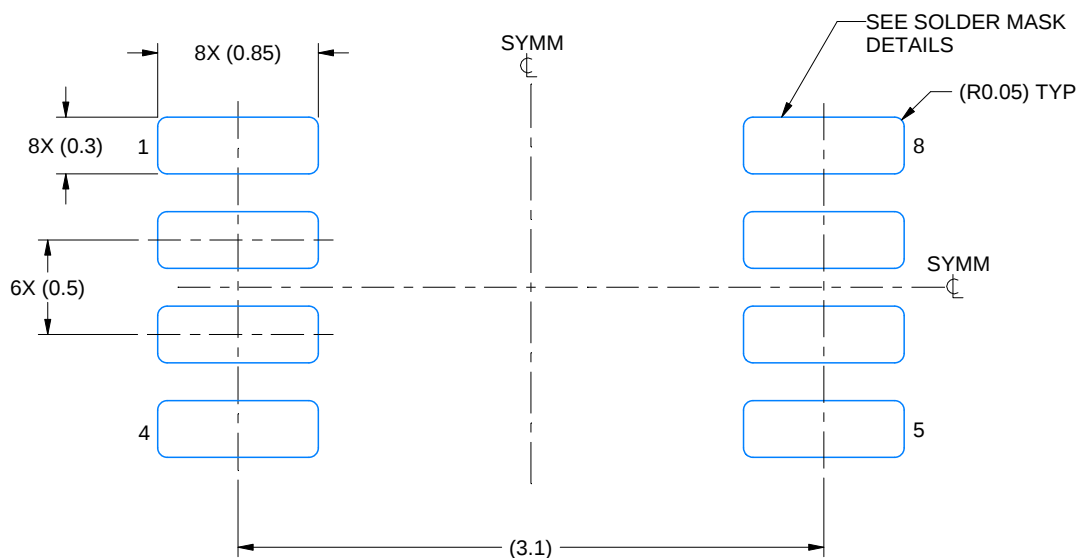
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. Reference JEDEC registration MO-187 variation CA.

EXAMPLE BOARD LAYOUT

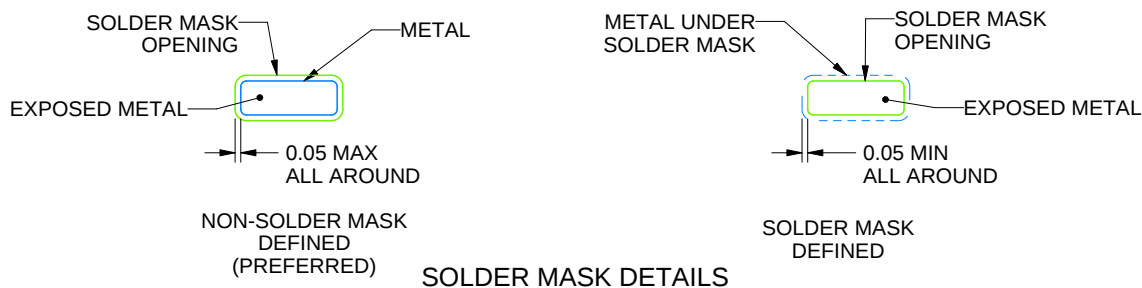
DCU0008A

VSSOP - 0.9 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 25X



4225266/A 09/2014

NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.

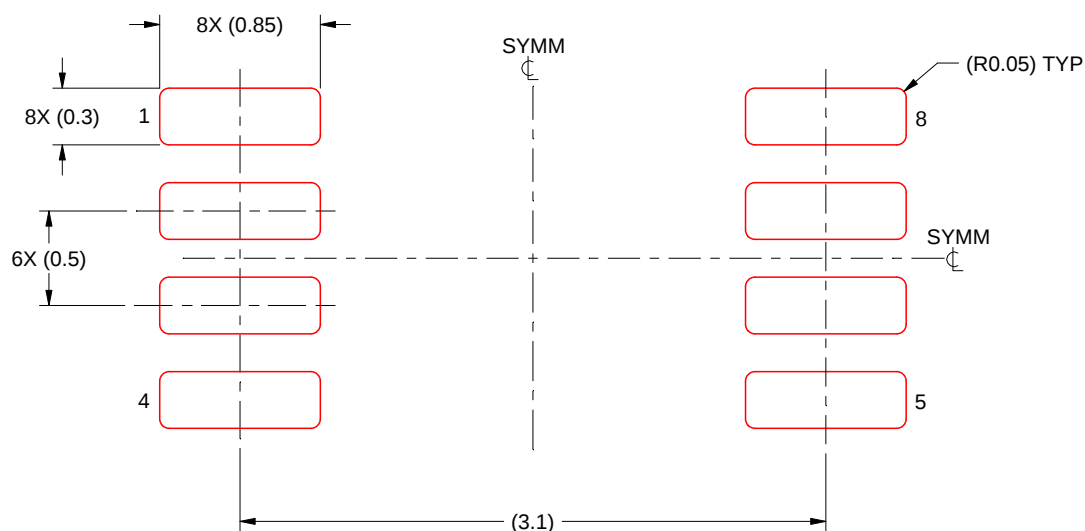
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DCU0008A

VSSOP - 0.9 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 25X

4225266/A 09/2014

NOTES: (continued)

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

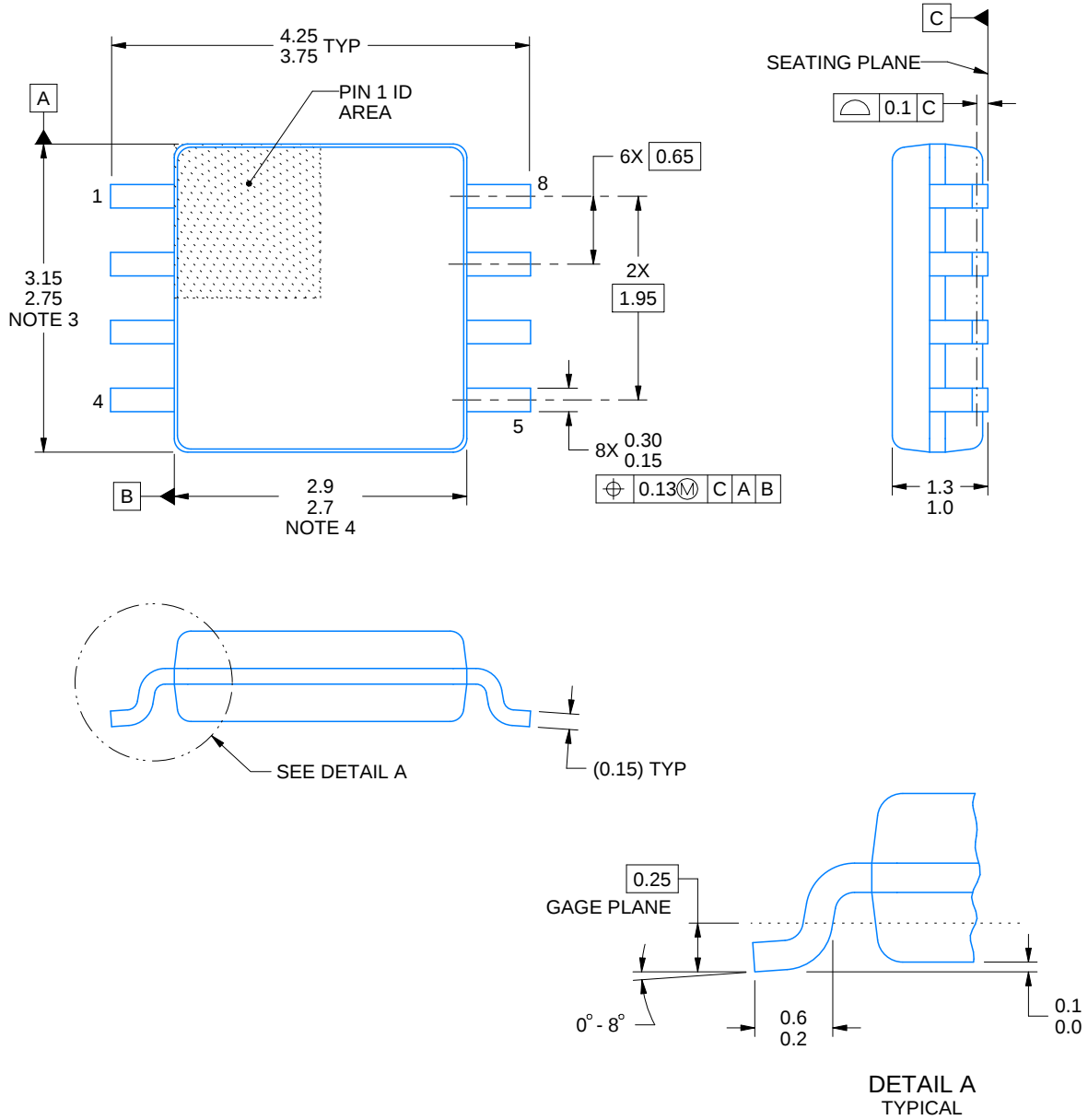


DCT0008A

PACKAGE OUTLINE

SSOP - 1.3 mm max height

SMALL OUTLINE PACKAGE



4220784/C 06/2021

NOTES:

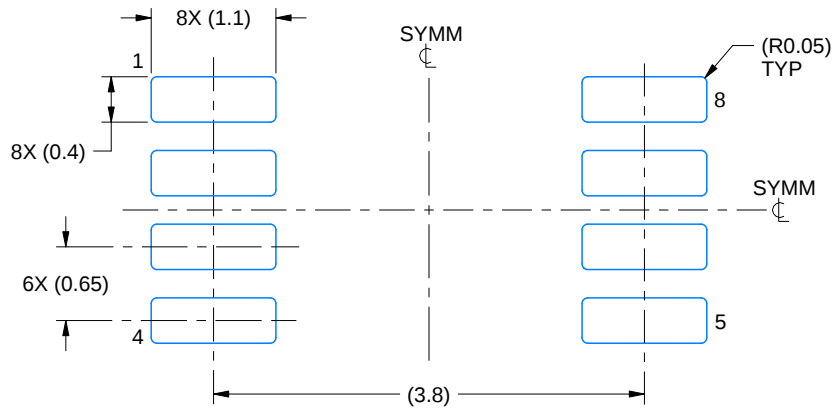
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate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

EXAMPLE BOARD LAYOUT

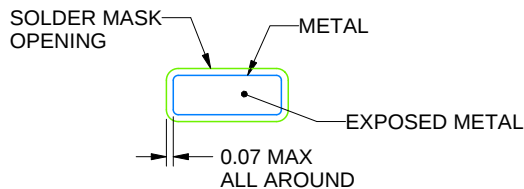
DCT0008A

SSOP - 1.3 mm max height

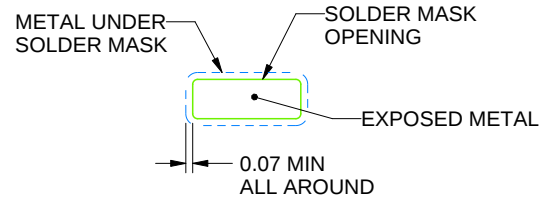
SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X



NON SOLDER MASK
DEFINED



SOLDER MASK
DEFINED

SOLDER MASK DETAILS

4220784/C 06/2021

NOTES: (continued)

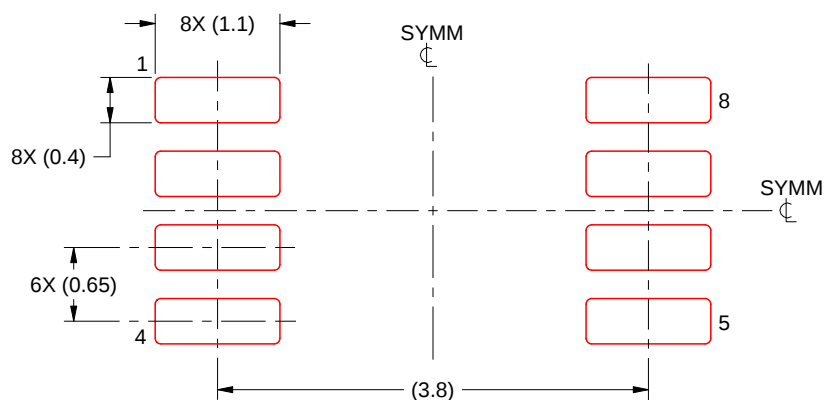
5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DCT0008A

SSOP - 1.3 mm max height

SMALL OUTLINE PACKAGE



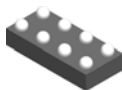
SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:15X

4220784/C 06/2021

NOTES: (continued)

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

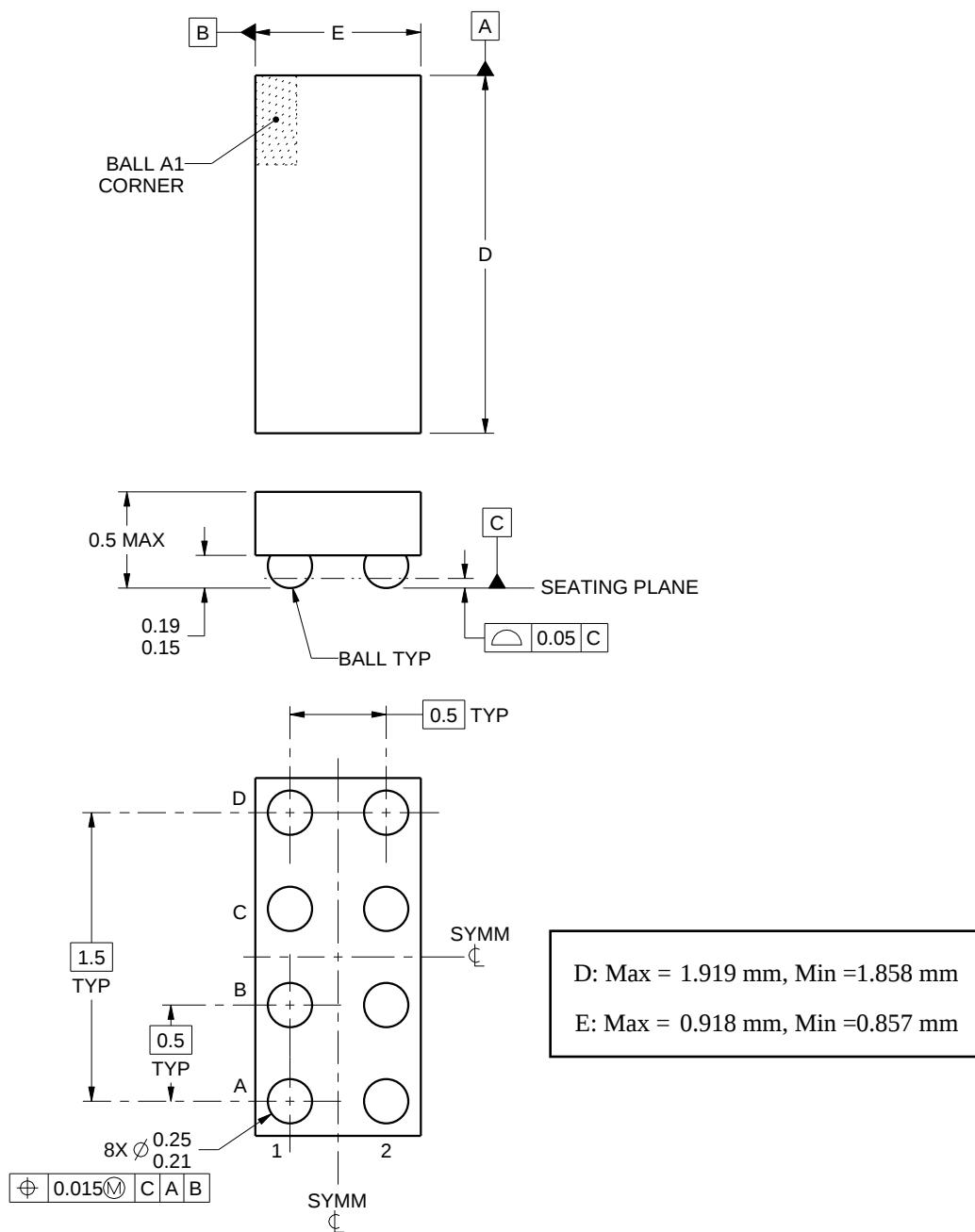
YZP0008



PACKAGE OUTLINE

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



4223082/A 07/2016

NOTES:

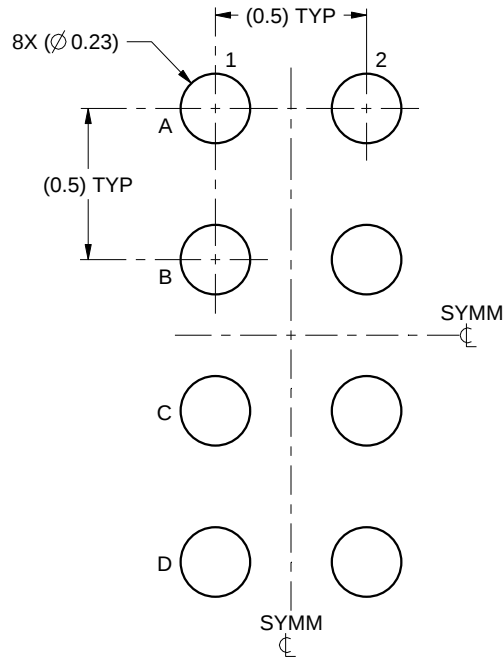
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

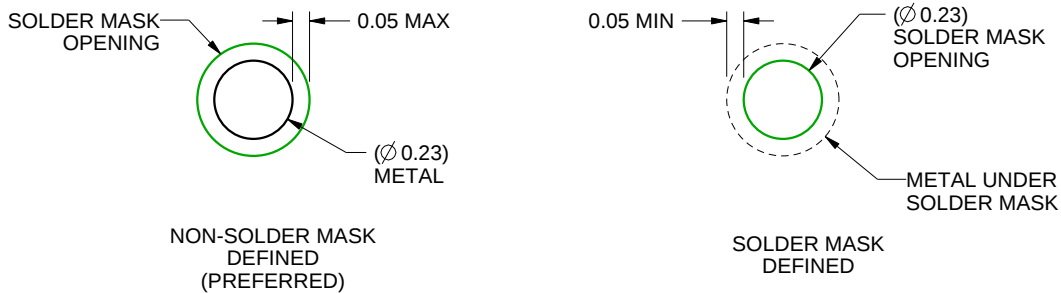
YZP0008

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



LAND PATTERN EXAMPLE
SCALE:40X

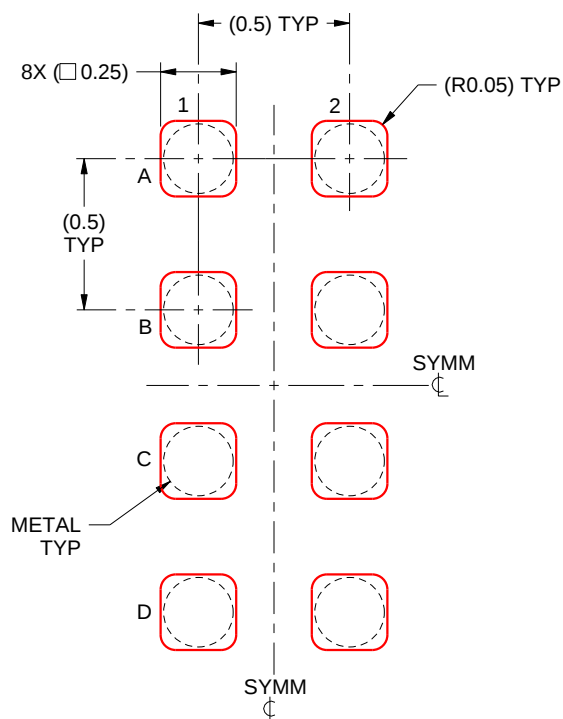


SOLDER MASK DETAILS
NOT TO SCALE

4223082/A 07/2016

NOTES: (continued)

- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For more information, see Texas Instruments literature number SNVA009 (www.ti.com/lit/snva009).



SOLDER PASTE EXAMPLE
 BASED ON 0.1 mm THICK STENCIL
 SCALE:40X

4223082/A 07/2016

NOTES: (continued)

4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release.

重要なお知らせと免責事項

TI は、技術データと信頼性データ (データシートを含みます)、設計リソース (リファレンス デザインを含みます)、アプリケーションや設計に関する各種アドバイス、Web ツール、安全性情報、その他のリソースを、欠陥が存在する可能性のある「現状のまま」提供しており、商品性および特定目的に対する適合性の黙示保証、第三者の知的財産権の非侵害保証を含むいかなる保証も、明示的または黙示的にかかわらず拒否します。

これらのリソースは、TI 製品を使用する設計の経験を積んだ開発者への提供を意図したものです。(1) お客様のアプリケーションに適した TI 製品の選定、(2) お客様のアプリケーションの設計、検証、試験、(3) お客様のアプリケーションに該当する各種規格や、その他のあらゆる安全性、セキュリティ、規制、または他の要件への確実な適合に関する責任を、お客様のみが単独で負うものとし、TI は一切の責任を拒否します。

上記の各種リソースは、予告なく変更される可能性があります。これらのリソースは、リソースで説明されている TI 製品を使用するアプリケーションの開発の目的でのみ、TI はその使用をお客様に許諾します。これらのリソースに関して、他の目的で複製することや掲載することは禁止されています。TI や第三者の知的財産権のライセンスが付与されている訳ではありません。お客様は、これらのリソースを自身で使用した結果発生するあらゆる申し立て、損害、費用、損失、責任について、TI およびその代理人を完全に補償するものとし、TI は一切の責任を拒否します。

TI の製品は、[TI の販売条件](#)、[TI の総合的な品質ガイドライン](#)、[ti.com](#) または TI 製品などに関連して提供される他の適用条件に従い提供されます。TI がこれらのリソースを提供することは、適用される TI の保証または他の保証の放棄の拡大や変更を意味するものではありません。TI がカスタム、またはカスタマー仕様として明示的に指定していない限り、TI の製品は標準的なカタログに掲載される汎用機器です。

お客様がいかなる追加条項または代替条項を提案する場合も、TI はそれらに異議を唱え、拒否します。

Copyright © 2025, Texas Instruments Incorporated

最終更新日：2025 年 10 月