

SN74LVC2G66 デュアル双方向アナログ・スイッチ

1 特長

- テキサス・インスツルメンツの NanoFree™ パッケージで供給
- 1.65V～5.5Vの V_{CC} で動作
- 5.5Vまでの入力電圧に対応
- 最大 t_{pd} 0.8ns (3.3V時)
- 高いオン/オフ出力電圧比
- 高度な線形性
- 高速、通常0.5ns ($V_{CC} = 3V$, $C_L = 50pF$)
- レール・ツー・レール入出力
- オン状態での低い抵抗、通常 $\approx 6\Omega$ ($V_{CC} = 4.5V$)
- JESD 78, Class II 準拠で100mA超のラッチアップ性能

2 アプリケーション

- ワイヤレス・デバイス
- オーディオおよびビデオ信号のルーティング
- ポータブル・コンピュータ
- ウェアラブル・デバイス
- 信号ゲーティング、チョッピング、変調または復調(モデム)
- アナログ/デジタルおよびデジタル/アナログ変換システム用の信号多重化

3 概要

このデュアル双方向アナログ・スイッチは、1.65V～5.5Vの V_{CC} で動作するように設計されています。

SN74LVC2G66は、アナログとデジタルの両方の信号を扱うことができます。SN74LVC2G66デバイスは、最高5.5V (ピーク)までの振幅の信号を、どちらの方向にも転送できます。

NanoFreeパッケージ技術はICパッケージの概念における主要なブレークスルーであり、ダイをパッケージとして使用します。

それぞれのスイッチ・セクションには、独自のイネーブル入力制御(C)が存在します。CにHIGHレベルの電圧が印加されると、対応するスイッチ・セクションがオンになります。

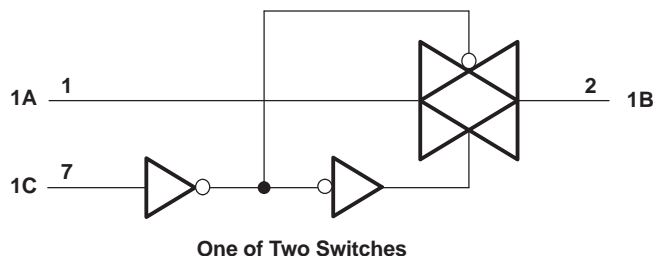
信号ゲーティング、チョッピング、変調または復調(モデム)、およびアナログ/デジタルやデジタル/アナログ変換システム用の信号多重化などのアプリケーションに使用できます。

製品情報⁽¹⁾

| 型番 | パッケージ | 本体サイズ(公称) |
|----------------|-----------|---------------|
| SN74LVC2G66DCT | SSOP (8) | 2.95mm×2.80mm |
| SN74LVC2G66DCU | VSSOP (8) | 2.30mm×2.00mm |
| SN74LVC2G66YZP | 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。

各スイッチの論理図(正論理)



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4 改訂履歴

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。

Revision M (May 2018) から Revision N に変更 Page

- Changed the YZP pin configuration 3

Revision L (September 2015) から Revision M に変更 Page

- Updated pinout image and the *Pin Function* table 3
- Changed pin 3 Name From: 1C To: 2C 3
- Changed the *Thermal Information* table for the DCT package 5

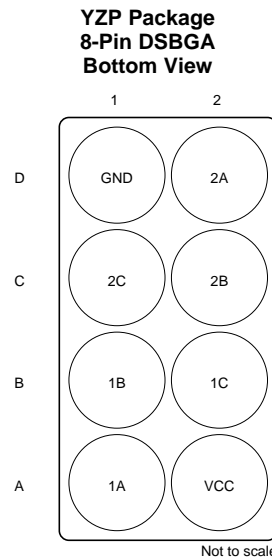
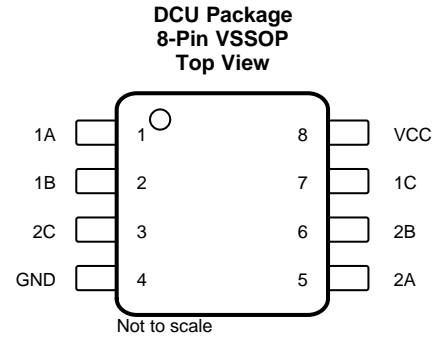
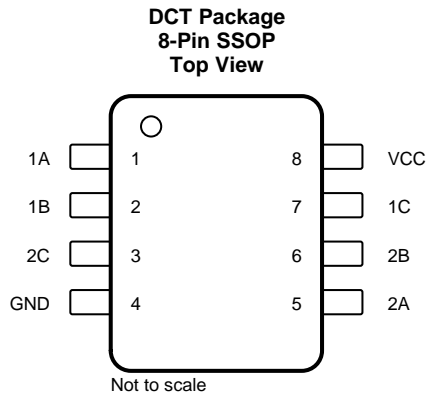
Revision K (January 2014) から Revision L に変更 Page

- 「アプリケーション」セクション、「製品情報」表、「ピン構成および機能」セクション、「ESD定格」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
- Added *Thermal Information* table 5

Revision J (December 2011) から Revision K に変更 Page

- 新しいTIデータシート・フォーマットにドキュメントを更新 - 仕様変更なし 1
- 「注文情報」表を削除 1

5 Pin Configuration and Functions



See mechanical drawings for dimensions.

Pin Functions

| NAME | PIN | | I/O | DESCRIPTION |
|-----------------|------------|-----|-----|---------------------------------------|
| | DCT DCU | YZP | | |
| 1A | 1 | A1 | I/O | Bidirectional signal to be switched |
| 1B | 2 | B1 | I/O | Bidirectional signal to be switched |
| 2C | 3 | C1 | I | Controls the switch (L = OFF, H = ON) |
| 2A | 5 | D2 | I/O | Bidirectional signal to be switched |
| 2B | 6 | C2 | I/O | Bidirectional signal to be switched |
| 1C | 7 | B2 | I | Controls the switch (L = OFF, H = ON) |
| GND | 4 | D1 | — | Ground pin |
| V _{CC} | 8 | A2 | — | Power pin |

6 Specifications

6.1 Absolute Maximum Ratings

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

| | | MIN | MAX | UNIT |
|---|---|--|-----------------------|------|
| V _{CC} | Supply voltage ⁽²⁾ | -0.5 | 6.5 | V |
| V _I | Input voltage ⁽²⁾⁽³⁾ | -0.5 | 6.5 | V |
| V _O | Switch I/O voltage ⁽²⁾⁽³⁾⁽⁴⁾ | -0.5 | V _{CC} + 0.5 | V |
| I _{IK} | Control input clamp current | V _I < 0 | -50 | mA |
| I _{I/O} | I/O port diode current | V _{I/O} < 0 or V _{I/O} > V _{CC} | -50 | mA |
| I _T | On-state switch current | V _{I/O} = 0 to V _{CC} | ±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 *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) All voltages are with respect to ground, unless otherwise specified.
- (3) The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
- (4) This value is limited to 5.5 V maximum.

6.2 ESD Ratings

| | | VALUE | UNIT |
|--------------------|-------------------------|--|-------|
| V _(ESD) | Electrostatic discharge | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins ⁽¹⁾ | ±2000 |
| | | 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

 See ⁽¹⁾.

| | | MIN | MAX | UNIT |
|------------------|---|------------------------------------|------------------------|------|
| V _{CC} | Supply voltage | 1.65 | 5.5 | V |
| V _{I/O} | I/O port voltage | 0 | V _{CC} | V |
| V _{IH} | High-level input voltage, control input | V _{CC} = 1.65 V to 1.95 V | V _{CC} × 0.65 | V |
| | | V _{CC} = 2.3 V to 2.7 V | V _{CC} × 0.7 | |
| | | V _{CC} = 3 V to 3.6 V | V _{CC} × 0.7 | |
| | | V _{CC} = 4.5 V to 5.5 V | V _{CC} × 0.7 | |
| V _{IL} | Low-level input voltage, control input | V _{CC} = 1.65 V to 1.95 V | V _{CC} × 0.35 | V |
| | | V _{CC} = 2.3 V to 2.7 V | V _{CC} × 0.3 | |
| | | V _{CC} = 3 V to 3.6 V | V _{CC} × 0.3 | |
| | | V _{CC} = 4.5 V to 5.5 V | V _{CC} × 0.3 | |
| V _I | Control input voltage | 0 | 5.5 | V |
| Δt/Δv | Input transition rise or fall time | V _{CC} = 1.65 V to 1.95 V | 20 | ns/V |
| | | V _{CC} = 2.3 V to 2.7 V | 20 | |
| | | V _{CC} = 3 V to 3.6 V | 10 | |
| | | V _{CC} = 4.5 V to 5.5 V | 10 | |
| T _A | Operating free-air temperature | -40 | 85 | °C |

- (1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, [SCBA004](#).

6.4 Thermal Information

| THERMAL METRIC ⁽¹⁾ | | SN74LVC2G66 | | | UNIT |
|-------------------------------|--|-------------|-------------|-------------|------|
| | | DCT (SSOP) | DCU (VSSOP) | YZP (DSBGA) | |
| | | 8 PINS | 8 PINS | 8 PINS | |
| R _{θJA} | Junction-to-ambient thermal resistance | 186.1 | 204.4 | 102 | °C/W |
| R _{θJC(top)} | Junction-to-case (top) thermal resistance | 116.5 | 77 | — | °C/W |
| R _{θJB} | Junction-to-board thermal resistance | 98.6 | 83.2 | — | °C/W |
| ψ _{JT} | Junction-to-top characterization parameter | 42.2 | 7.1 | — | °C/W |
| ψ _{JB} | Junction-to-board characterization parameter | 97.6 | 82.7 | — | °C/W |
| R _{θJC(bot)} | Junction-to-case (bottom) thermal resistance | 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 recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER | TEST CONDITIONS | V _{CC} | MIN TYP ⁽¹⁾ MAX | | | UNIT |
|----------------------|---|-----------------------|----------------------------|------------------|--------------------|------|
| | | | | | | |
| r _{on} | V _I = V _{CC} or GND, V _C = V _{IH} (see Figure 3 and Figure 1) | I _S = 4 mA | 1.65 V | 12.5 | 30 | Ω |
| | | | 2.3 V | 9 | 20 | |
| | | | 3 V | 7.5 | 15 | |
| | | | 4.5 V | 6 | 10 | |
| r _{on(p)} | V _I = V _{CC} to GND, V _C = V _{IH} (see Figure 3 and Figure 1) | I _S = 4 mA | 1.65 V | 85 | 120 ⁽¹⁾ | Ω |
| | | | 2.3 V | 22 | 30 ⁽¹⁾ | |
| | | | 3 V | 12 | 20 | |
| | | | 4.5 V | 7.5 | 15 | |
| Δr _{on} | V _I = V _{CC} to GND, V _C = V _{IH} (see Figure 3 and Figure 1) | I _S = 4 mA | 1.65 V | | 7 | Ω |
| | | | 2.3 V | | 5 | |
| | | | 3 V | | 3 | |
| | | | 4.5 V | | 2 | |
| I _{S(off)} | V _I = V _{CC} and V _O = GND or V _I = GND and V _O = V _{CC} , V _C = V _{IL} (see Figure 4) | 5.5 V | | ±1 | μA | |
| I _{S(on)} | V _I = V _{CC} or GND, V _C = V _{IH} , V _O = Open (see Figure 5) | 5.5 V | | ±1 | μA | |
| I _I | V _C = V _{CC} or GND | 5.5 V | | ±1 | μA | |
| I _{CC} | V _C = V _{CC} or GND | 5.5 V | | 10 | μA | |
| ΔI _{CC} | V _C = V _{CC} – 0.6 V | 5.5 V | | 1 ⁽¹⁾ | μA | |
| C _{ic} | | 5 V | | 3.5 | pF | |
| C _{io(off)} | | 5 V | | 6 | pF | |
| C _{io(on)} | | 5 V | | 14 | pF | |

(1) T_A = 25°C

6.6 Switching Characteristics

 over recommended operating free-air temperature range (unless otherwise noted) (see [Figure 2](#))

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC} = 1.8\text{ V} \pm 0.15\text{ V}$ | | $V_{CC} = 2.5\text{ V} \pm 0.2\text{ V}$ | | $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ | | $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ | | UNIT |
|-----------------|--------------|-------------|---|------|--|-----|--|-----|--|-----|------|
| | | | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| $t_{pd}^{(1)}$ | A or B | B or A | | 2 | | 1.2 | | 0.8 | | 0.6 | ns |
| $t_{en}^{(2)}$ | C | A or B | 2.3 | 10 | 1.6 | 5.6 | 1.5 | 4.4 | 1.3 | 3.9 | ns |
| $t_{dis}^{(3)}$ | C | A or B | 2.5 | 10.5 | 1.2 | 6.9 | 2 | 7.2 | 1.1 | 6.3 | ns |

- (1) t_{PLH} and t_{PHL} are the same as t_{pd} . The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).
- (2) t_{PZL} and t_{PZH} are the same as t_{en} .
- (3) t_{PLZ} and t_{PHZ} are the same as t_{dis} .

6.7 Analog Switch Characteristics

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

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | TEST CONDITIONS | V_{CC} | TYP | UNIT |
|---|--------------|-------------|--|----------|------|------|
| Frequency response (switch on) | A or B | B or A | $C_L = 50\text{ pF}$, $R_L = 600\ \Omega$, $f_{in} = \text{sine wave}$ (see Figure 6) | 1.65 V | 35 | MHz |
| | | | | 2.3 V | 120 | |
| | | | | 3 V | 175 | |
| | | | | 4.5 V | 195 | |
| | | | $C_L = 5\text{ pF}$, $R_L = 50\ \Omega$, $f_{in} = \text{sine wave}$ (see Figure 6) | 1.65 V | >300 | |
| | | | | 2.3 V | >300 | |
| | | | | 3 V | >300 | |
| | | | | 4.5 V | >300 | |
| Crosstalk ⁽¹⁾ (between switches) | A or B | B or A | $C_L = 50\text{ pF}$, $R_L = 600\ \Omega$, $f_{in} = 1\text{ MHz}$ (sine wave) (see Figure 7) | 1.65 V | -58 | dB |
| | | | | 2.3 V | -58 | |
| | | | | 3 V | -58 | |
| | | | | 4.5 V | -58 | |
| | | | $C_L = 5\text{ pF}$, $R_L = 50\ \Omega$, $f_{in} = 1\text{ MHz}$ (sine wave) (see Figure 7) | 1.65 V | -42 | |
| | | | | 2.3 V | -42 | |
| | | | | 3 V | -42 | |
| | | | | 4.5 V | -42 | |
| Crosstalk (control input to signal output) | C | A or B | $C_L = 50\text{ pF}$, $R_L = 600\ \Omega$, $f_{in} = 1\text{ MHz}$ (square wave) (see Figure 8) | 1.65 V | 35 | mV |
| | | | | 2.3 V | 50 | |
| | | | | 3 V | 70 | |
| | | | | 4.5 V | 100 | |
| Feedthrough attenuation (switch off) | A or B | B or A | $C_L = 50\text{ pF}$, $R_L = 600\ \Omega$, $f_{in} = 1\text{ MHz}$ (sine wave) (see Figure 9) | 1.65 V | -58 | dB |
| | | | | 2.3 V | -58 | |
| | | | | 3 V | -58 | |
| | | | | 4.5 V | -58 | |
| | | | $C_L = 5\text{ pF}$, $R_L = 50\ \Omega$, $f_{in} = 1\text{ MHz}$ (sine wave) (see Figure 9) | 1.65 V | -42 | |
| | | | | 2.3 V | -42 | |
| | | | | 3 V | -42 | |
| | | | | 4.5 V | -42 | |

 (1) Adjust f_{in} voltage to obtain 0 dBm at input.

Analog Switch Characteristics (continued)

T_A = 25°C

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | TEST CONDITIONS | V _{CC} | TYP | UNIT |
|----------------------|--------------|-------------|--|-----------------|--------|------|
| Sine-wave distortion | A or B | B or A | C _L = 50 pF, R _L = 10 kΩ, f _{in} = 1 kHz (sine wave) (see Figure 10) | 1.65 V | 0.1% | |
| | | | | 2.3 V | 0.025% | |
| | | | | 3 V | 0.015% | |
| | | | | 4.5 V | 0.01% | |
| | | | C _L = 50 pF, R _L = 10 kΩ, f _{in} = 10 kHz (sine wave) (see Figure 10) | 1.65 V | 0.15% | |
| | | | | 2.3 V | 0.025% | |
| | | | | 3 V | 0.015% | |
| | | | | 4.5 V | 0.01% | |

6.8 Operating Characteristics

T_A = 25°C

| PARAMETER | TEST CONDITIONS | V _{CC} = 1.8 V | V _{CC} = 2.5 V | V _{CC} = 3.3 V | V _{CC} = 5 V | UNIT |
|---|-----------------|-------------------------|-------------------------|-------------------------|-----------------------|------|
| | | TYP | TYP | TYP | TYP | |
| C _{pd} Power dissipation capacitance | f = 10 MHz | 8 | 9 | 9.5 | 11 | pF |

6.9 Typical Characteristics

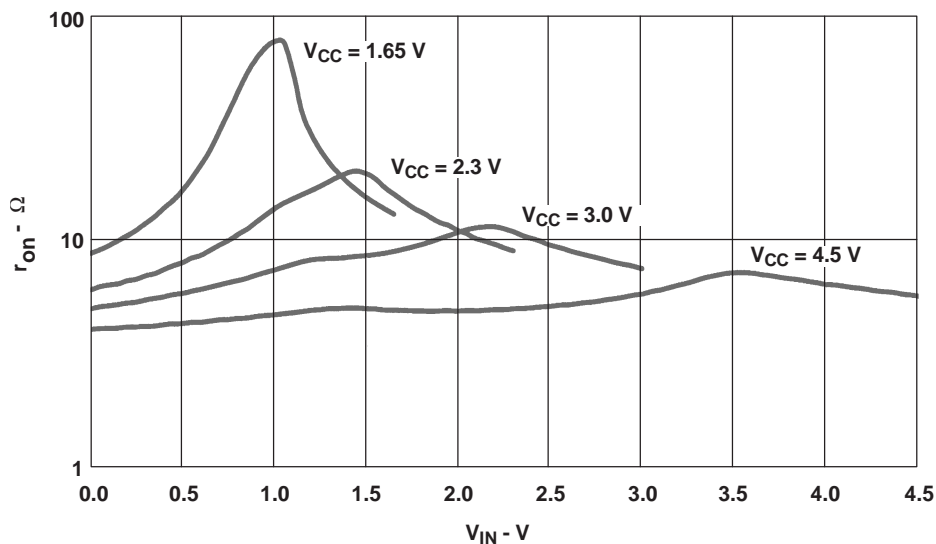
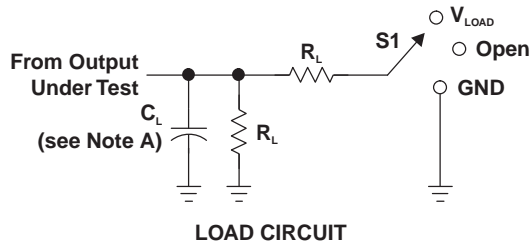


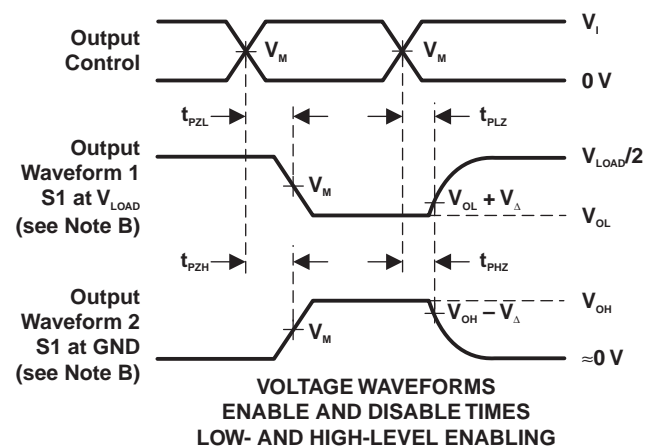
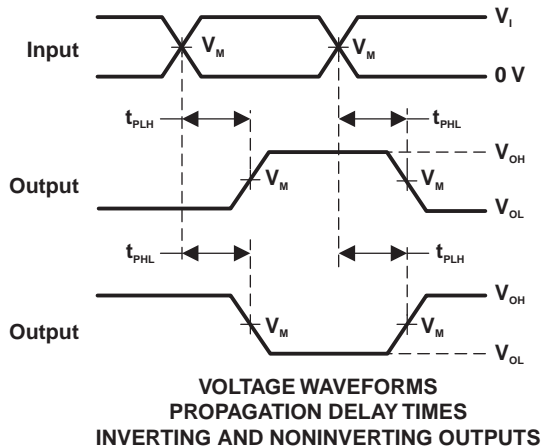
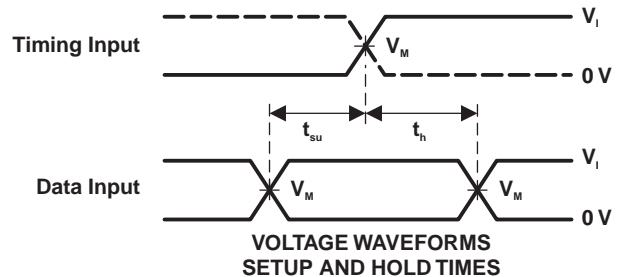
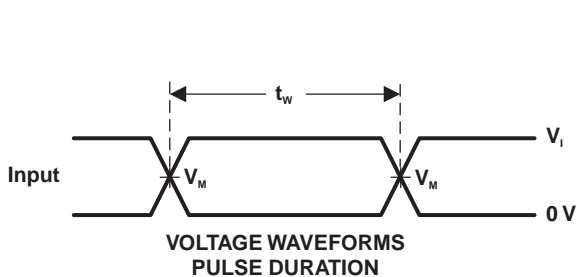
Figure 1. Typical r_{on} as a Function of Input Voltage (V_I) for V_I = 0 to V_{CC}

7 Parameter Measurement Information



| 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 |
| $3.3\text{ V} \pm 0.3\text{ V}$ | V_{CC} | $\leq 2.5\text{ ns}$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 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: 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 have the following characteristics: PRR \leq 10 MHz, $Z_o = 50\ \Omega$.
 D. The outputs are measured one at a time, with one transition per measurement.
 E. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 F. t_{PZL} and t_{PZH} are the same as t_{en} .
 G. t_{PLH} and t_{PHL} are the same as t_{pd} .
 H. All parameters and waveforms are not applicable to all devices.

Figure 2. Load Circuit and Voltage Waveforms

Parameter Measurement Information (continued)

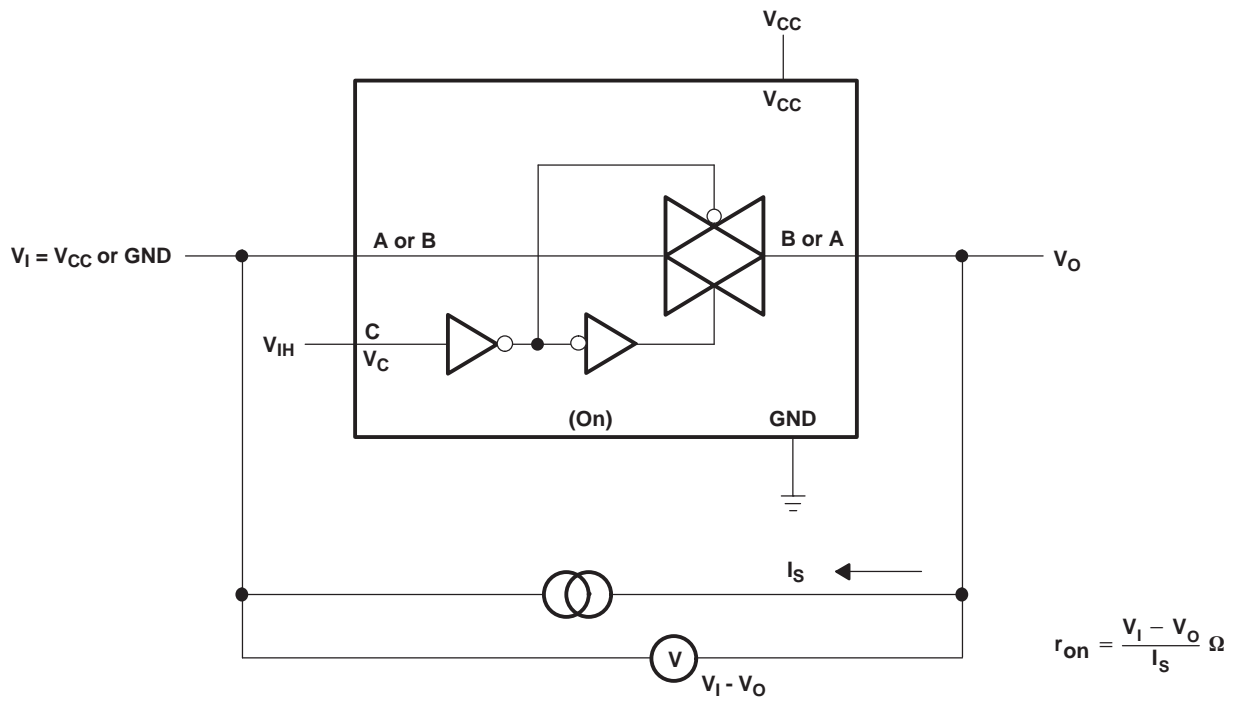


Figure 3. ON-State Resistance Test Circuit

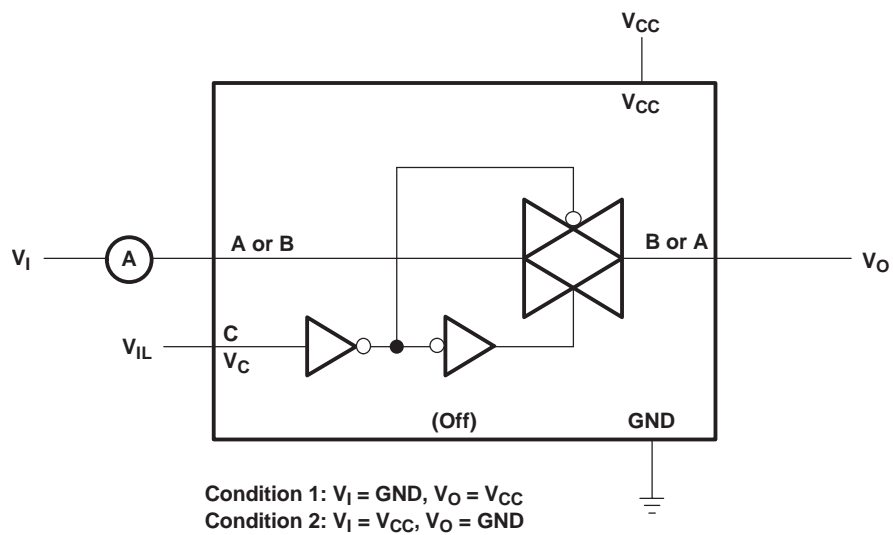


Figure 4. OFF-State Switch Leakage-Current Test Circuit

Parameter Measurement Information (continued)

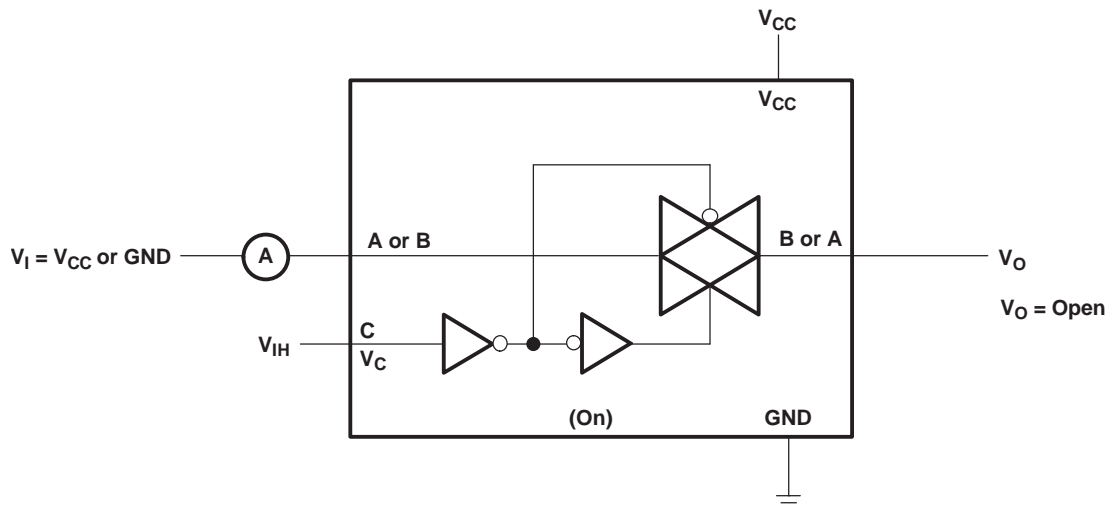


Figure 5. ON-State Leakage-Current Test Circuit

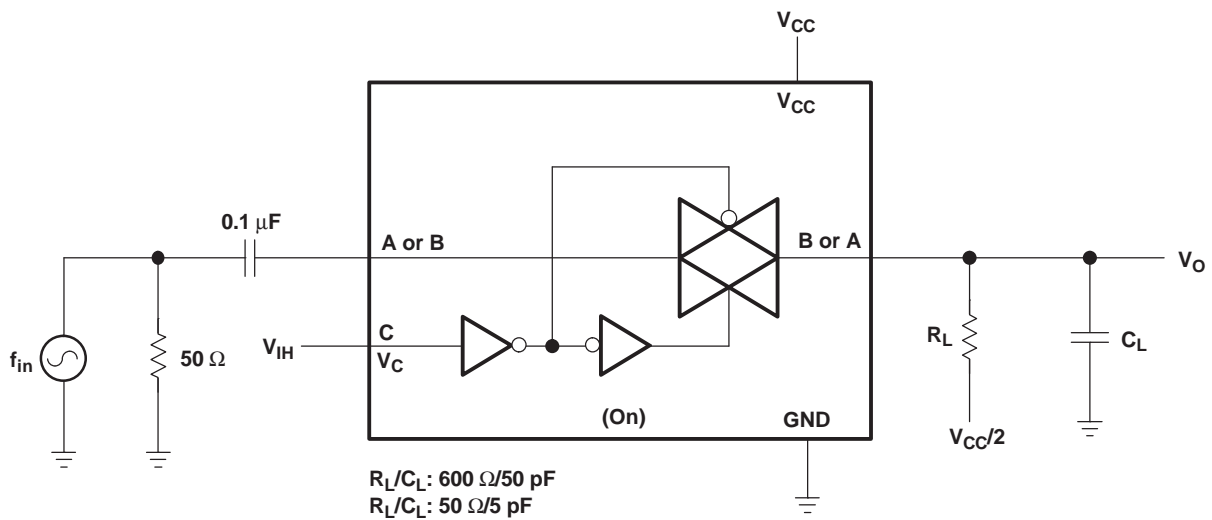


Figure 6. Frequency Response (Switch On)

Parameter Measurement Information (continued)

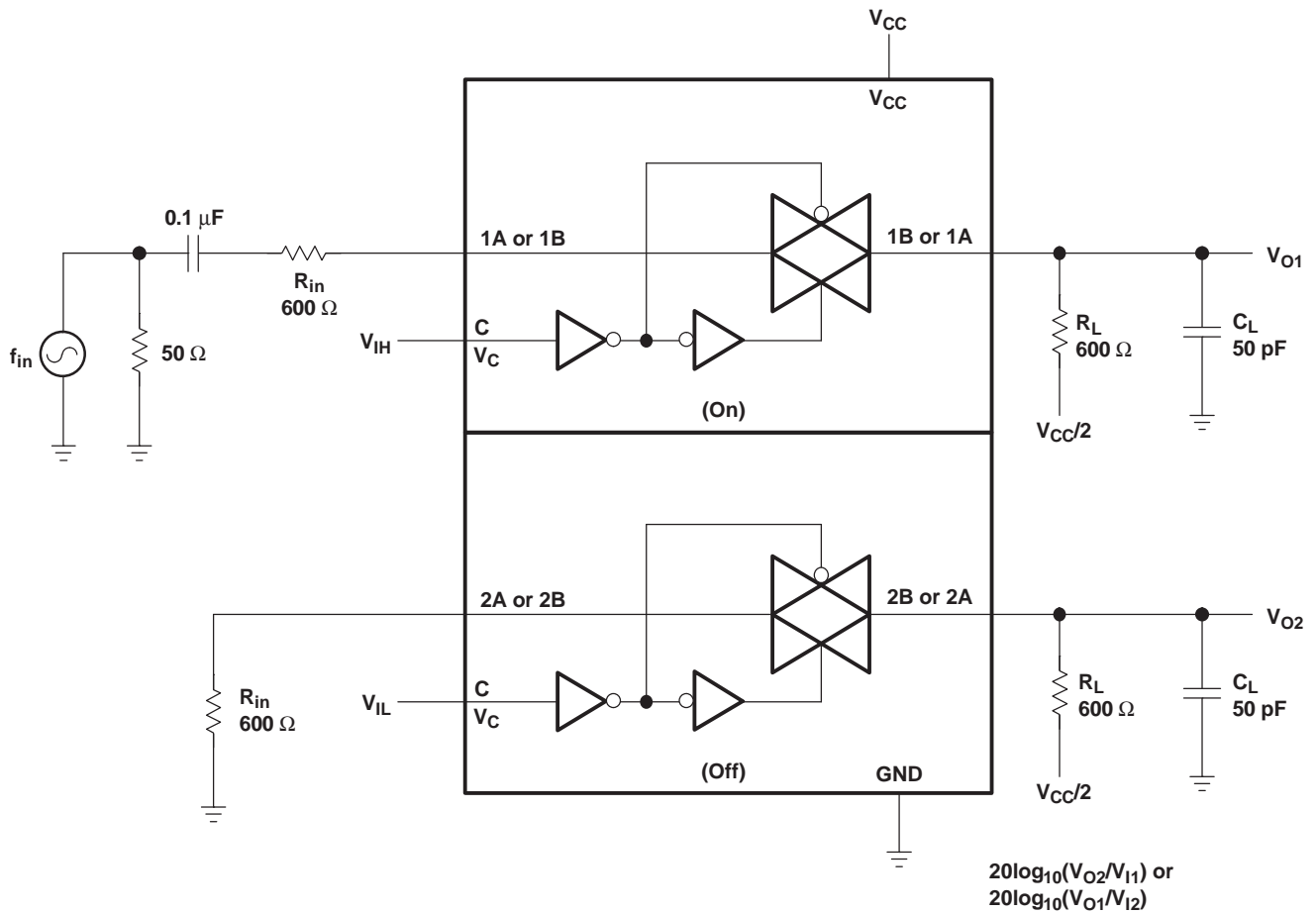


Figure 7. Crosstalk (Between Switches)

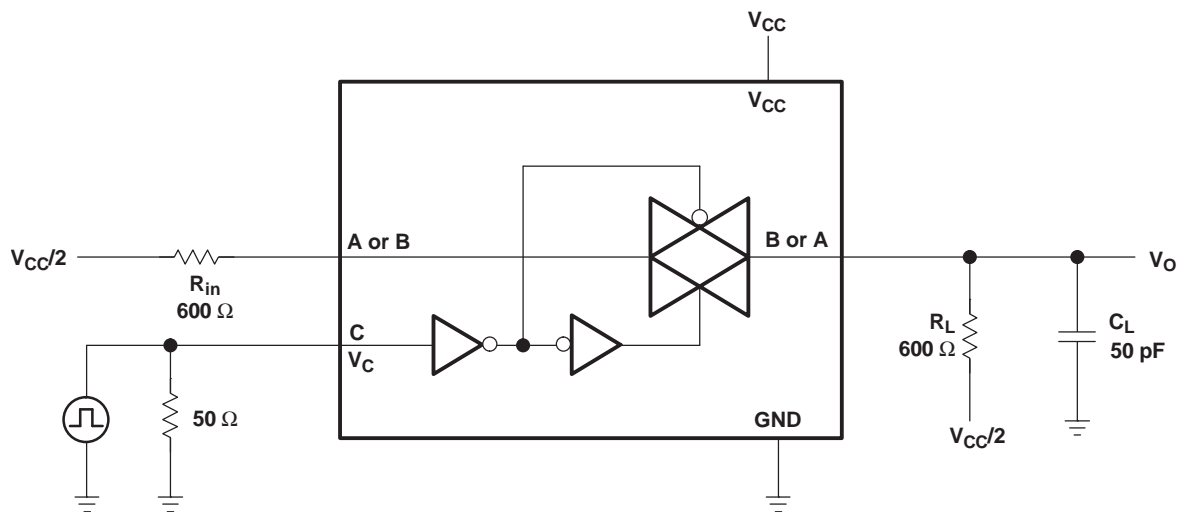


Figure 8. Crosstalk (Control Input, Switch Output)

Parameter Measurement Information (continued)

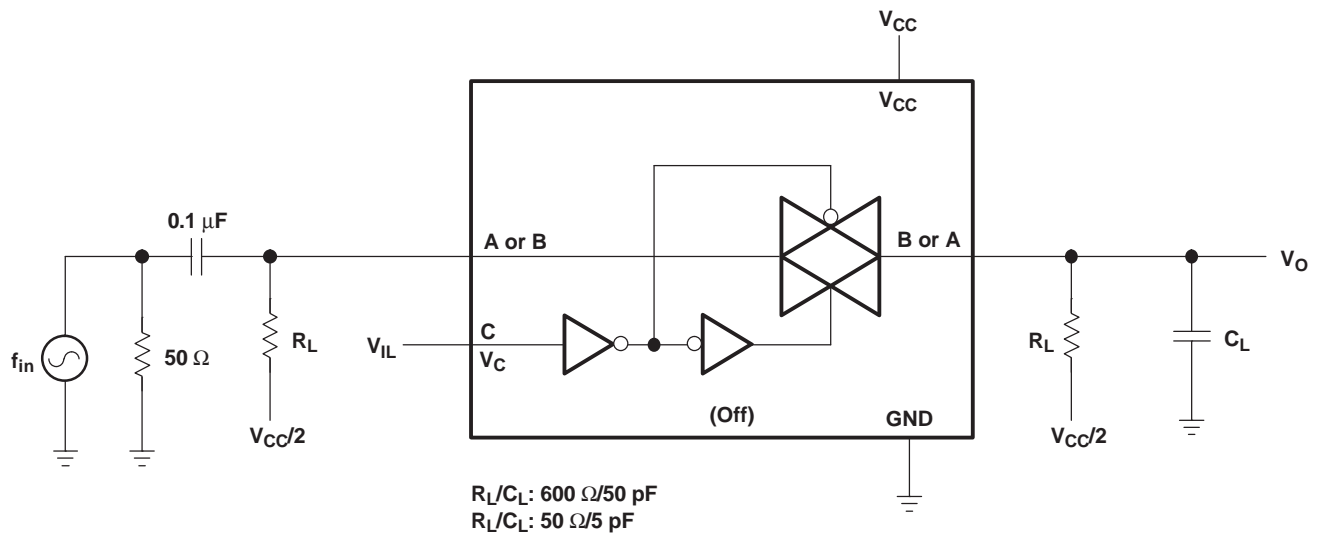


Figure 9. Feedthrough (Switch Off)

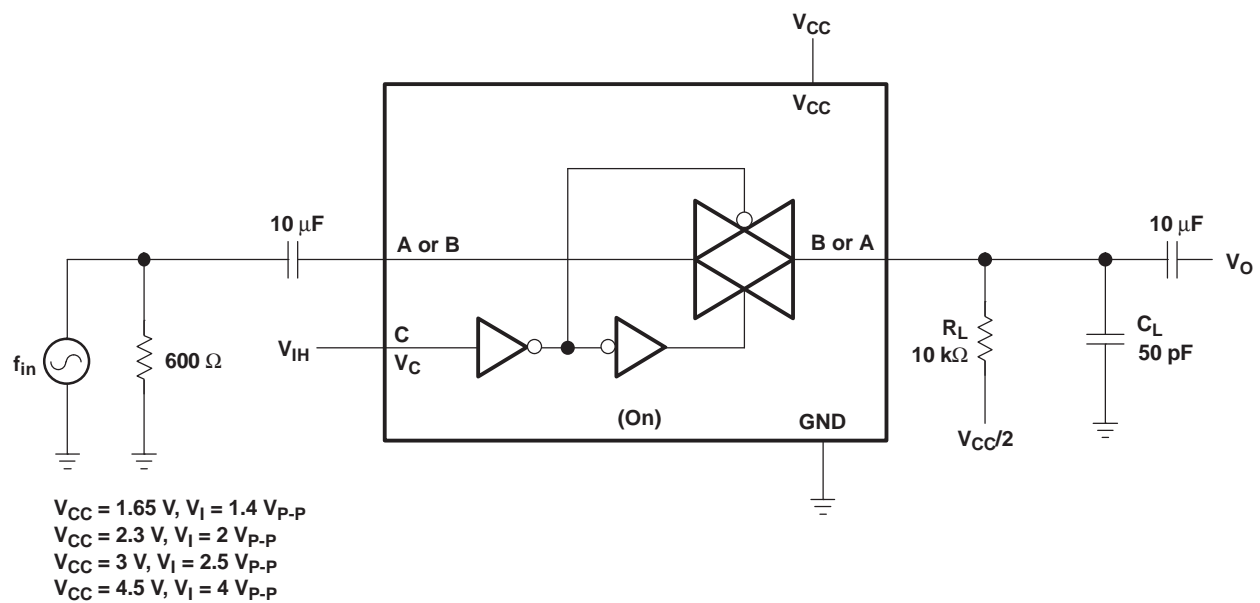


Figure 10. Sine-Wave Distortion

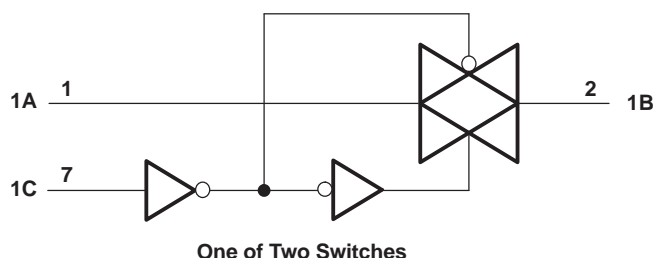
8 Detailed Description

8.1 Overview

This dual bilateral analog switch is designed for 1.65-V to 5.5-V V_{CC} operation. Robust LVC family technology allows this device to accept input voltages without connecting power to V_{CC} .

The SN74LVC2G66 device permits signals with amplitudes of up to 5.5 V (peak) to be transmitted in either direction. A high-level voltage applied to the control pin C enables the respective switch to begin propagating signals across the device. A low-level voltage disables this transmission. Each device incorporates two switches with independent control and operation.

8.2 Functional Block Diagram



8.3 Feature Description

Each switch section has its own enable-input control (C). A high-level voltage applied to C turns on the associated switch section. When C is this Signals can pass through A to B or B to A. Low ON-resistance of 6 Ω at 4.5-V V_{CC} is ideal for analog signal conditioning systems. The control signals can accept voltages up to 5.5 V without V_{CC} connected in the system. Combination of lower t_{pd} of 0.8 ns at 3.3 V and low enable and disable time make this part suitable for high-speed signal switching applications.

8.4 Device Functional Modes

Table 1 lists the functional modes of the SN74LVC2G66.

Table 1. Function Table

| CONTROL INPUT (C) | SWITCH |
|-------------------|--------|
| L | Off |
| H | On |

9 Application and Implementation

NOTE

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

9.1 Application Information

The SN74LVC2G66 can be used in any situation where an Dual SPST switch would be used and a solid-state, voltage controlled version is preferred.

9.2 Typical Application

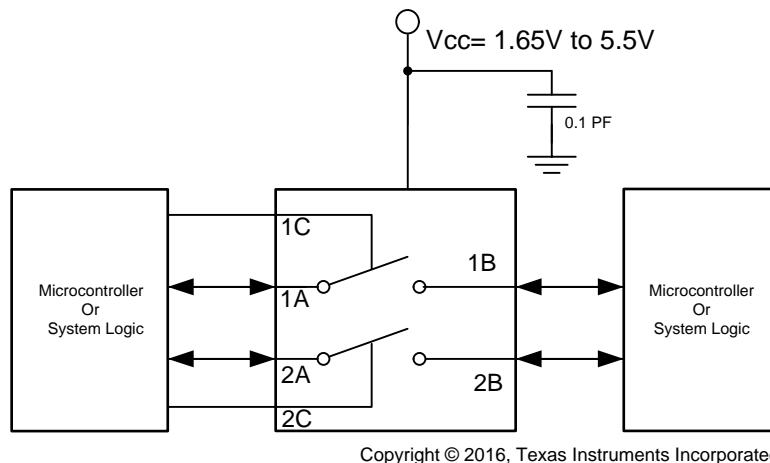


Figure 11. Typical Application Schematic

9.2.1 Design Requirements

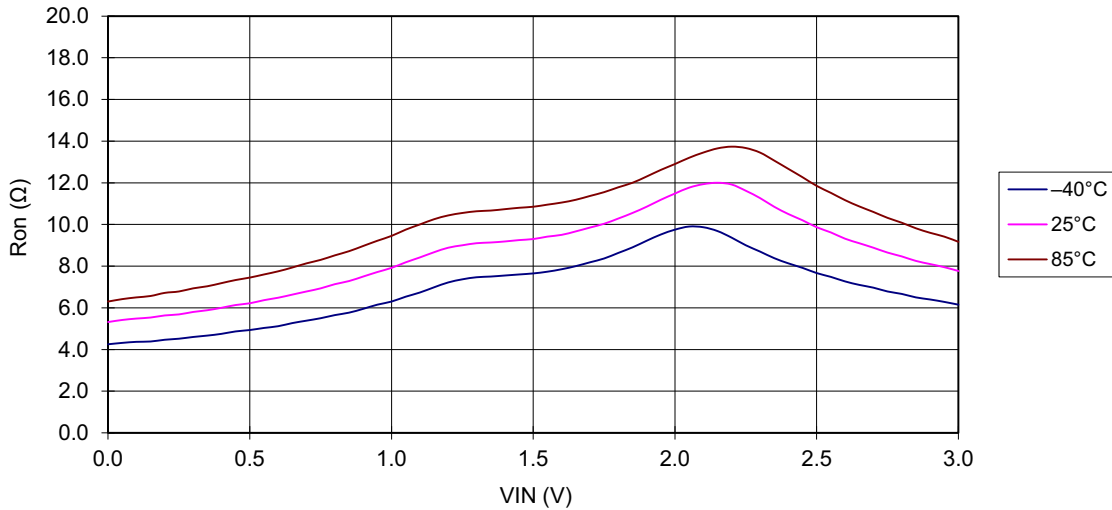
The SN74LVC2G66 allows on/off control of analog and digital signals with a digital control signal. All input signals should remain between 0 V and V_{CC} for optimal operation.

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 and outputs are overvoltage tolerant allowing them to go as high as 5.5 V at any valid V_{CC} .
2. Recommended Output Conditions:
 - Load currents should not exceed ± 50 mA.
3. Frequency Selection Criterion:
 - Maximum frequency tested is 150 MHz.
 - Added trace resistance or capacitance can reduce maximum frequency capability; use layout practices as directed in [Layout](#).

Typical Application (continued)

9.2.3 Application Curve



Pin: A–B, $V_{CC} = 3\text{ V}$, $I_S = 24\text{ mA}$

Figure 12. r_{on} vs V_I

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. For devices with a single supply, a 0.1- μF bypass capacitor is recommended. If there are multiple pins labeled V_{CC} , then a 0.01- μF or 0.022- μF capacitor is recommended for each V_{CC} because the VCC pins will be tied together internally. For devices with dual-supply pins operating at different voltages, for example V_{CC} and V_{DD} , a 0.1- μF bypass capacitor is recommended for each supply pin. It is acceptable to parallel multiple bypass capacitors to reject different frequencies of noise. 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.

11 Layout

11.1 Layout Guidelines

Reflections and matching are closely related to loop antenna theory, but different enough to warrant their own discussion. When a PCB trace turns a corner at a 90° angle, a reflection can occur. This is primarily due to the change of width of the trace. At the apex of the turn, the trace width is increased to 1.414 times its width. This upsets the transmission line characteristics, especially the distributed capacitance and self-inductance of the trace — resulting in the reflection.

NOTE

Not all PCB traces can be straight, and so they will have to turn corners. Figure 13 shows progressively better techniques of rounding corners. Only the last example maintains constant trace width and minimizes reflections.

11.2 Layout Example

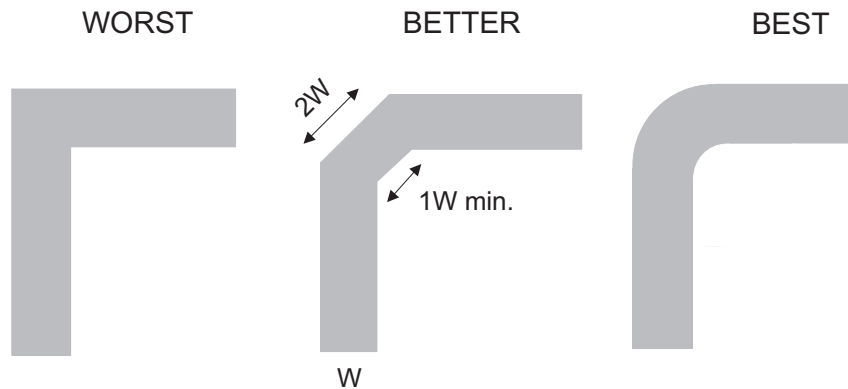


Figure 13. Trace Example

12 デバイスおよびドキュメントのサポート

12.1 コミュニティ・リソース

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

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設計サポート *TIの設計サポート* 役に立つE2Eフォーラムや、設計サポート・ツールをすばやく見つけることができます。技術サポート用の連絡先情報も参照できます。

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12.4 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

13 メカニカル、パッケージ、および注文情報

以降のページには、メカニカル、パッケージ、および注文に関する情報が記載されています。この情報は、そのデバイスについて利用可能な最新のデータです。このデータは予告なく変更されることがあり、ドキュメントが改訂される場合もあります。本データシートのブラウザ版を使用されている場合は、画面左側の説明をご覧ください。

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 |
|-------------------|---------------|--------------|-----------------|------|-------------|-----------------|--------------------------------------|----------------------|--------------|-------------------------|-------------------------|
| SN74LVC2G66DCTR | ACTIVE | SSOP | DCT | 8 | 3000 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | C66 (R, Z) | Samples |
| SN74LVC2G66DCUR | ACTIVE | VSSOP | DCU | 8 | 3000 | RoHS & Green | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | (66, C66Q, C66R) CZ | Samples |
| SN74LVC2G66DCURG4 | ACTIVE | VSSOP | DCU | 8 | 3000 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | C66R | Samples |
| SN74LVC2G66DCUT | OBSOLETE | VSSOP | DCU | 8 | | TBD | Call TI | Call TI | -40 to 85 | (C66Q, C66R) | |
| SN74LVC2G66DCUTE4 | ACTIVE | VSSOP | DCU | 8 | 250 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | C66R | Samples |
| SN74LVC2G66DCUTG4 | ACTIVE | VSSOP | DCU | 8 | 250 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | C66R | Samples |
| SN74LVC2G66YZPR | ACTIVE | DSBGA | YZP | 8 | 3000 | RoHS & Green | SNAGCU | Level-1-260C-UNLIM | -40 to 85 | (C67, C6N) | 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.

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OTHER QUALIFIED VERSIONS OF SN74LVC2G66 :

- Automotive : [SN74LVC2G66-Q1](#)

NOTE: Qualified Version Definitions:

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

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 |
|-------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LVC2G66DCTR | SSOP | DCT | 8 | 3000 | 180.0 | 13.0 | 3.35 | 4.5 | 1.55 | 4.0 | 12.0 | Q3 |
| SN74LVC2G66DCUR | VSSOP | DCU | 8 | 3000 | 178.0 | 9.0 | 2.25 | 3.35 | 1.05 | 4.0 | 8.0 | Q3 |
| SN74LVC2G66DCURG4 | VSSOP | DCU | 8 | 3000 | 180.0 | 8.4 | 2.25 | 3.35 | 1.05 | 4.0 | 8.0 | Q3 |
| SN74LVC2G66DCUTG4 | VSSOP | DCU | 8 | 250 | 180.0 | 8.4 | 2.25 | 3.35 | 1.05 | 4.0 | 8.0 | Q3 |
| SN74LVC2G66YZPR | 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) |
|-------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LVC2G66DCTR | SSOP | DCT | 8 | 3000 | 182.0 | 182.0 | 20.0 |
| SN74LVC2G66DCUR | VSSOP | DCU | 8 | 3000 | 180.0 | 180.0 | 18.0 |
| SN74LVC2G66DCURG4 | VSSOP | DCU | 8 | 3000 | 202.0 | 201.0 | 28.0 |
| SN74LVC2G66DCUTG4 | VSSOP | DCU | 8 | 250 | 202.0 | 201.0 | 28.0 |
| SN74LVC2G66YZPR | 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

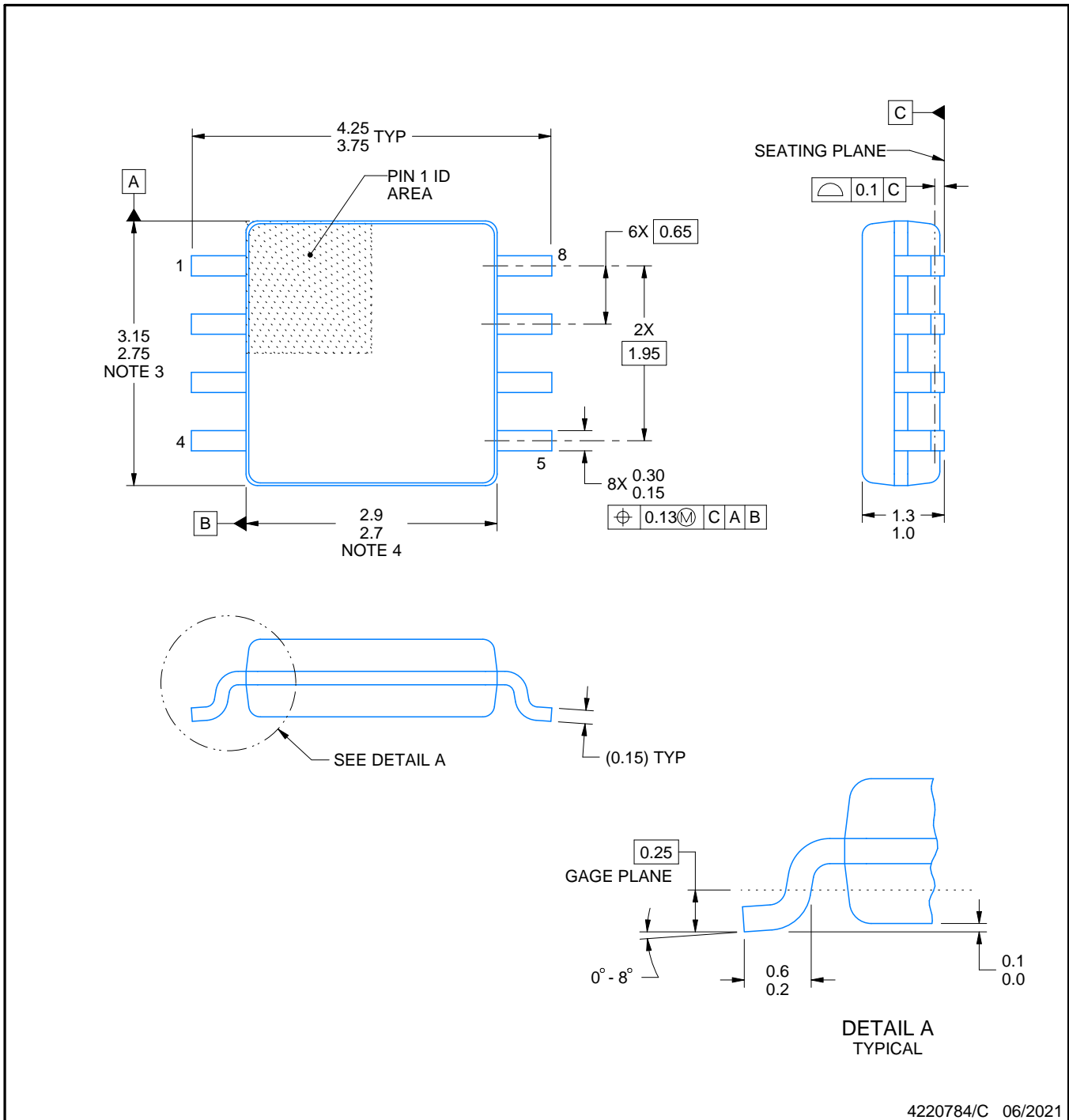
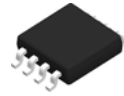


SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 25X

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.



4220784/C 06/2021

NOTES:

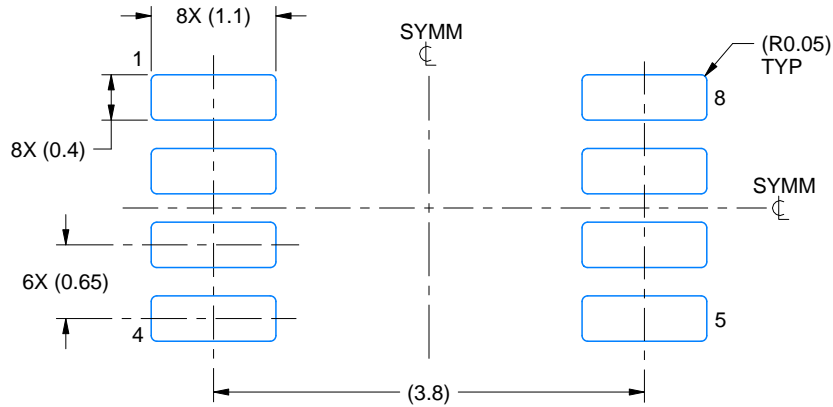
- All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
- This drawing is subject to change without notice.
- This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs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

EXAMPLE BOARD LAYOUT

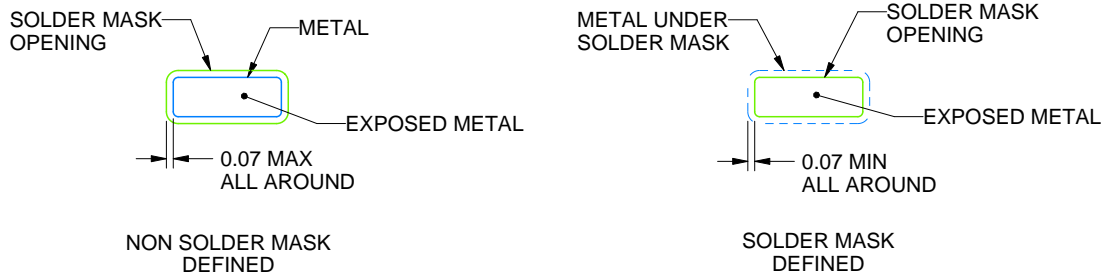
DCT0008A

SSOP - 1.3 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X



SOLDER MASK DETAILS

4220784/C 06/2021

NOTES: (continued)

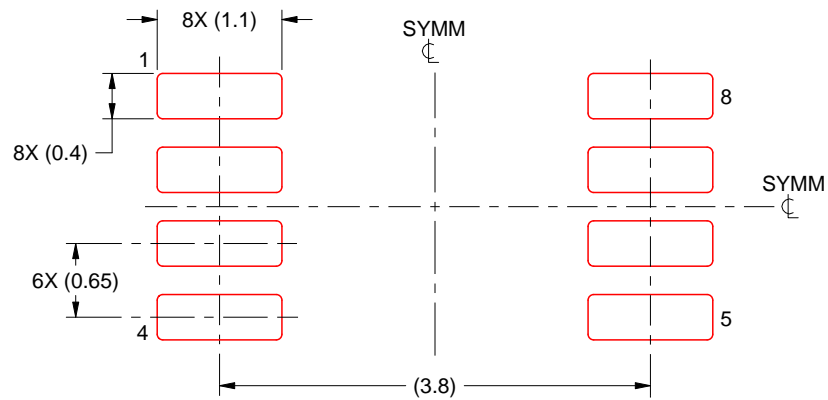
- 5. Publication IPC-7351 may have alternate designs.
- 6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

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



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)

3. 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).

EXAMPLE STENCIL DESIGN

YZP0008

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



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.

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