TEXAS INSTRUMENTS

SN74LVC2G66

SCES325N – JULY 2001 – REVISED AUGUST 2018

SN74LVC2G66 Dual Bilateral Analog Switch

1 Features

- Available in the Texas Instruments NanoFree™ Package
- 1.65-V to 5.5-V V_{CC} Operation
- Inputs Accept Voltages to 5.5 V
- Max t_{pd} of 0.8 ns at 3.3 V
- High On-Off Output Voltage Ratio
- High Degree of Linearity
- High Speed, Typically 0.5 ns (V_{CC} = 3 V, C_L = 50 pF)
- Rail-to-Rail Input/Output
- Low ON-State Resistance, Typically ≠6 Ω (V_{CC} = 4.5 V)
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II

2 Applications

- Wireless Devices
- Audio and Video Signal Routing
- Portable Computing
- Wearable Devices
- Signal Gating, Chopping, Modulation or Demodulation (Modem)
- Signal Multiplexing for Analog-to-Digital and Digital-to-Analog Conversion Systems

3 Description

This dual bilateral analog switch is designed for 1.65-V to 5.5-V V_{CC} operation.

The SN74LVC2G66 device can handle both analog and digital signals. The SN74LVC2G66 device permits signals with amplitudes of up to 5.5 V (peak) to be transmitted in either direction.

NanoFree package technology is a major breakthrough in IC packaging concepts, using the die as the package.

Each switch section has its own enable-input control (C). A high-level voltage applied to C turns on the associated switch section.
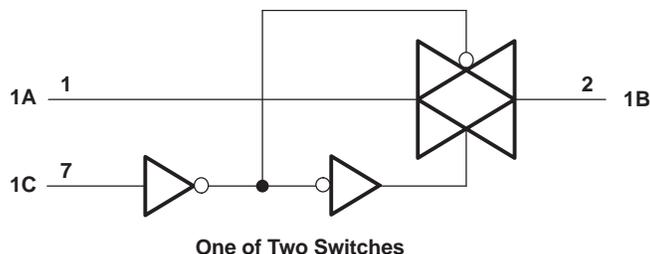
Applications include signal gating, chopping, modulation or demodulation (modem), and signal multiplexing for analog-to-digital and digital-to-analog conversion systems.

Device Information[1]

PART NUMBER	PACKAGE	BODY SIZE (NOM)
SN74LVC2G66DCT	SSOP (8)	2.95 mm × 2.80 mm
SN74LVC2G66DCU	VSSOP (8)	2.30 mm × 2.00 mm
SN74LVC2G66YZP	DSBGA (8)	1.91 mm × 0.91 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

Logic Diagram, Each Switch (Positive Logic)

One of Two Switches

Table of Contents

4 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision M (May 2018) to Revision N **Page**

- Changed the YZP pin configuration 3

Changes from Revision L (September 2015) to Revision M **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

Changes from Revision K (January 2014) to Revision L **Page**

- Added *Applications* section, *Device Information* table, *Pin Configuration and Functions* section, *ESD Ratings* table, *Typical Characteristics* section, *Feature Description* section, *Device Functional Modes*, *Application and Implementation* section, *Power Supply Recommendations* section, *Layout* section, *Device and Documentation Support* section, and *Mechanical, Packaging, and Orderable Information* section 1
- Added *Thermal Information* table 5

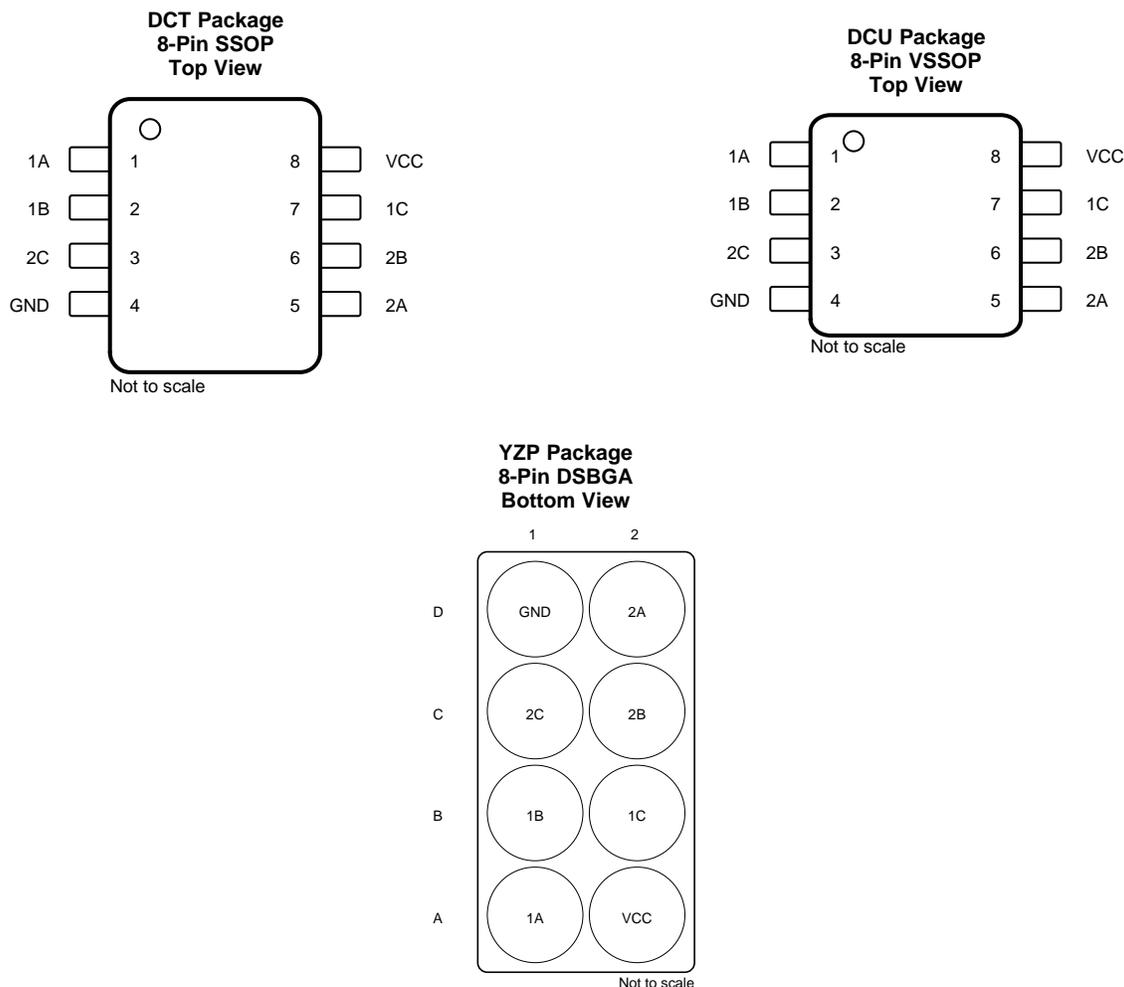**Changes from Revision J (December 2011) to Revision K** **Page**

- Updated document to new TI data sheet format--no specification changes. 1
- Removed *Ordering Information* table. 1

Product Folder Links: *SN74LVC2G66*

5 Pin Configuration and Functions

DCT Package
8-Pin SSOP
Top View

Not to scale

DCU Package
8-Pin VSSOP
Top View

Not to scale

YZP Package
8-Pin DSBGA
Bottom View

Not to scale

See mecahnical drawings for dimensions.

Pin Functions

PIN			I/O	DESCRIPTION
NAME	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
$I_{I/OK}$	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	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

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
$\Delta t/\Delta v$	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.

Product Folder Links: *SN74LVC2G66*

6.4 Thermal Information

THERMAL METRIC[1]		SN74LVC2G66			UNIT
		DCT (SSOP)	DCU (VSSOP)	YZP (DSBGA)	
		8 PINS	8 PINS	8 PINS	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	186.1	204.4	102	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	116.5	77	—	°C/W
$R_{\theta JB}$	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
$R_{\theta JC(bot)}$	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}	ON-state switch resistance	$V_I = V_{CC}$ or GND, $V_C = V_{IH}$ (see Figure 3 and Figure 1)	$I_S = 4$ mA	1.65 V		12.5	30	Ω
			$I_S = 8$ mA	2.3 V		9	20	
			$I_S = 24$ mA	3 V		7.5	15	
			$I_S = 32$ mA	4.5 V		6	10	
$r_{on(p)}$	Peak ON-state resistance	$V_I = V_{CC}$ to GND, $V_C = V_{IH}$ (see Figure 3 and Figure 1)	$I_S = 4$ mA	1.65 V		85	120[1]	Ω
			$I_S = 8$ mA	2.3 V		22	30[1]	
			$I_S = 24$ mA	3 V		12	20	
			$I_S = 32$ mA	4.5 V		7.5	15	
Δr_{on}	Difference of ON-state resistance between switches	$V_I = V_{CC}$ to GND, $V_C = V_{IH}$ (see Figure 3 and Figure 1)	$I_S = 4$ mA	1.65 V			7	Ω
			$I_S = 8$ mA	2.3 V			5	
			$I_S = 24$ mA	3 V			3	
			$I_S = 32$ mA	4.5 V			2	
$I_{S(off)}$	OFF-state switch leakage current	$V_I = V_{CC}$ 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
							±0.1[1]	
$I_{S(on)}$	ON-state switch leakage current	$V_I = V_{CC}$ or GND, $V_C = V_{IH}$, $V_O = $ Open (see Figure 5)		5.5 V			±1	μA
							±0.1[1]	
I_I	Control input current	$V_C = V_{CC}$ or GND		5.5 V			±1	μA
							±0.1[1]	
I_{CC}	Supply current	$V_C = V_{CC}$ or GND		5.5 V			10	μA
							1[1]	
ΔI_{CC}	Supply-current change	$V_C = V_{CC} - 0.6$ V		5.5 V			500	μA
C_{ic}	Control input capacitance			5 V		3.5		pF
$C_{io(off)}$	Switch input / output capacitance			5 V		6		pF
$C_{io(on)}$	Switch input / output capacitance			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 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		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°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 pF, R_L = 600 Ω, f_{in} = sine wave (see Figure 6)	1.65 V	35	MHz
				2.3 V	120	
				3 V	175	
				4.5 V	195	
			C_L = 5 pF, R_L = 50 Ω, f_{in} = 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 pF, R_L = 600 Ω, f_{in} = 1 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 pF, R_L = 50 Ω, f_{in} = 1 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 pF, R_L = 600 Ω, f_{in} = 1 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 pF, R_L = 600 Ω, f_{in} = 1 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 pF, R_L = 50 Ω, f_{in} = 1 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

$T_A = 25°C$

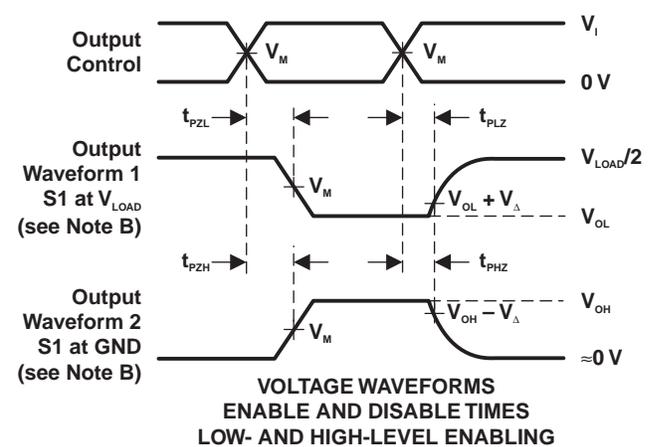| PARAMETER		TEST CONDITIONS	V_{CC} = 1.8 V TYP	V_{CC} = 2.5 V TYP	V_{CC} = 3.3 V TYP	V_{CC} = 5 V TYP	UNIT
C_{pd}	Power dissipation capacitance	f = 10 MHz	8	9	9.5	11	pF

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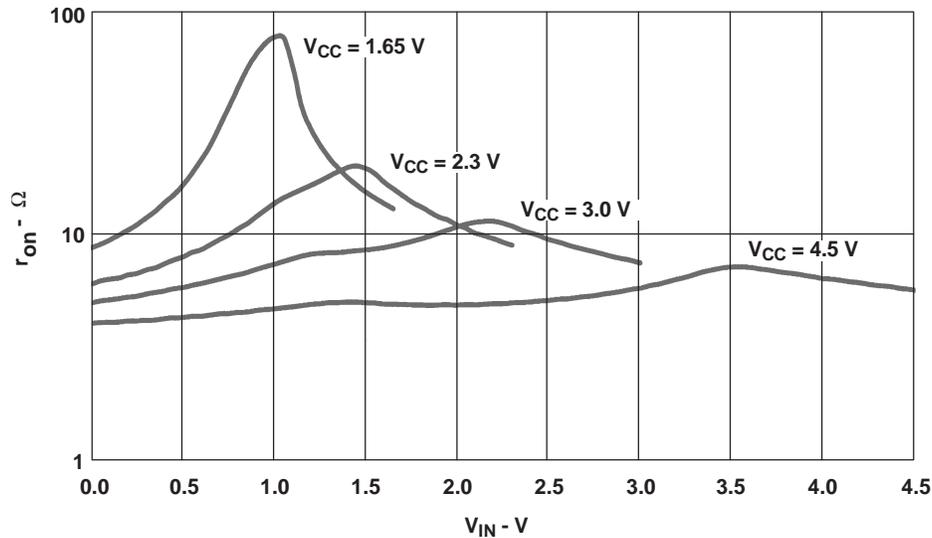
Figure 1. Typical r_{on} as a Function of Input Voltage (V_I) for V_I = 0 to V_{CC}

Product Folder Links: SN74LVC2G66

7 Parameter Measurement Information

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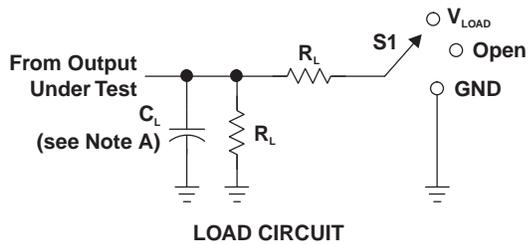
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_I	t_r/t_f					
1.8 V ± 0.15 V	V_{CC}	≤2 ns	$V_{CC}/2$	2 × V_{CC}	30 pF	1 kΩ	0.15 V
2.5 V ± 0.2 V	V_{CC}	≤2 ns	$V_{CC}/2$	2 × V_{CC}	30 pF	500 Ω	0.15 V
3.3 V ± 0.3 V	V_{CC}	≤2.5 ns	$V_{CC}/2$	2 × V_{CC}	50 pF	500 Ω	0.3 V
5 V ± 0.5 V	V_{CC}	≤2.5 ns	$V_{CC}/2$	2 × V_{CC}	50 pF	500 Ω	0.3 V

VOLTAGE WAVEFORMS
PULSE DURATION

VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES

VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS

VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING
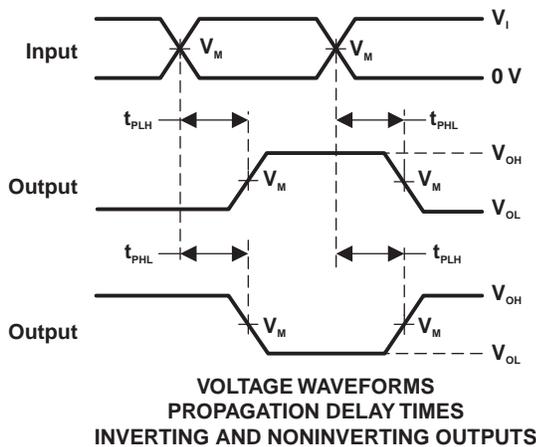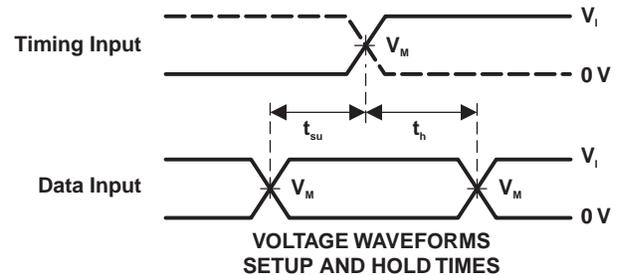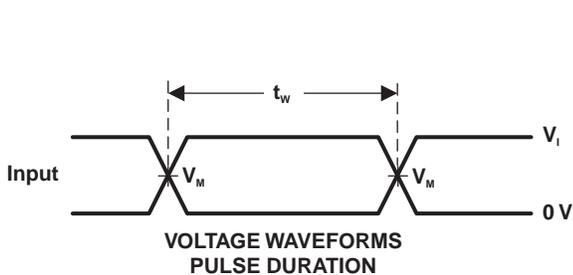
NOTES: A. C_L includes probe and jig capacitance.
   B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.
      Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
   C. All input pulses are supplied by generators have the following characteristics: PRR ≤ 10 MHz, $Z_O = 50$ Ω.
   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

Product Folder Links: *SN74LVC2G66*

Parameter Measurement Information (continued)

$$r_{on} = \frac{V_I - V_O}{I_S} \, \Omega$$
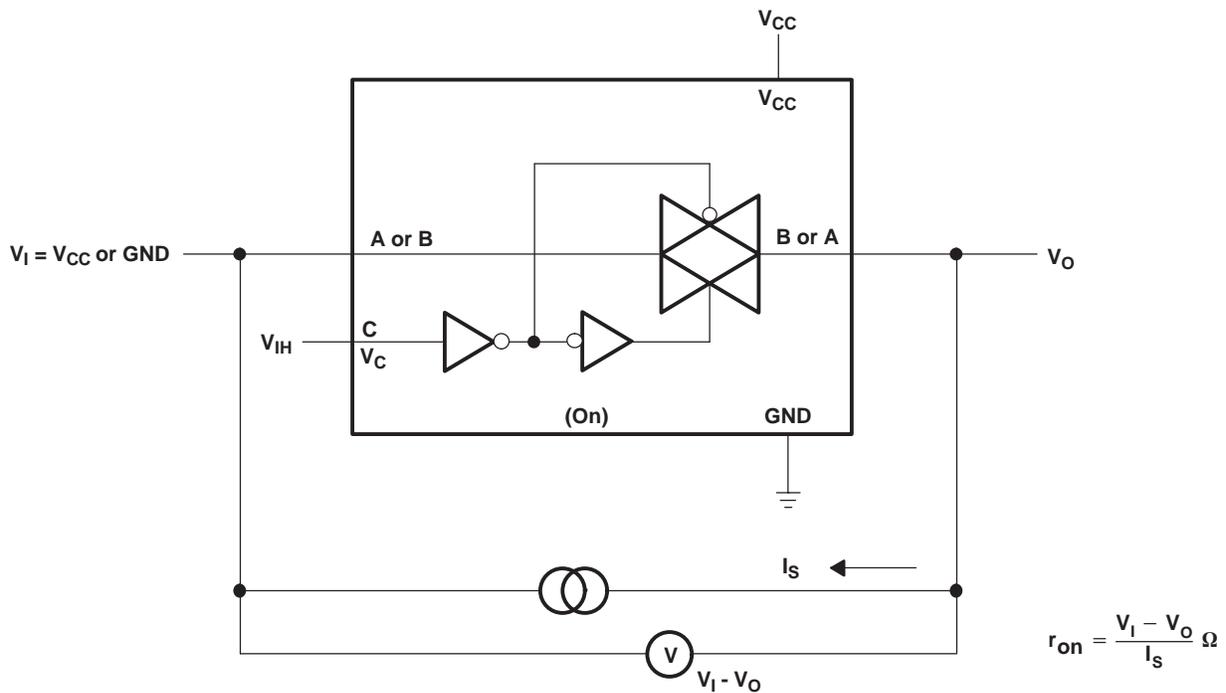
Figure 3. ON-State Resistance Test Circuit

Condition 1: $V_I = GND, V_O = V_{CC}$
Condition 2: $V_I = V_{CC}, V_O = GND$
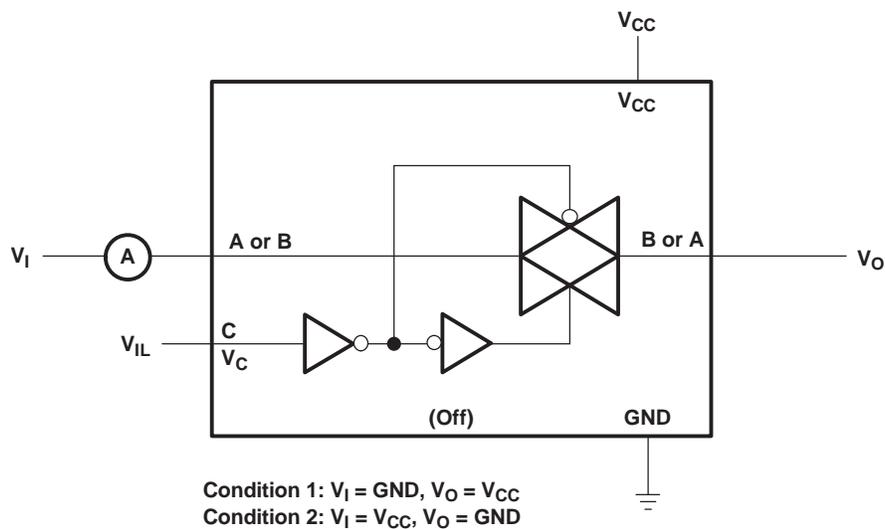
Figure 4. OFF-State Switch Leakage-Current Test Circuit

Product Folder Links: *SN74LVC2G66*

Parameter Measurement Information (continued)
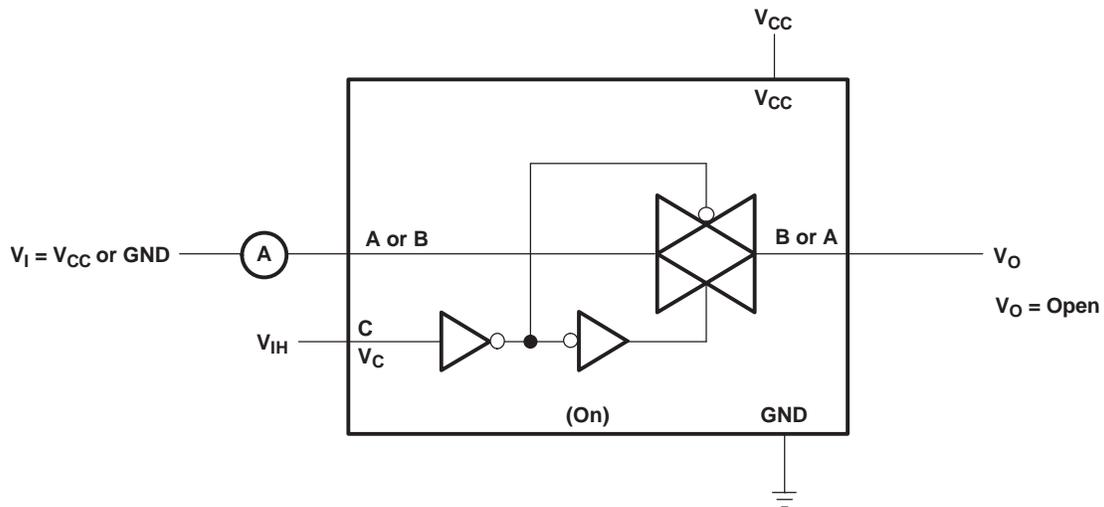
Figure 5. ON-State Leakage-Current Test Circuit

R$_L$/C$_L$: 600 Ω/50 pF
R$_L$/C$_L$: 50 Ω/5 pF
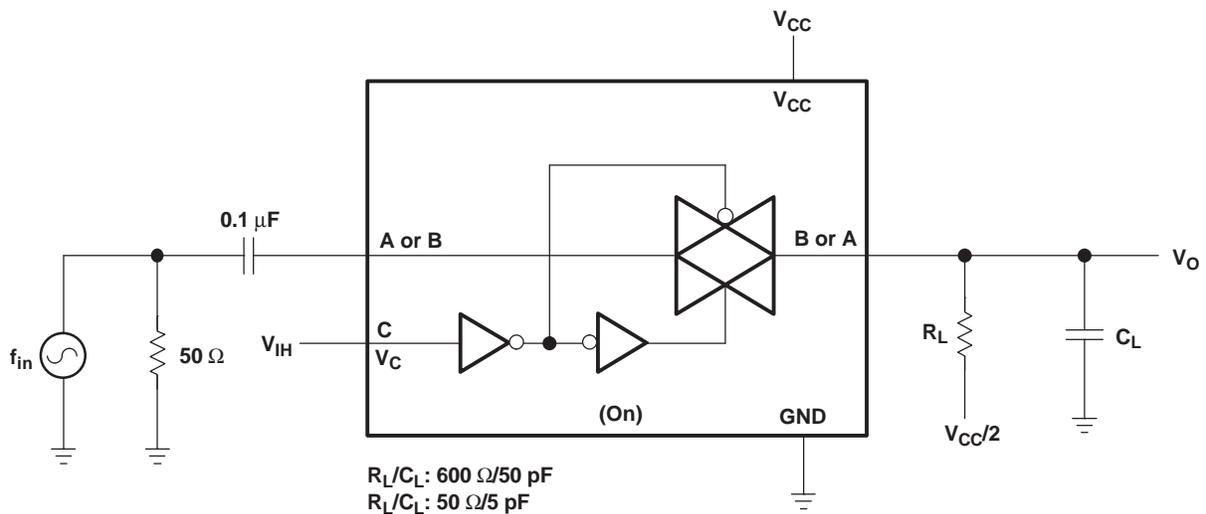
Figure 6. Frequency Response (Switch On)

Parameter Measurement Information (continued)
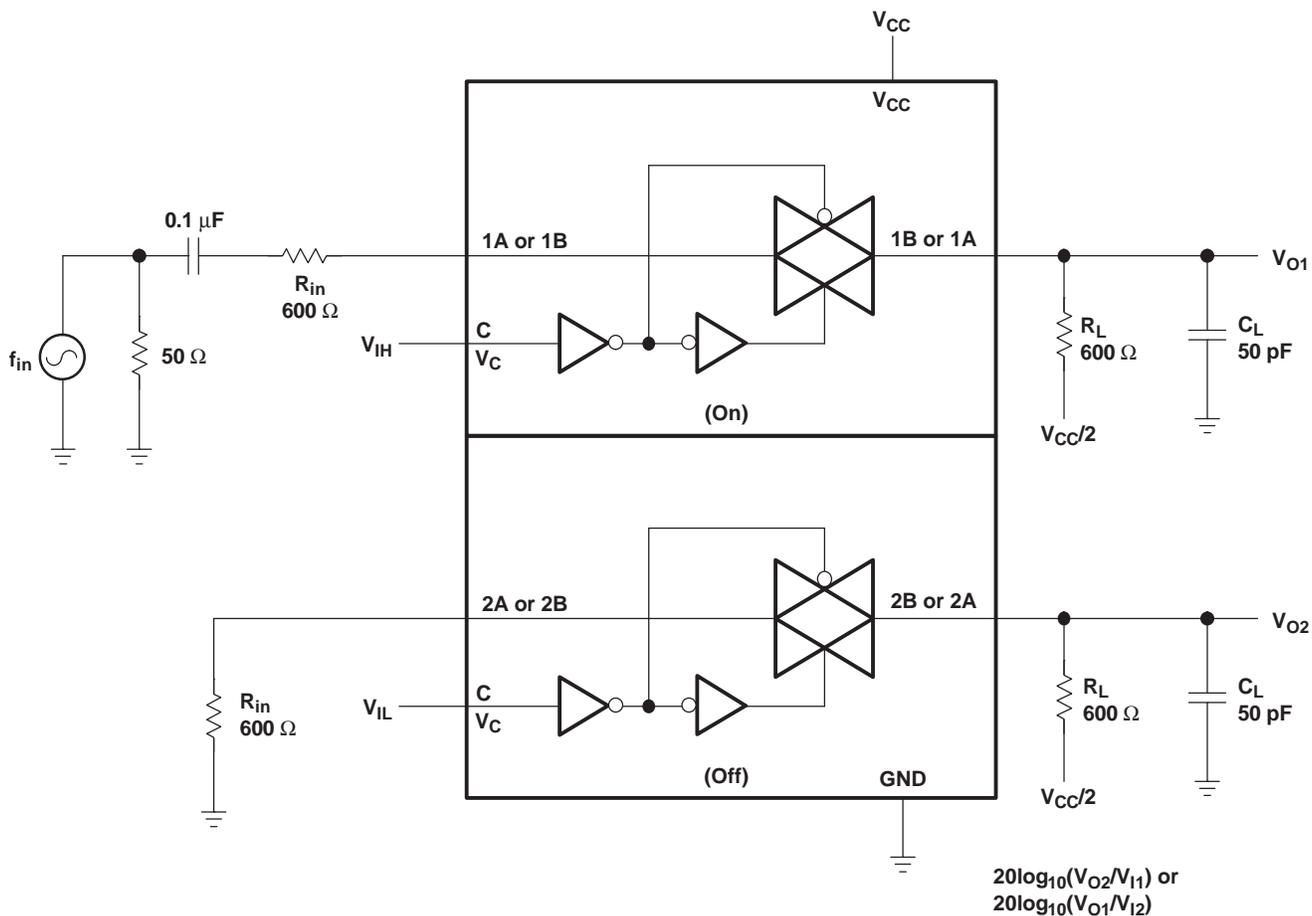
Figure 7. Crosstalk (Between Switches)
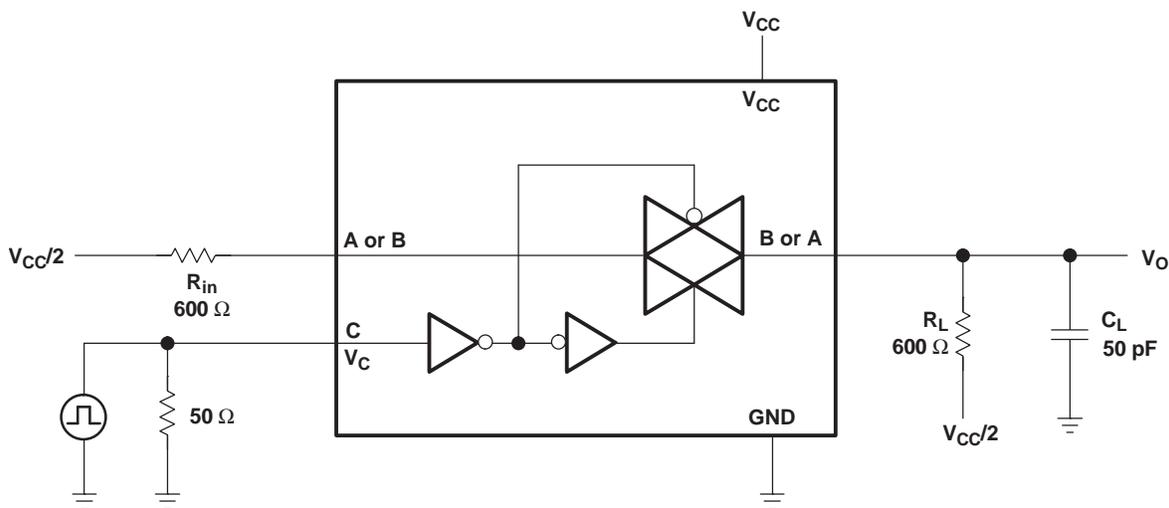
Figure 8. Crosstalk (Control Input, Switch Output)

Product Folder Links: *SN74LVC2G66*

Parameter Measurement Information (continued)

R_L/C_L: 600 Ω/50 pF
R_L/C_L: 50 Ω/5 pF
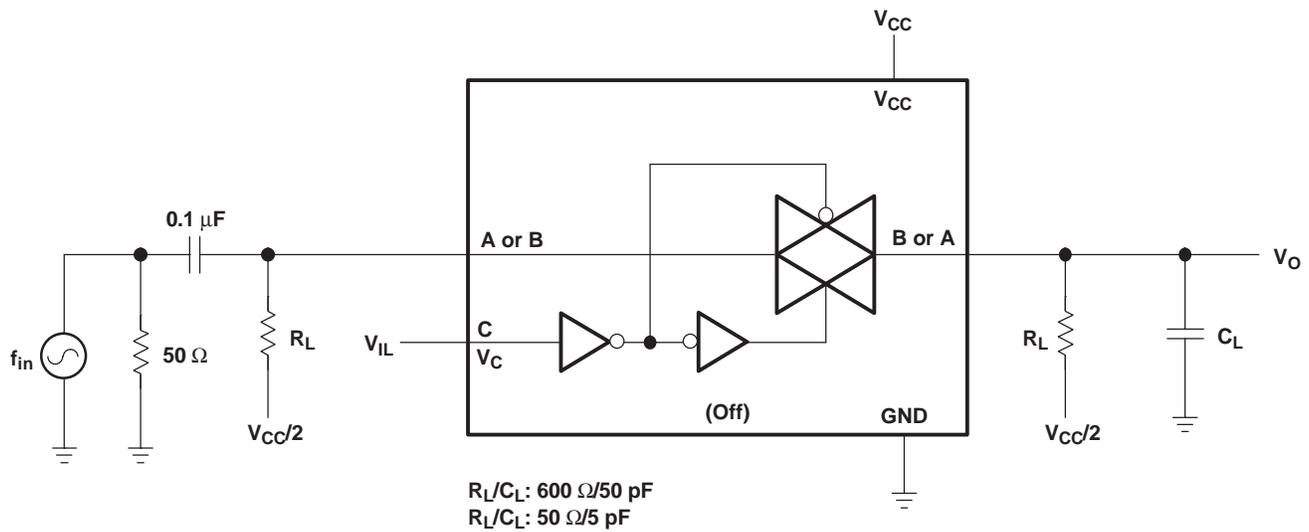
Figure 9. Feedthrough (Switch Off)

V_{CC} = 1.65 V, V_I = 1.4 V_{P-P}
V_{CC} = 2.3 V, V_I = 2 V_{P-P}
V_{CC} = 3 V, V_I = 2.5 V_{P-P}
V_{CC} = 4.5 V, V_I = 4 V_{P-P}
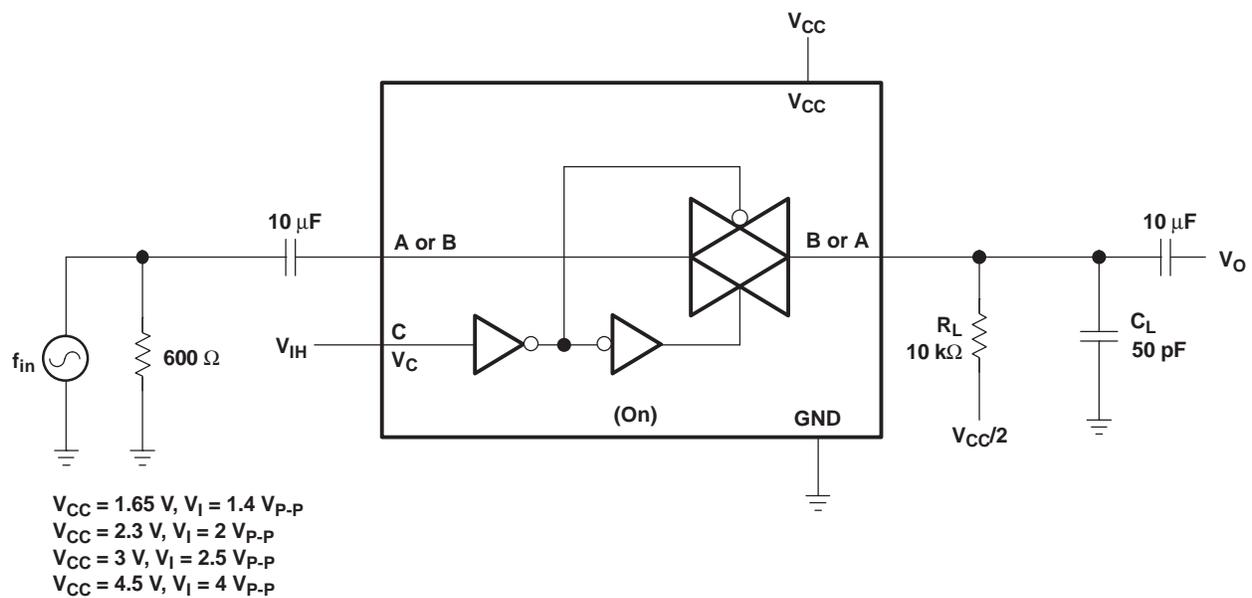
Figure 10. Sine-Wave Distortion

Product Folder Links: *SN74LVC2G66*

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.
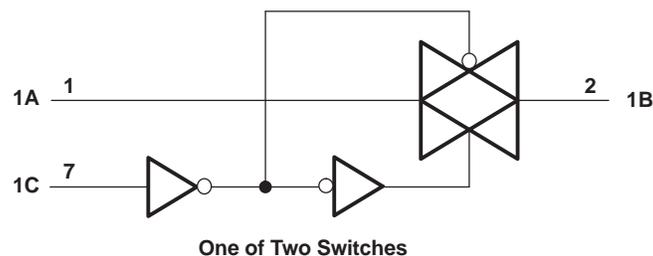
8.2 Functional Block Diagram

One of Two Switches

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

Copyright © 2016, Texas Instruments Incorporated
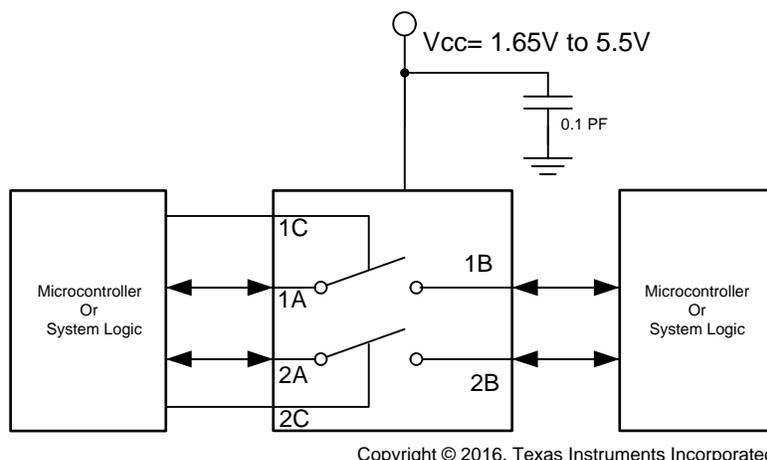
Figure 11. Typical Application Schematic

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
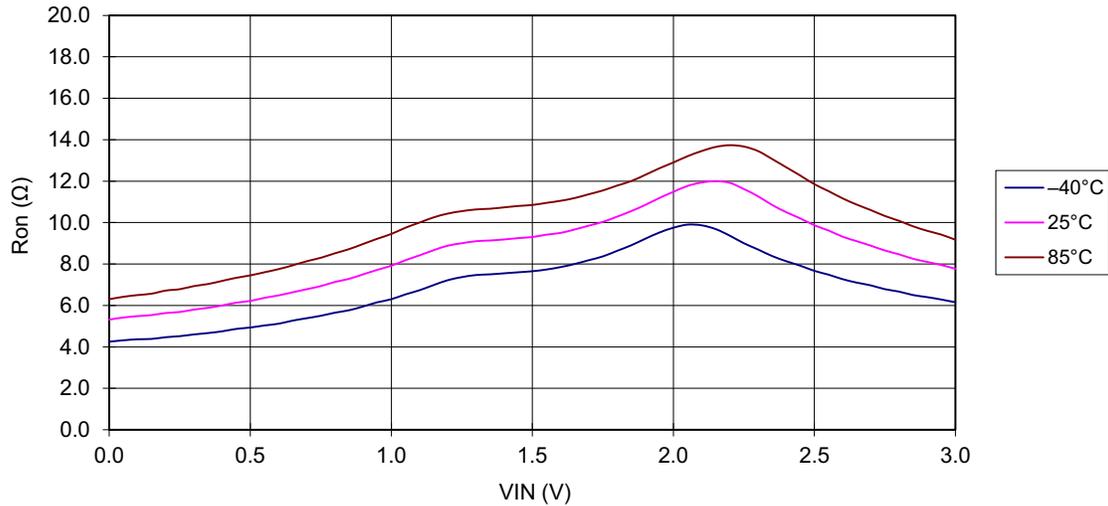
Pin: A–B, V_{CC} = 3 V, I_S = 24 mA

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.
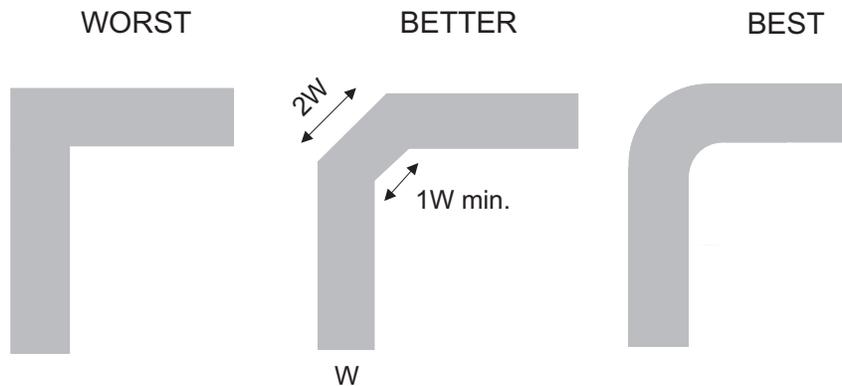
11.2 Layout Example

WORST   BETTER   BEST

Figure 13. Trace Example

Product Folder Links: *SN74LVC2G66*

12 Device and Documentation Support

12.1 Community Resources

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.

TI E2E™ Online Community *TI's Engineer-to-Engineer (E2E) Community.* Created to foster collaboration among engineers. At e2e.ti.com, you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support *TI's Design Support* Quickly find helpful E2E forums along with design support tools and contact information for technical support.

12.2 Trademarks

NanoFree, E2E are trademarks of Texas Instruments.
All other trademarks are the property of their respective owners.

12.3 Electrostatic Discharge Caution

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

12.4 Glossary

SLYZ022 — *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.

PACKAGE MATERIALS INFORMATION

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
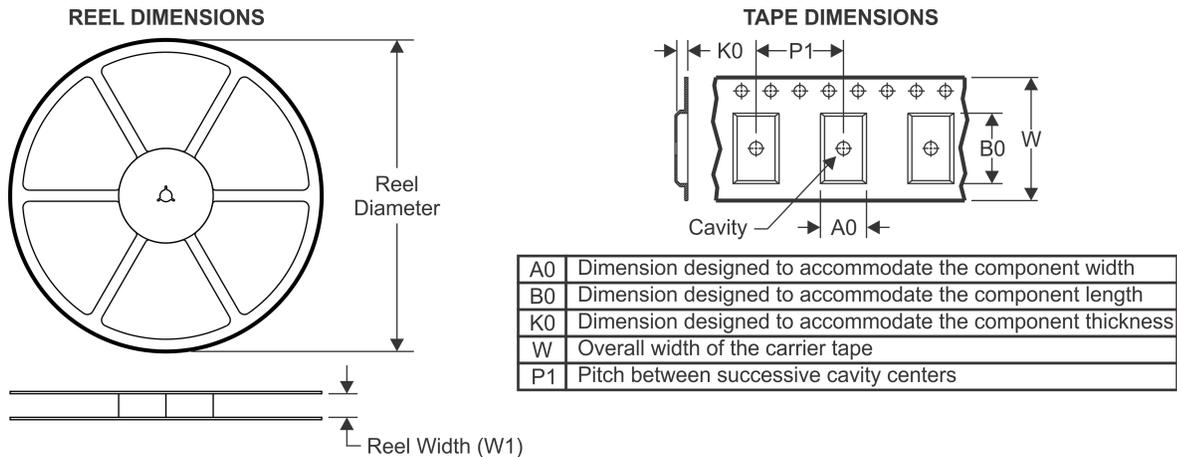
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

*All dimensions are nominal

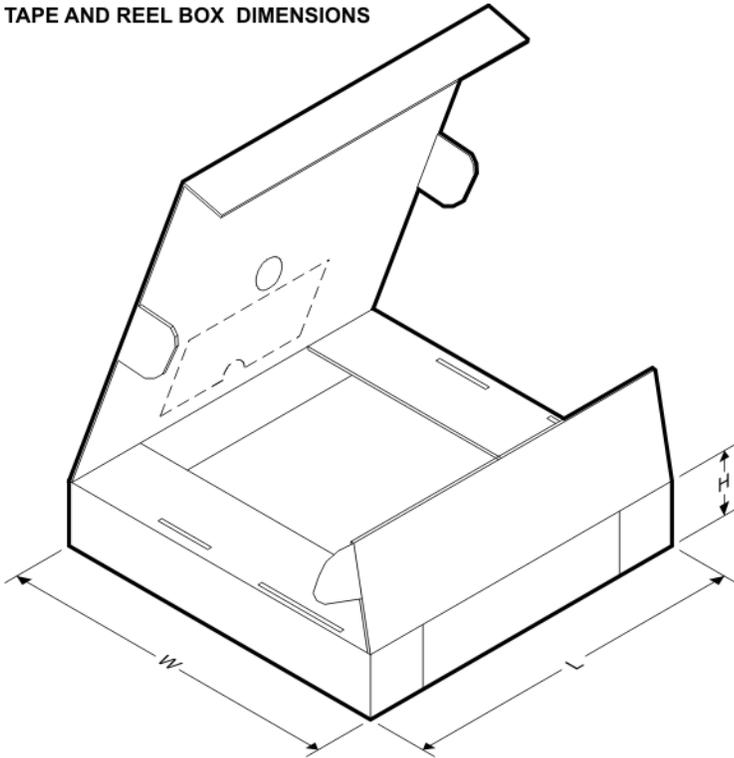| Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC2G66DCTR	SM8	DCT	8	3000	180.0	13.0	3.35	4.5	1.55	4.0	12.0	Q3
SN74LVC2G66DCUR	VSSOP	DCU	8	3000	180.0	8.4	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC2G66DCUR	VSSOP	DCU	8	3000	178.0	9.5	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC2G66DCUR	VSSOP	DCU	8	3000	180.0	9.0	2.05	3.3	1.0	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

PACKAGE MATERIALS INFORMATION

TAPE AND REEL BOX DIMENSIONS

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC2G66DCTR	SM8	DCT	8	3000	182.0	182.0	20.0
SN74LVC2G66DCUR	VSSOP	DCU	8	3000	202.0	201.0	28.0
SN74LVC2G66DCUR	VSSOP	DCU	8	3000	202.0	201.0	28.0
SN74LVC2G66DCUR	VSSOP	DCU	8	3000	182.0	182.0	20.0
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

DCU (R−PDSO−G8)   PLASTIC SMALL−OUTLINE PACKAGE (DIE DOWN)
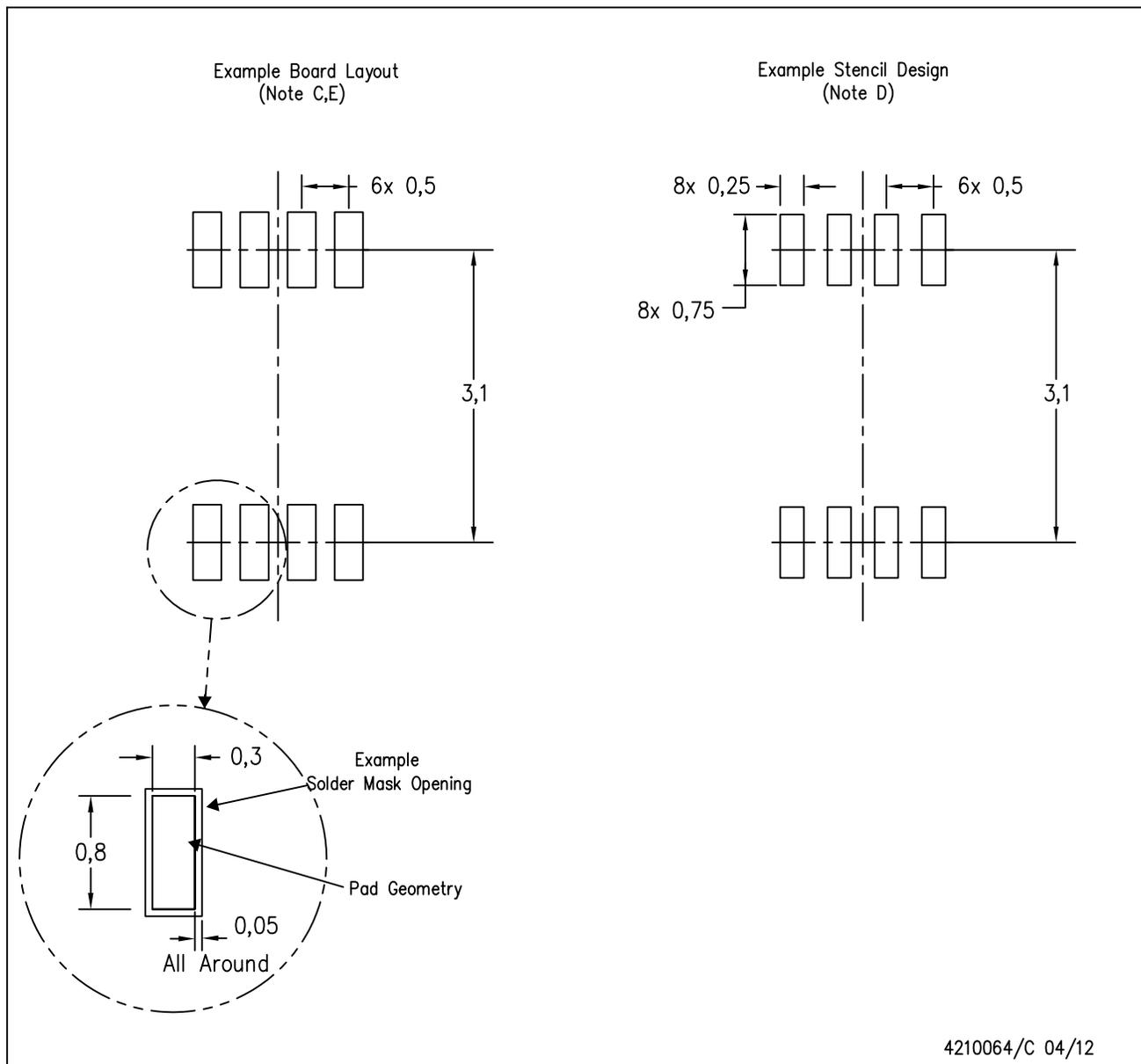
4200503/F 07/05

NOTES: A. All linear dimensions are in millimeters.
           B. This drawing is subject to change without notice.
           C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
           D. Falls within JEDEC MO−187 variation CA.

DCU (S—PDSO—G8)   PLASTIC SMALL OUTLINE PACKAGE (DIE DOWN)

Example Board Layout
(Note C,E)

6x 0,5

3,1

0,3

0,8

Example
Solder Mask Opening

Pad Geometry

0,05

All Around

Example Stencil Design
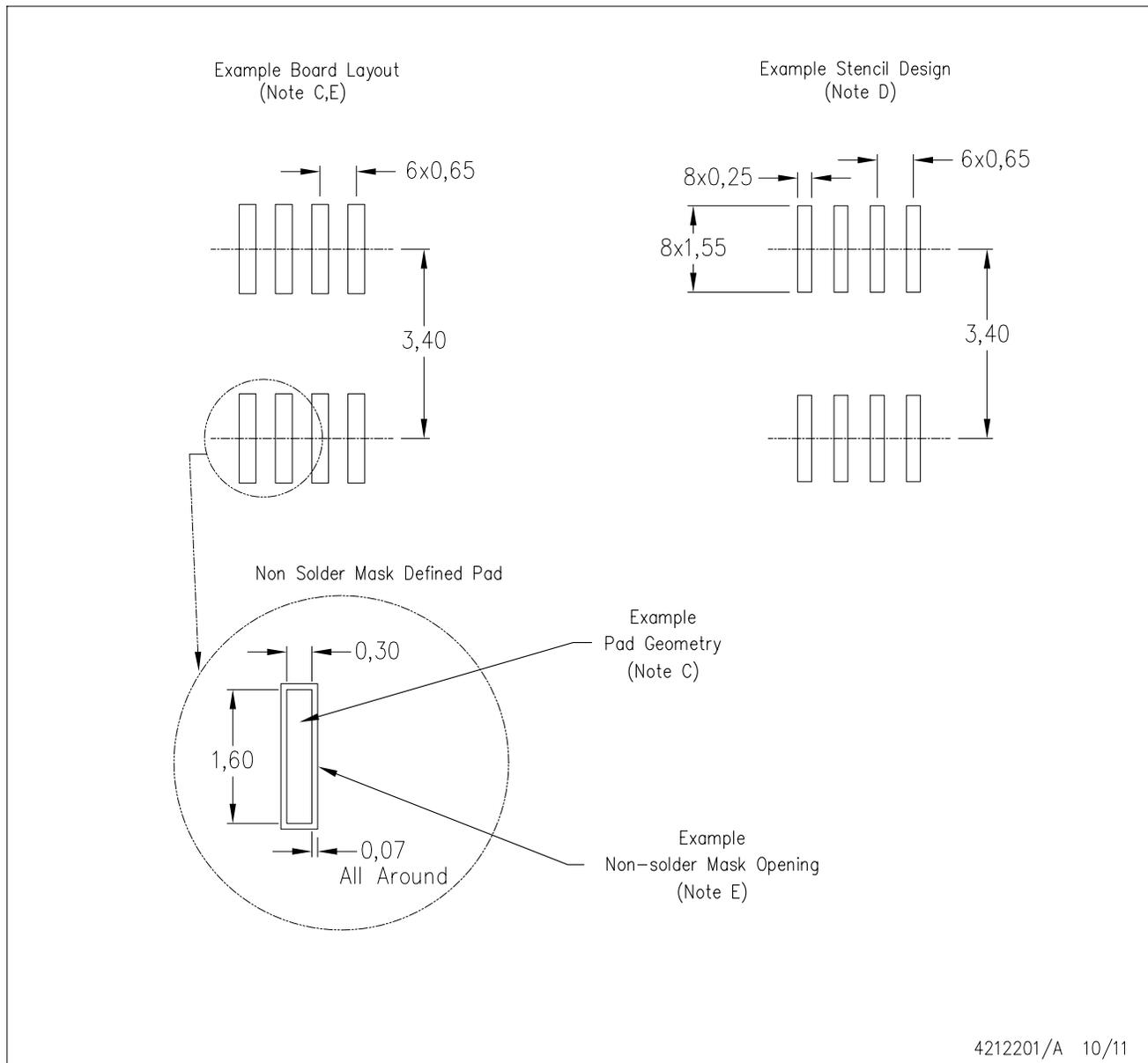(Note D)

8x 0,25

8x 0,75

6x 0,5

3,1

4210064/C 04/12

NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Publication IPC—7351 is recommended for alternate designs.
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should
   contact their board assembly site for stencil design recommendations. Refer to IPC—7525 for other stencil recommendations.
E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

TEXAS
INSTRUMENTS
www.ti.com

DCT (R-PDSO-G8)   **PLASTIC SMALL-OUTLINE PACKAGE**

4188781/C 09/02

NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion
D. Falls within JEDEC MO-187 variation DA.

DCT (R–PDSO–G8)   PLASTIC SMALL OUTLINE

Example Board Layout
(Note C,E)

Example Stencil Design
(Note D)

6x0,65

8x0,25

6x0,65

8x1,55

3,40

3,40

Non Solder Mask Defined Pad

0,30

1,60

0,07
All Around

Example
Pad Geometry
(Note C)

Example
Non–solder Mask Opening
(Note E)

4212201/A 10/11

NOTES: A. All linear dimensions are in millimeters.
        B. This drawing is subject to change without notice.
        C. Publication IPC–7351 is recommended for alternate designs.
        D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers
            should contact their board assembly site for stencil design recommendations. Refer to IPC–7525.
        E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.
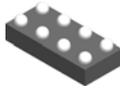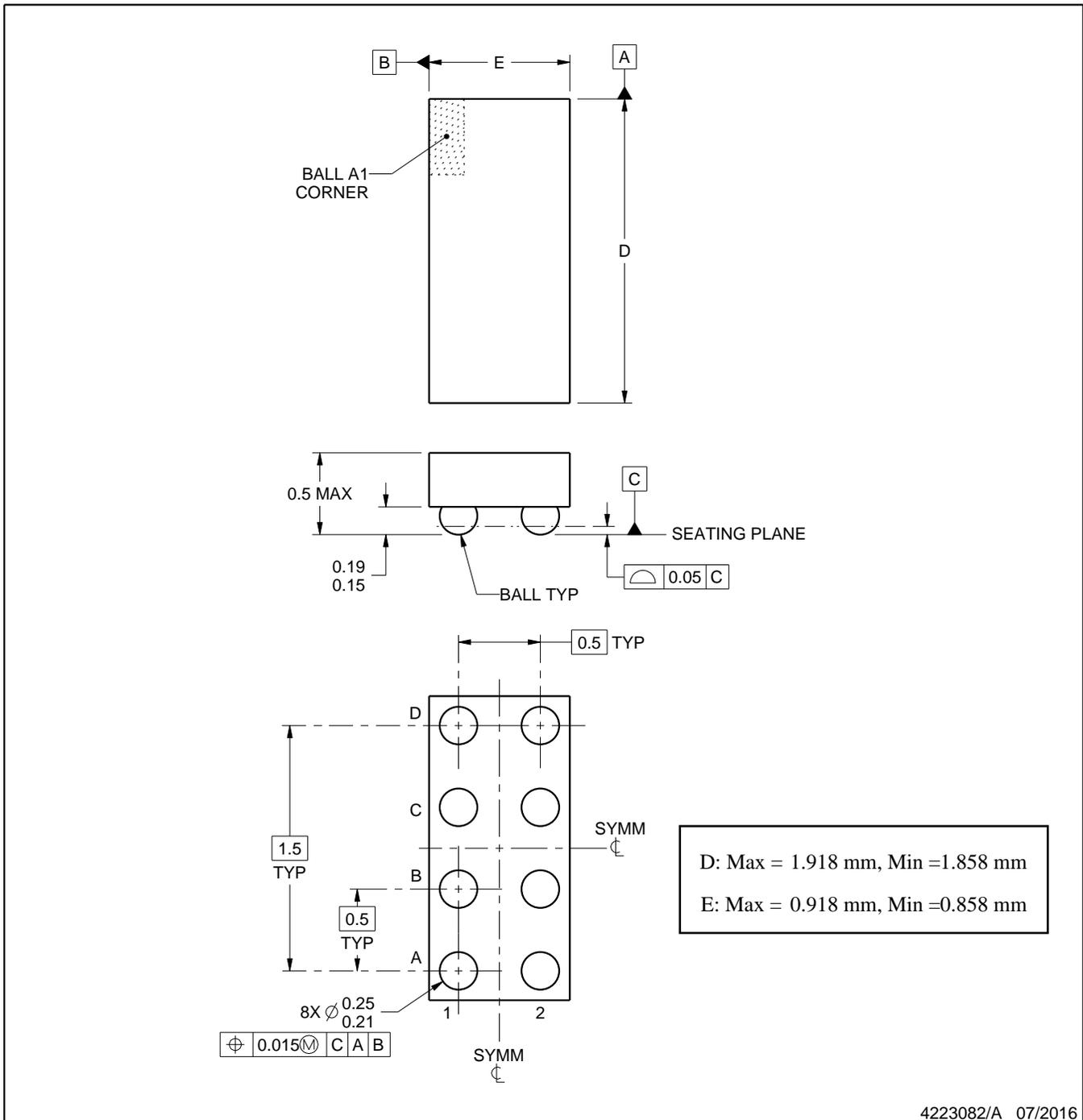
B ◄── E ──► A

BALL A1
CORNER

D

0.5 MAX

C

SEATING PLANE

0.19
0.15

BALL TYP

⌒ 0.05 C

0.5 TYP

D

C

SYMM
₵

1.5
TYP

B

0.5
TYP

A

D: Max = 1.918 mm, Min =1.858 mm

E: Max = 0.918 mm, Min =0.858 mm

1   2

8X ⌀ 0.25
0.21

⊕ 0.015 Ⓜ C A B

SYMM
₵
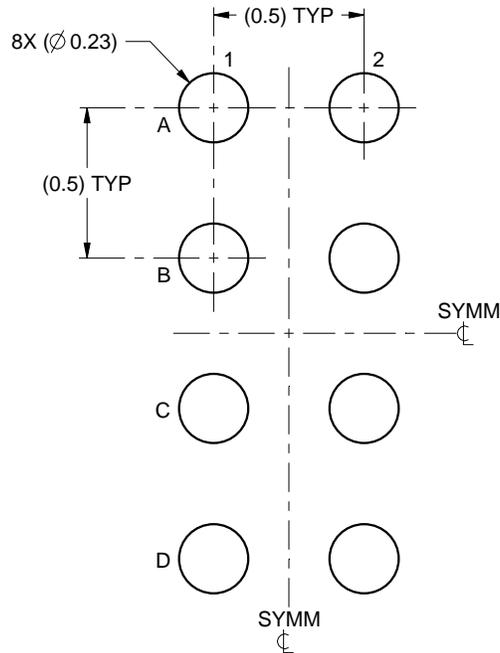
4223082/A   07/2016

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.

8X (∅ 0.23)

(0.5) TYP
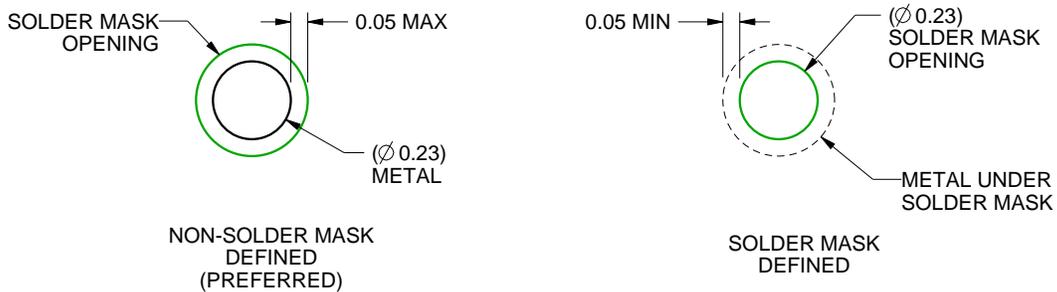
(0.5) TYP

1   2

A

B

SYMM ₵

C

D

SYMM ₵

LAND PATTERN EXAMPLE
SCALE:40X

SOLDER MASK
OPENING

0.05 MAX

(∅ 0.23)
METAL

**NON-SOLDER MASK
DEFINED
(PREFERRED)**

0.05 MIN

(∅ 0.23)
SOLDER MASK
OPENING

METAL UNDER
SOLDER MASK

**SOLDER MASK
DEFINED**

SOLDER MASK DETAILS
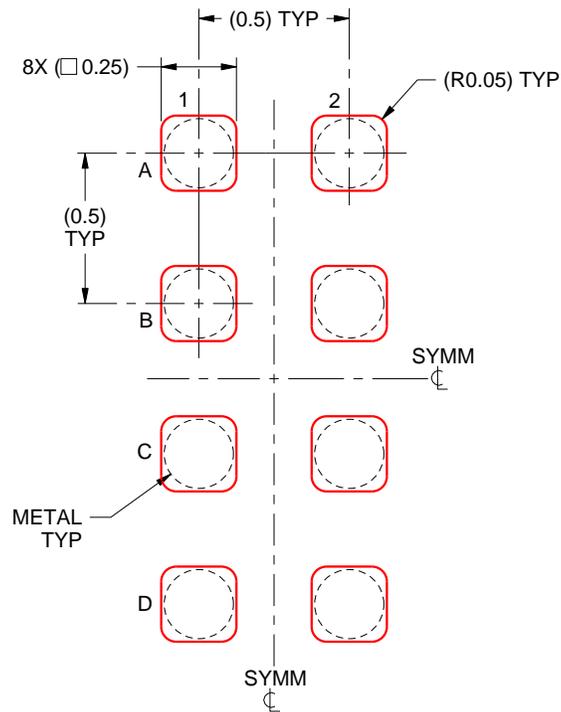NOT TO SCALE

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).

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.

IMPORTANT NOTICE

Texas Instruments Incorporated (TI) reserves the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete.

TI's published terms of sale for semiconductor products (http://www.ti.com/sc/docs/stdterms.htm) apply to the sale of packaged integrated circuit products that TI has qualified and released to market. Additional terms may apply to the use or sale of other types of TI products and services.

Reproduction of significant portions of TI information in TI data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such reproduced documentation. Information of third parties may be subject to additional restrictions. Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyers and others who are developing systems that incorporate TI products (collectively, "Designers") understand and agree that Designers remain responsible for using their independent analysis, evaluation and judgment in designing their applications and that Designers have full and exclusive responsibility to assure the safety of Designers' applications and compliance of their applications (and of all TI products used in or for Designers' applications) with all applicable regulations, laws and other applicable requirements. Designer represents that, with respect to their applications, Designer has all the necessary expertise to create and implement safeguards that (1) anticipate dangerous consequences of failures, (2) monitor failures and their consequences, and (3) lessen the likelihood of failures that might cause harm and take appropriate actions. Designer agrees that prior to using or distributing any applications that include TI products, Designer will thoroughly test such applications and the functionality of such TI products as used in such applications.

TI's provision of technical, application or other design advice, quality characterization, reliability data or other services or information, including, but not limited to, reference designs and materials relating to evaluation modules, (collectively, "TI Resources") are intended to assist designers who are developing applications that incorporate TI products; by downloading, accessing or using TI Resources in any way, Designer (individually or, if Designer is acting on behalf of a company, Designer's company) agrees to use any particular TI Resource solely for this purpose and subject to the terms of this Notice.

TI's provision of TI Resources does not expand or otherwise alter TI's applicable published warranties or warranty disclaimers for TI products, and no additional obligations or liabilities arise from TI providing such TI Resources. TI reserves the right to make corrections, enhancements, improvements and other changes to its TI Resources. TI has not conducted any testing other than that specifically described in the published documentation for a particular TI Resource.

Designer is authorized to use, copy and modify any individual TI Resource only in connection with the development of applications that include the TI product(s) identified in such TI Resource. NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT OF TI OR ANY THIRD PARTY IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information regarding or referencing third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of TI Resources may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

TI RESOURCES ARE PROVIDED "AS IS" AND WITH ALL FAULTS. TI DISCLAIMS ALL OTHER WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, REGARDING RESOURCES OR USE THEREOF, INCLUDING BUT NOT LIMITED TO ACCURACY OR COMPLETENESS, TITLE, ANY EPIDEMIC FAILURE WARRANTY AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS. TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY DESIGNER AGAINST ANY CLAIM, INCLUDING BUT NOT LIMITED TO ANY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON ANY COMBINATION OF PRODUCTS EVEN IF DESCRIBED IN TI RESOURCES OR OTHERWISE. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, DIRECT, SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF TI RESOURCES OR USE THEREOF, AND REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Unless TI has explicitly designated an individual product as meeting the requirements of a particular industry standard (e.g., ISO/TS 16949 and ISO 26262), TI is not responsible for any failure to meet such industry standard requirements.

Where TI specifically promotes products as facilitating functional safety or as compliant with industry functional safety standards, such products are intended to help enable customers to design and create their own applications that meet applicable functional safety standards and requirements. Using products in an application does not by itself establish any safety features in the application. Designers must ensure compliance with safety-related requirements and standards applicable to their applications. Designer may not use any TI products in life-critical medical equipment unless authorized officers of the parties have executed a special contract specifically governing such use. Life-critical medical equipment is medical equipment where failure of such equipment would cause serious bodily injury or death (e.g., life support, pacemakers, defibrillators, heart pumps, neurostimulators, and implantables). Such equipment includes, without limitation, all medical devices identified by the U.S. Food and Drug Administration as Class III devices and equivalent classifications outside the U.S.

TI may expressly designate certain products as completing a particular qualification (e.g., Q100, Military Grade, or Enhanced Product). Designers agree that it has the necessary expertise to select the product with the appropriate qualification designation for their applications and that proper product selection is at Designers' own risk. Designers are solely responsible for compliance with all legal and regulatory requirements in connection with such selection.

Designer will fully indemnify TI and its representatives against any damages, costs, losses, and/or liabilities arising out of Designer's non-compliance with the terms and provisions of this Notice.