

SN74LVC1G66 Single 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)
- Low ON-State Resistance, Typically $\pm 5.5 \Omega$ ($V_{CC} = 4.5$ V)
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)

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

The SN74LVC1G66 device can handle analog and digital signals. The device permits bidirectional transmission of signals with amplitudes of up to 5.5 V (peak).

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

Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
SN74LVC1G66DBV	SOT-23 (5)	2.90 mm x 1.60 mm
SN74LVC1G66DCK	SC70 (5)	2.00 mm x 1.25 mm
SN74LVC1G66DRL	SOT (5)	1.60 mm x 1.20 mm
SN74LVC1G66DRY	SON (6)	1.45 mm x 1.00 mm
SN74LVC1G66YZP	DSBGA (5)	1.39 mm x 0.89 mm
SN74LVC1G66DSF	SON (6)	1.00 mm x 1.00 mm

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

Logic Diagram (Positive Logic)

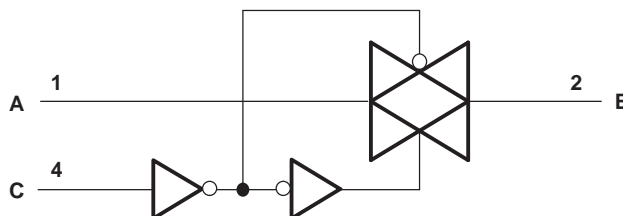


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4 Revision History

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

Changes from Revision P (March 2016) to Revision Q Page

- Changed the YZP package pin out graphic..... **4**

Changes from Revision O (March 2015) to Revision P Page

- Added Junction temperature spec to *Absolute Maximum Ratings* table **5**
- Added "Control" to "Input transition rise and fall time" in *Recommended Operating Conditions* table **5**

Changes from Revision N (December 2012) to Revision O Page

- Added *Pin Configuration and Functions* section, *ESD Ratings* table, *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**
- Removed *Ordering Information* table **1**
- Added *Device Information* table **1**

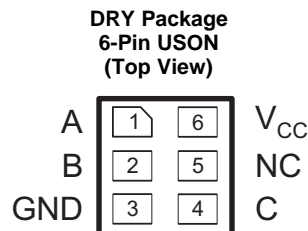
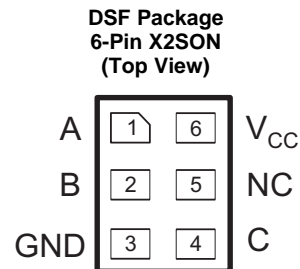
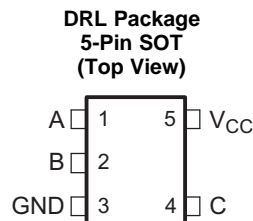
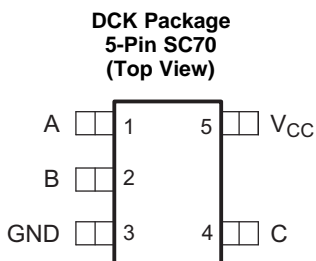
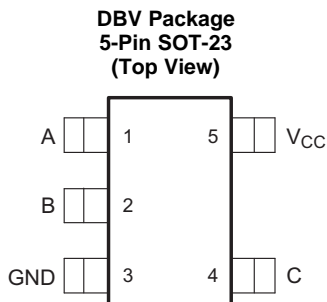
Changes from Revision M (January 2012) to Revision N Page

- Added jumbo reel to *Ordering Information* table **1**

Changes from Revision L (January 2007) to Revision M Page

- Added DSF and DRY package to pin out graphic..... **3**

5 Pin Configuration and Functions

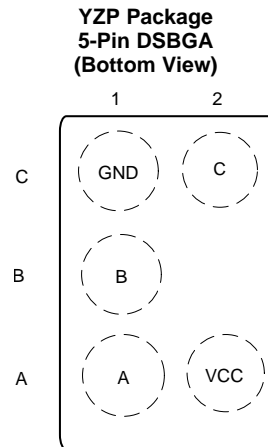


Pin Functions

PIN			I/O	DESCRIPTION
NAME	SOT NO.	USON, X2SON NO.		
A	1	1	I/O	Bidirectional signal to be switched
B	2	2	I/O	Bidirectional signal to be switched
C	4	4	I	Controls the switch (L = OFF, H = ON)
GND	3	3	—	Ground pin
NC	—	5	—	Do not connect
V _{CC}	5	6	—	Power pin

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Pin Functions

PIN		I/O	DESCRIPTION
NAME	DSBGA NO.		
A	A1	I/O	Bidirectional signal to be switched
B	B1	I/O	Bidirectional signal to be switched
C	C2	I	Controls the switch (L = OFF, H = ON)
GND	C1	—	Ground pin
V _{CC}	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 _{I/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
T _j	Junction Temperature		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 ⁽¹⁾	+2000
		Charged-device model (CDM), per JEDEC specification JESD22-C101 ⁽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	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	Control input transition rise and 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](#).

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6.4 Thermal Information

THERMAL METRIC	SN74LVC1G66						UNIT
	DBV (SOT-23)	DCK (SC70)	DRL (SOT)	DRY (USON)	DSF (X2SON)	YZP (DSBGA)	
	5 PINS	5 PINS	5 PINS	6 PINS	6 PINS	5 PINS	
$R_{\theta JA}$ Junction-to-ambient thermal resistance	206	252	142	—	—	132	°C/W

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 2 and Figure 1)	$I_S = 4$ mA	1.65 V	12	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	5.5	10	
$r_{on(p)}$ Peak on resistance	$V_I = V_{CC}$ or GND, $V_C = V_{IH}$ (see Figure 2 and Figure 1)	$I_S = 4$ mA	1.65 V	74.5	120	Ω
		$I_S = 8$ mA	2.3 V	20	30	
		$I_S = 24$ mA	3 V	11.5	20	
		$I_S = 32$ mA	4.5 V	7.5	15	
$I_{S(off)}$ 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 3)	$T_A = 25^\circ\text{C}$	5.5 V		± 1 ± 0.1	μA
$I_{S(on)}$ ON-state switch leakage current	$V_I = V_{CC}$ or GND, $V_C = V_{IH}$, $V_O =$ Open (see Figure 4)	$T_A = 25^\circ\text{C}$	5.5 V		± 1 ± 0.1	μA
I_I Control input current	$V_C = V_{CC}$ or GND	$T_A = 25^\circ\text{C}$	5.5 V		± 1 ± 0.1	μA
I_{CC} Supply current	$V_C = V_{CC}$ or GND	$T_A = 25^\circ\text{C}$	5.5 V		10 1	μA
ΔI_{CC} Supply current change	$V_C = V_{CC} - 0.6$ V		5.5 V		500	μA
C_{ic} Control input capacitance			5 V		2	pF
$C_{io(off)}$ Switch input and output capacitance			5 V		6	pF
$C_{io(on)}$ Switch input and output capacitance			5 V		13	pF

 (1) $T_A = 25^\circ\text{C}$

6.6 Switching Characteristics

over recommended operating free-air temperature range (unless otherwise noted) (see Figure 5)

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	2.5	12	1.9	6.5	1.8	5	1.5	4.2	ns
$t_{dis}^{(3)}$	C	A or B	2.2	10	1.4	6.9	2	6.5	1.4	5	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 ⁽¹⁾ (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 (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 7)	1.65 V	35	mV
				2.3 V	50	
				3 V	70	
				4.5 V	100	
Feedthrough attenuation ⁽²⁾ (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 8)	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 8)	1.65 V	–42	
				2.3 V	–42	
				3 V	–42	
				4.5 V	–42	
Sine-wave distortion	A or B	B or A	$C_L = 50\text{ pF}$, $R_L = 10\text{ k}\Omega$, $f_{in} = 1\text{ kHz}$ (sine wave) (see Figure 9)	1.65 V	0.1%	
				2.3 V	0.025%	
				3 V	0.015%	
				4.5 V	0.01%	
			$C_L = 50\text{ pF}$, $R_L = 10\text{ k}\Omega$, $f_{in} = 10\text{ kHz}$ (sine wave) (see Figure 9)	1.65 V	0.15%	
				2.3 V	0.025%	
				3 V	0.015%	
				4.5 V	0.01%	

(1) Adjust f_{in} voltage to obtain 0 dBm at output. Increase f_{in} frequency until dB meter reads –3 dB.

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

6.8 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	$f = 10\text{ MHz}$	8	9	9	11	pF

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6.9 Typical Characteristics

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

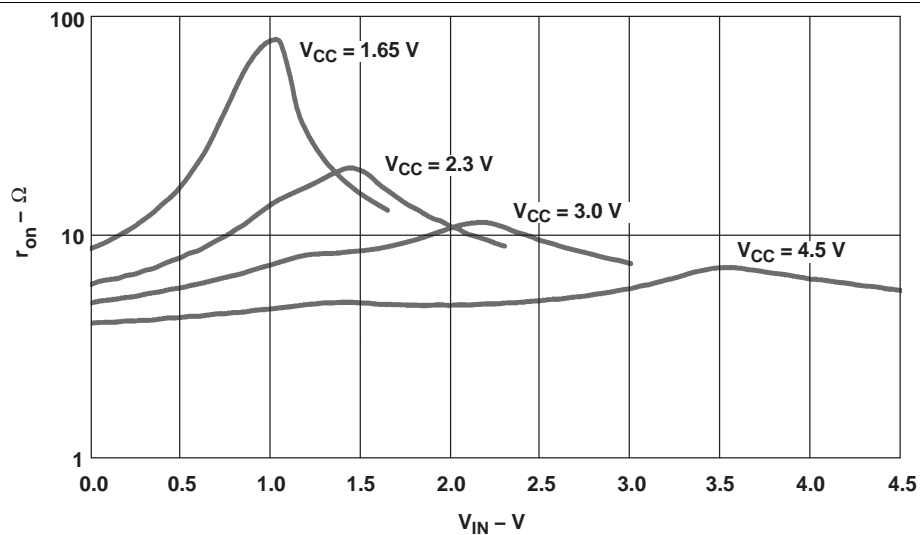


Figure 1. Typical r_{on} as a Function of Input Voltage (V_I) for $V_I = 0$ to V_{CC}

7 Parameter Measurement Information

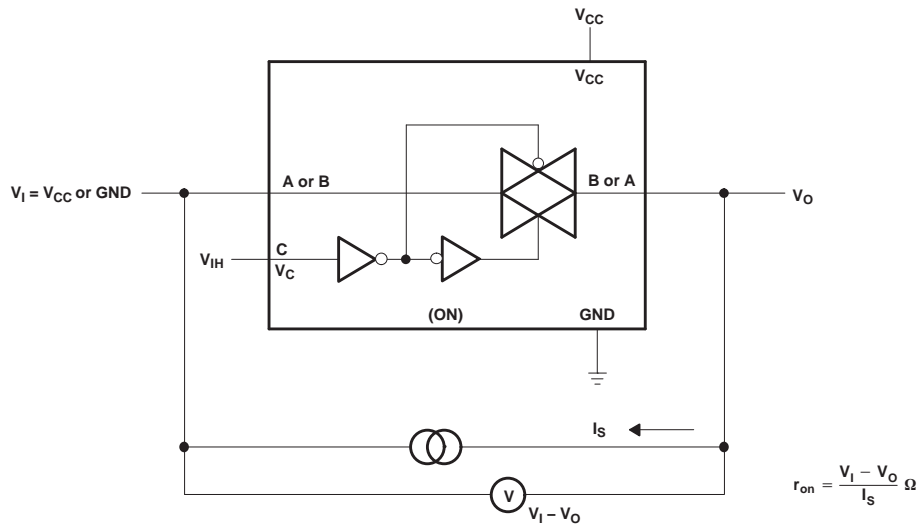


Figure 2. ON-State Resistance Test Circuit

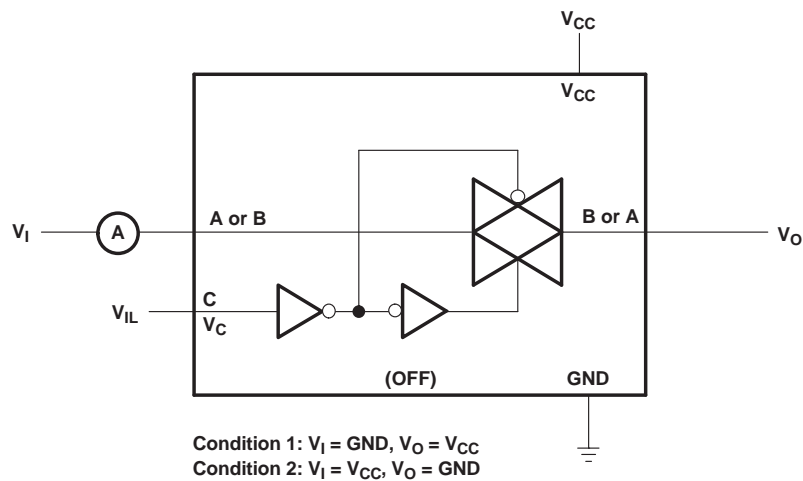


Figure 3. OFF-State Switch Leakage-Current Test Circuit

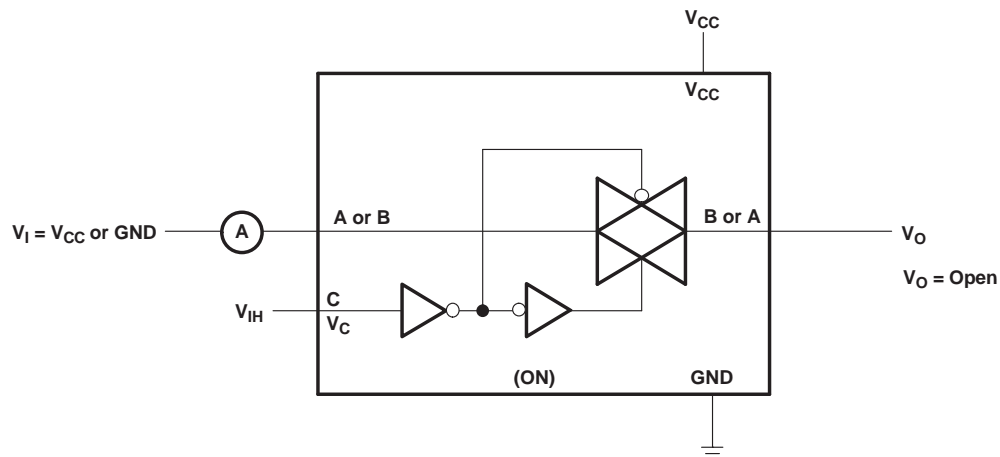
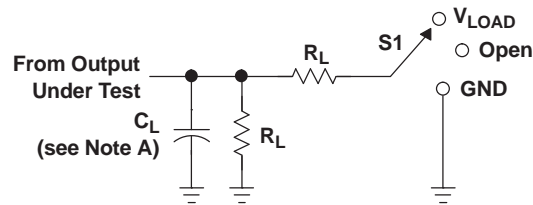


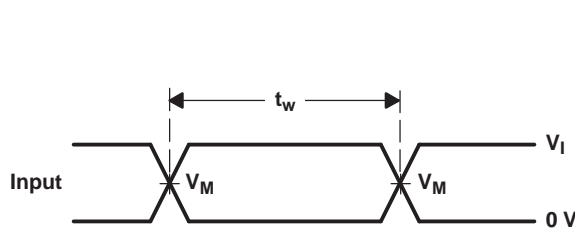
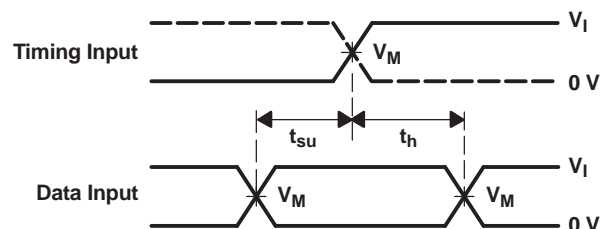
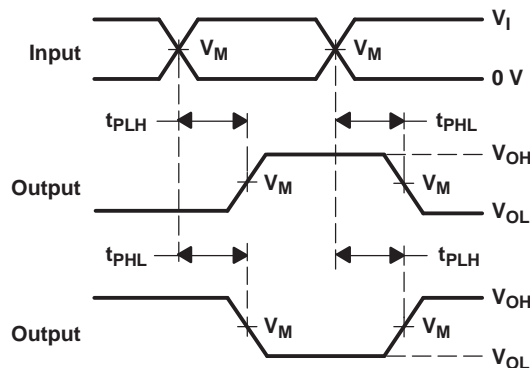
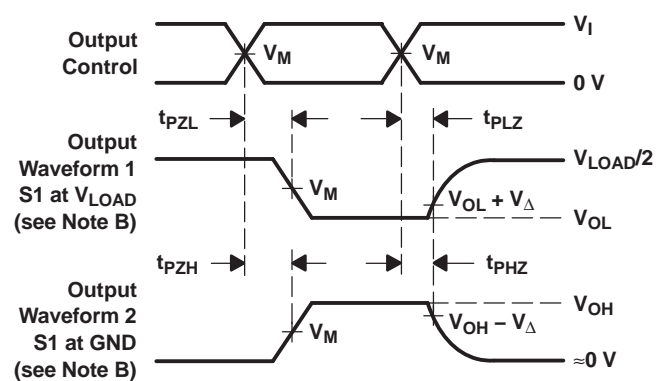
Figure 4. ON-State Switch Leakage-Current Test Circuit

Parameter Measurement Information (continued)


LOAD CIRCUIT

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

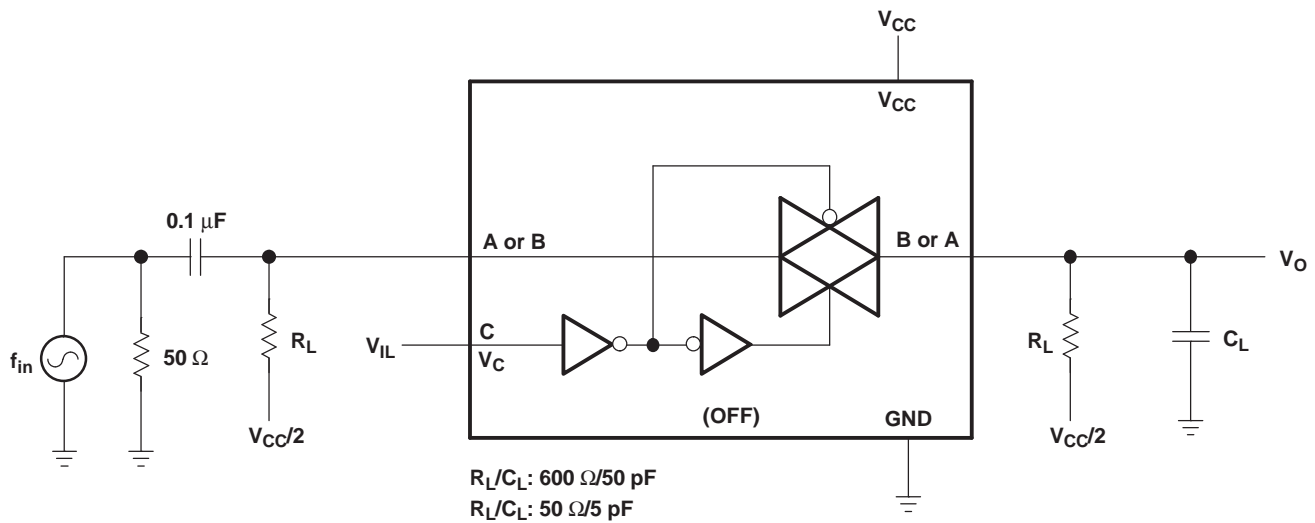
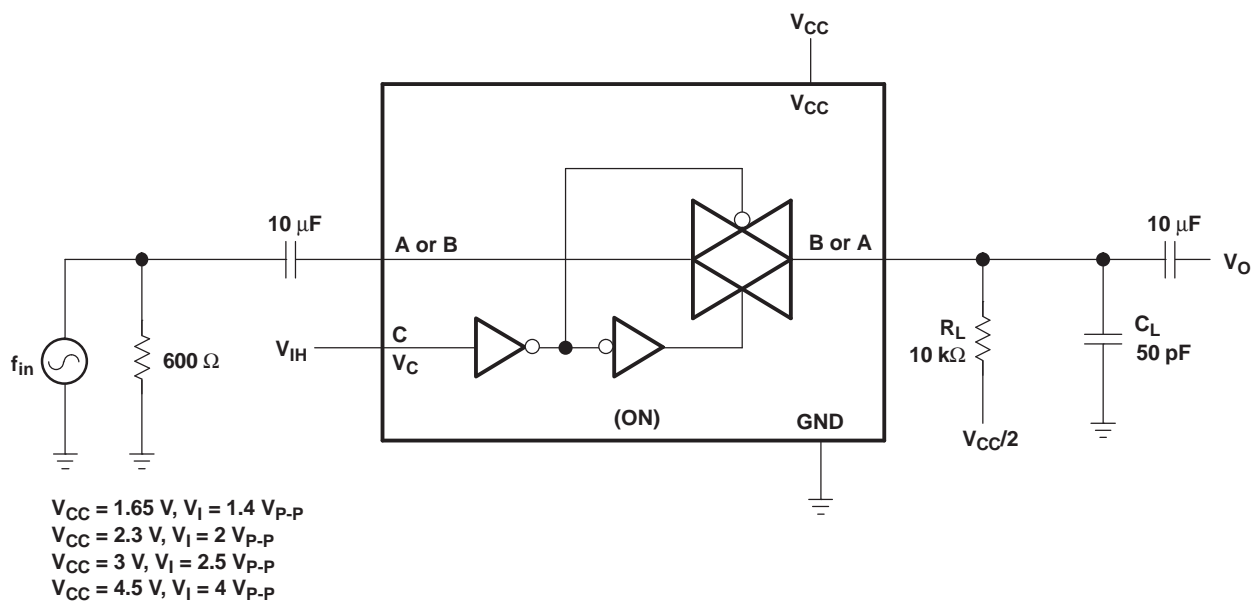
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
$1.8\text{ V} \pm 0.15\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	1 k Ω	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	500 Ω	0.15 V
$3.3\text{ V} \pm 0.3\text{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


**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:
- 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: $PRR \leq 10\text{ MHz}$, $Z_O = 50\text{ }\Omega$.
 - 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.

Figure 5. Load Circuit and Voltage Waveforms

Parameter Measurement Information (continued)


Figure 8. Feedthrough (Switch OFF)

Figure 9. Sine-Wave Distortion

8 Detailed Description

8.1 Overview

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

The SN74LVC1G66 device can handle analog and digital signals. The device permits bidirectional transmission of signals with amplitudes of up to 5.5 V (peak). Like all analog switches, the SN74LVC1G66 is bidirectional.

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

8.2 Functional Block Diagram

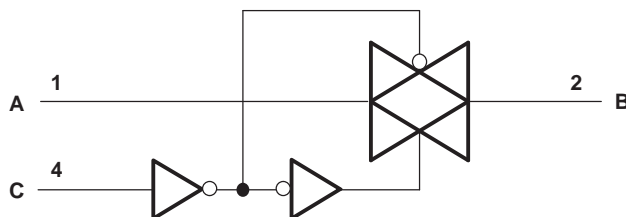


Figure 10. Logic Diagram (Positive Logic)

8.3 Feature Description

The TI NanoFree package is one of TI's smallest packages and allows customers to save board space while the solder bumps allow for easy testing. The SN74LVC1G66 has a wide V_{CC} range, allowing rail-to-rail operation of signals anywhere from a 1.8-V system to a 5-V system. In addition, the control input (C Pin) is 5.5-V tolerant, allowing higher-voltage logic to interface to the switch control system.

8.4 Device Functional Modes

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 SN74LVC1G66 can be used in any situation where an SPST switch would be used and a solid-state, voltage-controlled version is preferred.

9.2 Typical Application

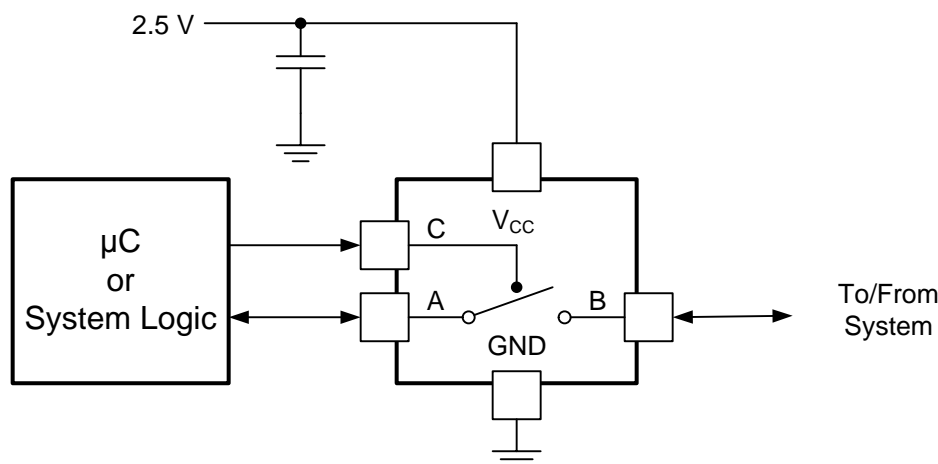


Figure 11. Typical Application Schematic

9.2.1 Design Requirements

The SN74LVC1G66 allows on and 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 [Recommended Operating Conditions](#).
 - For specified high and low levels, see V_{IH} and V_{IL} in [Recommended Operating Conditions](#).
 - 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/capacitance can reduce maximum frequency capability; use layout practices as directed in [Layout](#).

Typical Application (continued)

9.2.3 Application Curve

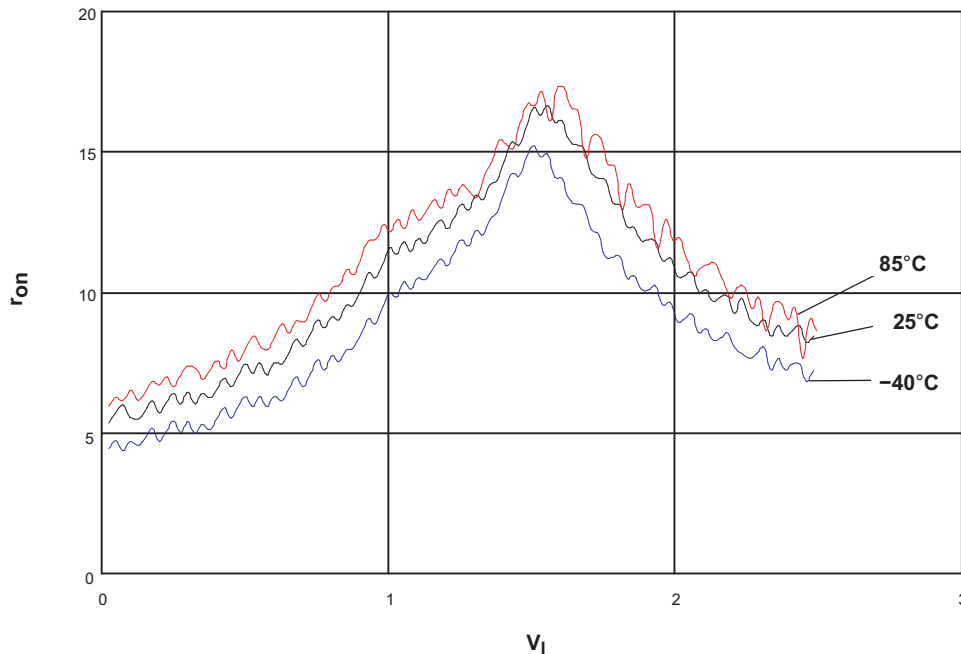


Figure 12. r_{on} vs V_I , $V_{CC} = 2.5$ V (SN74LVC1G66)

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- μ F bypass capacitor is recommended. If there are multiple pins labeled V_{CC} , then a 0.01- μ F or 0.022- μ F capacitor is recommended for each V_{CC} because the V_{CC} 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- μ F bypass capacitor is recommended for each supply pin. It is acceptable to parallel multiple bypass capacitors to reject different frequencies of noise. 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

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. It is a given that 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

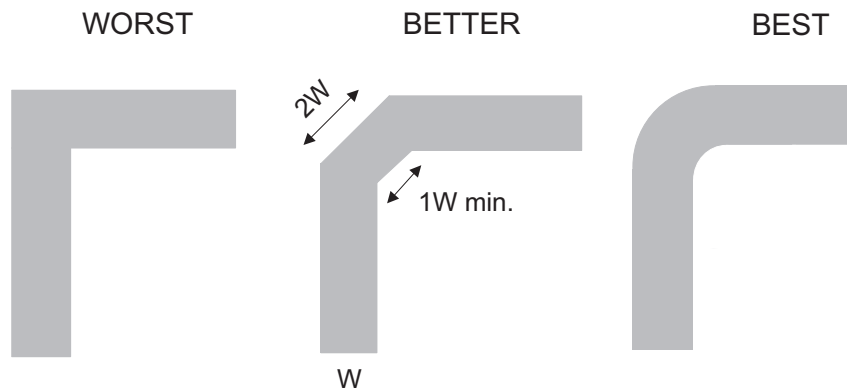


Figure 13. Trace Example

12 Device and Documentation Support

12.1 Documentation Support

12.1.1 Related Documentation

- *Implications of Slow or Floating CMOS Inputs*, [SCBA004](#)

12.2 Trademarks

NanoFree is a trademark 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.

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)
SN74LVC1G66DBVR	Active	Production	SOT-23 (DBV) 5	3000 LARGE T&R	Yes	NIPDAU SN NIPDAU	Level-1-260C-UNLIM	-40 to 85	(C665, C66J, C66R, C66T)
SN74LVC1G66DBVR.A	Active	Production	SOT-23 (DBV) 5	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	(C665, C66J, C66R, C66T)
SN74LVC1G66DBVR.B	Active	Production	SOT-23 (DBV) 5	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	(C665, C66J, C66R, C66T)
SN74LVC1G66DBVT	Obsolete	Production	SOT-23 (DBV) 5	-	-	Call TI	Call TI	-40 to 85	(C665, C66J, C66R)
SN74LVC1G66DCKR	Active	Production	SC70 (DCK) 5	3000 LARGE T&R	Yes	NIPDAU SN NIPDAU	Level-1-260C-UNLIM	-40 to 85	(C65, C6F, C6J, C6K, C6O, C6R, C6T)
SN74LVC1G66DCKR.A	Active	Production	SC70 (DCK) 5	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	(C65, C6F, C6J, C6K, C6O, C6R, C6T)
SN74LVC1G66DCKR.B	Active	Production	SC70 (DCK) 5	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	(C65, C6F, C6J, C6K, C6O, C6R, C6T)
SN74LVC1G66DCKT	Obsolete	Production	SC70 (DCK) 5	-	-	Call TI	Call TI	-40 to 85	(C65, C6J, C6R, C6T)
SN74LVC1G66DRLR	Active	Production	SOT-5X3 (DRL) 5	4000 LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 85	(C67, C6R)
SN74LVC1G66DRLR.A	Active	Production	SOT-5X3 (DRL) 5	4000 LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 85	(C67, C6R)
SN74LVC1G66DRLR.B	Active	Production	SOT-5X3 (DRL) 5	4000 LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 85	(C67, C6R)
SN74LVC1G66DRYR	Active	Production	SON (DRY) 6	5000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C6
SN74LVC1G66DRYR.A	Active	Production	SON (DRY) 6	5000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C6
SN74LVC1G66DRYR.B	Active	Production	SON (DRY) 6	5000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C6
SN74LVC1G66DSF2	Obsolete	Production	SON (DSF) 6	-	-	Call TI	Call TI	-40 to 85	C6
SN74LVC1G66DSFR	Active	Production	SON (DSF) 6	5000 LARGE T&R	Yes	NIPDAU NIPDAU	Level-1-260C-UNLIM	-40 to 85	C6
SN74LVC1G66DSFR.A	Active	Production	SON (DSF) 6	5000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C6
SN74LVC1G66DSFR.B	Active	Production	SON (DSF) 6	5000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C6
SN74LVC1G66YZPR	Active	Production	DSBGA (YZP) 5	3000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 85	C6N
SN74LVC1G66YZPR.B	Active	Production	DSBGA (YZP) 5	3000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 85	C6N

(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 SN74LVC1G66 :

- Automotive : [SN74LVC1G66-Q1](#)

NOTE: Qualified Version Definitions:

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

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
SN74LVC1G66DBVR	SOT-23	DBV	5	3000	178.0	9.0	3.3	3.2	1.4	4.0	8.0	Q3
SN74LVC1G66DCKR	SC70	DCK	5	3000	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74LVC1G66DRLR	SOT-5X3	DRL	5	4000	180.0	8.4	1.98	1.78	0.69	4.0	8.0	Q3
SN74LVC1G66DRYR	SON	DRY	6	5000	180.0	9.5	1.15	1.6	0.75	4.0	8.0	Q1
SN74LVC1G66DSFR	SON	DSF	6	5000	180.0	8.4	1.16	1.16	0.5	4.0	8.0	Q2
SN74LVC1G66YZPR	DSBGA	YZP	5	3000	178.0	9.2	1.02	1.52	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)
SN74LVC1G66DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74LVC1G66DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74LVC1G66DRLR	SOT-5X3	DRL	5	4000	202.0	201.0	28.0
SN74LVC1G66DRYR	SON	DRY	6	5000	184.0	184.0	19.0
SN74LVC1G66DSFR	SON	DSF	6	5000	210.0	185.0	35.0
SN74LVC1G66YZPR	DSBGA	YZP	5	3000	220.0	220.0	35.0



SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



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. Reference JEDEC MO-178.
4. Body dimensions do not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.25 mm per side.
5. Support pin may differ or may not be present.

EXAMPLE BOARD LAYOUT

DBV0005A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X



SOLDER MASK DETAILS

4214839/K 08/2024

NOTES: (continued)

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

DBV0005A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



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

4214839/K 08/2024

NOTES: (continued)

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

GENERIC PACKAGE VIEW

DRY 6

USON - 0.6 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



Images above are just a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.

4207181/G

EXAMPLE BOARD LAYOUT

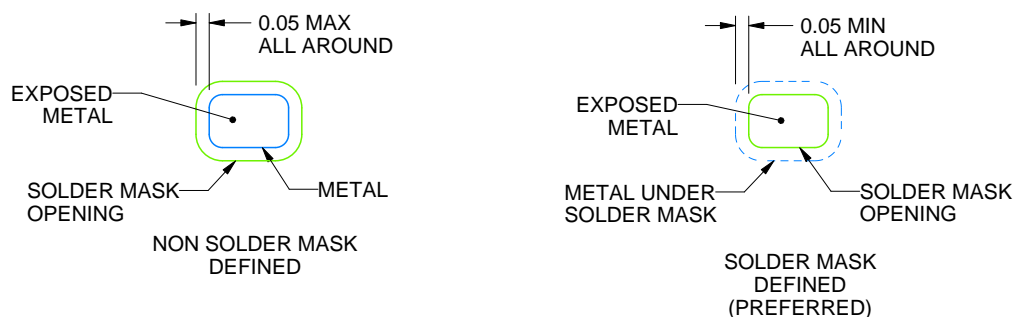
DRY0006A

USON - 0.6 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE
1:1 RATIO WITH PKG SOLDER PADS
EXPOSED METAL SHOWN
SCALE:40X



SOLDER MASK DETAILS

4222894/A 01/2018

NOTES: (continued)

3. For more information, see QFN/SON PCB application report in literature No. SLUA271 (www.ti.com/lit/slue271).

EXAMPLE STENCIL DESIGN

DRY0006A

USON - 0.6 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.075 - 0.1 mm THICK STENCIL
SCALE:40X

4222894/A 01/2018

NOTES: (continued)

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

EXAMPLE BOARD LAYOUT

DSF0006A

X2SON - 0.4 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:40X



SOLDER MASK DETAILS

4220597/B 06/2022

NOTES: (continued)

4. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/sluea271).

EXAMPLE STENCIL DESIGN

DSF0006A

X2SON - 0.4 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.09 mm THICK STENCIL

PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE
SCALE:40X

4220597/B 06/2022

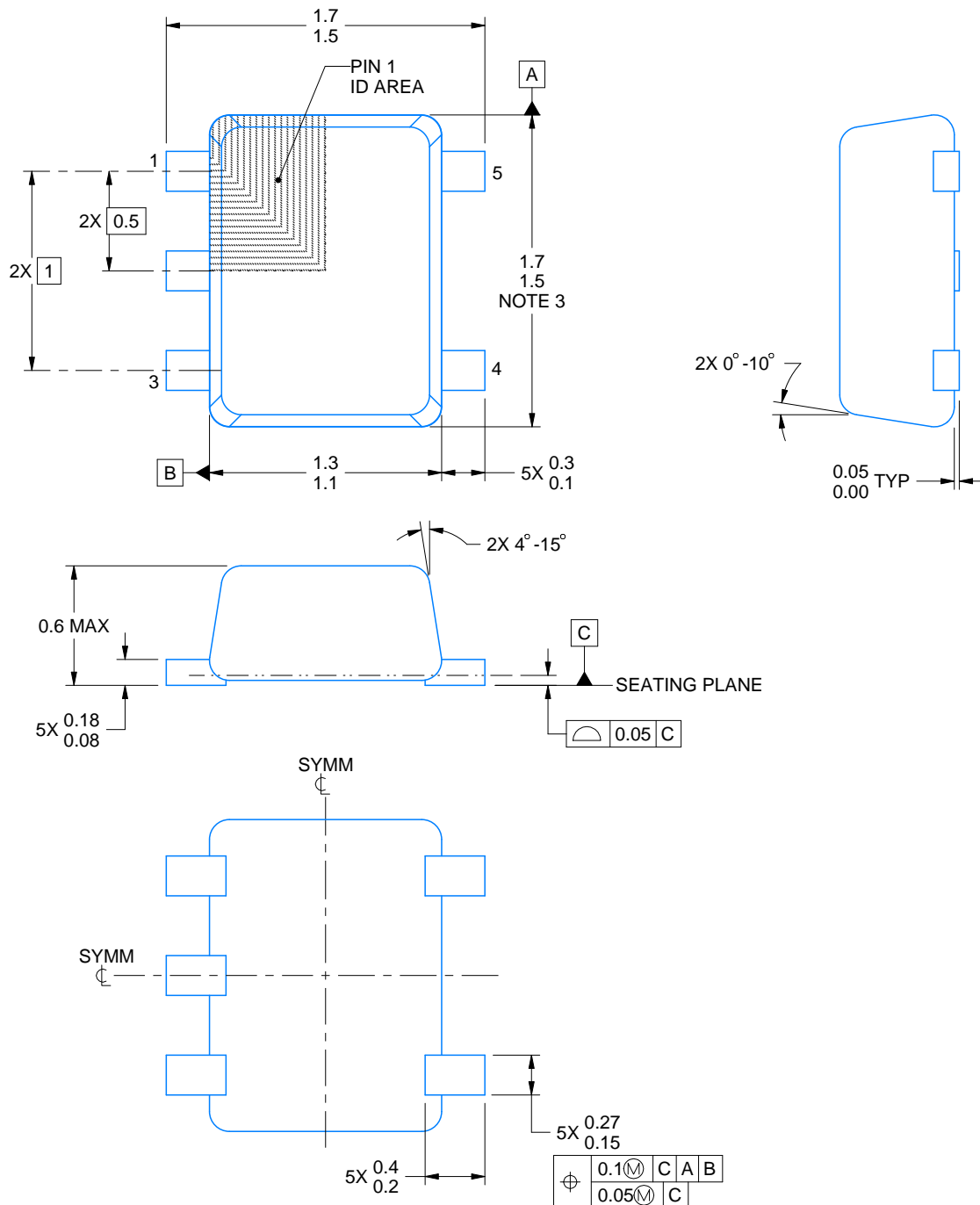
4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

DRL0005A

PACKAGE OUTLINE

SOT - 0.6 mm max height

PLASTIC SMALL OUTLINE



4220753/E 11/2024

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-293 Variation UAAD-1

EXAMPLE BOARD LAYOUT

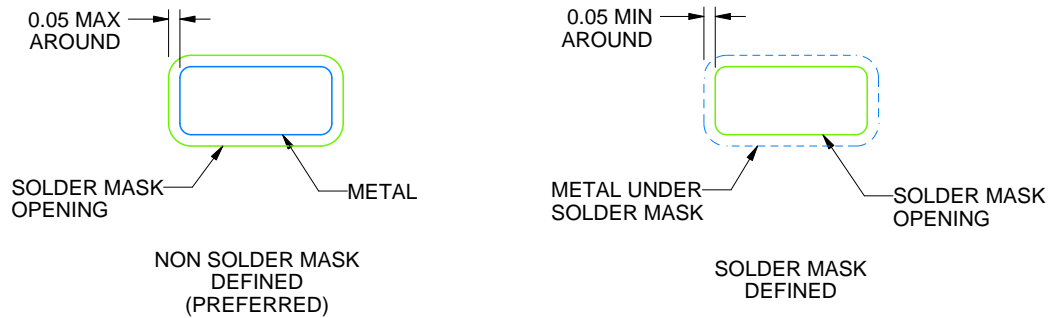
DRL0005A

SOT - 0.6 mm max height

PLASTIC SMALL OUTLINE



LAND PATTERN EXAMPLE
SCALE:30X



SOLDERMASK DETAILS

4220753/E 11/2024

NOTES: (continued)

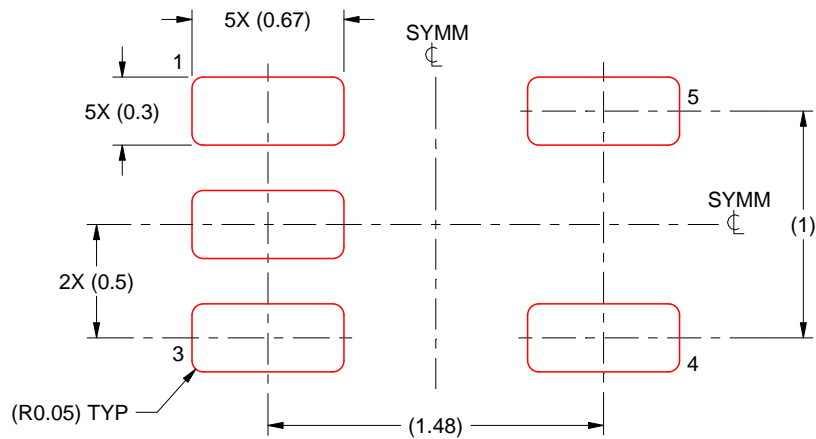
5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DRL0005A

SOT - 0.6 mm max height

PLASTIC SMALL OUTLINE



SOLDER PASTE EXAMPLE
BASED ON 0.1 mm THICK STENCIL
SCALE:30X

4220753/E 11/2024

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.

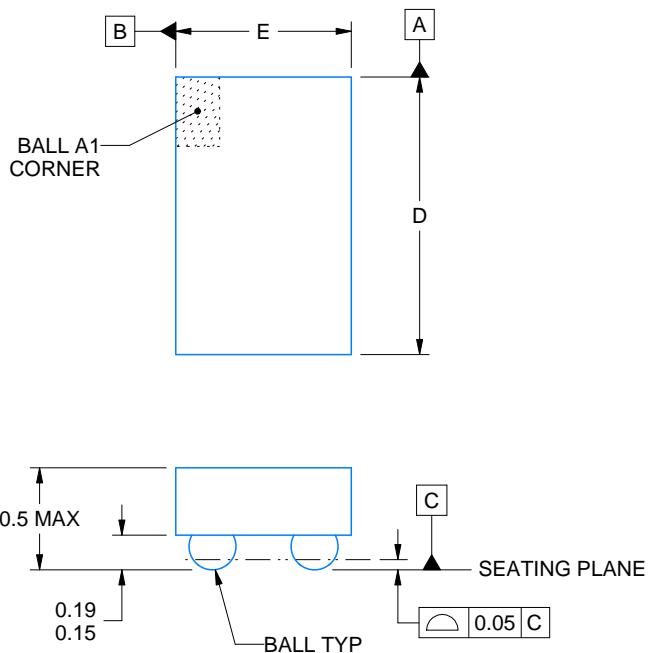
YZP0005



PACKAGE OUTLINE

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



D: Max = 1.418 mm, Min = 1.358 mm

E: Max = 0.918 mm, Min = 0.858 mm

4219492/A 05/2017

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

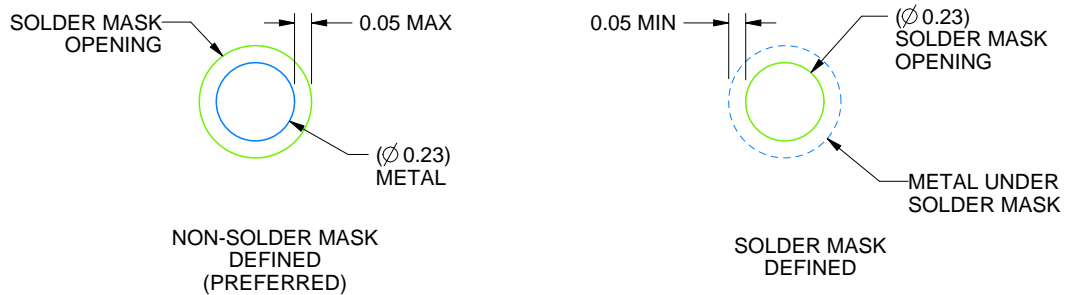
YZP0005

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



LAND PATTERN EXAMPLE
SCALE:40X



SOLDER MASK DETAILS
NOT TO SCALE

4219492/A 05/2017

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).

EXAMPLE STENCIL DESIGN

YZP0005

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



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

4219492/A 05/2017

NOTES: (continued)

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



SOT - 1.1 max height

Technical drawing of a mechanical part showing three views: front, side, and top.

Front View Dimensions:

- Overall width: 2.4 (1.8)
- Overall height: 2.15 (1.85)
- Pin 1 Index Area (hatched)
- Feature 1: 1.3 (0.65)
- Feature 2: 1.3 (0.65)
- Feature 3: 1.3 (0.65)
- Feature 4: 1.3 (0.65)
- Feature 5: 1.3 (0.65)
- Feature 6: 1.3 (0.65)
- Feature 7: 1.3 (0.65)
- Feature 8: 1.3 (0.65)
- Feature 9: 1.3 (0.65)
- Feature 10: 1.3 (0.65)
- Feature 11: 1.3 (0.65)
- Feature 12: 1.3 (0.65)
- Feature 13: 1.3 (0.65)
- Feature 14: 1.3 (0.65)
- Feature 15: 1.3 (0.65)
- Feature 16: 1.3 (0.65)
- Feature 17: 1.3 (0.65)
- Feature 18: 1.3 (0.65)
- Feature 19: 1.3 (0.65)
- Feature 20: 1.3 (0.65)
- Feature 21: 1.3 (0.65)
- Feature 22: 1.3 (0.65)
- Feature 23: 1.3 (0.65)
- Feature 24: 1.3 (0.65)
- Feature 25: 1.3 (0.65)
- Feature 26: 1.3 (0.65)
- Feature 27: 1.3 (0.65)
- Feature 28: 1.3 (0.65)
- Feature 29: 1.3 (0.65)
- Feature 30: 1.3 (0.65)
- Feature 31: 1.3 (0.65)
- Feature 32: 1.3 (0.65)
- Feature 33: 1.3 (0.65)
- Feature 34: 1.3 (0.65)
- Feature 35: 1.3 (0.65)
- Feature 36: 1.3 (0.65)
- Feature 37: 1.3 (0.65)
- Feature 38: 1.3 (0.65)
- Feature 39: 1.3 (0.65)
- Feature 40: 1.3 (0.65)
- Feature 41: 1.3 (0.65)
- Feature 42: 1.3 (0.65)
- Feature 43: 1.3 (0.65)
- Feature 44: 1.3 (0.65)
- Feature 45: 1.3 (0.65)
- Feature 46: 1.3 (0.65)
- Feature 47: 1.3 (0.65)
- Feature 48: 1.3 (0.65)
- Feature 49: 1.3 (0.65)
- Feature 50: 1.3 (0.65)
- Feature 51: 1.3 (0.65)
- Feature 52: 1.3 (0.65)
- Feature 53: 1.3 (0.65)
- Feature 54: 1.3 (0.65)
- Feature 55: 1.3 (0.65)
- Feature 56: 1.3 (0.65)
- Feature 57: 1.3 (0.65)
- Feature 58: 1.3 (0.65)
- Feature 59: 1.3 (0.65)
- Feature 60: 1.3 (0.65)
- Feature 61: 1.3 (0.65)
- Feature 62: 1.3 (0.65)
- Feature 63: 1.3 (0.65)
- Feature 64: 1.3 (0.65)
- Feature 65: 1.3 (0.65)
- Feature 66: 1.3 (0.65)
- Feature 67: 1.3 (0.65)
- Feature 68: 1.3 (0.65)
- Feature 69: 1.3 (0.65)
- Feature 70: 1.3 (0.65)
- Feature 71: 1.3 (0.65)
- Feature 72: 1.3 (0.65)
- Feature 73: 1.3 (0.65)
- Feature 74: 1.3 (0.65)
- Feature 75: 1.3 (0.65)
- Feature 76: 1.3 (0.65)
- Feature 77: 1.3 (0.65)
- Feature 78: 1.3 (0.65)
- Feature 79: 1.3 (0.65)
- Feature 80: 1.3 (0.65)
- Feature 81: 1.3 (0.65)
- Feature 82: 1.3 (0.65)
- Feature 83: 1.3 (0.65)
- Feature 84: 1.3 (0.65)
- Feature 85: 1.3 (0.65)
- Feature 86: 1.3 (0.65)
- Feature 87: 1.3 (0.65)
- Feature 88: 1.3 (0.65)
- Feature 89: 1.3 (0.65)
- Feature 90: 1.3 (0.65)
- Feature 91: 1.3 (0.65)
- Feature 92: 1.3 (0.65)
- Feature 93: 1.3 (0.65)
- Feature 94: 1.3 (0.65)
- Feature 95: 1.3 (0.65)
- Feature 96: 1.3 (0.65)
- Feature 97: 1.3 (0.65)
- Feature 98: 1.3 (0.65)
- Feature 99: 1.3 (0.65)
- Feature 100: 1.3 (0.65)

Side View Dimensions:

- Overall width: 1.1 MAX
- Overall height: 0.1 C

Top View Dimensions:

- Overall width: 0.9
- Overall height: 0.1 TYP

Other Dimensions:

- Feature 1: 0.15
- Feature 2: 0.1
- Feature 3: 0.15
- Feature 4: 0.1
- Feature 5: 0.15
- Feature 6: 0.1
- Feature 7: 0.15
- Feature 8: 0.1
- Feature 9: 0.15
- Feature 10: 0.1
- Feature 11: 0.15
- Feature 12: 0.1
- Feature 13: 0.15
- Feature 14: 0.1
- Feature 15: 0.15
- Feature 16: 0.1
- Feature 17: 0.15
- Feature 18: 0.1
- Feature 19: 0.15
- Feature 20: 0.1
- Feature 21: 0.15
- Feature 22: 0.1
- Feature 23: 0.15
- Feature 24: 0.1
- Feature 25: 0.15
- Feature 26: 0.1
- Feature 27: 0.15
- Feature 28: 0.1
- Feature 29: 0.15
- Feature 30: 0.1
- Feature 31: 0.15
- Feature 32: 0.1
- Feature 33: 0.15
- Feature 34: 0.1
- Feature 35: 0.15
- Feature 36: 0.1
- Feature 37: 0.15
- Feature 38: 0.1
- Feature 39: 0.15
- Feature 40: 0.1
- Feature 41: 0.15
- Feature 42: 0.1
- Feature 43: 0.15
- Feature 44: 0.1
- Feature 45: 0.15
- Feature 46: 0.1
- Feature 47: 0.15
- Feature 48: 0.1
- Feature 49: 0.15
- Feature 50: 0.1
- Feature 51: 0.15
- Feature 52: 0.1
- Feature 53: 0.15
- Feature 54: 0.1
- Feature 55: 0.15
- Feature 56: 0.1
- Feature 57: 0.15
- Feature 58: 0.1
- Feature 59: 0.15
- Feature 60: 0.1
- Feature 61: 0.15
- Feature 62: 0.1
- Feature 63: 0.15
- Feature 64: 0.1
- Feature 65: 0.15
- Feature 66: 0.1
- Feature 67: 0.15
- Feature 68: 0.1
- Feature 69: 0.15
- Feature 70: 0.1
- Feature 71: 0.15
- Feature 72: 0.1
- Feature 73: 0.15
- Feature 74: 0.1
- Feature 75: 0.15
- Feature 76: 0.1
- Feature 77: 0.15
- Feature 78: 0.1
- Feature 79: 0.15
- Feature 80: 0.1
- Feature 81: 0.15
- Feature 82: 0.1
- Feature 83: 0.15
- Feature 84: 0.1
- Feature 85: 0.15
- Feature 86: 0.1
- Feature 87: 0.15
- Feature 88: 0.1
- Feature 89: 0.15
- Feature 90: 0.1
- Feature 91: 0.15
- Feature 92: 0.1
- Feature 93: 0.15
- Feature 94: 0.1
- Feature 95: 0.15
- Feature 96: 0.1
- Feature 97: 0.15
- Feature 98: 0.1
- Feature 99: 0.15
- Feature 100: 0.1

Notes:

- NOTE 4: (0.15)
- NOTE 5: (0.1)

Other Features:

- GAGE PLANE
- SEATING PLANE
- 4X 4° -15°
- 8° 0° TYP
- 0.22 0.08 TYP
- 0.46 0.26 TYP

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. Reference JEDEC MO-203.
4. Support pin may differ or may not be present.
5. Lead width does not comply with JEDEC.
6. Body dimensions do not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.25mm per side

EXAMPLE BOARD LAYOUT

DCK0005A

SOT - 1.1 max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:18X



SOLDER MASK DETAILS

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NOTES: (continued)

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



SOLDER PASTE EXAMPLE
BASED ON 0.125 THICK STENCIL
SCALE:18X

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NOTES: (continued)

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

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