

SN74LVC2G17 Dual Schmitt-Trigger Buffer

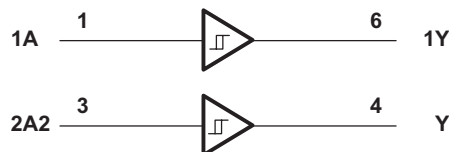
1 Features

- Schmitt-Trigger inputs provide hysteresis
- Available in the Texas Instruments NanoFree™ Package
- Supports 5-V V_{CC} Operation
- Inputs Accept Voltages to 5.5 V
- Max t_{pd} of 5.4 ns at 3.3 V
- Low Power Consumption, 10- μ A Max I_{CC}
- ± 24 -mA Output Drive at 3.3 V
- Typical V_{OLP} (Output Ground Bounce) < 0.8 V at $V_{CC} = 3.3$ V, $T_A = 25^\circ\text{C}$
- Typical V_{OHV} (Output V_{OH} Undershoot) > 2 V at $V_{CC} = 3.3$ V, $T_A = 25^\circ\text{C}$
- I_{off} Supports Live Insertion, Partial-Power-Down Mode Operation and Back-Drive Protection
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model
 - 1000-V Charged-Device Model

2 Applications

- AV Receivers
- Audio Docks: Portable
- Blu-ray Players and Home Theater
- MP3 Players/Recorders
- Personal Digital Assistants (PDAs)
- Power: Telecom/Server AC/DC Supply: Single Controller: Analog and Digital
- Solid State Drives (SSDs): Client and Enterprise
- TVs: LCD/Digital and High-Definition (HDTVs)
- Tablets: Enterprise
- Video Analytics: Server
- Wireless Headsets, Keyboards, and Mice

4 Simplified Schematic



3 Description

This dual Schmitt-Trigger buffer is designed for 1.65-V to 5.5-V V_{CC} operation.

The SN74LVC2G17 device contains two buffers and performs the Boolean function $Y = A$. The device functions as two independent buffers, but because of Schmitt action, it may have different input threshold levels for positive-going (V_{T+}) and negative-going (V_{T-}) signals.

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

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

Device Information⁽¹⁾

| PART NUMBER | PACKAGE (PIN) | BODY SIZE |
|-------------|---------------|-------------------|
| SN74LVC2G17 | SOT-23 (6) | 2.90 mm × 1.60 mm |
| | SC70 (6) | 2.00 mm × 1.25 mm |
| | SON (6) | 1.45 mm × 1.00 mm |
| | SON (6) | 1.00 mm × 1.00 mm |
| | DSBGA (6) | 1.41 mm × 0.91 mm |

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



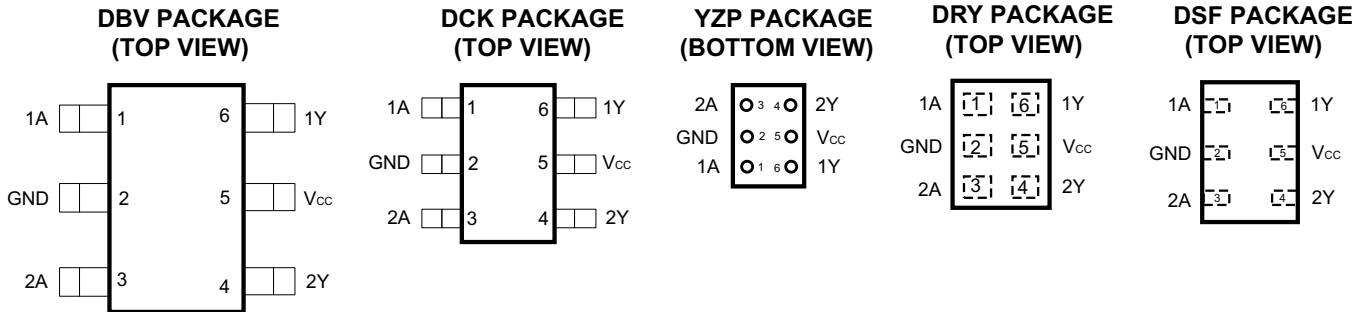
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5 Revision History

| Changes from Revision M (November 2013) to Revision N | Page |
|---|-----------------------|
| <ul style="list-style-type: none"> Added <i>Applications</i>, <i>Device Information</i> table, <i>Pin Functions</i> table, <i>ESD Ratings</i> table, <i>Thermal Information</i> table, <i>Typical Characteristics</i>, <i>Feature Description</i> section, <i>Device Functional Modes</i>, <i>Application and Implementation</i> section, <i>Power Supply Recommendations</i> section, <i>Layout</i> section, <i>Device and Documentation Support</i> section, and <i>Mechanical, Packaging, and Orderable Information</i> section. | 1 |
| <hr/> | |
| Changes from Revision L (September 2013) to Revision M | Page |
| <ul style="list-style-type: none"> Updated document formatting. Changed MAX operating temperature to 125°C in <i>Recommended Operating Conditions</i> table. | 1 4 |
| <hr/> | |
| Changes from Revision K (July 2012) to Revision L | Page |
| <ul style="list-style-type: none"> Updated document to new TI data sheet format. Added ESD warning. | 1 12 |
| <hr/> | |
| Changes from Revision J (June 2012) to Revision K | Page |
| <ul style="list-style-type: none"> Updated pin out graphic. | 3 |

6 Pin Configuration and Functions



Pin Functions

| PIN | | TYPE | DESCRIPTION |
|-----------------|-----|------|-------------|
| NAME | NO. | | |
| 1A | 1 | I | Input 1 |
| 1Y | 6 | O | Output 1 |
| 2A | 3 | I | Input 2 |
| 2Y | 4 | O | Output 2 |
| GND | 2 | — | Ground |
| V _{CC} | 5 | — | Power Pin |

7 Specifications

7.1 Absolute Maximum Ratings

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

| | | MIN | MAX | UNIT |
|------------------|---|--------------------|-----------------------|------|
| V _{CC} | Supply voltage range | -0.5 | 6.5 | V |
| V _I | Input voltage range ⁽²⁾ | -0.5 | 6.5 | V |
| V _O | Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾ | -0.5 | 6.5 | V |
| V _O | Voltage range applied to any output in the high or low state ⁽²⁾⁽³⁾ | -0.5 | V _{CC} + 0.5 | V |
| I _{IK} | Input clamp current | V _I < 0 | -50 | mA |
| I _{OK} | Output clamp current | V _O < 0 | -50 | mA |
| I _O | Continuous output current | | ±50 | mA |
| | Continuous current through V _{CC} or GND | | ±100 | mA |
| T _J | Junction temperature under bias | | 150 | °C |
| T _{stg} | Storage temperature range | -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) The input negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The value of V_{CC} is provided in the *Recommended Operating Conditions* table.

7.2 ESD Ratings

| | | VALUE | UNIT |
|---------------------------------|--|-------|------|
| V _{ESD} ⁽¹⁾ | Human-Body Model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins ⁽²⁾ | 2000 | V |
| | Charged-Device Model (CDM), per JEDEC specification JESD22-C101, all pins ⁽³⁾ | 1000 | V |

- (1) Electrostatic discharge (ESD) to measure device sensitivity and immunity to damage caused by assembly line electrostatic discharges in to the device.
- (2) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (3) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

7.3 Recommended Operating Conditions

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

| | | MIN | MAX | UNIT | |
|-----------------|--------------------------------|--------------------------|------|-----------------|----|
| V _{CC} | Supply voltage | Operating | 1.65 | 5.5 | V |
| V _I | Input voltage | | 0 | 5.5 | V |
| V _O | Output voltage | | 0 | V _{CC} | V |
| I _{OH} | High-level output current | V _{CC} = 1.65 V | | -4 | mA |
| | | V _{CC} = 2.3 V | | -8 | |
| | | V _{CC} = 3 V | | -16 | |
| | | V _{CC} = 4.5 V | | -24 | |
| I _{OL} | Low-level output current | V _{CC} = 1.65 V | | 4 | mA |
| | | V _{CC} = 2.3 V | | 8 | |
| | | V _{CC} = 3 V | | 16 | |
| | | V _{CC} = 4.5 V | | 24 | |
| T _A | Operating free-air temperature | | -40 | 125 | °C |

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

7.4 Thermal Information

| THERMAL METRIC ⁽¹⁾ | SN74LVC2G17 | | | | | UNIT |
|---|-------------|-----|-----|-----|-----|------|
| | DBV | DCK | YZP | DRY | DSF | |
| | 6 PINS | | | | | |
| $R_{\theta JA}$ Junction-to-ambient thermal resistance ⁽²⁾ | 165 | 259 | 123 | 234 | 300 | °C/W |

(1) For more information about traditional and new thermal metrics, see the *IC Package Thermal Metrics* application report, [SPRA953](#).

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

7.5 Electrical Characteristics

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

| PARAMETER | TEST CONDITIONS | V_{CC} | –40°C to 85°C | | | –40°C to 125°C | | | UNIT |
|--|---------------------------|--|-----------------|--------------------|-----|----------------|--------------------|-----|---------|
| | | | MIN | TYP ⁽¹⁾ | MAX | MIN | TYP ⁽¹⁾ | MAX | |
| V_{T+} Positive-going input threshold voltage | | 1.65 V | 0.7 | | 1.4 | 0.7 | | 1.4 | V |
| | | 2.3 V | 1.0 | | 1.7 | 1.0 | | 1.7 | |
| | | 3 V | 1.3 | | 2.0 | 1.3 | | 2.0 | |
| | | 4.5 V | 1.9 | | 3.1 | 1.9 | | 3.1 | |
| | | 5.5 V | 2.2 | | 3.7 | 2.2 | | 3.7 | |
| V_{T-} Negative-going input threshold voltage | | 1.65 V | 0.3 | | 0.7 | 0.3 | | 0.7 | V |
| | | 2.3 V | 0.4 | | 1 | 0.4 | | 1.0 | |
| | | 3 V | 0.8 | | 1.3 | 0.8 | | 1.3 | |
| | | 4.5 V | 1.1 | | 2 | 1.1 | | 2.0 | |
| | | 5.5 V | 1.4 | | 2.5 | 1.4 | | 2.5 | |
| ΔV_T Hysteresis ($V_{T+} - V_{T-}$) | | 1.65 V | 0.3 | | 0.8 | 0.3 | | 0.8 | V |
| | | 2.3 V | 0.4 | | 0.9 | 0.35 | | 0.9 | |
| | | 3 V | 0.4 | | 1.1 | 0.4 | | 1.1 | |
| | | 4.5 V | 0.6 | | 1.3 | 0.6 | | 1.3 | |
| | | 5.5 V | 0.7 | | 1.4 | 0.7 | | 1.4 | |
| V_{OH} | $I_{OH} = -100 \mu A$ | 1.65 V to 5.5 V | $V_{CC} - 0.1$ | | | $V_{CC} - 0.1$ | | | V |
| | $I_{OH} = -4 \text{ mA}$ | 1.65 V | 1.2 | | | 1.2 | | | |
| | $I_{OH} = -8 \text{ mA}$ | 2.3 V | 1.9 | | | 1.9 | | | |
| | $I_{OH} = -16 \text{ mA}$ | 3 V | 2.4 | | | 2.4 | | | |
| | $I_{OH} = -24 \text{ mA}$ | | 2.3 | | | 2.3 | | | |
| | $I_{OH} = -32 \text{ mA}$ | 4.5 V | 3.8 | | | 3.8 | | | |
| V_{OL} | $I_{OL} = 100 \mu A$ | 1.65 V to 5.5 V | 0.1 | | | 0.1 | | | V |
| | $I_{OL} = 4 \text{ mA}$ | 1.65 V | 0.45 | | | 0.45 | | | |
| | $I_{OL} = 8 \text{ mA}$ | 2.3 V | 0.3 | | | 0.3 | | | |
| | $I_{OL} = 16 \text{ mA}$ | 3 V | 0.4 | | | 0.4 | | | |
| | $I_{OL} = 24 \text{ mA}$ | | 0.55 | | | 0.55 | | | |
| | $I_{OL} = 32 \text{ mA}$ | 4.5 V | 0.55 | | | 0.55 | | | |
| I_I | A input | $V_I = 5.5 \text{ V or GND}$ | 0 to 5.5 V | | | ± 5 | | | μA |
| I_{off} | | $V_I \text{ or } V_O = 5.5 \text{ V}$ | 0 | | | ± 10 | | | μA |
| I_{CC} | | $V_I = 5.5 \text{ V or GND, } I_O = 0$ | 1.65 V to 5.5 V | | | 10 | | | μA |
| ΔI_{CC} | | One input at $V_{CC} - 0.6 \text{ V}$, Other inputs at V_{CC} or GND | 3 V to 5.5 V | | | 500 | | | μA |
| C_i | | $V_I = V_{CC} \text{ or GND}$ | 3.3 V | | | 4 | | | pF |

(1) All typical values are at $V_{CC} = 3.3 \text{ V}$, $T_A = 25^\circ\text{C}$.

7.6 Switching Characteristics, –40°C to 85°C

 over recommended operating free-air temperature range (unless otherwise noted) (see [Figure 3](#))

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | –40°C to 85°C | | | | | | | | UNIT |
|-----------|--------------|-------------|---|-----|--|-----|--|-----|--|-----|------|
| | | | $V_{CC} = 1.8\text{ V} \pm 0.15\text{ V}$ | | $V_{CC} = 2.5\text{ V} \pm 0.2\text{ V}$ | | $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ | | $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ | | |
| | | | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| t_{pd} | A | Y | 3.9 | 9.3 | 1.9 | 5.7 | 2.2 | 5.4 | 1.5 | 4.3 | ns |

7.7 Switching Characteristics, –40°C to 125°C

 over recommended operating free-air temperature range (unless otherwise noted) (see [Figure 3](#))

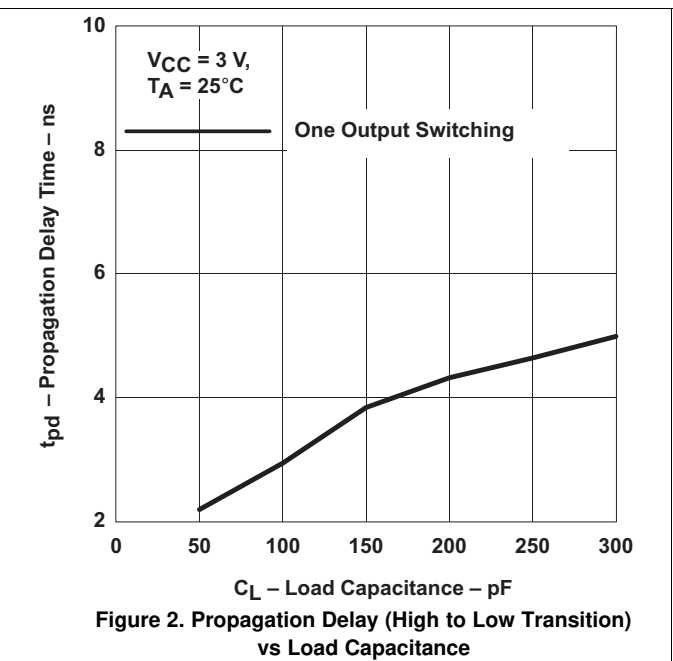
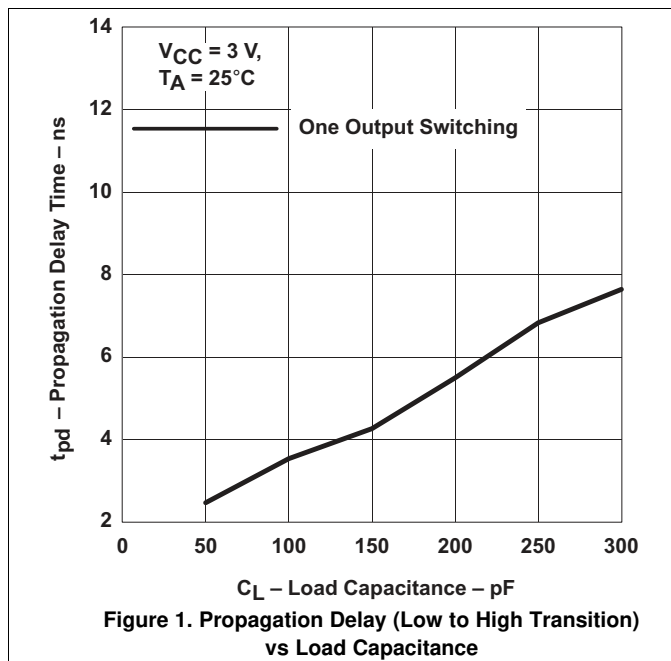
| PARAMETER | FROM (INPUT) | TO (OUTPUT) | –40°C to 125°C | | | | | | | | UNIT |
|-----------|--------------|-------------|---|-----|--|-----|--|-----|--|-----|------|
| | | | $V_{CC} = 1.8\text{ V} \pm 0.15\text{ V}$ | | $V_{CC} = 2.5\text{ V} \pm 0.2\text{ V}$ | | $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ | | $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ | | |
| | | | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| t_{pd} | A | Y | 3.9 | 9.8 | 1.9 | 6.2 | 2.2 | 5.9 | 1.5 | 4.8 | ns |

7.8 Operating Characteristics

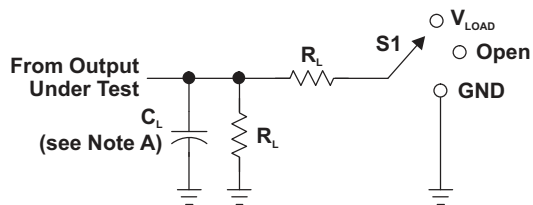
 $T_A = 25^\circ\text{C}$

| 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 MHz | 17 | 18 | 19 | 21 | pF |

7.9 Typical Characteristics



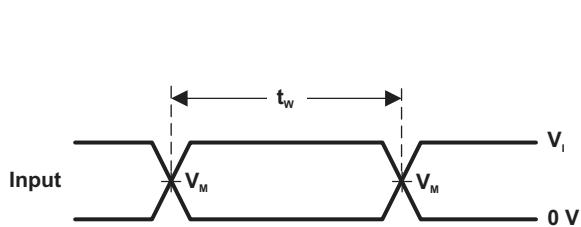
8 Parameter Measurement Information



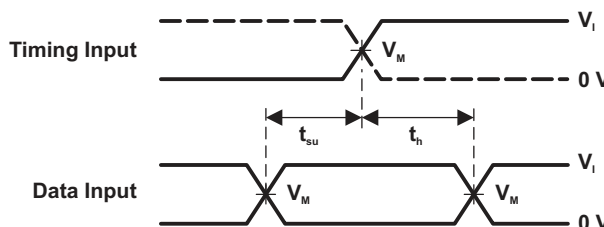
LOAD CIRCUIT

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

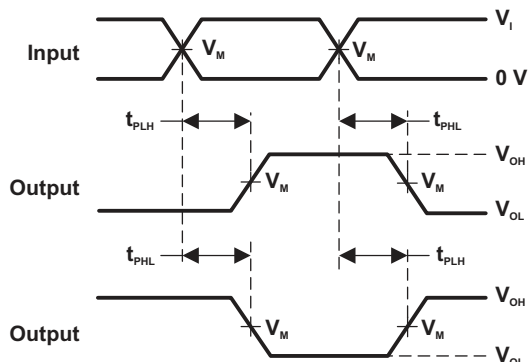
| V_{CC} | INPUTS | | V_M | V_{LOAD} | C_L | R_L | V_{Δ} |
|----------------------------------|----------|----------------------|------------|-------------------|-------|--------------|--------------|
| | V_i | t_i/t_r | | | | | |
| $1.8\text{ V} \pm 0.15\text{ V}$ | V_{CC} | $\leq 2\text{ ns}$ | $V_{CC}/2$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



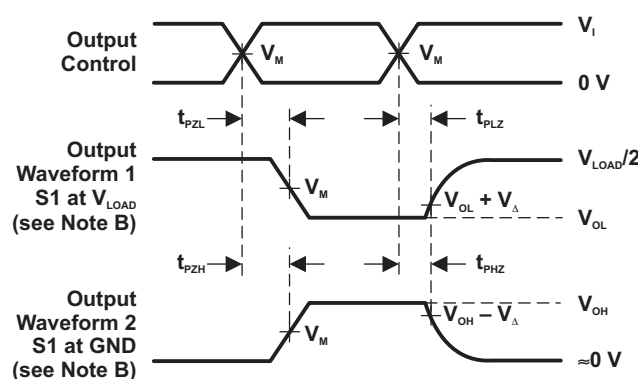
VOLTAGE WAVEFORMS PULSE DURATION



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 having the following characteristics: $PRR \leq 10\text{ MHz}$, $Z_o = 50\ \Omega$.
 - 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 3. Load Circuit and Voltage Waveforms

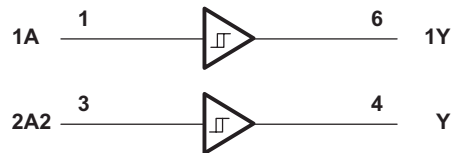
9 Detailed Description

9.1 Overview

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

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

9.2 Functional Block Diagram



9.3 Feature Description

- 1.65 V to 5.5 V operating voltage range
- Allows down voltage translation
 - 5 V to 3.3 V
 - 5 V or 3.3 V to 1.8 V
- Inputs accept voltages to 5.5 V
 - 5-V tolerance on input pin
- I_{off} feature
 - Allows voltage on the inputs and outputs when V_{CC} is 0 V
 - Able to reduce leakage when V_{CC} is 0 V
- Schmitt-Trigger Input can improve the noise immunity capability

9.4 Device Functional Modes

| INPUT A | OUTPUT Y |
|------------|-------------|
| H | H |
| L | L |

10 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.

10.1 Application Information

The SN74LVC2G17 device contains two buffers and performs the Boolean function $Y = A$. The device functions as two independent buffers, but because of Schmitt action, it may have different input threshold levels for positive-going (V_{T+}) and negative-going (V_{T-}) signals.

10.2 Typical Power Button Circuit

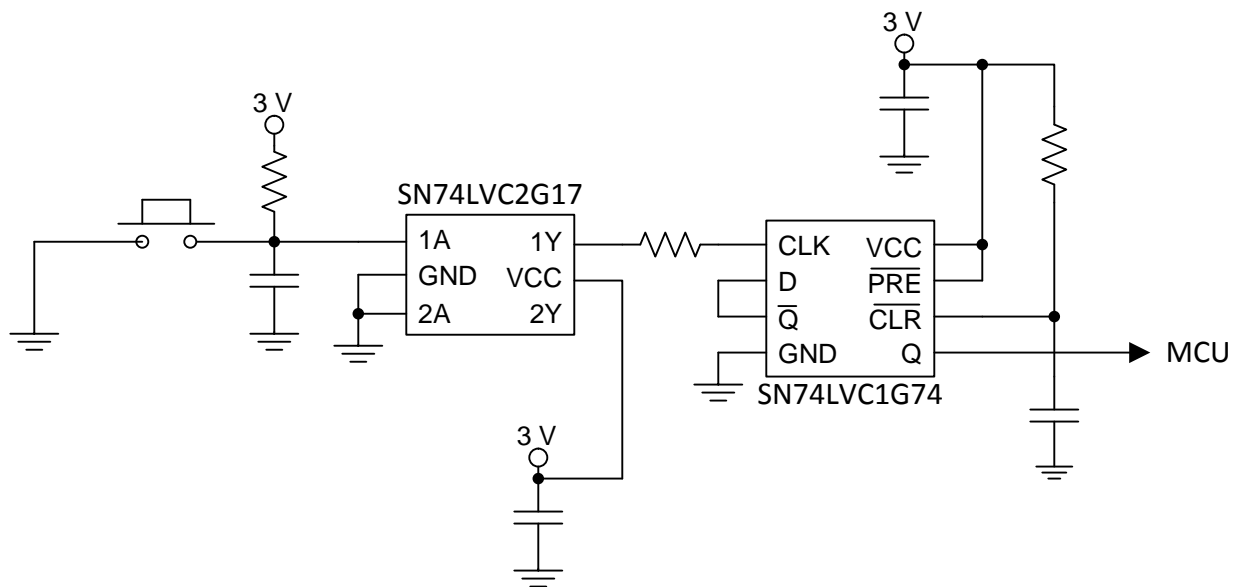


Figure 4. Device Power Button Circuit

10.2.1 Design Requirements

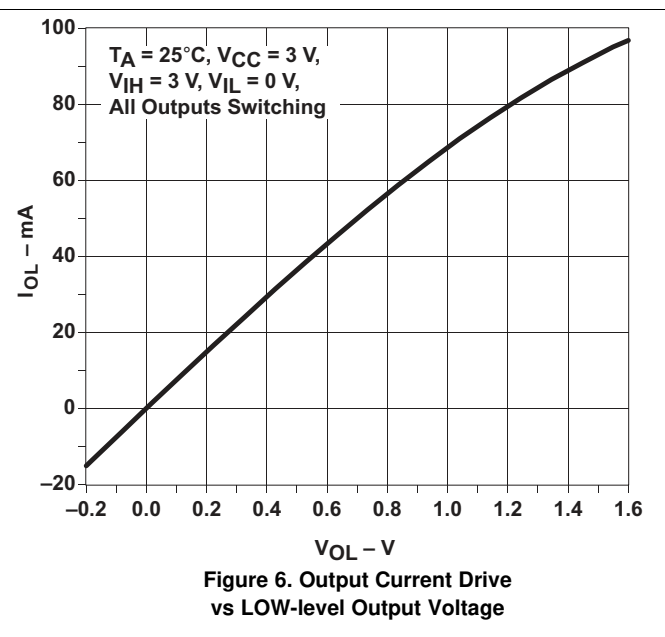
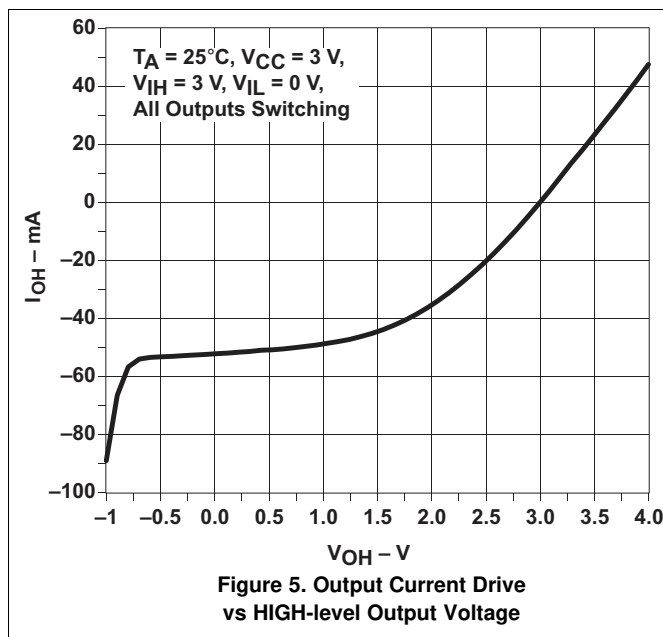
This device uses CMOS technology and has balanced output drive. Care should be taken to avoid bus contention because it can drive currents that would exceed maximum limits. Outputs can be combined to produce higher drive but the high drive will also create faster edges into light loads so routing and load conditions should be considered to prevent ringing.

10.2.2 Detailed Design Procedure

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

Typical Power Button Circuit (continued)

10.2.3 Application Curves



11 Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply voltage rating located in the [Recommended Operating Conditions](#) table.

Each V_{CC} terminal should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, a 0.1 μF capacitor is recommended. If there are multiple V_{CC} terminals then 0.01 μF or 0.022 μF capacitors are recommended for each power terminal. It is ok to parallel multiple bypass capacitors to reject different frequencies of noise. Multiple bypass capacitors may be paralleled to reject different frequencies of noise. The bypass capacitor should be installed as close to the power terminal as possible for the best results.

12 Layout

12.1 Layout Guidelines

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

Specified in [Figure 7](#) are rules that must be observed under all circumstances. All unused inputs of digital logic devices must be connected to a high or low bias to prevent them from floating. The logic level that should be applied to any particular unused input depends on the function of the device. Generally they will be tied to GND or V_{CC} , whichever makes more sense or is more convenient.

12.2 Layout Example

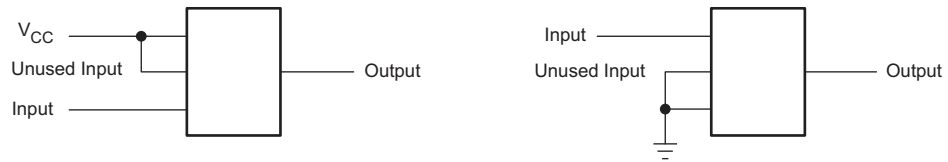


Figure 7. Layout Diagram

13 Device and Documentation Support

13.1 Trademarks

NanoFree is a trademark of Texas Instruments.
All other trademarks are the property of their respective owners.

13.2 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.

13.3 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms and definitions.

14 Mechanical, Packaging, and Orderable Information

The following pages include mechanical packaging and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser based versions of this data sheet, refer to the left hand navigation.

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead finish/ Ball material (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|-------------------|---------------|--------------|-----------------|------|-------------|------------------|--------------------------------------|----------------------|--------------|---------------------------|-------------------------|
| SN74LVC2G17DBVR | ACTIVE | SOT-23 | DBV | 6 | 3000 | RoHS & Green | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (C175, C17F, C17K, C17R) | Samples |
| SN74LVC2G17DBVT | ACTIVE | SOT-23 | DBV | 6 | 250 | RoHS & Green | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (C175, C17F, C17K, C17R) | Samples |
| SN74LVC2G17DBVTG4 | ACTIVE | SOT-23 | DBV | 6 | 250 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (C17F, C17R) | Samples |
| SN74LVC2G17DCK3 | ACTIVE | SC70 | DCK | 6 | 3000 | RoHS & Non-Green | SNBI | Level-1-260C-UNLIM | -40 to 85 | (C7F, C7Z) | Samples |
| SN74LVC2G17DCKR | ACTIVE | SC70 | DCK | 6 | 3000 | RoHS & Green | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (C75, C7F, C7J, C7K, C7R) | Samples |
| SN74LVC2G17DCKRE4 | ACTIVE | SC70 | DCK | 6 | 3000 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | C75 | Samples |
| SN74LVC2G17DCKRG4 | ACTIVE | SC70 | DCK | 6 | 3000 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | C75 | Samples |
| SN74LVC2G17DCKT | ACTIVE | SC70 | DCK | 6 | 250 | RoHS & Green | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (C75, C7F, C7J, C7K, C7R) | Samples |
| SN74LVC2G17DCKTE4 | ACTIVE | SC70 | DCK | 6 | 250 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | C75 | Samples |
| SN74LVC2G17DCKTG4 | ACTIVE | SC70 | DCK | 6 | 250 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | C75 | Samples |
| SN74LVC2G17DRYR | ACTIVE | SON | DRY | 6 | 5000 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | C7 | Samples |
| SN74LVC2G17DSF2 | ACTIVE | SON | DSF | 6 | 5000 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | C7 | Samples |
| SN74LVC2G17DSFR | ACTIVE | SON | DSF | 6 | 5000 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | C7 | Samples |
| SN74LVC2G17YZPR | ACTIVE | DSBGA | YZP | 6 | 3000 | RoHS & Green | SNAGCU | Level-1-260C-UNLIM | -40 to 85 | (C77, C7N) | 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 ≤ 1000 ppm threshold. Antimony trioxide based flame retardants must also meet the ≤ 1000 ppm 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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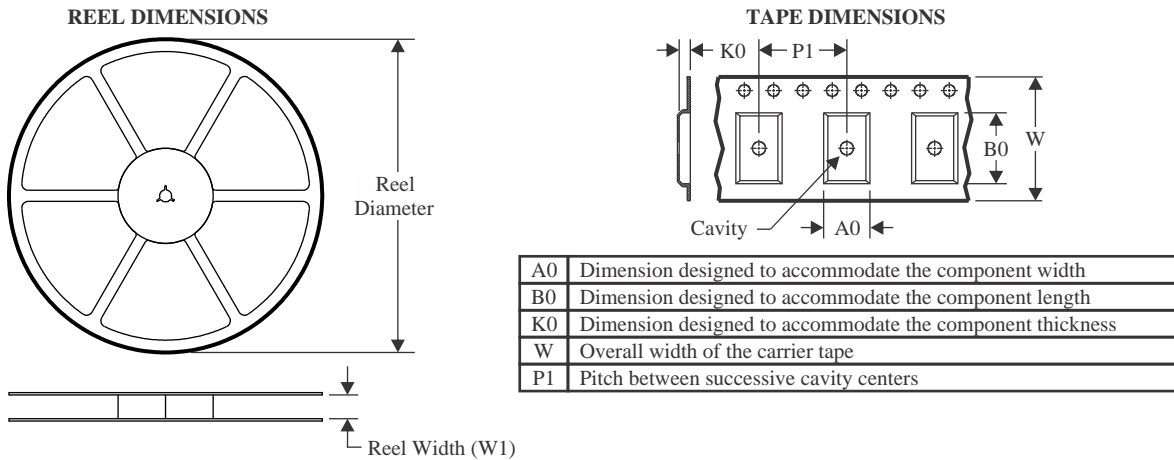
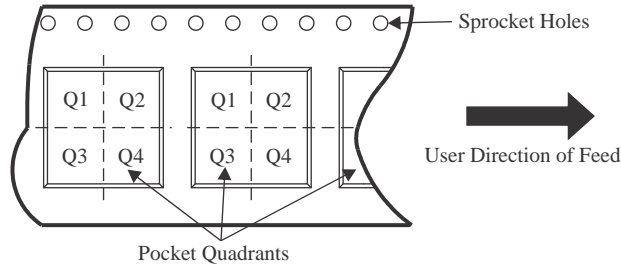
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN74LVC2G17 :

- Automotive: [SN74LVC2G17-Q1](#)
- Enhanced Product: [SN74LVC2G17-EP](#)

NOTE: Qualified Version Definitions:

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

TAPE AND REEL INFORMATION

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 |
|-------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LVC2G17DBVR | SOT-23 | DBV | 6 | 3000 | 180.0 | 8.4 | 3.2 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DBVT | SOT-23 | DBV | 6 | 250 | 180.0 | 8.4 | 3.23 | 3.17 | 1.37 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DBVT | SOT-23 | DBV | 6 | 250 | 178.0 | 9.2 | 3.3 | 3.23 | 1.55 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DBVTG4 | SOT-23 | DBV | 6 | 250 | 178.0 | 9.0 | 3.23 | 3.17 | 1.37 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DCKR | SC70 | DCK | 6 | 3000 | 180.0 | 8.4 | 2.3 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DCKRG4 | SC70 | DCK | 6 | 3000 | 178.0 | 9.2 | 2.4 | 2.4 | 1.22 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DCKT | SC70 | DCK | 6 | 250 | 180.0 | 8.4 | 2.41 | 2.41 | 1.2 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DCKT | SC70 | DCK | 6 | 250 | 178.0 | 9.2 | 2.4 | 2.4 | 1.22 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DCKT | SC70 | DCK | 6 | 250 | 178.0 | 9.0 | 2.4 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DCKTG4 | SC70 | DCK | 6 | 250 | 178.0 | 9.2 | 2.4 | 2.4 | 1.22 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DRYR | SON | DRY | 6 | 5000 | 180.0 | 9.5 | 1.15 | 1.6 | 0.75 | 4.0 | 8.0 | Q1 |
| SN74LVC2G17DSF2 | SON | DSF | 6 | 5000 | 180.0 | 9.5 | 1.16 | 1.16 | 0.5 | 4.0 | 8.0 | Q3 |
| SN74LVC2G17DSFR | SON | DSF | 6 | 5000 | 180.0 | 9.5 | 1.16 | 1.16 | 0.5 | 4.0 | 8.0 | Q2 |
| SN74LVC2G17YZPR | DSBGA | YZP | 6 | 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) |
|-------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LVC2G17DBVR | SOT-23 | DBV | 6 | 3000 | 210.0 | 185.0 | 35.0 |
| SN74LVC2G17DBVT | SOT-23 | DBV | 6 | 250 | 202.0 | 201.0 | 28.0 |
| SN74LVC2G17DBVT | SOT-23 | DBV | 6 | 250 | 180.0 | 180.0 | 18.0 |
| SN74LVC2G17DBVTG4 | SOT-23 | DBV | 6 | 250 | 180.0 | 180.0 | 18.0 |
| SN74LVC2G17DCKR | SC70 | DCK | 6 | 3000 | 210.0 | 185.0 | 35.0 |
| SN74LVC2G17DCKRG4 | SC70 | DCK | 6 | 3000 | 180.0 | 180.0 | 18.0 |
| SN74LVC2G17DCKT | SC70 | DCK | 6 | 250 | 202.0 | 201.0 | 28.0 |
| SN74LVC2G17DCKT | SC70 | DCK | 6 | 250 | 180.0 | 180.0 | 18.0 |
| SN74LVC2G17DCKT | SC70 | DCK | 6 | 250 | 180.0 | 180.0 | 18.0 |
| SN74LVC2G17DCKTG4 | SC70 | DCK | 6 | 250 | 180.0 | 180.0 | 18.0 |
| SN74LVC2G17DRYR | SON | DRY | 6 | 5000 | 184.0 | 184.0 | 19.0 |
| SN74LVC2G17DSF2 | SON | DSF | 6 | 5000 | 184.0 | 184.0 | 19.0 |
| SN74LVC2G17DSFR | SON | DSF | 6 | 5000 | 184.0 | 184.0 | 19.0 |
| SN74LVC2G17YZPR | DSBGA | YZP | 6 | 3000 | 220.0 | 220.0 | 35.0 |

GENERIC PACKAGE VIEW

DRY 6

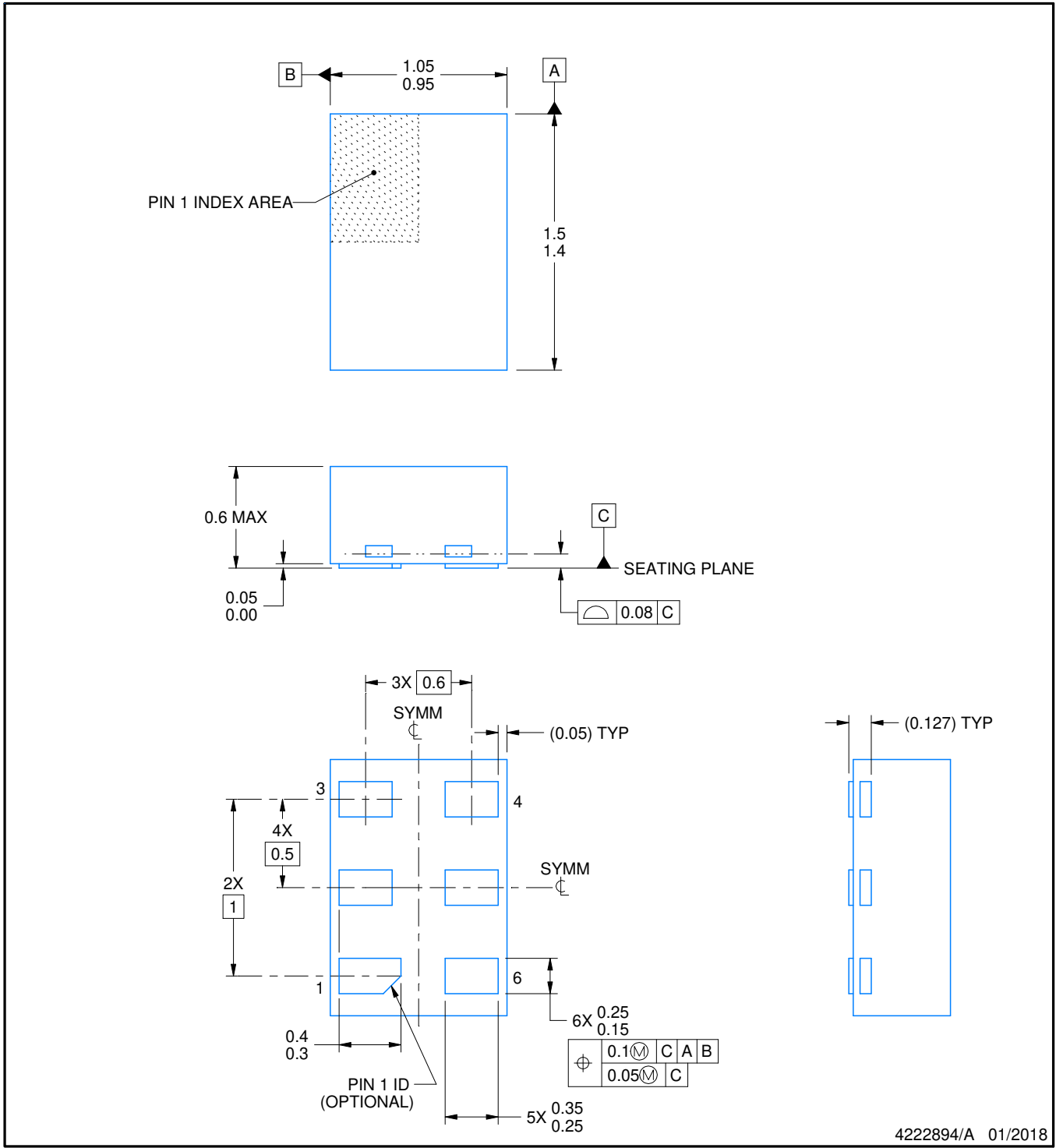
USON - 0.6 mm max height

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



4222894/A 01/2018

NOTES:

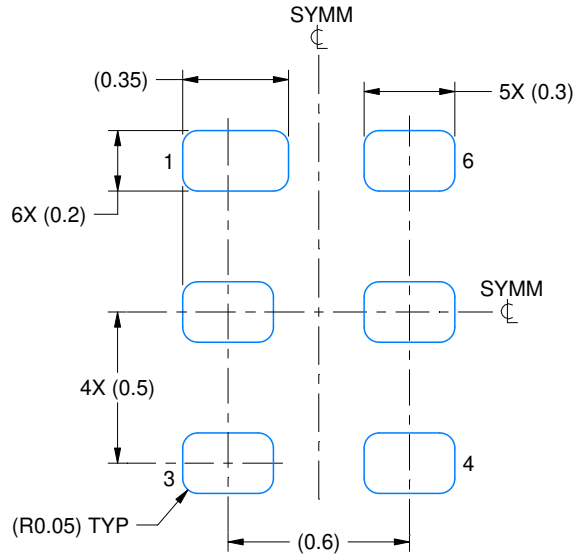
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

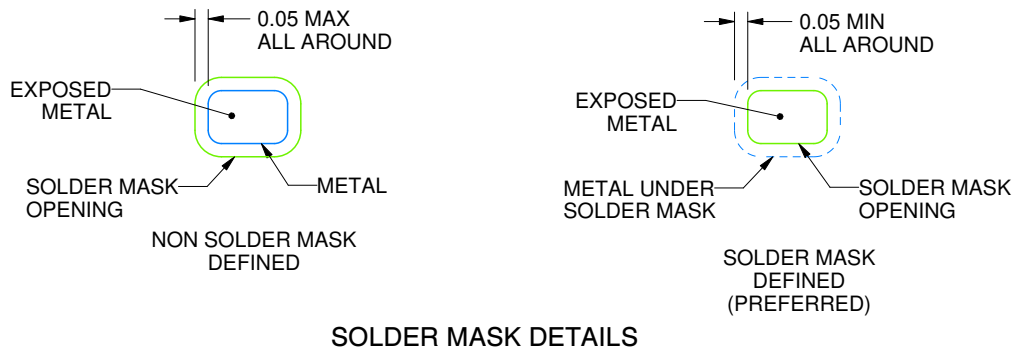
DRY0006A

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)

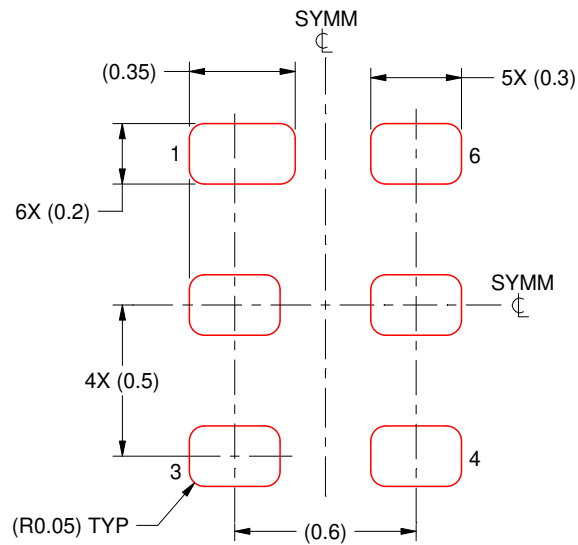
3. For more information, see QFN/SON PCB application report in literature No. SLUA271 (www.ti.com/lit/slue271).

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)

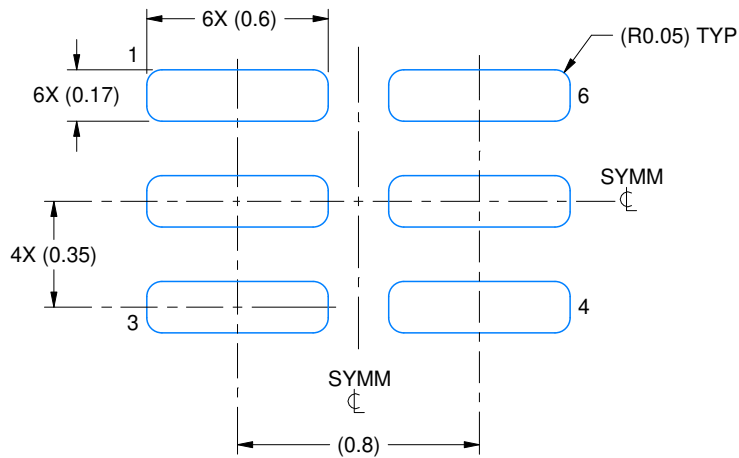
4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

EXAMPLE BOARD LAYOUT

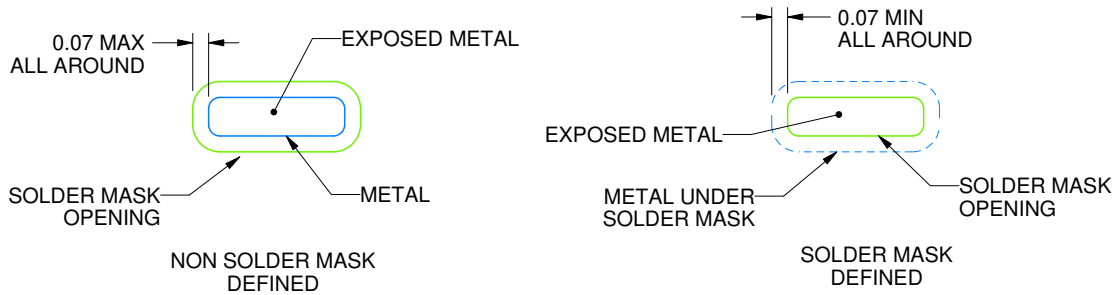
DSF0006A

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)

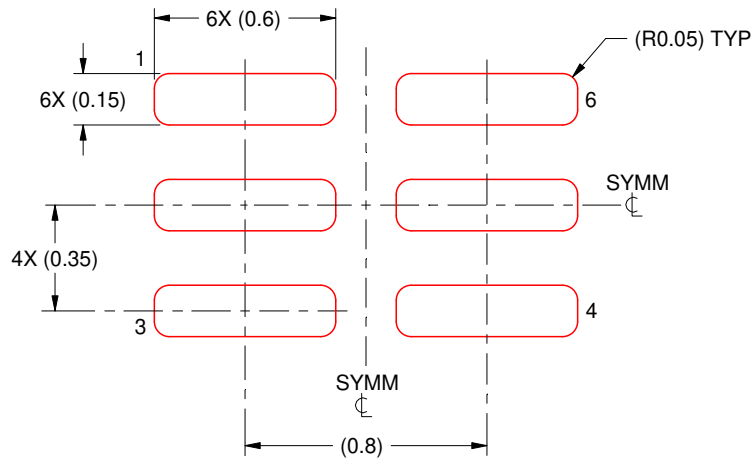
4. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).

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.

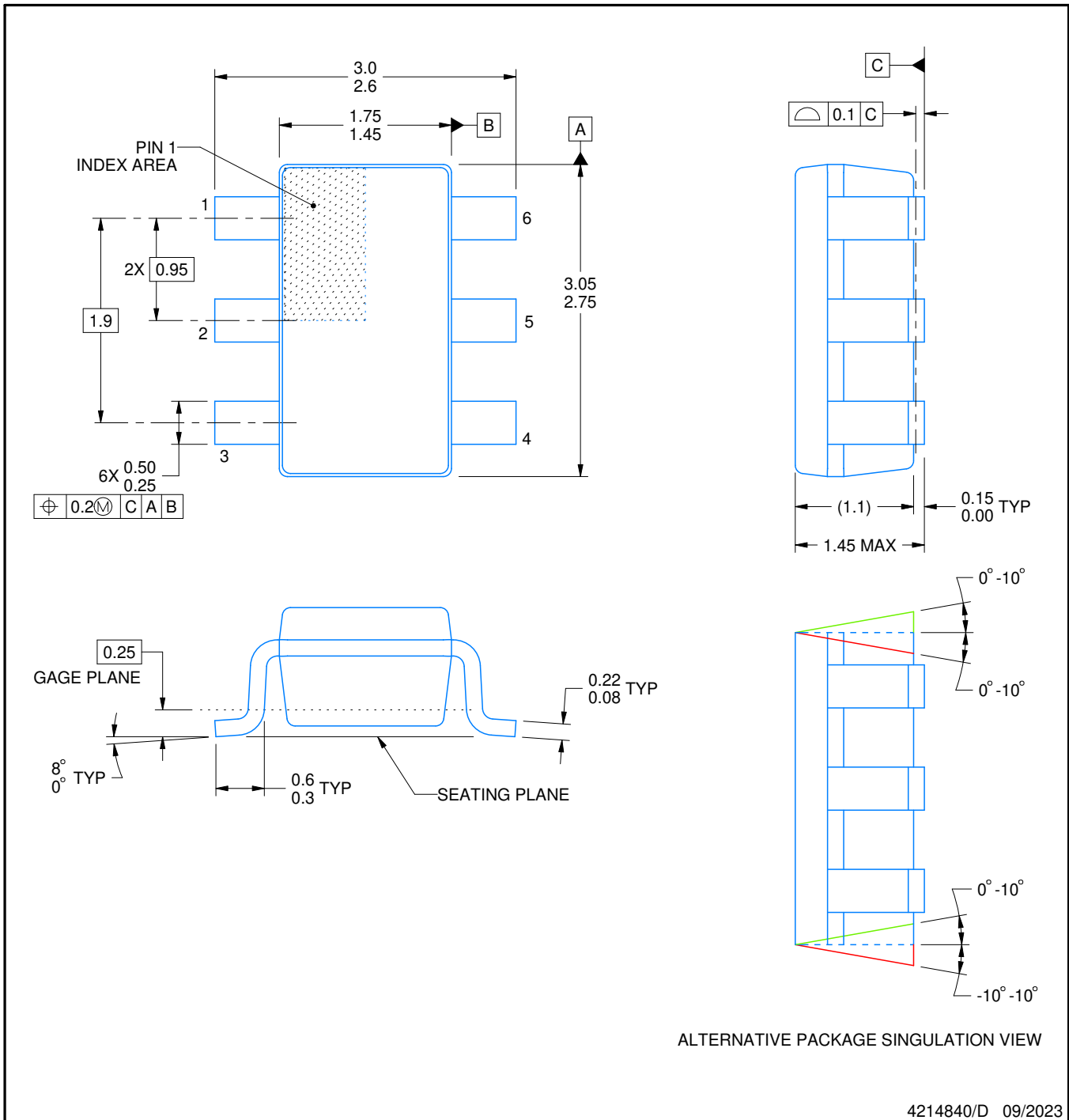
DBV0006A



PACKAGE OUTLINE

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



NOTES:

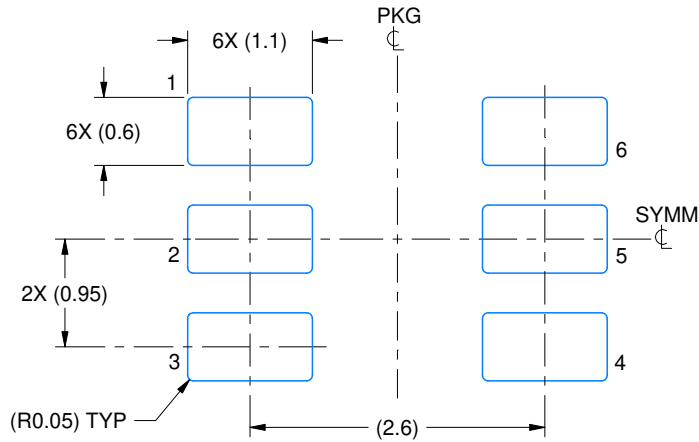
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.25 per side.
4. Leads 1,2,3 may be wider than leads 4,5,6 for package orientation.
5. Reference JEDEC MO-178.

EXAMPLE BOARD LAYOUT

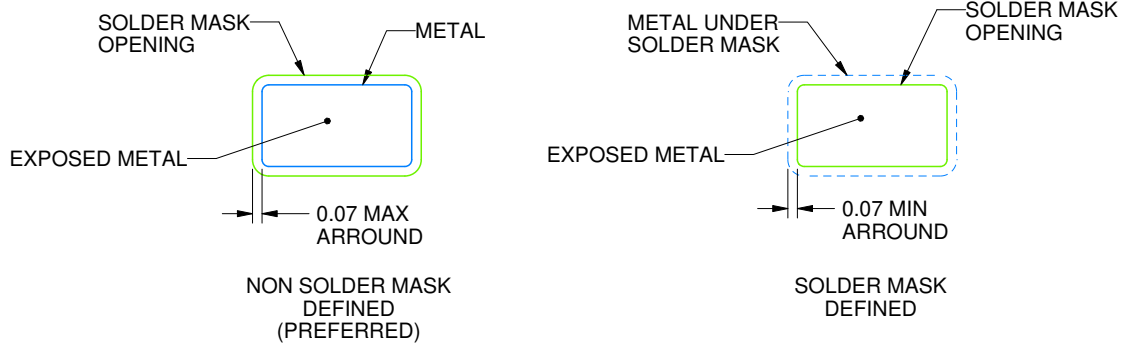
DBV0006A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X



SOLDER MASK DETAILS

4214840/D 09/2023

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

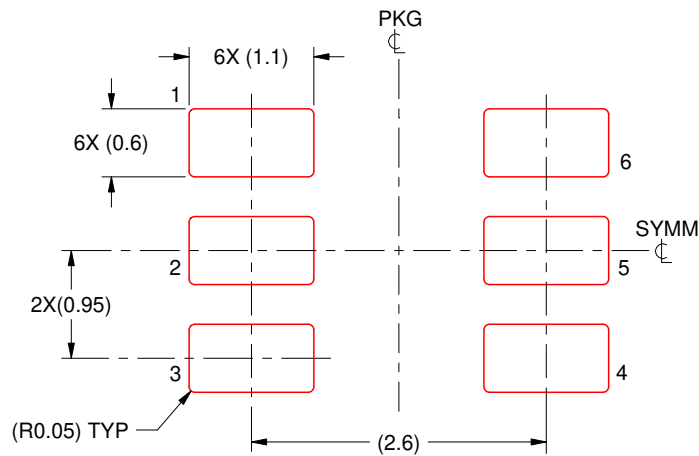
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DBV0006A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



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

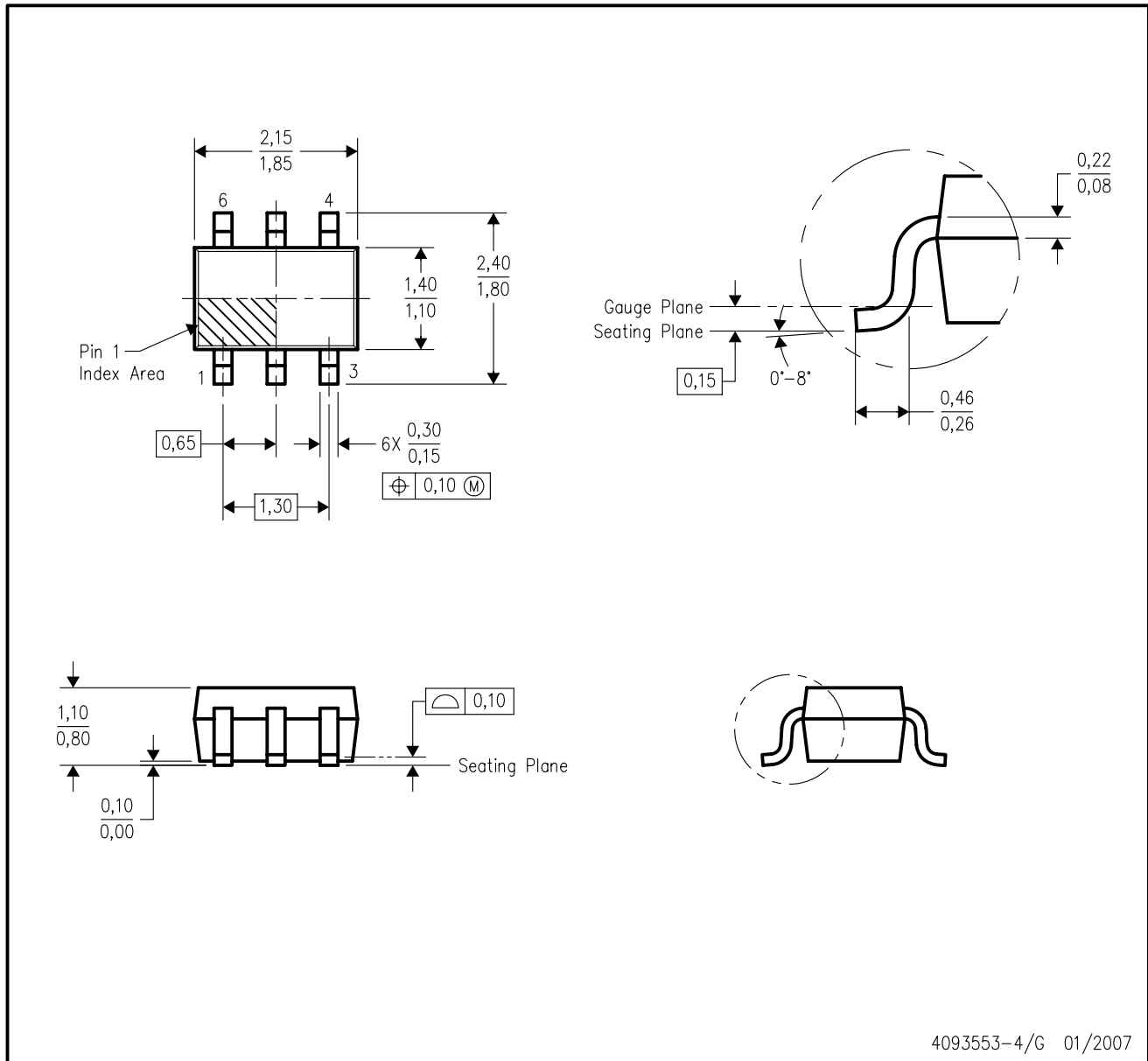
4214840/D 09/2023

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.

DCK (R-PDSO-G6)

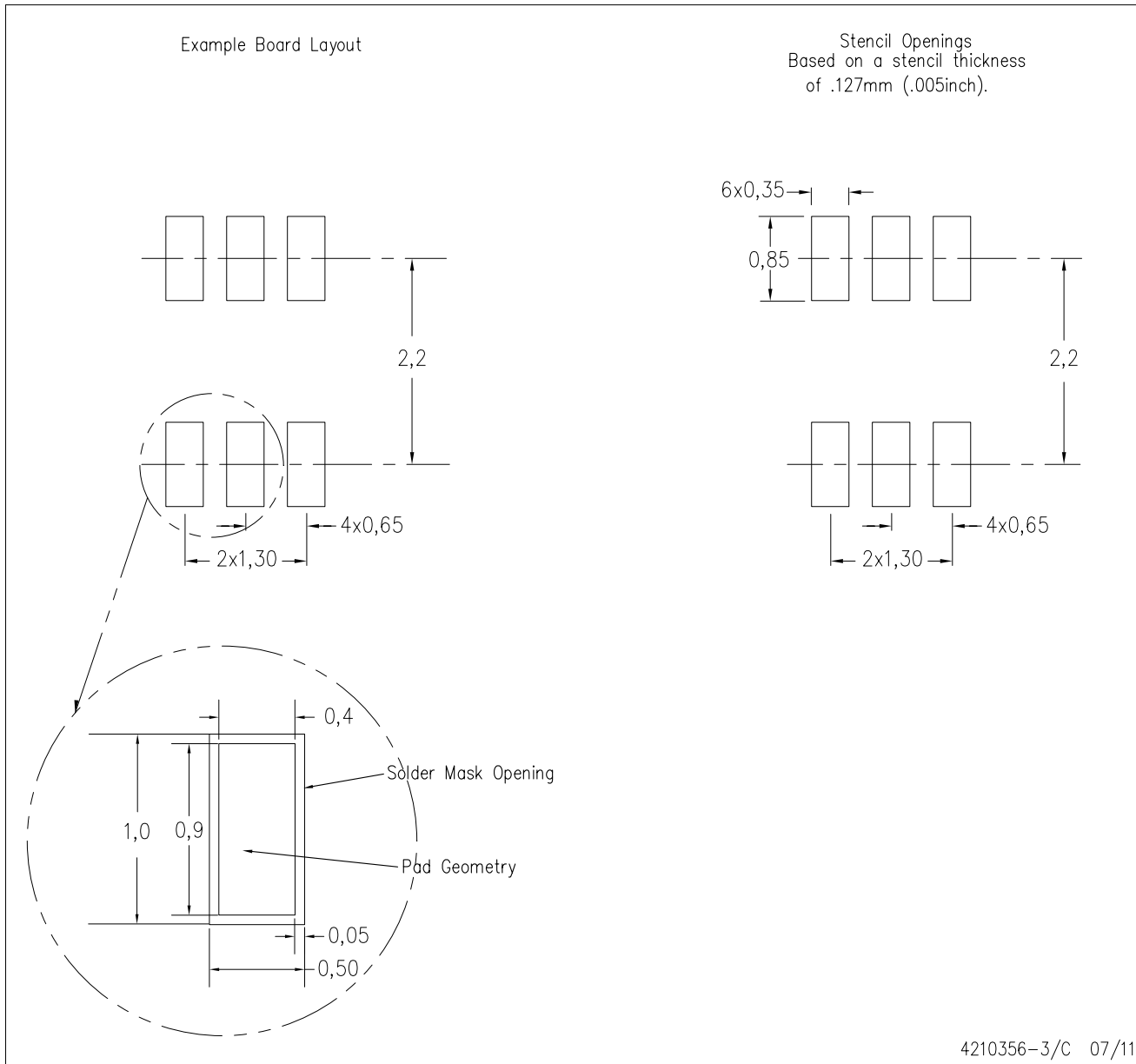
PLASTIC SMALL-OUTLINE PACKAGE



- 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-203 variation AB.

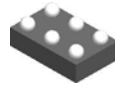
DCK (R-PDSO-G6)

PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
 - Publication IPC-7351 is recommended for alternate designs.
 - 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. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.

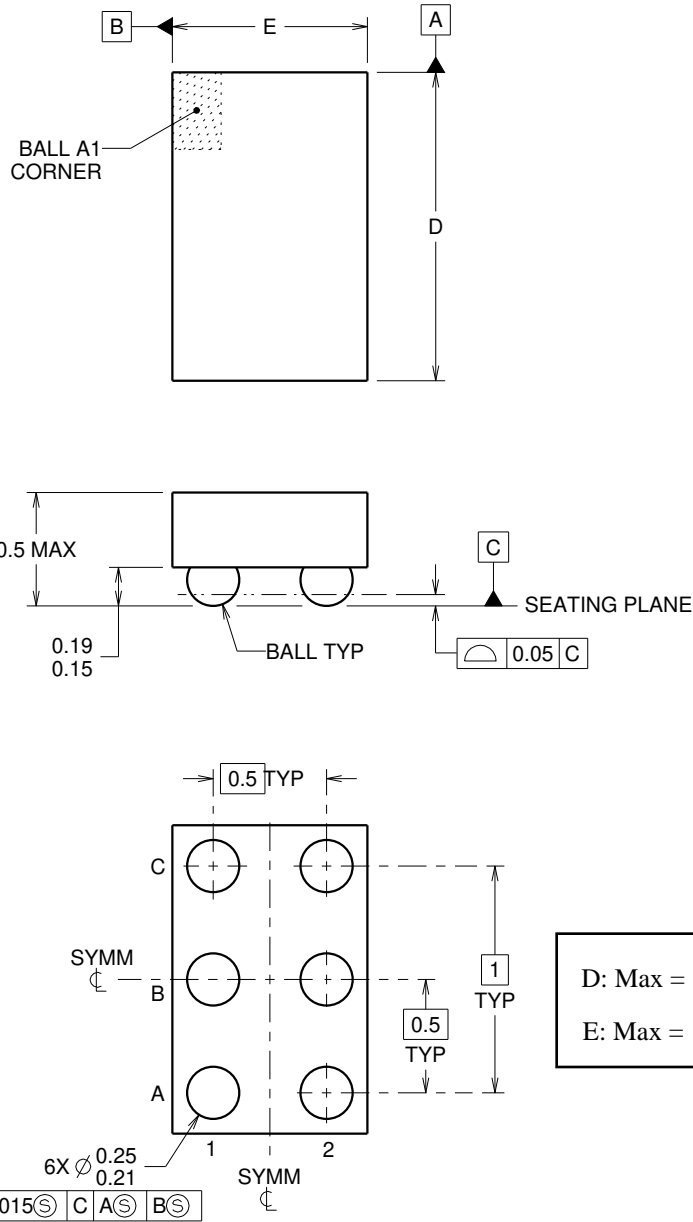
YZP0006



PACKAGE OUTLINE

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



D: Max = 1.418 mm, Min = 1.357 mm
 E: Max = 0.918 mm, Min = 0.857 mm

4219524/A 06/2014

NOTES:

NanoFree is a trademark of Texas Instruments.

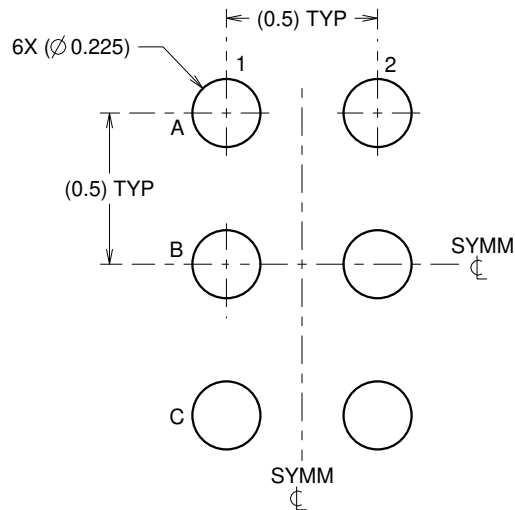
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. NanoFree™ package configuration.

EXAMPLE BOARD LAYOUT

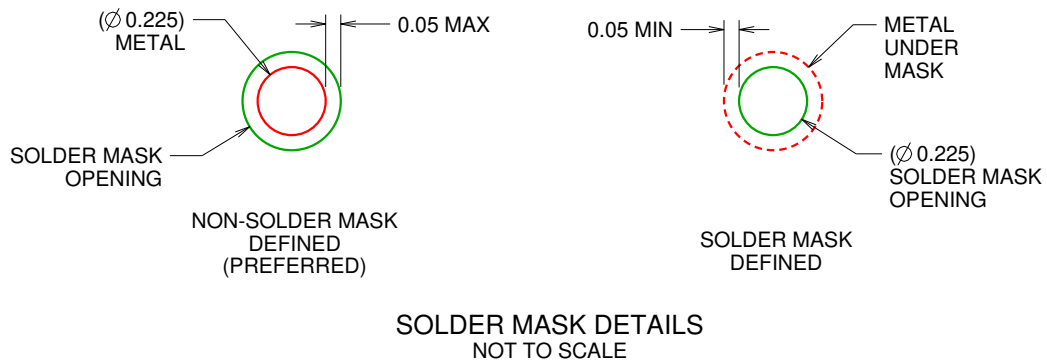
YZP0006

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



LAND PATTERN EXAMPLE
SCALE:40X



4219524/A 06/2014

NOTES: (continued)

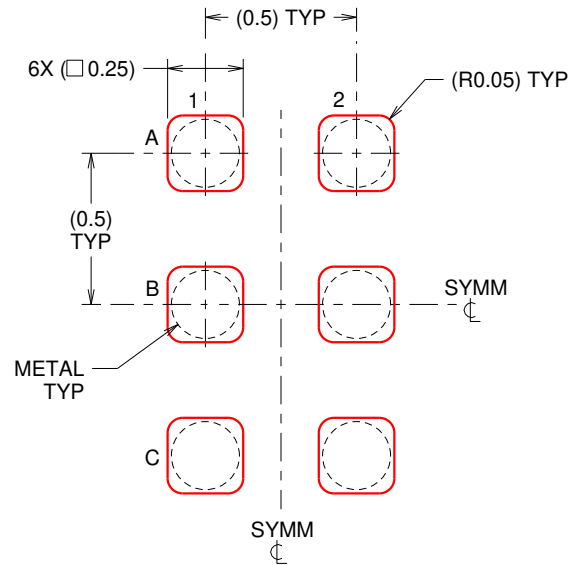
- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For more information, see Texas Instruments literature number SBVA017 (www.ti.com/lit/sbva017).

EXAMPLE STENCIL DESIGN

YZP0006

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



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

4219524/A 06/2014

NOTES: (continued)

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

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