

## SN74LVC1G17 Single Schmitt-Trigger Buffer

### 1 Features

- Available in Ultra Small 0.64-mm<sup>2</sup> Package (DPW) With 0.5-mm Pitch
- Supports 5-V  $V_{CC}$  Operation
- Inputs Accept Voltages to 5.5 V
- Max  $t_{pd}$  of 4.6 ns at 3.3 V
- Low Power Consumption, 10- $\mu$ A Max  $I_{CC}$
- $\pm 24$ -mA Output Drive at 3.3 V
- $I_{off}$  Supports Live Insertion, Partial-Power-Down Mode, 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 (A114-A)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)

### 2 Applications

- AV Receiver
- Audio Dock: Portable
- Blu-ray Player and Home Theater
- MP3 Player/Recorder
- Personal Digital Assistant (PDA)
- Power: Telecom/Server AC/DC Supply: Single Controller: Analog and Digital
- Solid State Drive (SSD): Client and Enterprise
- TV: LCD/Digital and High-Definition (HDTV)
- Tablet: Enterprise
- Video Analytics: Server
- Wireless Headset, Keyboard, and Mouse

### 3 Description

This single Schmitt-trigger buffer is designed for 1.65-V to 5.5-V  $V_{CC}$  operation.

The SN74LVC1G17 device contains one buffer and performs the Boolean function  $Y = A$ .

The CMOS device has high output drive while maintaining low static power dissipation over a broad  $V_{CC}$  operating range.

The SN74LVC1G17 is available in a variety of packages, including the ultra-small DPW package with a body size of 0.8 mm  $\times$  0.8mm.

**Device Information**

| DEVICE NAME | PACKAGE <sup>(1)</sup> | BODY SIZE             |
|-------------|------------------------|-----------------------|
| SN74LVC1G17 | SOT-23 (5)             | 2.9mm $\times$ 1.6mm  |
|             | SC70 (5)               | 2.0mm $\times$ 1.25mm |
|             | X2SON (4)              | 0.8mm $\times$ 0.8mm  |
|             | SON (6)                | 1.45mm $\times$ 1.0mm |
|             | SON (6)                | 1.0mm $\times$ 1.0mm  |

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



## Table of Contents

|                                                                                          |          |                                                                  |           |
|------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------|-----------|
| <b>1 Features</b> .....                                                                  | <b>1</b> | <b>8 Detailed Description</b> .....                              | <b>10</b> |
| <b>2 Applications</b> .....                                                              | <b>1</b> | 8.1 Overview.....                                                | 10        |
| <b>3 Description</b> .....                                                               | <b>1</b> | 8.2 Functional Block Diagram.....                                | 10        |
| <b>4 Revision History</b> .....                                                          | <b>2</b> | 8.3 Feature Description.....                                     | 10        |
| <b>5 Pin Configuration and Functions</b> .....                                           | <b>3</b> | 8.4 Device Functional Modes.....                                 | 10        |
| <b>6 Specifications</b> .....                                                            | <b>4</b> | <b>9 Applications and Implementation</b> .....                   | <b>11</b> |
| 6.1 Absolute Maximum Ratings .....                                                       | 4        | 9.1 Application Information.....                                 | 11        |
| 6.2 Handling Ratings.....                                                                | 4        | 9.2 Typical Application.....                                     | 11        |
| 6.3 Recommended Operating Conditions .....                                               | 5        | <b>10 Power Supply Recommendations</b> .....                     | <b>12</b> |
| 6.4 Thermal Information.....                                                             | 5        | <b>11 Layout</b> .....                                           | <b>13</b> |
| 6.5 Electrical Characteristics—DC Limit Changes.....                                     | 6        | 11.1 Layout Guidelines.....                                      | 13        |
| 6.6 Switching Characteristics, $C_L = 15$ pF.....                                        | 7        | 11.2 Layout Example.....                                         | 13        |
| 6.7 Switching Characteristics AC Limit, $-40^\circ\text{C}$ TO $85^\circ\text{C}$ .....  | 7        | <b>12 Device and Documentation Support</b> .....                 | <b>14</b> |
| 6.8 Switching Characteristics AC Limit, $-40^\circ\text{C}$ TO $125^\circ\text{C}$ ..... | 7        | 12.1 Trademarks.....                                             | 14        |
| 6.9 Operating Characteristics.....                                                       | 7        | 12.2 Electrostatic Discharge Caution.....                        | 14        |
| 6.10 Typical Characteristics.....                                                        | 7        | 12.3 Glossary.....                                               | 14        |
| <b>7 Parameter Measurement Information</b> .....                                         | <b>8</b> | <b>13 Mechanical, Packaging, and Orderable Information</b> ..... | <b>14</b> |

## 4 Revision History

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

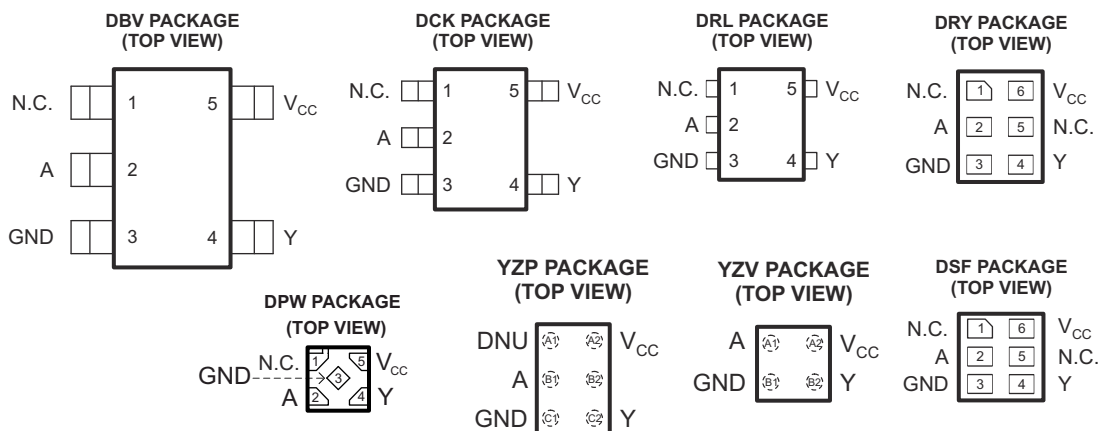
| <b>Changes from Revision V (April 2014) to Revision W (September 2020)</b>                                 | <b>Page</b> |
|------------------------------------------------------------------------------------------------------------|-------------|
| • Updated the numbering format for tables, figures, and cross-references throughout the document.....      | 1           |
| • Corrected part number from SN74LVC1G14 to SN74LVC1G17 in the <i>Application Information</i> section..... | 11          |
| • Corrected typical application schematic in <i>Typical Application</i> section.....                       | 11          |

| <b>Changes from Revision U (February 2014) to Revision V (April 2014)</b> | <b>Page</b> |
|---------------------------------------------------------------------------|-------------|
| • Added Pin Functions table. ....                                         | 3           |
| • Added Handling Ratings table. ....                                      | 4           |
| • Added Thermal Information table. ....                                   | 5           |
| • Added Typical Characteristics. ....                                     | 7           |
| • Added Application and Implementation section. ....                      | 11          |
| • Added Power Supply Recommendations section. ....                        | 12          |
| • Added Layout section. ....                                              | 13          |

| <b>Changes from Revision T (November 2012) to Revision U (February 2014)</b>                                  | <b>Page</b> |
|---------------------------------------------------------------------------------------------------------------|-------------|
| • Added Applications.....                                                                                     | 1           |
| • Moved $T_{stg}$ to Handling Ratings table.....                                                              | 4           |
| • Changed MAX operating free-air temperature from $85^\circ\text{C}$ to $125^\circ\text{C}$ .....             | 5           |
| • Added $-40^\circ\text{C}$ to $125^\circ\text{C}$ to Electrical Characteristics table.....                   | 6           |
| • Added Switching Characteristics table for $-40^\circ\text{C}$ to $125^\circ\text{C}$ temperature range..... | 7           |

| <b>Changes from Revision S (June 2011) to Revision T (November 2012)</b> | <b>Page</b> |
|--------------------------------------------------------------------------|-------------|
| • Removed Ordering Information table.....                                | 3           |

## 5 Pin Configuration and Functions



N.C. – No internal connection  
See mechanical drawings for dimensions.  
DNU – Do not use

### Pin Functions

| NAME            | PIN                |          |        |     | DESCRIPTION    |
|-----------------|--------------------|----------|--------|-----|----------------|
|                 | DBV, DCK, DRL, DPW | DRY, DSF | YZP    | YZV |                |
| NC              | 1                  | 1, 5     | A1, B2 | –   | Not connected  |
| A               | 2                  | 2        | B1     | A1  | Input          |
| GND             | 3                  | 3        | C1     | B1  | Ground         |
| Y               | 4                  | 4        | C2     | B2  | Output         |
| V <sub>CC</sub> | 5                  | 6        | A2     | A2  | Power terminal |

## 6 Specifications

### 6.1 Absolute Maximum Ratings

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

|          |                                                                                             | MIN  | MAX            | UNIT |
|----------|---------------------------------------------------------------------------------------------|------|----------------|------|
| $V_{CC}$ | Supply voltage range                                                                        | –0.5 | 6.5            | V    |
| $V_I$    | Input voltage range <sup>(1)</sup>                                                          | –0.5 | 6.5            | V    |
| $V_O$    | Voltage range applied to any output in the high-impedance or power-off state <sup>(1)</sup> | –0.5 | 6.5            | V    |
| $V_O$    | Voltage range applied to any output in the high or low state <sup>(1) (2)</sup>             | –0.5 | $V_{CC} + 0.5$ | V    |
| $I_{IK}$ | Input clamp current<br>$V_I < 0$                                                            |      | –50            | mA   |
| $I_{OK}$ | Output clamp current<br>$V_O < 0$                                                           |      | –50            | mA   |
| $I_O$    | Continuous output current                                                                   |      | ±50            | mA   |
|          | Continuous current through $V_{CC}$ or GND                                                  |      | ±100           | mA   |

(1) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(2) The value of  $V_{CC}$  is provided in the *Recommended Operating Conditions* table.

### 6.2 Handling Ratings

|                 |                                           | MIN | MAX | UNIT |
|-----------------|-------------------------------------------|-----|-----|------|
| $T_{stg}$       | Storage temperature range                 | –65 | 150 | °C   |
| $V_{ESD}^{(1)}$ | Human-Body Model (HBM) <sup>(2)</sup>     | 0   | 2   | kV   |
|                 | Charged-Device Model (CDM) <sup>(3)</sup> | 0   | 1   | kV   |

(1) Electrostatic discharge (ESD) to measure device sensitivity and immunity to damage caused by assembly line electrostatic discharges in to the device.

(2) Level listed above is the passing level per ANSI, ESDA, and JEDEC JS-001. JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(3) Level listed above is the passing level per EIA-JEDEC JESD22-C101. JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

### 6.3 Recommended Operating Conditions

|                 |                                |                          | MIN  | MAX             | UNIT |
|-----------------|--------------------------------|--------------------------|------|-----------------|------|
| V <sub>CC</sub> | Supply voltage                 | Operating                | 1.65 | 5.5             | V    |
|                 |                                | Data retention only      | 1.5  |                 |      |
| V <sub>I</sub>  | Input voltage                  |                          | 0    | 5.5             | V    |
| V <sub>O</sub>  | Output voltage                 |                          | 0    | V <sub>CC</sub> | V    |
| I <sub>OH</sub> | High-level output current      | V <sub>CC</sub> = 1.65 V |      | –4              | mA   |
|                 |                                | V <sub>CC</sub> = 2.3 V  |      | –8              |      |
|                 |                                | V <sub>CC</sub> = 3 V    |      | –16             |      |
|                 |                                |                          |      | –24             |      |
|                 |                                | V <sub>CC</sub> = 4.5 V  |      | –32             |      |
| I <sub>OL</sub> | Low-level output current       | V <sub>CC</sub> = 1.65 V |      | 4               | mA   |
|                 |                                | V <sub>CC</sub> = 2.3 V  |      | 8               |      |
|                 |                                | V <sub>CC</sub> = 3 V    |      | 16              |      |
|                 |                                |                          |      | 24              |      |
|                 |                                | V <sub>CC</sub> = 4.5 V  |      | 32              |      |
| T <sub>A</sub>  | Operating free-air temperature |                          | –40  | 125             | °C   |

### 6.4 Thermal Information

| THERMAL METRIC <sup>(1)</sup> |                                              | SN74LVC1G17 |        |        |        |        |        |        | UNIT |
|-------------------------------|----------------------------------------------|-------------|--------|--------|--------|--------|--------|--------|------|
|                               |                                              | DBV         | DCK    | DRL    | DRY    | YZP    | DPW    | YZV    |      |
|                               |                                              | 5 PINS      | 5 PINS | 5 PINS | 6 PINS | 5 PINS | 4 PINS | 4 PINS |      |
| R <sub>θJA</sub>              | Junction-to-ambient thermal resistance       | 229         | 280    | 350    | 608    | 130    | 340    | 181    | °C/W |
| R <sub>θJC(top)</sub>         | Junction-to-case (top) thermal resistance    | 164         | 66     | 121    | 432    | 54     | 215    | 1      |      |
| R <sub>θJB</sub>              | Junction-to-board thermal resistance         | 62          | 67     | 171    | 446    | 51     | 294    | 39     |      |
| ψ <sub>JT</sub>               | Junction-to-top characterization parameter   | 44          | 2      | 11     | 191    | 1      | 41     | 8      |      |
| ψ <sub>JB</sub>               | Junction-to-board characterization parameter | 62          | 66     | 169    | 442    | 50     | 294    | 38     |      |
| R <sub>θJC(bot)</sub>         | Junction-to-case (bottom) thermal resistance | –           | –      | –      | 198    | –      | 250    | –      |      |

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

## 6.5 Electrical Characteristics—DC Limit Changes

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

| PARAMETER                                                             |                                | TEST CONDITIONS                                                                 | V <sub>CC</sub>    | 25°C            |                    |     | –40°C TO 85°C         |                    |      | –40°C TO 125°C        |     |      | UNIT |
|-----------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------|--------------------|-----------------|--------------------|-----|-----------------------|--------------------|------|-----------------------|-----|------|------|
|                                                                       |                                |                                                                                 |                    | MIN             | TYP <sup>(1)</sup> | MAX | MIN                   | TYP <sup>(1)</sup> | MAX  | MIN                   | TYP | MAX  |      |
| V <sub>T+</sub><br>(Positive-going<br>input threshold<br>voltage)     |                                |                                                                                 | 1.65 V             |                 |                    |     | 0.76                  |                    | 1.13 | 0.76                  |     | 1.13 | V    |
|                                                                       |                                |                                                                                 | 2.3 V              |                 |                    |     | 1.08                  |                    | 1.56 | 1.08                  |     | 1.56 |      |
|                                                                       |                                |                                                                                 | 3 V                |                 |                    |     | 1.48                  |                    | 1.92 | 1.48                  |     | 1.92 |      |
|                                                                       |                                |                                                                                 | 4.5 V              |                 |                    |     | 2.19                  |                    | 2.74 | 2.19                  |     | 2.74 |      |
|                                                                       |                                |                                                                                 | 5.5 V              |                 |                    |     | 2.65                  |                    | 3.33 | 2.65                  |     | 3.33 |      |
| V <sub>T–</sub><br>(Negative-going<br>input threshold<br>voltage)     |                                |                                                                                 | 1.65 V             |                 |                    |     | 0.35                  |                    | 0.59 | 0.35                  |     | 0.59 | V    |
|                                                                       |                                |                                                                                 | 2.3 V              |                 |                    |     | 0.56                  |                    | 0.88 | 0.56                  |     | 0.88 |      |
|                                                                       |                                |                                                                                 | 3 V                |                 |                    |     | 0.89                  |                    | 1.2  | 0.89                  |     | 1.2  |      |
|                                                                       |                                |                                                                                 | 4.5 V              |                 |                    |     | 1.51                  |                    | 1.97 | 1.51                  |     | 1.97 |      |
|                                                                       |                                |                                                                                 | 5.5 V              |                 |                    |     | 1.88                  |                    | 2.4  | 1.88                  |     | 2.4  |      |
| ΔV <sub>T</sub><br>Hysteresis<br>(V <sub>T+</sub> – V <sub>T–</sub> ) |                                |                                                                                 | 1.65 V             |                 |                    |     | 0.36                  |                    | 0.64 | 0.36                  |     | 0.64 | V    |
|                                                                       |                                |                                                                                 | 2.3 V              |                 |                    |     | 0.45                  |                    | 0.78 | 0.45                  |     | 0.78 |      |
|                                                                       |                                |                                                                                 | 3 V                |                 |                    |     | 0.51                  |                    | 0.83 | 0.51                  |     | 0.83 |      |
|                                                                       |                                |                                                                                 | 4.5 V              |                 |                    |     | 0.58                  |                    | 0.93 | 0.58                  |     | 0.93 |      |
|                                                                       |                                |                                                                                 | 5.5 V              |                 |                    |     | 0.69                  |                    | 1.04 | 0.69                  |     | 1.04 |      |
| V <sub>OH</sub>                                                       |                                | I <sub>OH</sub> = –100 μA                                                       | 1.65 V to 5.5 V    |                 |                    |     | V <sub>CC</sub> – 0.1 |                    |      | V <sub>CC</sub> – 0.1 |     |      | V    |
|                                                                       |                                |                                                                                 | 1.65 V             |                 |                    |     | 1.2                   |                    |      | 1.2                   |     |      |      |
|                                                                       |                                |                                                                                 | 2.3 V              |                 |                    |     | 1.9                   |                    |      | 1.9                   |     |      |      |
|                                                                       |                                |                                                                                 | 3 V                |                 |                    |     | 2.4                   |                    |      | 2.4                   |     |      |      |
|                                                                       |                                |                                                                                 |                    |                 |                    |     | 2.3                   |                    |      | 2.3                   |     |      |      |
|                                                                       |                                |                                                                                 | 4.5 V              |                 |                    |     | 3.8                   |                    |      | 3.8                   |     |      |      |
| V <sub>OL</sub>                                                       |                                | I <sub>OL</sub> = 100 μA                                                        | 1.65 V to 5.5 V    |                 |                    |     |                       |                    | 0.1  |                       |     | 0.1  | V    |
|                                                                       |                                |                                                                                 | 1.65 V             |                 |                    |     |                       |                    | 0.45 |                       |     | 0.45 |      |
|                                                                       |                                |                                                                                 | 2.3 V              |                 |                    |     |                       |                    | 0.3  |                       |     | 0.3  |      |
|                                                                       |                                |                                                                                 | 3 V                |                 |                    |     |                       |                    | 0.4  |                       |     | 0.4  |      |
|                                                                       |                                |                                                                                 |                    |                 |                    |     |                       |                    | 0.55 |                       |     | 0.55 |      |
|                                                                       |                                |                                                                                 | 4.5 V              |                 |                    |     |                       |                    | 0.55 |                       |     | 0.55 |      |
| I <sub>I</sub>                                                        | A input                        | V <sub>I</sub> = 5.5 V or GND                                                   | 0 to 5.5 V         |                 |                    |     |                       |                    | ±5   |                       |     | ±5   | μA   |
| I <sub>off</sub>                                                      |                                | V <sub>I</sub> or V <sub>O</sub> = 5.5 V                                        |                    | 0               |                    |     |                       |                    | ±10  |                       |     | ±10  | μA   |
| I <sub>CC</sub>                                                       | V <sub>I</sub> = 5.5 V or GND, |                                                                                 | I <sub>O</sub> = 0 | 1.65 V to 5.5 V |                    |     |                       |                    | 10   |                       |     | 10   | μA   |
|                                                                       | V <sub>I</sub> = 3.6 V or GND, |                                                                                 |                    | 3 V to 3.6 V    |                    | 0.5 | 1.5                   |                    |      |                       |     |      |      |
| ΔI <sub>CC</sub>                                                      |                                | One input at V <sub>CC</sub> – 0.6 V,<br>Other inputs at V <sub>CC</sub> or GND |                    | 3 V to 5.5 V    |                    |     |                       |                    | 500  |                       |     | 500  | μA   |
| C <sub>I</sub>                                                        |                                | V <sub>I</sub> = V <sub>CC</sub> or GND                                         |                    | 3.3 V           |                    | 4.5 |                       |                    |      |                       |     |      | pF   |

(1) All typical values are at V<sub>CC</sub> = 3.3 V, T<sub>A</sub> = 25°C.

## 6.6 Switching Characteristics, $C_L = 15\text{ pF}$

over recommended operating free-air temperature range,  $C_L = 15\text{ pF}$  (unless otherwise noted) (see [Figure 7-1](#))

| PARAMETER       | FROM<br>(INPUT) | TO<br>(OUTPUT) | –40°C TO 85°C                       |     |                                    |     |                                    |     |                                  |     | UNIT |
|-----------------|-----------------|----------------|-------------------------------------|-----|------------------------------------|-----|------------------------------------|-----|----------------------------------|-----|------|
|                 |                 |                | V <sub>CC</sub> = 1.8 V<br>± 0.15 V |     | V <sub>CC</sub> = 2.5 V<br>± 0.2 V |     | V <sub>CC</sub> = 3.3 V<br>± 0.3 V |     | V <sub>CC</sub> = 5 V<br>± 0.5 V |     |      |
|                 |                 |                | MIN                                 | MAX | MIN                                | MAX | MIN                                | MAX | MIN                              | MAX |      |
| t <sub>pd</sub> | A               | Y              | 2.8                                 | 9.9 | 1.6                                | 5.5 | 1.5                                | 4.6 | 0.9                              | 4.4 | ns   |

## 6.7 Switching Characteristics AC Limit, –40°C TO 85°C

over recommended operating free-air temperature range,  $C_L = 30\text{ pF}$  or  $50\text{ pF}$  (unless otherwise noted) (see [Figure 7-2](#))

| PARAMETER       | FROM<br>(INPUT) | TO<br>(OUTPUT) | –40°C TO 85°C                       |     |                                    |     |                                    |     |                                  |     | UNIT |
|-----------------|-----------------|----------------|-------------------------------------|-----|------------------------------------|-----|------------------------------------|-----|----------------------------------|-----|------|
|                 |                 |                | V <sub>CC</sub> = 1.8 V<br>± 0.15 V |     | V <sub>CC</sub> = 2.5 V<br>± 0.2 V |     | V <sub>CC</sub> = 3.3 V<br>± 0.3 V |     | V <sub>CC</sub> = 5 V<br>± 0.5 V |     |      |
|                 |                 |                | MIN                                 | MAX | MIN                                | MAX | MIN                                | MAX | MIN                              | MAX |      |
| t <sub>pd</sub> | A               | Y              | 3.8                                 | 11  | 2                                  | 6.5 | 1.8                                | 5.5 | 1.2                              | 5   | ns   |

## 6.8 Switching Characteristics AC Limit, –40°C TO 125°C

over recommended operating free-air temperature range,  $C_L = 30\text{ pF}$  or  $50\text{ pF}$  (unless otherwise noted) (see [Figure 7-2](#))

| PARAMETER       | FROM<br>(INPUT) | TO<br>(OUTPUT) | –40°C TO 125°C                      |     |                                    |     |                                    |     |                                  |     | UNIT |
|-----------------|-----------------|----------------|-------------------------------------|-----|------------------------------------|-----|------------------------------------|-----|----------------------------------|-----|------|
|                 |                 |                | V <sub>CC</sub> = 1.8 V<br>± 0.15 V |     | V <sub>CC</sub> = 2.5 V<br>± 0.2 V |     | V <sub>CC</sub> = 3.3 V<br>± 0.3 V |     | V <sub>CC</sub> = 5 V<br>± 0.5 V |     |      |
|                 |                 |                | MIN                                 | MAX | MIN                                | MAX | MIN                                | MAX | MIN                              | MAX |      |
| t <sub>pd</sub> | A               | Y              | 3.8                                 | 13  | 2                                  | 8   | 1.8                                | 6.5 | 1.2                              | 6   | ns   |

## 6.9 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 | $f = 10\text{ MHz}$ | 20                      | 21                      | 22                      | 26                    | pF   |

## 6.10 Typical Characteristics

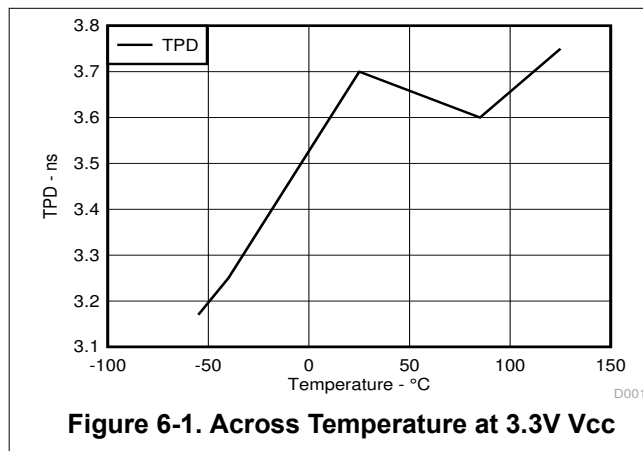


Figure 6-1. Across Temperature at 3.3V  $V_{CC}$

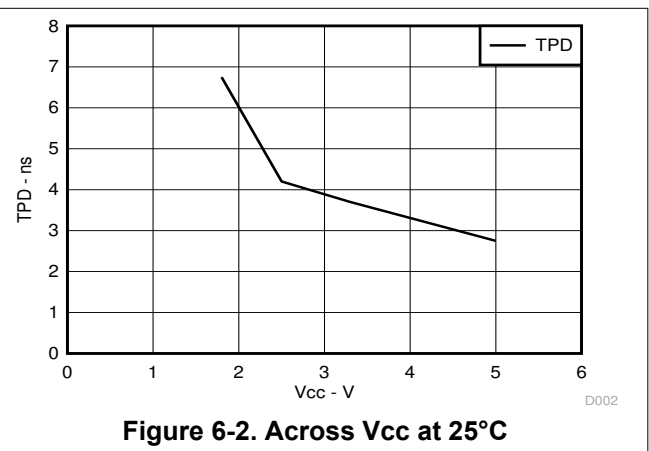
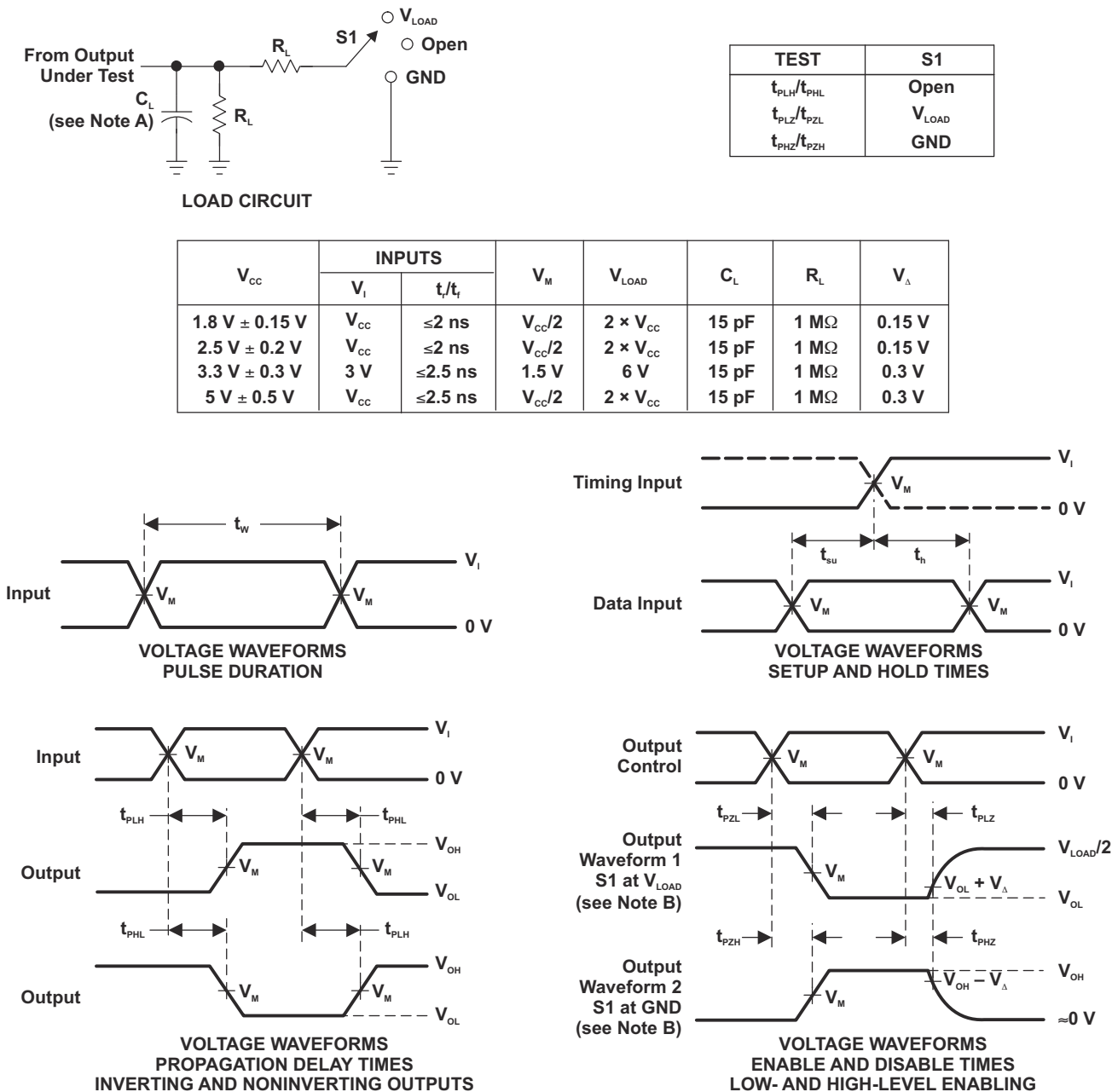


Figure 6-2. Across  $V_{CC}$  at  $25^\circ\text{C}$

## 7 Parameter Measurement Information



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  $t_{dis}$ .

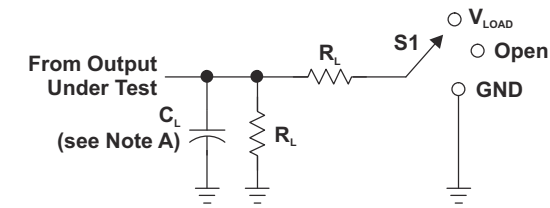
F.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .

G.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .

H. All parameters and waveforms are not applicable to all devices.

**Figure 7-1. Load Circuit and Voltage Waveforms**

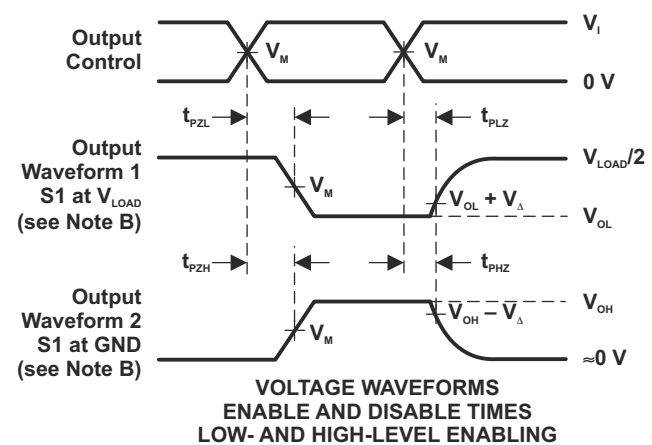
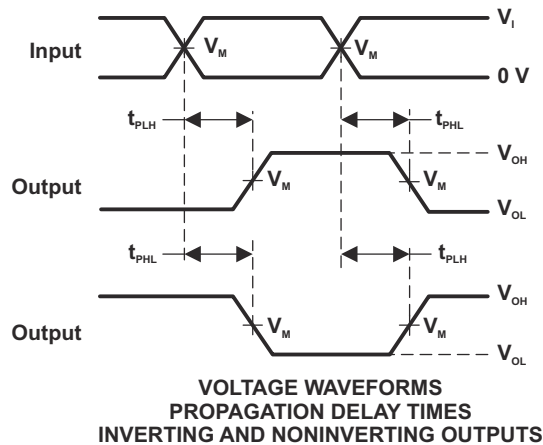
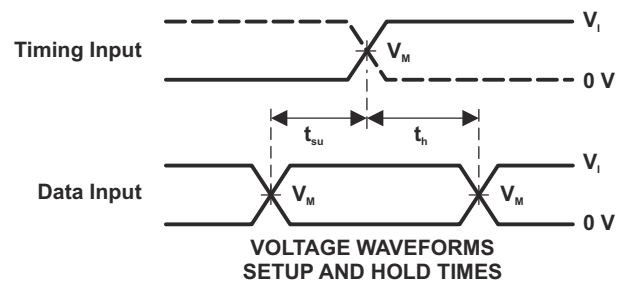
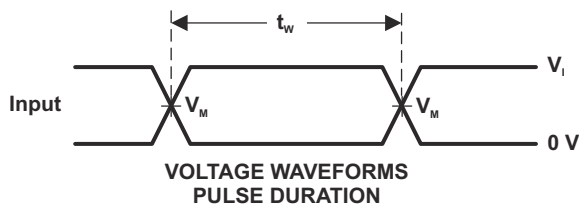




LOAD CIRCUIT

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

| $V_{CC}$                         | INPUTS   |                      | $V_M$      | $V_{LOAD}$        | $C_L$ | $R_L$        | $V_{\Delta}$ |
|----------------------------------|----------|----------------------|------------|-------------------|-------|--------------|--------------|
|                                  | $V_I$    | $t_f/t_r$            |            |                   |       |              |              |
| $1.8\text{ V} \pm 0.15\text{ V}$ | $V_{CC}$ | $\leq 2\text{ ns}$   | $V_{CC}/2$ | $2 \times V_{CC}$ | 30 pF | 1 k $\Omega$ | 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 $\Omega$ | 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 $\Omega$ | 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 $\Omega$ | 0.3 V        |



- NOTES:
- $C_L$  includes probe and jig capacitance.
  - Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
  - All input pulses are supplied by generators having the following characteristics:  $PRR \leq 10\text{ MHz}$ ,  $Z_o = 50\text{ }\Omega$ .
  - 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  $t_{on}$ .
  - $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .
  - All parameters and waveforms are not applicable to all devices.

Figure 7-2. Load Circuit and Voltage Waveforms

## 8 Detailed Description

### 8.1 Overview

The SN74LVC1G17 device contains one Schmitt trigger buffer and performs the Boolean function  $Y = A$ . The device functions as an independent buffer, but because of Schmitt action, it will have different input threshold levels for a positive-going ( $V_{T+}$ ) and negative-going signals.

The DPW package technology is a major breakthrough in IC packaging. Its tiny 0.64 mm square footprint saves significant board space over other package options while still retaining the traditional manufacturing friendly lead pitch of 0.5 mm.

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

### 8.2 Functional Block Diagram



### 8.3 Feature Description

- Wide operating voltage range.
  - Operates From 1.65 V to 5.5 V.
- Allows Down voltage translation.
- Inputs accept voltages to 5.5 V.
- $I_{off}$  feature allows voltages on the inputs and outputs, when  $V_{CC}$  is 0 V.

### 8.4 Device Functional Modes

**Table 8-1. Function Table**

| INPUT<br>A | OUTPUT<br>Y |
|------------|-------------|
| H          | H           |
| L          | L           |

## 9 Applications and Implementation

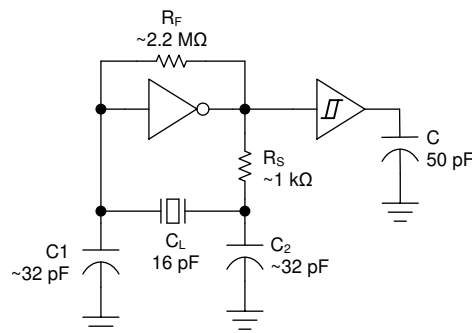
### Note

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 SN74LVC1G17 is a high drive CMOS device that can be used for a multitude of buffer type functions where the input is slow or noisy. It can produce 24 mA of drive current at 3.3 V making it Ideal for driving multiple outputs and good for high speed applications up to 100 MHz. The inputs are 5.5 V tolerant allowing it to translate down to  $V_{CC}$ .

### 9.2 Typical Application



#### 9.2.1 Design Requirements

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

#### 9.2.2 Detailed Design Procedure

##### 1. Recommended Input Conditions

- Rise time and fall time specs. See  $(\Delta t/\Delta V)$  in the [Recommended Operating Conditions](#) table.
- Specified high and low levels. See  $(V_{IH}$  and  $V_{IL})$  in the [Recommended Operating Conditions](#) table.
- Inputs are overvoltage tolerant allowing them to go as high as  $(V_I \text{ max})$  in the [Recommended Operating Conditions](#) table at any valid  $V_{CC}$ .

##### 2. Recommend Output Conditions

- Load currents should not exceed  $(I_O \text{ max})$  per output and should not exceed (continuous current through  $V_{CC}$  or GND) total current for the part. These limits are located in the [Absolute Max Ratings](#) table.
- Outputs should not be pulled above  $V_{CC}$ .

### 9.2.3 Application Curves

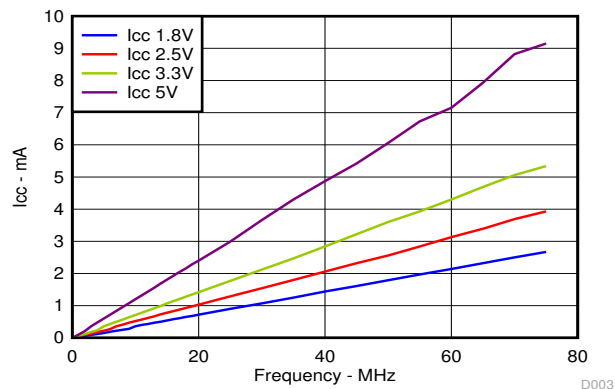


Figure 9-1. ICC vs Frequency

## 10 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.

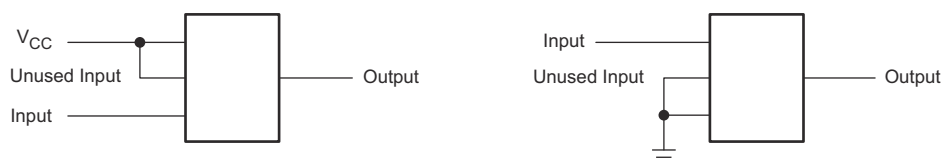
Each Vcc pin should have a good bypass capacitor to prevent power disturbance. For devices with a single supply a 0.1- $\mu$ F capacitor is recommended and if there are multiple Vcc pins then a 0.01- $\mu$ F or 0.022- $\mu$ F capacitor is recommended for each power pin. It is ok to parallel multiple bypass caps to reject different frequencies of noise. 0.1- $\mu$ F and 1- $\mu$ F capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power pin as possible for best results.

## 11 Layout

### 11.1 Layout Guidelines

When using multiple bit logic devices inputs should not ever float. In many cases, functions or parts of functions of digital logic devices are unused, for example, when only two inputs of a triple-input AND gate are used or only 3 of the 4 buffer gates are used. Such input terminals should not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. Specified below are the 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 Vcc whichever make more sense or is more convenient.

### 11.2 Layout Example



## 12 Device and Documentation Support

### 12.1 Trademarks

All other trademarks are the property of their respective owners.

### 12.2 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

### 12.3 Glossary

#### TI Glossary

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

## 13 Mechanical, Packaging, and Orderable Information

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

**PACKAGING INFORMATION**

| Orderable part number             | Status<br>(1)    | Material type<br>(2) | Package   Pins   | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6)                                     |
|-----------------------------------|------------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------------------------------------------|
| <a href="#">SN74LVC1G17DBVR</a>   | Active           | Production           | SOT-23 (DBV)   5 | 3000   LARGE T&R      | Yes         | NIPDAU   SN   NIPDAU                 | Level-1-260C-UNLIM                | -40 to 125   | (C175, C17F, C17J,<br>C17K, C17R)<br>(C17H, C17P, C17S) |
| SN74LVC1G17DBVR.A                 | Active           | Production           | SOT-23 (DBV)   5 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -40 to 125   | (C175, C17F, C17J,<br>C17K, C17R)<br>(C17H, C17P, C17S) |
| SN74LVC1G17DBVR.B                 | Active           | Production           | SOT-23 (DBV)   5 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -40 to 125   | (C175, C17F, C17J,<br>C17K, C17R)<br>(C17H, C17P, C17S) |
| SN74LVC1G17DBVRE4                 | Active           | Production           | SOT-23 (DBV)   5 | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C17F                                                    |
| <a href="#">SN74LVC1G17DBVRG4</a> | Active           | Production           | SOT-23 (DBV)   5 | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C17F                                                    |
| SN74LVC1G17DBVRG4.A               | Active           | Production           | SOT-23 (DBV)   5 | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C17F                                                    |
| SN74LVC1G17DBVRG4.B               | Active           | Production           | SOT-23 (DBV)   5 | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C17F                                                    |
| <a href="#">SN74LVC1G17DBVT</a>   | Active           | Production           | SOT-23 (DBV)   5 | 250   SMALL T&R       | Yes         | NIPDAU   SN   NIPDAU                 | Level-1-260C-UNLIM                | -40 to 125   | (C175, C17F, C17J,<br>C17K, C17R)<br>(C17H, C17P, C17S) |
| SN74LVC1G17DBVT.B                 | Active           | Production           | SOT-23 (DBV)   5 | 250   SMALL T&R       | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | (C175, C17F, C17J,<br>C17K, C17R)<br>(C17H, C17P, C17S) |
| SN74LVC1G17DBVTE4                 | Active           | Production           | SOT-23 (DBV)   5 | 250   SMALL T&R       | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C17F                                                    |
| <a href="#">SN74LVC1G17DBVTG4</a> | Active           | Production           | SOT-23 (DBV)   5 | 250   SMALL T&R       | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C17F                                                    |
| SN74LVC1G17DBVTG4.B               | Active           | Production           | SOT-23 (DBV)   5 | 250   SMALL T&R       | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C17F                                                    |
| <a href="#">SN74LVC1G17DCK3</a>   | Last<br>Time Buy | Production           | SC70 (DCK)   5   | 3000   LARGE T&R      | Yes         | SNBI                                 | Level-1-260C-UNLIM                | -40 to 85    | (C7F, C7Z)                                              |
| SN74LVC1G17DCK3.B                 | Last<br>Time Buy | Production           | SC70 (DCK)   5   | 3000   LARGE T&R      | Yes         | SNBI                                 | Level-1-260C-UNLIM                | -40 to 125   | (C7F, C7Z)                                              |
| <a href="#">SN74LVC1G17DCKR</a>   | Active           | Production           | SC70 (DCK)   5   | 3000   LARGE T&R      | Yes         | NIPDAU   SN   NIPDAU                 | Level-1-260C-UNLIM                | -40 to 125   | (C75, C7F, C7J, C7<br>K, C7R, C7T)<br>(C7H, C7P, C7S)   |

| Orderable part number             | Status<br>(1) | Material type<br>(2) | Package   Pins    | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6)                               |
|-----------------------------------|---------------|----------------------|-------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------------------------------------|
| SN74LVC1G17DCKR.A                 | Active        | Production           | SC70 (DCK)   5    | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | (C75, C7F, C7J, C7K, C7R, C7T)<br>(C7H, C7P, C7S) |
| SN74LVC1G17DCKR.B                 | Active        | Production           | SC70 (DCK)   5    | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | (C75, C7F, C7J, C7K, C7R, C7T)<br>(C7H, C7P, C7S) |
| SN74LVC1G17DCKRE4                 | Active        | Production           | SC70 (DCK)   5    | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C75<br>C7S                                        |
| <a href="#">SN74LVC1G17DCKRG4</a> | Active        | Production           | SC70 (DCK)   5    | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C75<br>C7S                                        |
| SN74LVC1G17DCKRG4.A               | Active        | Production           | SC70 (DCK)   5    | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C75<br>C7S                                        |
| SN74LVC1G17DCKRG4.B               | Active        | Production           | SC70 (DCK)   5    | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C75<br>C7S                                        |
| <a href="#">SN74LVC1G17DCKT</a>   | Active        | Production           | SC70 (DCK)   5    | 250   SMALL T&R       | Yes         | NIPDAU   SN   NIPDAU                 | Level-1-260C-UNLIM                | -40 to 125   | (C75, C7F, C7J, C7K, C7R, C7T)<br>(C7H, C7P, C7S) |
| SN74LVC1G17DCKT.B                 | Active        | Production           | SC70 (DCK)   5    | 250   SMALL T&R       | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | (C75, C7F, C7J, C7K, C7R, C7T)<br>(C7H, C7P, C7S) |
| SN74LVC1G17DCKTE4                 | Active        | Production           | SC70 (DCK)   5    | 250   SMALL T&R       | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C75<br>C7S                                        |
| <a href="#">SN74LVC1G17DCKTG4</a> | Active        | Production           | SC70 (DCK)   5    | 250   SMALL T&R       | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C75<br>C7S                                        |
| SN74LVC1G17DCKTG4.B               | Active        | Production           | SC70 (DCK)   5    | 250   SMALL T&R       | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C75<br>C7S                                        |
| <a href="#">SN74LVC1G17DPWR</a>   | Active        | Production           | X2SON (DPW)   5   | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | S4                                                |
| SN74LVC1G17DPWR.B                 | Active        | Production           | X2SON (DPW)   5   | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | S4                                                |
| <a href="#">SN74LVC1G17DRLR</a>   | Active        | Production           | SOT-5X3 (DRL)   5 | 4000   LARGE T&R      | Yes         | NIPDAUAG                             | Level-1-260C-UNLIM                | -40 to 125   | (C77, C7R)                                        |
| SN74LVC1G17DRLR.B                 | Active        | Production           | SOT-5X3 (DRL)   5 | 4000   LARGE T&R      | Yes         | NIPDAUAG                             | Level-1-260C-UNLIM                | -40 to 125   | (C77, C7R)                                        |
| SN74LVC1G17DRLRG4                 | Active        | Production           | SOT-5X3 (DRL)   5 | 4000   LARGE T&R      | Yes         | NIPDAUAG                             | Level-1-260C-UNLIM                | -40 to 125   | (C77, C7R)                                        |
| <a href="#">SN74LVC1G17DRYR</a>   | Active        | Production           | SON (DRY)   6     | 5000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C7                                                |
| SN74LVC1G17DRYR.B                 | Active        | Production           | SON (DRY)   6     | 5000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C7                                                |
| SN74LVC1G17DRYRG4.B               | Active        | Production           | SON (DRY)   6     | 5000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C7                                                |
| <a href="#">SN74LVC1G17DSFR</a>   | Active        | Production           | SON (DSF)   6     | 5000   LARGE T&R      | Yes         | NIPDAU   NIPDAUAG                    | Level-1-260C-UNLIM                | -40 to 125   | C7                                                |



| Orderable part number           | Status<br>(1) | Material type<br>(2) | Package   Pins  | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6) |
|---------------------------------|---------------|----------------------|-----------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| SN74LVC1G17DSFR.B               | Active        | Production           | SON (DSF)   6   | 5000   LARGE T&R      | Yes         | NIPDAUAG                             | Level-1-260C-UNLIM                | -40 to 125   | C7                  |
| SN74LVC1G17DSFRG4.B             | Active        | Production           | SON (DSF)   6   | 5000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 125   | C7                  |
| <a href="#">SN74LVC1G17YZPR</a> | Active        | Production           | DSBGA (YZP)   5 | 3000   LARGE T&R      | Yes         | SNAGCU                               | Level-1-260C-UNLIM                | -40 to 85    | C7N                 |
| SN74LVC1G17YZPR.B               | Active        | Production           | DSBGA (YZP)   5 | 3000   LARGE T&R      | Yes         | SNAGCU                               | Level-1-260C-UNLIM                | -40 to 125   | C7N                 |
| SN74LVC1G17YZTR.B               | Active        | Production           | DSBGA (YZT)   4 | 3000   LARGE T&R      | Yes         | SNAGCU                               | Level-1-260C-UNLIM                | -40 to 125   | C7                  |
| <a href="#">SN74LVC1G17YZVR</a> | Active        | Production           | DSBGA (YZV)   4 | 3000   LARGE T&R      | Yes         | SNAGCU                               | Level-1-260C-UNLIM                | -40 to 85    | C7<br>(7, N)        |
| SN74LVC1G17YZVR.B               | Active        | Production           | DSBGA (YZV)   4 | 3000   LARGE T&R      | Yes         | SNAGCU                               | Level-1-260C-UNLIM                | -40 to 125   | C7<br>(7, N)        |

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

<sup>(2)</sup> **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.

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

<sup>(4)</sup> **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.

<sup>(5)</sup> **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.

<sup>(6)</sup> **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.

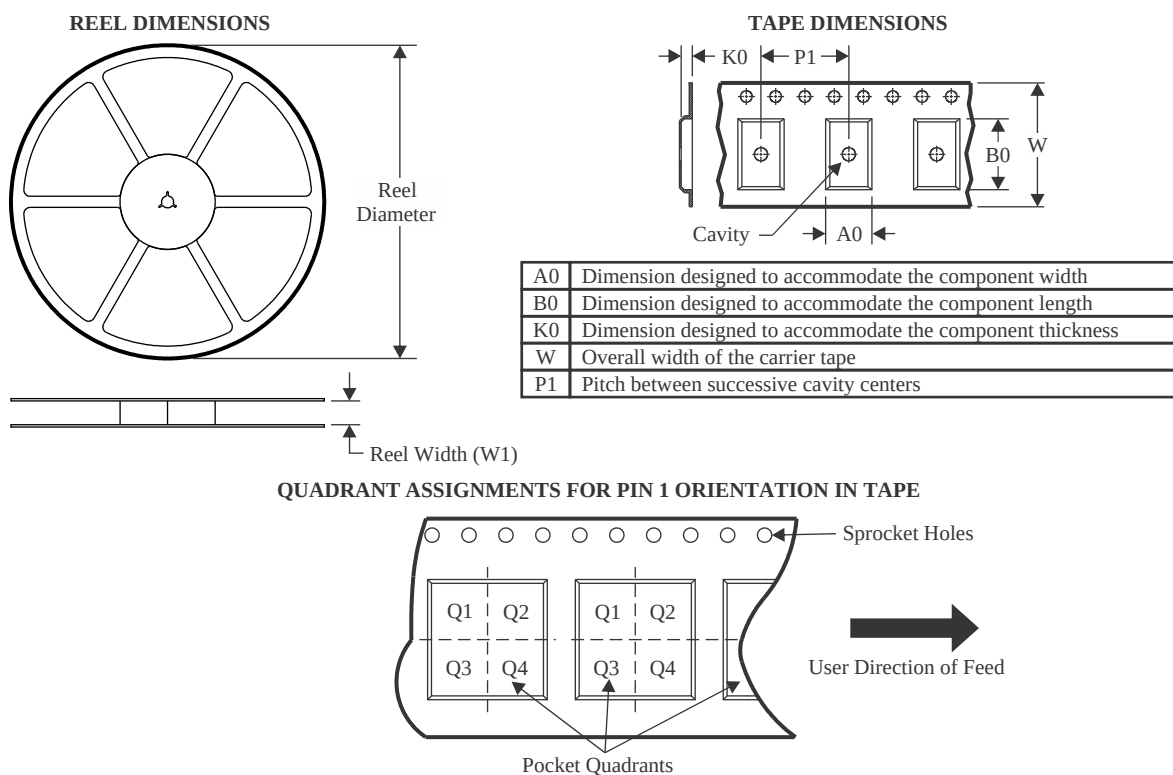
**OTHER QUALIFIED VERSIONS OF SN74LVC1G17 :**

- Automotive : [SN74LVC1G17-Q1](#)
- Enhanced Product : [SN74LVC1G17-EP](#)

## NOTE: Qualified Version Definitions:

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

## TAPE AND REEL INFORMATION



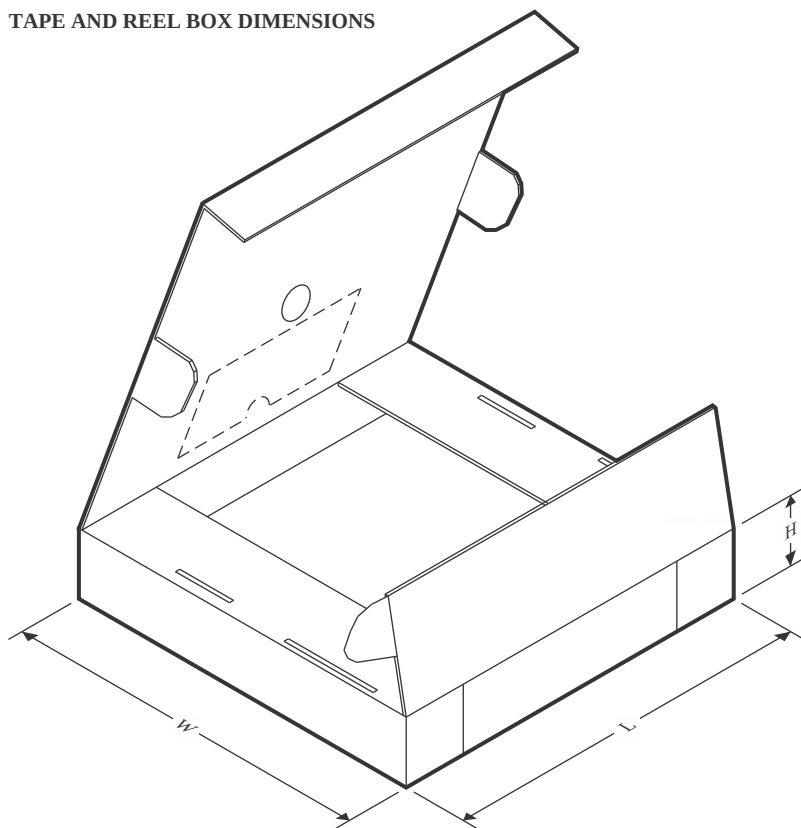
\*All dimensions are nominal

| Device            | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|-------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LVC1G17DBVR   | SOT-23       | DBV             | 5    | 3000 | 180.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DBVRG4 | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DBVT   | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.3     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DBVT   | SOT-23       | DBV             | 5    | 250  | 180.0              | 8.4                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DBVTG4 | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DCKR   | SC70         | DCK             | 5    | 3000 | 178.0              | 9.0                | 2.4     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DCKRG4 | SC70         | DCK             | 5    | 3000 | 178.0              | 9.2                | 2.4     | 2.4     | 1.22    | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DCKT   | SC70         | DCK             | 5    | 250  | 180.0              | 8.4                | 2.47    | 2.3     | 1.25    | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DCKT   | SC70         | DCK             | 5    | 250  | 178.0              | 9.2                | 2.4     | 2.4     | 1.22    | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DCKT   | SC70         | DCK             | 5    | 250  | 178.0              | 9.0                | 2.4     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DCKTG4 | SC70         | DCK             | 5    | 250  | 178.0              | 9.2                | 2.4     | 2.4     | 1.22    | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DPWR   | X2SON        | DPW             | 5    | 3000 | 178.0              | 8.4                | 0.91    | 0.91    | 0.5     | 2.0     | 8.0    | Q3            |
| SN74LVC1G17DRLR   | SOT-5X3      | DRL             | 5    | 4000 | 180.0              | 8.4                | 1.98    | 1.78    | 0.69    | 4.0     | 8.0    | Q3            |
| SN74LVC1G17DRYR   | SON          | DRY             | 6    | 5000 | 180.0              | 9.5                | 1.15    | 1.6     | 0.75    | 4.0     | 8.0    | Q1            |
| SN74LVC1G17DSFR   | SON          | DSF             | 6    | 5000 | 180.0              | 9.5                | 1.16    | 1.16    | 0.5     | 4.0     | 8.0    | Q2            |
| SN74LVC1G17YZPR   | DSBGA        | YZP             | 5    | 3000 | 178.0              | 9.2                | 1.02    | 1.52    | 0.63    | 4.0     | 8.0    | Q1            |

---

| 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 |
|-----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LVC1G17YZVR | DSBGA        | YZV             | 4    | 3000 | 178.0              | 9.2                | 1.0     | 1.0     | 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) |
|-------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LVC1G17DBVR   | SOT-23       | DBV             | 5    | 3000 | 210.0       | 185.0      | 35.0        |
| SN74LVC1G17DBVRG4 | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| SN74LVC1G17DBVT   | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| SN74LVC1G17DBVT   | SOT-23       | DBV             | 5    | 250  | 202.0       | 201.0      | 28.0        |
| SN74LVC1G17DBVTG4 | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| SN74LVC1G17DCKR   | SC70         | DCK             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| SN74LVC1G17DCKRG4 | SC70         | DCK             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| SN74LVC1G17DCKT   | SC70         | DCK             | 5    | 250  | 202.0       | 201.0      | 28.0        |
| SN74LVC1G17DCKT   | SC70         | DCK             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| SN74LVC1G17DCKT   | SC70         | DCK             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| SN74LVC1G17DCKTG4 | SC70         | DCK             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| SN74LVC1G17DPWR   | X2SON        | DPW             | 5    | 3000 | 205.0       | 200.0      | 33.0        |
| SN74LVC1G17DRLR   | SOT-5X3      | DRL             | 5    | 4000 | 202.0       | 201.0      | 28.0        |
| SN74LVC1G17DRYR   | SON          | DRY             | 6    | 5000 | 184.0       | 184.0      | 19.0        |
| SN74LVC1G17DSFR   | SON          | DSF             | 6    | 5000 | 184.0       | 184.0      | 19.0        |
| SN74LVC1G17YZPR   | DSBGA        | YZP             | 5    | 3000 | 220.0       | 220.0      | 35.0        |
| SN74LVC1G17YZVR   | DSBGA        | YZV             | 4    | 3000 | 220.0       | 220.0      | 35.0        |

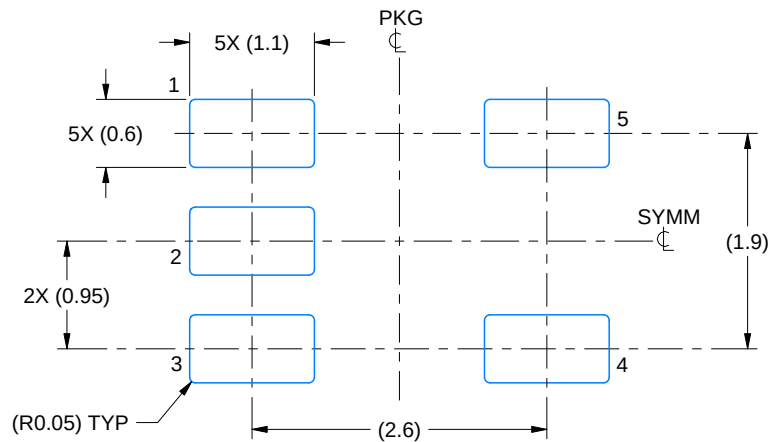


# EXAMPLE BOARD LAYOUT

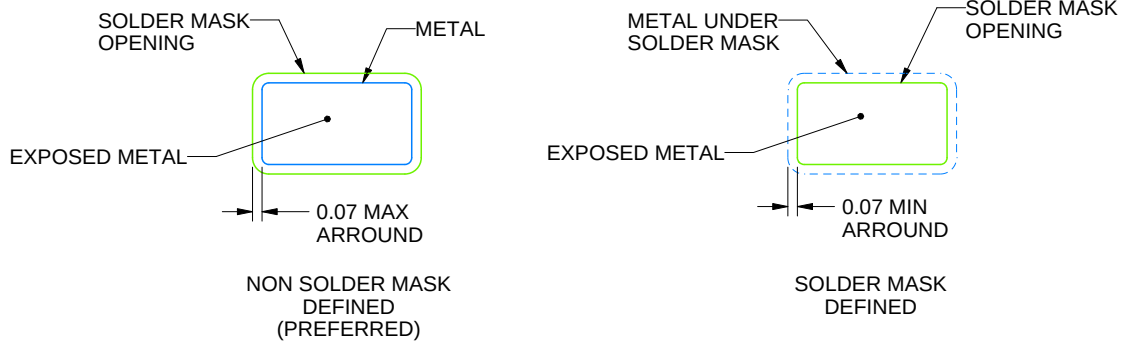
DBV0005A

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)

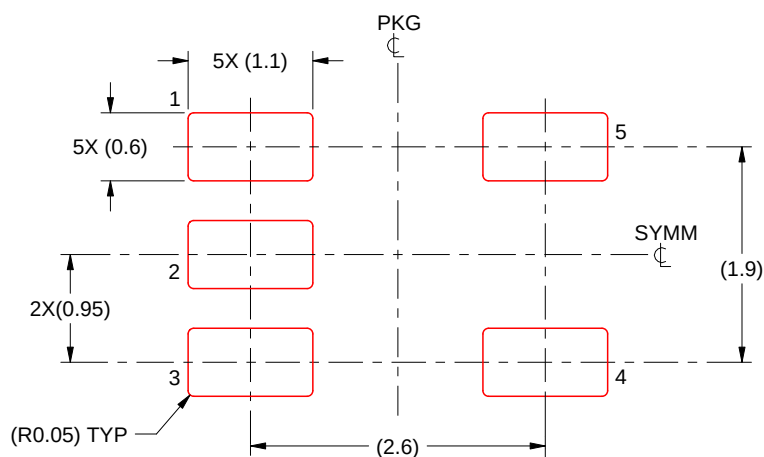
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

## EXAMPLE STENCIL DESIGN

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**

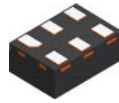
PLASTIC SMALL OUTLINE - NO LEAD



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

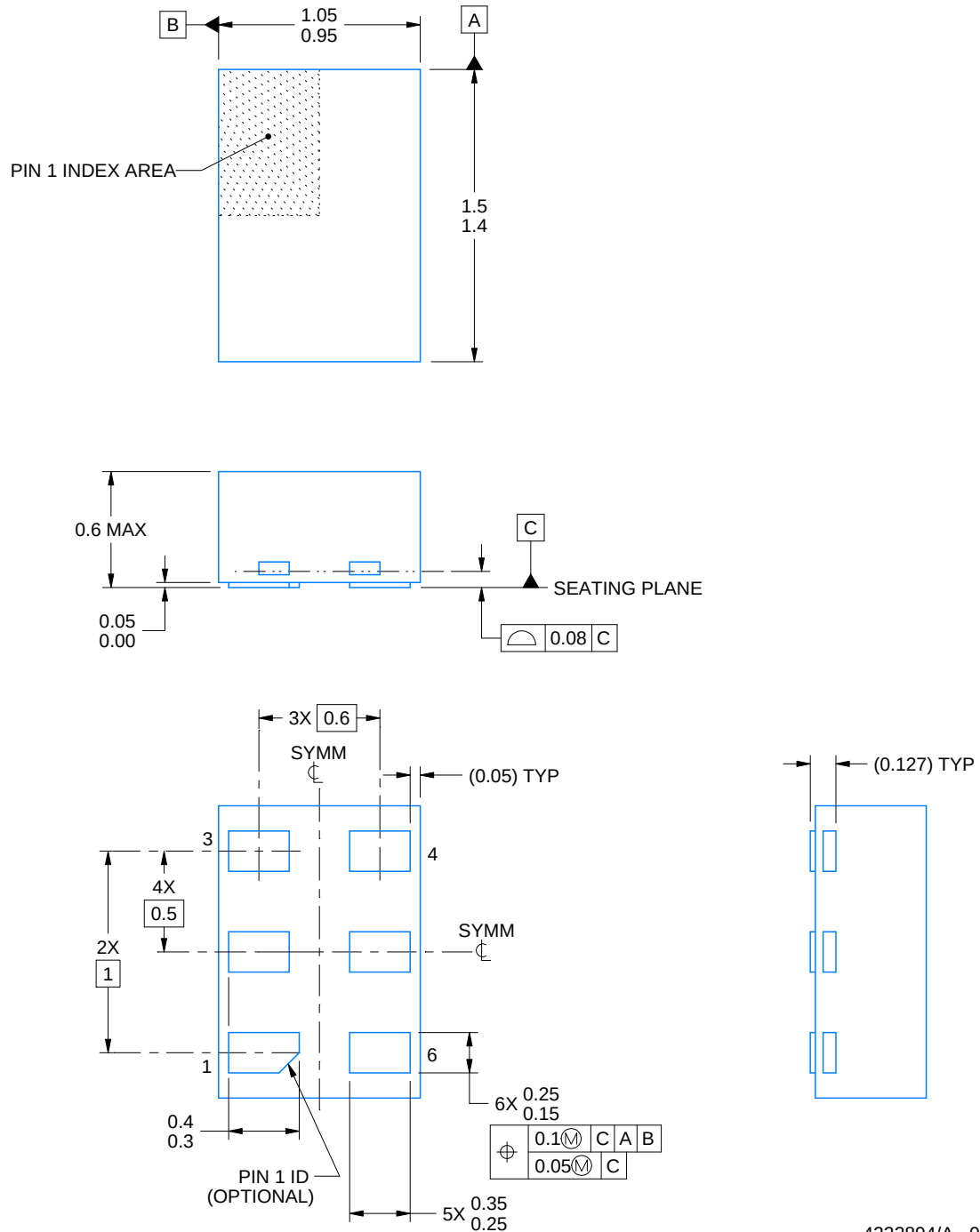
DRY0006A



## PACKAGE OUTLINE

USON - 0.6 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



4222894/A 01/2018

### NOTES:

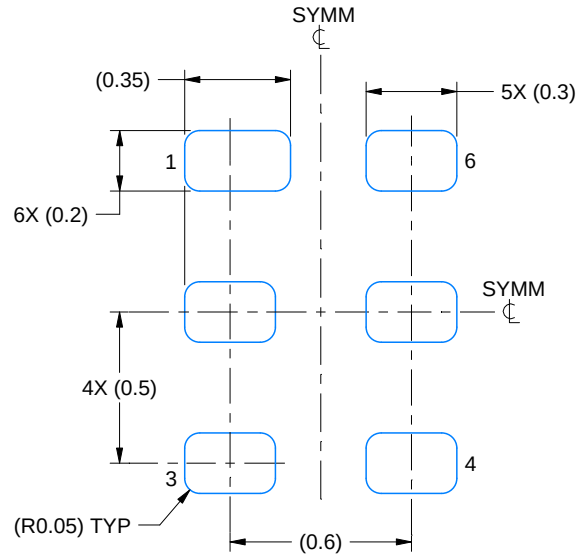
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

# EXAMPLE BOARD LAYOUT

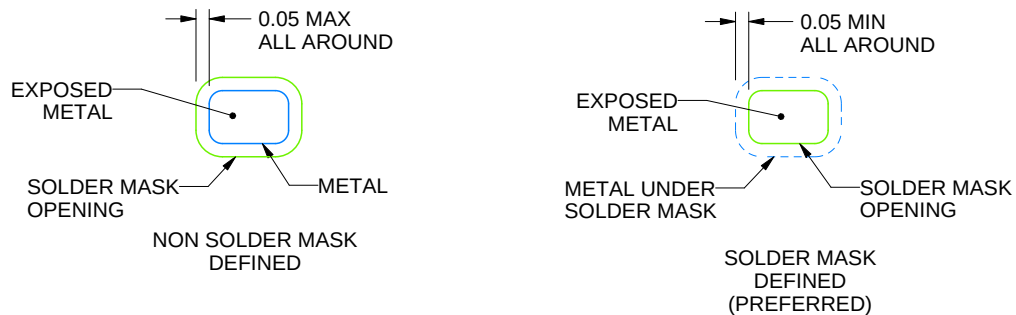
DRY0006A

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)

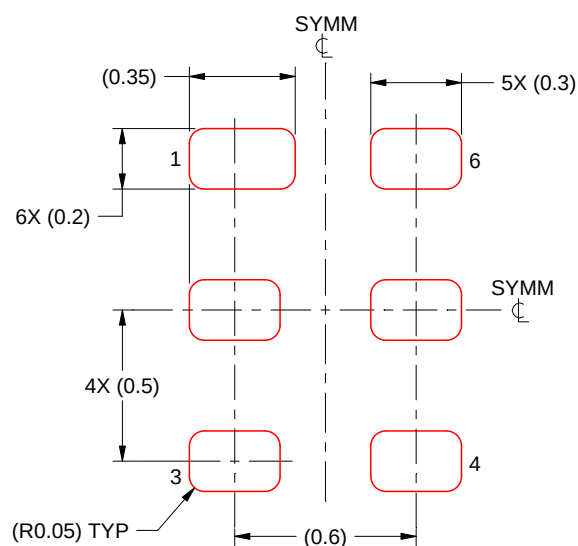
3. For more information, see QFN/SON PCB application report in literature No. SLUA271 ([www.ti.com/lit/slue271](http://www.ti.com/lit/slue271)).

## 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.

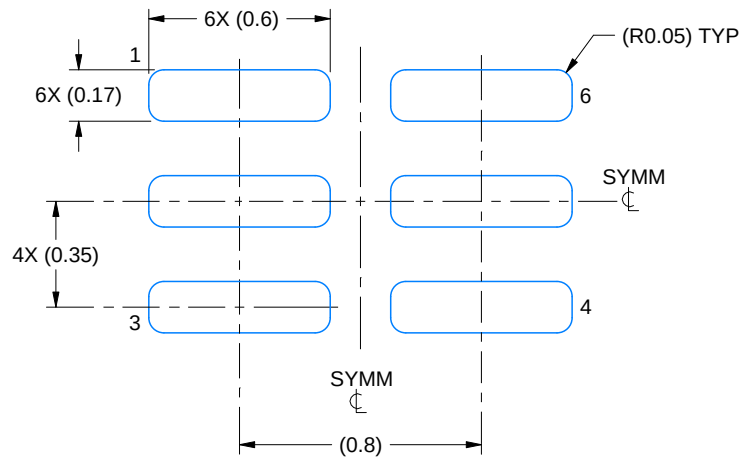


# EXAMPLE BOARD LAYOUT

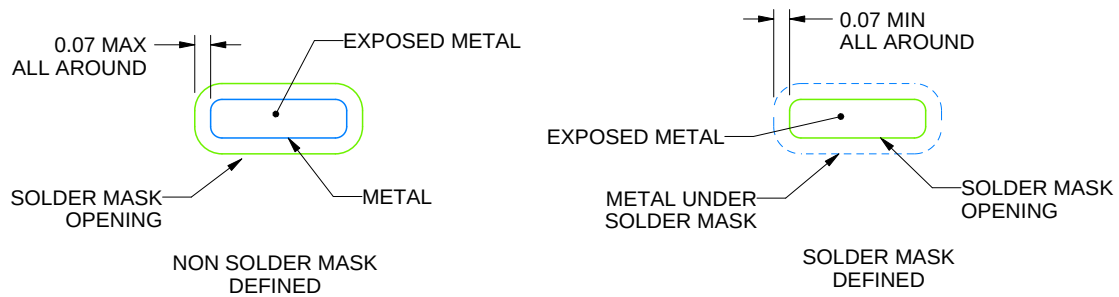
DSF0006A

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)

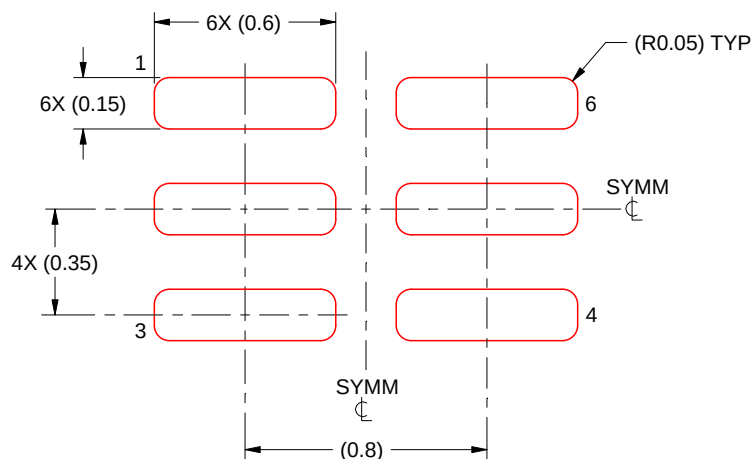
4. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/sluea271](http://www.ti.com/lit/sluea271)).

## 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.

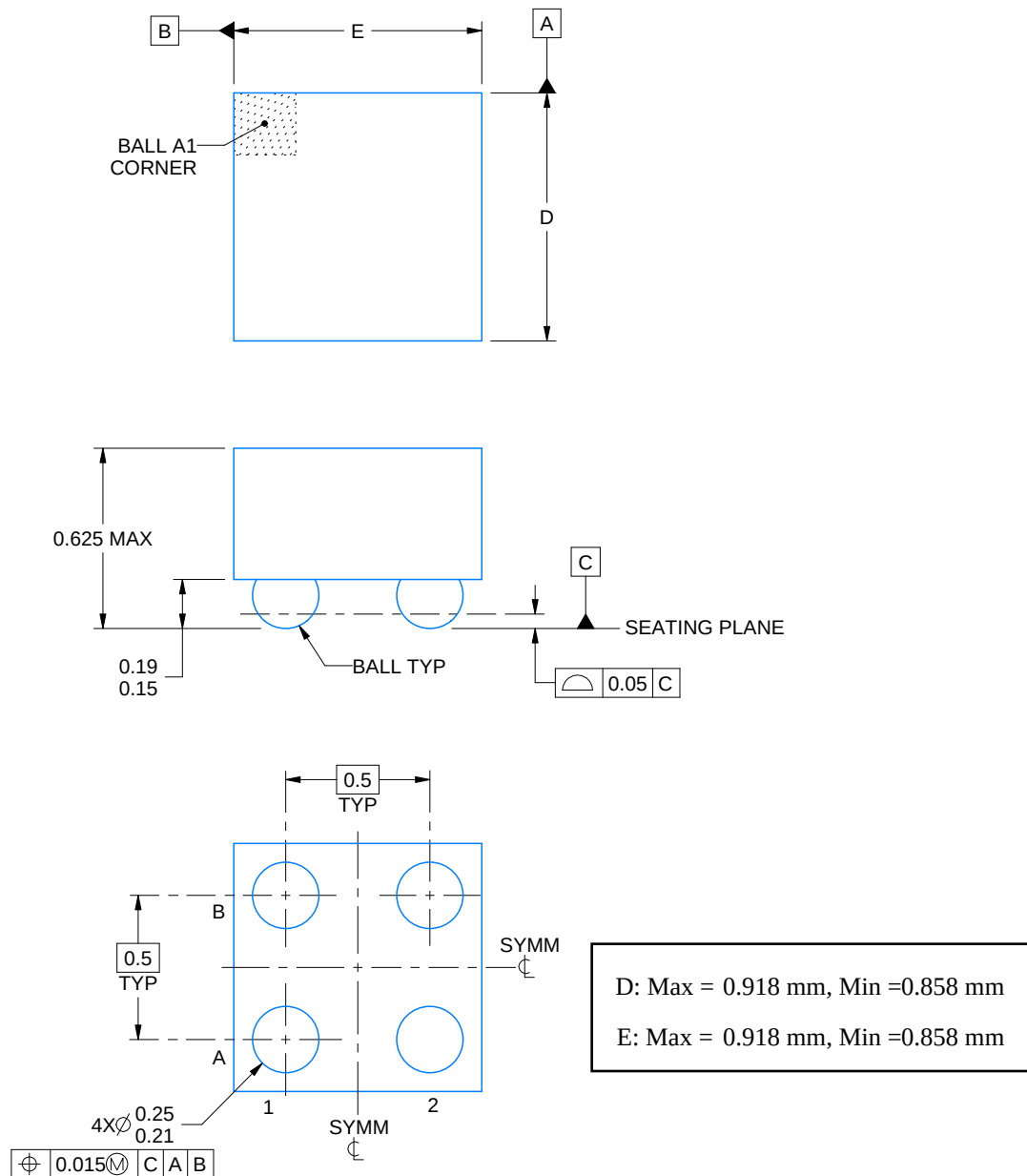


# PACKAGE OUTLINE

YZT0004

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



4219477/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.

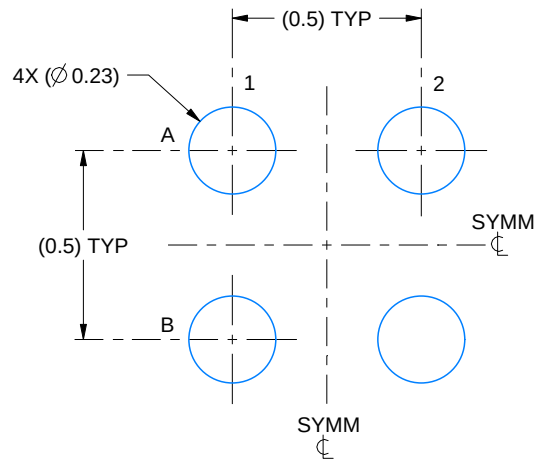


# EXAMPLE BOARD LAYOUT

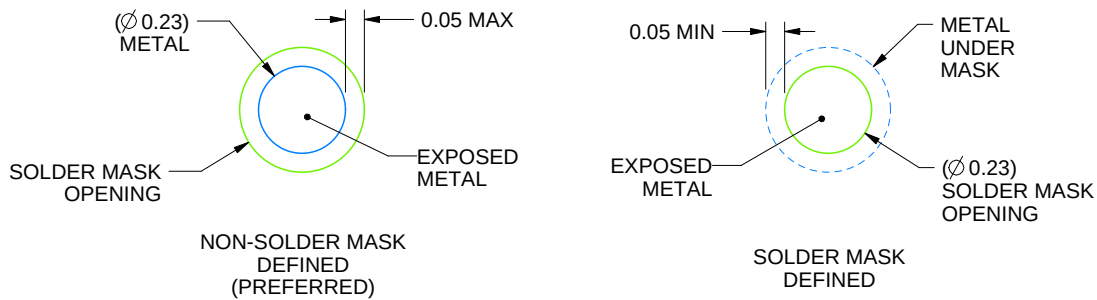
YZT0004

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE:50X



SOLDER MASK DETAILS  
NOT TO SCALE

4219477/A 05/2017

NOTES: (continued)

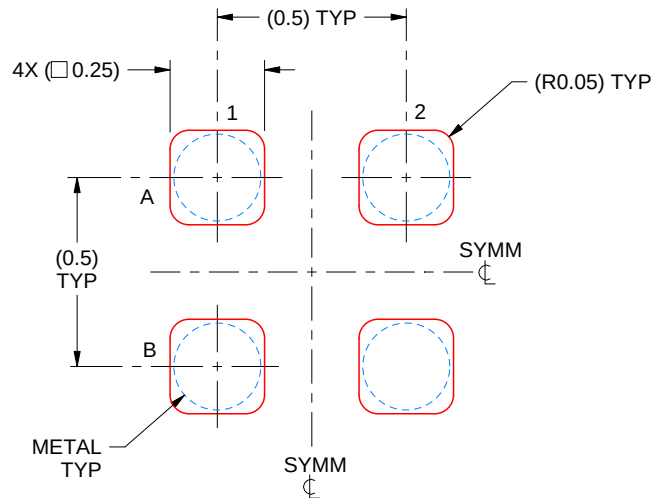
- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. Refer to Texas Instruments Literature No. SNVA009 ([www.ti.com/lit/snva009](http://www.ti.com/lit/snva009)).

## EXAMPLE STENCIL DESIGN

YZT0004

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY

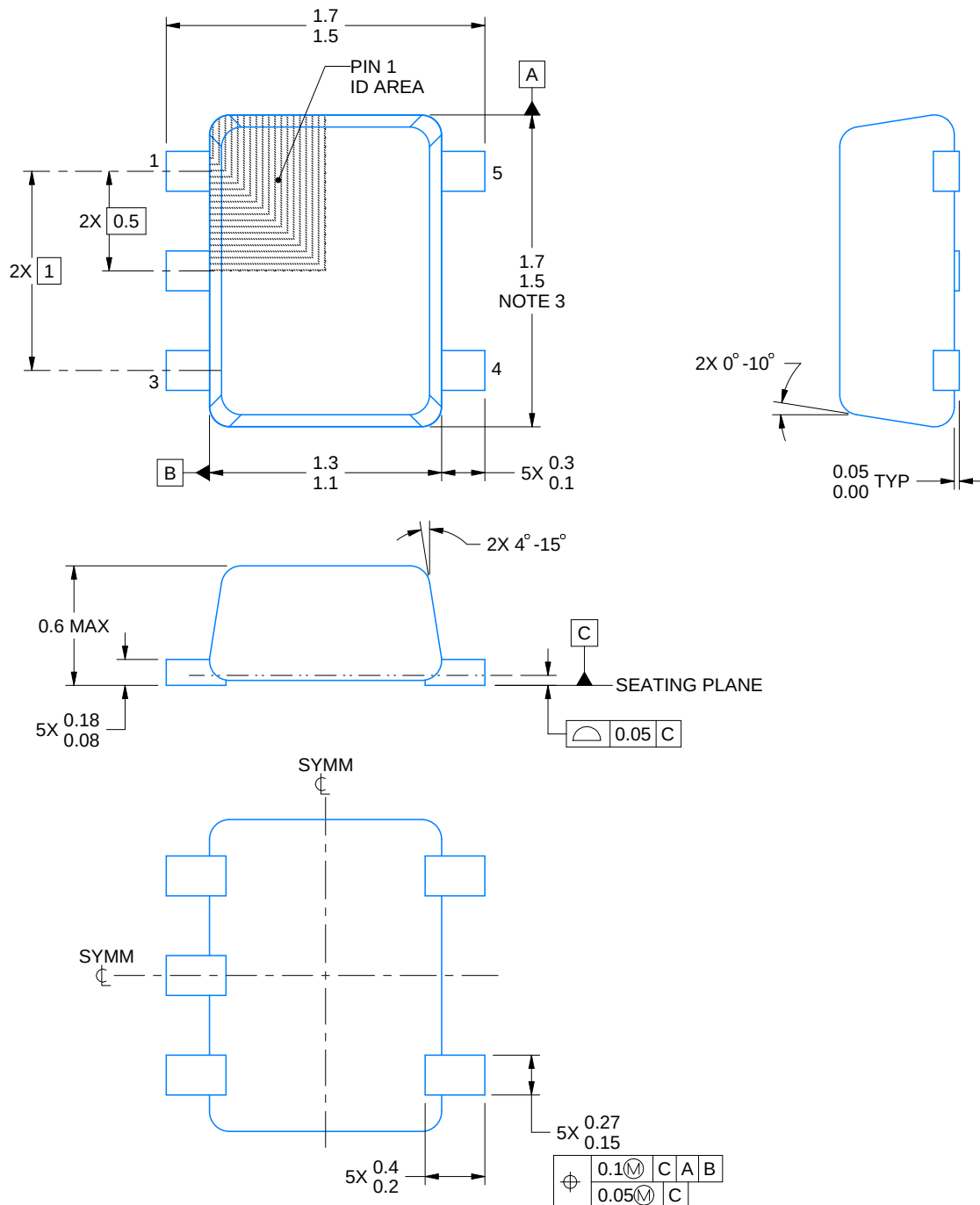
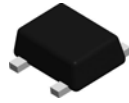


SOLDER PASTE EXAMPLE  
BASED ON 0.1 mm THICK STENCIL  
SCALE:50X

4219477/A 05/2017

NOTES: (continued)

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



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

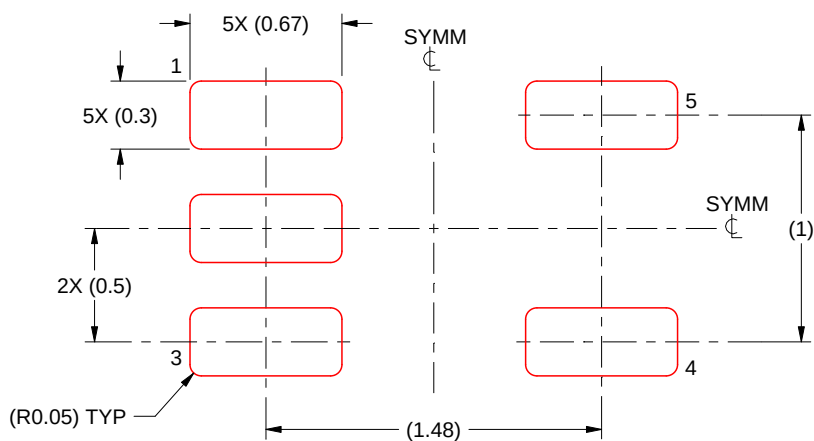


## EXAMPLE STENCIL DESIGN

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.

## GENERIC PACKAGE VIEW

**DPW 5**

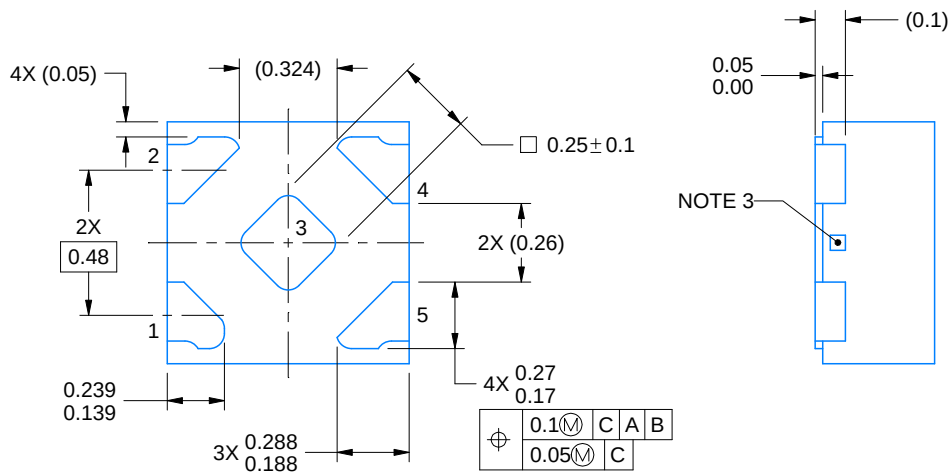
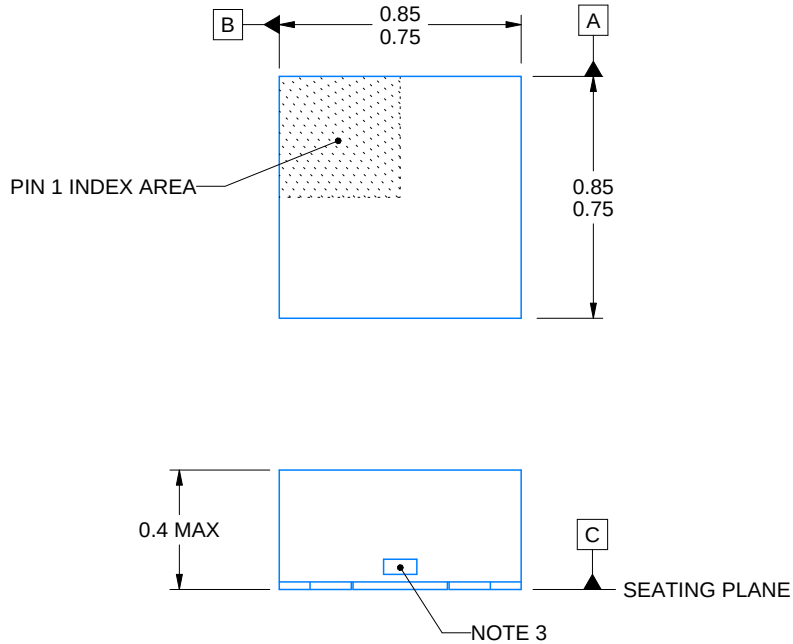
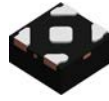
**X2SON - 0.4 mm max height**

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.

4211218-3/D



4223102/D 03/2022

## NOTES:

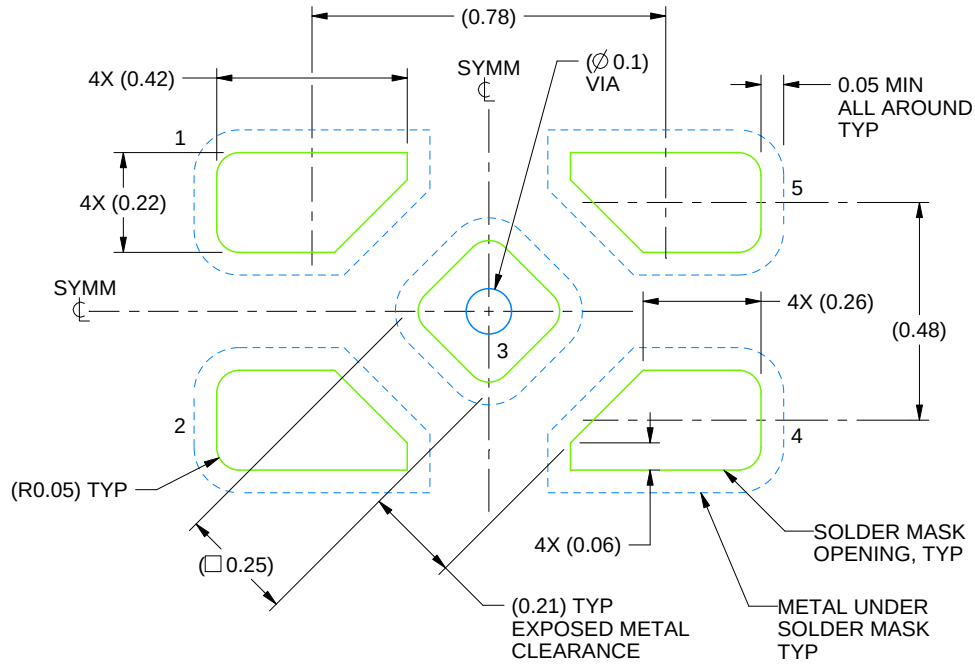
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The size and shape of this feature may vary.

# EXAMPLE BOARD LAYOUT

DPW0005A

X2SON - 0.4 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE  
SOLDER MASK DEFINED  
SCALE:60X

4223102/D 03/2022

NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, refer to QFN/SON PCB application note in literature No. SLUA271 ([www.ti.com/lit/sluea271](http://www.ti.com/lit/sluea271)).

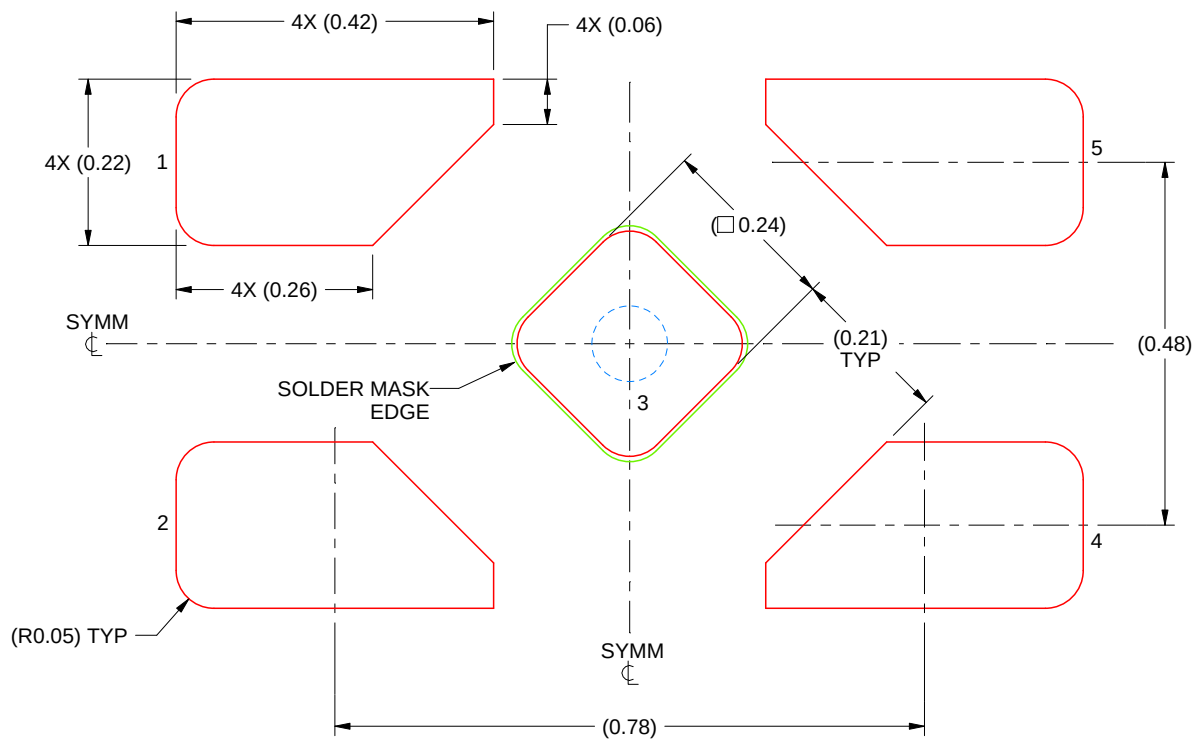


# EXAMPLE STENCIL DESIGN

DPW0005A

X2SON - 0.4 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



SOLDER PASTE EXAMPLE  
BASED ON 0.1 mm THICK STENCIL

EXPOSED PAD 3  
92% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE  
SCALE:100X

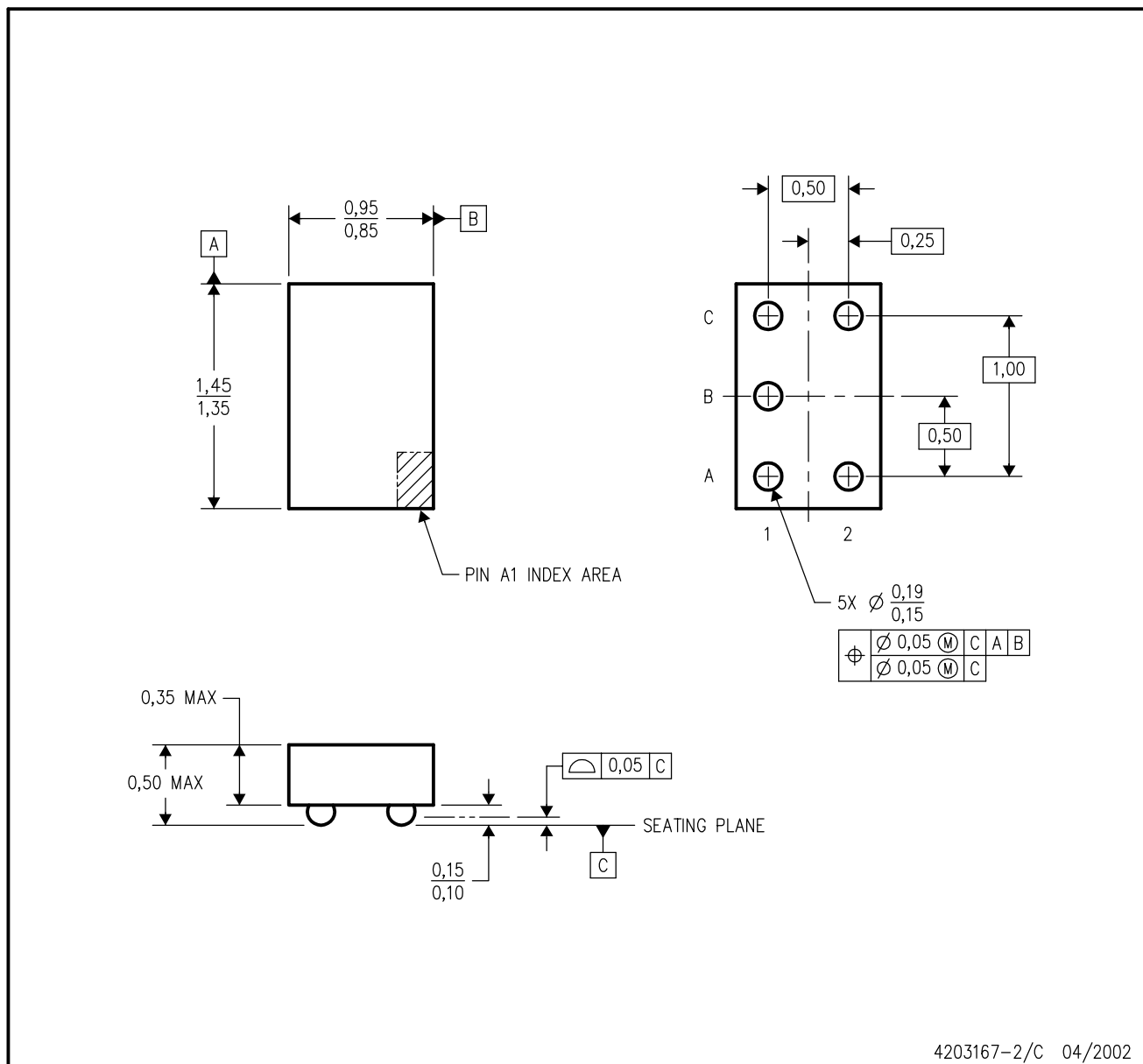
4223102/D 03/2022

NOTES: (continued)

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

YEA (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



4203167-2/C 04/2002

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. NanoStar™ package configuration.
  - D. Package complies to JEDEC MO-211 variation EA.
  - E. This package is tin-lead (SnPb). Refer to the 5 YZA package (drawing 4204151) for lead-free.

NanoStar is a trademark of Texas Instruments.

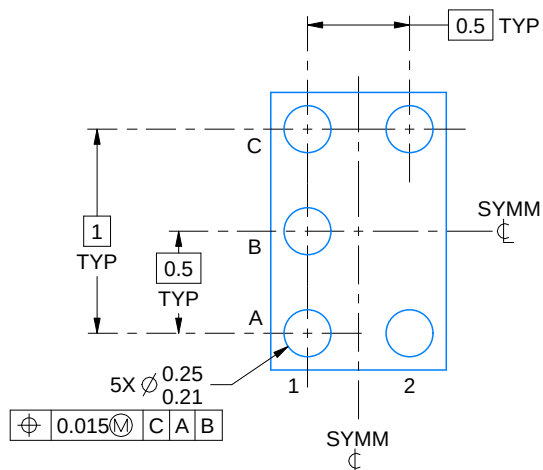
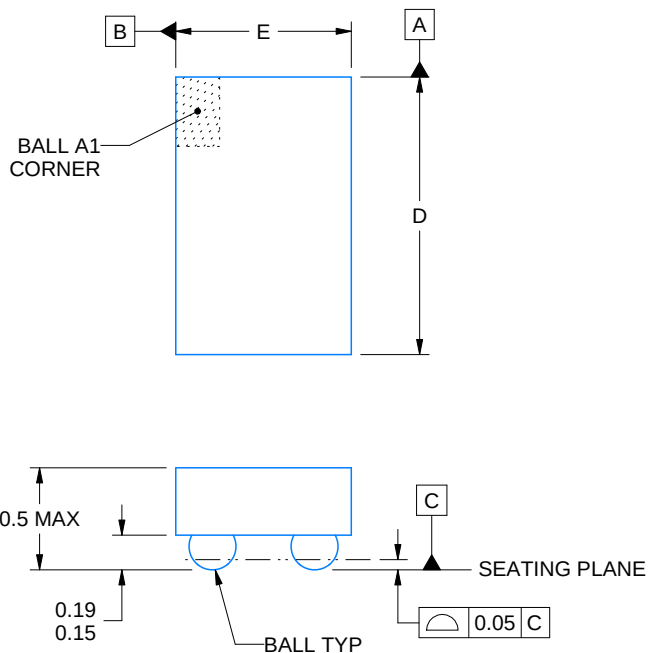
YZP0005



# 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

4219492/A 05/2017

## NOTES:

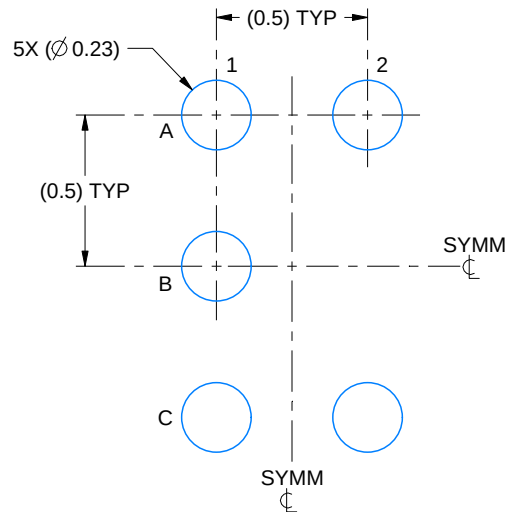
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

# EXAMPLE BOARD LAYOUT

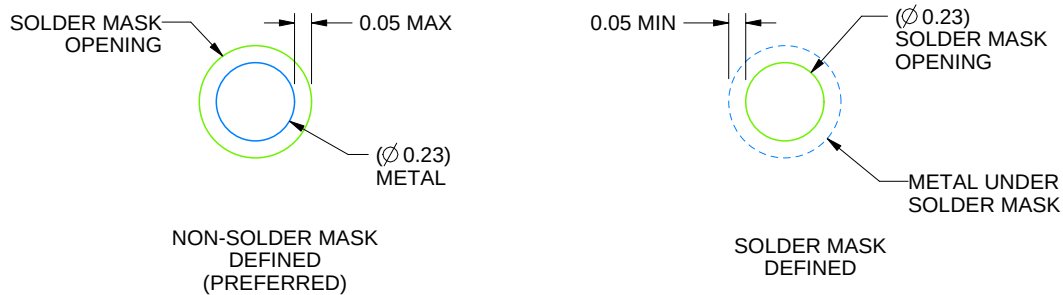
YZP0005

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)

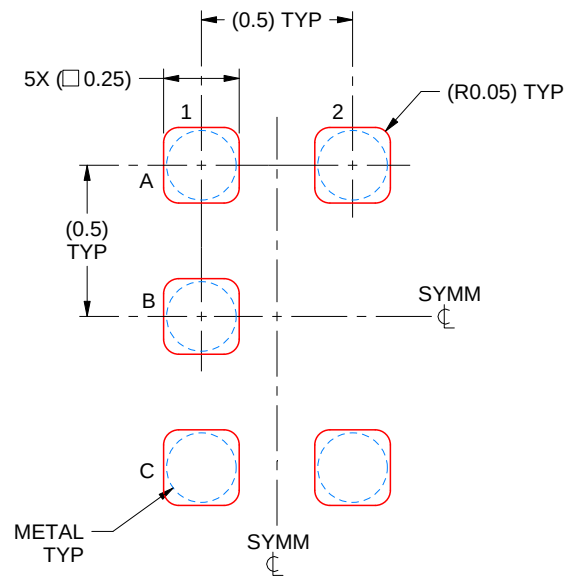
- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For more information, see Texas Instruments literature number SNVA009 ([www.ti.com/lit/snva009](http://www.ti.com/lit/snva009)).

## 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

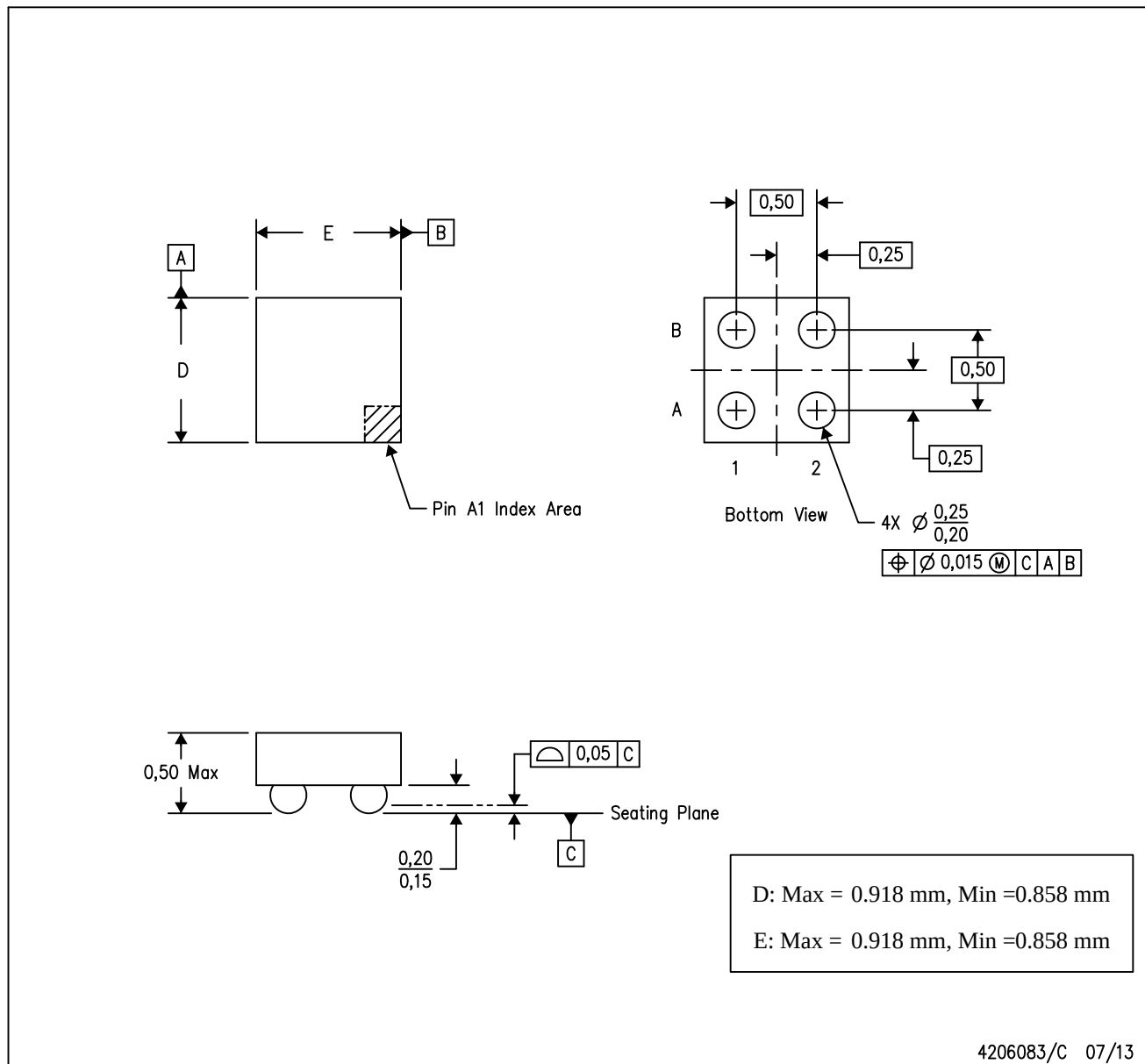
4219492/A 05/2017

NOTES: (continued)

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

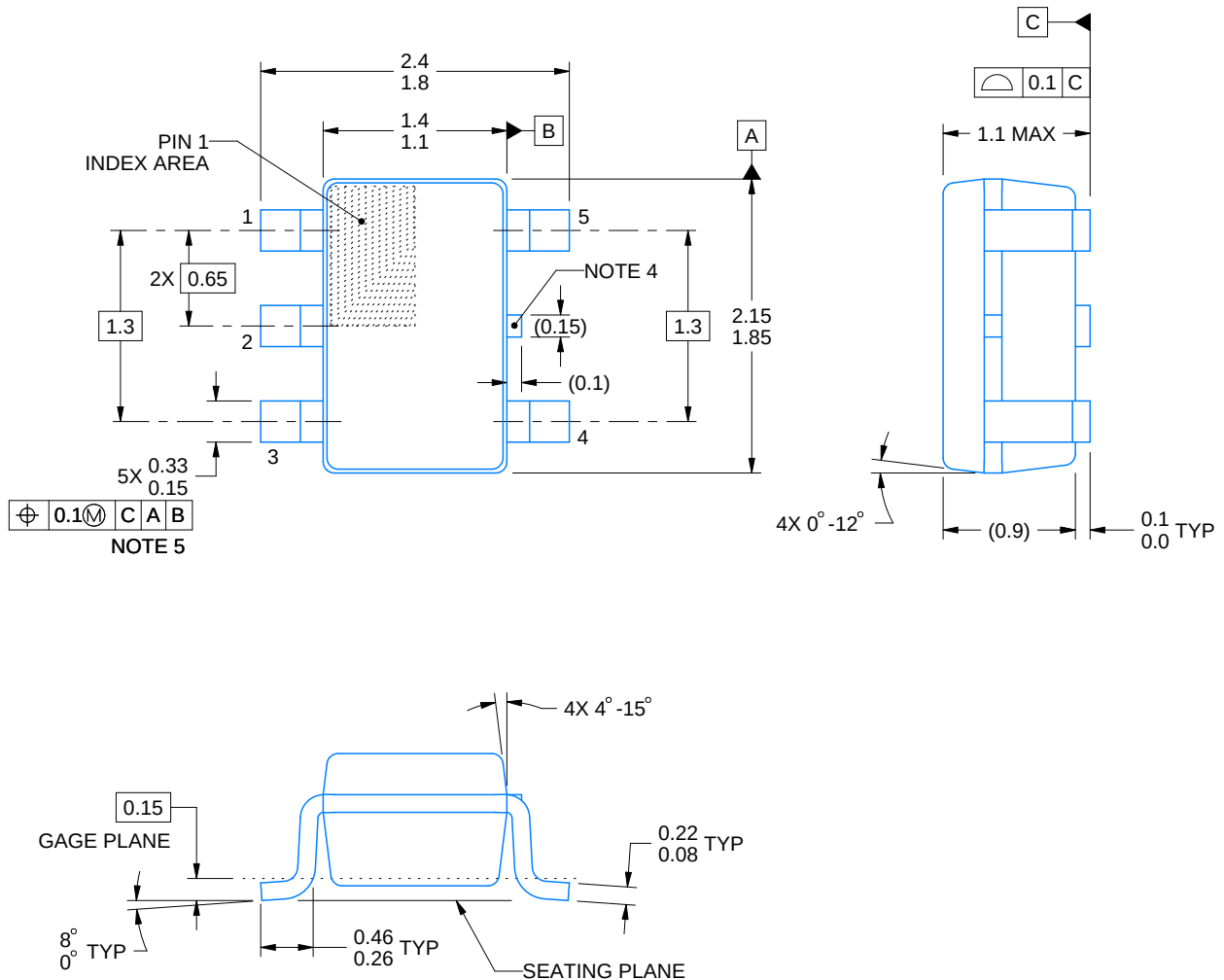
YZV (S-XBGA-N4)

DIE-SIZE BALL GRID ARRAY



- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. NanoFree™ package configuration.

NanoFree is a trademark of Texas Instruments.



4214834/G 11/2024

## NOTES:

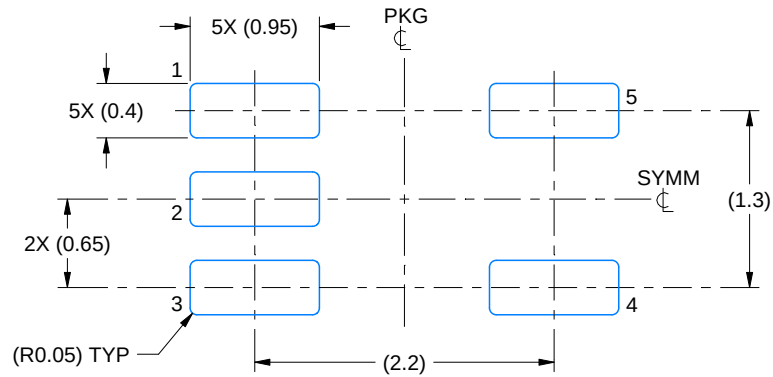
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC MO-203.
4. Support pin may differ or may not be present.
5. Lead width does not comply 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

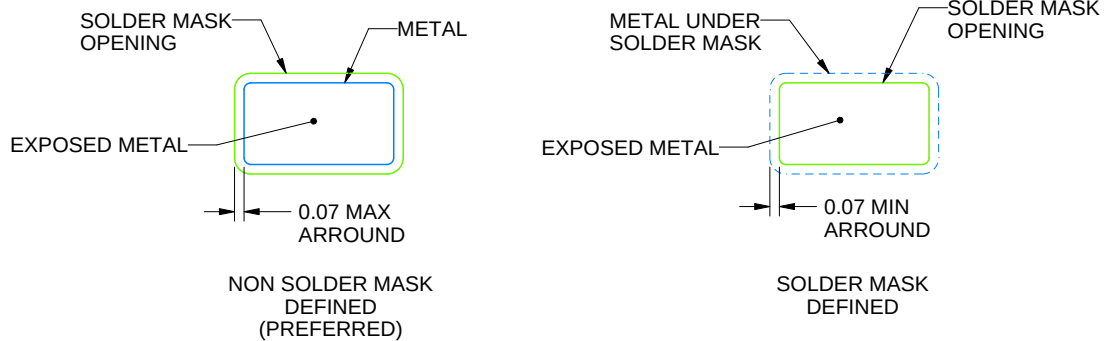
DCK0005A

SOT - 1.1 max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE:18X



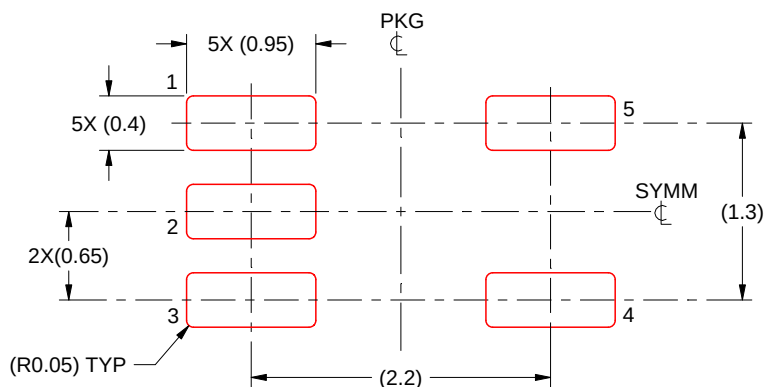
SOLDER MASK DETAILS

4214834/G 11/2024

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

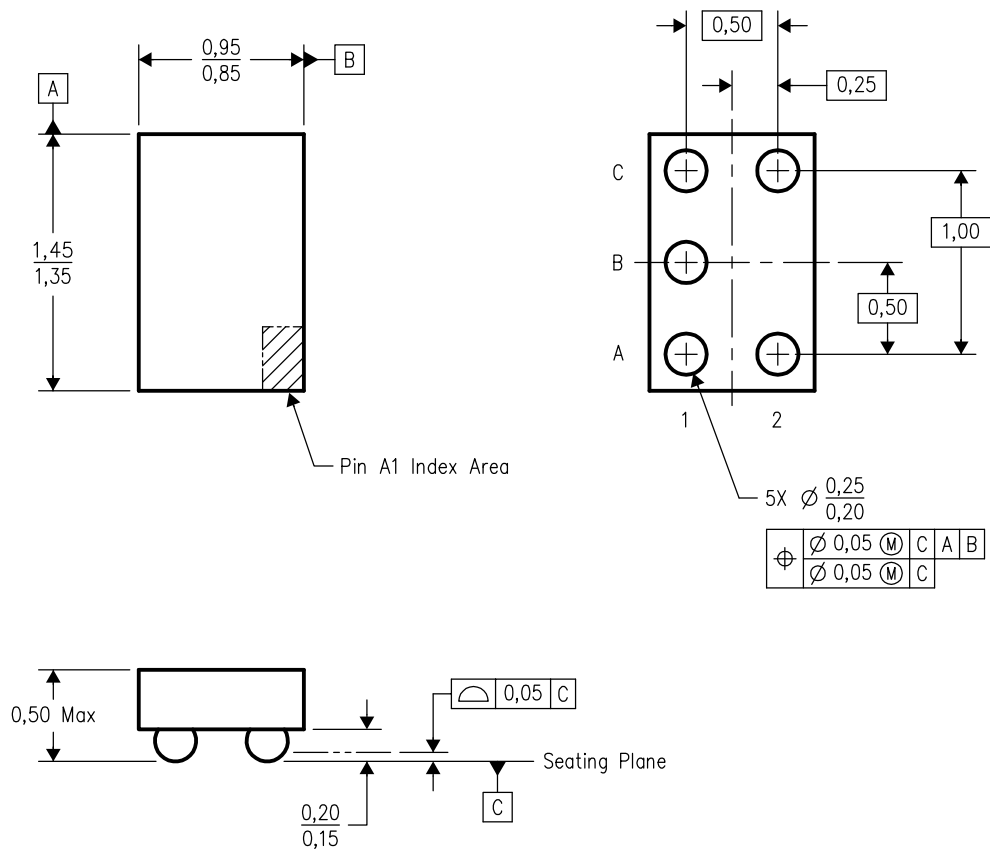
4214834/G 11/2024

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.

YEP (R-XBGA-N5)

## DIE-SIZE BALL GRID ARRAY



4204725-2/A 10/2002

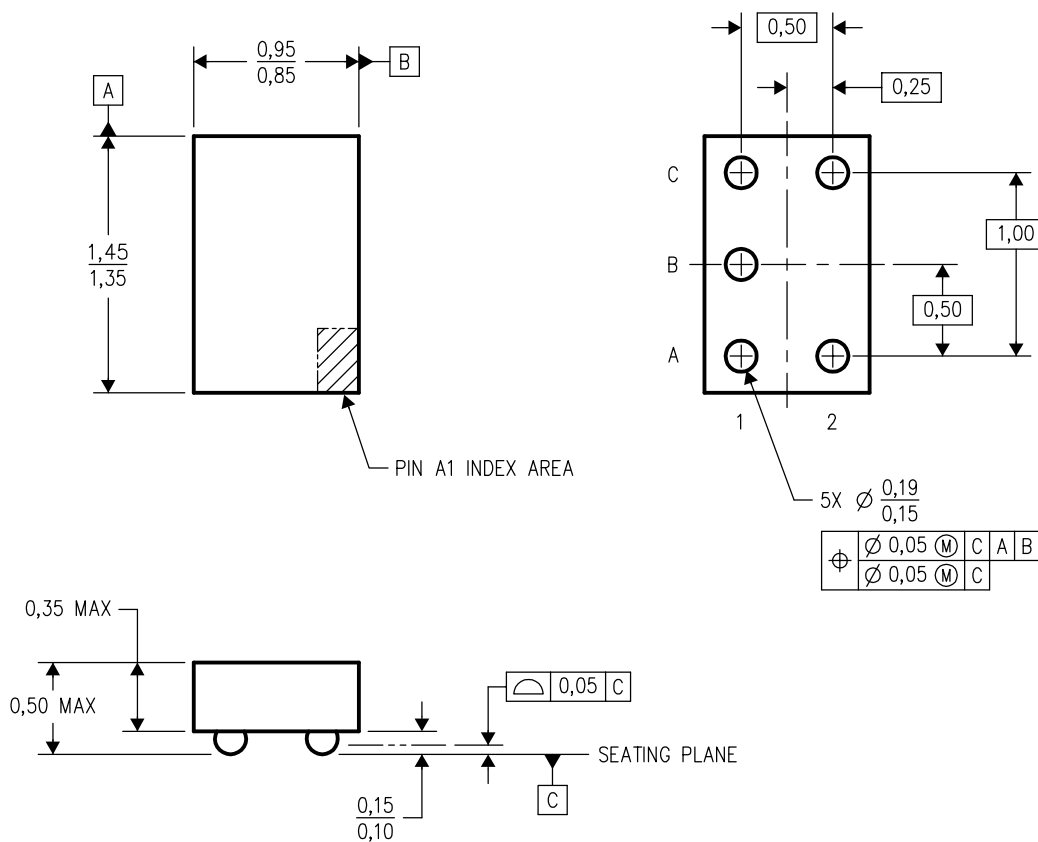
NOTES:

- A. All linear dimensions are in millimeters.  
B. This drawing is subject to change without notice.  
C. NanoStar™ package configuration.  
D. This package is tin-lead (SnPb). Refer to the 5 YZP package (drawing 4204741) for lead-free.

**NanoStar is a trademark of Texas Instruments.**

## YZA (R-XBGA-N5)

## DIE-SIZE BALL GRID ARRAY



4204151-2/B 03/2002

- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - NanoFree™ package configuration.
  - Package complies to JEDEC MO-211 variation EA.
  - This package is lead-free. Refer to the 5 YEA package (drawing 4203167) for tin-lead (SnPb).

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