



SN74LVC1G08 Single 2-Input Positive-AND Gate

1 Features

- Available in the Ultra Small 0.64-mm² Package (DPW) With 0.5-mm Pitch
- Supports 5-V V_{CC} Operation
- Inputs Accept Voltages to 5.5 V
- Provides Down Translation to V_{CC}
- Max t_{pd} of 3.6 ns at 3.3 V
- Low Power Consumption, 10-μA Max I_{CC}
- ±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

- ATCA Solutions
- Active Noise Cancellation (ANC)
- Barcode Scanner
- Blood Pressure Monitor
- CPAP Machine
- Cable Solutions
- DLP 3D Machine Vision, Hyperspectral Imaging, Optical Networking, and Spectroscopy
- E-Book
- Embedded PC
- Field Transmitter: Temperature or Pressure Sensor
- Fingerprint Biometrics
- HVAC: Heating, Ventilating, and Air Conditioning
- Network-Attached Storage (NAS)
- Server Motherboard and PSU
- Software Defined Radio (SDR)
- TV: High-Definition (HDTV), LCD, and Digital
- Video Communications System
- Wireless Data Access Card, Headset, Keyboard, Mouse, and LAN Card
- X-ray: Baggage Scanner, Medical, and Dental

3 Description

This single 2-input positive-AND gate is designed for 1.65-V to 5.5-V V_{CC} operation.

The SN74LVC1G08 device performs the Boolean function or $Y = A \cdot B$ or $Y = \overline{A + B}$ in positive logic.

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

The SN74LVC1G08 is available in a variety of packages, including the ultra-small DPW package with a body size of 0.8 mm × 0.8 mm.

Device Information⁽¹⁾

| DEVICE NAME | PACKAGE | BODY SIZE |
|-------------|------------|----------------|
| SN74LVC1G08 | SOT-23 (5) | 2.9mm × 1.6mm |
| | SC70 (5) | 2.0mm × 1.25mm |
| | X2SON (4) | 0.8mm × 0.8mm |
| | SON (6) | 1.45mm × 1.0mm |
| | SON (6) | 1.0mm × 1.0mm |

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



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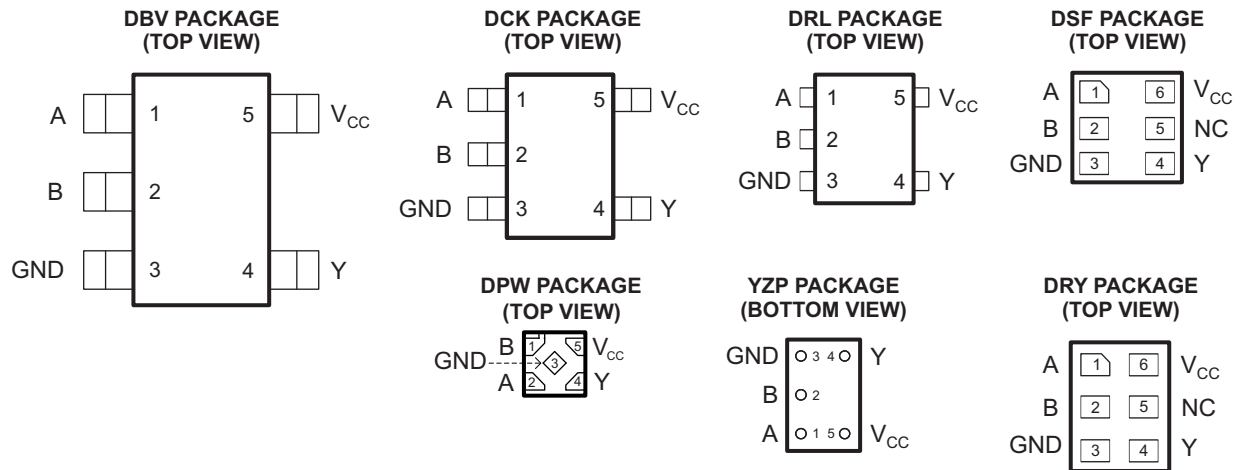
4 Revision History

| Changes from Revision X (March 2014) to Revision Y | Page |
|--|------|
| • Updated Handling Ratings table. | 4 |
| • Added Thermal Information table. | 5 |
| • Added Typical Characteristics. | 7 |
| • Added Detailed Description section. | 10 |
| • Added Application and Implementation section. | 11 |
| • Added Power Supply Recommendations section. | 12 |
| • Added Layout section. | 12 |

| Changes from Revision W (July 2013) to Revision X | Page |
|---|------|
| • Added Applications. | 1 |
| • Added Device Information table. | 1 |
| • Moved T_{stg} to Handling Ratings table. | 4 |

| Changes from Revision V (November 2012) to Revision W | Page |
|---|------|
| • Added parameter values for –40 to 125°C temperature ratings. | 6 |

5 Pin Configuration and Functions



NC – No internal connection

See mechanical drawings for dimensions.

Pin Functions

| PIN | | | | DESCRIPTION |
|-----------------|-----------------------|----------|-----|---------------|
| NAME | DBV, DCK, DRL, YZP | DRY, DSF | DPW | |
| A | 1 | 1 | 2 | Input |
| B | 2 | 2 | 1 | Input |
| GND | 3 | 3 | 3 | Ground |
| Y | 4 | 4 | 4 | Output |
| V _{CC} | 5 | 6 | 5 | Power pin |
| NC | | 5 | | Not connected |

6 Specifications

6.1 Absolute Maximum Ratings⁽¹⁾

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 ⁽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 |

- (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 and output negative-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.

6.2 Handling Ratings

| | | | MIN | MAX | UNIT |
|-------------|---------------------------|--|-----|------|------|
| T_{stg} | Storage temperature range | | –65 | 150 | °C |
| $V_{(ESD)}$ | Electrostatic discharge | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins ⁽¹⁾ | 0 | 2000 | V |
| | | Charged device model (CDM), per JEDEC specification JESD22-C101, all pins ⁽²⁾ | 0 | 1000 | |

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

6.3 Recommended Operating Conditions⁽¹⁾

| | | | MIN | MAX | UNIT |
|-----------------|------------------------------------|---|------------------------|------------------------|------|
| V _{CC} | Supply voltage | Operating | 1.65 | 5.5 | V |
| | | Data retention only | 1.5 | | |
| V _{IH} | High-level input voltage | V _{CC} = 1.65 V to 1.95 V | 0.65 × V _{CC} | | V |
| | | V _{CC} = 2.3 V to 2.7 V | 1.7 | | |
| | | V _{CC} = 3 V to 3.6 V | 2 | | |
| | | V _{CC} = 4.5 V to 5.5 V | 0.7 × V _{CC} | | |
| V _{IL} | Low-level input voltage | V _{CC} = 1.65 V to 1.95 V | | 0.35 × V _{CC} | V |
| | | V _{CC} = 2.3 V to 2.7 V | | 0.7 | |
| | | V _{CC} = 3 V to 3.6 V | | 0.8 | |
| | | V _{CC} = 4.5 V to 5.5 V | | 0.3 × V _{CC} | |
| 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 | |
| Δt/Δv | Input transition rise or fall rate | V _{CC} = 1.8 V ± 0.15 V, 2.5 V ± 0.2 V | | 20 | ns/V |
| | | V _{CC} = 3.3 V ± 0.3 V | | 10 | |
| | | V _{CC} = 5 V ± 0.5 V | | 5 | |
| 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](#).

6.4 Thermal Information

| THERMAL METRIC ⁽¹⁾ | | SN74LVC1G08 | | | | | | UNIT |
|-------------------------------|--|-------------|--------|--------|--------|--------|--------|------|
| | | DBV | DCK | DRL | DRY | YZP | DPW | |
| | | 5 PINS | 5 PINS | 5 PINS | 6 PINS | 5 PINS | 4 PINS | |
| R _{θJA} | Junction-to-ambient thermal resistance | 207.6 | 283.1 | 242.9 | 438.8 | 130 | 340 | °C/W |
| R _{θJCTop} | Junction-to-case (top) thermal resistance | 145.2 | 92.3 | 77.5 | 276.8 | 54 | 215 | |
| R _{θJB} | Junction-to-board thermal resistance | 53.5 | 60.9 | 77.5 | 271.7 | 51 | 294 | |
| Ψ _{JT} | Junction-to-top characterization parameter | 37.5 | 1.7 | 9.6 | 83.8 | 1 | 41 | |
| Ψ _{JB} | Junction-to-board characterization parameter | 53.1 | 60.1 | 77.3 | 271.4 | 50 | 294 | |
| R _{θJCbott} | Junction-to-case (bottom) thermal resistance | – | – | – | – | – | 250 | |

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

6.5 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 RECOMMENDED | | | UNIT |
|------------------|---------------|---|-----------------|-----------------------|--------------------|-----|-------------------------------|-----|-----|------|
| | | | | MIN | TYP ⁽¹⁾ | MAX | MIN | TYP | MAX | |
| V _{OH} | | I _{OH} = –100 μA | 1.65 V to 5.5 V | V _{CC} – 0.1 | | | V _{CC} – 0.15 | | | V |
| | | I _{OH} = –4 mA | 1.65 V | 1.2 | | | 1.2 | | | |
| | | I _{OH} = –8 mA | 2.3 V | 1.9 | | | 1.9 | | | |
| | | I _{OH} = –16 mA | 3 V | 2.4 | | | 2.4 | | | |
| | | I _{OH} = –24 mA | | 2.3 | | | 2.3 | | | |
| | | I _{OH} = –32 mA | 4.5 V | 3.8 | | | 3.8 | | | |
| V _{OL} | | I _{OL} = 100 μA | 1.65 V to 5.5 V | 0.1 | | | 0.1 | | | V |
| | | I _{OL} = 4 mA | 1.65 V | 0.45 | | | 0.45 | | | |
| | | I _{OL} = 8 mA | 2.3 V | 0.3 | | | 0.3 | | | |
| | | I _{OL} = 16 mA | 3 V | 0.4 | | | 0.4 | | | |
| | | I _{OL} = 24 mA | | 0.55 | | | 0.55 | | | |
| | | I _{OL} = 32 mA | 4.5 V | 0.55 | | | 0.55 | | | |
| I _I | A or B inputs | V _I = 5.5 V or GND | 0 to 5.5 V | ±5 | | | ±5 | | | μA |
| I _{off} | | V _I or V _O = 5.5 V | 0 | ±10 | | | ±10 | | | μA |
| I _{CC} | | V _I = 5.5 V or GND, I _O = 0 | 1.65 V to 5.5 V | 10 | | | 10 | | | μA |
| ΔI _{CC} | | One input at V _{CC} – 0.6 V, Other inputs at V _{CC} or GND | 3 V to 5.5 V | 500 | | | 500 | | | μA |
| C _i | | V _I = V _{CC} or GND | 3.3 V | 4 | | | 4 | | | pF |

(1) All typical values are at V_{CC} = 3.3 V, T_A = 25°C.

6.6 Switching Characteristics, C_L = 15 pF

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 V ± 0.15 V | | V _{CC} = 2.5 V ± 0.2 V | | V _{CC} = 3.3 V ± 0.3 V | | V _{CC} = 5 V ± 0.5 V | | |
| | | | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| t _{pd} | A or B | Y | 1.5 | 7.2 | 0.7 | 4.4 | 0.8 | 3.6 | 0.8 | 3.4 | ns |

6.7 Switching Characteristics, 1.8 V and 2.5 V⁽¹⁾

over recommended operating free-air temperature range, (unless otherwise noted) (see Figure 4)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | –40°C to 85°C | | –40°C to 125°C | | –40°C to 85°C | | –40°C to 125°C | | UNIT |
|-----------------|-----------------|----------------|-------------------------------------|-----|-------------------------------------|-----|------------------------------------|-----|------------------------------------|-----|------|
| | | | | | RECOMMENDED | | | | RECOMMENDED | | |
| | | | V _{CC} = 1.8 V ± 0.15 V | | V _{CC} = 1.8 V ± 0.15 V | | V _{CC} = 2.5 V ± 0.2 V | | V _{CC} = 2.5 V ± 0.2 V | | |
| | | | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| t _{pd} | A or B | Y | 2.4 | 8 | 2.4 | 10 | 1.1 | 5.5 | 1.1 | 7 | ns |

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested.

6.8 Switching Characteristics, 3.3 V and 5 V⁽¹⁾

over recommended operating free-air temperature range, $C_L = 30$ pF or 50 pF (unless otherwise noted) (see Figure 4)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | –40°C to 85°C | | –40°C to 125°C | | –40°C to 85°C | | –40°C to 125°C | | UNIT |
|-----------|-----------------|----------------|--|-----|--|-----|--|-----|--|-----|------|
| | | | | | RECOMMENDED | | | | RECOMMENDED | | |
| | | | $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ | | $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ | | $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ | | $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ | | |
| | | | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| t_{pd} | A or B | Y | 1 | 4.5 | 1 | 6 | 1 | 4 | 1 | 5 | ns |

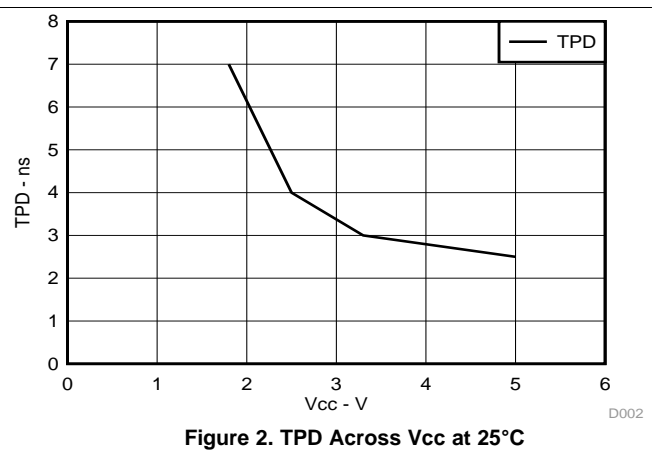
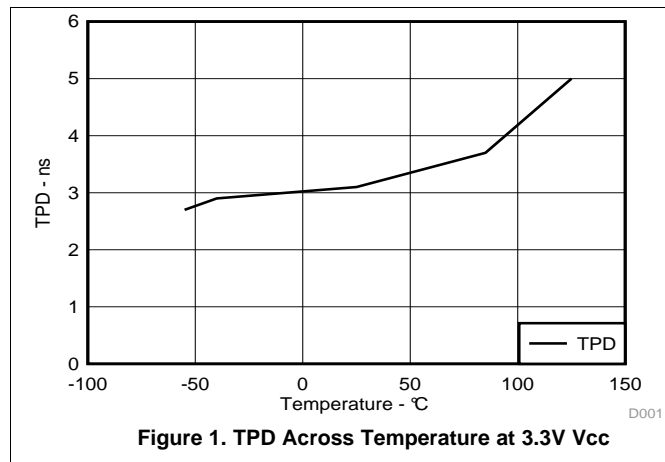
(1) On products compliant to MIL-PRF-38535, this parameter is not production tested.

6.9 Operating Characteristics

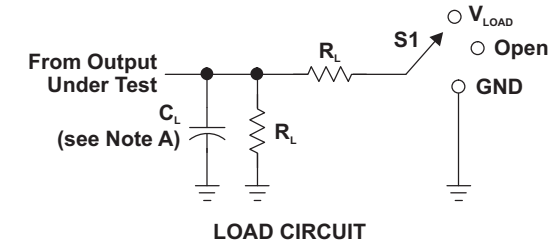
$T_A = 25^\circ\text{C}$

| 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 | $f = 10\text{ MHz}$ | 21 | 24 | 26 | 31 | pF |

6.10 Typical Characteristics

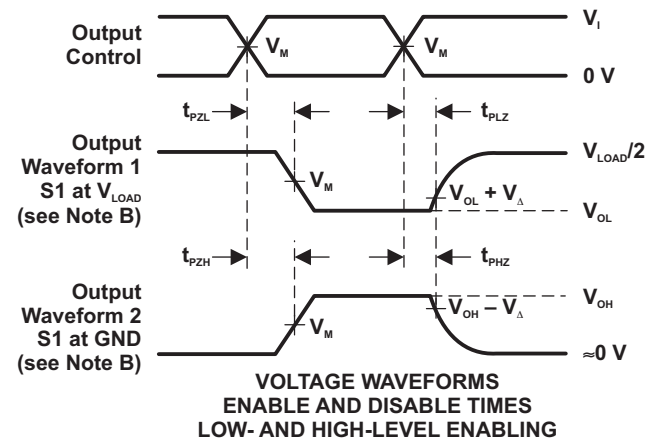
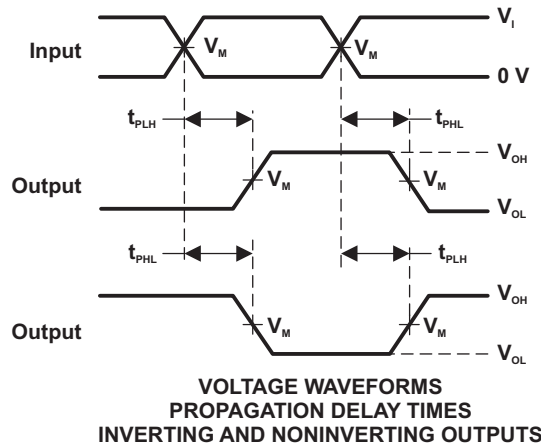
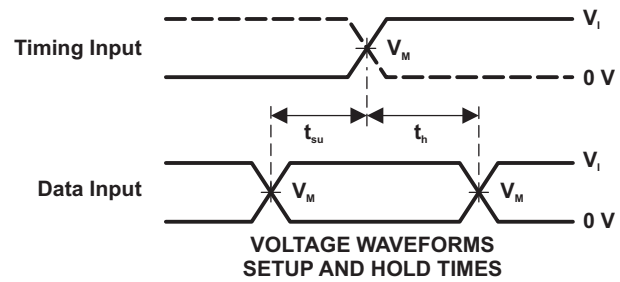
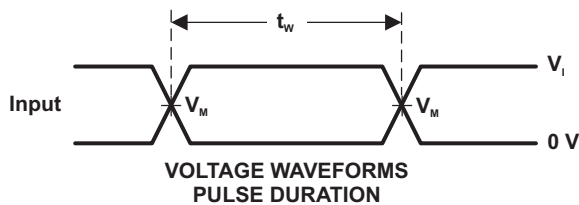


7 Parameter Measurement Information



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

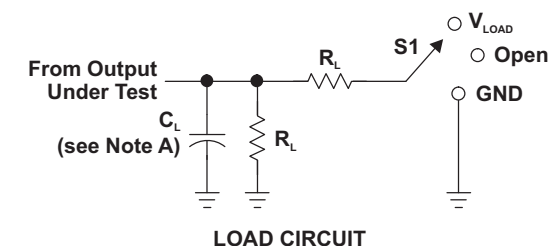
| V_{CC} | INPUTS | | V_M | V_{LOAD} | C_L | R_L | V_{Δ} |
|----------------------------------|----------|----------------------|------------|-------------------|-------|--------------|--------------|
| | V_I | t_r/t_f | | | | | |
| $1.8\text{ V} \pm 0.15\text{ V}$ | V_{CC} | $\leq 2\text{ ns}$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 15 pF | 1 M Ω | 0.15 V |
| $2.5\text{ V} \pm 0.2\text{ V}$ | V_{CC} | $\leq 2\text{ ns}$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 15 pF | 1 M 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 | 15 pF | 1 M Ω | 0.3 V |
| $5\text{ V} \pm 0.5\text{ V}$ | V_{CC} | $\leq 2.5\text{ ns}$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 15 pF | 1 M Ω | 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 $\leq 10\text{ MHz}$, $Z_o = 50\ \Omega$.
 - The outputs are measured one at a time, with one transition per measurement.
 - t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - t_{PZL} and t_{PZH} are the same as t_{en} .
 - t_{PLH} and t_{PHL} are the same as t_{pd} .
 - All parameters and waveforms are not applicable to all devices.

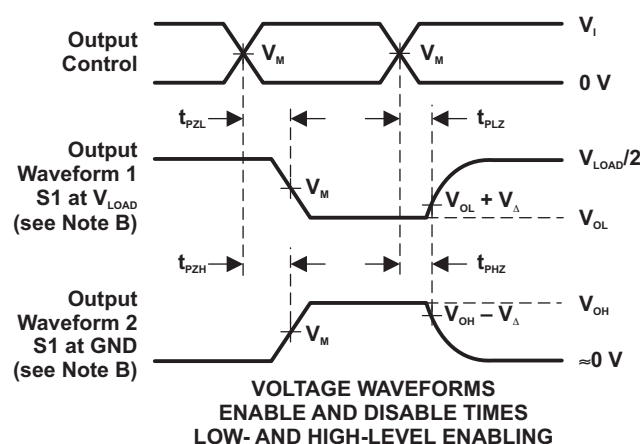
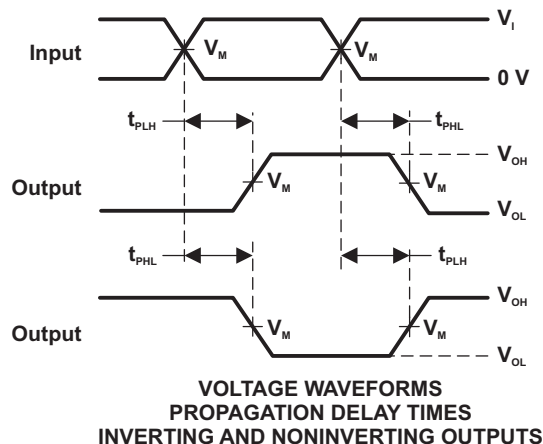
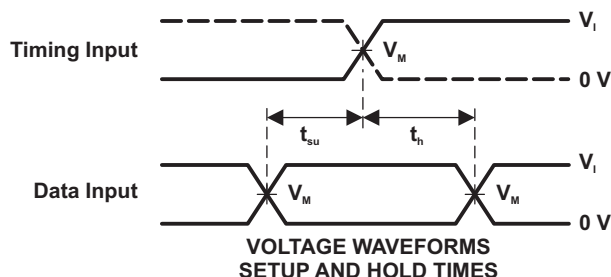
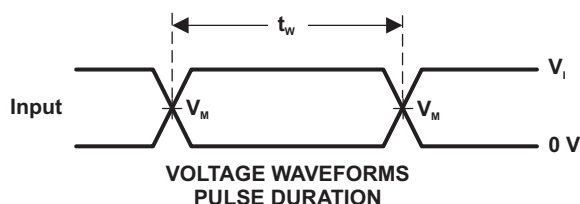
Figure 3. Load Circuit and Voltage Waveforms

Parameter Measurement Information (continued)



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

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



- 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_{on} .
 - G. t_{PLH} and t_{PHL} are the same as t_{pd} .
 - H. All parameters and waveforms are not applicable to all devices.

Figure 4. Load Circuit and Voltage Waveforms

8 Detailed Description

8.1 Overview

The SN74LVC1G08 device contains one 2-input positive AND gate device and performs the Boolean function $Y = A \cdot B$ or $Y = \overline{A + B}$. This device is fully specified for partial-power-down applications using Ioff. The Ioff circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

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.

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 and outputs accept voltages to 5.5 V.
- Ioff feature allows voltages on the inputs and outputs when V_{CC} is 0 V.

8.4 Device Functional Modes

Function Table

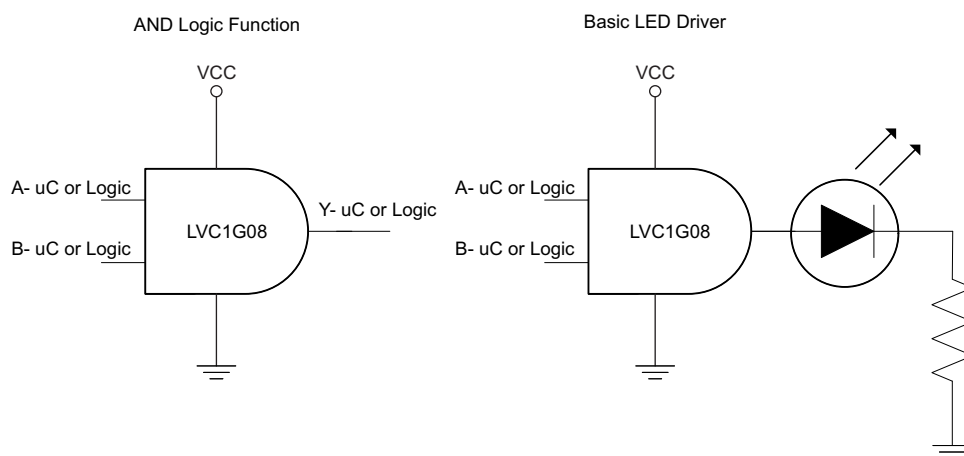
| INPUTS | | OUTPUT Y |
|--------|---|-------------|
| A | B | |
| H | H | H |
| L | X | L |
| X | L | L |

9 Application and Implementation

9.1 Application Information

The SN74LVC1G08 is a high drive CMOS device that can be used for implementing AND logic with a high output drive, such as an LED application. 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

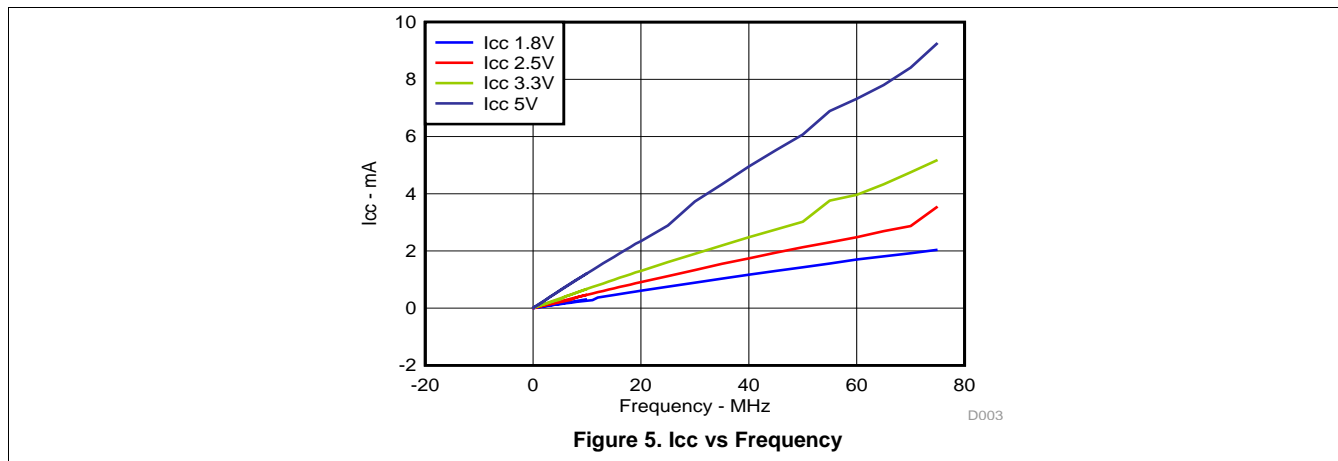
This device uses CMOS technology and has balanced output drive. Care should be taken to avoid bus contention because it can drive currents that would exceed maximum limits. The high drive will also create fast edges into light loads so routing and load conditions should be considered to prevent ringing.

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 max) in the [Recommended Operating Conditions](#) table at any valid V_{CC} .
2. Recommend Output Conditions
 - Load currents should not exceed (I_O max) per output and should not exceed total current (continuous current through V_{CC} or GND) for the part. These limits are located in the [Absolute Maximum Ratings](#) table.
 - Outputs should not be pulled above V_{CC} .

Typical Application (continued)

9.2.3 Application Curves



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.

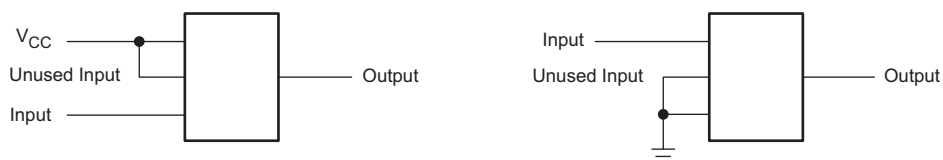
Each V_{CC} pin should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, a 0.1- μ F capacitor is recommended and if there are multiple V_{CC} pins then 0.01- μ F or 0.022- μ F capacitor is recommended for each power pin. It is ok to parallel multiple bypass capacitors to reject different frequencies of noise. 0.1- μ F and 1- μ F capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power 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 pins 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 V_{CC} whichever make more sense or is more convenient.

11.2 Layout Example



12 Device and Documentation Support

12.1 Trademarks

All trademarks are the property of their respective owners.

12.2 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.

12.3 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms and definitions.

13 Mechanical, Packaging, and Orderable Information

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

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|-------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|---|-------------------------|
| SN74LVC1G08DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (C085, C08F, C08K, C08R, C08T) (C08P, C08S) | Samples |
| SN74LVC1G08DBVRE4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (C085, C08F, C08K, C08R, C08T) (C08P, C08S) | Samples |
| SN74LVC1G08DBVRG4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (C085, C08F, C08K, C08R, C08T) (C08P, C08S) | Samples |
| SN74LVC1G08DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (C085, C08F, C08K, C08R) (C08H, C08P, C08S) | Samples |
| SN74LVC1G08DBVTE4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (C085, C08F, C08K, C08R) (C08H, C08P, C08S) | Samples |
| SN74LVC1G08DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | TBD | Call TI | Call TI | -40 to 125 | (C085, C08F, C08K, C08R) (C08H, C08P, C08S) | Samples |
| SN74LVC1G08DCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (CE5, CEF, CEK, CE R, CET) (CEH, CEP, CES) | Samples |
| SN74LVC1G08DCKRE4 | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (CE5, CEF, CEK, CE R, CET) (CEH, CEP, CES) | Samples |
| SN74LVC1G08DCKRG4 | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (CE5, CEF, CEK, CE R, CET) (CEH, CEP, CES) | Samples |
| SN74LVC1G08DCKT | ACTIVE | SC70 | DCK | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (CE5, CEF, CEK, CE R, CET) (CEH, CEP, CES) | Samples |
| SN74LVC1G08DCKTE4 | ACTIVE | SC70 | DCK | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (CE5, CEF, CEK, CE R, CET) (CEH, CEP, CES) | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|-------------------|---------------|--------------|--------------------|------|----------------|----------------------------|----------------------------|----------------------|--------------|--|-------------------------|
| SN74LVC1G08DCKTG4 | ACTIVE | SC70 | DCK | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (CE5, CEF, CEK, CE R, CET) (CEH, CEP, CES) | Samples |
| SN74LVC1G08DPWR | ACTIVE | X2SON | DPW | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | M4 | Samples |
| SN74LVC1G08DRLR | ACTIVE | SOT-5X3 | DRL | 5 | 4000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (CE7, CER) | Samples |
| SN74LVC1G08DRLRG4 | ACTIVE | SOT-5X3 | DRL | 5 | 4000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (CE7, CER) | Samples |
| SN74LVC1G08DRY2 | ACTIVE | SON | DRY | 6 | 5000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | CE | Samples |
| SN74LVC1G08DRYR | ACTIVE | SON | DRY | 6 | 5000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | CE | Samples |
| SN74LVC1G08DSF2 | ACTIVE | SON | DSF | 6 | 5000 | Green (RoHS & no Sb/Br) | CU NIPDAU CU NIPDAUAG | Level-1-260C-UNLIM | -40 to 125 | CE | Samples |
| SN74LVC1G08DSFR | ACTIVE | SON | DSF | 6 | 5000 | Green (RoHS & no Sb/Br) | CU NIPDAU CU NIPDAUAG | Level-1-260C-UNLIM | -40 to 125 | CE | Samples |
| SN74LVC1G08YZPR | ACTIVE | DSBGA | YZP | 5 | 3000 | Green (RoHS & no Sb/Br) | SNAGCU | Level-1-260C-UNLIM | -40 to 85 | (CE, CE7) | Samples |

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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.

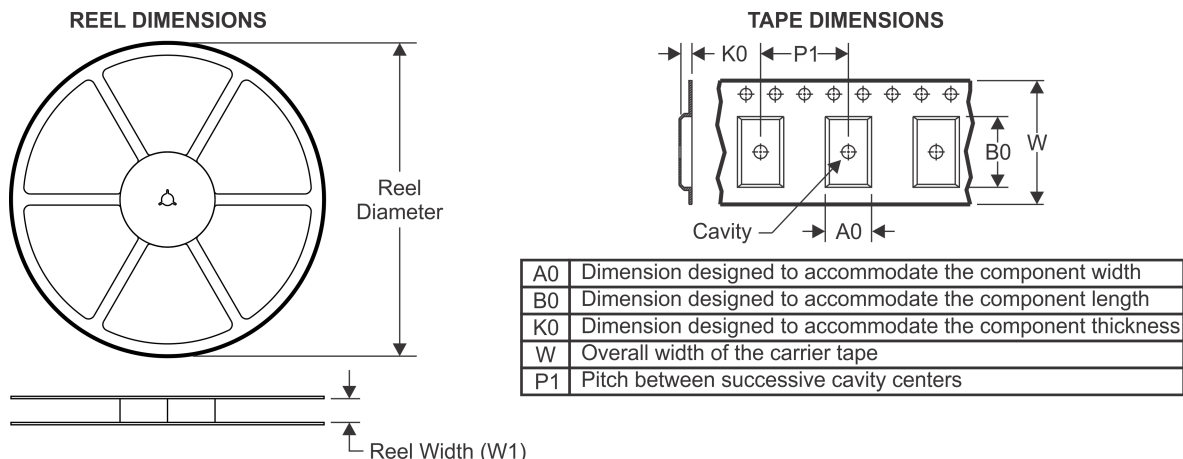
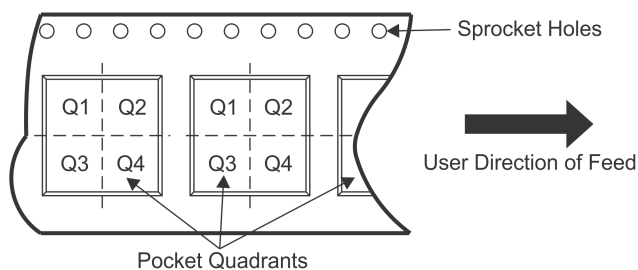
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN74LVC1G08 :

- Automotive: [SN74LVC1G08-Q1](#)
- Enhanced Product: [SN74LVC1G08-EP](#)

NOTE: Qualified Version Definitions:

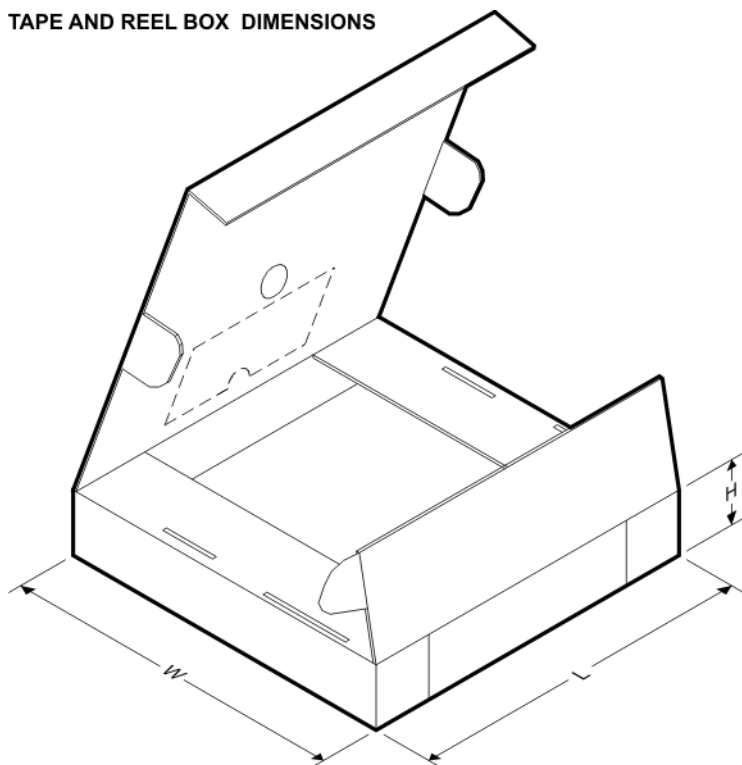
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

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 |
|-----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LVC1G08DBVR | SOT-23 | DBV | 5 | 3000 | 178.0 | 9.2 | 3.3 | 3.23 | 1.55 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DBVR | SOT-23 | DBV | 5 | 3000 | 178.0 | 9.0 | 3.23 | 3.17 | 1.37 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DBVT | SOT-23 | DBV | 5 | 250 | 178.0 | 9.2 | 3.3 | 3.23 | 1.55 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DBVT | SOT-23 | DBV | 5 | 250 | 178.0 | 9.0 | 3.23 | 3.17 | 1.37 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DCKR | SC70 | DCK | 5 | 3000 | 178.0 | 9.0 | 2.4 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DCKR | SC70 | DCK | 5 | 3000 | 178.0 | 9.2 | 2.4 | 2.4 | 1.22 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DCKT | SC70 | DCK | 5 | 250 | 178.0 | 9.0 | 2.4 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DCKT | SC70 | DCK | 5 | 250 | 180.0 | 9.2 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DCKT | SC70 | DCK | 5 | 250 | 178.0 | 9.2 | 2.4 | 2.4 | 1.22 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DPWR | X2SON | DPW | 5 | 3000 | 178.0 | 8.4 | 0.91 | 0.91 | 0.5 | 2.0 | 8.0 | Q3 |
| SN74LVC1G08DRLR | SOT-5X3 | DRL | 5 | 4000 | 180.0 | 8.4 | 1.98 | 1.78 | 0.69 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DRY2 | SON | DRY | 6 | 5000 | 180.0 | 8.4 | 1.65 | 1.2 | 0.7 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DRY2 | SON | DRY | 6 | 5000 | 180.0 | 9.5 | 1.6 | 1.15 | 0.75 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DRYR | SON | DRY | 6 | 5000 | 180.0 | 9.5 | 1.15 | 1.6 | 0.75 | 4.0 | 8.0 | Q1 |
| SN74LVC1G08DSF2 | SON | DSF | 6 | 5000 | 180.0 | 8.4 | 1.16 | 1.16 | 0.63 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08DSF2 | SON | DSF | 6 | 5000 | 180.0 | 9.5 | 1.16 | 1.16 | 0.5 | 4.0 | 8.0 | Q3 |
| SN74LVC1G08YZPR | DSBGA | YZP | 5 | 3000 | 180.0 | 8.4 | 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) |
|-----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LVC1G08DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 180.0 | 18.0 |
| SN74LVC1G08DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 180.0 | 18.0 |
| SN74LVC1G08DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 180.0 | 18.0 |
| SN74LVC1G08DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 180.0 | 18.0 |
| SN74LVC1G08DCKR | SC70 | DCK | 5 | 3000 | 180.0 | 180.0 | 18.0 |
| SN74LVC1G08DCKR | SC70 | DCK | 5 | 3000 | 180.0 | 180.0 | 18.0 |
| SN74LVC1G08DCKT | SC70 | DCK | 5 | 250 | 180.0 | 180.0 | 18.0 |
| SN74LVC1G08DCKT | SC70 | DCK | 5 | 250 | 205.0 | 200.0 | 33.0 |
| SN74LVC1G08DCKT | SC70 | DCK | 5 | 250 | 180.0 | 180.0 | 18.0 |
| SN74LVC1G08DPWR | X2SON | DPW | 5 | 3000 | 205.0 | 200.0 | 33.0 |
| SN74LVC1G08DRLR | SOT-5X3 | DRL | 5 | 4000 | 202.0 | 201.0 | 28.0 |
| SN74LVC1G08DRY2 | SON | DRY | 6 | 5000 | 202.0 | 201.0 | 28.0 |
| SN74LVC1G08DRY2 | SON | DRY | 6 | 5000 | 184.0 | 184.0 | 19.0 |
| SN74LVC1G08DRYR | SON | DRY | 6 | 5000 | 184.0 | 184.0 | 19.0 |
| SN74LVC1G08DSF2 | SON | DSF | 6 | 5000 | 202.0 | 201.0 | 28.0 |
| SN74LVC1G08DSF2 | SON | DSF | 6 | 5000 | 184.0 | 184.0 | 19.0 |
| SN74LVC1G08YZPR | DSBGA | YZP | 5 | 3000 | 182.0 | 182.0 | 20.0 |

DCK (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



4093553-3/G 01/2007

- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
 - Falls within JEDEC MO-203 variation AA.

DCK (R-PDSO-G5)

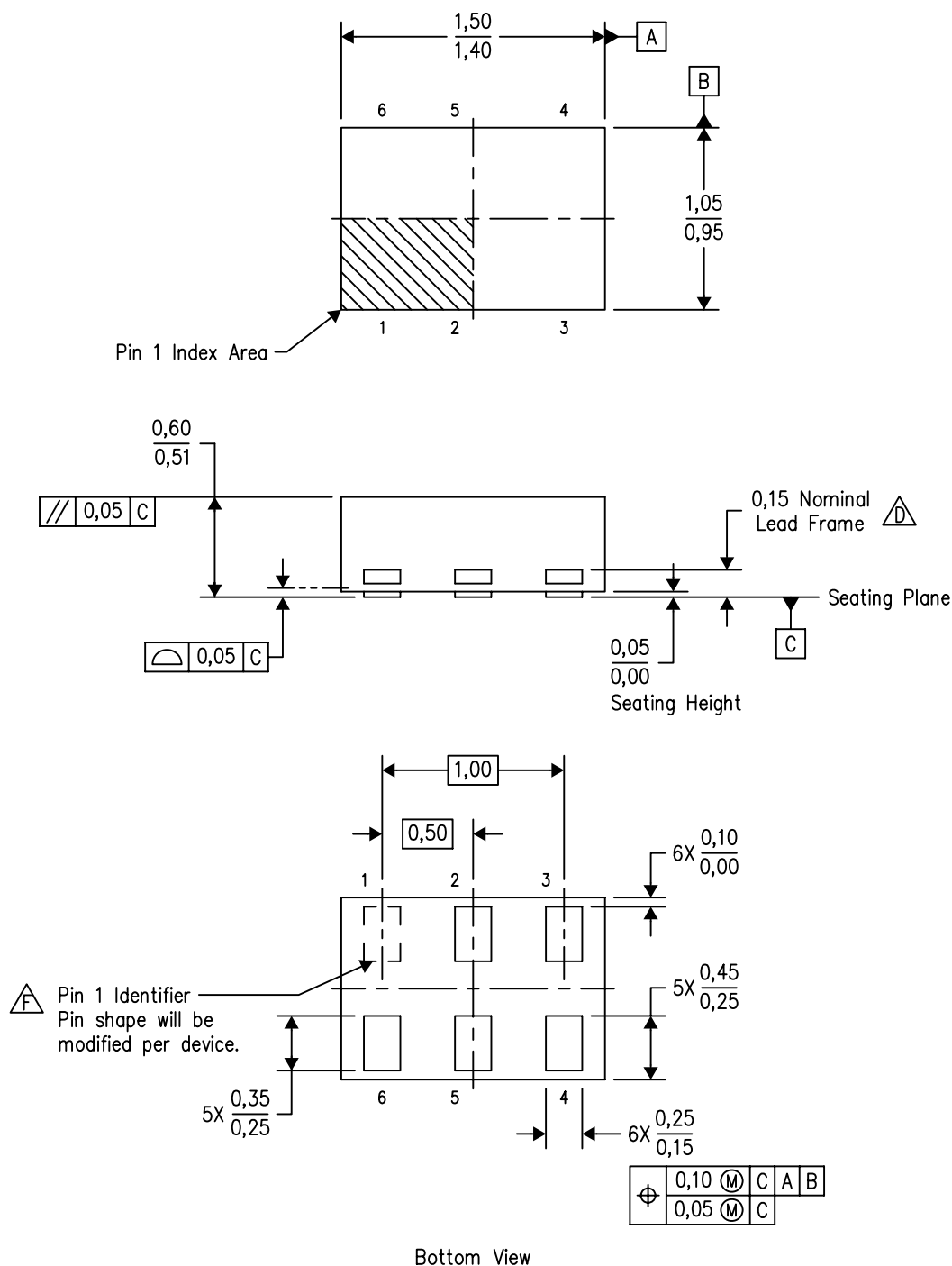
PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
 - D. Publication IPC-7351 is recommended for alternate designs.
 - E. 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.

DRY (R-PUSON-N6)

PLASTIC SMALL OUTLINE NO-LEAD

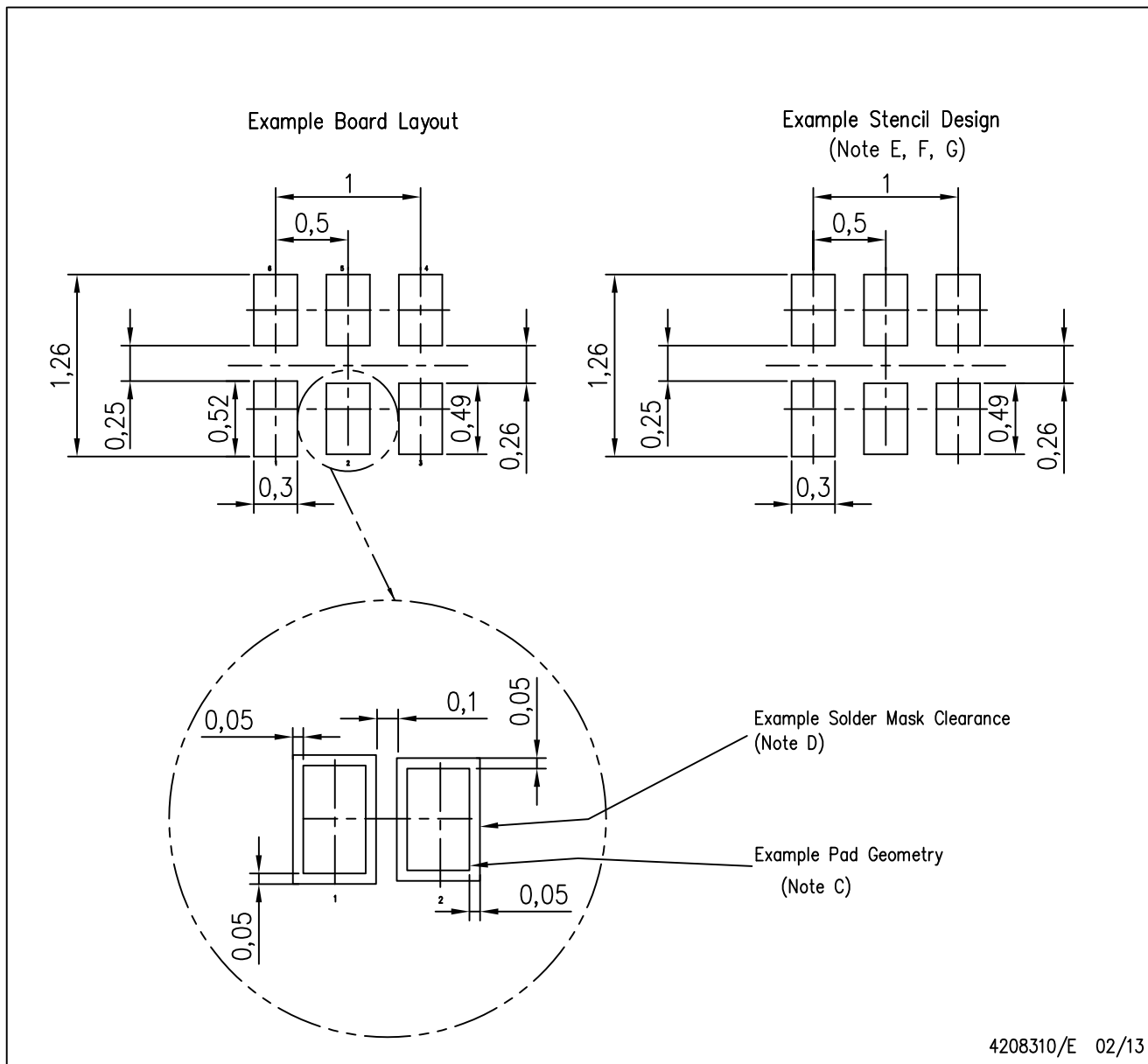


4207181/F 12/11

- 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. SON (Small Outline No-Lead) package configuration.
 - $\triangle D$ The exposed lead frame feature on side of package may or may not be present due to alternative lead frame designs.
 - E. This package complies to JEDEC MO-287 variation UFAD.
 - $\triangle F$ See the additional figure in the Product Data Sheet for details regarding the pin 1 identifier shape.

DRY (R-PUSON-N6)

PLASTIC SMALL OUTLINE NO-LEAD



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Publication IPC-7351 is recommended for alternate designs.
 - D. Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.
 - E. Maximum stencil thickness 0,127 mm (5 mils). All linear dimensions are in millimeters.
 - F. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
 - G. Side aperture dimensions over-print land for acceptable area ratio > 0.66. Customer may reduce side aperture dimensions if stencil manufacturing process allows for sufficient release at smaller opening.

GENERIC PACKAGE VIEW

DPW 5

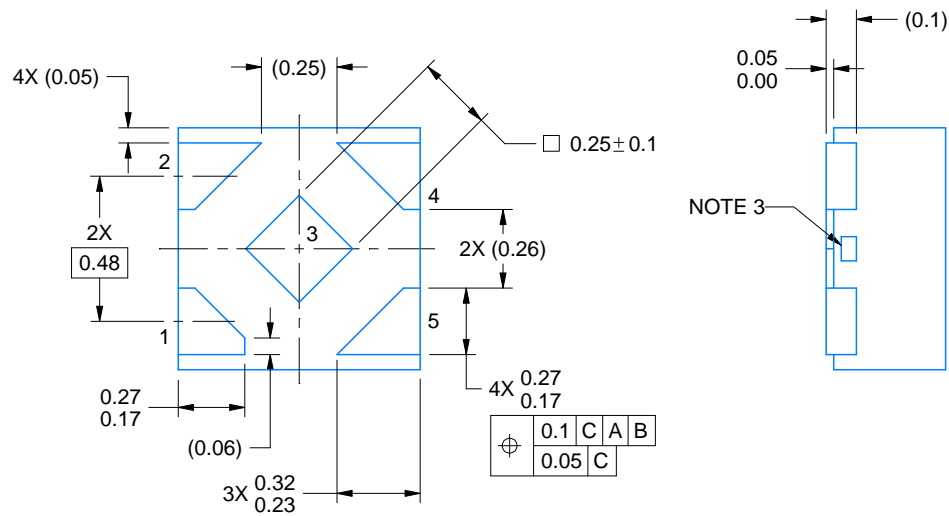
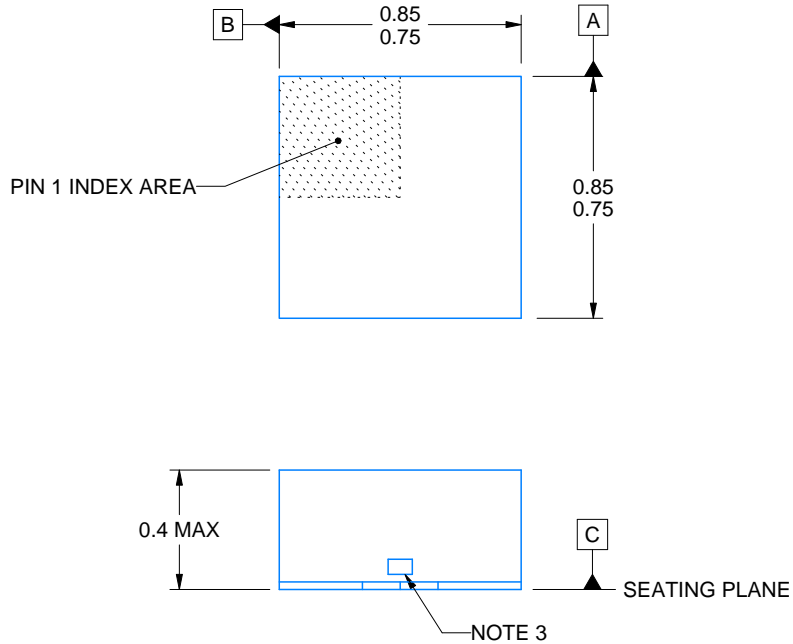
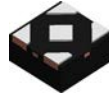
X2SON - 0.4 mm max height

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/B 09/2017

NOTES:

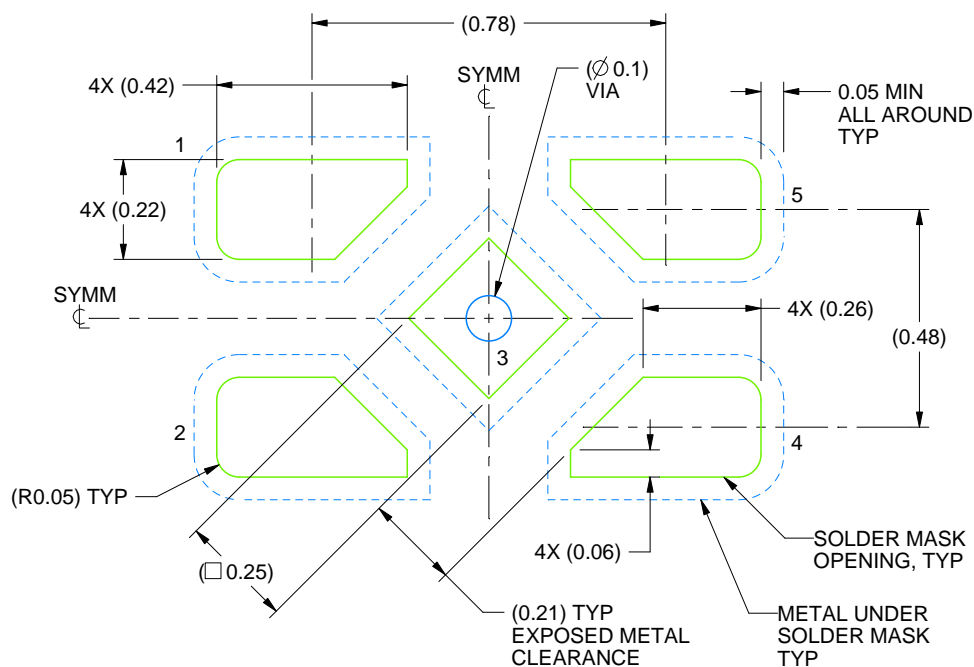
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The size and shape of this feature may vary.

EXAMPLE BOARD LAYOUT

DPW0005A

X2SON - 0.4 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE
SOLDER MASK DEFINED
SCALE:60X

4223102/B 09/2017

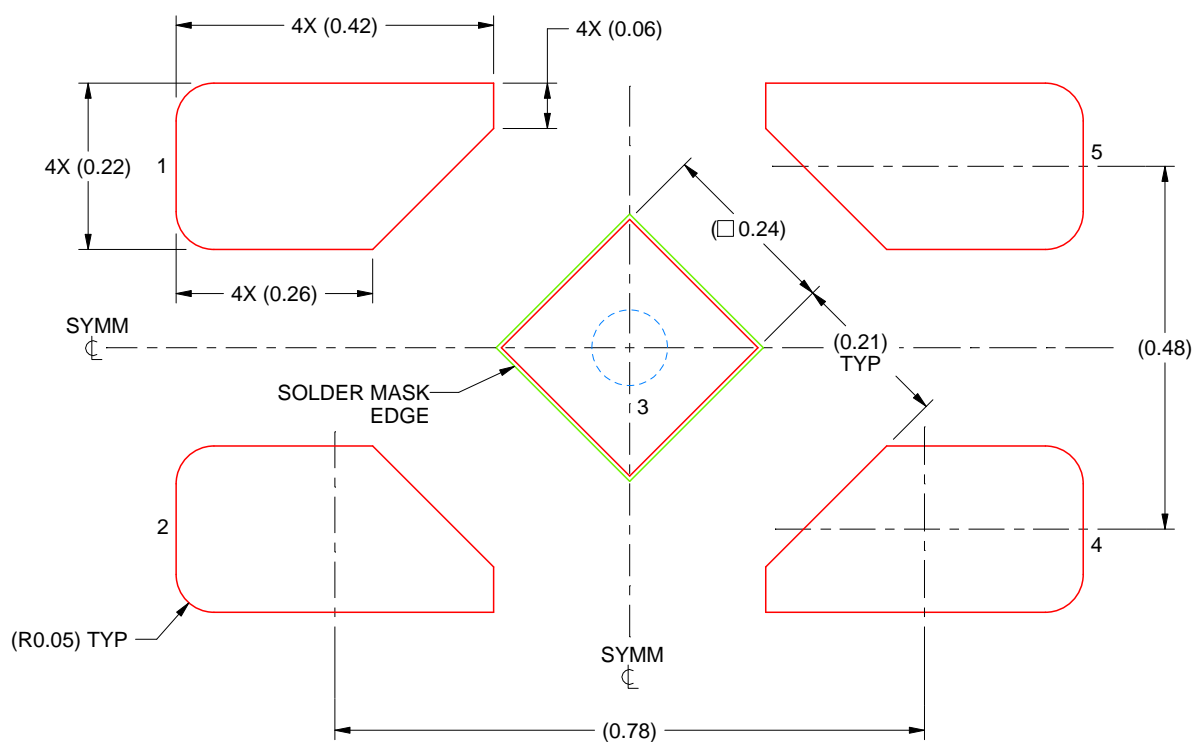
NOTES: (continued)

- 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).

DPW0005A

X2SON - 0.4 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



SOLDER PASTE EXAMPLE BASED ON 0.1 mm THICK STENCIL

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

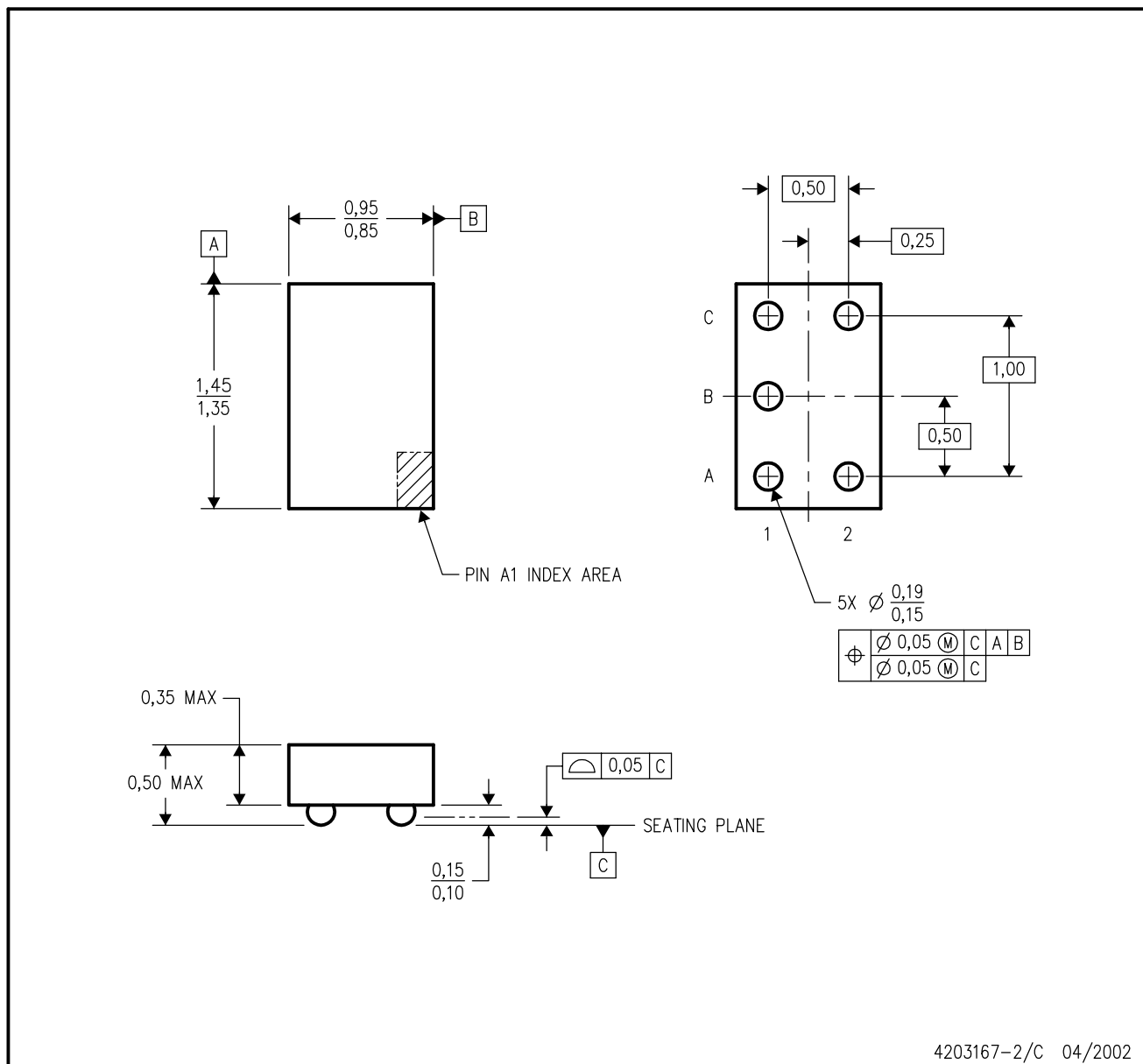
4223102/B 09/2017

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



- 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.

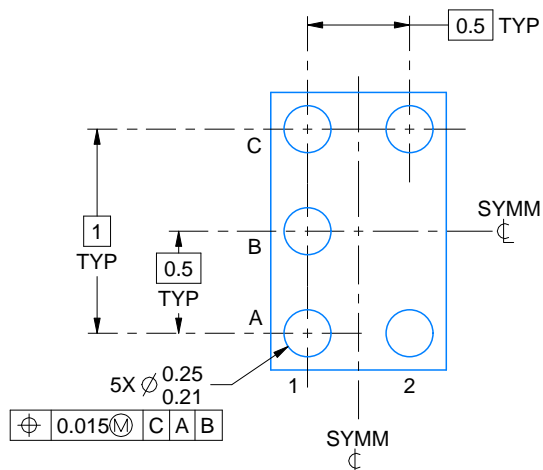
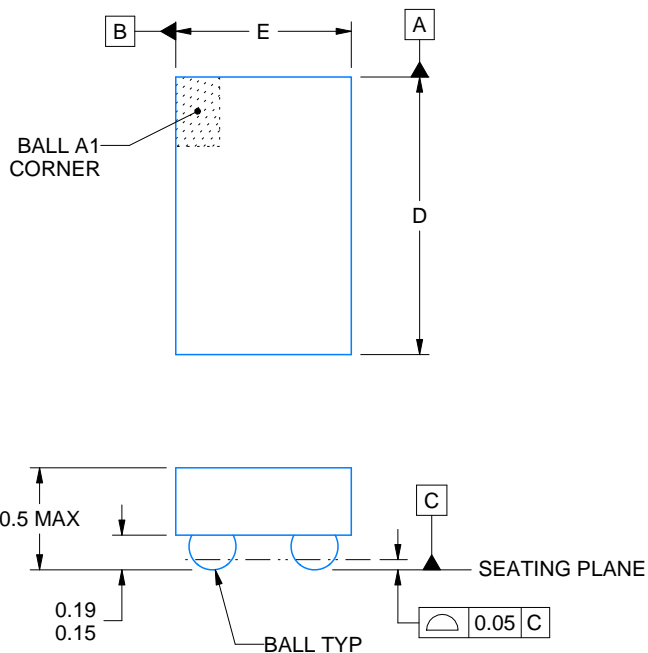
YZP0005



PACKAGE OUTLINE

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



D: Max = 1.418 mm, Min = 1.358 mm

E: Max = 0.918 mm, Min = 0.858 mm

4219492/A 05/2017

NOTES:

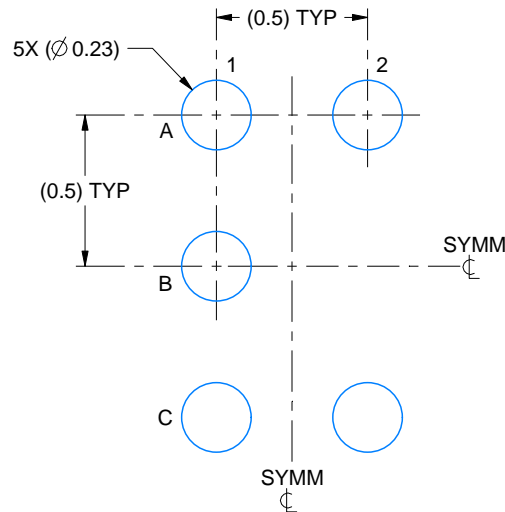
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

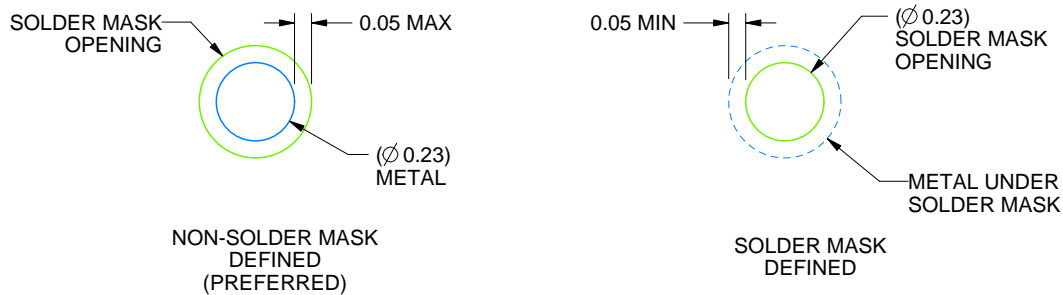
YZP0005

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



LAND PATTERN EXAMPLE
SCALE:40X



SOLDER MASK DETAILS
NOT TO SCALE

4219492/A 05/2017

NOTES: (continued)

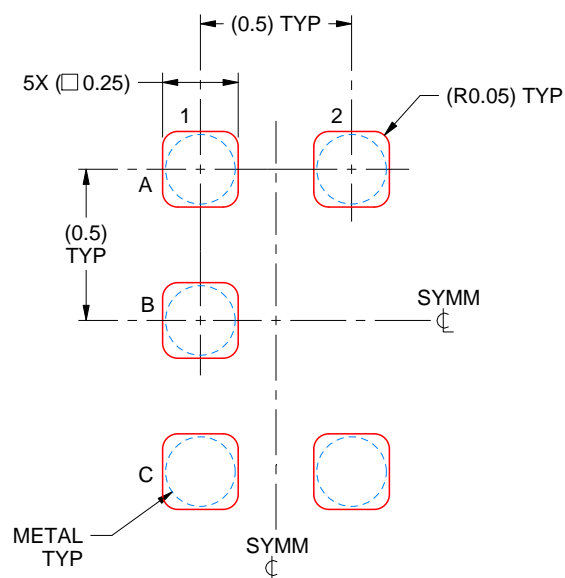
3. Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For more information, see Texas Instruments literature number SNVA009 (www.ti.com/lit/snva009).

EXAMPLE STENCIL DESIGN

YZP0005

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY

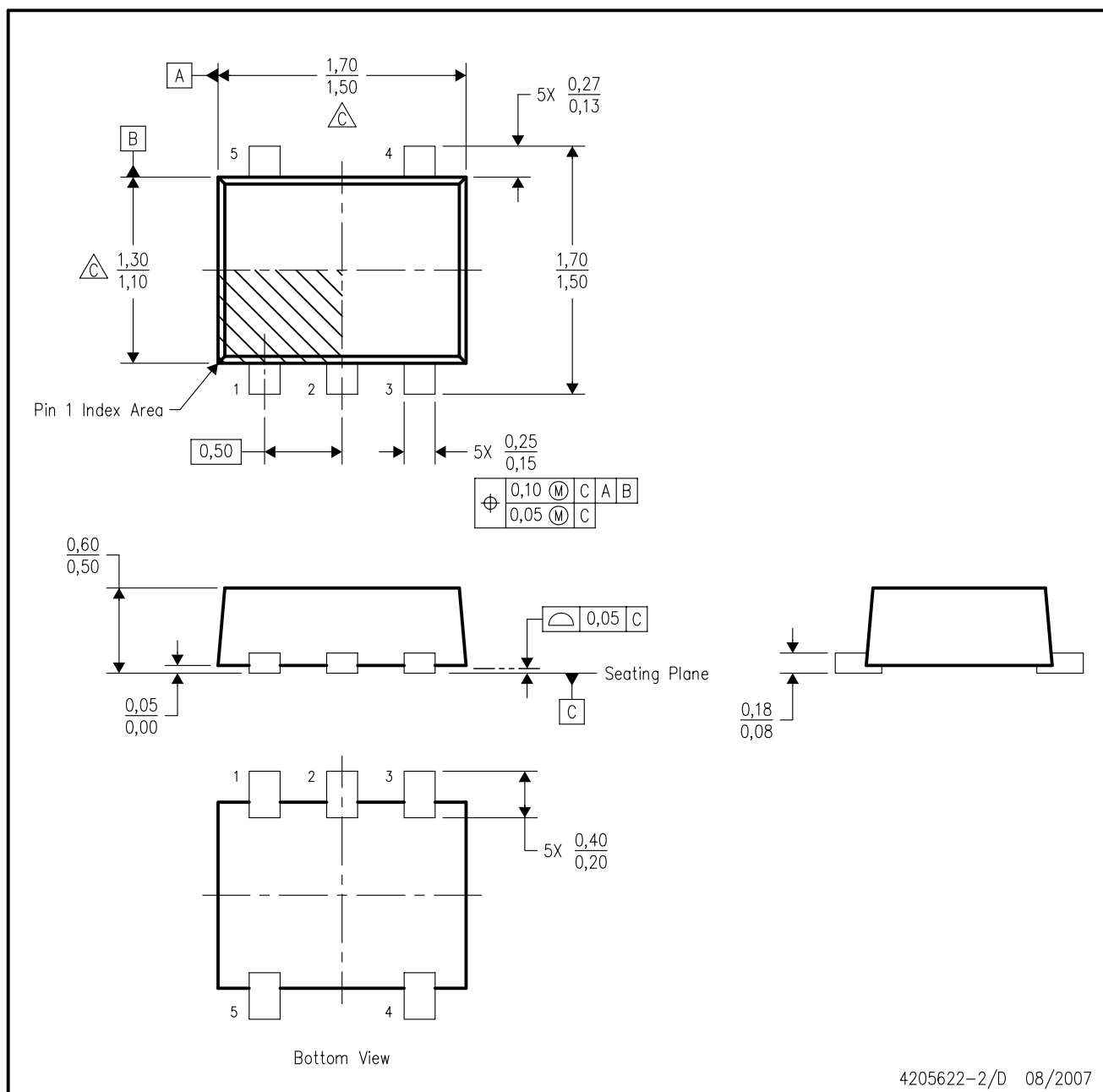


SOLDER PASTE EXAMPLE
BASED ON 0.1 mm THICK STENCIL
SCALE:40X

4219492/A 05/2017

NOTES: (continued)

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



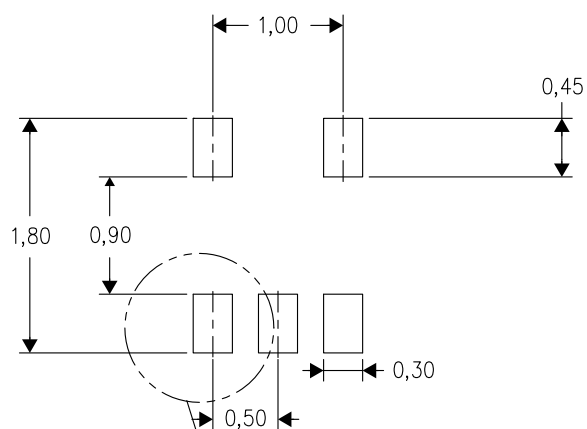
4205622-2/D 08/2007

- 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. Body dimensions do not include mold flash, interlead flash, protrusions, or gate burrs. Mold flash, interlead flash, protrusions, or gate burrs shall not exceed 0,15 per end or side.
 - D. JEDEC package registration is pending.

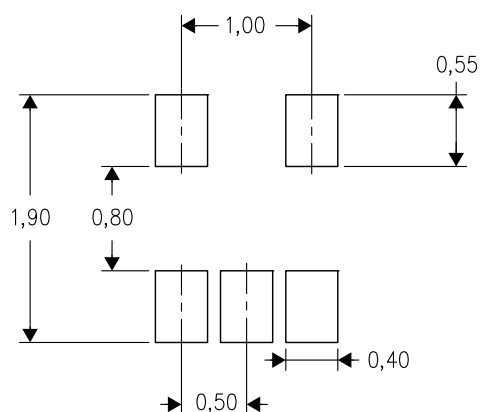
DRL (R-PDSO-N5)

PLASTIC SMALL OUTLINE

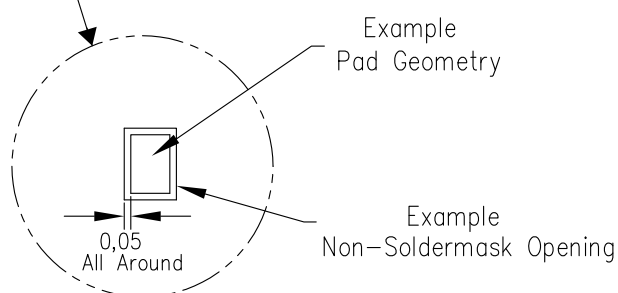
Example Board Layout



Example Stencil Design
(Note E)



Example
Non-Soldermask Defined Pad

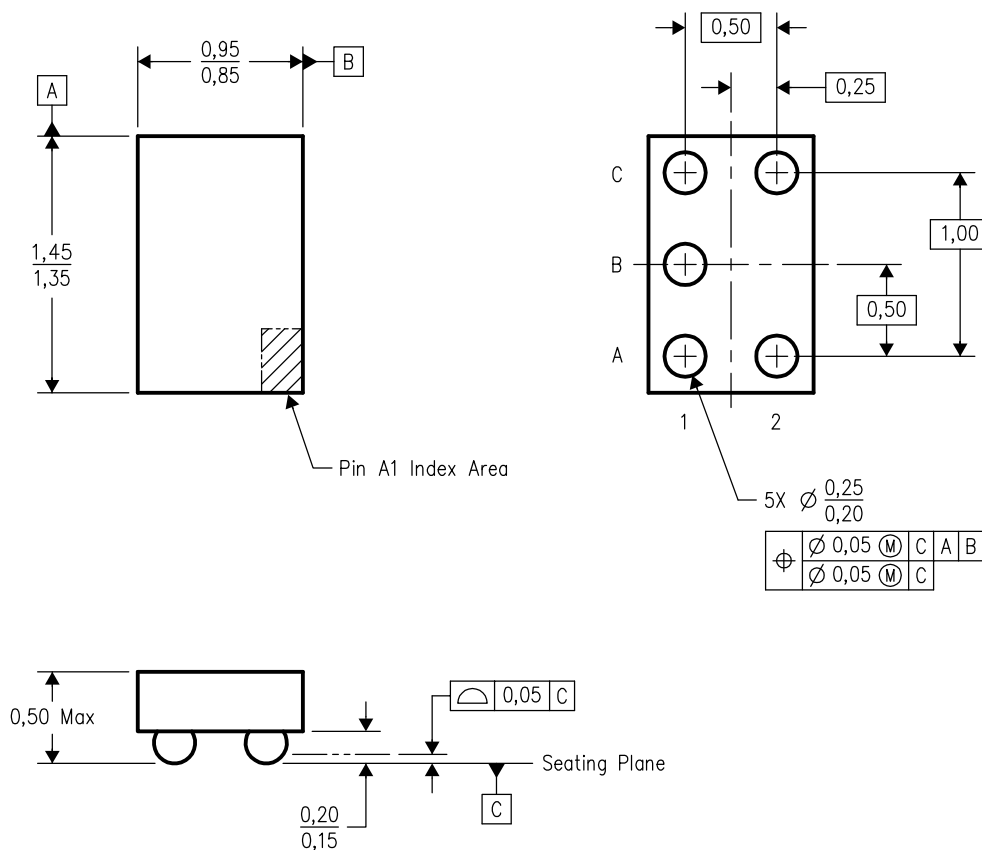


4208207-2/E 06/12

- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Publication IPC-7351 is recommended for alternate designs.
 - D. Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.
 - E. Maximum stencil thickness 0,127 mm (5 mils). All linear dimensions are in millimeters.
 - F. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
 - G. Side aperture dimensions over-print land for acceptable area ratio > 0.66. Customer may reduce side aperture dimensions if stencil manufacturing process allows for sufficient release at smaller opening.

YEP (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



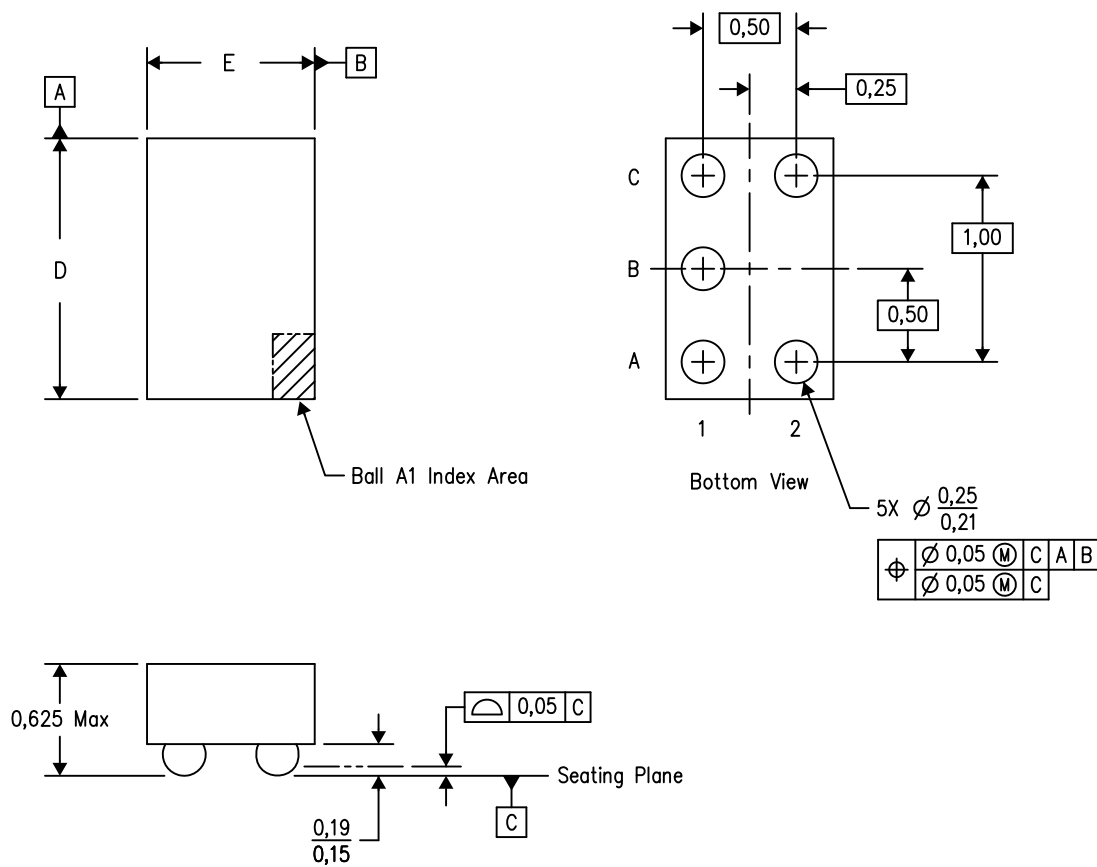
4204725-2/A 10/2002

- 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.

YZT (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY

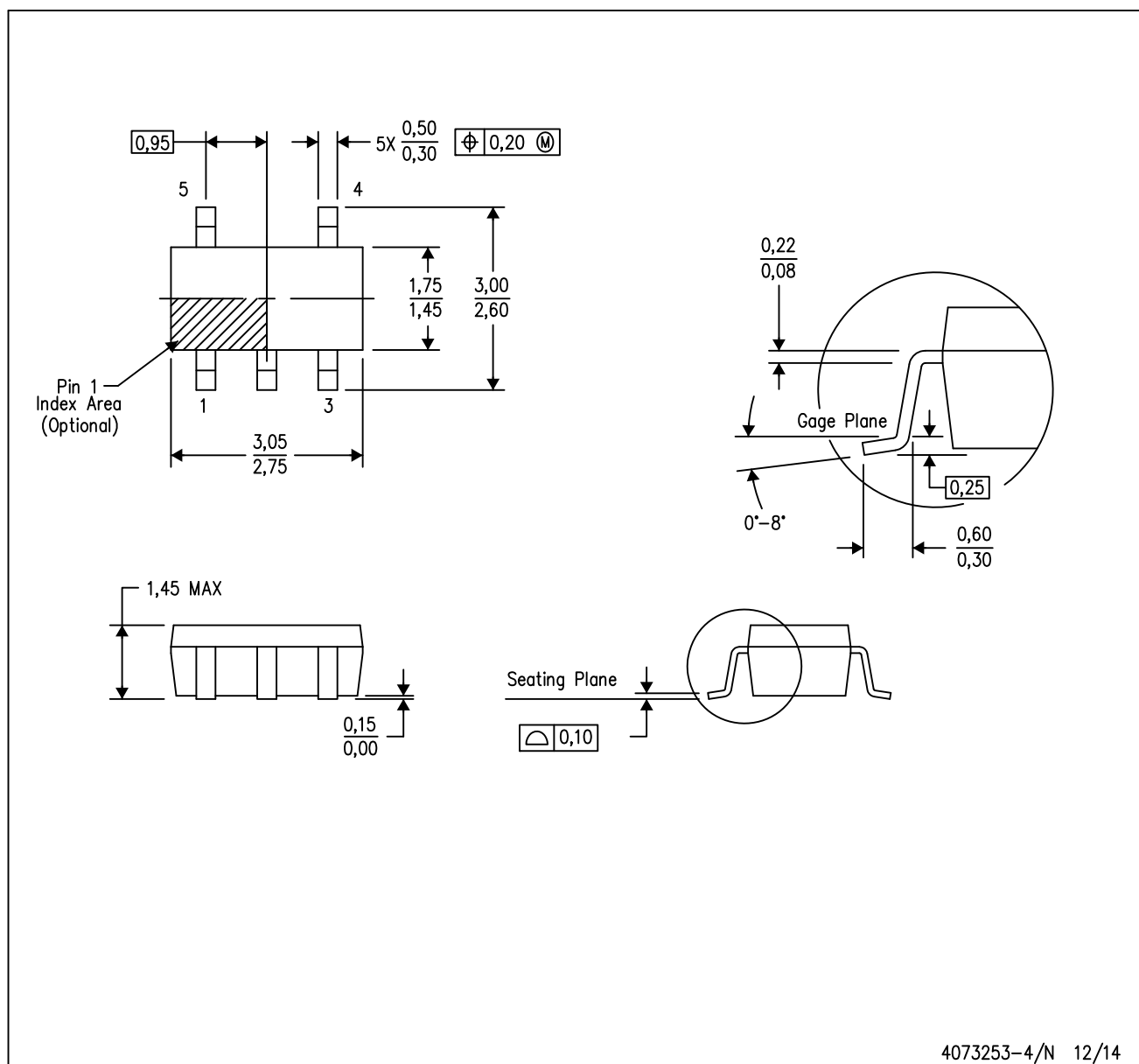


4205418-3/H 05/13

- 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.

DBV (R-PDSO-G5)

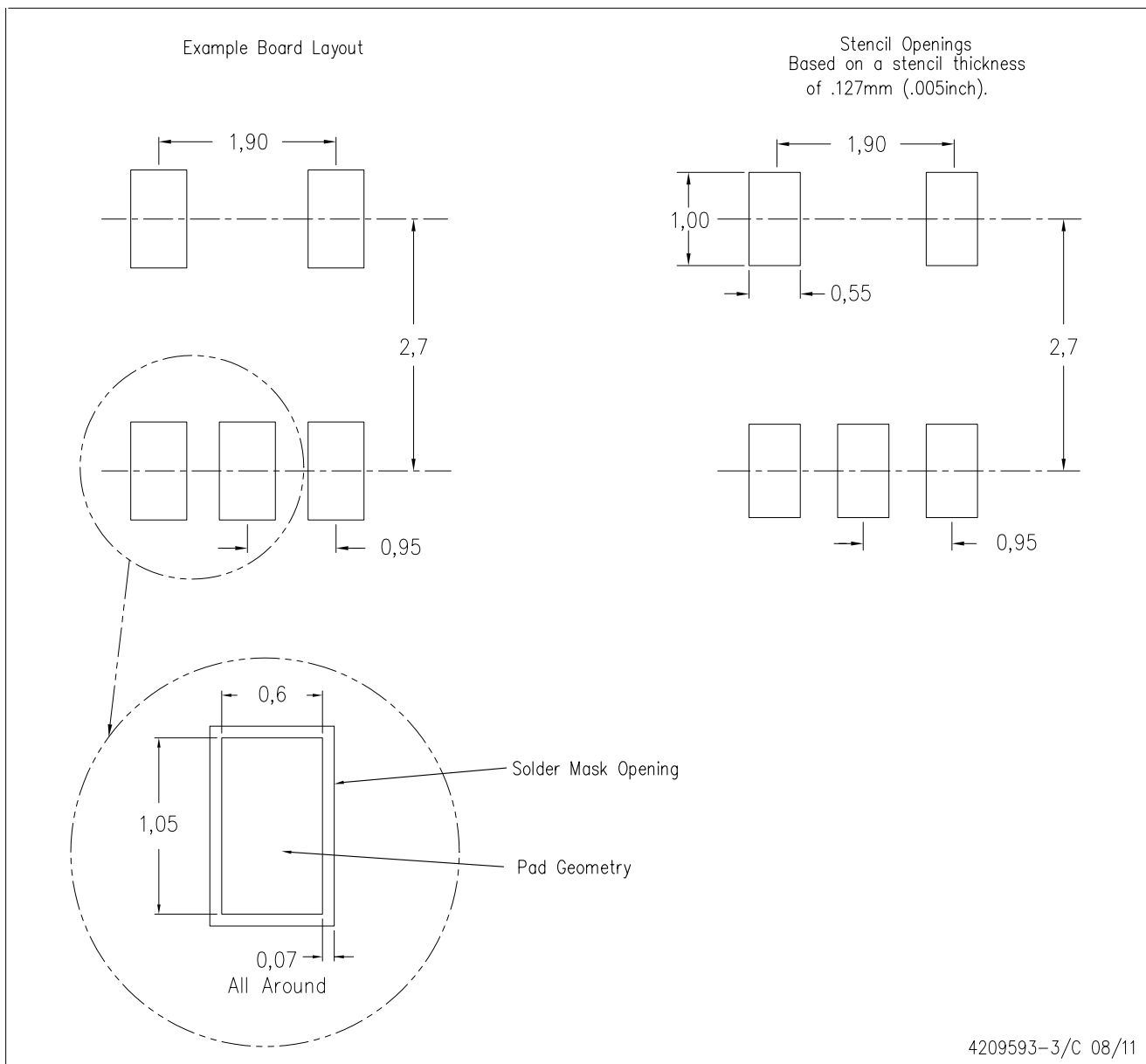
PLASTIC SMALL-OUTLINE PACKAGE



- 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-178 Variation AA.

DBV (R-PDSO-G5)

PLASTIC SMALL OUTLINE

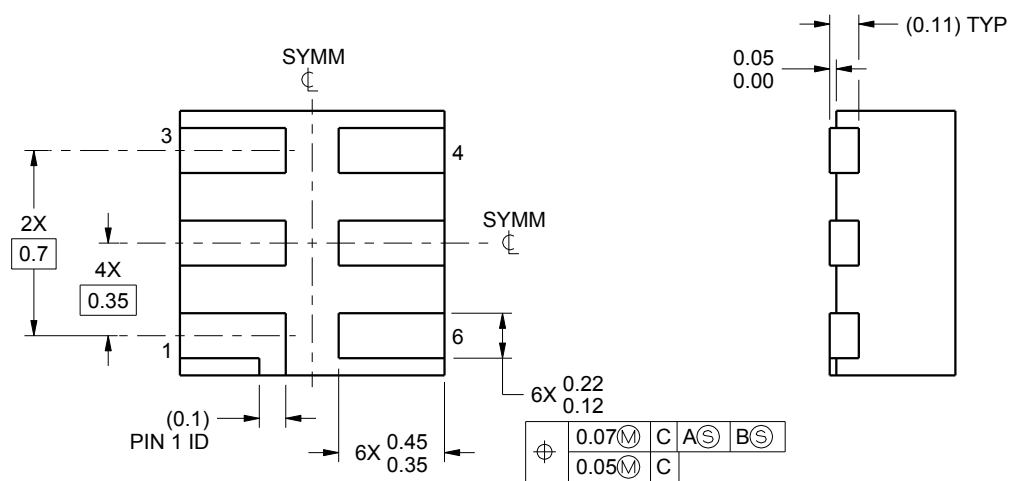
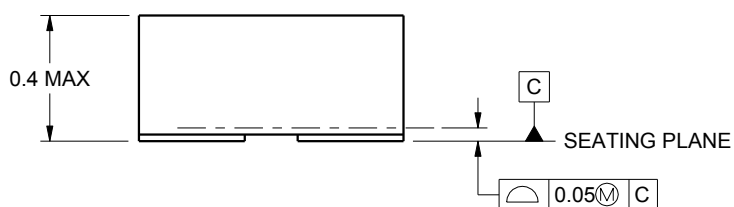


- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
 - D. Publication IPC-7351 is recommended for alternate designs.
 - E. 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.

DSF (S-PX2SON-N6)

Diagram illustrating the dimensions and pin 1 index area of a component:

- Horizontal dimensions: 1.05 (total width) and 0.95 (width of the shaded area).
- Vertical dimensions: 1.05 (total height) and 0.95 (height of the shaded area).
- A shaded rectangular area is labeled "PIN 1 INDEX AREA".
- Reference points A and B are marked at the top corners of the shaded area.

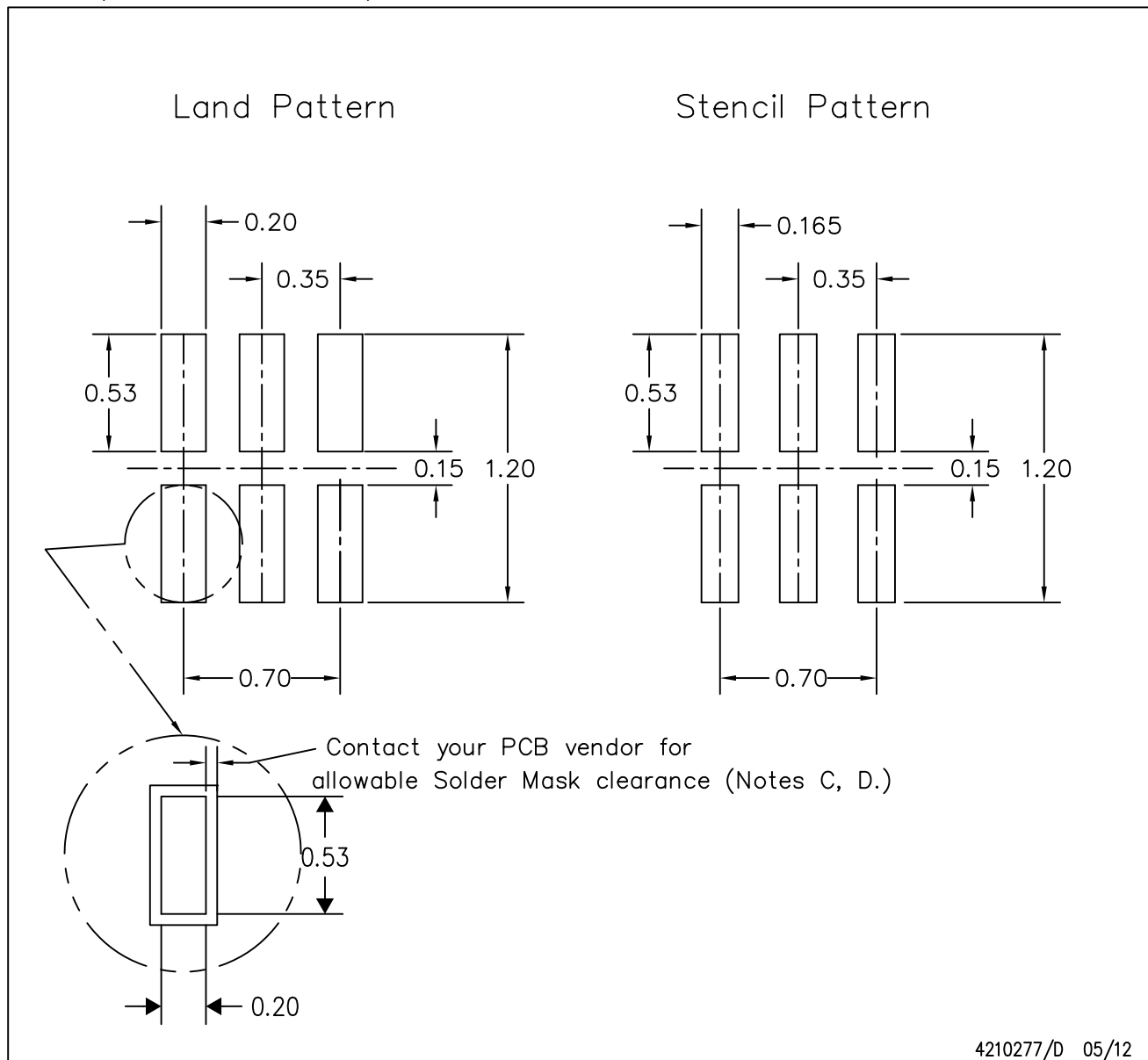


NOTES:

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 registration MO-287, variation X2AAF.

DSF (S-PX2SON-N6)

PLASTIC SMALL OUTLINE NO-LEAD

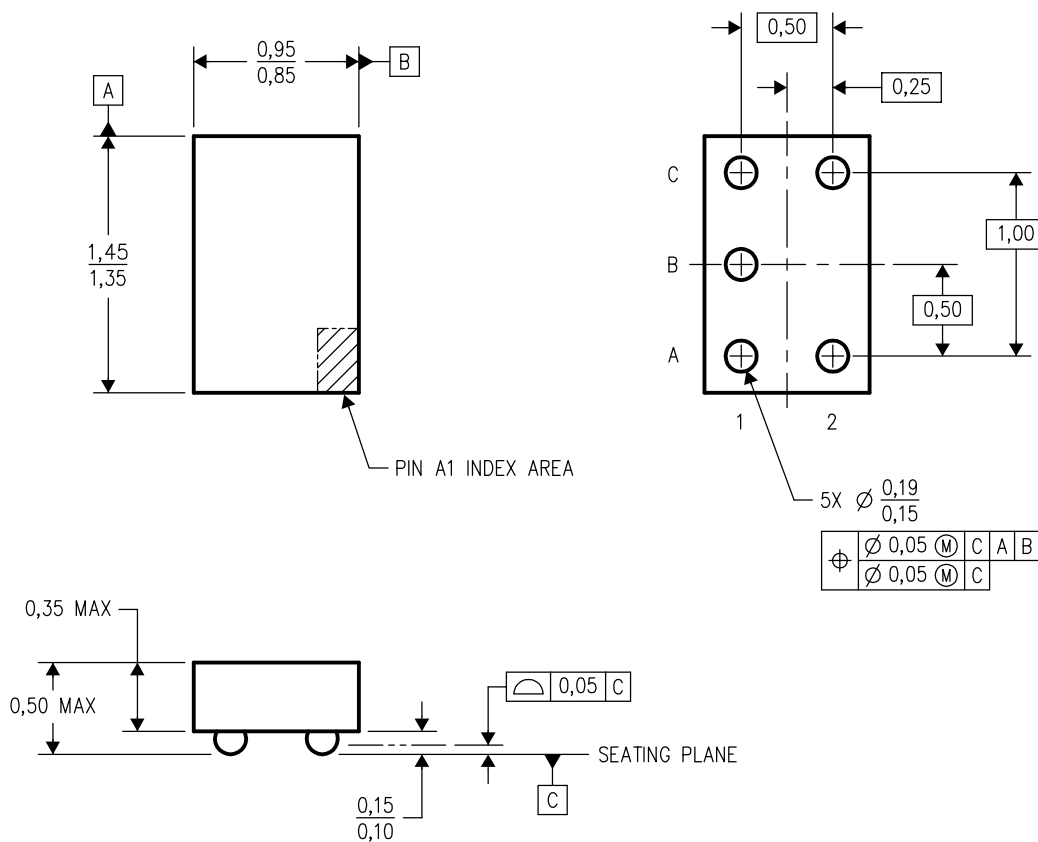


4210277/D 05/12

- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Publication IPC-7351 is recommended for alternate designs.
 - D. Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads. If 2 mil solder mask is outside PCB vendor capability, it is advised to omit solder mask.
 - E. Maximum stencil thickness 0,1016 mm (4 mils). All linear dimensions are in millimeters.
 - F. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
 - G. Suggest stencils cut with lasers such as Fiber Laser that produce the greatest positional accuracy.
 - H. Component placement force should be minimized to prevent excessive paste block deformation.

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).

NanoFree is a trademark of Texas Instruments.

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