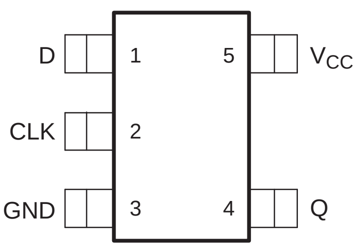
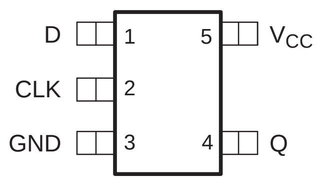
## FEATURES

- Available in the Texas Instruments NanoStar™ and NanoFree™ Packages
- Low Static-Power Consumption; $I_{CC}$ = 0.9 µA Max
- Low Dynamic-Power Consumption; $C_{pd}$ = 3 pF Typ at 3.3 V
- Low Input Capacitance; $C_i$ = 1.5 pF Typ
- Low Noise – Overshoot and Undershoot <10% of $V_{CC}$
- $I_{off}$ Supports Partial Power-Down-Mode Operation
- Input Hysteresis Allows Slow Input Transition and Better Switching Noise Immunity at the Input ($V_{hys}$ = 250 mV Typ at 3.3 V)
- Wide Operating $V_{CC}$ Range of 0.8 V to 3.6 V
- Optimized for 3.3-V Operation
- 3.6-V I/O Tolerant to Support Mixed-Mode Signal Operation
- $t_{pd}$ = 3.6 ns Max at 3.3 V
- Suitable for Point-to-Point Applications
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Performance Tested Per JESD 22
  - 2000-V Human-Body Model (A114-B, Class II)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)
- ESD Protection Exceeds ±5000 V With Human-Body Model

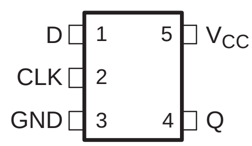
DBV PACKAGE
(TOP VIEW)



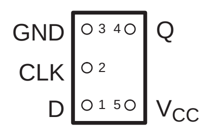

DCK PACKAGE
(TOP VIEW)




DRL PACKAGE
(TOP VIEW)




YEP OR YZP
PACKAGE
(BOTTOM VIEW)




See mechanical drawings for dimensions.

## DESCRIPTION/ORDERING INFORMATION

The AUP family is TI's premier solution to the industry's low-power needs in battery-powered portable applications. This family ensures a very low static and dynamic power consumption across the entire $V_{CC}$ range of 0.8 V to 3.6 V, resulting in an increased battery life. This product also maintains excellent signal integrity (see Figure 1 and Figure 2).

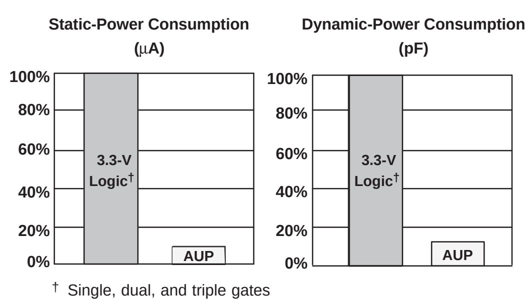



**Figure 1. AUP – The Lowest-Power Family**

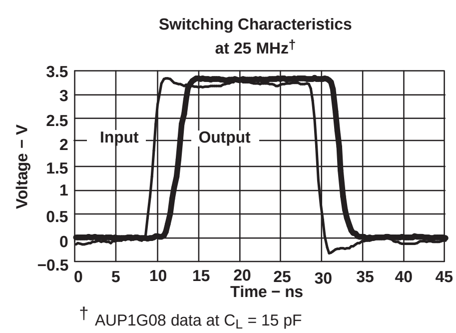



**Figure 2. Excellent Signal Integrity**

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

NanoStar, NanoFree are trademarks of Texas Instruments.

## DESCRIPTION/ORDERING INFORMATION (CONTINUED)

This is a single positive-edge-triggered D-type flip-flop. When data at the data (D) input meets the setup time requirement, the data is transferred to the Q output on the positive-going edge of the clock pulse. Clock triggering occurs at a voltage level and is not directly related to the rise time of the clock pulse. Following the hold-time interval, data at the D input can be changed without affecting the levels at the outputs.

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

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

### ORDERING INFORMATION

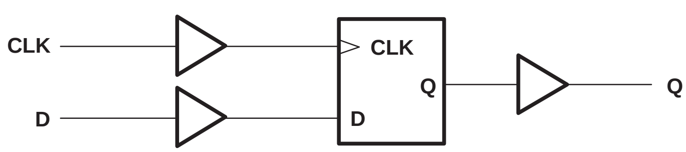
| $T_A$ | PACKAGE(1) | | ORDERABLE PART NUMBER | TOP-SIDE MARKING(2) |
|---|---|---|---|---|
| –40°C to 85°C | NanoStar™ – WCSP (DSBGA) 0.23-mm Large Bump – YEP | Reel of 3000 | SN74AUP1G79YEPR | _ _ HW _ |
| | NanoFree™ – WCSP (DSBGA) 0.23-mm Large Bump – YZP (Pb-free) | | SN74AUP1G79YZPR | |
| | SOT (SOT-23) – DBV | Reel of 3000 | SN74AUP1G79DBVR | H79_ |
| | | Reel of 250 | SN74AUP1G79DBVT | |
| | SOT (SC-70) – DCK | Reel of 3000 | SN74AUP1G79DCKR | HW_ |
| | | Reel of 250 | SN74AUP1G79DCKT | |
| | SOT (SOT-553) – DRL | Reel of 4000 | SN74AUP1G79DRLR | HW_ |

(1) Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.
(2) DBV/DCK/DRL: The actual top-side marking has one additional character that designates the assembly/test site.
YEP/YZP: The actual top-side marking has three preceding characters to denote year, month, and sequence code, and one following character to designate the assembly/test site. Pin 1 identifier indicates solder-bump composition(1 = SnPb, • = Pb-free).

### FUNCTION TABLE

| INPUTS | | OUTPUT |
|---|---|---|
| CLK | D | Q |
| ↑ | H | H |
| ↑ | L | L |
| L or H | X | $Q_0$ |

### LOGIC DIAGRAM (POSITIVE LOGIC)



## Absolute Maximum Ratings[1]

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

| | | | MIN | MAX | UNIT |
|---|---|---|---|---|---|
| $V_{CC}$ | Supply voltage range | | –0.5 | 4.6 | V |
| $V_I$ | Input voltage range[2] | | –0.5 | 4.6 | V |
| $V_O$ | Voltage range applied to any output in the high-impedance or power-off state[2] | | –0.5 | 4.6 | V |
| $V_O$ | Output voltage range in the high or low state[2] | | –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 | | | ±20 | mA |
| | Continuous current through $V_{CC}$ or GND | | | ±50 | mA |
| $\theta_{JA}$ | Package thermal impedance[3] | DBV package | | 206 | °C/W |
| | | DCK package | | 252 | |
| | | DRL package | | 142 | |
| | | YEP/YZP package | | 132 | |
| $T_{stg}$ | Storage temperature range | | –65 | 150 | °C |

(1) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
(2) The input negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.
(3) The package thermal impedance is calculated in accordance with JESD 51-7.

## Recommended Operating Conditions(1)

| | | | MIN | MAX | UNIT |
|---|---|---|---|---|---|
| $V_{CC}$ | Supply voltage | | 0.8 | 3.6 | V |
| $V_{IH}$ | High-level input voltage | $V_{CC}$ = 0.8 V | $V_{CC}$ | | V |
| | | $V_{CC}$ = 1.1 V to 1.95 V | 0.65 × $V_{CC}$ | | |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 1.6 | | |
| | | $V_{CC}$ = 3 V to 3.6 V | 2 | | |
| $V_{IL}$ | Low-level input voltage | $V_{CC}$ = 0.8 V | | 0 | V |
| | | $V_{CC}$ = 1.1 V to 1.95 V | | 0.35 × $V_{CC}$ | |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 0.7 | |
| | | $V_{CC}$ = 3 V to 3.6 V | | 0.9 | |
| $V_I$ | Input voltage | | 0 | 3.6 | V |
| $V_O$ | Output voltage | | 0 | $V_{CC}$ | V |
| $I_{OH}$(2) | High-level output current | $V_{CC}$ = 0.8 V | | –20 | μA |
| | | $V_{CC}$ = 1.1 V | | –1.1 | mA |
| | | $V_{CC}$ = 1.4 V | | –1.7 | |
| | | $V_{CC}$ = 1.65 V | | –1.9 | |
| | | $V_{CC}$ = 2.3 V | | –3.1 | |
| | | $V_{CC}$ = 3 V | | –4 | |
| $I_{OL}$(2) | Low-level output current | $V_{CC}$ = 0.8 V | | 20 | μA |
| | | $V_{CC}$ = 1.1 V | | 1.1 | mA |
| | | $V_{CC}$ = 1.4 V | | 1.7 | |
| | | $V_{CC}$ = 1.65 V | | 1.9 | |
| | | $V_{CC}$ = 2.3 V | | 3.1 | |
| | | $V_{CC}$ = 3 V | | 4 | |
| Δt/Δv | Input transition rise or fall rate | $V_{CC}$ = 0.8 V to 3.6 V | | 200 | ns/V |
| $T_A$ | Operating free-air temperature | | –40 | 85 | °C |

(1) All unused inputs of the device must be held at $V_{CC}$ or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inuts*, literature number SCBA004.
(2) Defined by the signal integrity requirements and design-goal priorities

## Electrical Characteristics

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

| PARAMETER | | TEST CONDITIONS | $V_{CC}$ | $T_A$ = 25°C | | | $T_A$ = –40°C to 85°C | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | |
| $V_{OH}$ | | $I_{OH}$ = –20 µA | 0.8 V to 3.6 V | $V_{CC}$ – 0.1 | | | $V_{CC}$ – 0.1 | | V |
| | | $I_{OH}$ = –1.1 mA | 1.1 V | 0.75 × $V_{CC}$ | | | 0.7 × $V_{CC}$ | | |
| | | $I_{OH}$ = –1.7 mA | 1.4 V | 1.11 | | | 1.03 | | |
| | | $I_{OH}$ = –1.9 mA | 1.65 V | 1.32 | | | 1.3 | | |
| | | $I_{OH}$ = –2.3 mA | 2.3 V | 2.05 | | | 1.97 | | |
| | | $I_{OH}$ = –3.1 mA | | 1.9 | | | 1.85 | | |
| | | $I_{OH}$ = –2.7 mA | 3 V | 2.72 | | | 2.67 | | |
| | | $I_{OH}$ = –4 mA | | 2.6 | | | 2.55 | | |
| $V_{OL}$ | | $I_{OL}$ = 20 µA | 0.8 V to 3.6 V | | | 0.1 | | 0.1 | V |
| | | $I_{OL}$ = 1.1 mA | 1.1 V | | | 0.3 × $V_{CC}$ | | 0.3 × $V_{CC}$ | |
| | | $I_{OL}$ = 1.7 mA | 1.4 V | | | 0.31 | | 0.37 | |
| | | $I_{OL}$ = 1.9 mA | 1.65 V | | | 0.31 | | 0.35 | |
| | | $I_{OL}$ = 2.3 mA | 2.3 V | | | 0.31 | | 0.33 | |
| | | $I_{OL}$ = 3.1 mA | | | | 0.44 | | 0.45 | |
| | | $I_{OL}$ = 2.7 mA | 3 V | | | 0.31 | | 0.33 | |
| | | $I_{OL}$ = 4 mA | | | | 0.44 | | 0.45 | |
| $I_I$ | D or CLK input | $V_I$ = GND to 3.6 V | 0 V to 3.6 V | | | 0.1 | | 0.5 | µA |
| $I_{off}$ | | $V_I$ or $V_O$ = 0 V to 3.6 V | 0 V | | | 0.2 | | 0.6 | µA |
| $\Delta I_{off}$ | | $V_I$ or $V_O$ = 0 V to 3.6 V | 0 V to 0.2 V | | | 0.2 | | 0.6 | µA |
| $I_{CC}$ | | $V_I$ = GND or $V_{CC}$ to 3.6 V, $I_O$ = 0 | 0.8 V to 3.6 V | | | 0.5 | | 0.9 | µA |
| $\Delta I_{CC}$ | | $V_I$ = $V_{CC}$ – 0.6 V,(1) $I_O$ = 0 | 3.3 V | | | 40 | | 50 | µA |
| $C_i$ | | $V_I$ = $V_{CC}$ or GND | 0 V | | 1.5 | | | | pF |
| | | | 3.6 V | | 1.5 | | | | |
| $C_o$ | | $V_O$ = GND | 0 V | | 3 | | | | pF |

(1) One-input switching

## Timing Requirements

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

| | | | $V_{CC}$ | $T_A$ = 25°C TYP | $T_A$ = –40°C to 85°C MIN | $T_A$ = –40°C to 85°C MAX | UNIT |
|---|---|---|---|---|---|---|---|
| $f_{clock}$ | Clock frequency | | 0.8 V | | | 20 | ns |
| | | | 1.2 V ± 0.1 V | | | 80 | |
| | | | 1.5 V ± 0.1 V | | | 100 | |
| | | | 1.8 V ± 0.15 V | | | 140 | |
| | | | 2.5 V ± 0.2 V | | | 210 | |
| | | | 3.3 V ± 0.3 V | | | 260 | |
| $t_w$ | Pulse duration, CLK high or low | | 0.8 V | | 4.8 | | ns |
| | | | 1.2 V ± 0.1 V | | 2.2 | | |
| | | | 1.5 V ± 0.1 V | | 1.5 | | |
| | | | 1.8 V ± 0.15 V | | 1.6 | | |
| | | | 2.5 V ± 0.2 V | | 1.7 | | |
| | | | 3.3 V ± 0.3 V | | 1.9 | | |
| $t_{su}$ | Setup time before CLK↑ | Data high | 0.8 V | 2.9 | 4.2 | | ns |
| | | | 1.2 V ± 0.1 V | | 1.4 | | |
| | | | 1.5 V ± 0.1 V | | 1 | | |
| | | | 1.8 V ± 0.15 V | | 0.9 | | |
| | | | 2.5 V ± 0.2 V | | 0.7 | | |
| | | | 3.3 V ± 0.3 V | | 0.6 | | |
| | | Data low | 0.8 V | 3.5 | 5.3 | | |
| | | | 1.2 V ± 0.1 V | | 1.8 | | |
| | | | 1.5 V ± 0.1 V | | 1.2 | | |
| | | | 1.8 V ± 0.15 V | | 1.1 | | |
| | | | 2.5 V ± 0.2 V | | 1 | | |
| | | | 3.3 V ± 0.3 V | | 1 | | |
| $t_h$ | Hold time, data after CLK↑ | | 0.8 V | 0 | 0 | | ns |
| | | | 1.2 V ± 0.1 V | | 0 | | |
| | | | 1.5 V ± 0.1 V | | 0 | | |
| | | | 1.8 V ± 0.15 V | | 0 | | |
| | | | 2.5 V ± 0.2 V | | 0 | | |
| | | | 3.3 V ± 0.3 V | | 0 | | |

## Switching Characteristics

over recommended operating free-air temperature range, $C_L$ = 5 pF (unless otherwise noted) (see Figure 3 and Figure 4)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ | $T_A$ = 25°C | | | $T_A$ = –40°C to 85°C | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | |
| $f_{max}$ | | | 0.8 V | | 93 | | 90 | | MHz |
| | | | 1.2 V ± 0.1 V | | 199 | | 220 | | |
| | | | 1.5 V ± 0.1 V | | 250 | | 230 | | |
| | | | 1.8 V ± 0.15 V | | 271 | | 240 | | |
| | | | 2.5 V ± 0.2 V | | 280 | | 250 | | |
| | | | 3.3 V ± 0.3 V | | 280 | | 260 | | |
| $t_{pd}$ | CLK | Q | 0.8 V | | 15.9 | | | | ns |
| | | | 1.2 V ± 0.1 V | 3.7 | 6.9 | 11 | 2.6 | 13.1 | |
| | | | 1.5 V ± 0.1 V | 3 | 4.8 | 7.6 | 2 | 8.8 | |
| | | | 1.8 V ± 0.15 V | 2.4 | 3.8 | 6.1 | 1.5 | 7.1 | |
| | | | 2.5 V ± 0.2 V | 1.8 | 2.7 | 4.4 | 1.1 | 5 | |
| | | | 3.3 V ± 0.3 V | 1.5 | 2.1 | 3.6 | 0.9 | 4 | |

## Switching Characteristics

over recommended operating free-air temperature range, $C_L$ = 10 pF (unless otherwise noted) (see Figure 3 and Figure 4)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ | $T_A$ = 25°C | | | $T_A$ = –40°C to 85°C | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | |
| $f_{max}$ | | | 0.8 V | | 62 | | 50 | | MHz |
| | | | 1.2 V ± 0.1 V | | 147 | | 160 | | |
| | | | 1.5 V ± 0.1 V | | 189 | | 200 | | |
| | | | 1.8 V ± 0.15 V | | 180 | | 240 | | |
| | | | 2.5 V ± 0.2 V | | 260 | | 250 | | |
| | | | 3.3 V ± 0.3 V | | 280 | | 260 | | |
| $t_{pd}$ | CLK | Q | 0.8 V | | 18 | | | | ns |
| | | | 1.2 V ± 0.1 V | 4.3 | 7.8 | 12.3 | 3.2 | 14.4 | |
| | | | 1.5 V ± 0.1 V | 3.5 | 5.5 | 8.4 | 2.5 | 9.8 | |
| | | | 1.8 V ± 0.15 V | 2.8 | 4.4 | 6.8 | 1.9 | 8 | |
| | | | 2.5 V ± 0.2 V | 2.2 | 3.2 | 5 | 1.5 | 5.7 | |
| | | | 3.3 V ± 0.3 V | 1.8 | 2.6 | 4.1 | 1.3 | 4.5 | |

## Switching Characteristics

over recommended operating free-air temperature range, $C_L$ = 15 pF (unless otherwise noted) (see Figure 3 and Figure 4)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ | $T_A$ = 25°C | | | $T_A$ = –40°C to 85°C | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | |
| $f_{max}$ | | | 0.8 V | | 48 | | 30 | | MHz |
| | | | 1.2 V ± 0.1 V | | 112 | | 120 | | |
| | | | 1.5 V ± 0.1 V | | 151 | | 160 | | |
| | | | 1.8 V ± 0.15 V | | 194 | | 220 | | |
| | | | 2.5 V ± 0.2 V | | 248 | | 250 | | |
| | | | 3.3 V ± 0.3 V | | 280 | | 260 | | |
| $t_{pd}$ | CLK | Q | 0.8 V | | 20.3 | | | | ns |
| | | | 1.2 V ± 0.1 V | 5 | 8.7 | 13.6 | 3.9 | 15.6 | |
| | | | 1.5 V ± 0.1 V | 4.1 | 6.3 | 9.3 | 3.1 | 10.7 | |
| | | | 1.8 V ± 0.15 V | 3.3 | 4 | 7.6 | 2.4 | 8.7 | |
| | | | 2.5 V ± 0.2 V | 2.6 | 3.6 | 5.5 | 1.9 | 6.3 | |
| | | | 3.3 V ± 0.3 V | 2.2 | 3 | 4.5 | 1.6 | 5 | |

## Switching Characteristics

over recommended operating free-air temperature range, $C_L$ = 30 pF (unless otherwise noted) (see Figure 3 and Figure 4)

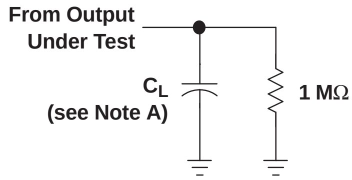
| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ | $T_A$ = 25°C | | | $T_A$ = –40°C to 85°C | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | |
| $f_{max}$ | | | 0.8 V | | 24 | | 20 | | MHz |
| | | | 1.2 V ± 0.1 V | | 72 | | 80 | | |
| | | | 1.5 V ± 0.1 V | | 100 | | 100 | | |
| | | | 1.8 V ± 0.15 V | | 127 | | 140 | | |
| | | | 2.5 V ± 0.2 V | | 185 | | 210 | | |
| | | | 3.3 V ± 0.3 V | | 266 | | 260 | | |
| $t_{pd}$ | CLK | Q | 0.8 V | | 27.2 | | | | ns |
| | | | 1.2 V ± 0.1 V | 7 | 11.5 | 17.3 | 5.9 | 24 | |
| | | | 1.5 V ± 0.1 V | 5.7 | 8.3 | 11.8 | 4.6 | 15.9 | |
| | | | 1.8 V ± 0.15 V | 4.7 | 6.7 | 9.6 | 3.8 | 13 | |
| | | | 2.5 V ± 0.2 V | 3.7 | 4.9 | 7 | 2.9 | 9 | |
| | | | 3.3 V ± 0.3 V | 3.2 | 4.1 | 5.8 | 2.6 | 7.2 | |

## Operating Characteristics

$T_A$ = 25°C

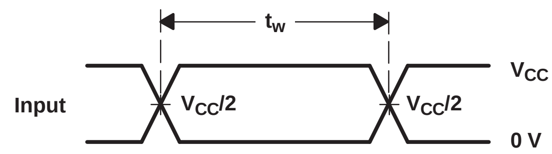
| PARAMETER | | TEST CONDITIONS | $V_{CC}$ | TYP | UNIT |
|---|---|---|---|---|---|
| $C_{pd}$ | Power dissipation capacitance | f = 10 MHz | 0.8 V | 2.5 | pF |
| | | | 1.2 V ± 0.1 V | 2.5 | |
| | | | 1.5 V ± 0.1 V | 2.5 | |
| | | | 1.8 V ± 0.15 V | 2.5 | |
| | | | 2.5 V ± 0.2 V | 3 | |
| | | | 3.3 V ± 0.3 V | 3 | |

## PARAMETER MEASUREMENT INFORMATION
## (Propagation Delays, Setup and Hold Times, and Pulse Width)

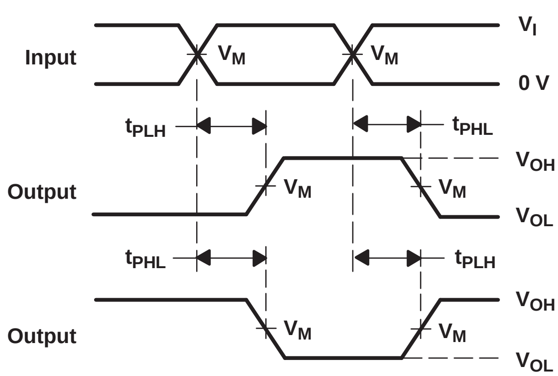



LOAD CIRCUIT

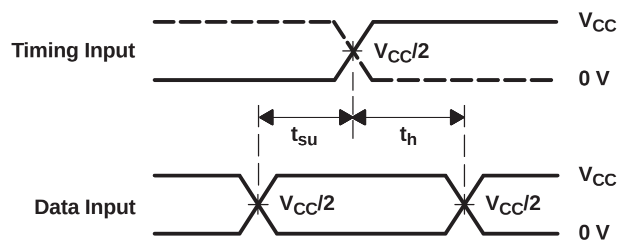
| | $V_{CC}$ = 0.8 V | $V_{CC}$ = 1.2 V ± 0.1 V | $V_{CC}$ = 1.5 V ± 0.1 V | $V_{CC}$ = 1.8 V ± 0.15 V | $V_{CC}$ = 2.5 V ± 0.2 V | $V_{CC}$ = 3.3 V ± 0.3 V |
|---|---|---|---|---|---|---|
| $C_L$ | 5, 10, 15, 30 pF | 5, 10, 15, 30 pF | 5, 10, 15, 30 pF | 5, 10, 15, 30 pF | 5, 10, 15, 30 pF | 5, 10, 15, 30 pF |
| $V_M$ | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ |
| $V_I$ | $V_{CC}$ | $V_{CC}$ | $V_{CC}$ | $V_{CC}$ | $V_{CC}$ | $V_{CC}$ |




VOLTAGE WAVEFORMS
PULSE DURATION




VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS

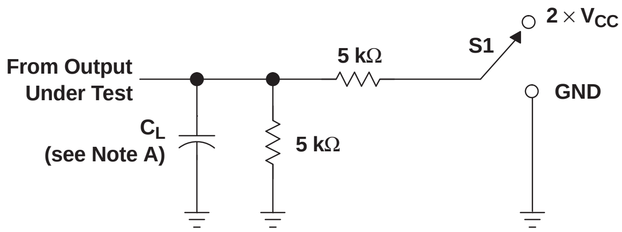



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES

NOTES: A. $C_L$ includes probe and jig capacitance.
B. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, $Z_O$ = 50 Ω, $t_r/t_f$ = 3 ns.
C. The outputs are measured one at a time, with one transition per measurement.
D. $t_{PLH}$ and $t_{PHL}$ are the same as $t_{pd}$.
E. All parameters and waveforms are not applicable to all devices.

**Figure 3. Load Circuit and Voltage Waveforms**

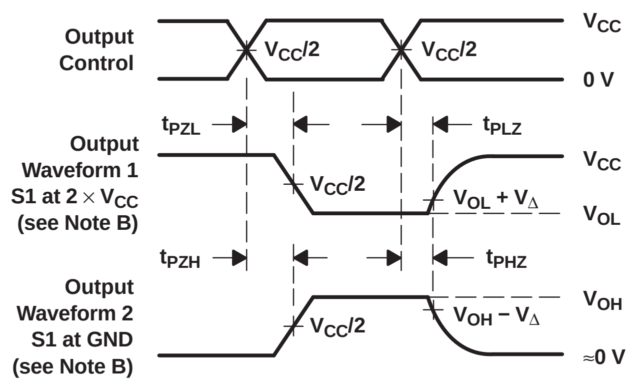
## PARAMETER MEASUREMENT INFORMATION
## (Enable and Disable Times)




LOAD CIRCUIT

| TEST | S1 |
|---|---|
| $t_{PLZ}/t_{PZL}$ | 2 × $V_{CC}$ |
| $t_{PHZ}/t_{PZH}$ | GND |

| | $V_{CC}$ = 0.8 V | $V_{CC}$ = 1.2 V ± 0.1 V | $V_{CC}$ = 1.5 V ± 0.1 V | $V_{CC}$ = 1.8 V ± 0.15 V | $V_{CC}$ = 2.5 V ± 0.2 V | $V_{CC}$ = 3.3 V ± 0.3 V |
|---|---|---|---|---|---|---|
| $C_L$ | 5, 10, 15, 30 pF | 5, 10, 15, 30 pF | 5, 10, 15, 30 pF | 5, 10, 15, 30 pF | 5, 10, 15, 30 pF | 5, 10, 15, 30 pF |
| $V_M$ | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ |
| $V_I$ | $V_{CC}$ | $V_{CC}$ | $V_{CC}$ | $V_{CC}$ | $V_{CC}$ | $V_{CC}$ |
| $V_\Delta$ | 0.1 V | 0.1 V | 0.1 V | 0.15 V | 0.15 V | 0.3 V |




VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

NOTES:
A. $C_L$ includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, $Z_O$ = 50 Ω, $t_r/t_f$ = 3 ns.
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. All parameters and waveforms are not applicable to all devices.

**Figure 4. Load Circuit and Voltage Waveforms**

## PACKAGING INFORMATION

| Orderable Device | Status [1] | Package Type | Package Drawing | Pins | Package Qty | Eco Plan [2] | Lead/Ball Finish | MSL Peak Temp [3] |
|---|---|---|---|---|---|---|---|---|
| SN74AUP1G79DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AUP1G79DBVRE4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AUP1G79DBVRG4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AUP1G79DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AUP1G79DBVTE4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AUP1G79DCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AUP1G79DCKRE4 | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AUP1G79DCKT | ACTIVE | SC70 | DCK | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AUP1G79DCKTE4 | ACTIVE | SC70 | DCK | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AUP1G79DRLR | ACTIVE | SOT-533 | DRL | 5 | 4000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AUP1G79YZPR | ACTIVE | WCSP | YZP | 5 | 3000 | Green (RoHS & no Sb/Br) | SNAGCU | Level-1-260C-UNLIM |

[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] Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
**TBD:** The Pb-Free/Green conversion plan has not been defined.
**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

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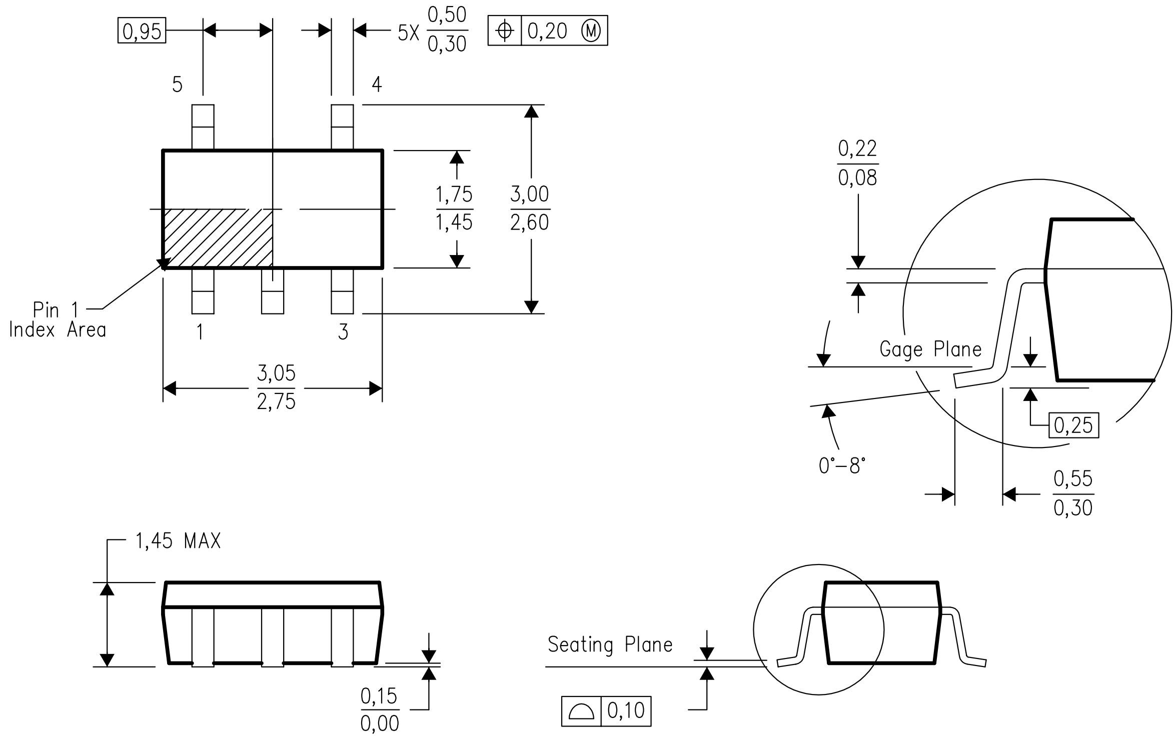
DBV (R-PDSO-G5) PLASTIC SMALL-OUTLINE PACKAGE

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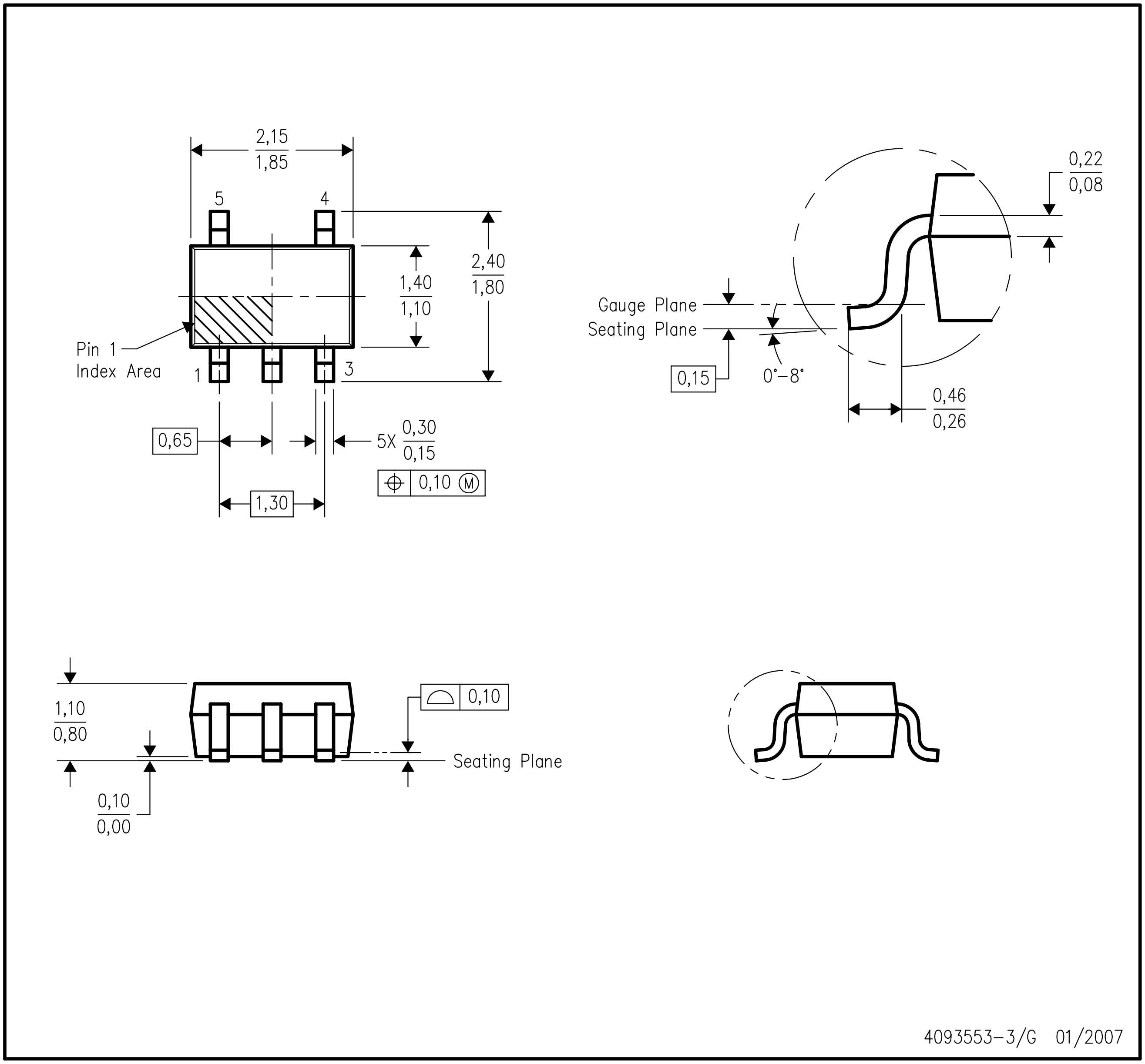
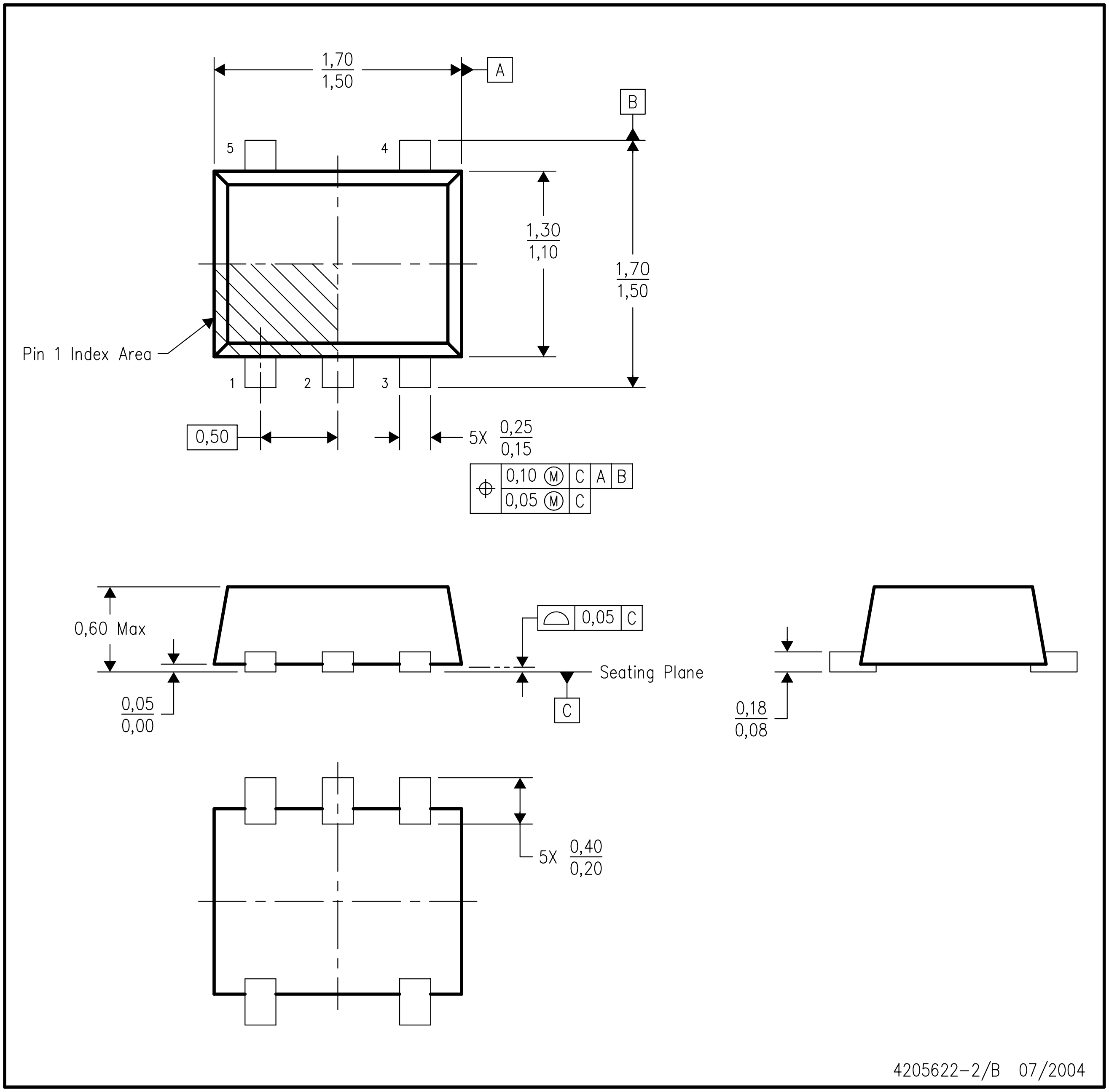
NOTES:
- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
- D. Falls within JEDEC MO-178 Variation AA.

DCK (R-PDSO-G5) PLASTIC SMALL-OUTLINE PACKAGE

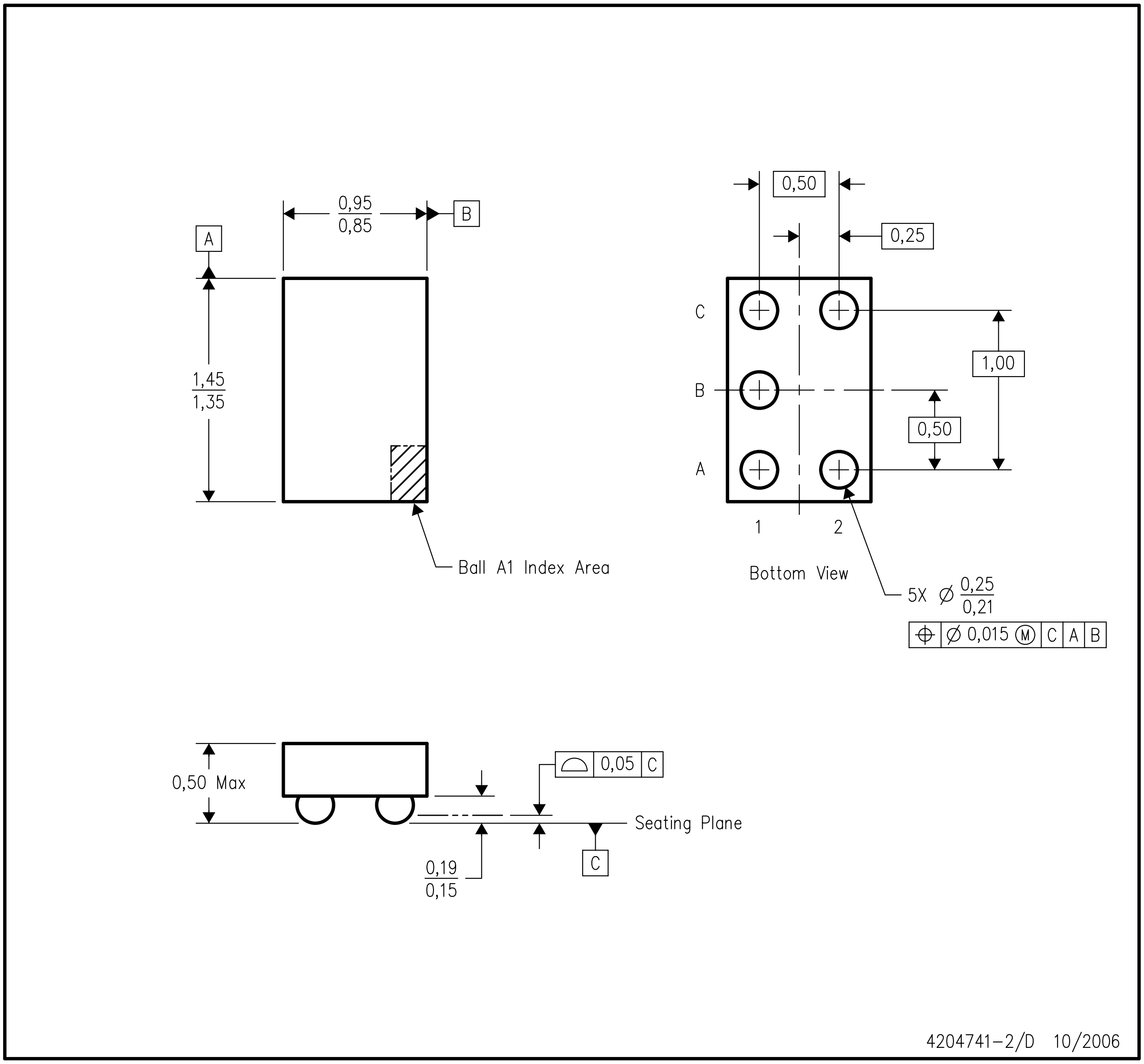



NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
D. Falls within JEDEC MO-203 variation AA.




NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. JEDEC package registration is pending.

YZP (R–XBGA–N5) 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.
- D. This package is lead–free. Refer to the 5 YEP package (drawing 4204725) for tin–lead (SnPb).

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