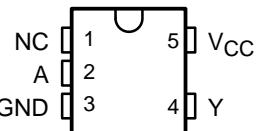


- Operating Range of 4.5 V to 5.5 V
- Max t_{pd} of 8 ns at 5 V
- Low Power Consumption, 10- μ A Max I_{CC}
- ± 8 -mA Output Drive at 5 V
- Inputs Are TTL-Voltage Compatible
- Latch-Up Performance Exceeds 250 mA Per JESD 17

DBV OR DCK PACKAGE
(TOP VIEW)



NC – No internal connection

description/ordering information

The SN74AHCT1G14 contains a single inverter gate. The device performs the Boolean function $Y = \bar{A}$.

The device functions as an independent inverter gate, but because of the Schmitt action, gates may have different input threshold levels for positive- (V_{T+}) and negative-going (V_{T-}) signals.

ORDERING INFORMATION

| T_A | PACKAGE [†] | | ORDERABLE PART NUMBER | TOP-SIDE MARKING [‡] |
|---------------|----------------------|--------------|-----------------------|-------------------------------|
| –40°C to 85°C | SOT (SOT-23) – DBV | Reel of 3000 | SN74AHCT1G14DBVR | B14_ |
| | | Reel of 250 | SN74AHCT1G14DBVT | |
| | SOT (SC-70) – DCK | Reel of 3000 | SN74AHCT1G14DCKR | BF_ |
| | | Reel of 250 | SN74AHCT1G14DCKT | |

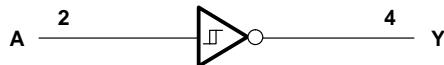
[†] Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

[‡] The actual top-side marking has one additional character that designates the assembly/test site.

FUNCTION TABLE

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

logic diagram (positive logic)



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.

SN74AHCT1G14 **SINGLE SCHMIDT-TRIGGER INVERTER GATE**

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

† 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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions (see Note 3)

| | | MIN | MAX | UNIT |
|----------|--------------------------------|-----|----------|------|
| V_{CC} | Supply voltage | 4.5 | 5.5 | V |
| V_I | Input voltage | 0 | 5.5 | V |
| V_O | Output voltage | 0 | V_{CC} | V |
| I_{OH} | High-level output current | | -8 | mA |
| I_{OL} | Low-level output current | | 8 | mA |
| T_A | Operating free-air temperature | -40 | 85 | °C |

NOTE 3: 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.

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

| PARAMETER | TEST CONDITIONS | V _{CC} | T _A = 25°C | | | MIN | MAX | UNIT |
|--|---|-----------------|-----------------------|-----|------|------|-----|------|
| | | | MIN | TYP | MAX | | | |
| V _{T+} Positive-going input threshold voltage | | 4.5 V | 0.9 | 2 | 0.9 | 2 | V | |
| | | 5.5 V | 1.1 | 2 | 1.1 | 2 | | |
| V _{T-} Negative-going input threshold voltage | | 4.5 V | 0.5 | 1.6 | 0.5 | 1.6 | V | |
| | | 5.5 V | 0.6 | 1.5 | 0.6 | 1.5 | | |
| ΔV _T Hysteresis (V _{T+} – V _{T-}) | | 4.5 V | 0.4 | 1.4 | 0.4 | 1.4 | V | |
| | | 5.5 V | 0.5 | 1.6 | 0.4 | 1.6 | | |
| V _{OH} | I _{OH} = -50 μA | 4.5 V | 4.4 | 4.5 | | 4.4 | V | |
| | I _{OH} = -8 mA | | 3.94 | | | 3.8 | | |
| V _{OL} | I _{OL} = 50 μA | 4.5 V | | | 0.1 | 0.1 | V | |
| | I _{OL} = 8 mA | | | | 0.36 | 0.44 | | |
| I _I | V _I = 5.5 V or GND | 0 V to 5.5 V | | | ±0.1 | ±1 | μA | |
| I _{CC} | V _I = V _{CC} or GND, I _O = 0 | 5.5 V | | | 1 | 10 | μA | |
| C _I | V _I = V _{CC} or GND | 5 V | | 2 | 10 | 10 | pF | |

SN74AHCT1G14
SINGLE SCHMITT-TRIGGER INVERTER GATE

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**switching characteristics over recommended operating free-air temperature range,
 $V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$ (unless otherwise noted) (see Figure 1)**

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | LOAD CAPACITANCE | $T_A = 25^\circ\text{C}$ | | | MIN | MAX | UNIT |
|-----------|-----------------|----------------|-----------------------|--------------------------|-----|-----|-----|-----|------|
| | | | | MIN | TYP | MAX | | | |
| t_{PLH} | A | Y | $C_L = 15 \text{ pF}$ | 4 | 7 | 1 | 8 | | ns |
| t_{PHL} | | | | 4 | 7 | 1 | 8 | | |
| t_{PLH} | A | Y | $C_L = 50 \text{ pF}$ | 5.5 | 8 | 1 | 9 | | ns |
| t_{PHL} | | | | 5.5 | 8 | 1 | 9 | | |

operating characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$

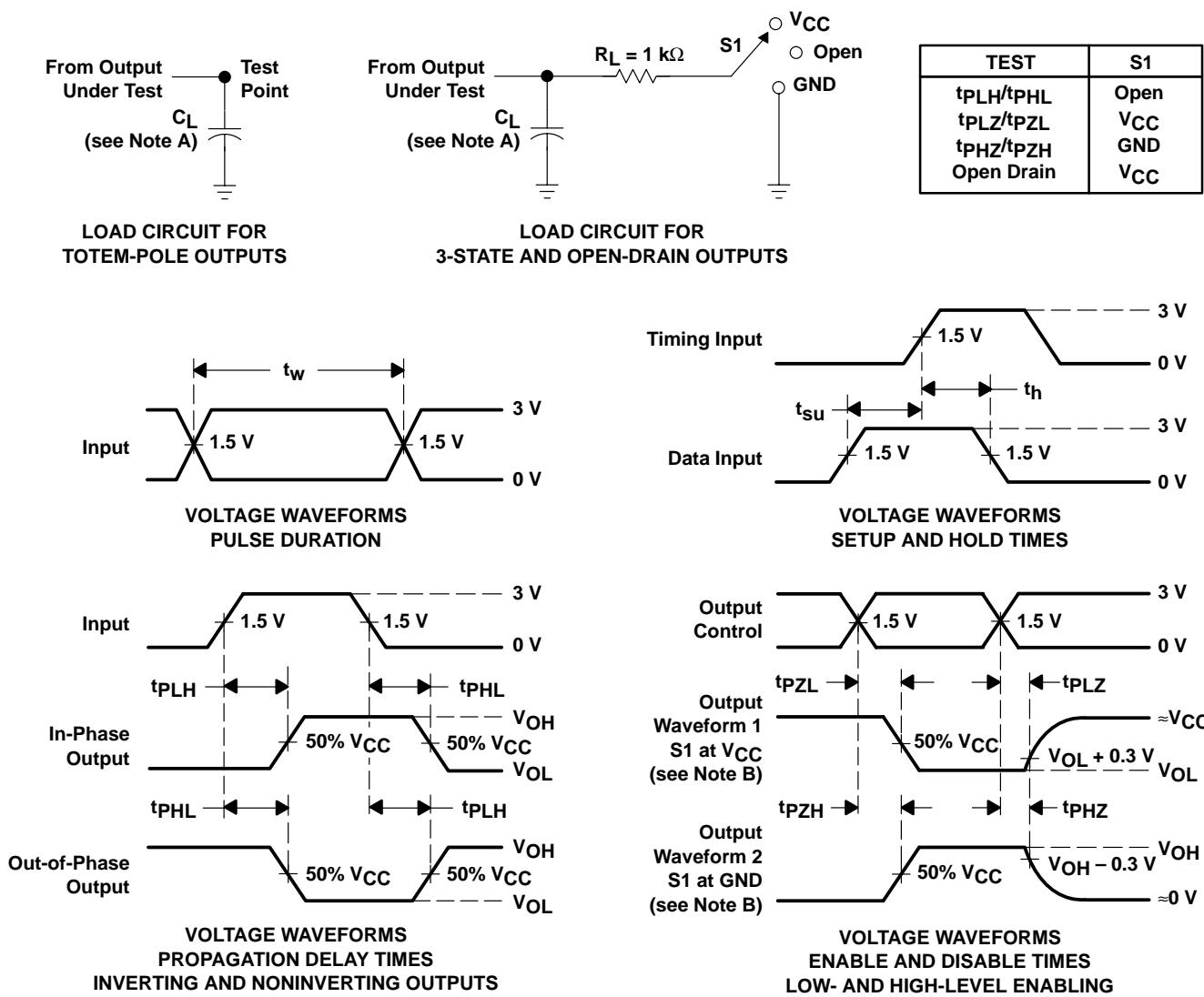
| PARAMETER | TEST CONDITIONS | TYP | UNIT |
|--|------------------------------|-----|------|
| C_{pd} Power dissipation capacitance | No load, $f = 1 \text{ MHz}$ | 12 | pF |

SN74AHCT1G14

SINGLE SCHMITT-TRIGGER INVERTER GATE

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PARAMETER MEASUREMENT INFORMATION



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: $PRR \leq 1 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 3 \text{ ns}$, $t_f \leq 3 \text{ ns}$.
- The outputs are measured one at a time with one input transition per measurement.
- All parameters and waveforms are not applicable to all devices.

Figure 1. 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⁾ |
|--------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 74AHCT1G14DBVRE4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74AHCT1G14DBVRG4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74AHCT1G14DBVTE4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74AHCT1G14DCKRE4 | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74AHCT1G14DCKTE4 | ACTIVE | SC70 | DCK | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AHCT1G14DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AHCT1G14DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AHCT1G14DCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AHCT1G14DCKRG4 | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AHCT1G14DCKT | ACTIVE | SC70 | DCK | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | 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) 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.

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)

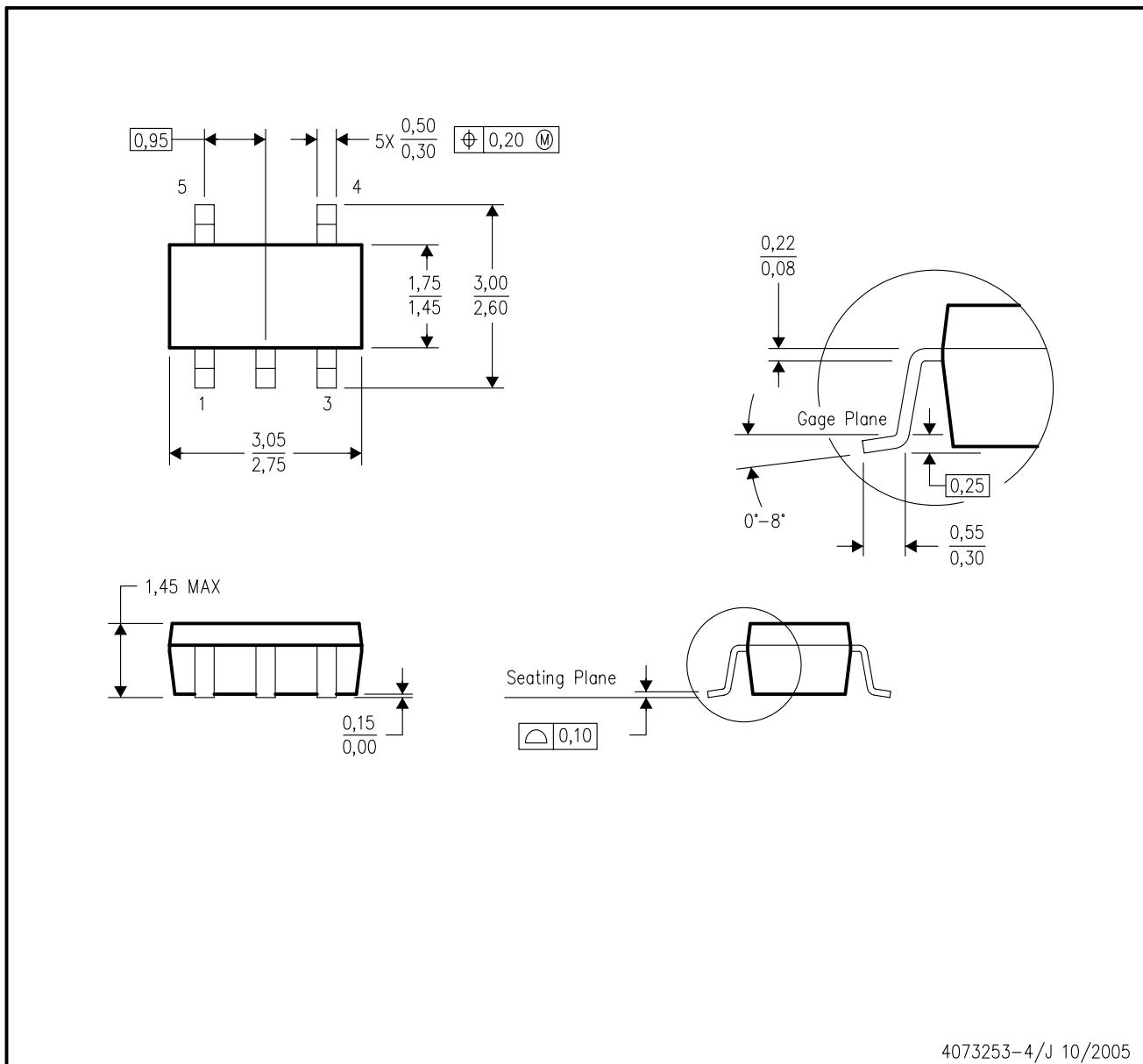
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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DBV (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



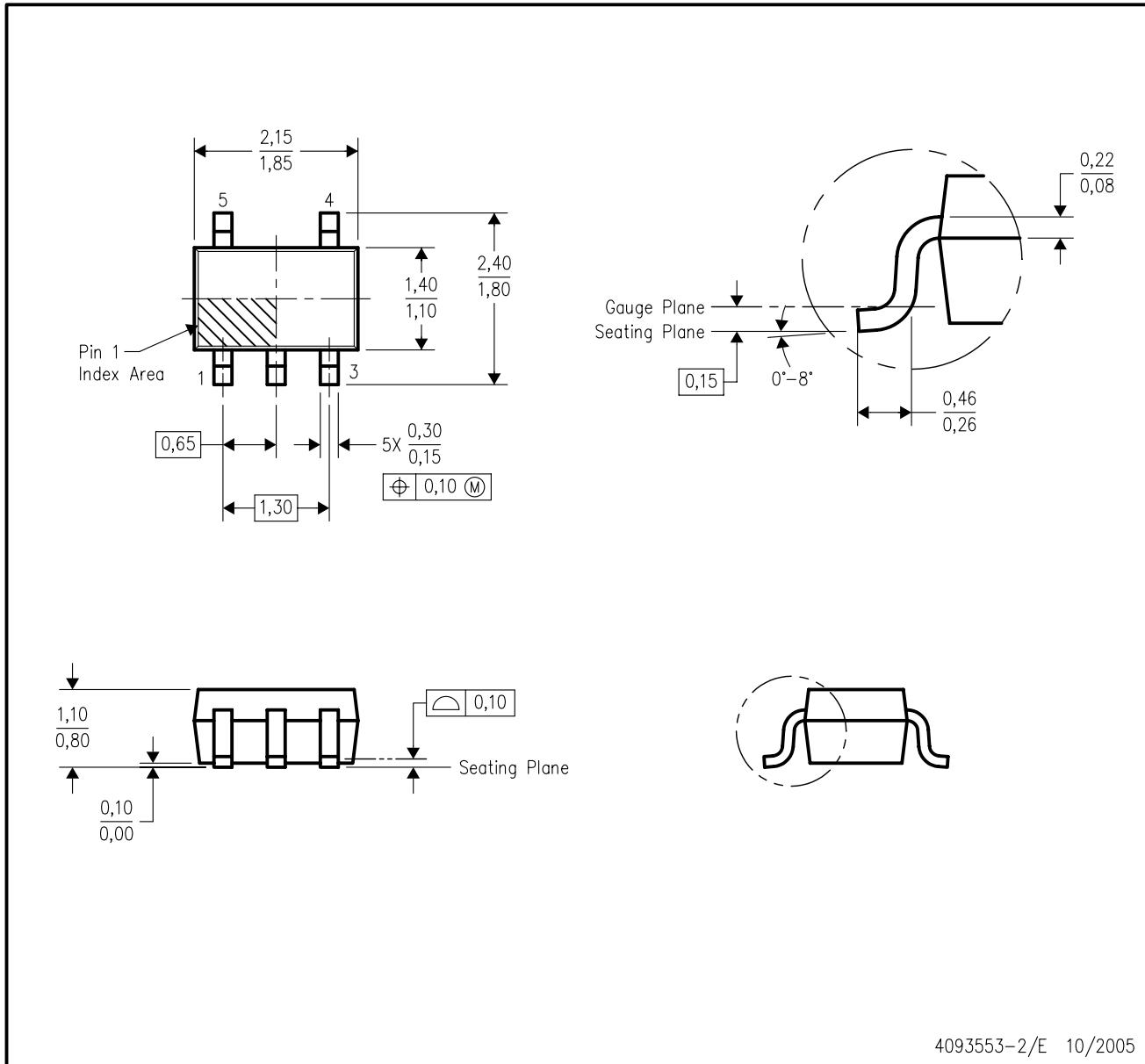
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NOTES:

- 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-178 Variation AA.

DCK (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



4093553-2/E 10/2005

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.

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