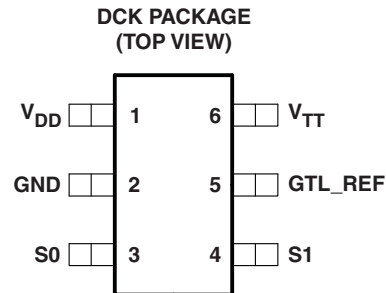


## SELECTABLE GTL VOLTAGE REFERENCE

### FEATURES

- $V_{DD}$  Range: 3.0 V to 3.6 V
- $V_{TT}$  Range: 1 V to 1.3 V
- Provides Selectable GTL  $V_{REF}$ 
  - $0.615 \times V_{TT}$
  - $0.63 \times V_{TT}$
  - $0.65 \times V_{TT}$
  - $0.67 \times V_{TT}$
- $\pm 1\%$  Resistor Ratio Tolerance
- Ambient Temperature Range:  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- ESD Protection Exceeds the Following Levels Tests (Tested Per JESD-22):
  - 2500-V Human-Body Model (A114-B, Class II)
  - 250-V Machine Model (A115-A)
  - 1500-V Charged-Device Model (C101)



### DESCRIPTION/ORDERING INFORMATION

The SN74GTL3004 provides for a selectable GTL Voltage Reference (GTL  $V_{REF}$ ). The value of the GTL  $V_{REF}$  can be adjusted using S0 and S1 select pins.

The S0 and S1 pins contain glitch-suppression circuitry for excellent noise immunity. When left floating, the S0 and S1 control input pins have 100-k $\Omega$  pullups that set the GTL  $V_{REF}$  default value to the  $0.67 \times V_{TT}$  ratio (S0 = 1 and S1 = 1).

### ORDERING INFORMATION

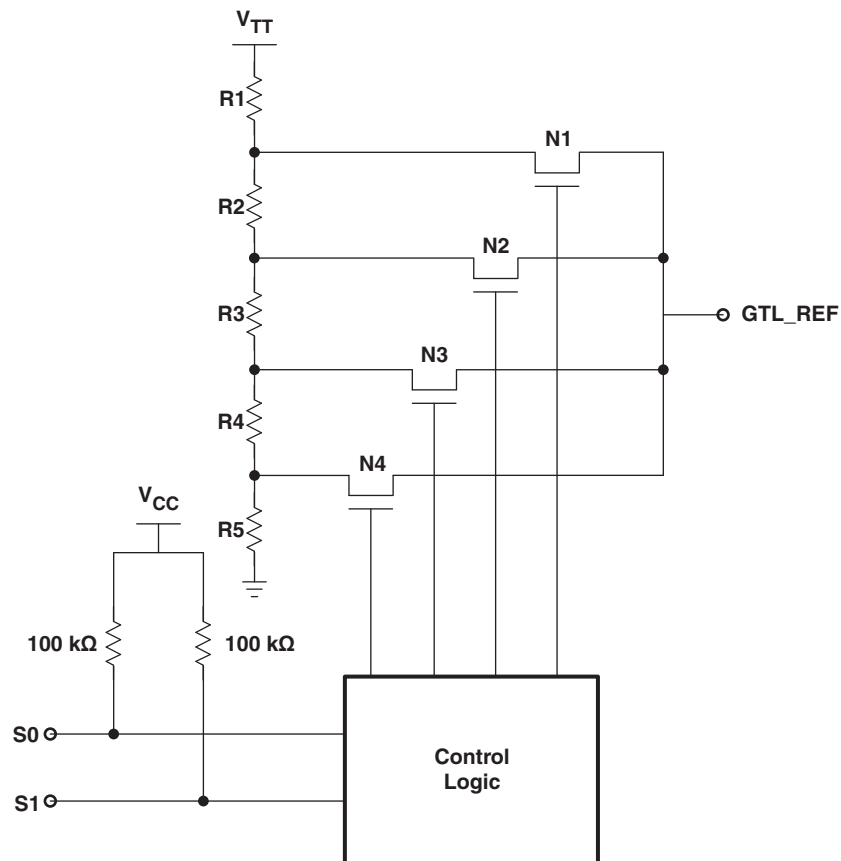
| $T_A$                                         | PACKAGE <sup>(1)(2)</sup> |               | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|-----------------------------------------------|---------------------------|---------------|-----------------------|------------------|
| $-40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ | SOT (SC70) – DCK          | Tape and reel | SN74GTL3004DCKR       | 2TK              |

(1) Package drawings, thermal data, and symbolization are available at [www.ti.com/packaging](http://www.ti.com/packaging).

(2) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at [www.ti.com](http://www.ti.com).



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**LOGIC DIAGRAM****FUNCTION TABLE**

| S1 | S0 | RATIO SET             |
|----|----|-----------------------|
| 0  | 0  | $0.615 \times V_{TT}$ |
| 0  | 1  | $0.63 \times V_{TT}$  |
| 1  | 0  | $0.65 \times V_{TT}$  |
| 1  | 1  | $0.67 \times V_{TT}$  |

## ABSOLUTE MINIMUM AND MAXIMUM RATINGS<sup>(1)</sup>

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

|                      |                                                   | MIN                 | MAX                   | UNIT     |
|----------------------|---------------------------------------------------|---------------------|-----------------------|----------|
| V <sub>DD</sub>      | Power supply voltage range                        | −0.3                | 4.6                   | V        |
| V <sub>TT</sub>      | Termination voltage range <sup>(2)</sup>          | −0.3                | 4.6                   | V        |
| V <sub>IN</sub>      | Control input voltage range <sup>(2)</sup>        | −0.3                | V <sub>DD</sub> + 0.3 | V        |
| V <sub>GTL_REF</sub> | Resistor output voltage range <sup>(2)</sup>      | −0.3                | V <sub>DD</sub> + 0.3 | V        |
| I <sub>IK</sub>      | Input clamp current                               | V <sub>IN</sub> < 0 |                       | −18 mA   |
| I <sub>OK</sub>      | Output clamp current                              | V <sub>O</sub> < 0  |                       | −18 mA   |
|                      | Continuous current through V <sub>DD</sub> or GND |                     | 100                   | mA       |
| θ <sub>JA</sub>      | Package thermal impedance <sup>(3)</sup>          | DCK package         |                       | 259 °C/W |
| T <sub>stg</sub>     | 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 and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
- (3) The package thermal impedance is calculated in accordance with JESD 51-7.

## RECOMMENDED OPERATING CONDITIONS<sup>(1)</sup>

|                  | PARAMETER                                     | MIN                    | TYP | MAX             | UNIT |
|------------------|-----------------------------------------------|------------------------|-----|-----------------|------|
| V <sub>DD</sub>  | Power supply voltage                          | 3                      | 3.3 | 3.6             | V    |
| V <sub>TT</sub>  | Termination voltage                           | 1                      | 1.1 | 1.3             | V    |
| V <sub>IH</sub>  | High-level control input voltage              | V <sub>DD</sub> × 0.65 |     |                 | V    |
| V <sub>IL</sub>  | Low-level control input voltage               | V <sub>DD</sub> × 0.35 |     |                 | V    |
| V <sub>I</sub>   | Control input voltage                         | 0                      |     | V <sub>DD</sub> | V    |
| I <sub>OUT</sub> | I <sub>GTL_REF</sub> , GTL_REF output current |                        | 0   | 10              | μA   |
| PW               | Control input pulse width                     | 110                    |     |                 | ns   |
| T <sub>A</sub>   | Operating free-air temperature                | −40                    |     | 85              | °C   |

- (1) All unused inputs of the device must be held at V<sub>CC</sub> 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, T<sub>A</sub> = −40°C to 85°C, V<sub>DD</sub> = 3.3 V ±10%, GND = 0 V (unless otherwise noted)

|                 | PARAMETER                                    | TEST CONDITIONS                                                         | MIN  | TYP  | MAX  | UNIT |
|-----------------|----------------------------------------------|-------------------------------------------------------------------------|------|------|------|------|
| V <sub>IK</sub> | Control                                      | V <sub>DD</sub> = 3.6 V, I <sub>IN</sub> = −18 mA                       |      |      | −1.8 | V    |
| I <sub>IN</sub> | Control                                      | V <sub>DD</sub> = 3.6 V, V <sub>IN</sub> = GND                          |      |      | 43   | μA   |
| I <sub>DD</sub> |                                              | V <sub>DD</sub> = 3.6 V, V <sub>IN</sub> = GND, I <sub>O</sub> = 0 mA   |      |      | 85   | μA   |
| R               | End-to-end resistance                        | V <sub>DD</sub> = 3.6 V, V <sub>TT</sub> = 1.1 V, I <sub>O</sub> = 0 mA | 4.25 | 7.12 | 10.6 | kΩ   |
|                 | GTL V <sub>REF</sub> accuracy <sup>(1)</sup> | I <sub>O</sub> = 0 μA, See <a href="#">Figure 1</a>                     | −1   |      | 1    | %    |
|                 |                                              | I <sub>O</sub> = 10 μA, See <a href="#">Figure 1</a>                    | −7   |      | 7    |      |

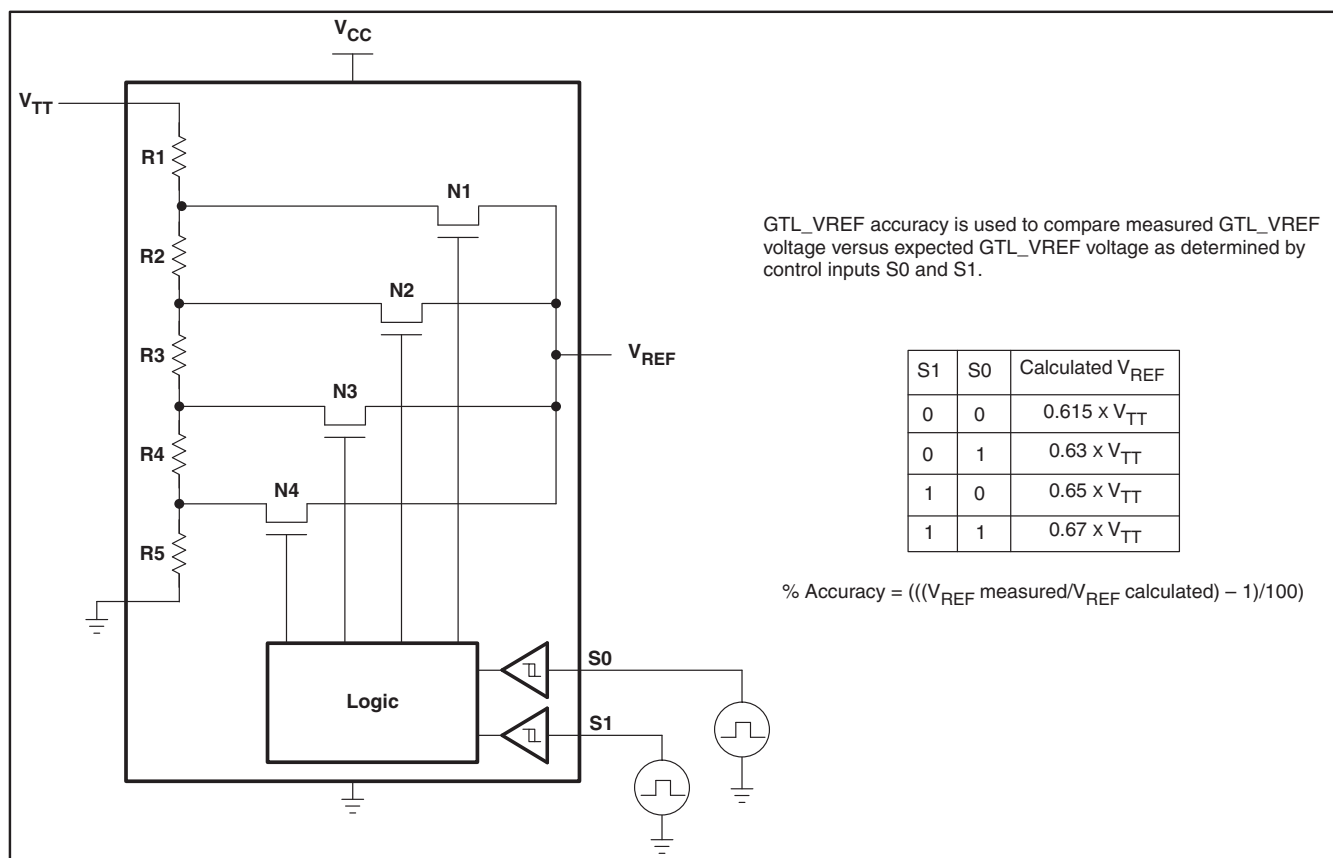
- (1) GTL V<sub>REF</sub> accuracy is used to compare measured GTL\_VREF voltage versus expected GTL\_VREF voltage as determined by control inputs S0 and S1. The resistor ratio tolerance is incorporated into this parameter.

## SWITCHING CHARACTERISTICS

over recommended operating free-air temperature range, T<sub>A</sub> = −40°C to 85°C, V<sub>DD</sub> = 3.3 V ±10%, GND = 0 V (unless otherwise noted)

|     | PARAMETER              | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-----|------------------------|-----------------|-----|-----|-----|------|
| PSR | Power supply rejection |                 |     | −58 |     | dB   |
|     | Pulse rejection        |                 |     |     | 40  | ns   |

## PARAMETER MEASUREMENT INFORMATION



**Figure 1. GTL\_REF Accuracy**

## 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="#">SN74GTL3004DCKR</a> | Active        | Production           | SC70 (DCK)   6 | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 85    | 2TK                 |
| SN74GTL3004DCKR.B               | Active        | Production           | SC70 (DCK)   6 | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 85    | 2TK                 |

<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.

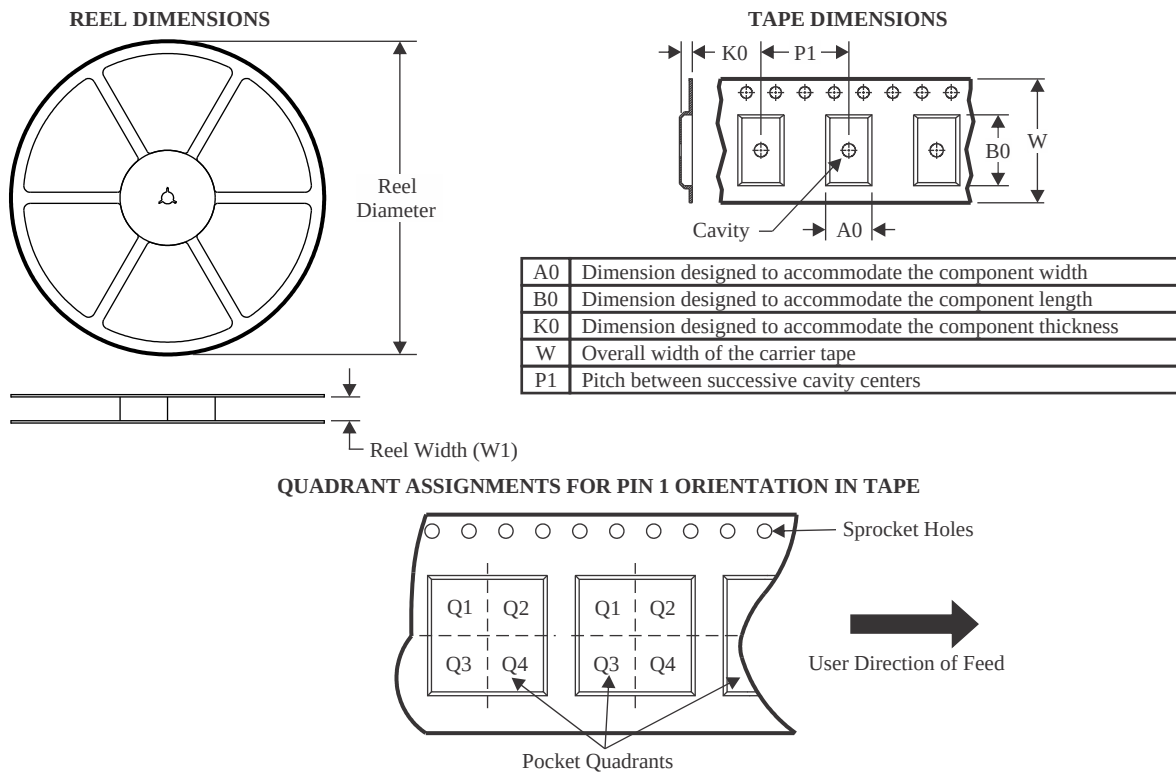
<sup>(6)</sup> **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

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.

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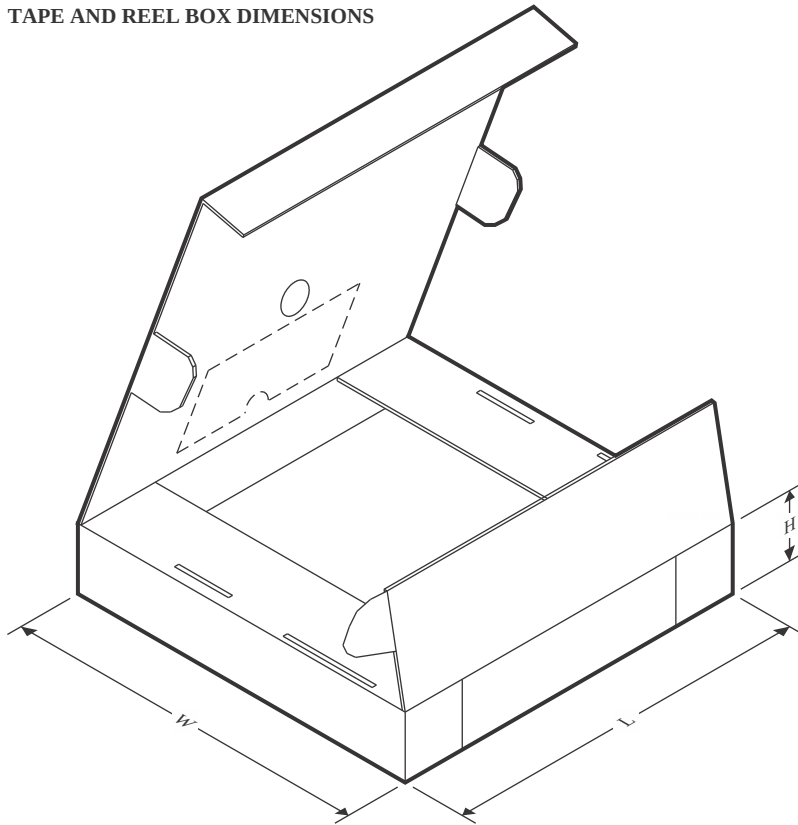
## TAPE AND REEL INFORMATION



\*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 |
|-----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74GTL3004DCKR | SC70         | DCK             | 6    | 3000 | 180.0              | 8.4                | 2.3     | 2.55    | 1.2     | 4.0     | 8.0    | Q3            |

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

| Device          | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|-----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74GTL3004DCKR | SC70         | DCK             | 6    | 3000 | 205.0       | 200.0      | 33.0        |

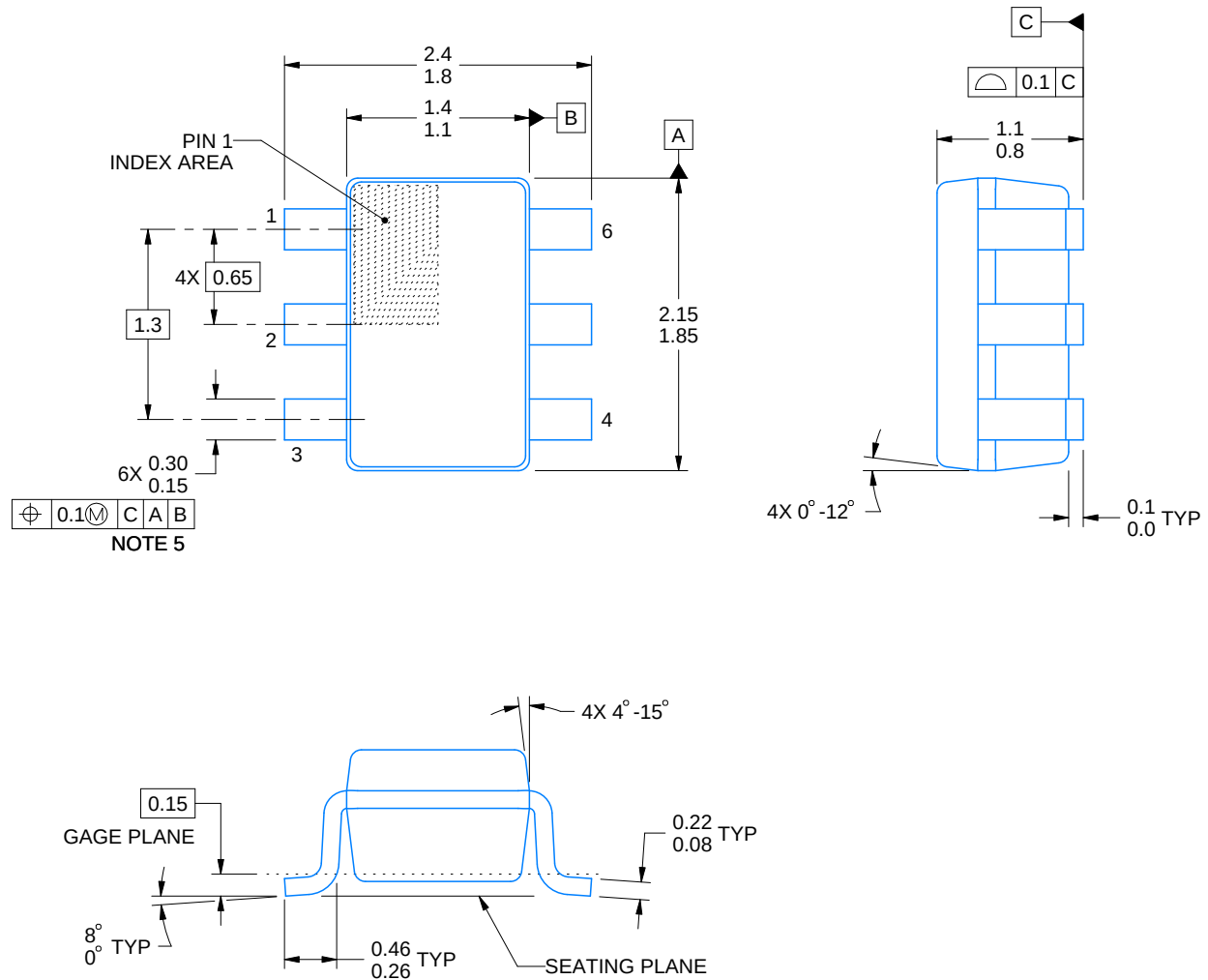
DCK0006A



## PACKAGE OUTLINE

SOT - 1.1 max height

SMALL OUTLINE TRANSISTOR

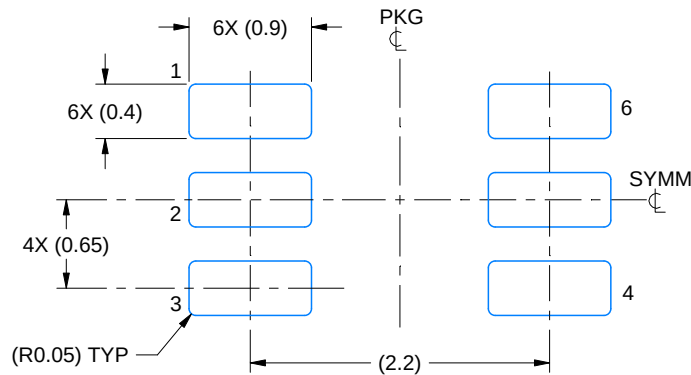


4214835/D 11/2024

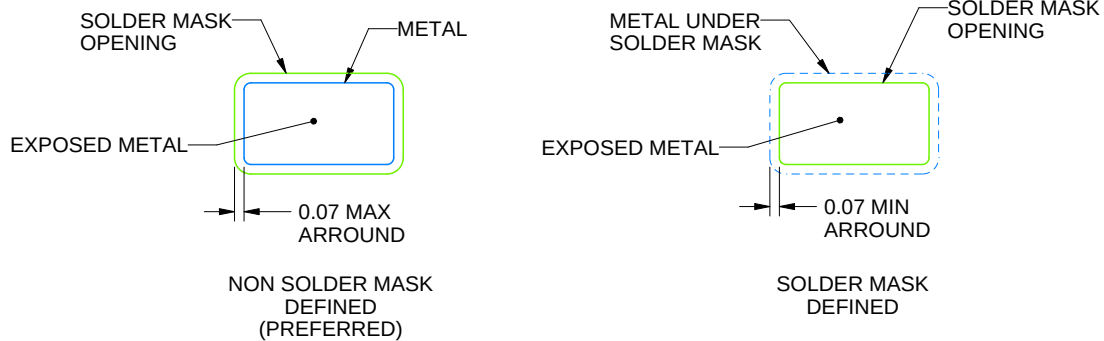
### NOTES:

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. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
4. Falls within JEDEC MO-203 variation AB.





LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE:18X

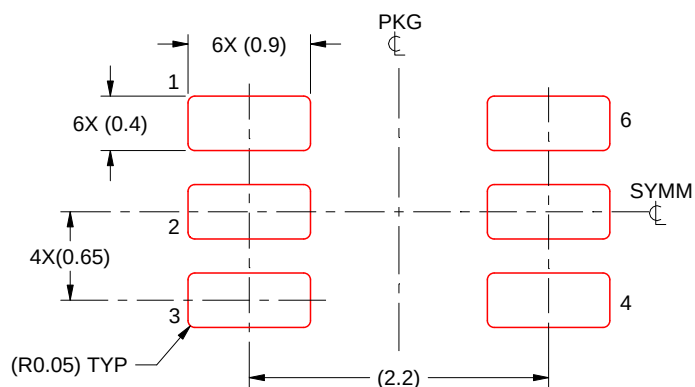


SOLDER MASK DETAILS

4214835/D 11/2024

NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.
6. 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

4214835/D 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.

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