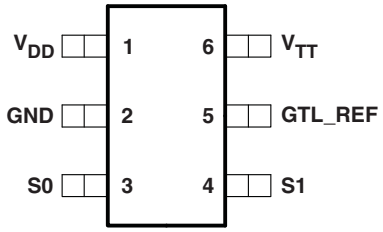
SELECTABLE GTL VOLTAGE REFERENCE

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}
  - $0.615 \times V_{TT}$
  - $0.63 \times V_{TT}$
  - $0.65 \times V_{TT}$
  - $0.67 \times V_{TT}$
- ±1% Resistor Ratio Tolerance
- Ambient Temperature Range: –40°C to 85°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)

DCK PACKAGE
(TOP VIEW)



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.

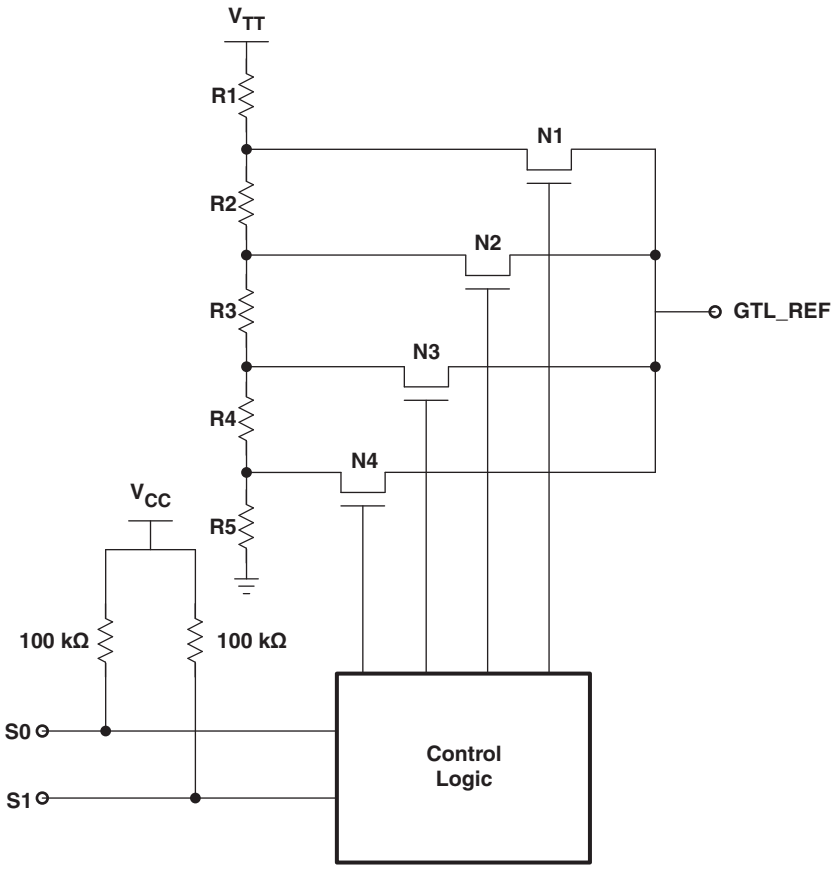
The S0 and S1 pins contain glitch-suppression circuitry for excellent noise immunity. When left floating, the S0 and S1 control input pins have 100-kΩ pullups that set the GTL V_{REF} default value to the $0.67 \times V_{TT}$ ratio (S0 = 1 and S1 =1).

ORDERING INFORMATION

T_A	PACKAGE(1)(2)		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	SOT (SC70) – DCK	Tape and reel	SN74GTL3004DCKR	2TK

(1) Package drawings, thermal data, and symbolization are available at 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.

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(1)

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

			MIN	MAX	UNIT
V_{DD}	Power supply voltage range		–0.3	4.6	V
V_{TT}	Termination voltage range(2)		–0.3	4.6	V
V_{IN}	Control input voltage range (2)		–0.3	V_{DD} + 0.3	V
V_{GTL_REF}	Resistor output voltage range(2)		–0.3	V_{DD} + 0.3	V
I_{IK}	Input clamp current	V_{IN} < 0		–18	mA
I_{OK}	Output clamp current	V_O < 0		–18	mA
	Continuous current through V_{DD} or GND			100	mA
θ_{JA}	Package thermal impedance(3)	DCK package		259	°C/W
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 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(1)

PARAMETER		MIN	TYP	MAX	UNIT
V_{DD}	Power supply voltage	3	3.3	3.6	V
V_{TT}	Termination voltage	1	1.1	1.3	V
V_{IH}	High-level control input voltage	$V_{DD} \times 0.65$			V
V_{IL}	Low-level control input voltage			$V_{DD} \times 0.35$	V
V_I	Control input voltage	0		V_{DD}	V
I_{OUT}	I_{GTL_REF}, GTL_REF output current		0	10	µA
PW	Control input pulse width	110			ns
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 of Floating CMOS Inputs*, literature number SCBA004.

ELECTRICAL CHARACTERISTICS

over recommended operating free-air temperature range, T_A = –40°C to 85°C, V_{DD} = 3.3 V ±10%, GND = 0 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{IK}	Control	V_{DD} = 3.6 V, I_{IN} = –18 mA			–1.8	V
I_{IN}	Control	V_{DD} = 3.6 V, V_{IN} = GND			43	µA
I_{DD}		V_{DD} = 3.6 V, V_{IN} = GND, I_O = 0 mA			85	µA
R	End-to-end resistance	V_{DD} = 3.6 V, V_{TT} = 1.1 V, I_O = 0 mA	4.25	7.12	10.6	kΩ
	GTL V_{REF} accuracy(1)	I_O = 0 µA, See Figure 1	–1		1	%
		I_O = 10 µA, See Figure 1	–7		7	

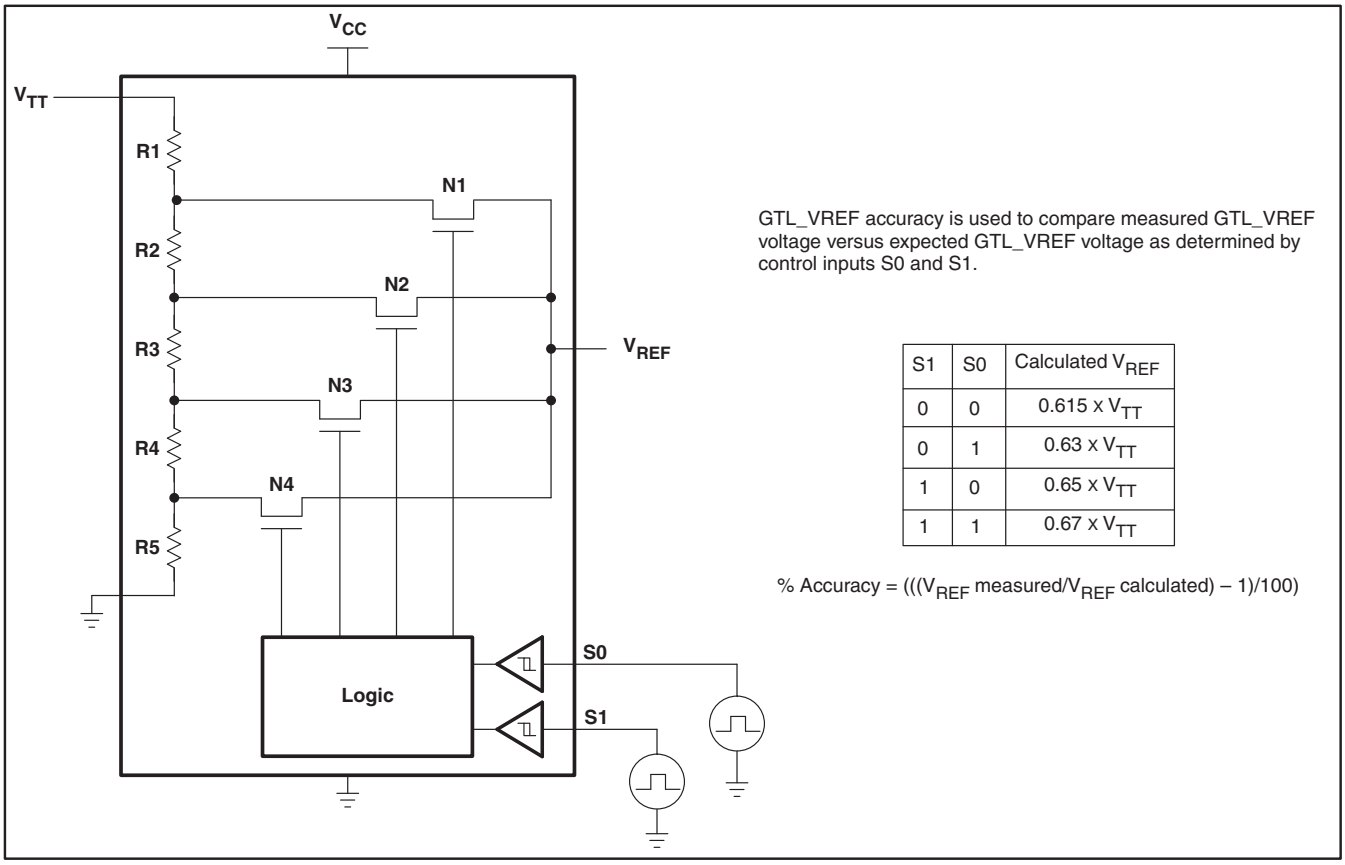
(1) GTL V_{REF} accuracy is used to compare measured GTL_VREF voltage versus expected GTL_VREF voltage as determined by control inputs S0 and S1. The resistor ratio tolerance is incorporated into this parameter.

SWITCHING CHARACTERISTICS

over recommended operating free-air temperature range,, T_A = –40°C to 85°C, V_{DD} = 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



GTL_VREF accuracy is used to compare measured GTL_VREF voltage versus expected GTL_VREF voltage as determined by control inputs S0 and S1.

S1	S0	Calculated V_{REF}
0	0	0.615 x V_{TT}
0	1	0.63 x V_{TT}
1	0	0.65 x V_{TT}
1	1	0.67 x V_{TT}

% Accuracy = ((V_{REF} measured/V_{REF} calculated) – 1)/100)

Figure 1. GTL_REF Accuracy

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN74GTL3004DCKR	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

(1) **Status:** For more details on status, see our product life cycle.

(2) **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.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **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.

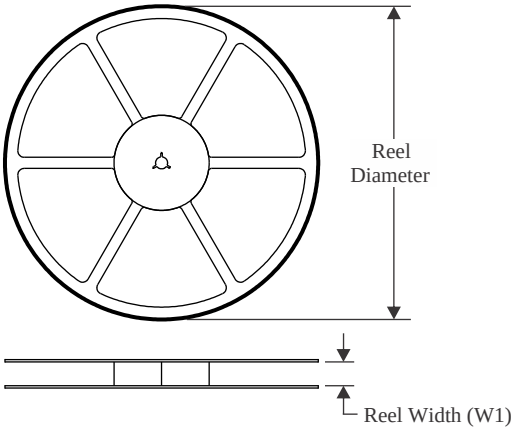
(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **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.

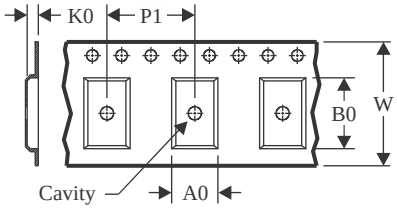
Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

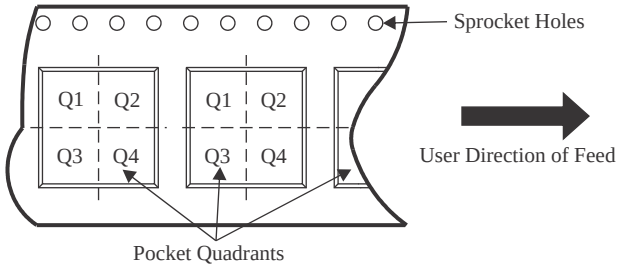


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

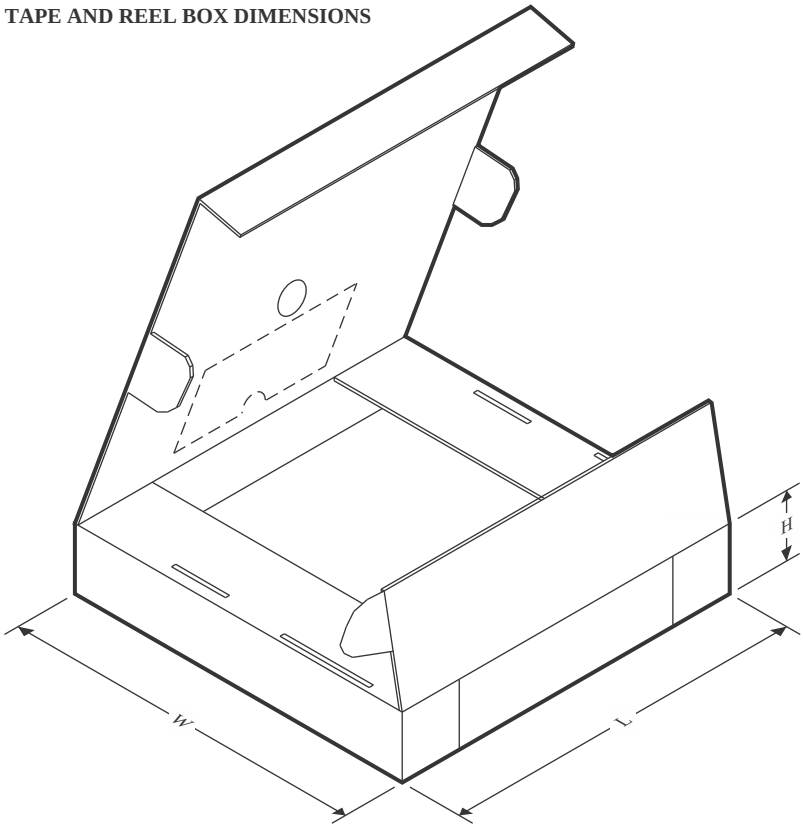
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
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

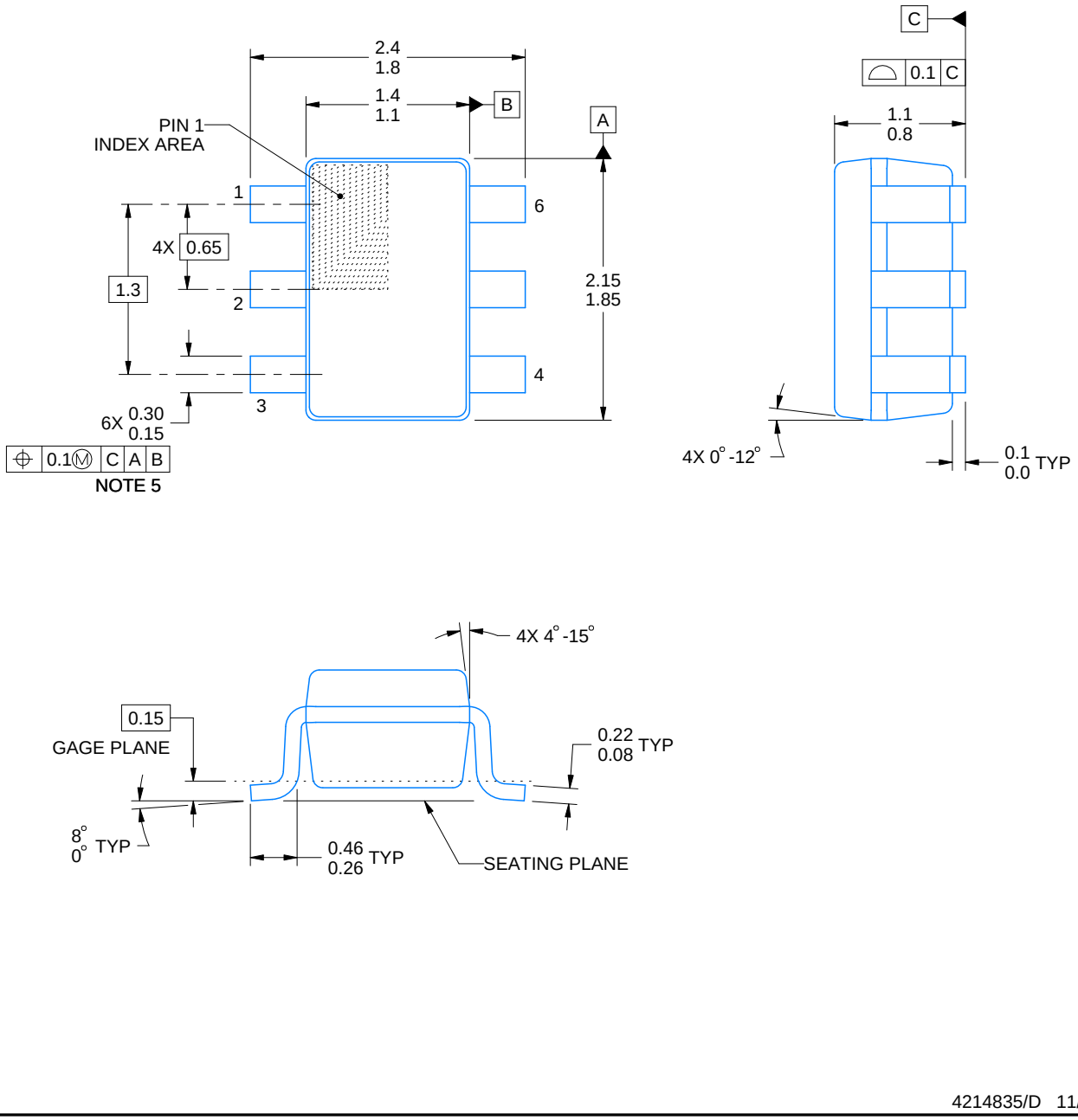
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74GTL3004DCKR	SC70	DCK	6	3000	205.0	200.0	33.0

PACKAGE OUTLINE

DCK0006A

SOT - 1.1 max height

SMALL OUTLINE TRANSISTOR



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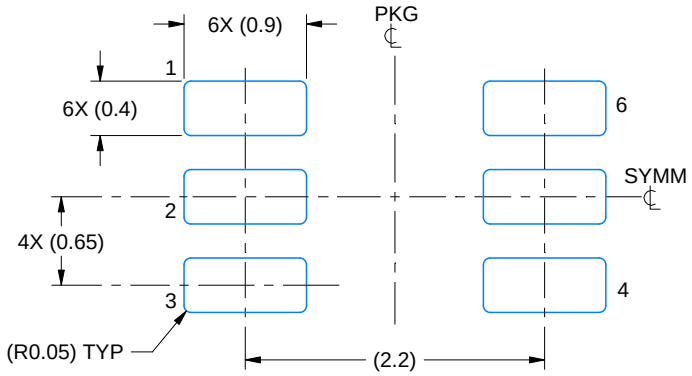
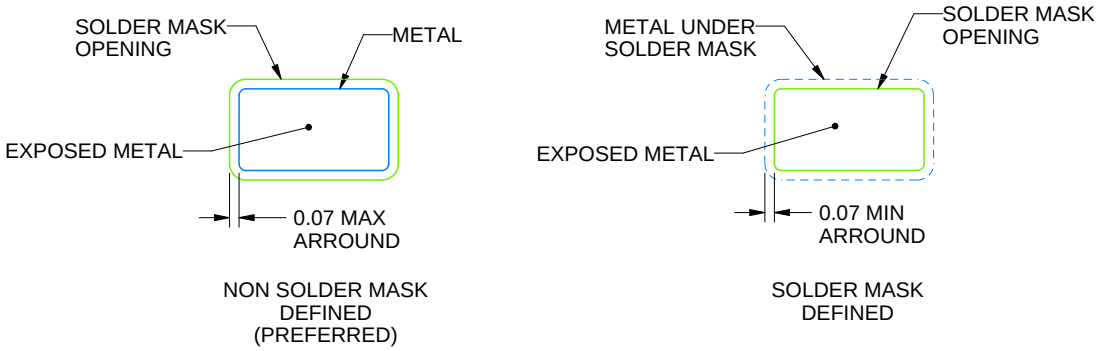
NOTES:

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

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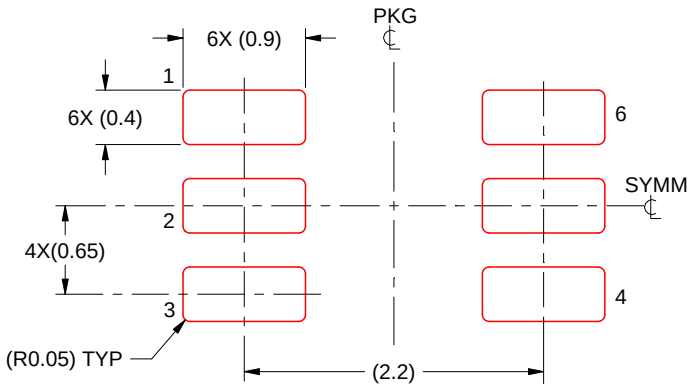
NOTES: (continued)

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

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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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