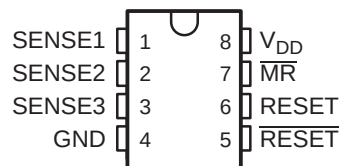


## TRIPLE PROCESSOR SUPERVISORS

### FEATURES

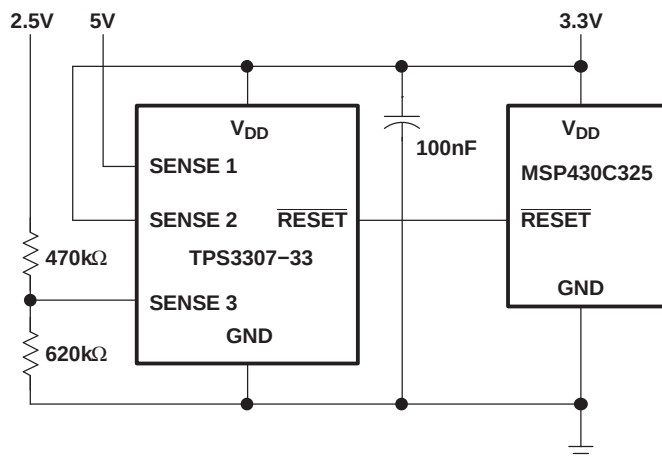
- Triple Supervisory Circuits for DSP and Processor-Based Systems
- Power-On Reset Generator With Fixed Delay Time of 200ms, No External Capacitor Needed
- Temperature-Compensated Voltage Reference
- Maximum Supply Current of 40µA
- Supply Voltage Range: 2V to 6V
- Defined  $\overline{\text{RESET}}$  Output From  $V_{\text{DD}} \geq 1.1\text{V}$
- MSOP-8 and SO-8 Packages
- Temperature Range :  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

D OR DGN PACKAGE  
(TOP VIEW)



### TYPICAL APPLICATIONS

Figure 1 lists some of the typical applications for the TPS3307 family, and a schematic diagram for a processor-based system application. This application uses TI part numbers [TPS3307-33](#) and [MSP430C325](#).



- Applications using DSPs, Microcontrollers or Microprocessors
- Industrial Equipment
- Programmable Controls
- Automotive Systems
- Portable/Battery Powered Equipment
- Intelligent Instruments
- Wireless Communication Systems
- Notebook/Desktop Computers

Figure 1. Applications Using the TPS3307 Family

### DESCRIPTION

The TPS3307 family is a series of micropower supply voltage supervisors designed for circuit initialization primarily in DSP and processor-based systems, which require more than one supply voltage.

The product spectrum of the TPS3307-xx is designed for monitoring three independent supply voltages: 3.3V/1.8V/adj, 3.3V/2.5V/adj or 3.3V/5V/adj. The adjustable SENSE input allows the monitoring of any supply voltage  $>1.25\text{V}$ .

The various supply voltage supervisors are designed to monitor the nominal supply voltage as shown in the following [supply voltage monitoring table](#).



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.

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During power-on,  $\overline{\text{RESET}}$  is asserted when the supply voltage  $V_{DD}$  becomes higher than 1.1V. Thereafter, the supply voltage supervisor monitors the  $\text{SENSE}_n$  inputs and keeps  $\overline{\text{RESET}}$  active as long as  $\text{SENSE}_n$  remain below the threshold voltage  $V_{IT+}$ .

An internal timer delays the return of the  $\overline{\text{RESET}}$  output to the inactive state (high) to ensure proper system reset. The delay time,  $t_{d(\text{typ})} = 200\text{ms}$ , starts after all  $\text{SENSE}_n$  inputs have risen above the threshold voltage  $V_{IT+}$ . When the voltage at any  $\text{SENSE}$  input drops below the threshold voltage  $V_{IT-}$ , the  $\overline{\text{RESET}}$  output becomes active (low) again.

The TPS3307-xx family of devices incorporates a manual reset input,  $\overline{\text{MR}}$ . A low level at  $\overline{\text{MR}}$  causes  $\overline{\text{RESET}}$  to become active. In addition to the active-low  $\overline{\text{RESET}}$  output, the TPS3307-xx family includes an active-high RESET output.

The devices are available in either 8-pin MSOP or standard 8-pin SO packages.

The TPS3307-xx devices are characterized for operation over a temperature range of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

### SUPPLY VOLTAGE MONITORING

| DEVICE     | NOMINAL SUPERVISED VOLTAGE |        |              | THRESHOLD VOLTAGE (TYP) |        |                      |
|------------|----------------------------|--------|--------------|-------------------------|--------|----------------------|
|            | SENSE1                     | SENSE2 | SENSE3       | SENSE1                  | SENSE2 | SENSE3               |
| TPS3307-18 | 3.3V                       | 1.8V   | User defined | 2.93V                   | 1.68V  | 1.25V <sup>(1)</sup> |
| TPS3307-25 | 3.3V                       | 2.5V   | User defined | 2.93V                   | 2.25V  | 1.25V <sup>(1)</sup> |
| TPS3307-33 | 5V                         | 3.3V   | User defined | 4.55V                   | 2.93V  | 1.25V <sup>(1)</sup> |

(1) The actual sense voltage has to be adjusted by an external resistor divider according to the application requirements.

### AVAILABLE OPTIONS<sup>(1)</sup>

| $T_A$                                          | PACKAGED DEVICES     |                                       | MARKING<br>DGN PACKAGE | CHIP FORM<br>(Y) |
|------------------------------------------------|----------------------|---------------------------------------|------------------------|------------------|
|                                                | SMALL OUTLINE<br>(D) | PowerPAD™<br>μ-SMALL OUTLINE<br>(DGN) |                        |                  |
| $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ | TPS3307-18D          | TPS3307-18DGN                         | TIAAP                  | TPS3307-18Y      |
|                                                | TPS3307-25D          | TPS3307-25DGN                         | TIAAQ                  | TPS3307-25Y      |
|                                                | TPS3307-33D          | TPS3307-33DGN                         | TIAAR                  | TPS3307-33Y      |

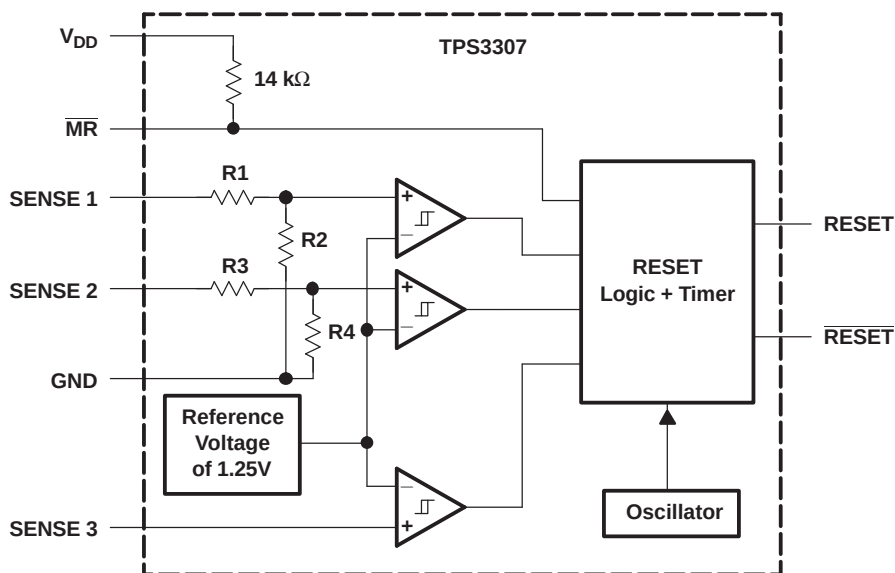
(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at [www.ti.com](http://www.ti.com).

### Function/Truth Tables

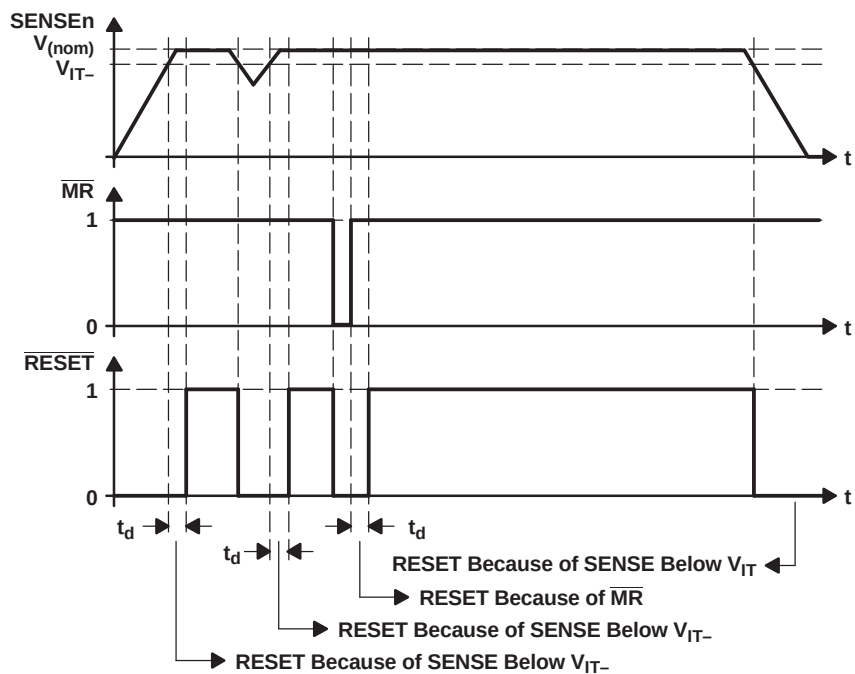
| $\overline{\text{MR}}$ | $\text{SENSE1} > V_{IT1}$ | $\text{SENSE2} > V_{IT2}$ | $\text{SENSE3} > V_{IT3}$ | $\overline{\text{RESET}}$ | RESET |
|------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-------|
| L                      | X <sup>(1)</sup>          | X <sup>(1)</sup>          | X                         | L                         | H     |
| H                      | 0                         | 0                         | 0                         | L                         | H     |
| H                      | 0                         | 0                         | 1                         | L                         | H     |
| H                      | 0                         | 1                         | 0                         | L                         | H     |
| H                      | 0                         | 1                         | 1                         | L                         | H     |
| H                      | 1                         | 0                         | 0                         | L                         | H     |
| H                      | 1                         | 0                         | 1                         | L                         | H     |
| H                      | 1                         | 1                         | 0                         | L                         | H     |
| H                      | 1                         | 1                         | 1                         | H                         | L     |

(1) X = Don't care

## Functional Block Diagram

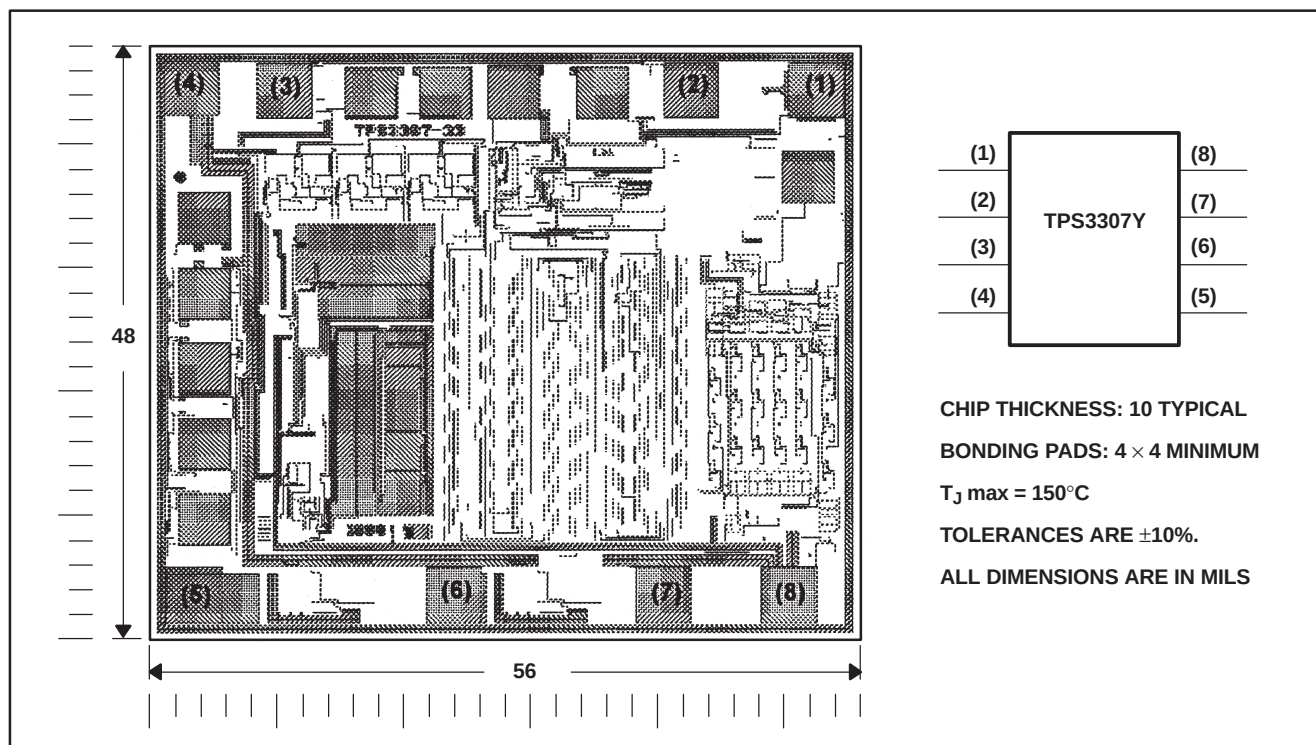


## Timing Diagram



## TPS3307Y Chip Information

These chips, when properly assembled, display characteristics similar to those of the TPS3307. Thermal compression or ultrasonic bonding may take place on the doped aluminium bonding pads. The chips may be mounted with conductive epoxy or a gold-silicon preform.



**Table 2. Terminal Functions**

| TERMINAL<br>NAME          | NO. | I/O | DESCRIPTION              |
|---------------------------|-----|-----|--------------------------|
| GND                       | 4   |     | Ground                   |
| $\overline{\text{MR}}$    | 7   | I   | Manual reset             |
| $\overline{\text{RESET}}$ | 5   | O   | Active-low reset output  |
| RESET                     | 6   | O   | Active-high reset output |
| SENSE1                    | 1   | I   | Sense voltage input 1    |
| SENSE2                    | 2   | I   | Sense voltage input 2    |
| SENSE3                    | 3   | I   | Sense voltage input 3    |
| V <sub>DD</sub>           | 8   |     | Supply voltage           |

## Absolute Maximum Ratings<sup>(1)</sup>

Over operating free-air temperature range (unless otherwise noted).

|                                                                | UNIT                                         |
|----------------------------------------------------------------|----------------------------------------------|
| Supply voltage, $V_{DD}$ <sup>(2)</sup>                        | 7V                                           |
| $\overline{MR}$ pin                                            | –0.3V to $V_{DD}$ +0.3V                      |
| All other pins <sup>(2)</sup>                                  | –0.3V to 7V                                  |
| Maximum low output current, $I_{OL}$                           | 5mA                                          |
| Maximum high output current, $I_{OH}$                          | –5mA                                         |
| Input clamp current, $I_{IK}$ ( $V_I < 0$ or $V_I > V_{DD}$ )  | ±20mA                                        |
| Output clamp current, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{DD}$ ) | ±20mA                                        |
| Continuous total power dissipation                             | See <a href="#">Dissipation Rating Table</a> |
| Operating free-air temperature range, $T_A$                    | –40°C to +85°C                               |
| Storage temperature range, $T_{stg}$                           | –65°C to +150°C                              |
| Soldering temperature                                          | +260°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) All voltage values are with respect to GND. For reliable operation the device must not be operated at 7V for more than  $t = 1000h$  continuously.

## Dissipation Rating Table

| PACKAGE | $T_A \leq +25^\circ\text{C}$<br>POWER RATING | DERATING FACTOR<br>ABOVE $T_A = +25^\circ\text{C}$ | $T_A = +70^\circ\text{C}$<br>POWER RATING | $T_A = +85^\circ\text{C}$<br>POWER RATING |
|---------|----------------------------------------------|----------------------------------------------------|-------------------------------------------|-------------------------------------------|
| DGN     | 2.14W                                        | 17.1mW/°C                                          | 1.37W                                     | 1.11W                                     |
| D       | 725mW                                        | 5.8mW/°C                                           | 464mW                                     | 377mW                                     |

## Recommended Operating Conditions

At specified temperature range.

|                                                                              | MIN                 | MAX                        | UNIT |
|------------------------------------------------------------------------------|---------------------|----------------------------|------|
| Supply voltage, $V_{DD}$                                                     | 2                   | 6                          | V    |
| Input voltage at $\overline{MR}$ and SENSE3, $V_I$                           | 0                   | $V_{DD} + 0.3$             | V    |
| Input voltage at SENSE1 and SENSE2, $V_I$                                    | 0                   | $(V_{DD}+0.3)V_{IT}/1.25V$ | V    |
| High-level input voltage at $\overline{MR}$ , $V_{IH}$                       | $0.7 \times V_{DD}$ |                            | V    |
| Low-level input voltage at $\overline{MR}$ , $V_{IL}$                        |                     | $0.3 \times V_{DD}$        | V    |
| Input transition rise and fall rate at $\overline{MR}$ , $\Delta t/\Delta V$ |                     | 50                         | ns/V |
| Operating free-air temperature range, $T_A$                                  | –40                 | +85                        | °C   |

## Electrical Characteristics

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

| PARAMETER                             |                                                       |  | TEST CONDITIONS                                             | MIN                                                        | TYP  | MAX  | UNIT |
|---------------------------------------|-------------------------------------------------------|--|-------------------------------------------------------------|------------------------------------------------------------|------|------|------|
| V <sub>OH</sub>                       | High-level output voltage                             |  | V <sub>DD</sub> = 2V to 6V, I <sub>OH</sub> = −20 μA        | V <sub>DD</sub> − 0.2V                                     |      |      | V    |
|                                       |                                                       |  | V <sub>DD</sub> = 3.3V, I <sub>OH</sub> = −2mA              | V <sub>DD</sub> − 0.4V                                     |      |      |      |
|                                       |                                                       |  | V <sub>DD</sub> = 6V, I <sub>OH</sub> = −3mA                | V <sub>DD</sub> − 0.4V                                     |      |      |      |
| V <sub>OL</sub>                       | Low-level output voltage                              |  | V <sub>DD</sub> = 2V to 6V, I <sub>OL</sub> = 20μA          |                                                            |      | 0.2  | V    |
|                                       |                                                       |  | V <sub>DD</sub> = 3.3V, I <sub>OL</sub> = 2mA               |                                                            |      | 0.4  |      |
|                                       |                                                       |  | V <sub>DD</sub> = 6V, I <sub>OL</sub> = 3mA                 |                                                            |      | 0.4  |      |
| Power-up reset voltage <sup>(1)</sup> |                                                       |  | V <sub>DD</sub> ≥ 1.1V, I <sub>OL</sub> = 20μA              |                                                            |      | 0.4  | V    |
| V <sub>IT−</sub>                      | Negative-going input threshold voltage <sup>(2)</sup> |  | V <sub>DD</sub> = 2V to 6V, T <sub>A</sub> = 0°C to +85°C   | 1.22                                                       | 1.25 | 1.28 | V    |
|                                       |                                                       |  |                                                             | 1.64                                                       | 1.68 | 1.72 |      |
|                                       |                                                       |  |                                                             | 2.20                                                       | 2.25 | 2.30 |      |
|                                       |                                                       |  |                                                             | 2.86                                                       | 2.93 | 3    |      |
|                                       |                                                       |  |                                                             | 4.46                                                       | 4.55 | 4.64 |      |
|                                       |                                                       |  | V <sub>DD</sub> = 2V to 6V, T <sub>A</sub> = −40°C to +85°C | 1.22                                                       | 1.25 | 1.29 | V    |
|                                       |                                                       |  |                                                             | 1.64                                                       | 1.68 | 1.73 | V    |
|                                       |                                                       |  |                                                             | 2.20                                                       | 2.25 | 2.32 |      |
|                                       |                                                       |  |                                                             | 2.86                                                       | 2.93 | 3.02 |      |
|                                       |                                                       |  |                                                             | 4.46                                                       | 4.55 | 4.67 |      |
| V <sub>hys</sub>                      | Hysteresis at VSENSEn input                           |  | V <sub>IT−</sub> = 1.25V                                    |                                                            | 10   | mV   |      |
|                                       |                                                       |  | V <sub>IT−</sub> = 1.68V                                    |                                                            | 15   |      |      |
|                                       |                                                       |  | V <sub>IT−</sub> = 2.25V                                    |                                                            | 20   |      |      |
|                                       |                                                       |  | V <sub>IT−</sub> = 2.93V                                    |                                                            | 30   |      |      |
|                                       |                                                       |  | V <sub>IT−</sub> = 4.55V                                    |                                                            | 40   |      |      |
| I <sub>H</sub>                        | High-level input current                              |  | $\overline{MR}$                                             | $\overline{MR} = 0.7 \times V_{DD}$ , V <sub>DD</sub> = 6V | −130 | −180 | μA   |
|                                       |                                                       |  | SENSE1                                                      | VSENSE1 = V <sub>DD</sub> = 6V                             | 5    | 8    |      |
|                                       |                                                       |  | SENSE2                                                      | VSENSE2 = V <sub>DD</sub> = 6V                             | 6    | 9    |      |
|                                       |                                                       |  | SENSE3                                                      | VSENSE3 = V <sub>DD</sub>                                  | −25  | 25   | nA   |
| I <sub>L</sub>                        | Low-level input current                               |  | $\overline{MR}$                                             | $\overline{MR} = 0V$ , V <sub>DD</sub> = 6V                | −430 | −600 | μA   |
|                                       |                                                       |  | SENSEn                                                      | VSENSE1,2,3 = 0V                                           | −25  | 25   | nA   |
| I <sub>DD</sub>                       | Supply current                                        |  |                                                             |                                                            |      | 40   | μA   |
| C <sub>i</sub>                        | Input capacitance                                     |  | V <sub>I</sub> = 0V to V <sub>DD</sub>                      |                                                            | 10   |      | pF   |

(1) The lowest supply voltage at which  $\overline{RESET}$  becomes active.  $t_r, V_{DD} \geq 15\mu s/V$

(2) To ensure best stability of the threshold voltage, a bypass capacitor (ceramic 0.1 $\mu F$ ) should be placed close to the supply terminals.

## Timing Requirements

At  $V_{DD} = 2V$  to  $6V$ ,  $R_L = 1M\Omega$ ,  $C_L = 50pF$ ,  $T_A = +25^\circ C$ .

| PARAMETER      |             | TEST CONDITIONS | MIN                                                                                            | TYP | MAX | UNIT |    |
|----------------|-------------|-----------------|------------------------------------------------------------------------------------------------|-----|-----|------|----|
| t <sub>w</sub> | Pulse width | SENSEn          | V <sub>SENSEnL</sub> = V <sub>IT−</sub> − 0.2V, V <sub>SENSEnH</sub> = V <sub>IT+</sub> + 0.2V |     |     | 6    | μs |
|                |             | MR              | V <sub>IH</sub> = 0.7 × V <sub>DD</sub> , V <sub>IL</sub> = 0.3 × V <sub>DD</sub>              |     |     | 100  | ns |

## Switching Characteristics

At  $V_{DD} = 2V$  to  $6V$ ,  $R_L = 1M\Omega$ ,  $C_L = 50pF$ ,  $T_A = +25^\circ C$ .

| PARAMETER |                                                       |                                                      | TEST CONDITIONS                                                                                                        |  | MIN | TYP | MAX | UNIT    |
|-----------|-------------------------------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--|-----|-----|-----|---------|
| $t_d$     | Delay time                                            |                                                      | $V_{I(SENSEn)} \geq V_{IT+} + 0.2V$ ,<br>$\overline{MR} \geq 0.7 \times V_{DD}$ . See <a href="#">Timing Diagram</a> . |  | 140 | 200 | 280 | ms      |
| $t_{PHL}$ | Propagation (delay) time,<br>high-to-low level output | $\overline{MR}$ to RESET<br>$\overline{MR}$ to RESET | $V_{I(SENSEn)} \geq V_{IT+} + 0.2V$ ,<br>$V_{IH} = 0.7 \times V_{DD}$ , $V_{IL} = 0.3 \times V_{DD}$                   |  |     | 200 | 500 | ns      |
| $t_{PLH}$ | Propagation (delay) time,<br>low-to-high level output | $\overline{MR}$ to RESET<br>$\overline{MR}$ to RESET |                                                                                                                        |  |     |     |     |         |
| $t_{PHL}$ | Propagation (delay) time,<br>high-to-low level output | SENSEn to RESET<br>SENSEn to RESET                   | $V_{IH} = V_{IT+} + 0.2V$ , $V_{IL} = V_{IT-} - 0.2V$ ,<br>$\overline{MR} \geq 0.7 \times V_{DD}$                      |  |     | 1   | 5   | $\mu s$ |
| $t_{PLH}$ | Propagation (delay) time,<br>low-to-high level output | SENSEn to RESET<br>SENSEn to RESET                   |                                                                                                                        |  |     |     |     |         |

## Typical Characteristics

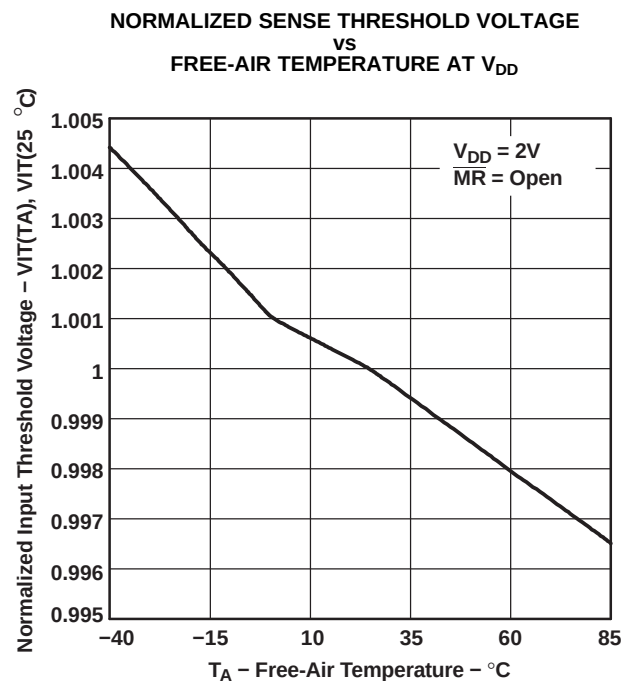


Figure 2.

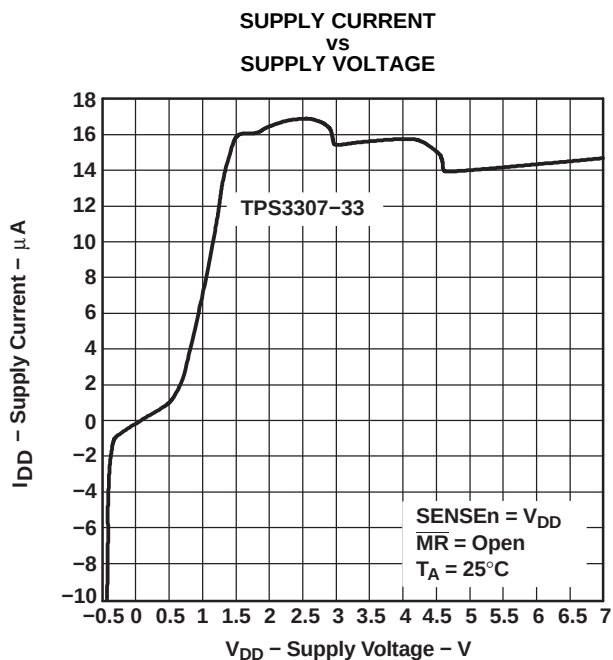


Figure 3.

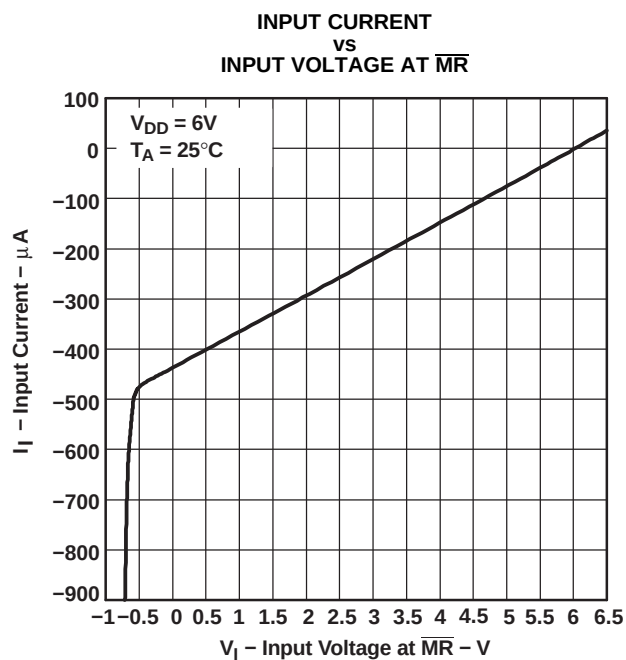


Figure 4.

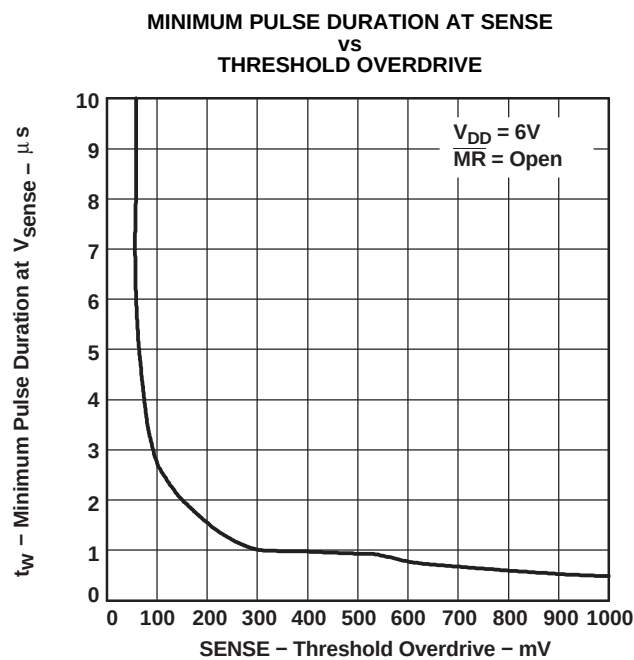


Figure 5.



## Typical Characteristics (continued)

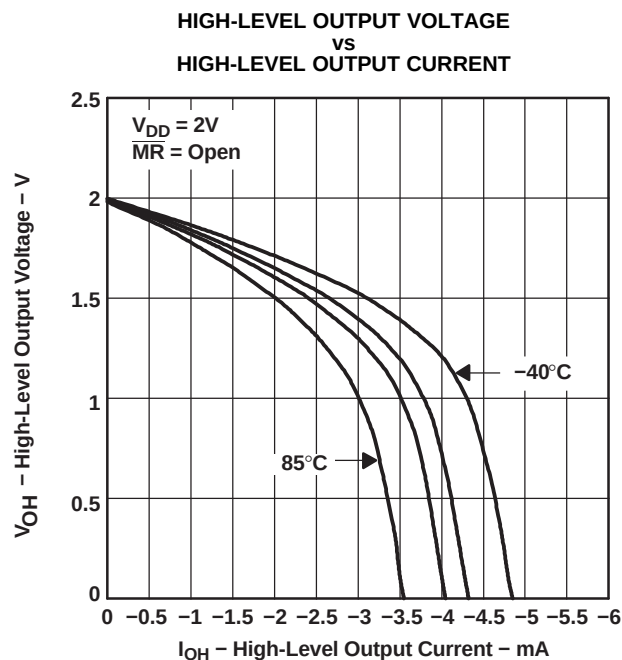


Figure 6.

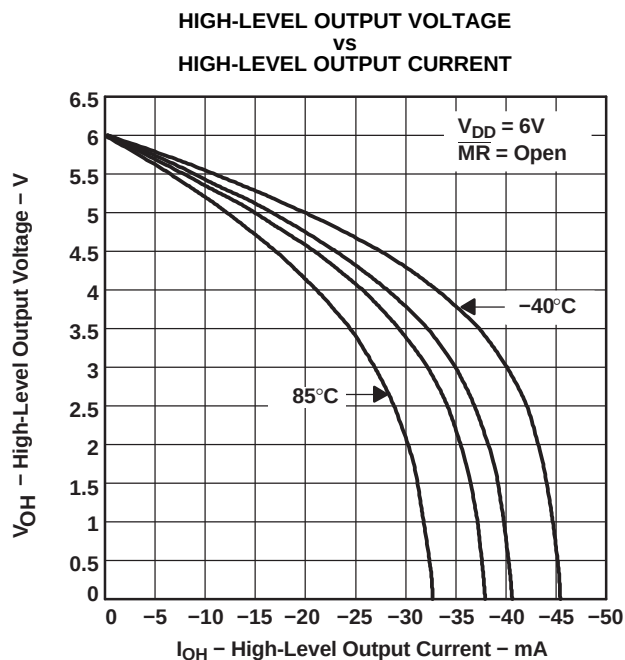


Figure 7.

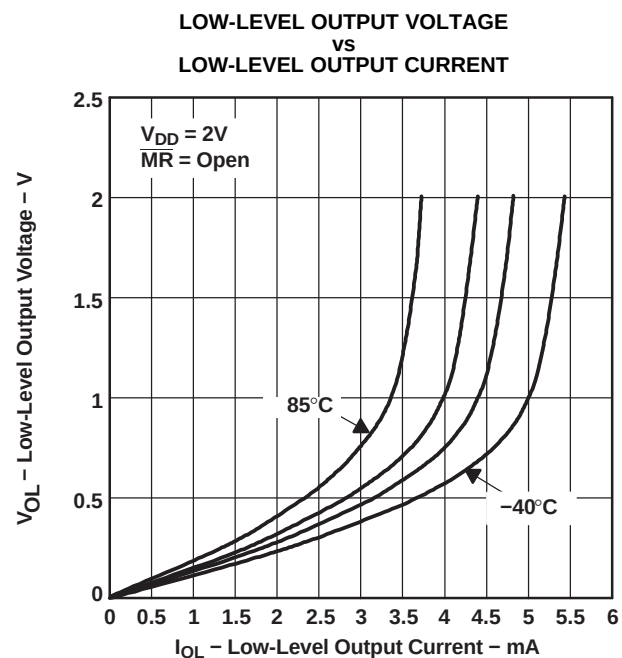


Figure 8.

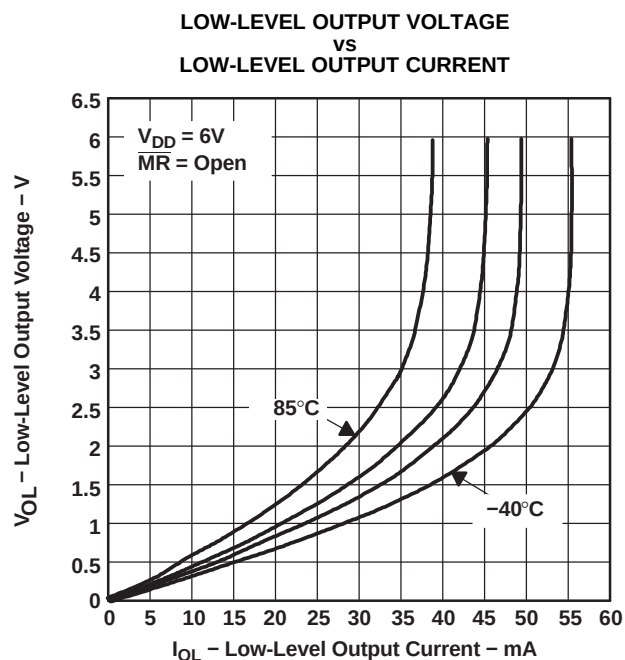


Figure 9.

## PACKAGING INFORMATION

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2) | Lead finish/<br>Ball material<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|-----------------|--------------------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3307-18D      | ACTIVE        | SOIC         | D                  | 8    | 75             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30718                   | <a href="#">Samples</a> |
| TPS3307-18DG4    | ACTIVE        | SOIC         | D                  | 8    | 75             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30718                   | <a href="#">Samples</a> |
| TPS3307-18DGN    | ACTIVE        | HVSSOP       | DGN                | 8    | 80             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAP                     | <a href="#">Samples</a> |
| TPS3307-18DGNG4  | ACTIVE        | HVSSOP       | DGN                | 8    | 80             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAP                     | <a href="#">Samples</a> |
| TPS3307-18DGNR   | ACTIVE        | HVSSOP       | DGN                | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAP                     | <a href="#">Samples</a> |
| TPS3307-18DGNRG4 | ACTIVE        | HVSSOP       | DGN                | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAP                     | <a href="#">Samples</a> |
| TPS3307-18DR     | ACTIVE        | SOIC         | D                  | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30718                   | <a href="#">Samples</a> |
| TPS3307-18DRG4   | ACTIVE        | SOIC         | D                  | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30718                   | <a href="#">Samples</a> |
| TPS3307-25D      | ACTIVE        | SOIC         | D                  | 8    | 75             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30725                   | <a href="#">Samples</a> |
| TPS3307-25DG4    | ACTIVE        | SOIC         | D                  | 8    | 75             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30725                   | <a href="#">Samples</a> |
| TPS3307-25DGN    | ACTIVE        | HVSSOP       | DGN                | 8    | 80             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAQ                     | <a href="#">Samples</a> |
| TPS3307-25DGNG4  | ACTIVE        | HVSSOP       | DGN                | 8    | 80             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAQ                     | <a href="#">Samples</a> |
| TPS3307-25DGNR   | ACTIVE        | HVSSOP       | DGN                | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAQ                     | <a href="#">Samples</a> |
| TPS3307-25DGNRG4 | ACTIVE        | HVSSOP       | DGN                | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAQ                     | <a href="#">Samples</a> |
| TPS3307-25DR     | ACTIVE        | SOIC         | D                  | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30725                   | <a href="#">Samples</a> |
| TPS3307-25DRG4   | ACTIVE        | SOIC         | D                  | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30725                   | <a href="#">Samples</a> |
| TPS3307-33D      | ACTIVE        | SOIC         | D                  | 8    | 75             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30733                   | <a href="#">Samples</a> |
| TPS3307-33DG4    | ACTIVE        | SOIC         | D                  | 8    | 75             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30733                   | <a href="#">Samples</a> |
| TPS3307-33DGN    | ACTIVE        | HVSSOP       | DGN                | 8    | 80             | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAR                     | <a href="#">Samples</a> |
| TPS3307-33DGNR   | ACTIVE        | HVSSOP       | DGN                | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAR                     | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2) | Lead finish/<br>Ball material<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|-----------------|--------------------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3307-33DGNRG4 | ACTIVE        | HVSSOP       | DGN                | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | AAR                     | <a href="#">Samples</a> |
| TPS3307-33DR     | ACTIVE        | SOIC         | D                  | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30733                   | <a href="#">Samples</a> |
| TPS3307-33DRG4   | ACTIVE        | SOIC         | D                  | 8    | 2500           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 85    | 30733                   | <a href="#">Samples</a> |

<sup>(1)</sup> 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.

<sup>(2)</sup> **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.

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

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

<sup>(5)</sup> 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.

<sup>(6)</sup> Lead finish/Ball material - Orderable Devices 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.

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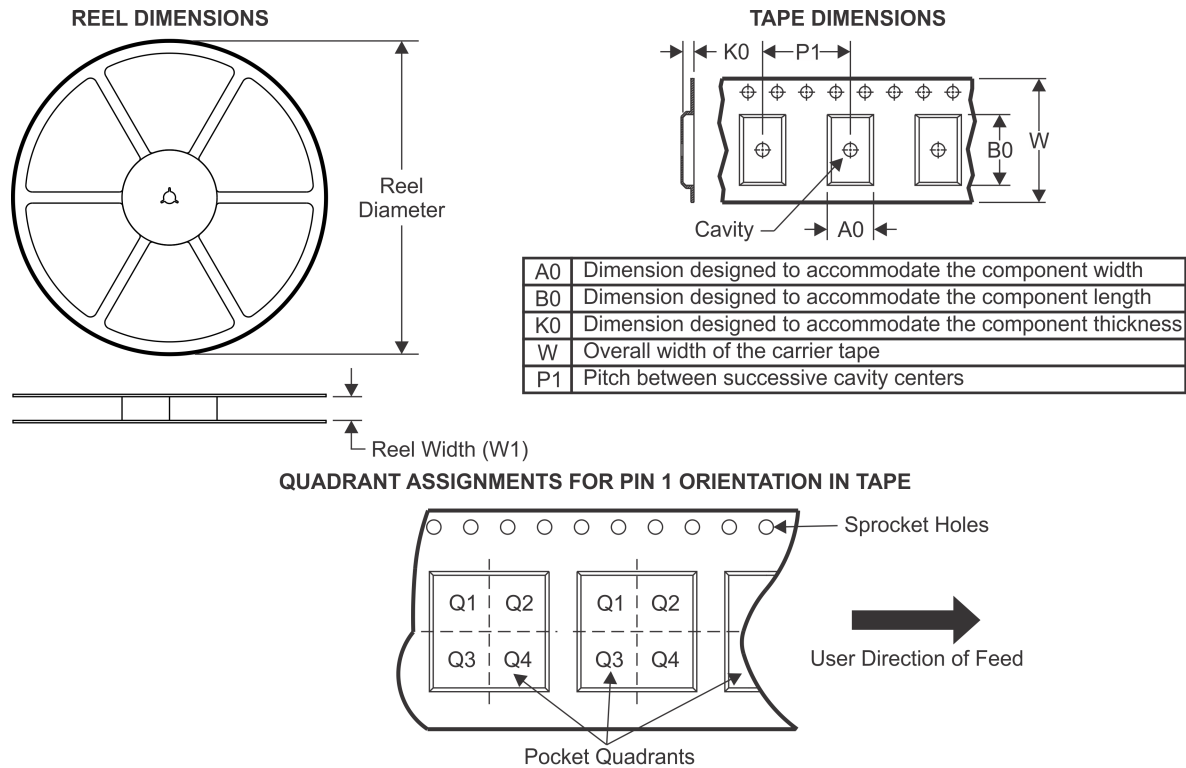
**OTHER QUALIFIED VERSIONS OF TPS3307 :**

- Enhanced Product : [TPS3307-EP](#)

NOTE: Qualified Version Definitions:

- Enhanced Product - Supports Defense, Aerospace and Medical Applications

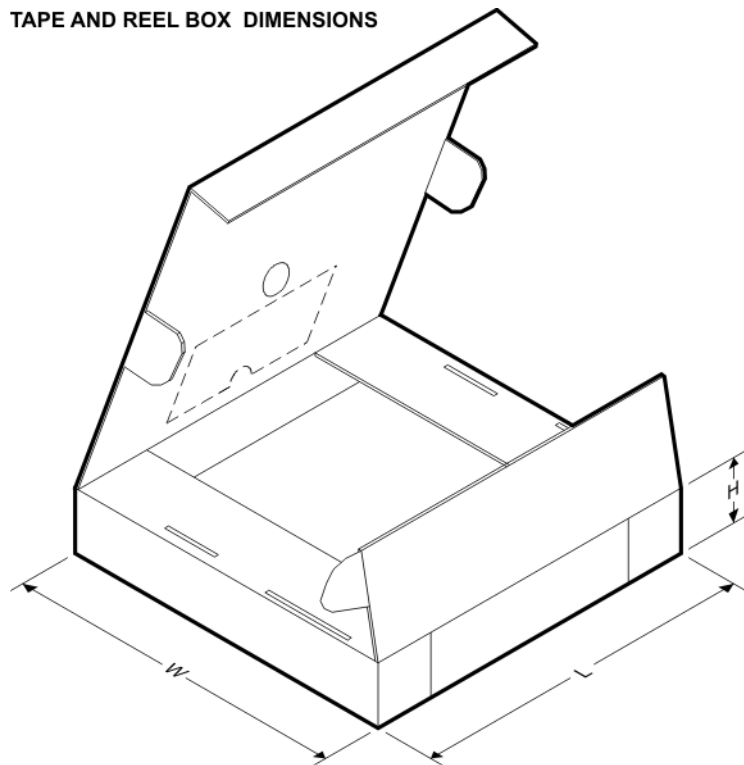
## TAPE AND REEL INFORMATION



\*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 |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TPS3307-18DGNR | HVSSOP       | DGN             | 8    | 2500 | 330.0              | 12.4               | 5.3     | 3.4     | 1.4     | 8.0     | 12.0   | Q1            |
| TPS3307-18DR   | SOIC         | D               | 8    | 2500 | 330.0              | 12.4               | 6.4     | 5.2     | 2.1     | 8.0     | 12.0   | Q1            |
| TPS3307-25DGNR | HVSSOP       | DGN             | 8    | 2500 | 330.0              | 12.4               | 5.3     | 3.4     | 1.4     | 8.0     | 12.0   | Q1            |
| TPS3307-25DR   | SOIC         | D               | 8    | 2500 | 330.0              | 12.4               | 6.4     | 5.2     | 2.1     | 8.0     | 12.0   | Q1            |
| TPS3307-33DGNR | HVSSOP       | DGN             | 8    | 2500 | 330.0              | 12.4               | 5.3     | 3.4     | 1.4     | 8.0     | 12.0   | Q1            |
| TPS3307-33DR   | SOIC         | D               | 8    | 2500 | 330.0              | 12.4               | 6.4     | 5.2     | 2.1     | 8.0     | 12.0   | Q1            |

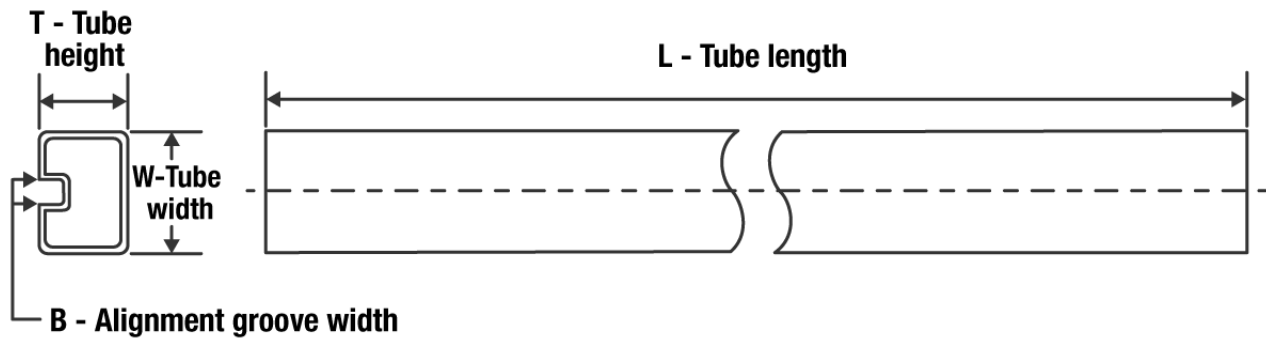
## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

| Device         | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TPS3307-18DGNR | HVSSOP       | DGN             | 8    | 2500 | 358.0       | 335.0      | 35.0        |
| TPS3307-18DR   | SOIC         | D               | 8    | 2500 | 350.0       | 350.0      | 43.0        |
| TPS3307-25DGNR | HVSSOP       | DGN             | 8    | 2500 | 358.0       | 335.0      | 35.0        |
| TPS3307-25DR   | SOIC         | D               | 8    | 2500 | 350.0       | 350.0      | 43.0        |
| TPS3307-33DGNR | HVSSOP       | DGN             | 8    | 2500 | 358.0       | 335.0      | 35.0        |
| TPS3307-33DR   | SOIC         | D               | 8    | 2500 | 350.0       | 350.0      | 43.0        |

## TUBE



\*All dimensions are nominal

| Device        | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|---------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| TPS3307-18D   | D            | SOIC         | 8    | 75  | 505.46 | 6.76   | 3810   | 4      |
| TPS3307-18DG4 | D            | SOIC         | 8    | 75  | 505.46 | 6.76   | 3810   | 4      |
| TPS3307-25D   | D            | SOIC         | 8    | 75  | 505.46 | 6.76   | 3810   | 4      |
| TPS3307-25DG4 | D            | SOIC         | 8    | 75  | 505.46 | 6.76   | 3810   | 4      |
| TPS3307-33D   | D            | SOIC         | 8    | 75  | 505.46 | 6.76   | 3810   | 4      |
| TPS3307-33DG4 | D            | SOIC         | 8    | 75  | 505.46 | 6.76   | 3810   | 4      |

## GENERIC PACKAGE VIEW

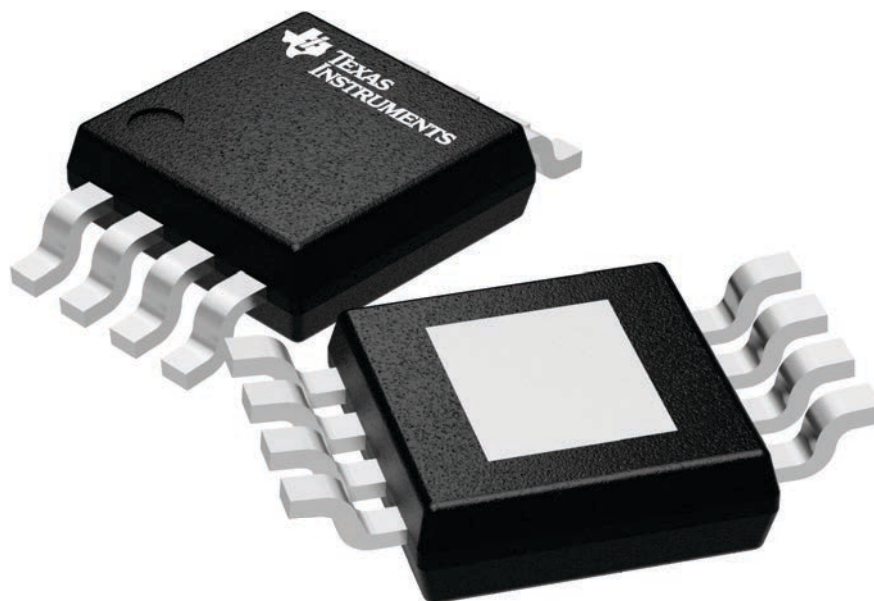
**DGN 8**

**PowerPAD VSSOP - 1.1 mm max height**

3 x 3, 0.65 mm pitch

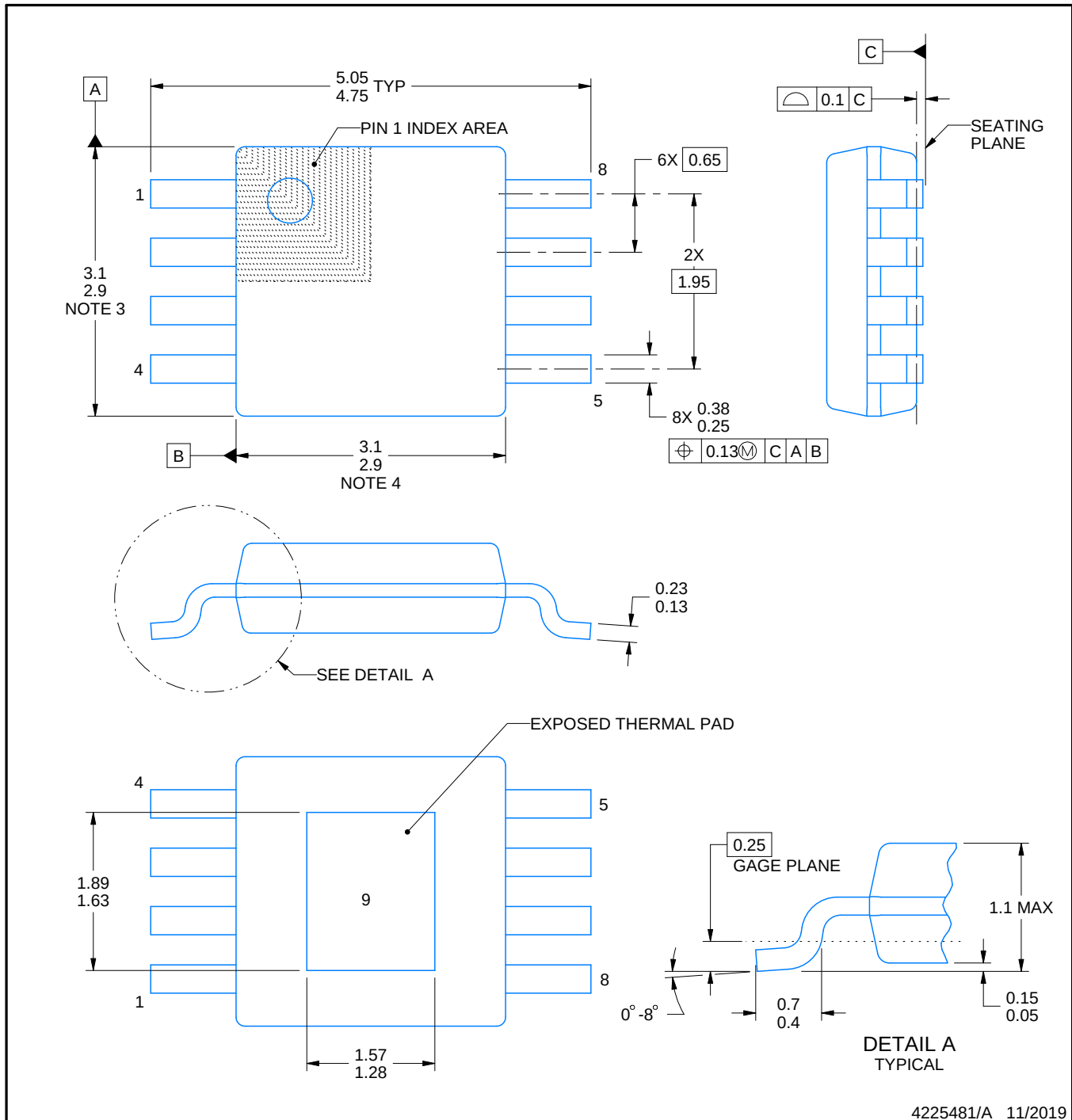
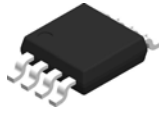
SMALL OUTLINE PACKAGE

This image is a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



4225482/A





4225481/A 11/2019

## NOTES:

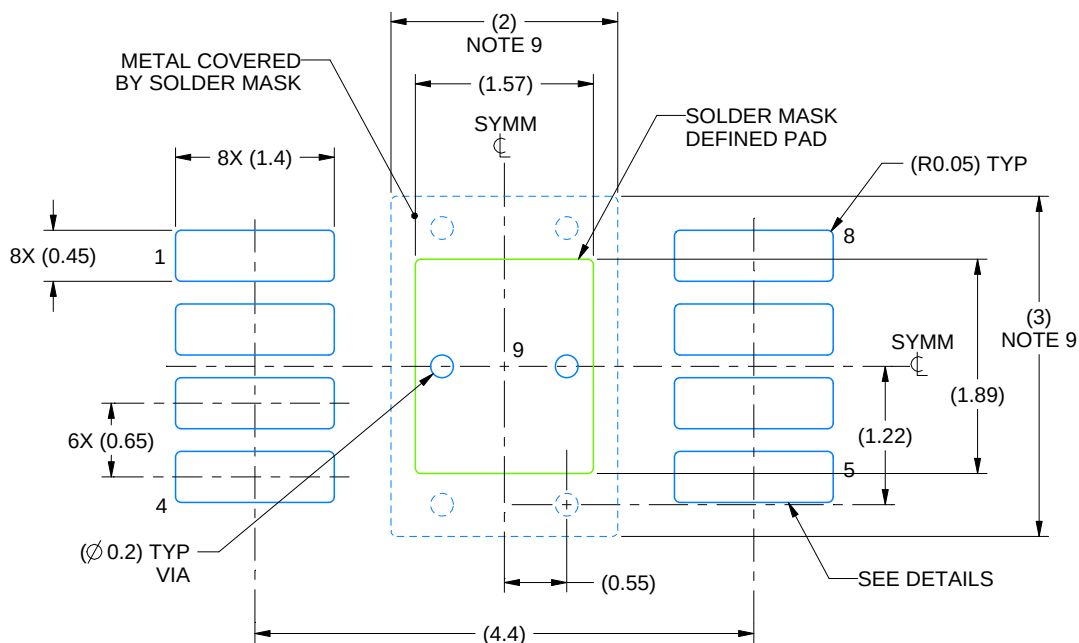
PowerPAD is a trademark of Texas Instruments.

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. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-187.

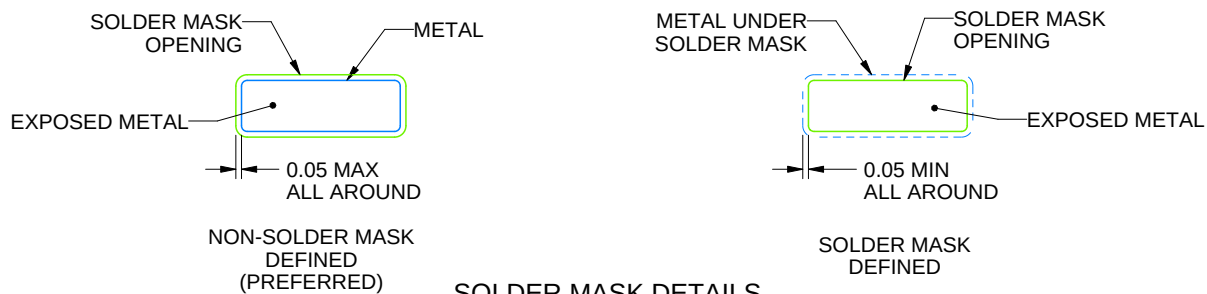
**DGN0008D**

# PowerPAD™ VSSOP - 1.1 mm max height

## SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 15X



## SOLDER MASK DETAILS

4225481/A 11/2019

NOTES: (continued)

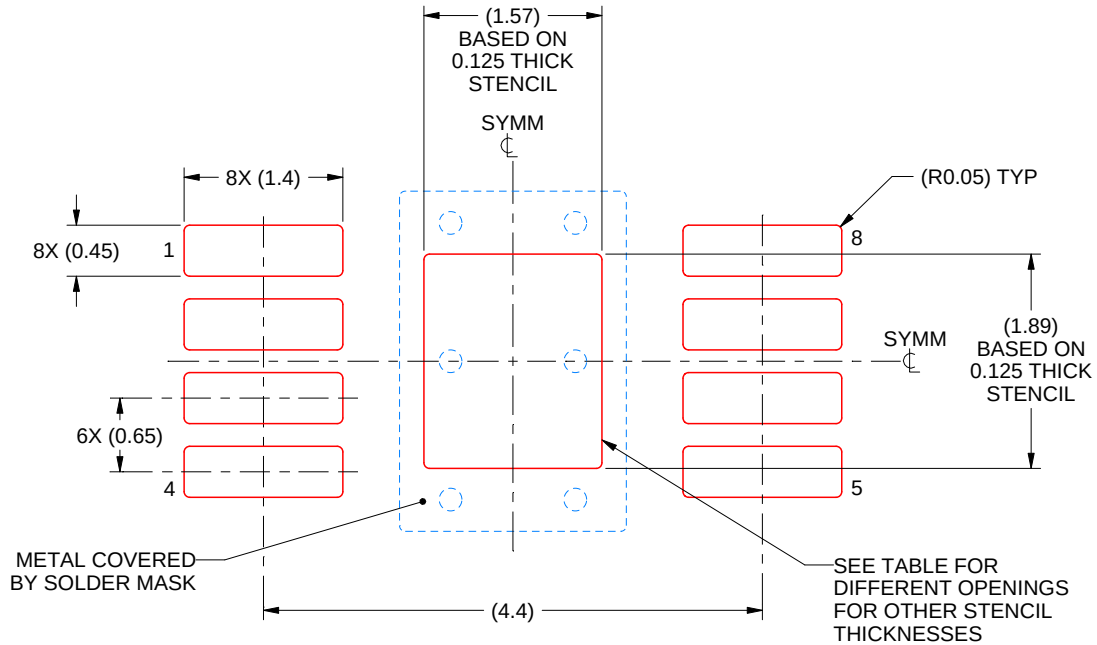
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.
8. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.
9. Size of metal pad may vary due to creepage requirement.

# EXAMPLE STENCIL DESIGN

DGN0008D

PowerPAD™ VSSOP - 1.1 mm max height

SMALL OUTLINE PACKAGE



**SOLDER PASTE EXAMPLE**  
EXPOSED PAD 9:  
100% PRINTED SOLDER COVERAGE BY AREA  
SCALE: 15X

| STENCIL THICKNESS | SOLDER STENCIL OPENING |
|-------------------|------------------------|
| 0.1               | 1.76 X 2.11            |
| 0.125             | 1.57 X 1.89 (SHOWN)    |
| 0.15              | 1.43 X 1.73            |
| 0.175             | 1.33 X 1.60            |

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NOTES: (continued)

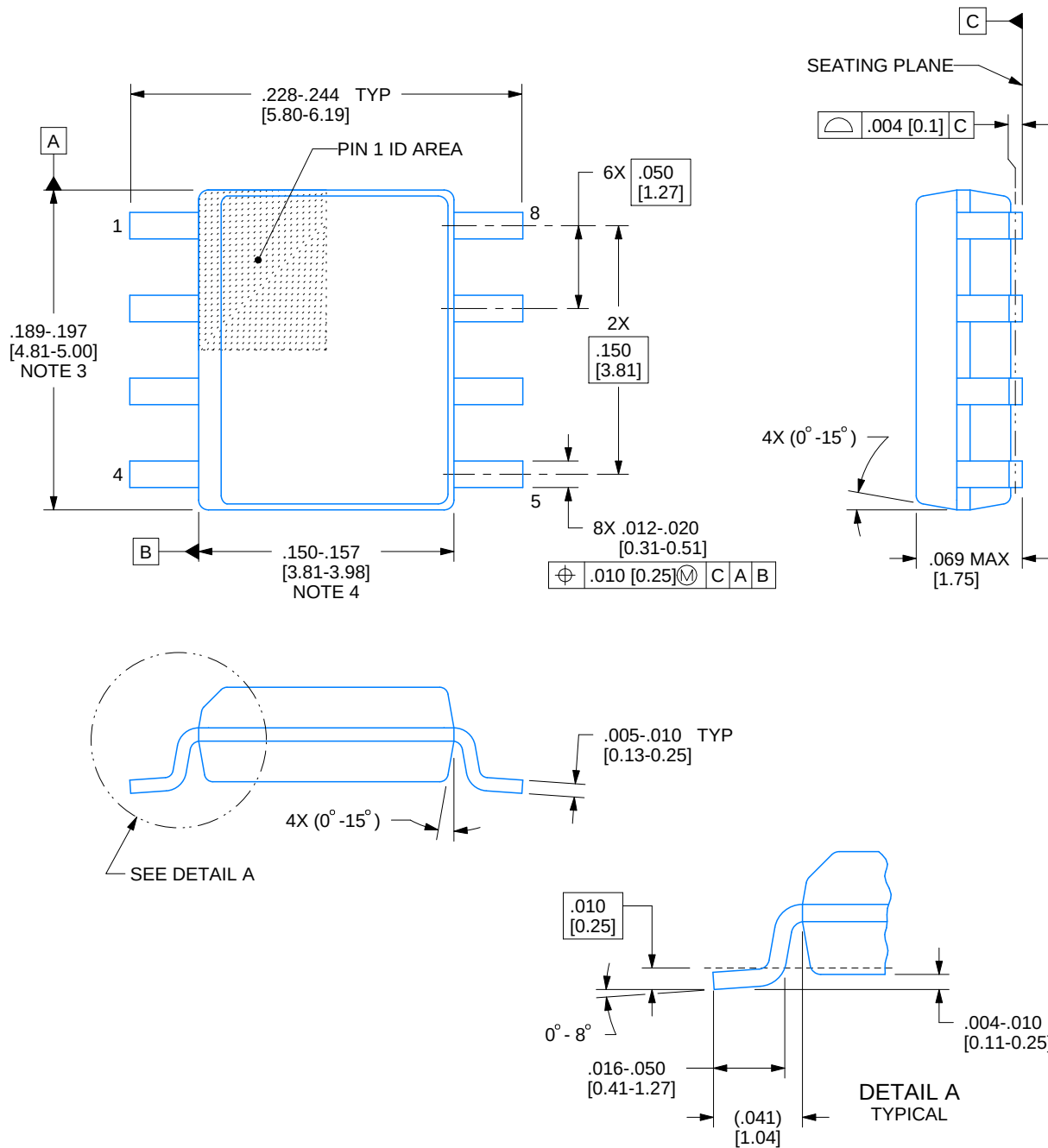
10. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
11. Board assembly site may have different recommendations for stencil design.

**D0008A**

## PACKAGE OUTLINE

**SOIC - 1.75 mm max height**

SMALL OUTLINE INTEGRATED CIRCUIT



4214825/C 02/2019

NOTES:

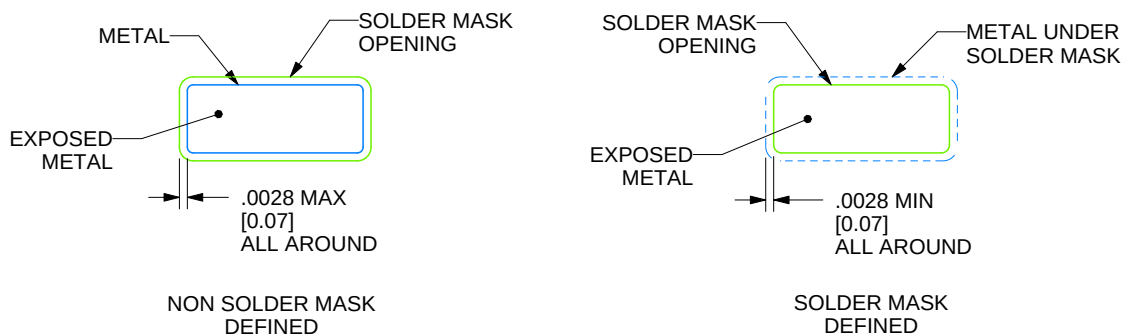
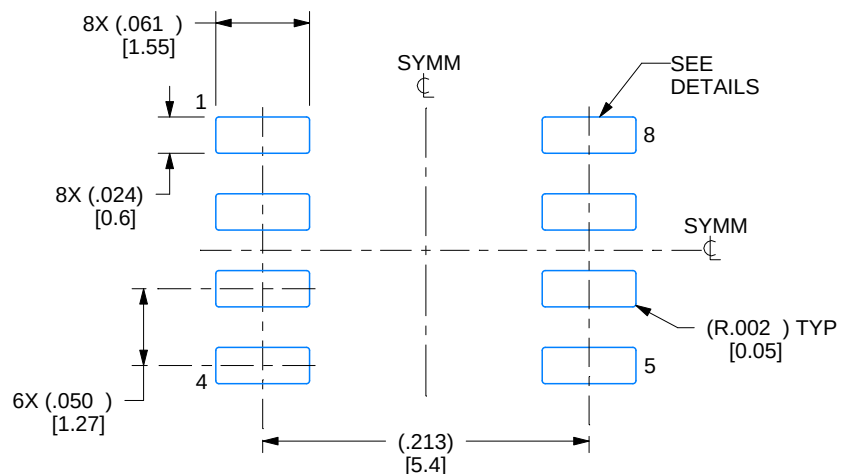
1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 [0.15] per side.
4. This dimension does not include interlead flash.
5. Reference JEDEC registration MS-012, variation AA.

# EXAMPLE BOARD LAYOUT

D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



4214825/C 02/2019

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

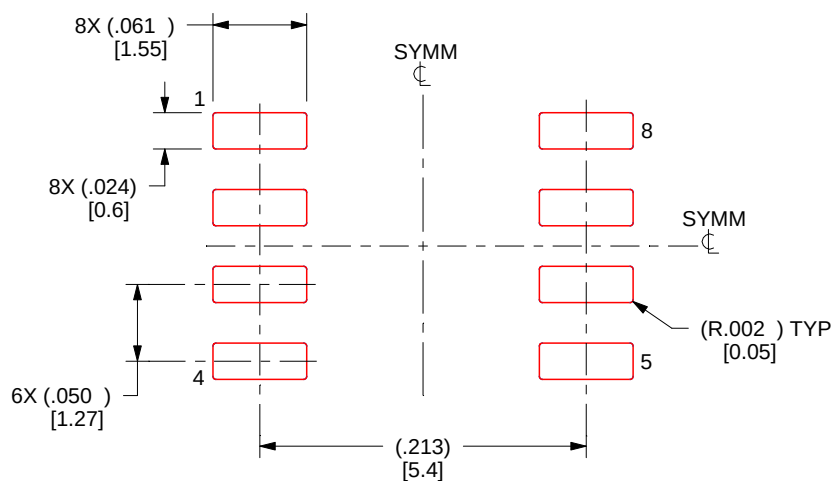
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

## EXAMPLE STENCIL DESIGN

D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE  
BASED ON .005 INCH [0.125 MM] THICK STENCIL  
SCALE:8X

4214825/C 02/2019

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

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