

## TPS3808 低静态电流、可编程延迟监控电路

### 1 特性

- 上电复位发生器具有可调节延迟时间：1.25ms 至 10s
- 超低静态电流：2.4  $\mu\text{A}$  (典型值)
- 高阈值精度：0.5% 典型值
- 提供适用于标准电压轨的 0.9V 至 5V 固定阈值电压且可调节电压低至 0.4V
- 手动复位 ( $\overline{\text{MR}}$ ) 输入
- 开漏复位 输出
- 温度范围：-40°C 至 125°C
- 小型 SOT-23 和 2mm  $\times$  2mm WSON 封装

### 2 应用

- DSP 或微控制器应用
- 笔记本电脑和台式机
- PDA 和手持式产品
- 便携式和电池供电类产品
- FPGA 和 ASIC 应用

### 3 说明

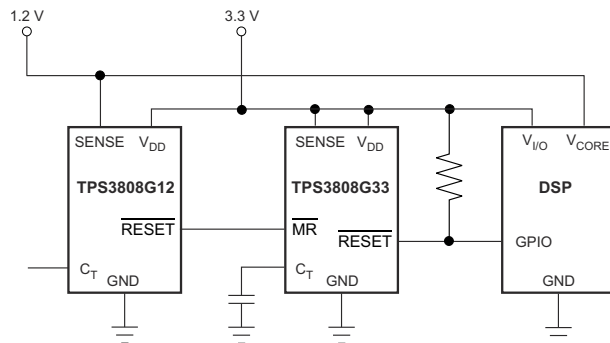
TPS3808 系列微处理器监控电路可监控从 0.4V 至 5V 的系统电压，并在  $\overline{\text{SENSE}}$  电压降至预设阈值以下或手动复位 ( $\overline{\text{MR}}$ ) 引脚降至逻辑低电平时，将开漏 RESET 信号置为有效。在  $\overline{\text{SENSE}}$  电压和手动复位 ( $\overline{\text{MR}}$ ) 返回值超出相应阈值时，RESET 输出将在用户可调延迟时间内保持低电平。

TPS3808 器件使用精密电压基准，可在  $V_{\text{IT}} \leq 3.3\text{V}$  时达到 0.5% 的阈值精度。通过断开  $C_T$  引脚，可将复位延迟时间设置为 20ms；通过使用电阻将  $C_T$  引脚连接至  $V_{\text{DD}}$ ，可将复位延迟时间设置为 300ms，或通过将  $C_T$  引脚连接到外部电容器，用户可在 1.25ms 至 10s 之间调整复位延迟时间。TPS3808 器件具有超低的典型静态电流，为 2.4  $\mu\text{A}$ ，因此非常适合电池供电类应用。它采用 SOT-23 和 2mm  $\times$  2mm WSON 封装，额定工作温度范围为 -40°C 至 125°C ( $T_J$ )。

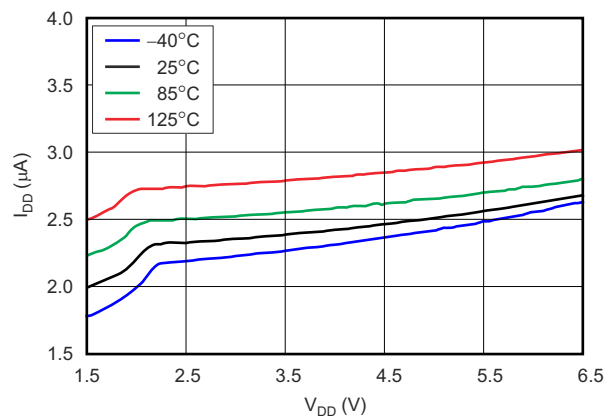
#### 器件信息

| 器件型号    | 封装 (1)     | 封装尺寸 (标称值)             |
|---------|------------|------------------------|
| TPS3808 | SOT-23 (6) | 2.90mm $\times$ 1.60mm |
|         | WSON (6)   | 2.00mm $\times$ 2.00mm |

(1) 如需了解所有可用封装，请参阅数据表末尾的可订购产品附录。



典型应用



电源电流与电源电压间的关系



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## 4 Revision History

注：以前版本的页码可能与当前版本的页码不同

|                                                                                                      |             |
|------------------------------------------------------------------------------------------------------|-------------|
| <b>Changes from Revision K (October 2015) to Revision L (September 2020)</b>                         | <b>Page</b> |
| • 更新了整个文档的表、图和交叉参考的编号格式。.....                                                                        | <b>1</b>    |
| <b>Changes from Revision J (August 2008) to Revision K (October 2015)</b>                            | <b>Page</b> |
| • 添加了 ESD 等级表、特性说明部分、器件功能模式、应用和实现部分、电源相关建议部分、布局部分、器件和文档支持部分以及机械、封装和可订购信息部分。移动了开关特性表、时序图和相关的真值表。..... | <b>1</b>    |
| • Changed 图 9-1; removed capacitor shown on C <sub>T</sub> .....                                     | <b>14</b>   |

## 5 Device Voltage Thresholds

The following table shows the nominal rail to be monitored and the corresponding threshold voltage of the device.

| PART NUMBER | NOMINAL SUPPLY VOLTAGE <sup>(1)</sup> | THRESHOLD VOLTAGE (V <sub>IT</sub> ) |
|-------------|---------------------------------------|--------------------------------------|
| TPS3808G01  | Adjustable                            | 0.405 V                              |
| TPS3808G09  | 0.9 V                                 | 0.84 V                               |
| TPS3808G12  | 1.2 V                                 | 1.12 V                               |
| TPS3808G125 | 1.25 V                                | 1.16 V                               |
| TPS3808G15  | 1.5 V                                 | 1.40 V                               |
| TPS3808G18  | 1.8 V                                 | 1.67 V                               |
| TPS3808G19  | 1.9 V                                 | 1.77 V                               |
| TPS3808G25  | 2.5 V                                 | 2.33 V                               |
| TPS3808G30  | 3 V                                   | 2.79 V                               |
| TPS3808G33  | 3.3 V                                 | 3.07 V                               |
| TPS3808G50  | 5 V                                   | 4.65 V                               |

- (1) Custom threshold voltages from 0.82 V to 3.3 V, 4.4 V to 5 V are available through the use of factory EEPROM programming. Minimum order quantities apply. Contact the factory for details and availability.

## 6 Pin Configuration and Functions

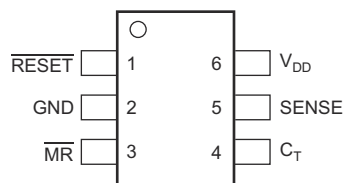


图 6-1. DBV Package 6-Pin SOT-23 Top View

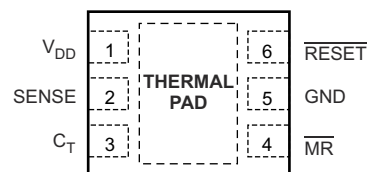


图 6-2. DRV Package 6-Pin (2.00 mm × 2.00 mm) WSON With Thermal Pad Top View

表 6-1. Pin Functions

| PIN                |        |      | I/O | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------|--------|------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NAME               | SOT-23 | WSON |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| $C_T$              | 4      | 3    | I   | Reset period programming pin. Connecting this pin to $V_{DD}$ through a 40-k $\Omega$ to 200-k $\Omega$ resistor or leaving it open results in fixed delay times (see §7.5). Connecting this pin to a ground referenced capacitor $\geq 100$ pF gives a user-programmable delay time. See §8.3.2 for more information.                                                                                                                                                                                                                                |
| GND                | 2      | 5    | —   | Ground                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $\overline{MR}$    | 3      | 4    | I   | Driving the manual reset pin ( $\overline{MR}$ ) low asserts $\overline{RESET}$ . $\overline{MR}$ is internally tied to $V_{DD}$ by a 90-k $\Omega$ pull-up resistor.                                                                                                                                                                                                                                                                                                                                                                                 |
| $\overline{RESET}$ | 1      | 6    | O   | $\overline{RESET}$ is an open-drain output that is driven to a low-impedance state when $\overline{RESET}$ is asserted (either the SENSE input is lower than the threshold voltage ( $V_{IT}$ ) or the $\overline{MR}$ pin is set to a logic low). $\overline{RESET}$ remains low (asserted) for the reset period after both SENSE is above $V_{IT}$ and $\overline{MR}$ is set to a logic high. A pull-up resistor from 10 k $\Omega$ to 1 M $\Omega$ should be used on this pin, and allows the reset pin to attain voltages higher than $V_{DD}$ . |
| SENSE              | 5      | 2    | I   | This pin is connected to the voltage to be monitored. If the voltage at this terminal drops below the threshold voltage $V_{IT}$ , then $\overline{RESET}$ is asserted.                                                                                                                                                                                                                                                                                                                                                                               |
| $V_{DD}$           | 6      | 1    | I   | Supply voltage. It is good analog design practice to place a 0.1- $\mu$ F ceramic capacitor close to this pin.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Thermal Pad        | —      | Pad  | —   | Thermal Pad. Connect to ground plane to enhance thermal performance of package.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## 7 Specifications

### 7.1 Absolute Maximum Ratings

over operating junction temperature range (unless otherwise noted) <sup>(1)</sup>

|             |                                                           | MIN   | MAX                   | UNIT |
|-------------|-----------------------------------------------------------|-------|-----------------------|------|
| Voltage     | V <sub>DD</sub>                                           | - 0.3 | 7                     | V    |
|             | V <sub>CT</sub>                                           | - 0.3 | V <sub>DD</sub> + 0.3 | V    |
|             | V <sub>RESET</sub> , V <sub>MR</sub> , V <sub>SENSE</sub> | - 0.3 | 7                     | V    |
| Current     | RESET pin                                                 | - 5   | 5                     | mA   |
| Temperature | Operating junction, T <sub>J</sub> <sup>(2)</sup>         | - 40  | 150                   | °C   |
|             | Storage, T <sub>stg</sub>                                 | - 65  | 150                   | °C   |

- (1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) As a result of the low dissipated power in this device, it is assumed that T<sub>J</sub> = T<sub>A</sub>.

### 7.2 ESD Ratings

|                    |                         | VALUE                                                                                    | UNIT  |
|--------------------|-------------------------|------------------------------------------------------------------------------------------|-------|
| V <sub>(ESD)</sub> | Electrostatic discharge | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins <sup>(1)</sup>              | ±2000 |
|                    |                         | Charged device model (CDM), per JEDEC specification JESD22-C101, all pins <sup>(2)</sup> | ±500  |

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

### 7.3 Recommended Operating Conditions

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

|                    |                            | MIN    | NOM | MAX             | UNIT |
|--------------------|----------------------------|--------|-----|-----------------|------|
| V <sub>DD</sub>    | Input supply range         | 1.7    |     | 6.5             | V    |
| V <sub>SENSE</sub> | SENSE pin voltage          | 0      |     | 6.5             | V    |
| V <sub>(CI)</sub>  | C <sub>T</sub> pin voltage |        |     | V <sub>DD</sub> | V    |
| V <sub>MR</sub>    | MR pin voltage             | 0      |     | 6.5             | V    |
| V <sub>RESET</sub> | RESET pin voltage          | 0      |     | 6.5             | V    |
| I <sub>RESET</sub> | RESET pin current          | 0.0003 |     | 5               | mA   |

### 7.4 Thermal Information

| THERMAL METRIC <sup>(1)</sup> |                                              | TPS3808      |            | UNIT |
|-------------------------------|----------------------------------------------|--------------|------------|------|
|                               |                                              | DBV (SOT-23) | DRV (WSON) |      |
|                               |                                              | 6 PINS       | 6 PINS     |      |
| R <sub>θJA</sub>              | Junction-to-ambient thermal resistance       | 180.9        | 178.1      | °C/W |
| R <sub>θJC(top)</sub>         | Junction-to-case (top) thermal resistance    | 117.8        | 95.6       | °C/W |
| R <sub>θJB</sub>              | Junction-to-board thermal resistance         | 27.8         | 135        | °C/W |
| ψ <sub>JT</sub>               | Junction-to-top characterization parameter   | 1.12         | 6.3        | °C/W |
| ψ <sub>JB</sub>               | Junction-to-board characterization parameter | 27.3         | 136.6      | °C/W |
| R <sub>θJC(bot)</sub>         | Junction-to-case (bottom) thermal resistance | N/A          | 7.3        | °C/W |

- (1) For more information about traditional and new thermal metrics, see the *Semiconductor and IC Package Thermal Metrics* application report, [SPRA953](#).

## 7.5 Electrical Characteristics

$1.7\text{ V} \leq V_{DD} \leq 6.5\text{ V}$ ,  $R_{LRESET} = 100\text{ k}\Omega$ ,  $C_{LRESET} = 50\text{ pF}$ , over operating temperature range ( $T_J = -40^\circ\text{C}$  to  $125^\circ\text{C}$ ), unless otherwise noted. Typical values are at  $T_J = 25^\circ\text{C}$ <sup>(1)</sup>.

| PARAMETER   |                                                   | TEST CONDITIONS                                                                                                                     | MIN                                          | TYP          | MAX   | UNIT          |
|-------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------|-------|---------------|
| $V_{DD}$    | Input supply range                                | $-40^\circ\text{C} < T_J < 125^\circ\text{C}$                                                                                       | 1.7                                          |              | 6.5   | V             |
|             |                                                   | $0^\circ\text{C} < T_J < 85^\circ\text{C}$                                                                                          | 1.65                                         |              | 6.5   | V             |
| $I_{DD}$    | Supply current (current into $V_{DD}$ pin)        | $V_{DD} = 3.3\text{ V}$ , $\overline{\text{RESET}}$ not asserted<br>$\overline{\text{MR}}$ , $\overline{\text{RESET}}$ , $C_T$ open |                                              | 2.4          | 5     | $\mu\text{A}$ |
|             |                                                   | $V_{DD} = 6.5\text{ V}$ , $\overline{\text{RESET}}$ not asserted<br>$\overline{\text{MR}}$ , $\overline{\text{RESET}}$ , $C_T$ open |                                              | 2.7          | 6     |               |
| $V_{OL}$    | Low-level output voltage                          | $1.3\text{ V} \leq V_{DD} < 1.8\text{ V}$ , $I_{OL} = 0.4\text{ mA}$                                                                |                                              |              | 0.3   | V             |
|             |                                                   | $1.8\text{ V} \leq V_{DD} \leq 6.5\text{ V}$ , $I_{OL} = 1\text{ mA}$                                                               |                                              |              | 0.4   |               |
| $V_{POR}$   | Power-up reset voltage <sup>(2)</sup>             | $V_{OL}(\text{max}) = 0.2\text{ V}$ , $I_{RESET} = 15\text{ }\mu\text{A}$                                                           |                                              |              | 0.8   |               |
| $V_{IT}$    | Negative-going input threshold accuracy           | TPS3808G01                                                                                                                          |                                              | -2%          | ±1%   | 2%            |
|             |                                                   | $V_{IT} \leq 3.3\text{ V}$                                                                                                          |                                              | -1.5%        | ±0.5% | 1.5%          |
|             |                                                   | $3.3\text{ V} < V_{IT} \leq 5.0\text{ V}$                                                                                           |                                              | -2%          | ±1%   | 2%            |
|             |                                                   | $V_{IT} \leq 3.3\text{ V}$                                                                                                          | $-40^\circ\text{C} < T_J < 85^\circ\text{C}$ | -1.25%       | ±0.5% | 1.25%         |
|             |                                                   | $3.3\text{ V} < V_{IT} \leq 5.0\text{ V}$                                                                                           | $-40^\circ\text{C} < T_J < 85^\circ\text{C}$ | -1.5%        | ±0.5% | 1.5%          |
| $V_{HYS}$   | Hysteresis on $V_{IT}$ pin                        | TPS3808G01                                                                                                                          |                                              | 1.5%         | 3%    | $V_{IT}$      |
|             |                                                   | Fixed versions                                                                                                                      |                                              | 1%           | 2.5%  |               |
| $R_{MR}$    | $\overline{\text{MR}}$ Internal pullup resistance |                                                                                                                                     | 70                                           | 90           |       | k $\Omega$    |
| $I_{SENSE}$ | Input current at SENSE pin                        | TPS3808G01                                                                                                                          | $V_{SENSE} = V_{IT}$                         | -25          | 25    | nA            |
|             |                                                   | Fixed versions                                                                                                                      | $V_{SENSE} = 6.5\text{ V}$                   | 1.7          |       | $\mu\text{A}$ |
| $I_{OH}$    | $\overline{\text{RESET}}$ leakage current         | $V_{RESET} = 6.5\text{ V}$ , $\overline{\text{RESET}}$ not asserted                                                                 |                                              |              | 300   | nA            |
| $C_{IN}$    | Input capacitance, any pin                        | $C_T$ pin                                                                                                                           | $V_{IN} = 0\text{ V}$ to $V_{DD}$            | 5            |       | pF            |
|             |                                                   | Other pins                                                                                                                          | $V_{IN} = 0\text{ V}$ to $6.5\text{ V}$      | 5            |       |               |
| $V_{IL}$    | $\overline{\text{MR}}$ logic low input            |                                                                                                                                     | 0                                            | $0.3 V_{DD}$ |       | V             |
| $V_{IH}$    | $\overline{\text{MR}}$ logic high input           |                                                                                                                                     | $0.7 V_{DD}$                                 | $V_{DD}$     |       |               |

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

(2)  $R_{LRESET}$  and  $C_{LRESET}$  are the resistor and capacitor connected to the RESET pin.

## 7.6 Switching Characteristics

$1.7\text{ V} \leq V_{DD} \leq 6.5\text{ V}$ ,  $R_{LRESET} = 100\text{ k}\Omega$ ,  $C_{LRESET} = 50\text{ pF}$ , over operating temperature range ( $T_J = -40^\circ\text{C}$  to  $125^\circ\text{C}$ ), unless otherwise noted. Typical values are at  $T_J = 25^\circ\text{C}$ .<sup>(1)</sup>

| PARAMETER                     |                            | TEST CONDITIONS                  | MIN                       | TYP  | MAX  | UNIT |    |
|-------------------------------|----------------------------|----------------------------------|---------------------------|------|------|------|----|
| t <sub>w</sub>                | Input pulse width to RESET | SENSE                            | 20                        |      |      | μ s  |    |
|                               |                            | MR                               | 0.001                     |      |      |      |    |
| t <sub>d</sub>                | RESET delay time           | C <sub>T</sub> = Open            | See <a href="#">图 7-1</a> | 12   | 20   | 28   | ms |
|                               |                            | C <sub>T</sub> = V <sub>DD</sub> |                           | 180  | 300  | 420  |    |
|                               |                            | C <sub>T</sub> = 100 pF          |                           | 0.75 | 1.25 | 1.75 |    |
|                               |                            | C <sub>T</sub> = 180 nF          |                           | 0.7  | 1.2  | 1.7  | s  |
| Propagation delay             |                            | MR to RESET                      | 150                       |      |      | ns   |    |
| High-to-low level RESET delay |                            | SENSE to RESET                   | 20                        |      |      | μ s  |    |

(1)  $R_{LRESET}$  and  $C_{LRESET}$  are the resistor and capacitor connected to the RESET pin.

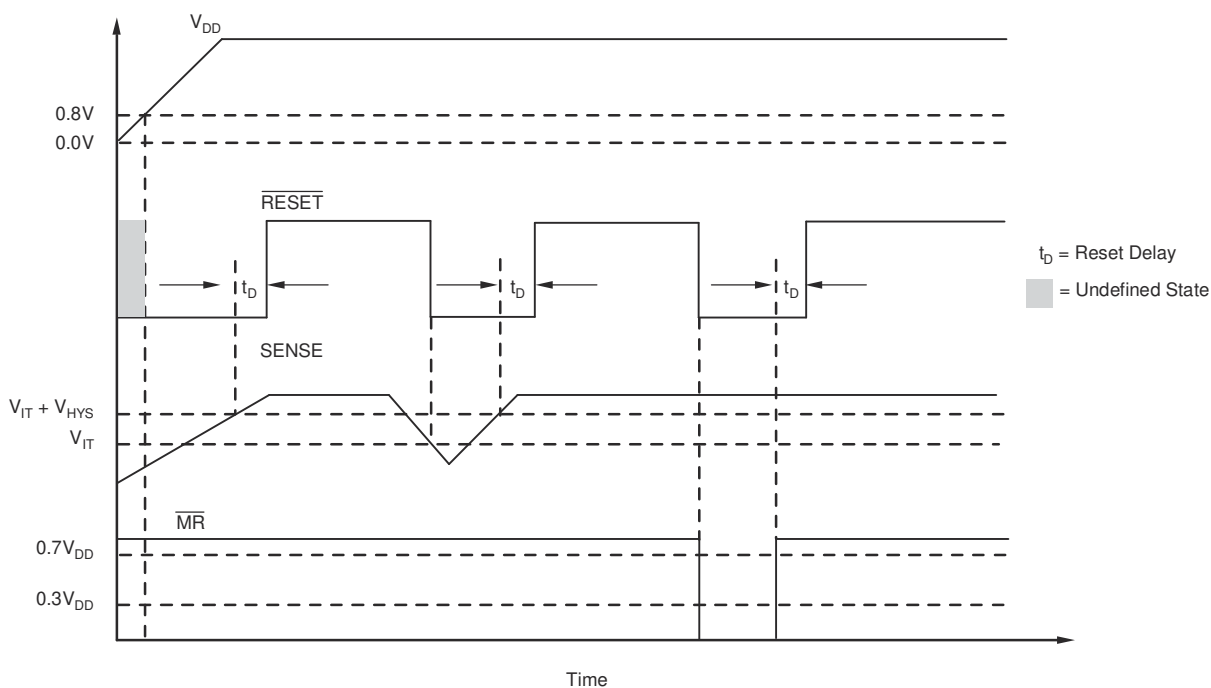


图 7-1. TPS3808 Timing Diagram Showing  $\overline{\text{MR}}$  and SENSE Reset Timing

## 7.7 Typical Characteristics

At  $T_J = 25^\circ\text{C}$ ,  $V_{DD} = 3.3\text{ V}$ ,  $R_{L\text{RESET}} = 100\text{ k}\Omega$ , and  $C_{L\text{RESET}} = 50\text{ pF}$ , unless otherwise noted.

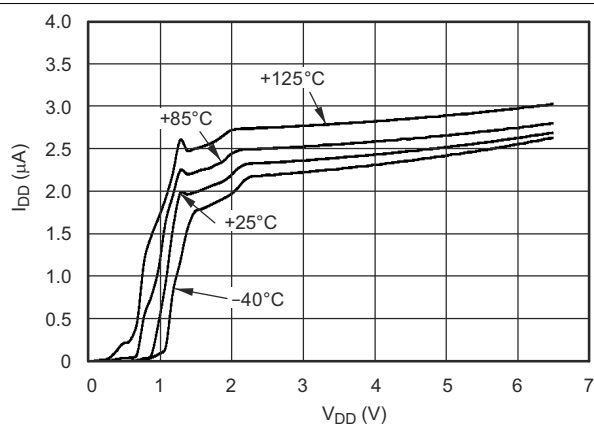


图 7-2. Supply Current vs Supply Voltage

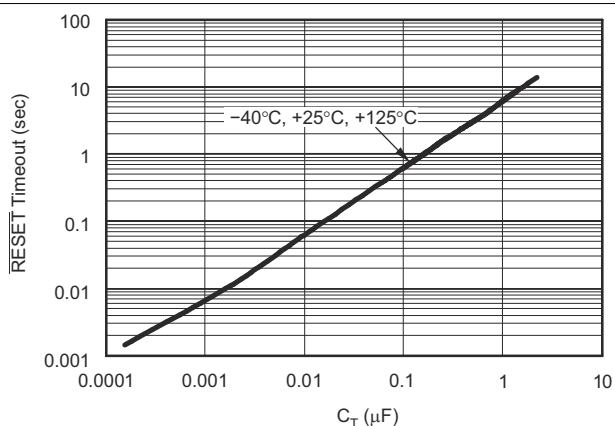


图 7-3.  $\overline{\text{RESET}}$  Time-Out Period vs  $C_T$

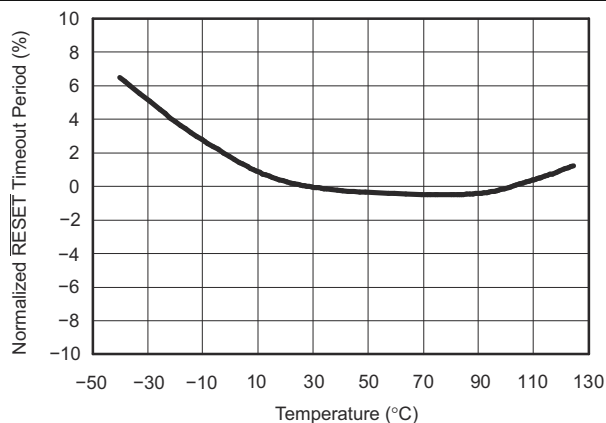


图 7-4. Normalized  $\overline{\text{RESET}}$  Time-Out Period vs Temperature ( $C_T = \text{Open}$ ,  $C_T = V_{DD}$ ,  $C_T = \text{Any}$ )

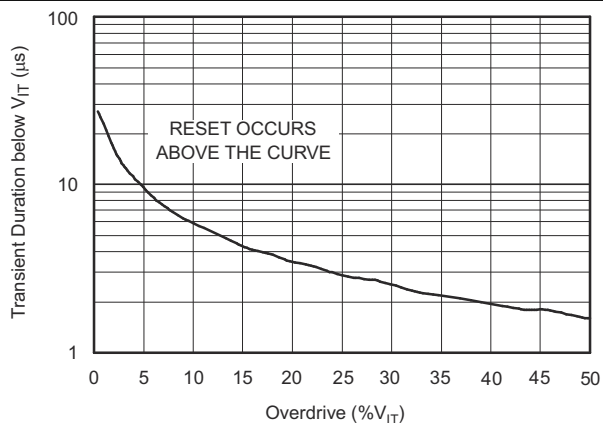


图 7-5. Maximum Transient Duration at Sense vs Sense Threshold Overdrive Voltage

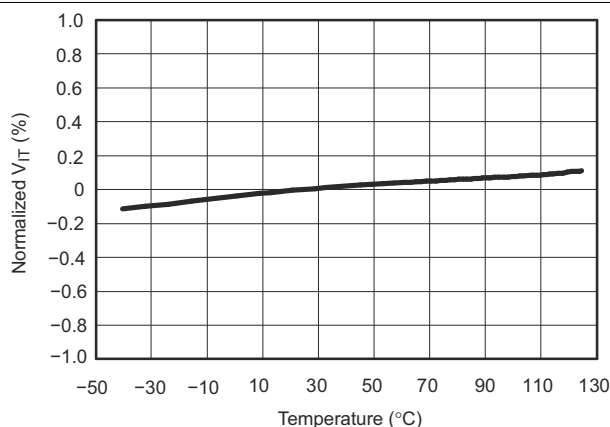


图 7-6. Normalized Sense Threshold Voltage ( $V_{IT}$ ) vs Temperature

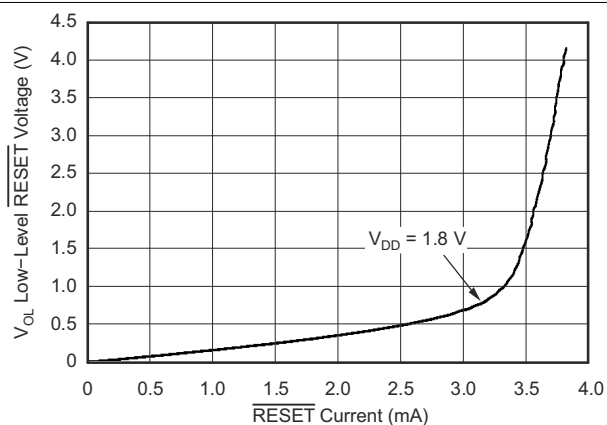
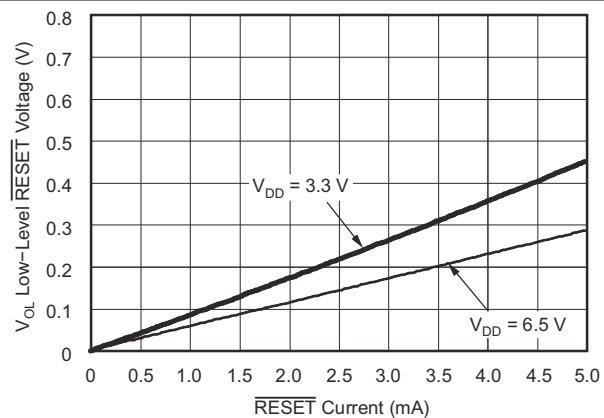


图 7-7. Low-Level  $\overline{\text{RESET}}$  Voltage vs  $\overline{\text{RESET}}$  Current



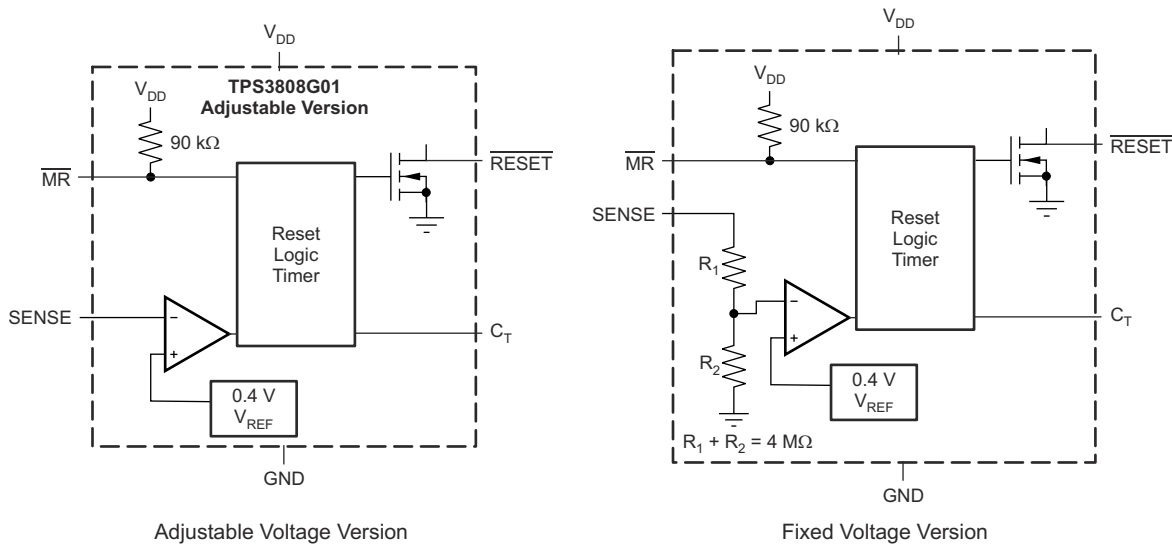
**图 7-8. Low-Level  $\overline{\text{RESET}}$  Voltage vs  $\overline{\text{RESET}}$  Current**

## 8 Detailed Description

### 8.1 Overview

The TPS3808 microprocessor supervisory product family is designed to assert a  $\overline{\text{RESET}}$  signal when either the SENSE pin voltage drops below  $V_{IT}$  or the manual reset ( $\overline{\text{MR}}$ ) is driven low. The  $\overline{\text{RESET}}$  output remains asserted for a user-adjustable time after both the manual reset ( $\overline{\text{MR}}$ ) and SENSE voltages return above their respective thresholds.

### 8.2 Functional Block Diagram



### 8.3 Feature Description

A broad range of voltage threshold and reset delay time adjustments are available for the TPS3808 device, allowing these devices to be used in a wide array of applications. Reset threshold voltages can be factory-set from 0.82 V to 3.3 V or from 4.4 V to 5 V, while the TPS3808G01 can be set to any voltage above 0.405 V using an external resistor divider. Two preset delay times are also user-selectable: connecting the  $C_T$  pin to  $V_{DD}$  results in a 300-ms reset delay, whereas leaving the  $C_T$  pin open yields a 20-ms reset delay. In addition, connecting a capacitor between  $C_T$  and GND allows the designer to select any reset delay period from 1.25 ms to 10 s.

#### 8.3.1 SENSE Input

The SENSE input provides a pin at which any system voltage can be monitored. If the voltage on this pin drops below  $V_{IT}$ , then  $\overline{\text{RESET}}$  is asserted. The comparator has a built-in hysteresis to ensure smooth  $\overline{\text{RESET}}$  assertions and de-assertions. It is good analog design practice to put a 1-nF to 10-nF bypass capacitor on the SENSE input to reduce sensitivity to transients and layout parasitics.

The TPS3808 device is relatively immune to short negative transients on the SENSE pin. Sensitivity to transients is dependent on threshold overdrive, as shown in (图 7-5).

The TPS3808G01 can be used to monitor any voltage rail down to 0.405 V using the circuit shown in 图 8-1.

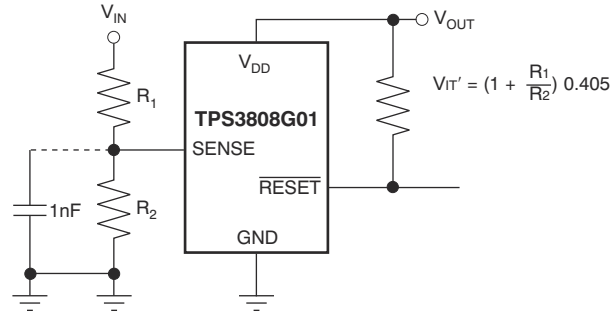


图 8-1. Using the TPS3808G01 to Monitor a User-Defined Threshold Voltage

### 8.3.2 Selecting the RESET Delay Time

The TPS3808 has three options for setting the  $\overline{\text{RESET}}$  delay time as shown in 图 8-2. 图 8-2 (a) shows the configuration for a fixed 300-ms typical delay time by tying  $C_T$  to  $V_{DD}$ ; a resistor from 40 k $\Omega$  to 200 k $\Omega$  must be used. Supply current is not affected by the choice of resistor. 图 8-2 (b) shows a fixed 20-ms delay time by leaving the  $C_T$  pin open. 图 8-2 (c) shows a ground referenced capacitor connected to  $C_T$  for a user-defined program time between 1.25 ms and 10 s.

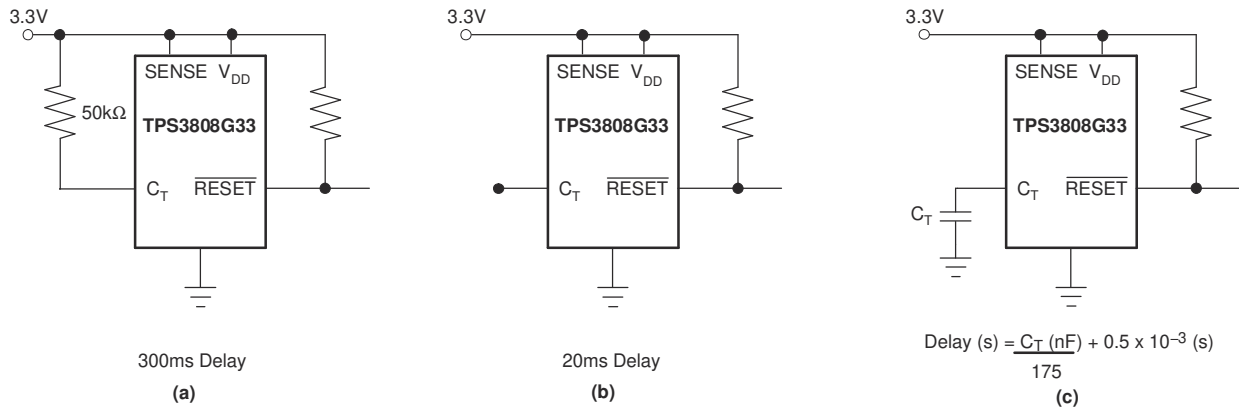


图 8-2. Configuration Used to Set the  $\overline{\text{RESET}}$  Delay Time

The capacitor  $C_T$  should be  $\geq 100$  pF nominal value in order for the TPS3808xxx to recognize that the capacitor is present. The capacitor value for a given delay time can be calculated using 方程式 1.

$$C_T (\text{nF}) = [t_D (\text{s}) - 0.5 \times 10^{-3} (\text{s})] \times 175 \quad (1)$$

The reset delay time is determined by the time it takes an on-chip precision 220-nA current source to charge the external capacitor to 1.23 V. When a  $\overline{\text{RESET}}$  is asserted, the capacitor is discharged. When the  $\overline{\text{RESET}}$  conditions are cleared, the internal current source is enabled and begins to charge the external capacitor. When the voltage on this capacitor reaches 1.23 V,  $\overline{\text{RESET}}$  is deasserted. Note that a low-leakage type capacitor such as a ceramic should be used, and that stray capacitance around this pin may cause errors in the reset delay time.

### 8.3.3 Manual RESET ( $\overline{\text{MR}}$ ) Input

The manual reset ( $\overline{\text{MR}}$ ) input allows a processor or other logic circuits to initiate a reset. A logic low ( $0.3 V_{\text{DD}}$ ) on  $\overline{\text{MR}}$  causes  $\overline{\text{RESET}}$  to assert. After  $\overline{\text{MR}}$  returns to a logic high and  $\text{SENSE}$  is above its reset threshold,  $\overline{\text{RESET}}$  is de-asserted after the user-defined reset delay expires. Note that  $\overline{\text{MR}}$  is internally tied to  $V_{\text{DD}}$  using a 90-k $\Omega$  resistor, so this pin can be left unconnected if  $\overline{\text{MR}}$  is not used.

See Figure 8-3 for how  $\overline{\text{MR}}$  can be used to monitor multiple system voltages. Note that if the logic signal driving  $\overline{\text{MR}}$  does not go fully to  $V_{\text{DD}}$ , there is some additional current draw into  $V_{\text{DD}}$  as a result of the internal pullup resistor on  $\overline{\text{MR}}$ . To minimize current draw, a logic-level FET can be used as illustrated in Figure 8-4.

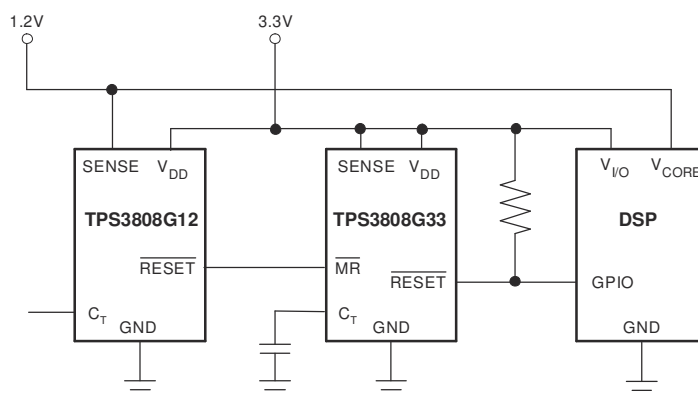


图 8-3. Using  $\overline{\text{MR}}$  to Monitor Multiple System Voltages

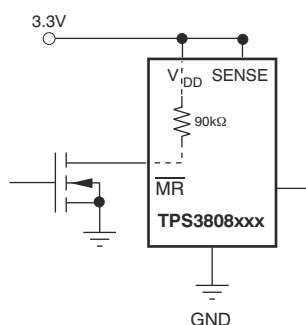


图 8-4. Using an External MOSFET to Minimize  $I_{\text{DD}}$  When  $\overline{\text{MR}}$  Signal Does Not Go to  $V_{\text{DD}}$

### 8.3.4 RESET Output

$\overline{\text{RESET}}$  remains high (unasserted) as long as  $\text{SENSE}$  is above its threshold ( $V_{\text{IT}}$ ) and the manual reset ( $\overline{\text{MR}}$ ) is logic high. If either  $\text{SENSE}$  falls below  $V_{\text{IT}}$  or  $\overline{\text{MR}}$  is driven low,  $\overline{\text{RESET}}$  is asserted, driving the  $\overline{\text{RESET}}$  pin to a low impedance.

Once  $\overline{\text{MR}}$  is again logic high and  $\text{SENSE}$  is above  $V_{\text{IT}} + V_{\text{HYS}}$  (the threshold hysteresis), a delay circuit is enabled that holds  $\overline{\text{RESET}}$  low for a specified reset delay period. Once the reset delay has expired, the  $\overline{\text{RESET}}$  pin goes to a high impedance state. The pullup resistor from the open-drain  $\overline{\text{RESET}}$  to the supply line can be used to allow the reset signal for the microprocessor to have a voltage higher than  $V_{\text{DD}}$  (up to 6.5 V). The pullup resistor should be no smaller than 10 k $\Omega$  as a result of the finite impedance of the  $\overline{\text{RESET}}$  line.

## 8.4 Device Functional Modes

表 8-1. Truth Table

| MR | SENSE > V <sub>IT</sub> | RESET |
|----|-------------------------|-------|
| L  | 0                       | L     |
| L  | 1                       | L     |
| H  | 0                       | L     |
| H  | 1                       | H     |

### 8.4.1 Normal Operation ( $V_{DD} > V_{DD(min)}$ )

When  $V_{DD}$  is greater than  $V_{DD(min)}$ , the  $\overline{RESET}$  signal is determined by the voltage on the SENSE pin and the logic state of MR.

- $\overline{MR}$  high: When the voltage on  $V_{DD}$  is greater than 1.7 V for a time of the selected  $t_D$ , the  $\overline{RESET}$  signal corresponds to the voltage on SENSE relative to  $V_{IT}$ .
- $\overline{MR}$  low: in this mode,  $\overline{RESET}$  is held low regardless of the value of the SENSE pin.

### 8.4.2 Above Power-On Reset but Less Than $V_{DD(min)}$ ( $V_{POR} < V_{DD} < V_{DD(min)}$ )

When the voltage on  $V_{DD}$  is less than the device  $V_{DD(min)}$  voltage, and greater than the power-on reset voltage ( $V_{POR}$ ), the  $\overline{RESET}$  signal is asserted and low impedance, respectively, regardless of the voltage on the SENSE pin.

### 8.4.3 Below Power-On Reset ( $V_{DD} < V_{POR}$ )

When the voltage on  $V_{DD}$  is lower than the required voltage ( $V_{POR}$ ) needed to internally pull the asserted output to GND,  $\overline{RESET}$  is undefined and should not be relied upon for proper device function.

## 9 Application and Implementation

### Note

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

### 9.1 Application Information

The following sections describe in detail how to properly use this device, depending on the requirements of the final application.

### 9.2 Typical Application

A typical application of the TPS3808G25 used with a 2.5-V processor is shown in 图 9-1. The open-drain  $\overline{\text{RESET}}$  output is typically connected to the  $\overline{\text{RESET}}$  input of a microprocessor. A pullup resistor must be used to hold this line high when  $\overline{\text{RESET}}$  is not asserted. The  $\overline{\text{RESET}}$  output is undefined for voltage below 0.8 V, but this characteristic is normally not a problem because most microprocessors do not function below this voltage.

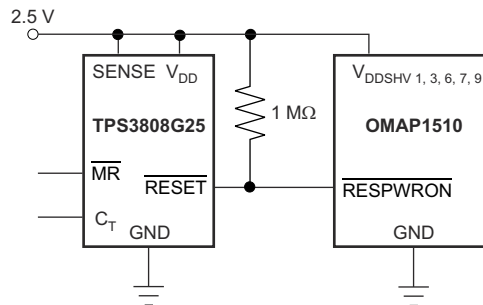


图 9-1. Typical Application of the TPS3808 With an OMAP Processor

#### 9.2.1 Design Requirements

The TPS3808 is intended to drive the  $\overline{\text{RESET}}$  input of a microprocessor. The  $\overline{\text{RESET}}$  pin is pulled high with a 1-MΩ resistor and the reset delay time is controlled by  $C_T$  depending on the reset requirement times of the microprocessor. In this case,  $C_T$  is left open for a typical reset delay time of 20 ms.

#### 9.2.2 Detailed Design Procedure

The primary constraint for this application is the reset delay time. In this case, because  $C_T$  is open, it is set to 20 ms. A 0.1-μF decoupling capacitor is connected to the  $V_{DD}$  pin and a 1-MΩ resistor is used to pull up the  $\overline{\text{RESET}}$  pin high. The  $\overline{\text{MR}}$  pin can be connected to an external signal if desired.

##### 9.2.2.1 Immunity to SENSE Pin Voltage Transients

The TPS3808 is relatively immune to short negative transients on the SENSE pin. Sensitivity to transients depends on threshold overdrive. Threshold overdrive is defined by how much the  $V_{\text{SENSE}}$  exceeds the specified threshold, and is important to know because the smaller the overdrive, the slower the  $\overline{\text{RESET}}$  response. Threshold overdrive is calculated as a percent of the threshold in question, as shown in 方程式 2:

$$\text{Overdrive} = | (V_{\text{SENSE}} / V_{\text{IT}} - 1) \times 100\% | \quad (2)$$

where:

- $V_{\text{IT}}$  is the threshold voltage.

图 9-2 shows this relationship.

### 9.2.3 Application Curve

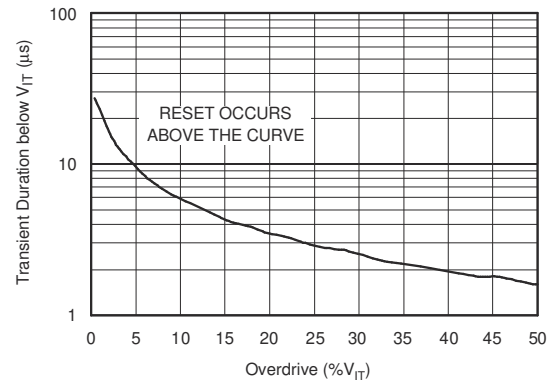


图 9-2. Maximum Transient Duration at SENSE vs SENSE Threshold Overdrive Voltage

## 10 Power Supply Recommendations

These devices are designed to operate from an input supply with a voltage range between 1.7 V and 6.5 V. Use a low-impedance power supply to eliminate inaccuracies caused by current changes during the voltage reference refresh.

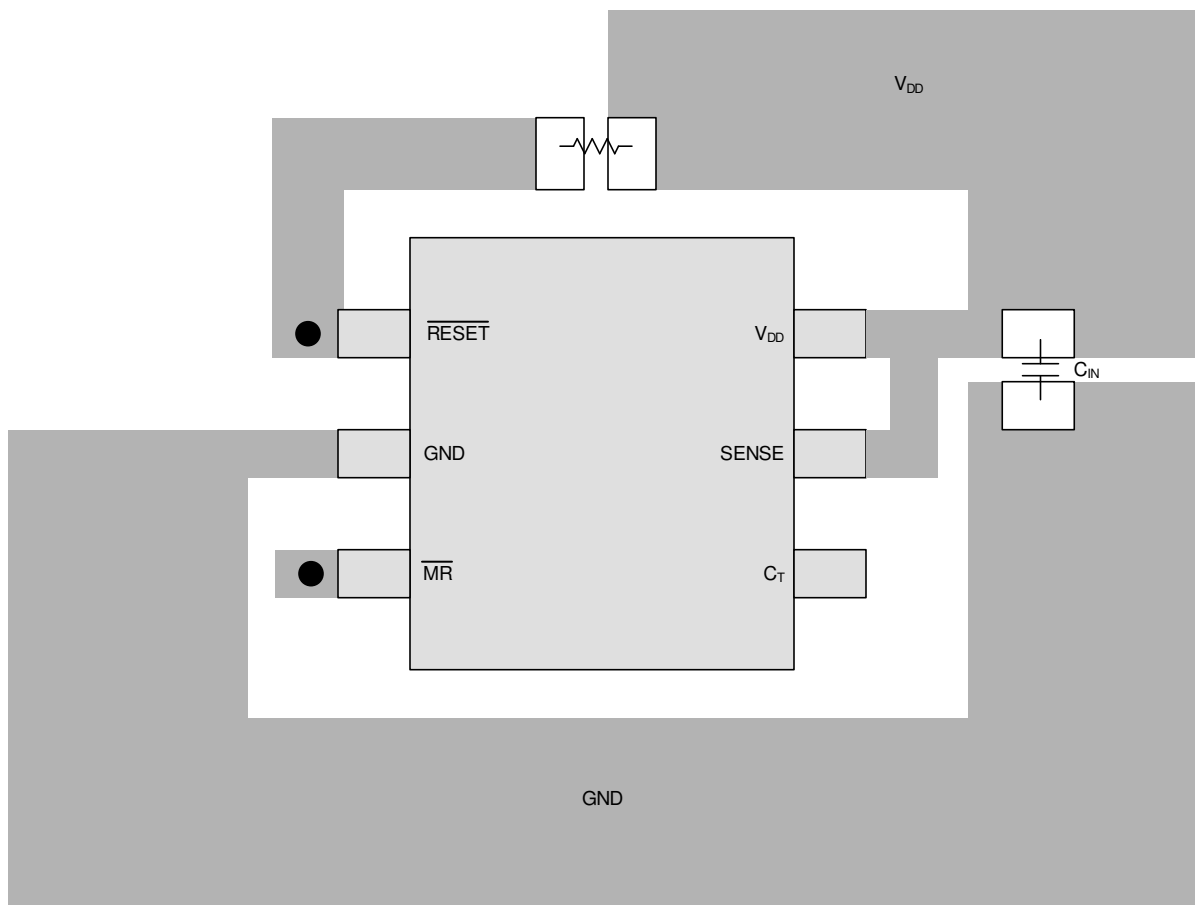
## 11 Layout

### 11.1 Layout Guidelines

Make sure the connection to the  $V_{DD}$  pin is low impedance. Place a 0.1-μF ceramic capacitor near the  $V_{DD}$  pin. If no capacitor is connected to the  $C_T$  pin, parasitic capacitance on this pin should be minimized so the  $\overline{\text{RESET}}$  delay time is not adversely affected.

### 11.2 Layout Example

The layout example in 图 11-1 shows how the TPS3808 is laid out on a printed circuit board (PCB) for a 20-ms delay.



● Vias used to connect pins for application-specific connections

**11-1. Layout Example for a 20-ms Delay**

## 12 Device and Documentation Support

### 12.1 Device Support

#### 12.1.1 Development Support

##### 12.1.1.1 Evaluation Modules

An evaluation module (EVM) is available to assist in the initial circuit performance evaluation using the TPS3808. The [TPS3808G01DBVEVM evaluation module](#) (and related [user guide](#)) can be requested at the Texas Instruments website through the product folders or purchased directly from the [TI eStore](#).

### 12.2 Documentation Support

#### 12.2.1 Related Documentation

The following related documents are available for download at [www.ti.com](http://www.ti.com):

- Application note. *Optimizing Resistor Dividers at a Comparator Input*. Literature number [SLVA450](#).
- Application note. *Sensitivity Analysis for Power Supply Design*. Literature number [SLVA481](#).
- TPS3808G01DBVEVM Evaluation Module User Guide. Literature number [SBVU015](#).

### 12.3 Support Resources

[TI E2E™ support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

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### 12.4 Trademarks

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### 12.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

### 12.6 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

## 13 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most-current data available for the designated devices. This data is subject to change without notice and without revision of this document. For browser-based versions of this data sheet, see the left-hand navigation pane.

**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                 |
|-------------------|---------------|--------------|--------------------|------|----------------|-----------------|--------------------------------------|----------------------|--------------|-------------------------|-------------------------|
| FX1077            | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVW                     | <a href="#">Samples</a> |
| HPA00489DRVR      | ACTIVE        | WSO          | DRV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVW                     | <a href="#">Samples</a> |
| TPS3808G01DBVR    | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVW                     | <a href="#">Samples</a> |
| TPS3808G01DBVRG4  | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVW                     | <a href="#">Samples</a> |
| TPS3808G01DBVT    | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVW                     | <a href="#">Samples</a> |
| TPS3808G01DBVTG4  | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVW                     | <a href="#">Samples</a> |
| TPS3808G01DRVR    | ACTIVE        | WSO          | DRV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVW                     | <a href="#">Samples</a> |
| TPS3808G01DRVRG4  | ACTIVE        | WSO          | DRV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVW                     | <a href="#">Samples</a> |
| TPS3808G01DRVVT   | ACTIVE        | WSO          | DRV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVW                     | <a href="#">Samples</a> |
| TPS3808G09DBVR    | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVV                     | <a href="#">Samples</a> |
| TPS3808G09DBVRG4  | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVV                     | <a href="#">Samples</a> |
| TPS3808G09DBVT    | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVV                     | <a href="#">Samples</a> |
| TPS3808G09DBVTG4  | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVV                     | <a href="#">Samples</a> |
| TPS3808G125DBVR   | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | CAC                     | <a href="#">Samples</a> |
| TPS3808G125DBVT   | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | CAC                     | <a href="#">Samples</a> |
| TPS3808G125DBVTG4 | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | CAC                     | <a href="#">Samples</a> |
| TPS3808G12DBVR    | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVY                     | <a href="#">Samples</a> |
| TPS3808G12DBVRG4  | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVY                     | <a href="#">Samples</a> |
| TPS3808G12DBVT    | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVY                     | <a href="#">Samples</a> |
| TPS3808G12DBVTG4  | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVY                     | <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                 |
|------------------|---------------|--------------|--------------------|------|----------------|-----------------|--------------------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3808G12DRVR   | ACTIVE        | WSON         | DRV                | 6    | 3000           | RoHS & Green    | NIPDAU   NIPDAUAG                    | Level-1-260C-UNLIM   | -40 to 125   | AVY                     | <a href="#">Samples</a> |
| TPS3808G12DRVT   | ACTIVE        | WSON         | DRV                | 6    | 250            | RoHS & Green    | NIPDAU   NIPDAUAG                    | Level-1-260C-UNLIM   | -40 to 125   | AVY                     | <a href="#">Samples</a> |
| TPS3808G12DRVTG4 | ACTIVE        | WSON         | DRV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVY                     | <a href="#">Samples</a> |
| TPS3808G15DBVR   | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVS                     | <a href="#">Samples</a> |
| TPS3808G15DBVRG4 | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVS                     | <a href="#">Samples</a> |
| TPS3808G15DBVT   | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVS                     | <a href="#">Samples</a> |
| TPS3808G15DBVTG4 | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVS                     | <a href="#">Samples</a> |
| TPS3808G15DRVR   | ACTIVE        | WSON         | DRV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVS                     | <a href="#">Samples</a> |
| TPS3808G15DRVT   | ACTIVE        | WSON         | DRV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVS                     | <a href="#">Samples</a> |
| TPS3808G18DBVR   | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVR                     | <a href="#">Samples</a> |
| TPS3808G18DBVRG4 | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVR                     | <a href="#">Samples</a> |
| TPS3808G18DBVT   | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVR                     | <a href="#">Samples</a> |
| TPS3808G18DBVTG4 | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVR                     | <a href="#">Samples</a> |
| TPS3808G18DRVR   | ACTIVE        | WSON         | DRV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVR                     | <a href="#">Samples</a> |
| TPS3808G18DRVT   | ACTIVE        | WSON         | DRV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVR                     | <a href="#">Samples</a> |
| TPS3808G19DBVR   | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | CHP                     | <a href="#">Samples</a> |
| TPS3808G19DBVT   | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | CHP                     | <a href="#">Samples</a> |
| TPS3808G25DBVR   | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVQ                     | <a href="#">Samples</a> |
| TPS3808G25DBVRG4 | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVQ                     | <a href="#">Samples</a> |
| TPS3808G25DBVT   | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVQ                     | <a href="#">Samples</a> |
| TPS3808G25DBVTG4 | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVQ                     | <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                 |
|------------------|---------------|--------------|--------------------|------|----------------|-----------------|--------------------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3808G25DRVR   | ACTIVE        | WSON         | DRV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVQ                     | <a href="#">Samples</a> |
| TPS3808G25DRVRG4 | ACTIVE        | WSON         | DRV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVQ                     | <a href="#">Samples</a> |
| TPS3808G25DRVT   | ACTIVE        | WSON         | DRV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVQ                     | <a href="#">Samples</a> |
| TPS3808G25DRVTG4 | ACTIVE        | WSON         | DRV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVQ                     | <a href="#">Samples</a> |
| TPS3808G30DBVR   | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVP                     | <a href="#">Samples</a> |
| TPS3808G30DBVRG4 | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVP                     | <a href="#">Samples</a> |
| TPS3808G30DBVT   | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVP                     | <a href="#">Samples</a> |
| TPS3808G30DBVTG4 | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVP                     | <a href="#">Samples</a> |
| TPS3808G30DRVR   | ACTIVE        | WSON         | DRV                | 6    | 3000           | RoHS & Green    | NIPDAU   NIPDAUAG                    | Level-1-260C-UNLIM   | -40 to 125   | AVP                     | <a href="#">Samples</a> |
| TPS3808G30DRVT   | ACTIVE        | WSON         | DRV                | 6    | 250            | RoHS & Green    | NIPDAU   NIPDAUAG                    | Level-1-260C-UNLIM   | -40 to 125   | AVP                     | <a href="#">Samples</a> |
| TPS3808G33DBVR   | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVO                     | <a href="#">Samples</a> |
| TPS3808G33DBVRG4 | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVO                     | <a href="#">Samples</a> |
| TPS3808G33DBVT   | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVO                     | <a href="#">Samples</a> |
| TPS3808G33DBVTG4 | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVO                     | <a href="#">Samples</a> |
| TPS3808G33DRVR   | ACTIVE        | WSON         | DRV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | SEC                     | <a href="#">Samples</a> |
| TPS3808G33DRVT   | ACTIVE        | WSON         | DRV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | SEC                     | <a href="#">Samples</a> |
| TPS3808G50DBVR   | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVN                     | <a href="#">Samples</a> |
| TPS3808G50DBVRG4 | ACTIVE        | SOT-23       | DBV                | 6    | 3000           | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVN                     | <a href="#">Samples</a> |
| TPS3808G50DBVT   | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVN                     | <a href="#">Samples</a> |
| TPS3808G50DBVTG4 | ACTIVE        | SOT-23       | DBV                | 6    | 250            | RoHS & Green    | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AVN                     | <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  $\leq 1000$ ppm threshold. Antimony trioxide based flame retardants must also meet the  $\leq 1000$ ppm 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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**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 |
|-----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TPS3808G01DBVR  | SOT-23       | DBV             | 6    | 3000 | 180.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3808G01DBVT  | SOT-23       | DBV             | 6    | 250  | 180.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3808G01DRVR  | WSO          | DRV             | 6    | 3000 | 178.0              | 8.4                | 2.25    | 2.25    | 1.0     | 4.0     | 8.0    | Q2            |
| TPS3808G01DRVT  | WSO          | DRV             | 6    | 250  | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G01DRVT  | WSO          | DRV             | 6    | 250  | 178.0              | 8.4                | 2.25    | 2.25    | 1.0     | 4.0     | 8.0    | Q2            |
| TPS3808G09DBVR  | SOT-23       | DBV             | 6    | 3000 | 180.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3808G09DBVR  | SOT-23       | DBV             | 6    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G09DBVT  | SOT-23       | DBV             | 6    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G09DBVT  | SOT-23       | DBV             | 6    | 250  | 180.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3808G125DBVR | SOT-23       | DBV             | 6    | 3000 | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3808G125DBVT | SOT-23       | DBV             | 6    | 250  | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3808G12DBVR  | SOT-23       | DBV             | 6    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G12DBVT  | SOT-23       | DBV             | 6    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G12DRVR  | WSO          | DRV             | 6    | 3000 | 178.0              | 8.4                | 2.25    | 2.25    | 1.0     | 4.0     | 8.0    | Q2            |
| TPS3808G12DRVR  | WSO          | DRV             | 6    | 3000 | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G12DRVT  | WSO          | DRV             | 6    | 250  | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G12DRVT  | WSO          | DRV             | 6    | 250  | 178.0              | 8.4                | 2.25    | 2.25    | 1.0     | 4.0     | 8.0    | Q2            |
| TPS3808G15DBVR  | SOT-23       | DBV             | 6    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |

| 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 |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TPS3808G15DBVT | SOT-23       | DBV             | 6    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G15DRVR | WSO          | DRV             | 6    | 3000 | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G15DRVT | WSO          | DRV             | 6    | 250  | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G18DBVR | SOT-23       | DBV             | 6    | 3000 | 180.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3808G18DBVT | SOT-23       | DBV             | 6    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G18DBVT | SOT-23       | DBV             | 6    | 250  | 180.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3808G18DBVT | SOT-23       | DBV             | 6    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G18DRVR | WSO          | DRV             | 6    | 3000 | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G18DRVT | WSO          | DRV             | 6    | 250  | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G19DBVR | SOT-23       | DBV             | 6    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G19DBVT | SOT-23       | DBV             | 6    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G25DBVR | SOT-23       | DBV             | 6    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G25DBVT | SOT-23       | DBV             | 6    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G25DRVR | WSO          | DRV             | 6    | 3000 | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G25DRVT | WSO          | DRV             | 6    | 250  | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G30DBVR | SOT-23       | DBV             | 6    | 3000 | 180.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3808G30DBVT | SOT-23       | DBV             | 6    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G30DBVT | SOT-23       | DBV             | 6    | 250  | 180.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3808G30DBVT | SOT-23       | DBV             | 6    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G30DRVR | WSO          | DRV             | 6    | 3000 | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G30DRVR | WSO          | DRV             | 6    | 3000 | 178.0              | 8.4                | 2.25    | 2.25    | 1.0     | 4.0     | 8.0    | Q2            |
| TPS3808G30DRVT | WSO          | DRV             | 6    | 250  | 178.0              | 8.4                | 2.25    | 2.25    | 1.0     | 4.0     | 8.0    | Q2            |
| TPS3808G30DRVT | WSO          | DRV             | 6    | 250  | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G33DBVR | SOT-23       | DBV             | 6    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G33DBVT | SOT-23       | DBV             | 6    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G33DRVR | WSO          | DRV             | 6    | 3000 | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G33DRVT | WSO          | DRV             | 6    | 250  | 179.0              | 8.4                | 2.2     | 2.2     | 1.2     | 4.0     | 8.0    | Q2            |
| TPS3808G50DBVR | SOT-23       | DBV             | 6    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3808G50DBVT | SOT-23       | DBV             | 6    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 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) |
|-----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TPS3808G01DBVR  | SOT-23       | DBV             | 6    | 3000 | 210.0       | 185.0      | 35.0        |
| TPS3808G01DBVT  | SOT-23       | DBV             | 6    | 250  | 210.0       | 185.0      | 35.0        |
| TPS3808G01DRVR  | WSON         | DRV             | 6    | 3000 | 205.0       | 200.0      | 33.0        |
| TPS3808G01DRVT  | WSON         | DRV             | 6    | 250  | 203.0       | 203.0      | 35.0        |
| TPS3808G01DRVT  | WSON         | DRV             | 6    | 250  | 205.0       | 200.0      | 33.0        |
| TPS3808G09DBVR  | SOT-23       | DBV             | 6    | 3000 | 210.0       | 185.0      | 35.0        |
| TPS3808G09DBVR  | SOT-23       | DBV             | 6    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3808G09DBVT  | SOT-23       | DBV             | 6    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3808G09DBVT  | SOT-23       | DBV             | 6    | 250  | 210.0       | 185.0      | 35.0        |
| TPS3808G125DBVR | SOT-23       | DBV             | 6    | 3000 | 200.0       | 183.0      | 25.0        |
| TPS3808G125DBVT | SOT-23       | DBV             | 6    | 250  | 200.0       | 183.0      | 25.0        |
| TPS3808G12DBVR  | SOT-23       | DBV             | 6    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3808G12DBVT  | SOT-23       | DBV             | 6    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3808G12DRVR  | WSON         | DRV             | 6    | 3000 | 205.0       | 200.0      | 33.0        |
| TPS3808G12DRVR  | WSON         | DRV             | 6    | 3000 | 200.0       | 183.0      | 25.0        |
| TPS3808G12DRVT  | WSON         | DRV             | 6    | 250  | 203.0       | 203.0      | 35.0        |
| TPS3808G12DRVT  | WSON         | DRV             | 6    | 250  | 205.0       | 200.0      | 33.0        |
| TPS3808G15DBVR  | SOT-23       | DBV             | 6    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3808G15DBVT  | SOT-23       | DBV             | 6    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3808G15DRVR  | WSON         | DRV             | 6    | 3000 | 200.0       | 183.0      | 25.0        |

| Device         | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TPS3808G15DRVT | WSON         | DRV             | 6    | 250  | 200.0       | 183.0      | 25.0        |
| TPS3808G18DBVR | SOT-23       | DBV             | 6    | 3000 | 210.0       | 185.0      | 35.0        |
| TPS3808G18DBVR | SOT-23       | DBV             | 6    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3808G18DBVT | SOT-23       | DBV             | 6    | 250  | 210.0       | 185.0      | 35.0        |
| TPS3808G18DBVT | SOT-23       | DBV             | 6    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3808G18DRVR | WSON         | DRV             | 6    | 3000 | 200.0       | 183.0      | 25.0        |
| TPS3808G18DRVT | WSON         | DRV             | 6    | 250  | 200.0       | 183.0      | 25.0        |
| TPS3808G19DBVR | SOT-23       | DBV             | 6    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3808G19DBVT | SOT-23       | DBV             | 6    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3808G25DBVR | SOT-23       | DBV             | 6    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3808G25DBVT | SOT-23       | DBV             | 6    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3808G25DRVR | WSON         | DRV             | 6    | 3000 | 203.0       | 203.0      | 35.0        |
| TPS3808G25DRVT | WSON         | DRV             | 6    | 250  | 200.0       | 183.0      | 25.0        |
| TPS3808G30DBVR | SOT-23       | DBV             | 6    | 3000 | 210.0       | 185.0      | 35.0        |
| TPS3808G30DBVR | SOT-23       | DBV             | 6    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3808G30DBVT | SOT-23       | DBV             | 6    | 250  | 210.0       | 185.0      | 35.0        |
| TPS3808G30DBVT | SOT-23       | DBV             | 6    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3808G30DRVR | WSON         | DRV             | 6    | 3000 | 203.0       | 203.0      | 35.0        |
| TPS3808G30DRVR | WSON         | DRV             | 6    | 3000 | 205.0       | 200.0      | 33.0        |
| TPS3808G30DRVT | WSON         | DRV             | 6    | 250  | 205.0       | 200.0      | 33.0        |
| TPS3808G30DRVT | WSON         | DRV             | 6    | 250  | 203.0       | 203.0      | 35.0        |
| TPS3808G33DBVR | SOT-23       | DBV             | 6    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3808G33DBVT | SOT-23       | DBV             | 6    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3808G33DRVR | WSON         | DRV             | 6    | 3000 | 200.0       | 183.0      | 25.0        |
| TPS3808G33DRVT | WSON         | DRV             | 6    | 250  | 200.0       | 183.0      | 25.0        |
| TPS3808G50DBVR | SOT-23       | DBV             | 6    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3808G50DBVT | SOT-23       | DBV             | 6    | 250  | 180.0       | 180.0      | 18.0        |

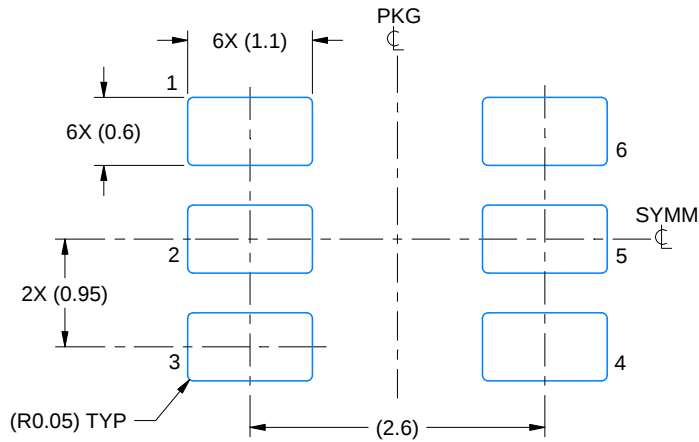


# EXAMPLE BOARD LAYOUT

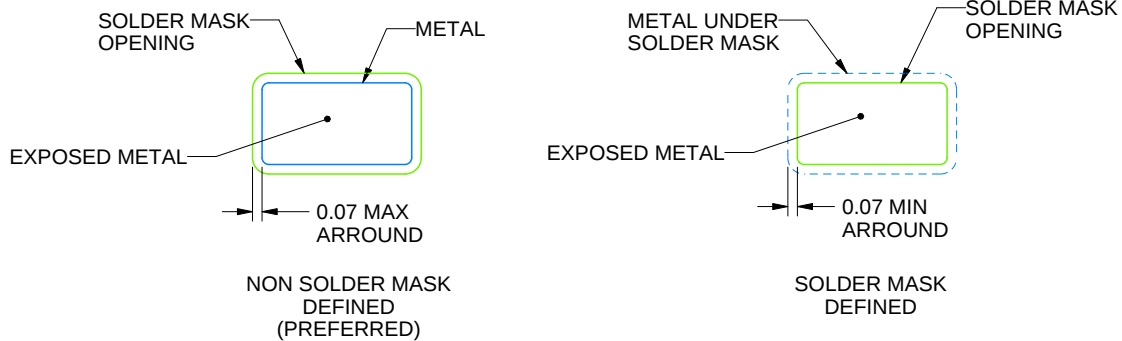
DBV0006A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE:15X



SOLDER MASK DETAILS

4214840/C 06/2021

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

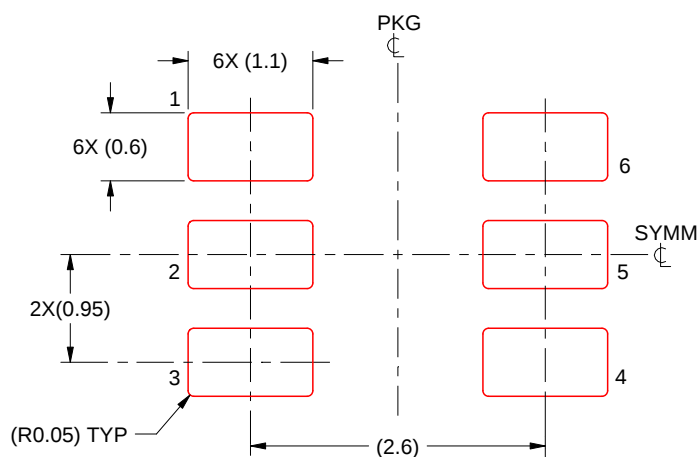
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

## EXAMPLE STENCIL DESIGN

DBV0006A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:15X

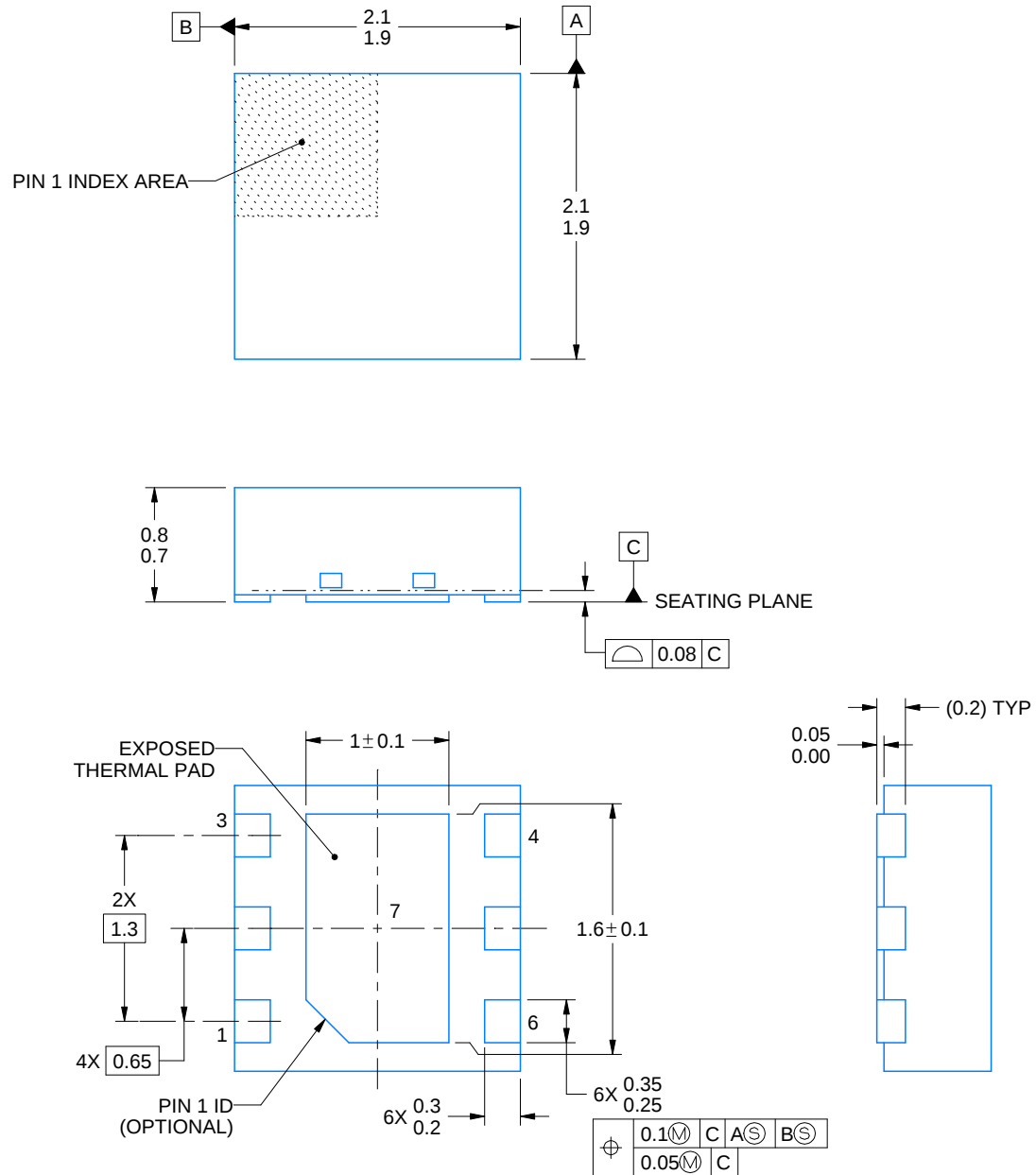
4214840/C 06/2021

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.



Images above are just a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



4222173/B 04/2018

## 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. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

# EXAMPLE BOARD LAYOUT

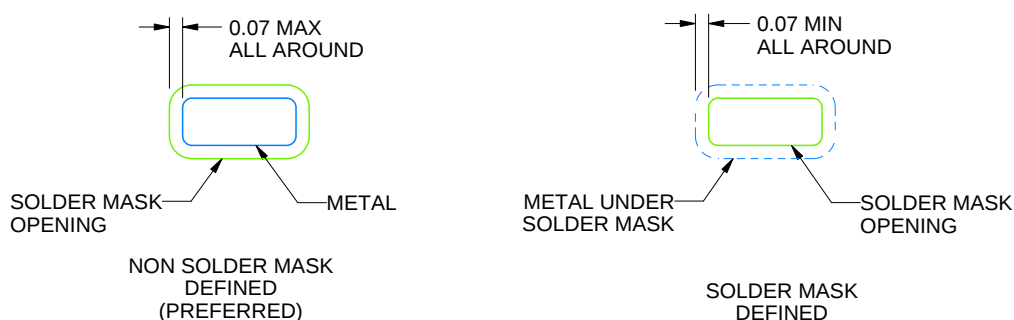
DRV0006A

WSN - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE  
SCALE:25X



SOLDER MASK DETAILS

4222173/B 04/2018

NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/sluea271](http://www.ti.com/lit/sluea271)).
5. Vias are optional depending on application, refer to device data sheet. If some or all are implemented, recommended via locations are shown.

## EXAMPLE STENCIL DESIGN

DRV0006A

WSO - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



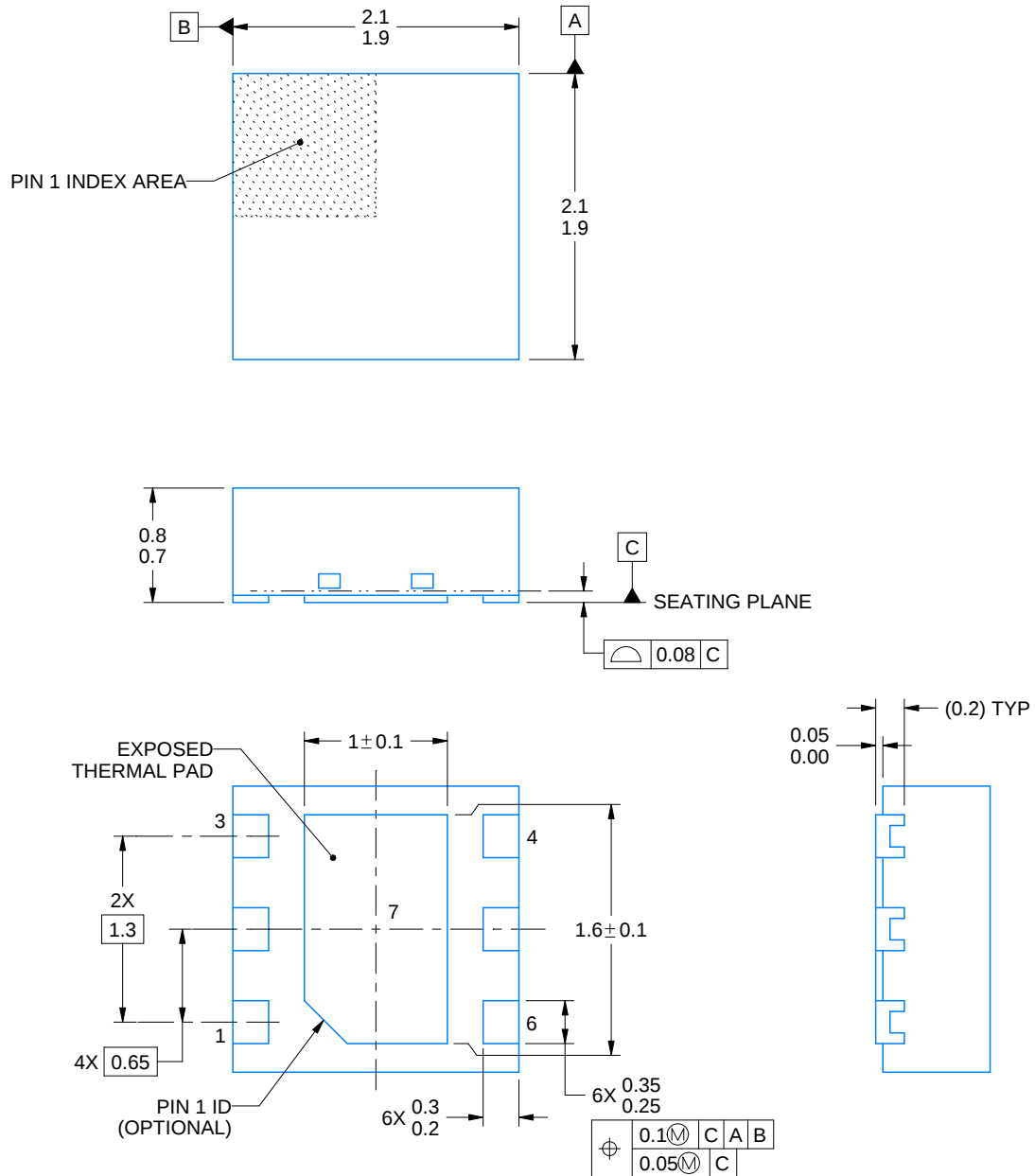
SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD #7  
88% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE  
SCALE:30X

4222173/B 04/2018

NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.



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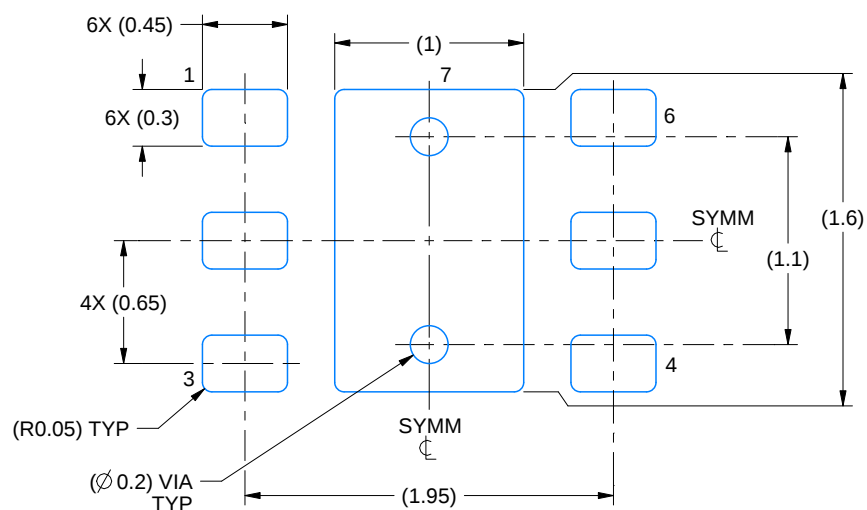
**NOTES:**

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. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

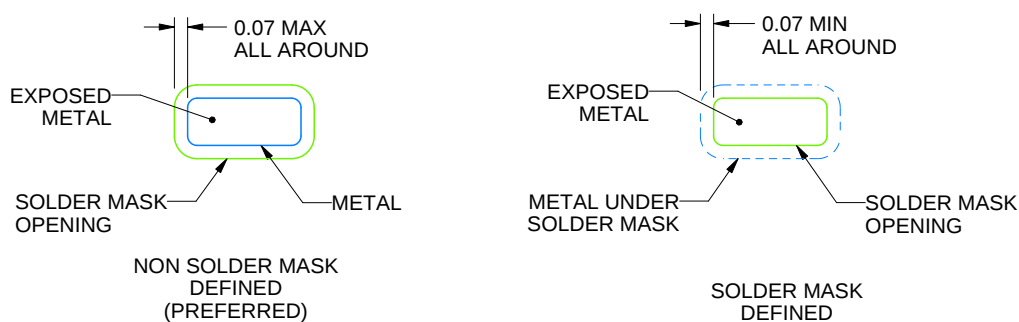
**DRV0006D**

**WSN - 0.8 mm max height**

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE:25X



## SOLDER MASK DETAILS

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NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/slua271](http://www.ti.com/lit/slua271)).
5. Vias are optional depending on application, refer to device data sheet. If some or all are implemented, recommended via locations are shown.

# EXAMPLE STENCIL DESIGN

DRV0006D

WSO - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD #7  
88% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE  
SCALE:30X

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NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

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