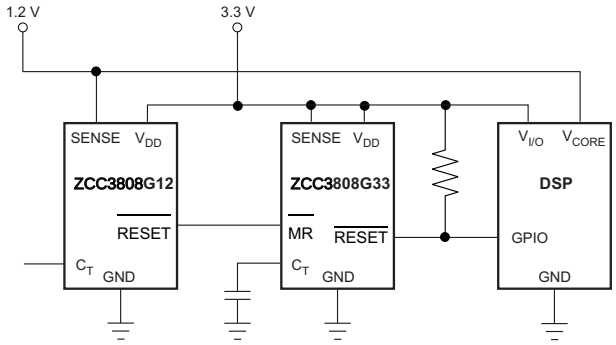
ZCC3808 低静态电流、可编程延迟监控电路

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 μA（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 (MR) 输入
- 开漏复位输出
- 温度范围：–40°C 至 125°C
- 小型 SOT-23 和 2mm × 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



典型应用

3 说明

ZCC3808 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 SENSE 电压 降至预设阈值以下或手动复位 (MR) 引脚降至逻辑低电平时，将开漏RESET 信号置为有效。在 SENSE 电压 和手动复位(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。

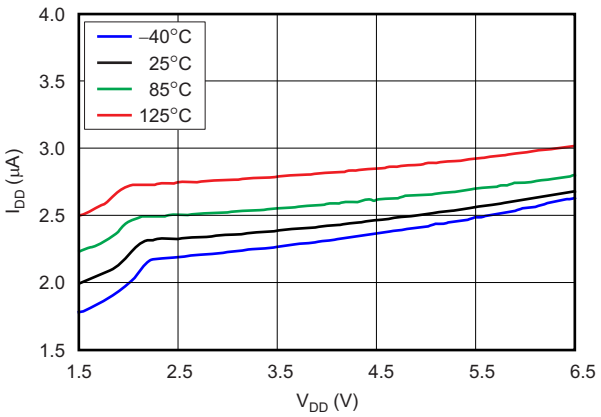
ZCC3808 器件使用精密电压基准，可在 V_{IT} ≤3.3V 时达到 0.5% 的阈值精度。通过断开 C_T 引脚，可将复位。

延迟时间设置为 20ms；通过使用电阻将 C_T 引脚连接至 V_{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。ZCC3808 器件具有超低的典型静态电流，为 2.4 μA，因此非常适合电池供电类应用。它采用 SOT-23 和 2mm × 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）
ZCC3808	SOT-23 (6)	2.90mm x 1.60mm
	WSON (6)	2.00mm x 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。



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

Changes from Revision K (October 2015) to Revision L (September 2020)	Page
• 更新了整个文档的表、图和交叉参考的编号格式。	1

Changes from Revision J (August 2008) to Revision K (October 2015)	Page
• 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。	1
• Changed 图 9-1; removed capacitor shown on C_T	14

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(1)	THRESHOLD VOLTAGE (V_{IT})
ZCC3808G01	Adjustable	0.405 V
ZCC3808G09	0.9 V	0.84 V
ZCC3808G12	1.2 V	1.12 V
ZCC3808G125	1.25 V	1.16 V
ZCC3808G15	1.5 V	1.40 V
ZCC3808G18	1.8 V	1.67 V
ZCC3808G19	1.9 V	1.77 V
ZCC3808G25	2.5 V	2.33 V
ZCC3808G30	3 V	2.79 V
ZCC3808G33	3.3 V	3.07 V
ZCC3808G50	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

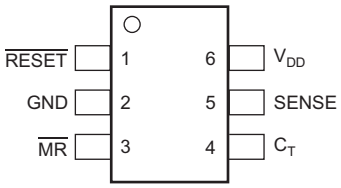


图 6-1. DBV Package 6-Pin SOT-23 Top View

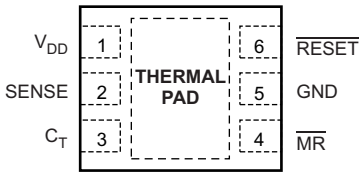


图 6-2. DRV Package 6-Pin (2.00 mm × 2.00 mm) WSON With Thermal Pad Top View

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-kΩ to 200-kΩ resistor or leaving it open results in fixed delay times (see 节 7.5). Connecting this pin to a ground referenced capacitor ≥ 100 pF gives a user-programmable delay time. See 节 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-kΩ 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 kΩ to 1 MΩ 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- μ 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) (1)

		MIN	MAX	UNIT
Voltage	V_{DD}	−0.3	7	V
	V_{CT}	−0.3	V_{DD} + 0.3	V
	V_{RESET}, V_{MR}, V_{SENSE}	−0.3	7	V
Current	$\overline{RESET}$ pin	−5	5	mA
Temperature	Operating junction, T_J (2)	−40	150	°C
	Storage, T_{stg}	−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 $T_J = T_A$.

7.2 ESD Ratings

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins(1)	±2000	V
		Charged device model (CDM), per JEDEC specification JESD22-C101, all pins(2)	±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_{DD}	Input supply range	1.7		6.5	V
V_{SENSE}	SENSE pin voltage	0		6.5	V
$V_{(Ct)}$	C_T pin voltage			V_{DD}	V
$V_{\overline{MR}}$	$\overline{MR}$ pin voltage	0		6.5	V
$V_{\overline{RESET}}$	$\overline{RESET}$ pin voltage	0		6.5	V
$I_{\overline{RESET}}$	$\overline{RESET}$ pin current	0.0003		5	mA

7.4 Thermal Information

THERMAL METRIC(1)		ZCC3808		UNIT
		DBV (SOT-23)	DRV (WSON)	
		6 PINS	6 PINS	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	180.9	178.1	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	117.8	95.6	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	27.8	135	°C/W
ψ_{JT}	Junction-to-top characterization parameter	1.12	6.3	°C/W
ψ_{JB}	Junction-to-board characterization parameter	27.3	136.6	°C/W
$R_{\theta JC(bot)}$	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 V ≤ V_{DD} ≤ 6.5 V, R_{LRESET} = 100 kΩ, C_{LRESET} = 50 pF, over operating temperature range (T_J = −40°C to 125°C), unless otherwise noted. Typical values are at T_J = 25°C(1).

PARAMETER			TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{DD}	Input supply range		−40°C < T_J < 125°C	1.7		6.5	V
			0°C < T_J < 85°C	1.65		6.5	V
I_{DD}	Supply current (current into V_{DD} pin)		V_{DD} = 3.3 V, $\overline{RESET}$ not asserted $\overline{MR}$, $\overline{RESET}$, C_T open		2.4	5	µA
			V_{DD} = 6.5 V, $\overline{RESET}$ not asserted $\overline{MR}$, $\overline{RESET}$, C_T open		2.7	6	
V_{OL}	Low-level output voltage		1.3 V ≤ V_{DD} < 1.8 V, I_{OL} = 0.4 mA			0.3	V
			1.8 V ≤ V_{DD} ≤ 6.5 V, I_{OL} = 1 mA			0.4	
V_{POR}	Power-up reset voltage(2)		V_{OL} (max) = 0.2 V, $I_{\overline{RESET}}$ = 15 µA			0.8	
V_{IT}	Negative-going input threshold accuracy	ZCC3808G01		−2%	±1%	2%	
		V_{IT} ≤ 3.3 V		−1.5%	±0.5%	1.5%	
		3.3 V < V_{IT} ≤ 5.0 V		−2%	±1%	2%	
		V_{IT} ≤ 3.3 V	−40°C < T_J < 85°C	−1.25%	±0.5%	1.25%	
		3.3 V < V_{IT} ≤ 5.0 V	−40°C < T_J < 85°C	−1.5%	±0.5%	1.5%	
V_{HYS}	Hysteresis on V_{IT} pin	ZCC3808G01			1.5%	3%	V_{IT}
		Fixed versions			1%	2.5%	
$R_{\overline{MR}}$	$\overline{MR}$ Internal pullup resistance			70	90		kΩ
I_{SENSE}	Input current at SENSE pin	ZCC3808G01	V_{SENSE} = V_{IT}	−25		25	nA
		Fixed versions	V_{SENSE} = 6.5 V		1.7		µA
I_{OH}	$\overline{RESET}$ leakage current		$V_{\overline{RESET}}$ = 6.5 V, $\overline{RESET}$ not asserted			300	nA
C_{IN}	Input capacitance, any pin	C_T pin	V_{IN} = 0 V to V_{DD}		5		pF
		Other pins	V_{IN} = 0 V to 6.5 V		5		
V_{IL}	$\overline{MR}$ logic low input			0		0.3 V_{DD}	V
V_{IH}	$\overline{MR}$ logic high input			0.7 V_{DD}		V_{DD}	

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

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

7.6 Switching Characteristics

1.7 V ⩽ V_{DD} ⩽ 6.5 V, R_{LRESET} = 100 kΩ, C_{LRESET} = 50 pF, over operating temperature range (T_J = －40°C to 125°C), unless otherwise noted. Typical values are at T_J = 25°C.(1)

PARAMETER			TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_w	Input pulse width to $\overline{RESET}$	SENSE	V_{IH} = 1.05 V_{IT}, V_{IL} = 0.95 V_{IT}		20		μs
		$\overline{MR}$	V_{IH} = 0.7 V_{DD}, V_{IL} = 0.3 V_{DD}		0.001		
t_d	$\overline{RESET}$ delay time	C_T = Open	See 图 7-1	12	20	28	ms
		C_T = V_{DD}		180	300	420	
		C_T = 100 pF		0.75	1.25	1.75	
		C_T = 180 nF		0.7	1.2	1.7	s
	Propagation delay	$\overline{MR}$ to $\overline{RESET}$	V_{IH} = 0.7 V_{DD}, V_{IL} = 0.3 V_{DD}		150		ns
	High-to-low level $\overline{RESET}$ delay	SENSE to $\overline{RESET}$	V_{IH} = 1.05 V_{IT}, V_{IL} = 0.95 V_{IT}		20		μs

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

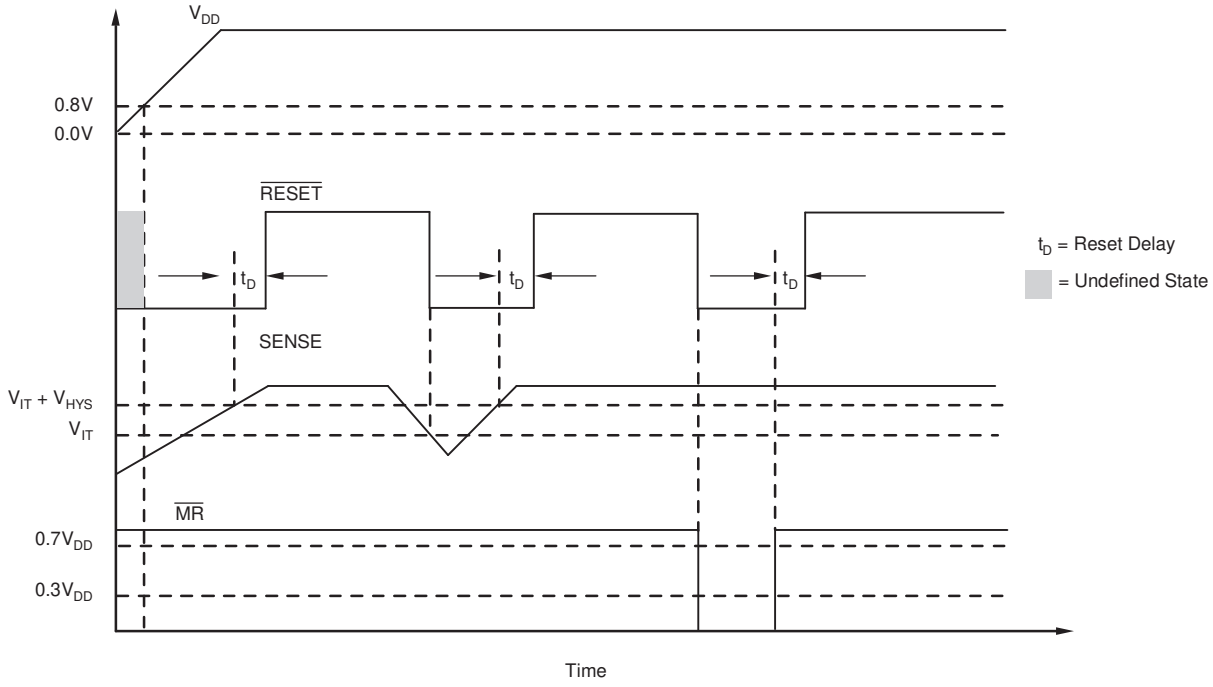


图 7-1. ZCC3808 Timing Diagram Showing MR and SENSE Reset Timing

7.7 Typical Characteristics

At T_J = 25°C, V_{DD} = 3.3 V, R_{LRESET} = 100 kΩ, and C_{LRESET} = 50 pF, unless otherwise noted.

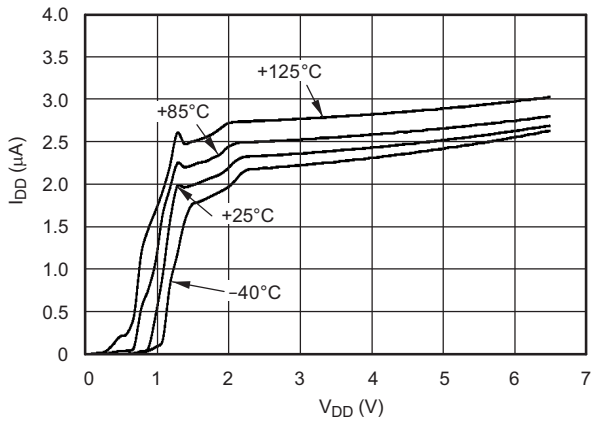


图 7-2. Supply Current vs Supply Voltage

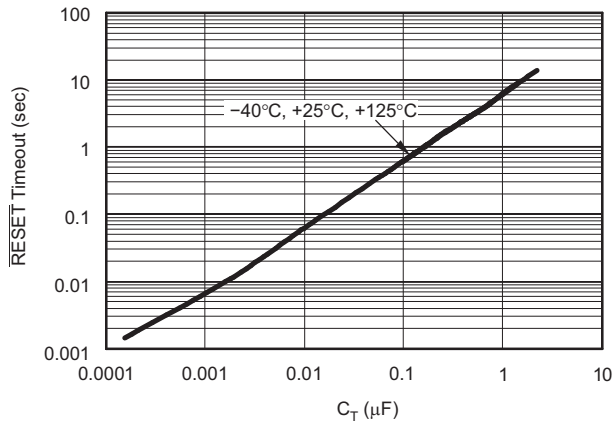


图 7-3. $\overline{\text{RESET}}$ Time-Out Period vs C_T

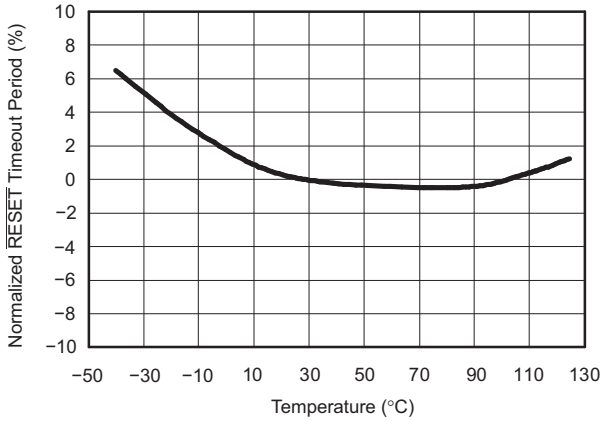


图 7-4. Normalized $\overline{\text{RESET}}$ Time-Out Period vs Temperature (C_T = Open, C_T = V_{DD}, C_T = Any)

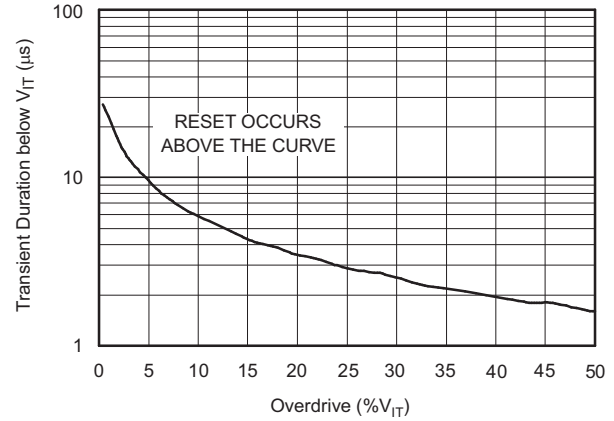


图 7-5. Maximum Transient Duration at Sense vs Sense Threshold Overdrive Voltage

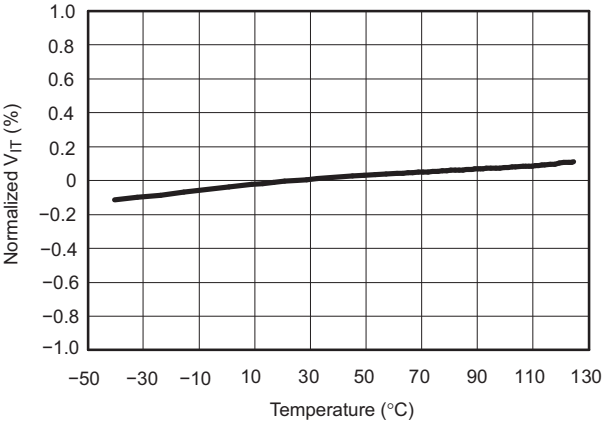


图 7-6. Normalized Sense Threshold Voltage (V_{IT}) vs Temperature

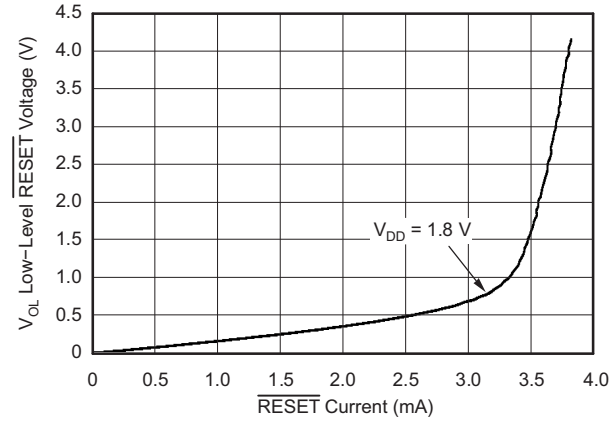


图 7-7. Low-Level $\overline{\text{RESET}}$ Voltage vs $\overline{\text{RESET}}$ Current

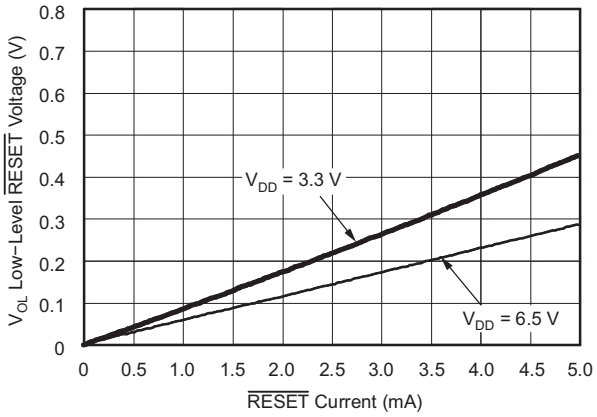


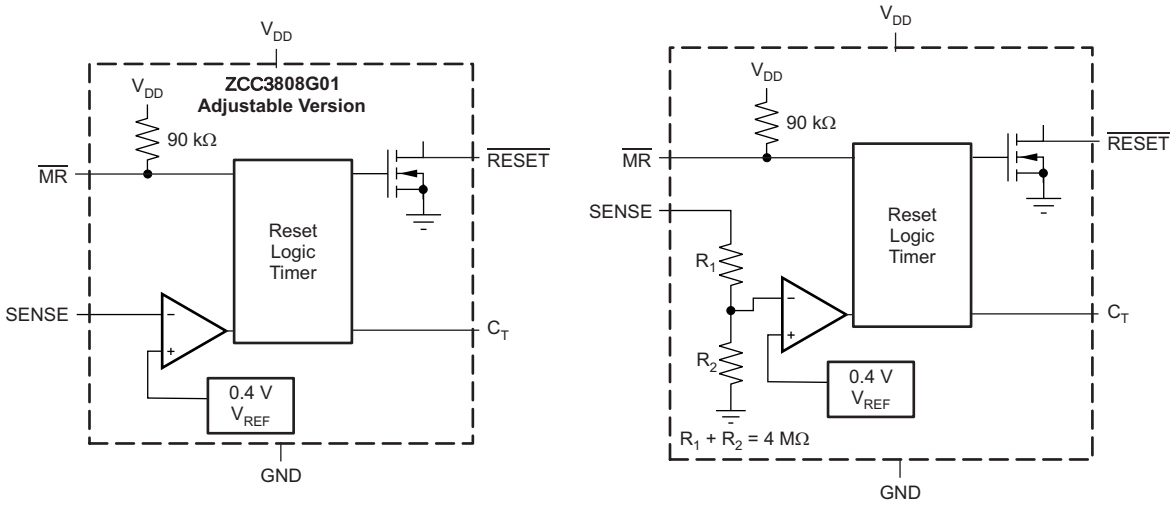
图 7-8. Low-Level $\overline{RESET}$ Voltage vs $\overline{RESET}$ Current

8 Detailed Description

8.1 Overview

The ZCC3808 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



Adjustable Voltage Version　　Fixed Voltage Version

8.3 Feature Description

A broad range of voltage threshold and reset delay time adjustments are available for the ZCC3808 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 ZCC3808G01 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 desi g ner to select an y reset dela y 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 ZCC3808 device is relatively immune to short negative transients on the SENSE pin. Sensitivity to transient sis dependent on threshold overdrive, as shown in (图 7-5).

The ZCC3808G01 can be used to monitor any voltage rail down to 0.405 V using the circuit shown in 图 8-1.

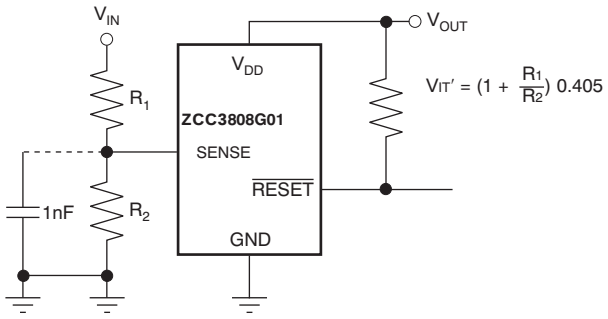


图 8-1. Using the ZCC3808G01 to Monitor a User-Defined Threshold Voltage

8.3.2 Selecting the RESET Delay Time

The ZCC3808 has three options for setting the $\overline{\text{RESET}}$ delay time as shown in 图 8-2. 图 8-2 (a) shows theco nfiguration for a fixed 300-ms typical delay time by tying C_T to V_{DD}; a resistor from 40 kΩ to 200 kΩ must beused. Supply current is not affected by the choice of resistor. 图 8-2 (b) shows a fixed 20-ms delay time byleaving 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.

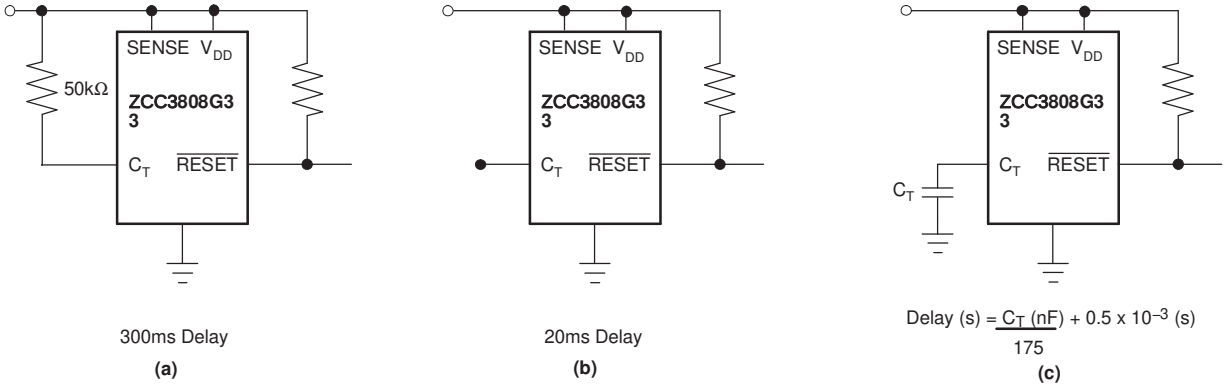


图 8-2. Configuration Used to Set the $\overline{\text{RESET}}$ Delay Time

The capacitor C_T should be ⩾ 100 pF nominal value in order for the ZCC3808xxx to recognize that the capacito ris present. The capacitor value for a given delay time can be calculated using 方程式 1.

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

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 (MR) Input

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

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

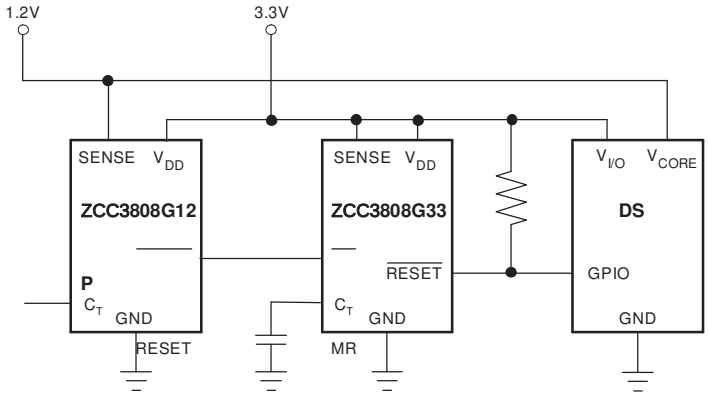


图 8-3. Using $\overline{MR}$ to Monitor Multiple System Voltages

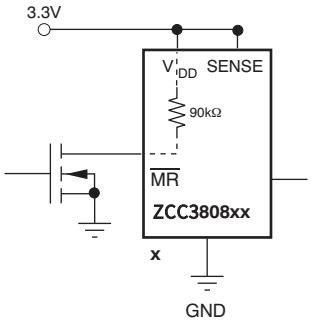


图 8-4. Using an External MOSFET to Minimize I_{DD} When $\overline{MR}$ Signal Does Not Go to V_{DD}

8.3.4 RESET Output

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

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

8.4 Device Functional Modes

表 8-1. Truth Table

$\overline{MR}$	SENSE > V_{IT}	$\overline{RESET}$
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 $\overline{MR}$.

- $\overline{MR}$ 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 ZCC3808G25 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.

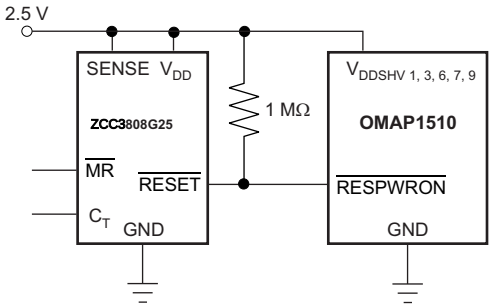


图 9-1. Typical Application of the ZCC3808 With an OMAP Processo r

9.2.1 Design Requirements

The ZCC3808 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 ZCC3808 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_{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:

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

where:

- V_{IT} is the threshold voltage.

图 9-2 shows this relationship.

9.2.3 Application Curve

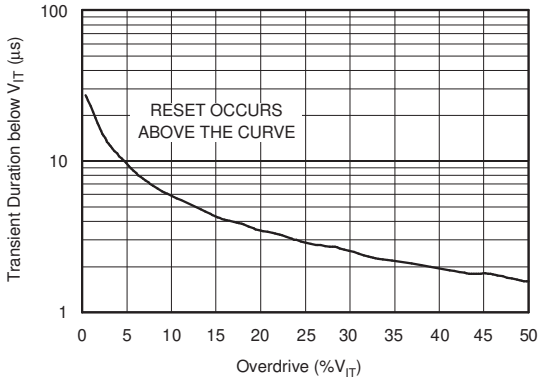


图 9-2. Maximum Transient Duration at SENSE vs SENSE Threshold Overdrive Voltage

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 ZCC3808 is laid out on a printed circuit board (PCB) for a 20-m sdelay.

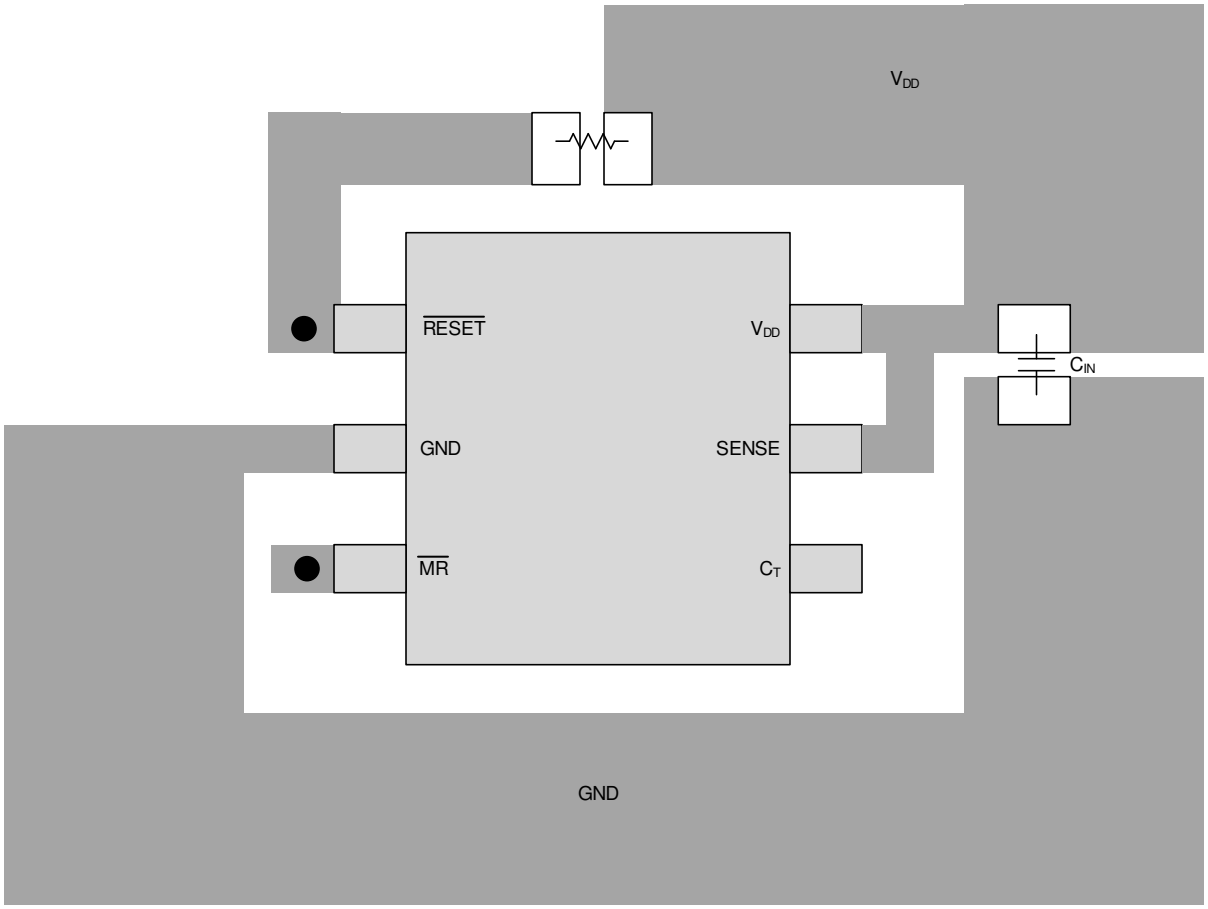


图 11-1. Layout Example for a 20-ms Delay

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 ZCC3808. The ZCC3808G01DBVEVM evaluation module (and related user guide) can be requested at the Texa sInstruments website through the product folders or purchased directly from the TI eStore.

12.2 Documentation Support

12.2.1 Related Documentation

- ZCC3808G01DBVEVM Evaluation Module User Guide. Literature number 5.

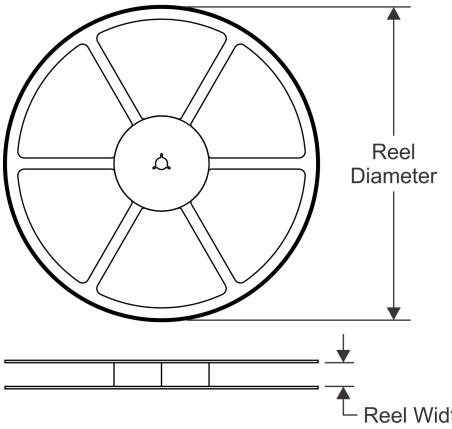
PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
FX1077	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVW	Samples
ZCC3808G01DBVR	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVW	Samples
ZCC3808G01DBVRG4	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVW	Samples
ZCC3808G01DBVT	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVW	Samples
ZCC3808G01DBVTG4	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVW	Samples
ZCC3808G01DRVR	ACTIVE	WSON	DRV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVW	Samples
ZCC3808G01DRVRG4	ACTIVE	WSON	DRV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVW	Samples
ZCC3808G01DRVT	ACTIVE	WSON	DRV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVW	Samples
ZCC3808G09DBVR	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVV	Samples
ZCC3808G09DBVRG4	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVV	Samples
ZCC3808G09DBVT	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVV	Samples
ZCC3808G09DBVTG4	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVV	Samples
ZCC3808G125DBVR	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	CAC	Samples
ZCC3808G125DBVT	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	CAC	Samples
ZCC3808G125DBVTG	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	CAC	Samples
4	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVY	Samples
ZCC3808G12DBVR	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVY	Samples
ZCC3808G12DBVRG4	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVY	Samples
ZCC3808G12DBVT	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVY	Samples
ZCC3808G12DBVTG4	ACTIVE	WSON	DRV	6	3000	RoHS & Green	NIPDAU | NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	AVY	Samples
ZCC3808G12DRVR											

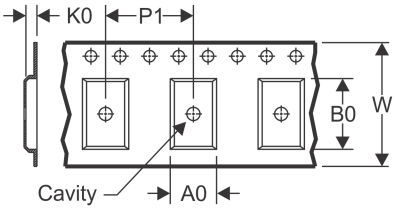
Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
ZCC3808G25DRVT	ACTIVE	WSON	DRV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVQ	Samples
ZCC3808G30DBVR	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVP	Samples
ZCC3808G30DBVRG	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVP	Samples
4	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVP	Samples
ZCC3808G30DBVT	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVP	Samples
ZCC3808G30DBVTG	ACTIVE	WSON	DRV	6	3000	RoHS & Green	NIPDAU | NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	AVP	Samples
4	ACTIVE	WSON	DRV	6	250	RoHS & Green	NIPDAU | NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	AVP	Samples
ZCC3808G30DRVR	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVO	Samples
ZCC3808G30DRVT	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVO	Samples
ZCC3808G33DBVR	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVO	Samples
ZCC3808G33DBVRG	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVO	Samples
4	ACTIVE	WSON	DRV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	SEC	Samples
ZCC3808G33DBVT	ACTIVE	WSON	DRV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	SEC	Samples
ZCC3808G33DBVTG	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVN	Samples
4	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVN	Samples
ZCC3808G33DRVR	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVN	Samples
ZCC3808G33DRVT	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AVN	Samples

TAPE AND REEL INFORMATION

REEL DIMENSIONS

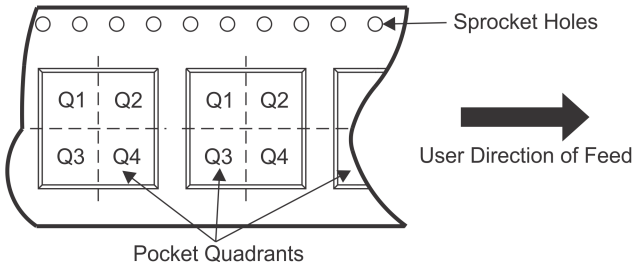


TAPE DIMENSIONS



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

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

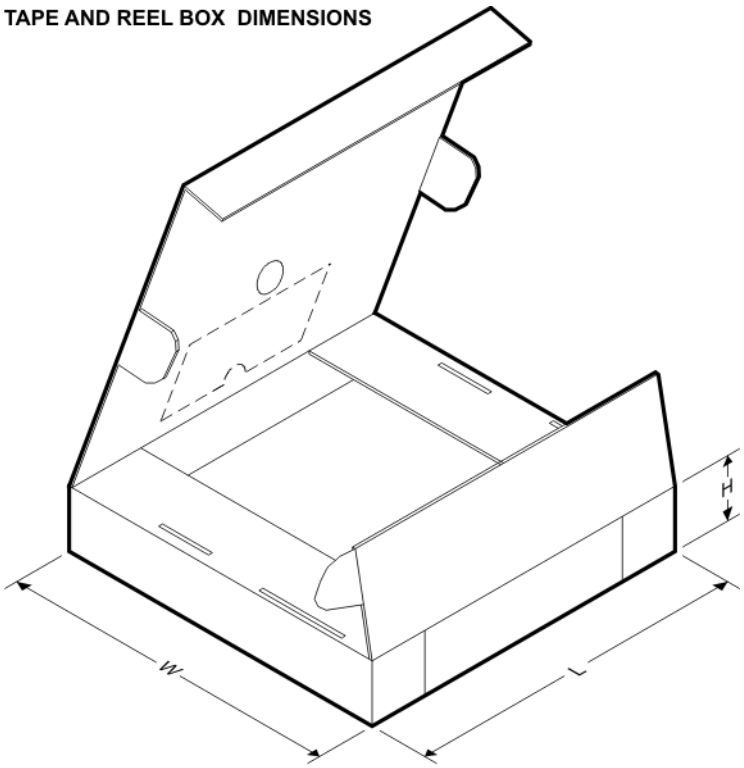


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
ZCC3808G01DBVR	SOT-23	DBV	6	3000	180.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
ZCC3808G01DBVT	SOT-23	DBV	6	250	180.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
ZCC3808G01DRVR	WSON	DRV	6	3000	178.0	8.4	2.25	2.25	1.0	4.0	8.0	Q2
ZCC3808G01DRVT	WSON	DRV	6	250	178.0	8.4	2.25	2.25	1.0	4.0	8.0	Q2
ZCC3808G01DRVT	WSON	DRV	6	250	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G09DBVR	SOT-23	DBV	6	3000	180.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
ZCC3808G09DBVR	SOT-23	DBV	6	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G09DBVT	SOT-23	DBV	6	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G09DBVT	SOT-23	DBV	6	250	180.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
ZCC3808G125DBVR	SOT-23	DBV	6	3000	179.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
ZCC3808G125DBVT	SOT-23	DBV	6	250	179.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
ZCC3808G12DBVR	SOT-23	DBV	6	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G12DBVT	SOT-23	DBV	6	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G12DRVR	WSON	DRV	6	3000	178.0	8.4	2.25	2.25	1.0	4.0	8.0	Q2
ZCC3808G12DRVR	WSON	DRV	6	3000	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G12DRVT	WSON	DRV	6	250	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G12DRVT	WSON	DRV	6	250	178.0	8.4	2.25	2.25	1.0	4.0	8.0	Q2
ZCC3808G15DBVR	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
ZCC3808G15DBVT	SOT-23	DBV	6	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G15DRVR	WSON	DRV	6	3000	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G15DRVT	WSON	DRV	6	250	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G18DBVR	SOT-23	DBV	6	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G18DBVR	SOT-23	DBV	6	3000	180.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
ZCC3808G18DBVT	SOT-23	DBV	6	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G18DBVT	SOT-23	DBV	6	250	180.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
ZCC3808G18DRVR	WSON	DRV	6	3000	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G18DRVT	WSON	DRV	6	250	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G19DBVR	SOT-23	DBV	6	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G19DBVT	SOT-23	DBV	6	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G25DBVR	SOT-23	DBV	6	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G25DBVT	SOT-23	DBV	6	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G25DRVR	WSON	DRV	6	3000	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G25DRVT	WSON	DRV	6	250	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G30DBVR	SOT-23	DBV	6	3000	180.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
ZCC3808G30DBVR	SOT-23	DBV	6	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G30DBVT	SOT-23	DBV	6	250	180.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
ZCC3808G30DBVT	SOT-23	DBV	6	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G30DRVR	WSON	DRV	6	3000	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G30DRVR	WSON	DRV	6	3000	178.0	8.4	2.25	2.25	1.0	4.0	8.0	Q2
ZCC3808G30DRVT	WSON	DRV	6	250	178.0	8.4	2.25	2.25	1.0	4.0	8.0	Q2
ZCC3808G30DRVT	WSON	DRV	6	250	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G33DBVR	SOT-23	DBV	6	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G33DBVT	SOT-23	DBV	6	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G33DRVR	WSON	DRV	6	3000	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G33DRVT	WSON	DRV	6	250	179.0	8.4	2.2	2.2	1.2	4.0	8.0	Q2
ZCC3808G50DBVR	SOT-23	DBV	6	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
ZCC3808G50DBVT	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)
ZCC3808G01DBVR	SOT-23	DBV	6	3000	210.0	185.0	35.0
ZCC3808G01DBVT	SOT-23	DBV	6	250	210.0	185.0	35.0
ZCC3808G01DRVR	WSON	DRV	6	3000	205.0	200.0	33.0
ZCC3808G01DRVT	WSON	DRV	6	250	205.0	200.0	33.0
ZCC3808G01DRVT	WSON	DRV	6	250	203.0	203.0	35.0
ZCC3808G09DBVR	SOT-23	DBV	6	3000	210.0	185.0	35.0
ZCC3808G09DBVR	SOT-23	DBV	6	3000	180.0	180.0	18.0
ZCC3808G09DBVT	SOT-23	DBV	6	250	180.0	180.0	18.0
ZCC3808G09DBVT	SOT-23	DBV	6	250	210.0	185.0	35.0
ZCC3808G125DBVR	SOT-23	DBV	6	3000	200.0	183.0	25.0
ZCC3808G125DBVT	SOT-23	DBV	6	250	200.0	183.0	25.0
ZCC3808G12DBVR	SOT-23	DBV	6	3000	180.0	180.0	18.0
ZCC3808G12DBVT	SOT-23	DBV	6	250	180.0	180.0	18.0
ZCC3808G12DRVR	WSON	DRV	6	3000	205.0	200.0	33.0
ZCC3808G12DRVR	WSON	DRV	6	3000	200.0	183.0	25.0
ZCC3808G12DRVT	WSON	DRV	6	250	203.0	203.0	35.0
ZCC3808G12DRVT	WSON	DRV	6	250	205.0	200.0	33.0
ZCC3808G15DBVR	SOT-23	DBV	6	3000	180.0	180.0	18.0
ZCC3808G15DBVT	SOT-23	DBV	6	250	180.0	180.0	18.0
ZCC3808G15DRVR	WSON	DRV	6	3000	200.0	183.0	25.0

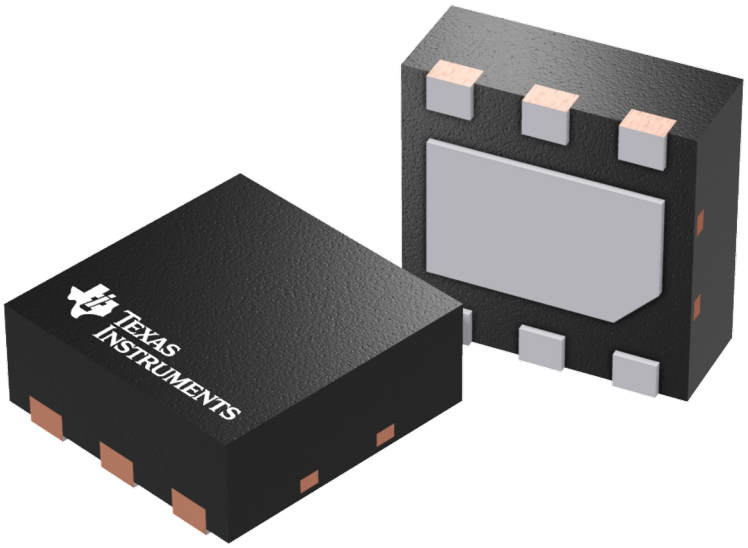
PACKAGE MATERIALS INFORMATION

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
ZCC3808G15DRVT	WSON	DRV	6	250	200.0	183.0	25.0
ZCC3808G18DBVR	SOT-23	DBV	6	3000	180.0	180.0	18.0
ZCC3808G18DBVR	SOT-23	DBV	6	3000	210.0	185.0	35.0
ZCC3808G18DBVT	SOT-23	DBV	6	250	180.0	180.0	18.0
ZCC3808G18DBVT	SOT-23	DBV	6	250	210.0	185.0	35.0
ZCC3808G18DRVR	WSON	DRV	6	3000	200.0	183.0	25.0
ZCC3808G18DRVT	WSON	DRV	6	250	200.0	183.0	25.0
ZCC3808G19DBVR	SOT-23	DBV	6	3000	180.0	180.0	18.0
ZCC3808G19DBVT	SOT-23	DBV	6	250	180.0	180.0	18.0
ZCC3808G25DBVR	SOT-23	DBV	6	3000	180.0	180.0	18.0
ZCC3808G25DBVT	SOT-23	DBV	6	250	180.0	180.0	18.0
ZCC3808G25DRVR	WSON	DRV	6	3000	203.0	203.0	35.0
ZCC3808G25DRVT	WSON	DRV	6	250	200.0	183.0	25.0
ZCC3808G30DBVR	SOT-23	DBV	6	3000	210.0	185.0	35.0
ZCC3808G30DBVR	SOT-23	DBV	6	3000	180.0	180.0	18.0
ZCC3808G30DBVT	SOT-23	DBV	6	250	210.0	185.0	35.0
ZCC3808G30DBVT	SOT-23	DBV	6	250	180.0	180.0	18.0
ZCC3808G30DRVR	WSON	DRV	6	3000	203.0	203.0	35.0
ZCC3808G30DRVR	WSON	DRV	6	3000	205.0	200.0	33.0
ZCC3808G30DRVT	WSON	DRV	6	250	205.0	200.0	33.0
ZCC3808G30DRVT	WSON	DRV	6	250	203.0	203.0	35.0
ZCC3808G33DBVR	SOT-23	DBV	6	3000	180.0	180.0	18.0
ZCC3808G33DBVT	SOT-23	DBV	6	250	180.0	180.0	18.0
ZCC3808G33DRVR	WSON	DRV	6	3000	200.0	183.0	25.0
ZCC3808G33DRVT	WSON	DRV	6	250	200.0	183.0	25.0
ZCC3808G50DBVR	SOT-23	DBV	6	3000	180.0	180.0	18.0
ZCC3808G50DBVT	SOT-23	DBV	6	250	180.0	180.0	18.0

GENERIC PACKAGE VIEW

DRV 6 WSON - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



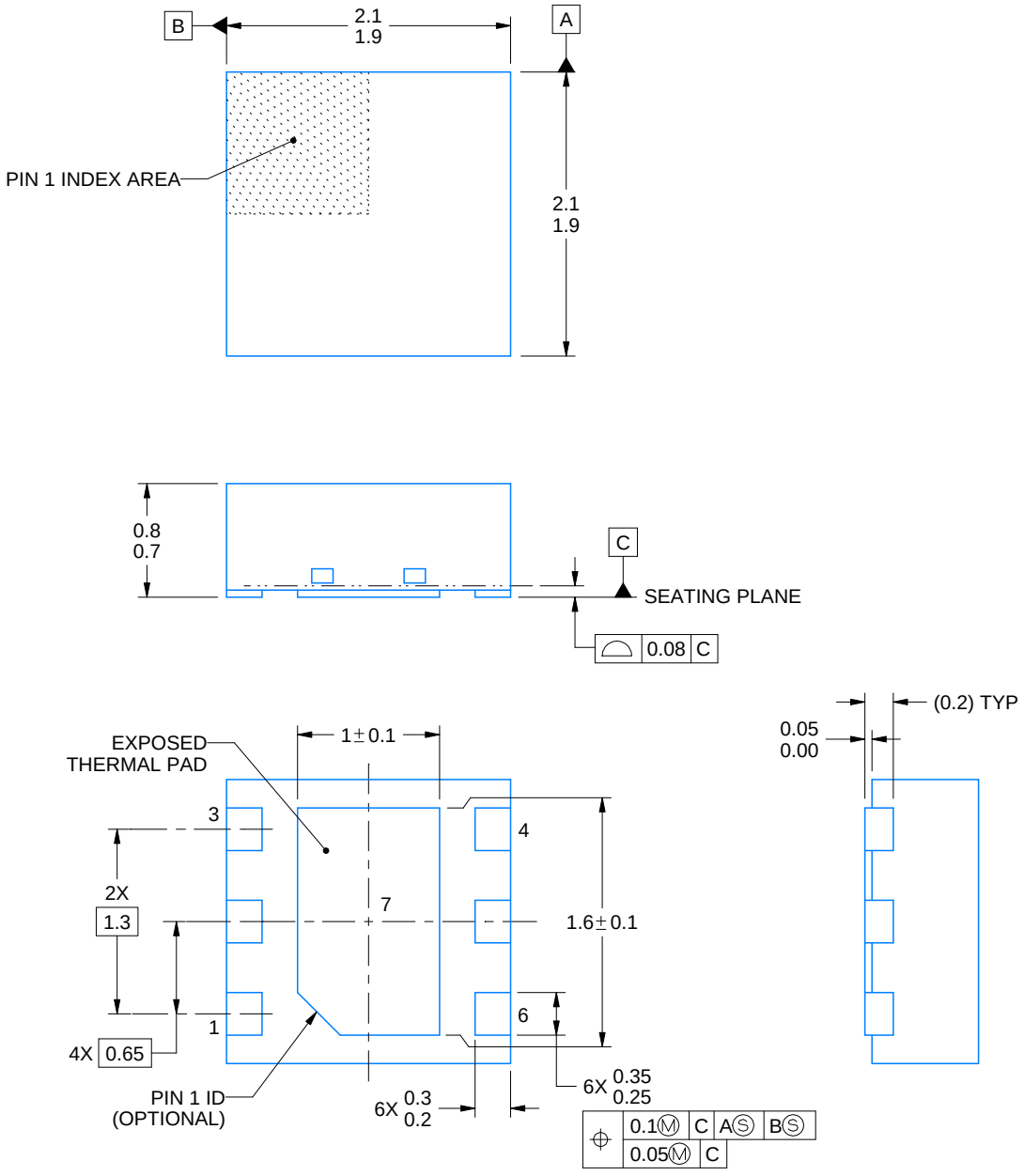
Images above are just a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.

DRV0006A

PACKAGE OUTLINE

WSON - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



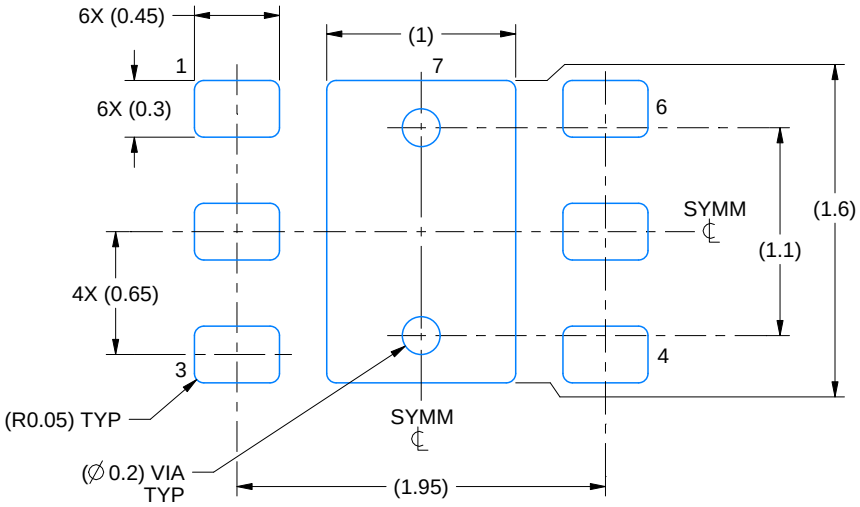
4222173/B 04/2018

EXAMPLE BOARD LAYOUT

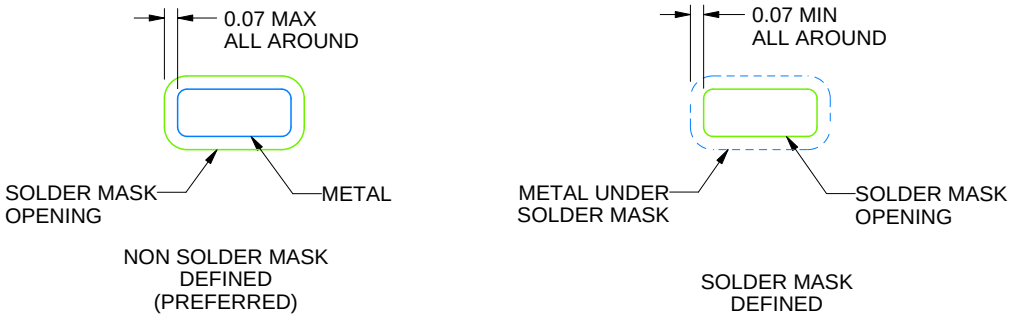
DRV0006A

WSON - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE
SCALE:25X



SOLDER MASK DETAILS

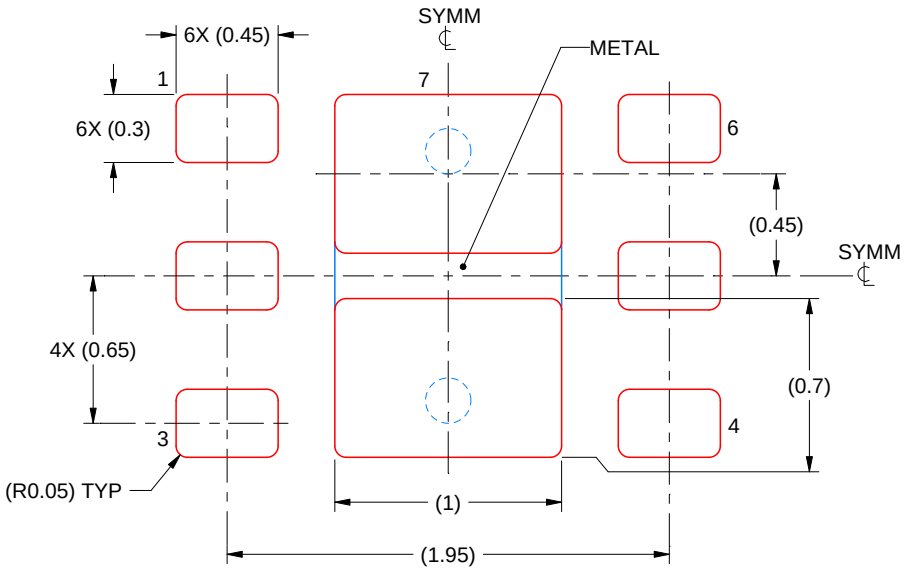
4222173/B 04/2018

EXAMPLE STENCIL DESIGN

DRV0006A

WSON - 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)

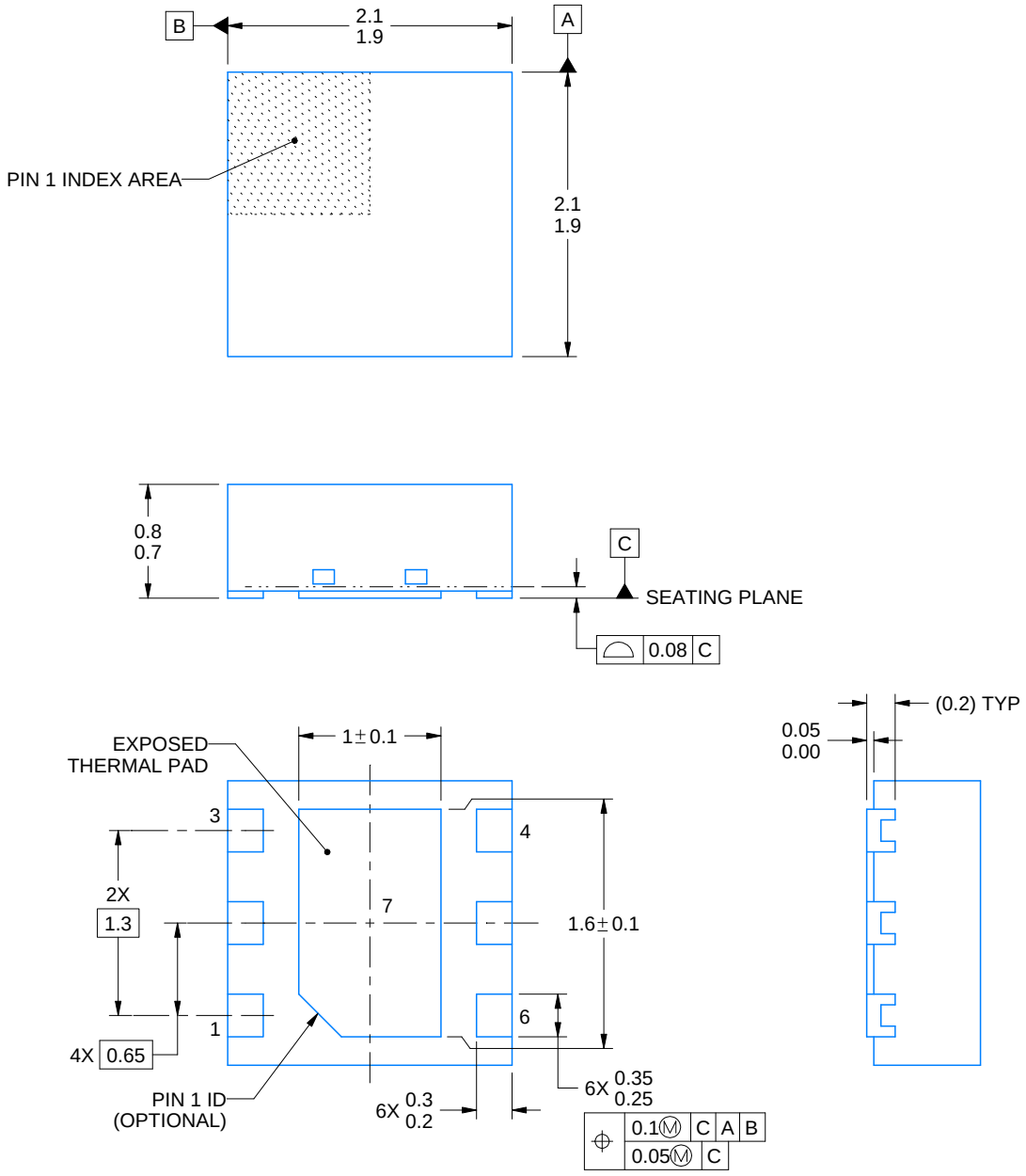
6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

PACKAGE OUTLINE

DRV0006D

WSON - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



4225563/A 12/2019

NOTES:

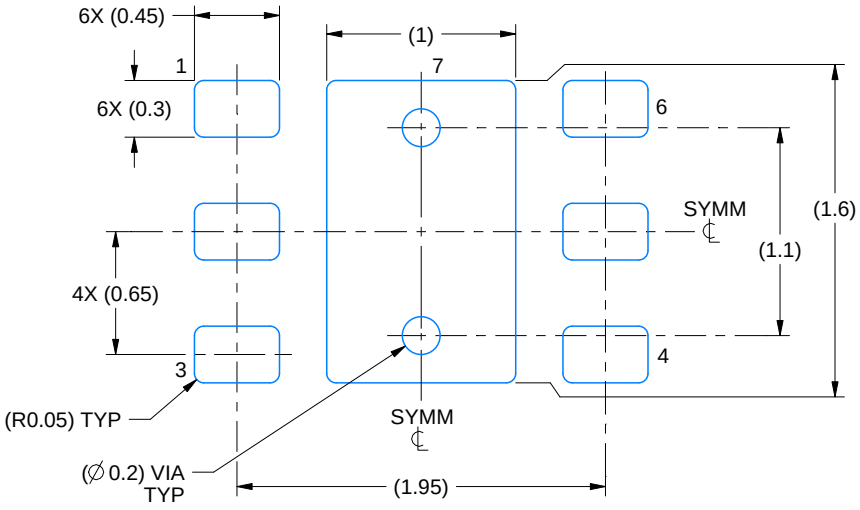
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

EXAMPLE BOARD LAYOUT

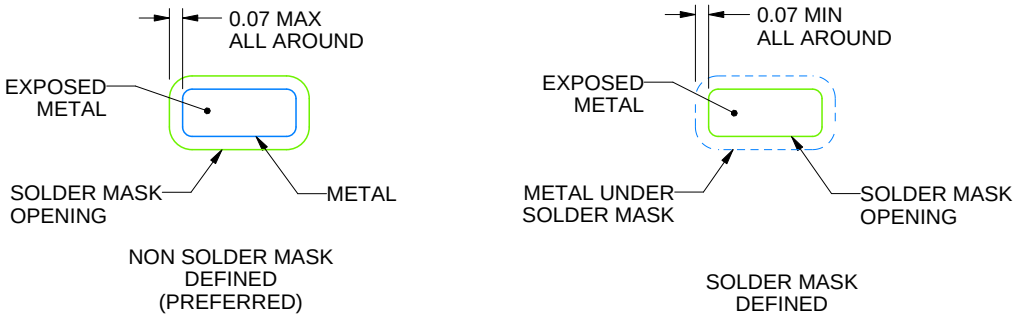
DRV0006D

WSON - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:25X



SOLDER MASK DETAILS

4225563/A 12/2019

NOTES: (continued)

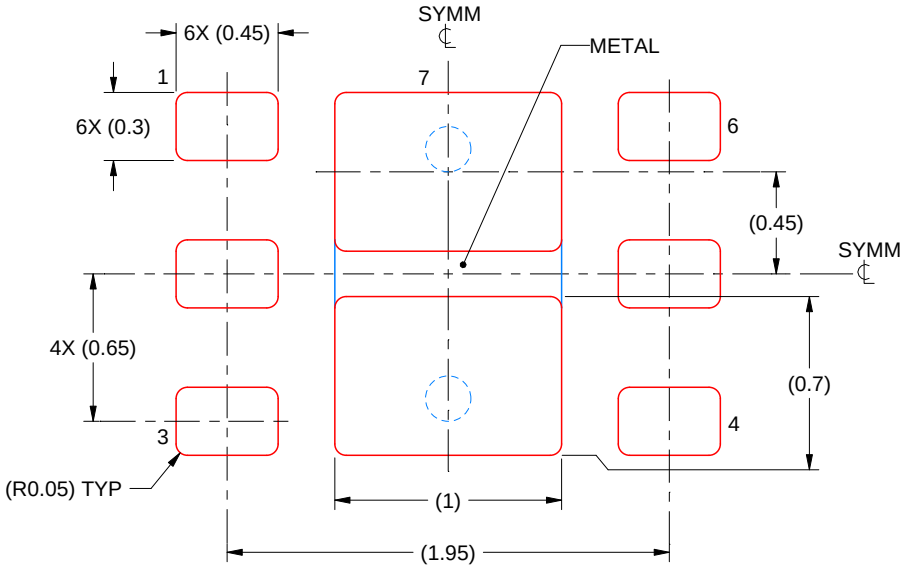
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
5. Vias are optional depending on application, refer to device data sheet. If some or all are implemented, recommended via locations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

EXAMPLE STENCIL DESIGN

DRV0006D

WSON - 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

4225563/A 12/2019

NOTES: (continued)

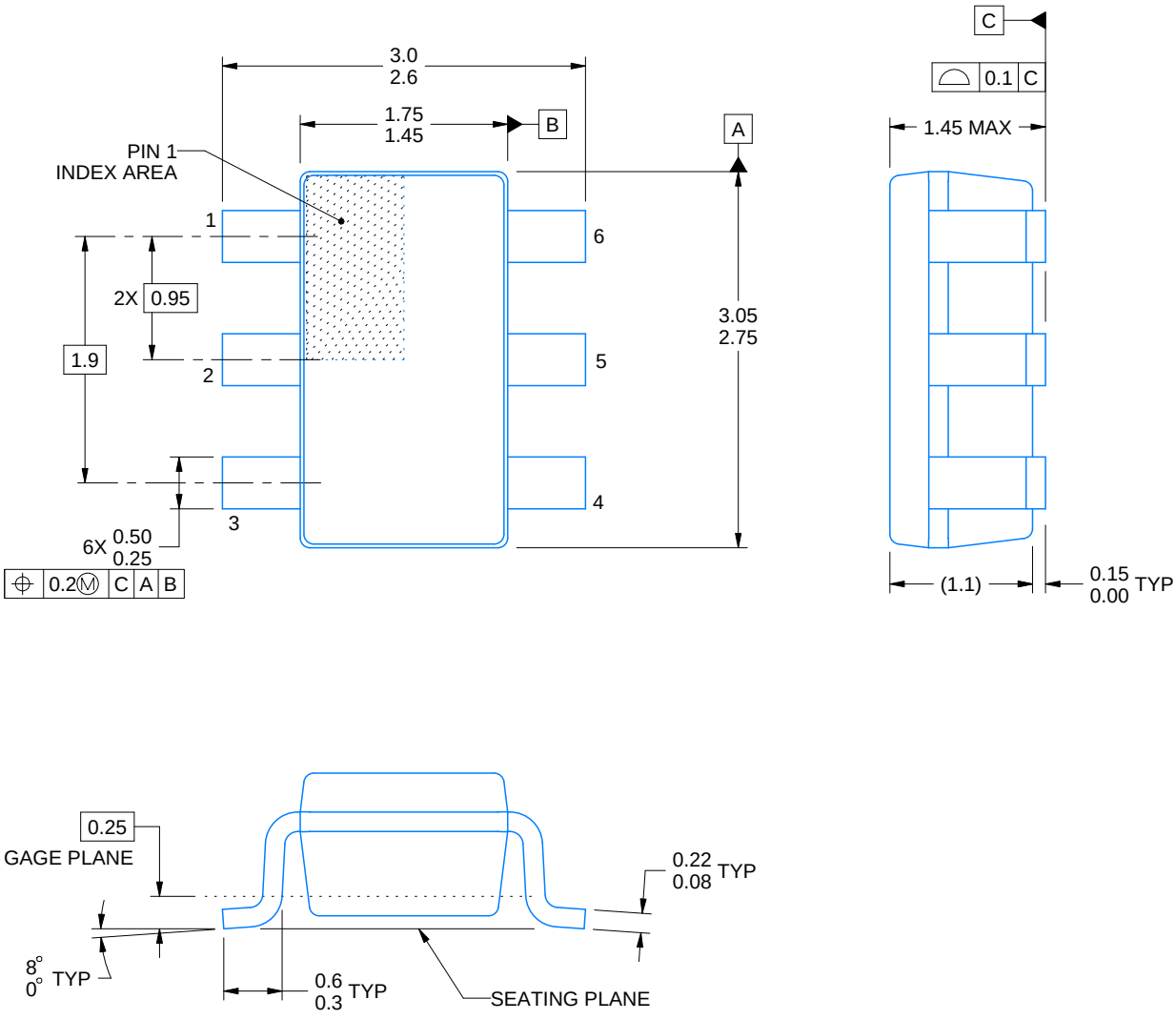
6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

PACKAGE OUTLINE

DBV0006A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



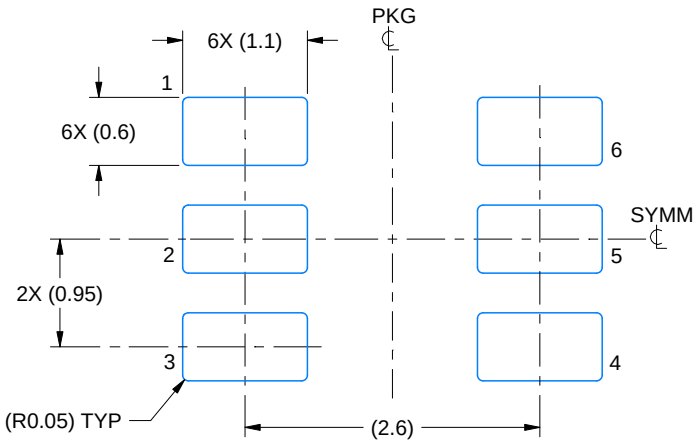
4214840/C 06/2021

EXAMPLE BOARD LAYOUT

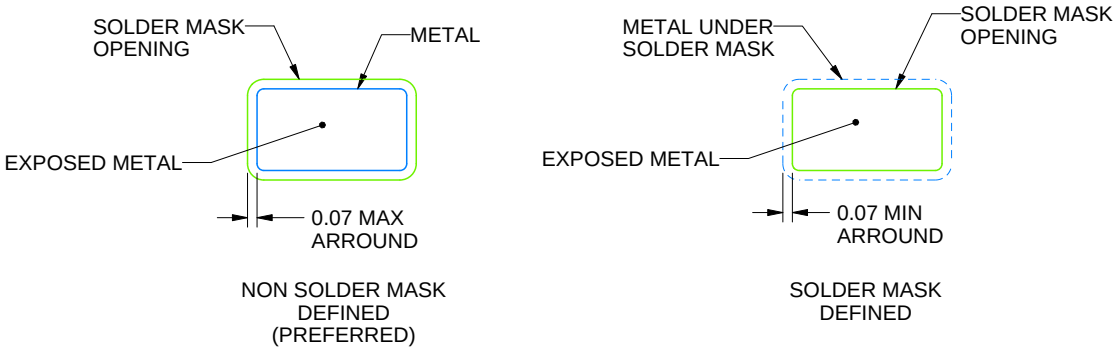
DBV0006A

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)

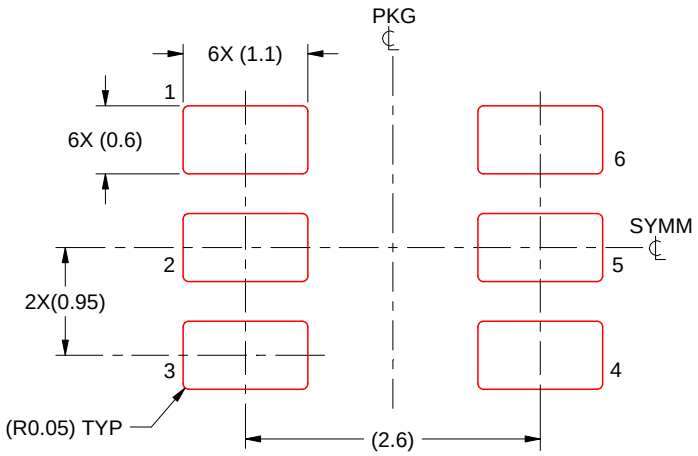
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

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.