

TLV809

3-Pin Supply Voltage Supervisor

1 Features

- Precision supply voltage monitor: 2.5 V, 3 V, 3.3 V, 5 V
- Power-on reset generator with a fixed delay time of 200 ms
- Supply current: 9 μ A (typical)
- Temperature range: -40°C to $+85^{\circ}\text{C}$
- 3-Pin SOT-23 package
- Pin-for-pin compatible with the MAX809

2 Applications

- [Factory automation](#)
- [Portable and battery-powered equipment](#)
- [Set-top boxes](#)
- [Servers](#)
- [Appliances](#)
- [Electricity meters](#)
- [Building automation](#)

3 Description

The TLV809 family of supervisory circuits provides circuit initialization and timing supervision, primarily for digital signal processors (DSPs) and processor-based systems. The newer [TLV809E](#) device is a pin-to-pin compatible alternative.

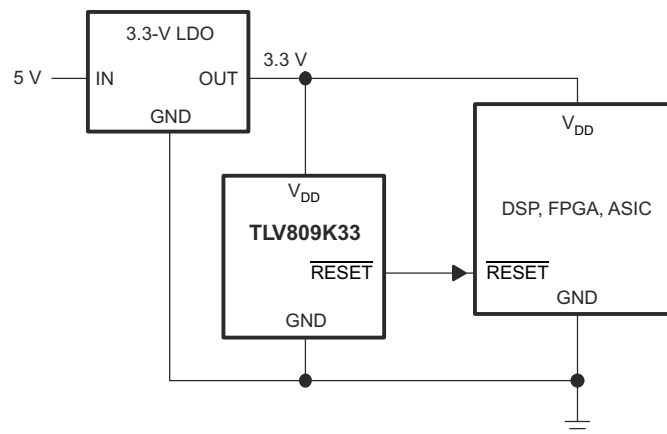
During power-on, $\overline{\text{RESET}}$ is asserted when the supply voltage (V_{DD}) becomes greater than 1.1 V. Thereafter, the supervisory circuit monitors V_{DD} and keeps $\overline{\text{RESET}}$ active as long as V_{DD} remains below the threshold voltage, V_{IT} . An internal timer delays the return of the output to the inactive state (high) to ensure proper system reset. The delay time ($t_{\text{d(typ)}} = 200 \text{ ms}$) starts after V_{DD} rises above the threshold voltage, V_{IT} . When the supply voltage drops below the V_{IT} threshold voltage, the output becomes active (low) again. No external components are required. All devices in this family have a fixed sense-threshold voltage (V_{IT}) set by an internal voltage divider.

This product family is designed for supply voltages of 2.5 V, 3 V, 3.3 V, and 5 V. The circuits are available in a 3-pin SOT-23 package. The TLV809 devices are characterized for operation over a temperature range of -40°C to $+85^{\circ}\text{C}$.

Device Information

| PART NUMBER | PACKAGE (1) | BODY SIZE (NOM) |
|-------------|-----------------|--------------------------|
| TLV809 | SOT-23 (3), DBV | 2.90 mm \times 1.60 mm |
| | SOT-23 (3), DBZ | 2.92 mm \times 1.30 mm |

(1) For all available packages, see the orderable addendum at the end of the data sheet.



Typical Application



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4 Revision History

Changes from Revision E (November 2020) to Revision F (December 2020)

Page

- Corrected missed change of VDD from 7 to 6.5 in *Absolute Maximum Ratings* for all other pins and in note2...
5

Changes from Revision D (March 2016) to Revision E (November 2020)

Page

- Updated the numbering format for tables, figures, and cross-references throughout the document..... 1
- Updated the *Description* section..... 1
- Updated *Device Comparison* 4
- Changed VDD from 7 to 6.5 in *Absolute Maximum Ratings* 5
- Changed V_{OL} @ 500 μ A from 0.2 to 0.3 in *Electrical Characteristics* 6
- Changed t_w pulse duration from 3 to 10 μ s in *Timing Requirements* 6
- Changed t_{PHL} from 1 to 10 μ s in *Switching Characteristics* 6
- Deleted figure for Minimum Pulse Duration At V_{DD} in Typical Characteristics..... 8
- Changed figure from Pulse Duration to V_{OL} , I_{OL} in the Typical Application Section..... 11

Changes from Revision C (February 2012) to Revision D (March 2016)

Page

- Added *Device Information* table, *Pin Configuration and Functions* section, *ESD Ratings* table, *Overview* section, *Feature Description* section, *Device Functional Modes* section, *Application and Implementation* section, *Power Supply Recommendations* section, *Layout* section, *Device and Documentation Support* section, and *Mechanical, Packaging, and Orderable Information* section..... 1
- Deleted pinout drawing from page 1 1
- Changed *Description* section: added third paragraph and changed section wording for clarity..... 1
- Deleted soldering temperature parameter from *Absolute Maximum Ratings* table 5
- Changed I_{DD} parameter test conditions in *Electrical Characteristics* table 6

Changes from Revision B (September 2010) to Revision C (February 2012)

Page

- Updated ordering information 4

Changes from Revision A (July 2010) to Revision B (September 2010)**Page**

| | |
|---|---|
| • Updated document format to current standards..... | 1 |
| • Added DBZ package to pinout figure..... | 1 |
| • Added <i>Thermal Information</i> table..... | 5 |
| • Changed Figure 7-3 | 8 |

5 Device Comparison

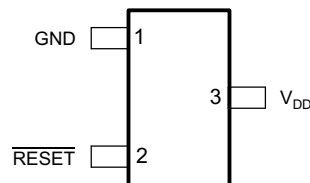
Table 5-1. Device Threshold Options

| PRODUCT | THRESHOLD VOLTAGE |
|-----------|-------------------|
| TLV809J25 | 2.25 V |
| TLV809L30 | 2.64 V |
| TLV809K33 | 2.93 V |
| TLV809I50 | 4.55 V |

Table 5-2. Device Family Comparison

| DEVICE | FUNCTION |
|--------|--|
| TLV803 | Open-Drain, $\overline{\text{RESET}}$ Output |
| TLV809 | Push-Pull, $\overline{\text{RESET}}$ Output |
| TLV810 | Push-Pull, RESET Output |

6 Pin Configuration and Functions



**Figure 6-1. DBV, DBZ Packages
3-Pin SOT-23
Top View**

Pin Functions

| PIN | | I/O | DESCRIPTION |
|-----|----------|-----|--|
| NO. | NAME | | |
| 1 | GND | — | Ground pin. This pin must be connected to ground with a low-impedance connection. |
| 2 | RESET | O | $\overline{\text{RESET}}$ pin. $\overline{\text{RESET}}$ is an active low signal, asserting when V_{DD} is below the threshold voltage. When V_{DD} rises above V_{IT} , there is a delay time (t_d) until $\overline{\text{RESET}}$ deasserts. $\overline{\text{RESET}}$ is a push-pull output stage. |
| 3 | V_{DD} | I | Supply voltage pin. A 0.1- μF ceramic capacitor from this pin to ground is recommended to improve stability of the threshold voltage. |

7 Specifications

7.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

| | | MIN | MAX | UNIT |
|------------------|--|------|-----|------|
| V _{DD} | Supply voltage ⁽²⁾ | | 6.5 | V |
| | All other pins ⁽²⁾ | -0.3 | 6.5 | |
| I _{OL} | Maximum low output current | | 5 | mA |
| I _{OH} | Maximum high output current | | -5 | mA |
| I _{IK} | Input clamp current (V _I < 0 or V _I > V _{DD}) | | ±20 | mA |
| I _{OK} | Output clamp current (V _O < 0 or V _O > V _{DD}) | | ±20 | mA |
| T _A | Operating free-air temperature | -40 | 85 | °C |
| T _{stg} | Storage temperature | -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) All voltage values are with respect to GND. For reliable operation, do not operate the device at 6.5 V for more than t = 1000h continuously.

7.2 ESD Ratings

| | | | VALUE | UNIT |
|--------------------|-------------------------|--|-------|------|
| V _(ESD) | Electrostatic discharge | Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001 ⁽¹⁾ | ±2000 | V |
| | | Charged-device model (CDM), per JEDEC specification JESD22-C101 ⁽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

at specified temperature range (unless otherwise noted)

| | | MIN | NOM | MAX | UNIT |
|-----------------|--------------------------------------|-----|-----|-----|------|
| V _{DD} | Supply voltage | 2 | | 6 | V |
| C _{IN} | V _{DD} bypass capacitor | | 0.1 | | µF |
| T _A | Operating free-air temperature range | -40 | | 85 | °C |

7.4 Thermal Information

| THERMAL METRIC ⁽¹⁾ | | TLV809 | | UNIT |
|-------------------------------|--|--------------|--------------|------|
| | | DBV (SOT-23) | DBZ (SOT-23) | |
| | | 3 PINS | 3 PINS | |
| R _{θJA} | Junction-to-ambient thermal resistance | 242.1 | 286.9 | °C/W |
| R _{θJC(top)} | Junction-to-case (top) thermal resistance | 213.0 | 105.6 | °C/W |
| R _{θJB} | Junction-to-board thermal resistance | 123.4 | 124.4 | °C/W |
| ψ _{JT} | Junction-to-top characterization parameter | 45.7 | 25.8 | °C/W |
| ψ _{JB} | Junction-to-board characterization parameter | 130.9 | 107.9 | °C/W |
| R _{θJC(bot)} | Junction-to-case (bottom) thermal resistance | — | — | °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

at $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$ (unless otherwise noted); typical values are at $T_A = 25^\circ\text{C}$

| PARAMETER | | TEST CONDITIONS | MIN | TYP | MAX | UNIT | |
|---------------------------------------|---|---|----------------|------|------|---------------|---|
| V_{OH} | High-level output voltage | $V_{DD} = 2.5\text{ V to }6\text{ V}, I_{OH} = -500\ \mu\text{A}$ | $V_{DD} - 0.2$ | | | V | |
| | | $V_{DD} = 3.3\text{ V}, I_{OH} = -2\text{ mA}$ | $V_{DD} - 0.4$ | | | | |
| | | $V_{DD} = 6\text{ V}, I_{OH} = -4\text{ mA}$ | $V_{DD} - 0.4$ | | | | |
| V_{OL} | Low-level output voltage | $V_{DD} = 2\text{ V to }6\text{ V}, I_{OH} = 500\ \mu\text{A}$ | 0.3 | | | V | |
| | | $V_{DD} = 3.3\text{ V}, I_{OH} = 2\text{ mA}$ | 0.4 | | | | |
| | | $V_{DD} = 6\text{ V}, I_{OH} = 4\text{ mA}$ | 0.4 | | | | |
| Power-up reset voltage ⁽¹⁾ | | $V_{DD} \geq 1.1\text{ V}, I_{OL} = 50\ \mu\text{A}$ | 0.2 | | | V | |
| V_{IT-} | Negative-going input threshold voltage ⁽²⁾ | $T_A = -40^\circ\text{C to }+85^\circ\text{C}$ | TLV809J25 | 2.20 | 2.25 | 2.30 | V |
| | | | TLV809L30 | 2.58 | 2.64 | 2.70 | |
| | | | TLV809K33 | 2.87 | 2.93 | 2.99 | |
| | | | TLV809I50 | 4.45 | 4.55 | 4.65 | |
| V_{hys} | Hysteresis | | TLV809J25 | 30 | | mV | |
| | | | TLV809L30 | 35 | | | |
| | | | TLV809K33 | 40 | | | |
| | | | TLV809I50 | 60 | | | |
| I_{DD} | Supply current | $V_{DD} = 2\text{ V}, \overline{\text{RESET}}$ is unconnected | 9 | | 12 | μA | |
| | | $V_{DD} = 6\text{ V}, \overline{\text{RESET}}$ is unconnected | 20 | | 25 | | |
| C_I | Input capacitance | $V_I = 0\text{ V to }V_{DD}$ | 5 | | | pF | |

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

(2) To ensure best stability of the threshold voltage, place a bypass capacitor (0.1- μF ceramic) near the supply pins.

7.6 Timing Requirements

at $T_A = 25^\circ\text{C}$, $R_L = 1\text{ M}\Omega$, and $C_L = 50\text{ pF}$

| | | MIN | NOM | MAX | UNIT |
|-------|----------------------------|--|-----|-----|---------------|
| t_w | Pulse duration at V_{DD} | $V_{DD} = V_{IT-} + 0.2\text{ V}, V_{DD} = V_{IT-} - 0.2\text{ V}$ | | 10 | μs |

7.7 Switching Characteristics

at $T_A = 25^\circ\text{C}$, $R_L = 1\text{ M}\Omega$, and $C_L = 50\text{ pF}$

| PARAMETER | | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------|--|---|-----|-----|-----|---------------|
| t_d | Delay time | $V_{DD} \geq V_{IT-} + 0.2\text{ V}$; see Figure 7-1 | 120 | 200 | 280 | ms |
| t_{PHL} | Propagation (delay) time, high-to-low-level output | V_{DD} to $\overline{\text{RESET}}$ delay $V_{IL} = V_{IT-} - 0.2\text{ V}, V_{IH} = V_{IT-} + 0.2\text{ V}$ | 10 | | | μs |

7.8 Timing Diagrams

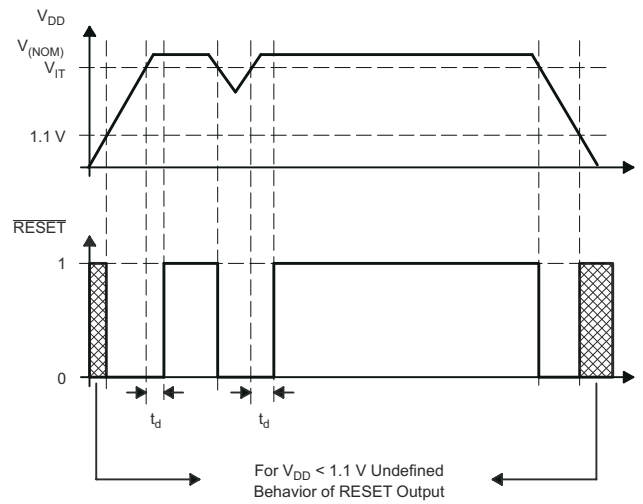


Figure 7-1. Timing Diagram

7.9 Typical Characteristics

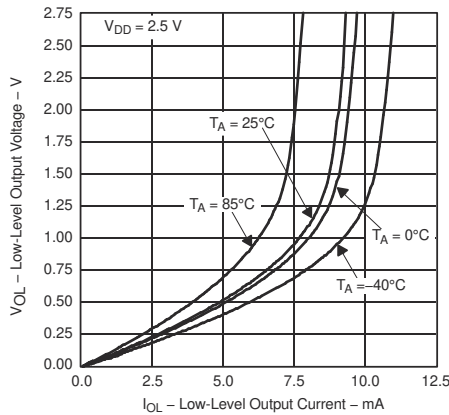


Figure 7-2. Low-Level Output Voltage vs Low-Level Output Current

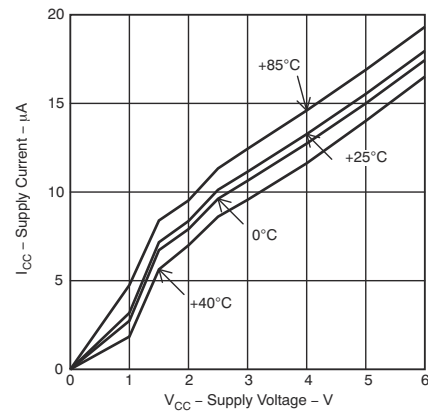


Figure 7-3. Supply Current vs Supply Voltage

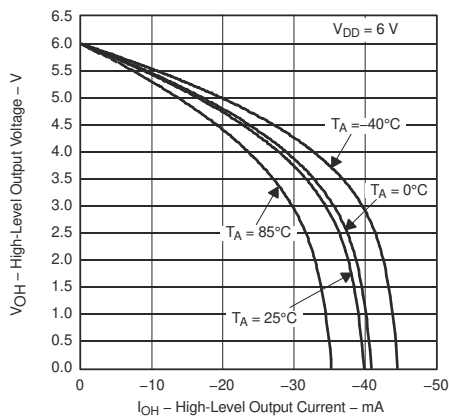


Figure 7-4. High-Level Output Voltage vs High-Level Output Current

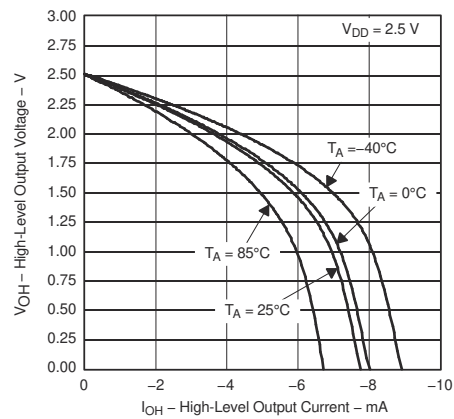


Figure 7-5. High-Level Output Voltage vs High-Level Output Current

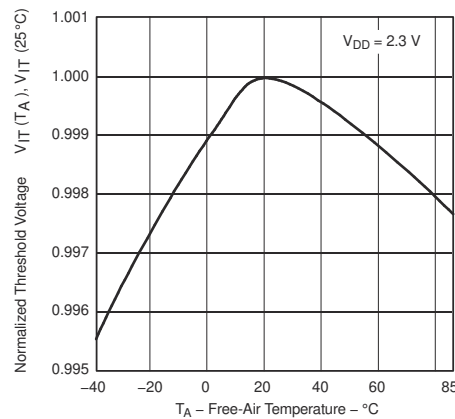


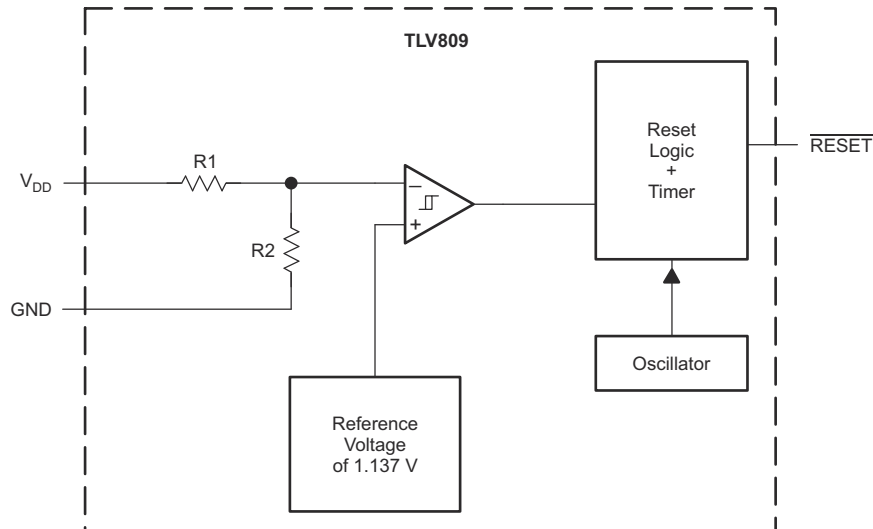
Figure 7-6. Normalized Input Threshold Voltage vs Free-Air Temperature at V_{DD}

8 Detailed Description

8.1 Overview

The TLV809 is a 3-pin voltage detector with fixed detection thresholds, an active-low push-pull $\overline{\text{RESET}}$ output, and an internal timer to delay the $\overline{\text{RESET}}$ signal when V_{DD} rises above the threshold voltage.

8.2 Functional Block Diagram



8.3 Feature Description

8.3.1 Supply Voltage Monitoring

The device actively monitors its supply voltage to ensure that the power supply is above a certain voltage threshold.

The device offers various fixed threshold options that are approximately 10% below several standard supply voltages (2.5 V, 3.0 V, 3.3 V, 5.0 V).

8.3.2 $\overline{\text{RESET}}$ Output

The device has a $\overline{\text{RESET}}$ output to indicate the status of the input power supply.

$\overline{\text{RESET}}$ is an active low signal, asserting when V_{DD} is below the threshold voltage. When V_{DD} rises above V_{IT} , there is a delay time (t_d) until $\overline{\text{RESET}}$ deasserts.

$\overline{\text{RESET}}$ is a push-pull output stage.

8.4 Device Functional Modes

When the input supply voltage is in its recommended operating range (2 V to 6 V), the device is in a normal operational mode. In normal operational mode the device monitors V_{DD} for undervoltage detection.

When the input supply is below its recommended operating range, the device is in shutdown mode and therefore tries to assert $\overline{\text{RESET}}$.

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, as well as validating and testing their design implementation to confirm system functionality.

9.1 Application Information

9.1.1 V_{DD} Transient Rejection

The device has built-in rejection of fast transients on the V_{DD} pin. The rejection of transients depends on both the duration and the amplitude of the transient. The amplitude of the transient is measured from the bottom of the transient to the negative threshold voltage of the device, as shown in Figure 9-1.

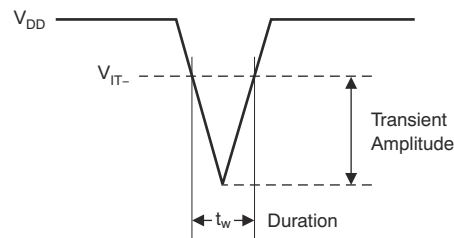


Figure 9-1. Voltage Transient Measurement

The device does not respond to transients that are fast duration and low amplitude or long duration and small amplitude. Transients meeting or longer than the t_w specified in the Section 7.6 section triggers a reset.

9.1.2 Reset During Power-Up and Power-Down

The device output is valid when V_{DD} is greater than 1.1 V. When V_{DD} is less than 1.1 V, the output transistor turns off and becomes high impedance. The voltage on the $\overline{\text{RESET}}$ pin rises to the voltage level connected to the pullup resistor. Figure 9-2 shows a typical waveform for power-up.

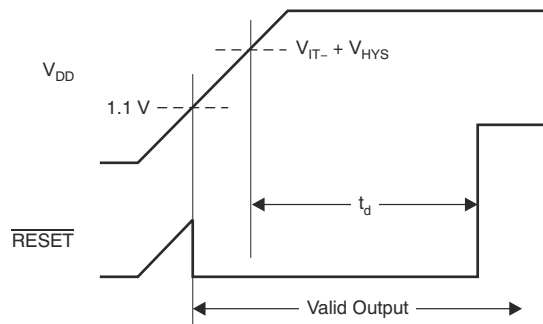


Figure 9-2. Power-Up Response

9.2 Typical Application

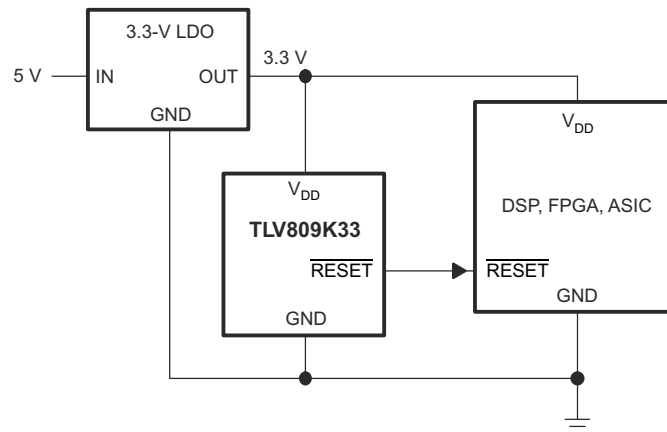


Figure 9-3. Monitoring a 3.3-V Supply

9.2.1 Design Requirements

The device must ensure that the supply voltage does not drop more than 15% below 3.3 V. If the supply voltage falls below 3.3 V – 15%, then the load must be disabled.

9.2.2 Detailed Design Procedure

The TLV809K33 is selected to ensure that V_{DD} is greater than 2.87 V when the load is enabled.

9.2.3 Application Curve

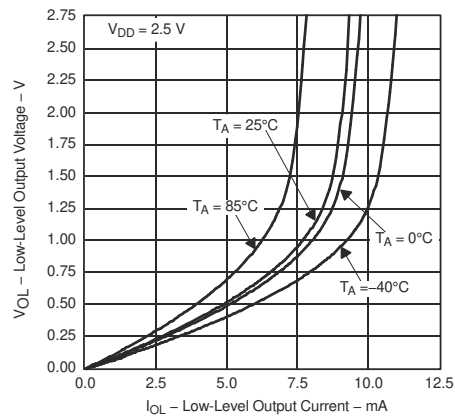


Figure 9-4. Low-Level Output Voltage vs Low-Level Output Current

10 Power Supply Recommendations

Power the device with a low-impedance supply. A 0.1- μF bypass capacitor from V_{DD} to ground is recommended.

11 Layout

11.1 Layout Guidelines

Place the device near the load for the input power supply, with a low-impedance connection to the power supply pins of the load to sense the supply voltage.

11.2 Layout Example

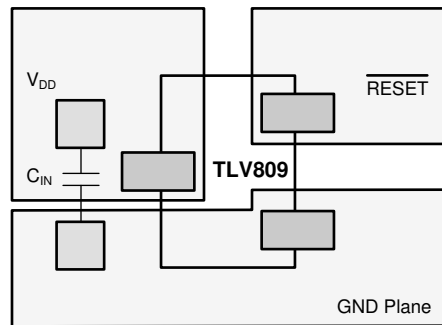


Figure 11-1. Example Layout

12 Device and Documentation Support

12.1 Documentation Support

12.1.1 Related Documentation

TLV803 Data Sheet, [SBVS157](#)

TLV810 Data Sheet, [SBVS158](#)

12.2 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.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

12.3 Trademarks

TI E2E™ is a trademark of Texas Instruments.

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12.4 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.

12.5 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 revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGING INFORMATION

| Orderable part number | Status (1) | Material type (2) | Package Pins | Package qty Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|-------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| TLV809I50DBVR | Active | Production | SOT-23 (DBV) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTBI |
| TLV809I50DBVR.A | Active | Production | SOT-23 (DBV) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTBI |
| TLV809I50DBVT | Active | Production | SOT-23 (DBV) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTBI |
| TLV809I50DBVT.A | Active | Production | SOT-23 (DBV) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTBI |
| TLV809I50DBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | BCMV |
| TLV809I50DBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | BCMV |
| TLV809I50DBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | BCMV |
| TLV809I50DBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | BCMV |
| TLV809J25DBVR | Active | Production | SOT-23 (DBV) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTCI |
| TLV809J25DBVR.A | Active | Production | SOT-23 (DBV) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTCI |
| TLV809J25DBVT | Active | Production | SOT-23 (DBV) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTCI |
| TLV809J25DBVT.A | Active | Production | SOT-23 (DBV) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTCI |
| TLV809J25DBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | BCMT |
| TLV809J25DBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | BCMT |
| TLV809J25DBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU NIPDAUAG SN | Level-1-260C-UNLIM | -40 to 85 | BCMT |
| TLV809J25DBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | BCMT |
| TLV809K33DBVR | Active | Production | SOT-23 (DBV) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTRI |
| TLV809K33DBVR.A | Active | Production | SOT-23 (DBV) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTRI |
| TLV809K33DBVT | Active | Production | SOT-23 (DBV) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTRI |
| TLV809K33DBVT.A | Active | Production | SOT-23 (DBV) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTRI |
| TLV809K33DBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | BCMX |
| TLV809K33DBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | BCMX |
| TLV809K33DBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | BCMX |
| TLV809K33DBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | BCMX |
| TLV809L30DBVR | Active | Production | SOT-23 (DBV) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTXI |
| TLV809L30DBVR.A | Active | Production | SOT-23 (DBV) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTXI |
| TLV809L30DBVT | Active | Production | SOT-23 (DBV) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTXI |
| TLV809L30DBVT.A | Active | Production | SOT-23 (DBV) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | VTXI |

| Orderable part number | Status (1) | Material type (2) | Package Pins | Package qty Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|-------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| TLV809L30DBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | BCMZ |
| TLV809L30DBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | BCMZ |
| TLV809L30DBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | BCMZ |
| TLV809L30DBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | BCMZ |

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

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

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

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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

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

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

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TAPE AND REEL INFORMATION



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 |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TLV809I50DBVR | SOT-23 | DBV | 3 | 3000 | 178.0 | 9.0 | 3.3 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TLV809I50DBVT | SOT-23 | DBV | 3 | 250 | 178.0 | 9.0 | 3.3 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TLV809I50DBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.0 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| TLV809I50DBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 2.9 | 3.35 | 1.35 | 4.0 | 8.0 | Q3 |
| TLV809I50DBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.0 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| TLV809I50DBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 2.9 | 3.35 | 1.35 | 4.0 | 8.0 | Q3 |
| TLV809J25DBVR | SOT-23 | DBV | 3 | 3000 | 178.0 | 9.0 | 3.3 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TLV809J25DBVT | SOT-23 | DBV | 3 | 250 | 178.0 | 9.0 | 3.3 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TLV809J25DBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 2.9 | 3.35 | 1.35 | 4.0 | 8.0 | Q3 |
| TLV809J25DBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.0 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| TLV809J25DBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 2.9 | 3.35 | 1.35 | 4.0 | 8.0 | Q3 |
| TLV809K33DBVR | SOT-23 | DBV | 3 | 3000 | 178.0 | 9.0 | 3.3 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TLV809K33DBVT | SOT-23 | DBV | 3 | 250 | 178.0 | 9.0 | 3.3 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TLV809K33DBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 2.9 | 3.35 | 1.35 | 4.0 | 8.0 | Q3 |
| TLV809K33DBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 2.9 | 3.35 | 1.35 | 4.0 | 8.0 | Q3 |
| TLV809K33DBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.0 | 3.15 | 2.77 | 1.22 | 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 |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TLV809L30DBVR | SOT-23 | DBV | 3 | 3000 | 178.0 | 9.0 | 3.3 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TLV809L30DBVT | SOT-23 | DBV | 3 | 250 | 178.0 | 9.0 | 3.3 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TLV809L30DBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 2.9 | 3.35 | 1.35 | 4.0 | 8.0 | Q3 |
| TLV809L30DBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.0 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| TLV809L30DBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 2.9 | 3.35 | 1.35 | 4.0 | 8.0 | Q3 |
| TLV809L30DBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.0 | 3.15 | 2.77 | 1.22 | 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) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TLV809I50DBVR | SOT-23 | DBV | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| TLV809I50DBVT | SOT-23 | DBV | 3 | 250 | 180.0 | 180.0 | 18.0 |
| TLV809I50DBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| TLV809I50DBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TLV809I50DBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| TLV809I50DBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TLV809J25DBVR | SOT-23 | DBV | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| TLV809J25DBVT | SOT-23 | DBV | 3 | 250 | 180.0 | 180.0 | 18.0 |
| TLV809J25DBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TLV809J25DBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| TLV809J25DBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TLV809K33DBVR | SOT-23 | DBV | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| TLV809K33DBVT | SOT-23 | DBV | 3 | 250 | 180.0 | 180.0 | 18.0 |
| TLV809K33DBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TLV809K33DBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TLV809K33DBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| TLV809L30DBVR | SOT-23 | DBV | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| TLV809L30DBVT | SOT-23 | DBV | 3 | 250 | 180.0 | 180.0 | 18.0 |

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TLV809L30DBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TLV809L30DBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| TLV809L30DBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TLV809L30DBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |

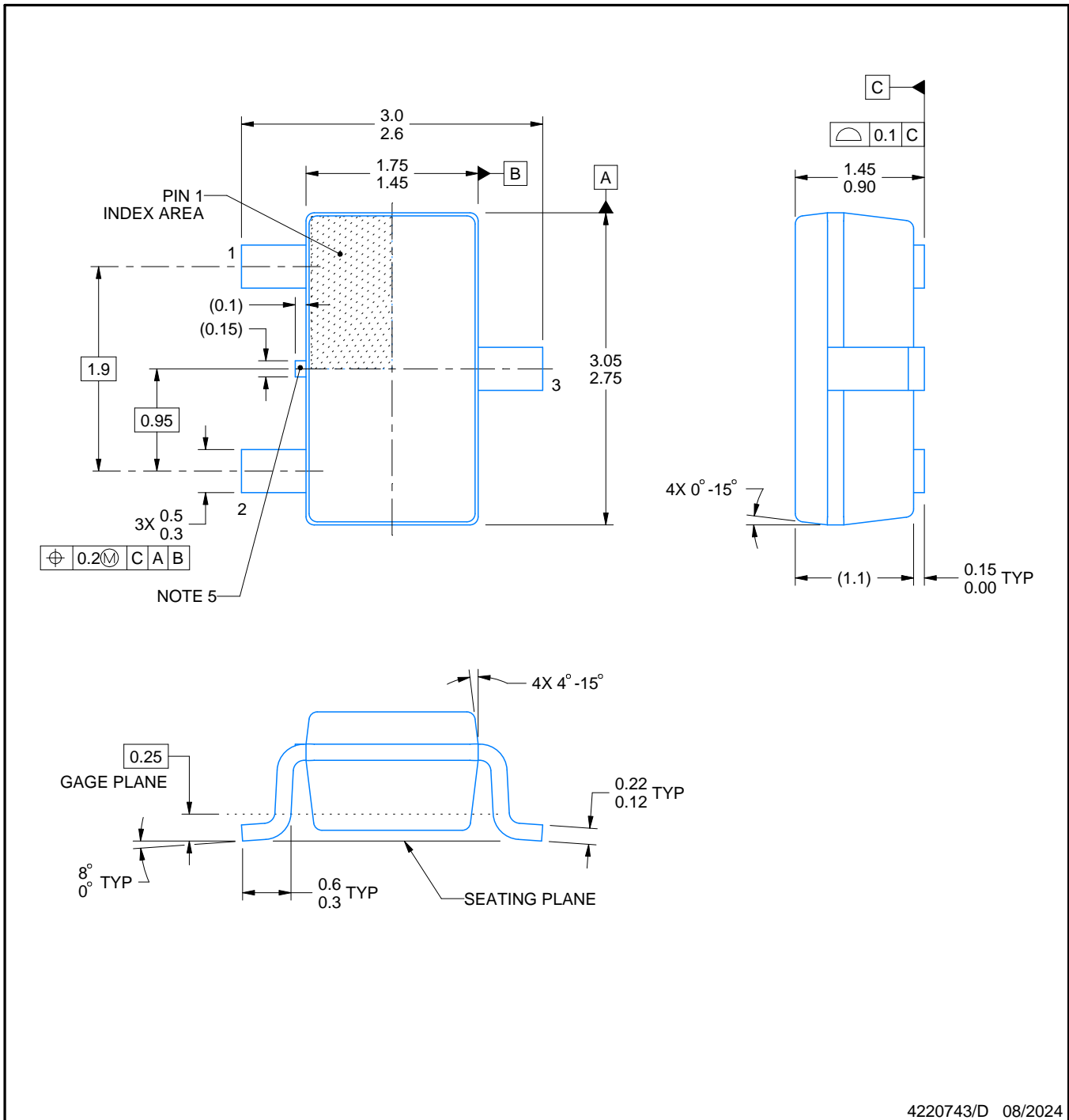
DBV0003A



PACKAGE OUTLINE

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



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NOTES:

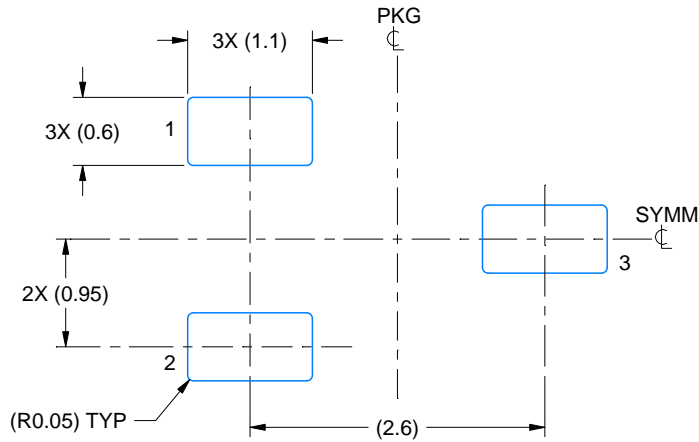
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC MO-178.
4. Body dimensions do not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.25 mm per side.
5. Support pin may differ or may not be present.

EXAMPLE BOARD LAYOUT

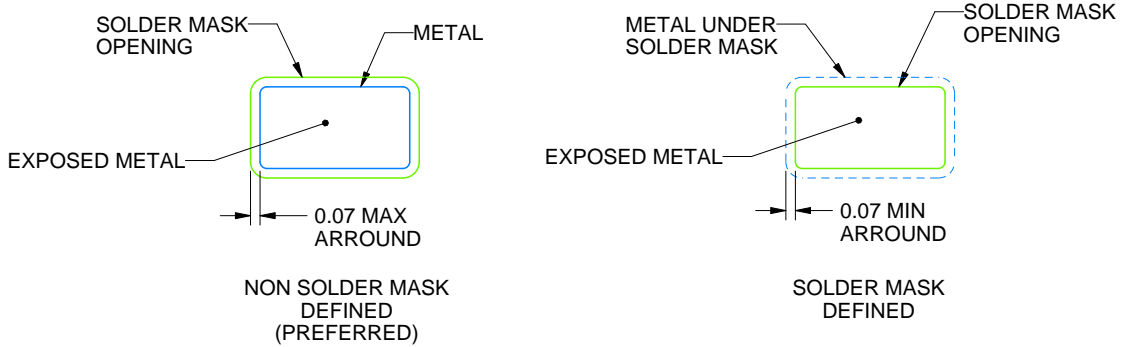
DBV0003A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X



SOLDER MASK DETAILS

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NOTES: (continued)

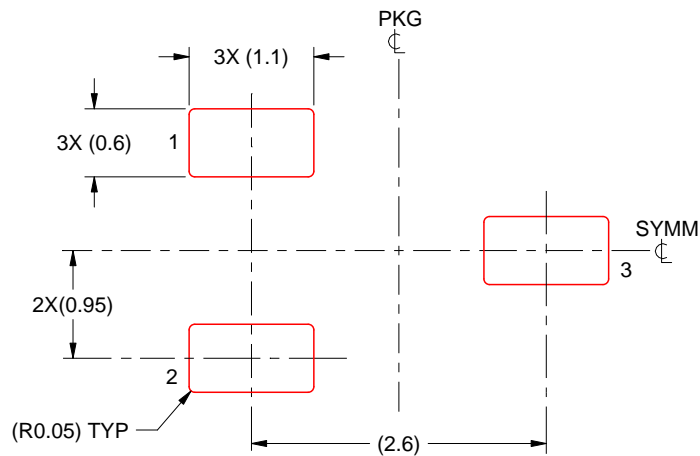
- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DBV0003A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



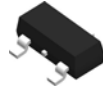
SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:15X

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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.

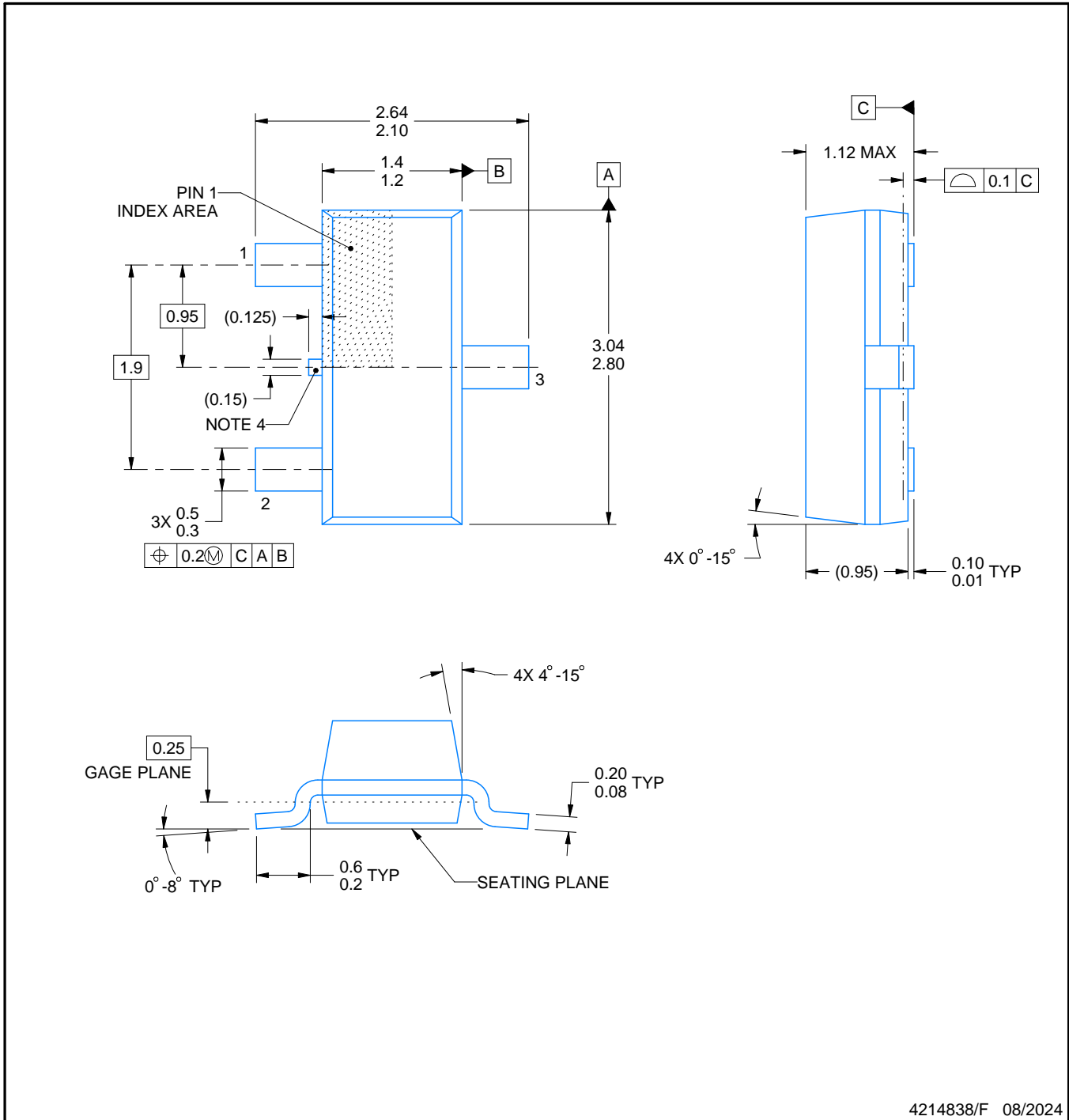
DBZ0003A



PACKAGE OUTLINE

SOT-23 - 1.12 mm max height

SMALL OUTLINE TRANSISTOR



NOTES:

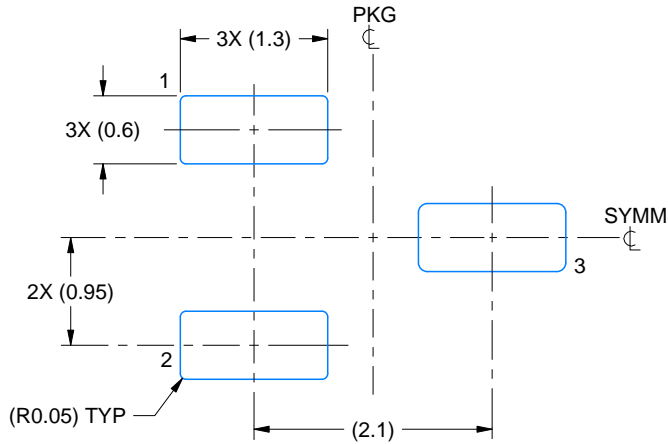
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC registration TO-236, except minimum foot length.
4. Support pin may differ or may not be present.
5. Body dimensions do not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.25mm per side

EXAMPLE BOARD LAYOUT

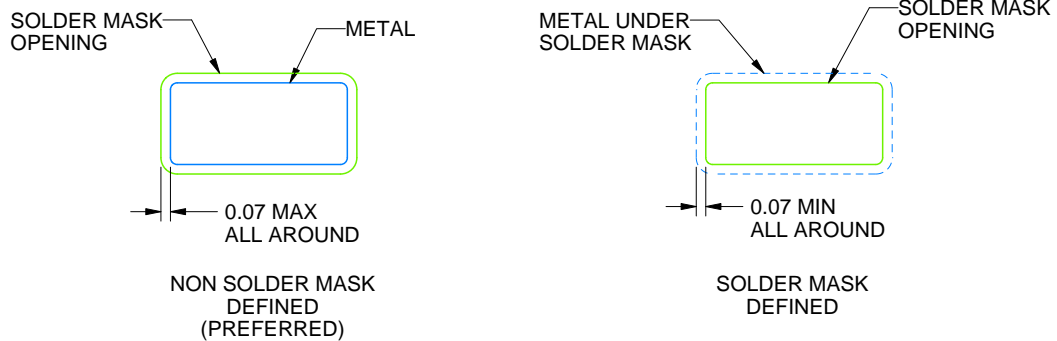
DBZ0003A

SOT-23 - 1.12 mm max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE
SCALE:15X



SOLDER MASK DETAILS

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NOTES: (continued)

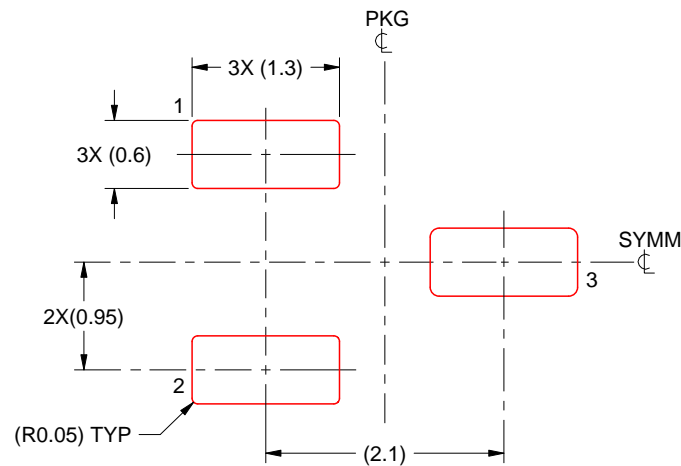
5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DBZ0003A

SOT-23 - 1.12 mm max height

SMALL OUTLINE TRANSISTOR



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

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NOTES: (continued)

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

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