Ultralow Power, Supply Voltage Supervisor

Check for Samples: **TPS3831**, **TPS3839**

FEATURES

- **Ultralow Supply Current: 150 nA (typ)**
- **Operating Supply Voltage: 0.6 V to 6.5 V**
- **Valid Reset for V_{DD} > 0.6 V**
- **Push-Pull $\overline{RESET}$ Output**
- **Factory-Trimmed Reset Threshold Voltages**
- **Temperature Range: –40°C to +85°C**
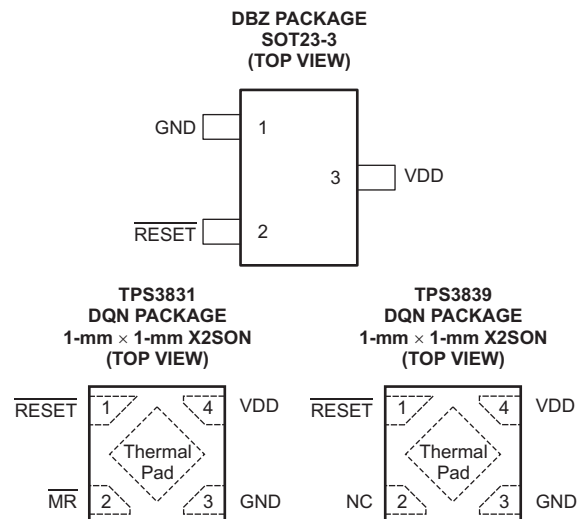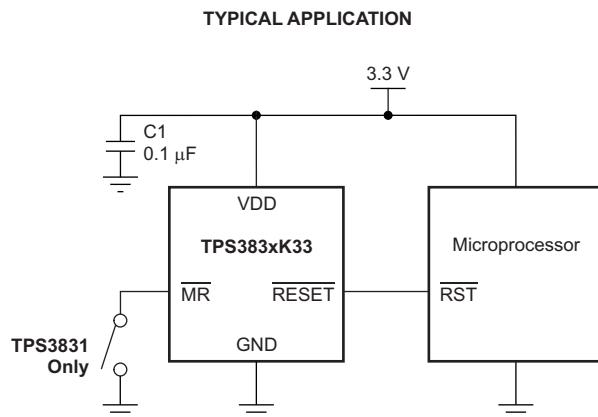- **Packages: 1-mm × 1-mm X2SON or 3-Pin SOT23**

APPLICATIONS

- **Portable and Battery-Powered Equipment**
- **Industrial Equipment**
- **Cell Phones**
- **Glucose Monitors**
- **Metering**
- **Televisions**

DESCRIPTION

The TPS3831 and TPS3839 (both referred to as the TPS383x) are ultralow current (150 nA, typical), voltage supervisory circuit that monitor a single voltage. Both devices assert an active-low reset signal whenever the V_{DD} supply voltage drops below the factory-trimmed reset threshold voltage. The reset output remains asserted for 200 ms (typical) after the V_{DD} voltage rises above the threshold voltage. These devices are designed to ignore fast transients on the V_{DD} pin. Note that the TPS3831 includes a manual reset input.

The ultralow current consumption of 150 nA makes these voltage supervisors ideal for use in low-power and portable applications. The TPS383x are specified to have the correct output logic state for supply voltages down to 0.6 V.

The TPS383x feature precision factory-trimmed threshold voltages and extremely low-power operation. The TPS3831 is available is a 4-pin 1-mm × 1-mm (DQN) X2SON package. The TPS3839 is available in a 3-pin SOT23 (DBZ) package or a 4-pin 1-mm × 1-mm (DQN) X2SON package.

TYPICAL APPLICATION

DBZ PACKAGE
SOT23-3
(TOP VIEW)

TPS3831
DQN PACKAGE
1-mm × 1-mm X2SON
(TOP VIEW)

TPS3839
DQN PACKAGE
1-mm × 1-mm X2SON
(TOP VIEW)

![Warning symbol] Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.
All trademarks are the property of their respective owners.

TPS3831
TPS3839

TEXAS
INSTRUMENTS

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.

PACKAGE INFORMATION[1]

PRODUCT	THRESHOLD VOLTAGE (V)	PACKAGE-LEAD	PACKAGE DESIGNATOR
TPS3831A09	0.900	X2SON-4	DQN
TPS3831G12	1.100	X2SON-4	DQN
TPS3831E16	1.520	X2SON-4	DQN
TPS3831G18	1.670	X2SON-4	DQN
TPS3831L30	2.630	X2SON-4	DQN
TPS3831K33	2.930	X2SON-4	DQN
TPS3831G33	3.080	X2SON-4	DQN
TPS3831K50	4.380	X2SON-4	DQN
TPS3839A09	0.900	SOT23-3	DBZ
		X2SON-4	DQN
TPS3839G12	1.100	SOT23-3	DBZ
		X2SON-4	DQN
TPS3839E16	1.520	SOT23-3	DBZ
		X2SON-4	DQN
TPS3839G18	1.670	SOT23-3	DBZ
		X2SON-4	DQN
TPS3839L30	2.630	SOT23-3	DBZ
		X2SON-4	DQN
TPS3839K33	2.930	SOT23-3	DBZ
		X2SON-4	DQN
TPS3839G33	3.080	SOT23-3	DBZ
		X2SON-4	DQN
TPS3839K50	4.380	SOT23-3	DBZ
		X2SON-4	DQN

(1) For the most current package and ordering information see the Package Option Addendum at the end of this document, or visit the device product folder at www.ti.com.

ABSOLUTE MAXIMUM RATINGS[1]

Over operating free-air temperature range, unless otherwise noted.

		VALUE		UNIT
		MIN	MAX	
Voltage	VDD	−0.3	7	V
	On $\overline{RESET}$	−0.3	7	V
Current	RESET pin		10	mA
Temperature[2]	Operating ambient, T_A	−40	+85	°C
	Storage, T_{stg}	−65	+150	°C
Electrostatic discharge (ESD) rating:	Human body model (HBM)		2	kV
	Charge device model (CDM)		500	V

(1) Stresses beyond those listed under *absolute maximum ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *recommended operating conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods my affect device reliability.
(2) As a result of the low dissipated power in this device, it is assumed that the junction temperature is equal to the ambient temperature.

Product Folder Links: *TPS3831 TPS3839*

THERMAL INFORMATION

THERMAL METRIC[1]		TPS3839	TPS3831 TPS3839	UNITS
		DBZ (SOT23-3)	DQN (X2SON)	
		3 PINS	4 PINS	
θ_{JA}	Junction-to-ambient thermal resistance	286.9	249.9	°C/W
θ_{JCtop}	Junction-to-case (top) thermal resistance	105.6	N/A	
θ_{JB}	Junction-to-board thermal resistance	123.4	N/A	
ψ_{JT}	Junction-to-top characterization parameter	25.8	6.0	
ψ_{JB}	Junction-to-board characterization parameter	107.9	N/A	
θ_{JCbot}	Junction-to-case (bottom) thermal resistance	N/A	N/A	

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

ELECTRICAL CHARACTERISTICS

At T_A = –40°C to +85°C, 0.9 V < V_{DD} < 6.5 V, and C1 = 0.1 μF, unless otherwise noted.

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{DD}	Input supply voltage range		0.9		6.5	V
$V_{(VO)}$	Minimum V_{DD} voltage for valid output	I_{OL} = 1 μA			0.6	V
I_{DD}	Supply current (into VDD pin)	Output not connected		150	500	nA
V_{OL}	Low-level output voltage ($\overline{RESET}$ pin)	V_{DD} = 0.9 V to 1.2 V, I_{OL} = 120 μA			0.4	V
		V_{DD} = 1.2 V to 2.8 V, I_{OL} = 0.5 mA			0.4	V
		V_{DD} = 2.8 V to 6.5 V, I_{OL} = 2 mA			0.4	V
V_{OH}	High-level output voltage ($\overline{RESET}$ pin)	V_{DD} = 0.9 V to 1.2 V, I_{OH} = –50 μA	V_{DD} – 0.4			V
		V_{DD} = 1.2 V to 2.8 V, I_{OH} = –0.5 mA	V_{DD} – 0.4			V
		V_{DD} = 2.8 V to 6.5 V, I_{OH} = –2 mA	V_{DD} – 0.4			V
V_{IL}	Low-level input voltage ($\overline{MR}$ pin)		$0.3V_{DD}$			V
V_{IH}	High-level input voltage ($\overline{MR}$ pin)				$0.7V_{DD}$	V
R_{MR}	MR pin pull-up resistance		10	20	30	kΩ
	Negative-going input threshold accuracy	T_A = +25°C		±1.0%		
$V_{IT–}$	Negative-going threshold voltage	TPS3839A09	0.874	0.900	0.914	V
		TPS3839G12	1.073	1.100	1.117	V
		TPS3839E16	1.482	1.520	1.543	V
		TPS3839G18	1.628	1.670	1.695	V
		TPS3839L30	2.564	2.630	2.669	V
		TPS3839K33	2.857	2.930	2.974	V
		TPS3839G33	3.003	3.080	3.126	V
		TPS3839K50	4.271	4.380	4.446	V
V_{hys}	Hysteresis voltage	TPS3839A09		54		mV
		TPS3839G12		11		mV
		TPS3839E16		15		mV
		TPS3839G18		17		mV
		TPS3839L30		26		mV
		TPS3839K33		29		mV
		TPS3839G33		31		mV
		TPS3839K50		44		mV

TPS3831
TPS3839

TIMING REQUIREMENTS

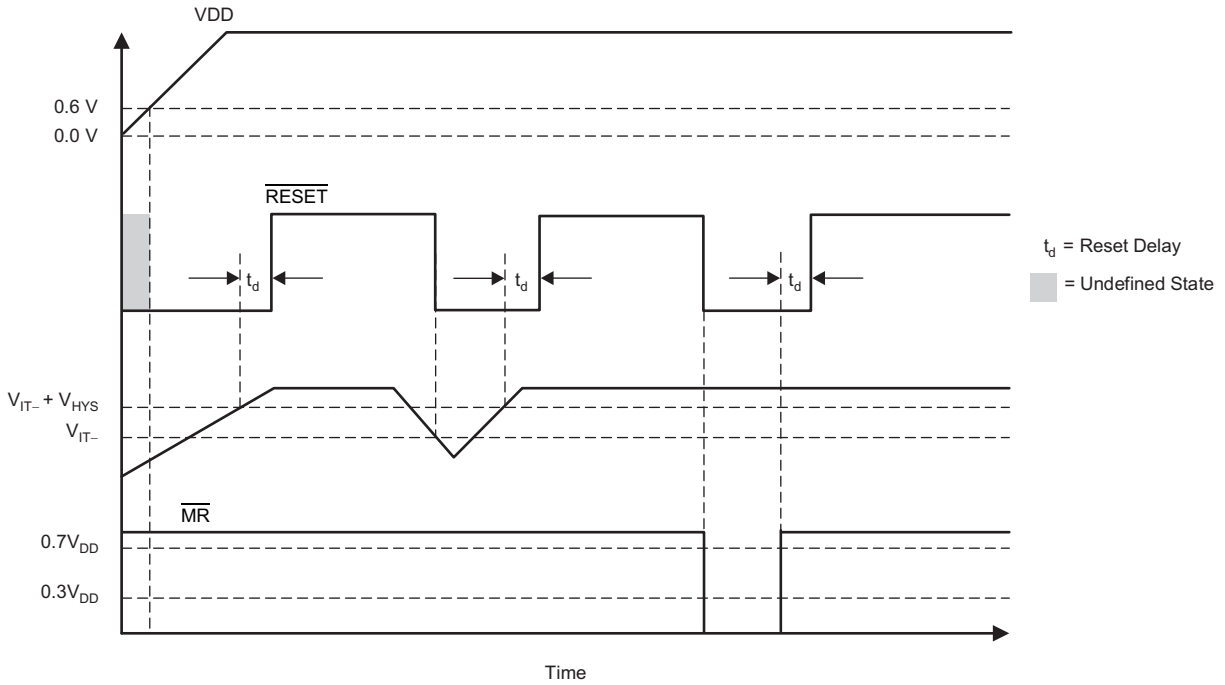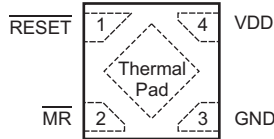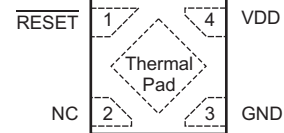|	PARAMETER	MIN	TYP	MAX	UNIT
t_d	$\overline{\text{RESET}}$ delay time (power-up delay)	120	200	350	ms
t_{pd_vdd}	Propagation delay, V_{DD} falling (power-down delay)		20		µs
t_{pd_mr}	Propagation delay from $\overline{\text{MR}}$ low to $\overline{\text{RESET}}$ low		46		ns

TIMING DIAGRAM

Figure 1. $\overline{\text{MR}}$ and V_{DD} Reset Timing

Submit Documentation Feedback   Copyright © 2012, Texas Instruments Incorporated

Product Folder Links: *TPS3831 TPS3839*

PIN CONFIGURATIONS

TPS3831 DQN PACKAGE
1-mm × 1-mm X2SON
(TOP VIEW)

```
RESET  1      4  VDD
       Thermal
        Pad
MR     2      3  GND
```

TPS3839 DQN PACKAGE
1-mm × 1-mm X2SON
(TOP VIEW)

```
RESET  1      4  VDD
       Thermal
        Pad
NC     2      3  GND
```

TPS3839 DBZ PACKAGE
SOT23-3
(TOP VIEW)

```
GND    1
              3   VDD
RESET  2
```
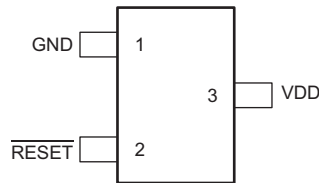
PIN ASSIGNMENTS

NAME	PIN NUMBER			DESCRIPTION
	TPS3839DBZ	TPS3839DQN	TPS3831DQN	
GND	1	3	3	Ground
$\overline{MR}$	N/A	N/A	2	Manual reset. Pull this pin to a logic low to assert the $\overline{RESET}$ output. After the $\overline{MR}$ pin is deasserted, the $\overline{RESET}$ output deasserts after the reset delay (t_d) elapses.
NC	N/A	2	N/A	No internal connection.
$\overline{RESET}$	2	1	1	Active-low reset output. $\overline{RESET}$ has a push-pull output drive and is capable of directly driving input pins. $\overline{RESET}$ is low as long as V_{DD} remains below the factory threshold voltage, and until the delay time (t_D) elapses after V_{DD} rises above the threshold voltage.
Thermal pad	N/A	Available	Available	Connect to ground or floating copper plane for mechanical stability.
VDD	3	4	4	Supply voltage

TPS3831
TPS3839

SBVS193A –JUNE 2012–REVISED SEPTEMBER 2012

TEXAS
INSTRUMENTS

www.ti.com

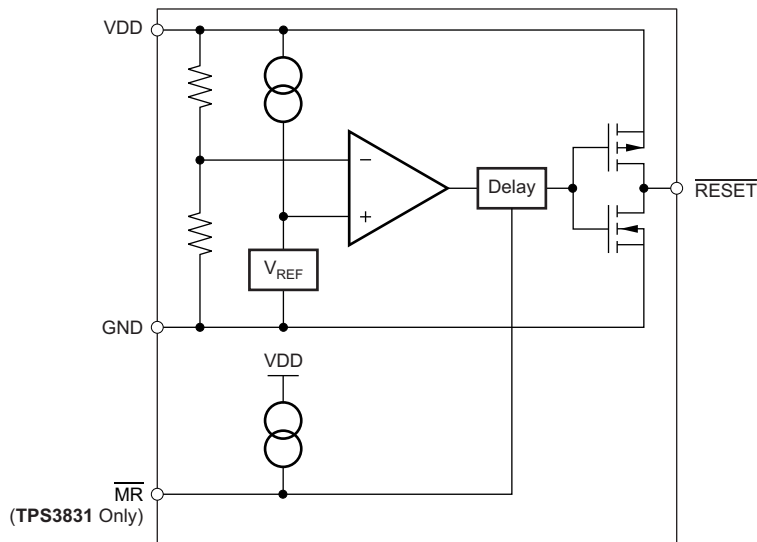# DEVICE INFORMATION

FUNCTIONAL BLOCK DIAGRAM
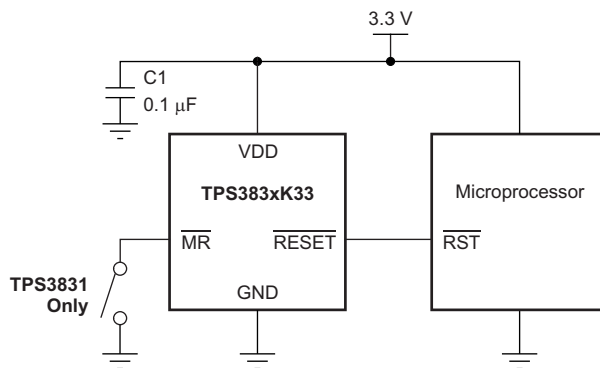

Figure 2. TPS383x Block Diagram

APPLICATION CIRCUIT

Figure 3. Typical Application Circuit

TYPICAL CHARACTERISTICS

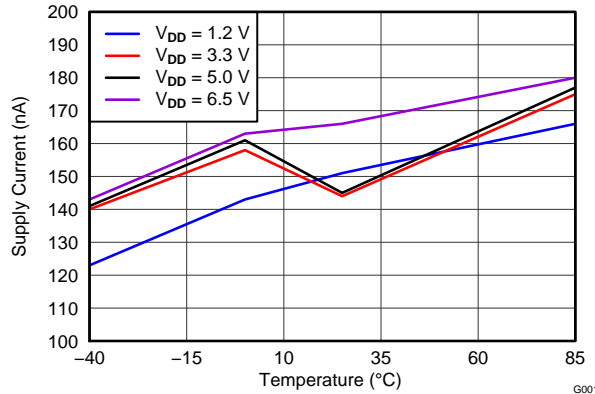At T_A = +25°C and C_1 = 0.1 μF, unless otherwise noted.

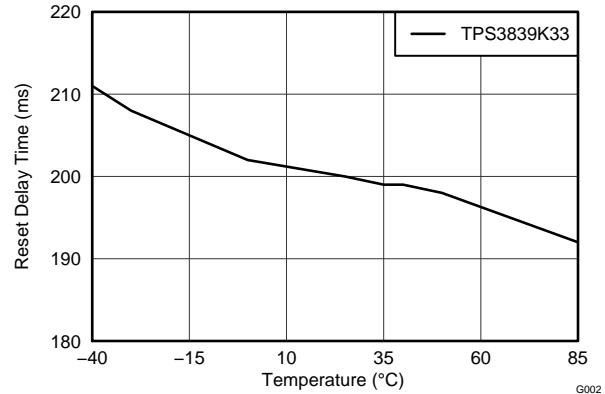Figure 4. SUPPLY CURRENT vs INPUT VOLTAGE AND TEMPERATURE
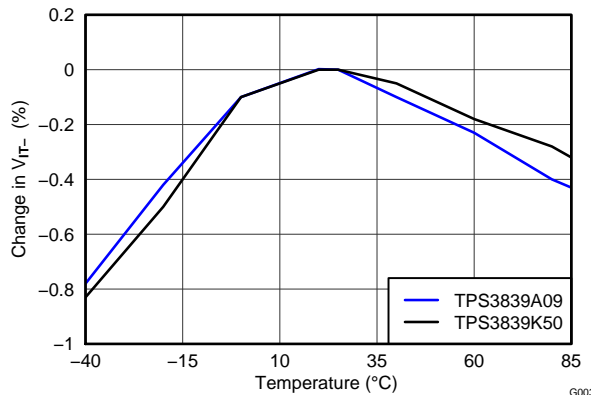
Figure 5. RESET DELAY vs TEMPERATURE

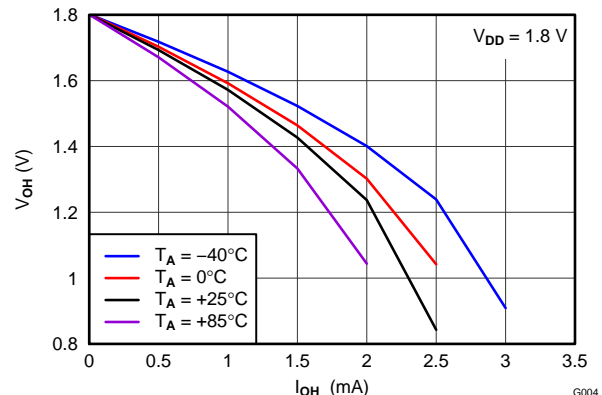Figure 6. PERCENTAGE CHANGE IN THRESHOLD VOLTAGE vs TEMPERATURE

Figure 7. V_{OH} vs I_{OH} AND TEMPERATURE FOR V_{DD} = 1.8 V
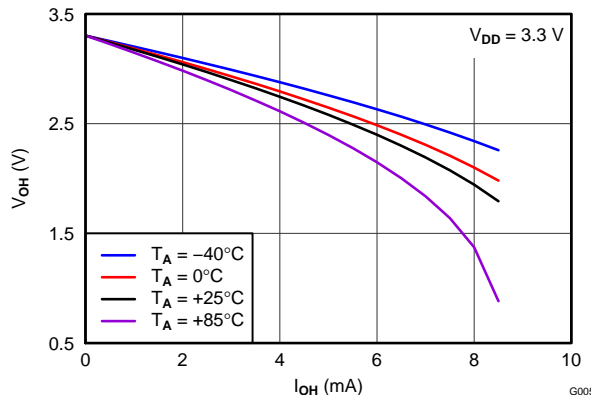
Figure 8. V_{OH} vs I_{OH} AND TEMPERATURE FOR V_{DD} = 3.3 V
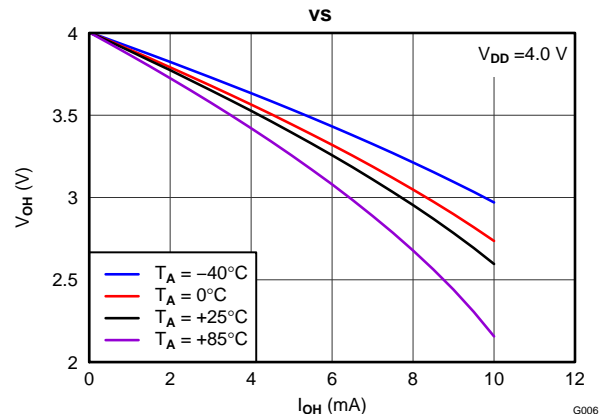
Figure 9. V_{OH} vs I_{OH} AND TEMPERATURE FOR V_{DD} = 4.0 V

TYPICAL CHARACTERISTICS (continued)

At T_A = +25°C and C_1 = 0.1 μF, unless otherwise noted.

Figure 10. V_{OL} vs I_{OL} AND TEMPERATURE FOR V_{DD} = 1.8 V

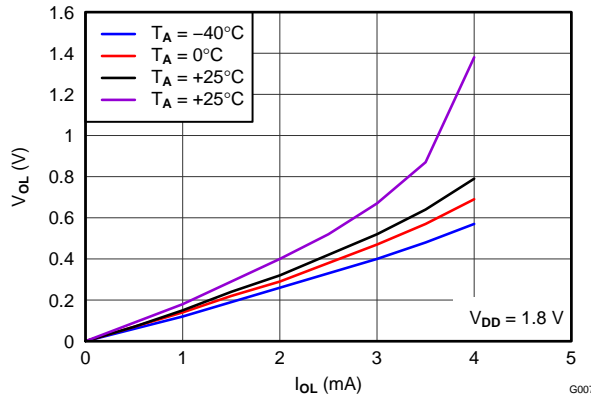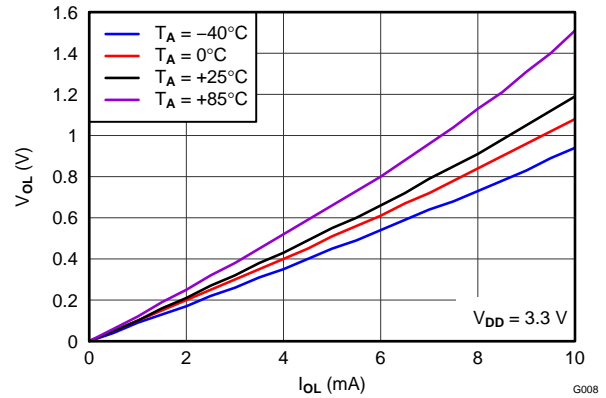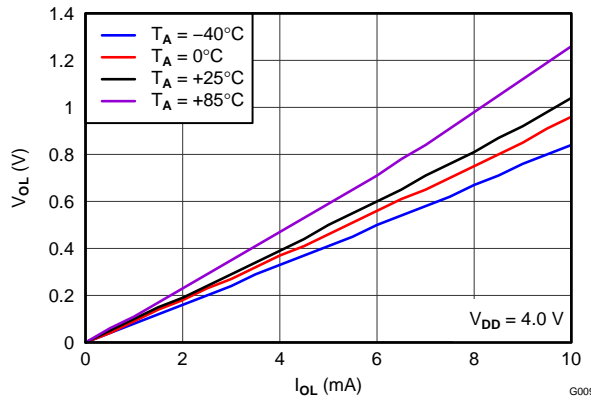**Figure 11. V_{OL} vs I_{OL} AND TEMPERATURE FOR V_{DD} = 3.3 V**

Figure 12. V_{OL} vs I_{OL} AND TEMPERATURE FOR V_{DD} = 4.0 V
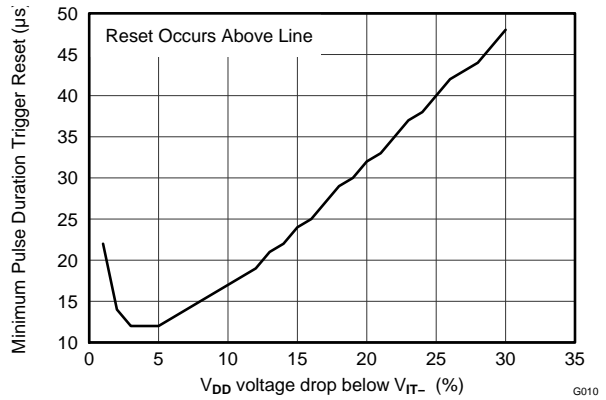
Figure 13. MAXIMUM PULSE DURATION vs PERCENT OF THRESHOLD OVERDRIVE

Product Folder Links: *TPS3831 TPS3839*

APPLICATION INFORMATION

VDD TRANSIENT REJECTION

The TPS383x (TPS3831 and TPS3839) has built-in rejection of fast transients on the VDD pin. Transient rejection depends on both the duration and amplitude of the transient. Transient amplitude is measured from the bottom of the transient to the negative threshold voltage (V_{IT-}) of the device, as shown in Figure 14.
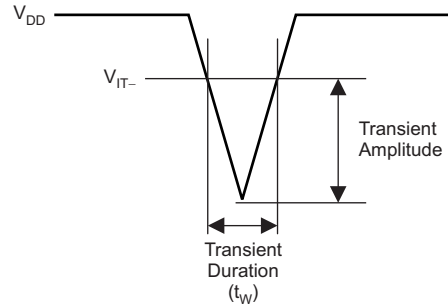
Figure 14. Voltage Transient Measurement

Figure 15 shows the relationship between the transient amplitude and duration required to trigger a reset. Any combination of duration and amplitude greater than that shown in Figure 15 generates a reset signal.
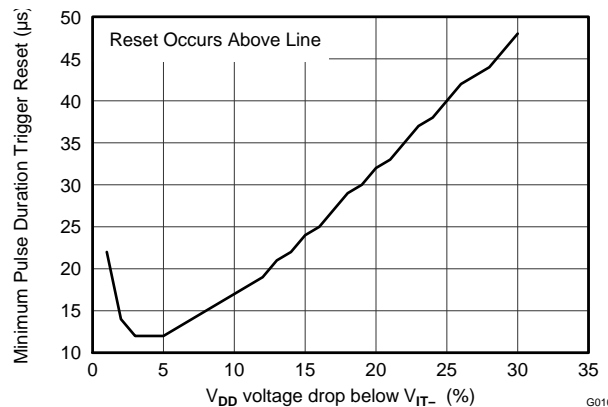
Figure 15. TPS3839 Transient Rejection

INPUT CAPACITOR

The TPS383x uses a unique sampling scheme to maintain an extremely low average quiescent current of 150 nA. The TPS383x typically consumes only about 100 nA of dc current. However, this current rises to approximately 15 µA for around 200 µs while the TPS383x samples the input voltage. If the source impedance back to the supply voltage is high, then the additional current during sampling may trigger a false reset as a result of the apparent voltage drop at VDD. For high VDD source or trace impedance applications, it is recommended to add a small 0.1-µF bypass capacitor near the TPS3839 VDD pin. This bypass capacitor effectively keeps the average current at 150 nA and reduces the effects of a high-impedance voltage source.

MANUAL RESET ($\overline{MR}$) INPUT (TPS3831 Only)

The manual reset ($\overline{MR}$) input allows a processor, or other logic devices, to initiate a reset (TPS3831 only). A logic low (0.3 V_{DD}) on $\overline{MR}$ causes $\overline{RESET}$ to assert. After $\overline{MR}$ returns to a logic high and V_{DD} is greater than the threshold voltage, $\overline{RESET}$ is deasserted after the reset delay time, t_d, elapses. Note that $\overline{MR}$ is internally tied to VDD with a 20-kΩ resistor; therefore, this pin can be left unconnected if $\overline{MR}$ is not used. If a logic signal driving $\overline{MR}$ does not go fully to VDD, there will be some additional current draw into VDD as a result of the internal pull-up resistor on $\overline{MR}$. To minimize current draw, a logic-level FET can be used, as illustrated in Figure 16.
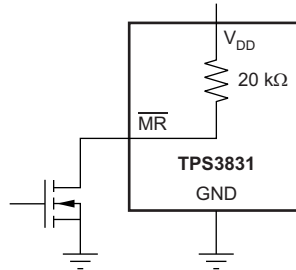
Figure 16. Using Logic-Level FET to Minimize Current Draw

BIDIRECTIONAL RESET PINS

Some microcontrollers have bidirectional reset pins that act both as an input and an output. A series resistor should be placed between the TPS383x output and the microcontroller reset pin to protect against excessive current flow when both the TPS383x and the microcontroller attempt to drive the reset line. Figure 17 shows the connection of the TPS3839K33 with a microcontroller using a series resistor to drive a bidirectional reset line.
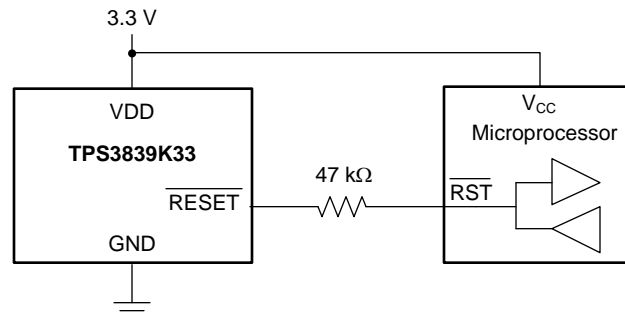
Figure 17. Connection to Bidirectional Reset Pin

APPLICATION EXAMPLE: SINGLE ALKALINE CELL MONITORING

Low operating voltage and threshold options make the TPS383x well-suited for monitoring single-cell, alkaline-battery applications. Figure 18 shows the TPS3839A09 used to disable a boost converter when the cell voltage reaches 0.9 V, which is the end of the discharge voltage for a single alkaline battery cell. When the cell voltage reaches 0.9 V, the TPS61261 enable pin is driven low. This setting disables the TPS61261 and places it in a low-current shutdown state. The combination of the TPS3839 and TPS61261 consumes only 250 nA (typical) from the discharged battery.

Figure 18. Disabled Boost Converter

Submit Documentation Feedback

REVISION HISTORY

NOTE: Page numbers for previous revisions may differ from page numbers in the current verison.

Changes from Original (June 2012) to Revision A   **Page**

• Changed data sheet status from product preview to production data 1

Product Folder Links: *TPS3831 TPS3839*

PACKAGING INFORMATION

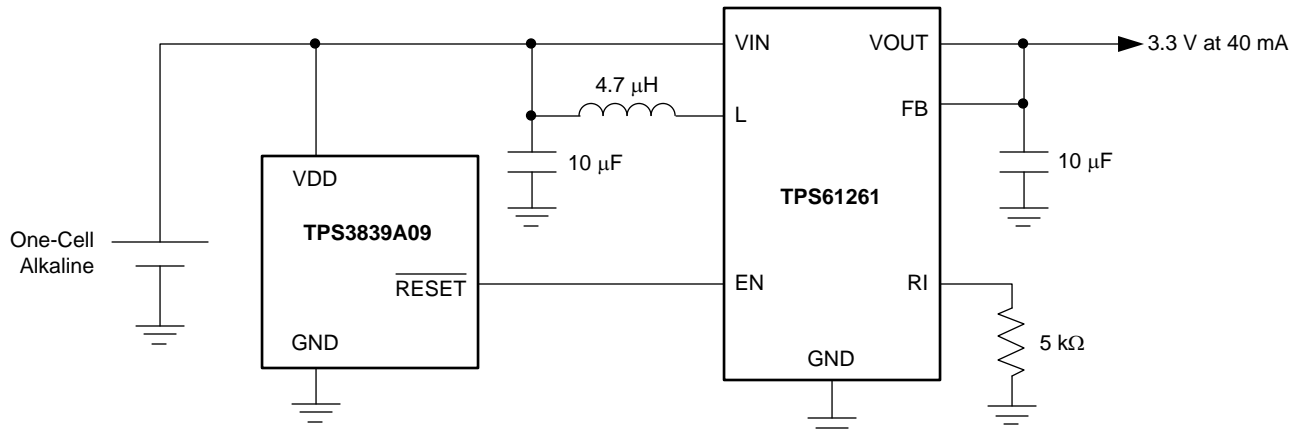| Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
TPS3831A09DQNR	PREVIEW	X2SON	DQN	4	3000	TBD	Call TI	Call TI	-40 to 85		
TPS3831A09DQNT	PREVIEW	X2SON	DQN	4	250	TBD	Call TI	Call TI	-40 to 85		
TPS3831E16DQNR	PREVIEW	X2SON	DQN	4	3000	TBD	Call TI	Call TI	-40 to 85		
TPS3831E16DQNT	PREVIEW	X2SON	DQN	4	250	TBD	Call TI	Call TI	-40 to 85		
TPS3831G12DQNR	PREVIEW	X2SON	DQN	4	3000	TBD	Call TI	Call TI	-40 to 85		
TPS3831G12DQNT	PREVIEW	X2SON	DQN	4	250	TBD	Call TI	Call TI	-40 to 85		
TPS3831G18DQNR	PREVIEW	X2SON	DQN	4	3000	TBD	Call TI	Call TI	-40 to 85		
TPS3831G18DQNT	PREVIEW	X2SON	DQN	4	250	TBD	Call TI	Call TI	-40 to 85		
TPS3831G33DQNR	PREVIEW	X2SON	DQN	4	3000	TBD	Call TI	Call TI	-40 to 85		
TPS3831G33DQNT	PREVIEW	X2SON	DQN	4	250	TBD	Call TI	Call TI	-40 to 85		
TPS3831K33DQNR	PREVIEW	X2SON	DQN	4	3000	TBD	Call TI	Call TI	-40 to 85		
TPS3831K33DQNT	PREVIEW	X2SON	DQN	4	250	TBD	Call TI	Call TI	-40 to 85		
TPS3831K50DQNR	PREVIEW	X2SON	DQN	4	3000	TBD	Call TI	Call TI	-40 to 85		
TPS3831K50DQNT	PREVIEW	X2SON	DQN	4	250	TBD	Call TI	Call TI	-40 to 85		
TPS3831L30DQNR	PREVIEW	X2SON	DQN	4	3000	TBD	Call TI	Call TI	-40 to 85		
TPS3831L30DQNT	PREVIEW	X2SON	DQN	4	250	TBD	Call TI	Call TI	-40 to 85		
TPS3839A09DBZR	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PZDI	Samples
TPS3839A09DBZT	ACTIVE	SOT-23	DBZ	3	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PZDI	Samples
TPS3839A09DQNR	ACTIVE	X2SON	DQN	4	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85		Samples
TPS3839A09DQNT	ACTIVE	X2SON	DQN	4	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85		Samples
TPS3839E16DBZR	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PZCI	Samples
TPS3839E16DBZT	ACTIVE	SOT-23	DBZ	3	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PZCI	Samples
TPS3839E16DQNR	ACTIVE	X2SON	DQN	4	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85		Samples
TPS3839E16DQNT	ACTIVE	X2SON	DQN	4	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85		Samples

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
TPS3839G12DBZR	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PZBI	Samples
TPS3839G12DBZT	ACTIVE	SOT-23	DBZ	3	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PZBI	Samples
TPS3839G12DQNR	ACTIVE	X2SON	DQN	4	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85		Samples
TPS3839G12DQNT	ACTIVE	X2SON	DQN	4	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85		Samples
TPS3839G18DBZR	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PZAI	Samples
TPS3839G18DBZT	ACTIVE	SOT-23	DBZ	3	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PZAI	Samples
TPS3839G18DQNR	ACTIVE	X2SON	DQN	4	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85		Samples
TPS3839G18DQNT	ACTIVE	X2SON	DQN	4	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85		Samples
TPS3839G33DBZR	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PYZI	Samples
TPS3839G33DBZT	ACTIVE	SOT-23	DBZ	3	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PYZI	Samples
TPS3839G33DQNR	ACTIVE	X2SON	DQN	4	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	ZG	Samples
TPS3839G33DQNT	ACTIVE	X2SON	DQN	4	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	ZG	Samples
TPS3839K33DBZR	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PYYI	Samples
TPS3839K33DBZT	ACTIVE	SOT-23	DBZ	3	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PYYI	Samples
TPS3839K33DQNR	ACTIVE	X2SON	DQN	4	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	ZF	Samples
TPS3839K33DQNT	ACTIVE	X2SON	DQN	4	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	ZF	Samples
TPS3839K50DBZR	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PYXI	Samples
TPS3839K50DBZT	ACTIVE	SOT-23	DBZ	3	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PYXI	Samples

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
TPS3839K50DQNR	ACTIVE	X2SON	DQN	4	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	ZH	Samples
TPS3839K50DQNT	ACTIVE	X2SON	DQN	4	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	ZH	Samples
TPS3839L30DBZR	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PYWI	Samples
TPS3839L30DBZT	ACTIVE	SOT-23	DBZ	3	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	PYWI	Samples
TPS3839L30DQNR	ACTIVE	X2SON	DQN	4	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	ZI	Samples
TPS3839L30DQNT	ACTIVE	X2SON	DQN	4	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	ZI	Samples

(1) 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.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

(4) Only one of markings shown within the brackets will appear on the physical device.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

PACKAGE MATERIALS INFORMATION

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

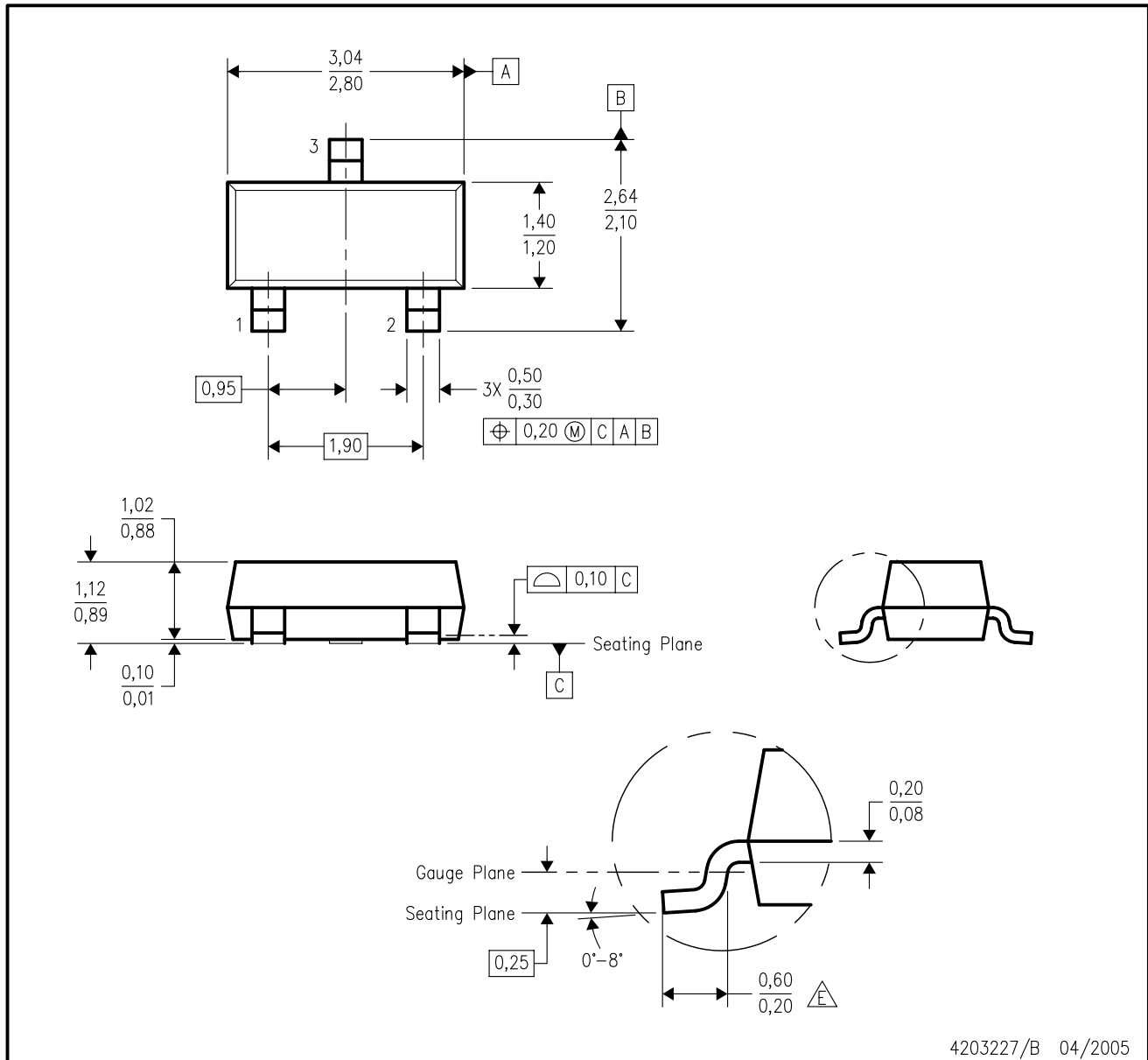| Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TPS3839G33DBZR	SOT-23	DBZ	3	3000	179.0	8.4	3.15	2.95	1.22	4.0	8.0	Q3
TPS3839G33DBZT	SOT-23	DBZ	3	250	179.0	8.4	3.15	2.95	1.22	4.0	8.0	Q3
TPS3839G33DQNR	X2SON	DQN	4	3000	180.0	9.5	1.16	1.16	0.63	4.0	8.0	Q2
TPS3839G33DQNT	X2SON	DQN	4	250	180.0	9.5	1.16	1.16	0.63	4.0	8.0	Q2
TPS3839K33DBZR	SOT-23	DBZ	3	3000	179.0	8.4	3.15	2.95	1.22	4.0	8.0	Q3
TPS3839K33DBZT	SOT-23	DBZ	3	250	179.0	8.4	3.15	2.95	1.22	4.0	8.0	Q3
TPS3839K33DQNR	X2SON	DQN	4	3000	180.0	9.5	1.16	1.16	0.63	4.0	8.0	Q2
TPS3839K33DQNT	X2SON	DQN	4	250	180.0	9.5	1.16	1.16	0.63	4.0	8.0	Q2
TPS3839K50DBZR	SOT-23	DBZ	3	3000	179.0	8.4	3.15	2.95	1.22	4.0	8.0	Q3
TPS3839K50DBZT	SOT-23	DBZ	3	250	179.0	8.4	3.15	2.95	1.22	4.0	8.0	Q3
TPS3839K50DQNR	X2SON	DQN	4	3000	180.0	9.5	1.16	1.16	0.63	4.0	8.0	Q2
TPS3839K50DQNT	X2SON	DQN	4	250	180.0	9.5	1.16	1.16	0.63	4.0	8.0	Q2
TPS3839L30DBZR	SOT-23	DBZ	3	3000	179.0	8.4	3.15	2.95	1.22	4.0	8.0	Q3
TPS3839L30DBZT	SOT-23	DBZ	3	250	179.0	8.4	3.15	2.95	1.22	4.0	8.0	Q3
TPS3839L30DQNR	X2SON	DQN	4	3000	180.0	9.5	1.16	1.16	0.63	4.0	8.0	Q2
TPS3839L30DQNT	X2SON	DQN	4	250	180.0	9.5	1.16	1.16	0.63	4.0	8.0	Q2

PACKAGE MATERIALS INFORMATION

TAPE AND REEL BOX DIMENSIONS

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TPS3839G33DBZR	SOT-23	DBZ	3	3000	203.0	203.0	35.0
TPS3839G33DBZT	SOT-23	DBZ	3	250	203.0	203.0	35.0
TPS3839G33DQNR	X2SON	DQN	4	3000	180.0	180.0	30.0
TPS3839G33DQNT	X2SON	DQN	4	250	180.0	180.0	30.0
TPS3839K33DBZR	SOT-23	DBZ	3	3000	203.0	203.0	35.0
TPS3839K33DBZT	SOT-23	DBZ	3	250	203.0	203.0	35.0
TPS3839K33DQNR	X2SON	DQN	4	3000	180.0	180.0	30.0
TPS3839K33DQNT	X2SON	DQN	4	250	180.0	180.0	30.0
TPS3839K50DBZR	SOT-23	DBZ	3	3000	203.0	203.0	35.0
TPS3839K50DBZT	SOT-23	DBZ	3	250	203.0	203.0	35.0
TPS3839K50DQNR	X2SON	DQN	4	3000	180.0	180.0	30.0
TPS3839K50DQNT	X2SON	DQN	4	250	180.0	180.0	30.0
TPS3839L30DBZR	SOT-23	DBZ	3	3000	203.0	203.0	35.0
TPS3839L30DBZT	SOT-23	DBZ	3	250	203.0	203.0	35.0
TPS3839L30DQNR	X2SON	DQN	4	3000	180.0	180.0	30.0
TPS3839L30DQNT	X2SON	DQN	4	250	180.0	180.0	30.0

DBZ (R−PDSO−G3)

PLASTIC SMALL−OUTLINE

3,04
2,80
A

B

3

2,64
2,10

1,40
1,20

1

2

0,95

3X $\frac{0,50}{0,30}$

1,90

⊕ | 0,20 Ⓜ | C | A | B

1,02
0,88

1,12
0,89

0,10 C

Seating Plane

C

0,10
0,01

0,20
0,08

Gauge Plane

Seating Plane

0,25

0°−8°

0,60
0,20
E

4203227/B 04/2005
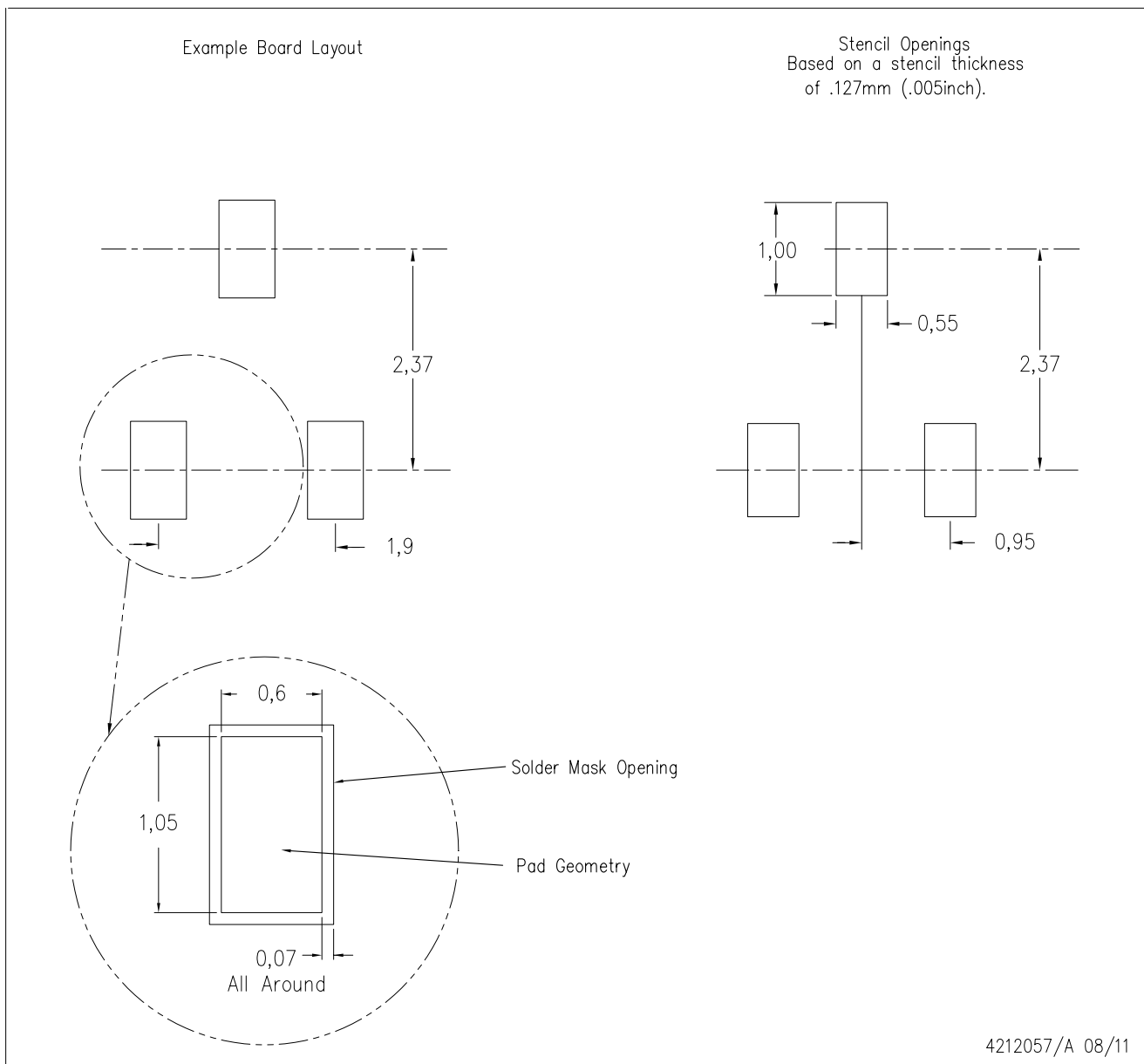
NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M−1994.
        B. This drawing is subject to change without notice.
        C. Lead dimensions are inclusive of plating.
        D. Body dimensions are exclusive of mold flash and protrusion. Mold flash and protrusion not to exceed 0.25 per side.
        E. Falls within JEDEC TO−236 variation AB, except minimum foot length.
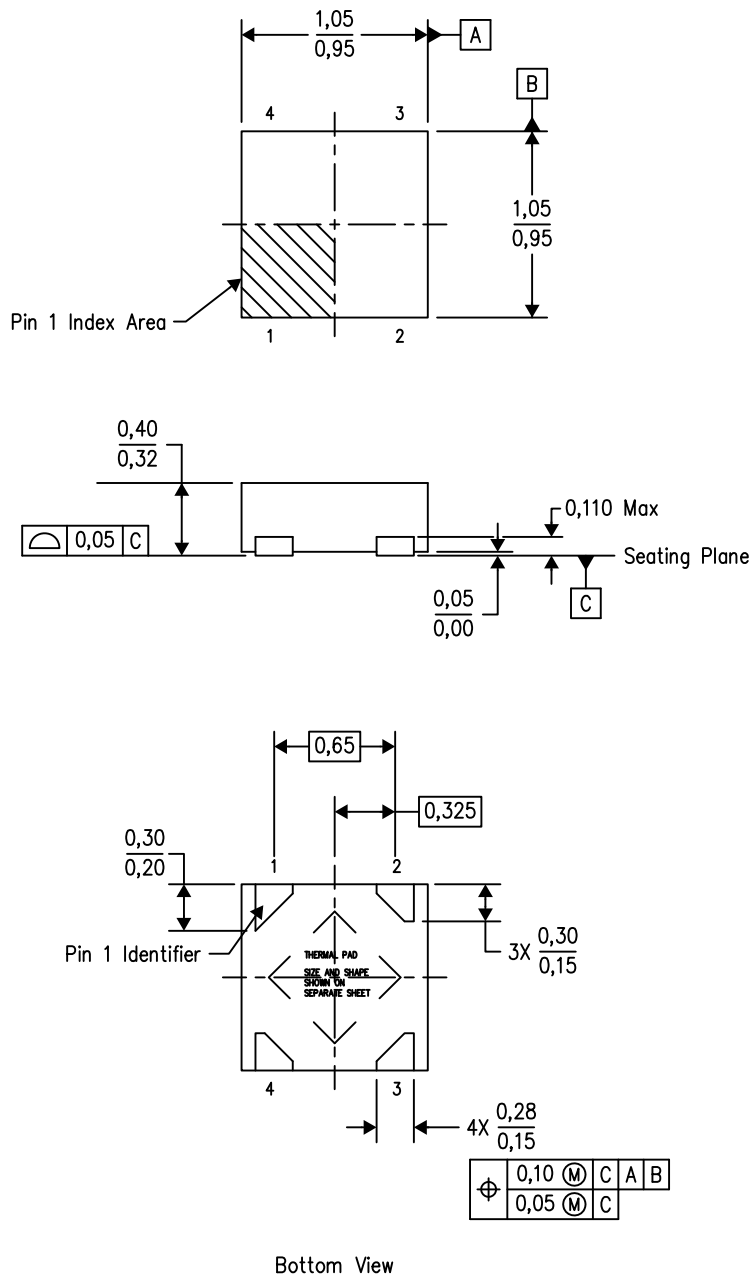
DBZ (R−PDSO−G3)   PLASTIC SMALL OUTLINE

Example Board Layout

Stencil Openings
Based on a stencil thickness
of .127mm (.005inch).

1,00

0,55

2,37

2,37

1,9

0,95

0,6

Solder Mask Opening

1,05

Pad Geometry

0,07
All Around

4212057/A 08/11

NOTES: A.   All linear dimensions are in millimeters.
          B.   This drawing is subject to change without notice.
          C.   Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
          D.   Publication IPC−7351 is recommended for alternate designs.
          E.   Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should
               contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric
               metal load solder paste. Refer to IPC−7525 for other stencil recommendations.

DQN (S-PX2SON-N4)   PLASTIC SMALL OUTLINE NO-LEAD

$\frac{1,05}{0,95}$ [A]

[B]

4   3

$\frac{1,05}{0,95}$

Pin 1 Index Area

1   2

$\frac{0,40}{0,32}$

0,110 Max

[△] 0,05 [C]

Seating Plane

[C]

$\frac{0,05}{0,00}$

[0,65]

[0,325]

$\frac{0,30}{0,20}$

1   2

Pin 1 Identifier

THERMAL PAD
SIZE AND SHAPE
SHOWN ON
SEPARATE SHEET

3X $\frac{0,30}{0,15}$

4   3

4X $\frac{0,28}{0,15}$

⊕	0,10 Ⓜ	C	A	B
	0,05 Ⓜ	C		

Bottom View

4210367/D   09/2012

NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
        B. This drawing is subject to change without notice.
        C. SON (Small Outline No-Lead) package configuration.
        D. The package thermal pad must be soldered to the board for thermal and mechanical performance.
        E. See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.

TEXAS
INSTRUMENTS
www.ti.com

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have *not* been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		Applications	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		