

## Processor Supervisory Circuits

Check for Samples: [TPS382x-xx](#), [TPS382xA-xx](#)

### FEATURES

- Power-On Reset Generator With Fixed Delay  
Time of 200 ms (TPS3823/4/5/8) or 25 ms (TPS3820)
- Manual Reset Input (TPS3820/3/5/8)
- Reset Output Available in Active-Low (TPS3820/3/4/5), Active-High (TPS3824/5) and Open-Drain (TPS3828)
- Supply Voltage Supervision Range:  
2.5 V, 3 V, 3.3 V, 5 V
- Watchdog Timer (TPS3820/3/4/8)
- Supply Current of 15  $\mu$ A (Typ)
- SOT23-5 Package
- Temperature Range:  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$

### APPLICATIONS

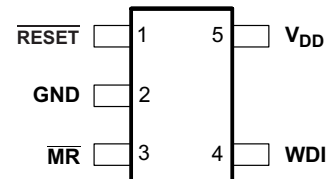
- Applications Using DSPs, Microcontrollers, or Microprocessors
- Industrial Equipment
- Programmable Controls
- Automotive Systems
- Portable/Battery-Powered Equipment
- Intelligent Instruments
- Wireless Communications Systems
- Notebook/Desktop Computers

### DESCRIPTION

The TPS382x family of supervisors provide circuit initialization and timing supervision, primarily for DSP and processor-based systems. During power-on,  $\overline{\text{RESET}}$  asserts when the supply voltage  $V_{\text{DD}}$  becomes higher than 1.1 V. Thereafter, the supply voltage supervisor monitors  $V_{\text{DD}}$  and keeps  $\overline{\text{RESET}}$  active as long as  $V_{\text{DD}}$  remains below the threshold voltage,  $V_{\text{IT-}}$ . An internal timer delays the return of the output to the inactive state (high) to ensure proper system reset. The delay time,  $t_d$ , starts after  $V_{\text{DD}}$  has risen above the threshold voltage,  $V_{\text{IT-}}$ . When the supply voltage drops below the threshold voltage  $V_{\text{IT-}}$ , the output becomes active (low) again. No external components are required. All the devices of this family have a fixed-sense threshold voltage,  $V_{\text{IT-}}$ , set by an internal voltage divider.

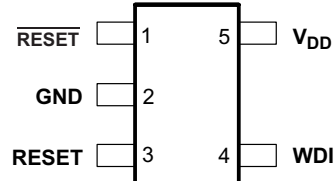
TPS3820, TPS3823, TPS3828: DBV PACKAGE  
TPS3820A, TPS3823A, TPS3828A: DBV PACKAGE

(TOP VIEW)



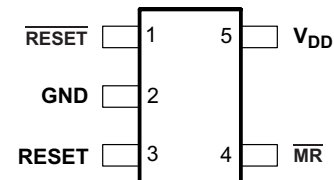
TPS3824 and TPS3824A: DBV PACKAGE

(TOP VIEW)

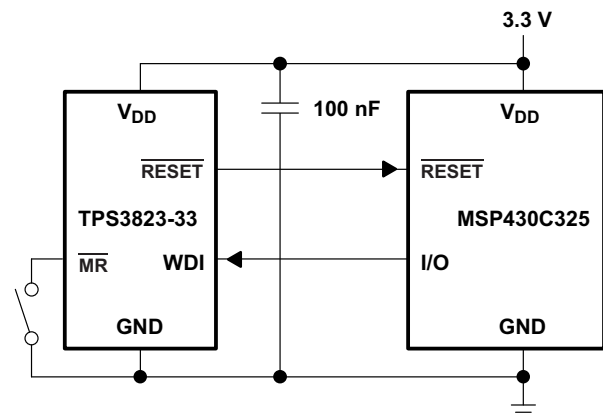


TPS3825 and TPS3825A: DBV PACKAGE

(TOP VIEW)



### TYPICAL APPLICATION



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These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

## DESCRIPTION (CONTINUED)

The TPS3820/3/5/8 devices incorporate a manual reset input,  $\overline{MR}$ . A low level at  $\overline{MR}$  causes  $\overline{RESET}$  to become active. The TPS3824/5 devices include a high-level output RESET. TPS3820/3/4/8 have a watchdog timer that is periodically triggered by a positive or negative transition at WDI. When the supervising system fails to retrigger the watchdog circuit within the time-out interval,  $t_{out}$ ,  $\overline{RESET}$  becomes active for the time period  $t_d$ . This event also reinitializes the watchdog timer. Leaving WDI unconnected disables the watchdog. In applications where the input to the WDI pin may be active (transitioning high and low) when the TPS3820/3/4/8 is asserting RESET, the TPS3820/3/4/8 does not return to a non-reset state when the input voltage is above  $V_T$ .

If the application requires that input to WDI is active when RESET pin is asserted, then the “A” version of the device should be used. The “A” versions will not latch the RESET to the asserted state if a WDI pulse is received while RESET is asserted.

Figure 1 shows how to decouple WDI from the active signal using when using the non-“A” version. This is accomplished with an N-Channel FET in series with the WDI pin, with the gate of the FET connected to the RESET output. The “A” version of the device does not need this FET but will operate in circuits that have it. Therefore, the “A” version is backward compatible with the non-“A” versions.

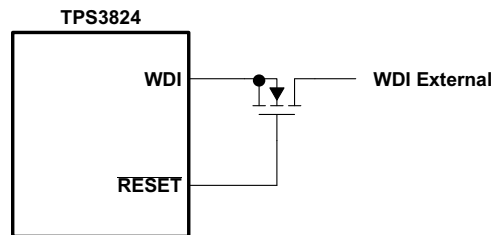


Figure 1.

The product spectrum is designed for supply voltages of 2.5 V, 3 V, 3.3 V, and 5 V. The circuits are available in an SOT23-5 package. The TPS382x devices are characterized for operation over a temperature range of  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .

## PACKAGE INFORMATION<sup>(1)</sup>

| DEVICE NAME <sup>(2)</sup> | DEVICE NAME <sup>(3)</sup> | THRESHOLD VOLTAGE <sup>(4)</sup> | MARKING |
|----------------------------|----------------------------|----------------------------------|---------|
| TPS3820-33DBVT             | TPS3820-33DBVR             | 2.93 V                           | PDEI    |
| TPS3820-50DBVT             | TPS3820-50DBVR             | 4.55 V                           | PDDI    |
| TPS3823-25DBVT             | TPS3823-25DBVR             | 2.25 V                           | PAPI    |
| TPS3823-30DBVT             | TPS3823-30DBVR             | 2.63 V                           | PAQI    |
| TPS3823-33DBVT             | TPS3823-33DBVR             | 2.93 V                           | PARI    |
| TPS3823-50DBVT             | TPS3823-50DBVR             | 4.55 V                           | PASI    |
| TPS3824-25DBVT             | TPS3824-25DBVR             | 2.25 V                           | PATI    |
| TPS3824-30DBVT             | TPS3824-30DBVR             | 2.63 V                           | PAUI    |
| TPS3824-33DBVT             | TPS3824-33DBVR             | 2.93 V                           | PAVI    |
| TPS3824-50DBVT             | TPS3824-50DBVR             | 4.55 V                           | PAWI    |
| TPS3825-33DBVT             | TPS3825-33DBVR             | 2.93 V                           | PDGI    |
| TPS3825-50DBVT             | TPS3825-50DBVR             | 4.55 V                           | PDFI    |
| TPS3828-33DBVT             | TPS3828-33DBVR             | 2.93 V                           | PDII    |
| TPS3828-50DBVT             | TPS3828-50DBVR             | 4.55 V                           | PDHI    |
| TPS3823A-33DBVT            | TPS3823A-33DBVR            | 2.93 V                           | PYPI    |

- (1) For the most current package and ordering information see the Package Option Addendum at the end of this document, or see the TI web site at [www.ti.com](http://www.ti.com).
- (2) The DBVT package indicates tape and reel of 250 parts.
- (3) The DBVR package indicates tape and reel of 3000 parts.
- (4) For other threshold voltage versions, please contact the local TI sales office.

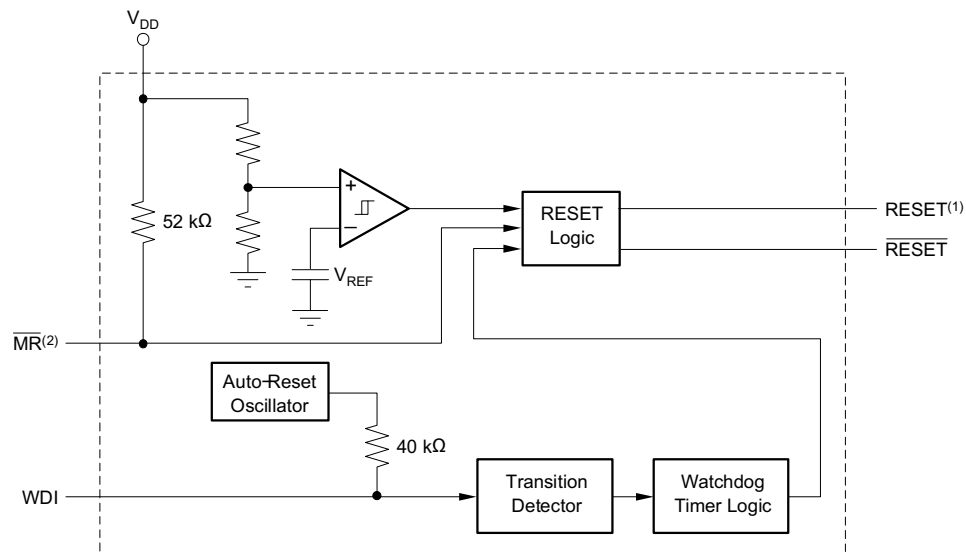
### FUNCTION/TRUTH TABLE

| INPUTS                       |                           | OUTPUTS                   |                      |
|------------------------------|---------------------------|---------------------------|----------------------|
| $\overline{\text{MR}}^{(1)}$ | $\text{VDD} > \text{VIT}$ | $\overline{\text{RESET}}$ | $\text{RESET}^{(2)}$ |
| L                            | 0                         | L                         | H                    |
| L                            | 1                         | L                         | H                    |
| H                            | 0                         | L                         | H                    |
| H                            | 1                         | H                         | L                    |

(1) TPS3820/3/5/8

(2) TPS3824/5

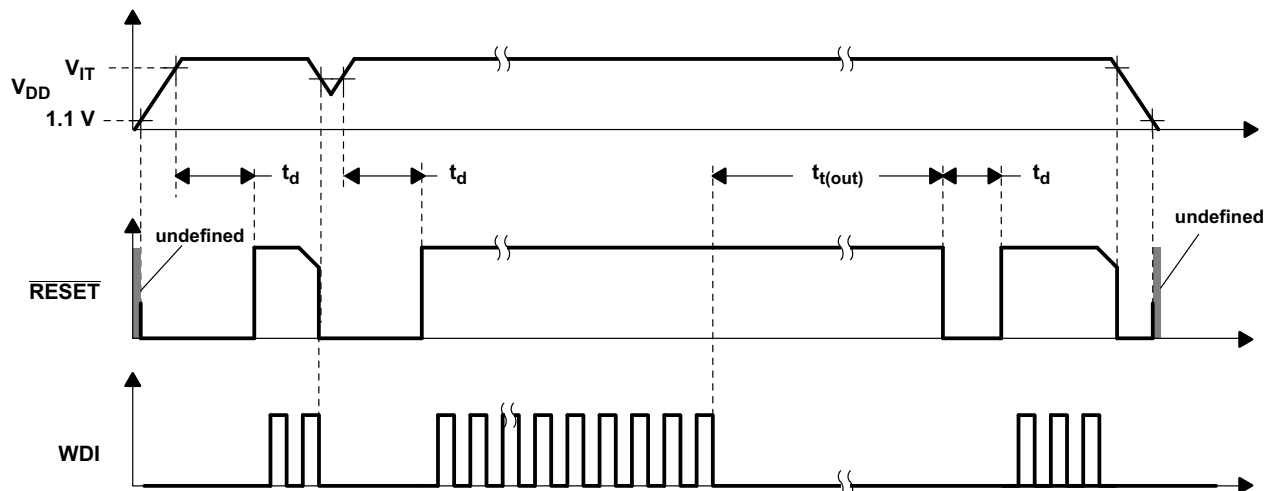
### FUNCTIONAL BLOCK DIAGRAM



(1) TPS3824/5

(2) TPS3820/3/5/8

### TIMING DIAGRAM



## ABSOLUTE MAXIMUM RATINGS<sup>(1)(2)</sup>

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

|                                                                                                      | VALUE                           | UNIT |
|------------------------------------------------------------------------------------------------------|---------------------------------|------|
| V <sub>DD</sub> Supply voltage                                                                       | 6 V                             | V    |
| RESET, $\overline{\text{RESET}}$ , MR, WDI                                                           | –0.3 to (V <sub>DD</sub> + 0.3) | V    |
| I <sub>OL</sub> Maximum low output current                                                           | 5                               | mA   |
| I <sub>OH</sub> Maximum high output current                                                          | –5                              | mA   |
| I <sub>IK</sub> Input clamp current range (V <sub>I</sub> < 0 or V <sub>I</sub> > V <sub>DD</sub> )  | ±10                             | mA   |
| I <sub>OK</sub> Output clamp current range (V <sub>O</sub> < 0 or V <sub>O</sub> > V <sub>DD</sub> ) | ±10                             | mA   |
| Continuous total power dissipation                                                                   | See Dissipation Rating Table    |      |
| T <sub>A</sub> Operating free-air temperature range                                                  | –40 to +85                      | °C   |
| T <sub>stg</sub> Storage temperature range                                                           | –65 to +150                     | °C   |
| Soldering temperature                                                                                | 260                             | °C   |

- (1) Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) All voltage values are with respect to GND.

## DISSIPATION RATINGS

| PACKAGE | T <sub>A</sub> ≤ 25°C<br>POWER RATING | OPERATING<br>FACTOR<br>ABOVE T <sub>A</sub> = 25°C | T <sub>A</sub> = 70°C<br>POWER RATING | T <sub>A</sub> = 85°C<br>POWER RATING |
|---------|---------------------------------------|----------------------------------------------------|---------------------------------------|---------------------------------------|
| DBV     | 437 mW                                | 3.5 mW/°C                                          | 280 mW                                | 227 mW                                |

## RECOMMENDED OPERATING CONDITIONS

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

|                                                                                                | MIN                   | MAX                   | UNIT |
|------------------------------------------------------------------------------------------------|-----------------------|-----------------------|------|
| V <sub>DD</sub> Supply voltage                                                                 | 1.1                   | 5.5                   | V    |
| V <sub>I</sub> Input voltage                                                                   | 0                     | V <sub>DD</sub> + 0.3 | V    |
| V <sub>IH</sub> High-level input voltage at $\overline{\text{MR}}$ and $\overline{\text{WDI}}$ | 0.7 × V <sub>DD</sub> |                       | V    |
| V <sub>IL</sub> Low-level input voltage                                                        |                       | 0.3 × V <sub>DD</sub> | V    |
| Δt/ΔV Input transition rise and fall rate at $\overline{\text{MR}}$ or $\overline{\text{WDI}}$ |                       | 100                   | ns/V |
| T <sub>A</sub> Operating free-air temperature range                                            | –40                   | 85                    | °C   |

## ELECTRICAL CHARACTERISTICS

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

| PARAMETER                                                              |                           |                                                                    | TEST CONDITIONS                                                         | MIN                     | TYP  | MAX  | UNIT |      |      |     |   |
|------------------------------------------------------------------------|---------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------|------|------|------|------|------|-----|---|
| V <sub>OH</sub> High-level output voltage                              | $\overline{\text{RESET}}$ | TPS382x-25                                                         | V <sub>DD</sub> = V <sub>IT-</sub> + 0.2 V, I <sub>OH</sub> = −20 μA    | 0.8 × V <sub>DD</sub>   |      |      | V    |      |      |     |   |
|                                                                        |                           | TPS382x-30                                                         | V <sub>DD</sub> = V <sub>IT-</sub> + 0.2 V, I <sub>OH</sub> = −30 μA    |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS382x-33                                                         |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS382xA-33                                                        |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS382x-50                                                         | V <sub>DD</sub> = V <sub>IT-</sub> + 0.2 V, I <sub>OH</sub> = −120 μA   | V <sub>DD</sub> − 1.5 V |      |      |      |      |      |     |   |
|                                                                        | RESET                     | TPS3824-25                                                         | V <sub>DD</sub> ≥ 1.8 V, I <sub>OH</sub> = −100 μA                      | 0.8 × V <sub>DD</sub>   |      |      | V    |      |      |     |   |
|                                                                        |                           | TPS3825-25                                                         |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS3824-30                                                         | V <sub>DD</sub> ≥ 1.8 V, I <sub>OH</sub> = −150 μA                      |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS3825-30                                                         |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS3824-33                                                         |                                                                         |                         |      |      |      |      |      |     |   |
| TPS3825-33                                                             |                           |                                                                    |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        | TPS3824-50                |                                                                    |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        | TPS3825-50                |                                                                    |                                                                         |                         |      |      |      |      |      |     |   |
| V <sub>OL</sub> Low-level output voltage                               | RESET                     | TPS3824-25                                                         | V <sub>DD</sub> = V <sub>IT-</sub> + 0.2 V, I <sub>OL</sub> = 1 mA      |                         |      | 0.4  | V    |      |      |     |   |
|                                                                        |                           | TPS3825-25                                                         |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS3824-30                                                         | V <sub>DD</sub> = V <sub>IT-</sub> + 0.2 V, I <sub>OL</sub> = 1.2 mA    |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS3825-30                                                         |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        | TPS3824-33                |                                                                    |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS3825-33                                                         |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS3824-50                                                         | V <sub>DD</sub> = V <sub>IT-</sub> + 0.2 V, I <sub>OL</sub> = 3 mA      |                         |      | 0.4  | V    |      |      |     |   |
|                                                                        |                           | TPS3825-50                                                         |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        | $\overline{\text{RESET}}$ | TPS382x-25                                                         | V <sub>DD</sub> = V <sub>IT-</sub> −0.2 V, I <sub>OL</sub> = 1 mA       |                         |      |      |      |      |      | 0.4 | V |
|                                                                        |                           | TPS382x-30                                                         | V <sub>DD</sub> = V <sub>IT-</sub> −0.2 V, I <sub>OL</sub> = 1.2 mA     |                         |      |      |      |      |      |     |   |
| TPS382x-33                                                             |                           | V <sub>DD</sub> = V <sub>IT-</sub> − 0.2 V, I <sub>OL</sub> = 3 mA |                                                                         |                         |      |      |      |      |      |     |   |
| TPS382xA-33                                                            |                           |                                                                    |                                                                         |                         |      |      |      |      |      |     |   |
| TPS382x-50                                                             |                           |                                                                    |                                                                         |                         |      |      |      |      |      |     |   |
| Power-up reset voltage <sup>(1)</sup>                                  |                           |                                                                    | V <sub>DD</sub> ≥ 1.1 V, I <sub>OL</sub> = 20 μA                        |                         |      | 0.4  | V    |      |      |     |   |
| V <sub>IT-</sub> Negative-going input threshold voltage <sup>(2)</sup> |                           | TPS382x-25                                                         | T <sub>A</sub> = 0°C to +85°C                                           |                         |      | 2.21 | 2.25 | 2.30 | V    |     |   |
|                                                                        |                           | TPS382x-30                                                         |                                                                         |                         |      | 2.59 | 2.63 | 2.69 |      |     |   |
|                                                                        |                           | TPS382x-33                                                         |                                                                         |                         |      | 2.88 | 2.93 | 3    |      |     |   |
|                                                                        |                           | TPS382xA-33                                                        |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS382x-50                                                         | 4.49                                                                    | 4.55                    | 4.64 | V    |      |      |      |     |   |
|                                                                        | RESET                     | TPS382x-25                                                         | T <sub>A</sub> = − 40°C to +85°C                                        |                         |      |      | 2.20 | 2.25 | 2.30 |     |   |
|                                                                        |                           | TPS382x-30                                                         |                                                                         |                         |      |      | 2.57 | 2.63 | 2.69 |     |   |
|                                                                        |                           | TPS382x-33                                                         |                                                                         |                         |      |      | 2.86 | 2.93 | 3    |     |   |
|                                                                        |                           | TPS382xA-33                                                        |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           |                                                                    | TPS382x-50                                                              |                         |      | 4.46 | 4.55 | 4.64 |      |     |   |
| V <sub>hys</sub> Hysteresis at V <sub>DD</sub> input                   |                           | TPS382x-25                                                         |                                                                         |                         |      | 30   | mV   |      |      |     |   |
|                                                                        |                           | TPS382x-30                                                         |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS382x-33                                                         |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS382xA-33                                                        |                                                                         |                         |      |      |      |      |      |     |   |
|                                                                        |                           | TPS382x-50                                                         | 50                                                                      |                         |      |      |      |      |      |     |   |
| I <sub>IH(AV)</sub> Average high-level input current                   | WDI                       | WDI                                                                | WDI = V <sub>DD</sub> , time average (dc = 88%)                         |                         |      | 120  | μA   |      |      |     |   |
| I <sub>IL(AV)</sub> Average low-level input current                    |                           | WDI                                                                | WDI = 0.3 V, V <sub>DD</sub> = 5.5 V time average (dc = 12%)            |                         |      | −15  |      |      |      |     |   |
| I <sub>IH</sub> High-level input current                               | WDI                       | WDI                                                                | WDI = V <sub>DD</sub>                                                   |                         |      | 140  | 190  | μA   |      |     |   |
|                                                                        | $\overline{\text{MR}}$    | $\overline{\text{MR}}$                                             | $\overline{\text{MR}}$ = V <sub>DD</sub> × 0.7, V <sub>DD</sub> = 5.5 V |                         |      | −40  | −60  |      |      |     |   |
| I <sub>IL</sub> Low-level input current                                | WDI                       | WDI                                                                | WDI = 0.3 V, V <sub>DD</sub> = 5.5 V                                    |                         |      | 140  | 190  | μA   |      |     |   |
|                                                                        | $\overline{\text{MR}}$    | $\overline{\text{MR}}$                                             | $\overline{\text{MR}}$ = 0.3 V, V <sub>DD</sub> = 5.5 V                 |                         |      | −110 | −160 |      |      |     |   |

## ELECTRICAL CHARACTERISTICS (continued)

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

| PARAMETER |                                                    |             | TEST CONDITIONS                                            | MIN | TYP | MAX  | UNIT          |
|-----------|----------------------------------------------------|-------------|------------------------------------------------------------|-----|-----|------|---------------|
| $I_{OS}$  | Output short-circuit current <sup>(3)</sup>        | TPS382x-25  | $V_{DD} = V_{IT, max} + 0.2\text{ V}$ , $V_O = 0\text{ V}$ |     |     | -400 | $\mu\text{A}$ |
|           |                                                    | TPS382x-30  |                                                            |     |     |      |               |
|           |                                                    | TPS382x-33  |                                                            |     |     |      |               |
|           |                                                    | TPS382xA-33 |                                                            |     |     |      |               |
|           |                                                    | TPS382x-50  |                                                            |     |     | -800 |               |
| $I_{DD}$  | Supply current                                     |             | WDI, $\overline{\text{MR}}$ , and Outputs unconnected      |     | 15  | 25   | $\mu\text{A}$ |
|           | Internal pullup resistor at $\overline{\text{MR}}$ |             |                                                            |     | 52  |      | k $\Omega$    |
| $C_i$     | Input capacitance at $\overline{\text{MR}}$ , WDI  |             | $V_i = 0\text{ V}$ to $5.5\text{ V}$                       |     | 5   |      | pF            |

(3) The  $\overline{\text{RESET}}$  short-circuit current is the maximum pullup current when  $\overline{\text{RESET}}$  is driven low by a  $\mu\text{P}$  bidirectional reset pin.

## TIMING REQUIREMENTS AT

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

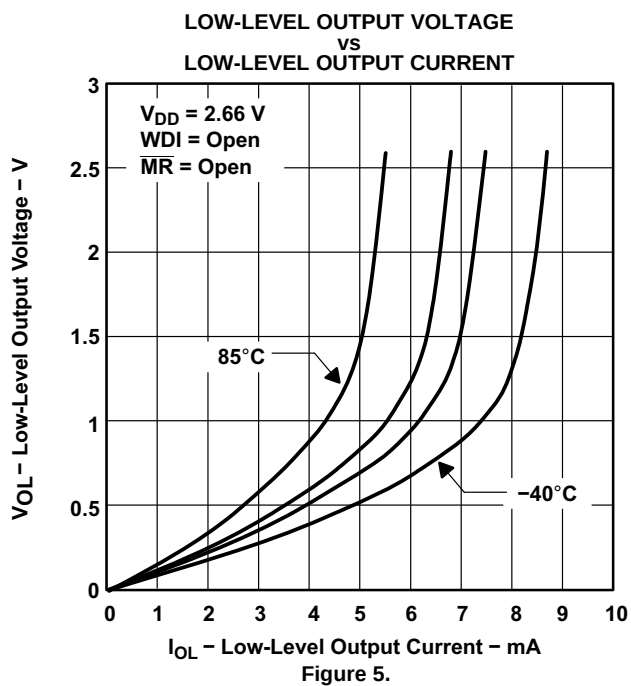
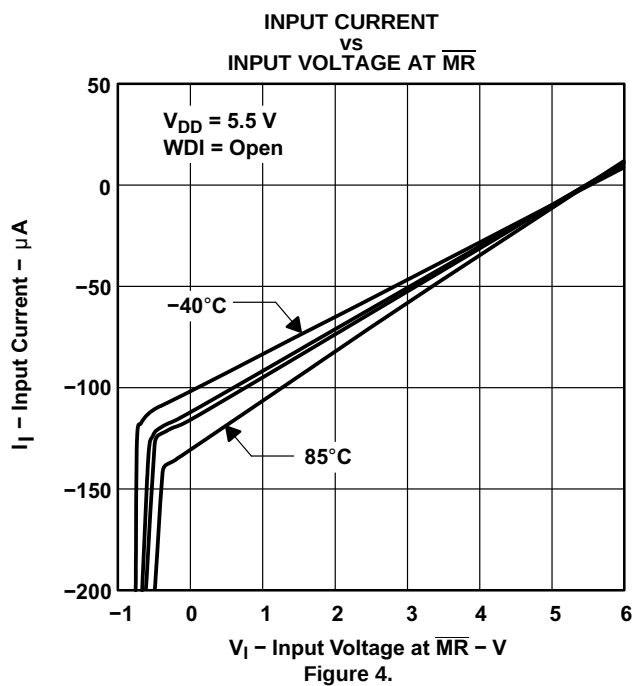
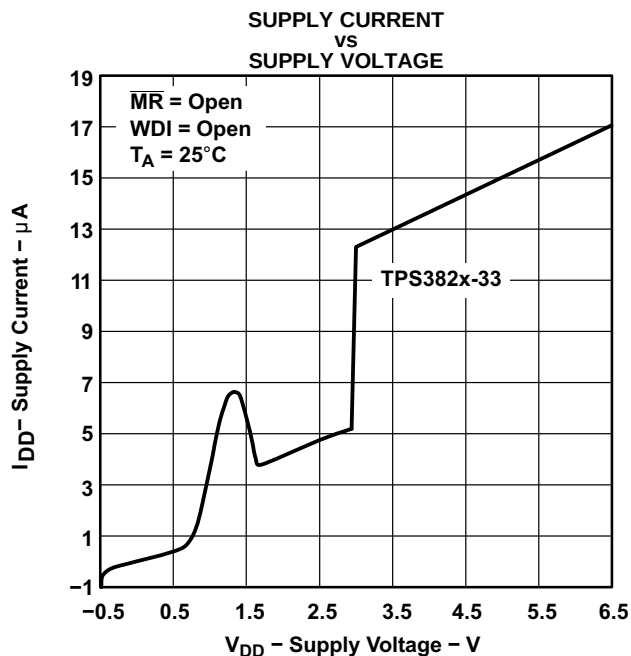
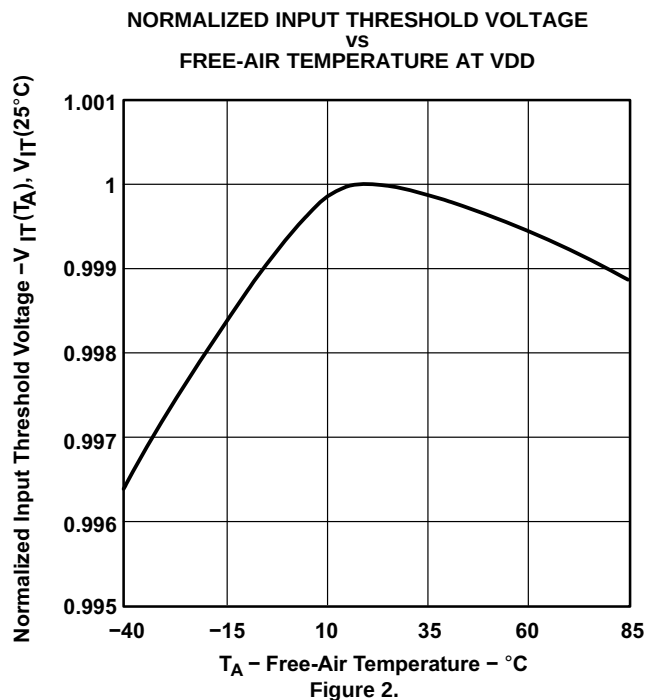
| PARAMETER |             | TEST CONDITIONS | MIN                                                                                                | MAX | UNIT |               |
|-----------|-------------|-----------------|----------------------------------------------------------------------------------------------------|-----|------|---------------|
| $t_w$     | Pulse width | at VDD          | $V_{DD} = V_{IT-} + 0.2\text{ V}$ , $V_{DD} = V_{IT-} - 0.2\text{ V}$                              |     | 6    | $\mu\text{s}$ |
|           |             | at MR           | $V_{DD} \geq V_{IT-} + 0.2\text{ V}$ , $V_{IL} = 0.3 \times V_{DD}$ , $V_{IH} = 0.7 \times V_{DD}$ |     | 1    | $\mu\text{s}$ |
|           |             | at WDI          | $V_{DD} \geq V_{IT-} + 0.2\text{ V}$ , $V_{IL} = 0.3 \times V_{DD}$ , $V_{IH} = 0.7 \times V_{DD}$ |     | 100  | ns            |

## SWITCHING CHARACTERISTICS

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

| PARAMETER        |                                                    |                                                                                     | TEST CONDITIONS                                                                                                              | MIN | TYP | MAX | UNIT |
|------------------|----------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| t <sub>out</sub> | Watchdog time out                                  | TPS3820                                                                             | V <sub>DD</sub> ≥ V <sub>IT-</sub> + 0.2 V,                                                                                  | 112 | 200 | 300 | ms   |
|                  |                                                    | TPS3823/4/8, TPS3823A                                                               | See timing diagram                                                                                                           | 0.9 | 1.6 | 2.5 | s    |
| t <sub>d</sub>   | Delay time                                         | TPS3820                                                                             | V <sub>DD</sub> ≥ V <sub>IT-</sub> +0.2 V,                                                                                   | 15  | 25  | 37  | ms   |
|                  |                                                    | TPS3823/4/5/8, TPS3823A                                                             | See timing diagram                                                                                                           | 120 | 200 | 300 |      |
| t <sub>PHL</sub> | Propagation (delay) time, high-to-low-level output | $\overline{\text{MR}}$ to $\overline{\text{RESET}}$ delay (TPS3820/3/5/8, TPS3823A) | V <sub>DD</sub> ≥ V <sub>IT-</sub> +0.2 V, V <sub>IL</sub> = 0.3 x V <sub>DD</sub> , V <sub>IH</sub> = 0.7 x V <sub>DD</sub> | 0.1 |     |     | μs   |
|                  |                                                    | V <sub>DD</sub> to $\overline{\text{RESET}}$ delay                                  | V <sub>IL</sub> = V <sub>IT-</sub> –0.2 V, V <sub>IH</sub> = V <sub>IT-</sub> + 0.2 V                                        | 25  |     |     |      |
| t <sub>PLH</sub> | Propagation (delay) time, low-to-high-level output | $\overline{\text{MR}}$ to RESET delay (TPS3824/5)                                   | V <sub>DD</sub> ≥ V <sub>IT-</sub> +0.2 V, V <sub>IL</sub> = 0.3 x V <sub>DD</sub> , V <sub>IH</sub> = 0.7 x V <sub>DD</sub> | 0.1 |     |     | μs   |
|                  |                                                    | V <sub>DD</sub> to RESET delay (TPS3824/5)                                          | V <sub>IL</sub> = V <sub>IT-</sub> –0.2 V, V <sub>IH</sub> = V <sub>IT-</sub> + 0.2 V                                        | 25  |     |     |      |

## TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS (continued)

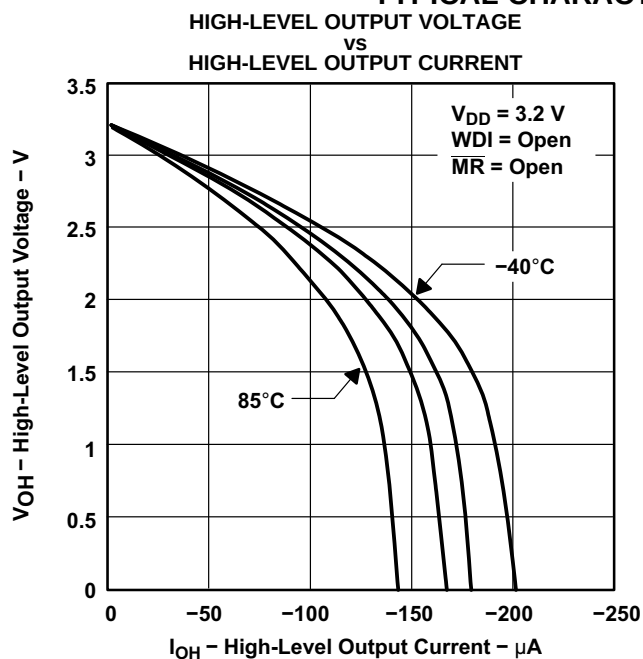


Figure 6.

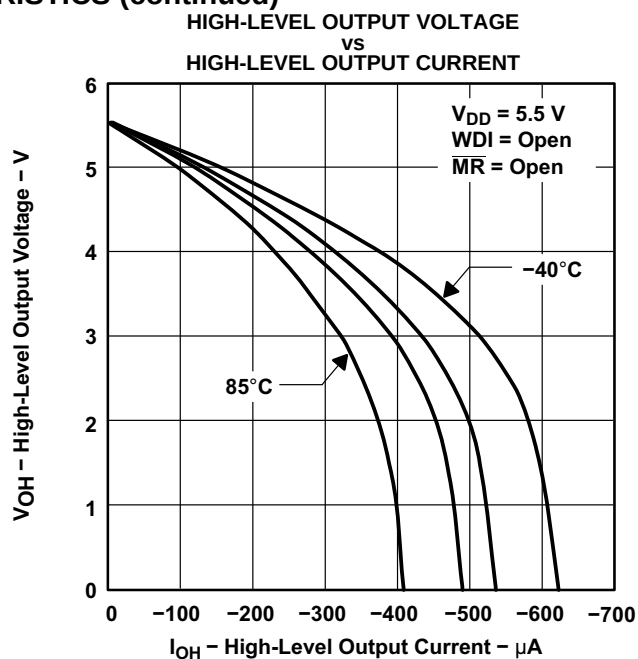


Figure 7.

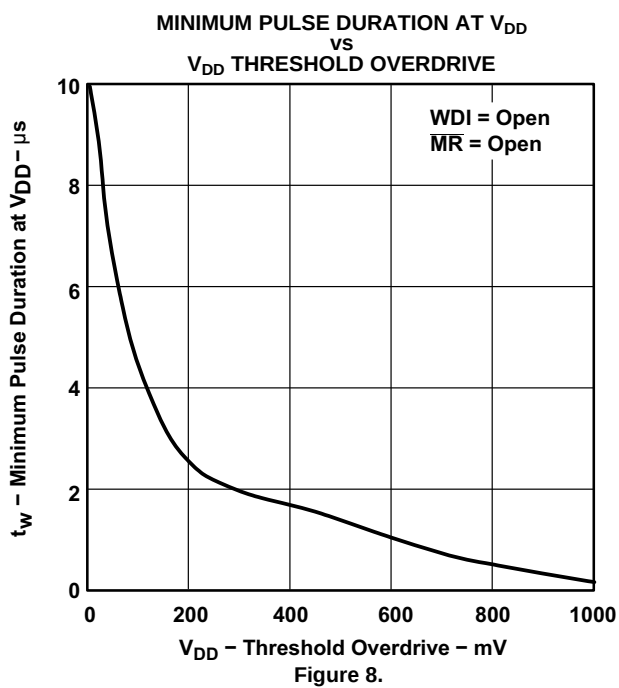


Figure 8.

## REVISION HISTORY

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

| Changes from Revision I (February 2013) to Revision J                                                                              | Page |
|------------------------------------------------------------------------------------------------------------------------------------|------|
| • Added <i>TPS382xA-33</i> to second $\overline{\text{RESET}}$ row of $V_{OH}$ parameter in Electrical Characteristics table ..... | 5    |
| • Added <i>TPS382xA-33</i> to third $\overline{\text{RESET}}$ row of $V_{OL}$ parameter in Electrical Characteristics table .....  | 5    |
| • Corrected typo in $V_{OL}$ $\overline{\text{RESET}}$ parameter test conditions .....                                             | 5    |
| • Added <i>TPS382xA-33</i> to third and seventh rows of $V_{IT-}$ parameter in Electrical Characteristics table .....              | 5    |
| • Added <i>TPS382xA-33</i> to third row of $V_{hys}$ parameter in Electrical Characteristics table .....                           | 5    |
| • Added <i>TPS382xA-33</i> to third row of $I_{OS}$ parameter in Electrical Characteristics table .....                            | 6    |
| • Added <i>TPS3823A</i> to second row of $t_{out}$ parameter in Switching Characteristics table .....                              | 6    |
| • Added <i>TPS3823A</i> to second row of $t_d$ parameter in Switching Characteristics table .....                                  | 6    |
| • Added <i>TPS3823A</i> to first row of $t_{PHL}$ parameter in Switching Characteristics table .....                               | 6    |
| <hr/>                                                                                                                              |      |
| Changes from Revision H (July 2012) to Revision I                                                                                  | Page |
| • Added last row to Package Information table .....                                                                                | 2    |

**PACKAGING INFORMATION**

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2)            | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3820-33DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDEI                    | <a href="#">Samples</a> |
| TPS3820-33DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDEI                    | <a href="#">Samples</a> |
| TPS3820-33DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDEI                    | <a href="#">Samples</a> |
| TPS3820-33DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDEI                    | <a href="#">Samples</a> |
| TPS3820-50DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDDI                    | <a href="#">Samples</a> |
| TPS3820-50DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDDI                    | <a href="#">Samples</a> |
| TPS3820-50DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDDI                    | <a href="#">Samples</a> |
| TPS3820-50DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDDI                    | <a href="#">Samples</a> |
| TPS3823-25DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAPI                    | <a href="#">Samples</a> |
| TPS3823-25DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAPI                    | <a href="#">Samples</a> |
| TPS3823-25DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PAPI                    | <a href="#">Samples</a> |
| TPS3823-25DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PAPI                    | <a href="#">Samples</a> |
| TPS3823-30DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAQI                    | <a href="#">Samples</a> |
| TPS3823-30DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAQI                    | <a href="#">Samples</a> |
| TPS3823-30DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PAQI                    | <a href="#">Samples</a> |
| TPS3823-30DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PAQI                    | <a href="#">Samples</a> |
| TPS3823-33DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PARI                    | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2)            | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3823-33DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PARI                    | <a href="#">Samples</a> |
| TPS3823-33DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PARI                    | <a href="#">Samples</a> |
| TPS3823-33DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PARI                    | <a href="#">Samples</a> |
| TPS3823-50DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PASI                    | <a href="#">Samples</a> |
| TPS3823-50DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PASI                    | <a href="#">Samples</a> |
| TPS3823-50DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PASI                    | <a href="#">Samples</a> |
| TPS3823-50DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PASI                    | <a href="#">Samples</a> |
| TPS3823A-33DBVR  | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PYPI                    | <a href="#">Samples</a> |
| TPS3823A-33DBVT  | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PYPI                    | <a href="#">Samples</a> |
| TPS3824-25DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PATI                    | <a href="#">Samples</a> |
| TPS3824-25DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PATI                    | <a href="#">Samples</a> |
| TPS3824-25DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PATI                    | <a href="#">Samples</a> |
| TPS3824-25DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PATI                    | <a href="#">Samples</a> |
| TPS3824-30DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAUI                    | <a href="#">Samples</a> |
| TPS3824-30DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAUI                    | <a href="#">Samples</a> |
| TPS3824-30DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PAUI                    | <a href="#">Samples</a> |
| TPS3824-30DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PAUI                    | <a href="#">Samples</a> |
| TPS3824-33DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAVI                    | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2)            | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3824-33DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAVI                    | <a href="#">Samples</a> |
| TPS3824-33DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PAVI                    | <a href="#">Samples</a> |
| TPS3824-33DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PAVI                    | <a href="#">Samples</a> |
| TPS3824-50DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAWI                    | <a href="#">Samples</a> |
| TPS3824-50DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAWI                    | <a href="#">Samples</a> |
| TPS3824-50DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PAWI                    | <a href="#">Samples</a> |
| TPS3824-50DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   |              | PAWI                    | <a href="#">Samples</a> |
| TPS3825-33DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDGI                    | <a href="#">Samples</a> |
| TPS3825-33DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDGI                    | <a href="#">Samples</a> |
| TPS3825-33DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDGI                    | <a href="#">Samples</a> |
| TPS3825-33DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDGI                    | <a href="#">Samples</a> |
| TPS3825-50DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDFI                    | <a href="#">Samples</a> |
| TPS3825-50DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDFI                    | <a href="#">Samples</a> |
| TPS3825-50DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDFI                    | <a href="#">Samples</a> |
| TPS3825-50DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDFI                    | <a href="#">Samples</a> |
| TPS3828-33DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDII                    | <a href="#">Samples</a> |
| TPS3828-33DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDII                    | <a href="#">Samples</a> |
| TPS3828-33DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDII                    | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2)            | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3828-33DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDII                    | <a href="#">Samples</a> |
| TPS3828-50DBVR   | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDHI                    | <a href="#">Samples</a> |
| TPS3828-50DBVRG4 | ACTIVE        | SOT-23       | DBV                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDHI                    | <a href="#">Samples</a> |
| TPS3828-50DBVT   | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDHI                    | <a href="#">Samples</a> |
| TPS3828-50DBVTG4 | ACTIVE        | SOT-23       | DBV                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDHI                    | <a href="#">Samples</a> |

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

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "-" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

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

**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.

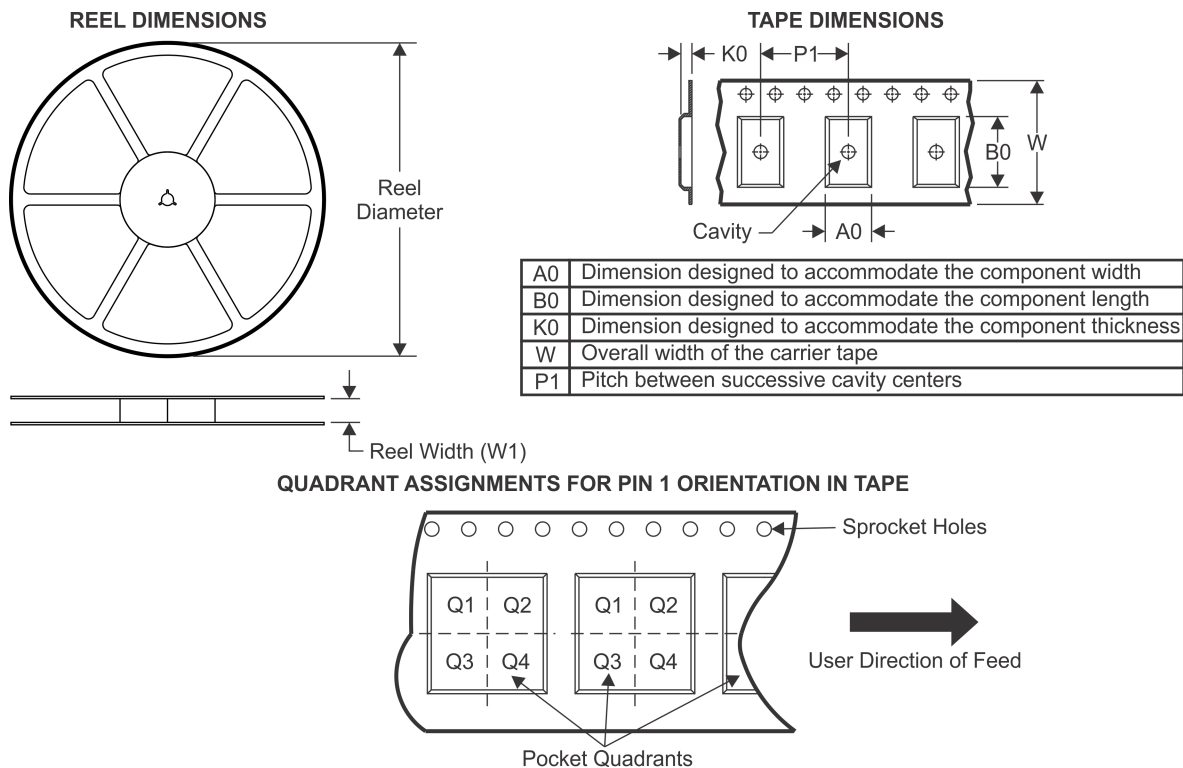
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

**OTHER QUALIFIED VERSIONS OF TPS3820-33, TPS3820-50, TPS3823-25, TPS3823-30, TPS3823-33, TPS3823-50, TPS3824-25, TPS3824-30, TPS3824-33, TPS3824-50, TPS3825-33, TPS3825-50, TPS3828-33, TPS3828-50 :**

- Automotive: [TPS3820-33-Q1](#), [TPS3820-50-Q1](#), [TPS3823-25-Q1](#), [TPS3823-30-Q1](#), [TPS3823-33-Q1](#), [TPS3823-50-Q1](#), [TPS3824-25-Q1](#), [TPS3824-30-Q1](#), [TPS3824-33-Q1](#), [TPS3824-50-Q1](#), [TPS3825-33-Q1](#), [TPS3825-50-Q1](#), [TPS3828-33-Q1](#), [TPS3828-50-Q1](#)

NOTE: Qualified Version Definitions:

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

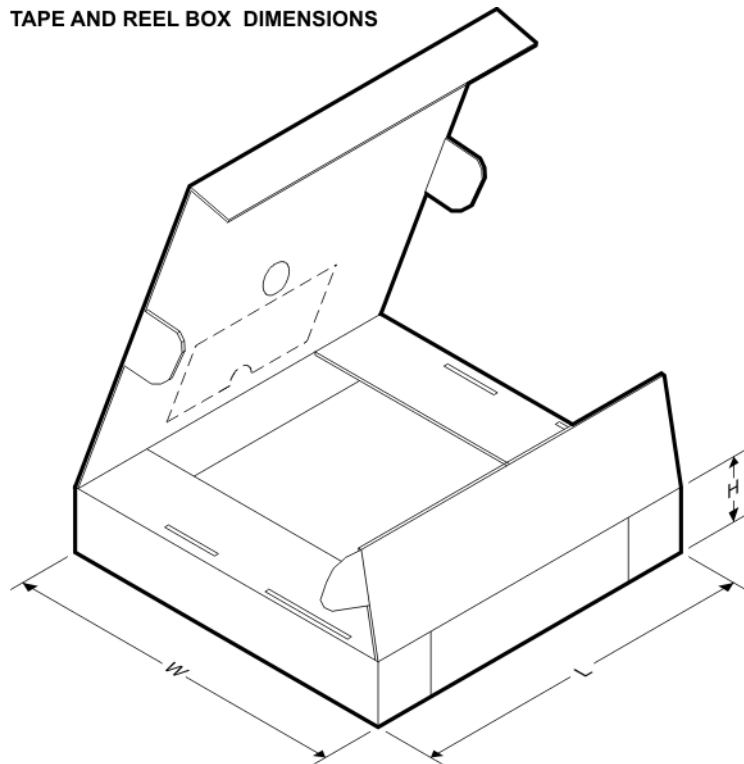
**TAPE AND REEL INFORMATION**


\*All dimensions are nominal

| Device          | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|-----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TPS3820-33DBVR  | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.3     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3820-33DBVT  | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3820-50DBVR  | SOT-23       | DBV             | 5    | 3000 | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3820-50DBVR  | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3820-50DBVT  | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3820-50DBVT  | SOT-23       | DBV             | 5    | 250  | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3823-25DBVR  | SOT-23       | DBV             | 5    | 3000 | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3823-25DBVR  | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3823-25DBVT  | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3823-25DBVT  | SOT-23       | DBV             | 5    | 250  | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3823-30DBVR  | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3823-30DBVT  | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3823-33DBVR  | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3823-33DBVT  | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.3     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3823-50DBVR  | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3823-50DBVT  | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3823A-33DBVR | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.3     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3823A-33DBVT | SOT-23       | DBV             | 5    | 250  | 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 |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TPS3824-25DBVR | SOT-23       | DBV             | 5    | 3000 | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3824-25DBVT | SOT-23       | DBV             | 5    | 250  | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3824-30DBVR | SOT-23       | DBV             | 5    | 3000 | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3824-30DBVT | SOT-23       | DBV             | 5    | 250  | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3824-33DBVR | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3824-33DBVT | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.3     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3824-50DBVR | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3824-50DBVT | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3824-50DBVT | SOT-23       | DBV             | 5    | 250  | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3825-33DBVR | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.3     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3825-33DBVT | SOT-23       | DBV             | 5    | 250  | 178.0              | 8.4                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3825-50DBVR | SOT-23       | DBV             | 5    | 3000 | 179.0              | 8.4                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3825-50DBVR | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3825-50DBVT | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.3     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |
| TPS3828-33DBVR | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3828-33DBVT | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3828-50DBVR | SOT-23       | DBV             | 5    | 3000 | 178.0              | 9.0                | 3.23    | 3.17    | 1.37    | 4.0     | 8.0    | Q3            |
| TPS3828-50DBVT | SOT-23       | DBV             | 5    | 250  | 178.0              | 9.0                | 3.3     | 3.2     | 1.4     | 4.0     | 8.0    | Q3            |

## TAPE AND REEL BOX DIMENSIONS

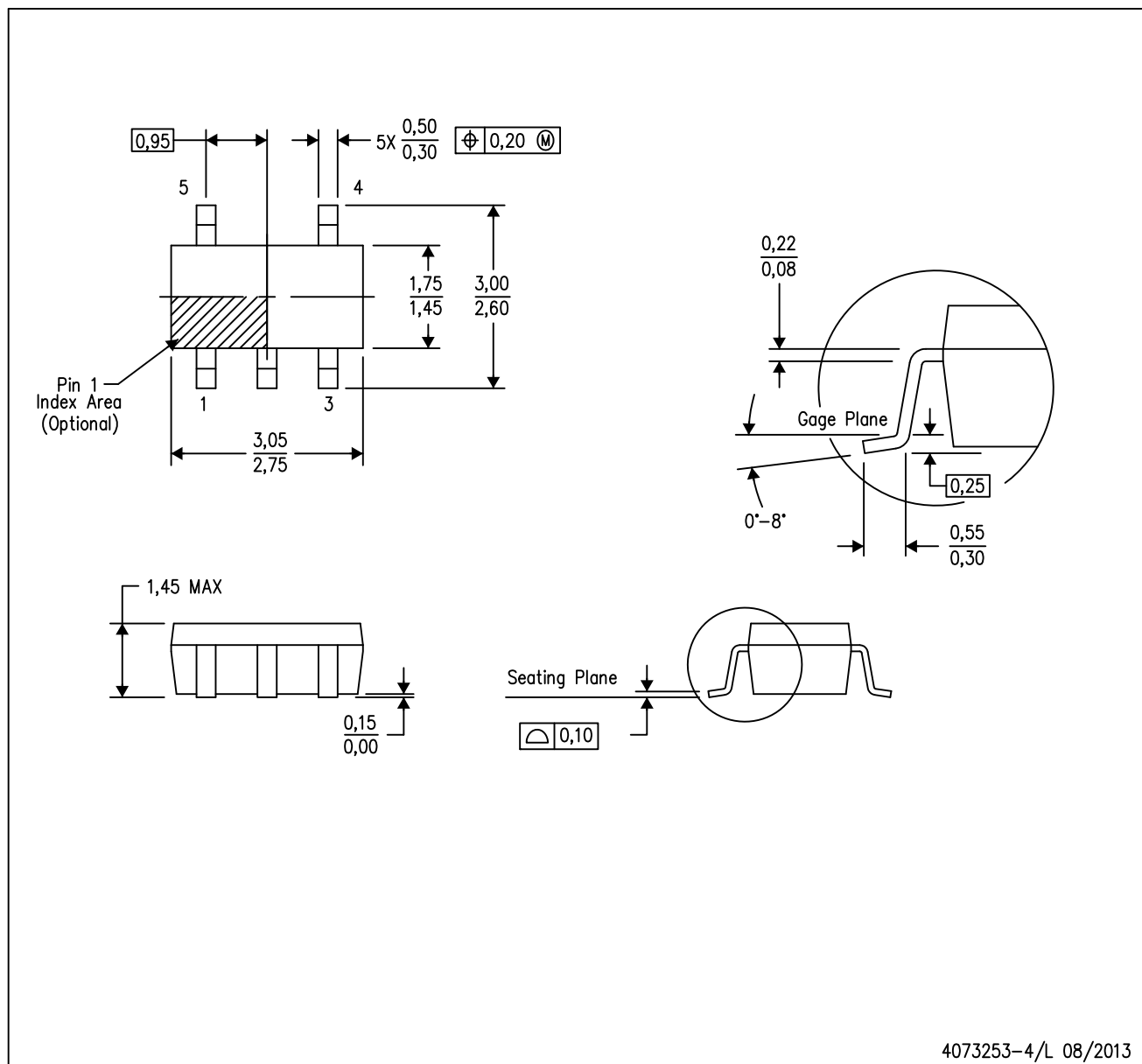


\*All dimensions are nominal

| Device          | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|-----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TPS3820-33DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3820-33DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3820-50DBVR  | SOT-23       | DBV             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| TPS3820-50DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3820-50DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3820-50DBVT  | SOT-23       | DBV             | 5    | 250  | 203.0       | 203.0      | 35.0        |
| TPS3823-25DBVR  | SOT-23       | DBV             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| TPS3823-25DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3823-25DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3823-25DBVT  | SOT-23       | DBV             | 5    | 250  | 203.0       | 203.0      | 35.0        |
| TPS3823-30DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3823-30DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3823-33DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3823-33DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3823-50DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3823-50DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3823A-33DBVR | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3823A-33DBVT | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3824-25DBVR  | SOT-23       | DBV             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| TPS3824-25DBVT  | SOT-23       | DBV             | 5    | 250  | 203.0       | 203.0      | 35.0        |
| TPS3824-30DBVR  | SOT-23       | DBV             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| TPS3824-30DBVT  | SOT-23       | DBV             | 5    | 250  | 203.0       | 203.0      | 35.0        |
| TPS3824-33DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3824-33DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3824-50DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3824-50DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3824-50DBVT  | SOT-23       | DBV             | 5    | 250  | 203.0       | 203.0      | 35.0        |
| TPS3825-33DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3825-33DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3825-50DBVR  | SOT-23       | DBV             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| TPS3825-50DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3825-50DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3828-33DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3828-33DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |
| TPS3828-50DBVR  | SOT-23       | DBV             | 5    | 3000 | 180.0       | 180.0      | 18.0        |
| TPS3828-50DBVT  | SOT-23       | DBV             | 5    | 250  | 180.0       | 180.0      | 18.0        |

DBV (R-PDSO-G5)

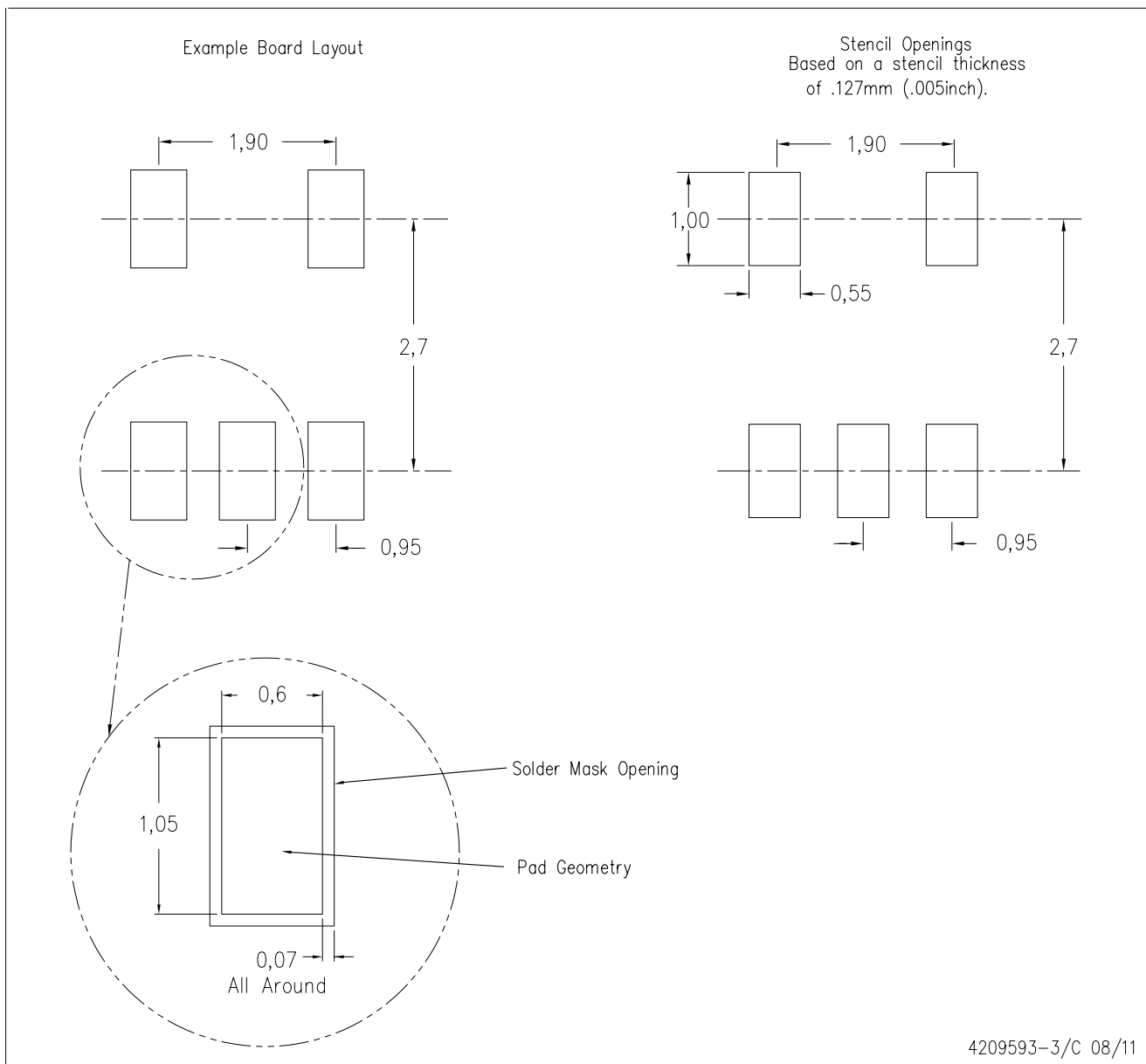
PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
  - D. Falls within JEDEC MO-178 Variation AA.

DBV (R-PDSO-G5)

PLASTIC SMALL OUTLINE



- 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.

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