



ULTRA-LOW VOLTAGE PROCESSOR SUPERVISORY CIRCUITS

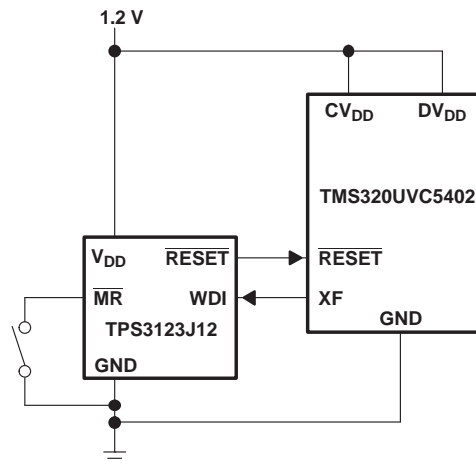
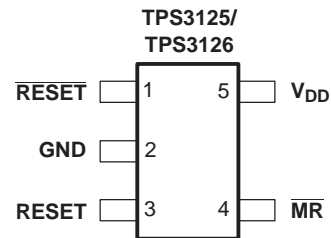
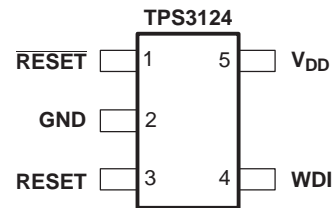
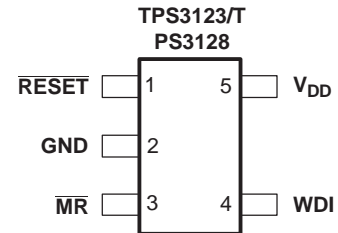
 Check for Samples: [TPS3123-xx](#), [TPS3124-xx](#), [TPS3125-xx](#), [TPS3126-xx](#), [TPS3128-xx](#)

FEATURES

- Minimum Supply Voltage of 0.75 V
- Supply Voltage Supervision Range:
 - 1.2 V, 1.5 V, 1.8 V (TPS312x)
 - 3 V (TPS3125 Devices Only)
 - Other Versions on Request
- Power-On Reset Generator With Fixed Delay Time of 180 ms
- Manual Reset Input (TPS3123/5/6/8)
- Watchdog Timer Retriggeres the $\overline{\text{RESET}}$ Output at $V_{\text{DD}} \geq V_{\text{IT}}$
- Supply Current of 14 μA (Typ)
- Small SOT23-5 Package
- Temperature Range of -40°C to $+85^{\circ}\text{C}$
- Reset Output Available in Push-Pull (Active Low and High) and Open-Drain (Active-Low)

APPLICATIONS

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

**DBV PACKAGE
(TOP VIEW)**

Figure 1. Typical Low-Voltage DSP Application


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DESCRIPTION

The TPS312x family of ultralow voltage processor supervisory circuits provides circuit initialization and timing supervision, primarily for DSP and processor-based systems.

During power-on, $\overline{\text{RESET}}$ is asserted when the supply voltage (V_{DD}) becomes higher than 0.75 V. Thereafter, the supply voltage supervisor monitors V_{DD} and keeps $\overline{\text{RESET}}$ output active as long as V_{DD} remains below the threshold voltage (V_{IT}). An internal timer delays the return of the output to the inactive state (high) to ensure proper system reset. The delay time, $t_d = 180$ ms, starts after V_{DD} has risen above the threshold voltage (V_{IT}).

When the supply voltage drops below the threshold voltage (V_{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_{IT}) set by a high precision internal voltage divider.

The TPS3123/5/6/8 devices incorporate a manual reset input, $\overline{\text{MR}}$. A low level at $\overline{\text{MR}}$ causes $\overline{\text{RESET}}$ to become active. The TPS3124 devices do not have the input MR, but include a high-level output RESET same as the TPS3125 and TPS3126 devices. In addition, the TPS3123/4/8 have a watchdog timer that needs to be triggered periodically by a positive or negative transition at $\overline{\text{WDI}}$. When the supervising system fails to retrigger the watchdog circuit within the time-out interval $t_{\text{out}} = 0.8$ s, $\overline{\text{RESET}}$ output becomes active for the time period (t_d). This event also reinitializes the watchdog timer.

The circuits are available in a 5-pin SOT23-5 package. The TPS312x devices are characterized for operation over a temperature range of -40°C to $+85^\circ\text{C}$.

Table 1. PACKAGE INFORMATION, STANDARD VERSIONS⁽¹⁾⁽²⁾

| T_A | DEVICE NAME | | THRESHOLD VOLTAGE | MARKING |
|--|-------------------------------|-------------------------------|-------------------|---------|
| -40°C to $+85^\circ\text{C}$ | TPS3123J12DBVR ⁽³⁾ | TPS3123J12DBVT ⁽⁴⁾ | 1.08 V | PBNI |
| | TPS3123G15DBVR ⁽³⁾ | TPS3123G15DBVT ⁽⁴⁾ | 1.40 V | PBOI |
| | TPS3123J18DBVR ⁽³⁾ | TPS3123J18DBVT ⁽⁴⁾ | 1.62 V | PBPI |
| | TPS3124J12DBVR ⁽³⁾ | TPS3124J12DBVT ⁽⁴⁾ | 1.08 V | PBQI |
| | TPS3124G15DBVR ⁽³⁾ | TPS3124G15DBVT ⁽⁴⁾ | 1.40 V | PBRI |
| | TPS3124J18DBVR ⁽³⁾ | TPS3124J18DBVT ⁽⁴⁾ | 1.62 V | PBSI |
| | TPS3125J12DBVR ⁽³⁾ | TPS3125J12DBVT ⁽⁴⁾ | 1.08 V | PBTI |
| | TPS3125G15DBVR ⁽³⁾ | TPS3125G15DBVT ⁽⁴⁾ | 1.40 V | PBUI |
| | TPS3125J18DBVR ⁽³⁾ | TPS3125J18DBVT ⁽⁴⁾ | 1.62 V | PBVI |
| | TPS3125L30DBVR ⁽³⁾ | TPS3125L30DBVT ⁽⁴⁾ | 2.64 V | PBXI |
| | TPS3126E12DBVR ⁽³⁾ | TPS3126E12DBVT ⁽⁴⁾ | 1.14 V | PFOI |
| | TPS3126E15DBVR ⁽³⁾ | TPS3126E15DBVT ⁽⁴⁾ | 1.43 V | PFPI |
| | TPS3126E18DBVR ⁽³⁾ | TPS3126E18DBVT ⁽⁴⁾ | 1.71 V | PFQI |
| | TPS3128E15DBVR ⁽³⁾ | TPS3128E15DBVT ⁽⁴⁾ | 1.43 V | PFSI |
| TPS3128E18DBVR ⁽³⁾ | TPS3128E18DBVT ⁽⁴⁾ | 1.71 V | PFTI | |

- (1) Other versions available. Contact Texas Instruments for details; minimum order quantities apply.
- (2) 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.
- (3) The DBVR passive indicates tape and reel of 3000 parts.
- (4) The DBVT passive indicates tape and reel of 250 parts.

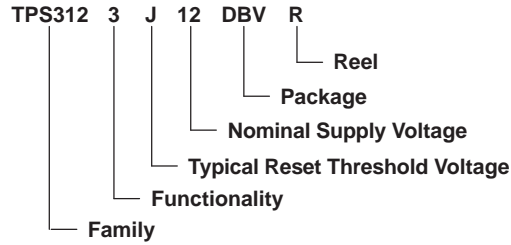


Table 2. Ordering Information Application Specific Versions ⁽¹⁾

| DEVICE NAME | NOMINAL SUPPLY VOLTAGE, V_{NOM} | DEVICE NAME | TYPICAL RESET THRESHOLD VOLTAGE- V_{IT-} |
|---------------|-----------------------------------|---------------|--|
| TPS312xx12DBV | 1.2 V | TPS312xAxxDBV | $V_{NOM} -1\%$ |
| TPS312xx15DBV | 1.5 V | TPS312xBxxDBV | $V_{NOM} -2\%$ |
| TPS312xx18DBV | 1.8 V | TPS312xCxxDBV | $V_{NOM} -3\%$ |
| TPS312xx30DBV | 3.0 V | TPS312xDxxDBV | $V_{NOM} -4\%$ |
| | | TPS312xExxDBV | $V_{NOM} -5\%$ |
| | | TPS312xFxxDBV | $V_{NOM} -6\%$ |
| | | TPS312xGxxDBV | $V_{NOM} -7\%$ |
| | | TPS312xHxxDBV | $V_{NOM} -8\%$ |
| | | TPS312xIxxDBV | $V_{NOM} -9\%$ |
| | | TPS312xJxxDBV | $V_{NOM} -10\%$ |
| | | TPS312xKxxDBV | $V_{NOM} -11\%$ |
| | | TPS312xLxxDBV | $V_{NOM} -12\%$ |
| | | TPS312xMxxDBV | $V_{NOM} -13\%$ |
| | | TPS312xNxxDBV | $V_{NOM} -14\%$ |
| | | TPS312xOxxDBV | $V_{NOM} -15\%$ |

(1) For the application-specific versions contact Texas Instruments for availability, lead time, and minimum order quantities.

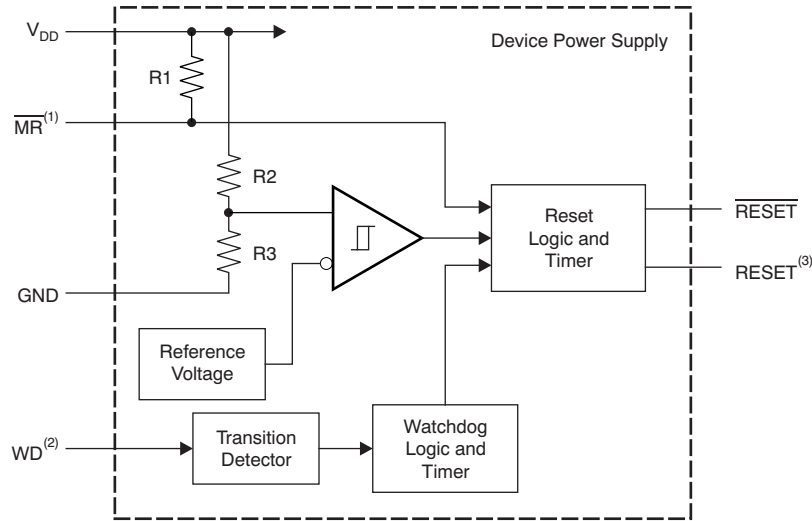
Table 3. Function Tables

| TPS3123/8 | | | TPS3124 | | | TPS3125/6 | | | |
|-----------------|-------------------|--------------------|-------------------|--------------------|-------|-----------------|-------------------|--------------------|-------|
| \overline{MR} | $V_{DD} > V_{IT}$ | \overline{RESET} | $V_{DD} > V_{IT}$ | \overline{RESET} | RESET | \overline{MR} | $V_{DD} > V_{IT}$ | \overline{RESET} | RESET |
| L | 0 | L | 0 | L | H | L | 0 | L | H |
| L | 1 | L | 1 | H | L | L | 1 | L | H |
| H | 0 | L | | | | H | 0 | L | H |
| H | 1 | H | | | | H | 1 | H | L |

Table 4. Reset Topology

| DEVICES | OPEN DRAIN | PUSH-PULL |
|---------|------------|-----------|
| TPS3123 | | X |
| TPS3124 | | X |
| TPS3125 | | X |
| TPS3126 | X | |
| TPS3128 | X | |

Figure 2. FUNCTIONAL BLOCK DIAGRAM



- NOTES:
 (1) TPS3123/5/6/8
 (2) TPS3123/4/8
 (3) TPS3124/5/6

Figure 3. TIMING DIAGRAM TPS3123/5/6/8

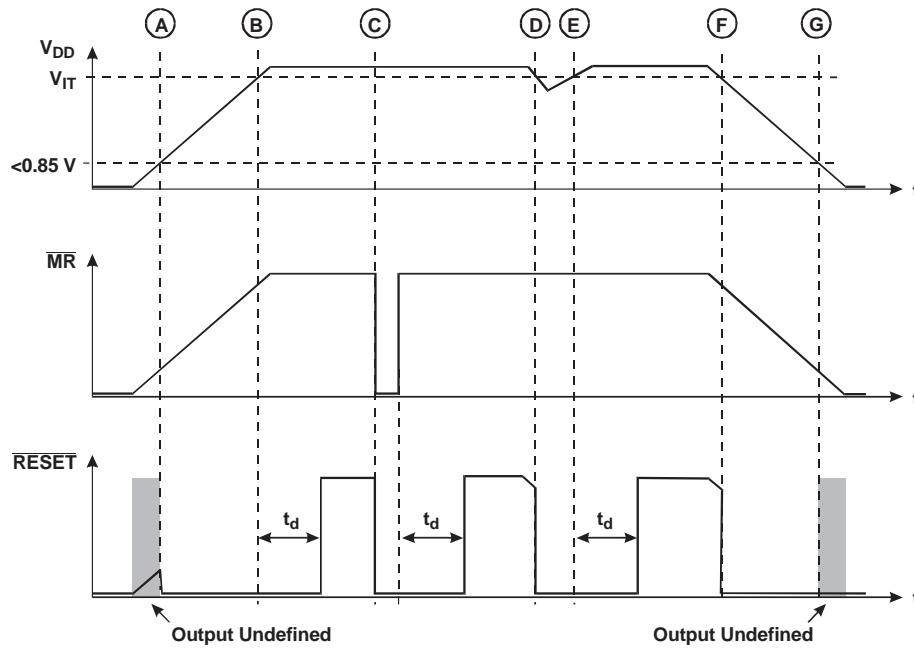
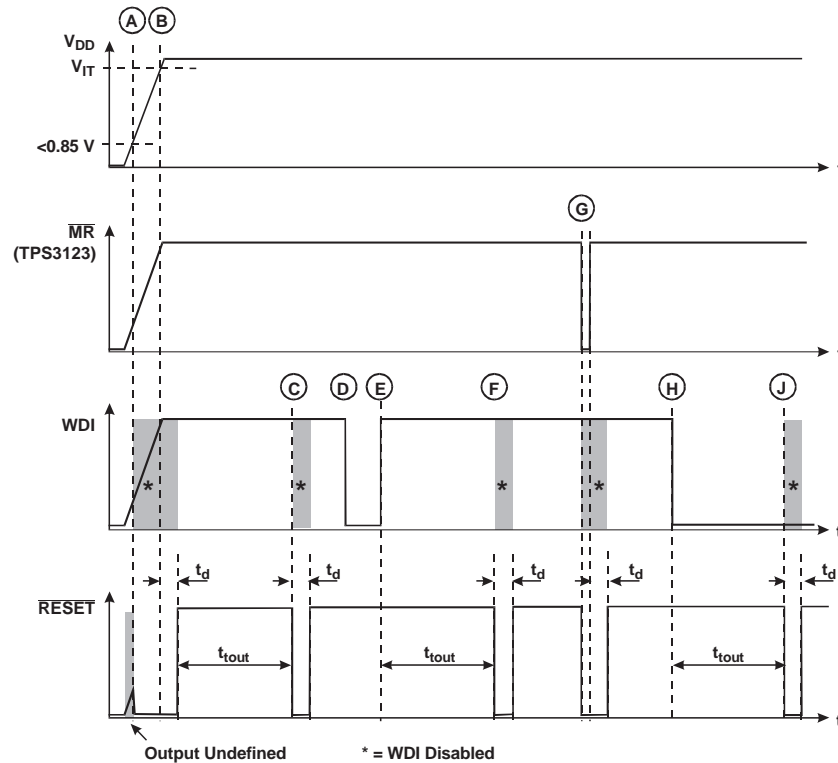


Figure 4. TIMING DIAGRAM TPS3123/4//8



ABSOLUTE MAXIMUM RATINGS

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

| | UNIT |
|---|--|
| Manual reset, $\overline{\text{MR}}$ | -0.3 V to $V_{DD} + 0.6\text{ V}$ |
| $\overline{\text{RESET}}$ | -0.3 V to $V_{DD} + 0.6\text{ V}$ |
| V_{DD} Supply voltage | 3.6 V |
| WDI Watchdog input | -0.3 V to $V_{DD} + 0.6\text{ V}$ |
| I_{OL} Maximum low output current | 5 mA |
| I_{OH} Maximum high output current | -5 mA |
| I_{IK} Input clamp current ($V_I < 0$ or $V_I > V_{DD}$) | $\pm 10\text{ mA}$ |
| I_{OK} Output clamp current ($V_O < 0$ or $V_O > V_{DD}$) | $\pm 10\text{ mA}$ |
| Continuous total power dissipation | See Dissipation Rating Table |
| T_A Operating free-air temperature range, | -40°C to +85°C |
| T_{stg} Storage temperature range, | -65°C to +150°C |
| Soldering temperature | +260°C |
| Open drain $\overline{\text{RESET}}$ outputs | -0.3 V to $V_{DD} + 0.3\text{ V}$ |

(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 may affect device reliability.

DISSIPATION RATING TABLE

| PACKAGE | $T_A \leq +25^\circ\text{C}$ POWER RATING | DERATING FACTOR ABOVE $T_A = +25^\circ\text{C}$ | $T_A = +70^\circ\text{C}$ POWER RATING | $T_A = +85^\circ\text{C}$ POWER RATING |
|---------|--|--|---|---|
| DBV | 437 mW | 3.5 mW/°C | 280 mW | 227 mW |

RECOMMENDED OPERATING CONDITIONS

at specified temperature range.

| | | MIN | MAX | UNIT |
|------------------|--|---------------------------------|-----------------------|------|
| V _{DD} | Supply voltage | T _A = 0°C to +85°C | | V |
| | | T _A = -40°C to +85°C | | |
| V _{DD} | Manual reset voltage | 0.0 | V _{DD} + 0.3 | V |
| V _{WD1} | Watchdog input voltage | 0 | V _{DD} + 0.3 | V |
| V _{IH} | High-level input voltage | 0.7 × V _{DD} | | V |
| V _{IL} | Low-level input voltage | 0.3 × V _{DD} | | V |
| Δ t/Δ V | Input transition rise and fall rate at WDI | 1 | | μs/V |
| T _A | Operating free-air temperature range | 40 | +85 | °C |

ELECTRICAL CHARACTERISTICS

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

| PARAMETER | | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|--|---|---|--------------------------|------|------|------|
| $\overline{\text{MR}}$ pullup resistor (internal) | | | | 27 | | | kΩ |
| I _{IH} | High-level input current | WDI | WDI = V _{DD} = 3.3 V | 1 | | 1 | μA |
| | | $\overline{\text{MR}}$ | $\overline{\text{MR}}$ = 0.7 × V _{DD} , V _{DD} = 3.3 V | 20 | | 55 | |
| I _{IL} | Low-level input current | WDI | WDI = 0 V, V _{DD} = 3.3 V | 1 | | 1 | μA |
| | | $\overline{\text{MR}}$ | $\overline{\text{MR}}$ = 0 V, V _{DD} = 3.3 V | 80 | | 170 | |
| I _{OH} | High-level output current (leakage into $\overline{\text{RESET}}$ pin) | TPS3126-xx, TPS3128-xx | V _{DD} = V _{OH} = 3.3 V | | | 200 | nA |
| V _{OH} | High-level output voltage (TPS3123/4/5 only) | $\overline{\text{RESET}}$ | V _{DD} = 1.5 V, I _{OH} = -1 mA | 0.8 × V _{DD} | | | V |
| | | | V _{DD} = 3.3 V, I _{OH} = -4.5 mA | | | | |
| | | RESET | V _{DD} = 0.75 V, I _{OH} = -8 μA | | | | |
| | | | V _{DD} = 1.5 V, I _{OH} = -1 mA | | | | |
| V _{OL} | Low-level output voltage | $\overline{\text{RESET}}$ | V _{DD} = 0.75 V, I _{OL} = 15 μA | 0.2 × V _{DD} | | | V |
| | | | V _{DD} = 1.5 V, I _{OL} = 1.4 mA | | | | |
| | | RESET | V _{DD} = 1.5 V, I _{OL} = 1.4 mA | | | | |
| | | | V _{DD} = 3.3 V, I _{OL} = 3 mA | | | | |
| V _{IT-} | Negative-going input threshold voltage ⁽¹⁾ | TPS312xJ12 | T _A = -40°C to +85°C | 1.04 | 1.08 | 1.12 | V |
| | | TPS312xG15 | | 1.35 | 1.40 | 1.45 | |
| | | TPS312xJ18 | | 1.56 | 1.62 | 1.68 | |
| | | TPS312xL30 | | 2.57 | 2.64 | 2.71 | |
| | | TPS312xE12 | | 1.10 | 1.14 | 1.18 | |
| | | TPS312xE15 | | 1.38 | 1.43 | 1.48 | |
| | | TPS312xE18 | | 1.65 | 1.71 | 1.77 | |
| V _{hys} | Hysteresis at V _{DD} input | 1 V < V _{IT-} < 1.4 V | | 15 | | | mV |
| | | 1.4 V < V _{IT-} < 2 V | | 20 | | | |
| | | 2 V < V _{IT-} < 3 V | | 30 | | | |
| I _{DD} | Supply current | TPS3123-xx TPS3124-xx TPS3128-xx | $\overline{\text{WDI}}$ = V _{DD} , $\overline{\text{MR}}$ unconnected | V _{DD} = 0.75 V | 14 | | μA |
| | | | | V _{DD} = 3.3 V | 22 | 30 | |
| | | TPS3125-xx TPS3126-xx ⁽²⁾ | $\overline{\text{MR}}$ unconnected | V _{DD} = 0.75 V | 14 | | |
| | | | | V _{DD} = 3.3 V | 18 | 25 | |
| C _i | Input capacitance at $\overline{\text{MR}}$, WDI | V _I = 0 V to 3.3 V | | 5 | | | pF |

(1) To ensure best stability of the threshold voltage, a bypass capacitor (ceramic, 0.1 μF) should be placed near the supply terminal.

(2) The supply current during delay time t_d is typical 5 μA higher.

TIMING REQUIREMENTS

 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_w | Pulse width | $V_{IH} = V_{IT-} + 0.2\text{ V}$, $V_{IL} = V_{IT-} - 0.2\text{ V}$ $V_{DD} \geq V_{IT-} + 0.2\text{ V}$, $V_{IL} = 0.3 \times V_{DD}$, $V_{IH} = 0.7 \times V_{DD}$ | 6 | | | μs |
| | At V_{DD} | | 1 | | | |
| | At $\overline{\text{MR}}$ | | 0.1 | | | |

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_{out} | Watchdog time out | $V_{DD} \geq V_{IT-} + 0.2\text{ V}$, See timing diagram | 0.8 | 1.4 | 2.1 | s |
| t_d | Delay time | $V_{DD} > V_{IT-} + 0.2\text{ V}$, See timing diagram | 100 | 180 | 260 | ms |
| t_{PHL} | Propagation delay time, high-to-low-level output | $\overline{\text{MR}}$ to $\overline{\text{RESET}}$ delay (TPS3123/5/6/8) | | | 0.1 | μs |
| t_{PLH} | Propagation delay time, low-to-high-level output | $\overline{\text{MR}}$ to $\overline{\text{RESET}}$ delay (TPS3125/6) | | | 0.1 | |
| t_{PHL} | Propagation delay time, high-to-low-level output | V_{DD} to $\overline{\text{RESET}}$ delay | | | 10 | μs |
| t_{PLH} | Propagation delay time, low-to-high-level output | V_{DD} to $\overline{\text{RESET}}$ delay (TPS3124/5/6) | | | 10 | |

TYPICAL CHARACTERISTICS

SUPPLY CURRENT
 vs
 SUPPLY VOLTAGE

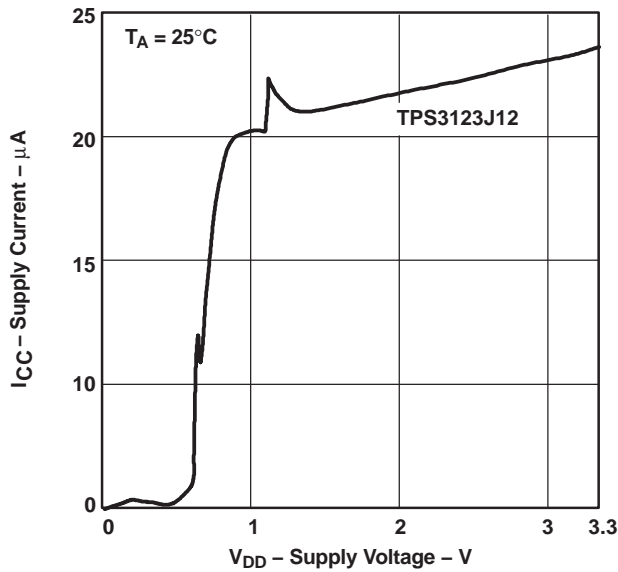


Figure 5.

LOW-LEVEL OUTPUT VOLTAGE
 vs
 LOW-LEVEL OUTPUT CURRENT

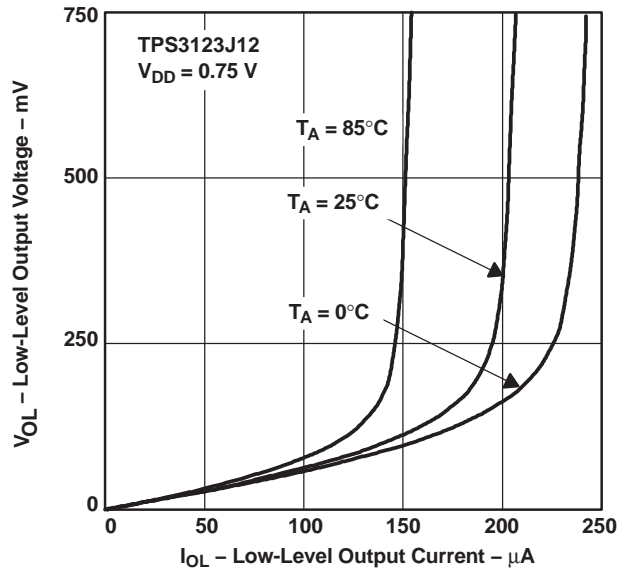


Figure 6.

LOW-LEVEL OUTPUT VOLTAGE
 vs
 LOW-LEVEL OUTPUT CURRENT

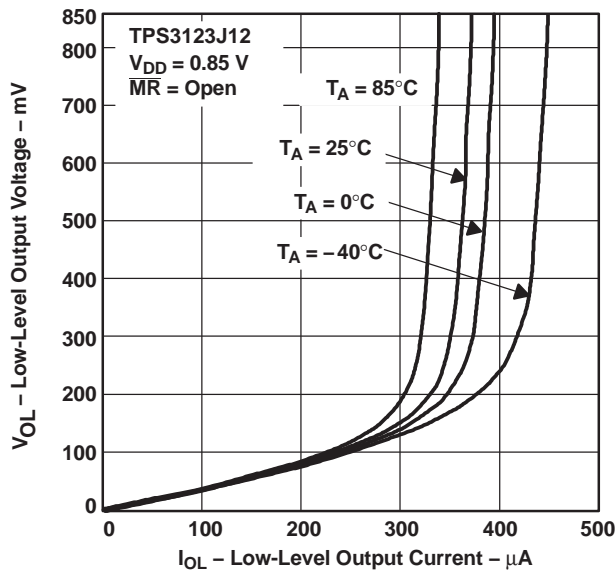


Figure 7.

LOW-LEVEL OUTPUT VOLTAGE
 vs
 LOW-LEVEL OUTPUT CURRENT

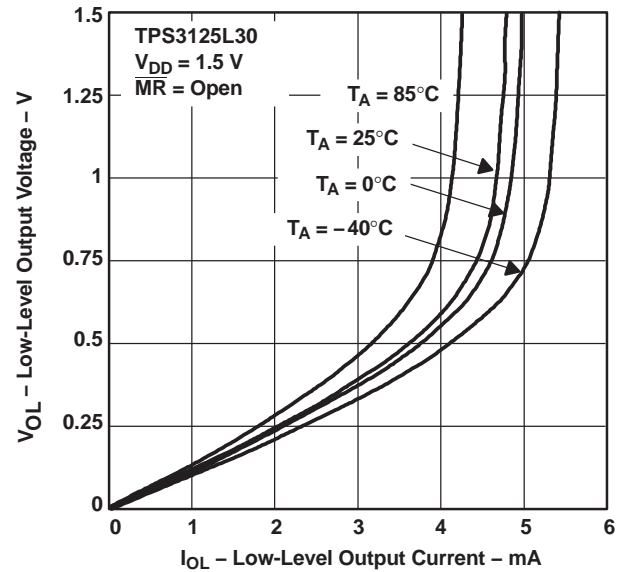


Figure 8.

TYPICAL CHARACTERISTICS (continued)

LOW-LEVEL OUTPUT VOLTAGE
 vs
 LOW-LEVEL OUTPUT CURRENT

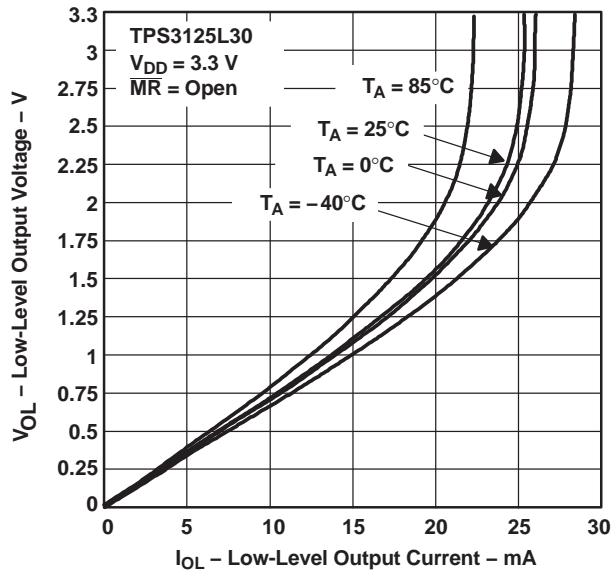


Figure 9.

HIGH-LEVEL OUTPUT VOLTAGE
 vs
 HIGH-LEVEL OUTPUT CURRENT

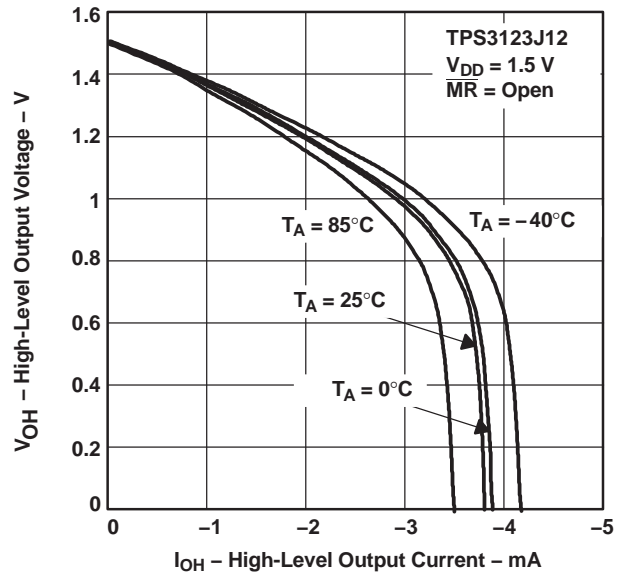


Figure 10.

HIGH-LEVEL OUTPUT VOLTAGE
 vs
 HIGH-LEVEL OUTPUT CURRENT

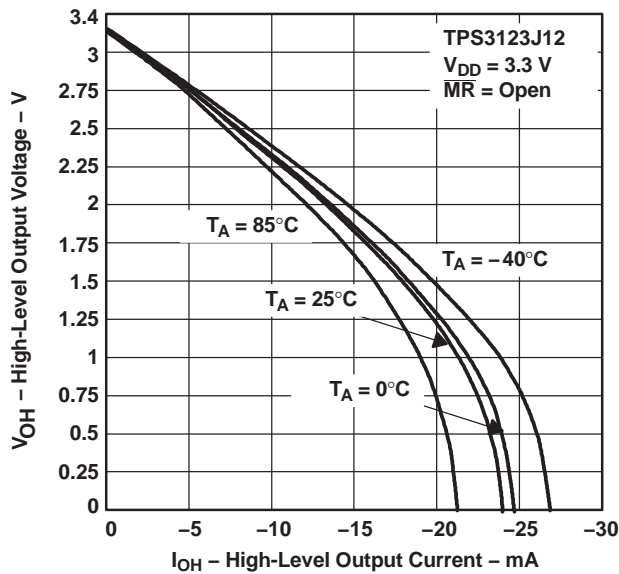


Figure 11.

NORMALIZED INPUT THRESHOLD VOLTAGE
 vs
 FREE-AIR TEMPERATURE

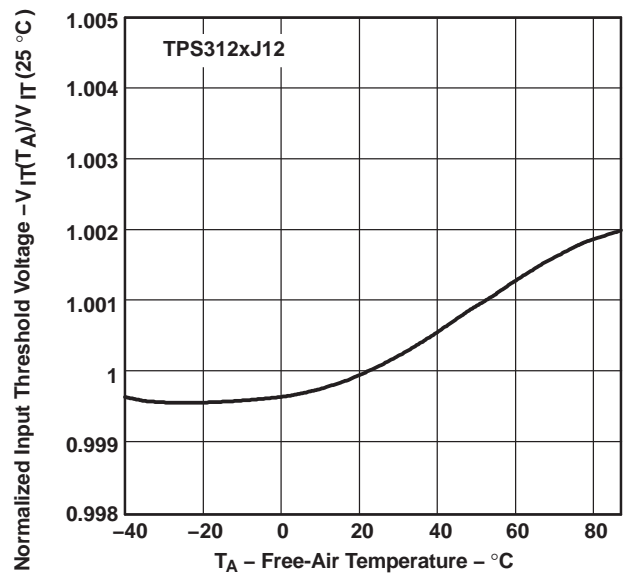


Figure 12.

TYPICAL CHARACTERISTICS (continued)

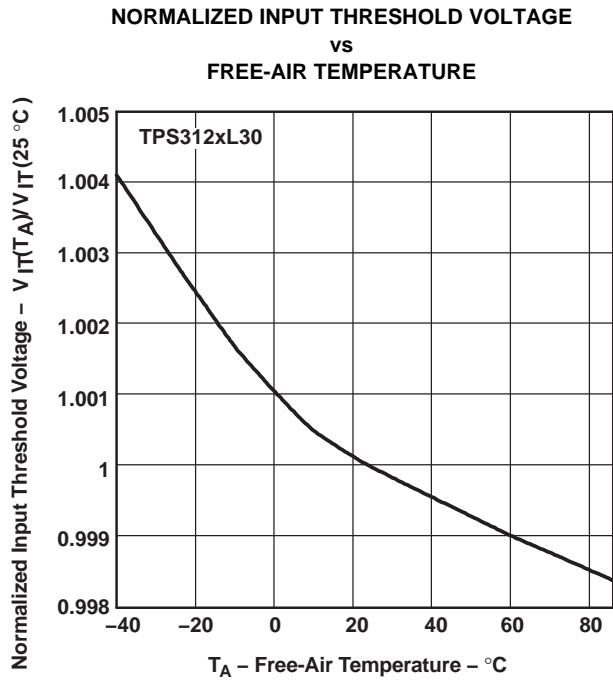


Figure 13.

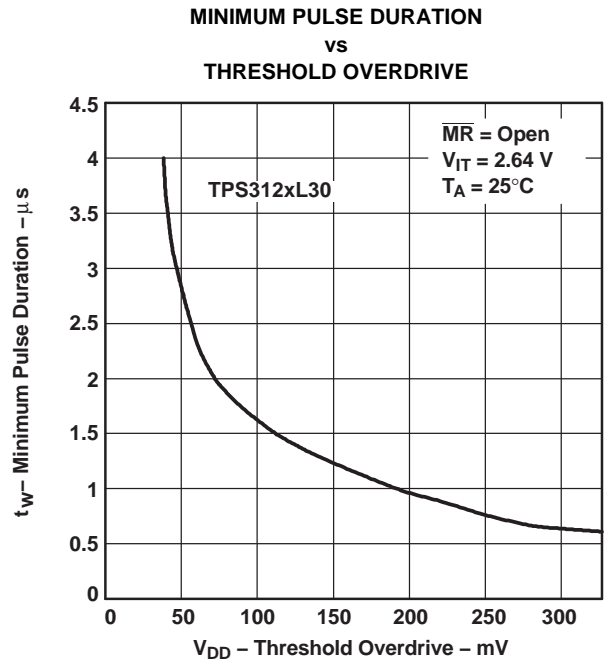


Figure 14.

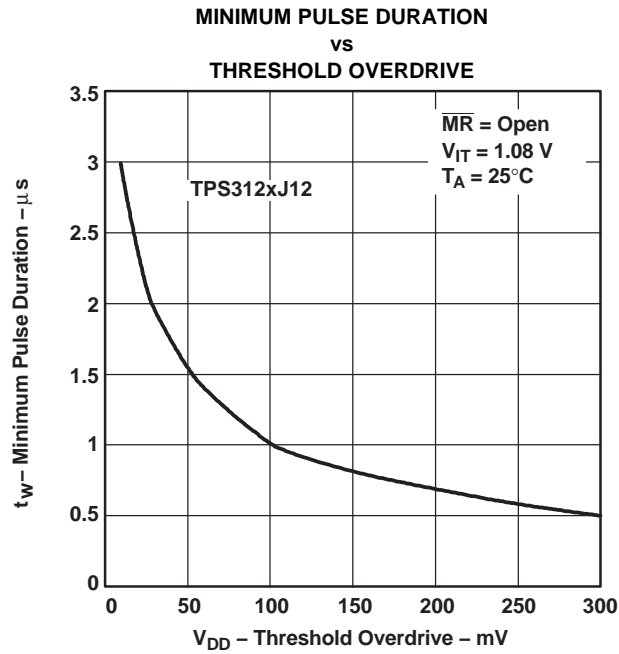


Figure 15.

REVISION HISTORY

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

| Changes from Revision D (December, 2006) to Revision E | Page |
|---|------|
| • Removed <i>TPS3128E12DBVR</i> from list of orderable devices in Table 1 | 2 |

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3123G15DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBOI | Samples |
| TPS3123J12DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBNI | Samples |
| TPS3123J12DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBNI | Samples |
| TPS3123J12DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBNI | Samples |
| TPS3123J18DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBPI | Samples |
| TPS3123J18DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBPI | Samples |
| TPS3123J18DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBPI | Samples |
| TPS3124G15DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBRI | Samples |
| TPS3124J12DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBQI | Samples |
| TPS3124J12DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBQI | Samples |
| TPS3124J12DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBQI | Samples |
| TPS3124J18DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBSI | Samples |
| TPS3124J18DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBSI | Samples |
| TPS3124J18DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBSI | Samples |
| TPS3125G15DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBUI | Samples |
| TPS3125G15DBVRG4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBUI | Samples |
| TPS3125G15DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBUI | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3125G15DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBUI | Samples |
| TPS3125J12DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBTI | Samples |
| TPS3125J12DBVRG4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBTI | Samples |
| TPS3125J12DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBTI | Samples |
| TPS3125J12DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBTI | Samples |
| TPS3125J18DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBVI | Samples |
| TPS3125J18DBVRG4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBVI | Samples |
| TPS3125J18DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBVI | Samples |
| TPS3125J18DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBVI | Samples |
| TPS3125L30DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBXI | Samples |
| TPS3125L30DBVRG4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBXI | Samples |
| TPS3125L30DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBXI | Samples |
| TPS3125L30DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBXI | Samples |
| TPS3126E12DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFOI | Samples |
| TPS3126E12DBVRG4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFOI | Samples |
| TPS3126E12DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFOI | Samples |
| TPS3126E12DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFOI | Samples |
| TPS3126E15DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFPI | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| TPS3126E15DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFPI | Samples |
| TPS3126E15DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFPI | Samples |
| TPS3126E18DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFQI | Samples |
| TPS3126E18DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFQI | Samples |
| TPS3126E18DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFQI | Samples |
| TPS3128E12DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFRI | Samples |
| TPS3128E12DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFRI | Samples |
| TPS3128E15DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFSI | Samples |
| TPS3128E15DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFSI | Samples |
| TPS3128E18DBVR | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFTI | Samples |
| TPS3128E18DBVRG4 | ACTIVE | SOT-23 | DBV | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFTI | Samples |
| TPS3128E18DBVT | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFTI | Samples |
| TPS3128E18DBVTG4 | ACTIVE | SOT-23 | DBV | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFTI | 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.

OBSELETE: 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.

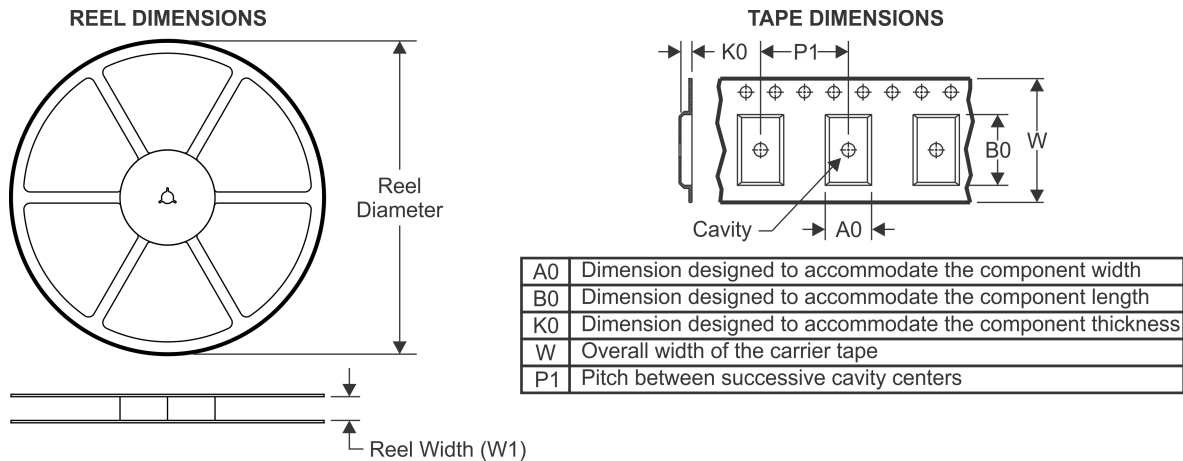
⁽⁴⁾ There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

⁽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.

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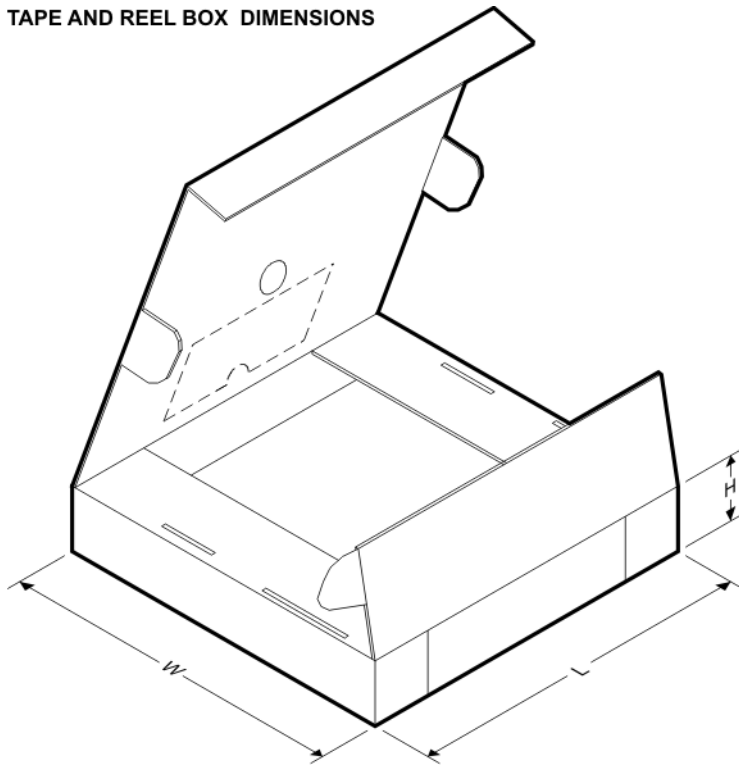
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TAPE AND REEL INFORMATION

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TPS3123G15DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3123J12DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3123J12DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3123J18DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3123J18DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3124G15DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3124J12DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3124J12DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3124J18DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3124J18DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3125G15DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3125G15DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3125J12DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3125J12DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3125J18DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3125J18DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3125L30DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3125L30DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 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 |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TPS3126E12DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3126E12DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3126E15DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3126E15DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3126E18DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3126E18DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3128E12DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3128E15DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3128E15DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3128E18DBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TPS3128E18DBVT | SOT-23 | DBV | 5 | 250 | 180.0 | 9.0 | 3.15 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |

TAPE AND REEL BOX DIMENSIONS


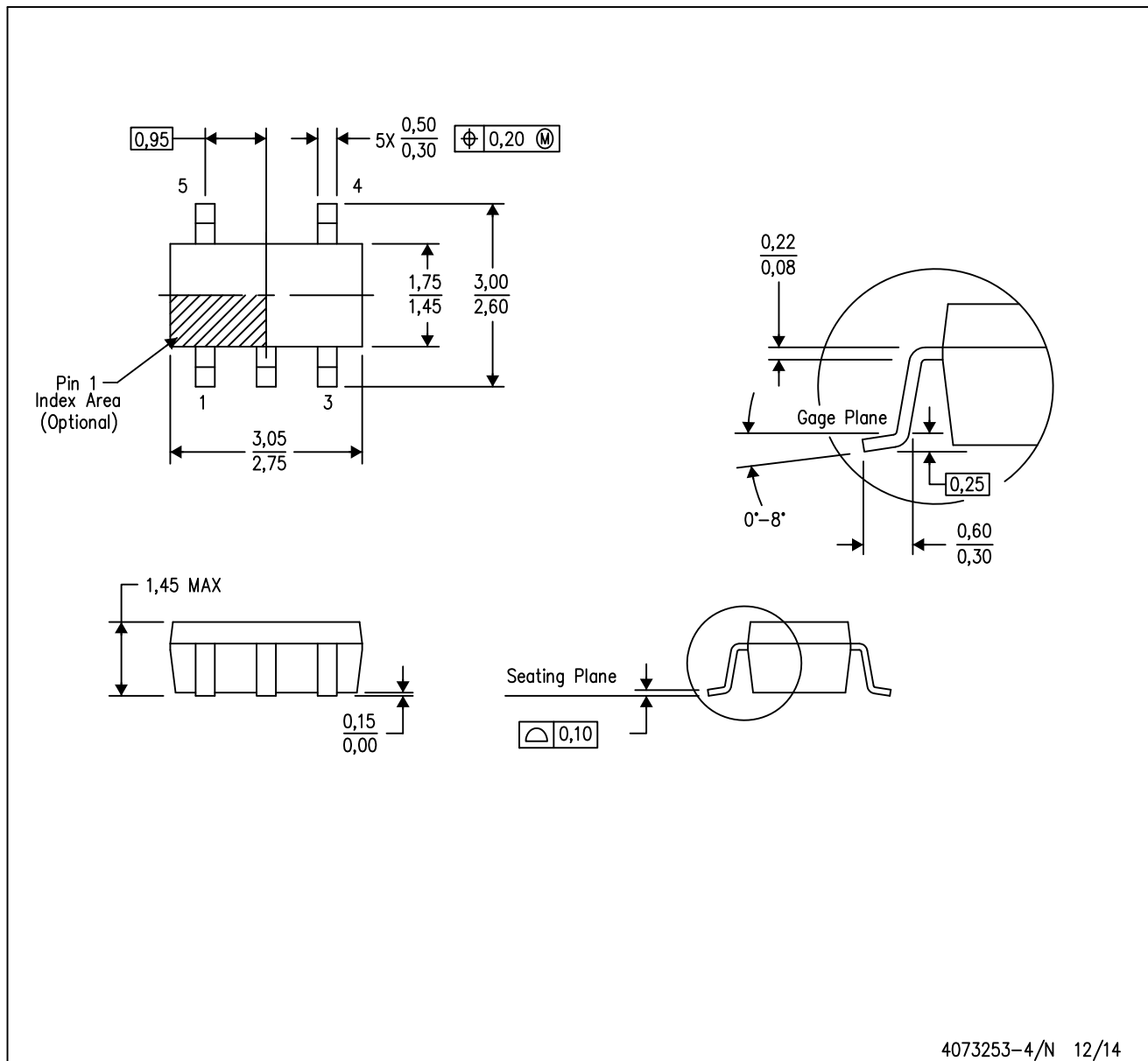
*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TPS3123G15DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3123J12DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3123J12DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3123J18DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3123J18DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3124G15DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TPS3124J12DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3124J12DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3124J18DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3124J18DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3125G15DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3125G15DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3125J12DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3125J12DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3125J18DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3125J18DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3125L30DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3125L30DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3126E12DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3126E12DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3126E15DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3126E15DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3126E18DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3126E18DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3128E12DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3128E15DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3128E15DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |
| TPS3128E18DBVR | SOT-23 | DBV | 5 | 3000 | 182.0 | 182.0 | 20.0 |
| TPS3128E18DBVT | SOT-23 | DBV | 5 | 250 | 182.0 | 182.0 | 20.0 |

DBV (R-PDSO-G5)

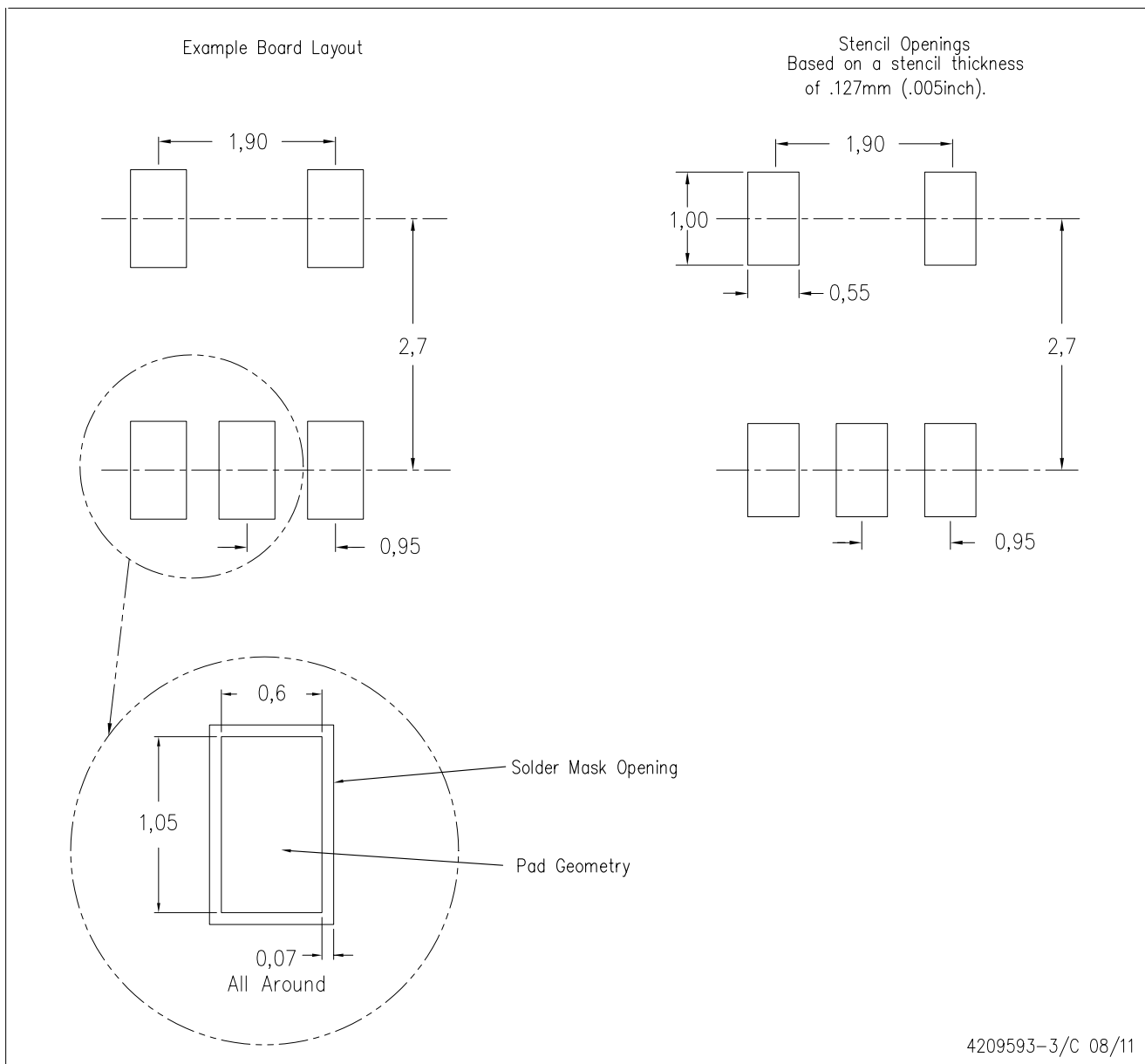
PLASTIC SMALL-OUTLINE PACKAGE



- 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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