

# TPS3820-xx, TPS3823-xx, TPS3824-xx, TPS3825-xx, TPS3828-xx PROCESSOR SUPERVISORY CIRCUITS

SLVS165E – APRIL 1998 – REVISED DECEMBER 2002

## 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) 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

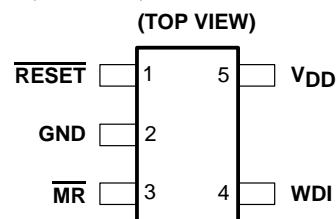
## description

The TPS382x family of supervisors provides circuit initialization and timing supervision, primarily for DSP and processor-based systems.

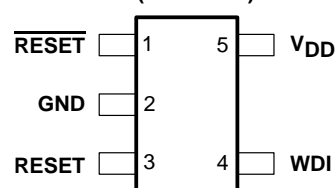
During power-on,  $\overline{\text{RESET}}$  is asserted when supply voltage  $V_{\text{DD}}$  becomes higher than 1.1 V. Thereafter, the supply voltage supervisor monitors  $V_{\text{DD}}$  and keeps  $\overline{\text{RESET}}$  active as long as  $V_{\text{DD}}$  remains below the threshold voltage  $V_{\text{IT-}}$ .

An internal timer delays the return of the output to the inactive state (high) to ensure proper system reset. The delay time,  $t_{\text{d}}$ , 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.

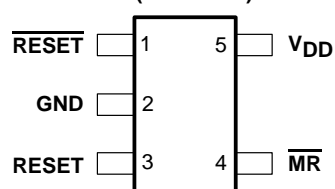
TPS3820, TPS3823, TPS3828 . . . DBV PACKAGE



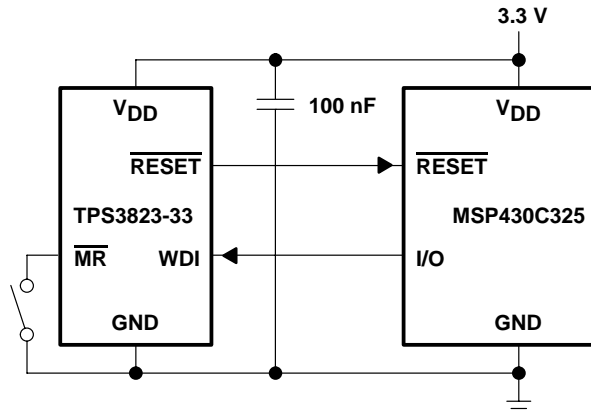
TPS3824 . . . DBV PACKAGE  
(TOP VIEW)



TPS3825 . . . DBV PACKAGE  
(TOP VIEW)



## typical application



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

This document contains information on products in more than one phase of development. The status of each device is indicated on the page(s) specifying its electrical characteristics.

**TEXAS  
INSTRUMENTS**

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# TPS3820-xx, TPS3823-xx, TPS3824-xx, TPS3825-xx, TPS3828-xx PROCESSOR SUPERVISORY CIRCUITS

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## 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  $\overline{RESET}$ , 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  $\overline{RESET}$  is asserted, WDI must be decoupled from the active signal. This can be accomplished by using an N-channel FET in series with the WDI pin, with the gate of the FET connected to the  $\overline{RESET}$  output as shown in Figure 1.

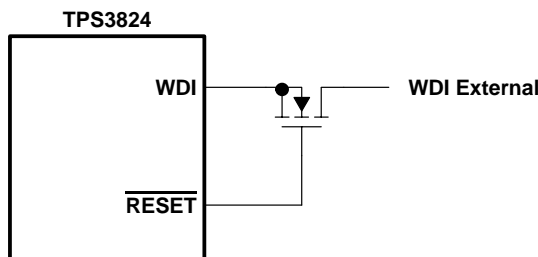


Figure 1

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 a 5-pin SOT23-5 package. The TPS382x devices are characterized for operation over a temperature range of -40°C to 85°C.

### PACKAGE INFORMATION

DEVICE NAME	DEVICE NAME	THRESHOLD VOLTAGE <sup>§</sup>	MARKING
TPS3820-33DBVT <sup>†</sup>	TPS3820-33DBVR <sup>‡</sup>	2.93 V	PDEI
TPS3820-50DBVT <sup>†</sup>	TPS3820-50DBVR <sup>‡</sup>	4.55 V	PDDI
TPS3823-25DBVT <sup>†</sup>	TPS3823-25DBVR <sup>‡</sup>	2.25 V	PAPI
TPS3823-30DBVT <sup>†</sup>	TPS3823-30DBVR <sup>‡</sup>	2.63 V	PAQI
TPS3823-33DBVT <sup>†</sup>	TPS3823-33DBVR <sup>‡</sup>	2.93 V	PARI
TPS3823-50DBVT <sup>†</sup>	TPS3823-50DBVR <sup>‡</sup>	4.55 V	PASI
TPS3824-25DBVT <sup>†</sup>	TPS3824-25DBVR <sup>‡</sup>	2.25 V	PATI
TPS3824-30DBVT <sup>†</sup>	TPS3824-30DBVR <sup>‡</sup>	2.63 V	PAUI
TPS3824-33DBVT <sup>†</sup>	TPS3824-33DBVR <sup>‡</sup>	2.93 V	PAVI
TPS3824-50DBVT <sup>†</sup>	TPS3824-50DBVR <sup>‡</sup>	4.55 V	PAWI
TPS3825-33DBVT <sup>†</sup>	TPS3825-33DBVR <sup>‡</sup>	2.93 V	PDGI
TPS3825-50DBVT <sup>†</sup>	TPS3825-50DBVR <sup>‡</sup>	4.55 V	PDFI
TPS3828-33DBVT <sup>†</sup>	TPS3828-33DBVR <sup>‡</sup>	2.93 V	PDII
TPS3828-50DBVT <sup>†</sup>	TPS3828-50DBVR <sup>‡</sup>	4.55 V	PDHI

<sup>†</sup> The DBVT package indicates tape and reel of 250 parts.

<sup>‡</sup> The DBVR package indicates tape and reel of 3000 parts.

<sup>§</sup> For other threshold voltage versions, please contact the local TI sales office.

# TPS3820-xx, TPS3823-xx, TPS3824-xx, TPS3825-xx, TPS3828-xx PROCESSOR SUPERVISORY CIRCUITS

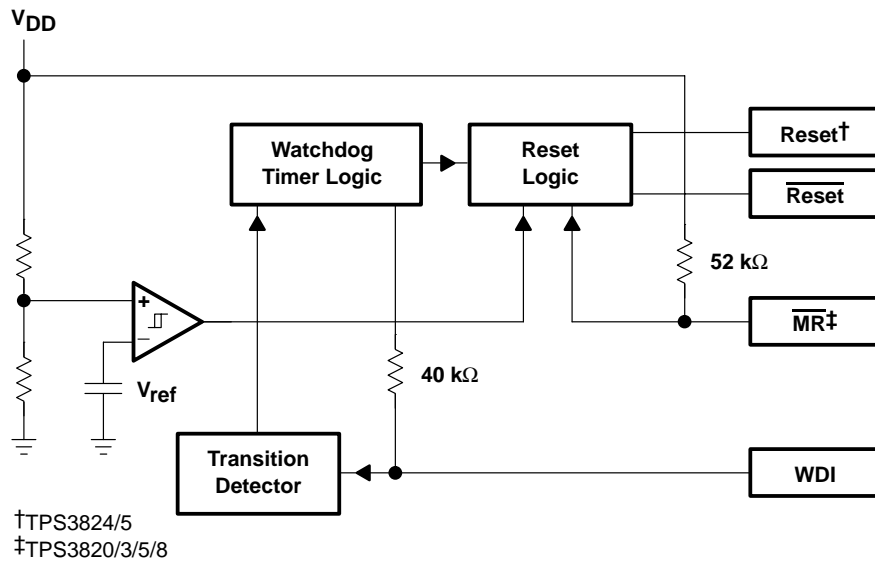
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FUNCTION/TRUTH TABLE

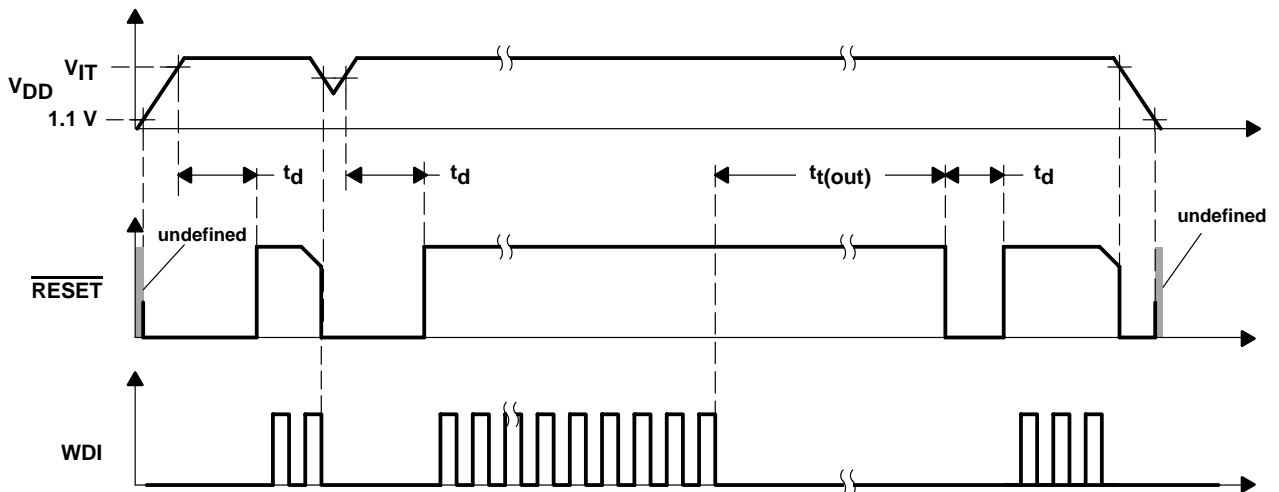
INPUTS		OUTPUTS	
$\overline{MR}\dagger$	$V_{DD} > V_{IT}$	$\overline{RESET}$	RESET#
L	0	L	H
L	1	L	H
H	0	L	H
H	1	H	L

† TPS3820/3/5/8  
# TPS3824/5

## functional block diagram



## timing diagram



# TPS3820-xx, TPS3823-xx, TPS3824-xx, TPS3825-xx, TPS3828-xx PROCESSOR SUPERVISORY CIRCUITS

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## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, $V_{DD}$ (see Note 1)	6 V
RESET, $\overline{RESET}$ , MR, WDI (see Note 1)	-0.3 V to ( $V_{DD} + 0.3$ V)
Maximum low output current, $I_{OL}$	5 mA
Maximum high output current, $I_{OH}$	-5 mA
Input clamp current range, $I_{IK}$ ( $V_I < 0$ or $V_I > V_{DD}$ )	$\pm 10$ mA
Output clamp current range, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{DD}$ )	$\pm 10$ mA
Continuous total power dissipation	See Dissipation Rating Table
Operating free-air temperature range, $T_A$	-40°C to 85°C
Storage temperature range, $T_{stg}$	-65°C to 150°C
Soldering temperature	260°C

† 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.

NOTE 1: All voltage values are with respect to GND.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25^\circ\text{C}$ POWER RATING	OPERATING 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

	MIN	MAX	UNIT
Supply voltage, $V_{DD}$	1.1	5.5	V
Input voltage, $V_I$	0	$V_{DD} + 0.3$	V
High-level input voltage at $\overline{MR}$ and WDI, $V_{IH}$	$0.7 \times V_{DD}$		V
Low-level input voltage, $V_{IL}$		$0.3 \times V_{DD}$	V
Input transition rise and fall rate at $\overline{MR}$ or WDI, $\Delta t/\Delta V$		100	ns/V
Operating free-air temperature range, $T_A$	-40	85	°C



# TPS3820-xx, TPS3823-xx, TPS3824-xx, TPS3825-xx, TPS3828-xx PROCESSOR SUPERVISORY CIRCUITS

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**electrical characteristics over recommended 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	0.8 × V <sub>DD</sub>		V		
			TPS382x-30					
			TPS382x-33					
	TPS382x-50	V <sub>DD</sub> – 1.5 V						
	$\overline{\text{RESET}}$	TPS3824-25 TPS3825-25	V <sub>DD</sub> ≥ 1.8 V, I <sub>OH</sub> = –100 μA	0.8 × V <sub>DD</sub>		V		
							TPS3824-30 TPS3825-30	V <sub>DD</sub> ≥ 1.8 V, I <sub>OH</sub> = –150 μA
							TPS3824-50 TPS3825-50	
V <sub>OL</sub>	Low-level output voltage	$\overline{\text{RESET}}$	TPS3824-25 TPS3825-25	0.4		V		
			TPS3824-30 TPS3825-30					
			TPS3824-33 TPS3825-33					
			TPS3824-50 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	
							TPS382x-33	
							TPS382x-50	
Power-up reset voltage (see Note 2)					0.4	V		
V <sub>IT–</sub>	Negative-going input threshold voltage (see Note 3)	TPS382x-25	T <sub>A</sub> = 0°C – 85°C	2.21	2.25	2.30	V	
				2.59	2.63	2.69		
				2.88	2.93	3		
				4.49	4.55	4.64		
		TPS382x-25	T <sub>A</sub> = –40°C – 85°C	2.20	2.25	2.30	V	
				2.57	2.63	2.69		
				2.86	2.93	3		
				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						
		TPS382x-50		50				

NOTES: 2. The lowest supply voltage at which RESET becomes active. t<sub>r</sub>, V<sub>DD</sub> ≥ 15 μs/V  
 3. To ensure best stability of the threshold voltage, a bypass capacitor (ceramic, 0.1 μF) should be placed near the supply terminals.



# TPS3820-xx, TPS3823-xx, TPS3824-xx, TPS3825-xx, TPS3828-xx PROCESSOR SUPERVISORY CIRCUITS

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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted) (continued)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
I <sub>IH(AV)</sub>	Average high-level input current	WDI	WDI = V <sub>DD</sub> , time average (dc = 88%)		120	μA
			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 = V <sub>DD</sub>		140 190	
			MR	MR = V <sub>DD</sub> × 0.7, V <sub>DD</sub> = 5.5 V		
I <sub>IL</sub>	Low-level input current	WDI	WDI = 0.3 V, V <sub>DD</sub> = 5.5 V		140 190	
			MR	MR = 0.3 V, V <sub>DD</sub> = 5.5 V		
I <sub>OS</sub>	Output short-circuit current (see Note 4)	RESET	TPS382x-25	V <sub>DD</sub> = V <sub>IT, max</sub> + 0.2 V, V <sub>O</sub> = 0 V		μA
			TPS382x-30			
			TPS382x-33			
			TPS382x-50			
I <sub>DD</sub>	Supply current	WDI and MR unconnected, Outputs unconnected		15 25	μA	
	Internal pullup resistor at MR			52	kΩ	
C <sub>i</sub>	Input capacitance at MR, WDI	V <sub>I</sub> = 0 V to 5.5 V		5	pF	

NOTE 4: The RESET short-circuit current is the maximum pullup current when RESET is driven low by a μP bidirectional reset pin.

timing requirements at R<sub>L</sub> = 1 MΩ, C<sub>L</sub> = 50 pF, T<sub>A</sub> = 25°C

PARAMETER		TEST CONDITIONS	MIN	MAX	UNIT	
t <sub>w</sub>	Pulse width	at V <sub>DD</sub>	V <sub>DD</sub> = V <sub>IT-</sub> + 0.2 V, V <sub>DD</sub> = V <sub>IT-</sub> - 0.2 V		6	μs
		at MR	V <sub>DD</sub> ≥ V <sub>IT-</sub> + 0.2 V, V <sub>IL</sub> = 0.3 × V <sub>DD</sub> , V <sub>IH</sub> = 0.7 × V <sub>DD</sub>		1	μs
		at WDI	V <sub>DD</sub> ≥ V <sub>IT-</sub> + 0.2 V, V <sub>IL</sub> = 0.3 × V <sub>DD</sub> , V <sub>IH</sub> = 0.7 × V <sub>DD</sub>		100	ns

switching characteristics at R<sub>L</sub> = 1 MΩ, C<sub>L</sub> = 50 pF, T<sub>A</sub> = 25°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>tout</sub>	Watchdog time out	TPS3820	112	200	310	ms
		TPS3823/4/8	0.9	1.6	2.5	s
t <sub>d</sub>	Delay time	TPS3820	15	25	37	ms
		TPS3823/4/5/8	120	200	300	
t <sub>PHL</sub>	Propagation (delay) time, high-to-low-level output	MR to RESET delay (TPS3820/3/5/8)	V <sub>DD</sub> ≥ V <sub>IT-</sub> + 0.2 V, V <sub>IL</sub> = 0.3 × V <sub>DD</sub> , V <sub>IH</sub> = 0.7 × V <sub>DD</sub>		0.1	μs
		V <sub>DD</sub> to 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	MR to RESET delay (TPS3824/5)	V <sub>DD</sub> ≥ V <sub>IT-</sub> + 0.2 V, V <sub>IL</sub> = 0.3 × V <sub>DD</sub> , V <sub>IH</sub> = 0.7 × 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

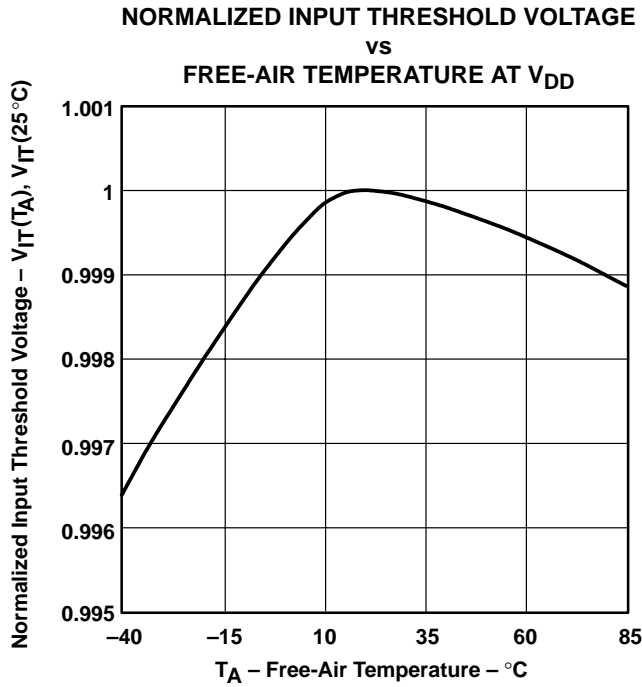


Figure 2

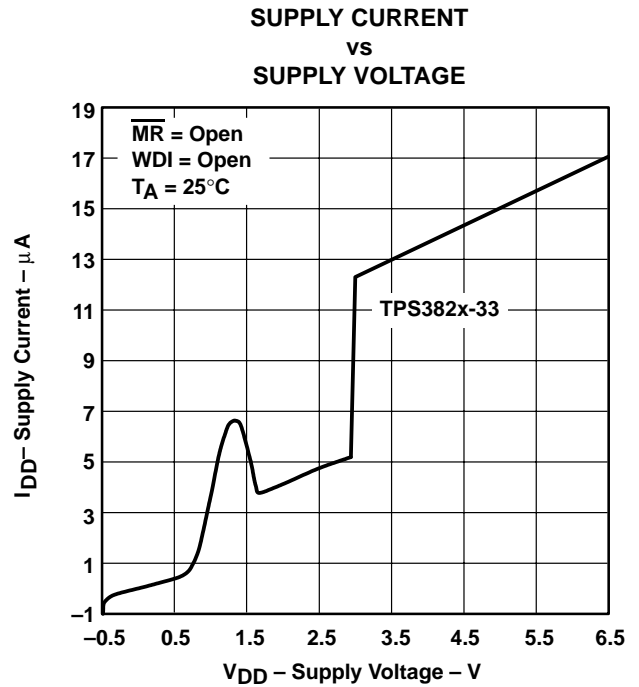


Figure 3

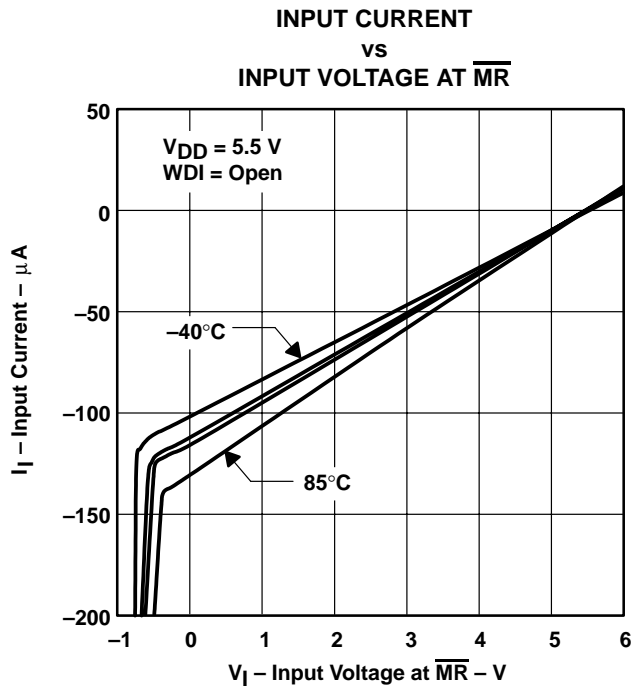


Figure 4

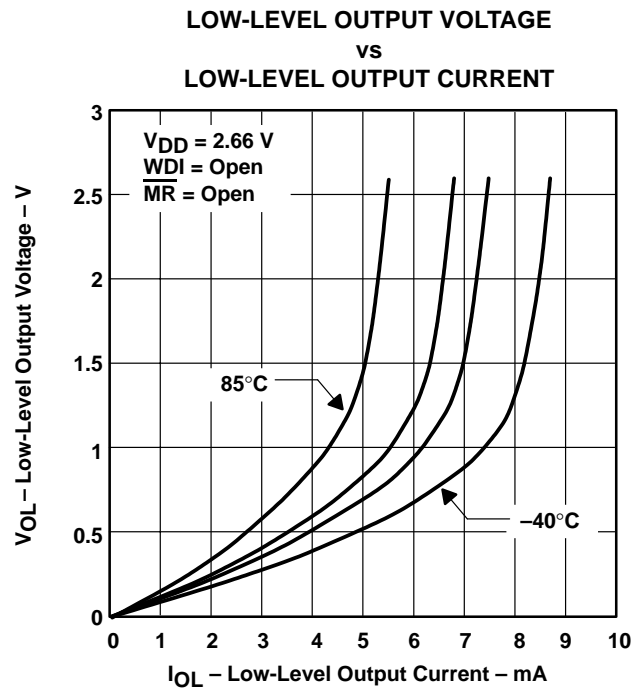
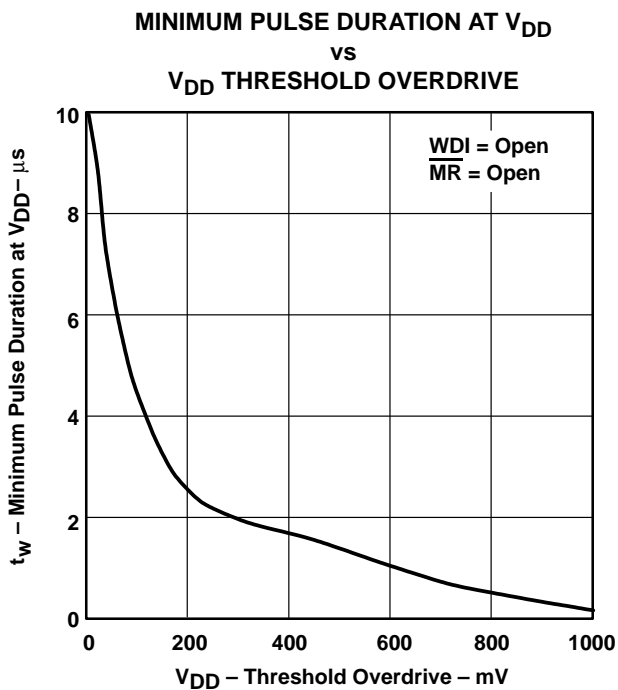
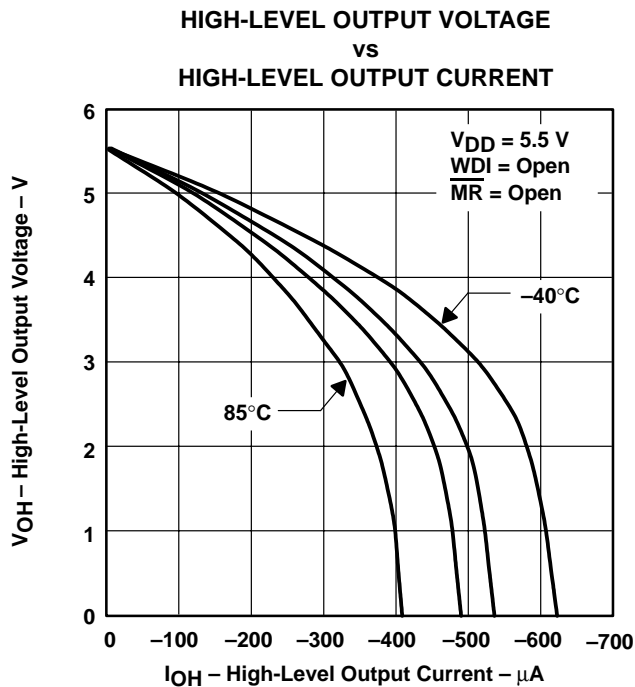
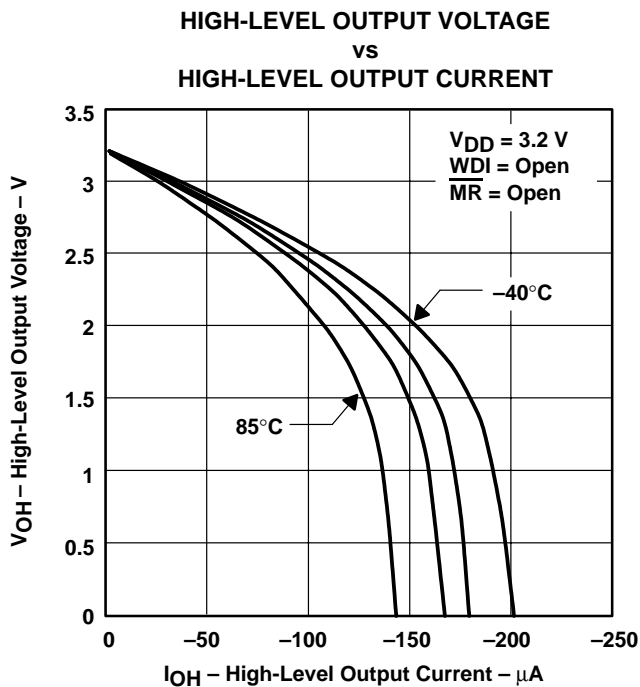


Figure 5

# TPS3820-xx, TPS3823-xx, TPS3824-xx, TPS3825-xx, TPS3828-xx PROCESSOR SUPERVISORY CIRCUITS

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## TYPICAL CHARACTERISTICS





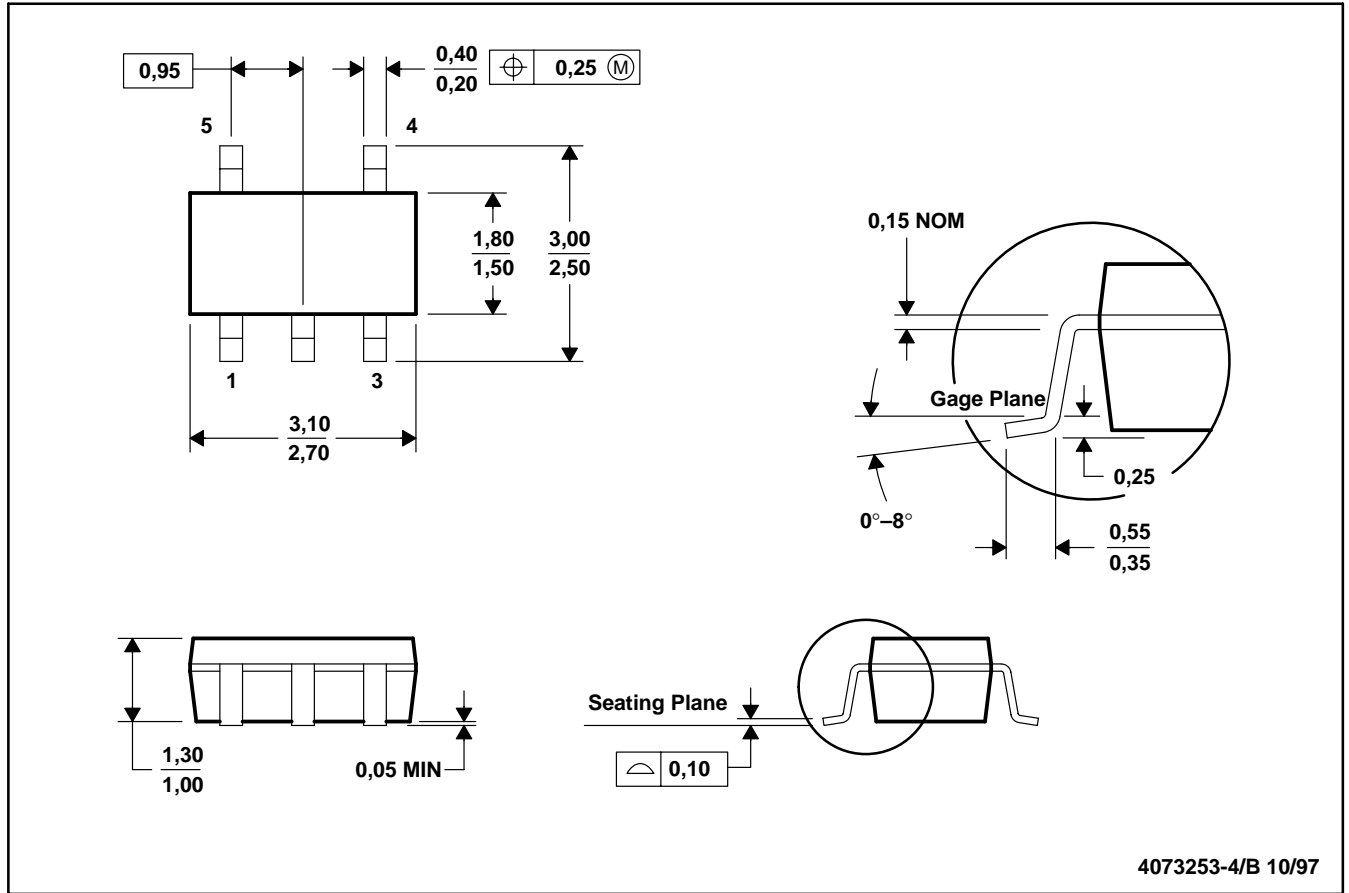
TPS3820-xx, TPS3823-xx, TPS3824-xx, TPS3825-xx, TPS3828-xx  
 PROCESSOR SUPERVISORY CIRCUITS

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MECHANICAL DATA

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 include mold flash or protrusion.

**PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
TPS3820-33DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3820-33DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3820-33DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3820-33DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3820-50DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3820-50DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3820-50DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3820-50DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-25DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-25DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-25DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-30DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-30DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-30DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-30DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-33DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-33DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-33DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-33DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-50DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-50DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-50DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3823-50DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-25DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-25DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
TPS3824-25DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-30DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-30DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-30DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-30DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-33DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-33DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-33DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-50DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-50DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-50DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3824-50DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3825-33DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3825-33DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3825-33DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3825-33DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3825-50DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3825-50DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3825-50DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3825-50DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3828-33DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3828-33DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3828-33DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3828-33DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3828-50DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3828-50DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
TPS3828-50DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TPS3828-50DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR

<sup>(1)</sup> 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.

<sup>(2)</sup> Eco Plan - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**None:** Not yet available Lead (Pb-Free).

**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.

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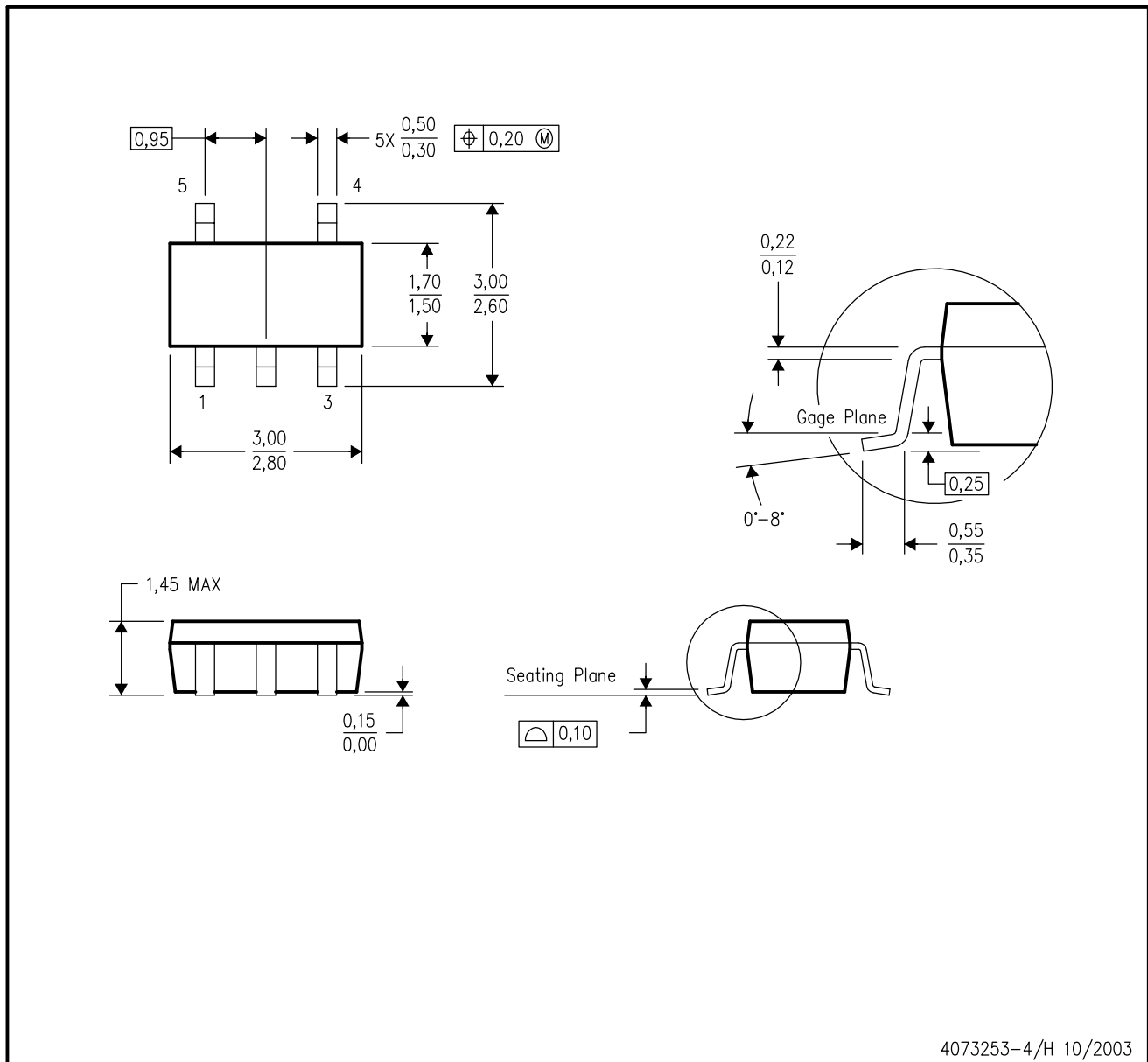
<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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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.
  - D. Falls within JEDEC MO-178 Variation AA.

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