NanoPower Supervisory Circuits

FEATURES

- **Supply Current: 220 nA (typical)**
- **Precision Supply Voltage Supervision Range: 1.8 V, 2.5 V, 3.0 V, and 3.3 V**
- **Power-On Reset Generator With Selectable Delay Time: 10 ms or 200 ms**
- **Push/Pull $\overline{\text{RESET}}$ Output (TPS3836), $\overline{\text{RESET}}$ Output (TPS3837), or Open-Drain $\overline{\text{RESET}}$ Output (TPS3838)**
- **Manual Reset**
- **SOT23-5 Package**
- **Temperature Range: –40°C to +85°C**

APPLICATIONS

- **Applications Using Low-Power DSPs, Microcontrollers, or Microprocessors**
- **Portable- and Battery-Powered Equipment**
- **Intelligent Instruments**
- **Wireless Communication Systems**
- **Notebook Computers**
- **Automotive Systems**
- **Applications Using the MSP430**

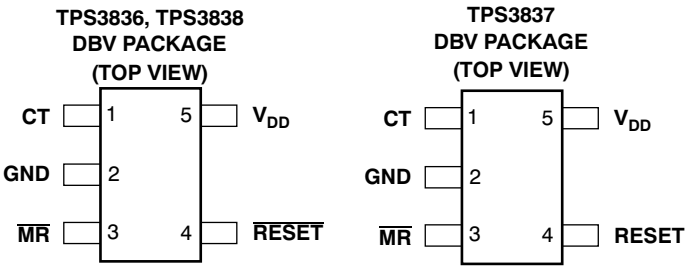
DESCRIPTION

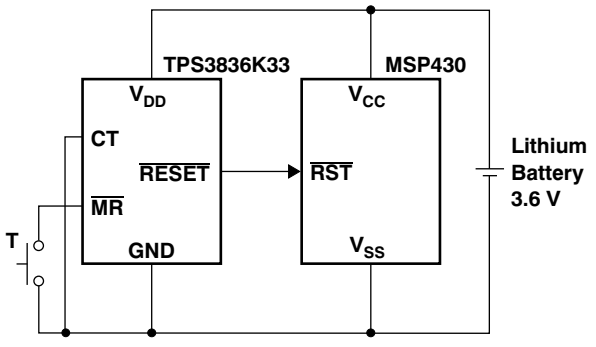
The TPS3836, TPS3837, and TPS3838 families of supervisory circuits provide circuit initialization and timing supervision, primarily for DSP and processor-based systems.

During power-on, $\overline{\text{RESET}}$ is asserted when the supply voltage V_{DD} becomes higher than 1.1 V. Thereafter, the supervisory circuit monitors V_{DD} and keeps the $\overline{\text{RESET}}$ output active as long as V_{DD} remains below the threshold voltage of V_{IT}. An internal timer delays the return of the output to the inactive state (high) to ensure proper system reset. The delay time starts after V_{DD} has risen above the threshold voltage V_{IT}.

When CT is connected to GND, a fixed delay time of typical 10 ms is asserted. When connected to V_{DD}, the delay time is typically 200 ms. When the supply voltage drops below the threshold voltage V_{IT}, the output becomes active (low) again. All the devices of this family have a fixed-sense threshold voltage (V_{IT}) set by an internal voltage divider.

The TPS3836 has an active-low, push-pull $\overline{\text{RESET}}$ output. The TPS3837 has an active-high, push-pull RESET, and the TPS3838 integrates an active-low, open-drain $\overline{\text{RESET}}$ output. The product spectrum is designed for supply voltages of 1.8 V, 2.5 V, 3.0 V, and 3.3 V. The circuits are available in a SOT23-5 package. The TPS3836, TPS3837, and TPS3838 families are characterized for operation over a temperature range of –40°C to +85°C.





Typical Application Circuit

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

ORDERING INFORMATION(1)

PRODUCT	NOMINAL SUPPLY VOLTAGE	THRESHOLD VOLTAGE (V_{IT})(2)
TPS383xE18	1.8 V	1.71 V
TPS383xJ25	2.5 V	2.25 V
TPS383xH30	3.0 V	2.79 V
TPS383xL30	3.0 V	2.64 V
TPS383xK33	3.3 V	2.93 V

(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.
(2) Custom threshold voltages are available. Minimum order quantities apply. Contact factory for details and availability.

ABSOLUTE MAXIMUM RATINGS(1)

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

	TPS383xx	UNIT
Supply voltage, V_{DD}(2)	7	V
All other pins(2)(3)	–0.3 to 7	V
Maximum low output current, I_{OL}	5	mA
Maximum high output current, I_{OH}	–5	mA
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{DD}$)	±10	mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{DD}$)	±10	mA
Continuous total power dissipation	See Dissipation Ratings Table	
Operating temperature range, T_A	–40 to +85	°C
Storage temperature range, T_{STG}	–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.
(3) If RESET or $\overline{\text{RESET}}$ are pulled above V_{DD}, the internal ESD structure will present an effective 1.5 kΩ resistor between these pins, causing leakage current to flow into the RESET or $\overline{\text{RESET}}$ pin.

DISSIPATION RATINGS

PACKAGE	T_A < +25°C POWER RATING	DERATING FACTOR ABOVE T_A = +25°C	T_A = +70°C POWER RATING	T_A = +85°C POWER RATING
DBV	437 mW	3.5 mW/°C	280 mW	227 mW

RECOMMENDED OPERATING CONDITIONS

	MIN	MAX	UNIT
Supply voltage, V_{DD}	1.6	6	V
Voltage range, CT, $\overline{MR}$, RESET, and $\overline{RESET}$ pins	0	V_{DD} + 0.3	V
High-level input voltage, 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 $\overline{MR}$, $\Delta t/\Delta V$		100	ns/V
Operating temperature range, T_A	–40	+85	°C

ELECTRICAL CHARACTERISTICS

Over recommended operating conditions, unless otherwise noted.

PARAMETER			TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{OH}	High-level output voltage	$\overline{RESET}$ (TPS3836)	V_{DD} = 3.3 V, I_{OH} = –2 mA	$0.8 \times V_{DD}$			V
			V_{DD} = 6 V, I_{OH} = –3 mA				
		RESET (TPS3837)	V_{DD} = 1.8 V, I_{OH} = –1 mA				
			V_{DD} = 3.3 V, I_{OL} = –2 mA				
V_{OL}	Low-level output voltage	$\overline{RESET}$ (TPS3836, TPS3838)	V_{DD} = 1.8 V, I_{OL} = 1 mA			0.4	V
			V_{DD} = 3.3 V, I_{OL} = 2 mA				
		RESET (TPS3837)	V_{DD} = 3.3 V, I_{OL} = 2 mA				
			V_{DD} = 6 V, I_{OL} = 3 mA				
	Power-up reset voltage(1)	TPS3836, TPS3838	$V_{DD} \geq$ 1.1 V, I_{OL} = 50 µA			0.2	V
		TPS3837	$V_{DD} \geq$ 1.1 V, I_{OL} = –50 µA	$0.8 \times V_{DD}$			V
V_{IT}	Negative-going input threshold voltage(2)	TPS383xE18	T_A = –40°C to +85°C	1.66	1.71	1.74	V
		TPS383xJ25		2.18	2.25	2.29	
		TPS383xH30		2.70	2.79	2.85	
		TPS383xL30		2.56	2.64	2.69	
		TPS383xK33		2.84	2.93	2.99	
V_{HYS}	Hysteresis at V_{DD} input		1.7 V < V_{IT} < 2.5 V		30		mV
			2.5 V < V_{IT} < 3.5 V		40		
			3.5 V < V_{IT} < 5 V		50		
I_{IH}	High-level input current	$\overline{MR}$ (3)	$\overline{MR}$ = $0.7 \times V_{DD}$, V_{DD} = 6 V	–40	–60	–100	µA
		CT	CT = V_{DD} = 6 V	–25		+25	nA
I_{IL}	Low-level input current	$\overline{MR}$ (3)	$\overline{MR}$ = 0 V, V_{DD} = 6 V	–130	–200	–340	µA
		CT	CT = 0 V, V_{DD} = 6 V	–25		+25	nA
I_{OH}	High-level output current	TPS3838	V_{DD} = V_{IT} + 0.2 V, V_{OH} = V_{DD}			25	nA
I_{DD}	Supply current		V_{DD} > V_{IT}, V_{DD} < 3 V		220	400	nA
			V_{DD} > V_{IT}, V_{DD} > 3 V		250	450	
			V_{DD} < V_{IT}		10	15	µA
	Internal pull-up resistor at $\overline{MR}$				30		kΩ
C_I	Input capacitance at $\overline{MR}$ and CT		V_I = 0 V to V_{DD}		5		pF

(1) The lowest voltage at which the $\overline{RESET}$ output becomes active. t_R, $V_{DD} \geq$ 15 µs/V.
(2) To ensure best stability of the threshold voltage, a bypass capacitor (ceramic, 0.1 µF) should be placed near the supply terminal.
(3) If manual reset is unused, $\overline{MR}$ should be connected to V_{DD} to minimize current consumption.

SWITCHING CHARACTERISTICS

At T_A = +25°C, R_L = 1 MΩ, and C_L = 50 pF, unless otherwise noted.

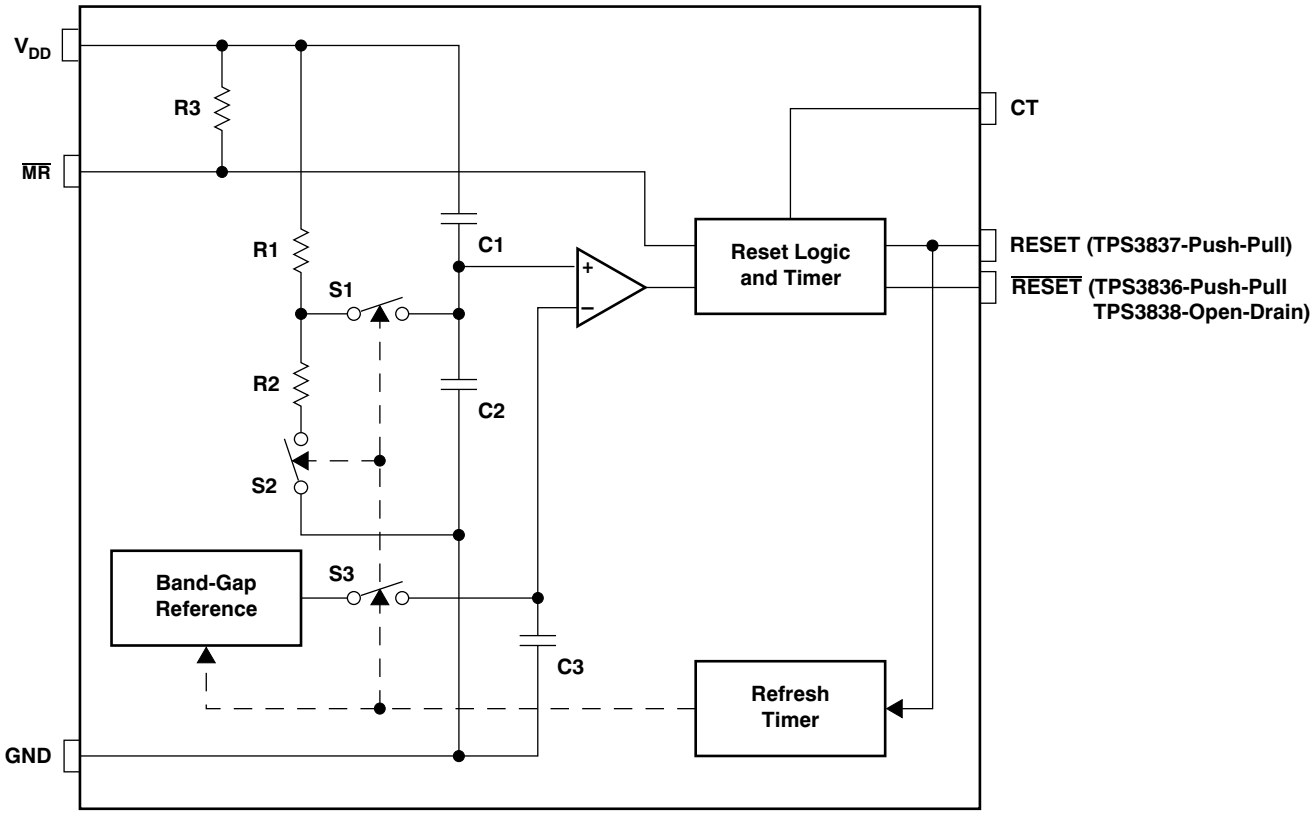
PARAMETER			TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_D	Delay time		$V_{DD} \geq V_{IT}$ + 0.2 V, $\overline{MR}$ = 0.7 × V_{DD}, CT = GND, See Timing Diagram	5	10	15	ms
			$V_{DD} \geq V_{IT}$ + 0.2 V, $\overline{MR}$ = 0.7 × V_{DD}, CT = V_{DD}, See Timing Diagram	100	200	300	
t_{PHL}	Propagation (delay) time, high-to-low-level output	V_{DD} to $\overline{RESET}$ delay (TPS3836, TPS3838)	$V_{IL} = V_{IT}$ – 0.2 V, $V_{IH} = V_{IT}$ + 0.2 V			10	µs
			V_{IL} = 1.6 V			50	
t_{PLH}	Propagation (delay) time, low-to-high-level output	V_{DD} to RESET delay (TPS3837)	$V_{IL} = V_{IT}$ – 0.2 V, $V_{IH} = V_{IT}$ + 0.2 V			10	µs
			V_{IL} = 1.6 V			50	
t_{PHL}	Propagation (delay) time, high-to-low-level output	$\overline{MR}$ to $\overline{RESET}$ delay (TPS3836, TPS3838)	$V_{DD} \geq V_{IT}$ + 0.2 V, V_{IL} = 0.3 × V_{DD}, V_{IL} = 0.7 × V_{DD}			0.1	µs
t_{PLH}	Propagation (delay) time, low-to-high-level output	$\overline{MR}$ to RESET delay (TPS3837)	$V_{DD} \geq V_{IT}$ + 0.2 V, V_{IL} = 0.3 × V_{DD}, V_{IL} = 0.7 × V_{DD}			0.1	µs

TIMING REQUIREMENTS

At T_A = +25°C, R_L = 1 MΩ, and C_L = 50 pF, unless otherwise noted.

PARAMETER			TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_W	Pulse width	at V_{DD}	$V_{IH} = V_{IT}$ + 0.2 V, $V_{IL} = V_{IT}$ – 0.2 V	6			µs
		at $\overline{MR}$	$V_{DD} \geq V_{IT}$ + 0.2 V, V_{IL} = 0.3 × V_{DD}, V_{IH} = 0.7 × V_{DD}	1			

FUNCTIONAL BLOCK DIAGRAM

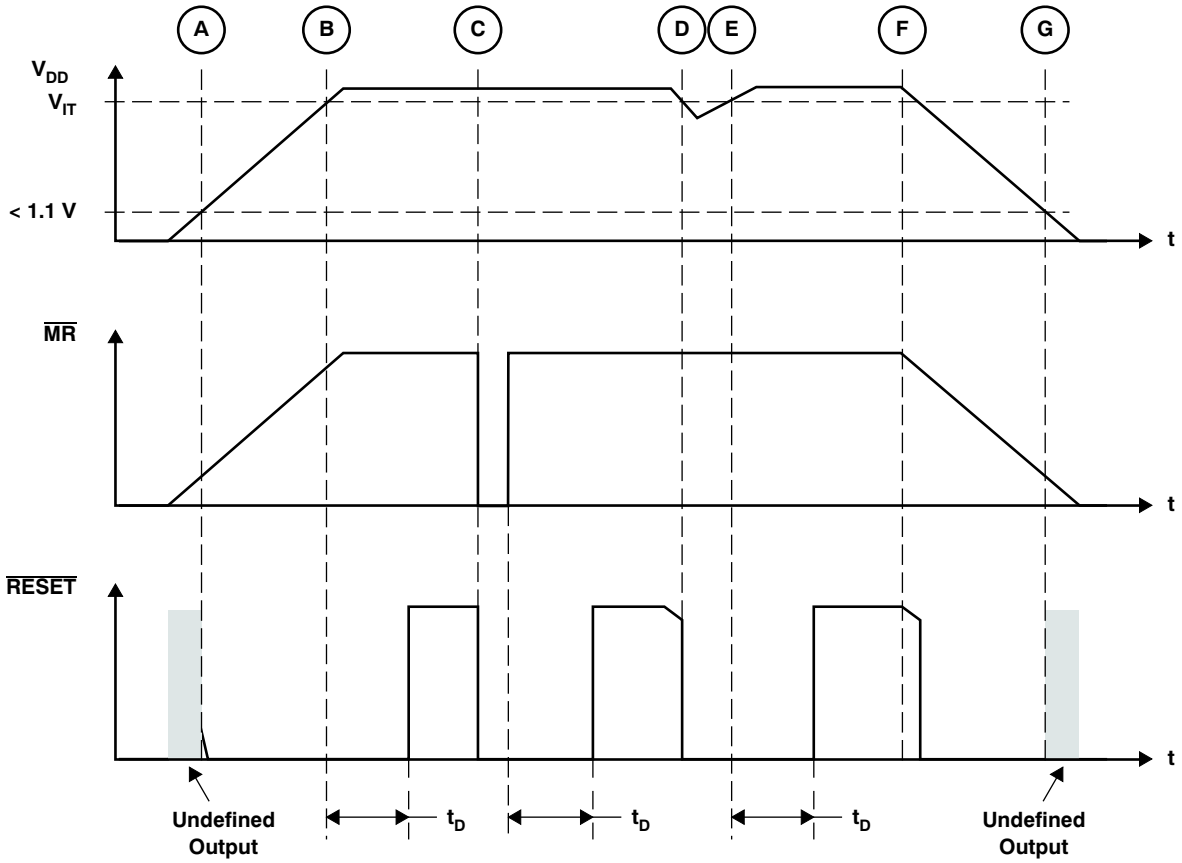


FUNCTION TABLE

$\overline{MR}$	$V_{DD} > V_{IT}$	$\overline{RESET}$ (1)	RESET (2)
L	0	L	H
L	1	L	H
H	0	L	H
H	1	H	L

(1) TPS3836 and TPS3838.
(2) TPS3837.

TIMING DIAGRAM



TYPICAL CHARACTERISTICS

SUPPLY CURRENT vs SUPPLY VOLTAGE

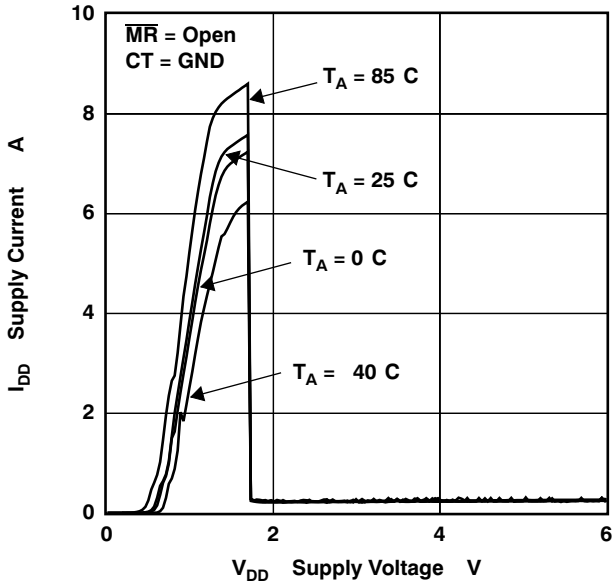


Figure 1.

MANUAL RESET CURRENT vs MANUAL RESET VOLTAGE

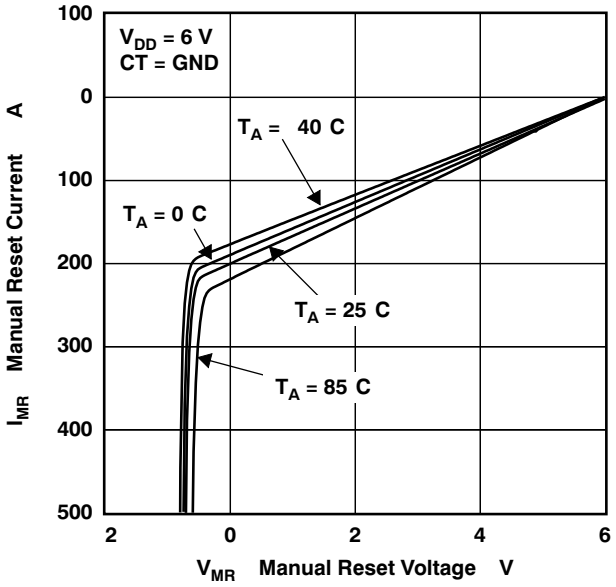


Figure 2.

LOW-LEVEL OUTPUT VOLTAGE vs LOW-LEVEL OUTPUT CURRENT

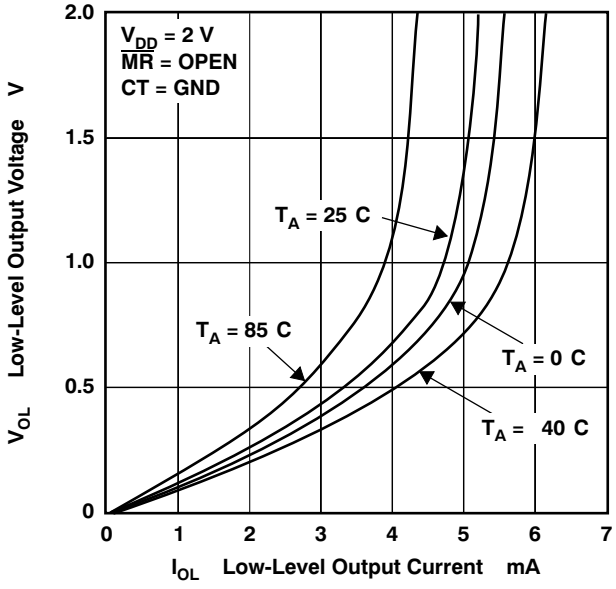


Figure 3.

HIGH-LEVEL OUTPUT VOLTAGE vs HIGH-LEVEL OUTPUT CURRENT

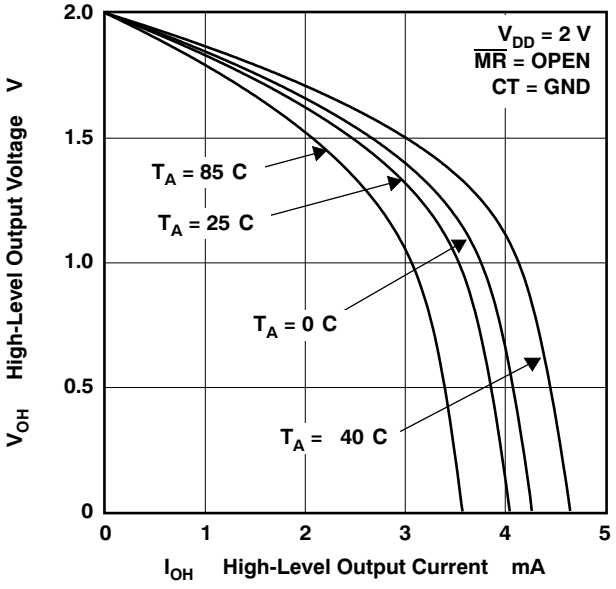


Figure 4.

TYPICAL CHARACTERISTICS (continued)

NORMALIZED RESET THRESHOLD VOLTAGE VS FREE-AIR TEMPERATURE

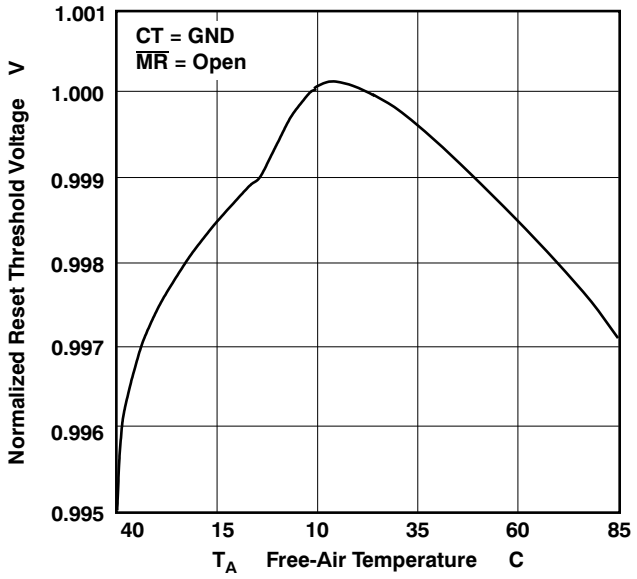


Figure 5.

MINIMUM PULSE DURATION AT V_{DD} VS V_{DD} THRESHOLD OVERDRIVE

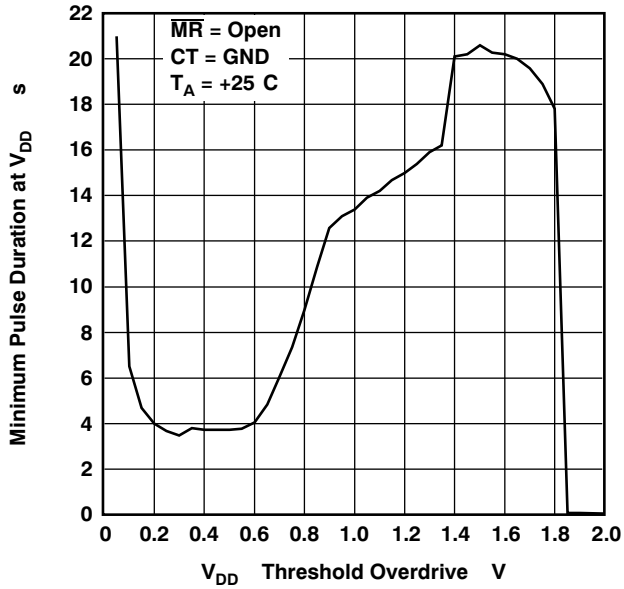


Figure 6.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
TPS3836E18DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836E18DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836E18DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836E18DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836H30DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836H30DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836H30DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836H30DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836J25DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836J25DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836J25DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836J25DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836K33DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836K33DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836K33DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836K33DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836L30DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836L30DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836L30DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3836L30DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837E18DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837E18DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837E18DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837E18DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837J25DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

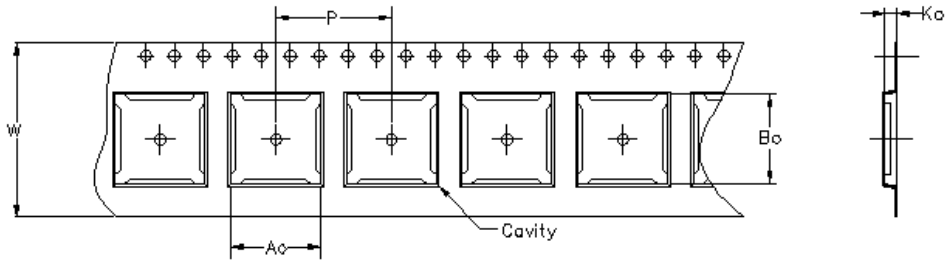
Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
TPS3837J25DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837J25DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837J25DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837K33DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837K33DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837K33DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837K33DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837L30DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837L30DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837L30DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3837L30DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838E18DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838E18DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838E18DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838E18DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838J25DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838J25DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838J25DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838J25DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838K33DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838K33DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838K33DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838K33DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838L30DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838L30DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TPS3838L30DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
TPS3838L30DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

(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.

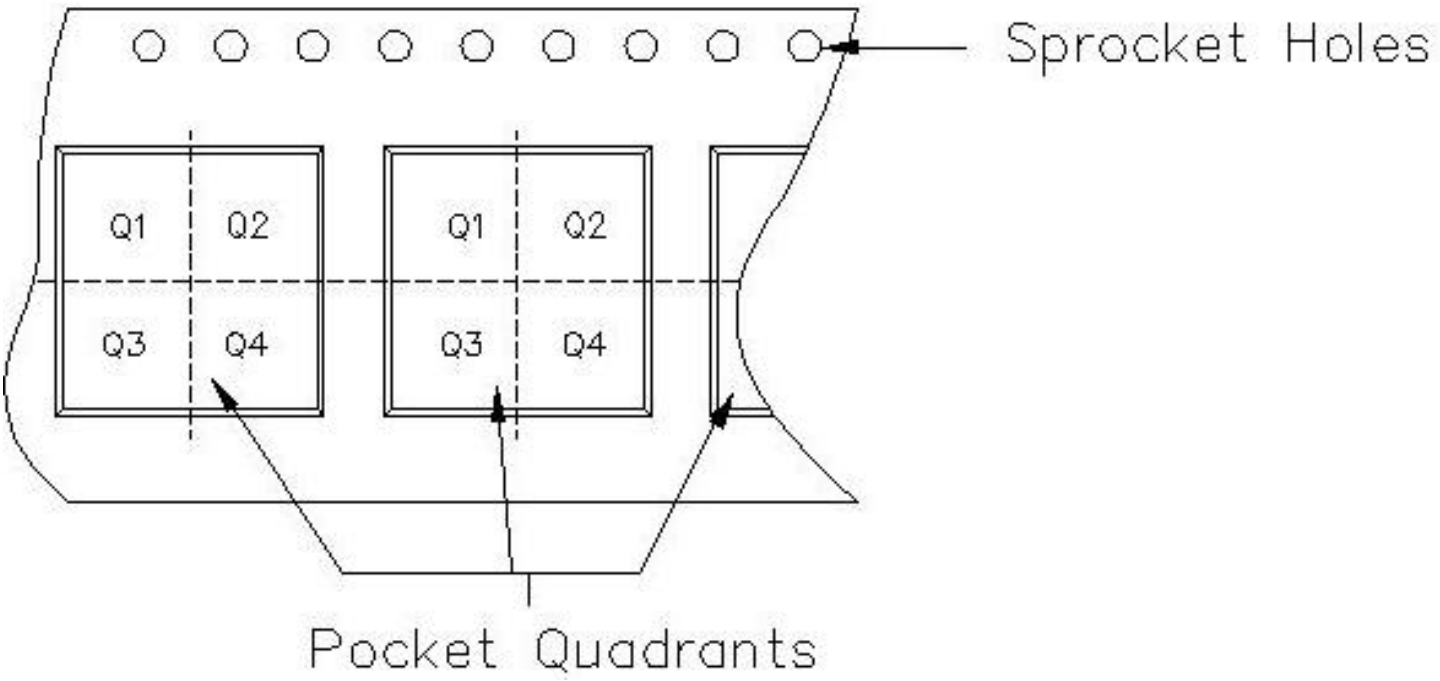
(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been 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.



Carrier tape design is defined largely by the component lentgh, width, and thickness.

Ao = Dimension designed to accommodate the component width.
Bo = Dimension designed to accommodate the component length.
Ko = Dimension designed to accommodate the component thickness.
W = Overall width of the carrier tape.
P = Pitch between successive cavity centers.

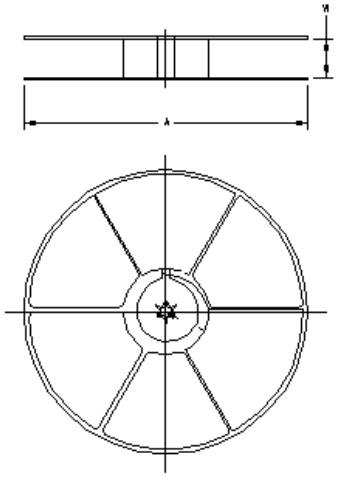


TAPE AND REEL INFORMATION

PACKAGE MATERIALS INFORMATION

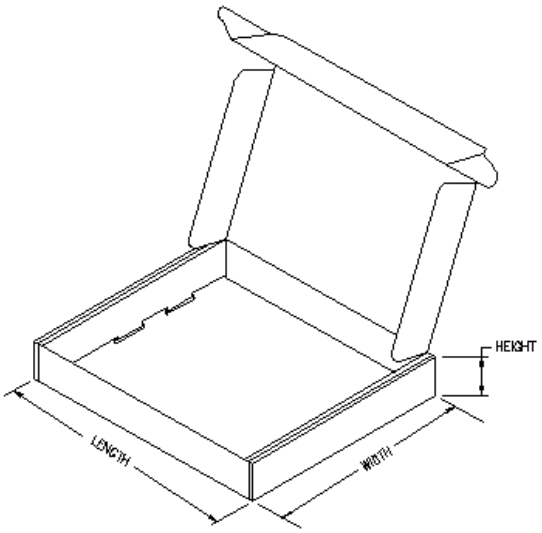
7-May-2007

Device	Package	Pins	Site	Reel Diameter (mm)	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TPS3836E18DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3836E18DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3836H30DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3836H30DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3836J25DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3836J25DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3836K33DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3836K33DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3836L30DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3836L30DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3837E18DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3837E18DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3837J25DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3837J25DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3837K33DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3837K33DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3837L30DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3837L30DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3838E18DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3838E18DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3838J25DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3838J25DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3838K33DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3838K33DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3838L30DBVR	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3
TPS3838L30DBVT	DBV	5	LEN	180	9	3.15	3.2	1.4	4	8	Q3

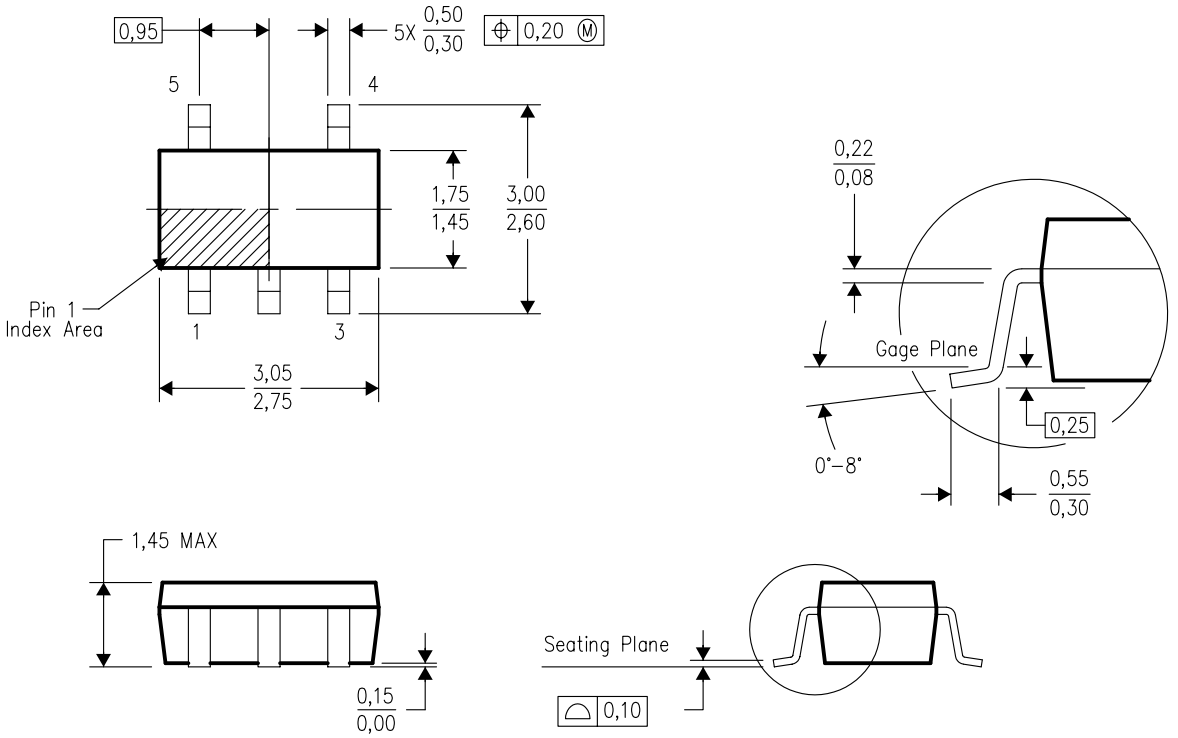


TAPE AND REEL BOX INFORMATION

Device	Package	Pins	Site	Length (mm)	Width (mm)	Height (mm)
TPS3836E18DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3836E18DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3836H30DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3836H30DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3836J25DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3836J25DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3836K33DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3836K33DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3836L30DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3836L30DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3837E18DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3837E18DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3837J25DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3837J25DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3837K33DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3837K33DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3837L30DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3837L30DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3838E18DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3838E18DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3838J25DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3838J25DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3838K33DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3838K33DBVT	DBV	5	LEN	182.4	182.4	17.3
TPS3838L30DBVR	DBV	5	LEN	182.4	182.4	17.3
TPS3838L30DBVT	DBV	5	LEN	182.4	182.4	17.3


HEIGHT
LENGTH
WIDTH

DBV (R–PDSO–G5) PLASTIC SMALL–OUTLINE PACKAGE



4073253–4/K 03/2006

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.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

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

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

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

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

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

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		**Applications**	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
Low Power Wireless	www.ti.com/lpw	Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265