

Features

- Precision Low Voltage Monitoring
- 200 ms (Typical) Reset Timeout
- Open-drain Active-low Output (TPV803)
- Push-pull Active-low Output (TPV809)
- Push-pull Active-high Output (TPV810)
- Low Power Consumption: 2.2 μA
- Guaranteed Reset Output valid to $V_{CC} = 1\text{ V}$
- Power Supply Glitch Immunity
- Specified from -40°C to $+125^{\circ}\text{C}$
- SOT23-3 and SOT23G-3 Packages

Applications

- Microprocessor Systems
- Computers
- Controllers
- Intelligent Instruments
- Portable Equipment

Description

The TPV803/809/810 is a series of supervisory circuit that monitors power supply voltage levels and provides a power-on reset signal. They provide a reset output during power-up, power-down, and brownout conditions.

The reset timeout periods are fixed at 200 ms (typical).

The TPV803 and TPV809 provide an active low reset signal ($\overline{\text{RESET}}$), whereas the TPV810 provides an active high signal (RESET) output. The TPV809 and TPV810 have push-pull outputs, whereas the TPV803 has an open-drain output, which requires an external pull-up resistor.

The TPV803/809/810 is available in SOT23-3 and SOT23G-3 packages and typically consumes only 2.2 μA , suitable for use in low-power, portable applications.

Typical Application Circuit

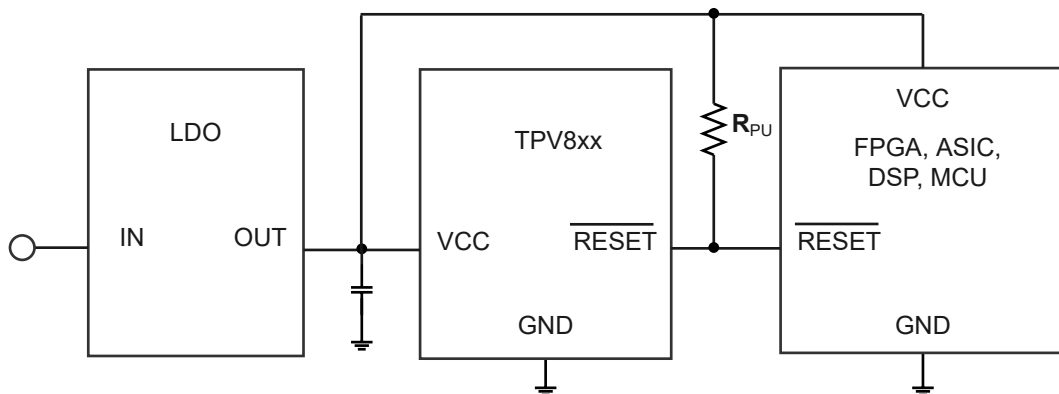


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Revision History

Date	Revision	Notes
2018-09-01	Rev.A.0	Initial Version
2019-01-01	Rev.A.1	Updated RESET VOH, and VOL parameters
2021-08-04	Rev.A.2	Added Application Note
2021-09-15	Rev.A.3	Modified version
2022-01-27	Rev.A.4	Removed the application limitation
2022-05-24	Rev.A.5	<ul style="list-style-type: none">Updated package nameAdded note in the order information tableUpdated RESET pin descriptionUpdated reset timing diagram
2022-11-20	Rev.A.6	Updated EC format by adding a symbol for parameters
2023-02-20	Rev.A.7	Updated package thermal information
2024-02-21	Rev.A.8	Added the t_{GI} parameter in the EC table and Curve of Maximum VCC transient duration vs Reset threshold overdrive
2024-09-09	Rev.A.9	Released SOT23-3 package for TPV803S Added more information in block diagram
2024-12-24	Rev.A.10	Released SOT23-3 package for TPV803R Corrected typo of V_{HYS} spec, from $2 \times V_{TH} / 1000$ mV to $2 \times V_{TH}$ mV
2025-02-20	Rev.A.11	Added the RESET pin voltage when $VCC < VPOR$ in the Typical Performance Characteristics.

Pin Configuration and Functions

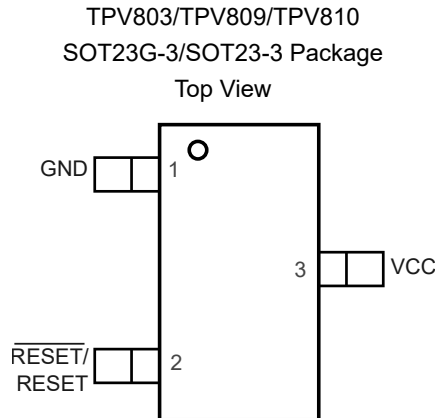


Table 1. Pin Functions: TPV803/TPV809/TPV810

Pin		I/O	Description
No.	Name		
1	GND		Ground.
2	$\overline{\text{RESET}}$		TPV803: Open-drain Active Low Logic Output. $\overline{\text{RESET}}$ remains low while V_{CC} is below the reset threshold and remains low for 200 ms (typical) after V_{CC} rises above the reset threshold.
	$\overline{\text{RESET}}$		TPV809: Push-pull Active Low Logic Output. $\overline{\text{RESET}}$ remains low while V_{CC} is below the reset threshold and remains low for 200 ms (typical) after V_{CC} rises above the reset threshold.
	RESET		TPV810: Push-pull Active High Logic Output. RESET remains high while V_{CC} is below the reset threshold and remains high for 200 ms (typical) after V_{CC} rises above the reset threshold.
3	VCC		Power Supply Voltage Being Monitored.

Specifications

Absolute Maximum Ratings

Parameter		Min	Max	Unit
Input Voltage	V _{CC}	-0.3	6	V
Output Current	Source or Sink Current for Push-pull, and Sink Current for Open Drain of RESET/ $\overline{\text{RESET}}$		20	mA
T _{OP}	Operating Temperature	-40	125	°C
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range	-65	150	°C
T _L	Lead Temperature (Soldering 10 sec)		260	°C

(1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

(2) This data was taken with the JEDEC low effective thermal conductivity test board.

(3) This data was taken with the JEDEC standard multilayer test boards.

ESD, Electrostatic Discharge Protection

Parameter		Condition	Minimum Level	Unit
HBM	Human Body Model ESD	ANSI/ESDA/JEDEC JS-001 ⁽¹⁾	4	kV
CDM	Charged Device Model ESD	ANSI/ESDA/JEDEC JS-002 ⁽²⁾	2	kV

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

Thermal Information

Package Type	θ_{JA}	θ_{JC}	Unit
SOT23-3	242	213	°C/W
SOT23G-3	287	105	°C/W

Electrical Characteristics

 All test conditions: $V_{CC} = 1.53\text{ V to }5.5\text{ V}$, $T_A = -40^\circ\text{C to }+125^\circ\text{C}$, unless otherwise noted.

Parameter		Conditions	Min	Typ	Max	Unit
Reset Threshold Voltage						
V_{CC}	V_{CC} Operating Voltage Range		1		5.5	V
I_{CC}	Supply Current	$V_{CC} = 1.8\text{ V}$		2.2	10	μA
		$V_{CC} = 5\text{ V}$		6	25	μA
Reset Threshold Voltage						
V_{TH}	TPV8xxV		1.51	1.58	1.63	V
	TPV8xxW		1.62	1.67	1.71	V
	TPV8xxY		2.12	2.19	2.25	V
	TPV8xxZ		2.25	2.32	2.38	V
	TPV8xxR		2.55	2.63	2.70	V
	TPV8xxS		2.85	2.93	3.00	V
	TPV8xxT		2.95	3.08	3.15	V
	TPV8xxM		4.20	4.38	4.5	V
	TPV8xxL		4.45	4.63	4.75	V
	Reset Threshold Temperature Coefficient			60		ppm/ $^\circ\text{C}$
V_{HYS}	Reset threshold hysteresis			$2 \times V_{TH}$		mV
t_{GI}	Glitch Immunity ⁽¹⁾	3.5% overdrive		11		μs
t_{RD}	V_{CC} To Reset Delay	$V_{TH} - V_{CC} = 100\text{ mV}$		20		μs
t_{RP}	Reset Timeout Period		140	200	280	ms
V_{OL}	Reset Output Voltage Vol (Push-Pull and open drain)	$V_{CC} \geq 1\text{ V}$, $I_{SINK} = 50\ \mu\text{A}$			0.3	V
	Reset Output Voltage Vol (Push-Pull and open drain)	$V_{CC} = V_{TH}$, $I_{SINK} = 1.2\text{ mA}$ $V_{TH} \geq 2.63\text{V}$			0.3	V
	Reset Output Voltage Vol (Push-Pull and open drain)	$V_{CC} = V_{TH}$, $I_{SINK} = 3.2\text{mA}$ $V_{TH} \geq 4\text{V}$			0.4	V
V_{OH}	Reset Output Voltage Voh (Push-Pull Only)	$V_{CC} \geq 1.8\text{ V}$, $I_{SOURCE} = 200\ \mu\text{A}$	$0.8 \times V_{CC}$			V
	Reset Output Voltage Voh (Push-Pull Only)	$V_{CC} = V_{TH}$, $I_{SOURCE} = 500\ \mu\text{A}$ $V_{TH} \geq 2.63\text{ V}$	$0.8 \times V_{CC}$			V
	Reset Output Voltage Voh (Push-Pull Only)	$V_{CC} = V_{TH}$, $I_{SOURCE} = 800\ \mu\text{A}$ $V_{TH} \geq 4\text{ V}$	$V_{CC}-1.5\text{ V}$			V

(1) Guaranteed by bench test

Typical Performance Characteristics

All test conditions: $V_{CC} = 3.3\text{ V}$, $T_A = +25^\circ\text{C}$, unless otherwise noted.

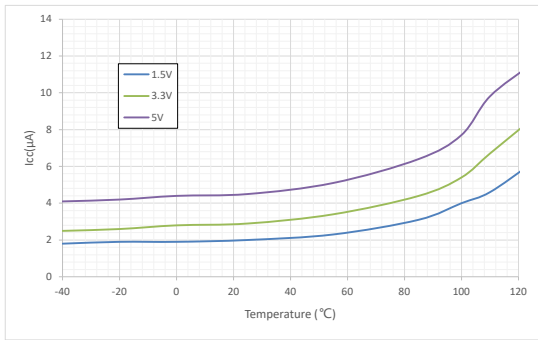


Figure 1. Supply Current vs Temperature

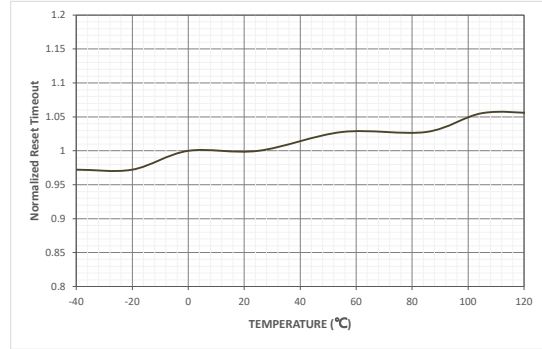


Figure 2. Normalized RESET Timeout Period vs Temperature

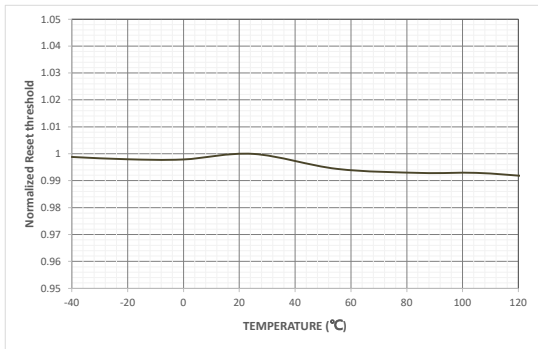


Figure 3. Normalized RESET Threshold vs Temperature

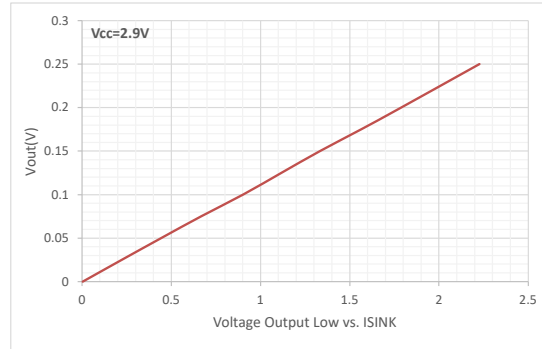


Figure 4. Voltage Output Low vs I_{SINK} (TPV809)

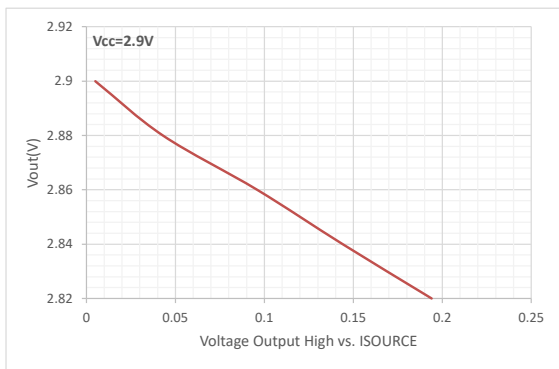


Figure 5. Voltage Output Low vs I_{SOURCE}

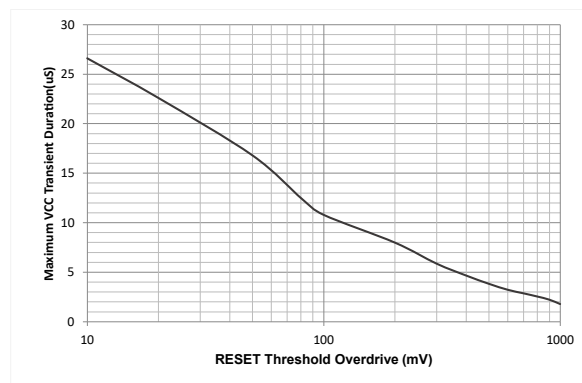


Figure 6. Maximum VCC Transient Duration vs. Reset Threshold Overdrive

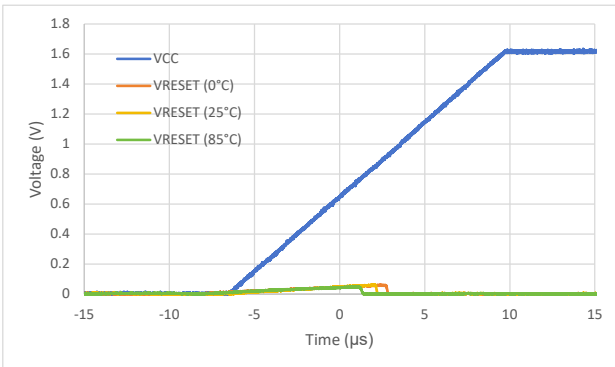


Figure 7. TPV809 RESET Voltage @ VCC < VPOR & RESET Pin Pull to GND Through 100 kΩ

Detailed Description

Overview

The TPV803/809/810 provides a supply voltage supervision function.

A reset signal is asserted when the supply voltage is lower than a preset threshold. In addition, the TPV803/809/810 allows supply voltage stabilization with a fixed timeout before the reset de-asserts after the supply voltage rises above the threshold.

Functional Block Diagram

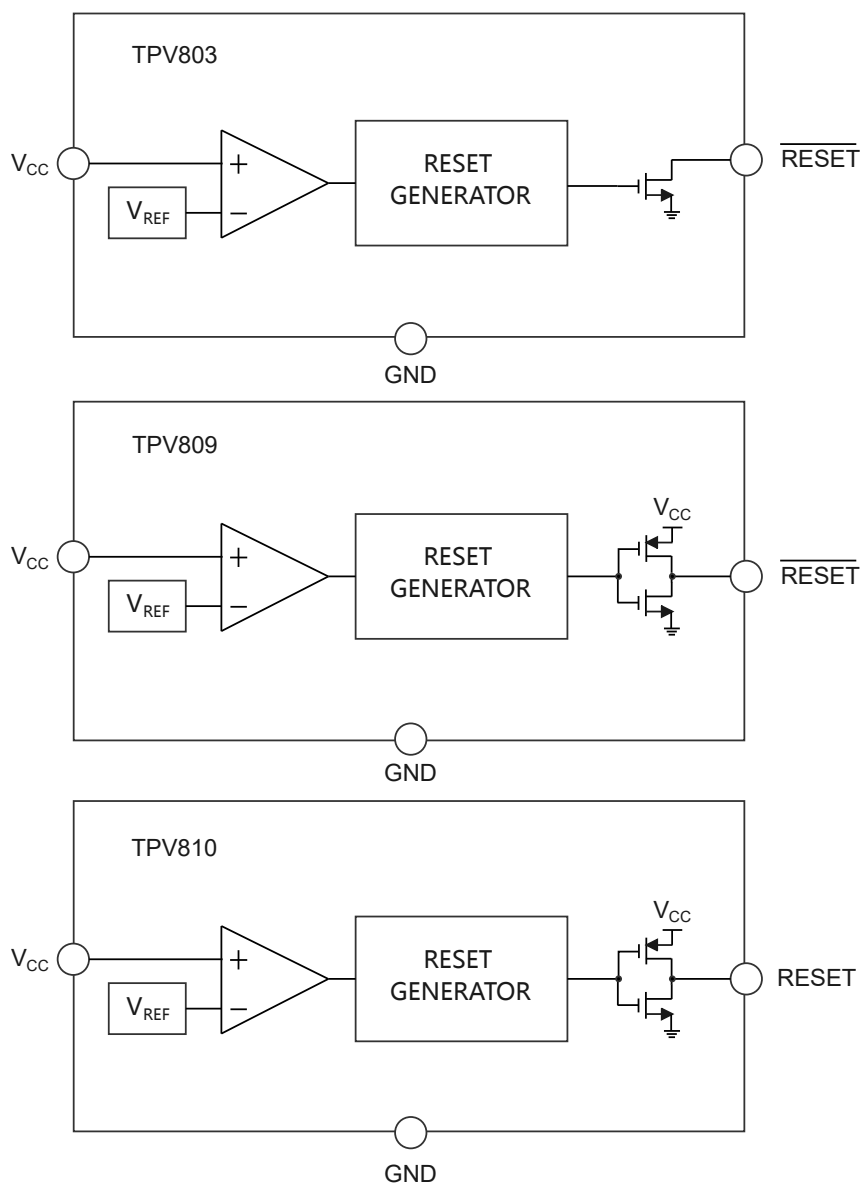


Figure 8. Functional Block Diagram

Feature Description

The TPV803/809 features an active-low open-drain or push-pull output. The TPV810 features an active-high push-pull output. For active-low output, the reset signal is guaranteed to be logic low for V_{CC} down to 1 V. For active-high output, the reset signal is guaranteed to be logic-high for V_{CC} down to 1 V. The reset output is asserted when V_{CC} is below the reset threshold (V_{TH}), Reset remains asserted for the duration of the reset active timeout period (t_{RP}) after V_{CC} rises above the reset threshold. Figure 9 shows the reset outputs.

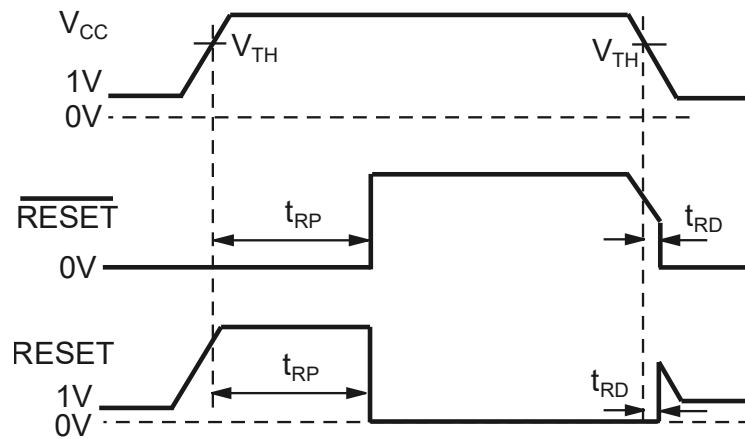
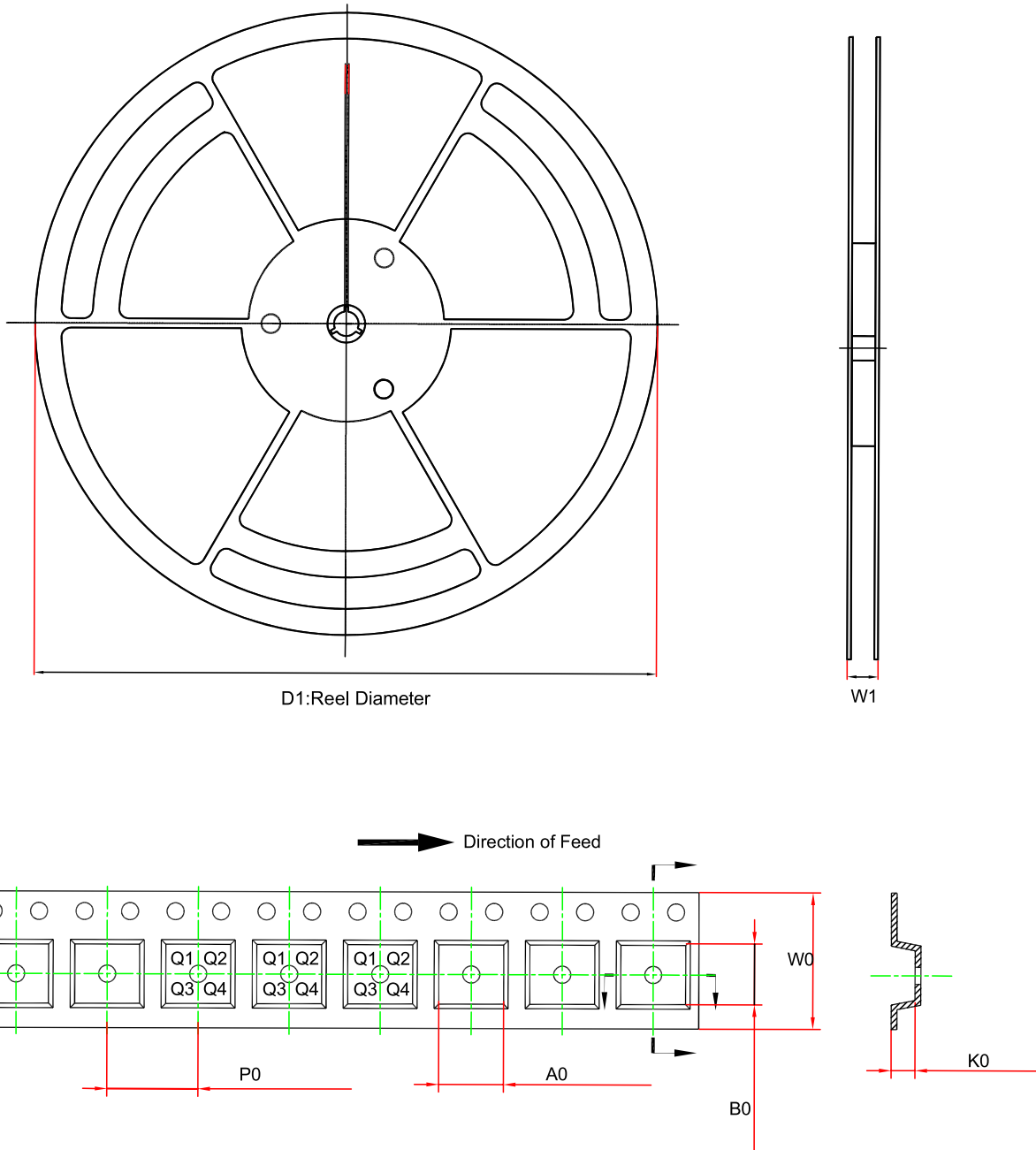


Figure 9. Reset Timing Diagram

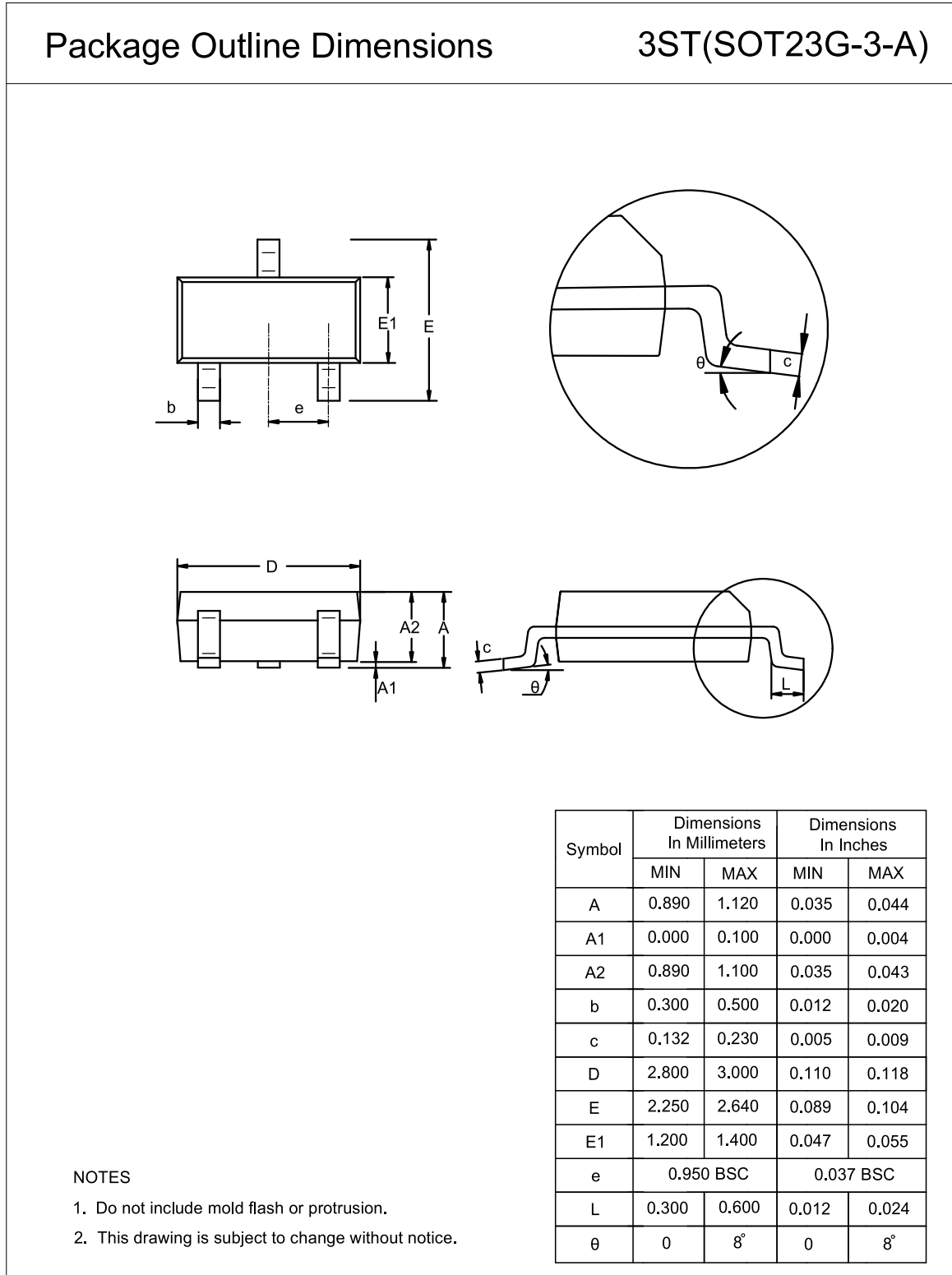
Tape and Reel Information



Order Number	Package	D1 (mm)	W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	W0 (mm)	Pin1 Quadrant
TPV8XXX-3TR	SOT23-3	180	13.1	3.18	3.28	1.32	4	8	Q3
TPV8XXX-3STR	SOT23G-3	178	13.1	3.15	2.77	1.22	4	8	Q3

Package Outline Dimensions

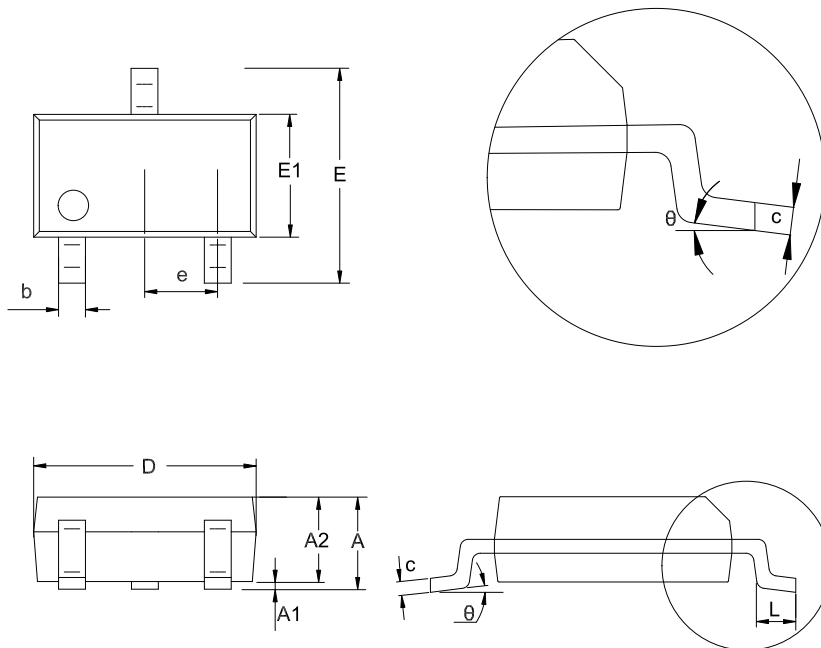
SOT23G-3



SOT23-3

Package Outline Dimensions

S3T(SOT23-3-A)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.150	0.000	0.006
A2	1.000	1.200	0.039	0.047
b	0.280	0.500	0.011	0.020
c	0.100	0.230	0.004	0.009
D	2.820	3.020	0.111	0.119
E	2.600	3.000	0.102	0.118
E1	1.500	1.720	0.059	0.068
e	0.950 BSC		0.037 BSC	
L	0.300	0.600	0.012	0.024
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

Order Information - TPV803

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
TPV803V-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V8V	3	Tape and Reel, 3,000	Green
TPV803W-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V8W	3	Tape and Reel, 3,000	Green
TPV803Y-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V8Y	3	Tape and Reel, 3,000	Green
TPV803Z-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V8Z	3	Tape and Reel, 3,000	Green
TPV803R-3TR	-40°C to 125°C	SOT23-3	V8R	3	Tape and Reel, 3,000	Green
TPV803S-3TR	-40°C to 125°C	SOT23-3	V8S	3	Tape and Reel, 3,000	Green
TPV803T-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V8T	3	Tape and Reel, 3,000	Green
TPV803M-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V8M	3	Tape and Reel, 3,000	Green
TPV803L-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V8L	3	Tape and Reel, 3,000	Green
TPV803V-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V8V	3	Tape and Reel, 3,000	Green
TPV803W-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V8W	3	Tape and Reel, 3,000	Green
TPV803Y-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V8Y	3	Tape and Reel, 3,000	Green
TPV803Z-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V8Z	3	Tape and Reel, 3,000	Green
TPV803R-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V8R	3	Tape and Reel, 3,000	Green
TPV803S-3STR	-40°C to 125°C	SOT23G-3	V8S	3	Tape and Reel, 3,000	Green
TPV803T-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V8T	3	Tape and Reel, 3,000	Green
TPV803M-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V8M	3	Tape and Reel, 3,000	Green
TPV803L-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V8L	3	Tape and Reel, 3,000	Green

(1) For future products, contact the 3PEAK factory for more information and samples.

Green: 3PEAK defines "Green" to mean RoHS compatible and free of halogen substances.

Order Information - TPV809

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
TPV809V-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V2V	3	Tape and Reel, 3,000	Green
TPV809W-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V2W	3	Tape and Reel, 3,000	Green
TPV809Y-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V2Y	3	Tape and Reel, 3,000	Green
TPV809Z-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V2Z	3	Tape and Reel, 3,000	Green
TPV809R-3TR	-40°C to 125°C	SOT23-3	V2R	3	Tape and Reel, 3,000	Green
TPV809S-3TR	-40°C to 125°C	SOT23-3	V2S	3	Tape and Reel, 3,000	Green
TPV809T-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V2T	3	Tape and Reel, 3,000	Green
TPV809M-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V2M	3	Tape and Reel, 3,000	Green
TPV809L-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V2L	3	Tape and Reel, 3,000	Green
TPV809V-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V2V	3	Tape and Reel, 3,000	Green
TPV809W-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V2W	3	Tape and Reel, 3,000	Green
TPV809Y-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V2Y	3	Tape and Reel, 3,000	Green
TPV809Z-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V2Z	3	Tape and Reel, 3,000	Green
TPV809R-3STR	-40°C to 125°C	SOT23G-3	V2R	3	Tape and Reel, 3,000	Green
TPV809S-3STR	-40°C to 125°C	SOT23G-3	V2S	3	Tape and Reel, 3,000	Green
TPV809T-3STR	-40°C to 125°C	SOT23G-3	V2T	3	Tape and Reel, 3,000	Green
TPV809M-3STR	-40°C to 125°C	SOT23G-3	V2M	3	Tape and Reel, 3,000	Green
TPV809L-3STR	-40°C to 125°C	SOT23G-3	V2L	3	Tape and Reel, 3,000	Green

(1) For future products, contact the 3PEAK factory for more information and samples.

Green: 3PEAK defines "Green" to mean RoHS compatible and free of halogen substances.

Order Information - TPV810

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
TPV810V-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V3V	3	Tape and Reel, 3,000	Green
TPV810W-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V3W	3	Tape and Reel, 3,000	Green
TPV810Y-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V3Y	3	Tape and Reel, 3,000	Green
TPV810Z-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V3Z	3	Tape and Reel, 3,000	Green
TPV810R-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V3R	3	Tape and Reel, 3,000	Green
TPV810S-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V3S	3	Tape and Reel, 3,000	Green
TPV810T-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V3T	3	Tape and Reel, 3,000	Green
TPV810M-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V3M	3	Tape and Reel, 3,000	Green
TPV810L-3TR ⁽¹⁾	-40°C to 125°C	SOT23-3	V3L	3	Tape and Reel, 3,000	Green
TPV810V-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V3V	3	Tape and Reel, 3,000	Green
TPV810W-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V3W	3	Tape and Reel, 3,000	Green
TPV810Y-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V3Y	3	Tape and Reel, 3,000	Green
TPV810Z-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V3Z	3	Tape and Reel, 3,000	Green
TPV810R-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V3R	3	Tape and Reel, 3,000	Green
TPV810S-3STR	-40°C to 125°C	SOT23G-3	V3S	3	Tape and Reel, 3,000	Green
TPV810T-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V3T	3	Tape and Reel, 3,000	Green
TPV810M-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V3M	3	Tape and Reel, 3,000	Green
TPV810L-3STR ⁽¹⁾	-40°C to 125°C	SOT23G-3	V3L	3	Tape and Reel, 3,000	Green

(1) For future products, contact the 3PEAK factory for more information and samples.

Green: 3PEAK defines "Green" to mean RoHS compatible and free of halogen substances.

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