

## 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  $\mu$ A
- Guaranteed reset output valid to  $V_{CC} = 1$  V
- Power supply glitch immunity
- Specified from  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- 3-lead SOT23-3 and SOT23G-3 package

## Applications

- Microprocessor systems
- Computers
- Controllers
- Intelligent instruments
- Portable equipment

## Description

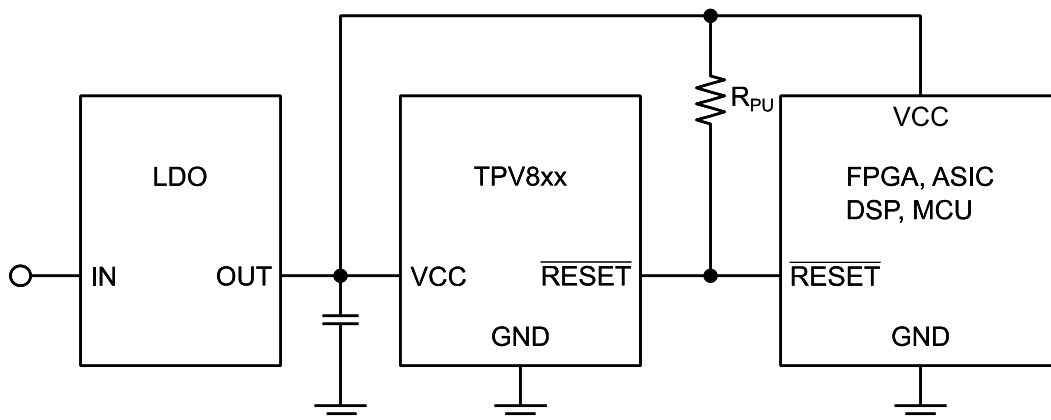
The TPV803/809/810 is a series of supervisory circuit that monitors power supply voltage levels and provides a power-on reset signal. They provide a reset output during power-up, power-down, and brownout conditions.

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 3-lead SOT23-3 and SOT23G-3 package and typically consumes only 2.2  $\mu$ A, suitable for use in low power, portable applications.

## Typical Application Circuit



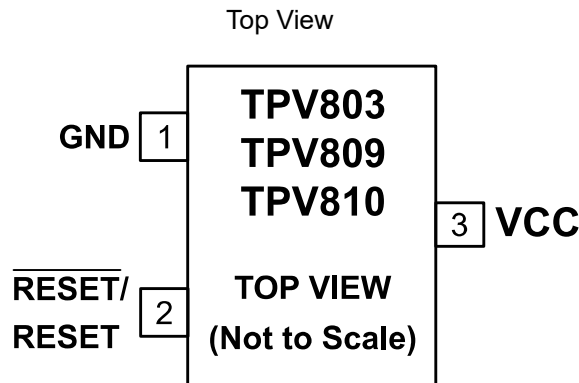
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## Revision History

Date	Revision	Notes
2018/9/1	Rev.A.0	Initial Version
2019/1/1	Rev.A.1	Update RESET VOH, VOL parameters.
2021/8/4	Rev.A.2	Add Application Note.
2021/9/15	Rev.A.3	Modify version
2022/1/27	Rev.A.4	Remove the application limitation.
2022/5/24	Rev.A.5	Update package name, add note in order information table, update RESET pin description.

### Pin Configuration and Functions



### Pin Functions

Pin		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 <sub>CC</sub>	-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 <sub>OP</sub>	Operating Temperature	-40	125	°C
T <sub>J</sub>	Maximum Junction Temperature		150	°C
T <sub>STG</sub>	Storage Temperature Range	-65	150	°C
T <sub>L</sub>	Lead Temperature (Soldering 10 sec)		260	°C

**Note:** 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.

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

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

### ESD, Electrostatic Discharge Protection

Symbol	Parameter	Condition	Minimum Level	Unit
HBM	Human Body Model ESD	ANSI/ESDA/JEDEC JS-001 <sup>(1)</sup>	4000	V
CDM	Charged Device Model ESD	ANSI/ESDA/JEDEC JS-002 <sup>(2)</sup>	2000	V

(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.

**Electrical Characteristics**
 $V_{CC} = 1.53\text{ V to }5.5\text{ V}; T_A = -40^{\circ}\text{C to }+125^{\circ}\text{C}$ , unless otherwise noted.

Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CC</sub> Operating Voltage Range		1		5.5	V
Supply Current	V <sub>CC</sub> = 1.8 V		2.2	10	μA
	V <sub>CC</sub> = 5 V		6	25	μA
<b>RESET THRESHOLD VOLTAGE</b>					
TPV8xxV	V <sub>TH</sub>	1.51	1.58	1.63	V
TPV8xxW	V <sub>TH</sub>	1.62	1.67	1.71	V
TPV8xxY	V <sub>TH</sub>	2.12	2.19	2.25	V
TPV8xxZ	V <sub>TH</sub>	2.25	2.32	2.38	V
TPV8xxR	V <sub>TH</sub>	2.55	2.63	2.70	V
TPV8xxS	V <sub>TH</sub>	2.85	2.93	3.00	V
TPV8xxT	V <sub>TH</sub>	2.95	3.08	3.15	V
TPV8xxM	V <sub>TH</sub>	4.20	4.38	4.5	V
TPV8xxL	V <sub>TH</sub>	4.45	4.63	4.75	V
RESET THRESHOLD TEMPERATURE COEFFICIENT			60		ppm/°C
RESET THRESHOLD HYSTERESIS			2 × V <sub>TH</sub> /1000		mV
V <sub>CC</sub> TO RESET DELAY	V <sub>TH</sub> - V <sub>CC</sub> = 100 mV		20		μs
RESET TIMEOUT PERIOD		140	200	280	ms
RESET OUTPUT VOLTAGE VOL (Push-Pull and open drain)	V <sub>CC</sub> ≥ 1 V, I <sub>SINK</sub> = 50 μA			0.3	V
RESET OUTPUT VOLTAGE VOL (Push-Pull and open drain)	V <sub>CC</sub> = V <sub>TH</sub> , I <sub>SINK</sub> = 1.2 mA V <sub>TH</sub> ≥ 2.63V			0.3	V
RESET OUTPUT VOLTAGE VOL (Push-Pull and open drain)	V <sub>CC</sub> = V <sub>TH</sub> , I <sub>SINK</sub> = 3.2mA V <sub>TH</sub> ≥ 4V			0.4	V
RESET OUTPUT VOLTAGE VOH (Push-Pull Only)	V <sub>CC</sub> ≥ 1.8 V, I <sub>SOURCE</sub> = 200 μA	0.8 × V <sub>CC</sub>			V
RESET OUTPUT VOLTAGE VOH (Push-Pull Only)	V <sub>CC</sub> = V <sub>TH</sub> , I <sub>SOURCE</sub> = 500 μA V <sub>TH</sub> ≥ 2.63 V	0.8 × V <sub>CC</sub>			V
RESET OUTPUT VOLTAGE VOH (Push-Pull Only)	V <sub>CC</sub> = V <sub>TH</sub> , I <sub>SOURCE</sub> = 800 μA V <sub>TH</sub> ≥ 4 V	V <sub>CC</sub> -1.5V			V

Typical Performance Characteristics

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

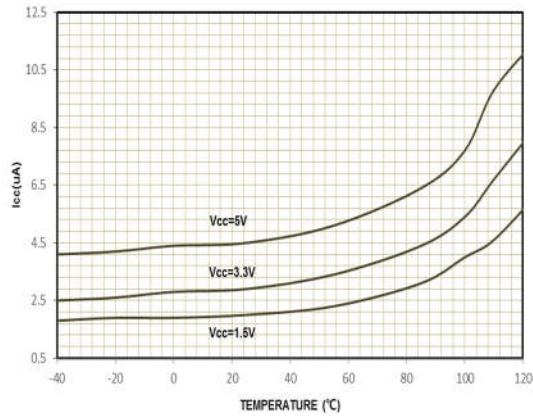


Figure 1 Supply Current vs. Temperature

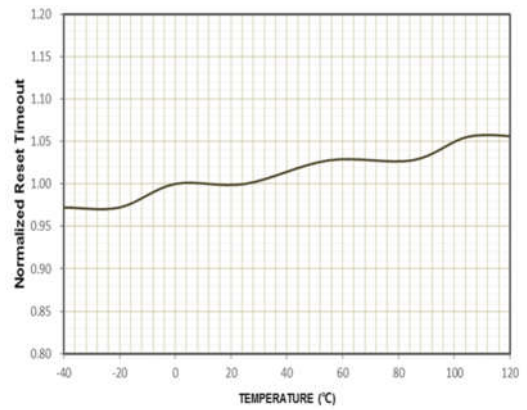


Figure 2 Normalized RESET Timeout Period vs. Temperature

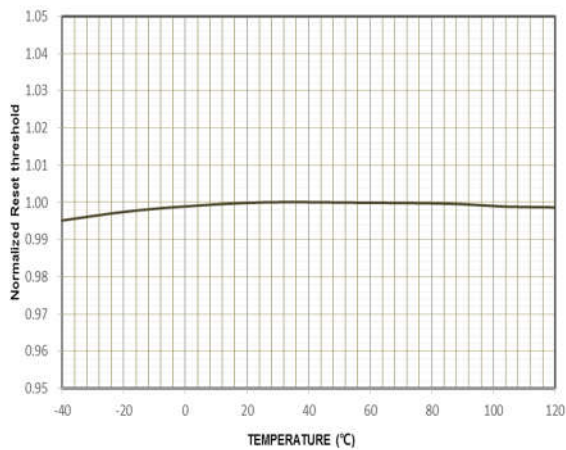


Figure 3 Normalized RESET Threshold vs. Temperature

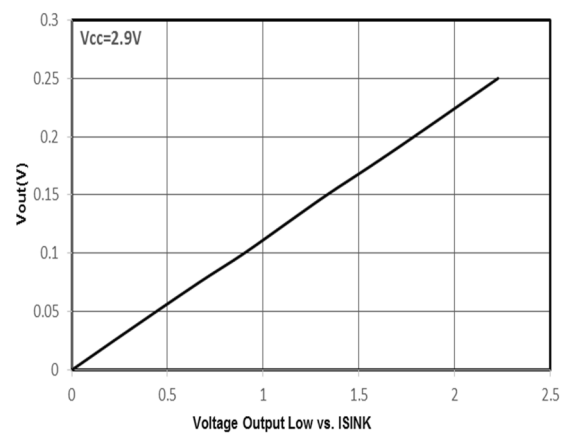


Figure 4 Voltage Output Low vs. ISINK (TPV809)

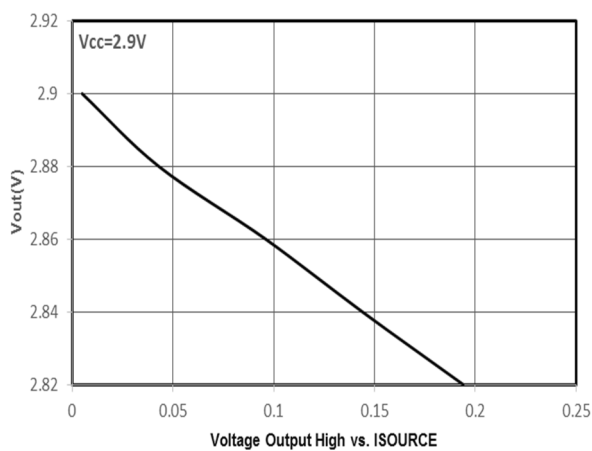


Figure 5 Voltage Output Low vs. ISOURCE

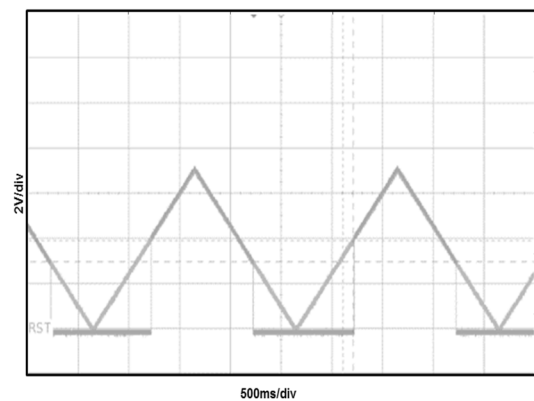


Figure 6 RESET Output Voltage vs. Supply Voltage

## Detailed Description

### Overview

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

A reset signal is asserted when the supply voltage is below 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

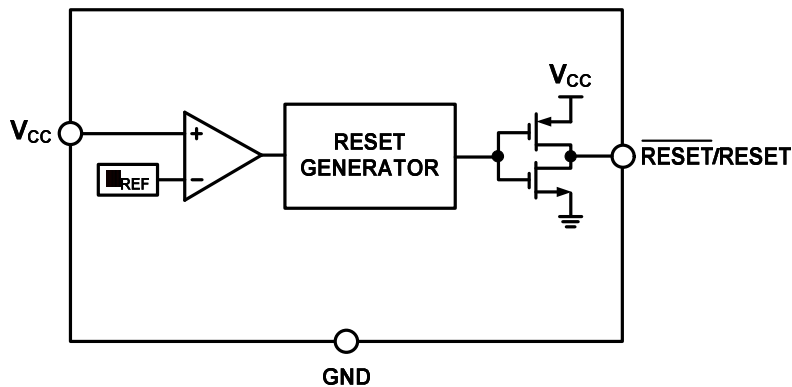


Figure 7 Functional Block Diagram

### Feature Description

The TPV803/809 feature an active-low open-drain or push-pull output. The TPV8810 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 low 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 8 shows the reset outputs.

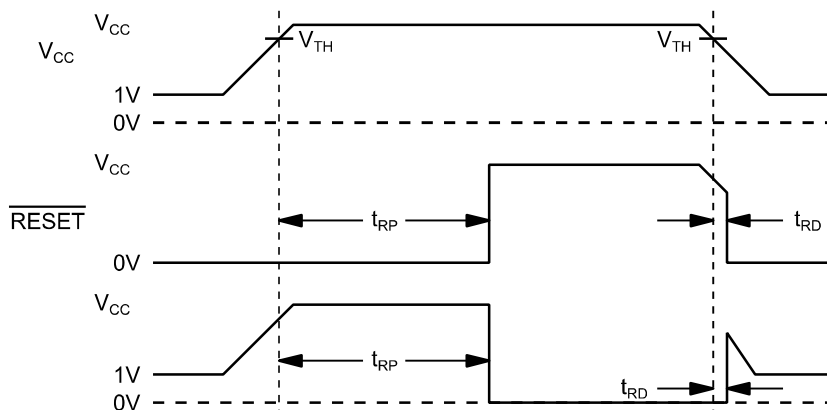
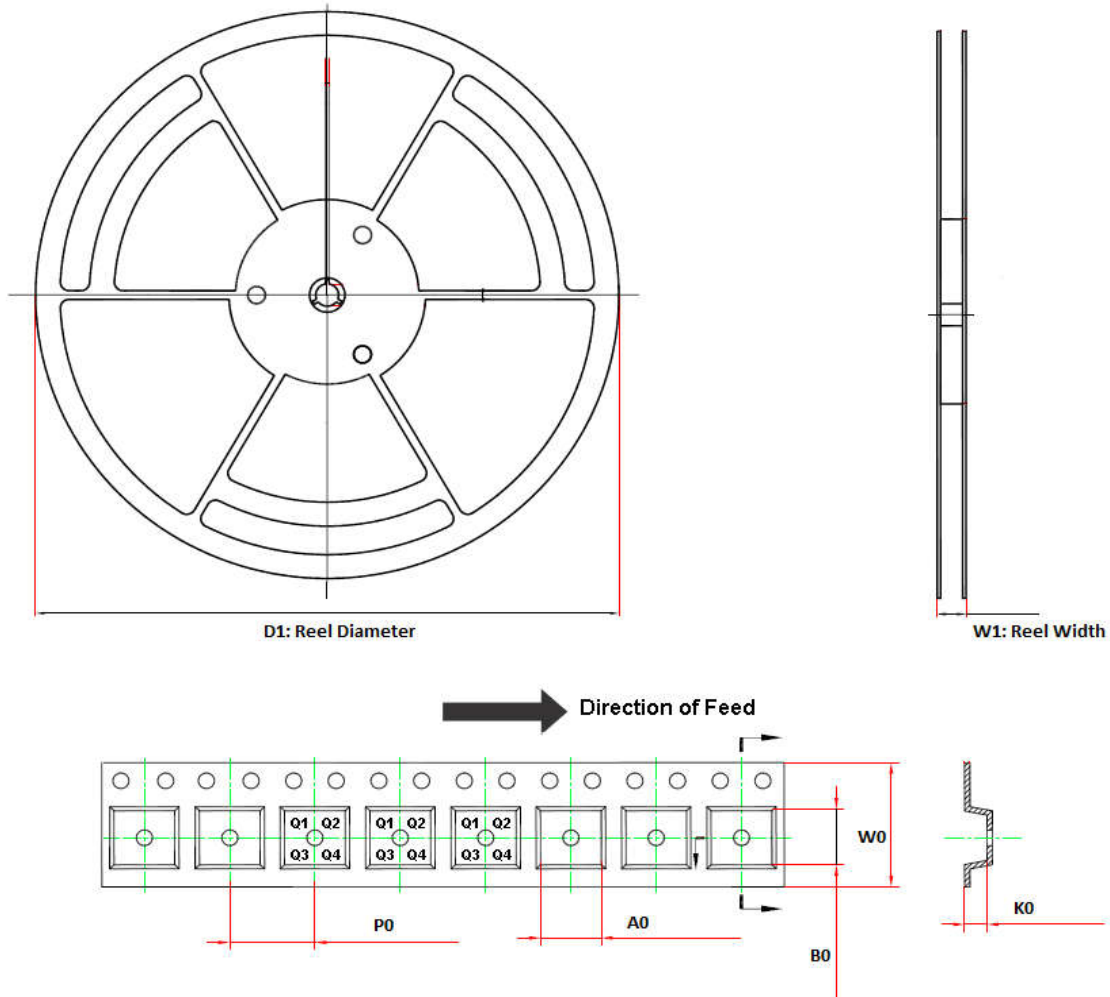


Figure 8 Reset Timing Diagram



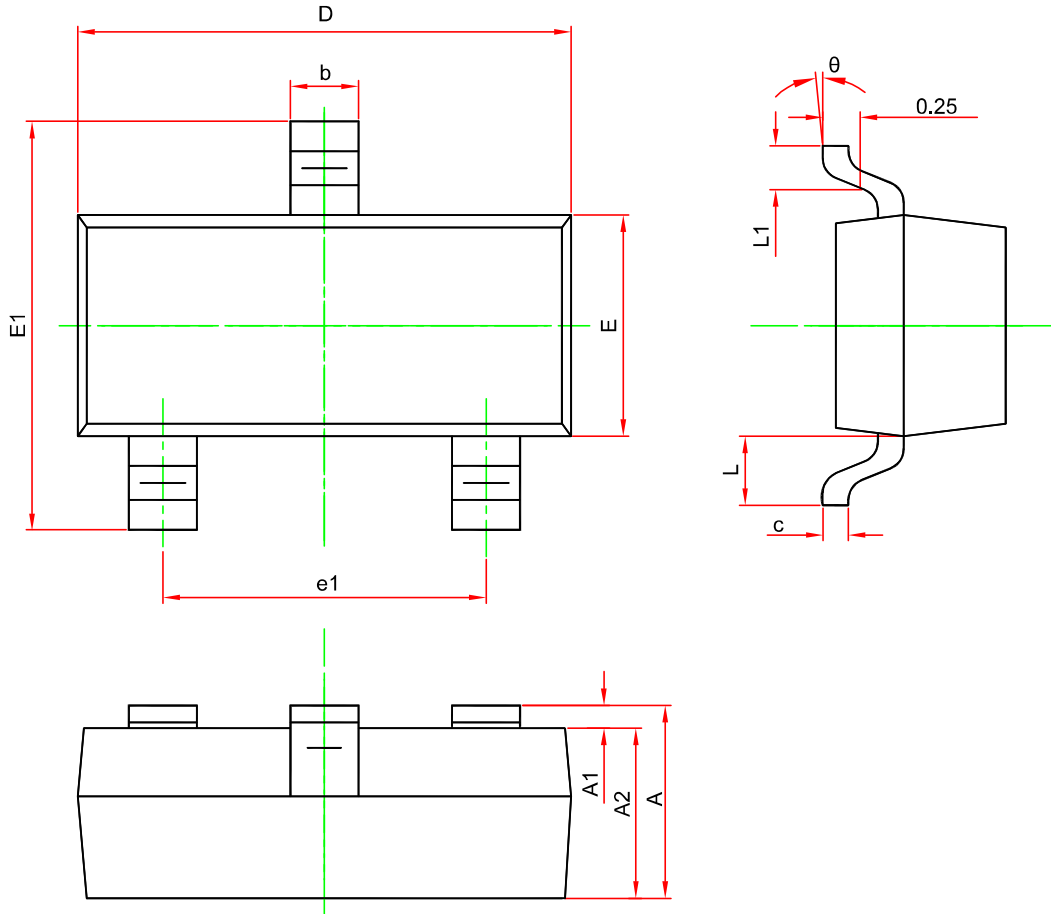
### Tape and Reel Information



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	12.1	3.15	2.77	1.22	4	8	Q3

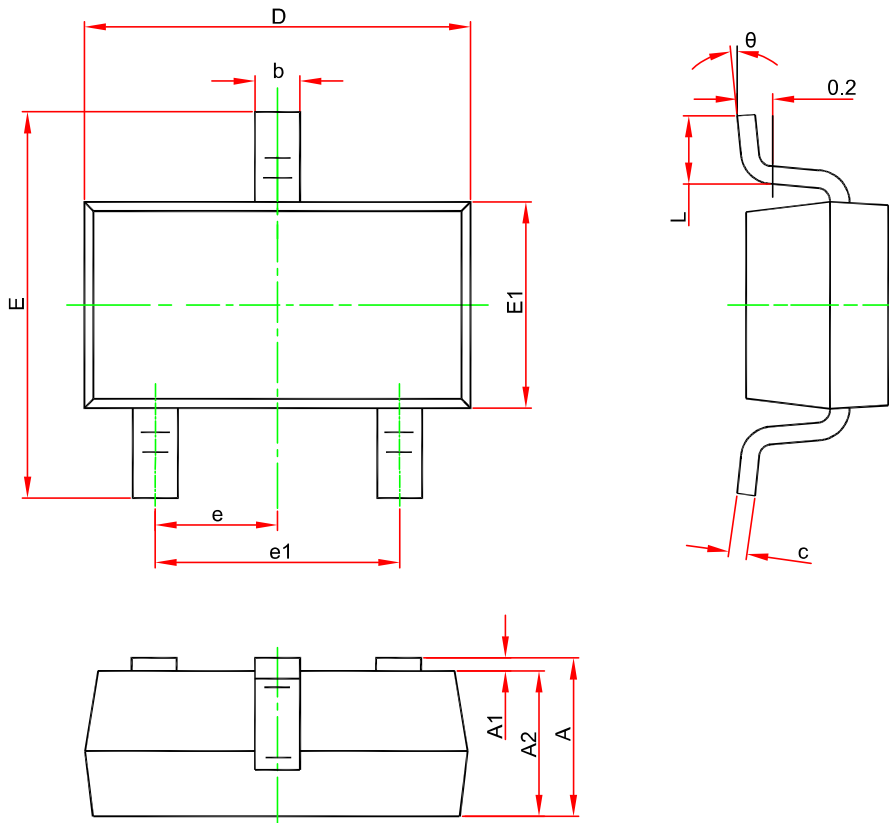
### Package Outline Dimensions

#### SOT23G-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A		1.150		0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.100	0.035	0.043
b	0.300	0.500	0.012	0.020
c	0.132	0.202	0.005	0.008
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
theta	0°	8°	0°	8°

SOT23-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950 (BSC)		0.037 (BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

Order Information – TPV803

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

(1) Future product, contact 3PEAK factory for more information and sample.

**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 <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V2V	3	Tape and Reel, 3,000	Green
TPV809W-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V2W	3	Tape and Reel, 3,000	Green
TPV809Y-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V2Y	3	Tape and Reel, 3,000	Green
TPV809Z-3TR <sup>(1)</sup>	-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 <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V2T	3	Tape and Reel, 3,000	Green
TPV809M-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V2M	3	Tape and Reel, 3,000	Green
TPV809L-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V2L	3	Tape and Reel, 3,000	Green
TPV809V-3STR <sup>(1)</sup>	-40°C to 125°C	SOT23G-3	V2V	3	Tape and Reel, 3,000	Green
TPV809W-3STR <sup>(1)</sup>	-40°C to 125°C	SOT23G-3	V2W	3	Tape and Reel, 3,000	Green
TPV809Y-3STR <sup>(1)</sup>	-40°C to 125°C	SOT23G-3	V2Y	3	Tape and Reel, 3,000	Green
TPV809Z-3STR <sup>(1)</sup>	-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) Future product, contact 3PEAK factory for more information and sample.

**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 <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V3V	3	Tape and Reel, 3,000	Green
TPV810W-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V3W	3	Tape and Reel, 3,000	Green
TPV810Y-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V3Y	3	Tape and Reel, 3,000	Green
TPV810Z-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V3Z	3	Tape and Reel, 3,000	Green
TPV810R-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V3R	3	Tape and Reel, 3,000	Green
TPV810S-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V3S	3	Tape and Reel, 3,000	Green
TPV810T-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V3T	3	Tape and Reel, 3,000	Green
TPV810M-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V3M	3	Tape and Reel, 3,000	Green
TPV810L-3TR <sup>(1)</sup>	-40°C to 125°C	SOT23-3	V3L	3	Tape and Reel, 3,000	Green
TPV810V-3STR <sup>(1)</sup>	-40°C to 125°C	SOT23G-3	V3V	3	Tape and Reel, 3,000	Green
TPV810W-3STR <sup>(1)</sup>	-40°C to 125°C	SOT23G-3	V3W	3	Tape and Reel, 3,000	Green
TPV810Y-3STR <sup>(1)</sup>	-40°C to 125°C	SOT23G-3	V3Y	3	Tape and Reel, 3,000	Green
TPV810Z-3STR <sup>(1)</sup>	-40°C to 125°C	SOT23G-3	V3Z	3	Tape and Reel, 3,000	Green
TPV810R-3STR <sup>(1)</sup>	-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 <sup>(1)</sup>	-40°C to 125°C	SOT23G-3	V3T	3	Tape and Reel, 3,000	Green
TPV810M-3STR <sup>(1)</sup>	-40°C to 125°C	SOT23G-3	V3M	3	Tape and Reel, 3,000	Green
TPV810L-3STR <sup>(1)</sup>	-40°C to 125°C	SOT23G-3	V3L	3	Tape and Reel, 3,000	Green

(1) Future product, contact 3PEAK factory for more information and sample.

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

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