

Features

- Precision Low Voltage Monitoring
- 200-ms (typical) Reset Timeout
- Manual Reset Input
- Reset Output Stage
- Push-Pull Active-Low Output (TPV811)
- Push-Pull Active-High Output (TPV812)
- Low Power Consumption: 2.2 μA
- Guaranteed Reset Output valid to $V_{CC} = 1\text{ V}$
- Power Supply Glitch Immunity
- Operating Temperature Range: -40°C to $+125^{\circ}\text{C}$
- 5-lead SOT-23-5 package and 4-lead SOT-143 package

Applications

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

Description

The TPV811/812 is a supervisory circuit that monitors power supply voltage levels and provides a power-on reset signal.

A reset signal can also be asserted by an external manual reset input.

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

The TPV811/812 is available in a 5-pin SOT-23-5 package and a 4-pin SOT-143 package, typically consumes only 2.2 μA , suitable for low-power and portable applications.

Typical Application Circuit

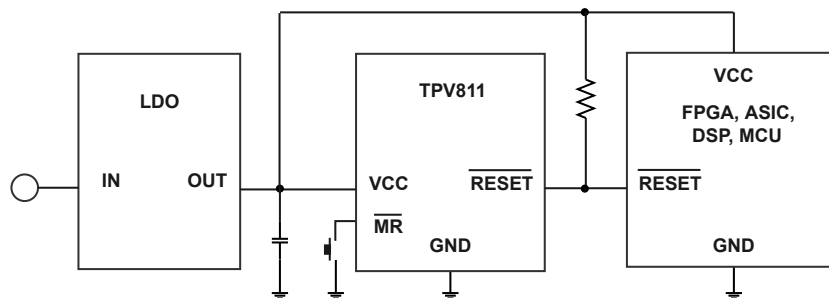
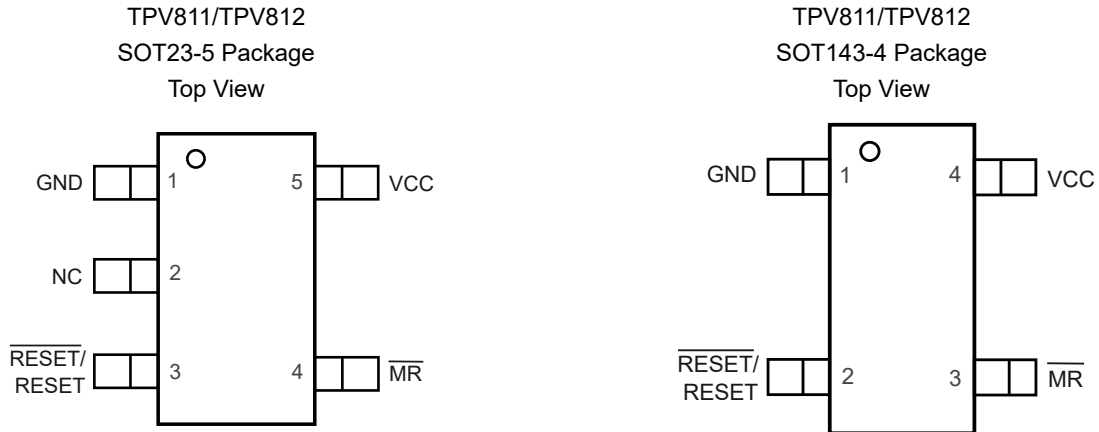


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Revision History

Date	Revision	Notes
2018-09-01	Rev.A.0	Version 1.0
2018-01-01	Rev.A.1	Updated RESET VOH, VOL parameters.
2021-06-02	Rev.A.2	Updated V _{CC} PIN NO of SOT-143, and pin 1 position of SOT-143 package.
2021-08-05	Rev.A.3	Added Application Note.
2022-04-26	Rev.A.4	Added note in Order information table
2022-11-10	Rev.A.5	Updated supply current max value @V _{CC} = 5 V is updated to 25 μ A. The reset threshold min value of T, M and L option are updated.
2023-02-20	Rev.A.6	Updated package thermal information.
2023-11-27	Rev.A.7	Removed application limitation.

Pin Configuration and Functions

Table 1. Pin Functions: TPV811/TPV812

Pin No.		Name	I/O	Description
SOT23-5	SOT143-4			
1	1	GND		Ground.
2	-	NC		Not connected.
3	2	$\overline{\text{RESET}}$		TPV811: Active-Low Reset Push-Pull Output Stage. Asserted whenever V_{CC} is below the reset threshold, V_{TH} .
3	2	RESET		TPV812: Active-High Reset Push-Pull Output Stage. Asserted whenever V_{CC} is below the reset threshold, V_{TH} .
4	3	$\overline{\text{MR}}$		Manual Reset Input. This is an active-low input, which, when forced low for at least 1 μs , generates a reset. It features a 50 k Ω internal pull-up.
5	4	VCC		Power Supply Voltage Being Monitored.

Low Voltage Supervisory Circuit with Manual Reset

Specifications

Absolute Maximum Ratings

Parameter		Min	Max	Unit
Input Voltage	V_{CC}	-0.3	6	V
Output Current	\overline{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
SOT23-5	209	73	°C/W
SOT143	330	TBD	°C/W

Low Voltage Supervisory Circuit with Manual Reset
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
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}	Reset Threshold Voltage	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			$2 \times V_{TH}/1000$		mV
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 Low (Push-Pull)	$V_{CC} \geq 1\text{ V}$, $I_{SINK} = 50\ \mu\text{A}$			0.3	V
		$V_{CC} = V_{TH}$, $I_{SINK} = 1.2\text{ mA}$ $V_{TH} \geq 2.63\text{ V}$			0.3	V
		$V_{CC} = V_{TH}$, $I_{SINK} = 3.2\text{ mA}$ $V_{TH} \geq 4\text{ V}$			0.4	V
V_{OH}	Reset Output Voltage High (Push-Pull)	$V_{CC} \geq 1.8\text{ V}$, $I_{SOURCE} = 200\ \mu\text{A}$	$0.8 \times V_{CC}$			V
		$V_{CC} = V_{TH}$, $I_{SOURCE} = 500\ \mu\text{A}$ $V_{TH} \geq 2.63\text{ V}$	$0.8 \times V_{CC}$			V
		$V_{CC} = V_{TH}$, $I_{SOURCE} = 800\ \mu\text{A}$ $V_{TH} \geq 4\text{ V}$	$V_{CC} - 1.5\text{ V}$			V
V_{IL_MR}	\overline{MR} Input Threshold VIL				$0.3 \times V_{CC}$	V
V_{IH_MR}	\overline{MR} Input Threshold VIH		$0.7 \times V_{CC}$			V
t_{PW_MR}	\overline{MR} Input Pulse Width		1			μs
t_{GR_MR}	\overline{MR} Glitch Rejection			100		nS
t_{d_MR}	\overline{MR} to Reset Delay			200		nS

Low Voltage Supervisory Circuit with Manual Reset

Parameter		Conditions	Min	Typ	Max	Unit
R _{PU_MR}	MR Pull-Up Resistance			50		kΩ

Typical Performance Characteristics

All test conditions: $V_{CC} = 5\text{ V}$, $T_A = +25^\circ\text{C}$, unless otherwise noted.

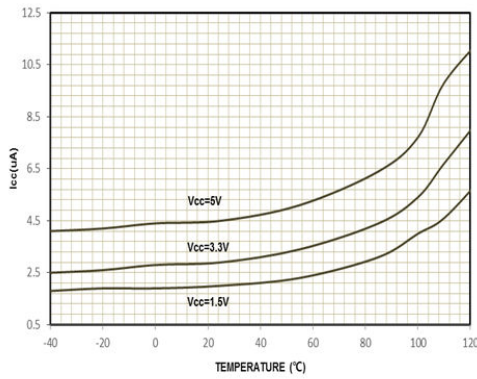


Figure 1. Supply Current vs Temperature

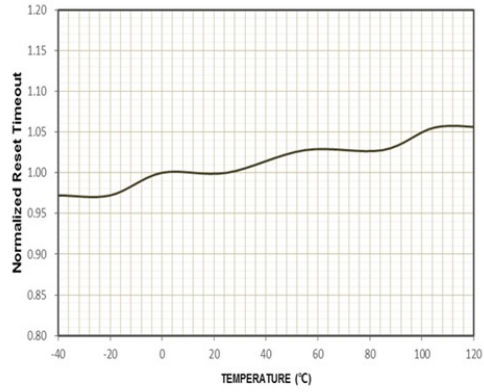


Figure 2. Normalized RESET Timeout Period vs Temperature

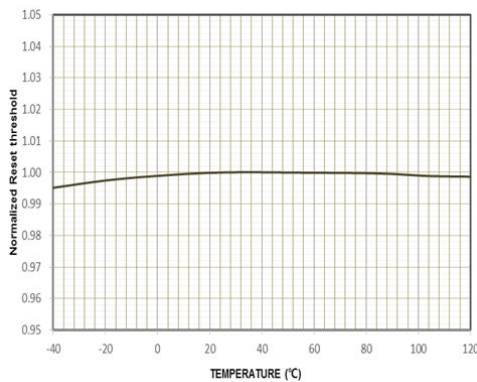


Figure 3. Normalized RESET Threshold vs Temperature

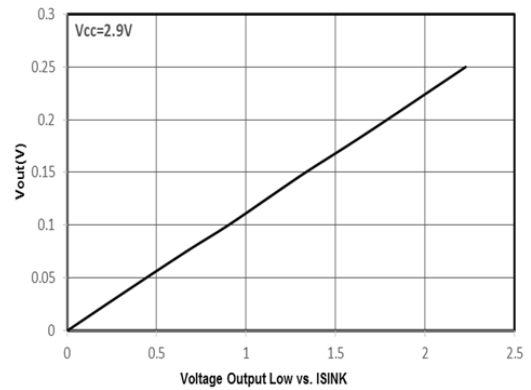


Figure 4. Voltage Output Low vs I_{SINK}

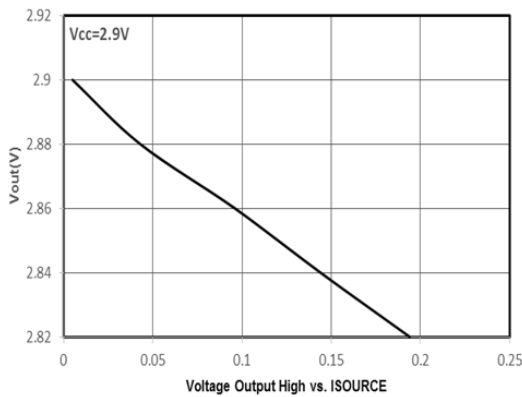


Figure 5. Voltage Output Low vs I_{SOURCE}

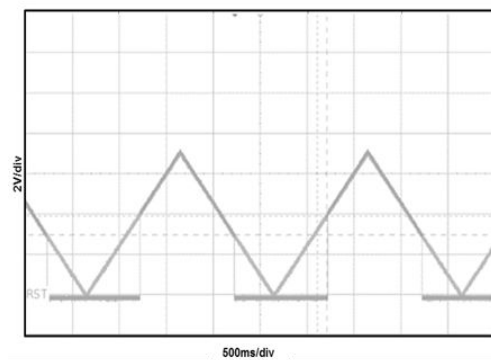


Figure 6. RESET Output Voltage vs Supply Voltage

Detailed Description

Overview

The TPV811/812 provides supply voltage supervision as well as manual reset function.

A reset signal is asserted when the supply voltage is below a preset threshold. In addition, the TPV811/812 allows supply voltage stabilization with a fixed timeout before the reset de-asserts after the supply voltage rises above the threshold.

A manual reset input is available to reset the microprocessor, for example, by using an external push-button.

Functional Block Diagram

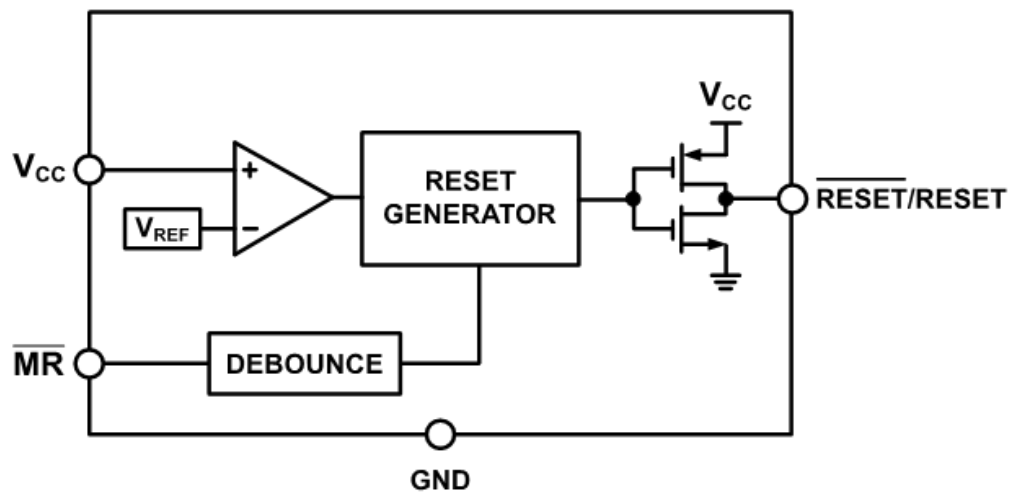


Figure 7. Functional Block for TPV811/812

Feature Description

RESET Output

The TPV811/812 features an active-low or 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. The reset output is asserted when V_{CC} is below the reset threshold (V_{TH}), when \overline{MR} is driven low. Reset remains asserted for the duration of the reset active timeout period (t_{RP}) after V_{CC} rises above the reset threshold, after \overline{MR} transitions from low to high. Figure 8 shows the reset (active low) outputs.

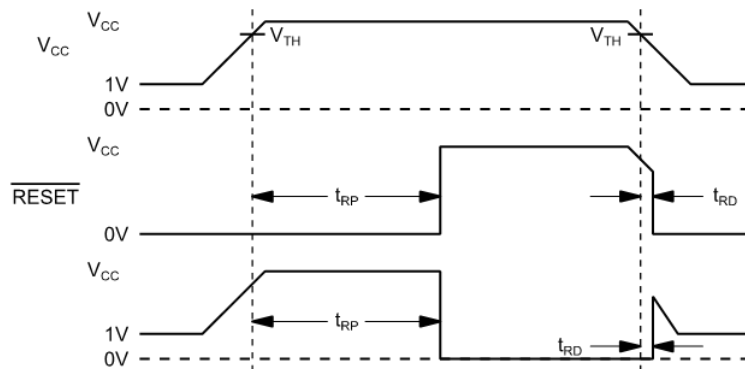


Figure 8. Reset Timing Diagram

Manual RESET Input

The TPV811/812 features a manual reset input \overline{MR} which, when driven low, asserts the reset output. When \overline{MR} transitions from low to high, the RESET remains asserted for the duration of the reset active timeout period. After this period, the RESET is de-asserting.

The \overline{MR} input has an internal pull-up resistor so that the input is always high when unconnected. Noise immunity is provided on the \overline{MR} input, fast and negative-going transients are ignored. A 0.1- μ F capacitor between \overline{MR} and ground provides additional noise immunity.

Application and Implementation

Note

Information in the following application sections is not part of the 3PEAK's component specification and 3PEAK does not warrant its accuracy or completeness. 3PEAK's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

Application Information

The TPV811/812 is a supervisory circuit that monitors power supply voltage levels and provides a power on reset signal. A reset signal can also be asserted by an external manual reset input.

Typical Application

The following figure shows the typical application circuit.

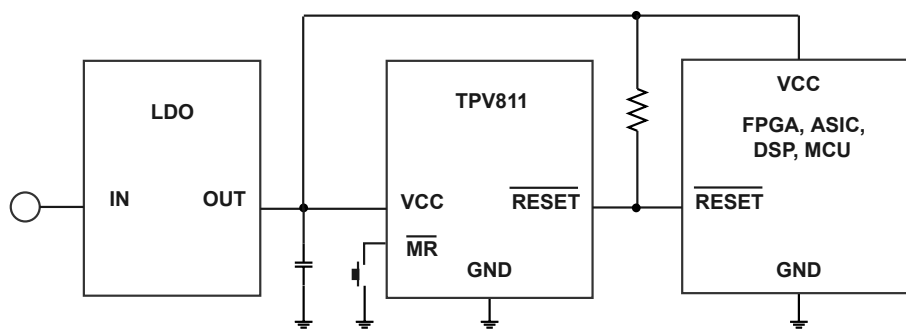
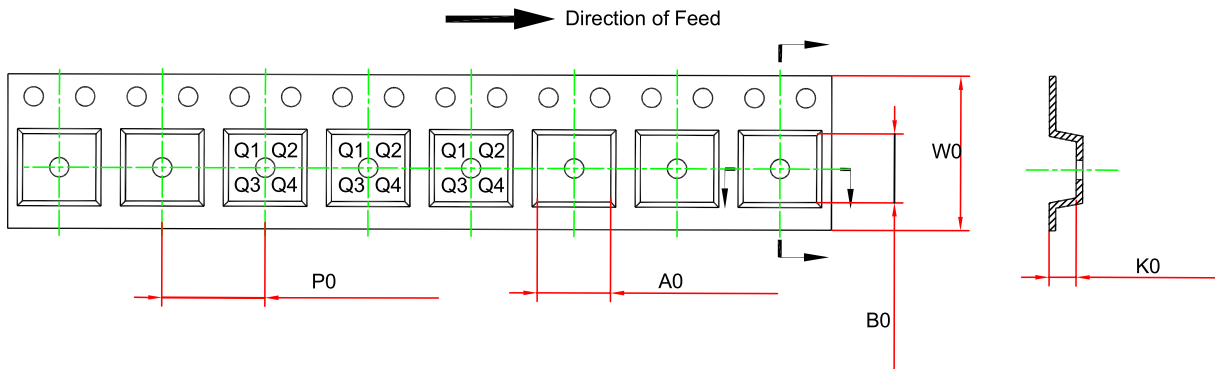
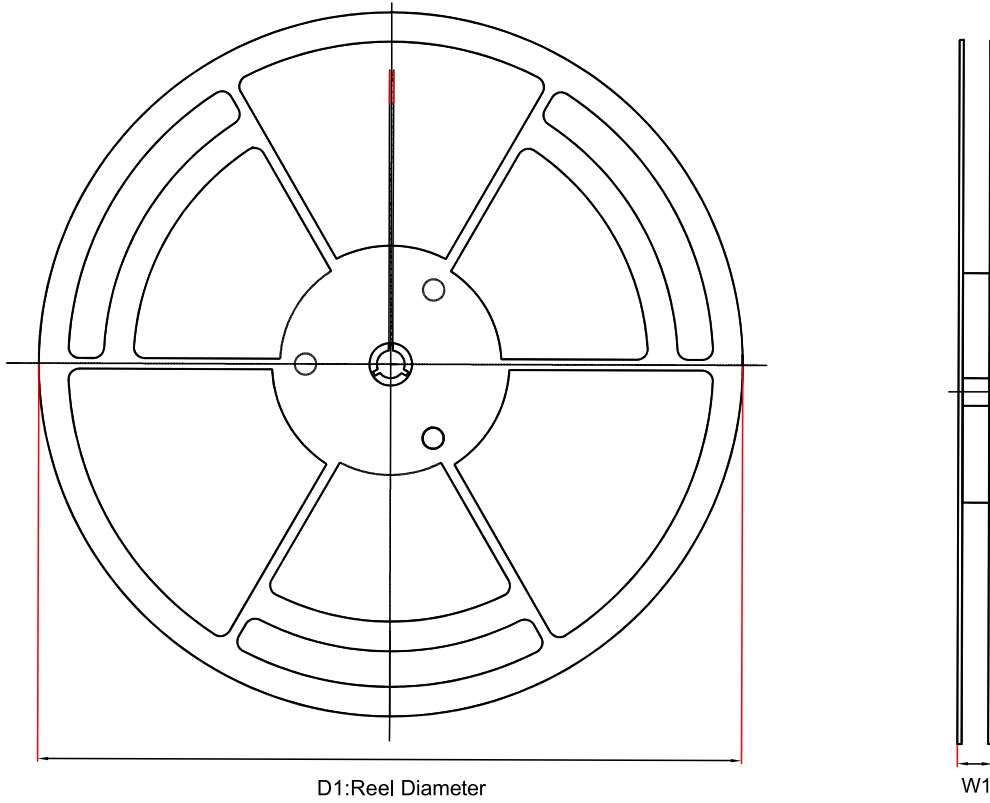


Figure 9. Typical Application

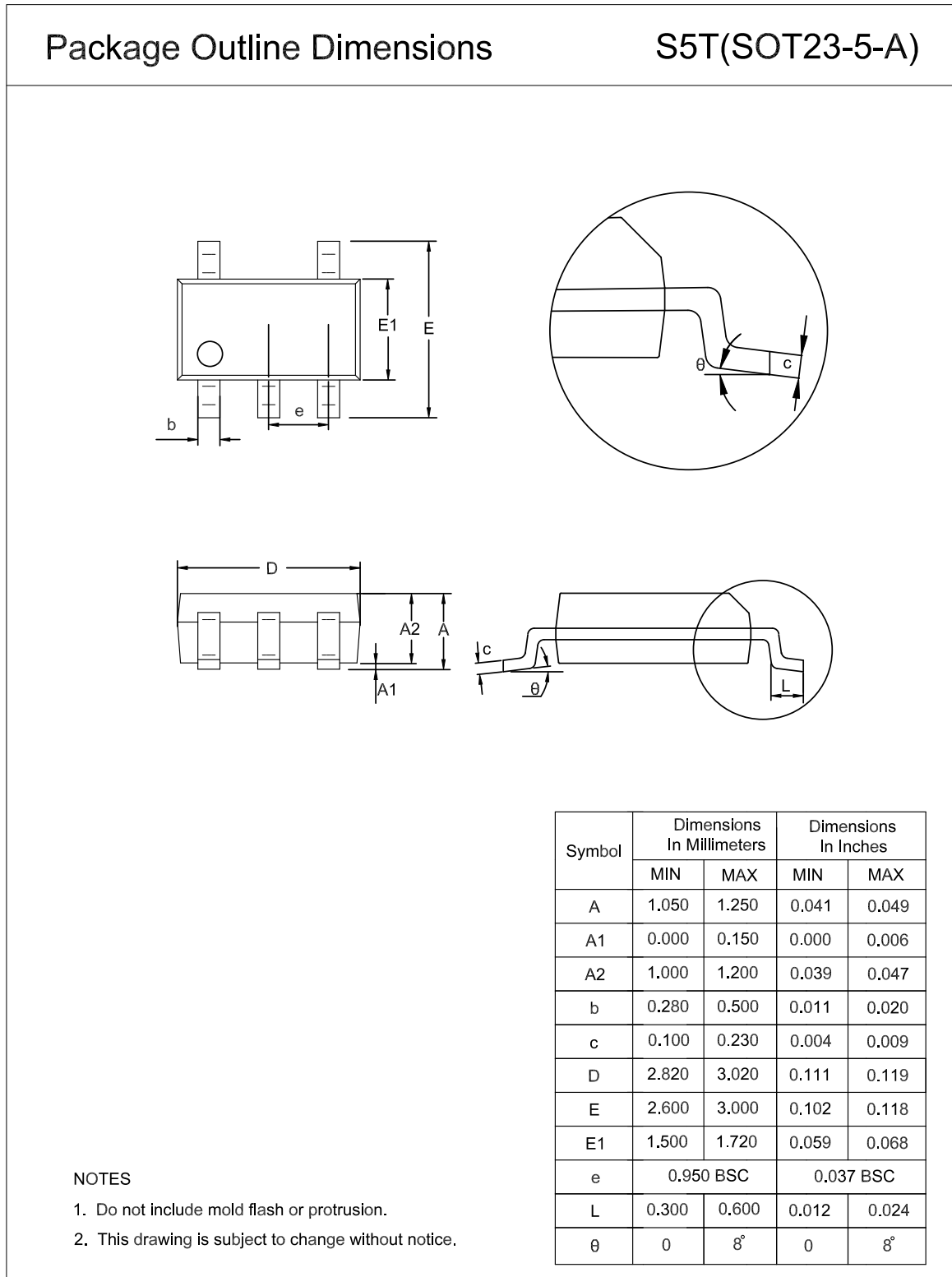
Tape and Reel Information



Order Number	Package	D1 (mm)	W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	W0 (mm)	Pin1 Quadrant
TPV81XX-5TR	SOT-23-5	180	13.1	3.2	3.2	1.4	4	8	Q3
TPV81XX-4LTR	SOT-143	178	12.1	3.19	2.8	1.31	4	8	Q3

Package Outline Dimensions

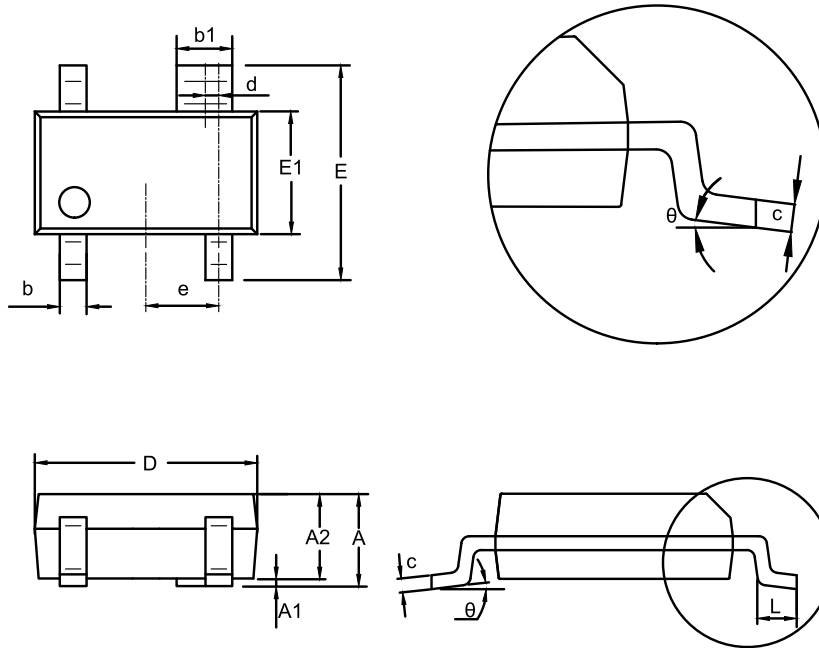
SOT23-5



SOT143-4

Package Outline Dimensions

4LT(SOT143-4-A)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
b1	0.750	0.900	0.030	0.035
d	0.200 TYP		0.008 TYP	
c	0.008	0.160	0.003	0.006
D	2.800	3.000	0.110	0.118
E	2.250	2.550	0.089	0.100
E1	1.200	1.400	0.047	0.055
e	0.950 BSC		0.037 BSC	
L	0.300	0.500	0.012	0.020
theta	0	8°	0	8°

NOTES

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

Order Information - TPV811

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
TPV811V-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V4V	3	Tape and Reel, 3,000	Green
TPV811W-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V4W	3	Tape and Reel, 3,000	Green
TPV811Y-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V4Y	3	Tape and Reel, 3,000	Green
TPV811Z-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V4Z	3	Tape and Reel, 3,000	Green
TPV811R-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V4R	3	Tape and Reel, 3,000	Green
TPV811S-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V4S	3	Tape and Reel, 3,000	Green
TPV811T-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V4T	3	Tape and Reel, 3,000	Green
TPV811M-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V4M	3	Tape and Reel, 3,000	Green
TPV811L-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V4L	3	Tape and Reel, 3,000	Green
TPV811V-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V4V	3	Tape and Reel, 3,000	Green
TPV811W-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V4W	3	Tape and Reel, 3,000	Green
TPV811Y-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V4Y	3	Tape and Reel, 3,000	Green
TPV811Z-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V4Z	3	Tape and Reel, 3,000	Green
TPV811R-4LTR	-40°C to 125°C	SOT-143	V4R	3	Tape and Reel, 3,000	Green
TPV811S-4LTR	-40°C to 125°C	SOT-143	V4S	3	Tape and Reel, 3,000	Green
TPV811T-4LTR	-40°C to 125°C	SOT-143	V4T	3	Tape and Reel, 3,000	Green
TPV811M-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V4M	3	Tape and Reel, 3,000	Green
TPV811L-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V4L	3	Tape and Reel, 3,000	Green

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

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

Order Information - TPV812

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
TPV812V-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V5V	3	Tape and Reel, 3,000	Green
TPV812W-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V5W	3	Tape and Reel, 3,000	Green
TPV812Y-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V5Y	3	Tape and Reel, 3,000	Green
TPV812Z-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V5Z	3	Tape and Reel, 3,000	Green
TPV812R-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V5R	3	Tape and Reel, 3,000	Green
TPV812S-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V5S	3	Tape and Reel, 3,000	Green
TPV812T-5TR ⁽¹⁾	-40°C to 125°C	SOT23-5	V5T	3	Tape and Reel, 3,000	Green
TPV812M-5TR ⁽¹⁾	-40°C to 125°C	SOT-23-5	V5M	3	Tape and Reel, 3,000	Green
TPV812L-5TR ⁽¹⁾	-40°C to 125°C	SOT-23-5	V5L	3	Tape and Reel, 3,000	Green
TPV812V-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V5V	3	Tape and Reel, 3,000	Green
TPV812W-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V5W	3	Tape and Reel, 3,000	Green
TPV812Y-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V5Y	3	Tape and Reel, 3,000	Green
TPV812Z-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V5Z	3	Tape and Reel, 3,000	Green
TPV812R-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V5R	3	Tape and Reel, 3,000	Green
TPV812S-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V5S	3	Tape and Reel, 3,000	Green
TPV812T-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V5T	3	Tape and Reel, 3,000	Green
TPV812M-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V5M	3	Tape and Reel, 3,000	Green
TPV812L-4LTR ⁽¹⁾	-40°C to 125°C	SOT-143	V5L	3	Tape and Reel, 3,000	Green

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

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

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