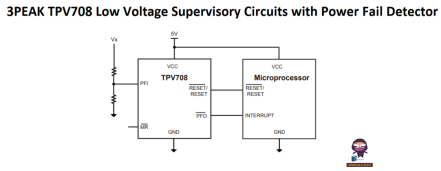
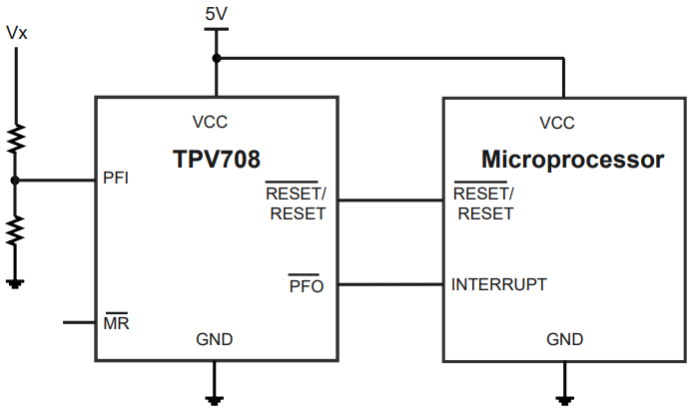


3PEAK TPV708 Low Voltage Supervisory Circuits with Power Fail Detector User Guide

Contents

3PEAK TPV708 Low Voltage Supervisory Circuits with Power Fail Detector



Specifications

Parameter	Min	Max	Unit
Power Supply, VCC to GND	-0.3	6	V
Input Voltage PFI, MR	-0.3	6	V
Output Current RESET, RESET, PFO			

Product Information

The TPV708 is a family of supervisory circuits designed to monitor power supply voltage levels and provide a power-on reset signal. It includes a power-fail detector with a 1.25-V threshold for monitoring an additional power supply. The reset periods are fixed at 200 ms (typical). The TPV708 is available in an 8-pin SOP package and typically consumes only 4 A, making it suitable for low-power and portable applications.

Product Usage Instructions

Pin Configuration and Functions

The TPV708 SOP8 package has the following pin configuration:

Pin No.	Name	Description
1	MR	Manual Reset Input. MR low asserts RESET/RESET pin. It featuresan internal pull-up current.
2	VCC	Power supply voltage being monitored.

Usage Guidelines

- Connect the power supply voltage to the VCC pin.
- Connect the ground reference to the GND pin.
- Utilize the manual reset input (MR) to assert the reset signal.

FAQ

What is the purpose of the power-fail detector in the TPV708?

The power-fail detector with a 1.25-V threshold in the TPV708 is used to monitor an additional power supply and trigger an output signal if the voltage falls below the threshold.

How long does the reset signal stay asserted after a power-on reset event?
The reset signal remains asserted for a fixed period of 200 ms (typical) after the power supply voltage goes above the reset threshold or after the manual reset input changes from low to high.

Features

- Precision Low-Voltage Monitoring and Power-Fail Detector
- 200-ms (typical) Reset Timeout
- Manual Reset Input
- Active High and Active Low Reset Output
- Low Power Consumption: 4 µA
- Guaranteed Reset Output Valid to VCC = 1 V
- Power Supply Glitch Immunity
- Temperature Range: –40°C to 125°C
- 8-Pin SOP Package

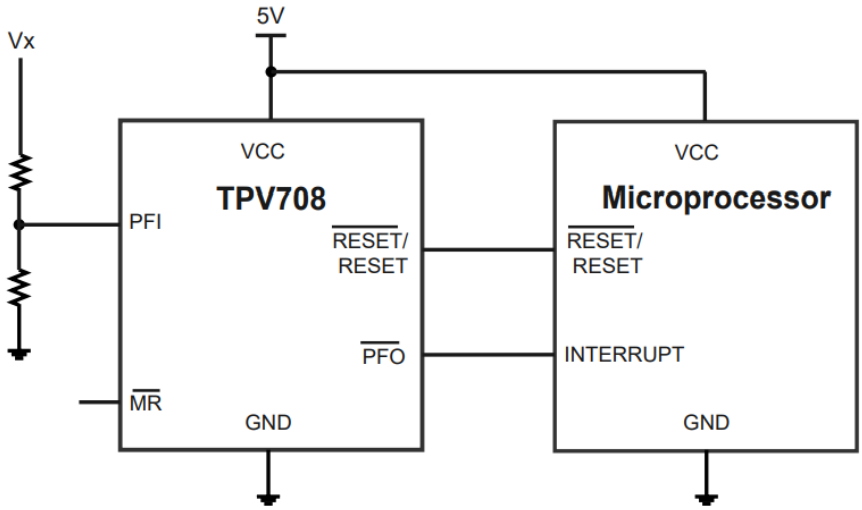
Applications

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

Description

The TPV708 is a family of supervisory circuits to monitor power supply voltage levels and provides a power-on reset signal.
A reset signal can be asserted by an external manual reset input.
In addition, there is a power-fail detector with a 1.25-V threshold, which can be used to monitor an additional power supply.
The reset periods are fixed at 200 ms (typical). The TPV708 is available in an 8-pin SOP package and typically consumes only 4 µA, which is suitable for low-power and portable applications.

Typical Application Circuit



Product Family Table

Order Number	Threshold Voltage (VTH)	Marking	Package
TPV708V-SO1R (1)	1.58 V	V8V	SOP8
TPV708W-SO1R (1)	1.67 V	V8W	SOP8
TPV708Y-SO1R (1)	2.19 V	V8Y	SOP8
TPV708Z-SO1R (1)	2.32 V	V8Z	SOP8
TPV708R-SO1R (1)	2.63 V	V8R	SOP8
TPV708S-SO1R	2.93 V	V8S	SOP8
TPV708T-SO1R	3.08 V	V8T	SOP8
TPV708M-SO1R	4.38 V	V8M	SOP8
TPV708L-SO1R (1)	4.63 V	V8L	SOP8

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

Revision History

Date	Revision	Notes
2022-01-26	Rev.Pre.0	Pre-Release Version.
2022-10-21	Rev.Pre.1	Updated VTH in EC.
2022-10-30	Rev.Pre.2	Updated M version VTH in EC.
2022-12-05	Rev.Pre.3	Updated MR to reset delay time, typical 2 μs, max 10 μs.
2022-12-20	Rev.A.0	Updated typical application circuit.
2023-02-17	Rev.A.1	Corrected typo.

Pin Configuration and Functions

TPV708
SOP8 Package
Top View

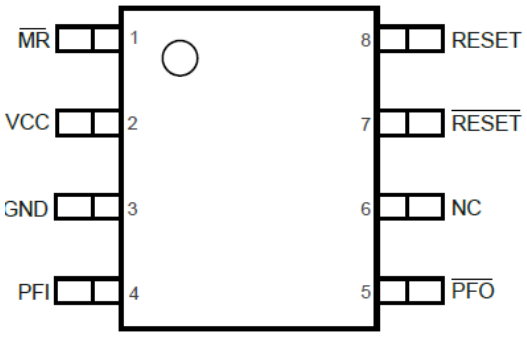


Table 1. Pin Functions: TPV708

Pin		I/O	Description
No.	**Name**		
1	MR	I	Manual Reset Input. MR low asserts RESET/RESET pin. It features an internal pull-up current.
2	VCC	P	Power supply voltage being monitored.
3	GND	G	Ground. This pin should be connected to ground reference.
4	PFI	I	Power fail input. When PFI is less than 1.25 V, PFO goes low. If unused, connect PFI to GND.
5	PFO	O	Power fail output. It goes low when PFI is less than 1.25 V, otherwise stays high.
6	NC	–	Not connected.
7	RESET	O	Active low reset push-pull output stage. Asserted whenever VCC is below the reset threshold or by low signal on the MR input. It remains low for 200 ms after VCC goes above the reset threshold or MR goes from low to high.
8	RESET	O	Active high reset push-pull output stage. Asserted whenever VCC is below the reset threshold or by low signal on the MR input. It remains high for 200 ms after VCC goes above the reset threshold or MR goes from low to high.

Specifications

Absolute Maximum Ratings

Parameter		Min	Max	Unit
Power Supply, VCC to GND		–0.3	6	V
Input Voltage	PFI, MR	–0.3	6	V
Output Current	RESET, RESET, PFO		20	mA
TJ	Maximum Junction Temperature	–40	150	°C
TA	Operating Temperature Range	–40	125	°C
TSTG	Storage Temperature Range	–65	150	°C
TL	Lead Temperature (Soldering 10 sec)		300	°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	θJA	θJC	Unit
SOP8	143	60	°C/W

Electrical Characteristics

All test conditions: VCC = 5 V, TA = –40°C to 125°C, unless otherwise noted.

Parameter			Conditions	Min	Typ	Max	Unit
VCC	Supply Voltage Range		–40°C < TA < 125°C	1		5.5	V
ICC	Quiescent Current		MR is unconnected (V_{CC} = 1.8 V)		4	15	µA
			MR is unconnected (VCC = 5 V)		6	20	µA
VTH	Reset Threshold Voltage of VCC	TPV708V-SO1R		1.51	1.58	1.63	V
		TPV708W-SO1R		1.62	1.67	1.71	V
		TPV708Y-SO1R		2.12	2.19	2.25	V
		TPV708Z-SO1R		2.25	2.32	2.38	V
		TPV708R-SO1R		2.55	2.63	2.70	V
		TPV708S-SO1R		2.82	2.93	3.00	V
		TPV708T-SO1R		3.00	3.08	3.15	V
		TPV708M-SO1R		4.18	4.38	4.47	V
		TPV708L-SO1R		4.50	4.63	4.75	V
	VTH Temperature Coefficient				80		ppm/°C
VHYS	Hysteresis on VTH		1.6 ≤ VDD ≤ 4.2 V		2×VTH		mV
tRD	VCC Falling to Reset Delay Time		VTH – VCC = 100 mV		20		µs
tRP	Reset Timeout Period			140	200	280	ms
VOL	RESET/RESET Output Low		VCC ≥ 1 V, ISINK = 50 µA			0.3	V
			ISINK = 1.2 mA, VCC ≥ 2 V			0.4	V
VOH	RESET/RESET Output Low		ISOURCE = 800 µA, VCC ≥ 5 V	0.7 × VCC			V
Manual Reset Function							
VIL	MR Logic Low Input			0		0.3VCC	V

VIH	MR Logic High Input		0.7VCC			V
tPW	MR Input Pulse Width		6			µs
tGR	MR Glitch Rejection				100	ns
tMD	MR to Reset Delay			2	10	µs
IPU	MR Pull-up Current	VCC = 3 V		80		µA
Power Fail Function						
VPF	Power Fail Input Threshold	PFI falling	1.18	1.25	1.33	V
VOL_PF	PFO Output Low	ISINK = 1.6 mA, VCC ≥ 5 V			0.4	V
VOH_PF	PFO Output High	ISOURCE = 800 µA, VCC ≥ 5 V	0.7 × VCC			V

Typical Performance Characteristics

All test conditions: VCC = 5 V, TA = + 25°C, unless otherwise noted.

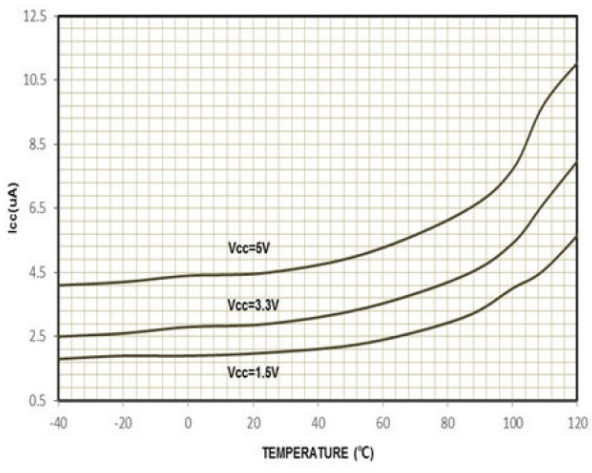


Figure 1. Supply Current vs Temperature

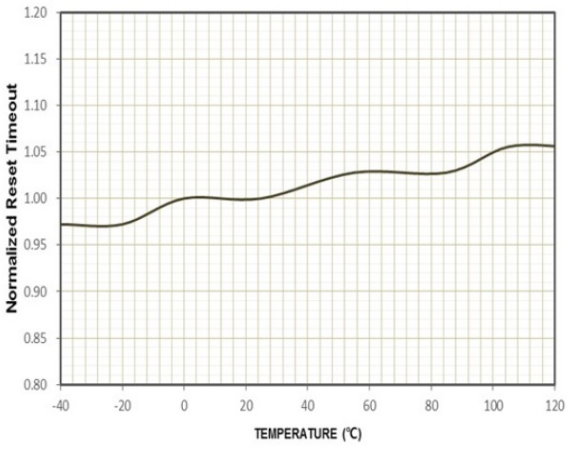


Figure 2. Normalized RESET Timeout Period vs. Temperature

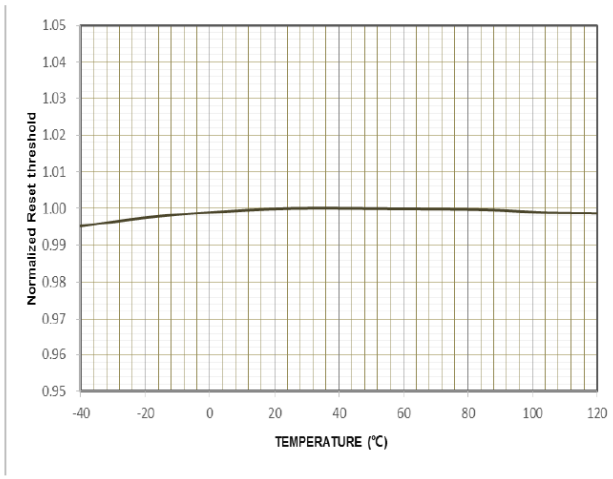


Figure 3. Normalized RESET Threshold vs Temperature

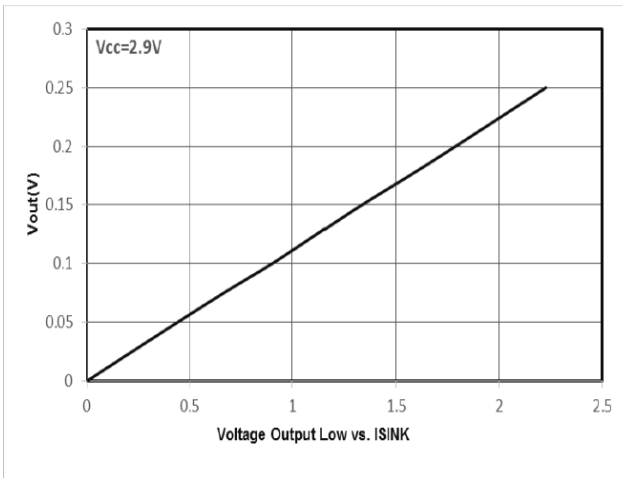


Figure 4. Voltage Output Low vs ISINK

Detailed Description

Overview

The TPV708 series provides supply voltage supervision, manual reset function as well as a 1.25-V power-fail detector.

Functional Block Diagram

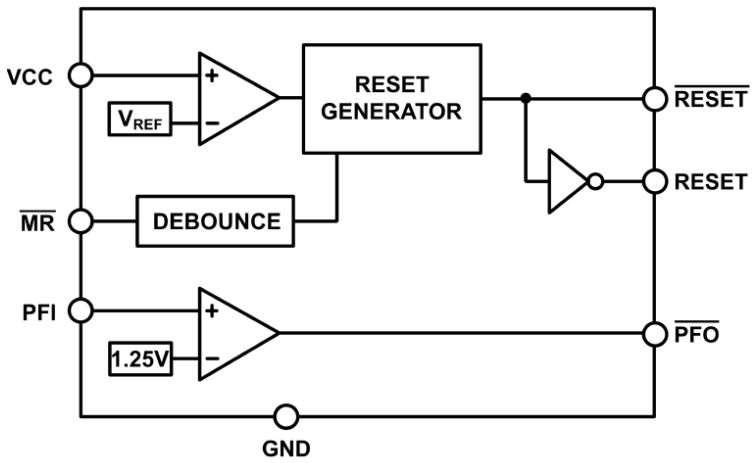


Figure 5. Functional Block Diagram

Feature Description

RESET Output

The TPV708 features an active-low and active-high push-pull output. The reset output is asserted when VCC is below the reset threshold (VTH), or when MR is driven low. Reset remains asserted for the duration of the reset delay time (tRP) after VCC rises above the reset threshold, or after MR transitions from low to high. Figure 6 shows the reset outputs.

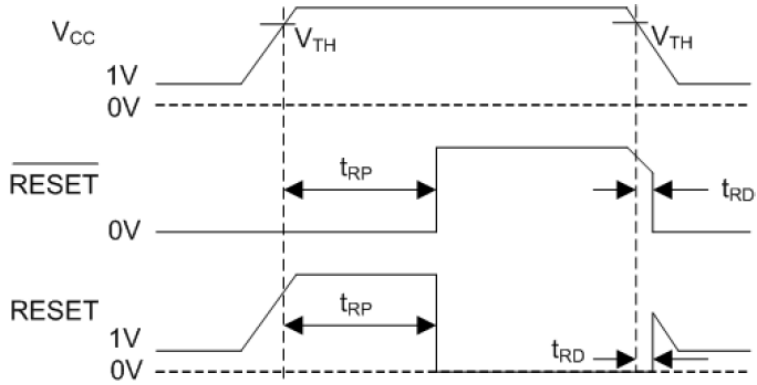


Figure 6. Reset Timing Diagram

Power-Fail Detector

The power-fail detector is a 1.25-V comparator, which can monitor an external power supply through a resistive divider. When the voltage on the PFI is lower than 1.25 V, the comparator output goes low, indicating a power fail, which can be used as an early warning of the power fail.

Manual RESET (MR) Input

The TPV708 features a manual reset input (MR), which, when driven low, asserts the reset output. When MR transitions from low to high, reset remains asserted for the duration of the reset active timeout period before de-asserting.

The MR input has an internal pull-up current so that the input is always high when unconnected. Noise immunity is provided on the MR input, and the fast and negative-going transients are ignored. A 0.1-µF capacitor between 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

Figure 7 shows the typical application circuit of TPV708.

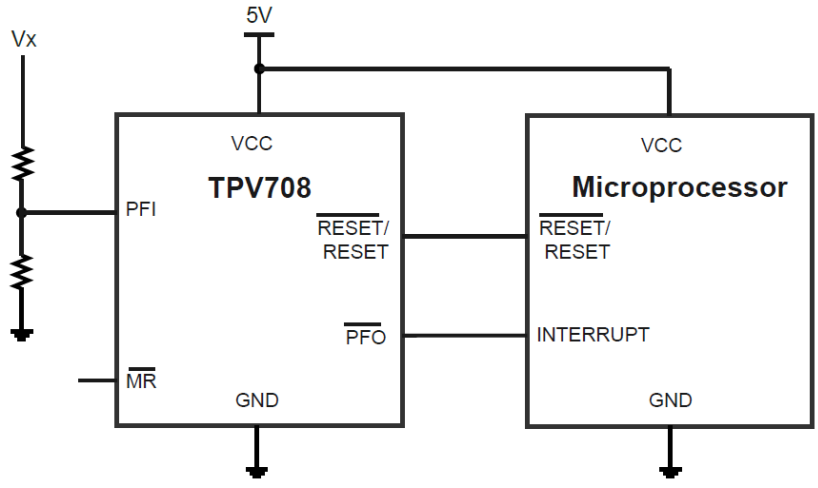
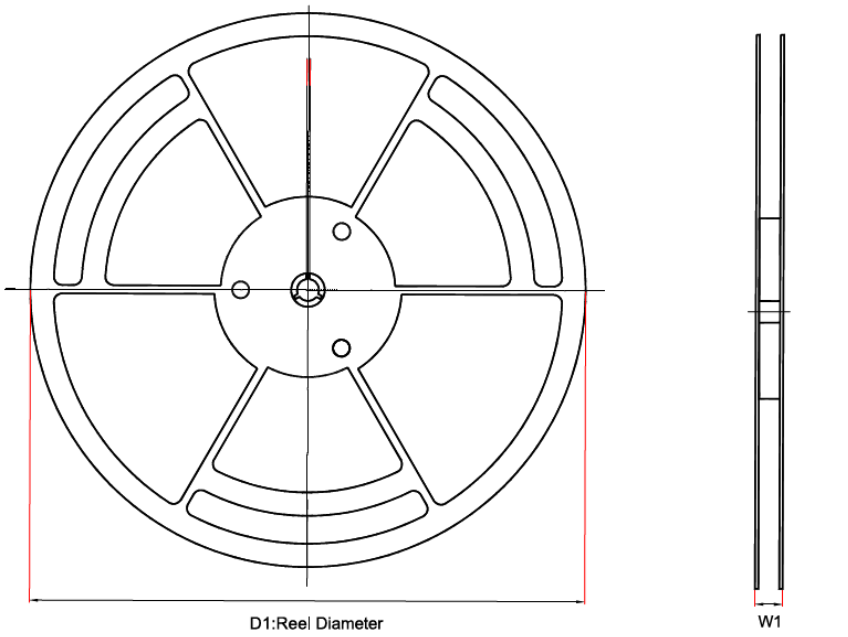


Figure 7. TPV708 Typical Application Circuit

Tape and Reel Information

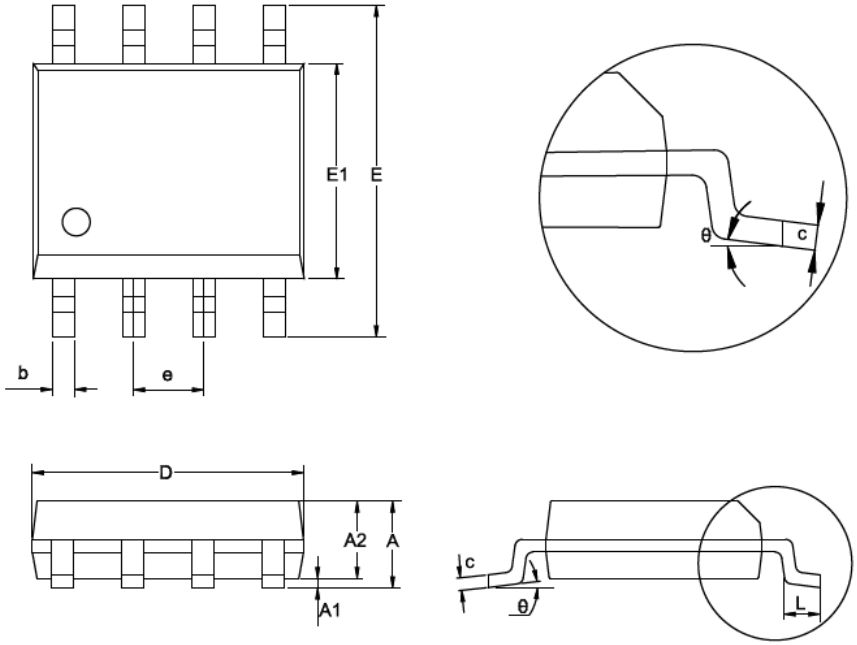


Order Number	Package	D1 (mm)	W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	W0 (mm)	Pin1 Quadrant
TPV708x-SO1R	SOP8	330	17.6	6.4	5.4	2.1	8	12	Q1

Package Outline Dimensions

SOP8

SO1 (SOP-8-A)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.050	0.250	0.002	0.010
A2	1.250	1.550	0.049	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
e	1.270 BSC		0.050 BSC	
L	0.400	1.000	0.016	0.039
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

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
TPV708V-SO1R (1)	–40 to 125°C	SOP8	V8V	1	Tape and Reel, 4000	Green
TPV708W-SO1R (1)	–40 to 125°C	SOP8	V8W	1	Tape and Reel, 4000	Green
TPV708Y-SO1R (1)	–40 to 125°C	SOP8	V8Y	1	Tape and Reel, 4000	Green
TPV708Z-SO1R (1)	–40 to 125°C	SOP8	V8Z	1	Tape and Reel, 4000	Green
TPV708R-SO1R (1)	–40 to 125°C	SOP8	V8R	1	Tape and Reel, 4000	Green
TPV708S-SO1R	–40 to 125°C	SOP8	V8S	1	Tape and Reel, 4000	Green
TPV708T-SO1R	–40 to 125°C	SOP8	V8T	1	Tape and Reel, 4000	Green
TPV708M-SO1R	–40 to 125°C	SOP8	V8M	1	Tape and Reel, 4000	Green
TPV708L-SO1R (1)	–40 to 125°C	SOP8	V8L	1	Tape and Reel, 4000	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.

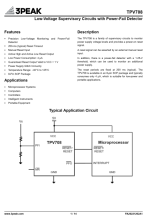
IMPORTANT NOTICE AND DISCLAIMER

Performance Information. Performance tests or performance range contained in this document/material are either results of design simulation or actual tests conducted under designated testing environment. Any variation in testing environment or simulation environment, including but not limited to testing method, testing process or testing temperature, may affect actual performance of the product.
Disclaimer. 3PEAK provides technical and reliability data (including data sheets), design resources (including reference designs), application or other design recommendations, networking tools, security information and other resources “As Is”.

3PEAK makes no warranty as to the absence of defects, and makes no warranties of any kind, express or implied, including without limitation, implied warranties as to merchantability, fitness for a particular purpose or non-infringement of any thirdparty’s intellectual property rights. Unless otherwise specified in writing, products supplied by 3PEAK are not designed to be used in any life-threatening scenarios, including critical medical applications, automotive safety-critical systems, aviation,aerospace, or any situations where failure could result in bodily harm, loss of life, or significant property damage. 3PEAK disclaims all liability for any such unauthorized use.

www.3peak.com

Documents / Resources

	3PEAK TPV708 Low Voltage Supervisory Circuits with Power Fail Detector [pdf] User Guide TPV708 Low Voltage Supervisory Circuits with Power Fail Detector, TPV708, Low Voltage Supervisory Circuits with Power Fail Detector, Voltage Supervisory Circuits with Power Fail Detector, Supervisory Circuits with Power Fail Detector, Circuits with Power Fail Detector, Power Fail Detector, Fail Detector, Detector

References

- User Manual