

### GENERAL DESCRIPTION

The SGM892B and SGM893B are low power consumption voltage detectors with high accuracy detection. These miniature devices offer tremendous flexibility with an adjustable threshold that is available from 1.0V to 5.0V with 0.1V increments. These devices are ideal for use in power-supply sequencing, reset sequencing, and power-switching applications.

The VOUT pin is an N-channel open-drain output with active-low reset. An active-low manual-reset input (nMR) is included in SGM893B.

The SGM892B is available in Green UTDFN-1×1-4L, SOT-23-3 and SOT-23-5 packages. The SGM893B is available in Green SOT-23-5 and UTDFN-1×1-4L packages. They are specified over the -40°C to +125°C operating temperature range.

### APPLICATIONS

- Microprocessor Reset Circuitry
- Charge Voltage Monitors
- Memory Battery Back-Up Switch Circuits
- Power Failure Detection Circuits

### FEATURES

- High Accuracy Detection:  $\pm 1\%$  (TYP)
- Low Power Consumption:  $0.4\mu\text{A}$  (TYP) at  $V_{\text{IN}} = 1\text{V}$
- Detection Voltage Range: 1.0V to 5.0V (0.1V Increments)
- Operating Voltage Range: 1V to 6V
- Detection Voltage Temperature Coefficient:  $\pm 40\text{ppm}/^\circ\text{C}$  (TYP)
- Manual-Reset Input (SGM893B Only)
- N-Channel Open-Drain Output
- -40°C to +125°C Operating Temperature Range
- Small Packaging:
  - SGM892B Available in Green SOT-23-5, SOT-23-3 and UTDFN-1×1-4L Packages
  - SGM893B Available in Green SOT-23-5 and UTDFN-1×1-4L Packages

### TYPICAL APPLICATION

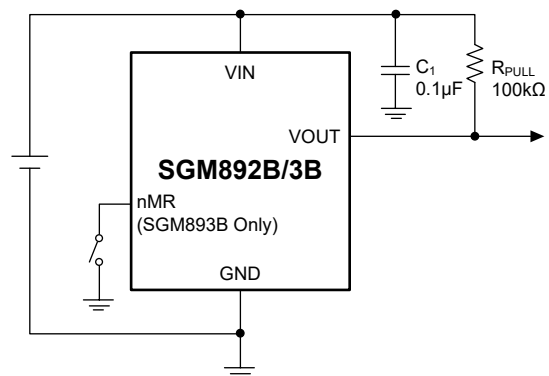


Figure 1. Typical Application Circuit

## PACKAGE/ORDERING INFORMATION

MODEL	DETECTION VOLTAGE (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM892B-1.0	1.0	SOT-23-5	-40°C to +125°C	SGM892B-1.0XN5G/TR	OV6XX	Tape and Reel, 3000
	1.0	SOT-23-3	-40°C to +125°C	SGM892B-1.0XN3G/TR	ONAXX	Tape and Reel, 3000
	1.0	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-1.0LXN3G/TR	OO4XX	Tape and Reel, 3000
	1.0	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-1.0XUDH4G/TR	29X	Tape and Reel, 10000
SGM892B-1.1	1.1	SOT-23-5	-40°C to +125°C	SGM892B-1.1XN5G/TR	OV7XX	Tape and Reel, 3000
	1.1	SOT-23-3	-40°C to +125°C	SGM892B-1.1XN3G/TR	OV8XX	Tape and Reel, 3000
	1.1	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-1.1LXN3G/TR	OV9XX	Tape and Reel, 3000
	1.1	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-1.1XUDH4G/TR	30X	Tape and Reel, 10000
SGM892B-1.2	1.2	SOT-23-5	-40°C to +125°C	SGM892B-1.2XN5G/TR	OVAXX	Tape and Reel, 3000
	1.2	SOT-23-3	-40°C to +125°C	SGM892B-1.2XN3G/TR	OVBXX	Tape and Reel, 3000
	1.2	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-1.2LXN3G/TR	OVCXX	Tape and Reel, 3000
	1.2	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-1.2XUDH4G/TR	32X	Tape and Reel, 10000
SGM892B-1.4	1.4	SOT-23-5	-40°C to +125°C	SGM892B-1.4XN5G/TR	CH7XX	Tape and Reel, 3000
	1.4	SOT-23-3	-40°C to +125°C	SGM892B-1.4XN3G/TR	CH6XX	Tape and Reel, 3000
	1.4	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-1.4LXN3G/TR	OO5XX	Tape and Reel, 3000
	1.4	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-1.4XUDH4G/TR	14X	Tape and Reel, 10000
SGM892B-1.6	1.6	SOT-23-5	-40°C to +125°C	SGM892B-1.6XN5G/TR	OW2XX	Tape and Reel, 3000
	1.6	SOT-23-3	-40°C to +125°C	SGM892B-1.6XN3G/TR	OW3XX	Tape and Reel, 3000
	1.6	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-1.6LXN3G/TR	OW4XX	Tape and Reel, 3000
	1.6	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-1.6XUDH4G/TR	55X	Tape and Reel, 10000
SGM892B-1.8	1.8	SOT-23-5	-40°C to +125°C	SGM892B-1.8XN5G/TR	RD9XX	Tape and Reel, 3000
	1.8	SOT-23-3	-40°C to +125°C	SGM892B-1.8XN3G/TR	ONBXX	Tape and Reel, 3000
	1.8	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-1.8LXN3G/TR	OO6XX	Tape and Reel, 3000
	1.8	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-1.8XUDH4G/TR	59X	Tape and Reel, 10000

## PACKAGE/ORDERING INFORMATION (continued)

MODEL	DETECTION VOLTAGE (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM892B-2.0	2.0	SOT-23-5	-40°C to +125°C	SGM892B-2.0XN5G/TR	OWAXX	Tape and Reel, 3000
	2.0	SOT-23-3	-40°C to +125°C	SGM892B-2.0XN3G/TR	OWBXX	Tape and Reel, 3000
	2.0	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-2.0LXN3G/TR	OWCXX	Tape and Reel, 3000
	2.0	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-2.0XUDH4G/TR	65X	Tape and Reel, 10000
SGM892B-2.2	2.2	SOT-23-5	-40°C to +125°C	SGM892B-2.2XN5G/TR	RDAXX	Tape and Reel, 3000
	2.2	SOT-23-3	-40°C to +125°C	SGM892B-2.2XN3G/TR	OX0XX	Tape and Reel, 3000
	2.2	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-2.2LXN3G/TR	OX1XX	Tape and Reel, 3000
	2.2	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-2.2XUDH4G/TR	67X	Tape and Reel, 10000
SGM892B-2.3	2.3	SOT-23-5	-40°C to +125°C	SGM892B-2.3XN5G/TR	OX2XX	Tape and Reel, 3000
	2.3	SOT-23-3	-40°C to +125°C	SGM892B-2.3XN3G/TR	OX3XX	Tape and Reel, 3000
	2.3	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-2.3LXN3G/TR	OX4XX	Tape and Reel, 3000
	2.3	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-2.3XUDH4G/TR	70X	Tape and Reel, 10000
SGM892B-2.5	2.5	SOT-23-5	-40°C to +125°C	SGM892B-2.5XN5G/TR	OX6XX	Tape and Reel, 3000
	2.5	SOT-23-3	-40°C to +125°C	SGM892B-2.5XN3G/TR	ONDXX	Tape and Reel, 3000
	2.5	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-2.5LXN3G/TR	O76XX	Tape and Reel, 3000
	2.5	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-2.5XUDH4G/TR	72X	Tape and Reel, 10000
SGM892B-2.7	2.7	SOT-23-5	-40°C to +125°C	SGM892B-2.7XN5G/TR	OXAXX	Tape and Reel, 3000
	2.7	SOT-23-3	-40°C to +125°C	SGM892B-2.7XN3G/TR	ONEXX	Tape and Reel, 3000
	2.7	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-2.7LXN3G/TR	RC6XX	Tape and Reel, 3000
	2.7	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-2.7XUDH4G/TR	28X	Tape and Reel, 10000
SGM892B-2.8	2.8	SOT-23-5	-40°C to +125°C	SGM892B-2.8XN5G/TR	OXBXX	Tape and Reel, 3000
	2.8	SOT-23-3	-40°C to +125°C	SGM892B-2.8XN3G/TR	OXCXX	Tape and Reel, 3000
	2.8	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-2.8LXN3G/TR	OXDXX	Tape and Reel, 3000
	2.8	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-2.8XUDH4G/TR	75X	Tape and Reel, 10000

## PACKAGE/ORDERING INFORMATION (continued)

MODEL	DETECTION VOLTAGE (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM892B-2.9	2.9	SOT-23-5	-40°C to +125°C	SGM892B-2.9XN5G/TR	OXEXX	Tape and Reel, 3000
	2.9	SOT-23-3	-40°C to +125°C	SGM892B-2.9XN3G/TR	RC8XX	Tape and Reel, 3000
	2.9	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-2.9LXN3G/TR	OO8XX	Tape and Reel, 3000
	2.9	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-2.9XUDH4G/TR	76X	Tape and Reel, 10000
SGM892B-3.0	3.0	SOT-23-5	-40°C to +125°C	SGM892B-3.0XN5G/TR	OY0XX	Tape and Reel, 3000
	3.0	SOT-23-3	-40°C to +125°C	SGM892B-3.0XN3G/TR	ONFXX	Tape and Reel, 3000
	3.0	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-3.0LXN3G/TR	OO9XX	Tape and Reel, 3000
	3.0	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-3.0XUDH4G/TR	77X	Tape and Reel, 10000
SGM892B-3.3	3.3	SOT-23-5	-40°C to +125°C	SGM892B-3.3XN5G/TR	OY7XX	Tape and Reel, 3000
	3.3	SOT-23-3	-40°C to +125°C	SGM892B-3.3XN3G/TR	OO0XX	Tape and Reel, 3000
	3.3	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-3.3LXN3G/TR	OOAXX	Tape and Reel, 3000
	3.3	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-3.3XUDH4G/TR	81X	Tape and Reel, 10000
SGM892B-3.9	3.9	SOT-23-5	-40°C to +125°C	SGM892B-3.9XN5G/TR	OZ7XX	Tape and Reel, 3000
	3.9	SOT-23-3	-40°C to +125°C	SGM892B-3.9XN3G/TR	OZ8XX	Tape and Reel, 3000
	3.9	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-3.9LXN3G/TR	OZ9XX	Tape and Reel, 3000
	3.9	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-3.9XUDH4G/TR	88X	Tape and Reel, 10000
SGM892B-4.6	4.6	SOT-23-5	-40°C to +125°C	SGM892B-4.6XN5G/TR	S0QXX	Tape and Reel, 3000
	4.6	SOT-23-3	-40°C to +125°C	SGM892B-4.6XN3G/TR	OO2XX	Tape and Reel, 3000
	4.6	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-4.6LXN3G/TR	OOCXX	Tape and Reel, 3000
	4.6	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-4.6XUDH4G/TR	97X	Tape and Reel, 10000
SGM892B-5.0	5.0	SOT-23-5	-40°C to +125°C	SGM892B-5.0XN5G/TR	S1GXX	Tape and Reel, 3000
	5.0	SOT-23-3	-40°C to +125°C	SGM892B-5.0XN3G/TR	OO3XX	Tape and Reel, 3000
	5.0	SOT-23-3 (L-Type)	-40°C to +125°C	SGM892B-5.0LXN3G/TR	OODXX	Tape and Reel, 3000
	5.0	UTDFN-1×1-4L	-40°C to +125°C	SGM892B-5.0XUDH4G/TR	0DX	Tape and Reel, 10000

## PACKAGE/ORDERING INFORMATION (continued)

MODEL	DETECTION VOLTAGE (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM893B-1.0	1.0	SOT-23-5	-40°C to +125°C	SGM893B-1.0XN5G/TR	S1HXX	Tape and Reel, 3000
	1.0	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-1.0XUDH4G/TR	0EX	Tape and Reel, 10000
SGM893B-1.1	1.1	SOT-23-5	-40°C to +125°C	SGM893B-1.1XN5G/TR	S1IXX	Tape and Reel, 3000
	1.1	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-1.1XUDH4G/TR	0FX	Tape and Reel, 10000
SGM893B-1.2	1.2	SOT-23-5	-40°C to +125°C	SGM893B-1.2XN5G/TR	S1JXX	Tape and Reel, 3000
	1.2	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-1.2XUDH4G/TR	1BX	Tape and Reel, 10000
SGM893B-1.4	1.4	SOT-23-5	-40°C to +125°C	SGM893B-1.4XN5G/TR	CH8XX	Tape and Reel, 3000
	1.4	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-1.4XUDH4G/TR	N9X	Tape and Reel, 10000
SGM893B-1.6	1.6	SOT-23-5	-40°C to +125°C	SGM893B-1.6XN5G/TR	S1MXX	Tape and Reel, 3000
	1.6	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-1.6XUDH4G/TR	1EX	Tape and Reel, 10000
SGM893B-1.8	1.8	SOT-23-5	-40°C to +125°C	SGM893B-1.8XN5G/TR	SVJXX	Tape and Reel, 3000
	1.8	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-1.8XUDH4G/TR	2BX	Tape and Reel, 10000
SGM893B-2.0	2.0	SOT-23-5	-40°C to +125°C	SGM893B-2.0XN5G/TR	S1QXX	Tape and Reel, 3000
	2.0	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-2.0XUDH4G/TR	2DX	Tape and Reel, 10000
SGM893B-2.2	2.2	SOT-23-5	-40°C to +125°C	SGM893B-2.2XN5G/TR	S1SXX	Tape and Reel, 3000
	2.2	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-2.2XUDH4G/TR	2FX	Tape and Reel, 10000
SGM893B-2.3	2.3	SOT-23-5	-40°C to +125°C	SGM893B-2.3XN5G/TR	S1TXX	Tape and Reel, 3000
	2.3	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-2.3XUDH4G/TR	5BX	Tape and Reel, 10000
SGM893B-2.5	2.5	SOT-23-5	-40°C to +125°C	SGM893B-2.5XN5G/TR	S1VXX	Tape and Reel, 3000
	2.5	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-2.5XUDH4G/TR	5DX	Tape and Reel, 10000
SGM893B-2.7	2.7	SOT-23-5	-40°C to +125°C	SGM893B-2.7XN5G/TR	S1XXX	Tape and Reel, 3000
	2.7	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-2.7XUDH4G/TR	5FX	Tape and Reel, 10000
SGM893B-2.8	2.8	SOT-23-5	-40°C to +125°C	SGM893B-2.8XN5G/TR	S1YXX	Tape and Reel, 3000
	2.8	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-2.8XUDH4G/TR	6FX	Tape and Reel, 10000

## PACKAGE/ORDERING INFORMATION (continued)

MODEL	DETECTION VOLTAGE (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM893B-2.9	2.9	SOT-23-5	-40°C to +125°C	SGM893B-2.9XN5G/TR	S1ZXX	Tape and Reel, 3000
	2.9	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-2.9XUDH4G/TR	7BX	Tape and Reel, 10000
SGM893B-3.0	3.0	SOT-23-5	-40°C to +125°C	SGM893B-3.0XN5G/TR	S2GXX	Tape and Reel, 3000
	3.0	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-3.0XUDH4G/TR	7CX	Tape and Reel, 10000
SGM893B-3.3	3.3	SOT-23-5	-40°C to +125°C	SGM893B-3.3XN5G/TR	S2JXX	Tape and Reel, 3000
	3.3	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-3.3XUDH4G/TR	7FX	Tape and Reel, 10000
SGM893B-3.9	3.9	SOT-23-5	-40°C to +125°C	SGM893B-3.9XN5G/TR	S2PXX	Tape and Reel, 3000
	3.9	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-3.9XUDH4G/TR	9CX	Tape and Reel, 10000
SGM893B-4.6	4.6	SOT-23-5	-40°C to +125°C	SGM893B-4.6XN5G/TR	S2WXX	Tape and Reel, 3000
	4.6	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-4.6XUDH4G/TR	BDX	Tape and Reel, 10000
SGM893B-5.0	5.0	SOT-23-5	-40°C to +125°C	SGM893B-5.0XN5G/TR	S3GXX	Tape and Reel, 3000
	5.0	UTDFN-1×1-4L	-40°C to +125°C	SGM893B-5.0XUDH4G/TR	C1X	Tape and Reel, 10000

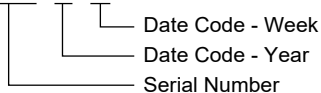
NOTE: For more models not listed above, please contact your local SGMICRO sales representatives.

## MARKING INFORMATION

NOTE: X = Date Code. XX = Date Code.

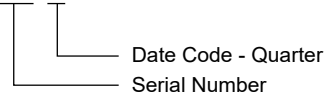
## SOT-23-5/SOT-23-3

YYY X X



## UTDFN-1×1-4L

YY X



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

**ABSOLUTE MAXIMUM RATINGS**

Input Voltage Range, $V_{IN}$ .....	GND - 0.3V to 7V
Output Current, $I_{OUT}$ .....	30mA
Output Voltage Range, $V_{OUT}$	
SGM892B/SGM893B <sup>(1)</sup> .....	GND - 0.3V to 7V
Manual-Reset Pin Voltage Range, $V_{NMR}$	
.....	GND - 0.3V to $V_{IN} + 0.3V$
Package Thermal Resistance	
SOT-23-5, $\theta_{JA}$ .....	246°C/W
SOT-23-3, $\theta_{JA}$ .....	340°C/W
UTDFN-1×1-4L, $\theta_{JA}$ .....	243°C/W
Junction Temperature.....	+150°C
Storage Temperature Range.....	-65°C to +150°C
Lead Temperature (Soldering, 10s).....	+260°C
ESD Susceptibility	
HBM.....	4000V
CDM.....	1000V

**RECOMMENDED OPERATING CONDITIONS**

Operating Junction Temperature Range.....	-40°C to +125°C
Operating Ambient Temperature Range.....	-40°C to +125°C

## NOTE:

1. N-channel open-drain output.

**OVERSTRESS CAUTION**

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

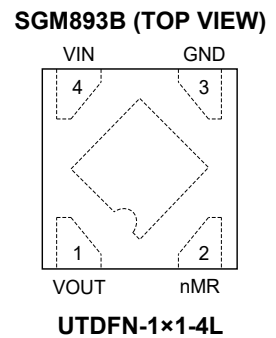
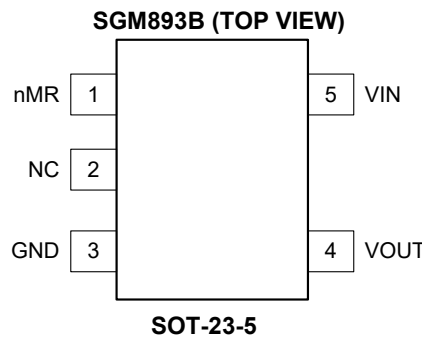
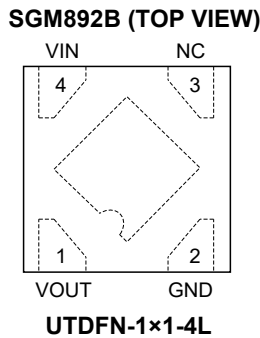
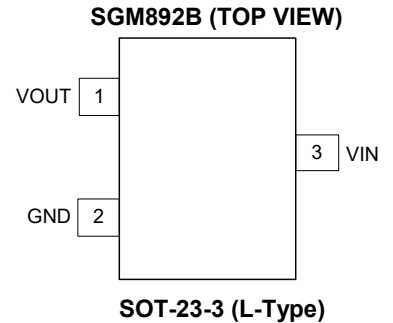
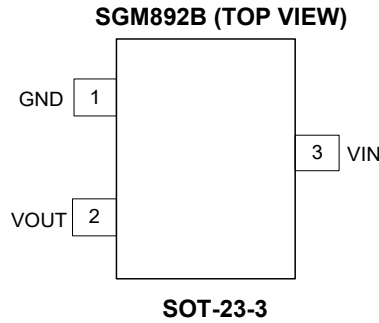
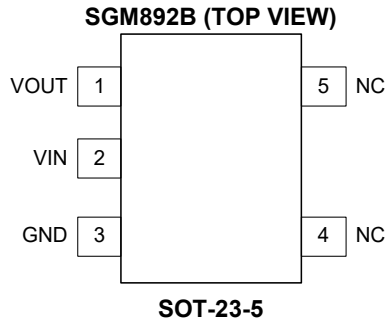
**ESD SENSITIVITY CAUTION**

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO 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 even small parametric changes could cause the device not to meet the published specifications.

**DISCLAIMER**

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATIONS



PIN DESCRIPTION

SGM892B:

PIN				NAME	FUNCTION
SOT-23-5	SOT-23-3	SOT-23-3 (L-Type)	UTDFN-1x1-4L		
1	2	1	1	VOUT	Output (Detect 'L') Pin.
2	3	3	4	VIN	Input Pin.
3	1	2	2	GND	Ground.
4, 5	—	—	3	NC	No Connection.
—	—	—	Exposed Pad	—	Connect to ground or to a floating copper plane for mechanical stability.

SGM893B:

PIN		NAME	FUNCTION
SOT-23-5	UTDFN-1x1-4L		
1	2	nMR	Manual Reset. Pull this pin to a logic low to assert the output. After the nMR pin is deasserted, the output deasserts after the reset delay ( $t_0$ ) elapses.
2	—	NC	No Connection.
3	3	GND	Ground.
4	1	VOUT	Output (Detect 'L') Pin.
5	4	VIN	Input Pin.
—	Exposed Pad	—	Connect to ground or to a floating copper plane for mechanical stability.



## ELECTRICAL CHARACTERISTICS

(T<sub>J</sub> = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Operating Voltage	V <sub>IN</sub>	V <sub>DET</sub> = 1V to 5V, T <sub>J</sub> = -40°C to +125°C		1		6	V
Detection Voltage	V <sub>DET</sub>	V <sub>IN</sub> = 1V to 6V, Test Circuit 1	T <sub>J</sub> = +25°C	E-1			V
			T <sub>J</sub> = -40°C to +125°C	E-2			
Hysteresis Voltage	V <sub>HYS</sub>	V <sub>IN</sub> = 1V to 6V, Test Circuit 1		E-3			V
Detection Voltage Temperature Coefficient	$\frac{\Delta V_{DET}}{(\Delta T_J \times V_{DET})}$	T <sub>J</sub> = -40°C to +125°C, Test Circuit 1			±40	±150	ppm/°C
Supply Current	I <sub>CC</sub>	Test Circuit 2	V <sub>IN</sub> = 1V		0.4	0.7	μA
			V <sub>IN</sub> = 3V		0.6	1.1	
			V <sub>IN</sub> = 6V		1.0	1.5	
Output Current	I <sub>OUT</sub>	V <sub>DS_NCH</sub> = 0.5V, Test Circuit 3	V <sub>IN</sub> = 1V	0.2	0.8		mA
			V <sub>IN</sub> = 2V	9.0	12.0		
			V <sub>IN</sub> = 3V	13.0	17.5		
			V <sub>IN</sub> = 4V	15.0	20.5		
			V <sub>IN</sub> = 5V	16.0	22.0		
V <sub>IN</sub> = 6V	16.5	23.0					
Minimum V <sub>IN</sub> Voltage for Valid Output	V <sub>POR</sub>	I <sub>OL</sub> = 1μA, Test Circuit 4			0.6	0.8	V
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>IN</sub> = 1V to 6V, I <sub>OL</sub> = 120μA, Test Circuit 4			0.02	0.20	V
Leakage Current	I <sub>LEAK</sub>	V <sub>IN</sub> = V <sub>OUT</sub> = 6V, Test Circuit 3			0.02	1.50	μA
<b>SGM893B Only</b>							
nMR Pin Low-Level Input Voltage	V <sub>IL</sub>	V <sub>IN</sub> = 6V, Test Circuit 5				2.1	V
nMR Pin High-Level Input Voltage	V <sub>IH</sub>	V <sub>IN</sub> = 6V, Test Circuit 5		2.9			V
nMR Pin Pull-Up Resistance	R <sub>nMR</sub>	V <sub>IN</sub> = 3V, V <sub>nMR</sub> = 0V, Test Circuit 6		20.0	23.5	27.0	kΩ

## TIMING REQUIREMENTS

(V<sub>IN</sub> = 1V to 6V, C<sub>1</sub> = 0.1μF and T<sub>J</sub> = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Reset Delay Time (Power-Up Delay)	t <sub>D</sub>	SGM892B, Test Circuit 7	10	110	220	μs
		SGM893B, Test Circuit 7	160	210	270	ms
Propagation Delay, V <sub>IN</sub> Falling (Power-Down Delay)	t <sub>PD_VIN</sub>	Test Circuit 7		50		μs
Propagation Delay from nMR Low to Output Low	t <sub>PD_nMR</sub>	Test Circuit 8		600		ns

Timing Diagram

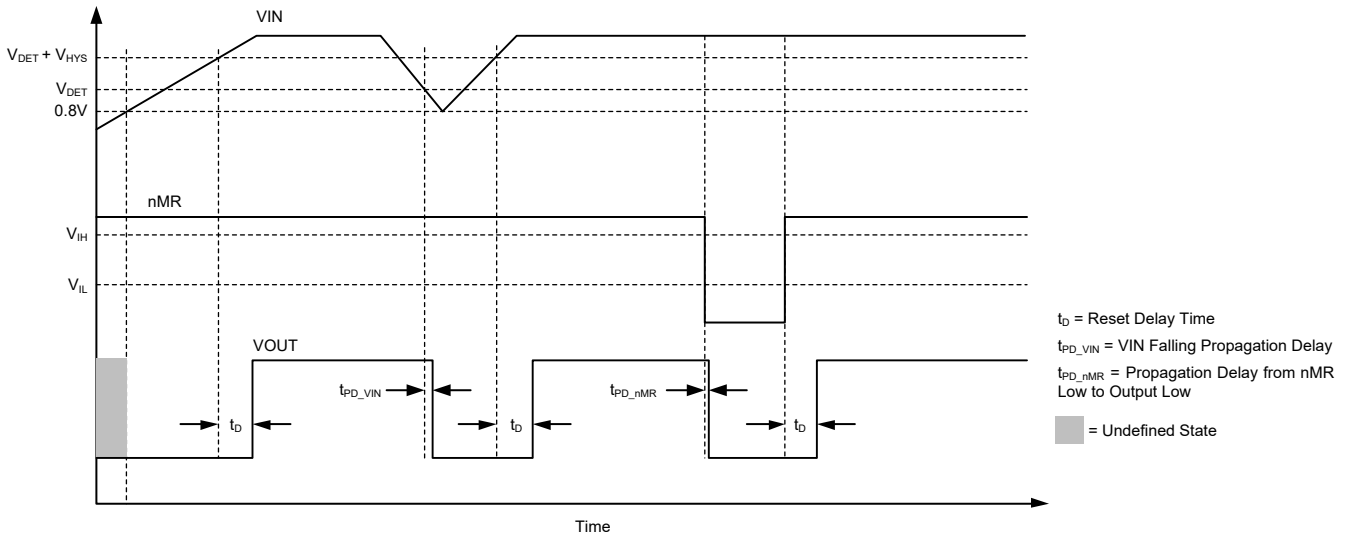
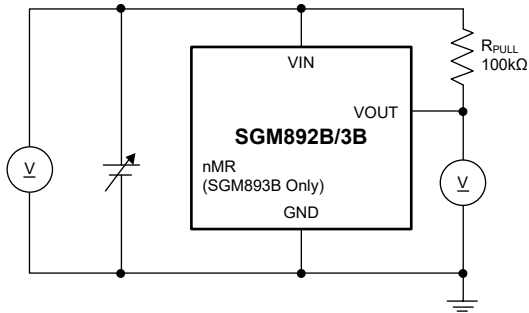


Figure 2. nMR and VIN Reset Timing (SGM893B Only)

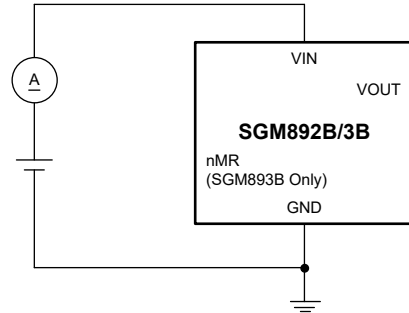
VOLTAGE CHART

Symbol	E-1		E-2		E-3		
Conditions Nominal Voltage (V)	T <sub>J</sub> = +25°C		T <sub>J</sub> = -40°C to +125°C		T <sub>J</sub> = +25°C		
	V <sub>DET</sub> (V), 1% Accuracy		V <sub>DET</sub> (V), 2% Accuracy		V <sub>HYS</sub> (V)		
	MIN	MAX	MIN	MAX	MIN	TYP	MAX
1.0	0.990	1.010	0.980	1.020	0.030	0.050	0.070
1.1	1.089	1.111	1.078	1.122	0.033	0.055	0.077
1.2	1.188	1.212	1.176	1.224	0.036	0.060	0.084
1.4	1.386	1.414	1.372	1.428	0.042	0.070	0.098
1.6	1.584	1.616	1.568	1.632	0.048	0.080	0.112
1.8	1.782	1.818	1.764	1.836	0.054	0.090	0.126
2.0	1.980	2.020	1.960	2.040	0.060	0.100	0.140
2.2	2.178	2.222	2.156	2.244	0.067	0.110	0.153
2.3	2.277	2.323	2.254	2.346	0.070	0.115	0.160
2.5	2.475	2.525	2.450	2.550	0.076	0.125	0.174
2.7	2.673	2.727	2.646	2.754	0.082	0.135	0.188
2.8	2.772	2.828	2.744	2.856	0.085	0.140	0.195
2.9	2.871	2.929	2.842	2.958	0.088	0.145	0.202
3.0	2.970	3.030	2.940	3.060	0.091	0.150	0.209
3.3	3.267	3.333	3.234	3.366	0.100	0.165	0.230
3.9	3.861	3.939	3.822	3.978	0.118	0.195	0.272
4.6	4.554	4.646	4.508	4.692	0.139	0.230	0.321
5.0	4.950	5.050	4.900	5.100	0.151	0.250	0.349

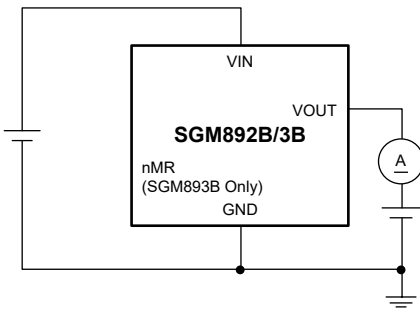
TEST CIRCUITS



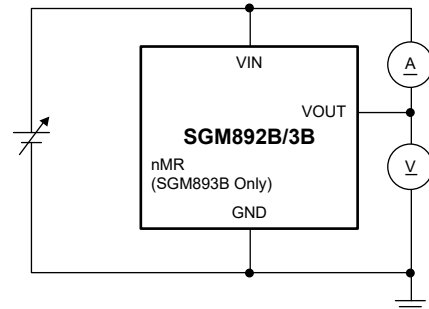
Test Circuit 1



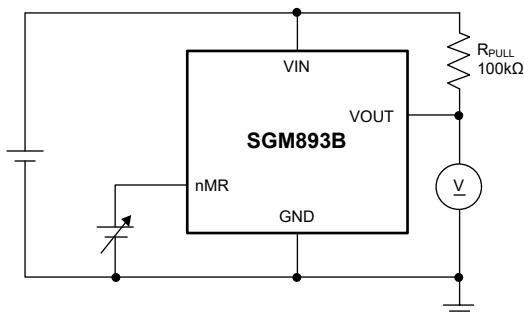
Test Circuit 2



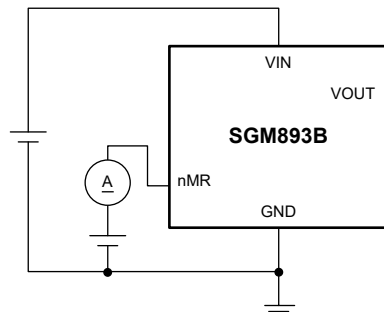
Test Circuit 3



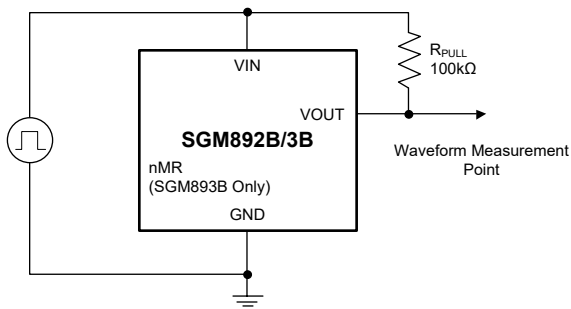
Test Circuit 4



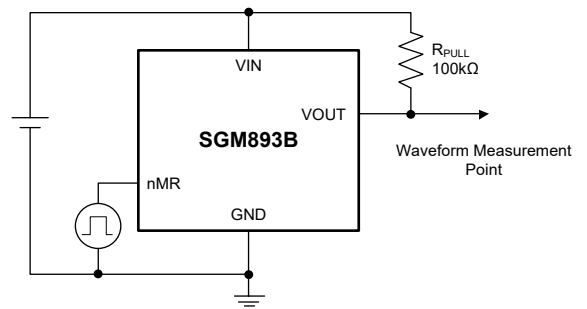
Test Circuit 5



Test Circuit 6

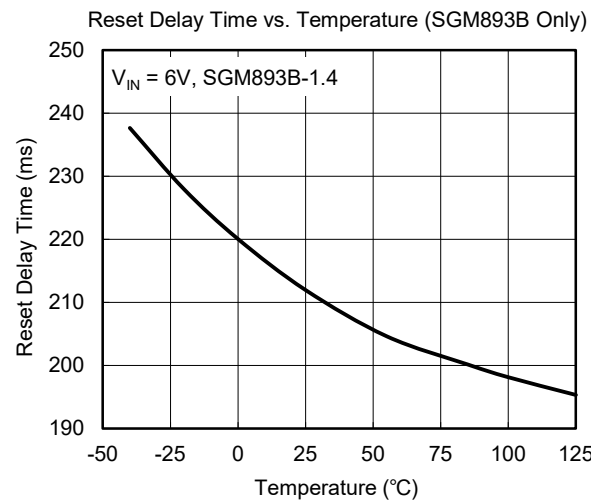
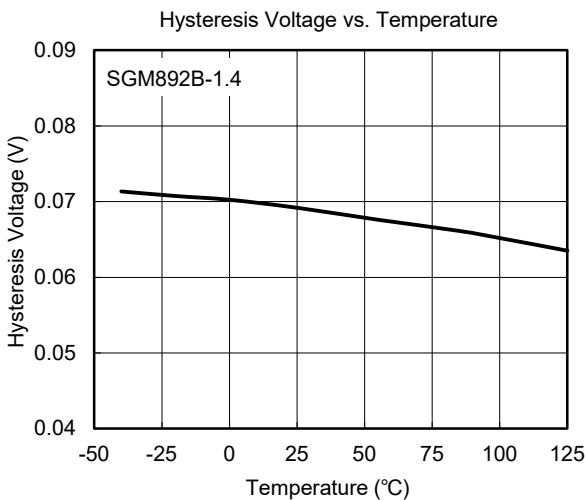
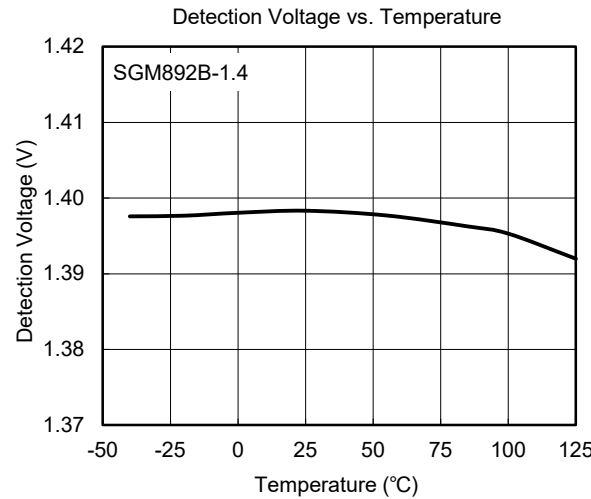
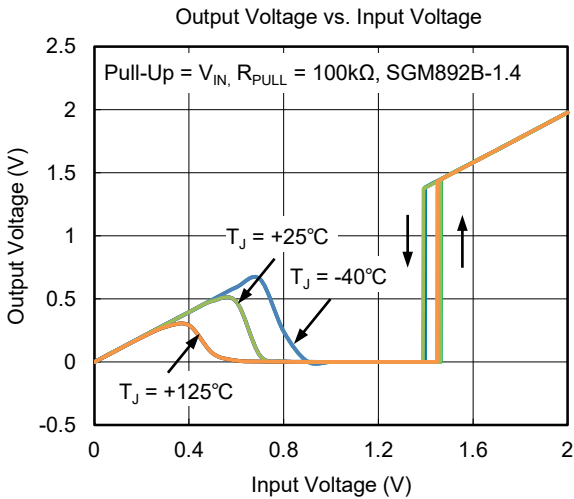
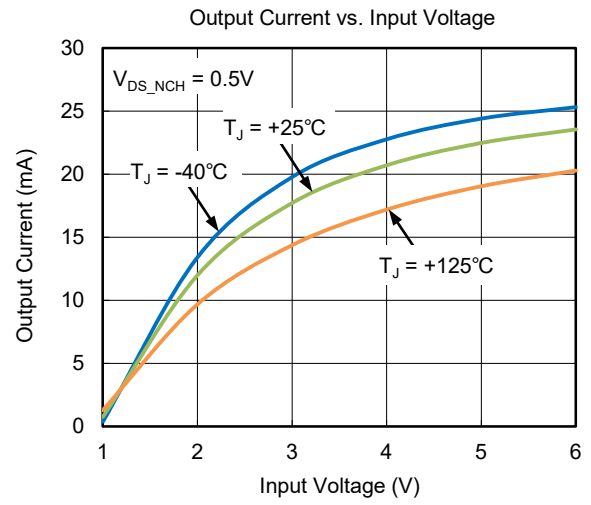
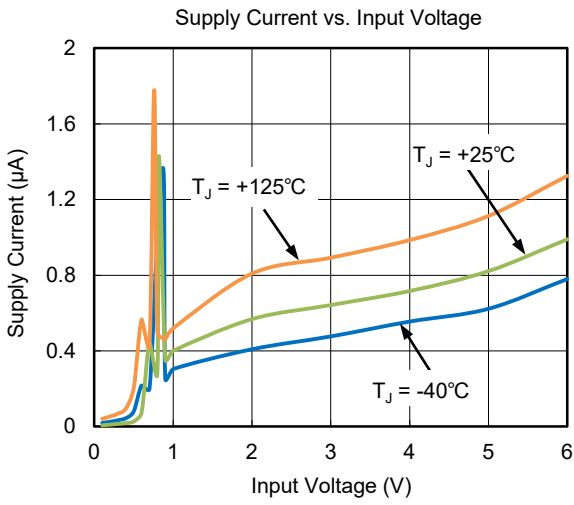


Test Circuit 7

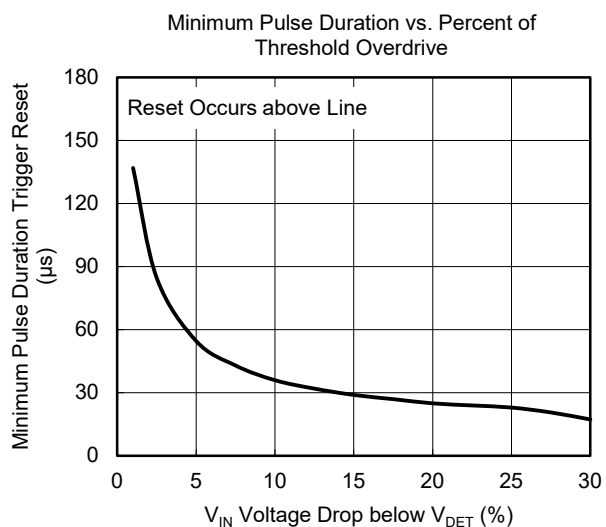


Test Circuit 8

TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (continued)



FUNCTIONAL BLOCK DIAGRAMS

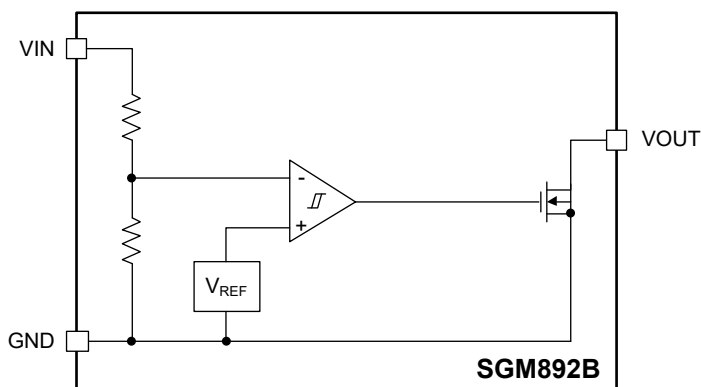


Figure 3. SGM892B Block Diagram

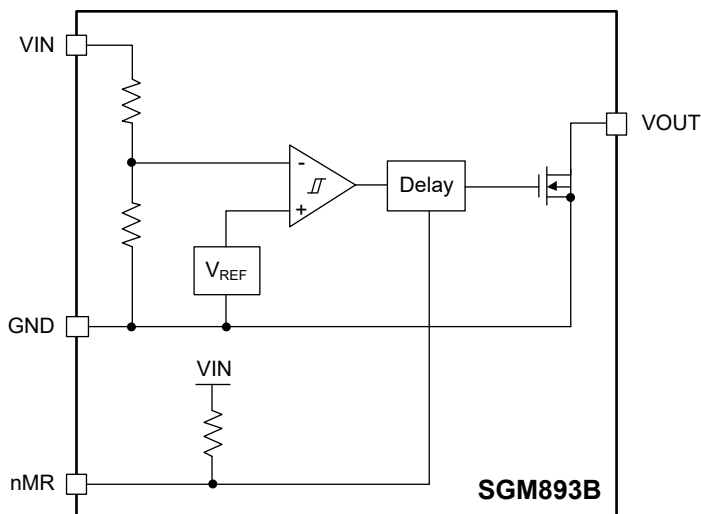


Figure 4. SGM893B Block Diagram

**DETAILED DESCRIPTION**

The SGM892B and SGM893B are supervisory ICs with ultra-low current and single channel. The voltage detection range is from 1V to 5V with factory-set 0.1V increments. When VIN voltage falls below the detection voltage, V<sub>DET</sub>, both devices assert an active low at the VOUT pin. These devices are designed to immune the voltage transients of the VIN pin.

The SGM893B remains VOUT asserted for the reset delay time, t<sub>D</sub>, after the VIN voltage rises above the factory-set voltage (V<sub>DET</sub> + V<sub>HYS</sub>).

The SGM893B includes a manual reset input (nMR). When nMR is pulled low, VOUT is forced low, even if the VIN voltage is above the factory-set voltage (V<sub>DET</sub> + V<sub>HYS</sub>).

**VIN Transient Immunity**

The SGM892B and SGM893B devices have built-in circuit to immune the voltage transients of the VIN pin. Transient immunity is tightly related to the transient duration and amplitude. Transient amplitude is measured from the bottom of the transient to the detection voltage (V<sub>DET</sub>) of the device, as shown in Figure 5.

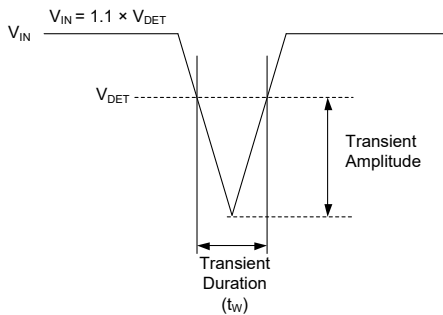


Figure 5. Voltage Transient Measurement

**Manual Reset (nMR) Input (SGM893B Only)**

The manual reset (nMR) input allows the operator, a test technician, or external logic circuits to initiate a reset (SGM893B only). A logic low on nMR forces

VOUT low, even if the VIN voltage is higher than the factory-set voltage (V<sub>DET</sub> + V<sub>HYS</sub>). After nMR returns to a logic high and the VIN voltage exceeds the threshold voltage (V<sub>DET</sub> + V<sub>HYS</sub>), VOUT is deasserted after the reset delay time (t<sub>D</sub>) elapses. nMR is pulled up to VIN with an internal 23.5kΩ resistor; this pin can be floating if nMR is not used. If the driving signal on nMR is lower than VIN, there will be a leakage current path between the VIN and nMR pins. To avoid the leakage current, a logic-level FET can be used, as shown in Figure 6.

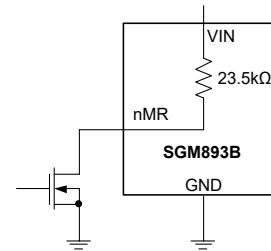


Figure 6. Using a Logic-Level FET to Minimize Current Draw

**Normal Operation (VIN > VIN\_MIN)**

When the VIN voltage is higher than VIN\_MIN, the VOUT status depends on the VIN voltage relative to V<sub>DET</sub> and the nMR voltage (SGM893B only).

**Below VIN\_MIN (VPOR < VIN < VIN\_MIN)**

When the VIN voltage is lower than VIN\_MIN but higher than the power-on reset voltage (VPOR), VOUT is asserted.

**Below Power-On Reset (VIN < VPOR)**

When the voltage on VIN is lower than the power-on reset voltage (VPOR), VOUT is undefined. Do not rely on the output for proper device function under this condition.

APPLICATION INFORMATION

Ultra-low operating and detection voltages make the SGM892B and SGM893B devices well-suited for the single-cell, alkaline-battery systems.

Figure 7 shows the SGM892B monitoring the single-cell alkaline battery. When the cell voltage reaches 1V, which is a typical voltage to stop discharging the alkaline battery, the SGM892B VOUT pin asserts. The SGM66099 EN pin is driven low, and places it in a low-current shutdown state. After SGM66099 is disabled, the combination of the SGM892B and SGM66099 devices consumes only 700nA (TYP).

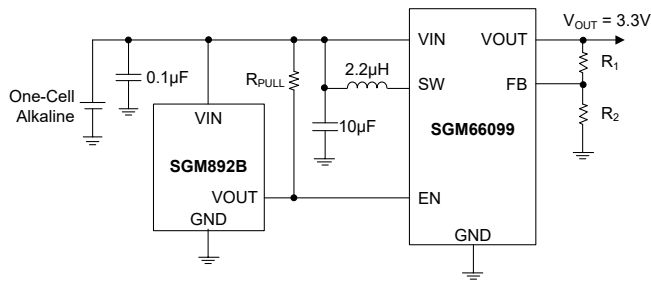


Figure 7. Disabled Boost Converter

Design Requirements

Table 1. Design Requirements and Results

Design Requirements	Design Result		
	SGM892B	SGM66099	Combined
Input Voltage Range of 1V to 6V	1V to 6V	0.9V to 5.2V	1V to 5.2V
Shutdown Current < 3µA	1.5µA (MAX)	1µA (MAX)	2.5µA (MAX)
Output Voltage of 3.3V	N/A	3.3V	3.3V
Output Current of 50mA	N/A	100mA	100mA
Switching Frequency ≥ 1MHz	N/A	1.2MHz	1.2MHz

Input Capacitor

The quiescent current is only 0.4µA (TYP). However, this current rises to approximately 3µA for about 500µs

during the SGM892B and SGM893B sampling the input voltage. If the power source (including trace) shows high impedance, the additional current during sampling may trigger a false reset as a result of the apparent voltage drop at VIN. For this application scenario, SGMICRO recommends adding a small 0.1µF bypass capacitor near the SGM892B VIN pin. This bypass capacitor effectively keeps the average current at 0.4µA.

Bidirectional Reset Pins

Some microprocessors or logic devices have bidirectional reset pins which may operate as input or output ports depending on their configuration. When the SGM892B and SGM893B devices drive a bidirectional reset pin, place a series resistor between the VOUT pin and the reset pin to limit the current flow, if both the devices and the reset pin attempt to drive the reset line. Figure 8 shows the connection of the SGM892B to a bidirectional reset pin of a microcontroller using a series resistor.

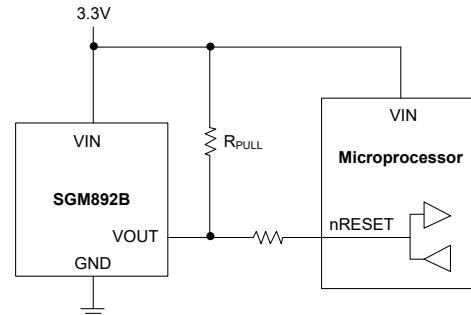


Figure 8. Connection to a Bidirectional Reset Pin

Power Supply Recommendations

The SGM892B/SGM893B input supply voltage range is between 1V and 6V. It is recommended to use a low-impedance power supply or a 0.1µF bypass capacitor to avoid a false reset.

**REVISION HISTORY**

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

<b>SEPTEMBER 2024 – REV.A to REV.A.1</b>	<b>Page</b>
Updated Package/Ordering Information section.....	2 ~ 6
Updated Voltage Chart section.....	10

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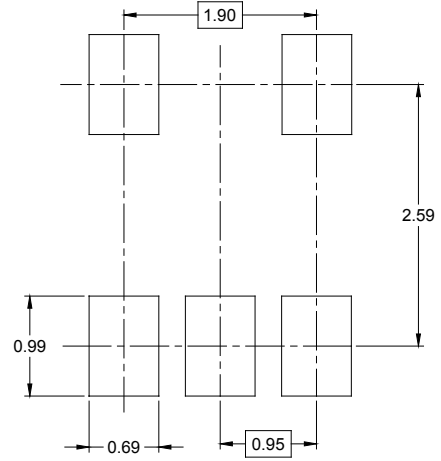
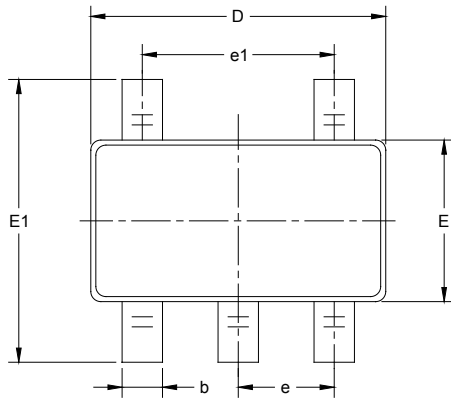
<b>Changes from Original (JUNE 2021) to REV.A</b>	<b>Page</b>
Changed from product preview to production data.....	All

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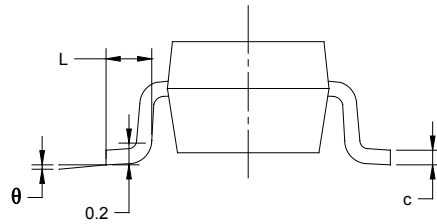


PACKAGE OUTLINE DIMENSIONS

SOT-23-5



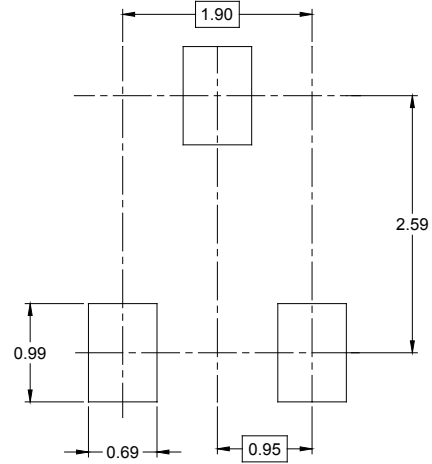
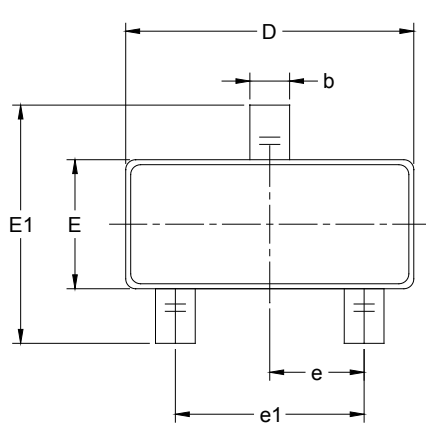
RECOMMENDED LAND PATTERN (Unit: mm)



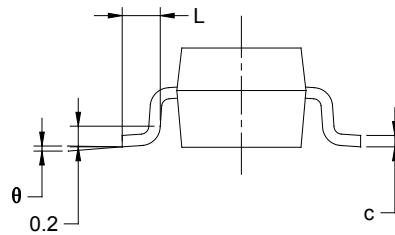
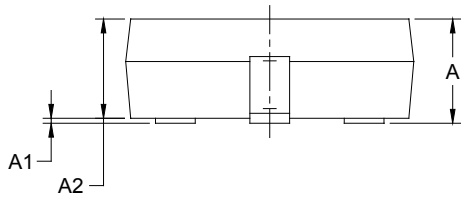
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

PACKAGE OUTLINE DIMENSIONS

SOT-23-3



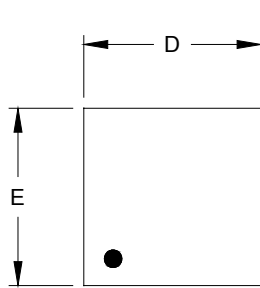
RECOMMENDED LAND PATTERN (Unit: mm)



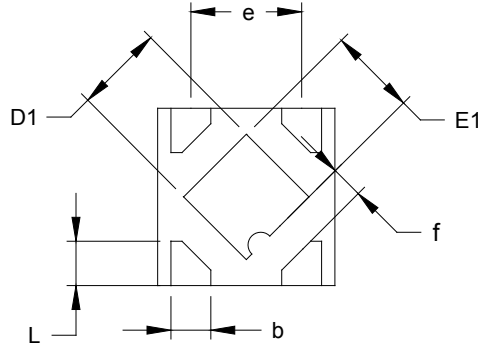
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

## PACKAGE OUTLINE DIMENSIONS

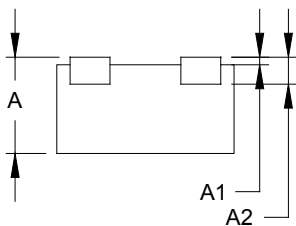
### UTDFN-1×1-4L



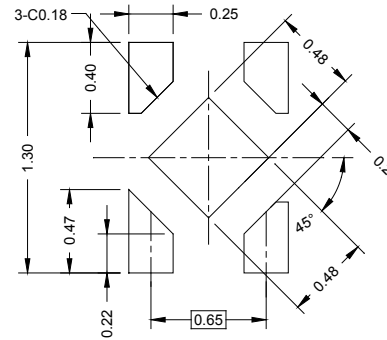
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.500	0.550	0.600
A1	0.000		0.050
A2	0.152 REF		
D	0.950	1.000	1.050
D1	0.450	0.500	0.550
E	0.950	1.000	1.050
E1	0.450	0.500	0.550
b	0.175	0.225	0.275
e	0.625 BSC		
f	0.195 REF		
L	0.200	0.250	0.300

# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

### KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT-23-5	7"	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3
SOT-23-3	7"	9.0	3.20	3.30	1.30	4.0	4.0	2.0	8.0	Q3
UTDFN-1×1-4L	7"	9.0	1.18	1.18	0.68	4.0	2.0	2.0	8.0	Q1

DD0001

# PACKAGE INFORMATION

## CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

## KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7" (Option)	368	227	224	8
7"	442	410	224	18

DD0002