

GENERAL DESCRIPTION

The SGM892A is a low power consumption voltage detector with high accuracy detection. The miniature device offers a fixed detection voltage of 3.1V. The device is ideal for use in power-supply sequencing, reset sequencing, and power-switching applications.

The VOUT pin is a CMOS output with active-low reset.

The SGM892A is available in Green SOT-23 and SC70-3 packages. It is 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 μ A (TYP) at $V_{IN} = 1V$
- **Detection Voltage:** 3.1V
- **Operating Voltage Range:** 1V to 6V
- **Detection Voltage Temperature Coefficient:** $\pm 40\text{ppm}/^\circ\text{C}$ (TYP)
- **CMOS Output**
- **-40°C to +125°C Operating Temperature Range**
- **Available in Green SOT-23 and SC70-3 Packages**

TYPICAL APPLICATION

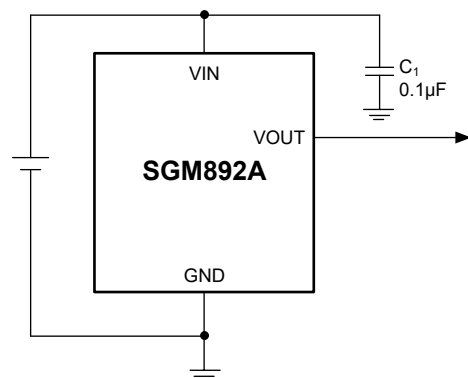


Figure 1. Typical Application Circuit

PACKAGE/ORDERING INFORMATION

MODEL	DETECTION VOLTAGE (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM892A-3.1	3.1	SOT-23	-40°C to +125°C	SGM892A-3.1XN3LG/TR	1PGXX	Tape and Reel, 3000
	3.1	SC70-3	-40°C to +125°C	SGM892A-3.1XC3G/TR	1PKXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XX = Date Code.

YYY X X

Date Code - Week

Date Code - Year

Serial Number

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 7VOutput Current, I_{OUT} 30mAOutput Voltage Range, V_{OUT} GND - 0.3V to 7V

Package Thermal Resistance

SOT-23, θ_{JA} 243.5°C/WSOT-23, θ_{JB} 89.4°C/WSOT-23, θ_{JC} 135.3°C/WSC70-3, θ_{JA} 569.2°C/WSC70-3, θ_{JB} 511.9°C/WSC70-3, θ_{JC} 237.7°C/W

Junction Temperature +150°C

Storage Temperature Range..... -65°C to +150°C

Lead Temperature (Soldering, 10s) +260°C

ESD Susceptibility ^{(1) (2)}

HBM..... ±4000V

CDM ±1000V

NOTES:

1. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.

2. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

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

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

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.

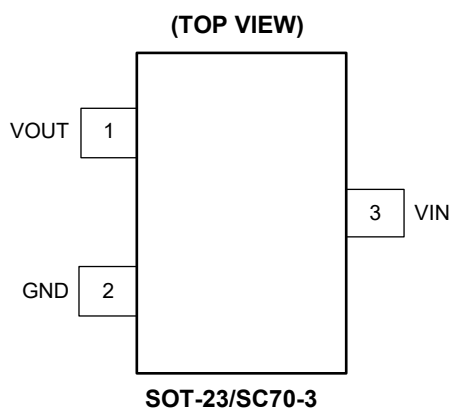
ESD SENSITIVITY CAUTION

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 CONFIGURATION



PIN DESCRIPTION

PIN	NAME	FUNCTION
1	VOUT	Output (Detect 'L') Pin.
2	GND	Ground.
3	VIN	Input Pin.

ELECTRICAL CHARACTERISTICS

(T_J = +25°C, unless otherwise noted.)

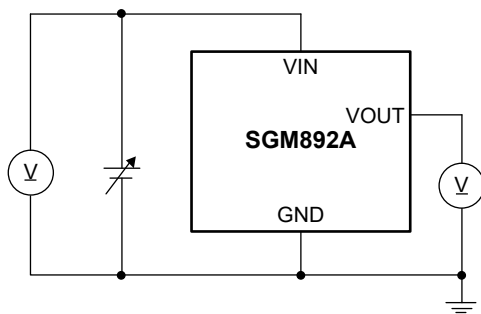
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operating Voltage	V _{IN}	T _J = -40°C to +125°C	1		6	V
Detection Voltage	V _{DET}	Test Circuit 1	T _J = +25°C	3.069	3.1	V
			T _J = -40°C to +125°C	3.038	3.1	
Hysteresis Voltage	V _{HYS}	Test Circuit 1	0.094	0.155	0.216	V
Detection Voltage Temperature Coefficient	$\frac{\Delta V_{DET}}{(\Delta T_J \times V_{DET})}$	T _J = -40°C to +125°C, Test Circuit 1		±40	±150	ppm/°C
Supply Current	I _{CC}	Test Circuit 2	V _{IN} = 1V	0.4	0.7	μA
			V _{IN} = 3V	0.6	1.1	
			V _{IN} = 6V	1.0	1.6	
Output Current	I _{OUT1}	V _{DS_NCH} = 0.5V (N-channel), Test Circuit 3	V _{IN} = 1V	0.2	0.7	mA
			V _{IN} = 2V	9.0	12.0	
			V _{IN} = 3V	13.0	17.5	
	I _{OUT2}	V _{DS_PCH} = 0.5V (P-channel), Test Circuit 4	V _{IN} = 4V	-17.0	-13.0	
			V _{IN} = 5V	-20.0	-16.0	
			V _{IN} = 6V	-22.0	-18.0	
Minimum V _{IN} Voltage for Valid Output	V _{POR}	I _{OL} = 1μA, Test Circuit 5		0.6	0.8	V
Low-Level Output Voltage	V _{OL}	V _{IN} = 1V to 3V, I _{OL} = 120μA, Test Circuit 5		0.02	0.10	V
Leakage Current	I _{LEAK}	V _{IN} = V _{OUT} = 6V (N-channel), Test Circuit 3		0.10	1	μA
		V _{IN} = 0.9 × V _{DET} , V _{OUT} = 0V (P-channel), Test Circuit 4		0.02	1	

TIMING REQUIREMENTS

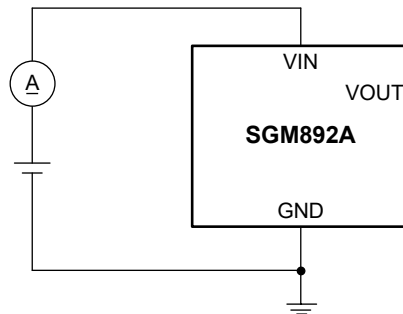
(V_{IN} = 1V to 6V, C₁ = 0.1μF and T_J = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Reset Delay Time (Power-Up Delay)	t _D	V _{IN} rises from 0.9 × V _{DET} to 1.1 × V _{DET} , Test Circuit 6	60	120	170	μs
Propagation Delay, V _{IN} Falling (Power-Down Delay)	t _{PD_VIN}	V _{IN} falls from 1.1 × V _{DET} to 0.9 × V _{DET} , Test Circuit 6		40		μs

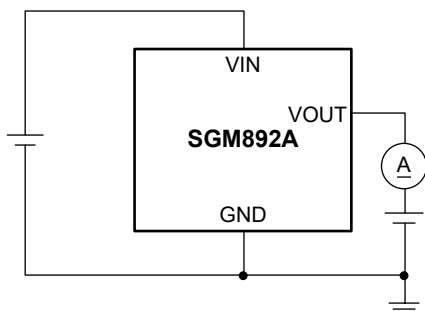
TEST CIRCUITS



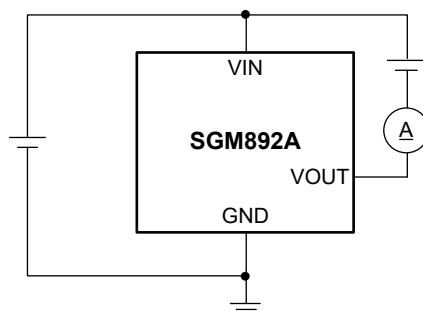
Test Circuit 1



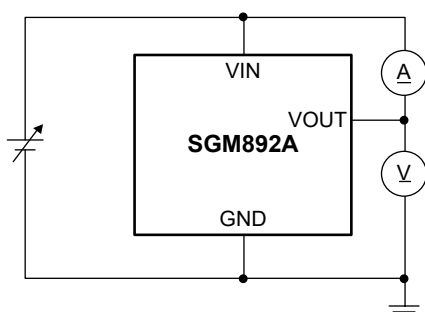
Test Circuit 2



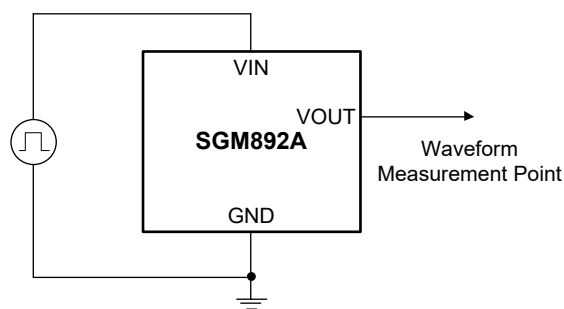
Test Circuit 3



Test Circuit 4

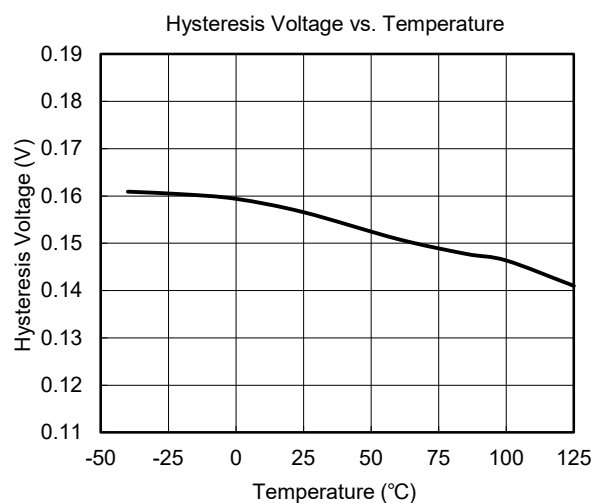
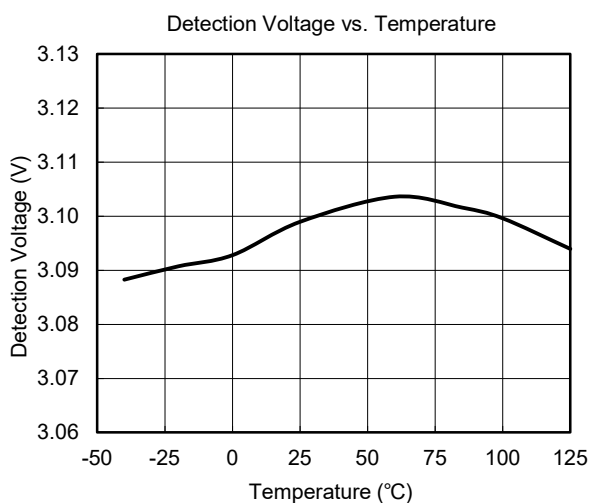
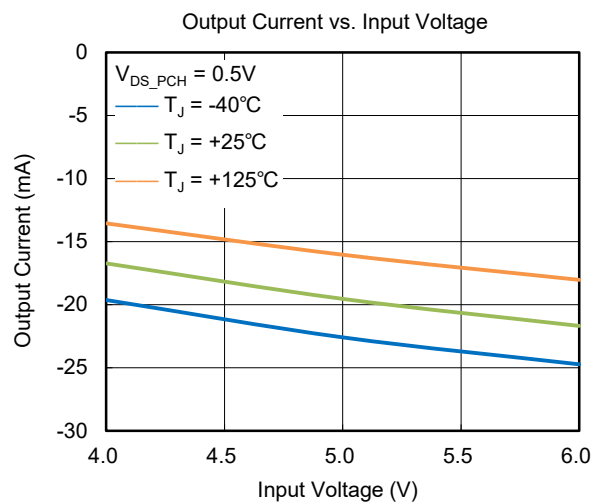
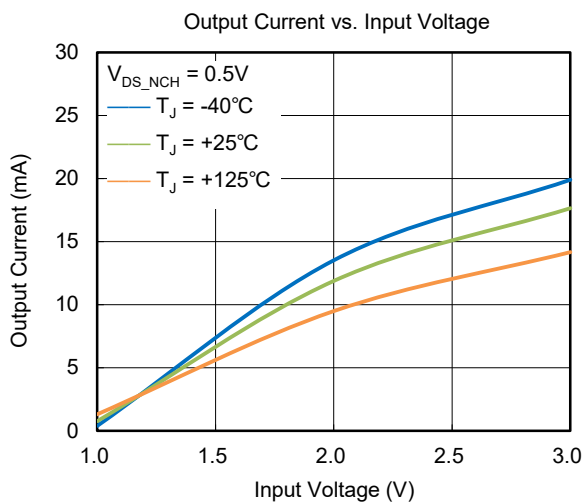
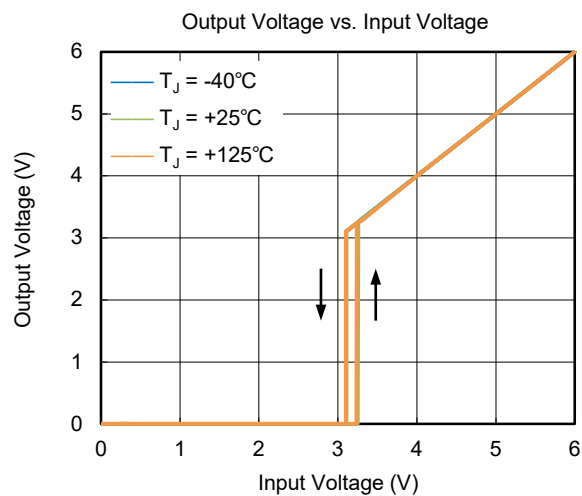
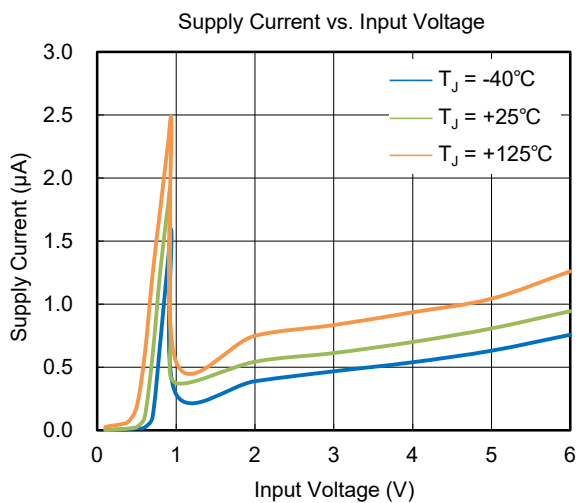


Test Circuit 5

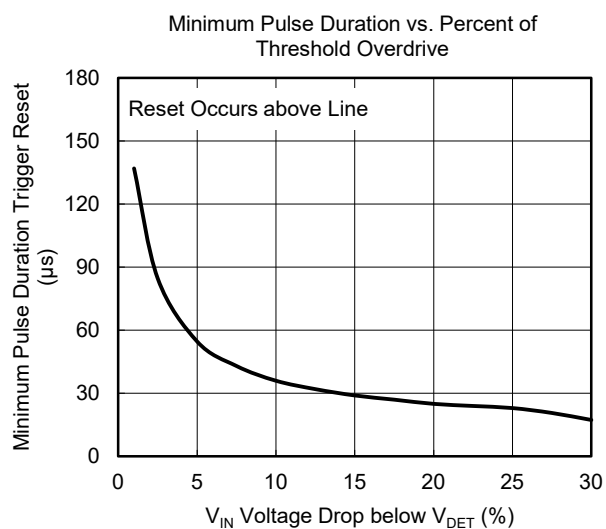


Test Circuit 6

TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (continued)



FUNCTIONAL BLOCK DIAGRAMS

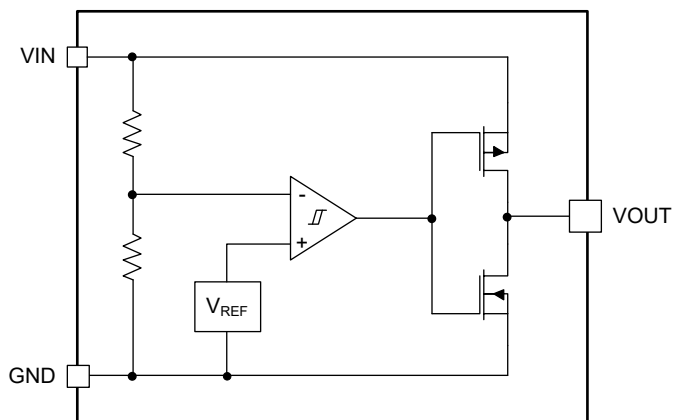


Figure 2. Block Diagram

DETAILED DESCRIPTION

The SGM892A is a supervisory device with ultra-low current and single channel. The detection voltage is factory-set 3.1V. When VIN voltage falls below the detection voltage, V_{DET} , the SGM892A assert an active low at the VOUT pin. The device is designed to be immune to transient voltages at the VIN pin.

VIN Transient Immunity

The SGM892A has a built-in circuit to be immune to transient voltages at 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_{DET}) of the device, as shown in Figure 3.

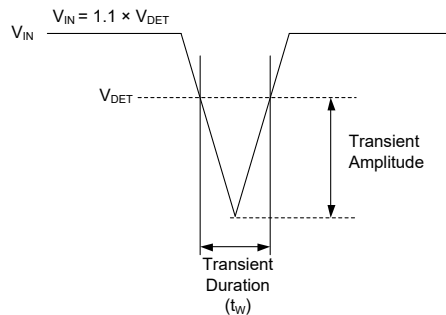


Figure 3. Voltage Transient Measurement

Normal Operation ($V_{IN} > V_{IN_MIN}$)

When the VIN voltage is higher than V_{IN_MIN} , the VOUT status depends on the VIN voltage relative to V_{DET} .

Below V_{IN_MIN} ($V_{POR} < V_{IN} < V_{IN_MIN}$)

When the VIN voltage is lower than V_{IN_MIN} but higher than the power-on reset voltage (V_{POR}), VOUT is asserted.

Below Power-On Reset ($V_{IN} < V_{POR}$)

When the voltage on VIN is lower than the power-on reset voltage (V_{POR}), 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 SGM892A well-suited for the multi-cell, alkaline-battery systems.

Figure 4 shows the SGM892A monitoring the multi-cell alkaline battery. When the cell voltage reaches V_{DET} , which is a typical voltage to stop discharging the alkaline battery, the SGM892A VOUT pin asserts. The SGM66099A EN pin is driven low, and place it in a low-current shutdown state. After SGM66099A is disabled, the combination of the SGM892A and SGM66099A devices consumes only 700nA (TYP).

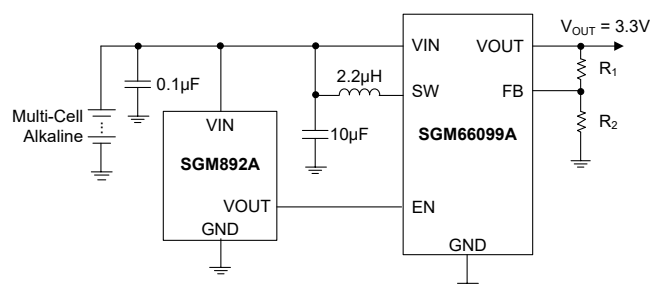


Figure 4. Control Boost Converter

Design Requirements

Table 1. Design Requirements and Results

Design Requirements	Design Result		
	SGM892A	SGM66099A	Combined
Input Voltage Range of 1V to 6V	1V to 6V	0.7V to 5.5V	1V to 5.5V
Shutdown Current < 3µA	1.6µA (MAX)	0.4µA (MAX)	2.0µA (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 SGM892A 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 SGM892A 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 SGM892A drives 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 5 shows the connection of the SGM892A to a bidirectional reset pin of a microcontroller using a series resistor.

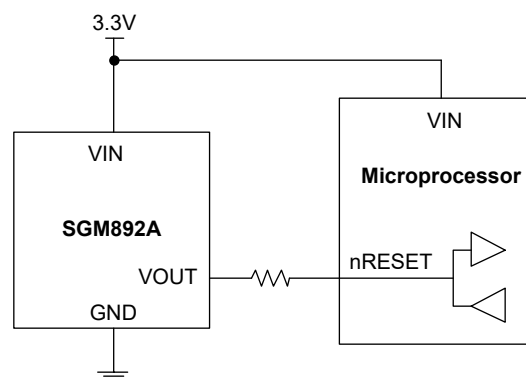


Figure 5. Connection to a Bidirectional Reset Pin

Power Supply Recommendations

The SGM892A 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

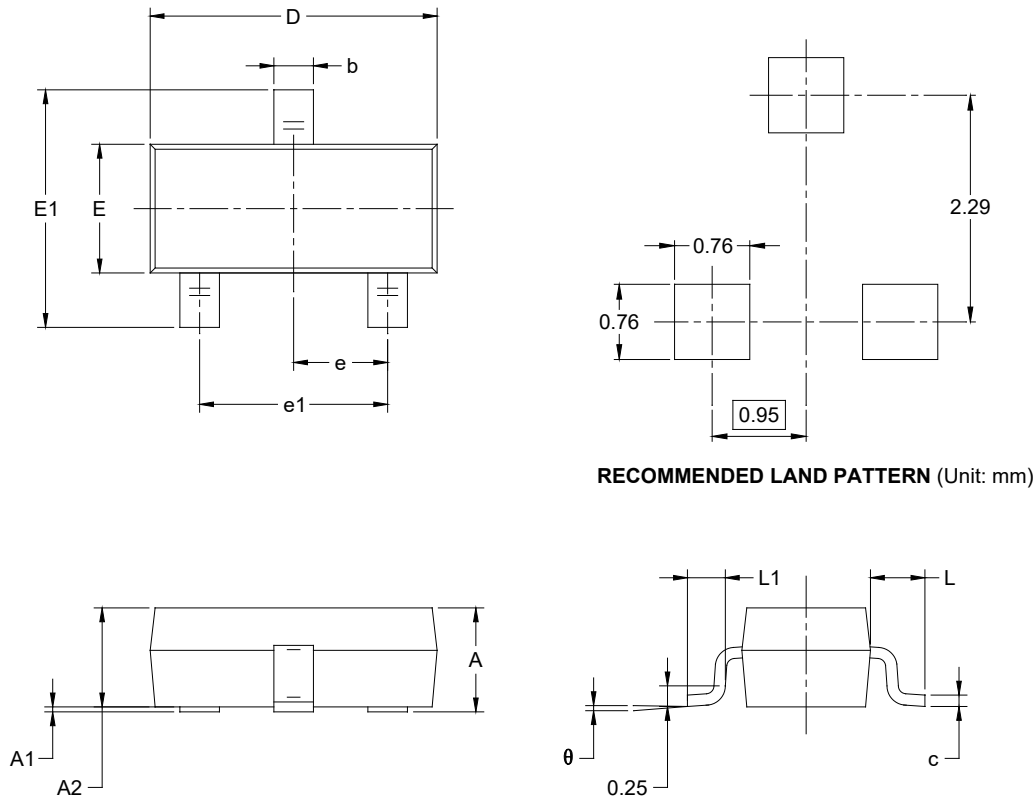
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original to REV.A (JULY 2025)

Changed from product preview to production data.....All

PACKAGE OUTLINE DIMENSIONS

SOT-23



RECOMMENDED LAND PATTERN (Unit: mm)

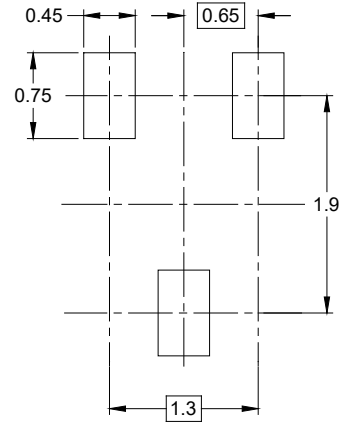
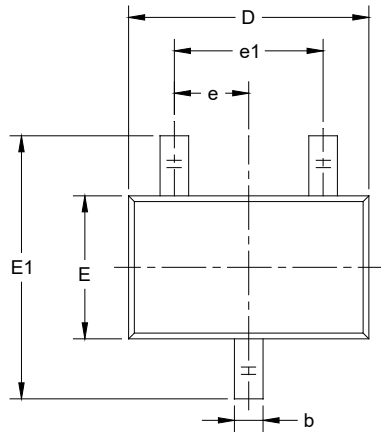
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.89	1.12	0.035	0.044
A1	0.01	0.10	0.000	0.004
A2	0.88	1.02	0.035	0.040
b	0.30	0.50	0.012	0.020
c	0.08	0.20	0.003	0.008
D	2.80	3.04	0.110	0.120
E	1.20	1.40	0.047	0.055
E1	2.10	2.64	0.083	0.104
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.54 REF		0.021 REF	
L1	0.40	0.60	0.016	0.024
θ	0°	8°	0°	8°

NOTES:

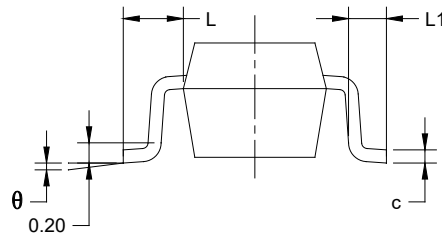
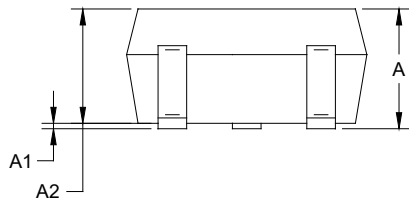
1. Body dimensions do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

SC70-3



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.65 TYP		0.026 TYP	
e1	1.300 BSC		0.051 BSC	
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

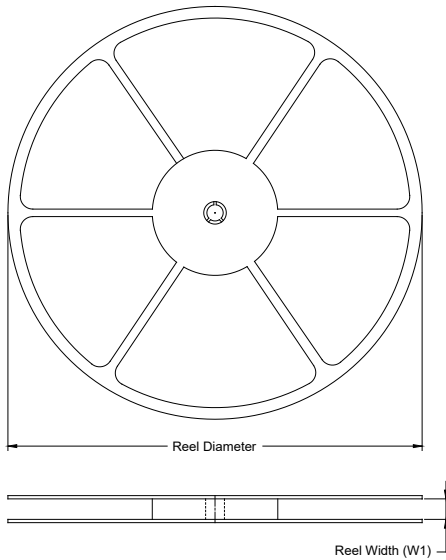
NOTES:

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

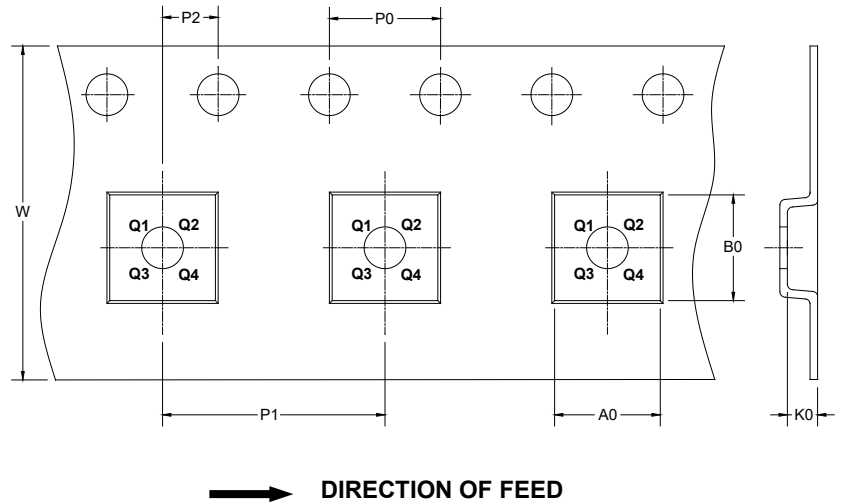
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

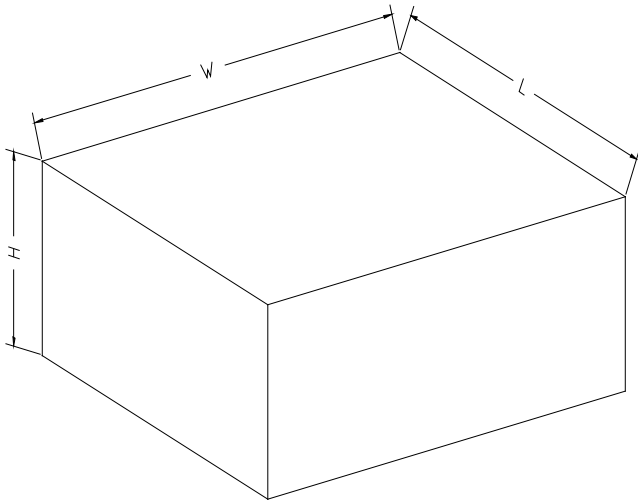
KEY PARAMETER LIST OF TAPE AND REEL

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	7"	9.5	3.15	2.77	1.22	4.0	4.0	2.0	8.0	Q3
SC70-3	7"	9.5	2.25	2.55	1.19	4.0	4.0	2.0	8.0	Q3

DD00001

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