



# SGM811B/SGM812B Microprocessor Supervisory Circuits with Manual Reset Input

## GENERAL DESCRIPTION

The SGM811B and SGM812B are integrated microprocessor supervisory devices which can be reset under power-up, power-down or even voltage reduction brownout conditions. When  $V_{CC}$  is as low as 1V, the reset output can still operate. On the power-on state, the internal timer maintains a 200ms reset assertion that keeps the microprocessor in the reset state until the condition is stable.

The SGM811B has an active-low nRESET output, while the SGM812B has an active-high RESET output. The devices provide three reset threshold voltage options for 3V and 3.3V voltage monitoring.

The devices also provide a manual reset (nMR) function. It can reduce damage if the device loses its control or is locked.

The SGM811B and SGM812B are available in a Green SOT-143 package. They operate over a junction temperature range of  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .

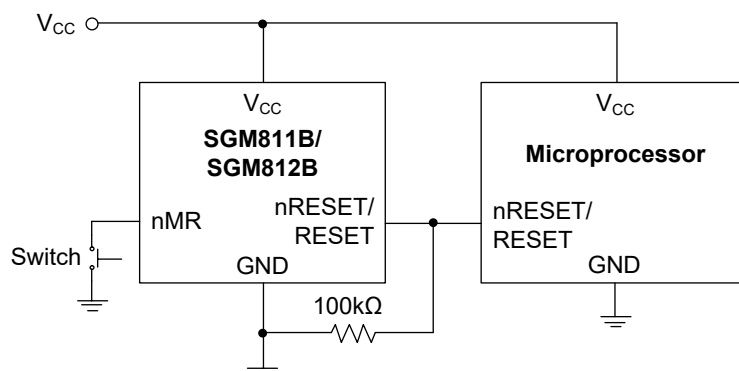
## FEATURES

- Superior Upgrade for MAX811/MAX812 and ADM811/ADM812
- High Accuracy Fixed Detection Options: 3V and 3.3V
- Low Supply Current:  $< 1\mu\text{A}$  (TYP)
- 200ms (TYP) Power-on Reset Pulse Width
- Reset Output Options:
  - ◊ Active-Low nRESET Output: SGM811B
  - ◊ Active-High RESET Output: SGM812B
- Manual Reset Input
- Reset Valid Down to  $V_{CC} = 1\text{V}$
- $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  Operating Temperature Range
- Available in a Green SOT-143 Package

## APPLICATIONS

Computers  
Battery-Powered Applications  
Portable Equipment  
Automotive Equipment  
Safety Systems  
Intelligent Instruments  
Critical  $\mu\text{P}$  Power Monitoring

## TYPICAL APPLICATION

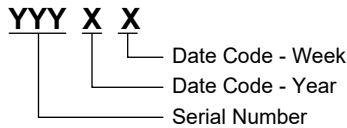


**PACKAGE/ORDERING INFORMATION**

| MODEL   | RESET THRESHOLD (V) | PACKAGE DESCRIPTION | ORDERING NUMBER   | PACKAGE MARKING | PACKING OPTION      |
|---------|---------------------|---------------------|-------------------|-----------------|---------------------|
| SGM811B | 3.08                | SOT-143             | SGM811B-TXKA4G/TR | MNAXX           | Tape and Reel, 3000 |
|         | 2.93                | SOT-143             | SGM811B-SXKA4G/TR | MNBXX           | Tape and Reel, 3000 |
|         | 2.63                | SOT-143             | SGM811B-RXKA4G/TR | MNCXX           | Tape and Reel, 3000 |
| SGM812B | 3.08                | SOT-143             | SGM812B-TXKA4G/TR | MN7XX           | Tape and Reel, 3000 |
|         | 2.93                | SOT-143             | SGM812B-SXKA4G/TR | MN8XX           | Tape and Reel, 3000 |
|         | 2.63                | SOT-143             | SGM812B-RXKA4G/TR | MN9XX           | Tape and Reel, 3000 |

**MARKING INFORMATION**

NOTE: XX = Date Code.



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**

- V<sub>CC</sub>..... -0.3V to 6V
- All Other Inputs .....-0.3V to V<sub>CC</sub> + 0.3V
- Input Current
- V<sub>CC</sub>, nMR .....20mA
- Output Current
- nRESET/RESET .....20mA
- Package Thermal Resistance
- SOT-143, θ<sub>JA</sub>..... 337°C/W
- Power Dissipation @ T<sub>A</sub> = +25°C
- SOT-143, P<sub>D</sub> ..... 0.32W
- Junction Temperature .....+150°C
- Storage Temperature Range ..... -65°C to +150°C
- Lead Temperature (Soldering, 10s).....+260°C
- ESD Susceptibility
- HBM.....4000V
- MM.....400V
- CDM ..... 1000V

**RECOMMENDED OPERATING CONDITIONS**

- Operating Junction 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.

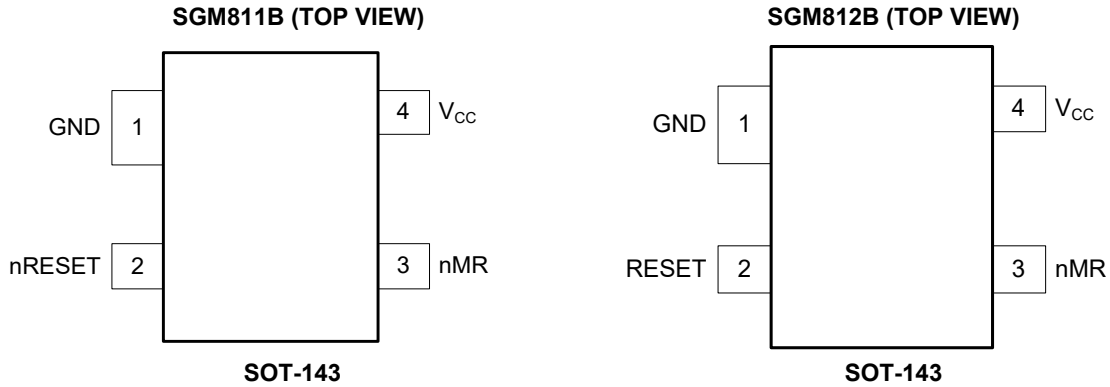
**ESD SENSITIVITY CAUTION**

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**

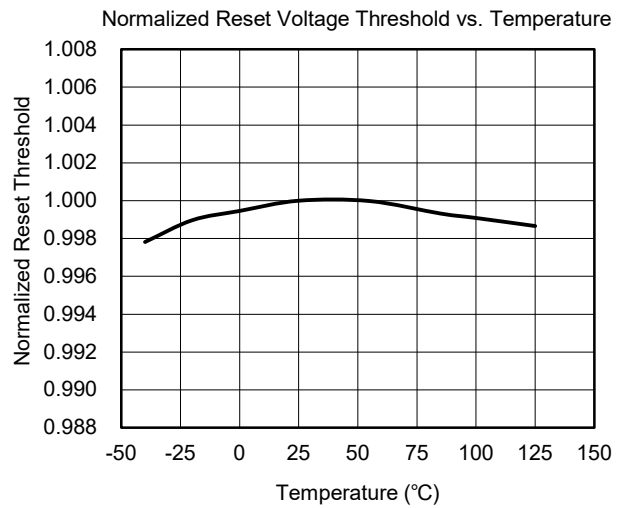
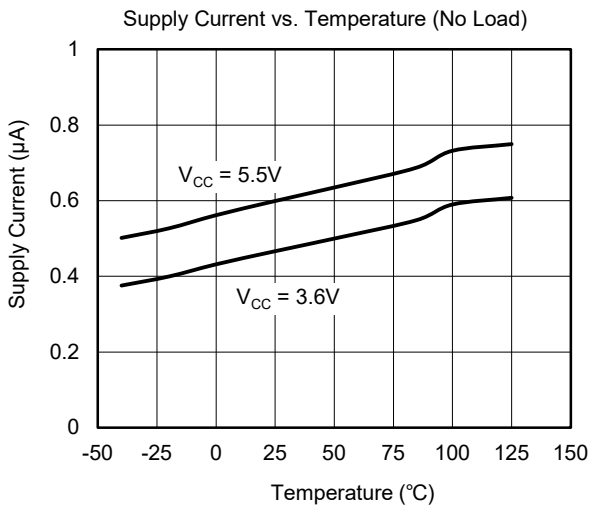
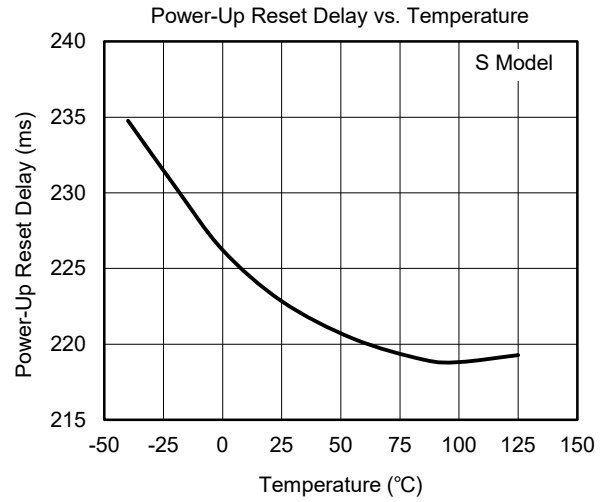
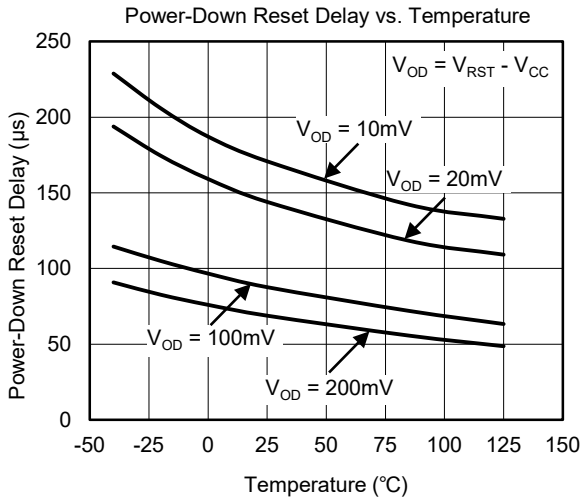
| NAME            | PIN NUMBER |         | FUNCTION   |
|-----------------|------------|---------|--|
|                 | SGM811B    | SGM812B |  |
| GND             | 1          | 1       | Ground.  |
| nRESET          | 2          | —       | Active-Low Reset Output Pin. If V <sub>CC</sub> falls below the reset threshold or nMR is low, nRESET will keep low. If V <sub>CC</sub> exceeds the reset threshold, the nRESET will keep low for 200ms (TYP).   |
| RESET           | —          | 2       | Active-Low Reset Output Pin. If the V <sub>CC</sub> falls below the reset threshold or nMR is low, RESET will keep high. If the V <sub>CC</sub> exceeds the reset threshold, RESET will keep high for 200ms (TYP).   |
| nMR             | 3          | 3       | Manual Reset Input Pin. It is an active-low reset input with an internal pull-up resistor of 59kΩ. nRESET keeps low when nMR is low. When nMR is high, nRESET becomes high after a timeout period. The nMR can be driven by a CMOS logic or by a switch shorting to GND. If not used, leave it open or connect it to V <sub>CC</sub> . |
| V <sub>CC</sub> | 4          | 4       | Supply Voltage Pin.  |

**ELECTRICAL CHARACTERISTICS**

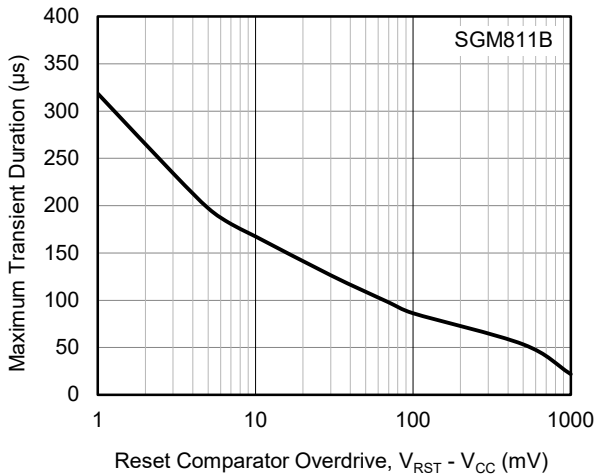
(V<sub>CC</sub> = 3.3V for T/S Models, V<sub>CC</sub> = 3V for R Model, T<sub>J</sub> = -40°C to +125°C, typical values are at T<sub>J</sub> = +25°C, unless otherwise noted.)

| PARAMETER                               |                        | SYMBOL              | CONDITIONS   | MIN                              | TYP  | MAX                   | UNITS  |   |
|---|------------------------|---------------------|--|----------------------------------|------|-----------------------|--------|---|
| Operating Voltage Range                 |                        | V <sub>CC</sub>     |  | 1.0                              |      | 5.5                   | V      |   |
| Supply Current                          |                        | I <sub>SUPPLY</sub> | V <sub>CC</sub> = 3.6V   |                                  | 0.5  | 1.0                   | μA     |   |
|   |                        |                     | V <sub>CC</sub> = 5.5V   |                                  | 0.6  | 1.4                   |        |   |
| Reset Threshold                         |                        | V <sub>RST</sub>    | T Model  | T <sub>J</sub> = +25°C           | 3.03 | 3.08                  | 3.14   | V |
|   |                        |                     |  | T <sub>J</sub> = -40°C to +125°C | 3.03 |                       | 3.15   |   |
|   |                        |                     | S Model  | T <sub>J</sub> = +25°C           | 2.88 | 2.93                  | 2.98   |   |
|   |                        |                     |  | T <sub>J</sub> = -40°C to +125°C | 2.87 |                       | 2.99   |   |
|   |                        |                     | R Model  | T <sub>J</sub> = +25°C           | 2.59 | 2.63                  | 2.67   |   |
|   |                        |                     |  | T <sub>J</sub> = -40°C to +125°C | 2.58 |                       | 2.68   |   |
| Reset Threshold Hysteresis              |                        |                     | T Model  |                                  | 13   |                       | mV     |   |
|   |                        |                     | S Model  |                                  | 13   |                       |        |   |
|   |                        |                     | R Model  |                                  | 12   |                       |        |   |
| Reset Threshold Temperature Coefficient |                        |                     | T <sub>J</sub> = -40°C to +125°C   |                                  | 20   |                       | ppm/°C |   |
| V <sub>CC</sub> to Reset Delay          |                        | t <sub>RD</sub>     | V <sub>RST</sub> - V <sub>CC</sub> = 100mV                                   |                                  | 84   |                       | μs     |   |
| Reset Pulse Width                       |                        | t <sub>RS</sub>     |  | 140                              | 200  | 290                   | ms     |   |
| <b>Manual Reset</b>                     |                        |                     |  |                                  |      |                       |        |   |
| Minimum Pulse Width                     |                        |                     |  | 300                              |      |                       | ns     |   |
| Glitch Immunity                         |                        |                     |  |                                  | 130  |                       | ns     |   |
| Reset Propagation Delay                 |                        |                     |  |                                  |      | 400                   | ns     |   |
| Pull-Up Resistance                      |                        |                     |  | 40                               | 59   | 81                    | kΩ     |   |
| The Manual Reset Circuit Act on:        | An Input Rising above  |                     | V <sub>CC</sub> > V <sub>RST(MAX)</sub>                                      | 0.7 × V <sub>CC</sub>            |      |                       | V      |   |
|   | An Input Falling below |                     | V <sub>CC</sub> > V <sub>RST(MAX)</sub>                                      |                                  |      | 0.3 × V <sub>CC</sub> |        |   |
| <b>nRESET/RESET Output Voltage</b>      |                        |                     |  |                                  |      |                       |        |   |
| Low (SGM811B)                           |                        |                     | V <sub>CC</sub> = V <sub>RST(MIN)</sub> , I <sub>SINK</sub> = 1.2mA          |                                  |      | 0.4                   | V      |   |
| Low (SGM811B)                           |                        |                     | V <sub>CC</sub> > 1.0V, I <sub>SINK</sub> = 50μA                             |                                  |      | 0.3                   |        |   |
| High (SGM811B)                          |                        |                     | V <sub>CC</sub> > V <sub>RST(MAX)</sub> , I <sub>SOURCE</sub> = 30μA         | 0.8 × V <sub>CC</sub>            |      |                       |        |   |
| Low (SGM812B)                           |                        |                     | V <sub>CC</sub> = V <sub>RST(MAX)</sub> , I <sub>SINK</sub> = 1.2mA          |                                  |      | 0.4                   |        |   |
| High (SGM812B)                          |                        |                     | 1.8V < V <sub>CC</sub> < V <sub>RST(MIN)</sub> , I <sub>SOURCE</sub> = 150μA | 0.8 × V <sub>CC</sub>            |      |                       |        |   |

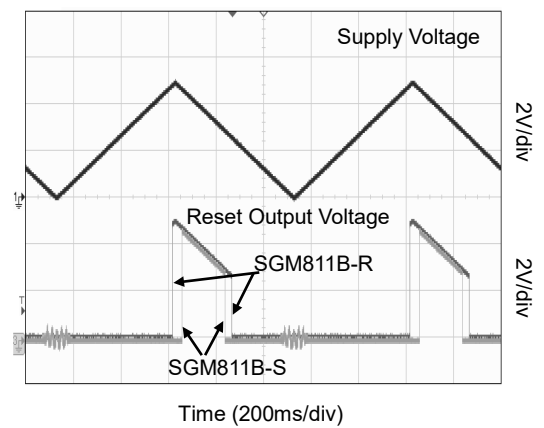
**TYPICAL PERFORMANCE CHARACTERISTICS**



Maximum Transient Duration without Causing a Reset Pulse vs. Reset Comparator Overdrive



Reset Output Voltage vs. Supply Voltage



**APPLICATION INFORMATION**

**Manual Reset Input**

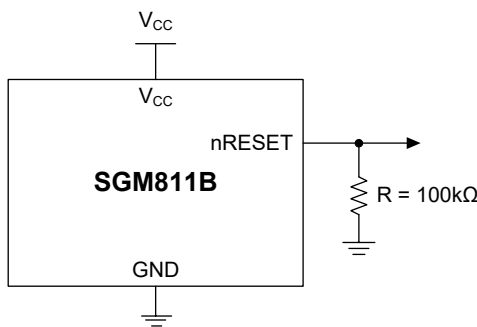
The SGM811B and SGM812B provide a manual reset (nMR) function that allows users to reset the system manually. It is an active-low reset input with an internal pull-up resistor of 59kΩ. When the nMR is low, and for  $t_{RS}$  (200ms, TYP) after nMR returns high, the reset remains active. The nMR can be driven by a CMOS logic or by a reset switch shorting to GND. If not used, leave it open or connect it to the  $V_{CC}$ . When the device is far away from the reset switch or used in a noisy environment, a 0.1μF capacitor is recommended to connect between nMR and GND.

**Precise Reset Threshold**

When the supply voltage drops significantly for the power supply fault, the SGM811B and SGM812B can even operate normally, which greatly reduces the possibility of system failure. In addition, the internal reference voltage accuracy of the SGM811B and SGM812B is very high, which provides high reliability of the devices.

**nRESET Valid to  $V_{CC} = 0V$  (SGM811B)**

The nRESET of SGM811B will stop sinking current and become open circuit if  $V_{CC}$  is below 1.0V. And if a high impedance CMOS logic input is connected to the nRESET, the logic level of the CMOS input is undetermined. To solve the problem, it is recommended to use a 100kΩ resistor between nRESET and GND.



**Figure 1. nRESET Valid to  $V_{CC} = 0V$  Circuit**

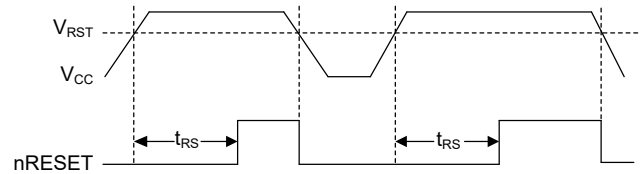
**Reset Output**

To ensure sufficient time for the power supply and microprocessor to stabilize after power-up, a 200ms (TYP) reset output will hold by the internal timer after  $V_{CC}$  exceeds the reset threshold voltage. Similarly, a 200ms (TYP) reset output will also exist after the power supply recover from brownout or interruption that allows the power supply and microprocessor to have enough time to reach a steady state (Figure 2).

The SGM811B has an active-low nRESET output, while the SGM812B has an active-high RESET output. When  $V_{CC}$  is as low as 1V during power-down, the nRESET of the SGM811B will continue output a low level. This not only keeps the microprocessor shutdown when the supply voltage falls, but also prevents the microprocessor occurring false actions when it powers up.

**Glitch Immunity**

The SGM811B and SGM812B have an internal filter circuit, which makes them have glitch immunity ability to bear the fast transient glitches on the power supply.



**Figure 2. Power Fail nRESET Timing**

**Interfacing to Other Devices Output**

In order to allow the SGM811B and SGM812B to be integrated with a variety of devices, it is guaranteed that the reset output is proportional to the  $V_{CC}$  when the  $V_{CC}$  is more than 1V. This allows the device to be used with any supply voltage between the minimum and maximum of the  $V_{CC}$ , including 3V and 3.3V.

## REVISION HISTORY

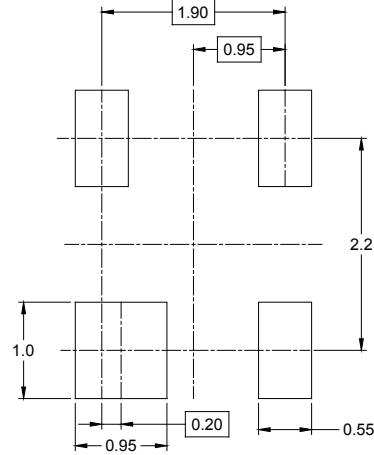
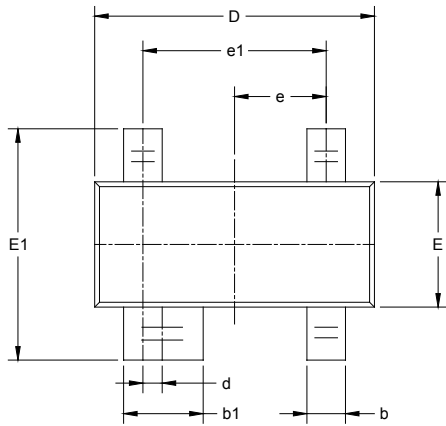
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

| <b>JUNE 2022 – REV.A.2 to REV.A.3</b>   | <b>Page</b> |
|---|-------------|
| Updated General Description section.....  | 1           |
| Updated Application Information section.....  | 6           |
| <hr/>   |             |
| <b>SEPTEMBER 2021 – REV.A.1 to REV.A.2</b>  | <b>Page</b> |
| Changed Electrical Characteristics .....  | 4           |
| <hr/>   |             |
| <b>FEBRUARY 2021 – REV.A to REV.A.1</b>   | <b>Page</b> |
| Changed Electrical Characteristics and Typical Performance Characteristics sections ..... | 4, 5        |
| <hr/>   |             |
| <b>Changes from Original (DECEMBER 2018) to REV.A</b>                                     |             |
| Changed from product preview to production data.....                                      | All         |

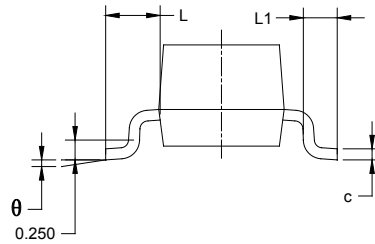
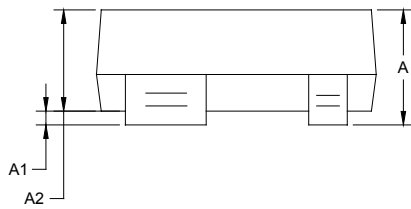
---

PACKAGE OUTLINE DIMENSIONS

SOT-143



RECOMMENDED LAND PATTERN (Unit: mm)



| Symbol   | Dimensions<br>In Millimeters |       | Dimensions<br>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 |
| c        | 0.080                        | 0.150 | 0.003                   | 0.006 |
| D        | 2.800                        | 3.000 | 0.110                   | 0.118 |
| d        | 0.200 TYP                    |       | 0.008 TYP               |       |
| E        | 1.200                        | 1.400 | 0.047                   | 0.055 |
| E1       | 2.250                        | 2.550 | 0.089                   | 0.100 |
| e        | 0.95 TYP                     |       | 0.037 TYP               |       |
| e1       | 1.800                        | 2.000 | 0.071                   | 0.079 |
| L        | 0.55 REF                     |       | 0.022 REF               |       |
| L1       | 0.300                        | 0.500 | 0.012                   | 0.020 |
| $\theta$ | 0°                           | 8°    | 0°                      | 8°    |



**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-143      | 7"            | 9.5                | 3.20    | 2.80    | 1.30    | 4.0     | 4.0     | 2.0     | 8.0    | Q3            |

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