

### GENERAL DESCRIPTION

The SGM803, SGM809 and SGM810 are integrated microprocessor supervisory devices. Compared with the design using a single IC or discrete components, this integration design has the advantage of improving system stability and accuracy.

The devices 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 240ms reset assertion that keeps the microprocessor in the reset state until the condition is stable.

The SGM803 has an open-drain  $\overline{\text{RESET}}$  output that needs a resistor pulled up to  $V_{CC}$ . The SGM809 has a push-pull  $\overline{\text{RESET}}$  output. And the SGM810 has a push-pull RESET output. All devices provide eight reset threshold voltage options for 1.8V, 2.5V, 3V, 3.3V and 5V voltage monitoring.

The devices also feature excellent transient immunity to ignore fast  $V_{CC}$  transients. Low quiescent current makes the SGM803, SGM809 and SGM810 very suitable for battery-powered applications.

The SGM803, SGM809 and SGM810 are available in Green SOT-23-3 and SOT-23 packages. They operate over an ambient temperature range of  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .

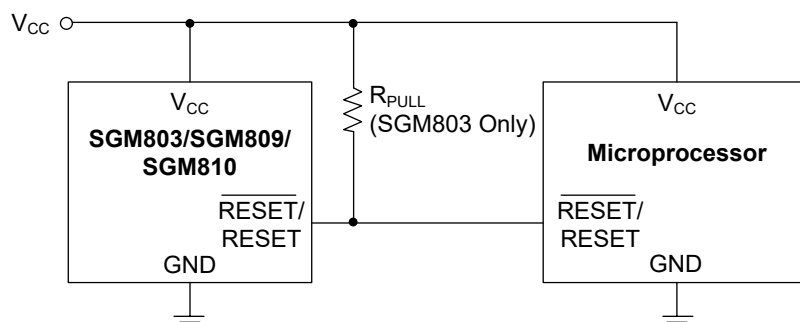
### FEATURES

- Superior Upgrade for MAX803/MAX809/MAX810 and ADM803/ADM809/ADM810
- High Accuracy Fixed Detection Options: 1.8V, 2.5V, 3V, 3.3V and 5V
- Low Current Consumption: 13 $\mu\text{A}$  (TYP)
- 150ms (MIN) Power-On Reset
- Reset Output Options:
  - Open-Drain  $\overline{\text{RESET}}$  Output: SGM803
  - Push-Pull  $\overline{\text{RESET}}$  Output: SGM809
  - Push-Pull RESET Output: SGM810
- Reset Assertion Down to 1V  $V_{CC}$
- $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  Operating Temperature Range
- Available in Green SOT-23-3 and SOT-23 Packages

### APPLICATIONS

Computers  
 Battery-Powered Applications  
 Portable Equipment  
 Automotive Equipment  
 Controllers  
 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      |
|--------|---------------------|---------------------|-----------------|-----------------|---------------------|
| SGM803 | 4.63                | SOT-23-3            | SGM803-LXN3/TR  | 803L            | Tape and Reel, 3000 |
|        | 4.63                | SOT-23              | SGM803-LXN3L/TR | 803LL           | Tape and Reel, 3000 |
|        | 4.38                | SOT-23-3            | SGM803-MXN3/TR  | 803M            | Tape and Reel, 3000 |
|        | 4.38                | SOT-23              | SGM803-MXN3L/TR | 803ML           | Tape and Reel, 3000 |
|        | 4.00                | SOT-23-3            | SGM803-JXN3/TR  | 803J            | Tape and Reel, 3000 |
|        | 4.00                | SOT-23              | SGM803-JXN3L/TR | 803JL           | Tape and Reel, 3000 |
|        | 3.08                | SOT-23-3            | SGM803-TXN3/TR  | 803T            | Tape and Reel, 3000 |
|        | 3.08                | SOT-23              | SGM803-TXN3L/TR | 803TL           | Tape and Reel, 3000 |
|        | 2.93                | SOT-23-3            | SGM803-SXN3/TR  | 803S            | Tape and Reel, 3000 |
|        | 2.93                | SOT-23              | SGM803-SXN3L/TR | 803SL           | Tape and Reel, 3000 |
|        | 2.63                | SOT-23-3            | SGM803-RXN3/TR  | 803R            | Tape and Reel, 3000 |
|        | 2.63                | SOT-23              | SGM803-RXN3L/TR | 803RL           | Tape and Reel, 3000 |
|        | 2.32                | SOT-23-3            | SGM803-ZXN3/TR  | 803Z            | Tape and Reel, 3000 |
|        | 2.32                | SOT-23              | SGM803-ZXN3L/TR | 803ZL           | Tape and Reel, 3000 |
|        | 1.63                | SOT-23-3            | SGM803-XXN3/TR  | 803X            | Tape and Reel, 3000 |
|        | 1.63                | SOT-23              | SGM803-XXN3L/TR | 803XL           | Tape and Reel, 3000 |
| SGM809 | 4.63                | SOT-23-3            | SGM809-LXN3/TR  | 809L            | Tape and Reel, 3000 |
|        | 4.63                | SOT-23              | SGM809-LXN3L/TR | 809LL           | Tape and Reel, 3000 |
|        | 4.38                | SOT-23-3            | SGM809-MXN3/TR  | 809M            | Tape and Reel, 3000 |
|        | 4.38                | SOT-23              | SGM809-MXN3L/TR | 809ML           | Tape and Reel, 3000 |
|        | 4.00                | SOT-23-3            | SGM809-JXN3/TR  | 809J            | Tape and Reel, 3000 |
|        | 4.00                | SOT-23              | SGM809-JXN3L/TR | 809JL           | Tape and Reel, 3000 |
|        | 3.08                | SOT-23-3            | SGM809-TXN3/TR  | 809T            | Tape and Reel, 3000 |
|        | 3.08                | SOT-23              | SGM809-TXN3L/TR | 809TL           | Tape and Reel, 3000 |
|        | 2.93                | SOT-23-3            | SGM809-SXN3/TR  | 809S            | Tape and Reel, 3000 |
|        | 2.93                | SOT-23              | SGM809-SXN3L/TR | 809SL           | Tape and Reel, 3000 |
|        | 2.63                | SOT-23-3            | SGM809-RXN3/TR  | 809R            | Tape and Reel, 3000 |
|        | 2.63                | SOT-23              | SGM809-RXN3L/TR | 809RL           | Tape and Reel, 3000 |
|        | 2.32                | SOT-23-3            | SGM809-ZXN3/TR  | 809Z            | Tape and Reel, 3000 |
|        | 2.32                | SOT-23              | SGM809-ZXN3L/TR | 809ZL           | Tape and Reel, 3000 |
|        | 1.63                | SOT-23-3            | SGM809-XXN3/TR  | 809X            | Tape and Reel, 3000 |
|        | 1.63                | SOT-23              | SGM809-XXN3L/TR | 809XL           | Tape and Reel, 3000 |

## PACKAGE/ORDERING INFORMATION (continued)

| MODEL  | RESET THRESHOLD (V) | PACKAGE DESCRIPTION | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION      |
|--------|---------------------|---------------------|-----------------|-----------------|---------------------|
| SGM810 | 4.63                | SOT-23-3            | SGM810-LXN3/TR  | 810L            | Tape and Reel, 3000 |
|        | 4.63                | SOT-23              | SGM810-LXN3L/TR | 810LL           | Tape and Reel, 3000 |
|        | 4.38                | SOT-23-3            | SGM810-MXN3/TR  | 810M            | Tape and Reel, 3000 |
|        | 4.38                | SOT-23              | SGM810-MXN3L/TR | 810ML           | Tape and Reel, 3000 |
|        | 4.00                | SOT-23-3            | SGM810-JXN3/TR  | 810J            | Tape and Reel, 3000 |
|        | 4.00                | SOT-23              | SGM810-JXN3L/TR | 810JL           | Tape and Reel, 3000 |
|        | 3.08                | SOT-23-3            | SGM810-TXN3/TR  | 810T            | Tape and Reel, 3000 |
|        | 3.08                | SOT-23              | SGM810-TXN3L/TR | 810TL           | Tape and Reel, 3000 |
|        | 2.93                | SOT-23-3            | SGM810-SXN3/TR  | 810S            | Tape and Reel, 3000 |
|        | 2.93                | SOT-23              | SGM810-SXN3L/TR | 810SL           | Tape and Reel, 3000 |
|        | 2.63                | SOT-23-3            | SGM810-RXN3/TR  | 810R            | Tape and Reel, 3000 |
|        | 2.63                | SOT-23              | SGM810-RXN3L/TR | 810RL           | Tape and Reel, 3000 |
|        | 2.32                | SOT-23-3            | SGM810-ZXN3/TR  | 810Z            | Tape and Reel, 3000 |
|        | 2.32                | SOT-23              | SGM810-ZXN3L/TR | 810ZL           | Tape and Reel, 3000 |
|        | 1.63                | SOT-23-3            | SGM810-XXN3/TR  | 810X            | Tape and Reel, 3000 |
|        | 1.63                | SOT-23              | SGM810-XXN3L/TR | 810XL           | Tape and Reel, 3000 |

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

(Typical values are at  $T_A = +25^\circ\text{C}$ , unless otherwise noted.)

$V_{CC}$ ..... -0.3V to 6V

RESET,  $\overline{\text{RESET}}$ ..... -0.3V to  $V_{CC} + 0.3\text{V}$

Input Current,  $V_{CC}$ ..... 20mA

Output Current, RESET,  $\overline{\text{RESET}}$ ..... 20mA

Rate of Rise,  $V_{CC}$ ..... 100V/ $\mu\text{s}$

Power Dissipation,  $P_D$  @  $T_A = +25^\circ\text{C}$

SOT-23-3 ..... 0.4W

Package Thermal Resistance

SOT-23-3,  $\theta_{JA}$  ..... 250 $^\circ\text{C}/\text{W}$

Junction Temperature ..... +150 $^\circ\text{C}$

Storage Temperature Range ..... -65 $^\circ\text{C}$  to +150 $^\circ\text{C}$

Lead Temperature (Soldering, 10s) ..... +260 $^\circ\text{C}$

ESD Susceptibility

HBM..... 4000V

MM..... 400V

## RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range ..... -40 $^\circ\text{C}$  to +125 $^\circ\text{C}$

## 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.

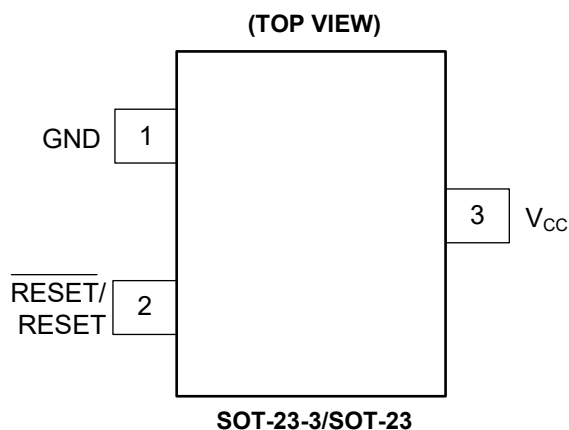
## ESD SENSITIVITY CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. 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 very small parametric changes could cause the device not to meet its published specifications.

## DISCLAIMER

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

## PIN CONFIGURATIONS



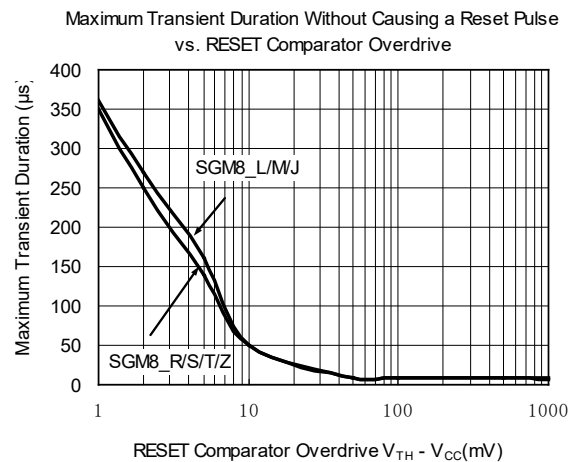
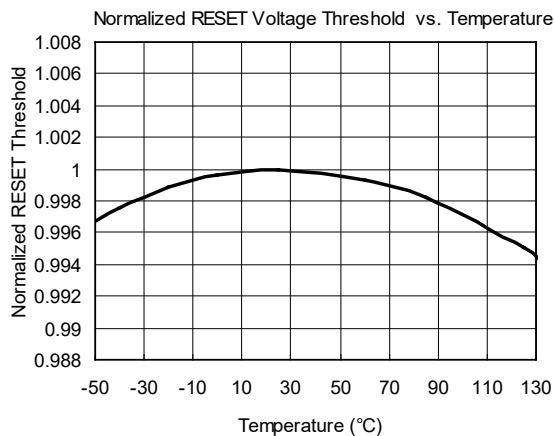
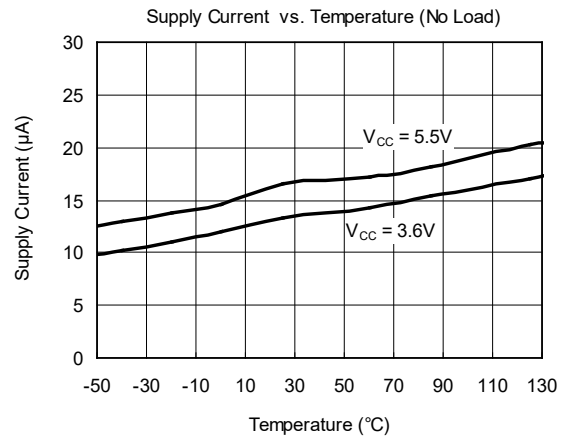
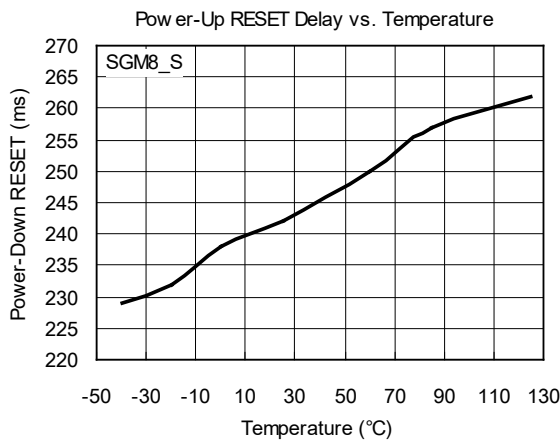
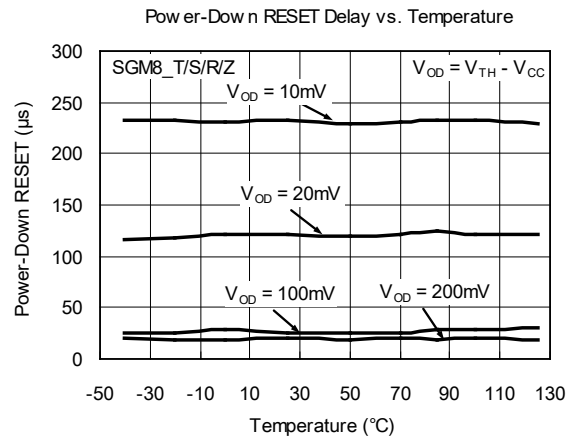
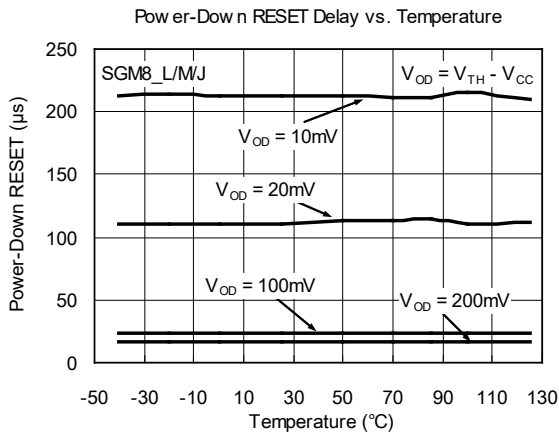
## PIN DESCRIPTION

| NAME                      | PIN NUMBER |        |        | FUNCTION                                                                                                                                                                                                                                                                |
|---------------------------|------------|--------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | SGM803     | SGM809 | SGM810 |                                                                                                                                                                                                                                                                         |
| GND                       | 1          | 1      | 1      | Ground Pin.                                                                                                                                                                                                                                                             |
| $\overline{\text{RESET}}$ | 2          | 2      | —      | Active-Low Reset Output (SGM803/SGM809). If V <sub>CC</sub> is lower than the reset threshold, the $\overline{\text{RESET}}$ goes low. If V <sub>CC</sub> voltage is higher than the reset threshold, the reset output remains low within a timeout period (240ms, TYP) |
| RESET                     | —          | —      | 2      | Active-High Reset Output Pin (SGM810). It is the inverse of $\overline{\text{RESET}}$ .                                                                                                                                                                                 |
| V <sub>CC</sub>           | 3          | 3      | 3      | Supply Voltage Pin.                                                                                                                                                                                                                                                     |

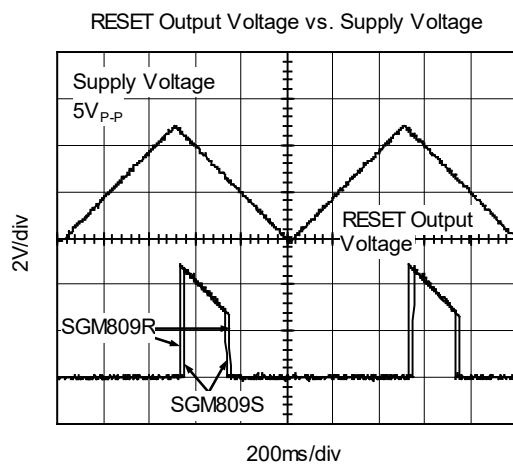
**ELECTRICAL CHARACTERISTICS**(V<sub>CC</sub> = 5V for L/M/J Models, 3.3V for T/S Models, 3V for R Models, 2.5V for Z Model, 1.8V for X Model, unless otherwise noted.)

| PARAMETER                                                  | CONDITIONS                                                                  | MIN                   | TYP  | MAX   | UNITS  |
|------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------|------|-------|--------|
| <b>SUPPLY</b>                                              |                                                                             |                       |      |       |        |
| Voltage                                                    | T <sub>A</sub> = 0°C to +70°C                                               | 1.0                   |      | 5.5   | V      |
|                                                            | T <sub>A</sub> = -40°C to +125°C                                            | 1.2                   |      | 5.5   | V      |
| Current                                                    | V <sub>CC</sub> < 5.5V, SGM8_L/M/J, T <sub>A</sub> = +25°C                  |                       | 17   | 30    | μA     |
|                                                            | V <sub>CC</sub> < 5.5V, SGM8_L/M/J, T <sub>A</sub> = -40°C to +125°C        |                       |      | 50    | μA     |
|                                                            | V <sub>CC</sub> < 3.6V, SGM8_R/S/T/Z/X, T <sub>A</sub> = +25°C              |                       | 13   | 25    | μA     |
|                                                            | V <sub>CC</sub> < 3.6V, SGM8_R/S/T/Z/X, T <sub>A</sub> = -40°C to +125°C    |                       |      | 45    | μA     |
| <b>RESET VOLTAGE THRESHOLD</b>                             |                                                                             |                       |      |       |        |
| SGM8_L                                                     | T <sub>A</sub> = +25°C                                                      | 4.537                 | 4.63 | 4.723 | V      |
|                                                            | T <sub>A</sub> = -40°C to +125°C                                            | 4.40                  |      | 4.86  | V      |
| SGM8_M                                                     | T <sub>A</sub> = +25°C                                                      | 4.292                 | 4.38 | 4.468 | V      |
|                                                            | T <sub>A</sub> = -40°C to +125°C                                            | 4.16                  |      | 4.56  | V      |
| SGM8_J                                                     | T <sub>A</sub> = +25°C                                                      | 3.92                  | 4.00 | 4.08  | V      |
|                                                            | T <sub>A</sub> = -40°C to +125°C                                            | 3.8                   |      | 4.2   | V      |
| SGM8_T                                                     | T <sub>A</sub> = +25°C                                                      | 3.003                 | 3.08 | 3.157 | V      |
|                                                            | T <sub>A</sub> = -40°C to +125°C                                            | 2.92                  |      | 3.23  | V      |
| SGM8_S                                                     | T <sub>A</sub> = +25°C                                                      | 2.857                 | 2.93 | 3.003 | V      |
|                                                            | T <sub>A</sub> = -40°C to +125°C                                            | 2.78                  |      | 3.08  | V      |
| SGM8_R                                                     | T <sub>A</sub> = +25°C                                                      | 2.564                 | 2.63 | 2.696 | V      |
|                                                            | T <sub>A</sub> = -40°C to +125°C                                            | 2.50                  |      | 2.76  | V      |
| SGM8_Z                                                     | T <sub>A</sub> = +25°C                                                      | 2.262                 | 2.32 | 2.378 | V      |
|                                                            | T <sub>A</sub> = -40°C to +125°C                                            | 2.22                  |      | 2.42  | V      |
| SGM8_X                                                     | T <sub>A</sub> = +25°C                                                      | 1.589                 | 1.63 | 1.671 | V      |
|                                                            | T <sub>A</sub> = -40°C to +125°C                                            | 1.55                  |      | 1.71  | V      |
| Reset Threshold Temperature Coefficient                    |                                                                             |                       | 30   |       | ppm/°C |
| V <sub>CC</sub> to RESET/RESET Delay                       | V <sub>CC</sub> = V <sub>TH</sub> to (V <sub>TH</sub> - 100mV)              |                       | 20   |       | μs     |
| Reset Active Timeout Period                                | T <sub>A</sub> = -40°C to +85°C                                             | 150                   | 240  | 560   | ms     |
|                                                            | T <sub>A</sub> = -40°C to +125°C                                            | 100                   |      | 840   | ms     |
| <b>RESET/RESET OUTPUT VOLTAGE</b>                          |                                                                             |                       |      |       |        |
| Low (SGM803R/S/T/Z/X)<br>Low (SGM809R/S/T/Z/X)             | V <sub>CC</sub> = V <sub>TH(MIN)</sub> , I <sub>SINK</sub> = 1.2mA          |                       |      | 0.3   | V      |
| Low (SGM803L/M/J)<br>Low (SGM809L/M/J)                     | V <sub>CC</sub> = V <sub>TH(MIN)</sub> , I <sub>SINK</sub> = 3.2mA          |                       |      | 0.4   | V      |
| Low (SGM803R/S/T/L/M/J/Z/X)<br>Low (SGM809R/S/T/L/M/J/Z/X) | V <sub>CC</sub> > 1.0V, I <sub>SINK</sub> = 50μA                            |                       |      | 0.3   | V      |
| High (SGM809R/S/T/Z/X)                                     | V <sub>CC</sub> > V <sub>TH(MAX)</sub> , I <sub>SOURCE</sub> = 500μA        | 0.8 × V <sub>CC</sub> |      |       | V      |
| High (SGM809L/M/J)                                         | V <sub>CC</sub> > V <sub>TH(MAX)</sub> , I <sub>SOURCE</sub> = 800μA        | V <sub>CC</sub> - 1.5 |      |       | V      |
| Low (SGM810R/S/T/Z/X)                                      | V <sub>CC</sub> = V <sub>TH(MAX)</sub> , I <sub>SINK</sub> = 1.2mA          |                       |      | 0.3   | V      |
| Low (SGM810L/M/J)                                          | V <sub>CC</sub> = V <sub>TH(MAX)</sub> , I <sub>SINK</sub> = 3.2mA          |                       |      | 0.4   | V      |
| High (SGM810R/S/T/L/M/J/Z)                                 | 1.8V < V <sub>CC</sub> < V <sub>TH(MIN)</sub> , I <sub>SOURCE</sub> = 150μA | 0.8 × V <sub>CC</sub> |      |       | V      |
| High (SGM810X)                                             | 1.2V < V <sub>CC</sub> < V <sub>TH(MIN)</sub> , I <sub>SOURCE</sub> = 150μA | 0.8 × V <sub>CC</sub> |      |       | V      |
| RESET Open-Drain Output Leakage Current (SGM803)           | V <sub>CC</sub> > V <sub>TH</sub> , reset de-asserted                       |                       |      | 1     | μA     |

## TYPICAL PERFORMANCE CHARACTERISTICS



## TYPICAL PERFORMANCE CHARACTERISTICS (continued)



REVISION HISTORY

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

JANUARY 2018 – REV.E.2 to REV.E.3

|                                   |   |
|-----------------------------------|---|
| Changed Reset Timing Diagram..... | 9 |
|-----------------------------------|---|

SEPTEMBER 2015 – REV.E.1 to REV.E.2

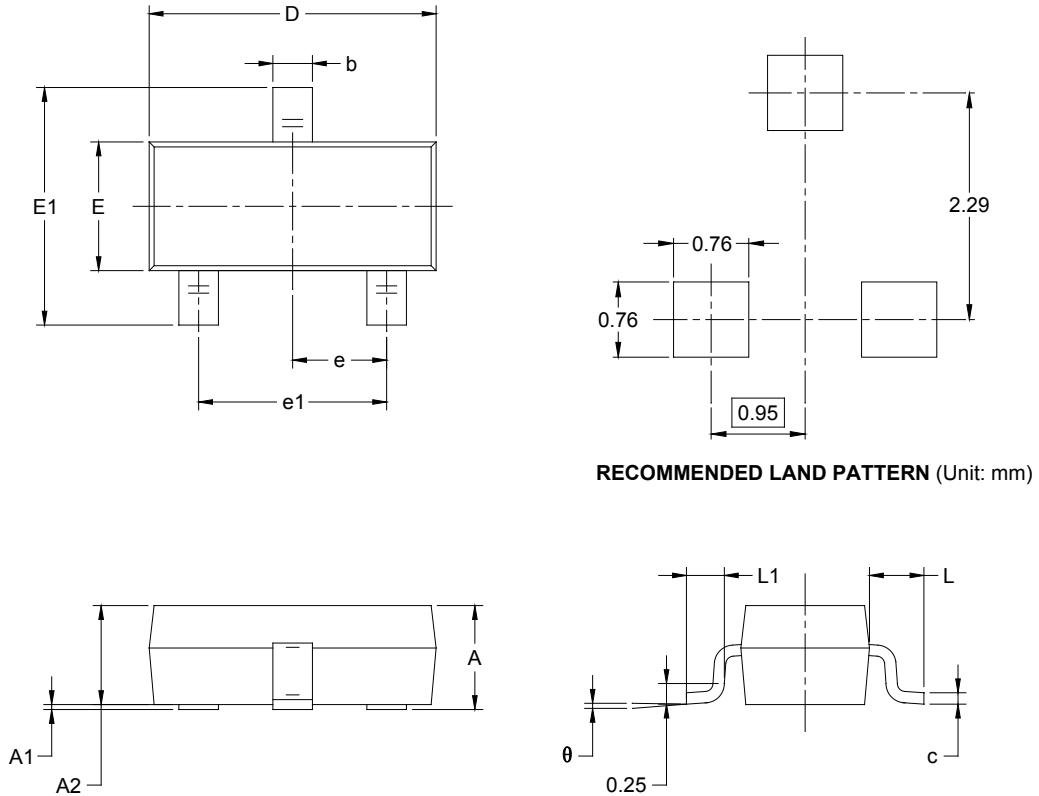
|                                                  |   |
|--------------------------------------------------|---|
| Changed Electrical Characteristics section ..... | 5 |
|--------------------------------------------------|---|

JANUARY 2013 – REV.E to REV.E.1

|                                                  |        |
|--------------------------------------------------|--------|
| Added Recommended Land Pattern Information ..... | 10, 11 |
| Added Tape and Reel Information.....             | 12, 13 |

## PACKAGE OUTLINE DIMENSIONS

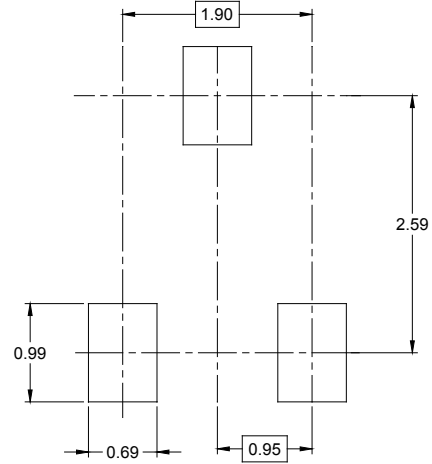
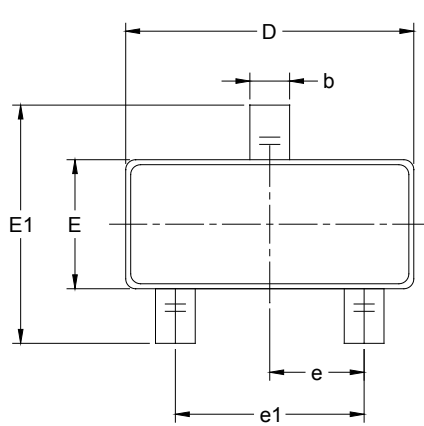
### SOT-23



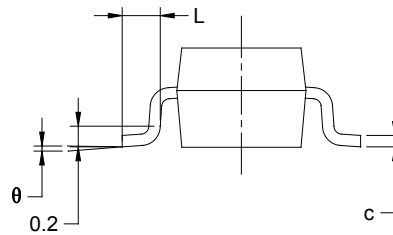
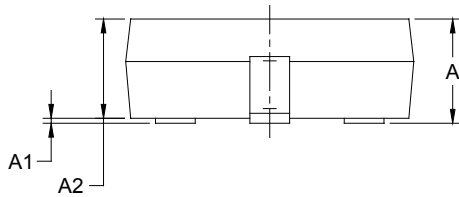
| Symbol | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|--------|------------------------------|-------|-------------------------|-------|
|        | MIN                          | MAX   | MIN                     | MAX   |
| A      | 0.900                        | 1.150 | 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 |
| c      | 0.080                        | 0.150 | 0.003                   | 0.006 |
| D      | 2.800                        | 3.000 | 0.110                   | 0.118 |
| E      | 1.200                        | 1.400 | 0.047                   | 0.055 |
| E1     | 2.250                        | 2.550 | 0.089                   | 0.100 |
| e      | 0.950 BSC                    |       | 0.037 BSC               |       |
| e1     | 1.900 BSC                    |       | 0.075 BSC               |       |
| L      | 0.550 REF                    |       | 0.022 REF               |       |
| L1     | 0.300                        | 0.500 | 0.012                   | 0.020 |
| θ      | 0°                           | 8°    | 0°                      | 8°    |

## PACKAGE OUTLINE DIMENSIONS

### SOT-23-3



RECOMMENDED LAND PATTERN (Unit: mm)

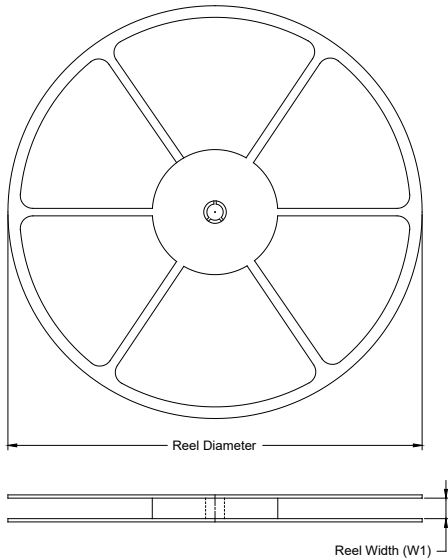


| Symbol   | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|----------|------------------------------|-------|-------------------------|-------|
|          | MIN                          | MAX   | MIN                     | MAX   |
| A        | 1.050                        | 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°    |

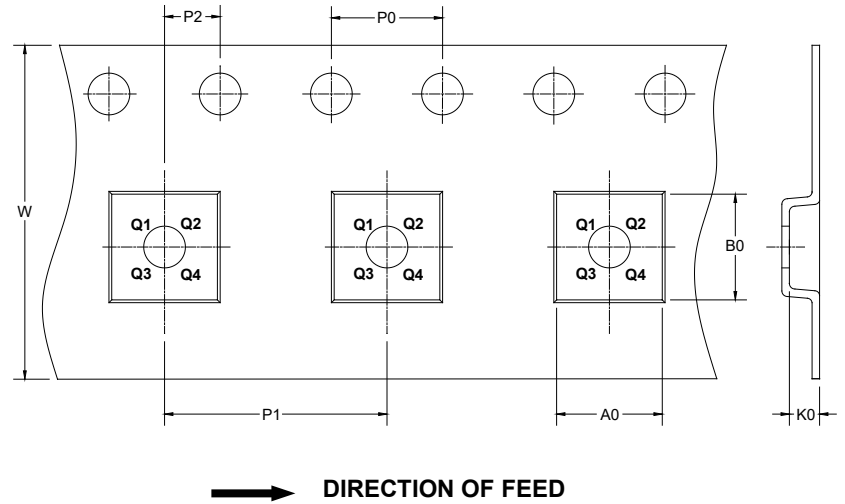
# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



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

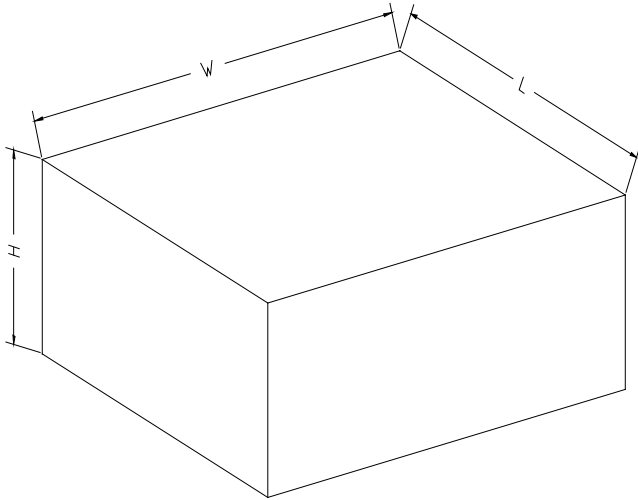
### KEY PARAMETER LIST OF TAPE AND REEL

| 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            |
| SOT-23-3     | 7"            | 9.0                | 3.20    | 3.30    | 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