



# SGM8925/SGM8927

## 110kHz, 6.4 $\mu$ A, Rail-to-Rail Output CMOS Operational Amplifiers

### GENERAL DESCRIPTION

The SGM8925 (single) and SGM8927 (single with shutdown) are low offset voltage, low power, voltage feedback amplifiers. These devices can operate from 1.6V to 5.5V single supply, and consume only 6.4 $\mu$ A quiescent current. They provide a wide input common mode voltage range and rail-to-rail output voltage swing. This feature makes SGM8925/7 appropriate for buffering ASIC.

The SGM8925/7 offer a gain-bandwidth product of 110kHz and an ultra-low input bias current of 1pA. They are well suited for piezoelectric sensors, integrators and photodiode amplifiers.

The SGM8925/7 are designed into a wide range of applications, such as battery-powered instrumentation, safety monitoring, portable systems, and transducer interface circuits in low power systems.

The SGM8925 is available in Green SOT-23-5, SC70-5, MSOP-8 and SOIC-8 packages. The SGM8927 is available in Green SOT-23-6, MSOP-8 and SOIC-8 packages. They are specified over the extended -40°C to +85°C temperature range.

### FEATURES

- **Low Offset Voltage: 0.6mV (MAX)**
- **Unity-Gain Stable**
- **Gain-Bandwidth Product: 110kHz**
- **Rail-to-Rail Output**
- **Supply Voltage Range: 1.6V to 5.5V**
- **Low Quiescent Current: 6.4 $\mu$ A (TYP)**
- **-40°C to +85°C Operating Temperature Range**
- **Small Packaging:**
  - SGM8925 Available in Green SOT-23-5, SC70-5, SOIC-8 and MSOP-8 Packages**
  - SGM8927 Available in Green SOT-23-6, SOIC-8 and MSOP-8 Packages**

### APPLICATIONS

ASIC Input or Output Amplifiers  
Piezoelectric Transducer Amplifiers  
Battery-Powered Equipment  
Portable Equipment  
Sensor Interfaces  
Medical Instrumentation  
Mobile Communications  
Audio Outputs  
Smoke Detectors  
Mobile Telephones  
Notebook PCs  
PCMCIA Cards

## PACKAGE/ORDERING INFORMATION

| MODEL   | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING          | PACKING OPTION      |
|---------|---------------------|-----------------------------|-----------------|--------------------------|---------------------|
| SGM8925 | SC70-5              | -40°C to +85°C              | SGM8925YC5G/TR  | SACXX                    | Tape and Reel, 3000 |
|         | SOT-23-5            | -40°C to +85°C              | SGM8925AYN5G/TR | SADXX                    | Tape and Reel, 3000 |
|         | SC70-5              | -40°C to +85°C              | SGM8925BYC5G/TR | ST9XX                    | Tape and Reel, 3000 |
|         | SOT-23-5            | -40°C to +85°C              | SGM8925BYN5G/TR | SAEXX                    | Tape and Reel, 3000 |
|         | SOIC-8              | -40°C to +85°C              | SGM8925YS8G/TR  | SGM<br>8925YS8<br>XXXXX  | Tape and Reel, 2500 |
|         | MSOP-8              | -40°C to +85°C              | SGM8925YMS8G/TR | SGM8925<br>YMS8<br>XXXXX | Tape and Reel, 3000 |
| SGM8927 | SOT-23-6            | -40°C to +85°C              | SGM8927YN6G/TR  | SAFXX                    | Tape and Reel, 3000 |
|         | SOIC-8              | -40°C to +85°C              | SGM8927YS8G/TR  | SGM<br>8927YS8<br>XXXXX  | Tape and Reel, 2500 |
|         | MSOP-8              | -40°C to +85°C              | SGM8927YMS8G/TR | SGM8927<br>YMS8<br>XXXXX | Tape and Reel, 3000 |

## MARKING INFORMATION

NOTE: XX = Date Code. XXXXX = Date Code and Vendor Code.

### SC70-5/SOT-23-5/SOT-23-6

YYY X X

Date Code - Month  
Date Code - Year  
Serial Number

### SOIC-8/MSOP-8

XXXXX

Vendor Code  
Date Code - Week  
Date Code - Year

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.

# SGM8925 SGM8927

## 110kHz, 6.4μA, Rail-to-Rail Output CMOS Operational Amplifiers

### ABSOLUTE MAXIMUM RATINGS

|                                         |                                    |
|-----------------------------------------|------------------------------------|
| Supply Voltage, $+V_S$ to $-V_S$ .....  | 6V                                 |
| Input Common Mode Voltage Range .....   | $(-V_S) - 0.1V$ to $(+V_S) - 1.3V$ |
| Junction Temperature .....              | +150°C                             |
| Storage Temperature Range .....         | -65°C to +150°C                    |
| Lead Temperature (Soldering, 10s) ..... | +260°C                             |
| ESD Susceptibility .....                |                                    |
| HBM .....                               | 4000V                              |
| MM .....                                | 400V                               |

### RECOMMENDED OPERATING CONDITIONS

|                                   |                |
|-----------------------------------|----------------|
| Operating Temperature Range ..... | -40°C to +85°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.

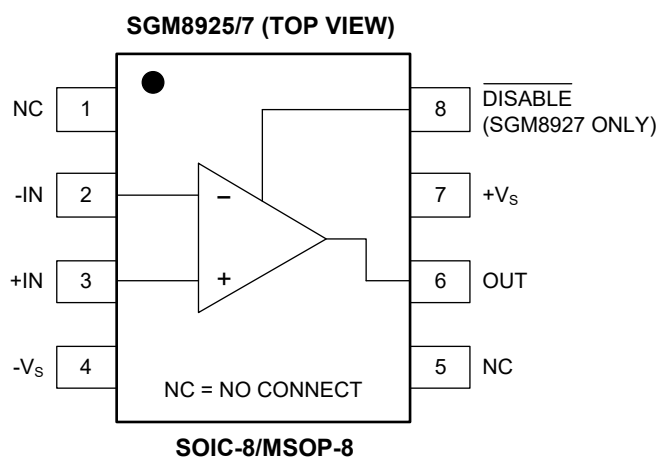
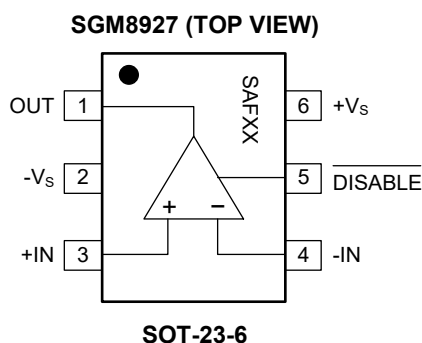
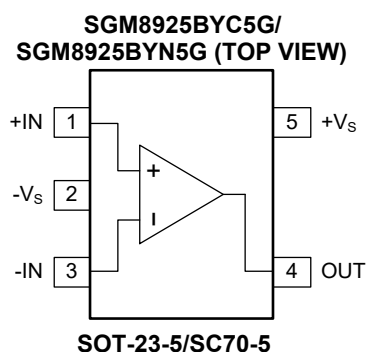
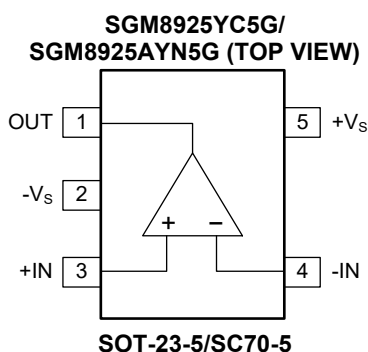
### ESD SENSITIVITY CAUTION

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 CONFIGURATIONS



## ELECTRICAL CHARACTERISTICS

(V<sub>S</sub> = 5V, V<sub>OUT</sub> = V<sub>S</sub>/2, Full = -40°C to +85°C, typical values are at T<sub>A</sub> = +25°C, unless otherwise noted.)

| PARAMETER                                         | CONDITIONS                                                                     |                  | TEMP  | MIN | TYP  | MAX  | UNITS  |
|---------------------------------------------------|--------------------------------------------------------------------------------|------------------|-------|-----|------|------|--------|
| DC Performance                                    |                                                                                |                  |       |     |      |      |        |
| Input Offset Voltage (V <sub>OS</sub> )           | V <sub>CM</sub> = V <sub>S</sub> /2                                            |                  | +25°C |     | 0.13 | 0.6  | mV     |
|                                                   |                                                                                | SGM8925YC5G only | +25°C |     |      | 0.75 |        |
| Input Offset Voltage Drift (ΔV <sub>OS</sub> /ΔT) |                                                                                |                  | Full  |     | 2.5  |      | μV/°C  |
| Open-Loop Voltage Gain (A <sub>OL</sub> )         | R <sub>L</sub> = 100kΩ to V <sub>S</sub> /2, V <sub>OUT</sub> = 0.05V to 4.95V |                  | +25°C |     | 93   |      | dB     |
|                                                   | R <sub>L</sub> = 10kΩ to V <sub>S</sub> /2, V <sub>OUT</sub> = 0.15V to 4.85V  |                  | +25°C | 80  | 88   |      |        |
|                                                   |                                                                                |                  | Full  | 78  |      |      |        |
| Input Characteristics                             |                                                                                |                  |       |     |      |      |        |
| Common Mode Rejection Ratio (CMRR)                | V <sub>CM</sub> = -0.1V to 3.7V                                                |                  | +25°C | 70  | 85   |      | dB     |
|                                                   |                                                                                |                  | Full  | 68  |      |      |        |
| Output Characteristics                            |                                                                                |                  |       |     |      |      |        |
| Output Voltage Swing from Rail                    | R <sub>L</sub> = 10kΩ to V <sub>S</sub> /2                                     |                  | +25°C |     | 21   | 36   | mV     |
|                                                   |                                                                                |                  | Full  |     |      | 40   |        |
|                                                   | R <sub>L</sub> = 2kΩ to V <sub>S</sub> /2                                      |                  | +25°C |     | 80   | 100  |        |
|                                                   |                                                                                |                  | Full  |     |      | 110  |        |
| Output Short-Circuit Current (I <sub>SC</sub> )   | R <sub>L</sub> = 10Ω to V <sub>S</sub> /2                                      |                  | +25°C | 29  | 36   |      | mA     |
|                                                   |                                                                                |                  | Full  | 23  |      |      |        |
| Power-Down (SGM8927 Only)                         |                                                                                |                  |       |     |      |      |        |
| Logic Low Voltage (V <sub>IL</sub> )              |                                                                                |                  | +25°C |     |      | 0.8  | V      |
| Logic High Voltage (V <sub>IH</sub> )             |                                                                                |                  | +25°C | 2   |      |      |        |
| Power Supply                                      |                                                                                |                  |       |     |      |      |        |
| Quiescent Current (I <sub>Q</sub> )               | I <sub>OUT</sub> = 0mA                                                         |                  | +25°C |     | 6.4  | 11.5 | μA     |
|                                                   |                                                                                |                  | Full  |     |      | 13.5 |        |
| Supply Current when Disabled (SGM8927 Only)       |                                                                                |                  | +25°C |     | 0.1  | 1.5  | μA     |
| Power Supply Rejection Ratio (PSRR)               | V <sub>S</sub> = 1.6V to 5.5V, V <sub>CM</sub> = 0.3V                          |                  | +25°C | 64  | 77   |      | dB     |
|                                                   |                                                                                |                  | Full  | 62  |      |      |        |
| Dynamic Performance                               |                                                                                |                  |       |     |      |      |        |
| Gain-Bandwidth Product (GBP)                      | R <sub>L</sub> = 100kΩ, C <sub>L</sub> = 100pF, V <sub>CM</sub> = 2.5V         |                  | +25°C |     | 110  |      | kHz    |
| Slew Rate (SR)                                    | V <sub>CM</sub> = 2.5V                                                         |                  | +25°C |     | 0.04 |      | V/μs   |
| Noise Performance                                 |                                                                                |                  |       |     |      |      |        |
| Input Voltage Noise Density (e <sub>n</sub> )     | f = 1kHz                                                                       |                  | +25°C |     | 105  |      | nV/√Hz |

## ELECTRICAL CHARACTERISTICS (continued)

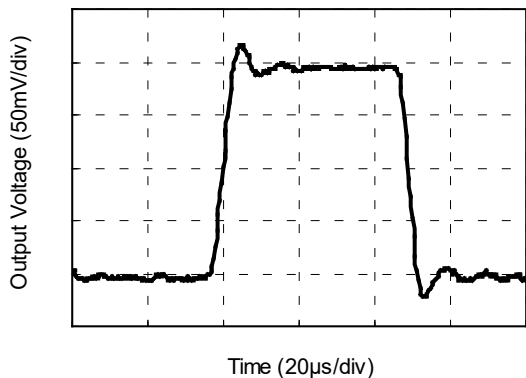
(V<sub>S</sub> = 1.6V, V<sub>CM</sub> = 0.3V, V<sub>OUT</sub> = V<sub>S</sub>/2, Full = -40°C to +85°C, typical values are at T<sub>A</sub> = +25°C, unless otherwise noted.)

| PARAMETER                                         | CONDITIONS                                                                     | TEMP             | MIN   | TYP  | MAX  | UNITS  |  |
|---------------------------------------------------|--------------------------------------------------------------------------------|------------------|-------|------|------|--------|--|
| DC Performance                                    |                                                                                |                  |       |      |      |        |  |
| Input Offset Voltage (V <sub>OS</sub> )           |                                                                                | +25°C            |       | 0.28 | 0.6  | mV     |  |
|                                                   | SGM8925YC5G only                                                               | +25°C            |       |      | 0.75 |        |  |
| Input Offset Voltage Drift (ΔV <sub>OS</sub> /ΔT) |                                                                                | Full             |       | 1.8  |      | μV/°C  |  |
| Open-Loop Voltage Gain (A <sub>OL</sub> )         | R <sub>L</sub> = 100kΩ to V <sub>S</sub> /2, V <sub>OUT</sub> = 0.05V to 1.55V | +25°C            |       | 99   |      | dB     |  |
|                                                   | R <sub>L</sub> = 10kΩ to V <sub>S</sub> /2, V <sub>OUT</sub> = 0.15V to 1.45V  | +25°C            | 80    | 91   |      |        |  |
|                                                   |                                                                                | Full             | 78    |      |      |        |  |
| Input Characteristics                             |                                                                                |                  |       |      |      |        |  |
| Common Mode Rejection Ratio (CMRR)                | V <sub>CM</sub> = -0.1V to 0.3V                                                | +25°C            | 65    | 78   |      | dB     |  |
|                                                   |                                                                                | Full             | 62    |      |      |        |  |
| Output Characteristics                            |                                                                                |                  |       |      |      |        |  |
| Output Voltage Swing from Rail                    | R <sub>L</sub> = 10kΩ to V <sub>S</sub> /2                                     | +25°C            |       | 13   | 25   | mV     |  |
|                                                   |                                                                                | Full             |       |      | 30   |        |  |
|                                                   | R <sub>L</sub> = 2kΩ to V <sub>S</sub> /2                                      | +25°C            |       | 63   | 87   |        |  |
|                                                   |                                                                                | Full             |       |      | 95   |        |  |
| Output Short-Circuit Current (I <sub>SC</sub> )   | R <sub>L</sub> = 10Ω to V <sub>S</sub> /2                                      |                  |       |      |      | mA     |  |
|                                                   |                                                                                | SGM8925YC5G only | +25°C | 0.35 |      |        |  |
|                                                   |                                                                                | Full             | 0.3   |      |      |        |  |
| Power-Down (SGM8927 Only)                         |                                                                                |                  |       |      |      |        |  |
| Logic Low Voltage (V <sub>IL</sub> )              |                                                                                | +25°C            |       |      | 0.4  | V      |  |
| Logic High Voltage (V <sub>IH</sub> )             |                                                                                | +25°C            | 1.1   |      |      |        |  |
| Power Supply                                      |                                                                                |                  |       |      |      |        |  |
| Quiescent Current (I <sub>Q</sub> )               | I <sub>OUT</sub> = 0mA                                                         | +25°C            |       | 5.8  | 10.5 | μA     |  |
|                                                   |                                                                                | Full             |       |      | 13   |        |  |
| Supply Current when Disabled (SGM8927 Only)       |                                                                                | +25°C            |       | 0.1  | 1.5  | μA     |  |
| Dynamic Performance                               |                                                                                |                  |       |      |      |        |  |
| Gain-Bandwidth Product (GBP)                      | R <sub>L</sub> = 100kΩ, C <sub>L</sub> = 100pF                                 | +25°C            |       | 110  |      | kHz    |  |
| Slew Rate (SR)                                    |                                                                                | +25°C            |       | 0.04 |      | V/μs   |  |
| Noise Performance                                 |                                                                                |                  |       |      |      |        |  |
| Input Voltage Noise Density (e <sub>n</sub> )     | f = 1kHz                                                                       | +25°C            |       | 105  |      | nV/√Hz |  |

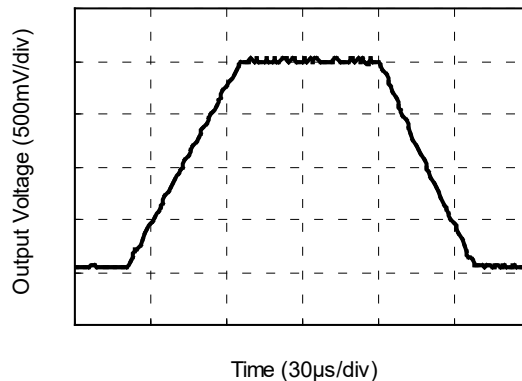
## TYPICAL PERFORMANCE CHARACTERISTICS

At  $T_A = +25^\circ\text{C}$ ,  $V_S = 5\text{V}$ , unless otherwise noted.

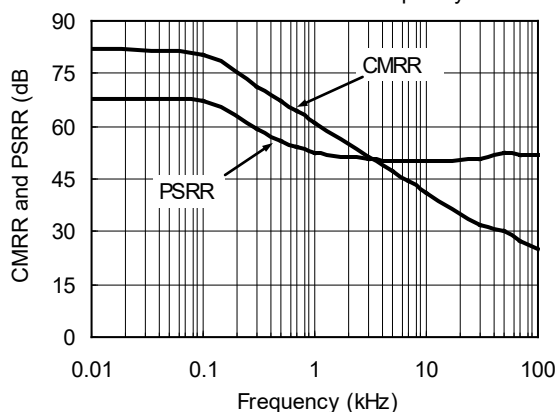
Small Signal Step Response



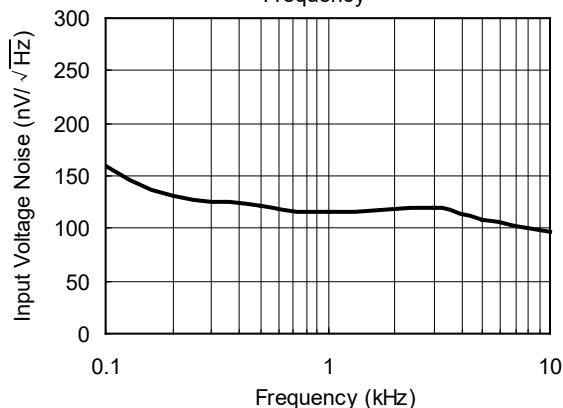
Large Signal Step Response



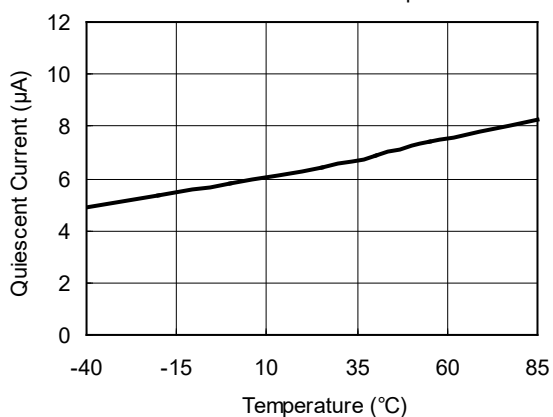
CMRR and PSRR vs. Frequency



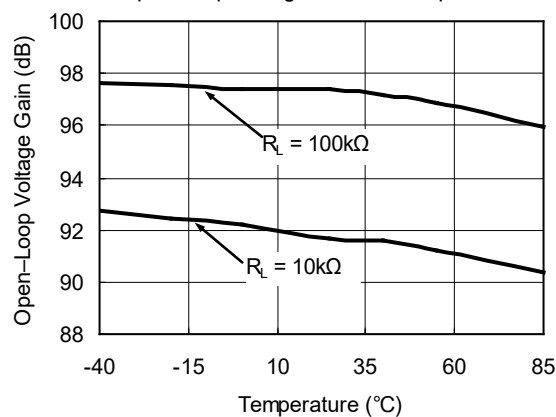
Input Voltage Noise Spectral Density vs. Frequency



Quiescent Current vs. Temperature

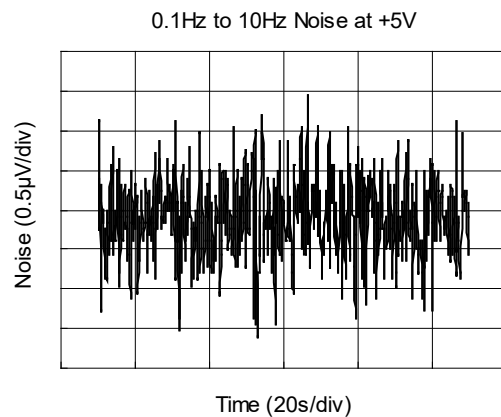
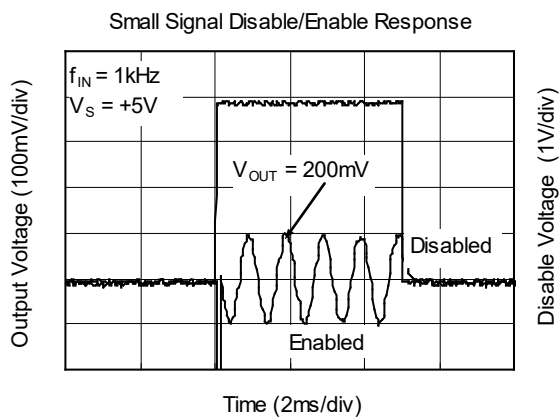
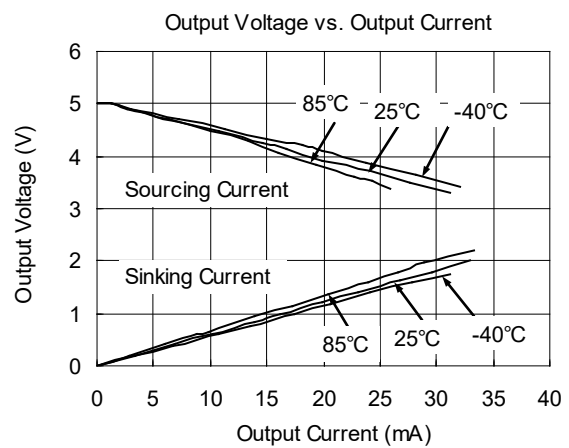
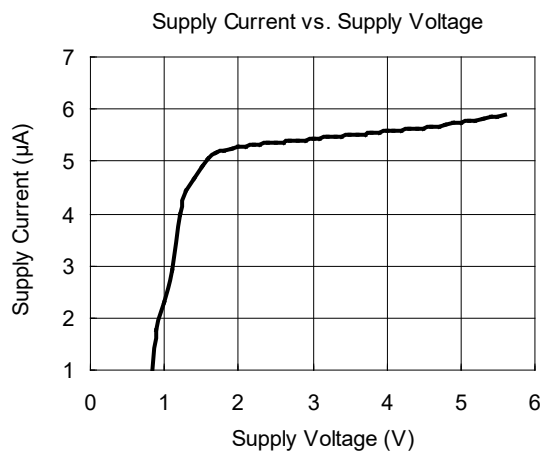
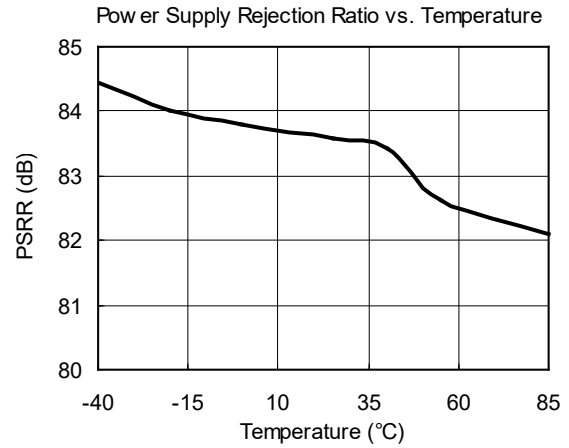
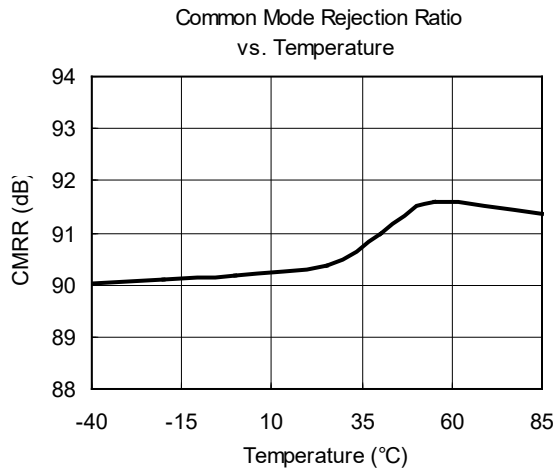


Open-Loop Voltage Gain vs. Temperature



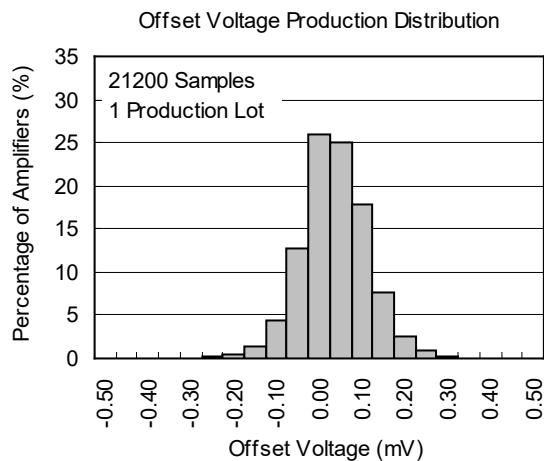
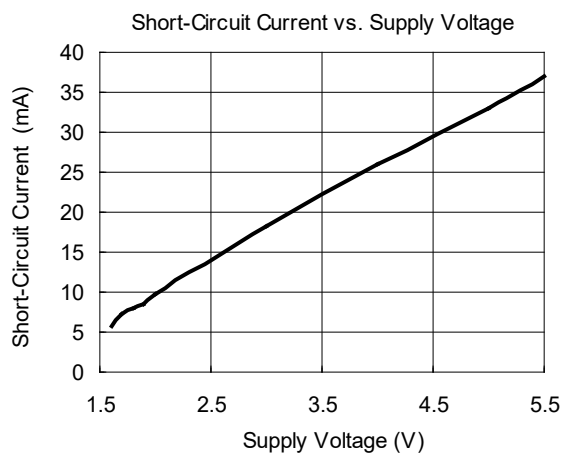
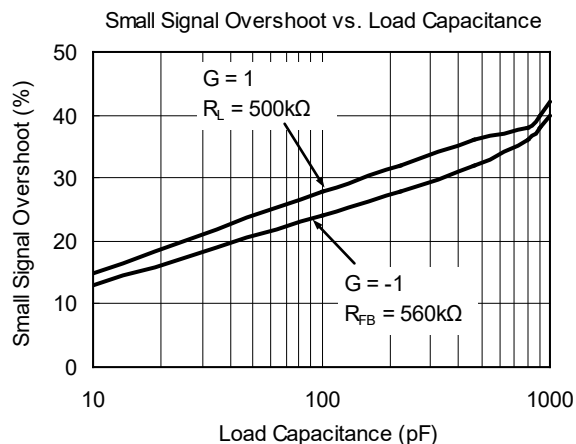
## TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At  $T_A = +25^\circ\text{C}$ ,  $V_S = 5\text{V}$ , unless otherwise noted.



## TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At  $T_A = +25^\circ\text{C}$ ,  $V_S = 5\text{V}$ , unless otherwise noted.



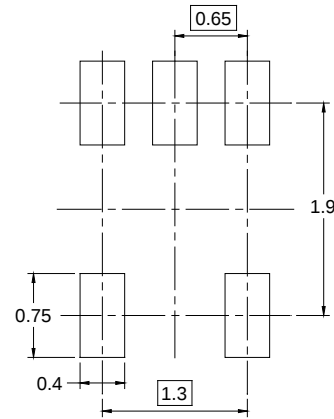
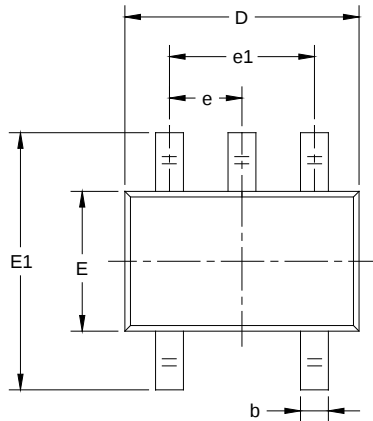
## REVISION HISTORY

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

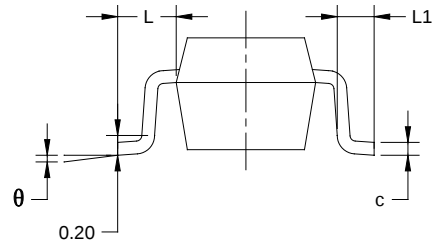
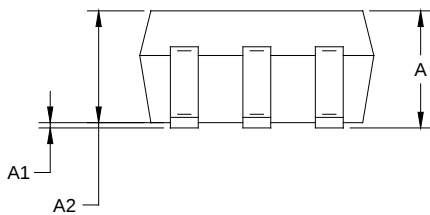
|                                                                                                             |             |
|-------------------------------------------------------------------------------------------------------------|-------------|
| <b>JULY 2023 – REV.A.3 to REV.A.4</b>                                                                       | <b>Page</b> |
| Updated Package Outline Dimensions section .....                                                            | 10          |
| <b>DECEMBER 2014 – REV.A.2 to REV.A.3</b>                                                                   | <b>Page</b> |
| Added SC70-5 Package from product preview to production data .....                                          | 1           |
| Added Ordering Information of SC70-5 package for SGM8925 .....                                              | 2           |
| Added SC70-5 package for SGM8925 .....                                                                      | 3           |
| <b>DECEMBER 2013 – REV.A.1 to REV.A.2</b>                                                                   | <b>Page</b> |
| Changed Electrical Characteristics section .....                                                            | 5           |
| Added input offset voltage ( $V_{OS}$ ) max value of SGM8925YC5G .....                                      | 5           |
| Changed Electrical Characteristics section .....                                                            | 6           |
| Added input offset voltage ( $V_{OS}$ ) max value of SGM8925YC5G .....                                      | 6           |
| Added output short-circuit current ( $I_{SC}$ ) min value of SGM8925YC5G .....                              | 6           |
| Changed output short-circuit current ( $I_{SC}$ ) min value from 0.4V to 0.3V .....                         | 6           |
| <b>MAY 2013 – REV.A to REV.A.1</b>                                                                          | <b>Page</b> |
| Changed Electrical Characteristics section .....                                                            | 5           |
| Deleted open-loop voltage gain ( $A_{OL}$ ) min value in $R_L = 100k\Omega$ to $V_S/2$ test condition ..... | 5           |
| Changed Electrical Characteristics section .....                                                            | 6           |
| Deleted open-loop voltage gain ( $A_{OL}$ ) min value in $R_L = 100k\Omega$ to $V_S/2$ test condition ..... | 6           |
| <b>Changes from Original (AUGUST 2012) to REV.A</b>                                                         | <b>Page</b> |
| Changed from product preview to production data .....                                                       | All         |

## PACKAGE OUTLINE DIMENSIONS

### SC70-5



RECOMMENDED LAND PATTERN (Unit: mm)



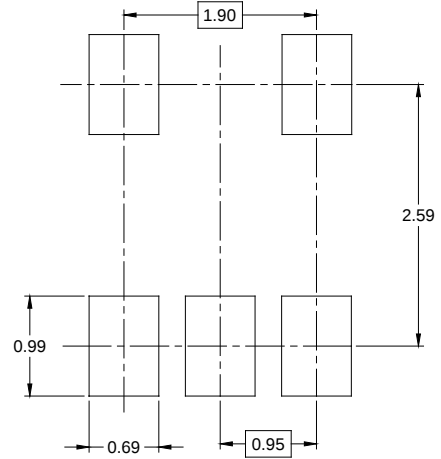
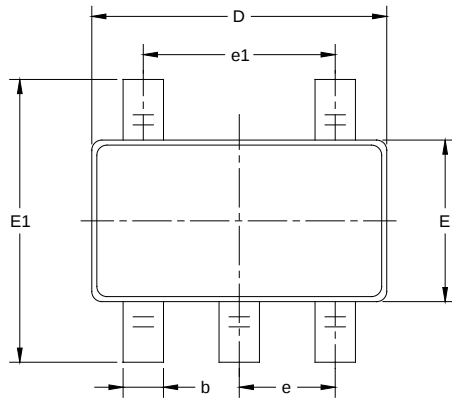
| Symbol | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|--------|------------------------------|-------|-------------------------|-------|
|        | MIN                          | MAX   | MIN                     | MAX   |
| A      | 0.800                        | 1.100 | 0.031                   | 0.043 |
| A1     | 0.000                        | 0.100 | 0.000                   | 0.004 |
| A2     | 0.800                        | 1.000 | 0.031                   | 0.039 |
| b      | 0.150                        | 0.350 | 0.006                   | 0.014 |
| c      | 0.080                        | 0.220 | 0.003                   | 0.009 |
| 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:

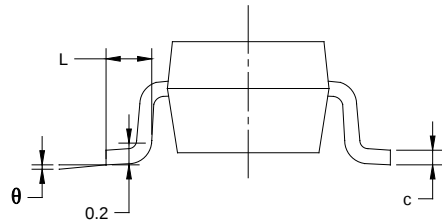
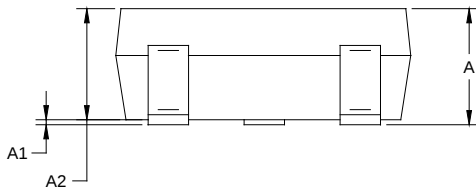
1. Body dimensions do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

## PACKAGE OUTLINE DIMENSIONS

### SOT-23-5



RECOMMENDED LAND PATTERN (Unit: mm)



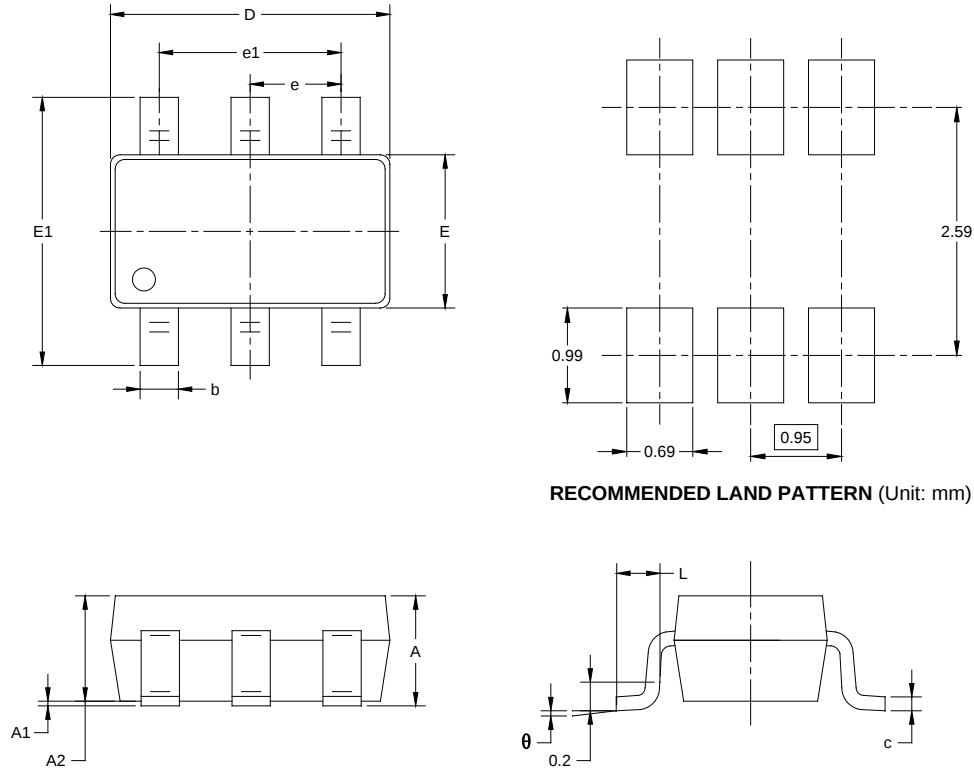
| Symbol | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|--------|------------------------------|-------|-------------------------|-------|
|        | MIN                          | MAX   | MIN                     | MAX   |
| A      | 1.050                        | 1.250 | 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 |
| 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

### SOT-23-6



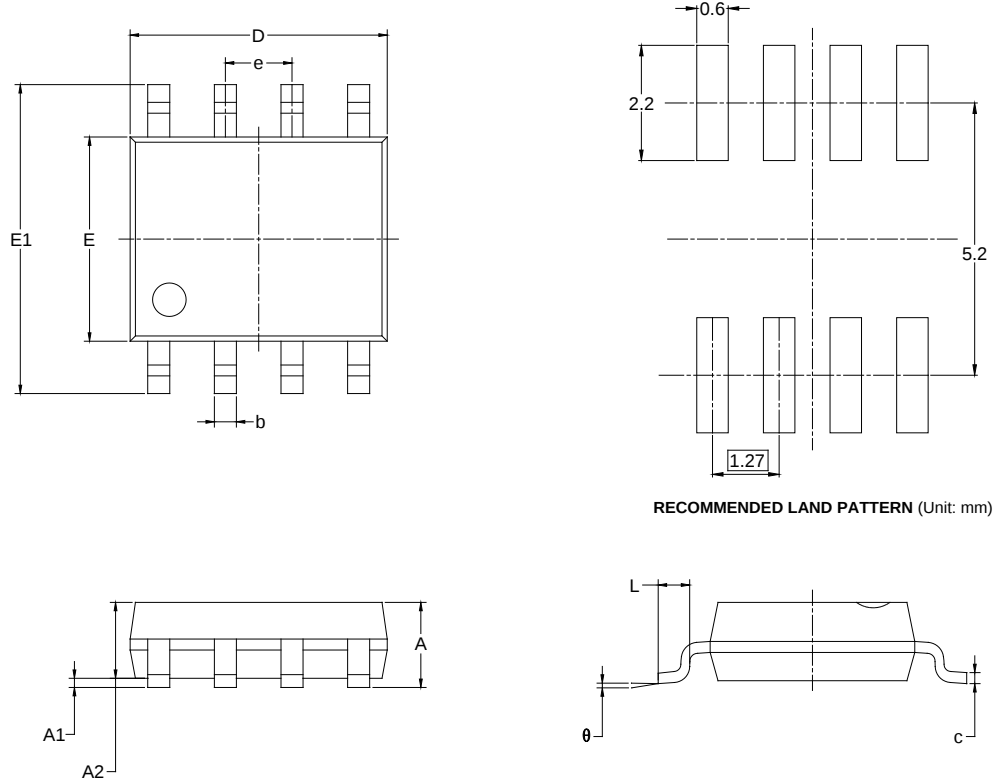
| Symbol   | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|----------|------------------------------|-------|-------------------------|-------|
|          | MIN                          | MAX   | MIN                     | MAX   |
| A        | 1.050                        |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

#### NOTES:

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

## PACKAGE OUTLINE DIMENSIONS

### SOIC-8



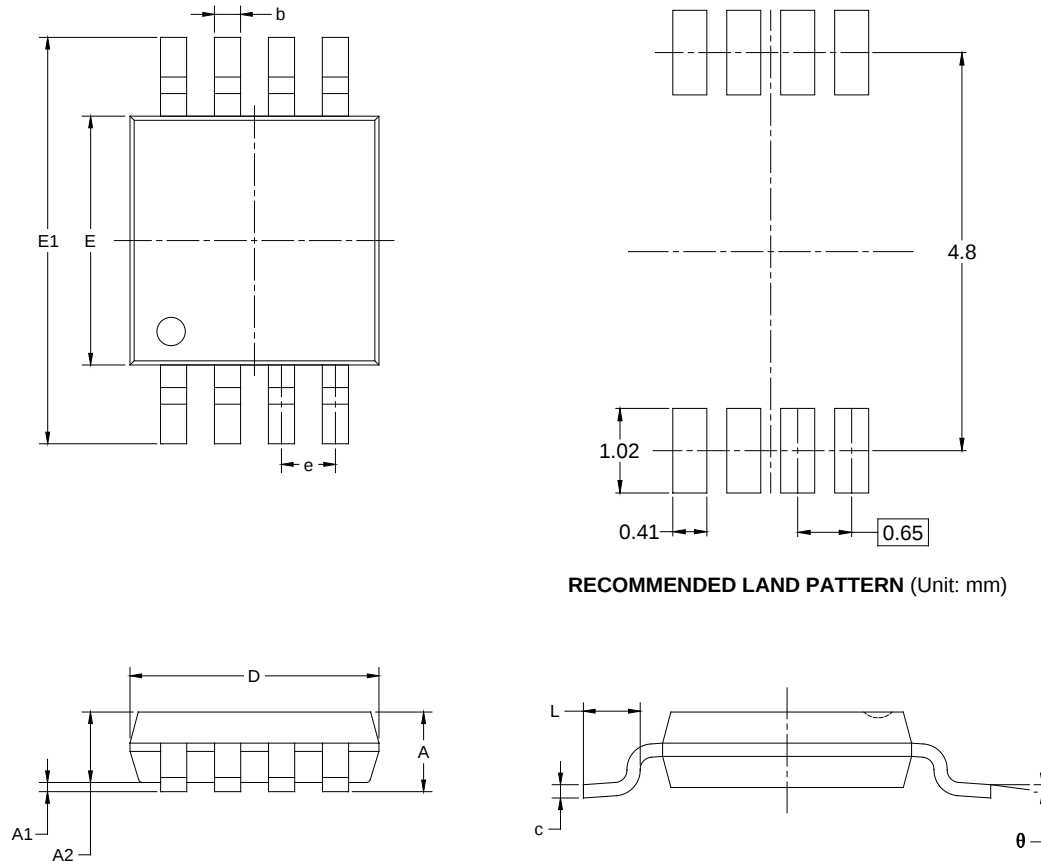
| Symbol   | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|----------|------------------------------|-------|-------------------------|-------|
|          | MIN                          | MAX   | MIN                     | MAX   |
| A        | 1.350                        | 1.750 | 0.053                   | 0.069 |
| A1       | 0.100                        | 0.250 | 0.004                   | 0.010 |
| A2       | 1.350                        | 1.550 | 0.053                   | 0.061 |
| b        | 0.330                        | 0.510 | 0.013                   | 0.020 |
| c        | 0.170                        | 0.250 | 0.006                   | 0.010 |
| D        | 4.700                        | 5.100 | 0.185                   | 0.200 |
| E        | 3.800                        | 4.000 | 0.150                   | 0.157 |
| E1       | 5.800                        | 6.200 | 0.228                   | 0.244 |
| e        | 1.27 BSC                     |       | 0.050 BSC               |       |
| L        | 0.400                        | 1.270 | 0.016                   | 0.050 |
| $\theta$ | 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

### MSOP-8



| Symbol   | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|----------|------------------------------|-------|-------------------------|-------|
|          | MIN                          | MAX   | MIN                     | MAX   |
| A        | 0.820                        | 1.100 | 0.032                   | 0.043 |
| A1       | 0.020                        | 0.150 | 0.001                   | 0.006 |
| A2       | 0.750                        | 0.950 | 0.030                   | 0.037 |
| b        | 0.250                        | 0.380 | 0.010                   | 0.015 |
| c        | 0.090                        | 0.230 | 0.004                   | 0.009 |
| D        | 2.900                        | 3.100 | 0.114                   | 0.122 |
| E        | 2.900                        | 3.100 | 0.114                   | 0.122 |
| E1       | 4.750                        | 5.050 | 0.187                   | 0.199 |
| e        | 0.650 BSC                    |       | 0.026 BSC               |       |
| L        | 0.400                        | 0.800 | 0.016                   | 0.031 |
| $\theta$ | 0°                           | 6°    | 0°                      | 6°    |

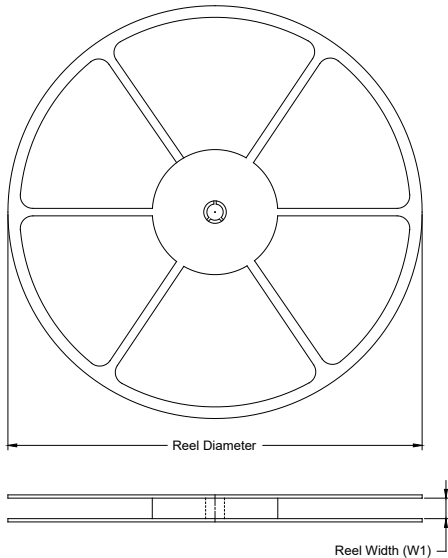
#### NOTES:

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

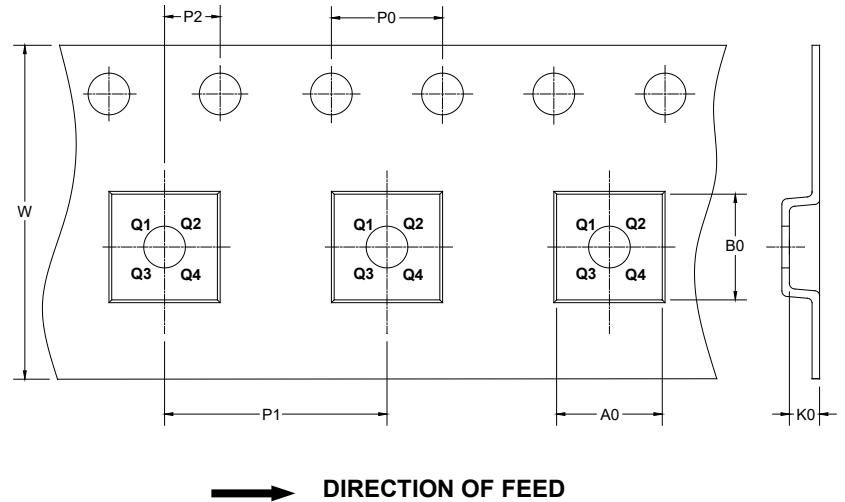
# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



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

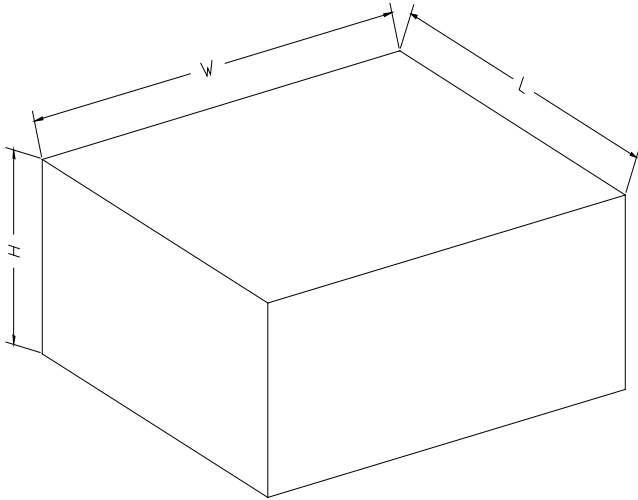
### KEY PARAMETER LIST OF TAPE AND REEL

| Package Type | Reel Diameter | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P0 (mm) | P1 (mm) | P2 (mm) | W (mm) | Pin1 Quadrant |
|--------------|---------------|--------------------|---------|---------|---------|---------|---------|---------|--------|---------------|
| SC70-5       | 7"            | 9.5                | 2.40    | 2.50    | 1.20    | 4.0     | 4.0     | 2.0     | 8.0    | Q3            |
| SOT-23-5     | 7"            | 9.5                | 3.20    | 3.20    | 1.40    | 4.0     | 4.0     | 2.0     | 8.0    | Q3            |
| SOT-23-6     | 7"            | 9.5                | 3.23    | 3.17    | 1.37    | 4.0     | 4.0     | 2.0     | 8.0    | Q3            |
| SOIC-8       | 13"           | 12.4               | 6.40    | 5.40    | 2.10    | 4.0     | 8.0     | 2.0     | 12.0   | Q1            |
| MSOP-8       | 13"           | 12.4               | 5.20    | 3.30    | 1.50    | 4.0     | 8.0     | 2.0     | 12.0   | 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           |
| 13"         | 386         | 280        | 370         | 5            |

DD0002