



# SGM8049-1/SGM8049-2/SGM8049-4

## Low Voltage, Low Power, Rail-to-Rail I/O Operational Amplifiers

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### GENERAL DESCRIPTION

The SGM8049-1 (single), SGM8049-2 (dual) and SGM8049-4 (quad) are low voltage and micro-power operational amplifiers suitable for battery-powered systems. These devices can operate from 1.8V to 5.5V single supply, while consuming only 2.5 $\mu$ A/Amplifier quiescent current. They also provide rail-to-rail input and output operation.

The SGM8049-1/2/4 provide low power, low bias current and low noise. These devices fit in small packages. The combination of above features makes them appropriate for various applications.

The SGM8049-1 is available in Green SC70-5, SOT-23-5 and TDFN-2 $\times$ 2-6L packages. The SGM8049-2 is available in Green SOT-23-8 and SOIC-8 packages. The SGM8049-4 is available in a Green TSSOP-14 package. They are specified over the extended -40°C to +125°C temperature range.

### FEATURES

- **Wide Supply Voltage Range:** 1.8V to 5.5V
- **Low Quiescent Current:** 2.5 $\mu$ A/Amplifier (TYP)
- **Low Offset Voltage:** 0.85mV (MAX)
- **Low 0.1Hz to 10Hz Noise:** 3.5 $\mu$ V<sub>P-P</sub>
- **CMRR:** 100dB
- **PSRR:** 2.5 $\mu$ V/V
- **Open-Loop Voltage Gain:** 118dB
- **-40°C to +125°C Operating Temperature Range**
- **Small Packaging:**
  - SGM8049-1 Available in Green SC70-5, SOT-23-5 and TDFN-2 $\times$ 2-6L Packages**
  - SGM8049-2 Available in Green SOT-23-8 and SOIC-8 Packages**
  - SGM8049-4 Available in a Green TSSOP-14 Package**

### APPLICATIONS

Battery-Powered Systems  
Wearable Devices  
Portable Devices  
Handheld Test Equipment  
Medical Instruments

## PACKAGE/ORDERING INFORMATION

| MODEL     | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER    | PACKAGE MARKING            | PACKING OPTION      |
|-----------|---------------------|-----------------------------|--------------------|----------------------------|---------------------|
| SGM8049-1 | SOT-23-5            | -40°C to +125°C             | SGM8049-1XN5G/TR   | SVAXX                      | Tape and Reel, 3000 |
|           | SC70-5              | -40°C to +125°C             | SGM8049-1AXC5G/TR  | SZAXX                      | Tape and Reel, 3000 |
|           | SC70-5              | -40°C to +125°C             | SGM8049-1BXC5G/TR  | SUEXX                      | Tape and Reel, 3000 |
|           | TDFN-2×2-6L         | -40°C to +125°C             | SGM8049-1XTDI6G/TR | SZC<br>XXXX                | Tape and Reel, 3000 |
| SGM8049-2 | SOT-23-8            | -40°C to +125°C             | SGM8049-2XN8G/TR   | SVBXX                      | Tape and Reel, 3000 |
|           | SOIC-8              | -40°C to +125°C             | SGM8049-2XS8G/TR   | SGM<br>80492XS8<br>XXXXX   | Tape and Reel, 2500 |
| SGM8049-4 | TSSOP-14            | -40°C to +125°C             | SGM8049-4XTS14G/TR | SGM80494<br>XTS14<br>XXXXX | Tape and Reel, 4000 |

## MARKING INFORMATION

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

### SOT-23-5/SC70-5/SOT-23-8

YYY X X

Date Code - Month  
 Date Code - Year  
 Serial Number

### SOIC-8/TSSOP-14

XXXXX

Vendor Code  
 Date Code - Week  
 Date Code - Year

### TDFN-2×2-6L

YYY — Serial Number

XXXX

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.

### **ABSOLUTE MAXIMUM RATINGS**

|                                         |                                    |
|-----------------------------------------|------------------------------------|
| Supply Voltage, $+V_S$ to $-V_S$ .....  | 6V                                 |
| Signal Input Terminals, Voltage .....   | $(-V_S) - 0.3V$ to $(+V_S) + 0.3V$ |
| Signal Input Terminals, Current .....   | $\pm 10mA$                         |
| Output Short-Circuit Current .....      | 30mA                               |
| Junction Temperature .....              | $+150^{\circ}C$                    |
| Storage Temperature Range .....         | $-65^{\circ}C$ to $+150^{\circ}C$  |
| Lead Temperature (Soldering, 10s) ..... | $+260^{\circ}C$                    |
| ESD Susceptibility                      |                                    |
| HBM .....                               | 6000V                              |
| MM .....                                | 400V                               |
| CDM .....                               | 1000V                              |

### **RECOMMENDED OPERATING CONDITIONS**

|                                   |                                   |
|-----------------------------------|-----------------------------------|
| Input Voltage Range .....         | 1.8V to 5.5V                      |
| Operating Temperature Range ..... | $-40^{\circ}C$ to $+125^{\circ}C$ |

### **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**

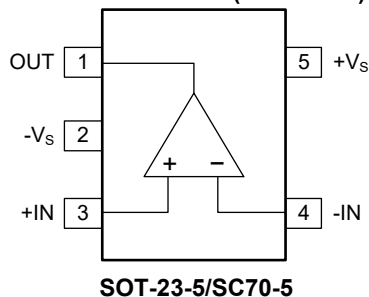
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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**

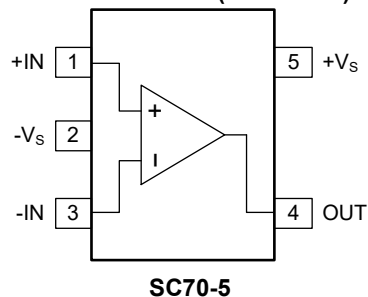
SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

## PIN CONFIGURATIONS

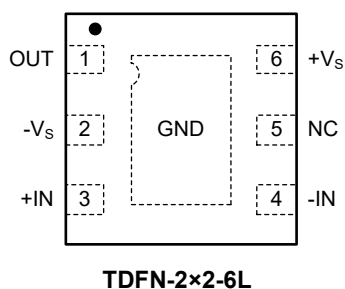
**SGM8049-1XN5G  
SGM8049-1AXC5G (TOP VIEW)**



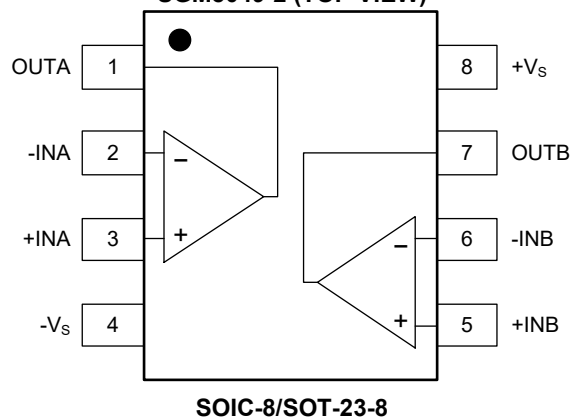
**SGM8049-1BXC5G (TOP VIEW)**



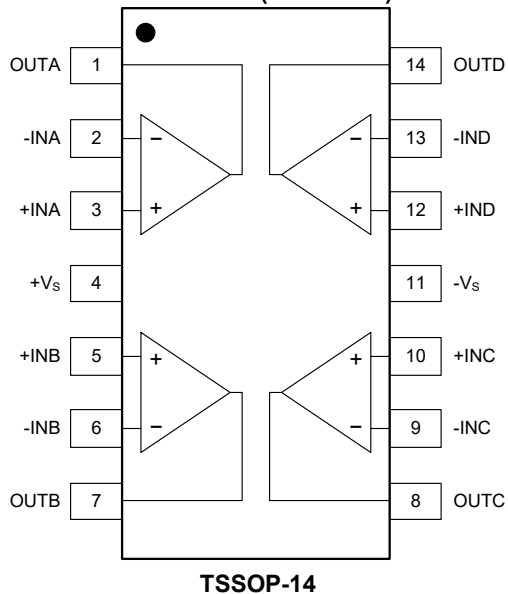
**SGM8049-1 (TOP VIEW)**



**SGM8049-2 (TOP VIEW)**



**SGM8049-4 (TOP VIEW)**



## ELECTRICAL CHARACTERISTICS

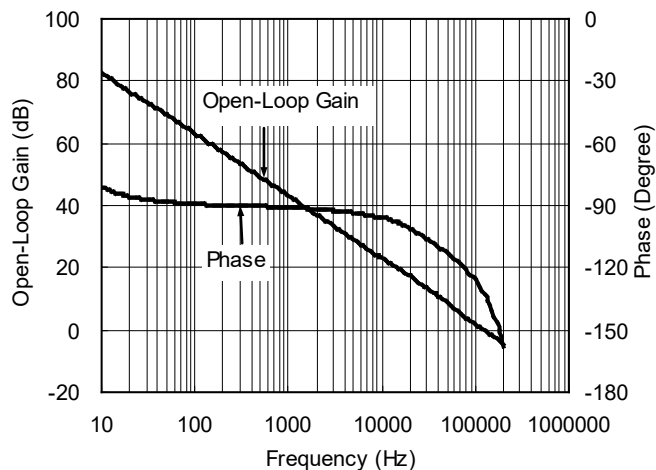
(At  $T_A = +25^\circ\text{C}$ ,  $V_S = 1.8\text{V}$  to  $5.5\text{V}$ ,  $R_L = 25\text{k}\Omega$  connected to  $V_S/2$  and  $V_{CM} < (+V_S) - 1.2\text{V}$ , unless otherwise noted.)

| PARAMETER                                      | SYMBOL               | CONDITIONS                                                                                           | MIN                      | TYP  | MAX                      | UNITS             |
|------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------|--------------------------|------|--------------------------|-------------------|
| Input Characteristics                          |                      |                                                                                                      |                          |      |                          |                   |
| Input Offset Voltage                           | V <sub>OS</sub>      | V <sub>S</sub> = 5V                                                                                  |                          | 0.2  | 0.85                     | mV                |
|                                                |                      | -40°C ≤ T <sub>A</sub> ≤ +125°C                                                                      |                          |      | 1                        |                   |
| Input Bias Current                             | I <sub>B</sub>       | V <sub>S</sub> = 5V, V <sub>CM</sub> ≤ V <sub>S</sub> /2                                             |                          | ±1   |                          | pA                |
| Input Offset Current                           | I <sub>OS</sub>      | V <sub>S</sub> = 5V                                                                                  |                          | ±1   |                          | pA                |
| Input Common Mode Voltage Range                | V <sub>CM</sub>      |                                                                                                      | (-V <sub>S</sub> ) - 0.1 |      | (+V <sub>S</sub> ) + 0.1 | V                 |
| Common Mode Rejection Ratio                    | CMRR                 | -V <sub>S</sub> < V <sub>CM</sub> < (+V <sub>S</sub> ) - 1.2V                                        | 81                       | 100  |                          | dB                |
|                                                |                      | -40°C ≤ T <sub>A</sub> ≤ +85°C                                                                       | 80                       |      |                          |                   |
|                                                |                      | -40°C ≤ T <sub>A</sub> ≤ +125°C                                                                      | 75                       |      |                          |                   |
| Open-Loop Voltage Gain                         | A <sub>OL</sub>      | V <sub>S</sub> = 5V, R <sub>L</sub> = 25kΩ,<br>100mV < V <sub>OUT</sub> < (+V <sub>S</sub> ) - 100mV | 100                      | 118  |                          | dB                |
|                                                |                      | -40°C ≤ T <sub>A</sub> ≤ +125°C                                                                      | 98                       |      |                          |                   |
|                                                |                      | V <sub>S</sub> = 5V, R <sub>L</sub> = 5kΩ,<br>500mV < V <sub>OUT</sub> < (+V <sub>S</sub> ) - 500mV  | 100                      | 116  |                          |                   |
|                                                |                      | -40°C ≤ T <sub>A</sub> ≤ +125°C                                                                      | 98                       |      |                          |                   |
| Input Offset Voltage Drift                     | ΔV <sub>OS</sub> /ΔT | -40°C ≤ T <sub>A</sub> ≤ +85°C                                                                       |                          | 0.5  |                          | μV/°C             |
|                                                |                      | -40°C ≤ T <sub>A</sub> ≤ +125°C                                                                      |                          | 0.6  |                          |                   |
| Output Characteristics                         |                      |                                                                                                      |                          |      |                          |                   |
| Output Voltage Swing from Rail                 |                      | R <sub>L</sub> = 25kΩ                                                                                |                          | 5    | 14                       | mV                |
|                                                |                      | -40°C ≤ T <sub>A</sub> ≤ +125°C                                                                      |                          |      | 15.5                     |                   |
|                                                |                      | R <sub>L</sub> = 5kΩ                                                                                 |                          | 25   | 40                       |                   |
|                                                |                      | -40°C ≤ T <sub>A</sub> ≤ +125°C                                                                      |                          |      | 46                       |                   |
| Output Short-Circuit Current                   | I <sub>SC</sub>      | V <sub>S</sub> = 5V                                                                                  |                          | 20   |                          | mA                |
| Power Supply                                   |                      |                                                                                                      |                          |      |                          |                   |
| Operating Voltage Range                        | V <sub>S</sub>       |                                                                                                      | 1.8                      |      | 5.5                      | V                 |
| Quiescent Current/Amplifier                    | I <sub>Q</sub>       | V <sub>S</sub> = 5.5V, I <sub>OUT</sub> = 0mA                                                        |                          | 2.5  | 4.2                      | μA                |
|                                                |                      | -40°C ≤ T <sub>A</sub> ≤ +125°C                                                                      |                          |      | 6.5                      |                   |
| Power Supply Rejection Ratio                   | PSRR                 | V <sub>S</sub> = 1.8V to 5.5V, V <sub>CM</sub> = 0.6V                                                |                          | 2.5  | 12                       | μV/V              |
|                                                |                      | -40°C ≤ T <sub>A</sub> ≤ +125°C                                                                      |                          |      | 14                       |                   |
| Dynamic Performance (C <sub>LOAD</sub> = 30pF) |                      |                                                                                                      |                          |      |                          |                   |
| Gain-Bandwidth Product                         | GBP                  |                                                                                                      |                          | 120  |                          | kHz               |
| Slew Rate                                      | SR                   | G = +1                                                                                               |                          | 0.08 |                          | V/μs              |
| Overload Recovery Time                         |                      | V <sub>IN</sub> × G > V <sub>S</sub>                                                                 |                          | 25   |                          | μs                |
| Turn-On Time                                   | t <sub>ON</sub>      |                                                                                                      |                          | 0.2  |                          | ms                |
| Noise                                          |                      |                                                                                                      |                          |      |                          |                   |
| Input Voltage Noise                            |                      | f = 0.1Hz to 10Hz                                                                                    |                          | 3.5  |                          | μV <sub>P-P</sub> |
| Input Voltage Noise Density                    | e <sub>n</sub>       | f = 1kHz                                                                                             |                          | 75   |                          | nV/√Hz            |
| Input Current Noise Density                    | i <sub>n</sub>       | f = 1kHz                                                                                             |                          | 0.2  |                          | pA/√Hz            |

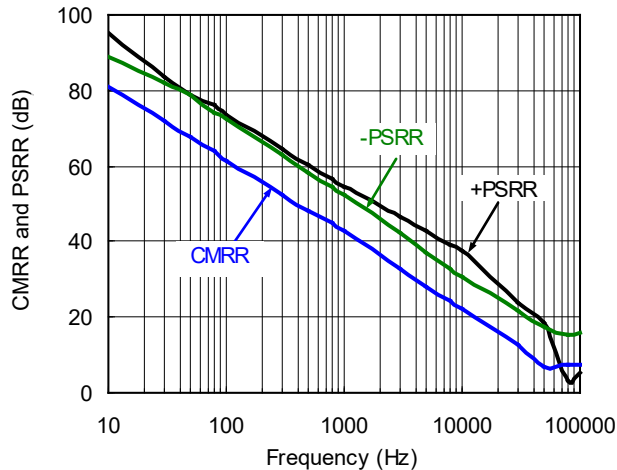
## TYPICAL PERFORMANCE CHARACTERISTICS

At  $T_A = +25^\circ\text{C}$ ,  $V_S = 5\text{V}$  and  $R_L = 25\text{k}\Omega$  connected to  $V_S/2$ , unless otherwise noted.

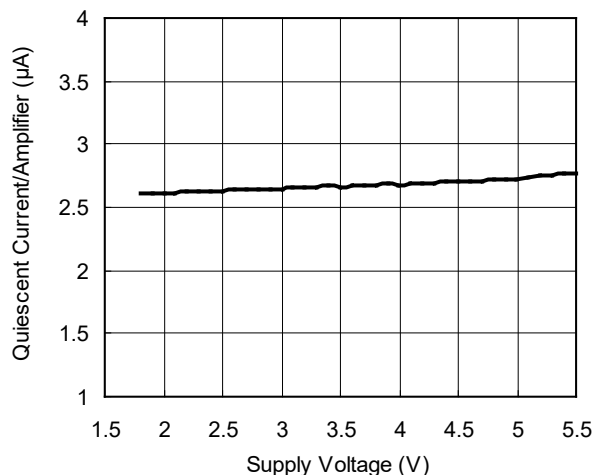
Open-Loop Gain and Phase vs. Frequency



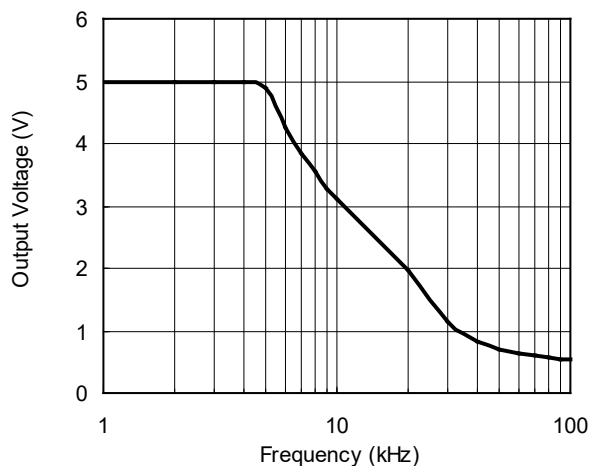
CMRR and PSRR vs. Frequency



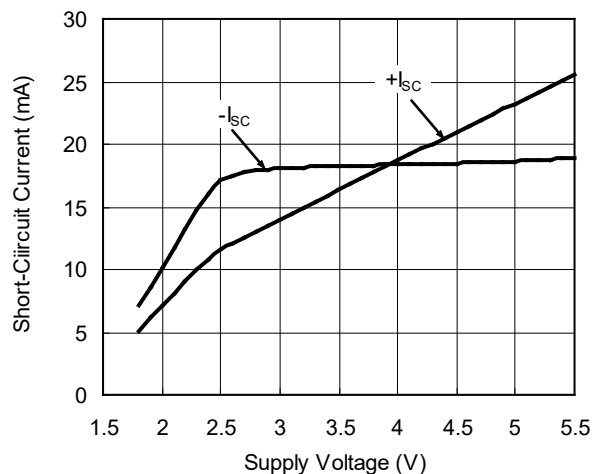
Quiescent Current vs. Supply Voltage



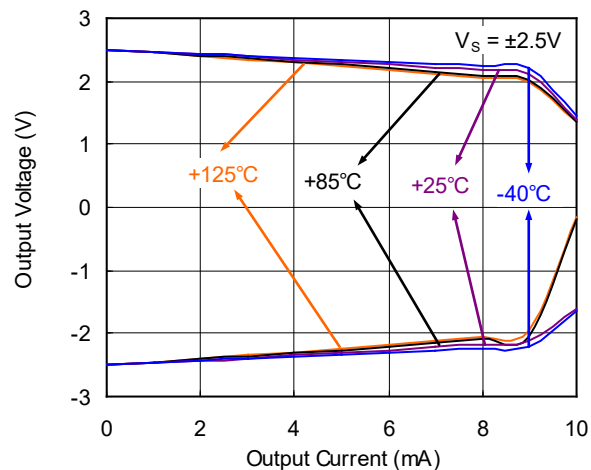
Maximum Output Voltage vs. Frequency



Short-Circuit Current vs. Supply Voltage

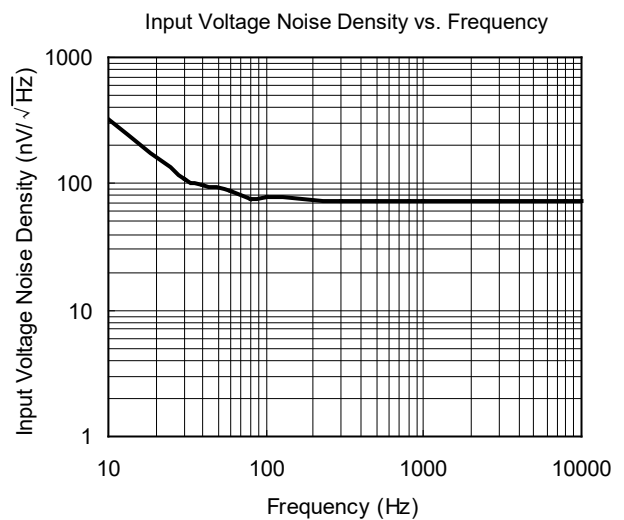
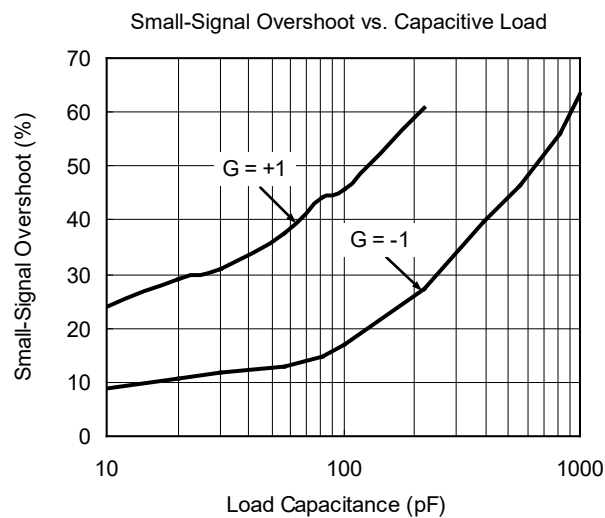
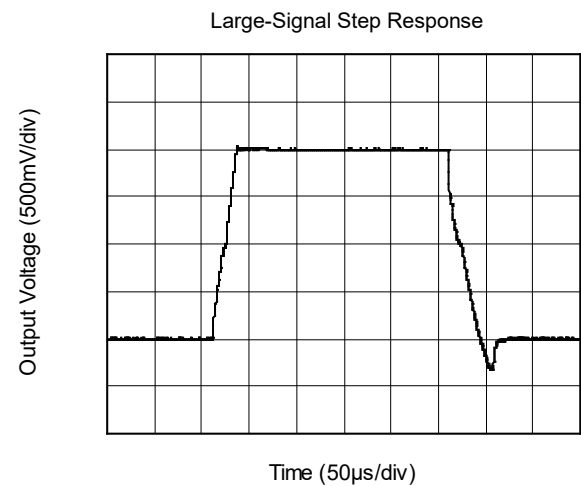
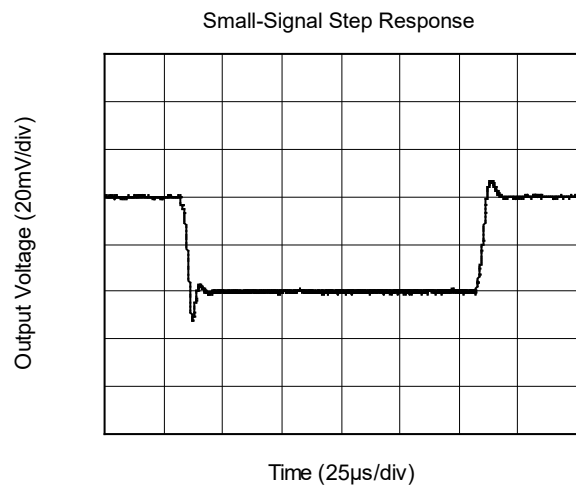
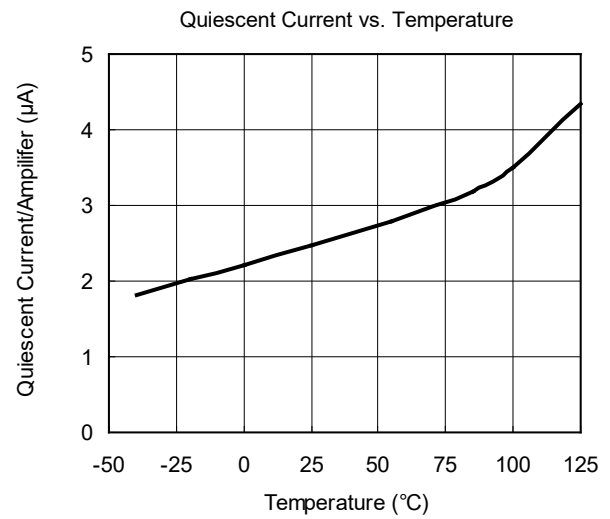
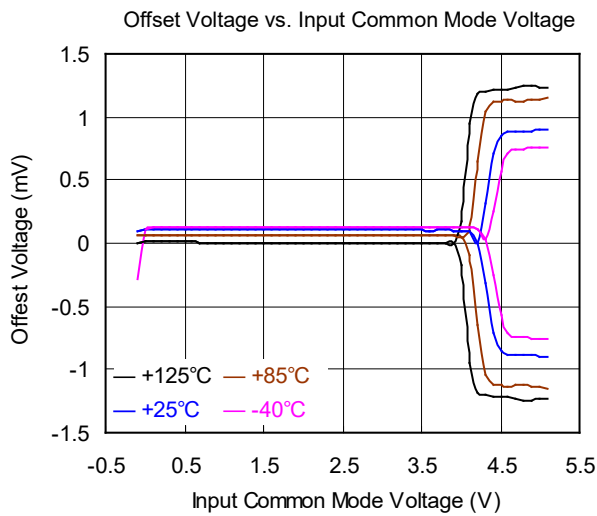


Output Voltage vs. Output Current



## TYPICAL PERFORMANCE CHARACTERISTICS (continued)

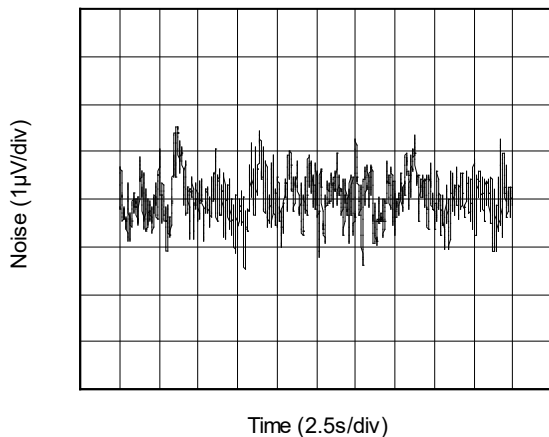
At  $T_A = +25^\circ\text{C}$ ,  $V_S = 5\text{V}$  and  $R_L = 25\text{k}\Omega$  connected to  $V_S/2$ , unless otherwise noted.



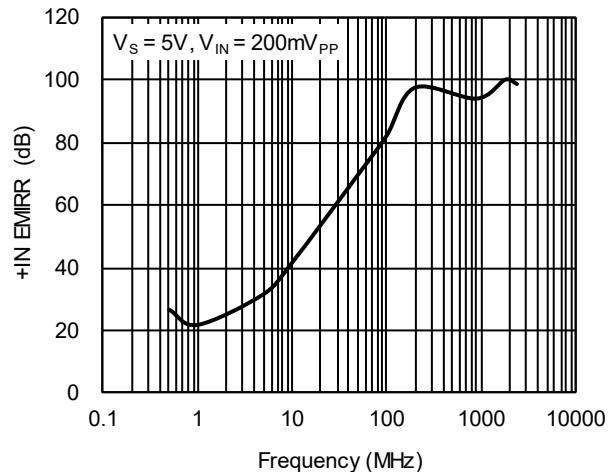
## TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At  $T_A = +25^\circ\text{C}$ ,  $V_S = 5\text{V}$  and  $R_L = 25\text{k}\Omega$  connected to  $V_S/2$ , unless otherwise noted.

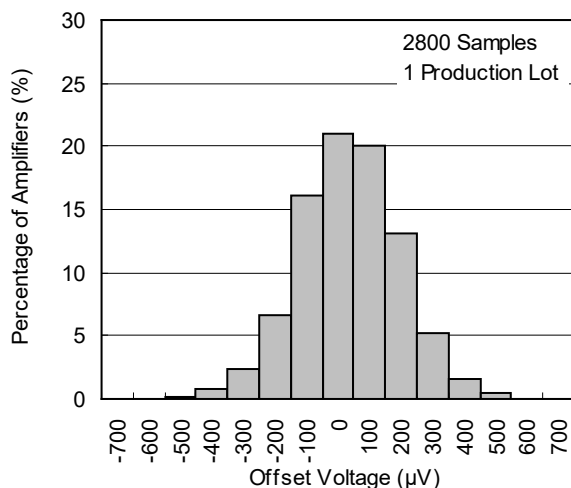
0.1Hz to 10Hz Noise



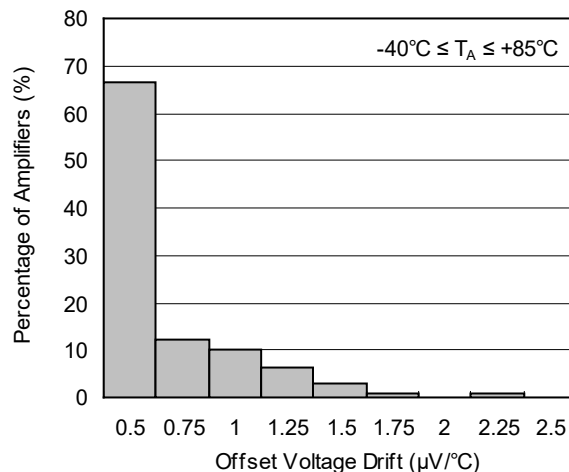
+IN EMIRR vs. Frequency



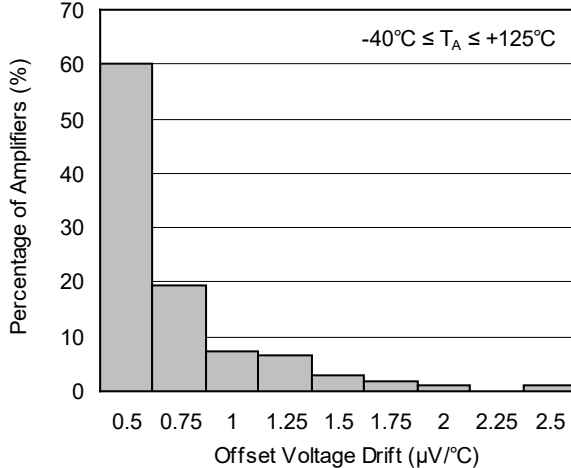
Offset Voltage Production Distribution



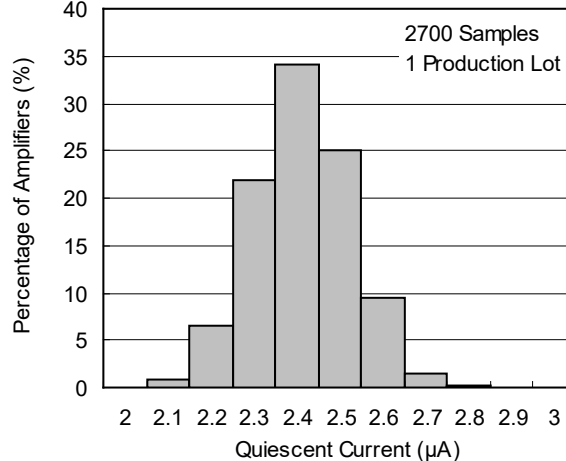
Offset Voltage Drift Distribution



Offset Voltage Drift Distribution



Quiescent Current Production Distribution



## REVISION HISTORY

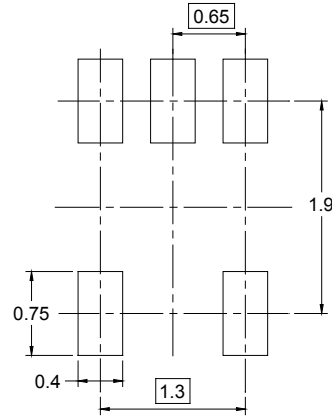
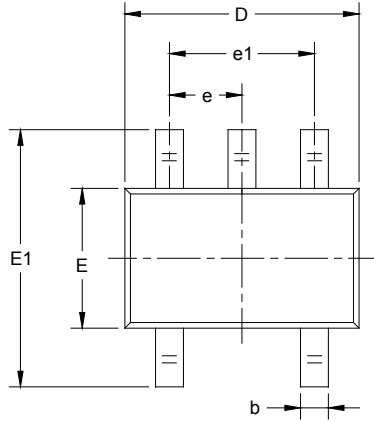
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

| AUGUST 2017 – REV.A to REV.A.1                       |  | Page |
|------------------------------------------------------|--|------|
| Added +IN EMIRR vs. Frequency .....                  |  | 8    |
| Changes from Original (NOVEMBER 2015) to REV.A       |  | Page |
| Changed from product preview to production data..... |  | All  |

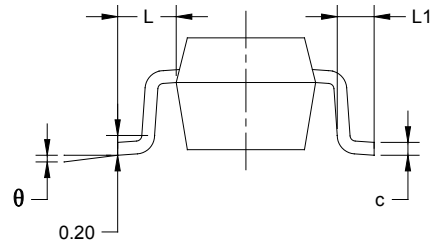
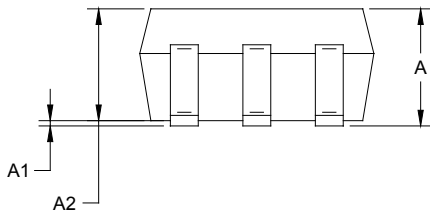
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## PACKAGE OUTLINE DIMENSIONS

### SC70-5



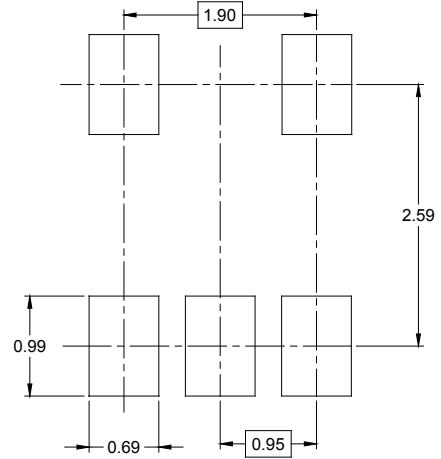
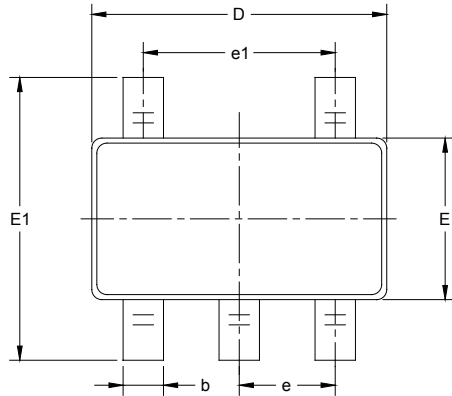
RECOMMENDED LAND PATTERN (Unit: mm)



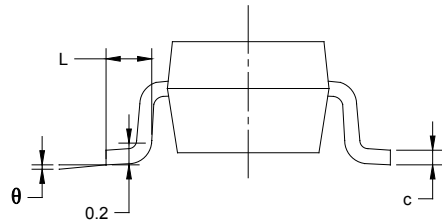
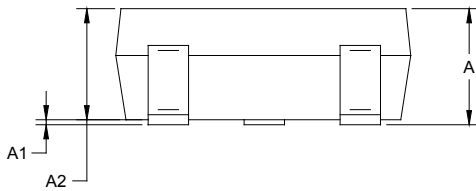
| Symbol   | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|----------|------------------------------|-------|-------------------------|-------|
|          | MIN                          | MAX   | MIN                     | MAX   |
| A        | 0.900                        | 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        | 0.150                        | 0.350 | 0.006                   | 0.014 |
| 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 |
| $\theta$ | 0°                           | 8°    | 0°                      | 8°    |

## PACKAGE OUTLINE DIMENSIONS

### SOT-23-5



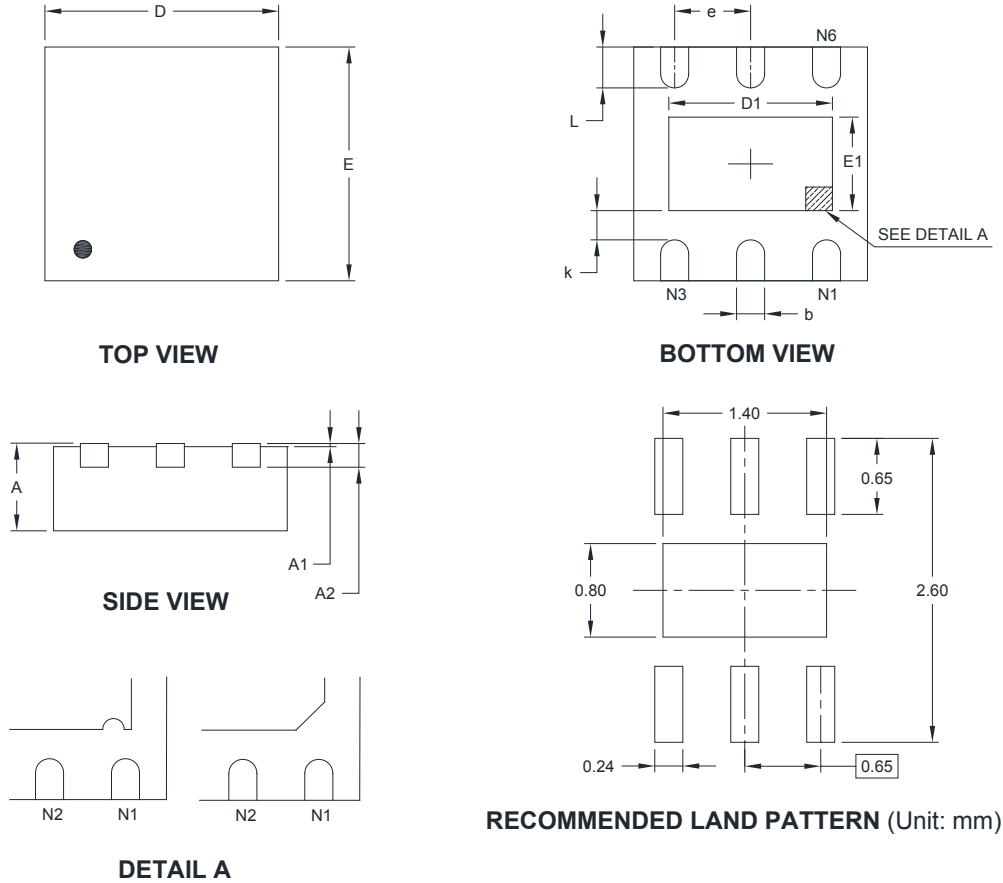
RECOMMENDED LAND PATTERN (Unit: mm)



| 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°    |

## PACKAGE OUTLINE DIMENSIONS

### TDFN-2x2-6L



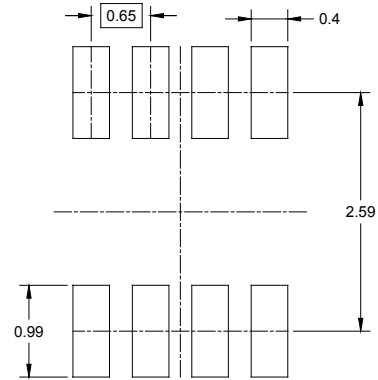
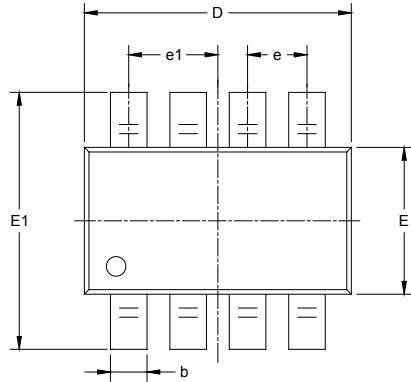
Pin #1 ID and Tie Bar Mark Options

NOTE: The configuration of the Pin #1 identifier is optional, but must be located within the zone indicated.

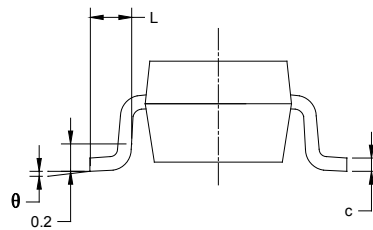
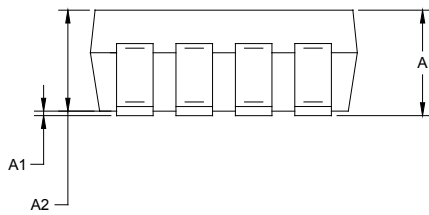
| Symbol | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|--------|------------------------------|-------|-------------------------|-------|
|        | MIN                          | MAX   | MIN                     | MAX   |
| A      | 0.700                        | 0.800 | 0.028                   | 0.031 |
| A1     | 0.000                        | 0.050 | 0.000                   | 0.002 |
| A2     | 0.203 REF                    |       | 0.008 REF               |       |
| D      | 1.900                        | 2.100 | 0.075                   | 0.083 |
| D1     | 1.100                        | 1.450 | 0.043                   | 0.057 |
| E      | 1.900                        | 2.100 | 0.075                   | 0.083 |
| E1     | 0.600                        | 0.850 | 0.024                   | 0.034 |
| k      | 0.200 MIN                    |       | 0.008 MIN               |       |
| b      | 0.180                        | 0.300 | 0.007                   | 0.012 |
| e      | 0.650 TYP                    |       | 0.026 TYP               |       |
| L      | 0.250                        | 0.450 | 0.010                   | 0.018 |

## PACKAGE OUTLINE DIMENSIONS

### SOT-23-8



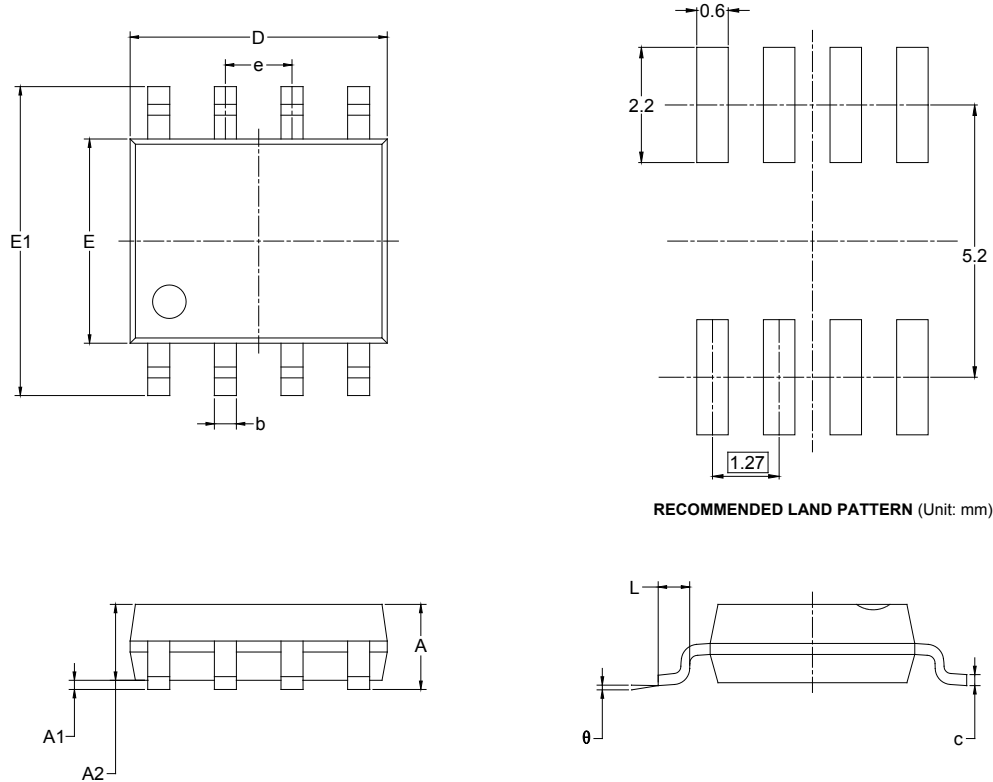
RECOMMENDED LAND PATTERN (Unit: mm)



| 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        | 0.650 BSC                    |       | 0.026 BSC               |       |
| e1       | 0.975 BSC                    |       | 0.038 BSC               |       |
| L        | 0.300                        | 0.600 | 0.012                   | 0.024 |
| $\theta$ | 0°                           | 8°    | 0°                      | 8°    |

## PACKAGE OUTLINE DIMENSIONS

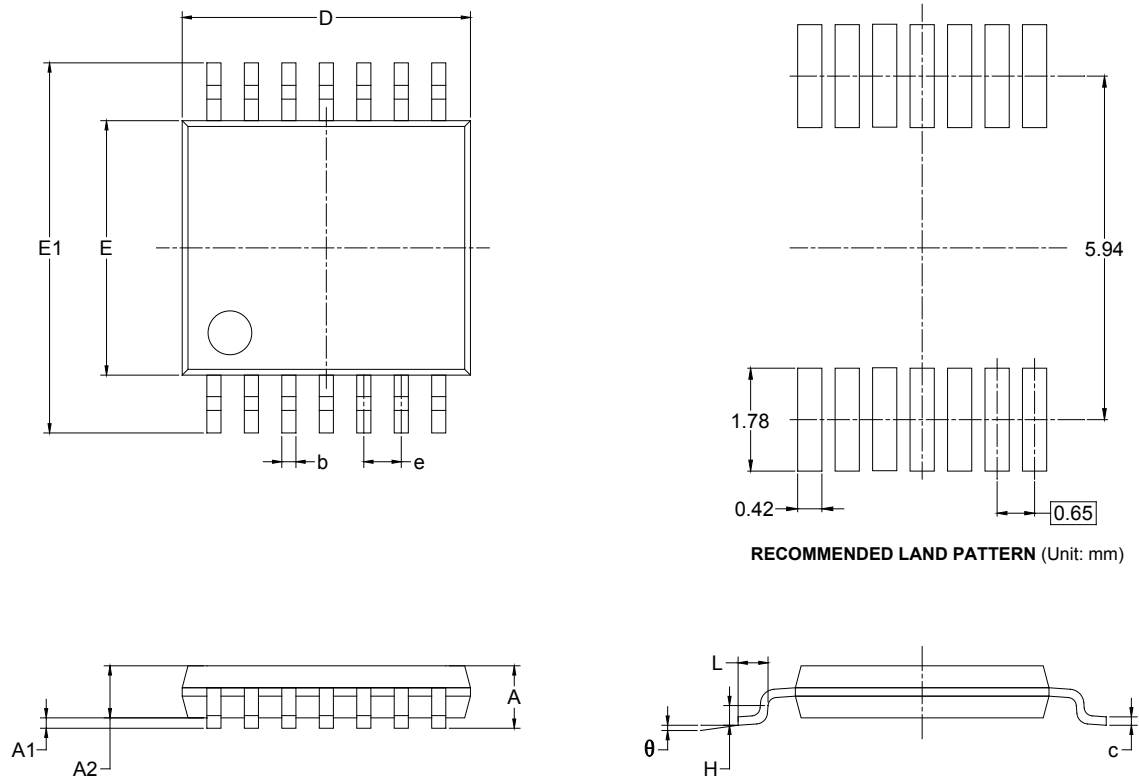
### SOIC-8



| 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°    |

## PACKAGE OUTLINE DIMENSIONS

### TSSOP-14

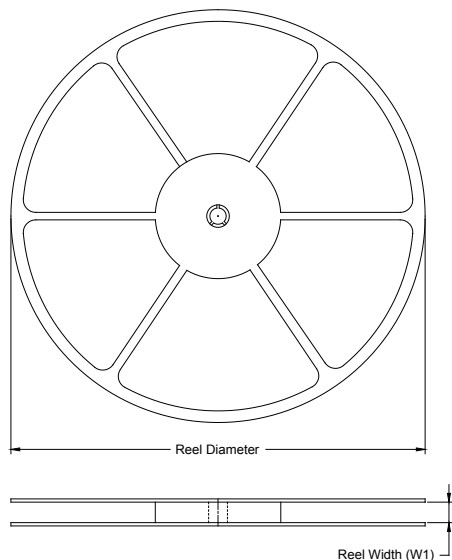


| Symbol   | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|----------|------------------------------|-------|-------------------------|-------|
|          | MIN                          | MAX   | MIN                     | MAX   |
| A        |                              | 1.200 |                         | 0.047 |
| A1       | 0.050                        | 0.150 | 0.002                   | 0.006 |
| A2       | 0.800                        | 1.050 | 0.031                   | 0.041 |
| b        | 0.190                        | 0.300 | 0.007                   | 0.012 |
| c        | 0.090                        | 0.200 | 0.004                   | 0.008 |
| D        | 4.860                        | 5.100 | 0.191                   | 0.201 |
| E        | 4.300                        | 4.500 | 0.169                   | 0.177 |
| E1       | 6.250                        | 6.550 | 0.246                   | 0.258 |
| e        | 0.650 BSC                    |       | 0.026 BSC               |       |
| L        | 0.500                        | 0.700 | 0.02                    | 0.028 |
| H        | 0.25 TYP                     |       | 0.01 TYP                |       |
| $\theta$ | 1°                           | 7°    | 1°                      | 7°    |

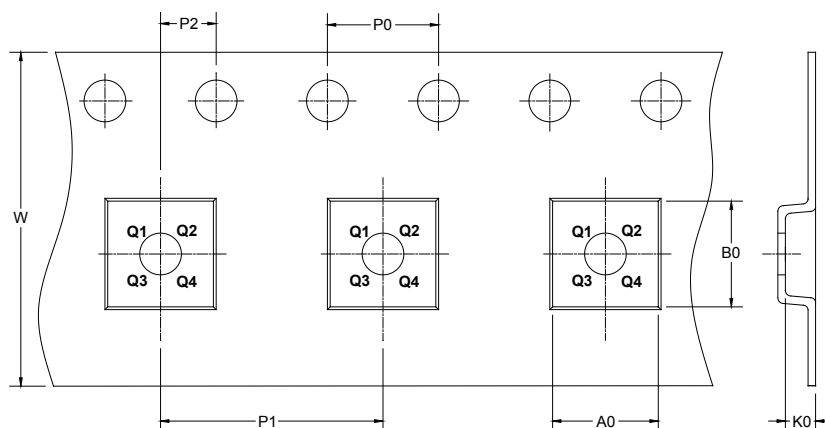
# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



➔ DIRECTION OF FEED

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                | 2.25    | 2.55    | 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            |
| TDFN-2×2-6L  | 7"            | 9.5                | 2.30    | 2.30    | 1.10    | 4.0     | 4.0     | 2.0     | 8.0    | Q1            |
| SOT-23-8     | 7"            | 9.5                | 3.17    | 3.23    | 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            |
| TSSOP-14     | 13"           | 12.4               | 6.95    | 5.60    | 1.20    | 4.0     | 8.0     | 2.0     | 12.0   | Q1            |

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## 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            |

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