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## **SoniCrest** Brand Acoustic Components

[www.jlsonicrest.com](http://www.jlsonicrest.com)

Document Type : Specification  
 Product Type : Silicon Microphone Component  
 Part Number : SMO08C-38/1317

|   |  |  |
|---|--|--|
| A1 - New issue created by<br>Hermes Shum on 29 Oct., 2019                     |  |  |
| A2 - Updated sections 2, 5, 6, 8, 9,<br>11 by Hermes Shum on 16 Dec.,<br>2019 |  |  |
| A3 - Updated section 6 by<br>Hermes Shum on 17 Dec., 2019                     |  |  |
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## 1. Purpose and Scope

This document contains both general requirements, qualification requirements, and those specific electrical, mechanical requirements for this part.

## 2. Description

3.5 x 2.65 x 0.98 mm analog silicon microphone, S/N ratio 65dB, reverse mounted, with RF filter, phase control and Sensitivity tolerance of  $\pm 1$ dB, RoHS compliant.

## 3. Application

Smartphones, Wearables, Smart home devices, Video cameras, IoT devices, Automotive, Audio Input Peripherals, etc.

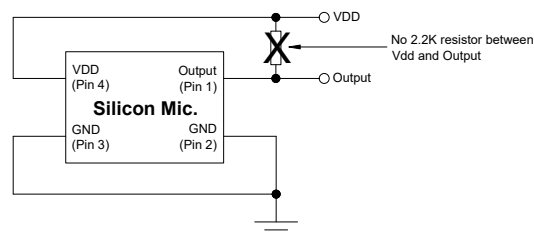
## 4. Features

- High Performance Analog ultra low pressure sensor
- Temperature Coefficient of Sensitivity stability within  $\pm 0.60$  dB/Deg C.
- Pressure Coefficient of Stability within  $\pm 0.55$  dB/Kpa
- Ultra Low Profile Package Availability
- Surface Mountable: MLP Design
- Tape & Reel Packaging
- RoHS Compliance

## 5. Interface Circuit Design Considerations

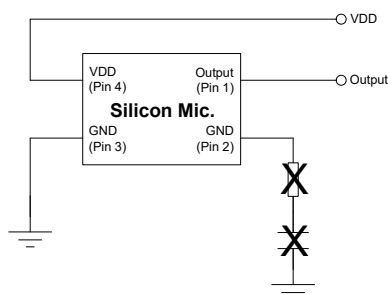
### 5.1. Design Consideration

- 5.1.1.** Must avoid connecting 2.2K resistor between VDD and output terminal will result in non-functional failure or current consumption will be too high.



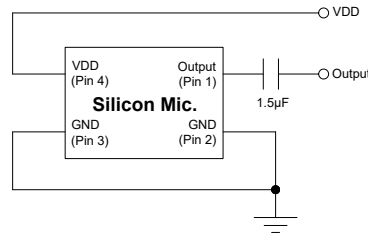
**Figure 1. Design Consideration (1)**

- 5.1.2.** Must avoid connecting RC to pin 2 because SoniCrest silicon microphones are all fixed gain series. Connecting RC to pin 2 leads to pin 2 floating resulted in malfunctioning or non-functional.



**Figure 2. Design Consideration (2)**

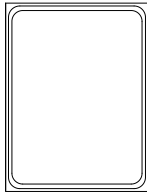
**5.1.3. Interface Schematic**



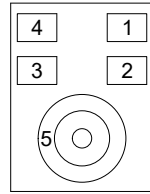
**Figure 3. SMO08C-38/1317 Interface Schematic Diagram**

**5.2. Electrical Layout**

**Top View**



**Bottom View**



| Pin No. | Function |
|---------|----------|
| 1       | Output   |
| 2       | GND      |
| 3       | GND      |
| 4       | VDD      |
| 5       | GND      |

**Figure 4. Electrical Layout of SMO08C-38/1317**

**5.3. Terminology**

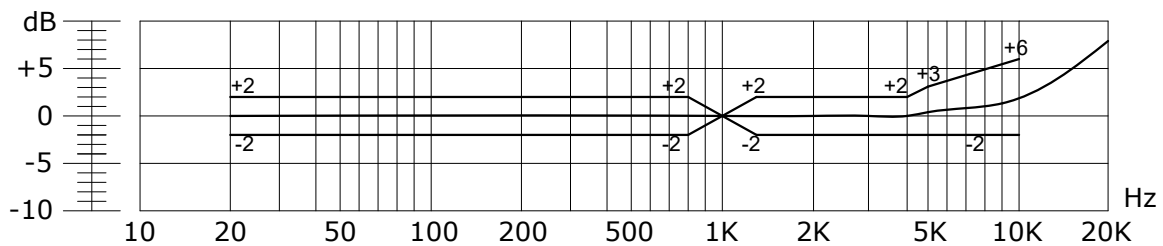
- 5.3.1.** Pin 1: The Output Terminal, where the analog signal equivalent to applied pressure is available.
- 5.3.2.** Pin 2, 3, 5: The Terminal where the supply negative is connected to sensor package.
- 5.3.3.** Pin 4: Input Voltage (maximum 3.6V).
- 5.3.4.** Sensitivity: Sensitivity is the open circuit output voltage amplitude for a given sound pressure at the pressure sensor diaphragm. This is frequency dependent so typically quoted at 1KHz. Units are defined in dB logarithmic scale. It is measured at the following conditions,  $f = P_{IN} = 1Pa, V_{DD} = 2.0V$ .

**6. Component Requirement (All data taken at 23±2°C unless otherwise specified)****6.1. General Requirement**

- 6.1.1.** Operating Temperature Range : -40°C to +100°C
- 6.1.2.** Storage Temperature Range : -40°C to +70°C
- 6.1.3.** Solder reflow (for 30s max. of peak temperature) : ≤ 260°C

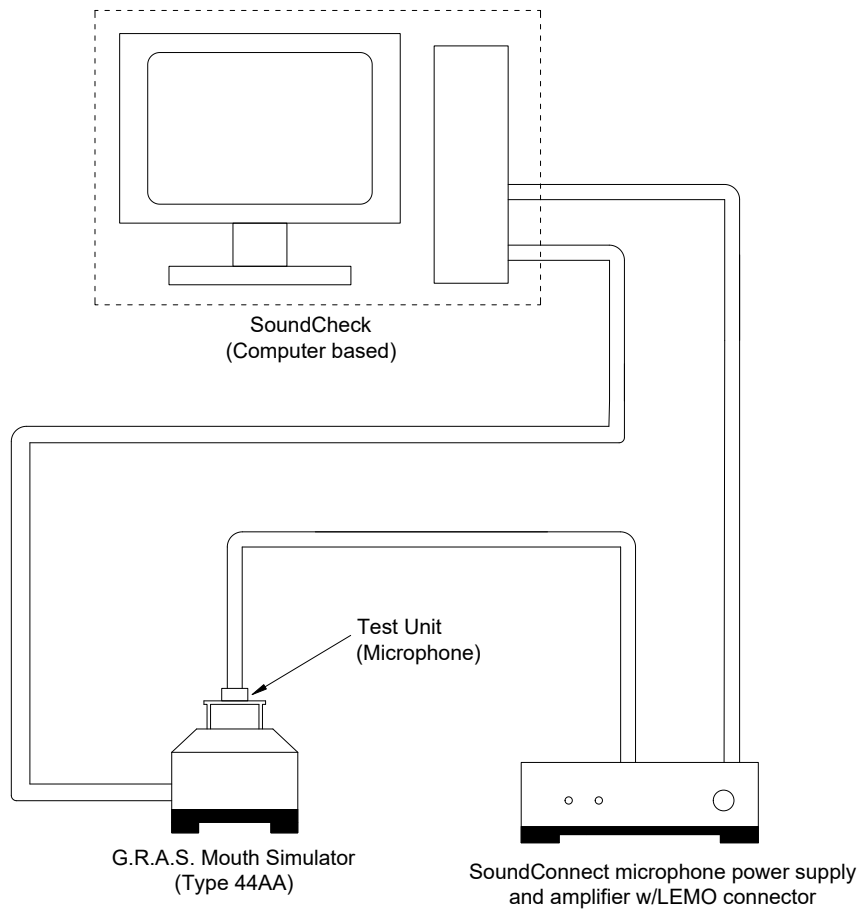
**6.2. Electrical Requirement**

- 6.2.1.** Directivity : Omnidirectional
- 6.2.2.** Maximum Input Sound Pressure Level  
(for less than 10% distortion) : 124dB
- 6.2.3.** Sensitivity (0dB = 1V/Pa, 1kHz) : -38 ± 1dB
- 6.2.4.** Operating Voltage Range : 1.5V to 3.6V
- 6.2.5.** Current Consumption : ≤ 0.2mA
- 6.2.6.** Output Impedance : ≤ 300Ω
- 6.2.7.** Total Harmonic Distortion (94dB at 1kHz) : ≤ 0.5%
- 6.2.8.** S/N Ratio (A-weighted) : 65dB
- 6.2.9.** Sensitivity Variation over Operation Range : 0.5dB
- 6.2.10.** Power Supply Rejection  
(100mVp-p square wave, 217Hz, A-weighted) : -100dB

**Figure 5. Frequency Response****6.3. Mechanical Requirement**

- 6.3.1.** Layout and Dimension : See Section 9, Figure 8

#### 6.4. Test Setup



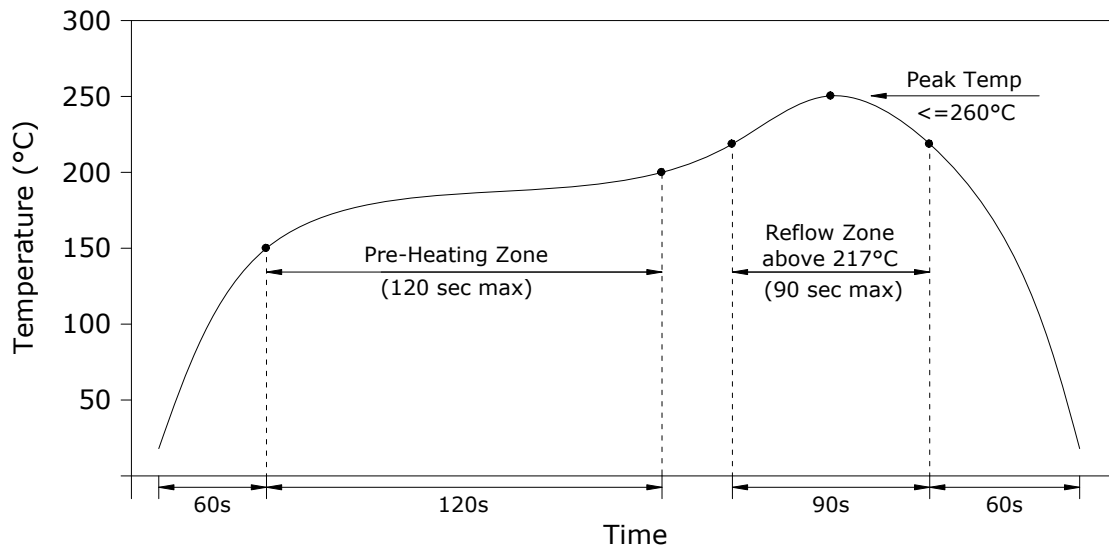
**Figure 6. Test Setup**

**Notes :** Apply sinusoidal wave from SoundCheck Audio Analyzer (Computer based) to speaker in G.R.A.S. Mouth Simulator Type 44AA. Measure sensitivity of test unit with specified driving circuit. The whole testing system should be calibrated based on calibration procedure recommended by the manufacturer before measurement. Measurement should be carried out in an excellent insulation from external noise environment.

## 7. Reliability Test

- 7.1. **Reflow Simulation (without solder)** : Subject samples to reflow soldering condition with maximum temperature  $260\pm 5^{\circ}\text{C}$  for 3 times. Components must be fully stabilized between each reflow test, which may require up to a 2 hours soak.
- 7.2. **Static Humidity** : Precondition at room temperature for 1 hour. Then expose to  $+85^{\circ}\text{C}$  with 85% relative humidity for 1000 hours. Finally dry at room ambient for 3 hours before taking final measurement.
- 7.3. **Temperature Shock** : Each temperature cycle shall consist of 30 minutes at  $-40^{\circ}\text{C}$ , 30 minutes at  $+125^{\circ}\text{C}$  with 5 minutes transition time. Test duration is for 30 cycles. Components must be fully stabilized at temperature extremes before data is taken, which may require up to a 2 hours soak.
- 7.4. **ESD Sensitivity** : Perform ESD sensitivity threshold measurement for each contact according to MIL-STD-883G, Method 3015.7 for Human Body Model. Identify the ESD threshold levels indicating passage of 8000V Human Body Model.
- 7.5. **Random Vibration** : Vibrate randomly along three perpendicular directions for 30 minutes in each direction, 4 cycles from 20 ~ 2000Hz with a peak acceleration 20g.
- 7.6. **Mechanical Shock** : Subject samples to half sine shock pulses ( $3000\text{g}\pm 15\%$  for 0.3ms) in each direction, totally 18 shocks.
- 7.7. **Operation Life** : Subject samples to  $+125^{\circ}\text{C}$  for 168 hours under maximum input voltage.
- 7.8. **Drop Test** : Drop samples naturally from the height of 1.5m onto a steel surface board for 3 times in 6 directions, totally 18 drops.

## 8. Recommended reflow oven temperature profile



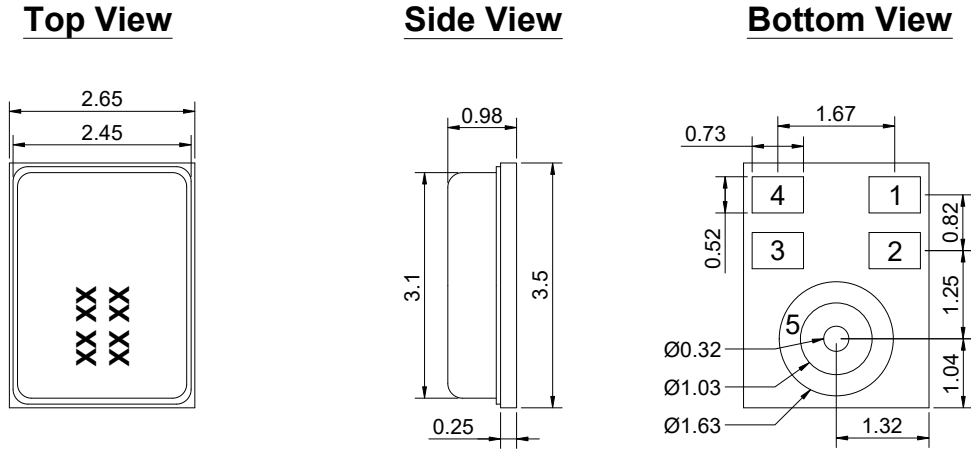
**Figure 7. Recommended Reflow Oven Temperature Profile**

### Notes:

1. Do not boards wash or clean after the reflow process.
2. Do not apply over 0.3Mpa of air pressure into the port hole.
3. Do not expose to ultrasonic processing or cleaning.
4. Do not pull a vacuum over port hole of the microphone.

**9. Mechanical Requirements**

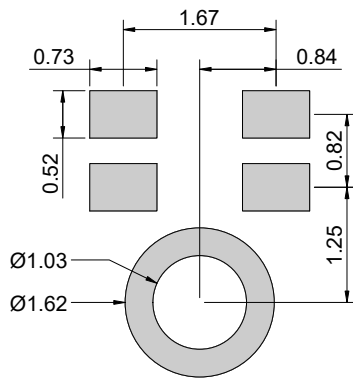
Unit : mm  
 Tolerance : Linear =  $\pm 0.15\text{mm}$   
 (unless otherwise specified)



**Figure 8. SMO08C-38/1317 Mechanical Layout**

**10. PCB Solder Pad Layout**

The below figure provide general guidance about the recommended PCB land pattern. The land pattern dimensions are exactly the same size and shape as the pads on the pressure sensor module. Recommended solder paste height is 3-5 mils ( $75\mu\text{m}$  to  $125\mu\text{m}$ ).

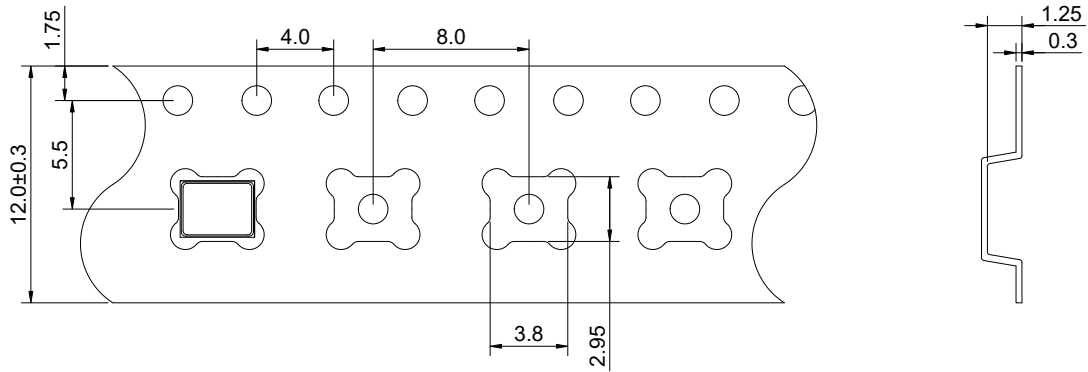


**Figure 9. SMO08C-38/1317 PCB Solder Pad Layout**



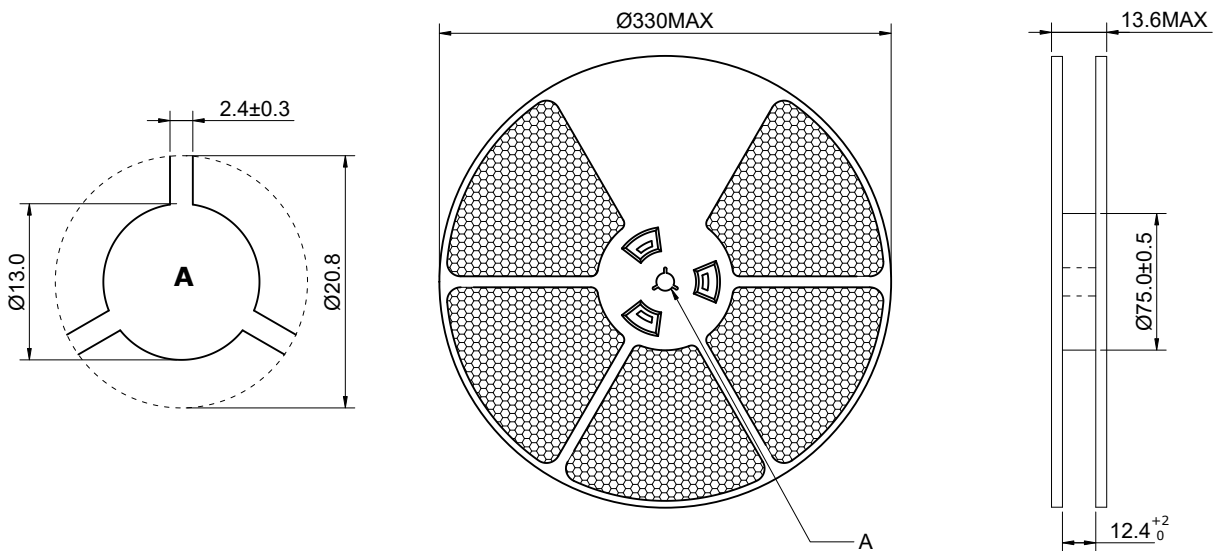
**11. Standard Packing Layout**

**11.1. Tape Layout**



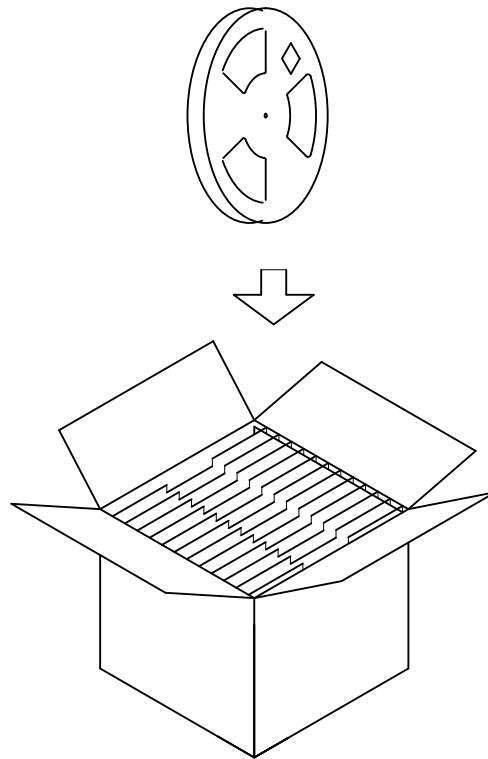
**Figure 10. Tape Layout**

**11.2. Reel Layout**



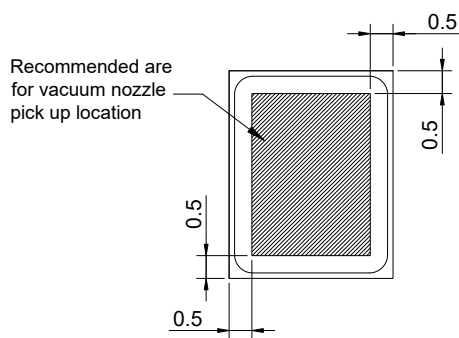
**Figure 11. Reel Layout**

**11.3. Packing Quantity:** 5000 pieces per reel, 5 reels per inner carton, 2 inner cartons per outer carton. (Total 50000 pieces)



**Figure 12. Reel Installation**

**11.4. Pickup Tool Pick Location**



| Pick Up Pressure Limits |      |     |
|-------------------------|------|-----|
| Condition               | mmHg | PSI |
| Max. Air Purge          | 3000 | 58  |
| Max. Vacuum             | -500 | 9.6 |

**Figure 13. Pickup Tool Pick Location**