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**SoniCrest** Brand Acoustic Components
www.jlsonicrest.com
Document Type : Specification
Product Type : Silicon Digital Microphone Component
Part Number : SDMO07A-26

| | | |
|---|---|---|
| A1 - New issue created by Loki, Lo on 11 Seot., 2014 | | |
| A2 - Added frequency response by Ting Lok, Ngan on 25 Feb., 2015 | | |
| A3 - Updated section 2, 4, 5, 8 - 10 by Loki, Lo on 19 Dec., 2017 | | |
| | | |

## 1. Purpose and Scope

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

## 2. Description

3 x 4 x 1mm Silicon digital microphone with N1 Sensor and C1 ASIC, top mounted, RoHS compliant.

## 3. Application

Telecommunication Equipment, Computers and Peripherals, etc.

## 4. Component Requirement

### 4.1. General Requirement

| Specification | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|
| Operating Temperature | -40 | - | 100 | °C |
| Storage Temperature | -40 | - | 125 | °C |
| Relative Humidity | 25 | - | 85 | % |
| Operating Voltage | 1.64 | 2.1 | 3.6 | V |

### 4.2. Electro Acoustical Specifications

| Specification | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|
| Directivity | | Omni-directional | | |
| Maximum Input Sound Level at 1kHz, 10% THD | | 120 | | dB |
| Total Harmonic Distortion at 94dB SPL, 1kHz | - | - | 0.5 | % |
| Sensitivity Range (0dB = 1V/Pa) | -29 | -26 | -23 | dBFS |
| Current Consumption at 2.1VDC in normal mode without the I/O buffer current | - | 650 | 800 | μA |
| Current consumption in SLEEP mode | - | - | 50 | μA |
| Solder Reflow (for 30s max. of peak temperature) | - | - | 260 | °C |
| Signal to Noise Ratio (A-weighted) at 94dB SPL, 1kHz | - | 58 | - | dBA |
| Power Supply Rejection (PSR) at 217Hz 100mVpp Square wave | - | -70 | - | dBFS |
| Load Capacitance for DATA output | - | - | 100 | pF |
| Sensitivity Variation over Operating Voltage Range | - | 0.5 | - | dB |
| Date Format | | 1/2 cycle PDM | | |
| Clock Frequency | 1.0 | 2.4 | 3.25 | MHz |
| Clock Duty Cycle | 40 | - | 60 | % |
| Logic Low Input/Output Voltage | -0.35 | - | 0.35* $V_{DD}$ | V |
| Logic High Input/Output Voltage | 0.65* $V_{DD}$ | - | $V_{DD}$ +0.3 | V |
| Short Circuit Current | 1 | - | 10 | mA |

### 4.3. Interface Timing Chart

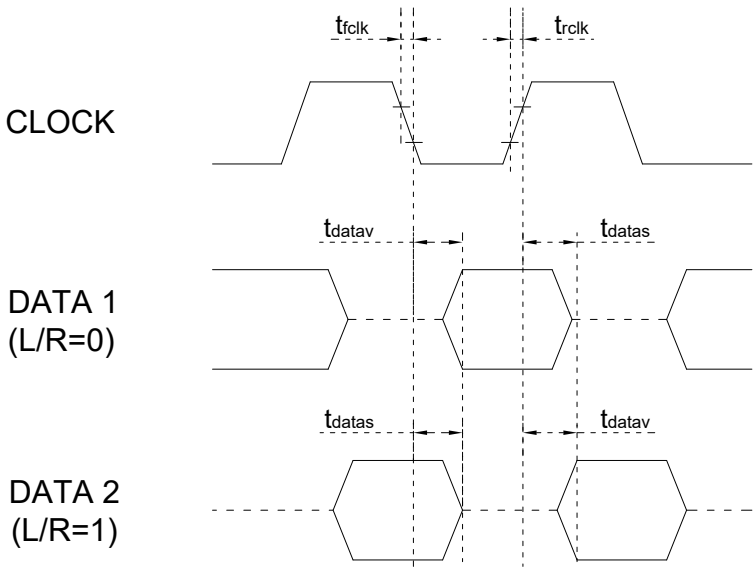



**Figure 1. Interface Timing Chart**

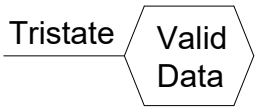



**Figure 2. Data Format**

**Notes :** Tristate logic has 3 states logic 1, logic 0 and high impedance state when the pin is not driven. During the high impedance state the pin will float and any other driver with logic 1 or 0 will drive the pin to its logic state if connected to the pin. This is used to share the DATAOUT pin between L & R. Device with L/R = 1 would drive the DATAOUT pin when the clock is high and put the output in high impedance state (tristate) when CLOCK = LOW. Device with L/R = 0 would drive the DATAOUT pin when CLOCK = LOW and make its output high impedance for CLOCK = HIGH.

DATA1 = RIGHT Sensor = L/R = 0
DATA2 = LEFT Sensor = L/R = 1

| Parameter | Comments | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| $T_{fclk}$ | Fall time | - | - | 10 | ns |
| $T_{rclk}$ | Rise time | - | - | 10 | ns |
| $T_{datav}$ | Time for Valid Data | 20 | 31 | 40 | ns |
| $T_{datas}$ | Delay Time for Data Tristate | 0 | 8 | 15 | ns |

### 4.4. Frequency Response

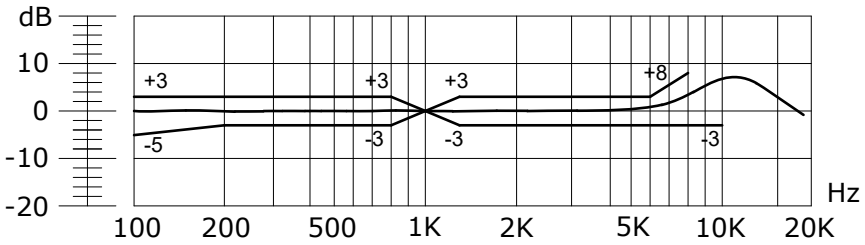



**Figure 3. Frequency Response**

## 5. Interface Circuit Design Considerations

### 5.1. Typical Application Schematics

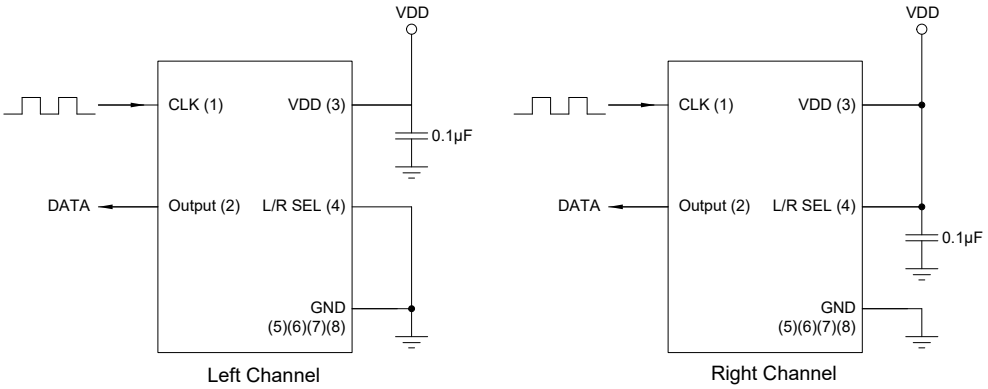
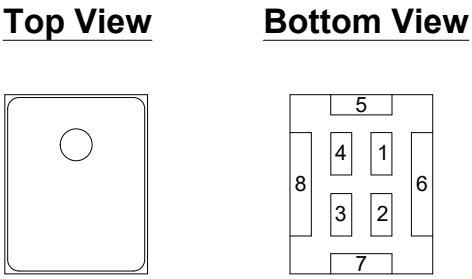



**Figure 4. Typical Application Schematics**

### 5.2. Electrical Layout




| Pin No. | Function | Comments |
|---|---|---|
| 1 | CLOCK | Clock Input |
| 2 | Output | Output Signal |
| 3 | VDD | VDD Input |
| 4 | LR SEL | Selection Control |
| 5 | GND | Ground |
| 6 | GND | Ground |
| 7 | GND | Ground |
| 8 | GND | Ground |

**Figure 5. Electrical Layout of SDMO07A-26**

### 5.3. Terminology

**5.3.1.** CLOCK 1: The clock input terminal (CLK is from CODEC to pressure sensor Clk Input).

**5.3.2.** Output 2: The Output Terminal, where the electrical signal equivalent to applied pressure is available (Pad name "Output" in Electrical Layout Drawing).

**5.3.3.** VDD 3: Input Voltage (Max. 3.6V).

**5.3.4.** LR SEL 4: Clock polarity for sampling the output determined by the L/R signal.

**5.3.5.** GND 5, 6, 7, 8: The Terminal where the supply negative (Pad name "GND" in Electrical layout drawing) is connected to sensor package.

**5.3.6.** DIRECTIVITY: It is the response pattern that expresses the geometric shape of the region of sensitivity surrounding the pressure sensor, omni-directional, uni-directional, bi-directional.

## 6. Reliability Test

### 6.1. Reliability Test Requirements

**6.1.1.** **Solder Reflow** : One pass through standard solder reflow profile.

**6.1.2.** **Temperature Shock** : Each cycle shall consist of 30 minutes at -40°C, 30 minutes at +125°C with a 5 minutes transition time. Test duration is for 30 cycles, starting from cold to hot temperature.

**6.1.3.** **Static Humidity** : Precondition at +25°C for 1 hour. Exposed to +85°C with 85% Relative Humidity for 1000 hours. Dry at room ambient for 4 hours before measurements.

**6.1.4.** **Random Vibration** : Vibrated randomly 20 ~ 2000Hz for 4 cycles with 20g acceleration in each directions. The test time is 30 minutes per plane.

**6.1.5.** **Mechanical Shock** : Subject samples to half sine shock pulses (3000g for 0.3ms) in each direction, total for 18 shocks.

**6.1.6.** **Operation Life** : Subject to 125°C for 168 hours under full rated power.

**6.1.7.** **Simulated Reflow (without solder)** : Samples for qualification testing require a minimum of 3 passes of standard reflow solder profiles. 2 hours of settling time is required between each reflow profile test.

**6.1.8.** **ESD Sensitivity** : Perform ESD sensitivity threshold measurements 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.

**6.1.9.** **Drop Test** : Samples are fixed inside the fixture and dropped naturally from the 1.5m height onto a stell surface in six directions for three times, total 18 times.

## 7. Recommended reflow oven temperature profile

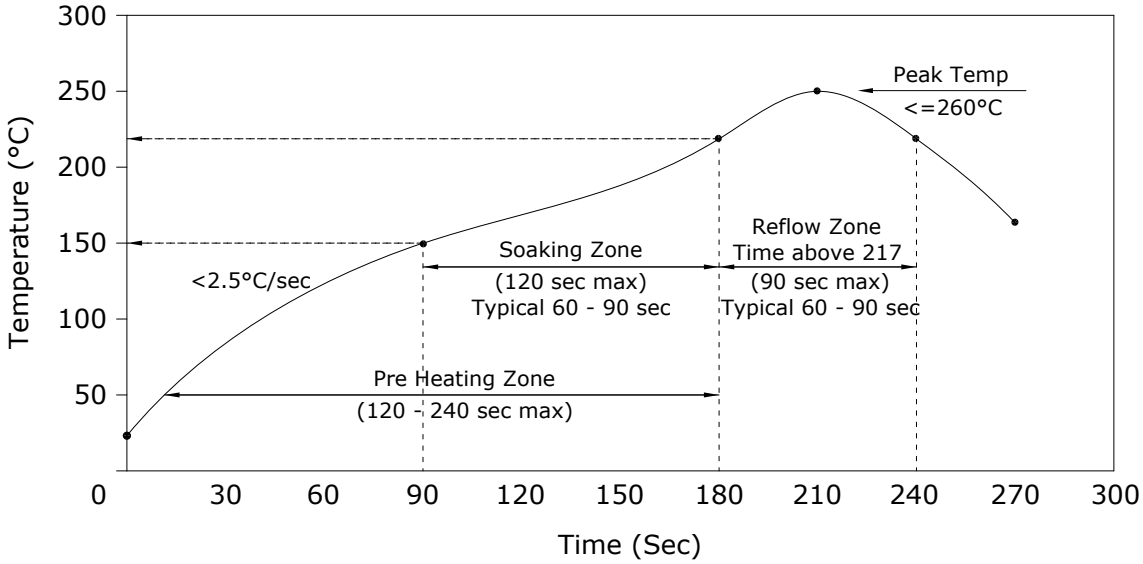



**Figure 6. Recommended Reflow Oven Temperature Profile**

**Notes:**

1. Pb-free soldering assembing processing: Reference IPC/JEDEC J-STD-020C.
2. Number of Reflows - Recommended not more than 3 cycles.
3. The SMD process should use no clean solder paste, cleaning is not allowed because washing will damage the pressure sensor sensing elements.
4. Do not board wash after the reflow process. Board washing and cleaning can damage the device.
5. Do not expose ultrasonic processing and cleaning.
6. Do not expose plasma cleaning process.

## 8. Mechanical Requirements

Unit : mm
Tolerance : Linear = ±0.15
(unless otherwise specified)

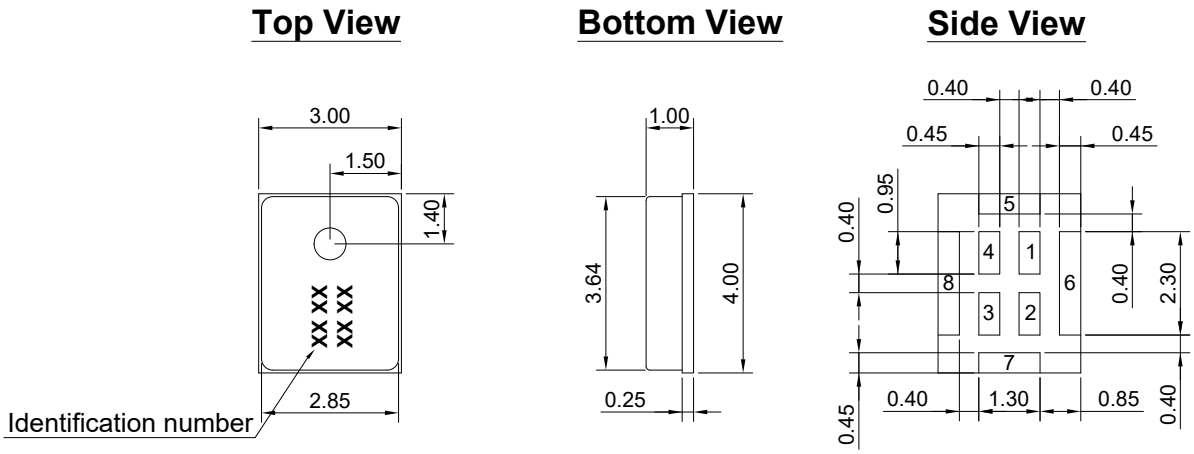



**Figure 7. Mechanical Layout of SDMO07A-26**

## 9. 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 (75μm to 125μm).

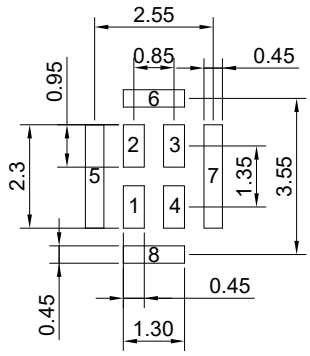



**Figure 8. PCB Solder Pad Layout of SDMO07A-26**

## 10. Standard Packing Requirements

### 10.1. Tape and Reel

#### 10.1.1. Packing Options

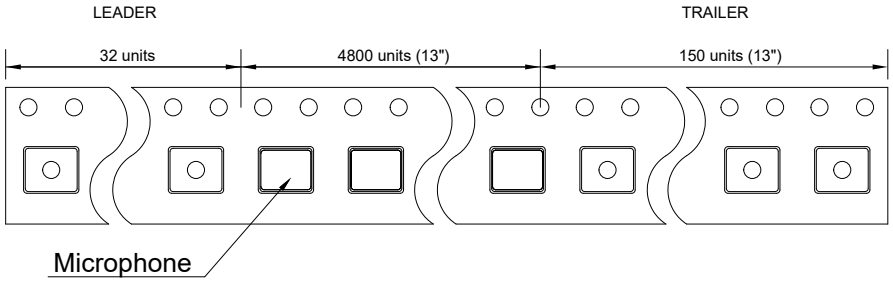



**Figure 9. Tape and Reel Packing Quantity**

#### 10.1.2. Tape Layout

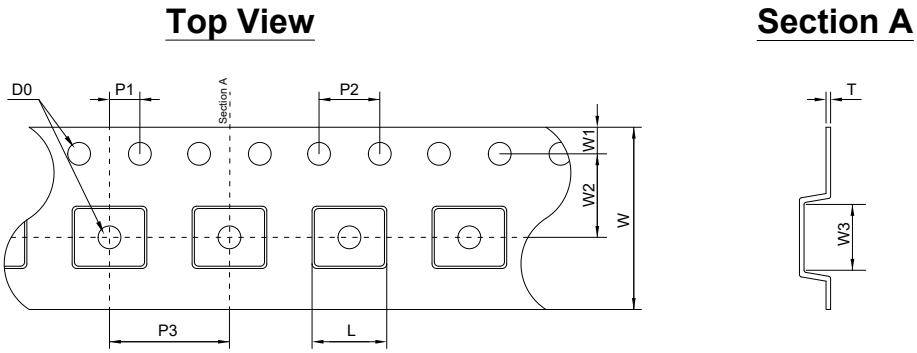



**Figure 10. Tape Layout**

| Symbol | Millimeter | | |
|---|---|---|---|
| | MINIMUM | NOMINAL | MAXIMUM |
| D0 | 1.50 | 1.50 | 1.60 |
| P1 | 1.90 | 2.00 | 2.10 |
| P2 | 3.90 | 4.00 | 4.10 |
| P3 | 7.90 | 8.00 | 8.10 |
| L | 4.00 | 4.10 | 4.20 |
| W | 11.70 | 12.00 | 12.30 |
| W1 | 1.65 | 1.75 | 1.85 |
| W2 | 5.40 | 5.50 | 5.60 |
| W3 | 3.30 | 3.40 | 3.50 |
| T | 0.25 | 0.30 | 0.35 |

### 10.1.3. Reel Layout

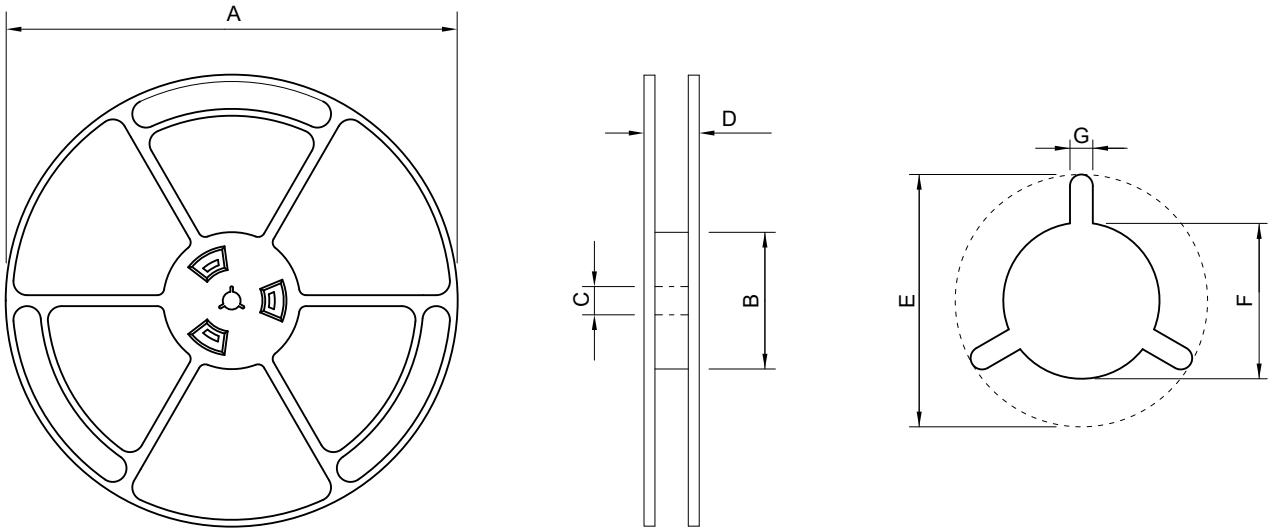



**Figure 11. Reel Layout**

| Item | Symbols | Diameter (mm) | | |
|---|---|---|---|---|
| | | Minimum | Nominal | Maximum |
| Reel Diameter | A | - | 330 | - |
| Hub Diameter | B | 98 | 100 | 102 |
| Hub Hole Diameter | C | 12.8 | 13 | 13.5 |
| Reel Width (measured at Hub) | D | - | 18 | 18.4 |
| Arbor Hole | E | 20.2 | - | - |
| Arbor Hw in mm Diameter | F | 12.8 | 13.0 | 13.5 |
| Arbor Slot Width | G | 1.5 | - | - |

### 10.1.4. Reel Installation and Carton Information

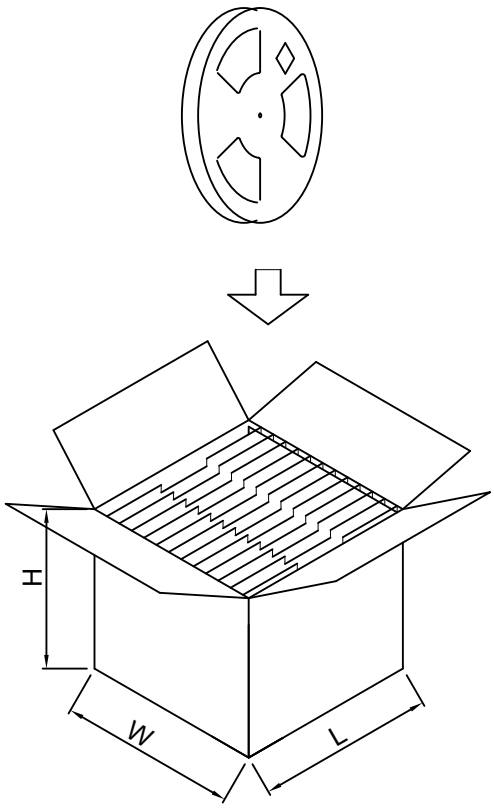
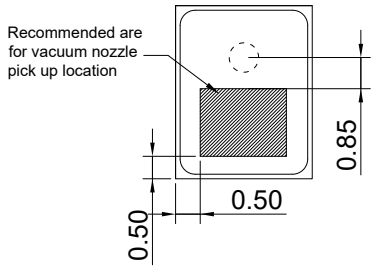



**Figure 12. Reel Installation**

| Qty/reel (pcs) | Weight/reel (kg) | Reel/carton (nos) | Qty/carton (pcs) | Weight full load (kg) | Dimension carton box (LxWxH) mm | Storage (Temp) |
|---|---|---|---|---|---|---|
| 4800 | 0.70 | 10 | 48000 | ~10.00 | 419 x 276 x 381 | -10°C ~ 50°C |

### 10.2. Pickup Tool Pick Location




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

**Figure 13. Packup Tool Pick Location**

### 10.3. Label Layout


**Figure 14. Label Layout Sample**