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SoniCrest Brand Acoustic Components

www.jlsonicrest.com

Document Type : Specification
Product Type : Silicon Digital Microphone Component
Part Number : SDMO07D-36/1363

A1 - New issue created by Hermes, Shum on 3 Jan., 2020		

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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

4 x 3 x 1.2 mm Silicon digital microphone with typical signal to noise ratio 68dB, reverse mount, sensitivity tolerance $-36\pm 1\text{dB}$ (0dB = 1V/Pa), AOP 130dB, RoHS compliant.

3. Application

Smartphones, Tablet, Headphones, Smart home devices, Automotive etc.

4. Component Requirement

4.1. General Specifications

Specification	Min.	Typ.	Max.	Unit
Operating Temperature	-40	-	100	°C
Storage Temperature	-40	-	70	°C
Weight	-	-	0.3	g
Directivity	Omni-directional			
Operating Voltage	1.62	1.8	3.6	V
Solder Reflow (for 30s max. of peak temperature)	-	-	260	°C
Sensitivity Variation over Operating Voltage Range	-	0.5	-	dB

4.2. Electro Acoustical Specifications in Standard Mode

Specification	Min.	Typ.	Max.	Unit
Sensitivity Range (0dB = 1V/Pa)	-37	-36	-35	dBFS
Current Consumption	-	1050	1300	μA
Signal to Noise Ratio (94dB, 1kHz, A-weighted)	-	70	-	dBA
Total Harmonic Distortion (94dB, 1kHz)	-	-	0.5	%
Maximum Input Sound Pressure Level (for less than 10% distortion)	-	120	-	dB
Power Supply Rejection (PSR)	-	-80	-	dBFS

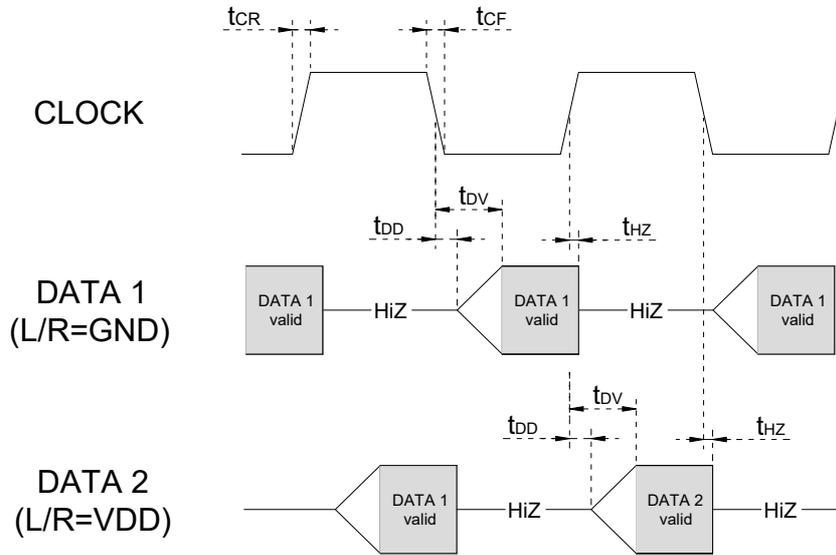
4.3. Electro Acoustical Specifications in Low Power Mode

Specification	Min.	Typ.	Max.	Unit
Sensitivity Range (0dB = 1V/Pa)	-37	-36	-35	dBFS
Current Consumption (low power mode)	-	350	450	μA
Signal to Noise Ratio (94dB, 1kHz, A-weighted)	-	66	-	dB
Total Harmonic Distortion (94dB, 1kHz)	-	0.5	1	%
Maximum Input Sound Pressure Level (for less than 10% distortion)	-	130	-	dB
Power Supply Rejection (PSR)	-	-80	-	dBFS

4.4. Operating Ratings

Parameter	Min.	Typ.	Max.	Unit	
Power Supply Voltage	1.62	-	3.6	V	
Frequency Range	Sleep Mode	0	-	350	KHz
	Low Power Mode	450	768	850	KHz
	Standard Mode	1.38	-	3.3	MHz
Duty Cycle	45	-	55	%	
Logic Input High	$0.65 \cdot V_{DD}$	-	$V_{DD} + 0.3$	V	
Logic Input Low	-0.3	-	$0.35 \cdot V_{DD}$	V	
Logic Output High	$0.7 \cdot V_{DD}$	-	-	V	
Logic Output Low	-	-	$0.3 \cdot V_{DD}$	V	
Load Capacitance	-	-	150	pF	

4.5. Interface Timing Chart



Parameter	Symbol	Min.	Typ.	Max.	Unit	Note / Test Condition
PDM Clock Frequency	f_{clock}	0.35±5%	-	3.3	MHz	Digital interface timing specifications only valid for clock frequencies within this range.
Clock Duty Cycle	-	45	-	55	%	$f_{clock} \leq 2.65\text{MHz}$
		48	-	52	%	$f_{clock} \geq 2.9\text{MHz}$
Clock Rise / Fall Time	-	-	-	13	ns	-
Delay time for DATA driven	t_{DD}	40	-	80	ns	Delay time from CLOCK edge (50% VDD) to DATA driven.
Delay time for DATA High-Z	t_{HV}	5	-	30	ns	Delay time from CLOCK edge (50% VDD) to DATA high impedance stage.
Delay time for DATA valid (Note 1)	t_{DV}	-	-	100	ns	Delay time from CLOCK edge (50% VDD) to DATA valid (<0.30 x VDD or > 0.7 x VDD).

Note :

(1) Load on data: $C_{load} = 100\text{pF}$, $R_{load} = 100\text{K}\Omega$

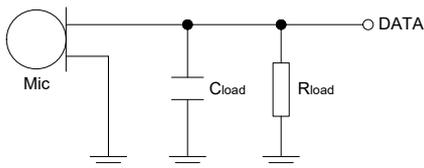


Figure 1. Interface Timing Chart

4.6. Frequency Response

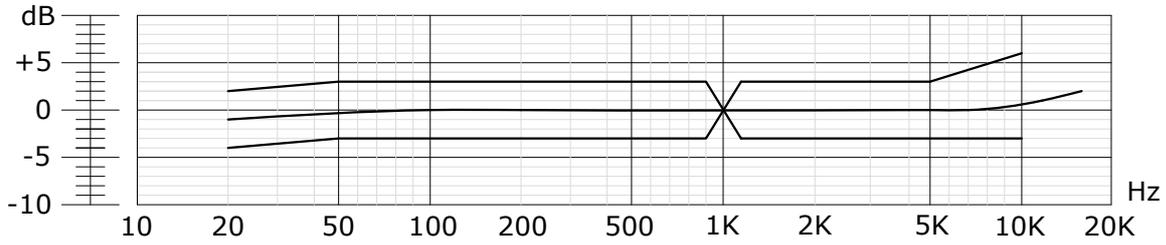


Figure 2. Frequency Response

5. Interface Circuit Design Considerations

5.1. Typical Application Schematics

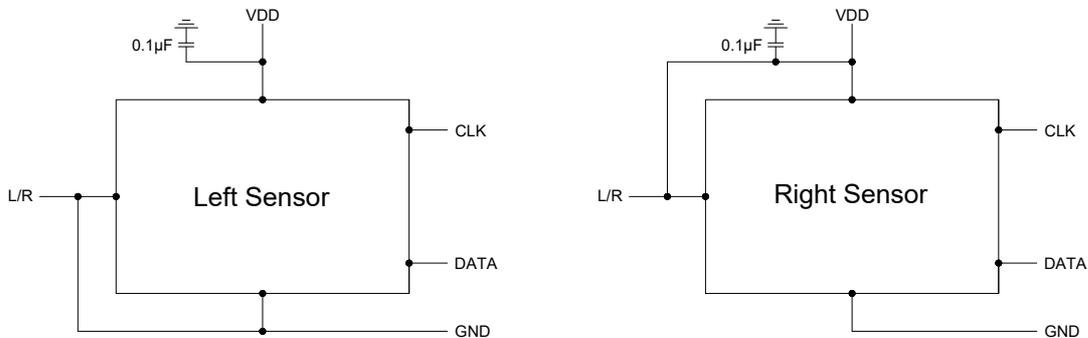
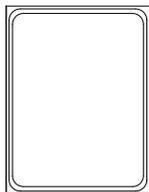


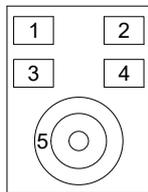
Figure 3. Typical Application Schematics

5.2. Electrical Layout

Top View



Bottom View



Pin No.	Function	Comments
1	OUTPUT	Output Signal
2	CLK	Clock input
3	VDD	Power Supply
4	L/R	Channel select
5	GND	Ground

Figure 4. Electrical Layout of SDMO07D-36/1365

6. Reliability Test

- 6.1. 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.
- 6.2. High Temperature Operating Test** : Subject samples to $+105\pm 3^{\circ}\text{C}$ for 1000 hours. Components must be fully stabilized at temperature extremes before data is taken, which may require up to a 2 hours soak.
- 6.3. High Temperature Storage Test** : Subject samples to $+105\pm 3^{\circ}\text{C}$ for 1000 hours. Components must be fully stabilized at temperature extremes before data is taken, which may require up to a 2 hours soak.
- 6.4. Low Temperature Operating Test** : Subject samples to $-40\pm 3^{\circ}\text{C}$ for 1000 hours. Components must be fully stabilized at temperature extremes before data is taken, which may require up to a 2 hours soak.
- 6.5. Low Temperature Storage Test** : Subject samples to $-40\pm 3^{\circ}\text{C}$ for 1000 hours. Components must be fully stabilized at temperature extremes before data is taken, which may require up to a 2 hours soak.
- 6.6. Static Humidity 1** : Precondition at room temperature for 1 hour. Then expose to $+85\pm 3^{\circ}\text{C}$ with 85% relative humidity for 1000 hours. Finally dry at room ambient for 2 hours before taking final measurement.
- 6.7. Static Humidity 2** : Precondition at room temperature for 1 hour. Then expose to $+65\pm 3^{\circ}\text{C}$ with 95% relative humidity for 168 hours. Finally dry at room ambient for 2 hours before taking final measurement.
- 6.8. Temperature Shock** : Each temperature cycle shall consist of 15 minutes at -40°C , 15 minutes at $+125^{\circ}\text{C}$ with 5 minutes transition time. Test duration is for 100 cycles. Components must be fully stabilized at temperature extremes before data is taken, which may require up to a 2 hours soak.
- 6.9. Random Vibration** : Vibrate randomly along three perpendicular directions for 12 minutes in each direction, from 20 ~ 2000Hz with a peak acceleration 20g.
- 6.10. Drop Test** : Drop samples naturally from the height of 1.5m onto a marble surface board for 4 times in 4 corners, 4 times in 6 faces, total of 40 drops.
- 6.11. ESD Test** : Perform ESD test according to IEC61000-4-2 level 3.
- 6.12. Mechanical Shock** : Subject samples to half sine shock pulses (10000g for 0.1ms) in each direction, total of 9 shocks.

7. Recommended reflow oven temperature profile

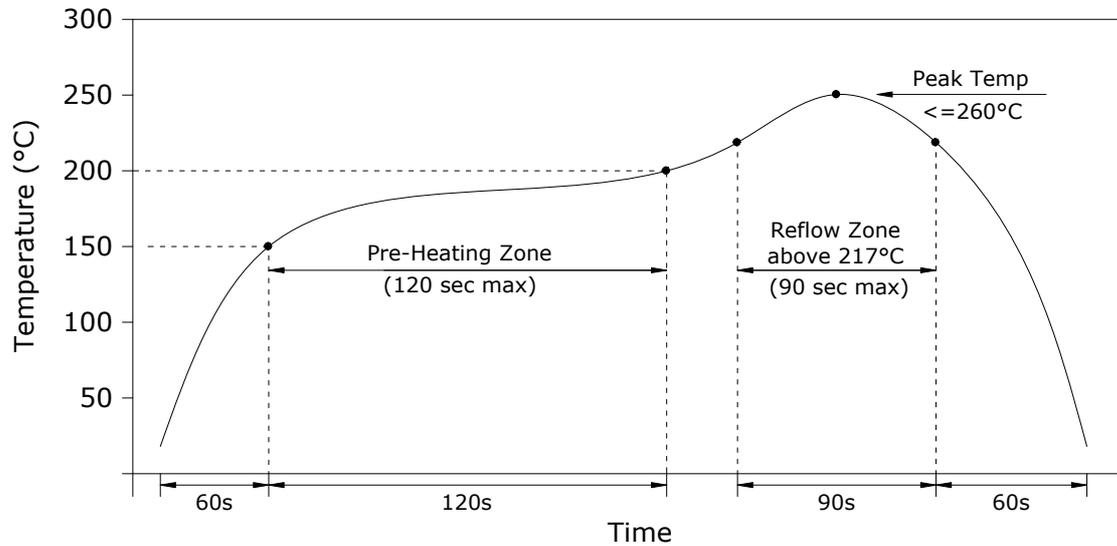


Figure 5. Recommended Reflow Oven Temperature Profile

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.

8. Mechanical Requirements

Unit : mm
 Tolerance : Linear = ± 0.10
 (unless otherwise specified)

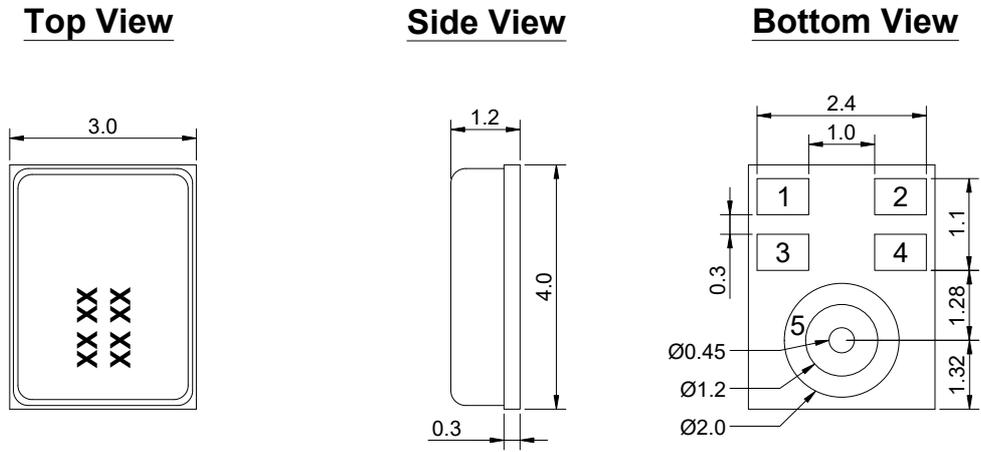


Figure 6. SDMO07D-36/1363 Mechanical Layout

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 (75 μ m to 125 μ m).

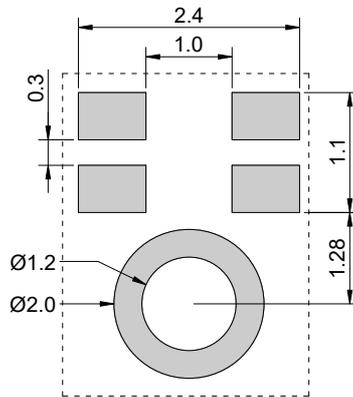


Figure 7. SDMO07D-36/1363 PCB Solder Pad Layout

10. Standard Packing Layout

10.1. Tape Layout

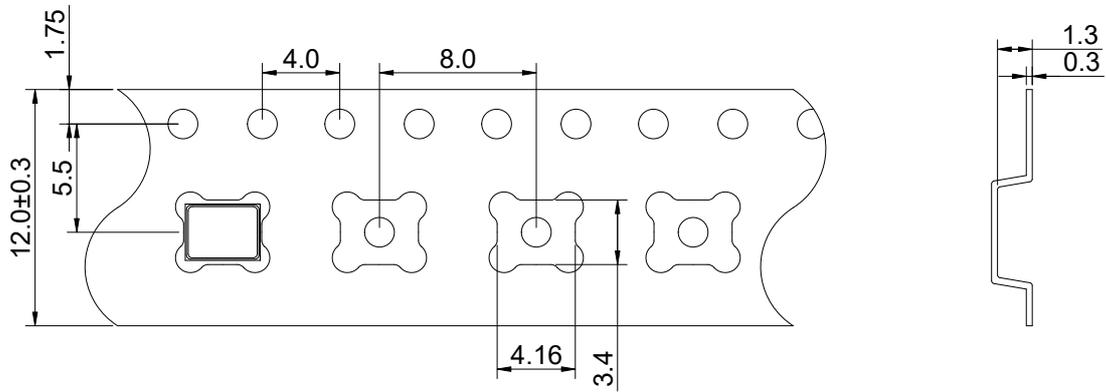


Figure 8. Tape Layout

10.2. Reel Layout

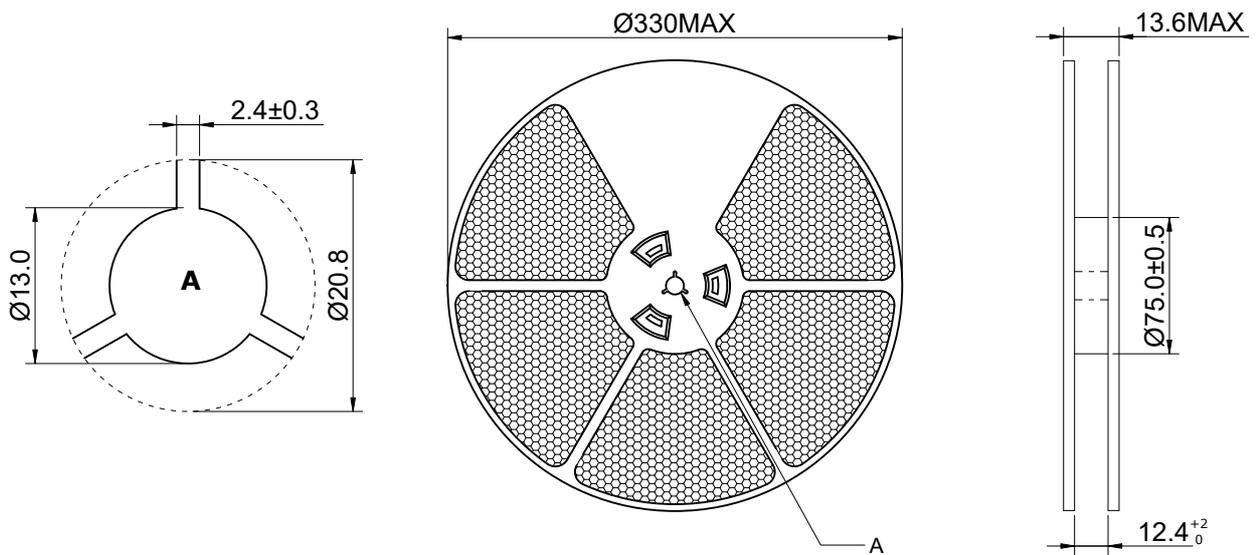


Figure 9. Reel Layout

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

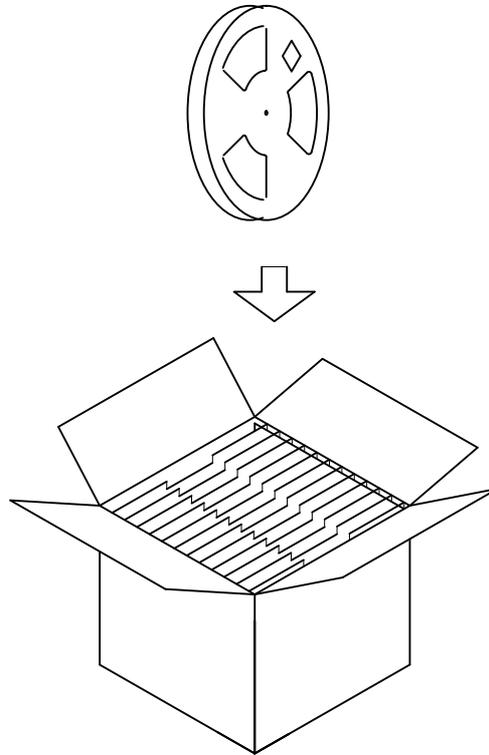
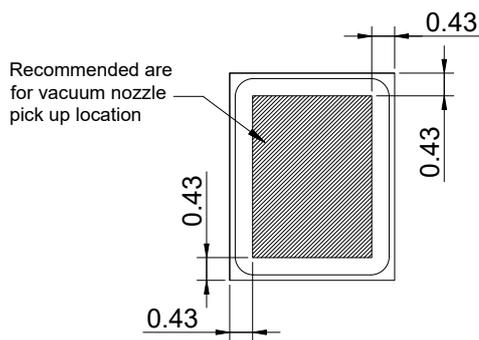


Figure 10. Reel Installation

10.4. Pickup Tool Pick Location



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

Figure 11. Pickup Tool Pick Location