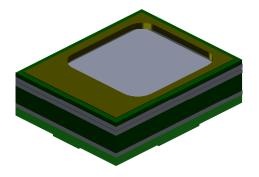
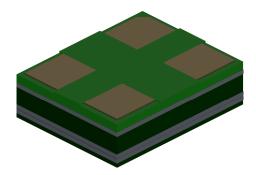


"Mini" SiSonic<sup>™</sup> Ultrasonic Acoustic Sensor Specification





Knowles Acoustics 1151 Maplewood Drive Itasca, IL 60143





#### 1. DESCRIPTION AND APPLICATION

- 1.1 DESCRIPTION
  Surface Mount Wide-band Ultrasonic Acoustic Sensor
- 1.2 APPLICATION

  Hand held telecommunication devices, Positioning Sensing,
  Pneumatic Flow Sensing.

#### 2. PART MARKING

Identification Number Convention

S 1 2 3

4 5 6 7

S: Manufacturing Location
"S" - Knowles Electronics Suzhou
Suzhou, China

"No Alpha Character" - Knowles Electronics Itasca, IL USA

"E" - Engineering Samples

Digits 1-7: Job Identification Number

#### 3. TEMPERATURE RANGE

- 3.1 Operating Temperature Range: -40°C to +100°C
- 3.2 Storage Temperature Range: -40°C to +100°C



Release Level: ACTIVE Sheet 2 of 10



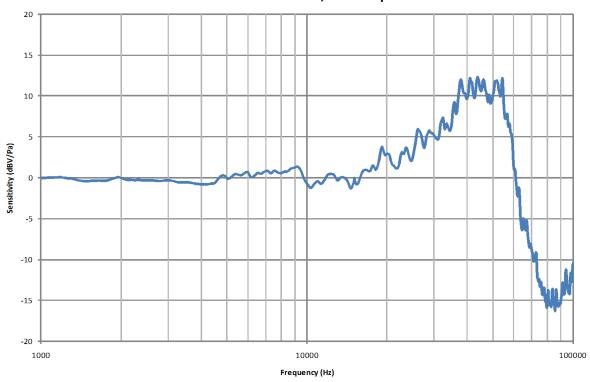
## 4. ACOUSTIC & ELECTRICAL SPECIFICATIONS

TEST CONDITIONS: +20°C, 60-70% R.H.

	Symbol	Condition	Limits		Unit	
	Syrribor	Condition	Min.	Nom.	Max.	OHIII
Directivity		Omni-directional				
Sensitivity	S	@ 1kHz (0dB-1V/Pa)	-46	-42	-38	dB
Output Impedance	Zout	@ 1kHz (0dB-1V/Pa)			300	Ω
Current Consumption	Idds	Across 1.5 to 3.6 volts			250	μA
Signal to Noise Ratio	S/N	@ 1kHz (0dB-1V/Pa)		59		dB
Supply Voltage	Vs		1.5		3.6	<b>\</b>
Sensitivity Loss Across		Change in sensitivity	No Change Across Voltage		dB	
Voltage		over 3.6V to 1.5V	Range		СВ	
Maximum Input Sound		At 100dB SPL, THD < 1%				
Level		At 115dB S	At 115dB SPL, THD ≤ 10%			

# 5. FREQUENCY RESPONSE CURVE

#### Typical Free Feild Responce Normalized to 1kHz, C1 = 2.2μF



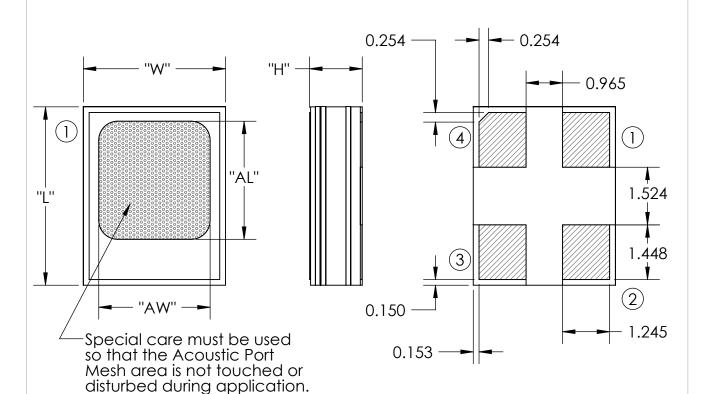


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## 6. MECHANICAL SPECIFICATIONS



ITEM	DIMENSION	TOLERANCE	UNITS
LENGTH (L)	4.720	±0.100	mm
WIDTH (W)	3.760	±0.100	mm
HEIGHT (H)	1.400	±0.100	mm
ACOUSTIC	3.120	±0.100	mm
LENGTH (AL)	3.120	±0.100	mm
ACOUSTIC	2.950	±0.100	mm
WIDTH (AW)	2.730	±0.100	mm

PIN OUTPUT		
PIN #	FUNCTION	
1	OUTPUT	
2	GROUND	
3	GROUND	
4	POWER (Vdd)	

#### Note:

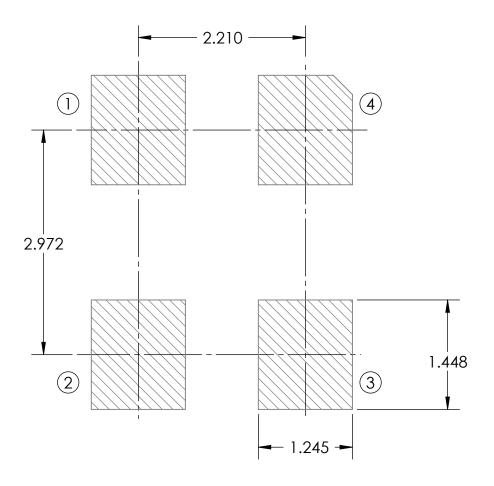
Dimensions are in milimeters unless otherwise specified.

Tolerance  $\pm 0.15$ mm unless otherwise specified.





## 7. RECOMMENDED CUSTOMER LAND PATTERN



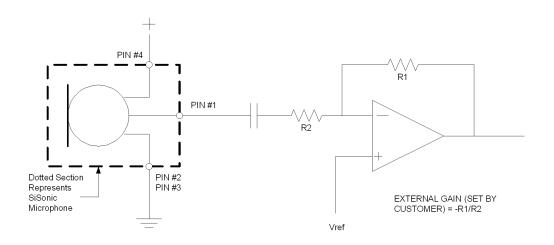
## 8. RECOMMENDED SOLDER STENCIL PATTERN

N/A





## 9. RECOMMENDED INTERFACE CIRCUIT







# 10. PACKAGING DETAIL 8.00±0.10 2.00±0.05 -0.30±0.05 12.0±0.3 -1.75±0.10 -4.00 -1.30±0.10 - $\emptyset$ 1.5<sup>+0.1</sup> 0.0 5.50±0.05 <sup>–</sup> RO.3 TYP. 5.12±0.10 4.16±0.10 PIN #1-

MODEL NUMBER	SUFFIX	REEL DIAMETER	QUANTITY PER REEL
SPM0404UD5	-2	7"	1,200
31 7/04040D3	-6	13"	4,800

TAPE & REEL	PER EIA-481
II ABEI	LABEL APPLIED TO EXTERNAL PACKAGE &
	DIRECT TO REEL.

#### Note:

**COMPONENT** ORIENTATION

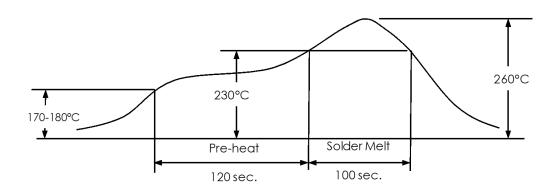
> Dimensions are in milimeters unless otherwise specified.



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#### 11. SOLDER FLOW PROFILE



Stage	Temperature Profile	Time (maximim)
Pre-heat	170 ~ 180°C	120 sec.
Solder Melt	Above 230°C	100 sec.
Peak	260°C maximum	30 sec.

#### 12. ADDITIONAL NOTES

- (A) Shelf life: Twelve (12) months when devices are to be stored in factory supplied, unopened ESD moisture sensitive bag under maximum environmental conditions of 30°C, 70% R.H.
- (B) MSL (moisture sensitivity level) Class 2a.
- (C) Do not pull a vacuum over port hole of the microphone. Pulling a vacum over the port hole can damage the device.
- (D) Do not board wash after the reflow process. Board washing and cleaning agents can damage the device. Do not expose to ultrasonic processing or cleaning.
- (E) <u>Do not brush board</u> after the reflow process. Brushing the board with/without solvents can damage the device.
- (F) Do not insert any object in port hole of device at any time as this can damage the device.
- (G) Number of reflow Recommend no more than 3 cycles.



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## 13. RELIABILITY SPECIFICATIONS

Note: After test conditions are performed, the sensitivity of the microphone shall not deviate more than 3dB from its initial value.

Test	Description
Thermal Shock	100 cycles of air-air thermal shock from -40°C to +125°C with 15 minute soaks. (ICE 68-2-4)
High Temperature Storage	+105°C environment for 1,000 hours. (ICE 68-2-2 Test Ba)
Low Temperature Storage	-40°C environment for 1,000 hours. (ICE 68-2-2 Test Aa)
High Temperature Bias	+105°C environment while under bias for 1,000 hours. (ICE 68-2-2 Test Ba)
Low Temperature Bias	-40°C environment while under bias for 1,000 hours. (ICE 68-2-2 Test Aa)
Temperature / Humidity Bias	+85°C/85% R.H. environment while under bias for 1,000 hours. (JESD22-A101A-B)
Vibration	4 cycles lasting 12 minutes from 20 TO 2,000 Hz in X, Y and Z direction with peak acceleration of 20g. (MIL 883E, Method 2007.2, A)
Electrostatic Discharge	3 discharges at +/-8kV direct contact to lid when unit is grounded (IEC 61000-4-2) and 3 discharges at +/-2kV direct contact to I/O pins. (MIL 883E, Method 3015.7)
Reflow	5 reflow cycles with peak temperature of +260°C.
Mechanical Shock	3 pulses of 10,000g in the X, Y and Z direction. (IEC 68-2-27, Test Ea)





#### 14. SPECIFICATION REVISIONS

Revision	Detailed Specification Changes	Date
1	Preliminary Specification, DMS	6-11-2009
Α	Initial Release. (DMS, C10109833)	7/20/2009

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