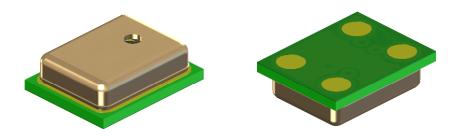


# Amplified "Ultra-Mini" SiSonic<sup>™</sup> Microphone Specification With MaxRF Protection - *Halogen Free*



Knowles Acoustics 1151 Maplewood Drive Itasca, IL 60143





#### 1. DESCRIPTION AND APPLICATION

- 1.1 DESCRIPTION

  "Ultra-mini" Surface Mount Silicon Microphone with
  Maximum RF Protection Halogen Free
- 1.2 APPLICATION

Consumer electronic devices

#### 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



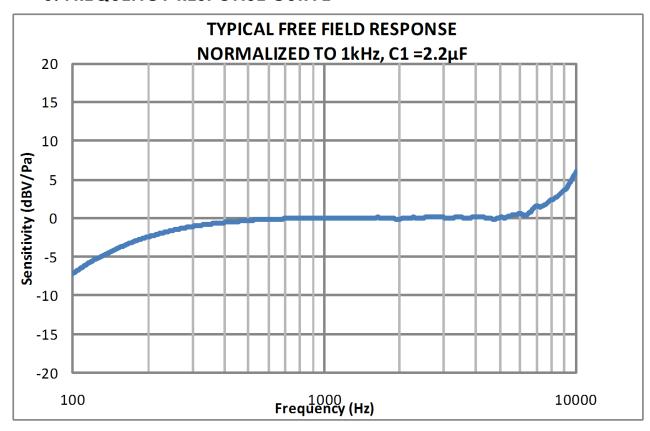


## 4. ACOUSTIC & ELECTRICAL SPECIFICATIONS

TEST CONDITIONS: +20°C, 60-70% R.H.

	Symbol	Condition		Limits		Unit
	Зуппрог	Condition	Min.	Nom.	Max.	OTIII
Directivity		Omni-directional				
Sensitivity	S	@ 1kHz (0dB-1V/Pa)	-25	-22	-19	dBV
Output Impedance	Zout	@ 1kHz (0dB-1V/Pa)			500	Ω
Current Consumption	Idds	Across 1.5 to 3.6 volts			350	μA
Signal to Noise Ratio	S/N	@ 1kHz (0dB-1V/Pa)		59		dB
Supply Voltage	Vs		1.5		3.6	V
Sensitivity Loss Across		Change in sensitivity	No Change Across Voltage		dB	
Voltage		over 3.6V to 1.5V	Range		ав	
Total Harmonic	THD	At 100dB	SPL, THD < 1%			
Distortion	IUD	At 150dB \$	SPL, THD <u>≤</u> 10%			

### 5. FREQUENCY RESPONSE CURVE



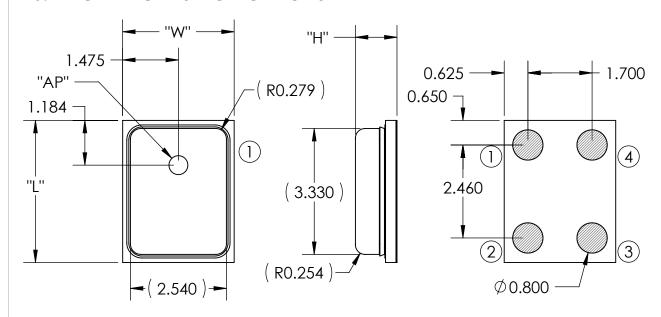


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## 6. MECHANICAL SPECIFICATIONS



ITEM	DIMENSION	TOLERANCE	UNITS
LENGTH (L)	3.760	±0.100	mm
WIDTH (W)	2.950	±0.100	mm
HEIGHT (H)	1.100	±0.100	mm
ACOUSTIC	Ø0.500	±0.100	po po
PORT (AP)	Ø0.300	±0.100	mm

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

#### Note:

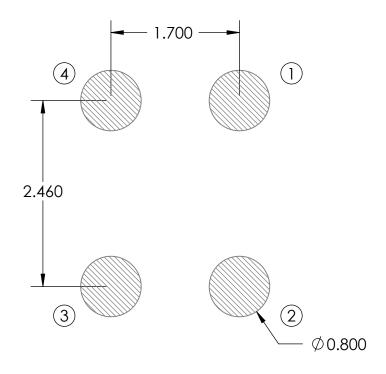


Dimensions are in milimeters unless otherwise specified. Tolerance  $\pm 0.15$ mm unless otherwise specified.





### 7. RECOMMENDED CUSTOMER LAND PATTERN



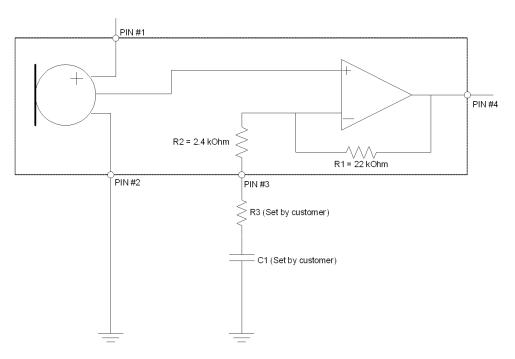
## 8. RECOMMENDED SOLDER STENCIL PATTERN

N/A





### 9. RECOMMENDED INTERFACE CIRCUIT



DESIRED GAIN	GAIN TERMINATION METHOD
Unity Gain (0dB)	Tie Gain directly to Output
20dB Gain	Tie Gain through C1 (0.47µF) to Ground
	Add R3 and C1. Use formulas provided to calculate
Adjustable Gain	settings or contact Knowles for support.

#### <u>Setting Gain Formulas:</u>

Gain of non-inverting Op-Amp is determined by:

 $-> G = 1 + \{R1 / (R2 + R3)\}$  Gain(dB) = 20 \* log(G)

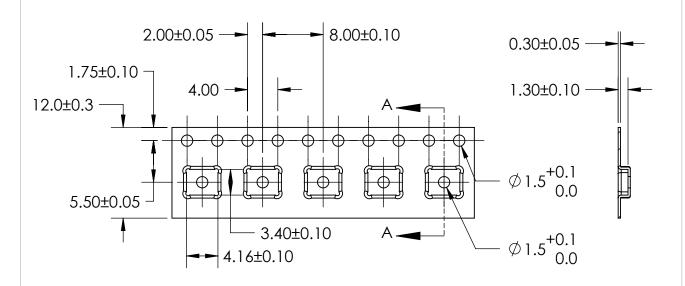
High-pass-filter Corner Frequency:

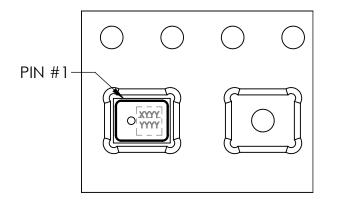
-> C.F. - 1 / { 2 \* pi \* ( R2 + R3 ) \* C1 }





#### 10. PACKAGING DETAIL





**COMPONENT ORIENTATION** 

MODEL NUMBER	SUFFIX	REEL	QUANTITY
MODEL NOMBER	30111X	DIAMETER	PER REEL
SPU0414HR5H-SB	-7	13"	5,700

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

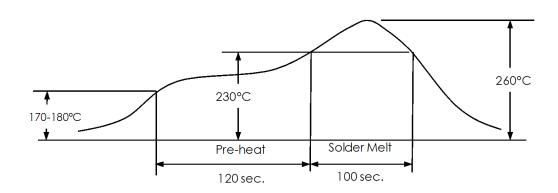
#### Note:

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	n/a

Notes:	
1.	Do not pull a vacuum over port hole of the microphone. Pulling a
	vacum over the port hole can damage the device.
2.	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.
3.	Do not brush board after the reflow process. Brushing the board
	with/without solvents can damage the device.
4.	Do not insert any object in port hole of device at any time as this
	can damage the device.
5.	Number of reflow - Recommend no more than 3 cycles.

#### 12. ADDITIONAL NOTES

- 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. (A)
- MSL (moisture sensitivity level) Class 2a. (B)



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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
moman erre en	+125°C with 15 minute soaks. (ICE 68-2-4)
High Temperature	+105°C environment for 1,000 hours. (ICE 68-2-2 Test
Storage	Ba)
Low Temperature	-40°C environment for 1,000 hours. (ICE 68-2-2 Test Aa)
Storage	-40 C CHVIIOTITICITI 101 1,000 110013. (ICE 00-2-2 1631 Adj
High Temperature Bias	+105°C environment while under bias for 1,000 hours.
Підп тептрегатоге віаз	(ICE 68-2-2 Test Ba)
Low Tomporature Pias	-40°C environment while under bias for 1,000 hours.
Low Temperature Bias	(ICE 68-2-2 Test Aa)
Temperature / Humidity +85°C/85% R.H. environment while under bias for 1,	
Bias	hours. (JESD22-A101A-B)
	4 cycles lasting 12 minutes from 20 TO 2,000 Hz in X, Y
Vibration	and Z direction with peak acceleration of 20g. (MIL
	883E, Method 2007.2, A)
	3 discharges at +/-8kV direct contact to lid when unit
Electrostatic Discharge	is grounded (IEC 61000-4-2) and 3 discharges at +/-2kV
Licenostatic Discharge	direct contact to I/O pins. (MIL 883E, Method 3015.7)
	alloci corrider to 1,0 piris. (Mile 000E, Metriod 3013.7)
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-
MECHANICALSHOCK	27, Test Ea)





#### 14. SPECIFICATION REVISIONS

Revision	Detailed Specification Changes	Date
1	Preliminary Specification Release	
Α	Initial Release, C10109400, DMS	4-23-2009

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