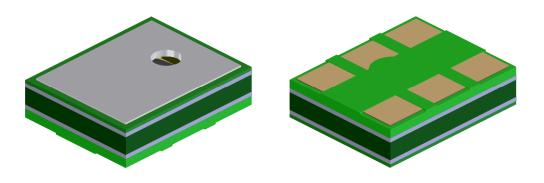


Switchable Gain "Mini" SiSonic[™] Microphone Specification with Enhanced RF Protection - *Halogen Free*



Knowles Acoustics 1151 Maplewood Drive Itasca, IL 60143



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1. DESCRIPTION AND APPLICATION

- 1.1 DESCRIPTION
 Switchable Gain "Mini" Surface Mount Silicon Microphone with Enhanced RF Protection Halogen Free
- 1.2 APPLICATION

Consumer electronics 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



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Downloaded from **Elcodis.com** electronic components distributor



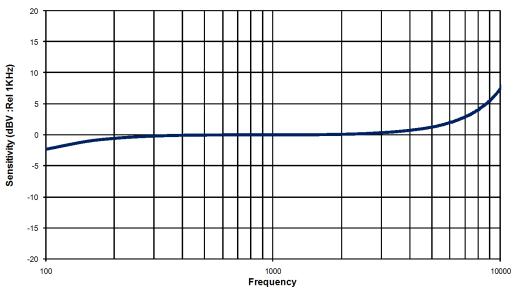
4. ACOUSTIC & ELECTRICAL SPECIFICATIONS

TEST CONDITIONS: +20°C, 60-70% R.H.

	Symple of	Condition	Limits			Unit
	Symbol	Condition	Min.	Nom.	Max.	Unii
Directivity		Omni-directional				
Nominal Sensitivity Range	S		-42		-22	dB
Sensitivity (maximum)	S _{max}	@1kHz (0dB=1 V/Pa) Vswitch = High	-25	-22	-19	dB
Sensitivity (maximum)	Smin	@1kHz (0dB=1 V/Pa) Vswitch = Low	-45	-42	-39	dB
Switching Voltage High	Vswitch	High Gain Switch	1.5		5.5	V
Switching Voltage Low	Vswitch	Low Gain Switch	0.0		0.4	V
Supply Voltage	Vs	Operating Voltage	1.5		5.5	V
Output Impedance	Zout	@1kHz (0dB=1 V/Pa)			100	Ω
Current Consumption	IDDS	Across 1.5V to 5.5V	100		370	μΑ
Signal to Noise Ratio	S/N	@ 1kHz (0dB=1V/Pa)		59		dB
Sensitivity Loss Across		Change in sensitivity	No Char	ge Across	Voltage	dB
Voltage		over 5.5V to 1.5V		Range		Фb
Maximum Input Sound		At 100dB	SPL, THD <	< 1%		
Level		At 115dB \$	SPL, THD <u><</u> 10%			
Frequency Range			100		10,000	Hz

5. FREQUENCY RESPONSE CURVE

TYPICAL FREE FEIELD RESPONSE NORMALIZED TO 1kHz



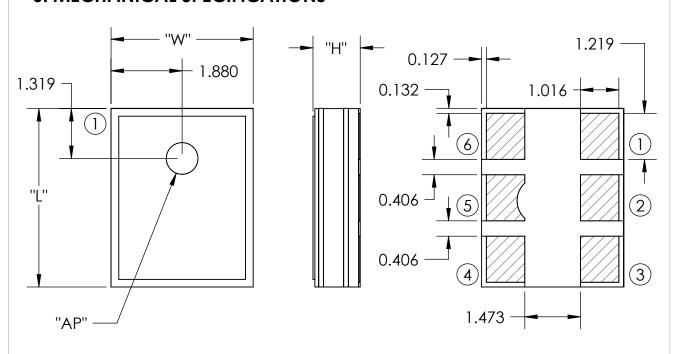


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6. MECHANICAL SPECIFICATIONS



ITEM	DIMENSION	TOLERANCE	UNITS
LENGTH (L)	4.720	±0.100	mm
WIDTH (W)	3.760	±0.100	mm
HEIGHT (H)	1.250	±0.100	mm
ACOUSTIC	Ø0.838	+0.100	no no
PORT (AP)	Ø0.838	±0.100	mm

PIN OUTPUT		
PIN#	FUNCTION	
1	OUTPUT	
2	HIGH GAIN SWITCH	
3	GAIN	
4	GROUND	
	NO CONNECT OR	
5	GROUND	
6	POWER (Vdd)	

Note:

Dimensions are in milimeters unless otherwise specified.

Tolerance ±0.15mm unless otherwise specified.

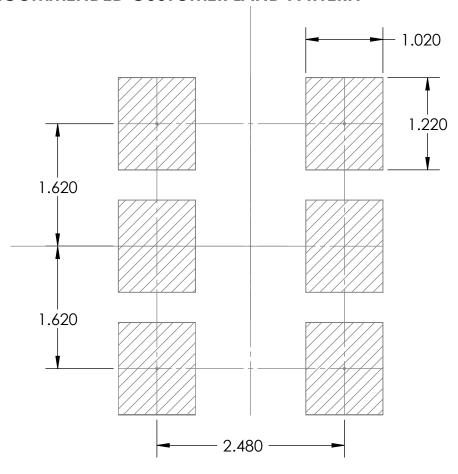


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7. RECOMMENDED CUSTOMER LAND PATTERN



8. RECOMMENDED SOLDER STENCIL PATTERN

N/A

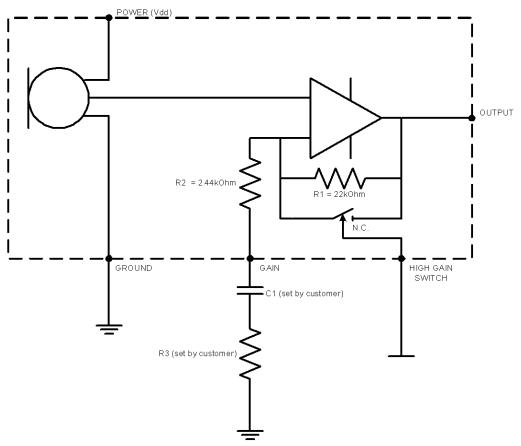




9. RECOMMENDED INTERFACE CIRCUIT

Gain Setting Guidelines		
Desired Gain (dB)	<u>Method</u>	
OdB	$V_{switch} = Low$	
20dB	$V_{\text{switch}} = \text{High}$, C1 > 0.47 μ F *	
Customer adjustable	Add R3 and C1 to achieve specific gain and high-	
gain (between 0 to	pass crossover frequency.	
20dB)		

^{*} Selection of actual value of C1 depends upon the highpass crossover frequency desi



Setting Gain Formulas:

High Gain setting is determined as:

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

High-pass-filter Corner Frequency:

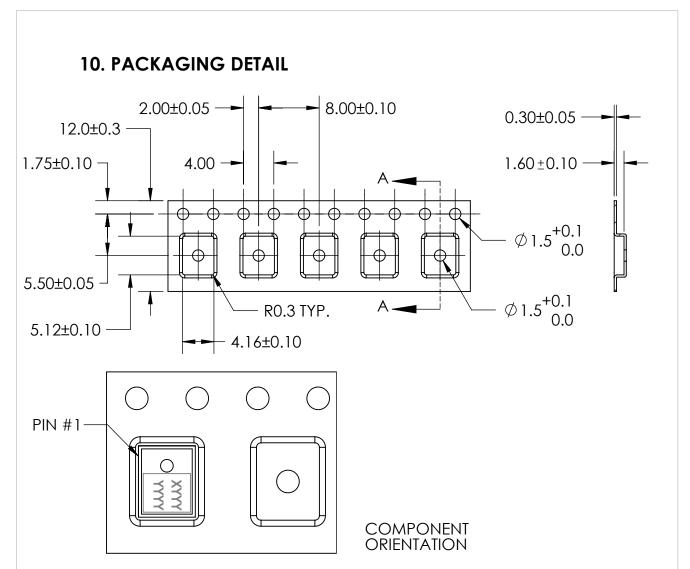
-> C.F. - 1 / { 2 * p * (R2 + R3) * C1 }



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MODEL NUMBER	SUFFIX	REEL DIAMETER	QUANTITY PER REFI
SPM0407HE3H-SB	-2	7"	1,200
31 74040711L311-3b	-6	13"	4,800

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

Note:

Dimensions are in milimeters unless otherwise specified.

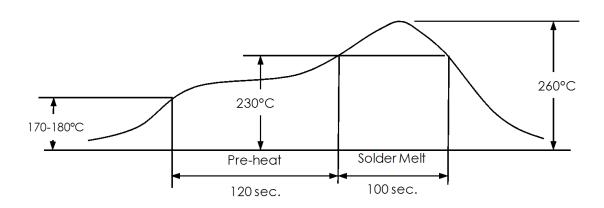


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11. SOLDER FLOW PROFILE



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

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

 <u>Do not pull a vacuum</u> over port hole of the microphone. Pulling a vacum over the port hole can damage the device.
- Do not board wash after the reflow process. Board washing and cleaning agents (D) can damage the device. Do not expose to ultrasonic processing or cleaning.
- Do not brush board after the reflow process. Brushing the board with/without (E) solvents can damage the device.
- Do not insert any object in port hole of device at any time as this can damage (F) 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 336 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 +/-1kV 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
Α	INITIAL RELEASE	8-28-09

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