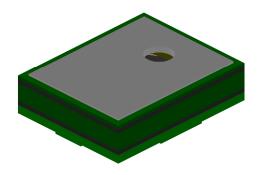
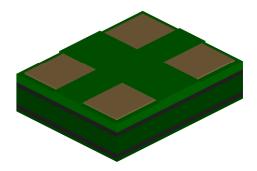


Amplified "Mini" SiSonic™ Microphone Specification - Halogen Free





Knowles Acoustics 1151 Maplewood Drive Itasca, IL 60143





Release Level: Active Sheet 2 of 10

1. DESCRIPTION AND APPLICATION

1.1 DESCRIPTION

Amplified "Mini" Surface Mount Silicon Microphone.

1.2 APPLICATION

Hand held telecomunication 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





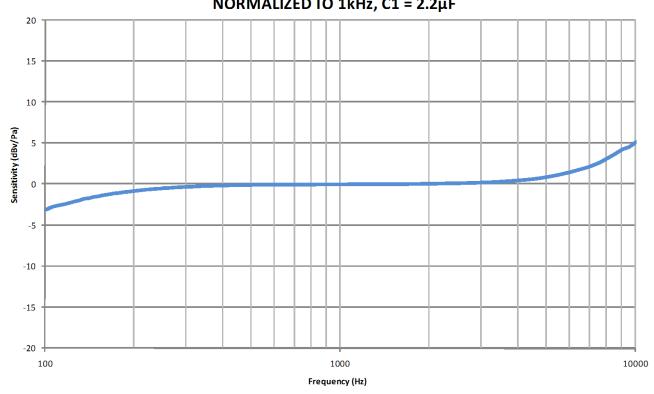
4. ACOUSTIC & ELECTRICAL SPECIFICATIONS

TEST CONDITIONS: +20°C, 60-70% R.H.

	Symbol	Condition		Limits		Unit
	Зуппоот	Condition	Min.	Nom.	Max.	Orini
Directivity		Omni-directional				
Sensitivity	S	@ 1kHz (0dB-1V/Pa)	-25	-22	-19	dB
Output Impedance	Zout	@ 1kHz (0dB-1V/Pa)			300	Ω
Current Consumption	I DDs	Across 1.5 to 3.6 volts	100		350	μΑ
Signal to Noise Ratio	S/N	@ 1kHz (0dB-1V/Pa)	55	59	-	dB
Supply Voltage	Vs		1.5	_	3.6	V
Typical Input Referred Noise	ENL	A-weighted		35	-	dBA SPL
Sensitivity Loss Across		Change in sensitivity	No Change Across Voltage		dB	
Voltage		over 3.6V to 1.5V	Range		5	
Maximum Input Sound		At 100dB	At 100dB SPL, THD < 1%			
Level		A† 115dB SPL, THD ≤ 10%				

5. FREQUENCY RESPONSE CURVE

Typical Free Field Response NORMALIZED TO 1kHz, C1 = 2.2μF



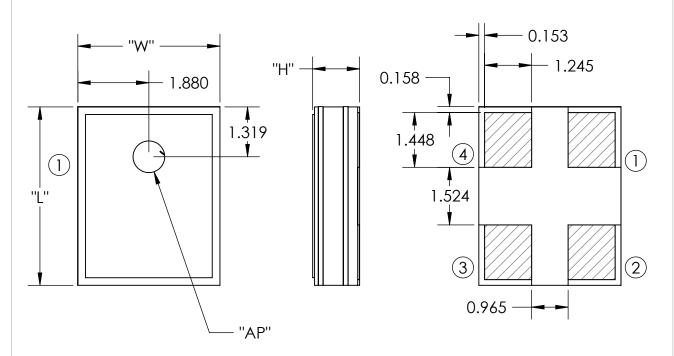


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6. MECHANICAL SPECIFICATIONS



ITEM	DIMENSION	TOLERANCE	UNITS
LENGTH (L)	4.720	±0.100	mm
WIDTH (W)	3.760	±0.100	mm
HEIGHT (H)	1.250	±0.100	mm
ACOUSTIC	Ø0.838	±0.100	po po
PORT (AP)	Ø0.030	±0.100	mm

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

Note:

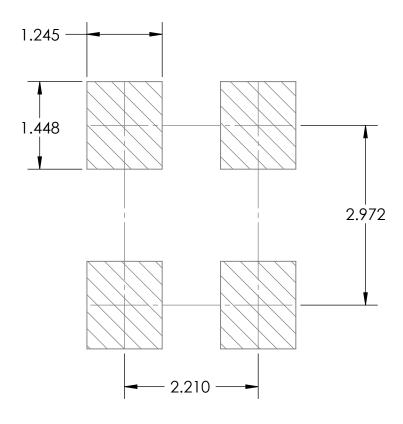
Dimensions are in milimeters unless otherwise specified.

Tolerance ± 0.15 mm unless otherwise specified.





7. RECOMMENDED CUSTOMER LAND PATTERN



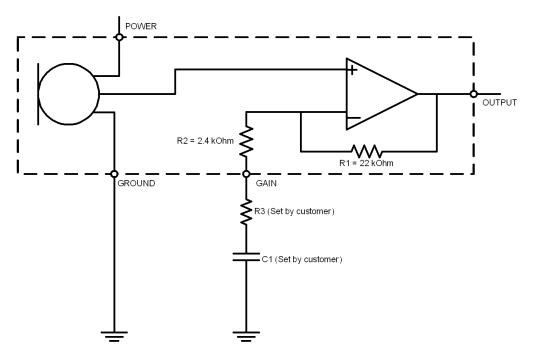
8. RECOMMENDED SOLDER STENCIL PATTERN

N/A





9. RECOMMENDED INTERFACE CIRCUIT



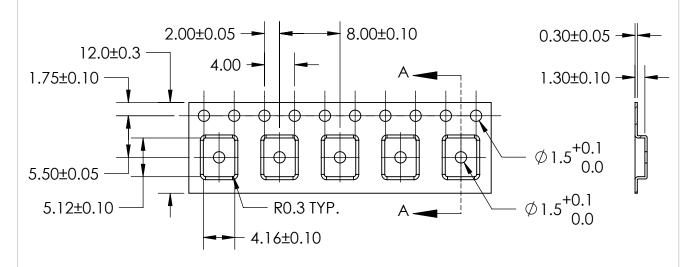
DESIRED GAIN	GAIN PIN TERMINATION METHOD
Unity Gain (0dB)	Tie Gain Pin directly to Output Pin
20dB Gain	Tie Gain Pin through C1 (0.47µF) to Ground
	Add Ground Pin and C1. Use formulas provided to
Adjustable Gain	calculate settings of contact Knowles for support.

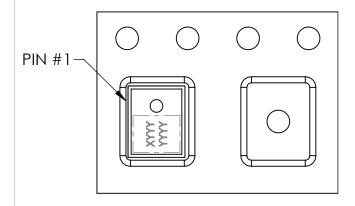
Setting Gain Formulas:	
Gain on non-inverting Op-Amp i	s determined as:
\rightarrow G = 1 + {R1 / (R2 + R3)}	Gain(dB) - 20 * log(G)
High-pass-filter Corner Frequency	<i>/</i> :
-> C.F 1 / { 2 * p * (R2 + R3)) * C1 }





10. PACKAGING DETAIL





COMPONENT **ORIENTATION**

MODEL NUMBER	SUFFIX	REEL DIAMETER	QUANTITY PER REEL
SPM0404HD5H-SB	-2	7''	1,200
31 1/10404110311-30	-6	13"	4,800

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

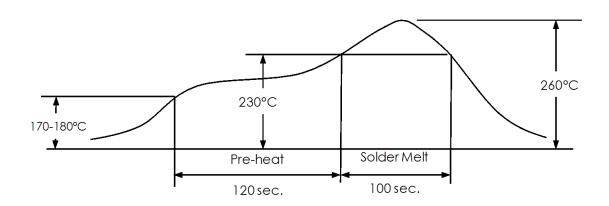
Note:

Dimensions are in milimeters unless otherwise specified.





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.
- Do not pull a vacuum over port hole of the microphone. Pulling a vacum over the (B) port hole can damage the device.
- (C) 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.
- Do not brush board after the reflow process. Brushing the board with/without (D) solvents can damage the device.
- Do not insert any object in port hole of device at any time as this can damage the (E) device.
- (F) Number of reflow - Recommend no more than 3 cycles.



Sheet 8 of 10



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	+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 environment for 1,000 hoors. (ICL 60-2-2 lest Ad)
High Tomporature Pigs	+105°C environment while under bias for 1,000 hours.
High Temperature Bias	(ICE 68-2-2 Test Ba)
Lavy Tapan aratura Diag	-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 1,000
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
	direct contact to I/O pins. (MIL 883E, Method 3015.7)
Reflow	5 reflow cycles with peak temperature of +260°C.
Ma ala quai a gul Cla a al :	3 pulses of 10,000g in the X, Y and Z direction. (IEC 68-2-
Mechanical Shock	27, Test Ea)





14. SPECIFICATION REVISIONS

Revision	Detailed Specification Changes	Date
Α	Specification Release (MD) (C10110156)	9/11/2009
В	Corrected pin callouts and Pin Output Table (Sheet 4); Updated Pin #1 location (Sheet 7). (MD) (C10110551) Corrected Pin Output Table (Sheet 4). (MD)	11/02/2009
С	Corrected Pin Output Table (Sheet 4). (MD) (C10110587)	12/11/2009

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