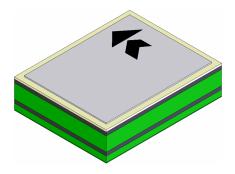
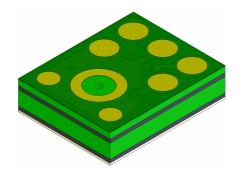


Halogen Free Enhanced RF Protected Zero Height Amplified "Mini" SiSonicTM Microphone Specification





Knowles Acoustics
1151 Maplewood Drive
Itasca, IL 60143

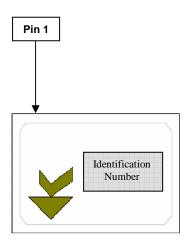




1. DESCRIPTION AND APPLICATION

- 1.1 Description Halogen Free "Mini" Amplified Surface Mount Zero Height Silicon Microphone with RF Protection
- 1.2 Application
 Hand held telecommunication 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 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

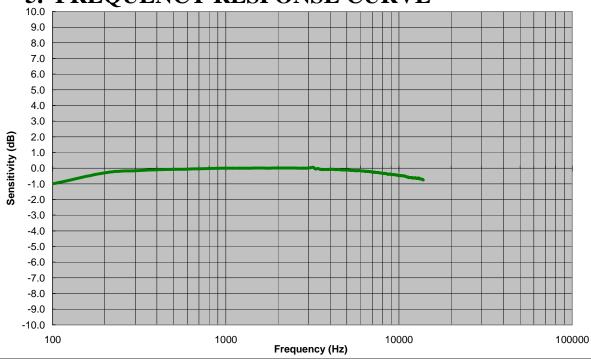




4. ACOUSTIC & ELECTRICAL SPECIFICATIONS

	Symbol	Condition	Limits			Unit
	Symbol	Condition	Min.	Nom.	Max.	J
Directivity		Omni-directional				
Sensitivity	S	@ 1kHz (0dB=1V/Pa)	-21	-18	-15	dB
Output impedance	Z _{OUT}	@ 1kHz (0dB=1V/Pa)	n/a	n/a	300	Ω
Current Consumption	I _{DSS}	across 1.5 to 3.6 volts	0.100	n/a	0.350	mA
Signal to Noise Ratio	S/N	@ 1kHz (0dB=1V/Pa)	55	59	n/a	dB
Supply Voltage	Vs		1.5	n/a	3.6	V
Typical Input Referred Noise	ENL	A-weighted	n/a	35	n/a	dBA SPL
Sensitivity Loss across Voltage		Change in sensitivity over 3.6v to 1.5v	No Change Across Voltage Range		dB	
Maximum Input Sound Level		At 100dB SPL, THD < 1% At 115dB SPL, THD = < 10%		dB		

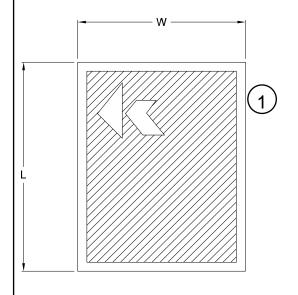
5. FREQUENCY RESPONSE CURVE

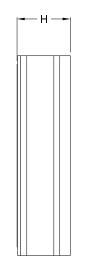


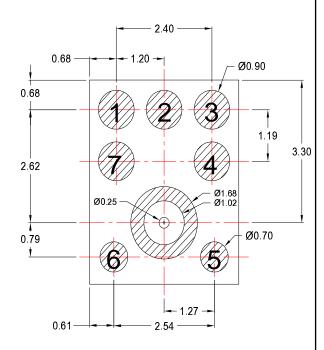




6. MECHANICAL SPECIFICATIONS







PIN Designation		
Pin#	Function	
1	Power	
2	Ground	
3	Output	
4	Gain	
5-7	Ground	

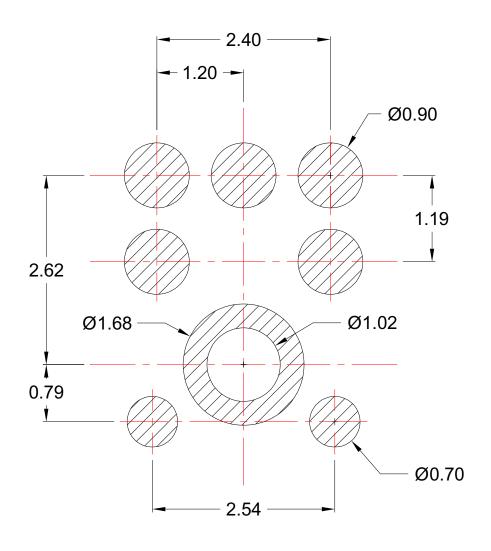
<u>Item</u>	<u>Dim.</u>	<u>Tol. (+/-)</u>	<u>Units</u>
Height	1.25	0.10	mm
Length	4.72	0.10	mm
Width	3.76	0.10	mm
Port Hole	0.25	TBD	mm
Weight	0.06	grams	
Coplanarity	<0.1	mm	

Note: (Tolerance +/-0.15mm unless otherwise specified)





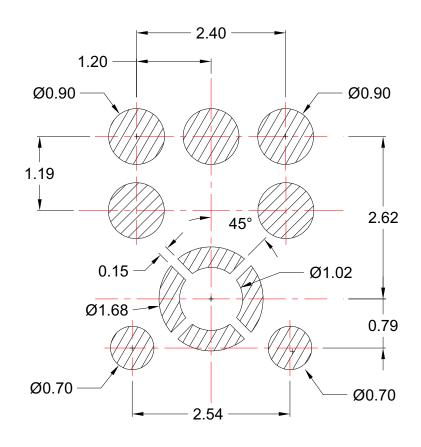
7. RECOMMENDED CUSTOMER LAND PATTERN







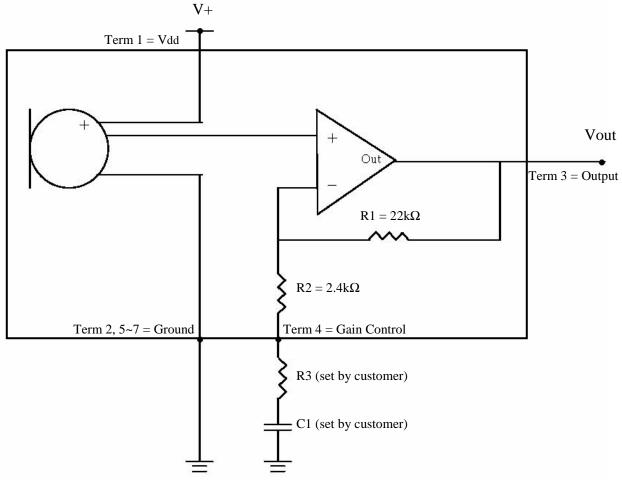
8. RECOMMENDED SOLDER STENCIL PATTERN







9. RECOMMENDED INTERFACE CIRCUIT



Desired Gain	Pin 2 Termination Method
Unity Gain (0dB)	Tie Terminal 4 directly to Output (Terminal 3).
20dB Gain	Tie Terminal 4 through C1 (0.47uF) to Ground.
Adjustable Gain	Add R3 and C1. Use formulas provided to calculate settings, or contact Knowles for support.

Setting Gain Formulas:

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

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

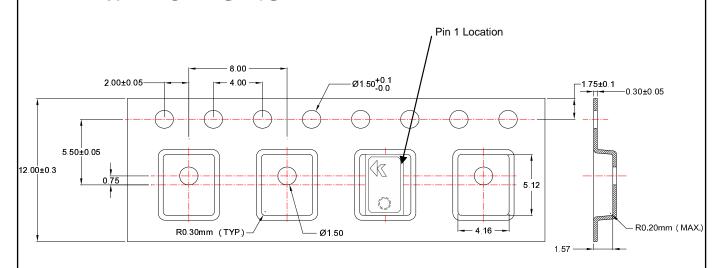
High-pass-filter Corner Frequency:

 \longrightarrow C.F. = 1 / { $2*\pi*(R2 + R3) * C1$ }





10. PACKAGING DETAIL



- 1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ± 0.2 . 2. CAMBER IN COMPLIANCE WITH EIA 481. 3. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET.

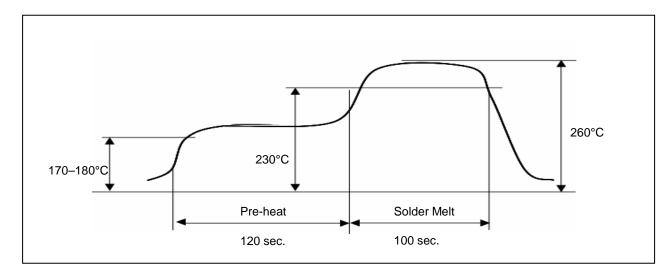
Model Number	<u>Suffix</u>	<u>Reel</u> <u>Diameter</u>	Quantity per Reel
SPM0208LE5H-TB	-2	7"	1,200
SPM0208LE5H-TB	-6	13"	4,800

Leader Length	800mm or minimum of 100 empty pockets
Label	Label applied to external package and direct to reel. Per JEDEC.
Empty Units	No consecutive empty pockets; No more than 3 empty pockets per reel. (Does not include empty pockets for leader/follower)





11. SOLDER REFLOW PROFILE



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

Notes:

- 1. <u>Do not pull a vacuum</u> over the port hole of the microphone. Pulling a vacuum over the port hole can damage the device.
- 2. <u>Do not board wash</u> after the reflow process. Board washing and cleaning agents can damage the device. Do not expose to ultrasonic processing or cleaning.
- 3. Number of Reflow = recommend no more than 3 cycles.

12. ADDITIONAL NOTES

- (A) Packaging (reference SiSonic_Packaging_Spec.pdf)
- (B) 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.
- (C) Exposure: Devices should not be exposed to high humidity, high temperature environment. MSL (moisture sensitivity level) Class 2.
- (D) Out of bag: Maximum of 90 days out of ESD moisture sensitive bag, assuming maximum conditions of 30°C/70% R.H.





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 -40C to +125C with 15min soaks. (ICE 68-2-4)
High Temperature Storage	+105C environment for 1,000 hours. (IEC 68-2-2 Test Ba)
Low Temperature Storage	-40C environment for 1,000 hours. (IEC 68-2-2 Test Aa)
High Temperature Bias	+105C environment while under bias for 1,000 hours. (IEC 68-2-2 Test Ba)
Low Temperature Bias	-40C environment while under bias for 1,000 hours. (IEC 68-2-2 Test Aa)
Temperature / Humidity Bias	+85C/85% RH environment while under bias for 500 hours. (JESD22-A101A-B)
Vibration	4 cycles lasting 12 minutes from 20 to 2,000Hz in X, Y, and Z direction with a peak acceleration of 20g. (MIL 883E, Method 2007.2, A)
Electrostatic Discharge	3 discharges at +/- 8kV direct contact to the lid when unit is grounded (IEC 1000-4-2) and 3 discharges at +/- 2kV direct contact to the I/O pins (MIL 883E, Method 3015.7)
Reflow	5 reflow cycles with peak temperature of 260C.
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
А	Specification Release	04-16-2008

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