

SPECIFICATION

Electret Condenser Microphone

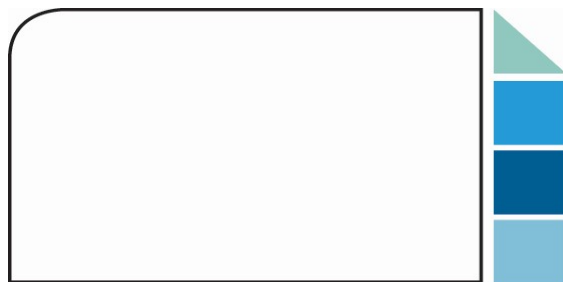
RoHS Compliance

Product : Omni directional ECM SMD $\Phi 4\text{mm} \times 1.3\text{mm}$

GETTOP P/N: SOM4013SL-G423I-HP

Version : V4.0

Designed by	Checked by	Approved by	Released Date
Yang Yu	Jack Liu	Jessica Sun	07-31-2025



CUSTOMER APPROVAL

Gettop 公司销售/技术支持联系方式 (Http://www.gettopacoustic.com)

Gettop Acoustic Co.,Ltd. Tel: +86 536 2283666 E-Mail: gettop@gettopacoustic.com E-Mail: sales@gettopacoustic.com Website: Http://www.gettopacoustic.com Address: NO.68 Fengshan Road.,Fangzi Development Zone, Weifang,Shandong,China	共达电声股份有限公司 电话: +86 536 2283666 邮箱: gettop@gettopacoustic.com sales@gettopacoustic.com 网址: Http://www.gettopacoustic.com 地址: 中国山东省潍坊市坊子区凤山路 68 号
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Revision History

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1. Scope

This document is the technical specification of surface mounted (SMD) electret condenser (ECM) Omni-Directional Microphone.

2. Product Type

SOM4013SL-G423I-HP

3. Electro-Acoustic Specifications

Table 3-1 Electrical Specifications

(Test Condition: +23°C±2, 63%~67% RH, 86~106Kpa, Vs=2V, unless specified differently)

No.	Parameter	Symbol	Condition	Limits			Unit
				Min	Nom.	Max	
3.1	Sensitivity	S	f=1kHz, Pin=1Pa, 0dB=1V/Pa	-45	-42	-39	dB
3.2	Directivity			Omni-directional			
3.3	Output Impedance	ZOUT	f=1kHz			2.2	kΩ
3.4	Current Consumption	IDSS	RL=2.2kΩ, Vs=2.0V			500	μA
3.5	S/N Ratio	S/N	f=1kHz, Pin=1Pa, (A-Weighted)	58			dB
3.6	Operating Voltage	Vmic		1.0		5	V
3.7	Sensitivity vs. Voltage	ΔS	Vs= 2.0V to 1.5V			3	dB
3.8	Total Harmonic Distortion	THD	94dB SPL at 1kHz			1	%
			115dB SPL at 1kHz			3	

Note: Considering tester and testing difference between each other, sensitivity 0.5 dB out of specification will be acceptable by customer for an acceptance.

4. Typical Frequency Response

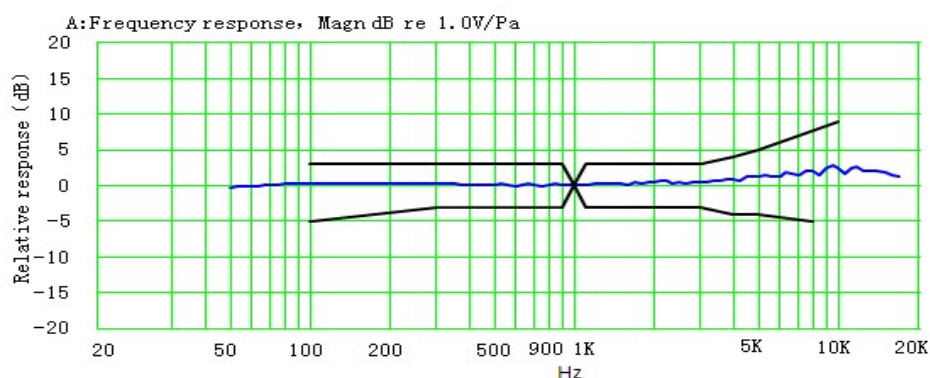


Fig. 4-1 Typical Frequency Response

Table 4-1 Frequency Response Limit Template

Frequency [Hz]	100	300	900	1K	1.1K	3K	4K	5K	8K	10K
Upper limit [dB]	3	3	3	0	3	3	4	5	-	9
Frequency [Hz]	100	300	900	1K	1.1K	3K	4K	5K	8K	10K
Lower limit [dB]	-5	-3	-3	0	-3	-3	-4	-4	-5	-

5. Schematic Diagram

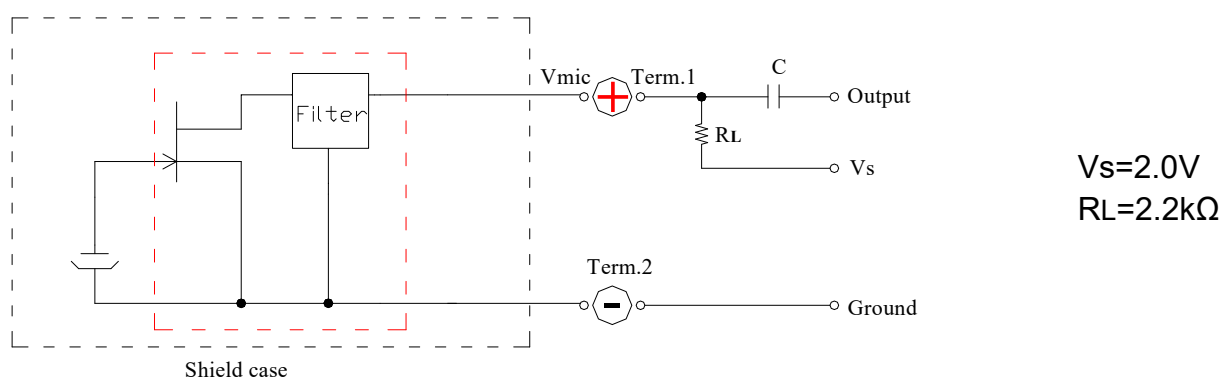


Fig. 5-1 Schematic Diagram

6. Measurement System Setup

Test signal: Sinusoid, Sweep,

Frequency Range: 50Hz-17KHz

Step: 1/12 octave

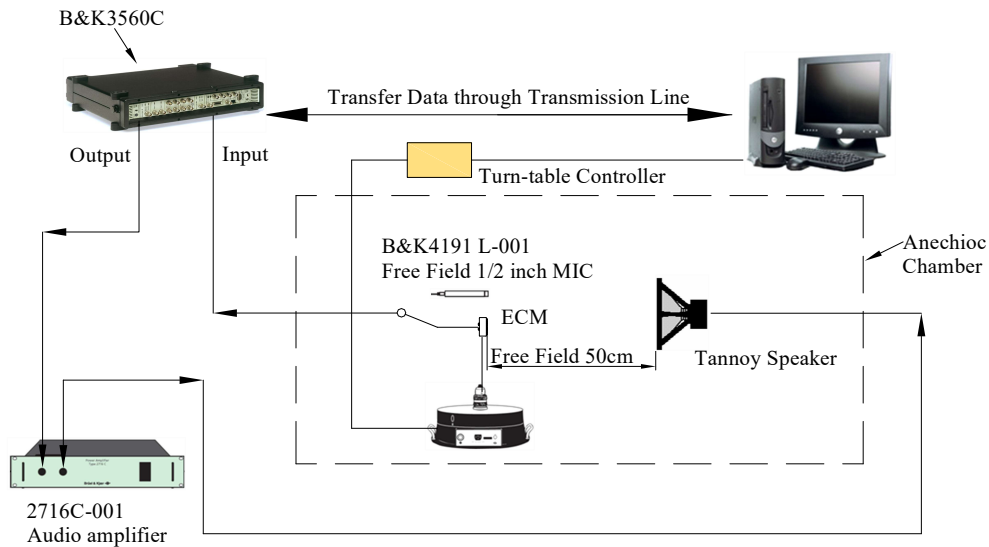
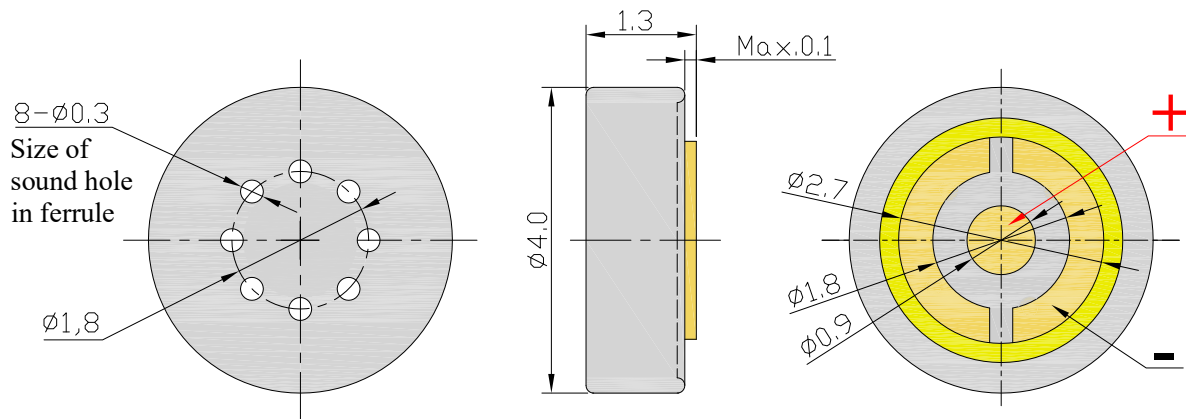


Fig. 6-1 Measurement System Setup

7. Mechanical Specification



Unmarked Tolerance: ± 0.1 (mm)

Fig. 7-1 Microphone Capsule

8. Reliability Tests

After conducting any of the following tests, the sensitivity change of DUT shall be less than $\pm 3\text{dB}$ from its initial value and shall keep its initial operation and appearance.

The measurement to be done after 2 hours of conditioning at $+15\text{ }^{\circ}\text{C} \sim +35\text{ }^{\circ}\text{C}$, R.H 45%~75%

8.1 Hi-Temperature Test

Temperature: $+85\text{ }^{\circ}\text{C}$
Duration: 240 hours

8.2 Low-Temperature Test

Temperature: $-40\text{ }^{\circ}\text{C}$
Duration: 240 hours

8.3 Humidity & Heat Test

Temperature: $+70\text{ }^{\circ}\text{C}$
Humidity: 93% RH
Duration: 240 hours

8.4 Thermal Shocking Test

Temperature & duration: $-40\text{ }^{\circ}\text{C}$, 30 minutes
Temperature & duration: $+80\text{ }^{\circ}\text{C}$, 30 minutes,
Cycles: 32 cycles

8.5 Vibration Test

Frequency: 10-55Hz
Amplitude: 1.52mm
Direction: 2 directions
Duration: 2 hours

8.6 Drop Test

Drop the microphones to the floor
Height: 1.5m
Reference surface: slippery marble floor
Duration: 5 times

8.7 ESD

The tests are performed acc. to IEC61000-4-2 level 4

a. Contact discharge

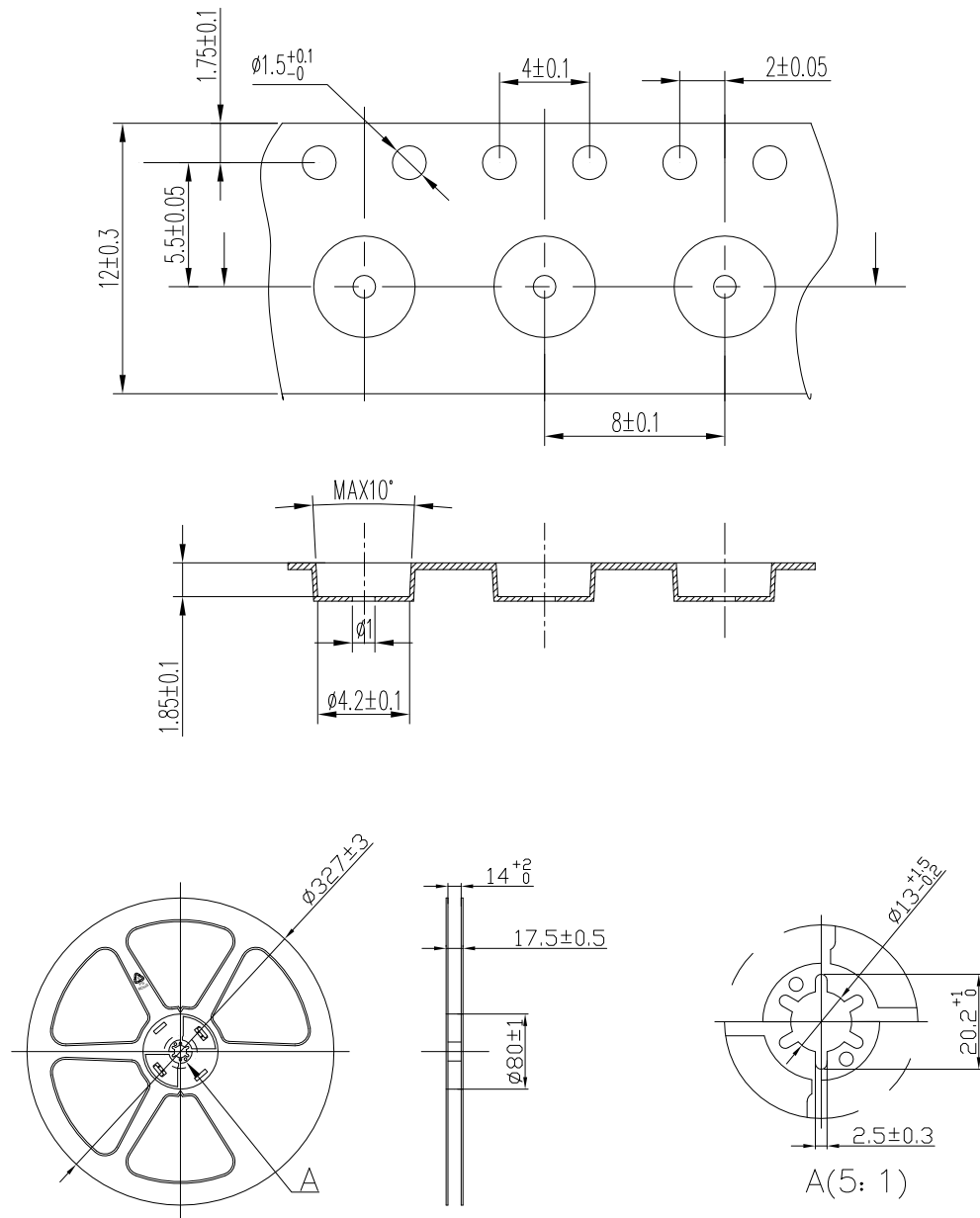
Discharge position: Output of microphone
Charge voltage: $\pm 8000\text{VDC}$
Discharge network: $150\text{pF} \ \& \ 330\Omega$

b. Air discharge

Discharge position: Sound hole
Charge voltage: $\pm 15000\text{VDC}$
Discharge network: $150\text{pF} \ \& \ 330\Omega$

9. Packaging

- * Use ESD tape and reel for microphone packaging.
- * Anti-static measures should be applied during packaging operation.



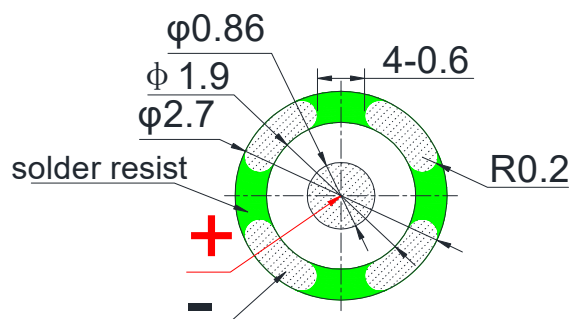
Tape and Reel	See the Picture	4,000PCS×1=4,000PCS
Shipping Box	370mm×215mm×370mm	4,000PCS×10=40,000PCS

Fig. 9-1 Packaging

10. Application Design Suggestions

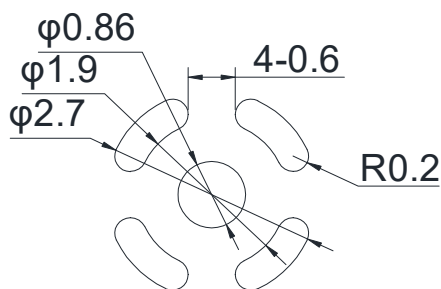
10.1 Recommended PCB Design

Land Pattern



PTH holes are required in the negative and positive solder pads acc. to different layout.

Stencil



Thickness of stencil:0.1mm

Fig. 10-1 Recommended PCB Design

10.2 Temperature Profile During Reflow Process :

Table 10-1 Temperature Profile During Reflow Process

Parameter	Reference	Specification
Average Temperature Gradient in Preheating		2.5°C/s
Soak Time	Tsoak	2-3 minutes
Time Above 217°C	T1	Max 60s
Time Above 245°C	T2	Max 10s
Peak Temperature in Reflow	Tpeak	250°C (-5/+0°C)
Temperature Gradient in Cooling		Max -5°C/s

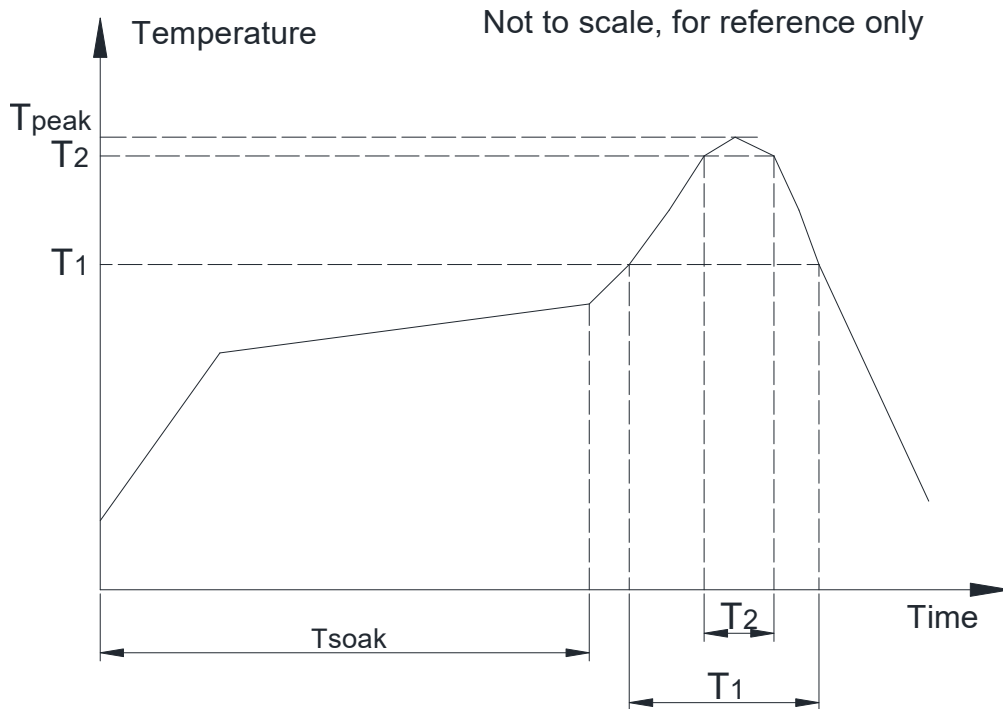


Fig. 10-2 Temperature Profile

- After the initial reflow, the MIC shall be resumed to room temperature if more reflow is needed.
- Do not reflow the MIC unit more than twice. Suggest SMT the MIC at last time if double side PCBA used.
- After two SMT tests, the sensitivity change of the MIC unit shall be within 3dB
- The test should be conducted after the MIC unit has been exposed to room temperature for 3 hours.
- Do not seal sound port during reflow.
- Reflow profile is set according to solder paste, PCB thickness, soldering fixture etc, and the actual peak temperature to Microphone during customer reflow process is suggested not exceed 245°C.

10.3 Instruction of Hot Air Gun Soldering

- Hot air gun can be used to remove the SMD MIC from the base board.
- Max temperature of the nozzle should be less than 360°C. Actual temperature of the hot air while blowing should be less than 270°C.
- Distance between the nozzle tip and SMD MIC should be within 2cm.
- Operation time should be less than 10 seconds.
- Hot air entry should never be facing to the sound hole of the SMD MIC.

- f. Aim the nozzle tip to the soldering joint of the SMD MIC and the base board.
- g. Anti-static measure should be applied, since SMD MIC is easy to be damaged by ESD.

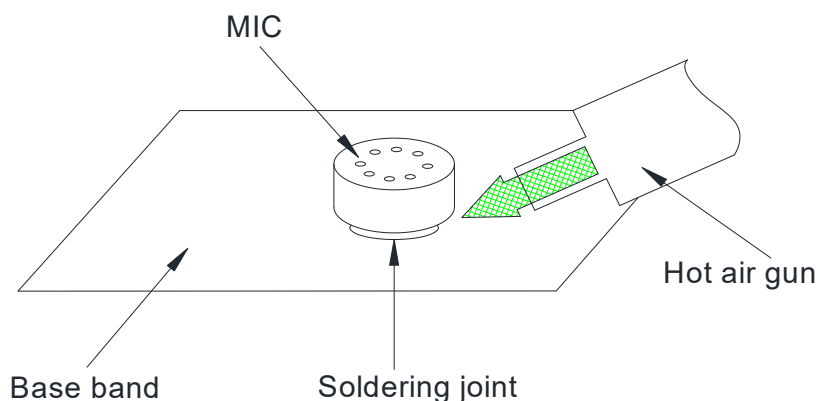


Fig. 10-3 Repairing

10.4 Recommended Nozzle for SMD MIC

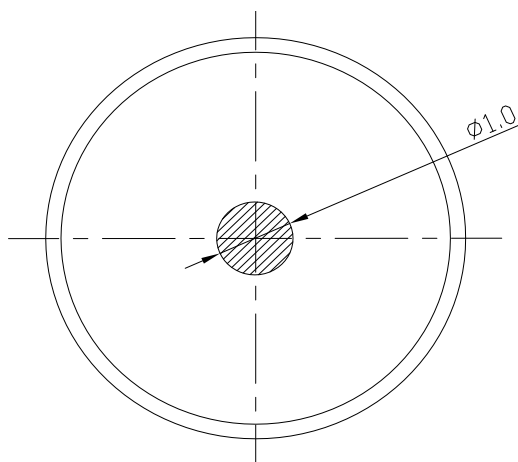


Fig. 10-4 Recommended Nozzle for SMD MIC

11. Special Cautions

11.1 X-Ray Screening

The MIC should not be subjected to x-ray screening. If it is absolutely necessary to do BGA screening by x-ray, the maximum dose applied to the MIC unit should be restricted per Table 11-1. The sensitivity of the MIC shall be measured before and after. The values should be recorded for reference.

Table 11-1 X-Ray Parameter

Parameter	Level Value	Unit
X-Ray Current	<0.080	mA
Distance	>0.30	m

Duration	<30	s
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11.2 Ionized Air Cleaning

Do not bring the ionized air gun to the port hole directly.

11.3 Board Wash Restrictions

It is prohibited to wash the board after reflow process. This could damage the MIC.

11.4 Vacuum Restrictions

It is prohibited to use a vacuum over the sound hole. This could damage the MIC.

11.5 Environmental Condition

Storage Condition: -40°C ~+70°C.

Operation Condition: -20°C ~+60°C.

Arbitration Condition: 23°C ±1°C, R.H. 63%~67%, Air pressure: 86~106Kpa.

11.6 Storage

Keep ECM in warehouse with humidity less than 75%R.H. and without sudden temperature change, acid air, any other harmful air or strong magnetic field.

Please protect products against moist, shock, sunburn and pressure.

Please take proper measures against ESD in the process. Please use the shipment package for long-term storage.

12. Discard Suggestions

For microphones to be wasted, customer shall follow the regulation of Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC).