



Electret Condenser Microphone

4x1.3 mm SMD

Waterproof

MEO4013MH-443RC

Revision

Date	Version	Status	Changes	Approver
2012/03/21	V1	Released	Final version	PG
2017/08/01	V1		New logo	LD

1. Scope

This specification shall be applied to surface mounted (SMD) electret condenser (ECM) omni-directional microphone.

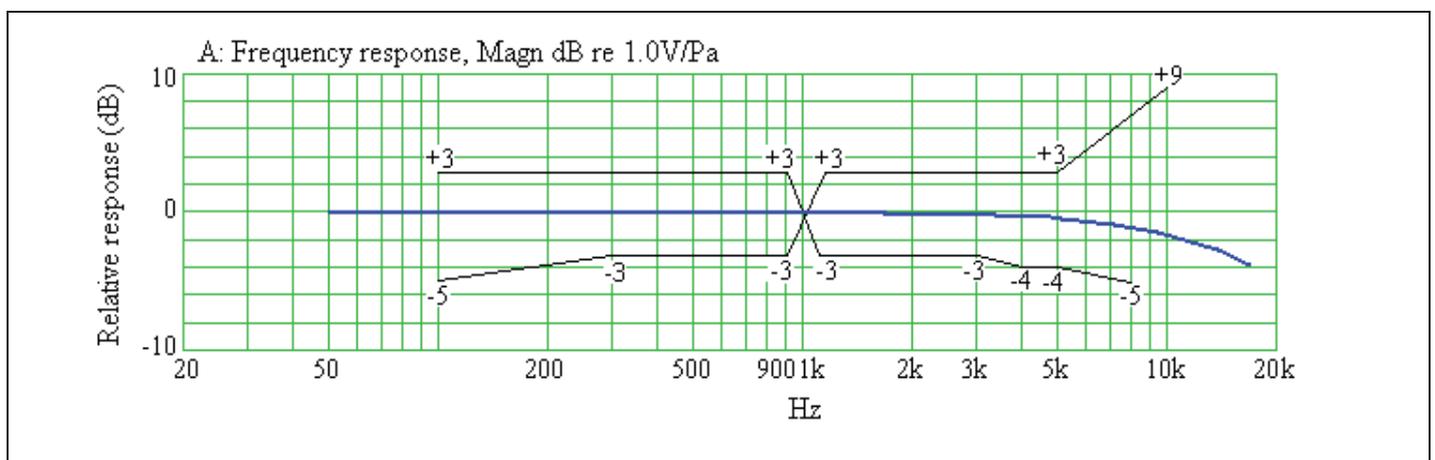
2. Product type

MEO4013MH-443RC

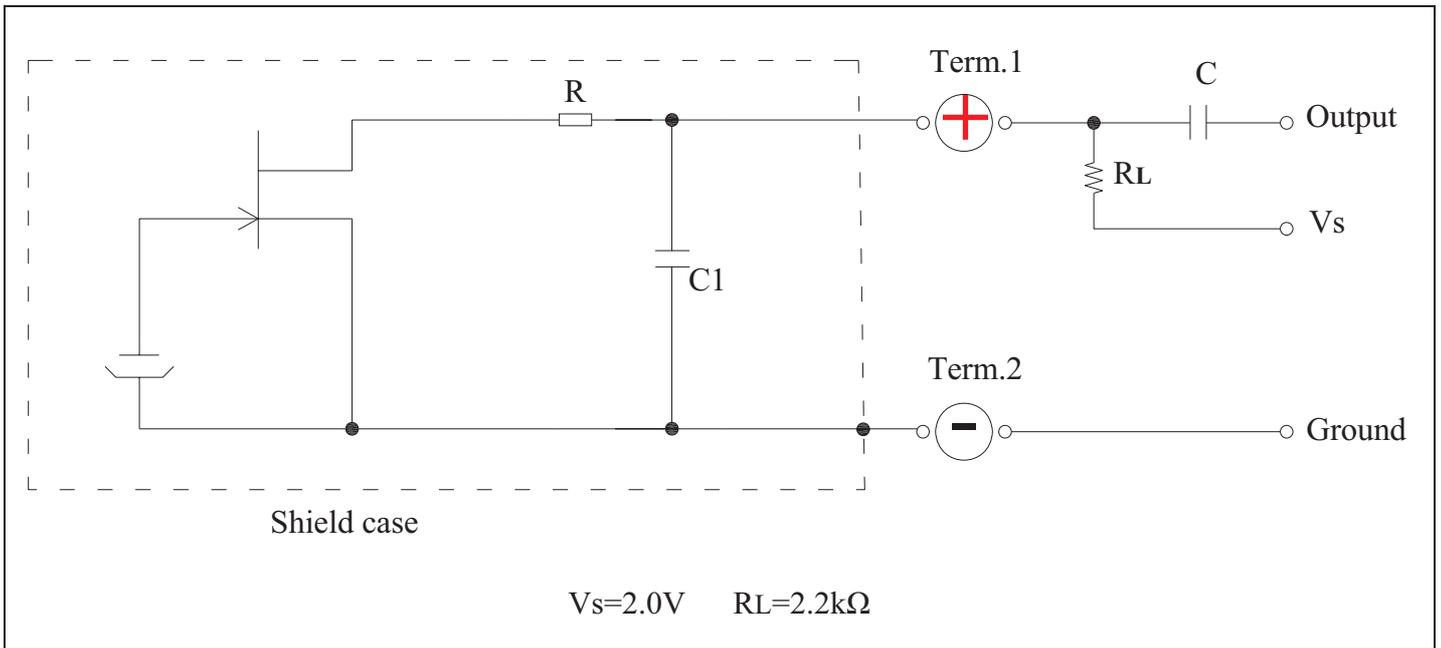
3. Electrical specifications

No.	Parameter	Symbol	Condition	Limits			Unit
				Min.	Center	Max.	
3.1	Sensitivity	S	f=1kHz, Pin=1Pa, 0dB=1V/Pa	-47	-44	-41	dB
3.2	Reflow characteristics		See 9.2			2	dB
3.3	Directivity			Omni-directional			
3.4	Frequency			50~12000			Hz
3.5	Output impedance	Z _{OUT}	f=1kHz			2.2	kΩ
3.6	Current consumption	I _{DSS}	R _L =2.2kΩ, V _s =2.0V			500	μA
3.7	S/N Ratio	S/N	f=1kHz, Pin=1Pa, (A-Weighted curve)	58			dB
3.8	Operating voltage			1.0	2.0	10	V
3.9	Decreasing voltage	ΔS	V _s = 2.0V to 1.5V			3	dB
3.10	Max. input S.P.L.					115	dB S.P.L.

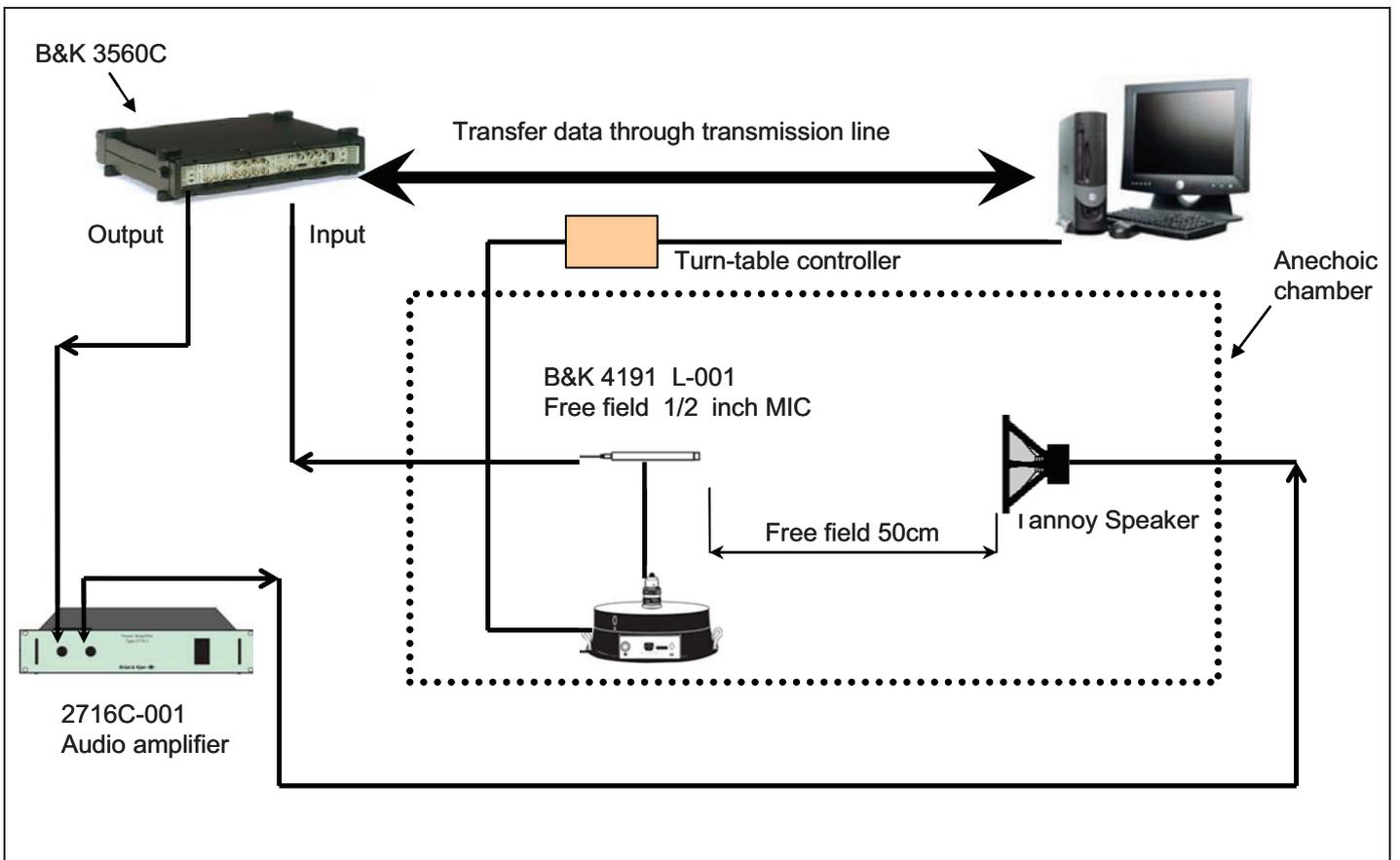
4. Typical frequency response curve:



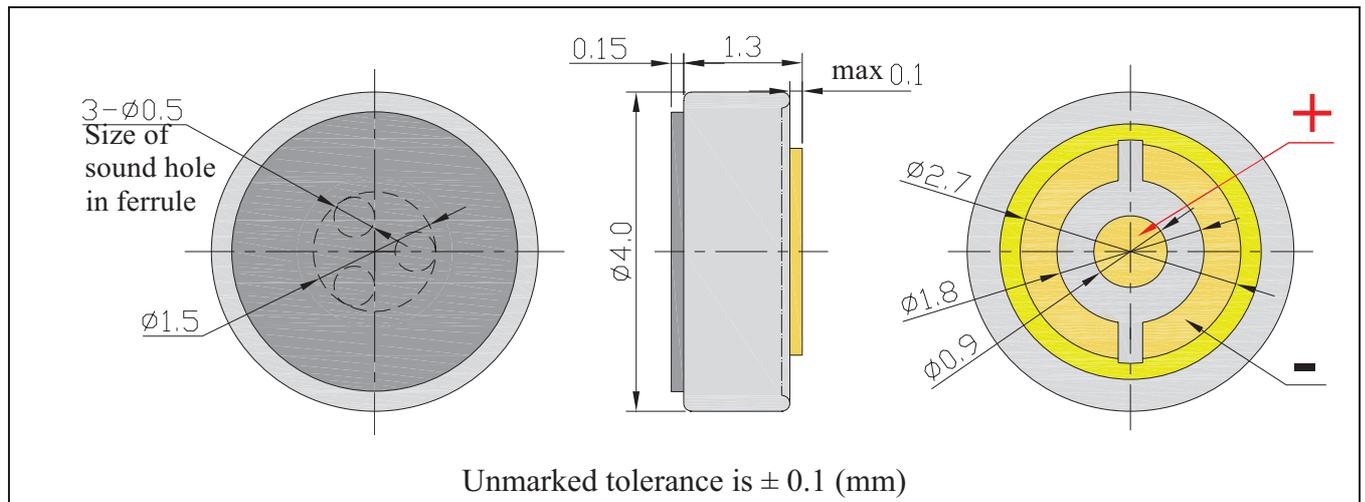
5. Schematic diagram:



6. Measurement system:



7. Dimension:



8. Reliability tests:

Evaluation Standard:

After any following tests, the sensitivity of the microphone shall not change more than ± 3 dB from initial value, and shall keep its initial operation and appearance.

8.1 Hi-Temperature test

+85°C, 240 Hours \rightarrow room temperature, 3 Hours.

8.2 Low-Temperature test

-40°C, 240 Hours \rightarrow room temperature, 3 Hours.

8.3 Humidity&Heat test

+70°C, 93% RH, 240 Hours \rightarrow room temperature, 3 Hours.

8.4 Thermal shocking test

a) -40°C, 30 minutes \leftrightarrow +80°C, 30 minutes, repeated 32 cycles \rightarrow room temperature, 3 hours.

b) +50°C, 1 hour \rightarrow room temperature 1 hour \rightarrow -10°C, 1hour \rightarrow room temperature 1 hour, repeated 5 cycles \rightarrow room temperature, 3 hours.

8.5 Vibration test

Two hours, two directions, a frequency of 10-55Hz and a 1.52mm-high amplitude.

8.6 Drop test

Dropping to a slippery marble floor for 5 times, from a 1.5-meter-high without package.

8.7 Electrostatic discharge

Tested to IEC61000-4-2 level 3:

a) Contact discharge

The microphone shall operate normally after 10 discharges to the output. The charge voltage is 6000v DC and the discharge network is 150pF and 330Ω.

b) Air discharge

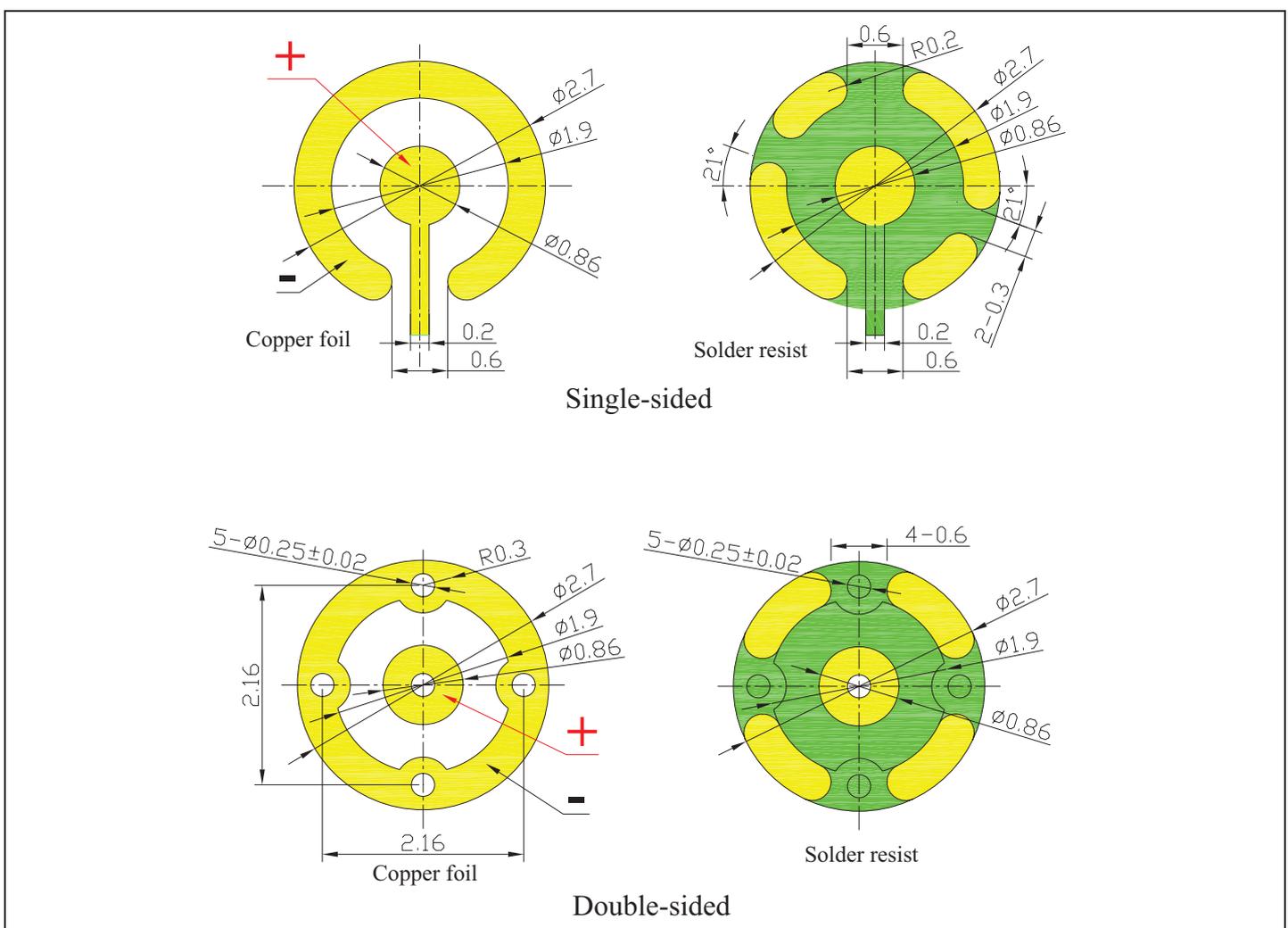
The microphone shall operate normally after 10 discharges to the sound hole. The charge voltage is 8000v DC and the discharge network is 150pF and 330Ω.

8.8 Waterproof test

IP65.

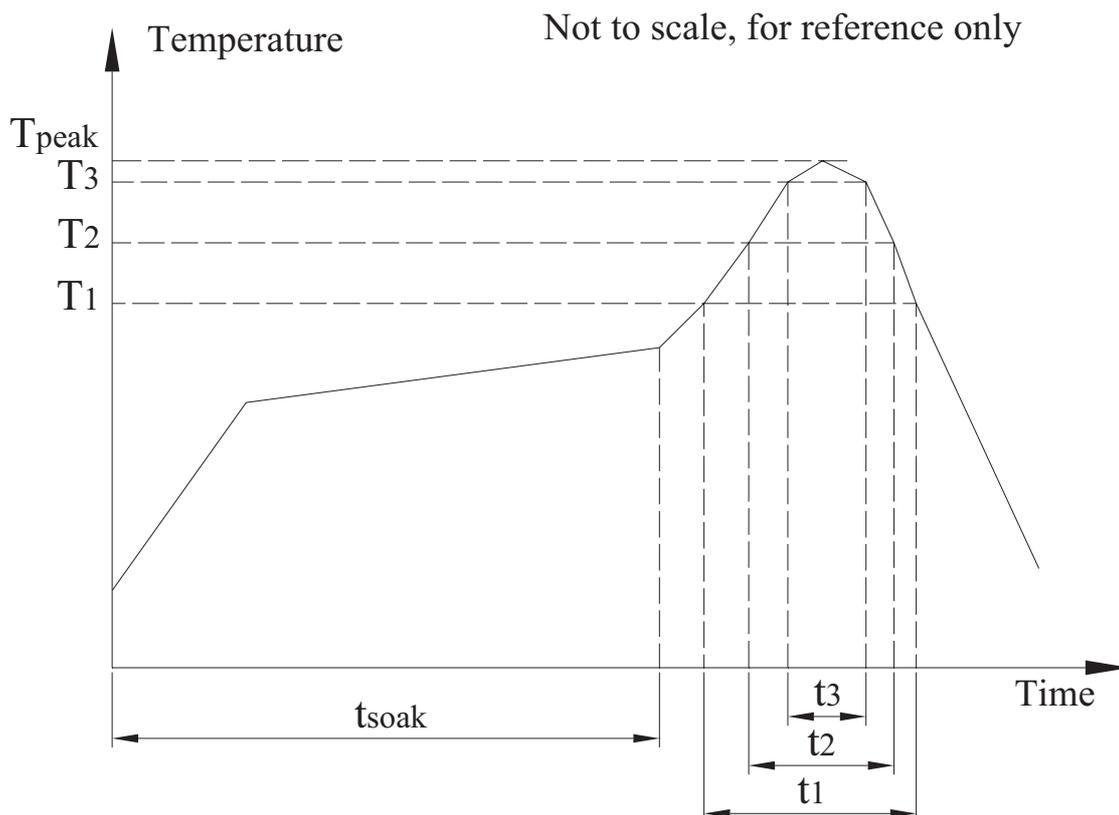
9. Notes

9.1 Ref. drawing of PCB for SMT and solder paste template:



9.2 Temperature restrictions during the reflow process:

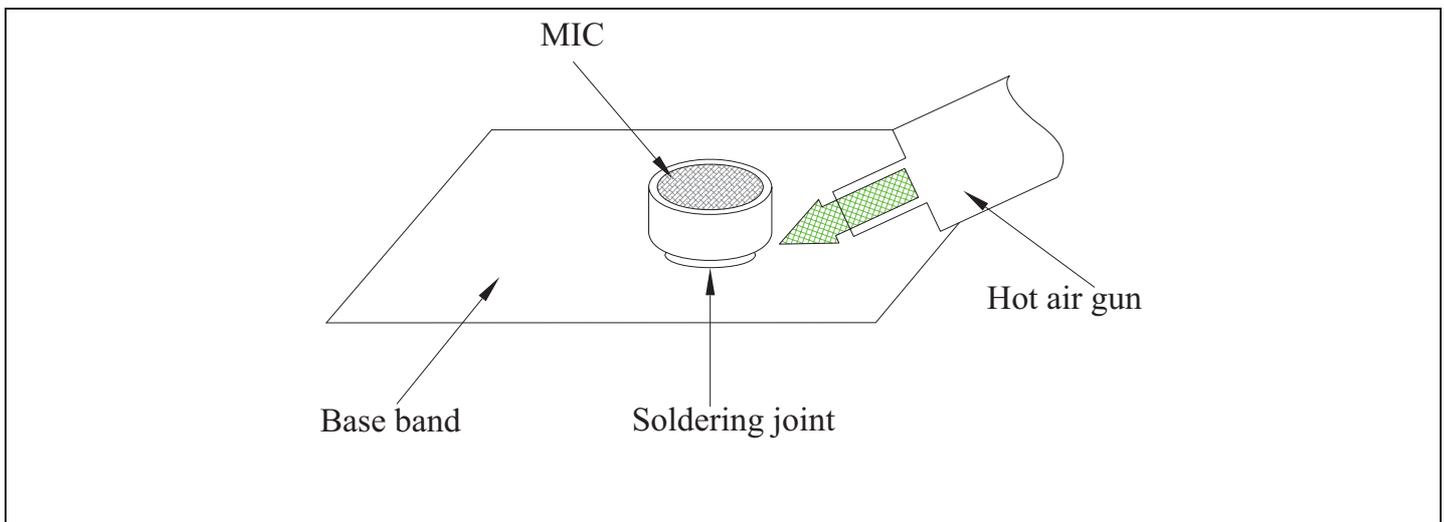
Parameter	Reference	Specification
Average temperature gradient in preheating		2.5°C/s
Soak time	t_{soak}	2-3 minutes
Time above 217°C	t_1	Max 60s
Time above 230°C	t_2	Max 50s
Time above 250°C	t_3	Max 10s
Peak temperature in reflow	T_{peak}	255°C (-0/+5°C)
Temperature gradient in cooling		Max -5°C/s



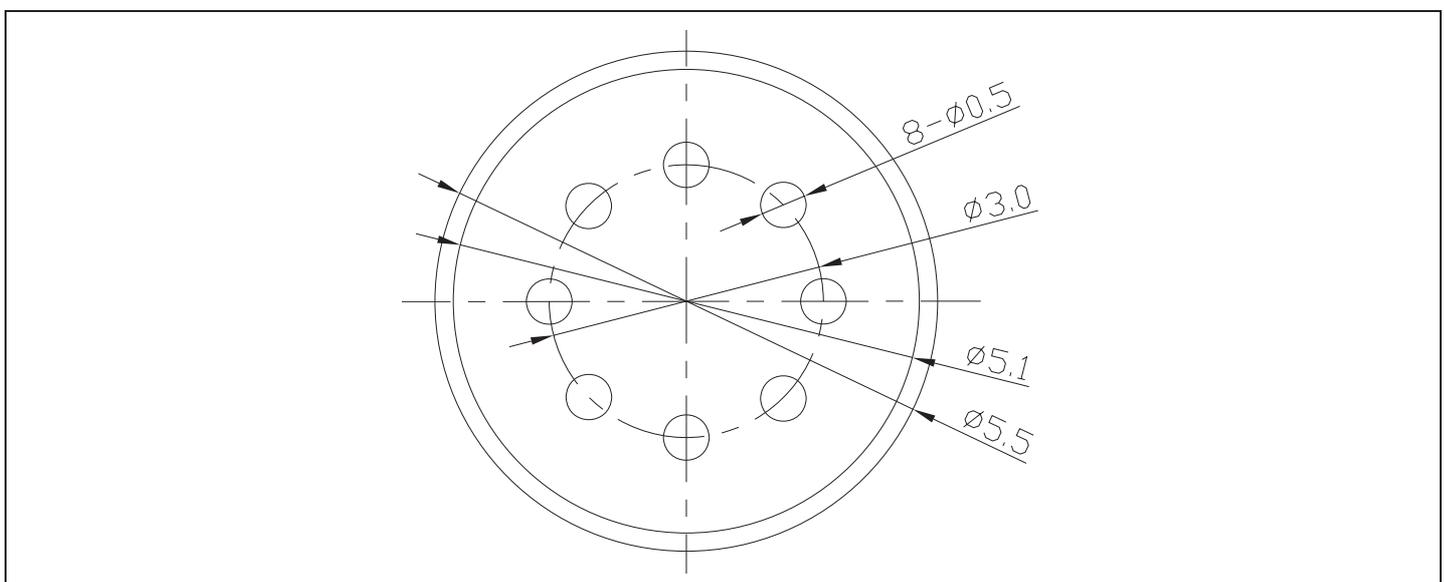
- *After the initial reflow, the MIC shall be resumed to ambient temperature if more reflow required.
- *Do not perform it more than twice.
- *After two SMT tests, the sensitivity of the MIC unit shall change less than ±2dB for initial value
- *The MIC should be exposed to room temperature for 3 hours and tested.

9.3 Hot air gun using instruction

- a) Hot air gun is used to separate the reflowable MIC from the base board.
- b) Max. temperature of the nozzle should be less than 400°C; Actual temperature of the hot air while blowing should be less than 270°C.
- c) Distance between nozzle's tip and reflowable MIC should be within 2mm.
- d) Operation time: Less than 10 seconds.
- e) Hot air's entry to the sound hole of the reflowable MIC should be prohibited.
- f) Aim the nozzle's tip to the joint of the soldering joint of the reflowable MIC and the base board.
- g) Anti-static measure should be taken for reflowable MIC is easy to be destroyed.



9.4 Recommended nozzle for reflowable MIC:



10. Suggestions in application

10.1 X-ray screening :

The MIC should not be subjected to x-ray screening. If it is absolutely necessary to do BGA screening using x-ray, the maximum dose the MIC can be subjected to is as per Table below. The sensitivity of the MIC shall be measured before and after and the values recorded for reference.

Parameter	Level Value	Unit
X-ray Current	<0.080	mA
Distance	>0.30	m
Duration	<30	s

10.2 Ionized air cleaning

Do not bring the ionized air gun to microphone's sound outlet directly.

Recommended condition (Distance>8cm; Time<5 sec.)

10.3 Board wash restrictions

It is very important not to wash the board after the reflow process. This could damage the MIC.

10.4 Vacuum restrictions

It is very important not to pull a vacuum over the port hole of the MIC. This could damage the MIC.

11. Environmental condition

11.1 Storage condition: -40°C~+70°C, R.H. less than 90%

11.2 Operation condition: -20°C~+60°C, R.H. less than 90%

11.3 Arbitration condition: 20°C±1°C, R.H. 63%~67%, Air pressure: 86~106Kpa

12. Storage

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

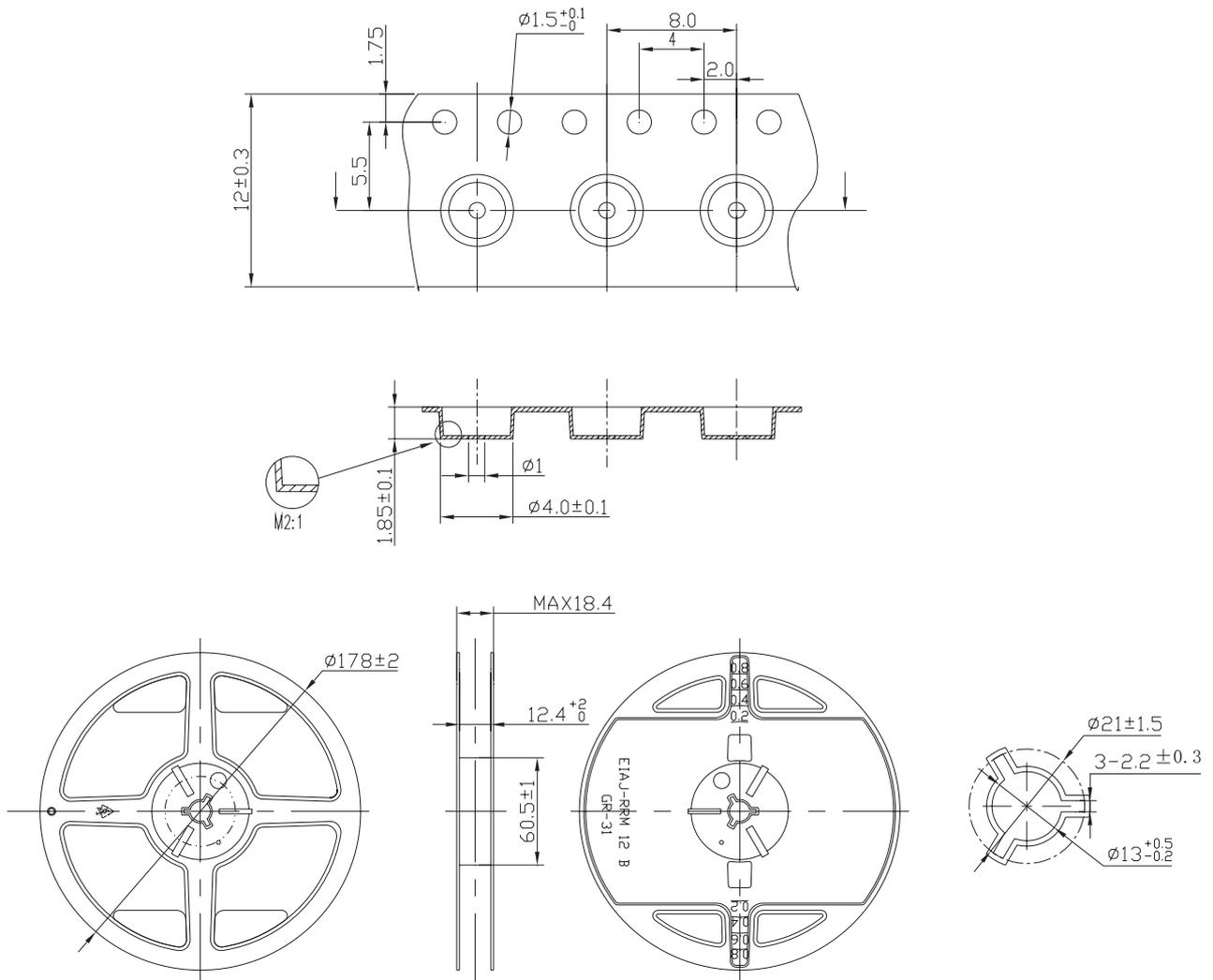
12.2 Please protect products against moist, shock, sunburn and pressure.

12.3 Proper measures against static electricity should be taken in the process.

12.4 Please do a long-term storage with the shipment package.

13. Packing

- * Use ESD reel and tape for microphone packing.
- * Anti static measures should be performed during packing.



Carrier-band	See the picture	1,000PCS×1=1,000PCS
Middle box	193mm×160mm×193mm	1,000PCS×10=10,000PCS
Out box	360mm×212mm×212mm	10,000PCS×2=20,000PCS