

Specification of MEMS Microphone

(RoHS Compliance & Halogen Free)

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Customer Model :

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1 Security Warning

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2 Publication History

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| 1.0 | New Design | 2020.12.08 | Aaron | Roy |
| 2.0 | Update THD performance in Section 3 Update Document Template | 2021.09.16 | Zamp | Roy |
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1 Introduction:

MEMS MIC which is able to endure reflow temperature up to 260°C for 50 seconds can be used in SMT process. It is widely used in telecommunication and electronics device such as mobile phone, laptop computers, and other portable electronic devices etc.

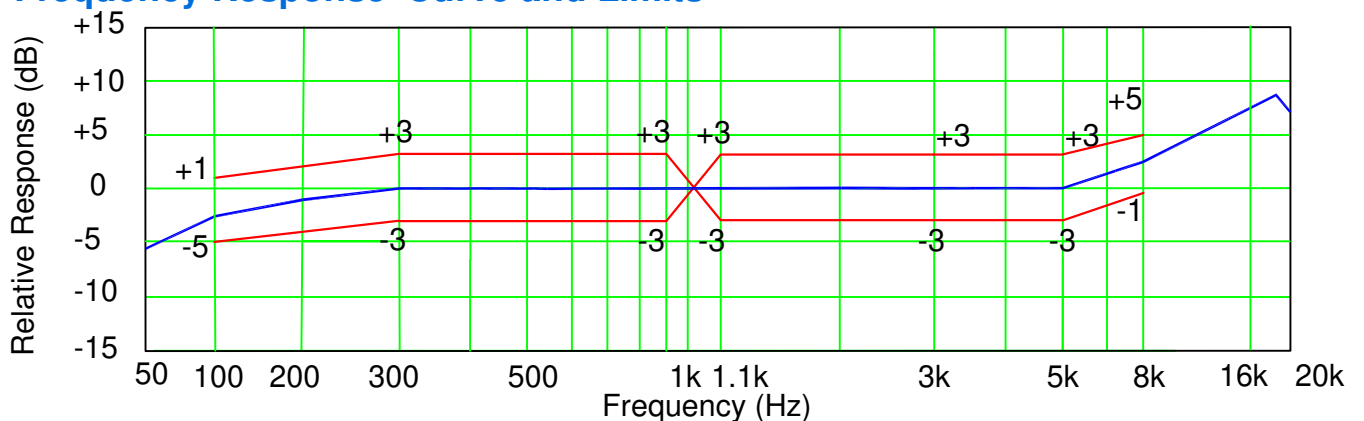
2 Test Condition (Vs=2.0V, L=50cm)

| StandardConditions (As IEC 60268-4) | Temperature | Humidity | Air pressure |
|-------------------------------------|---------------|---------------------|----------------|
| Environment Conditions | +15°C ~ +35°C | 25% R.H. ~ 75% R.H. | 86kPa ~ 106kPa |
| Basic Test Conditions | +20°C ± 2°C | 60% R.H. ~ 70% R.H. | 86kPa ~ 106kPa |

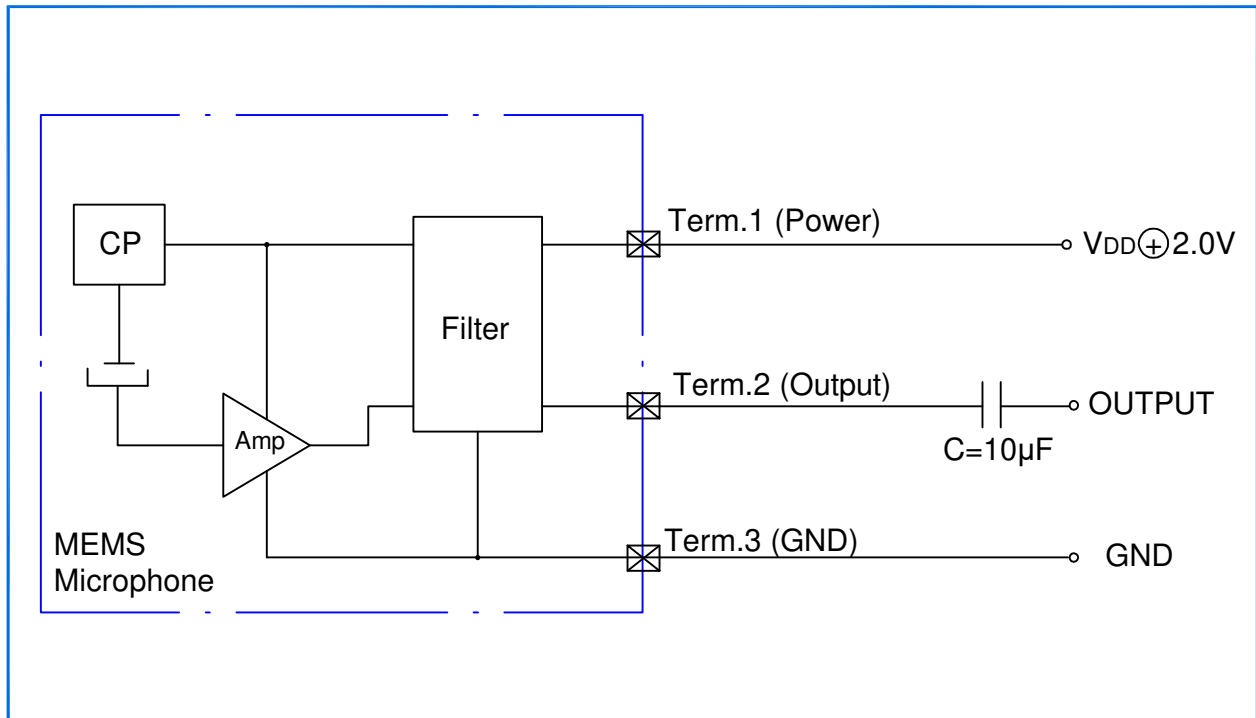
3 Acoustic and Electrical Characteristics

| Item | Symbol | Test Conditions | Min | Typ | Max | Unit |
|-----------------------------------|------------------|--|-----------------|------------|-----|---------------|
| Operating Voltage Range | V _s | | 1.5 | | 3.6 | V |
| Current Consumption | I | V _s =2.0V | | | 150 | μA |
| Sensitivity | S | f=1kHz, Pin=1Pa | -39 | -38 | -37 | dBV |
| S/N Ratio | SNR | f=1kHz, Pin=1Pa A-Weighted Curve | | 62.5 | | dB |
| Total Harmonic Distortion | THD | 1% THD@1kHz | | 113 | | dB SPL |
| Acoustic Overload Point | AOP | 10%THD@1kHz | | 128 | | dB SPL |
| Power Supply Rejection | PSR | 100mVpp square wave@217Hz, V _s =2.0V, A-Weighted | | -96 | | dBV |
| Power Supply Rejection Ration | PSRR | 200mVpp sinewave@1k Hz, V _s =2.0V | | 68 | | dB |
| Output Impedance | Z _{out} | f=1kHz, Pin=1Pa | | | 400 | Ω |
| Decreasing Voltage Characteristic | ΔS | f=1kHz, Pin=1Pa V _s =3.6 --1.5V | No Change | | | |
| Directivity | D(θ) | | Omnidirectional | | | |

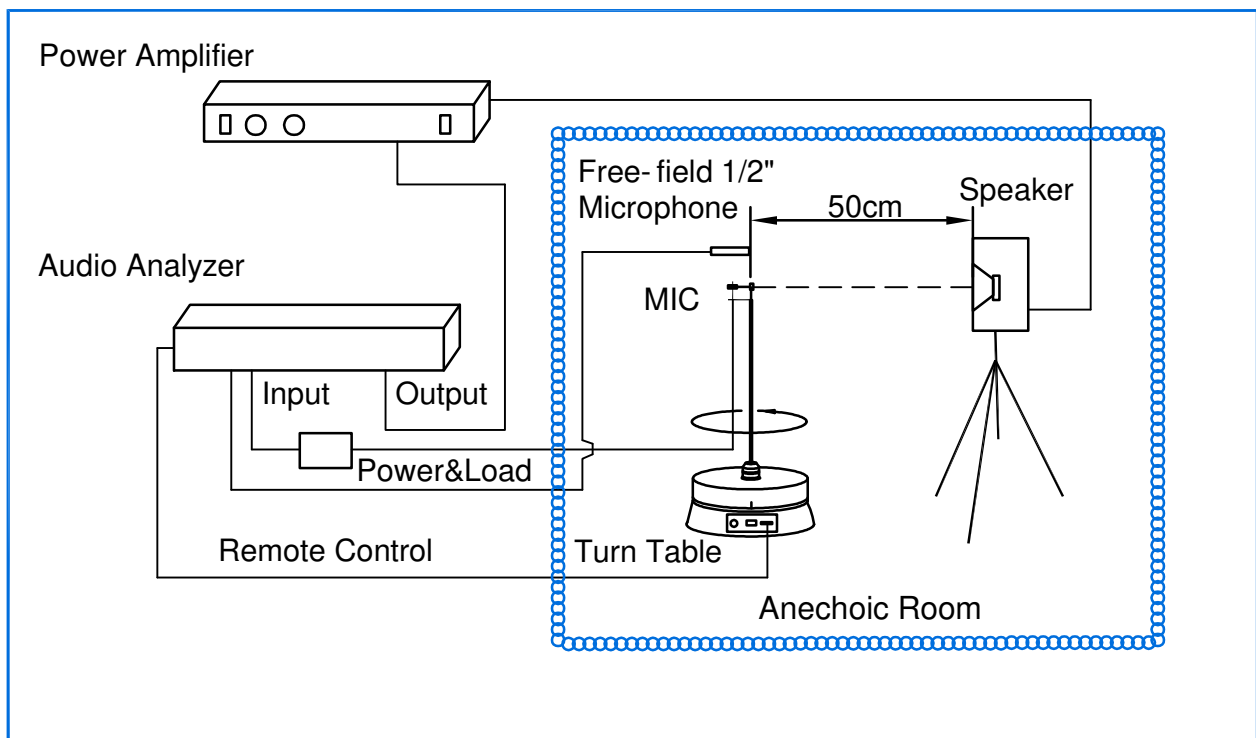
4 Frequency Response Curve and Limits



5 Measurement Circuit

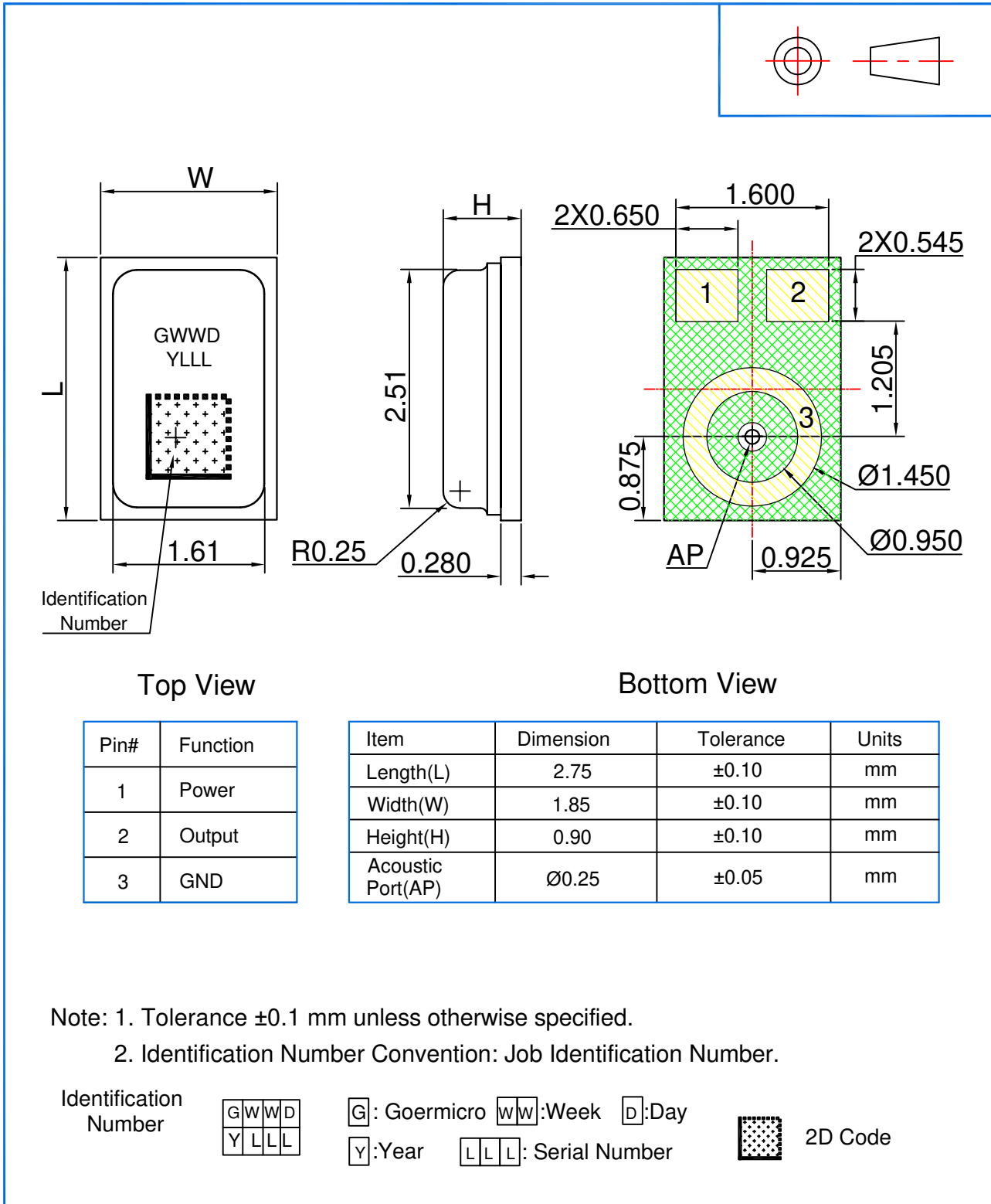


6 Test Setup Drawing



7 Mechanical Characteristics

7.1 Appearance Drawing (Unit: mm)



7.2 Weight

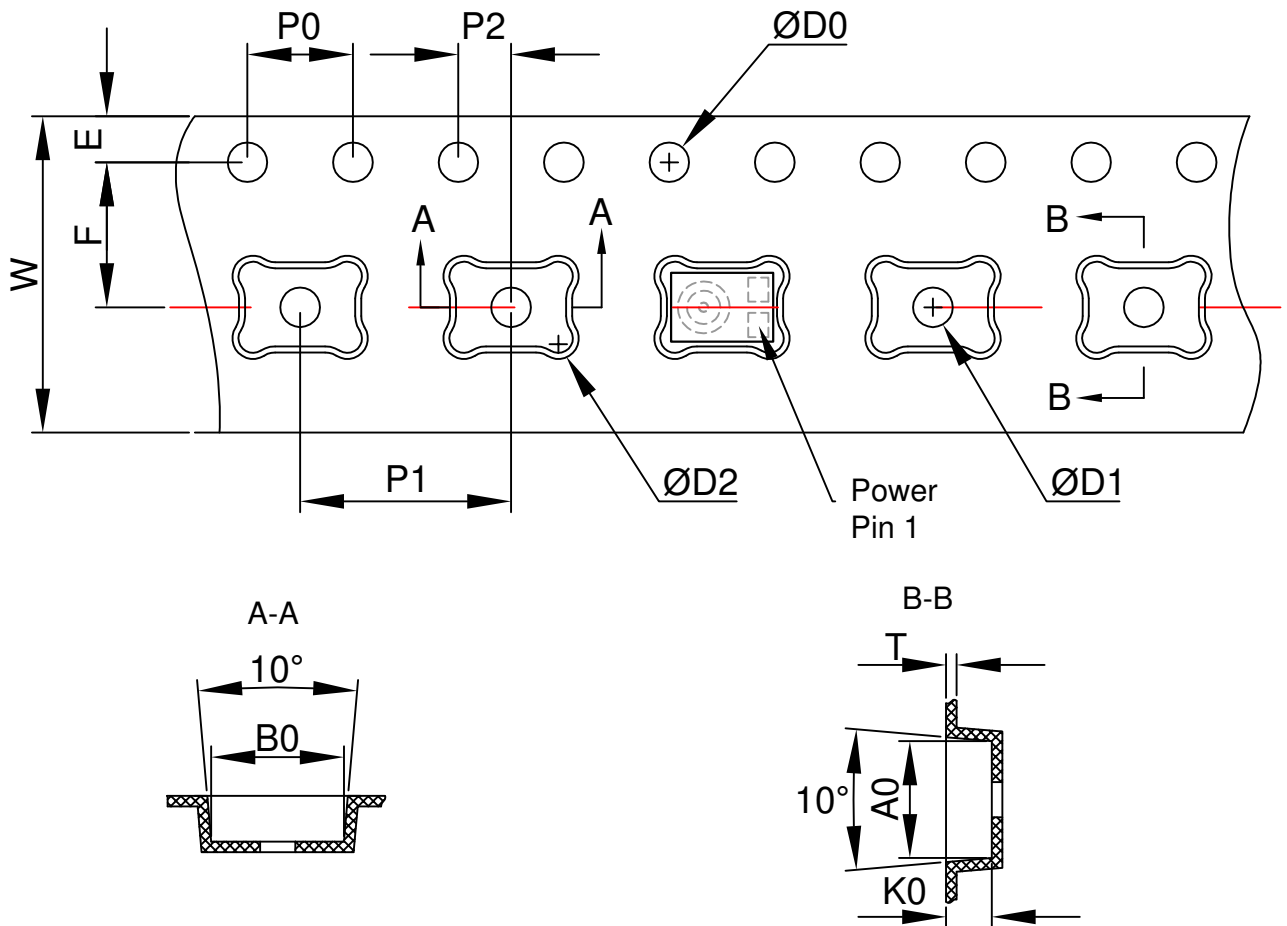
The weight of the MIC is Less than 0.02g.

8 Reliability Test

| | |
|---|--|
| <p>8.1 Vibration Test</p> | <p>To be no interference in operation after vibrations, 4 cycles, from 20 to 2,000Hz in each direction(X,Y,Z), 48 minutes, using peak acceleration of 20g, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25% \sim 75%)</p> |
| <p>8.2 Drop Test</p> | <p>To be no interference in operation after dropped to 1.0cm steel plate 12 times from 1.5 meter height in state of JIG,JIG weight of 100g, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25% \sim 75%)</p> |
| <p>8.3 Temperature Test</p> | <p>a) After exposure at $+125^{\circ}\text{C}$ for 200 hours, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25% \sim 75%) b) After exposure at -40°C for 200 hours, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25% \sim 75%)</p> |
| <p>8.4 Humidity Test</p> | <p>After exposure at $+85^{\circ}\text{C}$ and 85% relative humidity for 200 hours, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25% \sim 75%)</p> |
| <p>8.5 Mechanical Shock Test</p> | <p>Then subject samples to three one-half sine shock pulses (3000 g for 0.3 milliseconds) in each direction (for six axes in total) along each of the three mutually perpendicular axes for a total of 18 shocks, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25% \sim 75%)</p> |
| <p>8.6 Thermal Shock Test</p> | <p>After exposure at -40°C for 30 minutes, at $+125^{\circ}\text{C}$ for 30 minutes (change time 20 seconds) 32 cycles, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25% \sim 75%)</p> |
| <p>8.7 Reflow Test</p> | <p>Adopt the reflow curve of item 12.3, after three reflows, sensitivity should vary within $\pm 2\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25% \sim 75%)</p> |
| <p>8.8 Electrostatic Discharge Test</p> | <p>Under $C=150\text{pF}$, $R=330\text{ohm}$. Tested to $\pm 8\text{KV}$ contact to the case and tested to $\pm 2\text{KV}$ contact to I/O terminals.10 times. Grounding. Sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25% \sim 75%)</p> |

9 Package

9.1 Tape Specification



The Dimensions as Follows:

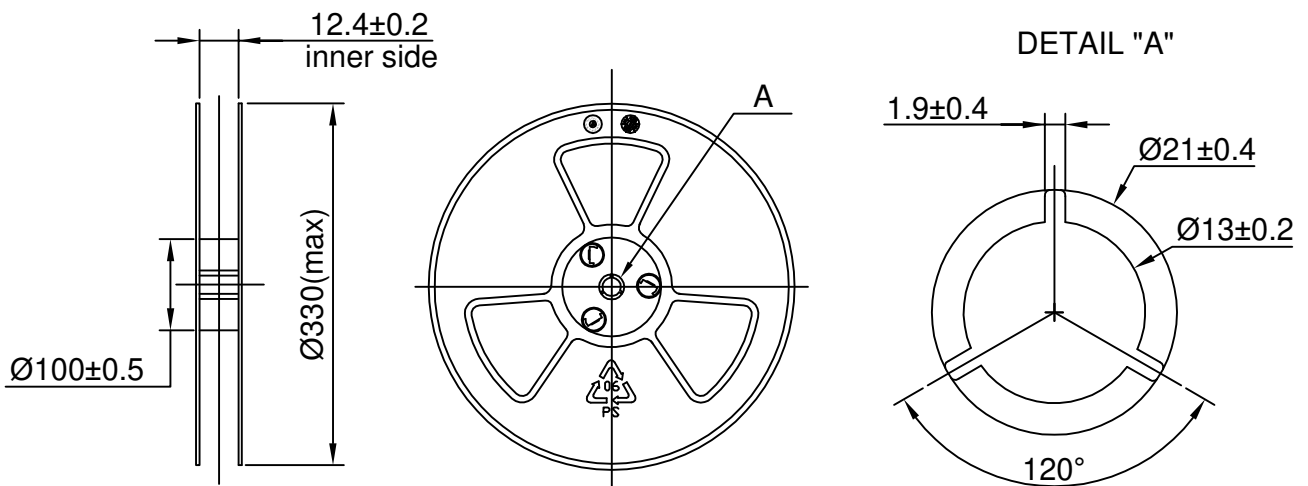
| | | | | | |
|---------|-----------|------------|-----------|------------------------------------|------------------------------------|
| ITEM | W | E | F | ØD0 | ØD1 |
| DIM(mm) | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 | 1.50 ^{+0.10} ₀ | 1.00 ^{+0.10} ₀ |
| ITEM | P0 | 10P0 | P1 | A0 | B0 |
| DIM(mm) | 4.00±0.10 | 40.00±0.20 | 8.00±0.10 | 3.00±0.05 | 2.05±0.05 |
| ITEM | K0 | P2 | T | ØD2 | |
| DIM(mm) | 1.10±0.10 | 2.00±0.05 | 0.30±0.05 | 0.50±0.10 | |

9.2 Reel Dimension

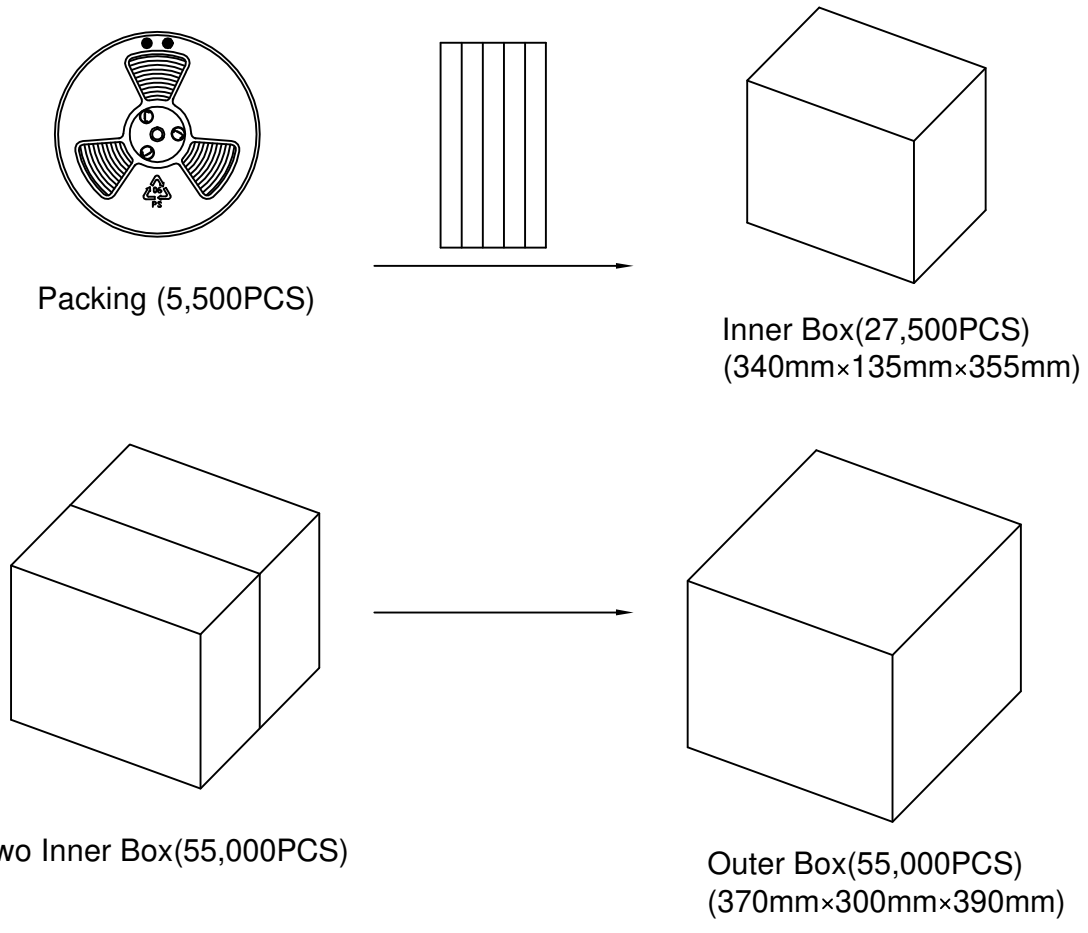
7" reel for sample stage

13" reel will be provided for the mass production stage

The following is 13" reel dimensions (unit:mm)

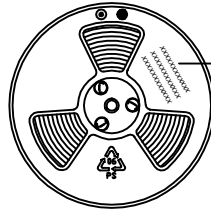


9.3 The Content of Box(13" reel)



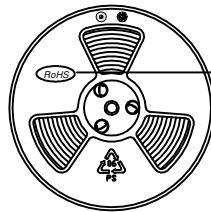
9.4 Packing Explain

9.4.1 The Label Content of the Reel



The Content Includes:
Product type, Lot, Customer P/N;
and other essential information such as
Quantity, Date etc.

9.4.2 The RoHS Label



RoHS Compliance &
Halogen Free Mark

10 Storage and Transportation

10.1 Keep MEMS MIC in warehouse with less than 75% humidity and without sudden temperature change, acid air, any other harmful air or strong magnetic field. Recommend storage period no more than 1 year and floor life(out of bag) at factory no more than 4 weeks.

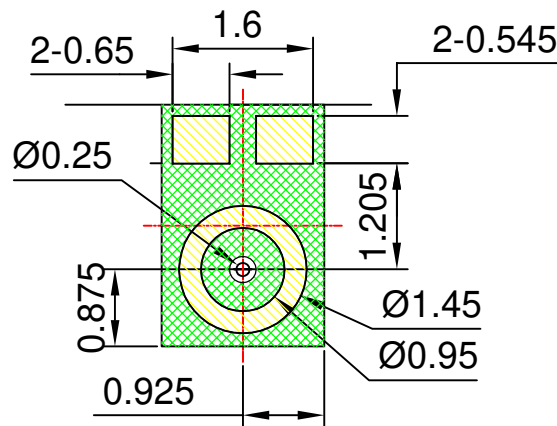
10.2 The MEMS MIC with normal pack can be transported by ordinary conveyances. Please protect products against moist, shock, sunburn and pressure during transportation.

10.3 Storage Temperature Range: -40°C ~ +70°C (Microphone units with package)

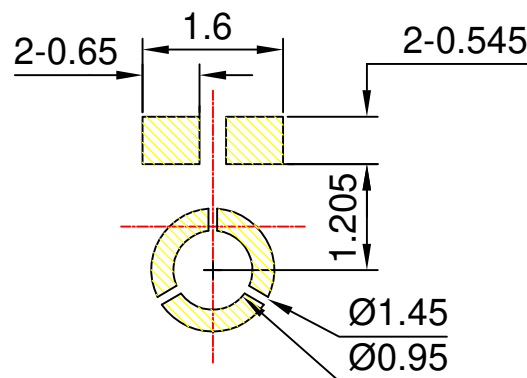
10.4 Operating Temperature Range: -40°C ~ +100°C

11 Land Pattern Recommendation

11.1 The Pattern of MIC Pad(Unit:mm)



11.2 Recommended Soldering Surface Land Pattern(Unit:mm)

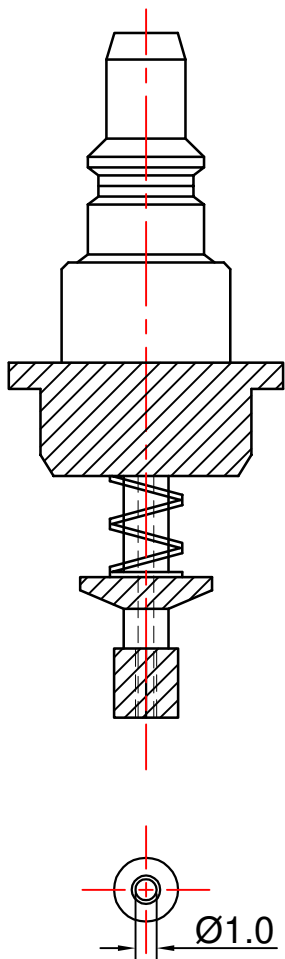


12 Soldering Recommendation

12.1 Soldering Machine Condition

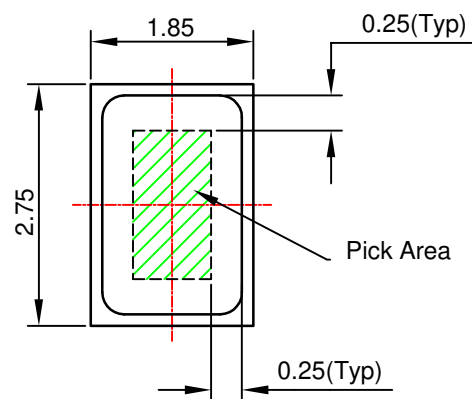
| | |
|---------------------|-----------|
| Temperature Control | 8 zones |
| Heater Type | Hot Air |
| Solder Type | Lead-free |

12.2 The Drawing and Dimension of Nozzle

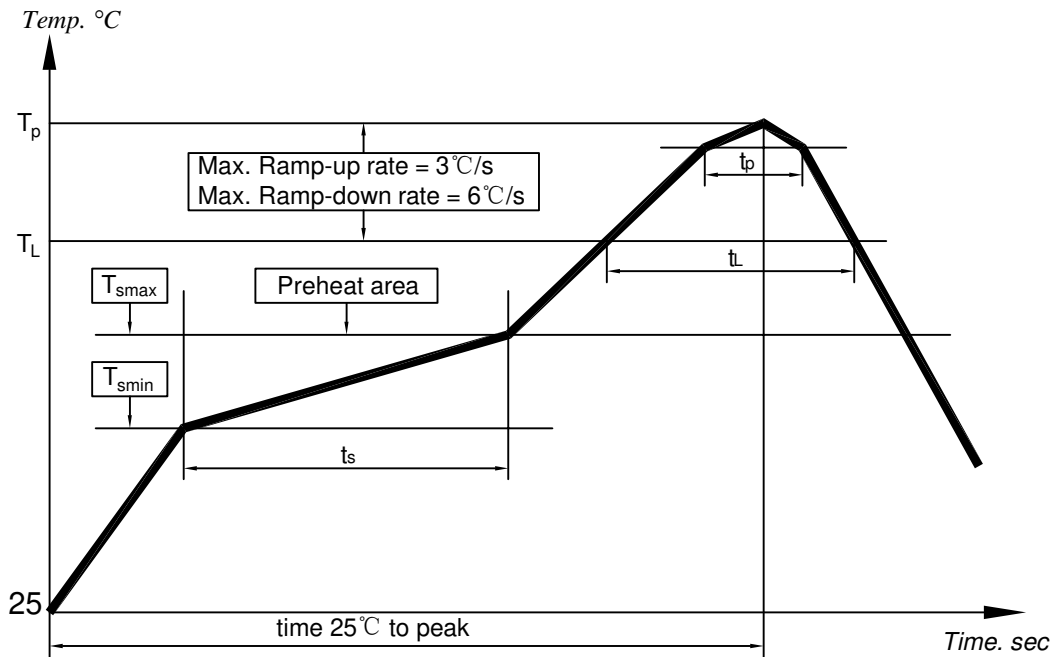


Inside Diameter: Ø1.0mm;

Please don't vacuum over the acoustic port directly.
Please don't blow the acoustic port directly.



12.3 Reflow Profile



Key Features of The Profile:

| | |
|--|---------------------------|
| Average Ramp-up rate(T_{smax} to T_p) | 3°C/s max. |
| Preheat : Temperature Min(T_{smin}) Temperature Max(T_{smax}) Time(T_{smin} to T_{smax})(t_s) | 150°C 200°C 60~180s |
| Time maintained above : Temperature(T_L) Time(t_L) | 217°C 60~150s |
| Peak Temperature(T_p) | 260°C |
| Time within 5°C of actual Peak Temperature(t_p) : | 30~40s |
| Ramp-down rate(T_p to T_{smax}) | 6°C/s max |
| Time 25°C to Peak Temperature | 8min max |

When MEMS MIC is soldered on PCB, the reflow profile is set according to solder paste and the thickness of PCB etc.

13 Cautions

13.1 Board Wash Restrictions

It is very important not to board wash the PCBA after reflow process, otherwise this could damage the microphone.

13.2 Vacuum Restrictions

It is very important not to put a vacuum over the acoustic port of the microphone. otherwise this could damage the microphone.

13.3 Ultrasonic Restrictions

It is very important not to use ultrasonic process. otherwise this could damage the microphone.

13.4 Air Blow Restrictions

It is very important not to use air gun near the port hole of the microphone, otherwise this could damage the microphone.

14 Output Inspection Standard

Output inspection standard is executed according to <<ISO2859-1:1999>>.