

Specification of Electret Condenser Microphone

(RoHS Compliance&Halogen-Free)

Customer Name :
Customer Model:
GoerTek Model : B4013AM-087

| GoerTek | CUSTOMER APPROVAL |
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Restricted

1 Security warning

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2 Publication history

| Version | Modified P/O No. | Date | Description | Design | Approval |
|---------|------------------|------------|-------------|-----------|--------------|
| 1.0 | / | 2015.11.26 | New Design | Jery.Yang | Vincent.Zhou |
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3 Symbols Show

| Symbols | Show |
|---------|--|
| © | Signify Customer's Special Characteristic. |
| Ⓒ | Signify GoerTek Special Characteristic. |

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PRODUCT SPECIFICATIONS

Type: Electret Condenser Microphone

Number: B4013AM-087

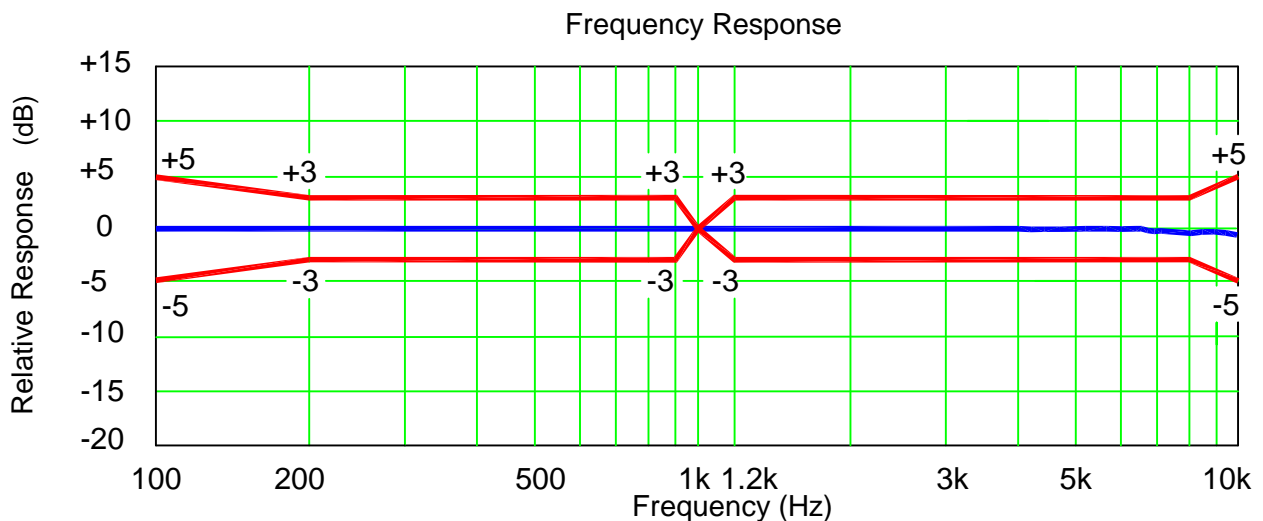
1 Test Condition ($V_s=2.0V$, $R_L=2.2k\Omega$, $L=50\text{ cm}$)

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

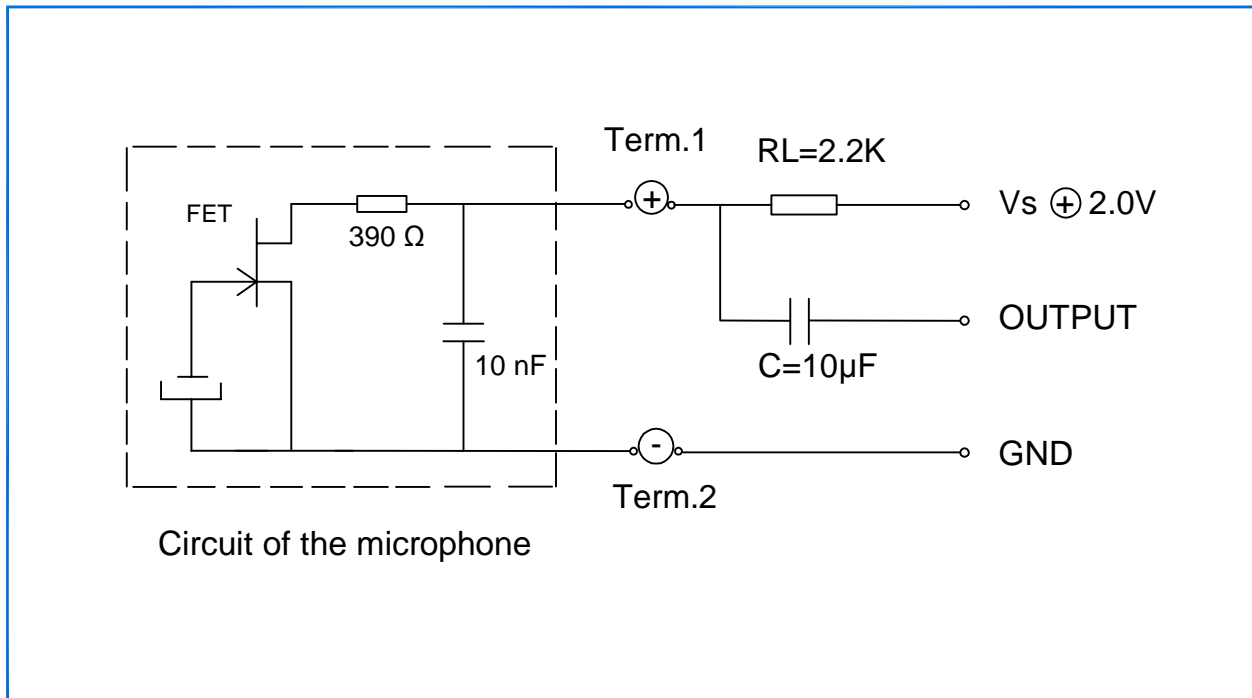
2 Electrical Characteristics

| Item | Symbol | Test Conditions | Min | Standard | Max | Unit |
|--------------------------------------|---------------|-------------------------------------|-------|----------|-------|-----------------|
| Sensitivity | S | f=1kHz, Pin=1Pa | -45.5 | -44 | -42.5 | dB 0dB=1V/Pa |
| Output Impedance | Zout | f=1kHz, Pin=1Pa | | | 2.2k | Ω |
| Directivity | D(θ) | Omnidirectional | | | | dB |
| Current Consumption | I | | | | 500 | μA |
| S/N Ratio | S/N(A) | f=1kHz, Pin=1Pa A-Weighted Curve | 58 | | | dB |
| Decreasing Voltage Characteristic | ΔS | f=1kHz, Pin=1Pa $V_s=2.0-1.5V$ | | | 3 | dB |
| Operating Voltage Range | V_s | | 1.0 | | 10 | V |
| Distortion | THD | f=1kHz, Pin=110dB | | | 3 | % |

3 Frequency Response Curve and Limits



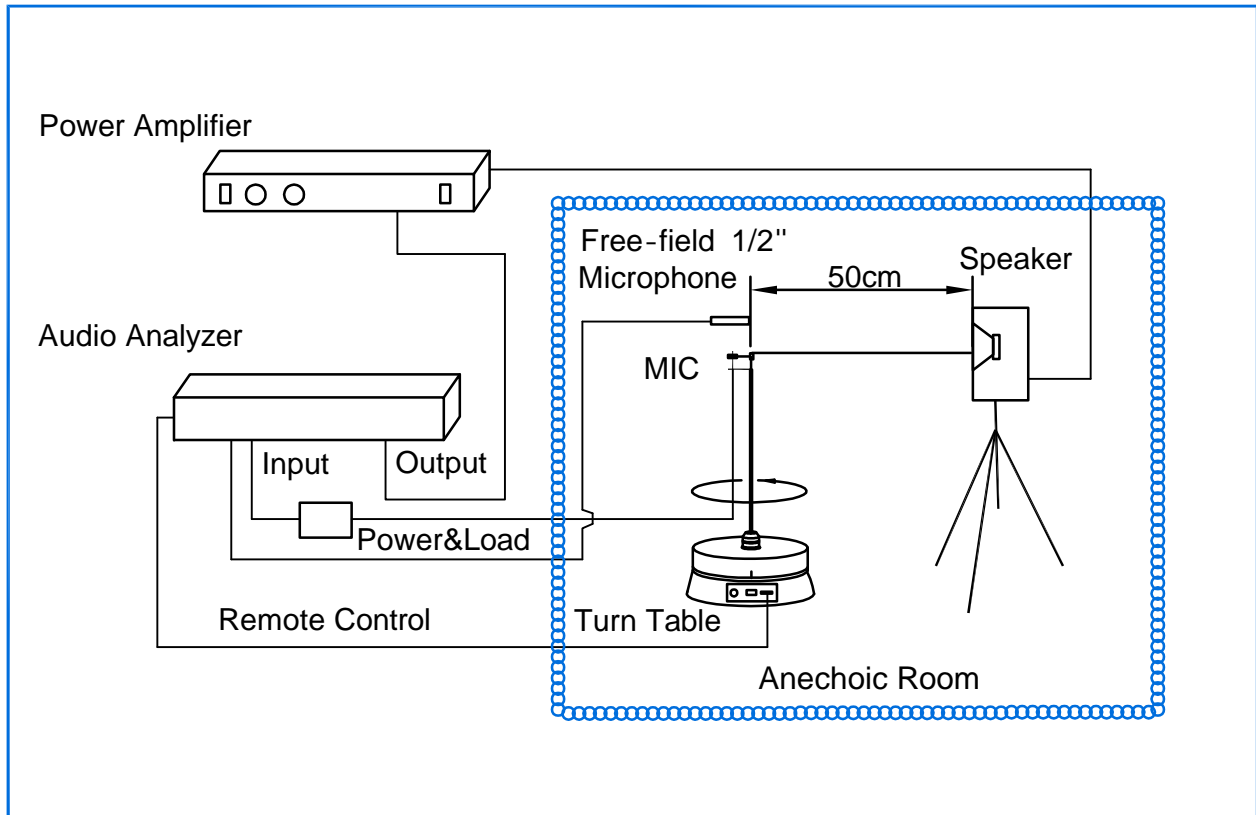
4 Measurement Circuit



5 Bom List

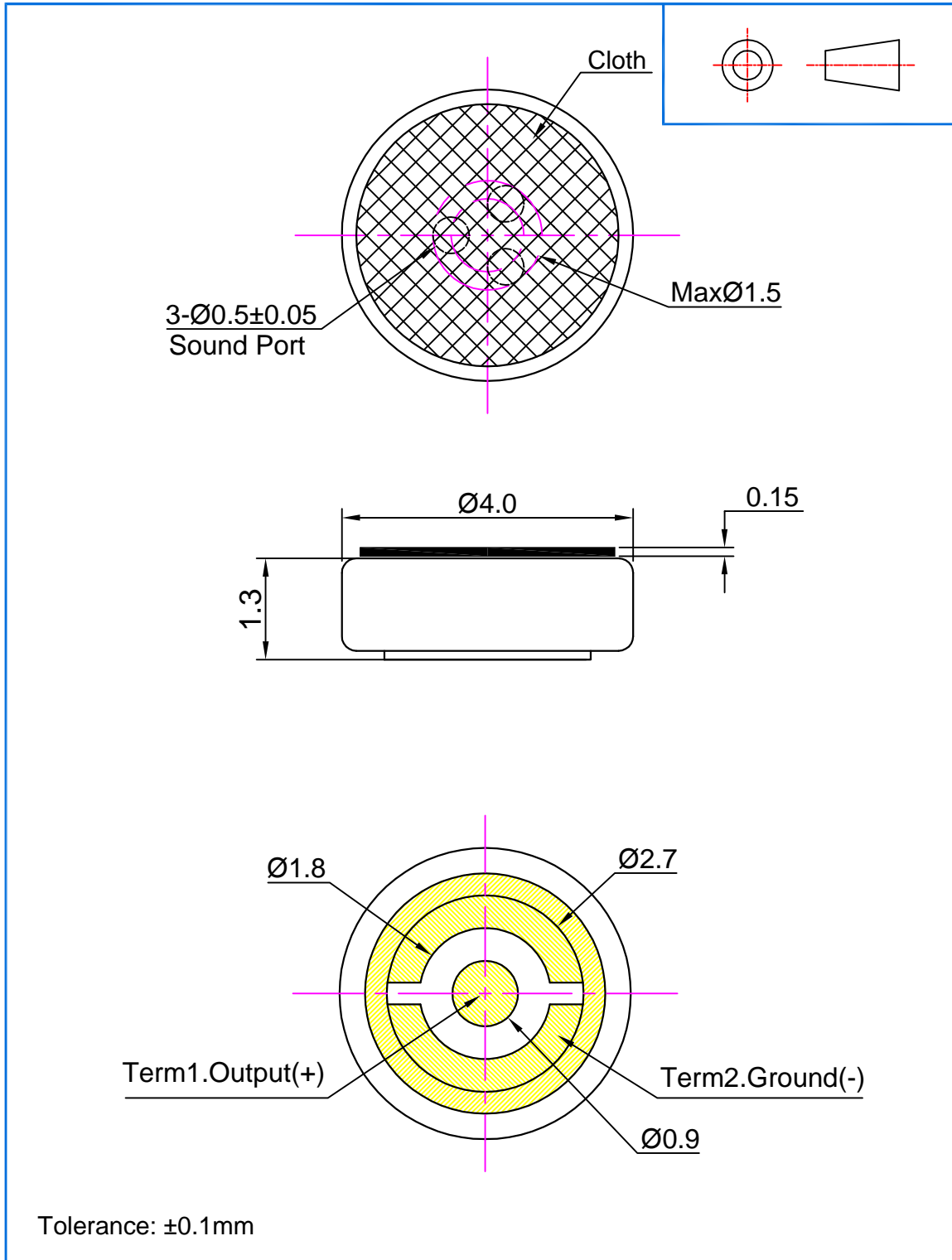
| No. | Name | Quantinty | Material |
|-----|----------------|-----------|-------------------|
| 1 | Chip Capacitor | 1 | 0201 |
| 2 | Resistor | 1 | 0201 |
| 3 | FET | 1 | FET |
| 4 | PCB | 1 | FR-4 |
| 5 | Plastic Holder | 1 | Plastic |
| 6 | Grid Ring | 1 | Brass |
| 7 | Back Plate | 1 | Cu&PTFE |
| 8 | Spacer | 1 | Pi |
| 9 | Diaphragm | 1 | PPS |
| 10 | Case | 1 | Brass |
| 11 | Mesh Cloth | 1 | Non-woven Fabrics |

6 Test Setup Drawing



7 Mechanical Characteristics

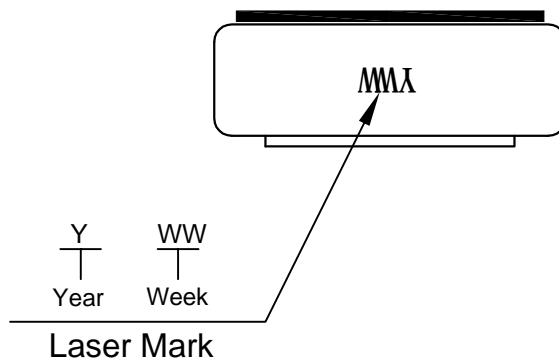
7.1 Appearance Drawing (Unit: mm)



7.2 Weight

Less than 0.2g

8. Laser Marking



ECM LOT: YWW

Y-PART: Year

| | | | | | | | | | | |
|-------------|------|------|------|------|------|------|------|------|------|-----|
| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | ... |
| Marking NO. | A | B | C | D | E | F | G | H | I | ... |

WW-PART: Week

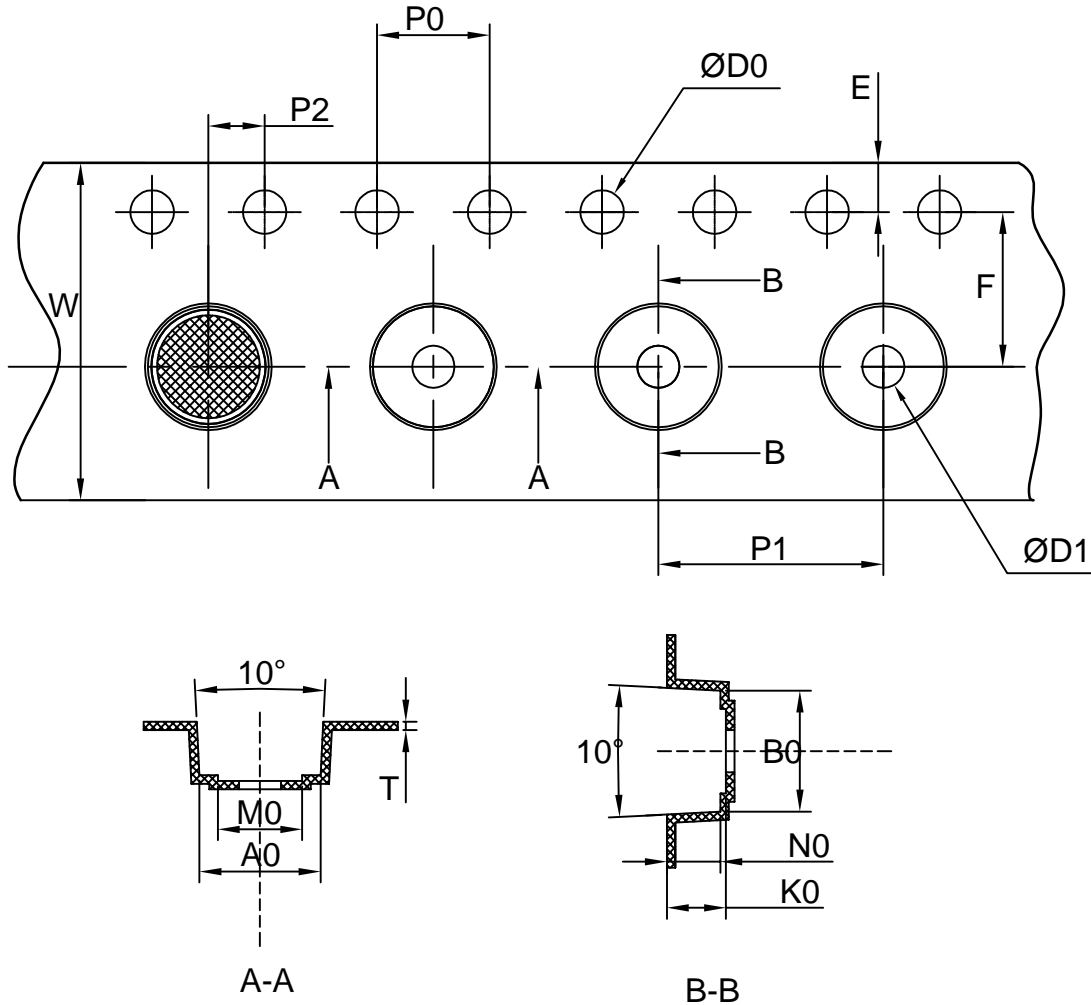
| | | | | | | | | | | |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------|
| Week | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | ... | fifty-second |
| Marking NO. | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | ... | 52 |

9. Reliability Test (20units of each test)

| | |
|---|---|
| <p>9.1 Vibration Test</p> | <p>To be no interference in operation after vibrations,10Hz to 55 Hz for 1 minute full amplitude 1.5mm,for 1 hours at three axes in state of standard packing,sensitivity to be within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15\text{ }^{\circ}\text{C}\sim+35\text{ }^{\circ}\text{C}$, R.H 25%~75%)</p> |
| <p>9.2 Drop Test</p> | <p>Microphone in test box or in representative mechanics shall demonstrate normal performance and maintain sensitivity within $\pm 3\text{ dB}$ of the 'initial sensitivity' after each of the following 1.5m drops onto concrete: 1.Two times on each side(2×6) 2.One drop from each edge(1×12) 3.Two drops from each corner(2×8)</p> |
| <p>9.3 Temperature Test</p> | <p>a) After exposure at $+70\text{ }^{\circ}\text{C}$ for 96 hours,sensitivity to be within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15\text{ }^{\circ}\text{C}\sim+35\text{ }^{\circ}\text{C}$, R.H 25%~75%) b) After exposure at $-40\text{ }^{\circ}\text{C}$ for 96 hours,sensitivity to be within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15\text{ }^{\circ}\text{C}\sim+35\text{ }^{\circ}\text{C}$, R.H 25%~75%)</p> |
| <p>9.4 Damp Heat Test</p> | <p>Microphone shall demonstrate normal performance and maintain sensitivity within $\pm 3\text{ dB}$ of the 'initial sensitivity' after 2 cycles: $+25\text{ }^{\circ}\text{C} / +55\text{ }^{\circ}\text{C}$, 95% RH with 1 hour dwell time in $+25\text{ }^{\circ}\text{C}$ and 9 hours dwell time in $+55\text{ }^{\circ}\text{C}$,and then 9 hours dwell time in $+25\text{ }^{\circ}\text{C}$,3 hours change time. Dut power on. (The measurement to be done after 2 hours of conditioning at $+15\text{ }^{\circ}\text{C}\sim+35\text{ }^{\circ}\text{C}$, R.H 25%~75%)</p> |
| <p>9.5 Salt Spray Test</p> | <p>Microphone shall be pretreatment at $35\text{ }^{\circ}\text{C}$ for 2 hours,and then placed in 5% brine spray environment for 8 hours. To be no interference in appearance of the microphone.</p> |
| <p>9.6 Temperature Cycle Test</p> | <p>After exposure at $-40\text{ }^{\circ}\text{C}$ for 60 minutes, at $+70\text{ }^{\circ}\text{C}$ for 60 minutes(change time 20 seconds), 24 cycles,sensitivity to be within $\pm 3\text{dB}$ from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $+15\text{ }^{\circ}\text{C}\sim+35\text{ }^{\circ}\text{C}$, R.H 25%~75%)</p> |
| <p>9.7 ESD Shock Test</p> | <p>The microphone under test must be discharged between each ESD exposure without ground.(contact:$\pm 6\text{kV}$,air:$\pm 8\text{kV}$) There is no interference in operation after 10 times exposure of each pole.</p> |
| <p>9.8 Tumble Test</p> | <p>Microphone mounted on PCB in a test block, drop from 1 meter onto steel base, 200 drops. (The measurement to be done after 2 hours of conditioning at $+15\text{ }^{\circ}\text{C}\sim+35\text{ }^{\circ}\text{C}$, R.H 25%~75%)</p> |
| <p>9.9 Reflow Test</p> | <p>Adopt the reflow curve of item12.3,after two reflows,sensitivity to be within $\pm 3\text{dB}$. (The measurement to be done after 2 hours of conditioning at $+15\text{ }^{\circ}\text{C}\sim+35\text{ }^{\circ}\text{C}$, R.H 25%~75%)</p> |

10 Package

10.1 Taping Specification



the dimensions as follows:

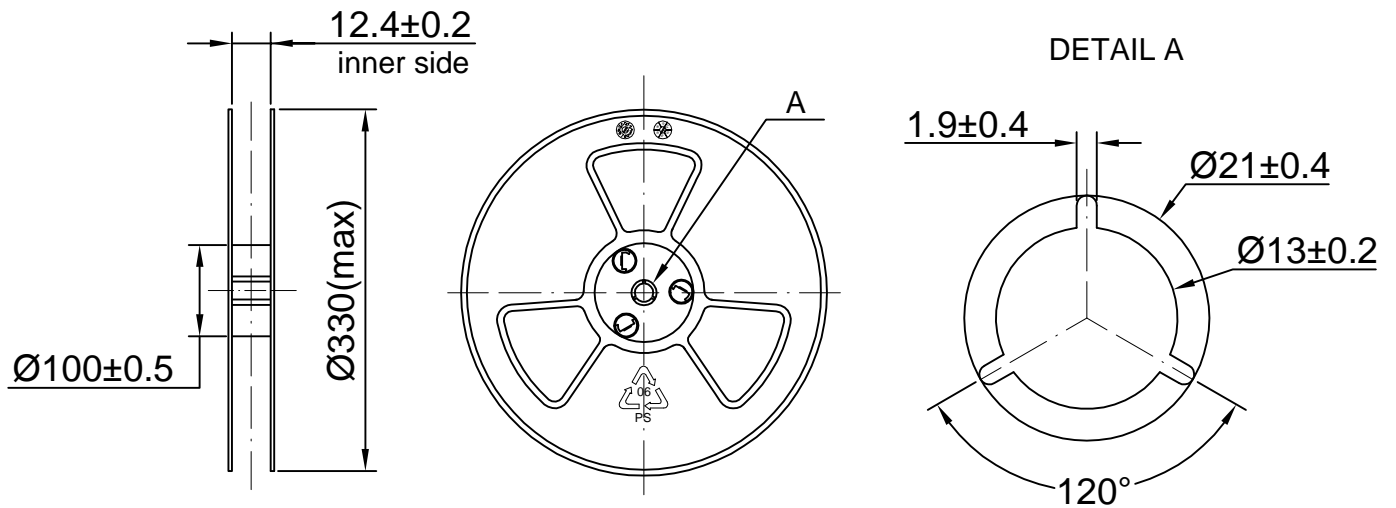
| | | | | | |
|---------|----------------|------------------|----------------|-------------------|-------------------|
| ITEM | W | E | F | $\varnothing D_0$ | $\varnothing D_1$ |
| DIM(mm) | 12.0±0.30 | 1.75±0.10 | 5.50±0.05 | 1.50±0.10 | 1.55±0.10 |
| ITEM | P ₀ | 10P ₀ | P ₁ | A ₀ | B ₀ |
| DIM(mm) | 4.00±0.10 | 40.00±0.20 | 8.00±0.10 | 4.20±0.05 | 4.20±0.05 |
| ITEM | K ₀ | P ₂ | T | M ₀ | N ₀ |
| DIM(mm) | 1.70±0.10 | 2.00±0.05 | 0.35±0.05 | 3.00±0.05 | 1.50±0.1 |

10.2 Reel Dimension

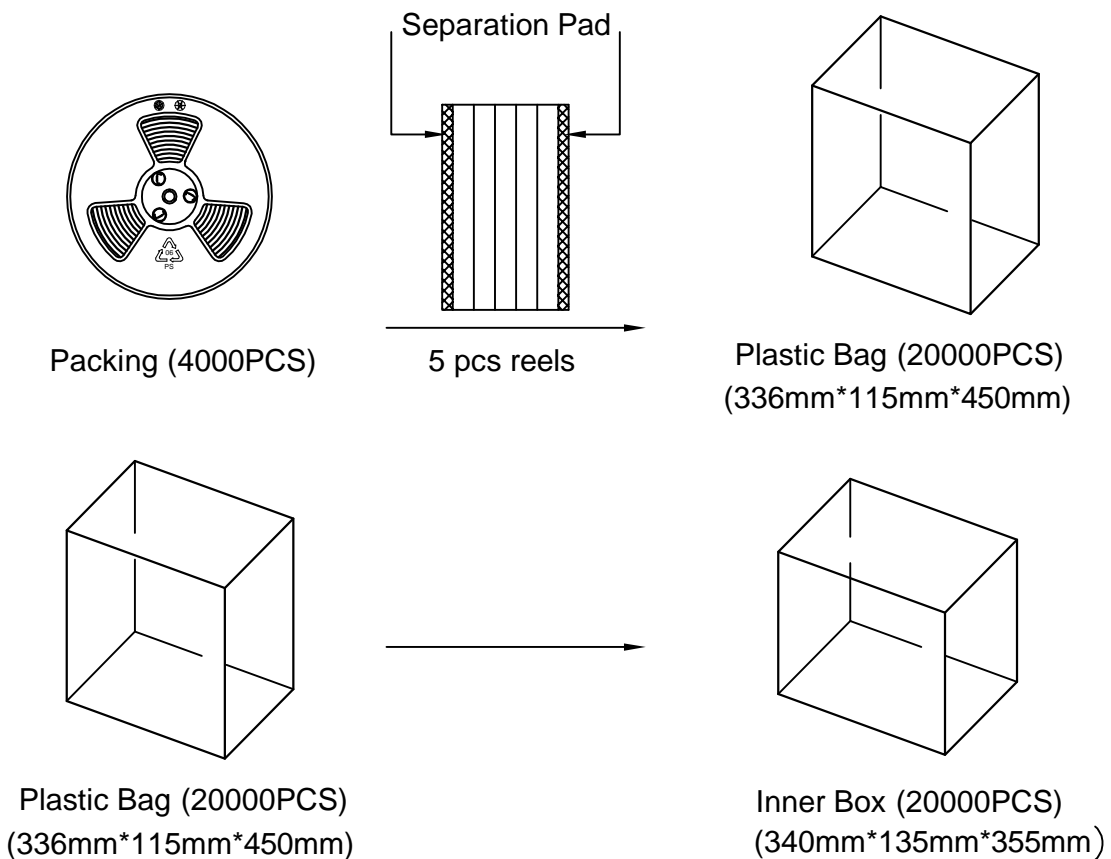
7 " reel for sample stage

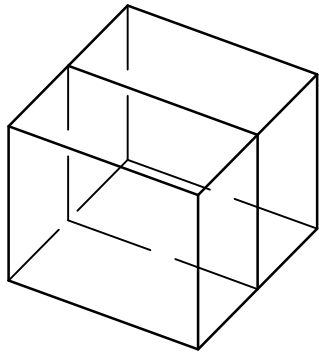
13 " reel will be provided for the mass production stage

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

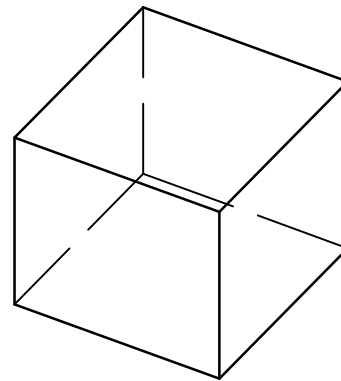


10.3 The Content of Box(13" reel)





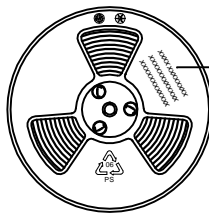
Two Inner Box(40000PCS)



Outer Box(40000PCS)
(370mm*300mm*390mm)

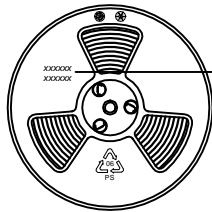
10.4 Packing Explain

10.4.1 The label content of the reel



the content including:
product type, Lot, customer P/N;
and other essential information such as
Quantity, Date etc.

10.4.2 The RoHS label



RoHS
compliance mark

11 Stock and Transportation

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

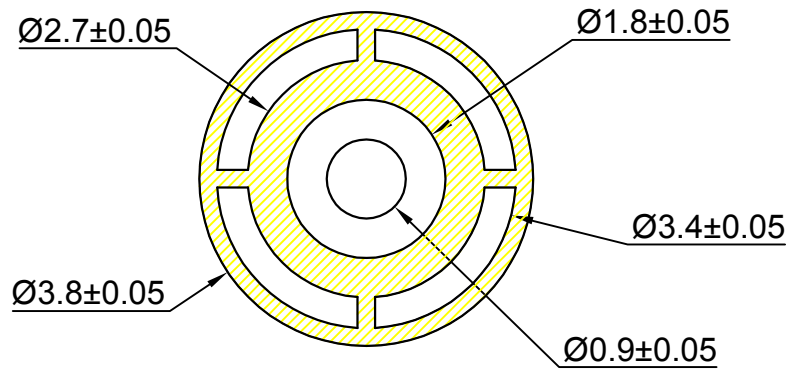
11.2 The ECM with normal pack can be transported by ordinary conveyances. Please protect products against moist, shock, sunburn and pressure during transportation.

11.3 Storage Temperature Range: -40 °C~+85°C

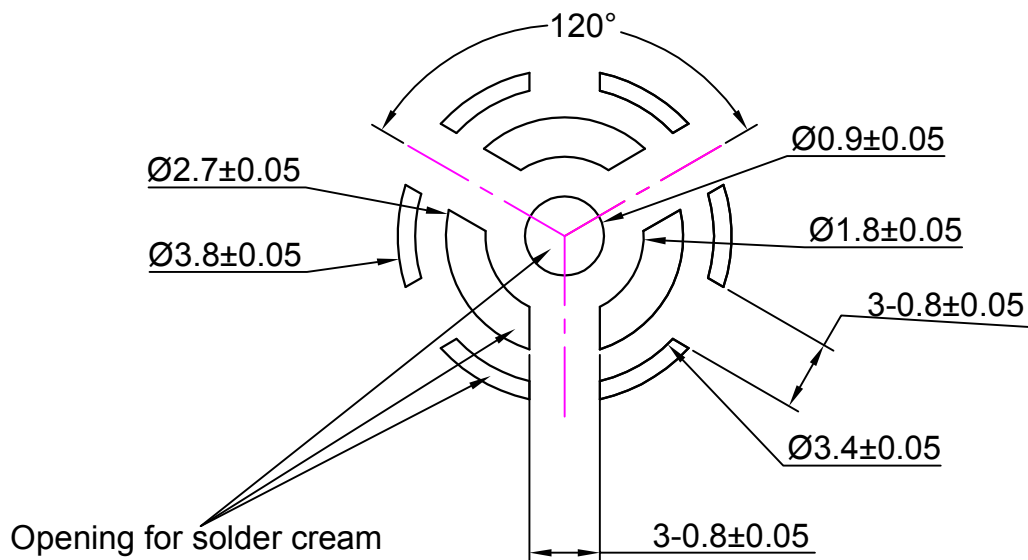
11.4 Operating Temperature Range: -30°C~+70°C

12 Land Pattern Recommendation (Unit: mm)

12.1 Soldering Surface - Land Pattern



12.2 Metal Mask Pattern



Opening for solder cream
 - thickness of metal mask: 0.1mm

13 Recommend Soldering

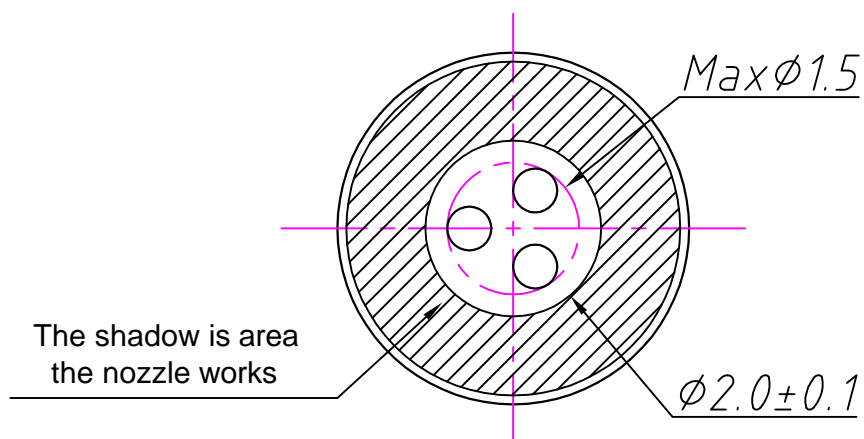
13.1 Soldering Machine Condition

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

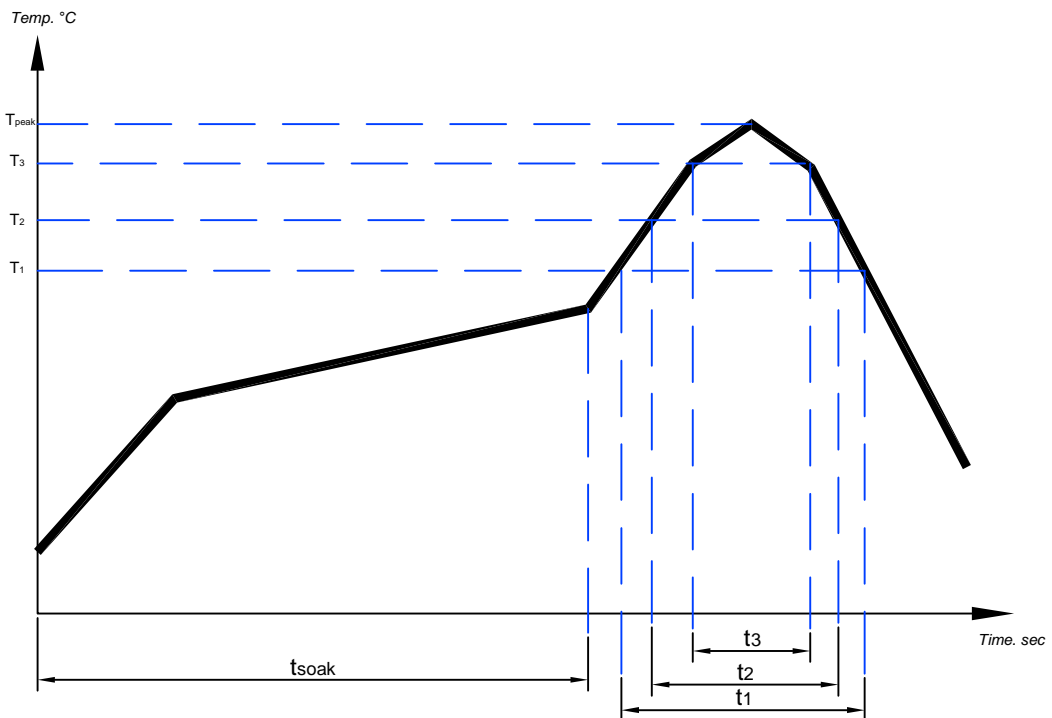
13.2 The Pattern of the Nozzle

According to the hole's dimension of the case, the pattern of the nozzle is circular.

The work area of the nozzle is outside of the $\varnothing 2.0\text{mm}$.



13.3 Reflow Profile



Pb-free reflow profile requirements for soldering heat resistance

| 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 30s |
| Peak Temperature In Reflow | T _{peak} | 255 °C (-0/+5 °C) |
| Temperature Gradient In Cooling | --- | Max -5 °C/s |

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

14 Cautions when Using SMD MIC

14.1 X-ray Inspection

The microphone should not be subjected to X-ray inspection. If it is absolutely necessary to do inspection using X-ray, the setting conditions with the following conditions:

Distance: >0.08meter;

Current: <0.080mA;

Time: <30s;

Voltage: <80kV.

14.2 Board Wash Restrictions

It is very important not to wash the PCB after reflow process, or this could damage the microphone.

14.3 Nozzle Restrictions

It is very important not to pull a nozzle over the post hole of the microphone, or this could damage the microphone.

15 Output Inspection Standard

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