

Specification of MEMS Microphone (RoHS Compliance & Halogen Free)

Customer Name :

Customer Model :

GoerTek Model : S17OT421-038

Goertek			CUSTOMER APPROVAL
<u>DESIGN</u>	Jasen	2018.10.19	
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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, MP3, PDAs etc.

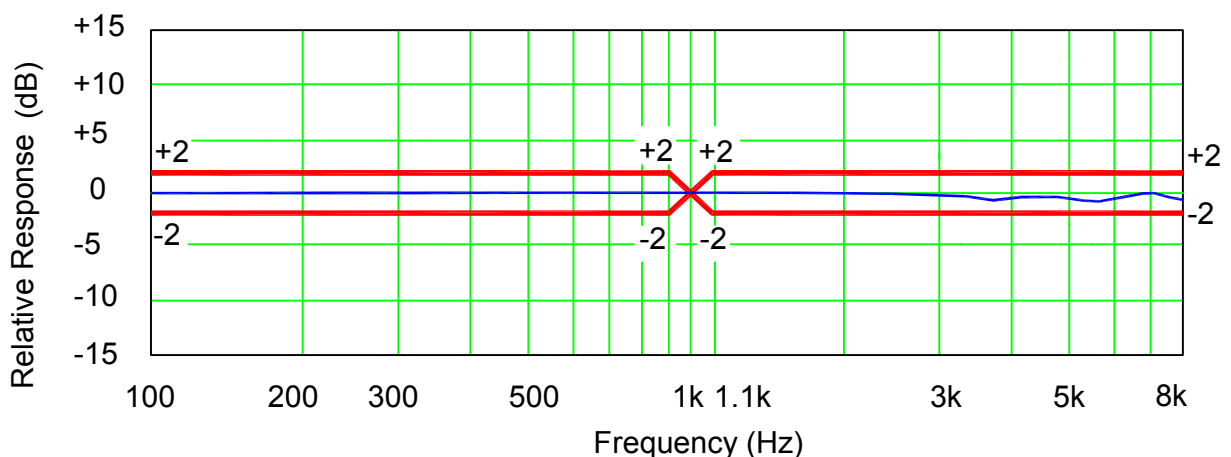
2 Test Condition (Vs=2.0V, L=50cm)

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

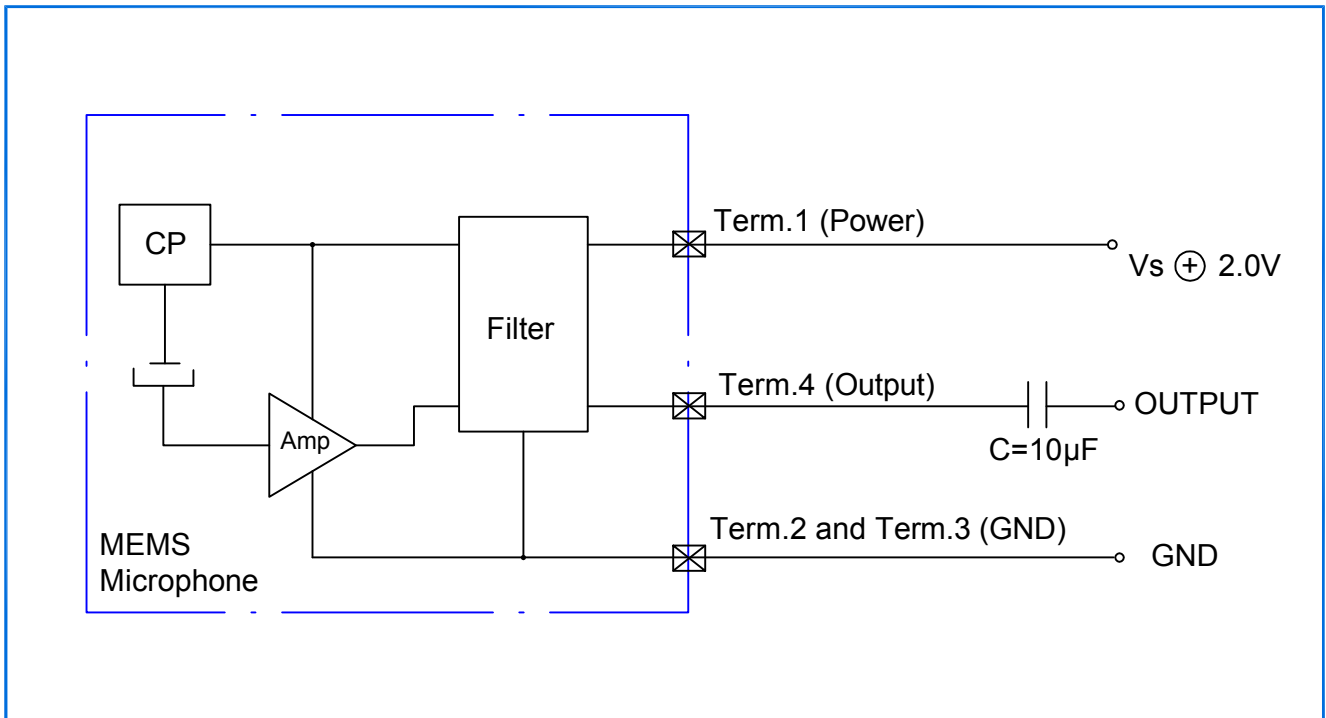
3 Acoustic and Electrical Characteristics

Item	Symbol	Test Conditions	Min	Typ	Max	Unit
Sensitivity	S	f=1kHz, Pin=1Pa	-43	-42	-41	dBV/Pa
Directivity	D(θ)	————	Omnidirectional			
Output Impedance	Zout	f=1kHz, Pin=1Pa	-	-	300	Ω
Operating Voltage Range	V _s	————	1.5	2.0	3.6	V
Current Consumption	I	————	-	-	200	μA
Decreasing Voltage Characteristic	ΔS	f=1kHz, Pin=1Pa Vs = 3.3 → 1.5V	No Change			dBV/Pa
S/N Ratio	S/N(A)	f=1kHz, Pin=1Pa (A-weighted)	56	59	-	dB
Total Harmonic Distortion	THD	110dB SPL@1 kHz	-	-	1	%
Acoustic Overload Point	AOP	10% THD @1 kHz	-	130	-	dB SPL

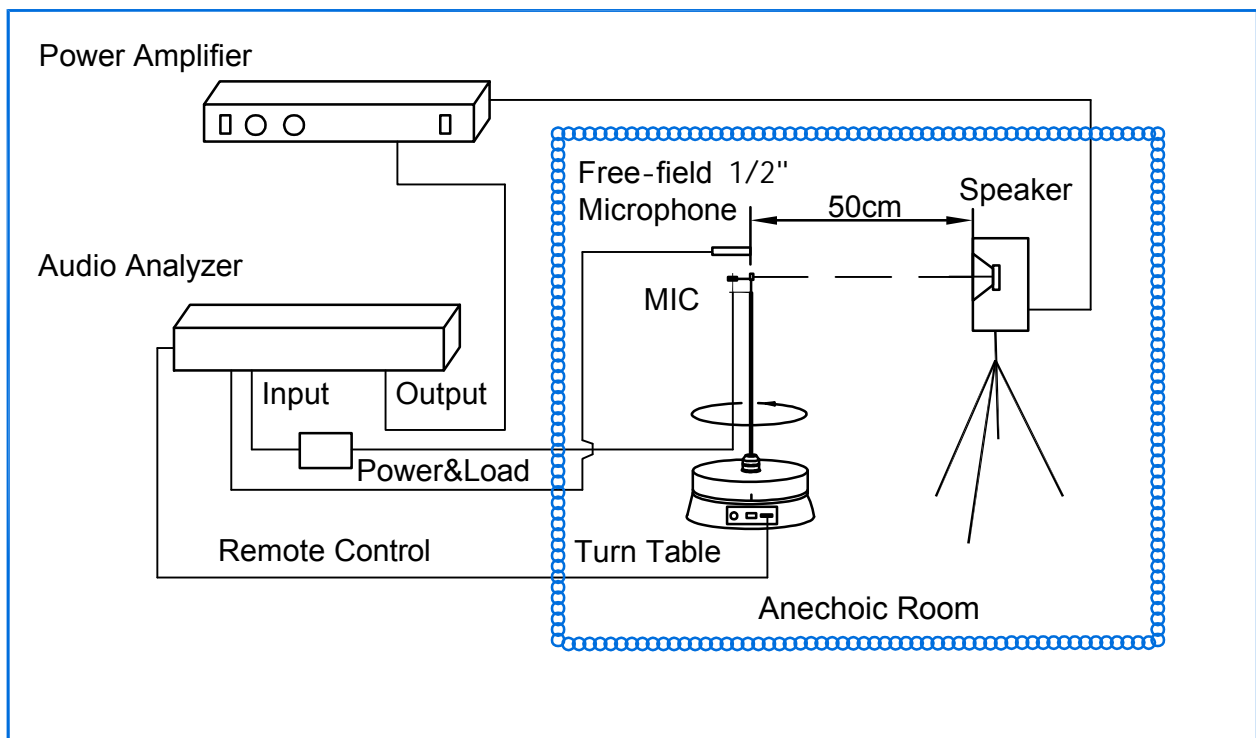
4 Frequency Response Curve and Limits



5 Measurement Circuit

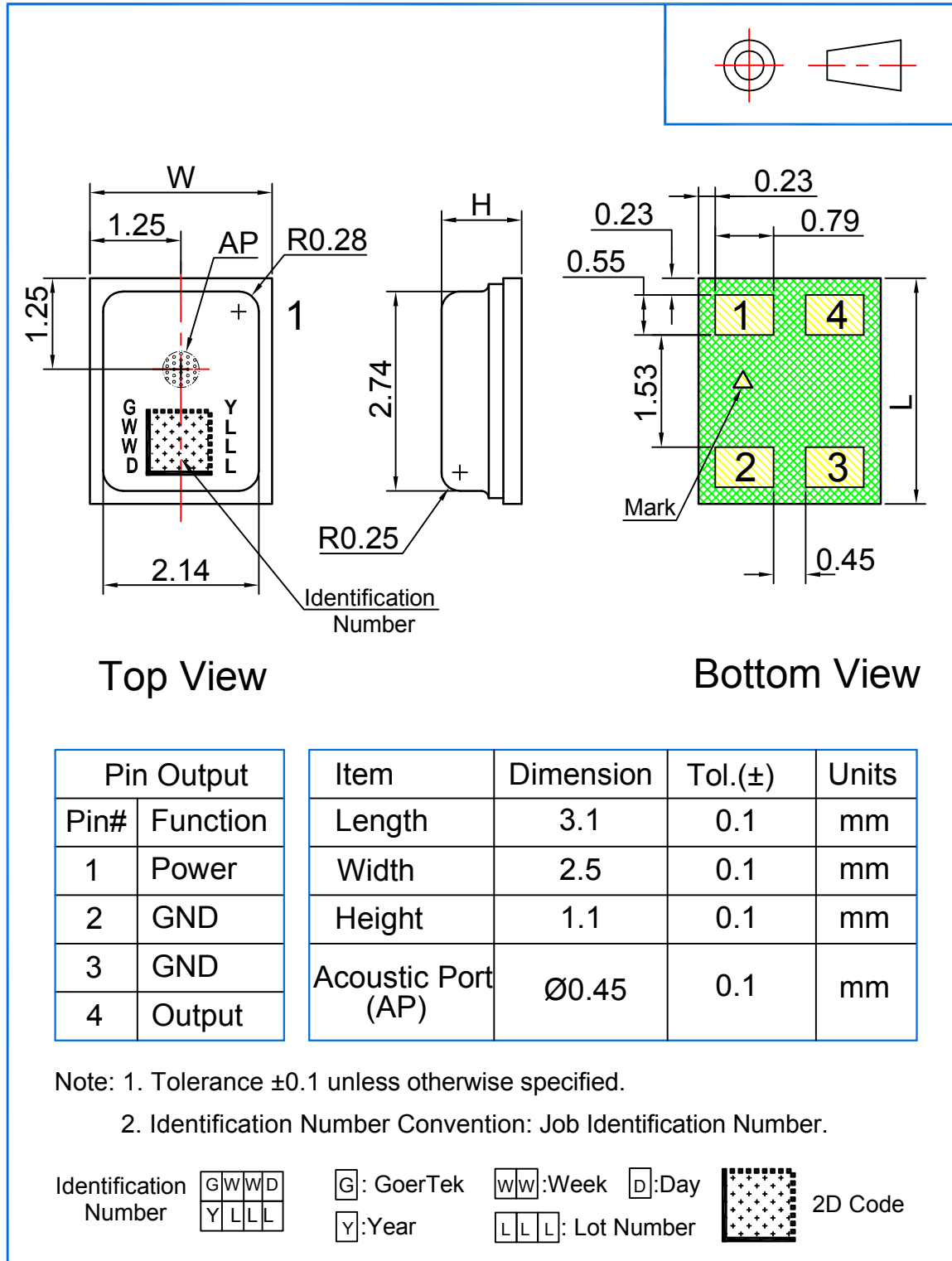


6 Test Setup Drawing



7 Mechanical Characteristics

7.1 Appearance Drawing (Unit: mm)



7.2 Weight

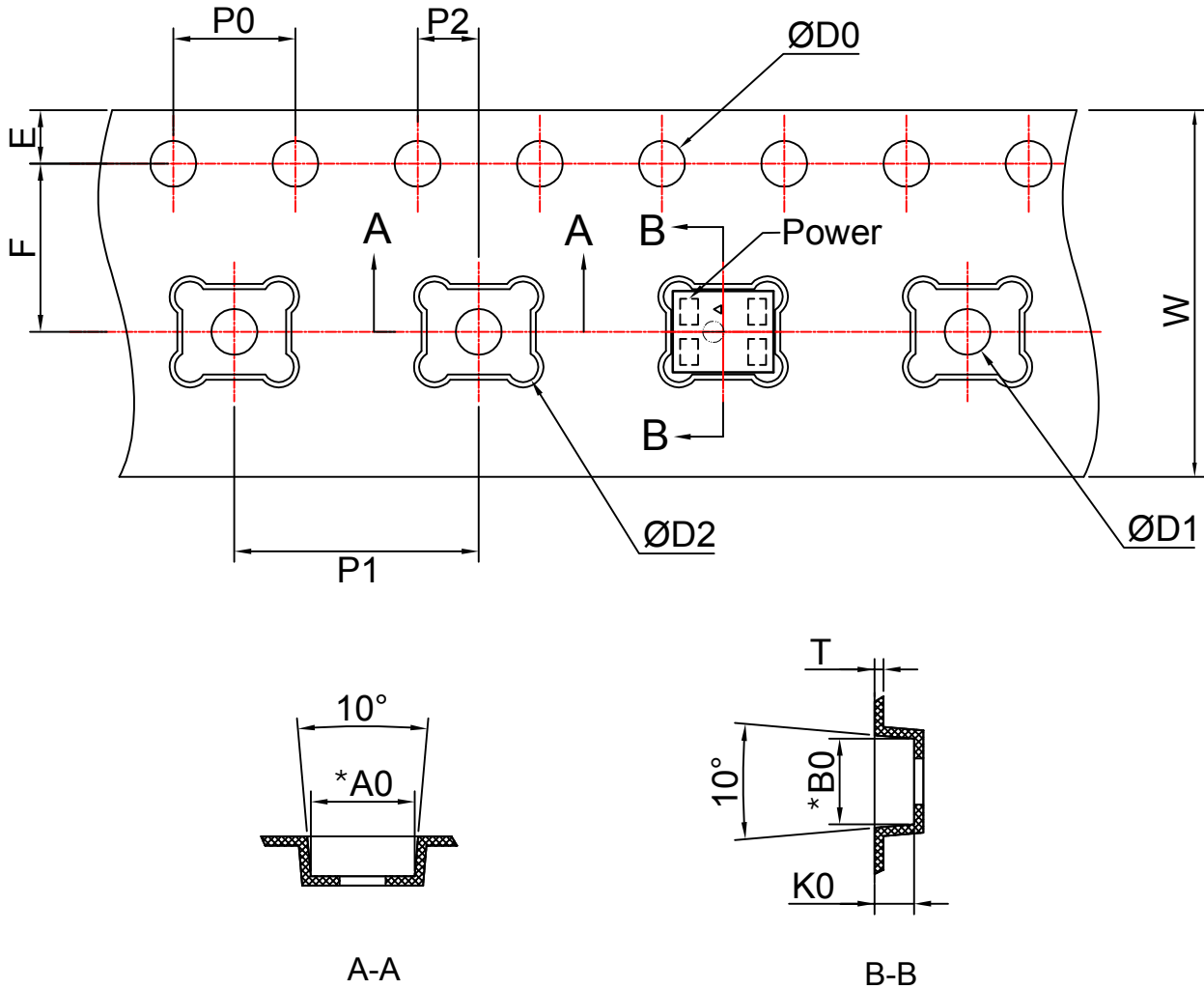
The weight of the MIC is Less than 0.04g.

8 Reliability Condition

<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. (Normal Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H 25%~75%)</p>
<p>8.2 Drop Test</p>	<p>a)To be no interference in operation after dropped to 1.0cm steel plate 20 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. (Normal Condition) b)To be no interference in operation after dropped to 1.0cm steel plate 30 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. (Limit Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25%~75%)</p>
<p>8.3 Tumble Test</p>	<p>a)To be no interference in operation after dropped 150times at 10 rotate/minute rotation speed from 1 meter height on to Steel Base, Steel thickness of 3mm, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (Normal Condition) b)To be no interference in operation after dropped 300times at 10 rotate/minute from 1 meter height on to Steel Base, Steel thickness of 3mm, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (Limit Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H.25%~75%)</p>
<p>8.4 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. (Normal Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H 25%~75%) b) After exposure at -40°C for 200 hours, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (Normal Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H 25%~75%)</p>
<p>8.5 Humidity Test</p>	<p>a)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. (Normal Condition) b)After exposure at $+80^{\circ}\text{C}$ and 80% relative humidity for 96 hours with 2.75V DC Bias, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (Limit Condition) c)After exposure at $+60^{\circ}\text{C}$ and 90% relative humidity for 96 hours with 2.75V DC Bias, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (Limit Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H 25%~75%)</p>
<p>8.6 Mechanical Shock Test</p>	<p>a) The 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. (Normal Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H 25%~75%) b) The subject samples to three one-half sine shock pulses (10000 g for 0.1 milliseconds) in each direction (for six axes in total) along each of the three mutually perpendicular axes for a total of 30 shocks with 2.75V DC Bias, sensitivity should vary within $\pm 3\text{dB}$ from initial sensitivity. (Limit Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H 25%~75%)</p>
<p>8.7 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. (Normal Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H 25%~75%)</p>
<p>8.8 Reflow Test</p>	<p>Adopt the reflow curve of item 12.3, after five reflows, sensitivity should vary within $\pm 2\text{dB}$ from initial sensitivity. (Normal Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H 25%~75%)</p>
<p>8.9 Electrostatic Discharge Test</p>	<p>C=150pF,R=330ohm,Test to $\pm 8\text{KV}$ contact the case,10times , without grounding ; contact discharge $\pm 2\text{KV}$ to I/O terminals,10times, case grounding. (Normal Condition) (The measurement to be done after 2 hours of conditioning at $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$, R.H 25%~75%)</p>

9 Package

9.1 Tape Specification



The Dimensions as Follows:

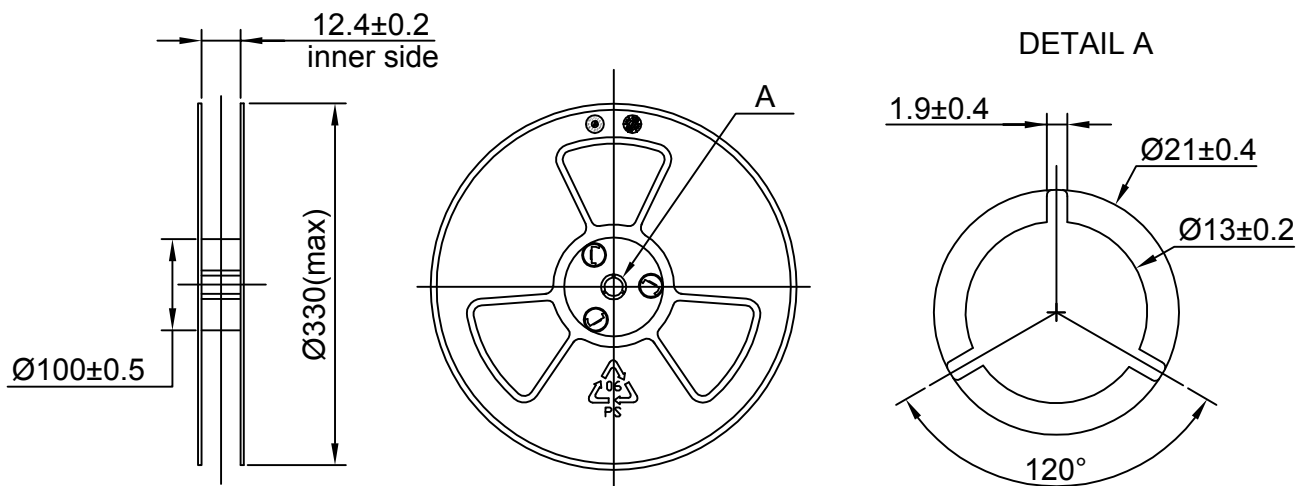
ITEM	W	E	F	ØD0	ØD1
DIM(mm)	12.0±0.30	1.75±0.10	5.50±0.05	1.50 ^{+0.10} ₀	1.50 MIN
ITEM	P0	10P0	P1	A0	B0
DIM(mm)	4.00±0.10	40.0±0.20	8.00±0.10	3.40±0.10	2.80±0.10
ITEM	K0	P2	T	ØD2	
DIM(mm)	1.30±0.10	2.00±0.05	0.30±0.05	1.00 MIN	

9.2 Reel Dimension

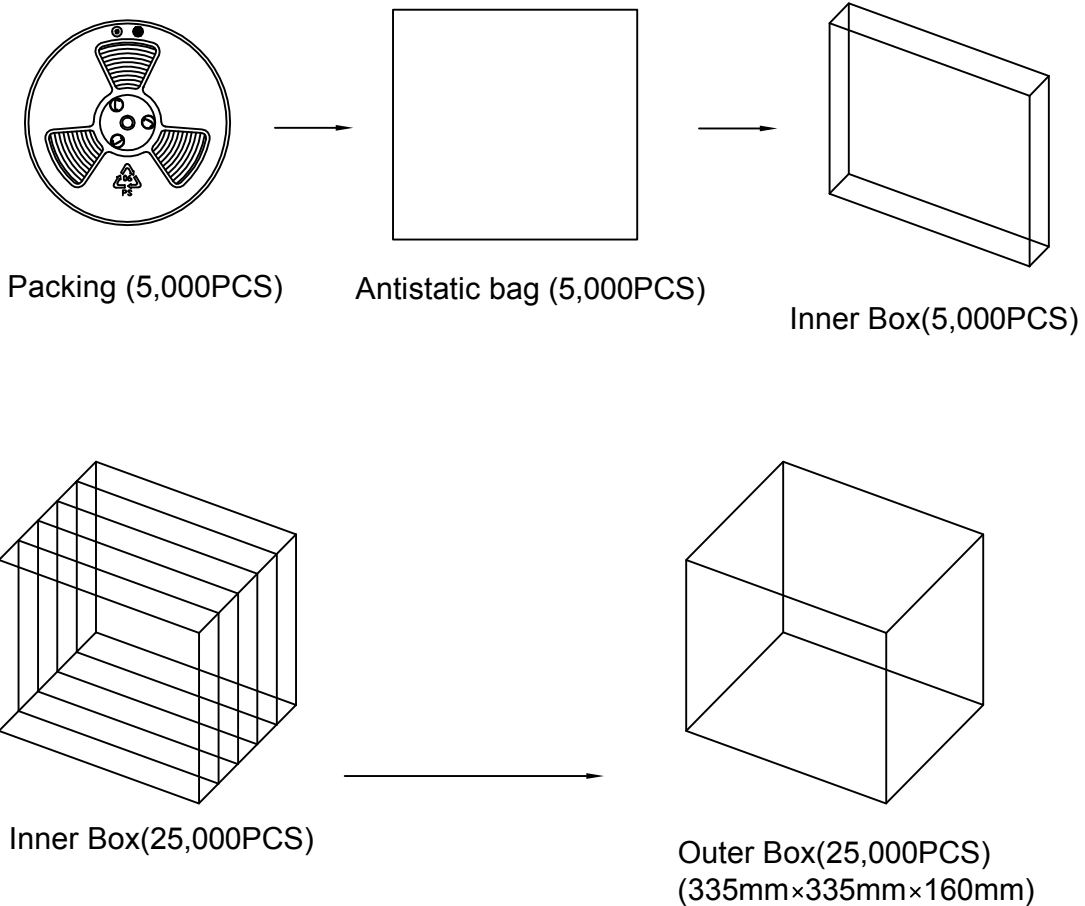
7" reel for sample stage

13" reel will be provided for the mass production stage

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

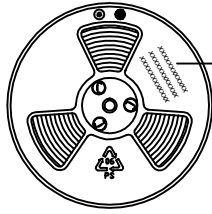


9.3 The Content of Box(13" reel)



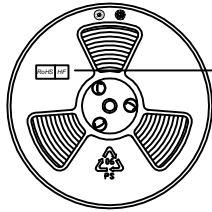
9.4 Packing Explain

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 Mark &
Halogen Free

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.

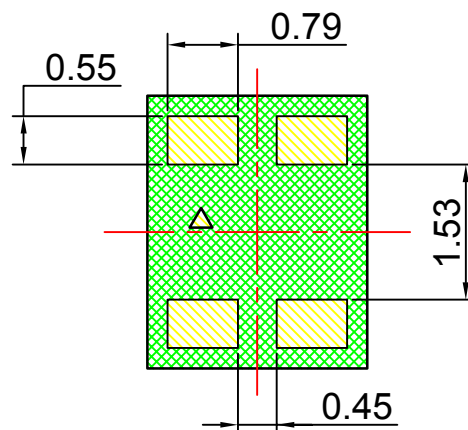
10.2 The MEMS MIC with normal pack can be transported by ordinary conveyances. Please protect products against moist, shock, sunburn and pressure during transportation.

10.3 Storage Temperature Range : $-40^{\circ}\text{C} \sim +100^{\circ}\text{C}$

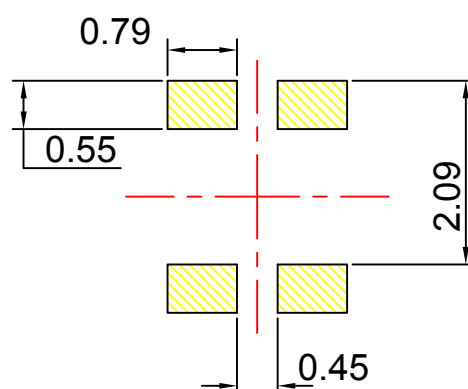
10.4 Operating Temperature Range : $-40^{\circ}\text{C} \sim +100^{\circ}\text{C}$

11 Land Pattern Recommendation

11.1 The Pattern of MIC Pad(Unit:mm)



11.2 Recommended Soldering Surface Land Pattern(Unit:mm)

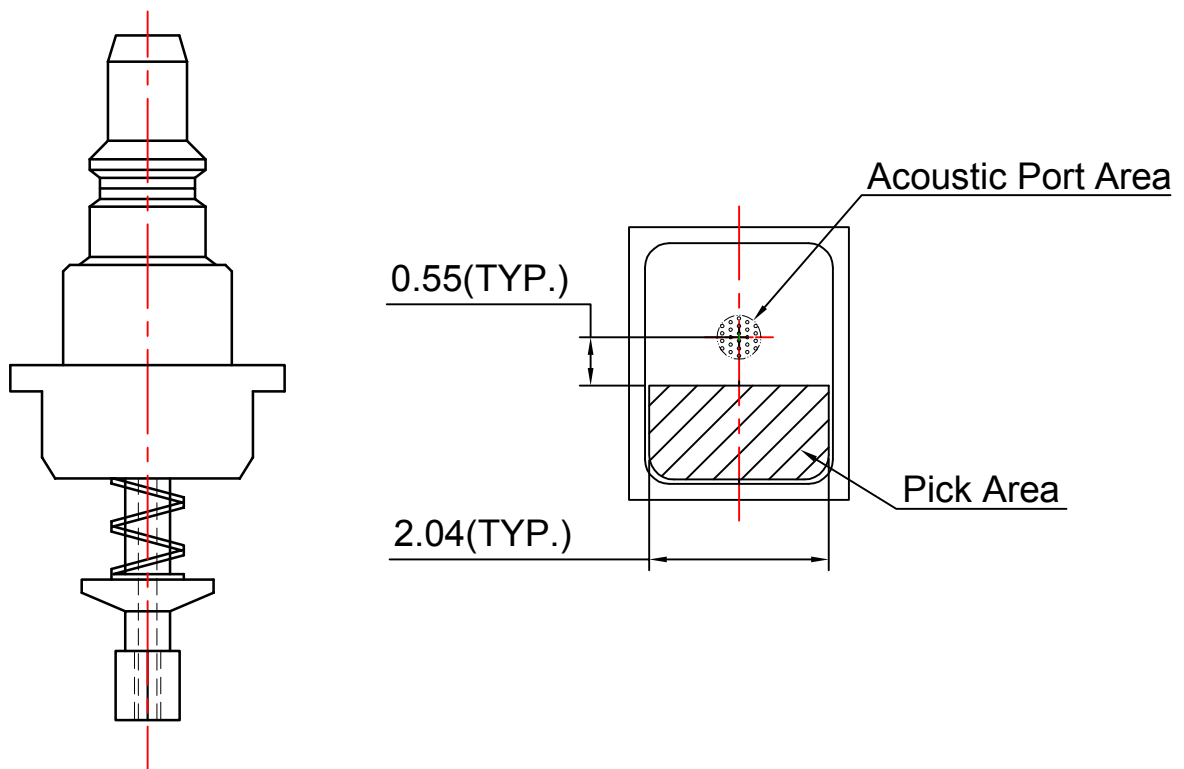


12 Soldering Recommendation

12.1 Soldering Machine Condition

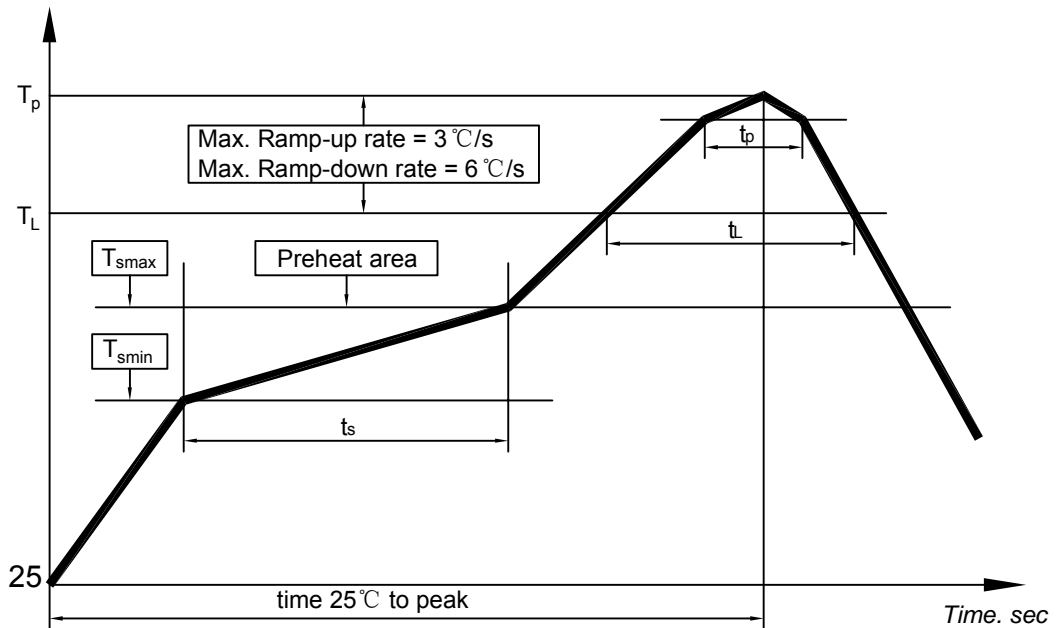
Temperature Control	8 zones
Heater Type	Hot Air
Solder Type	Lead-free

12.2 The Drawing and Dimension of Nozzle



Please don't vacuum over the acoustic port directly, The recommendation is for reference.

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 wash the PCBA after reflow process, otherwise this could damage the microphone.

13.2 Nozzle Restrictions

It is very important not to pull a nozzle over 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>>.

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