Specification of MEMS Microphone

(RoHS Compliance & Halogen Free)

Customer Name :

Customer Model :

Goertek Model :   S15OT421-005

Goertek		CUSTOMER APPROVAL
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Restricted

1 Security Warning

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2 Publication History

Version	Date	Description	Author	Approved
1.0	2019.06.04	New Design	Jasen	Daniel

Contents

1 Introduction:

MEMS MIC which is able to endure reflow temperature up to 260 ℃ 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.
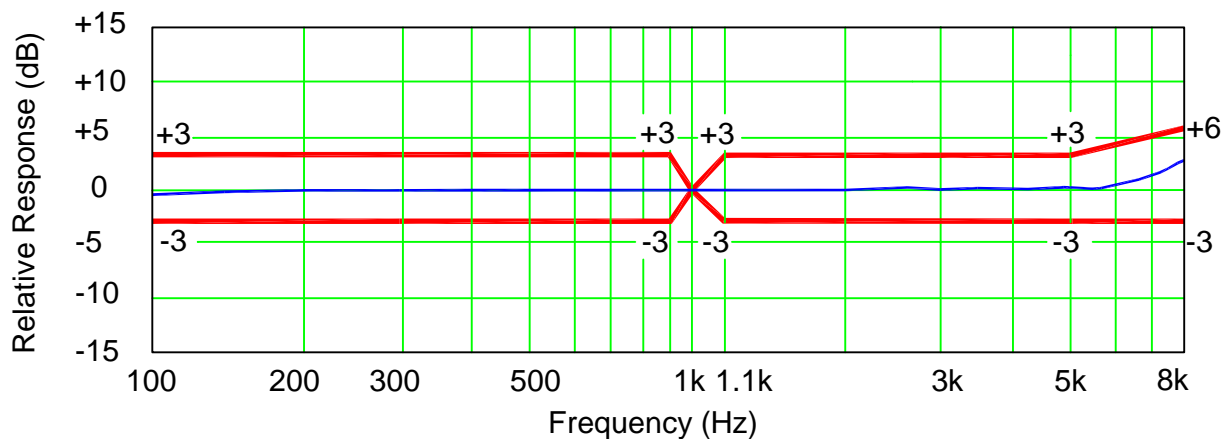
2 Test Condition (Vs=2.0V,L=50cm)

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

3 Electrical Characteristics

Item	Symbol	Test Conditions	Min	Typ	Max	Unit
Sensitivity	S	f=1kHz，Pin=1Pa	-43	-42	-41	dB
Output Impedance	Zout	f=1kHz，Pin=1Pa			400	Ω
Directivity	D(θ)		Omnidirectional			
Current Consumption	I		50		150	μA
S/N Ratio	S/N(A)	f=1kHz，Pin=1Pa A-Weighted		59		dB
Decreasing Voltage Characteristic	△S	f=1kHz，Pin=1Pa Vs=3.6 --1.5V	No Change			
Operating Voltage Range	Vs		1.5		3.6	V
Total Harmonic Distortion	THD	110dB SPL@ f=1kHz			1	%

4 Frequency Response Curve Limits

5 Measurement Circuit

CP

Filter

Amp

Term.1 (Power)

Vs ⊕ 2.0V

Term.4 (Output)

OUTPUT

C=10μF

Term.2 and Term.3 (GND)

GND

MEMS
Microphone

6 Test Setup Drawing

Power Amplifier

Free-field **1/2"**
Microphone

Speaker

50cm

MIC

Audio Analyzer

Input   Output

Power&Load

Remote Control

Turn Table

Anechoic Room
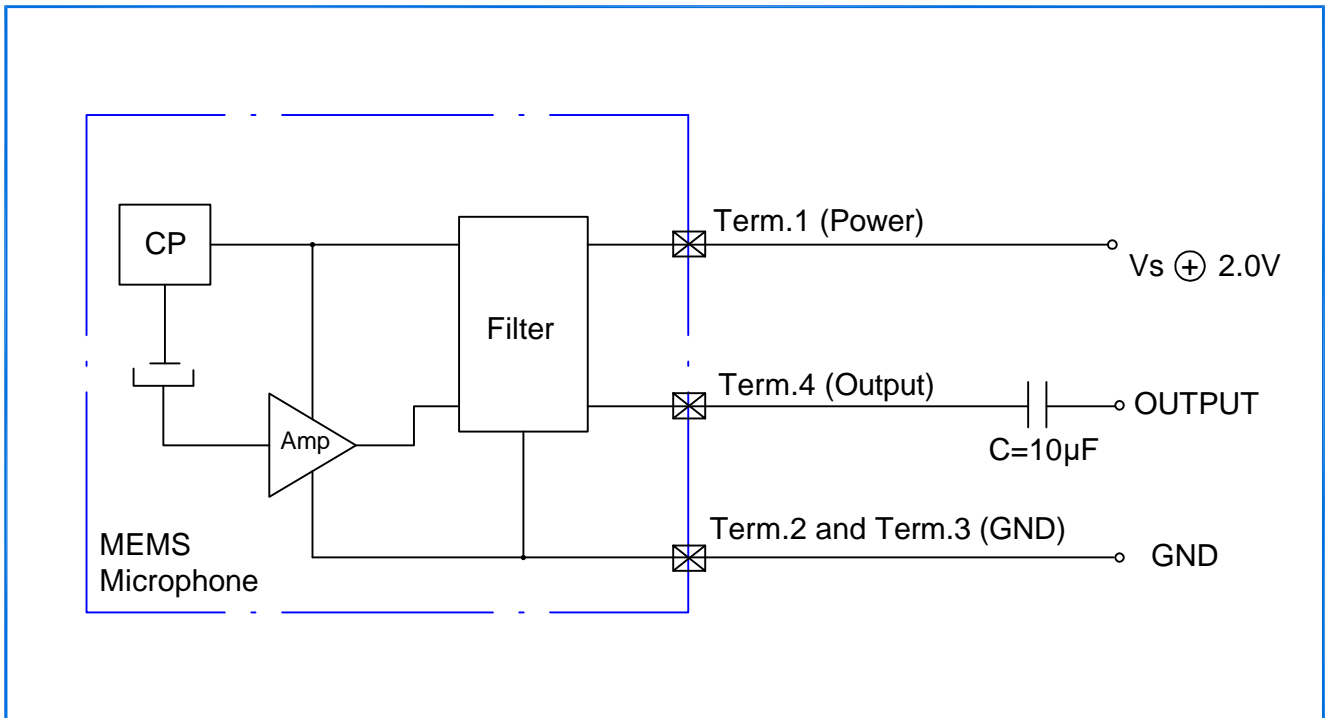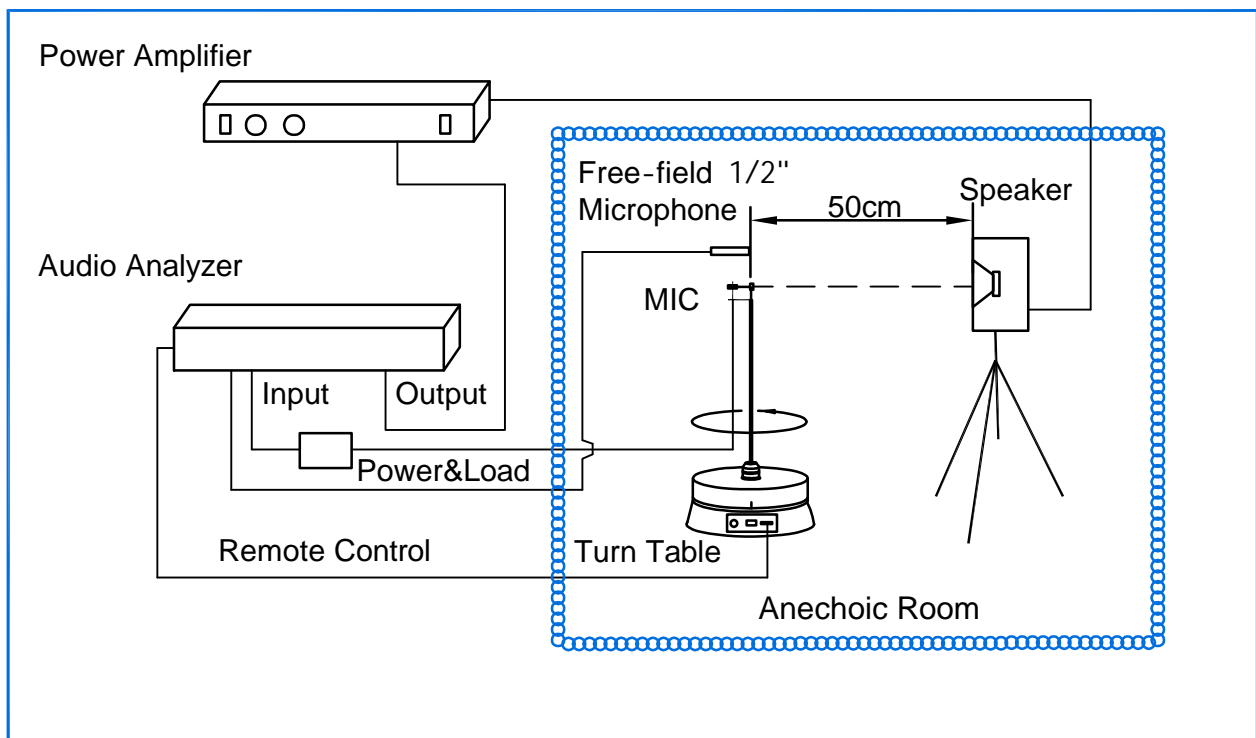
7 Mechanical Characteristics

7.1 Appearance Drawing (Unit: mm)

Top View   Bottom View

Pin Output	
Pin#	Function
1	Power
2	GND
3	GND
4	Output

Item	Dimension	Tol.(±)	Units
Length	2.75	0.1	mm
Width	1.85	0.1	mm
Height	0.95	0.1	mm
AP (Acoustic port)	0.5	0.1	mm

Note: 1. Tolerance ±0.10mm unless otherwise specified.

2. Identification Number Convention: Job Identification Number.

Identification Number   2D Code
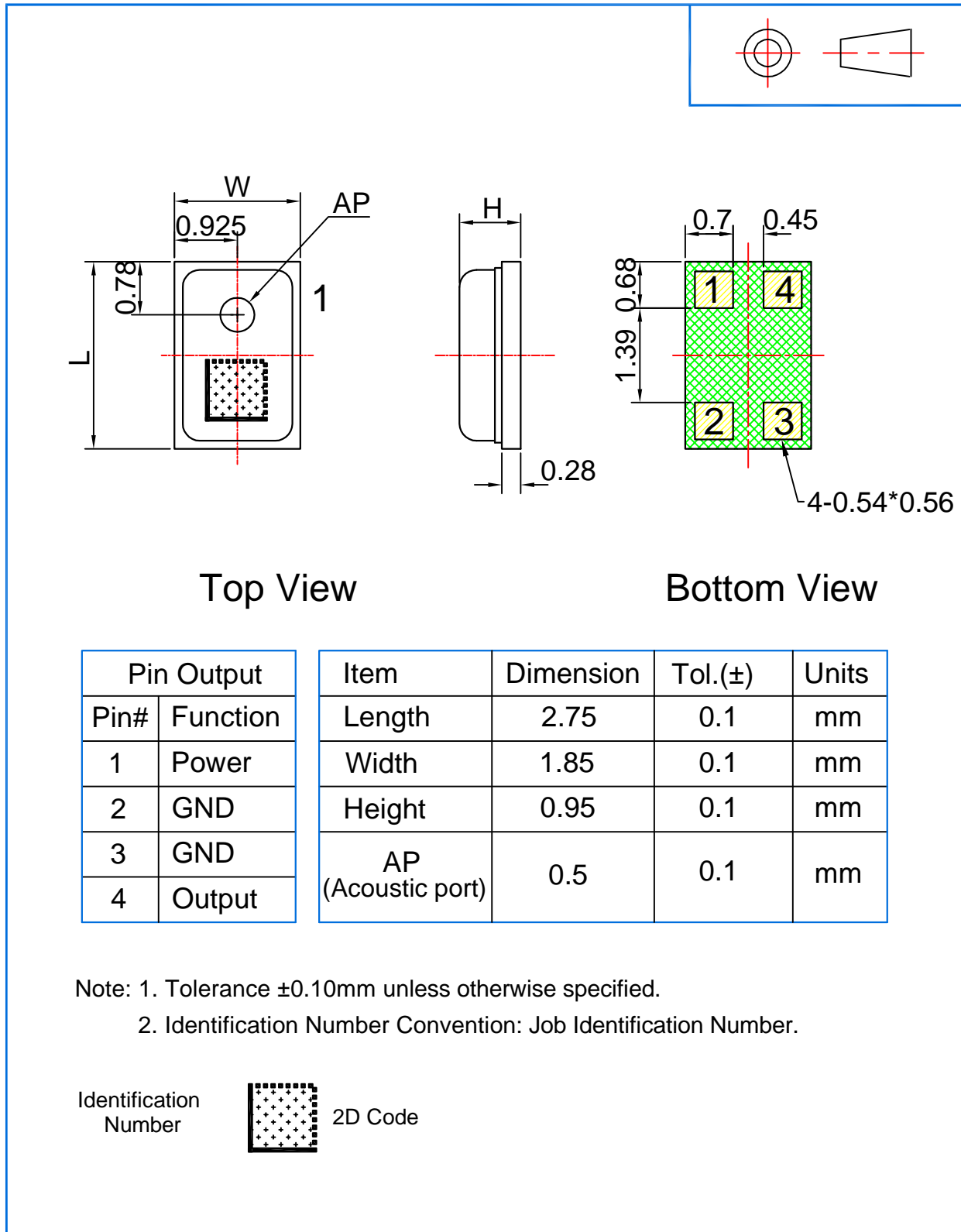
7.2 Weight

The weight of the MIC is Less than 0.04g.

8 Reliability

8.1 Vibration Test	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 ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at +15℃～+35℃, R.H 25%～75%)
8.2 Drop Test	To be no interference in operation after dropped to 1.0cm steel plate 18 times from 1.5 meter height, sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at +15℃～+35℃, R.H 25%～75%)
8.3 Temperature Test	a) After exposure at +125℃ for 200 hours, sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at +15℃～+35℃, R.H 25%～75%) b) After exposure at -40℃ for 200 hours, sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at +15℃～+35℃, R.H 25%～75%)
8.4 Humidity Test	After exposure at +85℃ and 85% relative humidity for 200 hours, sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at +15℃～+35℃, R.H 25%～75%)
8.5 Mechanical Shock Test	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 ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at +15℃～+35℃, R.H 25%～75%)
8.6 Thermal Shock Test	After exposure at -40℃ for 30 minutes, at +125℃ for 30 minutes (change time 20 seconds) 5 cycles, sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at +15℃～+35℃, R.H 25%～75%)
8.7 Reflow Test	Adopt the reflow curve of item 12.3, after five reflows, sensitivity should vary within ±2dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at +15℃～+35℃, R.H 25%～75%)
8.8 Electrostatic Discharge Test	Under C=150pF, R=330ohm. Tested to ±8KV contact to the case and tested to ±2kV contact to I/O terminals.10 times. Grounding. Sensitivity should vary within ±2dB from initial sensitivity.

9 Package

9.1 Tape Specification
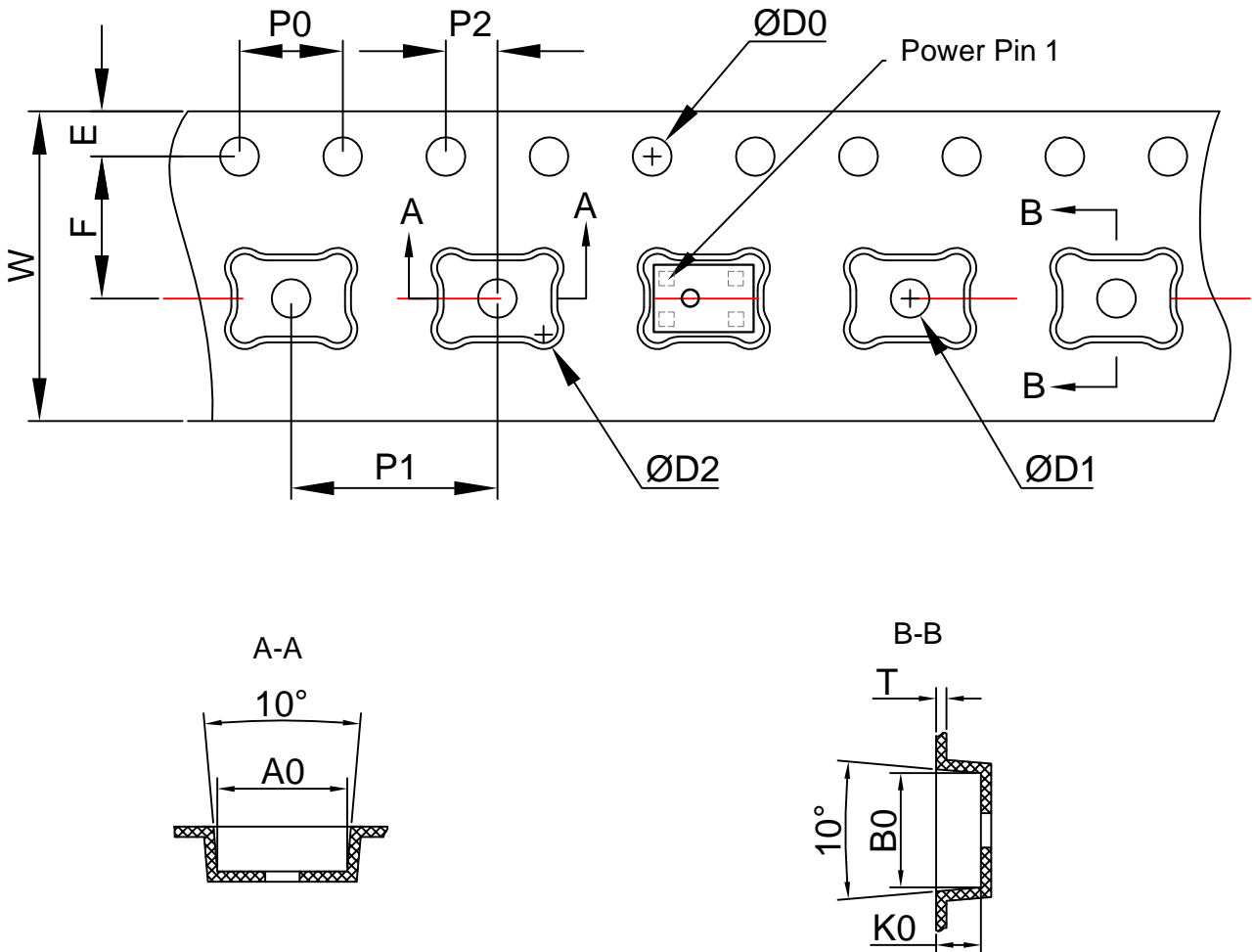
The Dimensions as Follows:

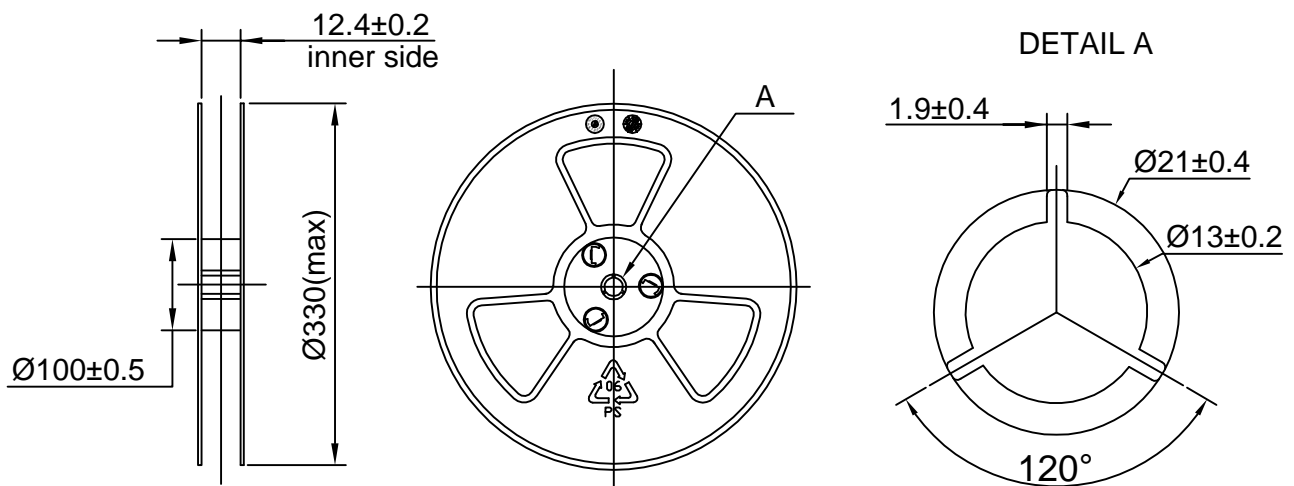| ITEM	W	E	F	ØD0	ØD1
DIM(mm)	12.0±0.30	1.75±0.10	5.5±0.05	$1.50^{+0.10}_{-0}$	$1.00^{+0.10}_{0}$
ITEM	P0	10P0	P1	A0	B0
DIM(mm)	4.00±0.10	40.00±0.20	8.00±0.10	3.00±0.05	2.05±0.05
ITEM	K0	P2	T	ØD2	
DIM(mm)	1.10±0.10	2.00±0.1	0.30±0.05	0.50±0.10	

9.2 Reel Dimension

7" reel for sample stage
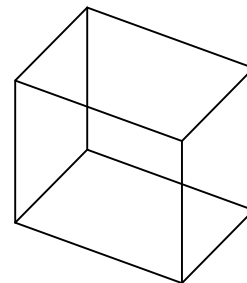
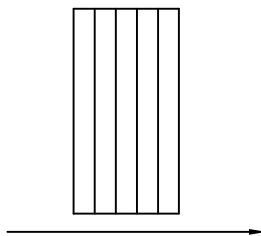13" reel will be provided for the mass production stage

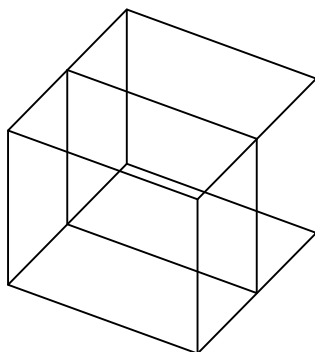The following is 13" reel dimensions (unit:mm)

DETAIL A

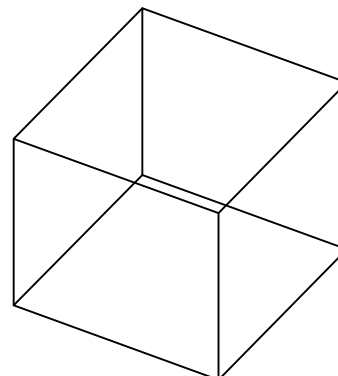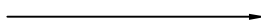## 9.3 The Content of Box(13" reel)

Packing (5,500PCS)

Inner Box(27,500PCS)
(340mm×135mm×355mm)

Two Inner Box(55,000PCS)

Outer Box(55,000PCS)
(370mm×300mm×390mm)

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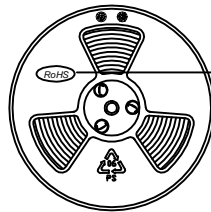
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9.4 Packing Explain

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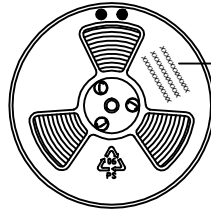
The Content Includes:
Product type, Lot, Customer P/N;
and other essential information such as
Quantity, Date etc.

9.4.2 The RoHS Label

RoHS HF
Compliance 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℃～+70℃（Microphone units with package）

10.4 Operating Temperature Range：-40℃～+100℃

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11 Land Pattern Recommendation

11.1 The Pattern of MIC Pad(Unit:mm)
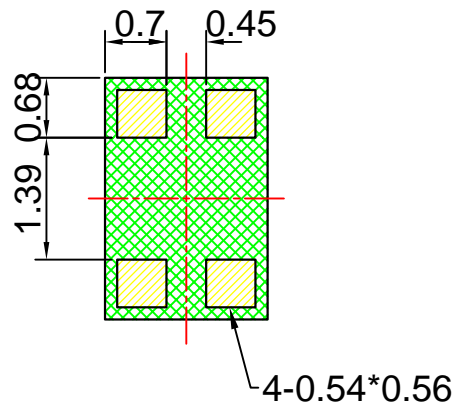
11.2 Recommended Soldering Surface Land Pattern
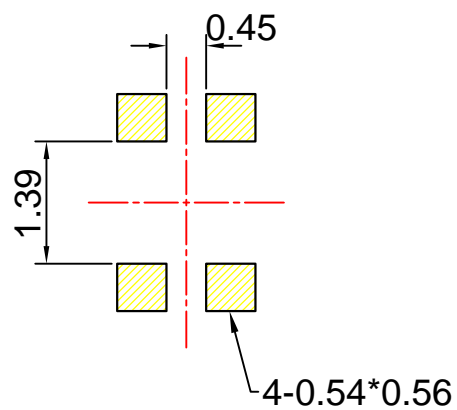
12 Soldering Recommendation

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

Nozzle Diameter: 0.8mm

Ø1 Forbidden area for vacuum application

0.3

Recommendation area for pick up

1.1

1.21

0.8

Please don't vacuum over the acoustic port directly. The recommendation is for reference.
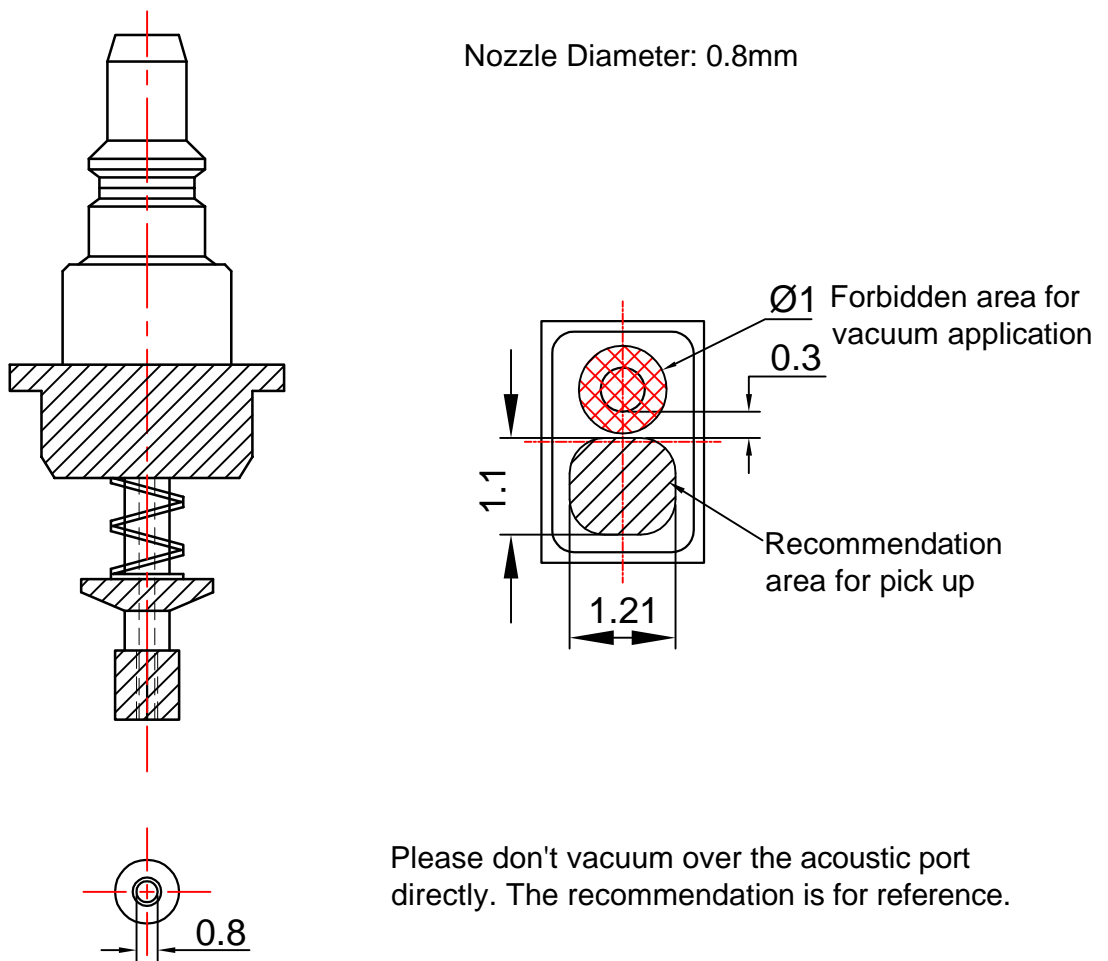
12.3 Reflow Profile
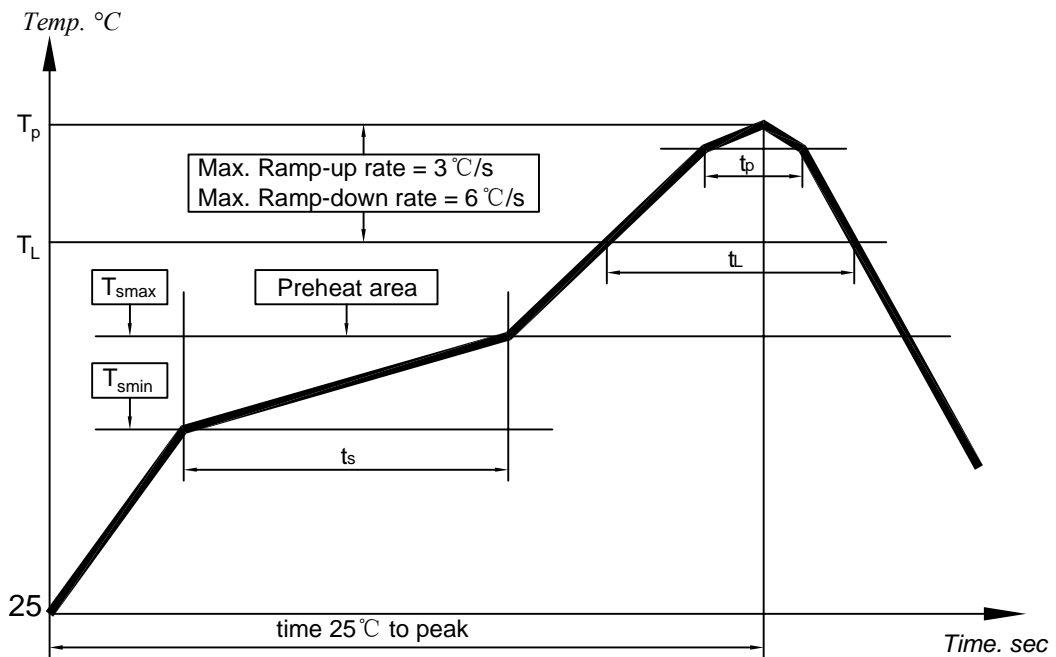
Key Features of The Profile:

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

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12.4 Rework

(1) 250°C～270°C, maximum 30 sec，Peak temperature 330°C.
(2) Wind speed: 15L/m.
(3) It is very important not to put a heatgun over the acoustic port of the microphone.

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 be put a nozzle over the acoustic hole of the microphone, otherwise this could damage the microphone.

13.3 Blowing Restrictions

It is very important not to blow the acoustic port of the microphone directly,otherwise this could damage the microphone.

13.4 Ultrasonic Restrictions

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

13.5 Case Adaption to Pressure Restrictions

It is very important not to press the case with a force larger than 2.5kgf, otherwise this would damage the microphone.

14 Output Inspection Standard

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

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