Specification of MEMS Microphone

(RoHS Compliance & Halogen Free)

Customer Name ：

Customer Model ：

Goermicro Model ：S14OB381-038

10644
ISO/TS16949:2009
2551
ISO14001:2004
2728
ISO9001:2008

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Restricted

1 Security Warning

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2 Publication History

Version	Description	Date	Author	Approved
1.0	Preliminary Design	2018.09.13	Tyler	Sunny
2.0	Update Acoustic and Electrical Characteristics	2018.10.09	Tyler	Sunny
3.0	Datasheet version update	2019.01.25	Tyler	Sunny
4.0	Add FR Limit	2019.05.08	Tyler	Sunny
5.0	Update the Logo to Goermicro	2021.08.25	Enoch	Roy

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.

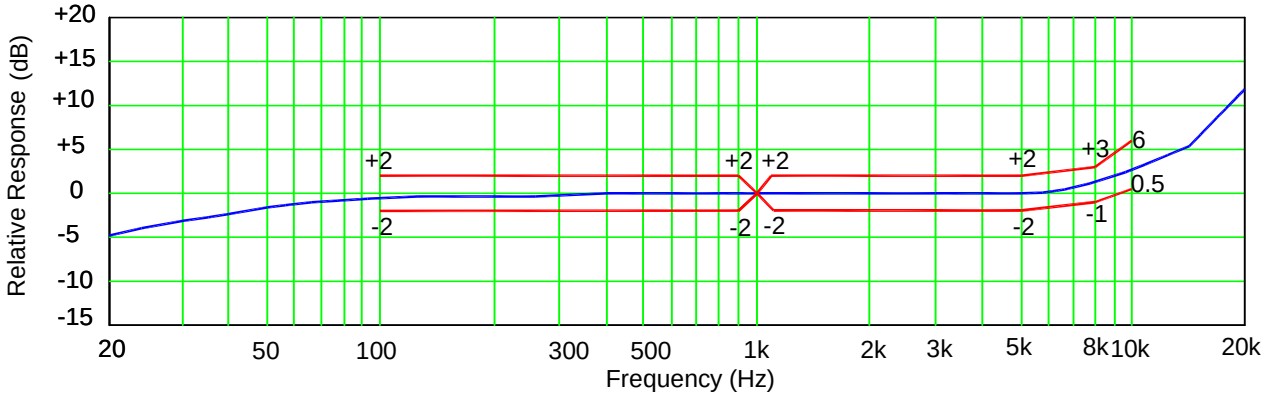
2 Test Condition (Vs=2.7V,L=50cm)

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

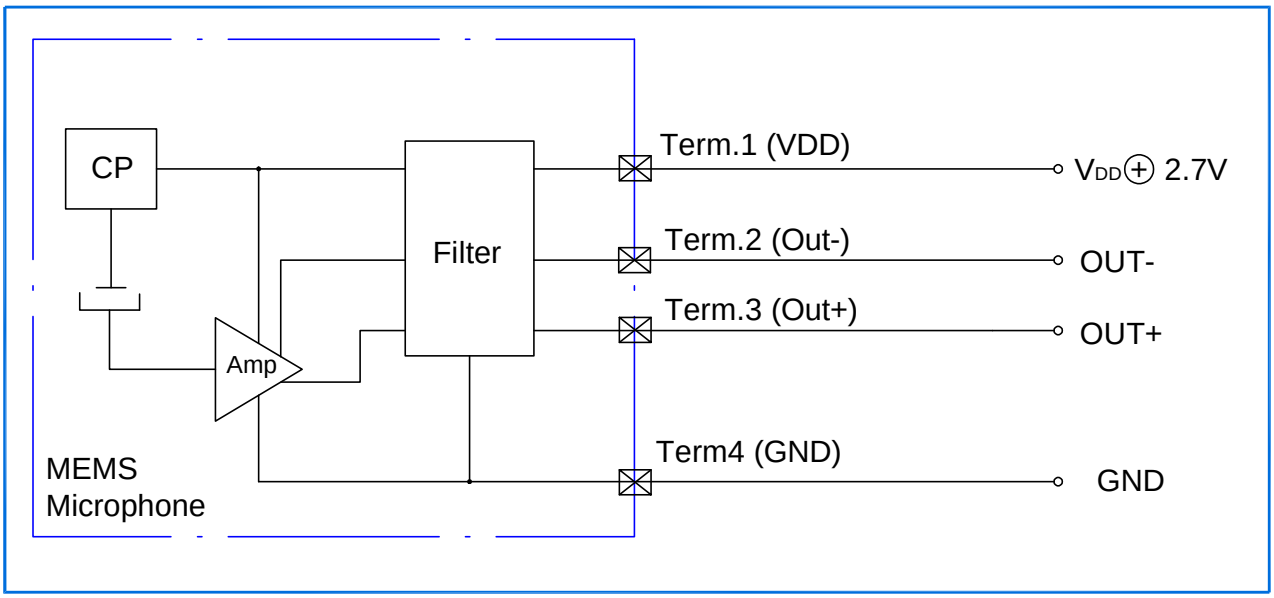
3 Acoustic and Electrical Characteristics

Item	Symbol	Test Conditions	Min	Typ	Max	Unit
Operating Voltage Range	V_{DD}		2.3	2.7	3.0	V
Current Consumption	I	V_{DD}=2.7V		160	250	μA
Sensitivity	S	f=1kHz, P_{in}=1Pa	-39	-38	-37	dB
S/N Ratio	SNR	f=1kHz, Pin=1Pa, Band width=100Hz-10kHz, A-weighted	65.5	67.5		dB
S/N Ratio	SNR	f=1kHz, Pin=1Pa, Band width=20Hz-20kHz, A-weighted	64	66		dB
Total Harmonic Distortion	THD	130dB SPL@ f=1kHz		1		%
Acoustic Overload Point	AOP	10%THD@1kHz,S=Typ, V_{DD}=2.7V,Rload>2kΩ	132	135		dBSPL
Power Supply Rejection	PSR	100mVpp square wave@217Hz, V_{DD}=2.7V A-Weighted		-103		dBV
V_{DD} ramp up time	t_{VDDup}	V_{DD} reaches its final value within ± 10 % tolerance	0.001		5	ms
Reset release voltage	$V_{DDreset}$	Reset is released for V_{DD}>$V_{DDreset}$			1.4	V
Output Impedance	Z_{out}	f=1kHz, P_{in}=1Pa			500	Ω
Decreasing Voltage Characteristic	ΔS	f=1kHz, P_{in}=1Pa V_{DD}=3.0 --2.3V	No Change			dB
Directivity	D(θ)	Omnidirectional				

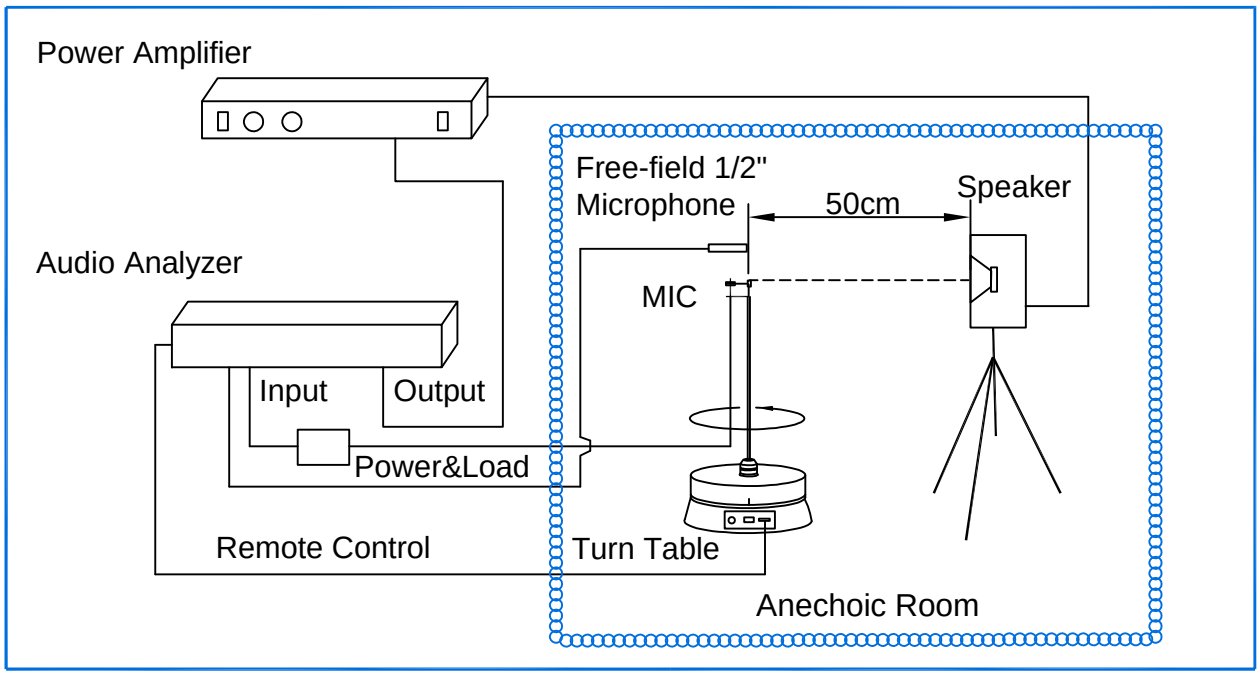
4 Frequency Response Curve



5 Measurement Circuit

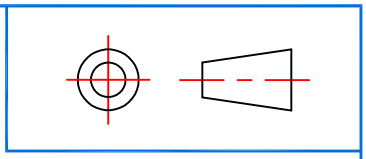


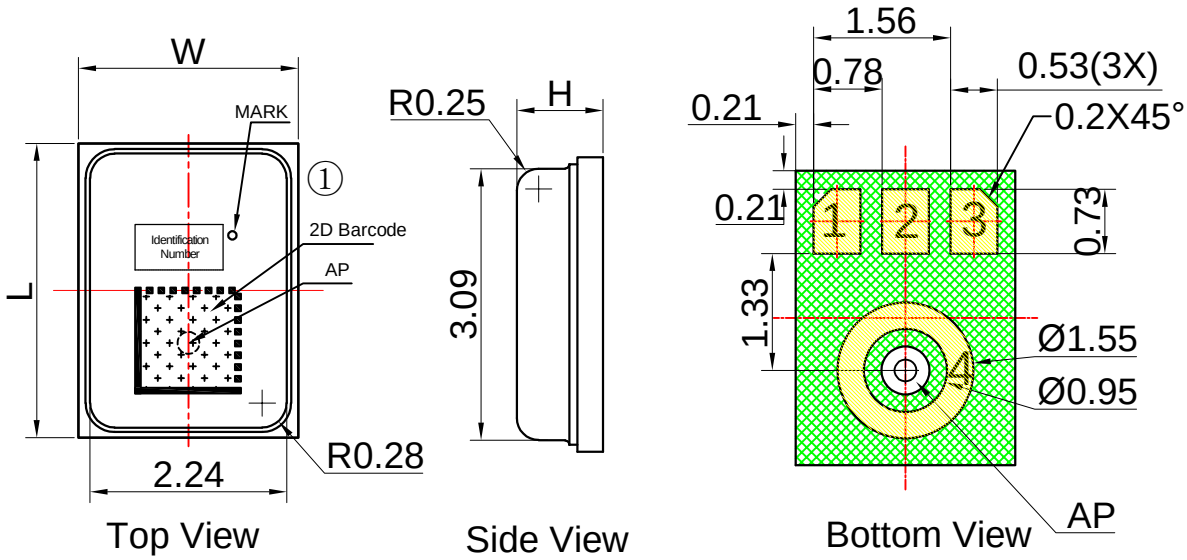
6 Test Setup Drawing



7 Mechanical Characteristics

7.1 Appearance Drawing (Unit: mm)





Pin#	Function
1	POWER
2	Out-
3	Out+
4	GND

Item	Dimention	Tolerance	Units
Length(L)	3.35	±0.10	mm
Width(W)	2.5	±0.10	mm
Height(H)	0.98	±0.10	mm
Acoustic Port (AP)	Ø0.25	±0.05	mm

Note: 1. Tolerance ±0.1 unless otherwise specified.

2. Identification Number Convention: Job Identification Number.

Identification Number 

G:Goermicro WW:Week D:Day

Y:Year LLL :Lot :2D Code

7.2 Weight

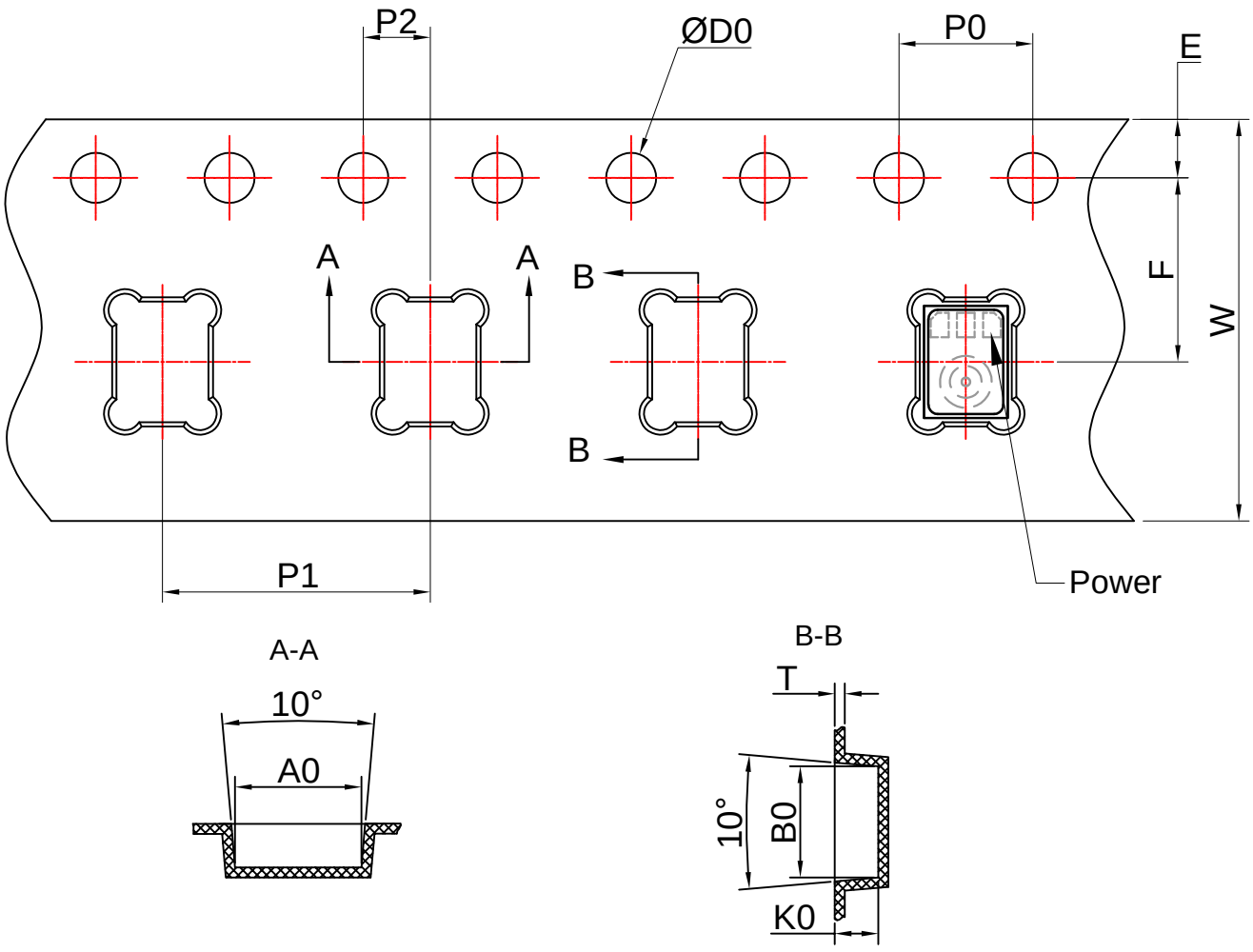
The weight of the MIC is Less than 0.03g.

8 Reliability Test

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 condition at 15℃-35℃, R.H. 25%～75%)
8.2 Drop Test	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 ±3dB from initial sensitivity. (The measurement to be done after 2 hours of condition 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 condition 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 condition 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 condition 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 condition 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) 32 cycles, sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2 hours of condition at 15℃-35℃, R.H. 25%～75%)
8.7 Reflow Test	Adopt the reflow curve of item 12.3, after three reflows, sensitivity should vary within ±2dB from initial sensitivity. (The measurement to be done after 2 hours of condition at 15℃-35℃, R.H. 25%～75%)
8.8 Electrostatic Discharge Test	Under C=150pF, R=330ohm. Air discharge to case with±8kV and contact discharge to I/O terminals with±2kV , 10 times, Grounding. Sensitivity should vary within ±3dB from initial sensitivity.

9 Package

9.1 Tape Specification



The Dimensions as Follows:

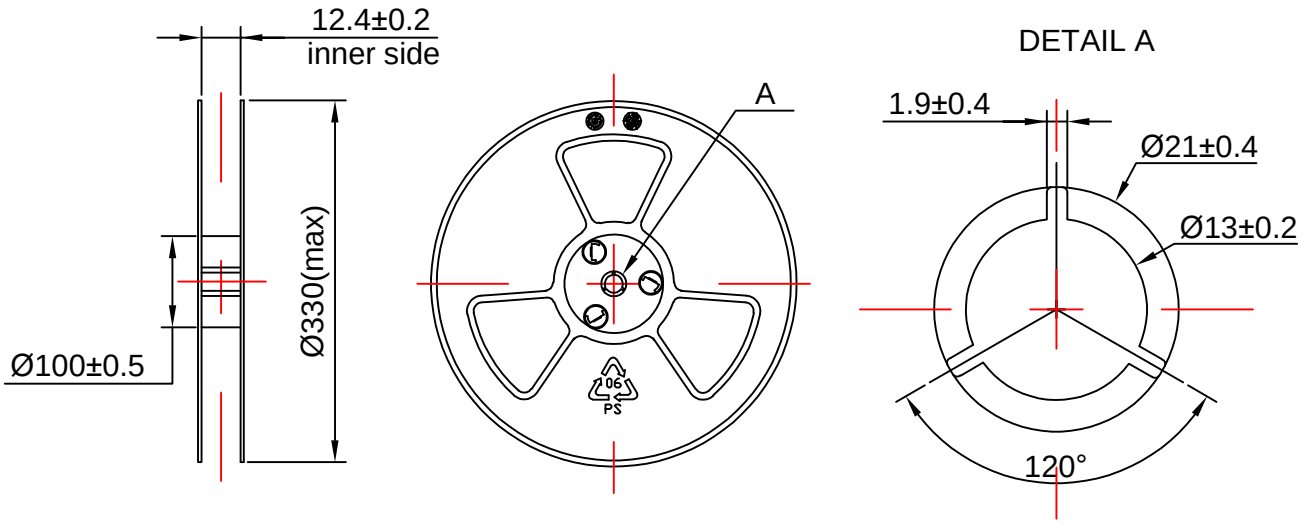
ITEM	W	E	F	ØD0	P0
DIM(mm)	12.0±0.30	1.75±0.10	5.5±0.05	$1.50^{+0.10}_{-0}$	4.00±0.10
ITEM	10P0	P1	P2	A0	B0
DIM(mm)	40.00±0.20	8.00±0.10	2.00±0.05	2.75±0.05	3.60±0.05
ITEM	K0	T			
DIM(mm)	1.2±0.05	0.30±0.05			

9.2 Reel Dimension

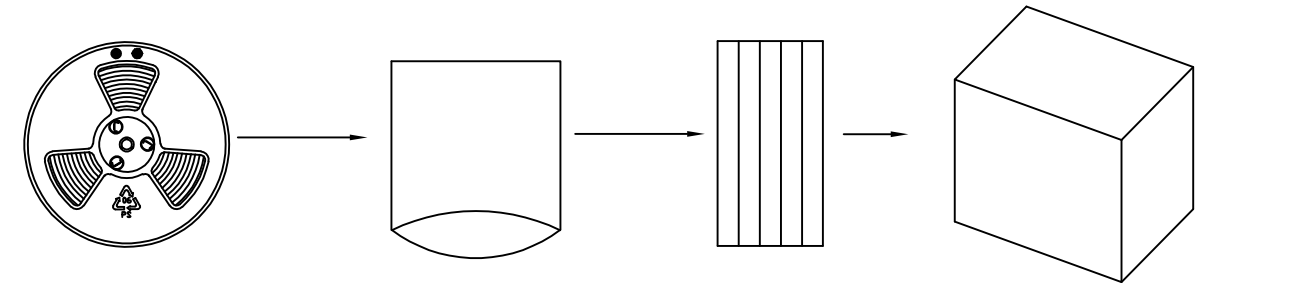
7" reel for sample stage

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)

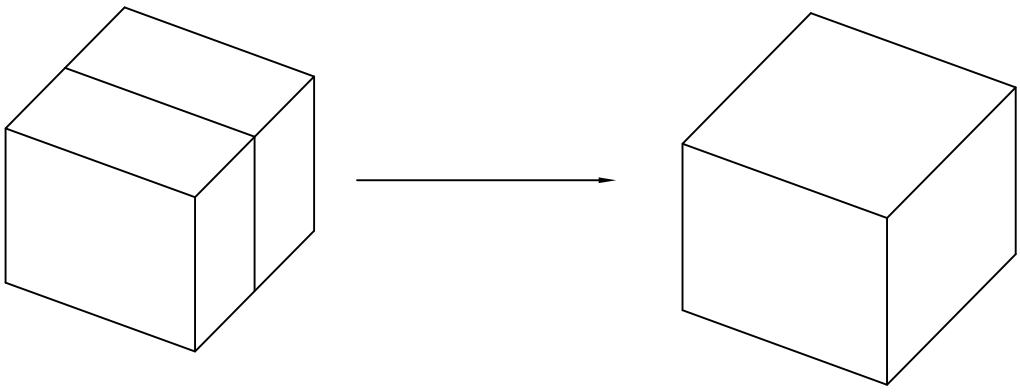


Packing (5,000PCS)

Antistatic Bag (5,000PCS)

5 Bags (25,000PCS)

Inner box (25,000PCS) (340mm×135mm×355mm)

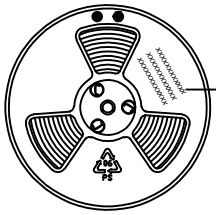


Two Inner Box(50,000PCS)

Outer Box(50,000PCS) (370mm×300mm×390mm)

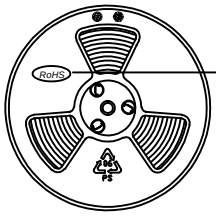
9.4 Packing Explain

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 &
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. Recommend storage period no more than 1 year and floor life(out of bag) at factory no more than 4 weeks.

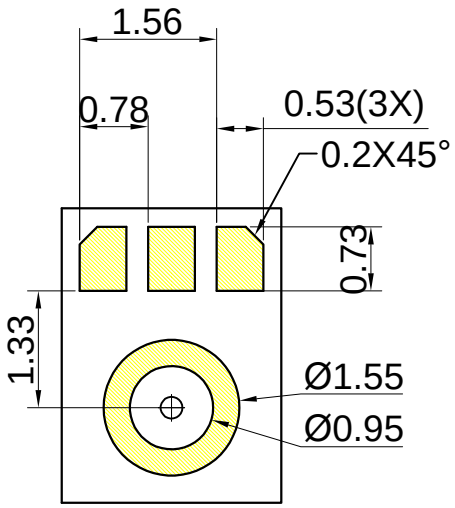
10.2 The MEMS MIC with normal pack can be transported by ordinary conveyances. Please protect products against moist, shock, sunburn and pressure during transportation.

10.3 Storage Temperature Range：-40℃～+70℃

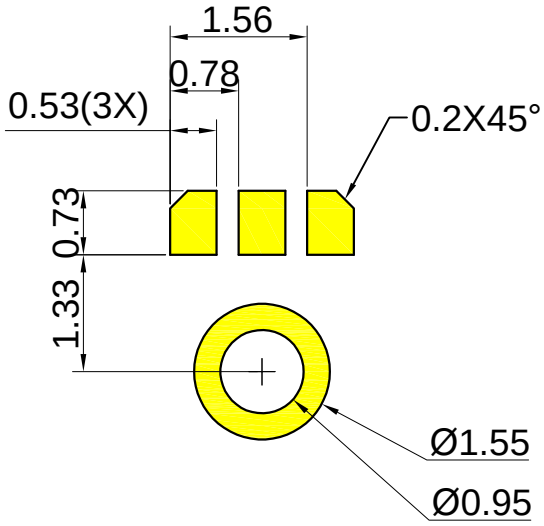
10.4 Operating Temperature Range：-40℃～+100℃

11 Land Pattern Recommendation

11.1 The Pattern of MIC Pad(Unit:mm)



11.2 Recommended Soldering Surface Land Pattern(Unit:mm)

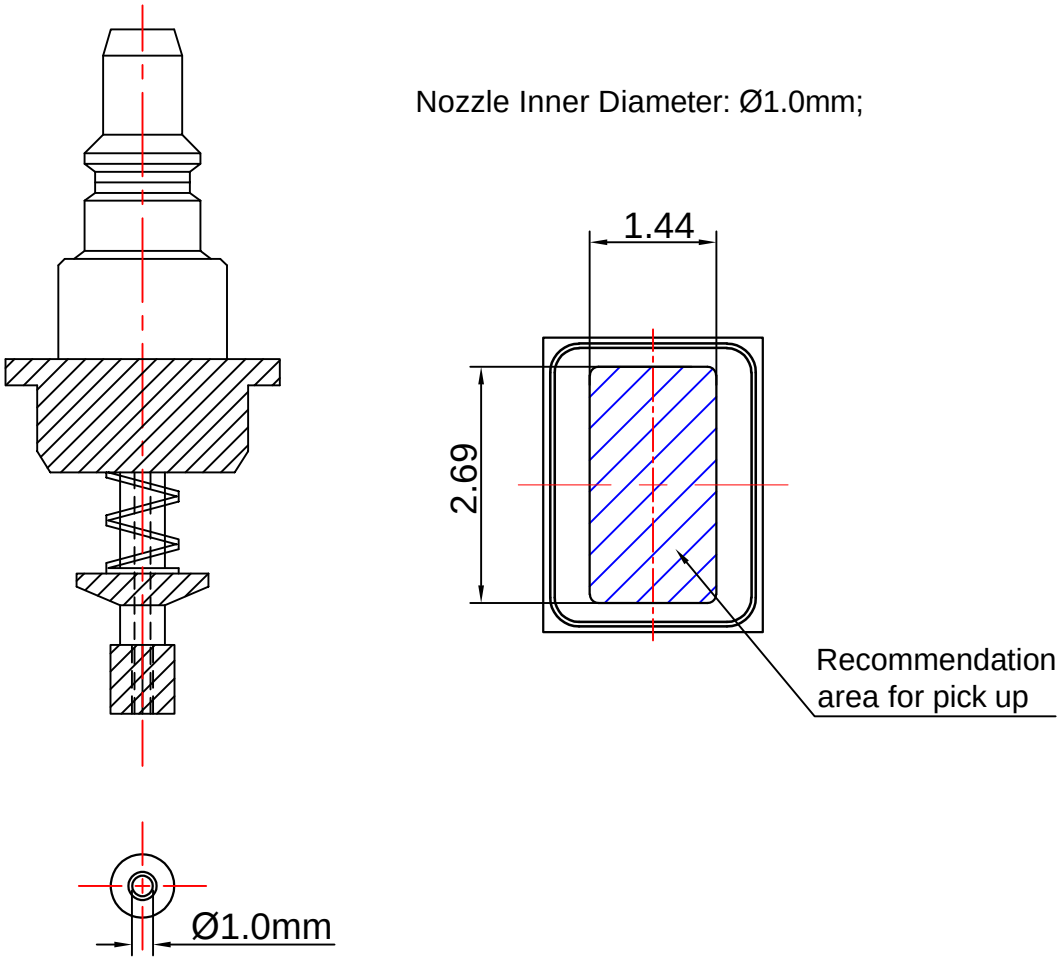


12 Soldering Recommendation

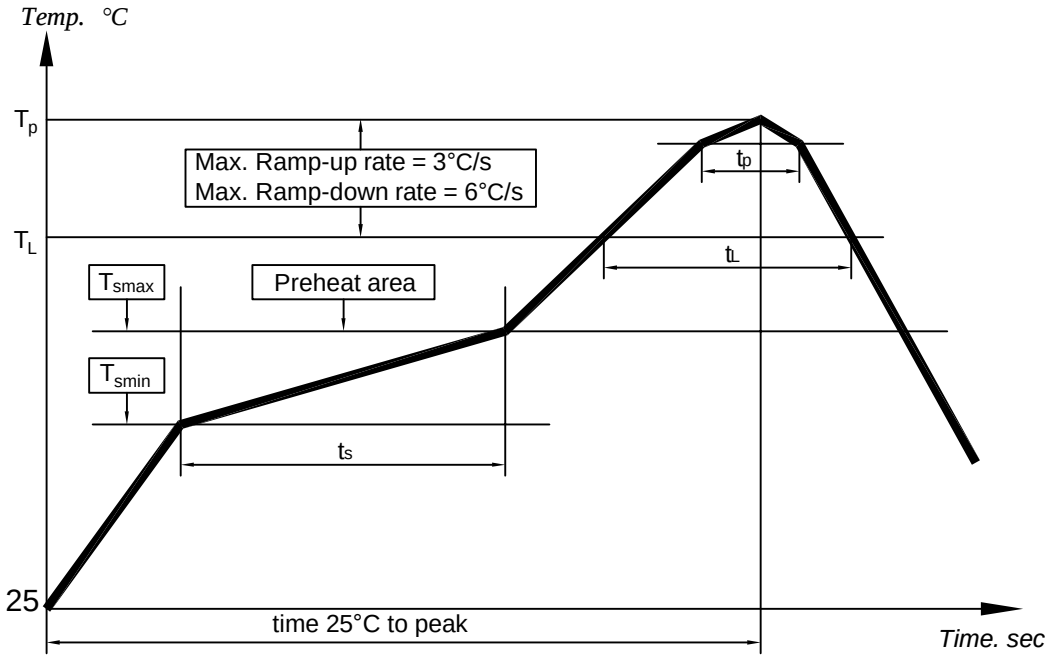
12.1 Soldering Machine Condition

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

12.2 The Drawing and Dimension of Nozzle



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 : Tempreature(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 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

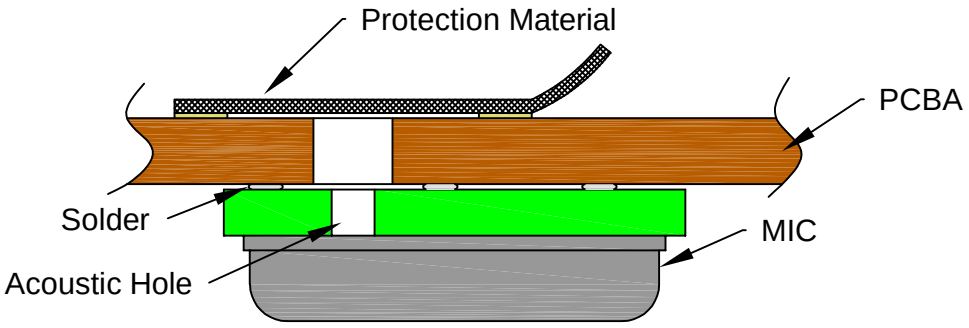
It is very important not to use ultrasonic process. otherwise this could damage the microphone.

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.

13.6 Acoustic Port Protection

It is very important not to operate vacuum and air blow into acoustic port(without any covering over acoustic port), otherwise this could damage the microphone.
And it is necessary to be careful about foreign substances into acoustic port .Please add protection material (e.g. PET) on the acoustic hole to protect it after SMT , refer to below pictures, take it away before test, then attach it again until the end of assembly.



14 Output Inspection Standard

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