Specification of MEMS Microphone

(RoHS Compliance & Halogen Free)

Customer Name ：

Customer Model ：

GoerTek Model ： S18OT381-016

GoerTek			CUSTOMER APPROVAL
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Restricted

1 Security Warning

2 Publication History

Version	Description	Date	Author	Approved
1.0	New Design	2015.05.13	Jasen	Worden
2.0	Update Acoustic Overload Point	2015.10.15	Jasen	Worden

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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.

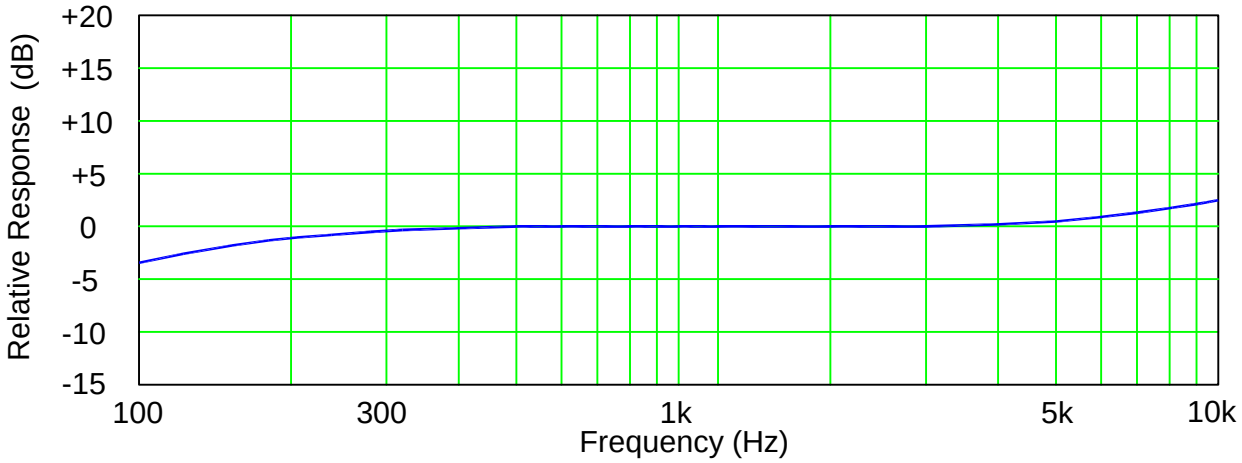
2 Test Condition (V_{DD}=2.0V, L=50cm)

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

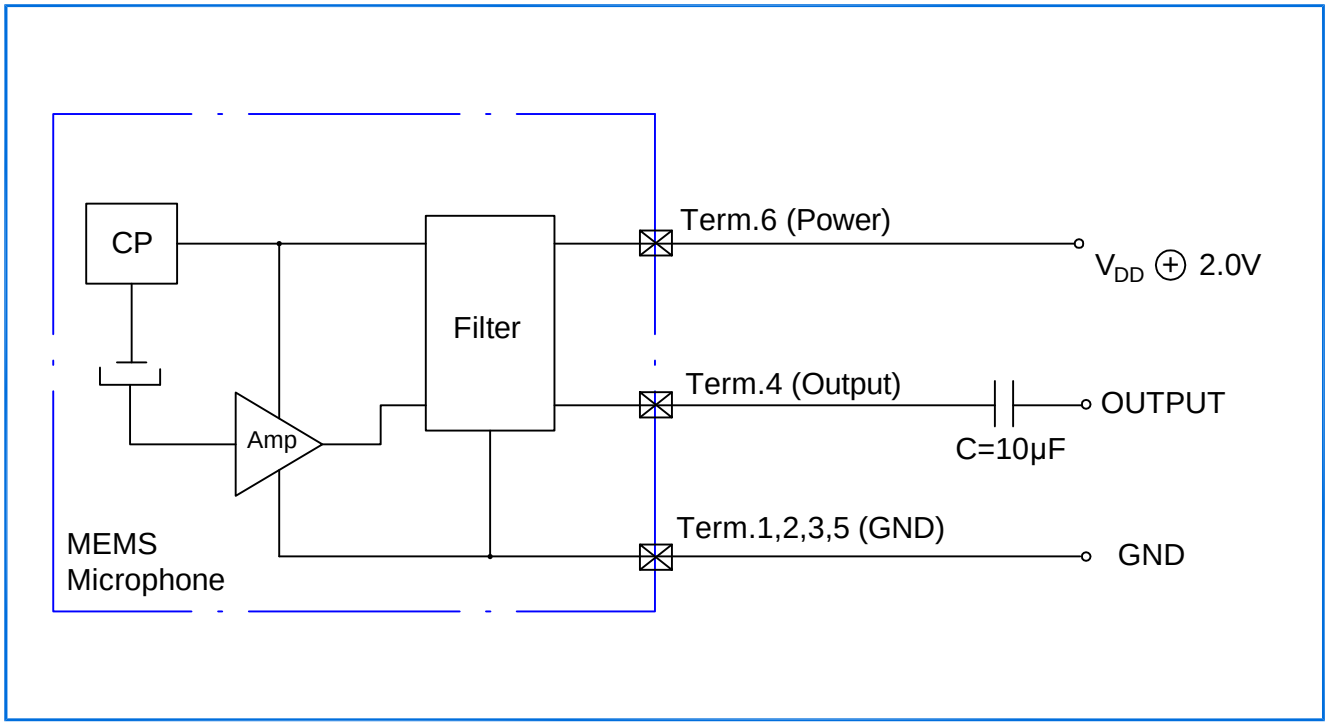
3 Acoustic and Electrical Characteristics

Item	Symbol	Test Conditions	Min	Typ	Max	Unit
Sensitivity	S	f=1kHz, Pin=1Pa	-39	-38	-37	dB
Output Impedance	Zout	f=1kHz, Pin=1Pa			400	Ω
Directivity	D(θ)	Omnidirectional				
Current Consumption	I				200	μA
S/N Ratio	S/N(A)	f=1kHz, Pin=1Pa A-Weighted Curve		65		dB
Decreasing Voltage Characteristic	△S	f=1kHz, Pin=1Pa V_{DD} =3.6 -- 1.6V	No Change			dB
Operating Voltage Range	V_{DD}		1.6		3.6	V
Total Harmonic Distortion	THD	94dB SPL@ f=1kHz			1	%
Acoustic Overload Point	AOP	10% THD@ f=1kHz, V_{DD}=3.6V		123		dB SPL
Power Supply Rejection	PSR	100mVpp Square wave @217Hz V_{DD}=2.0V		-105	-100	dB V

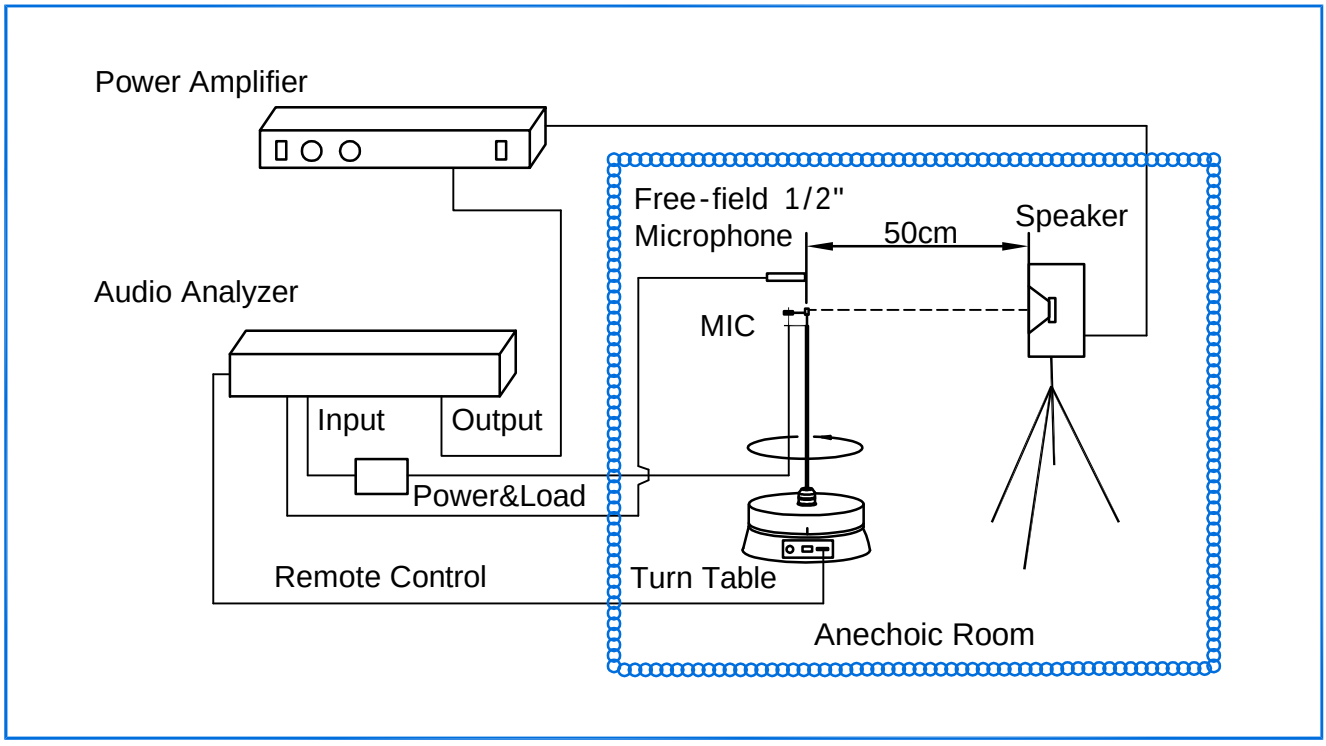
4 Frequency Response Curve



5 Measurement Circuit

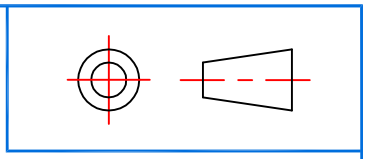


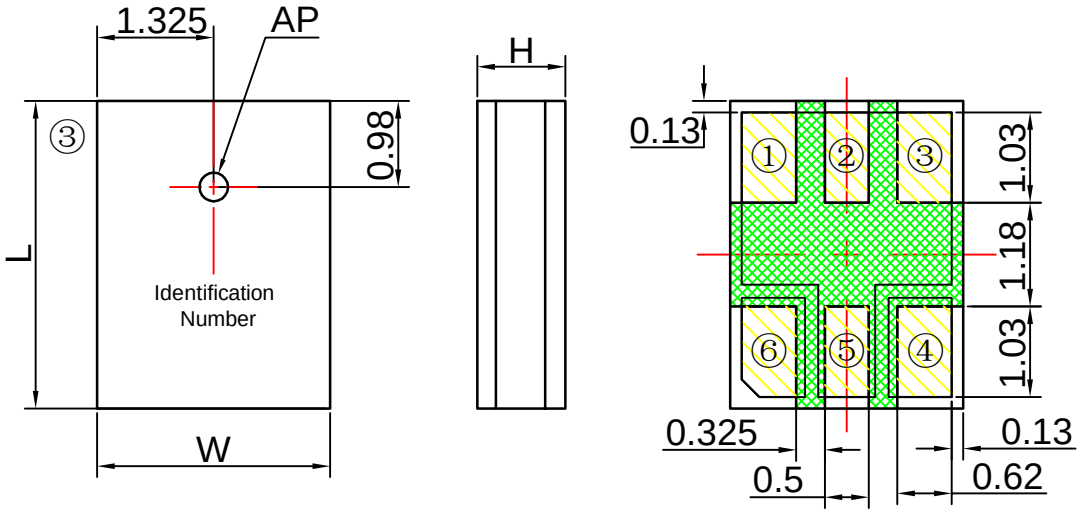
6 Test Setup Drawing



7 Mechanical Characteristics

7.1 Appearance Drawing (Unit: mm)





Top View

Bottom View

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

ITEM	DIMENSION	TOLERANCE	UNTIS
Length(L)	3.50	±0.10	mm
Width(W)	2.65	±0.10	mm
Height(H)	1.00	±0.10	mm
ACOUSTIC PORT(AP)	Ø0.325	±0.05	mm

Note: 1. Tolerance ±0.1 unless otherwise specified.

2. Identification Number Convention: Job Identification Number.

Identification Number

G	1	2	3
4	5	6	7

G: GoerTek 12:Week 3:Day

4:Year 567: Serial Number

7.2 Weight

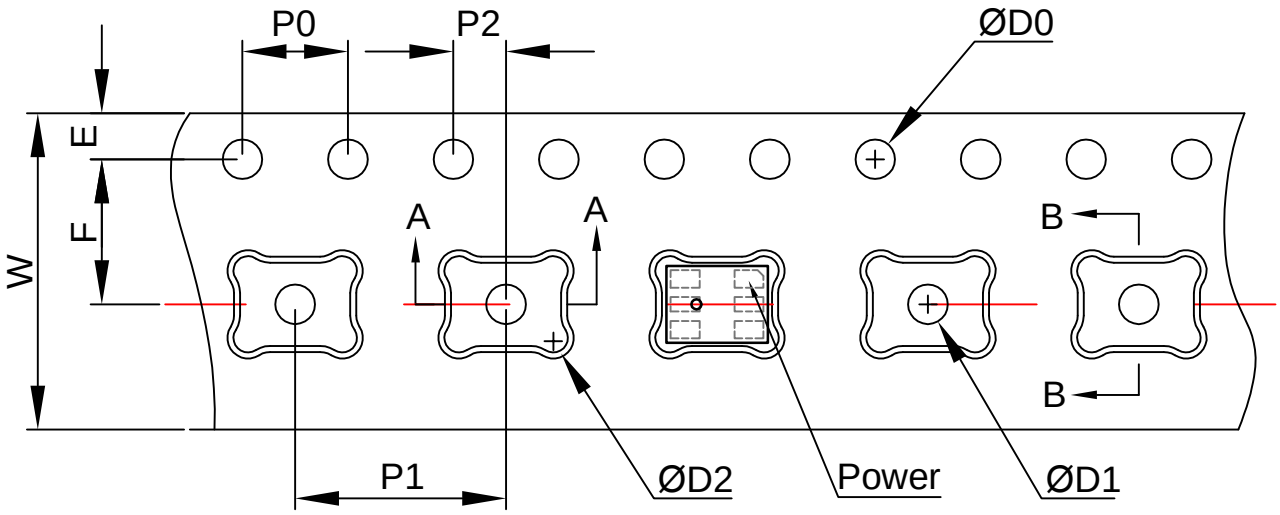
The weight of the MIC is Less than 0.03g.

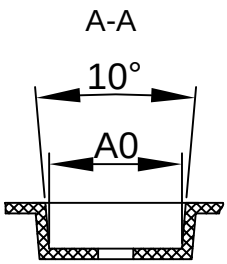
8 Reliability Test

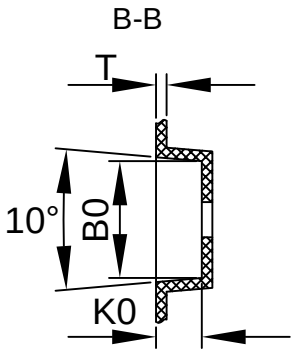
8.1 Vibration Test	To be no interference in operation after vibrations, 4 cycles, from 20 to 2000HZ in each direction (X,Y,Z), 48min, user acceleration of 20g, sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at +15 ℃～+35℃, R.H 25%～75%)
8.2 Drop Test	To be no interference in operation after dropped to 1.0 cm marble plate 12 times from 1.5 meter height in state of JIG, JIG weight of 150 g, 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 200h, sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2h of conditioning at +15 ℃～+35℃, R.H 25%～75%) b) After exposure at -40℃ for 200h, 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 30min, at +125℃ for 30min (change time 20 seconds) 32 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 three reflows, 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%)
8.8 ESD Shock 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 ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at +15℃～+35℃, R.H.25％～75%)

9 Package

9.1 Tape Specification







The Dimensions as Follows:

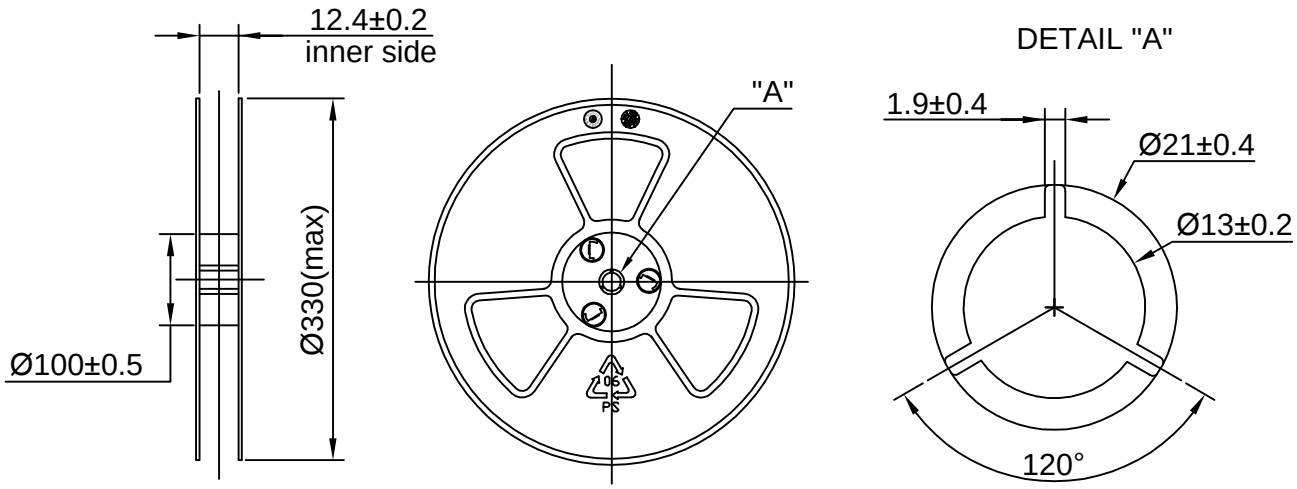
ITEM	W	E	F	ØD0	ØD1
DIM(mm)	12.0±0.30	1.75±0.10	5.5±0.05	$1.50^{+0.10}_{0}$	$1.00^{+0.10}_{0}$
ITEM	P0	10P0	P1	A0	B0
DIM(mm)	4.00±0.10	40.00±0.20	8.00±0.10	3.75±0.05	2.95±0.05
ITEM	K0	P2	T	ØD2	
DIM(mm)	1.30±0.10	2.00±0.05	0.30±0.05	0.50±0.10	

9.2 Reel Dimension

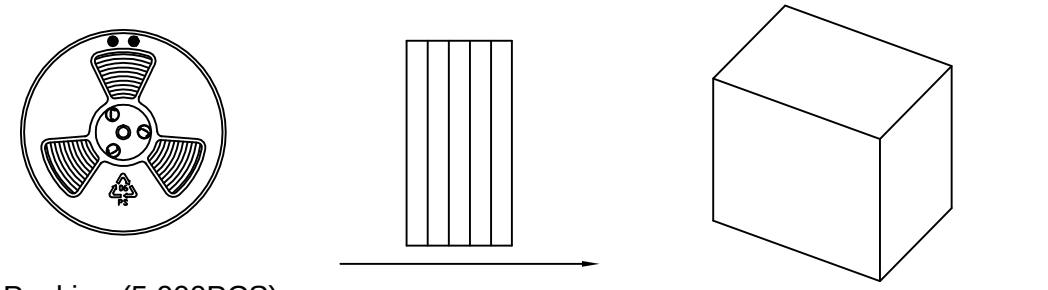
7" reel for sample stage

13" reel will be provided for the mass production stage

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

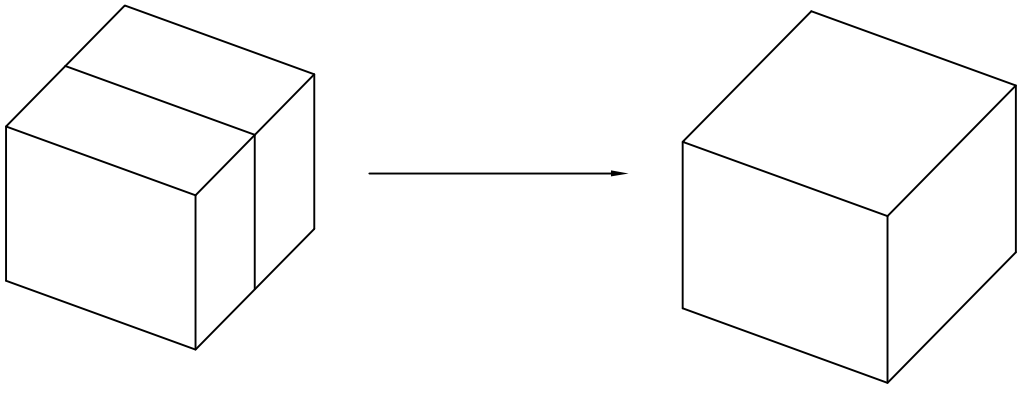


9.3 The Content of Box(13" reel)



Packing (5,000PCS)

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

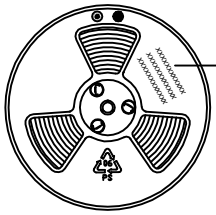


Two Inner Box(50,000PCS)

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

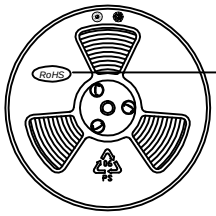
9.4 Packing Explain

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 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.

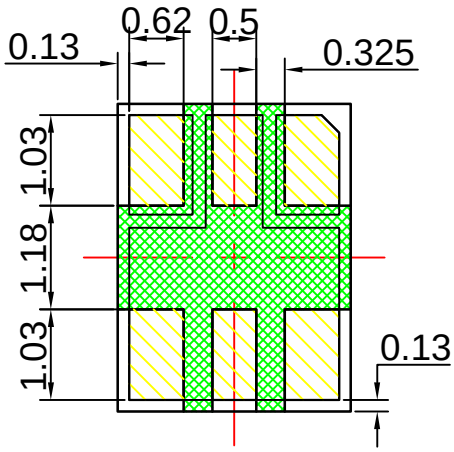
10.2 The MEMS MIC with normal pack can be transported by ordinary conveyances. Please protect products against moist, shock, sunburn and pressure during transportation.

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

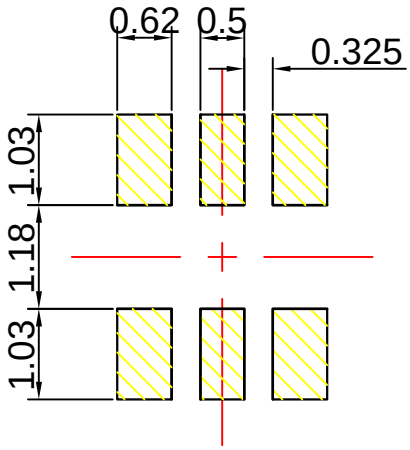
10.4 Operating Temperature Range： -40℃～+100℃

11 Land Pattern Recommendation

11.1 The Pattern of MIC Pad(Unit:mm)



11.2 Recommended Soldering Surface Land Pattern(Unit:mm)

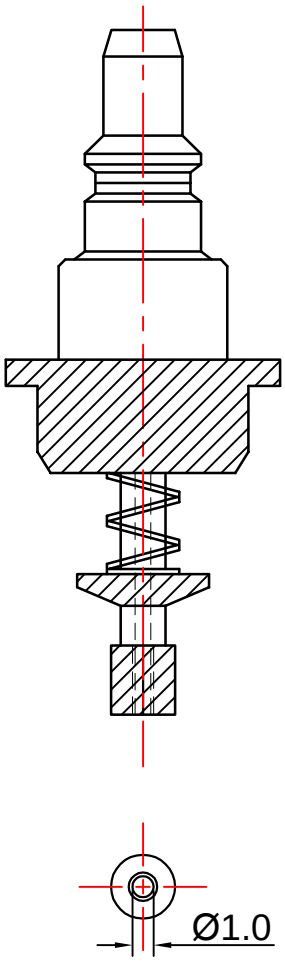


12 Soldering Recommendation

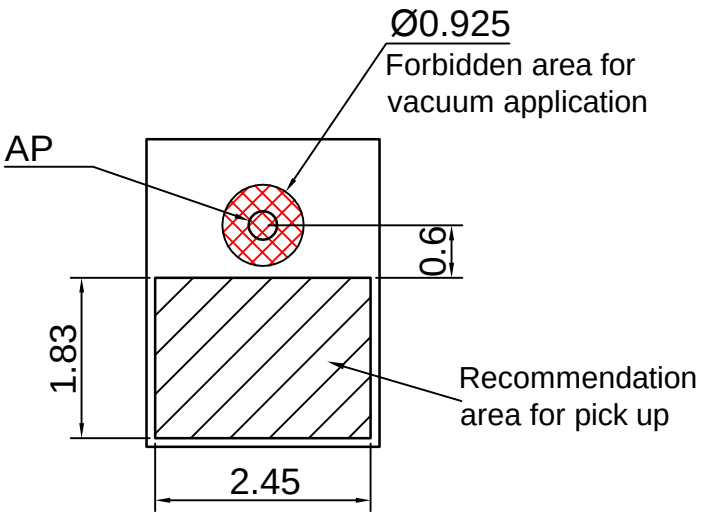
12.1 Soldering Machine Condition

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

12.2 The Drawing and Dimension of Nozzle

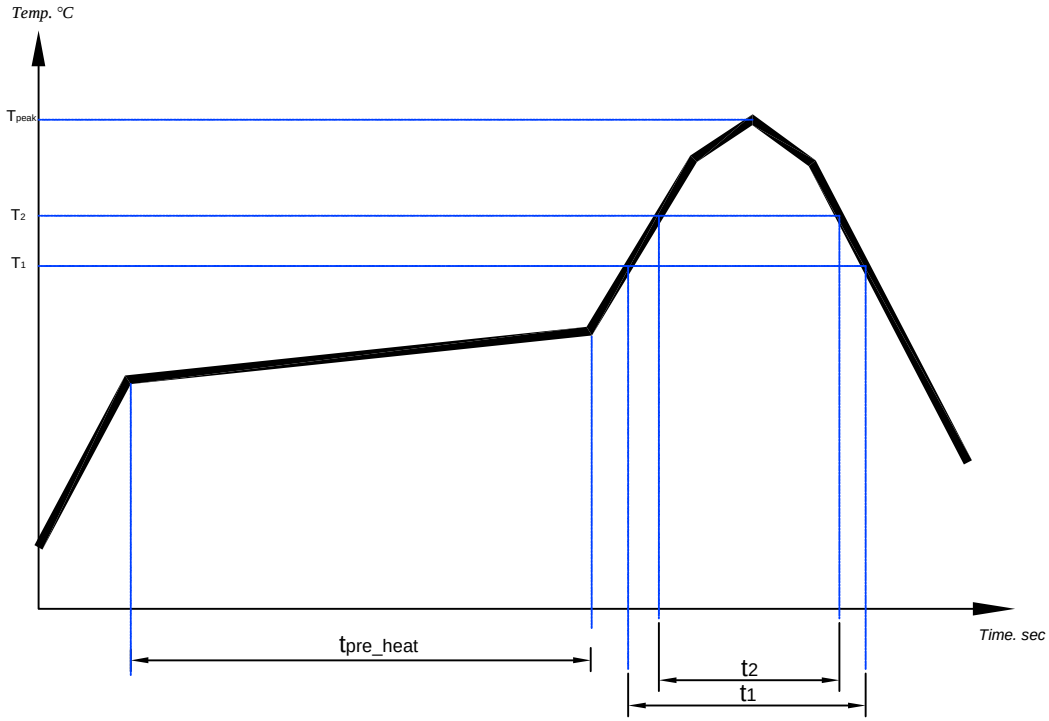


Nozzle Diameter: 1.0mm



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

12.3 Reflow Profile



Key Features of The Profile:

Average Temperature Gradient in Preheating	---	2.5℃/s
Pre_heat Time (170℃~180℃)	t_{pre_heat}	120-180s
Time Above 217℃	t_1	Max 80s
Time Above 230℃	t_2	Max 60s
Peak Temperature In Reflow	T_{peak}	260℃
Temperature Gradient In Cooling	---	Max -5℃/s

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

12.4 Rework

(1) 250℃～270℃, maximum 30 sec， Peak temperature 330℃.
(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 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.

14 Output Inspection Standard

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

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