Specification of MEMS Microphone

(RoHS Compliance & Halogen Free)

Customer Name :

Customer Model :

GoerTek Model : SD07OT261-041

GoerTek			CUSTOMER APPROVAL
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STANDARD	Sweety	2018.11.28	
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Restricted

1 Security warning

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2 Publication history

Version	Date	Description	Author	Approved
1.0	2018.11.28	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 (V_{DD}=1.8V f_{CLK}=2.4MHz, L=50 cm)

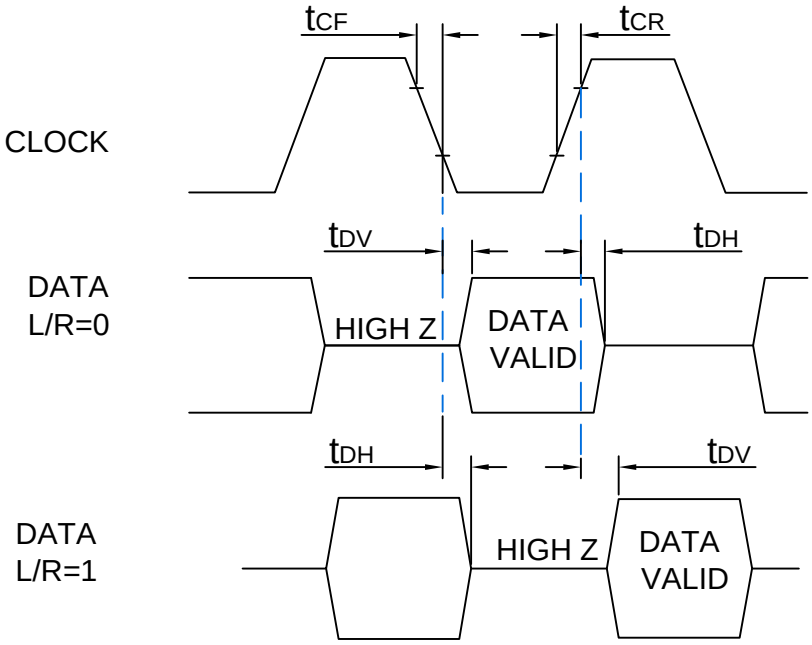
StandardConditions (As IEC 60268-4)	Temperature	Humidity	Air pressure
Environment Conditions	+15℃～+35℃	25％R.H.～75%R.H.	86kPa～106kPa
Basic Test Conditions	+20℃±2℃	60％R.H.～70%R.H.	86kPa～106kPa

3 Electrical and Acoustical Characteristics

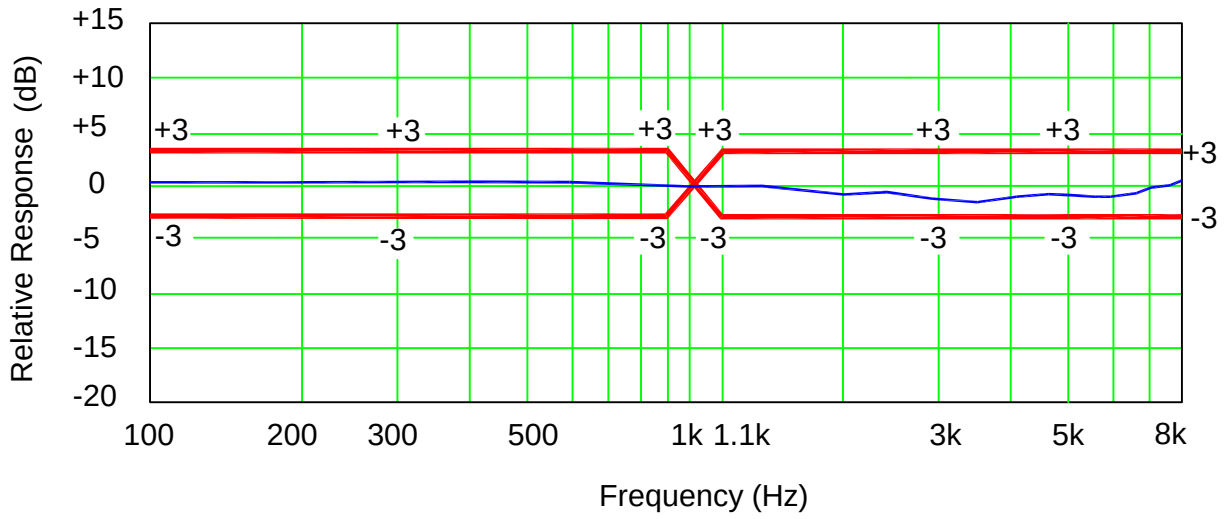
Item	Symbol	Test Conditions	Min	Stan.	Max	Unit
Sensitivity	S	f=1kHz,Pin=1Pa	-27	-26	-25	dBFS (Note 1)
Directivity	D(θ)		Omnidirectional			
Current Consumption (Note 2)	I_{DD}	CLK=ON,No load on DATA output			500	uA
Sleep Current	I_{sleep}	CLK=OFF or CLK<1kHz			50	uA
Analog S/N Ratio	S/N	f=1kHz,Pin=1Pa A-Weighted		60		dB
Operating Voltage Range	V_{DD}		1.6	1.8	3.6	V
Clock Frequency Range	f_{CLK}		1.2	2.4	3.5	MHz
Distortion	THD	Pin=94dB SPL@1kHz, S=typ			1	%
Acoustic Overload Point	AOP	10%THD@1kHz , S=typ		120		dBSPL
Power Supply Rejection	PSR	100mVpp square wave @217Hz ,A-weighted		-80		dBFS
Phase	Ph		Unity			
Short Circuit Current	Isc	Grounded DATA Pin			20	mA
Clock Duty Cycle	f_{DC}		40		60	%
Logic Input High	V_{IH}		0.65×V_{DD}		3.6	V
Logic Input Low	V_{IL}		-0.3		0.35×V_{DD}	V
Clock rise time	t_{CR}				6	ns
Clock fall time	t_{CF}				6	ns
Dalay Time for Valid Data (Note 3)	t_{DV}	No load for min t_{DV} Max C_{LOAD} for max t_{DV}	18		50	ns
DalayTime for High Z	t_{DH}		5		16	ns
Wake-up time	t_{WU}	V_{DD}=ON Fclk=2.4MHz			20	ms

Note 1. dBFS = 20xlog (A/B) where A is the level of the signal, B is the level that corrsponds to Full-scale level.
Note 2. The current consumption depends on the applied Clock Frequency and the load on the DATA output.

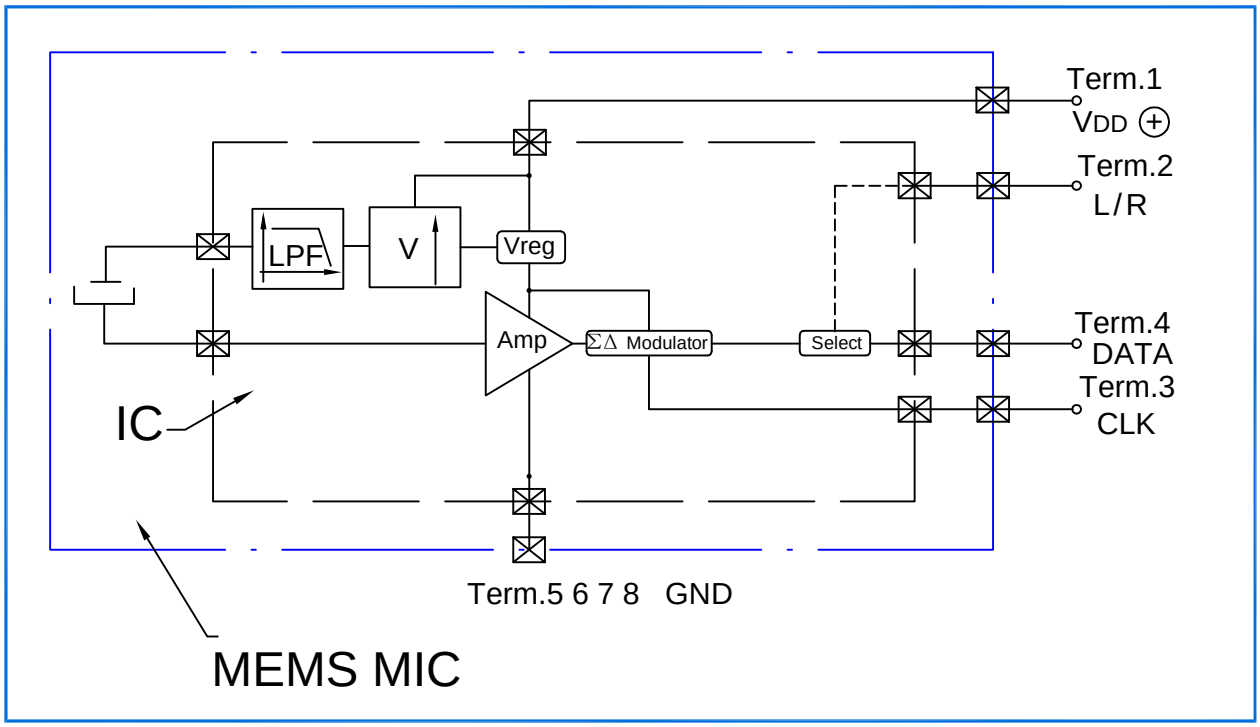
Note 3. Timing



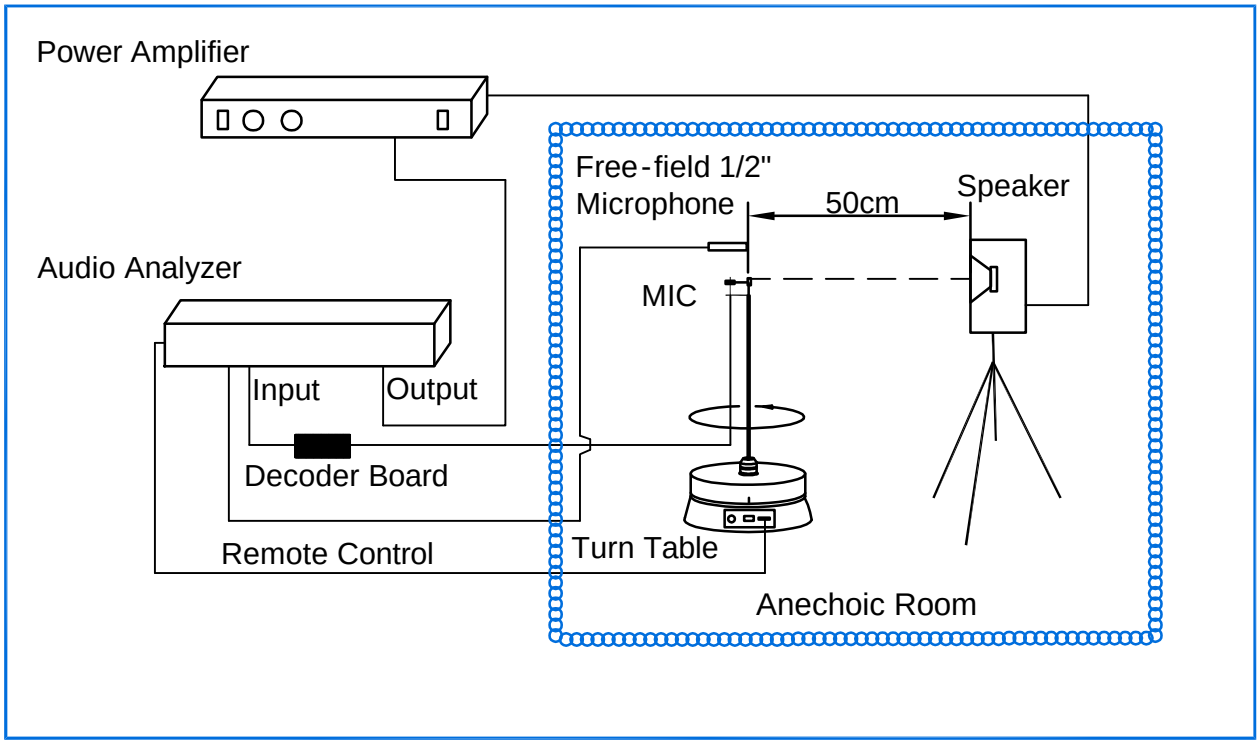
4 Frequency Response Curve and Limits



5 Measurement Circuit

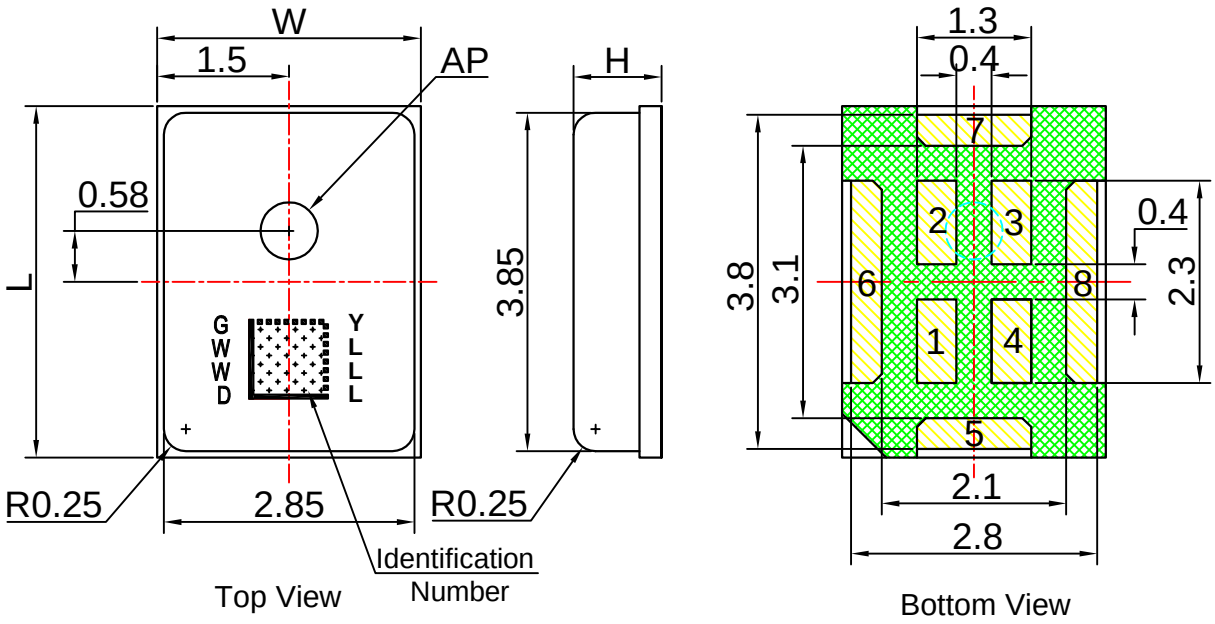


6 Test Setup Drawing



7 Mechanical Characteristics

7.1 Appearance Drawing (Unit: mm)



Pin#	Function
1	VDD
2	L/R
3	CLK
4	DATA
5	GND
6	GND
7	GND
8	GND

Item	Dimension	Tolerance	Unit
Length(L)	4.00	±0.10	mm
Width(W)	3.00	±0.10	mm
Height(H)	1.00	±0.10	mm
Acoustic Port (AP)	Ø0.65	±0.05	mm

Note: 1. Tolerance ±0.15mm unless otherwise specified.
2. Identification Number Convention:
Job Identification Number.

Identification Number [G][W][W][D] / [Y][L][L][L]

[G]: GoerTek [WW]:Week [D]:Day

[Y]:Year [LLL]: Lot Number

2D Code

7.2 Weight

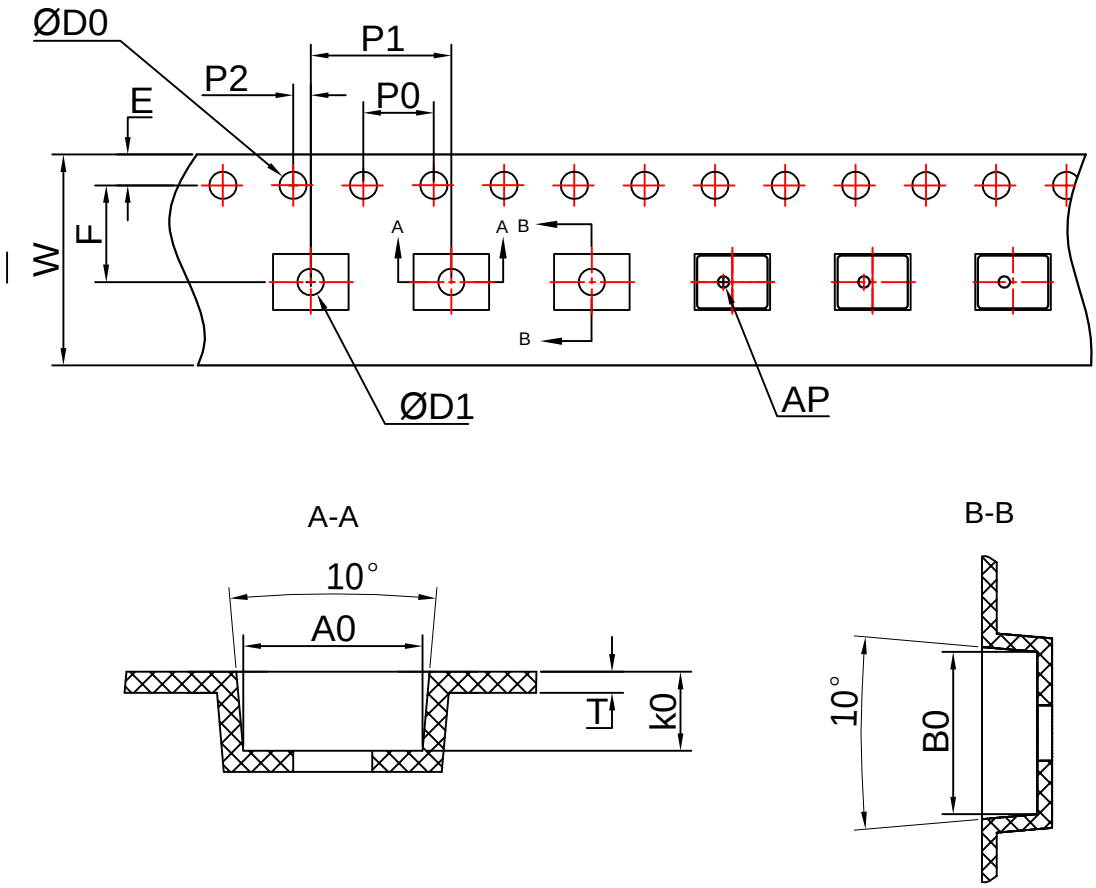
The weight of the MIC is less than 0.05g.

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 2h of conditioning at +15℃～+35℃, R.H. 25%～75% (Refer to JESD22-B103B)
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 JIG, JIG wight of 150g， sensitivity should vary within ±3dB from initial sensitivity. The measurement to be done after 2h of conditioning at +15℃～+35℃, R.H. 25%～75% (Refer to IEC 60068-2-32)
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% (Refer to IEC 60068-2-2) b) After exposure at -40℃ 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% (Refer to IEC 60068-2-1)
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 2h of conditioning at +15℃～+35℃, R.H. 25%～75% (Refer to IEC 60068-2-67)
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 2h of conditioning at +15℃～+35℃, R.H. 25%～75% (Refer to IEC 60068-2-27)
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 2h of conditioning at +15℃～+35℃, R.H. 25%～75% (Refer to IEC 60068-2-14)
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 2h of conditioning at +15℃～+35℃, R.H. 25%～75%
8.8 ESD Shock Test	Under C=150pF, R=330ohm, air discharge voltage ± 8KV to the case,10 times, sensitivity should vary within ±3dB from initial sensitivity. Under C=150pF, R=330ohm, contact discharge ± 2KV to I/O terminals,10 times(time interval 1.2s), case grounded, sensitivity should vary within ±3dB from initial sensitivity. The measurement to be done after 2h of conditioning at +15℃～+35℃, R.H .25%～75% （Refer to IEC 61000-4-2）

9 Package

9.1 Tape Specification



The Dimensions as Follows:

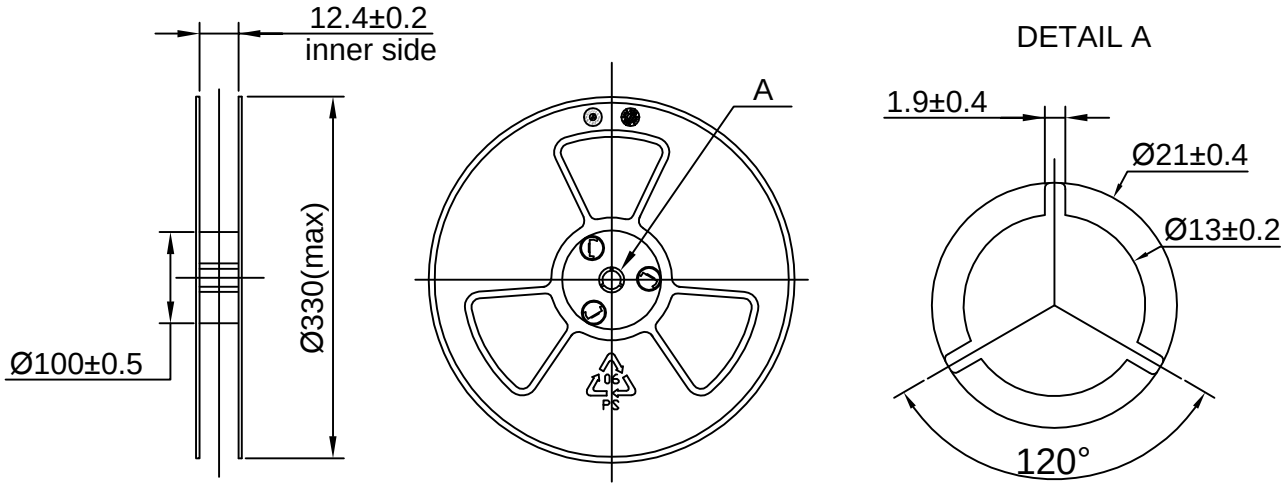
ITEM	W	E	F	ØD0	ØD1
DIM(mm)	12.0±0.10	1.75±0.10	5.50±0.05	1.55±0.05	1.50±0.1
ITEM	P0	10P0	P1	A0	B0
DIM(mm)	4.00±0.10	40.00±0.20	8.00±0.10	4.30±0.10	3.20±0.10
ITEM	K0	P2	T		
DIM(mm)	1.30±0.10	1.00±0.05	0.30±0.05		

9.2 Reel Dimension

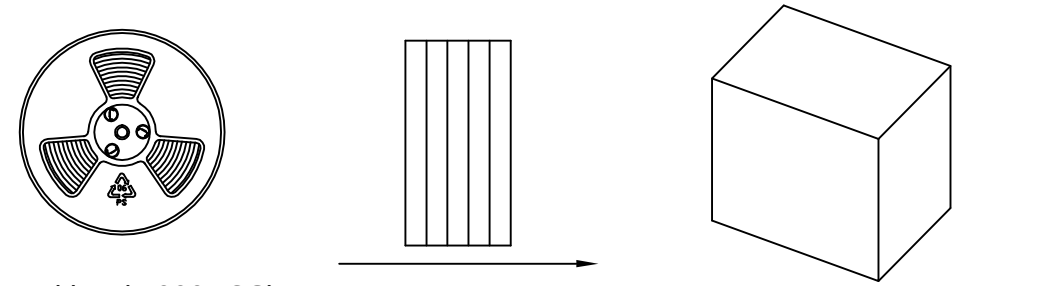
7" reel for sample stage

13" reel will be provided for the mass production stage

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

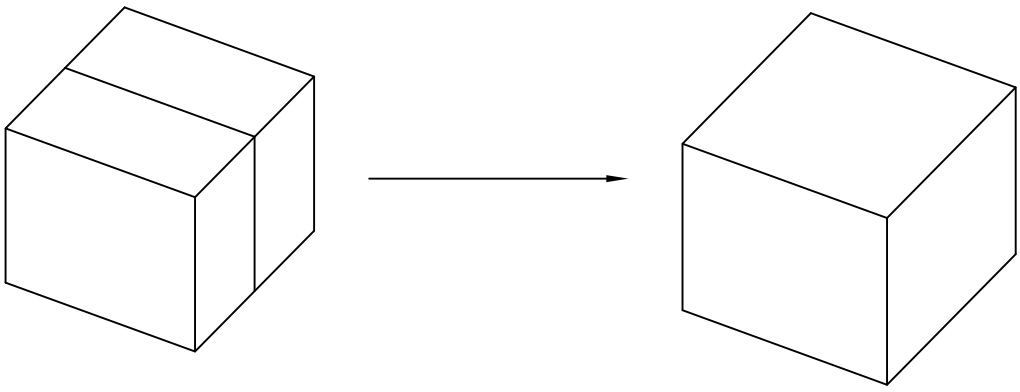


9.3 The Content of Box(13" reel)



Packing (4,000PCS)

Inner Box(20,000PCS)
(340mm×135mm×355mm)

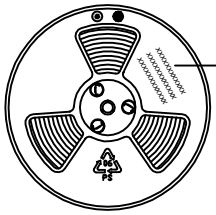


Two Inner Box(40,000PCS)

Outer Box(40,000PCS)
(370mm×300mm×390mm)

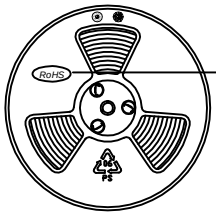
9.4 Packing Explain

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 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.

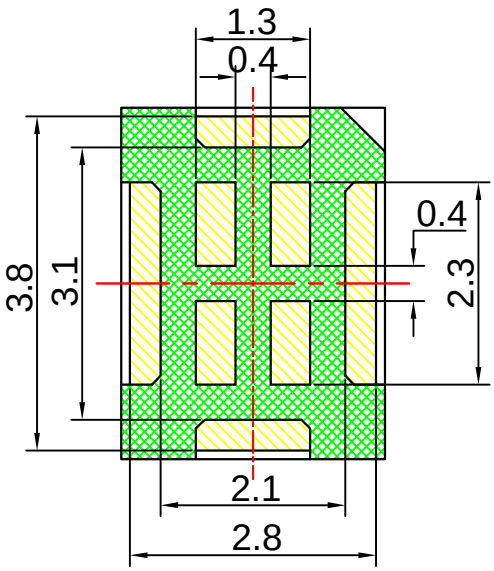
10.2 The MEMS MIC with normal pack can be transported by ordinary conveyances. Please protect products against moist, shock, sunburn and pressure during transportation.

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

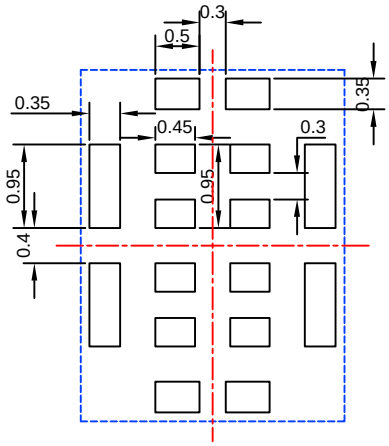
10.4 Operating Temperature Range：-40℃～+100℃

11 Land Pattern Recommendation

11.1 The Pattern of MIC Pad (unit:mm)



11.2 Recommended Solder Stencil Pattern (unit:mm)

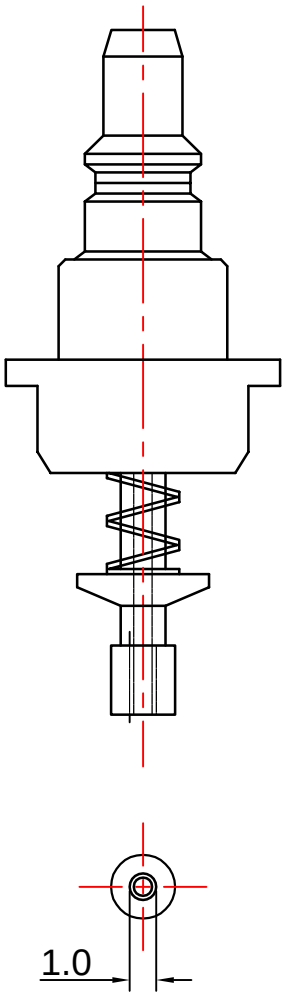


12 Soldering Recommendation

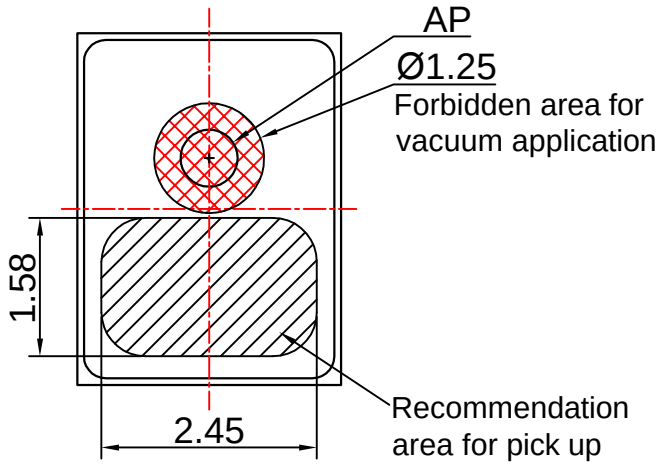
12.1 Soldering Machine Condition

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

12.2 The Drawing and Dimension of Nozzle

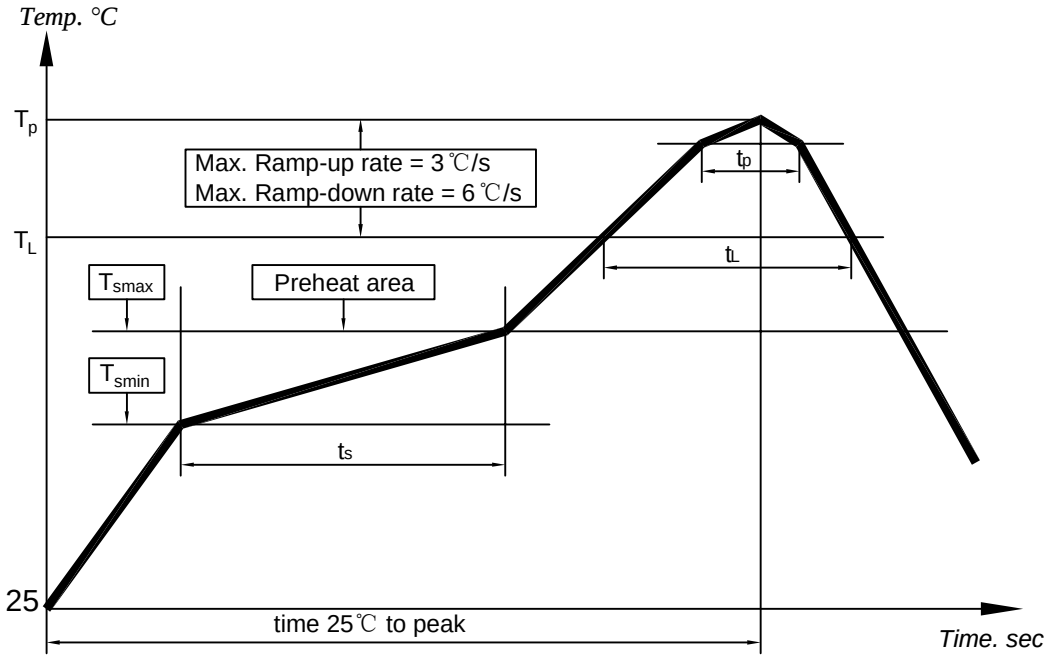


Nozzle Diameter: 1.0mm



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

12.3 Reflow Profile



Key Features of The Profile:

Average 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.

13 Cautions When Using MEMS MIC

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 pull a nozzle over the acoustic port of the microphone or blow the acoustic port,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.

13.4 Wire width Restrictions

It is needed to adjust the dumping resistance according to the wire length and wire tod,etc. when using.
It is also necessary to insert dumping resistance in the Data line located adjacent to the microphone according to circumstances.

14 Output Inspection Standard

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