Specification of MEMS Microphone

(RoHS Compliance & Halogen Free)

Customer Name :

Customer Model :

GoerTek Model : SD18OB261-060

GoerTek			CUSTOMER APPROVAL
DESIGN	Jasen	2018.10.05	
CHKD	Samual	2018.10.05	
STANDARD	Sweety	2018.10.05	
APVD	Daniel	2018.10.05	

Restricted

1 Security Warning

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2 Publication History

Version	Description	Date	Author	Approved
1.0	New Design	2018.10.05	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 (L=50 cm)

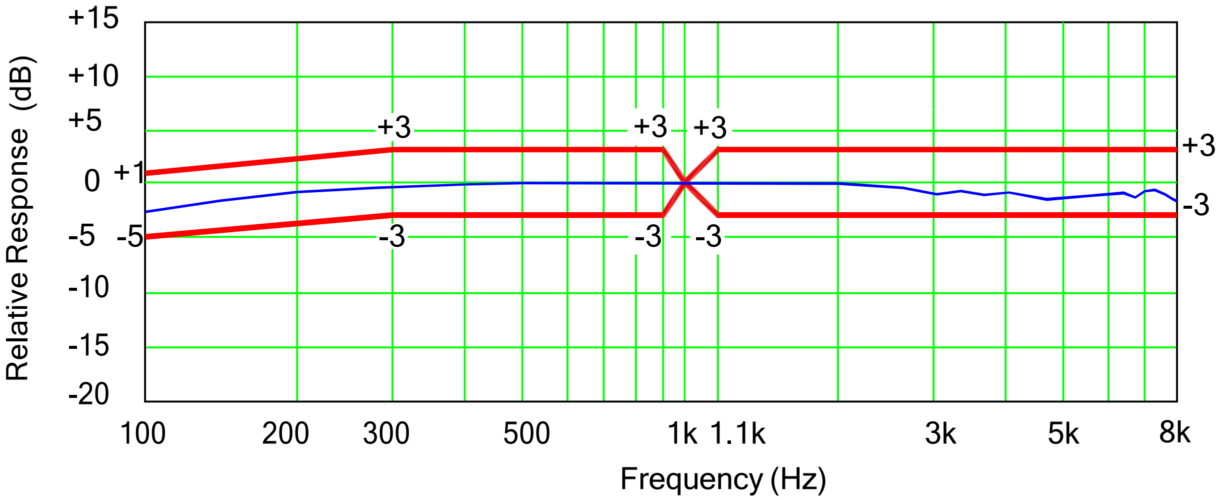
StandardConditions (As IEC 60268-4)	Temperature	Humidity	Air pressure
Environment Conditions	+15℃～+35℃	25％RH～75%RH	86kPa～106kPa
Basic Test Conditions	+20℃±2℃	60％RH～70%RH	86kPa～106kPa

3 Acoustical and Electrical Characteristics

3.1 Standard Performance Mode (Test Condition: V_{DD}=1.8V, f_{CLK}=2.4MHz)

Item	Symbol	Test Conditions	Min	Typ	Max	Unit
Sensitivity	S	f=1kHz, Pin=1Pa	-27	-26	-25	dBFS (Note 1)
Current Consumption (Note 2)	I	f_{clk}=2.4MHz	-	390	500	µA
S/N Ratio	SNR	f=1kHz, P_{in}=1Pa A-Weighted Curve	-	65	-	dB
Distortion	THD	94dB SPL@ 1kHz	-	-	1	%
Acoustic Overload Point	AOP	10% THD @1 kHz	-	120	-	dB SPL
Power Supply Rejection	PSR	100mVpp squarewave@217Hz	-	-88	-	dBFS
Power Supply Rejection Ratio	PSRR	100mVpp squarewave@217Hz	-	60	-	dBFS

3.2 Frequency Response Curve and Limits



3.3 Low Power Mode (Test Condition: V_{DD}=1.8V, f_{CLK}=768kHz)

Item	Symbol	Test Conditions	Min	Typ	Max	Unit
Sensitivity	S	f=1kHz, Pin=1Pa	-26.5	-25.5	-24.5	dBFS (Note 1)
Current Consumption (Note 2)	I	f_{clk}=768kHz	-	250	350	μA
S/N Ratio	SNR	f=1kHz, P_{in}=1Pa A-Weighted Curve	-	62	-	dB
Distortion	THD	94dB SPL@ 1kHz	-	-	1	%
Acoustic Overload Point	AOP	10% THD @1 kHz	-	120	-	dB SPL
Power Supply Rejection	PSR	100mVpp squarewave@217Hz	-	-88	-	dBFS
Power Supply Rejection Ratio	PSRR	100mVpp squarewave@217Hz	-	60	-	dBFS

3.4 General Microphone Specifications

Test Condition: V_{DD}=1.8V,f_{CLK}=2.4MHz, select pin grounded,no load.

Item		Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage		V_{DD}		1.60	-	3.6	V
Frequency Range	Sleep Mode			0	-	150	kHz
	Standard Mode			1.2	-	3.5	MHz
Sleep Current		I_{sleep}		-	10	-	μA
Directivity				Omnidirectional			
Polarity			Increasing Sound	Increasing density of 1's			
Data Format				PDM			
Short Circuit Current		I_{SC}	Ground Data Pin	-	-	20	mA
Output Load		C_{load}		-	140	-	pF
Fall-asleep Time				-	-	10	ms
Wake-up Time		T_W	f_{CLK}≥200kHz	-	-	20	ms
Start-up Time		T_S		-	-	50	ms
Mode-Change Time				-	-	10	ms

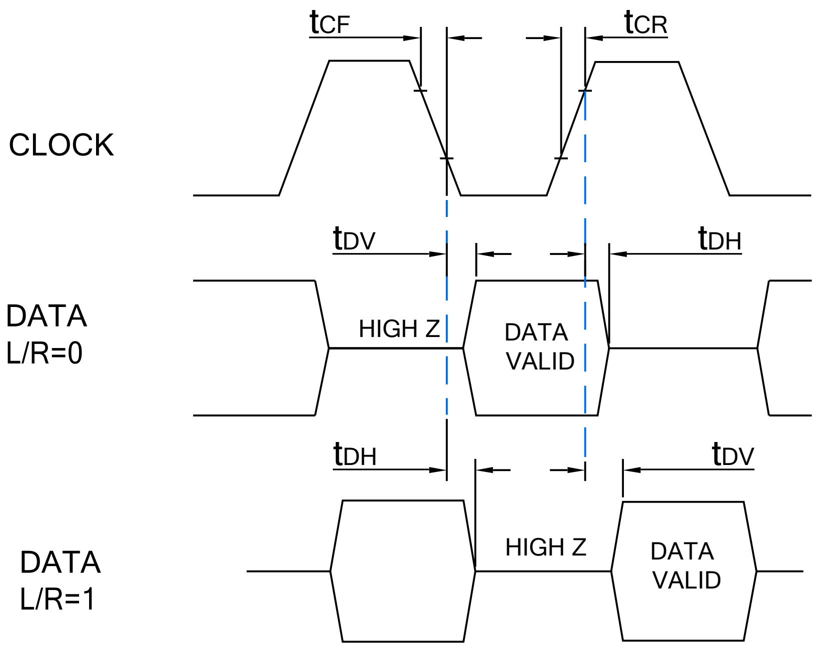
3.5 Microphone Interface Specifications

Item	Symbol	Test Conditions	Min	Typ	Max	Unit
Logic Input High	V_{IH}		0.65× V_{DD}	-	3.6	V
Logic Input Low	V_{IL}		-0.3	-	0.35× V_{DD}	V
Logic Output High	V_{OH}		V_{DD}-0.45	-	V_{DD}	V
Logic Output Low	V_{OL}		0	-	0.45	V
SELECT(high)			V_{DD}-0.45	-	3.6	V
SELECT(low)			-0.3	-	0.2	V
Clock Duty Cycle		$f_{CLK} \le$ 2.4MHz	40	-	60	%
		2.4MHz < $f_{CLK} \le$ 3.5MHz	48	50	52	%
Clock Rise/Fall Time	t_{CF},t_{CR}		-	-	6	ns
Dalay Time for Valid Data (Note 3)	t_{DV}	No load for min t_{DV}	18	-	50	ns
		Max C_{LOAD} for max t_{DV}				
DalayTime for High Z	t_{DH}		5	-	16	ns

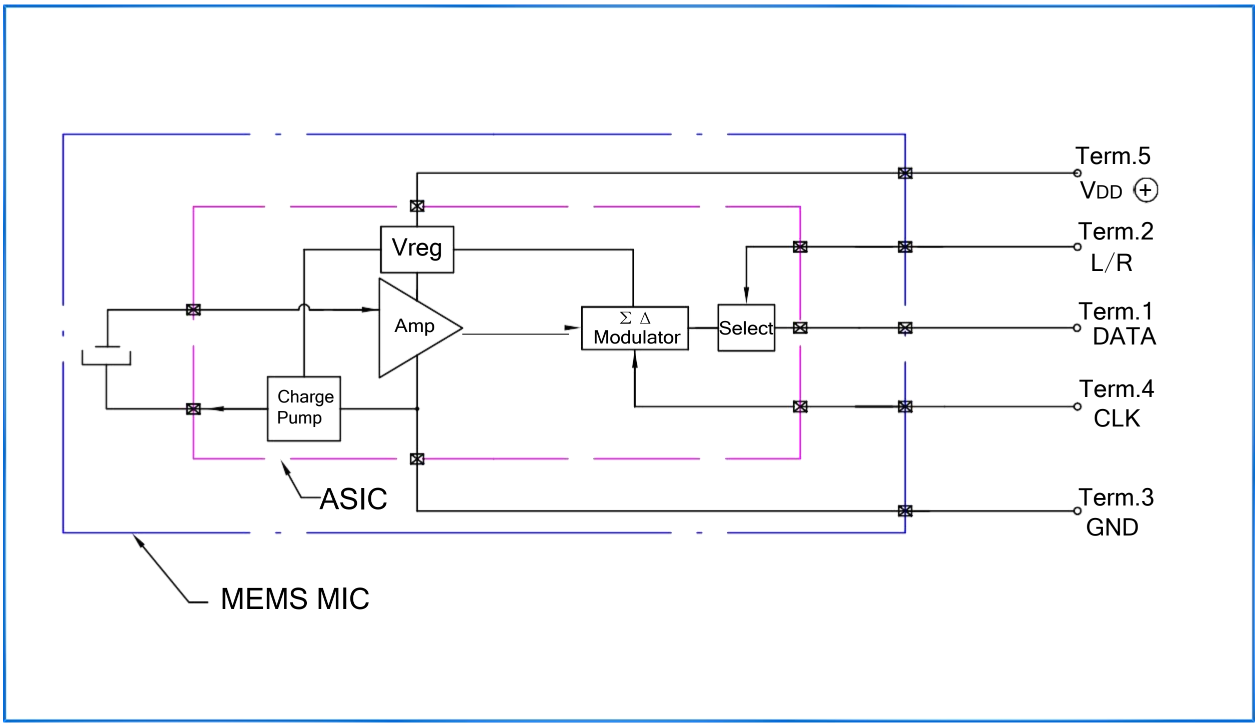
Note 1. dBFS = 20xlog (A/B) where A is the level of the signal, B is the level that corrsponds to Full-scale level.

Note 2. The current consumption depends on the applied Clock Frequency and the load on the DATA output.

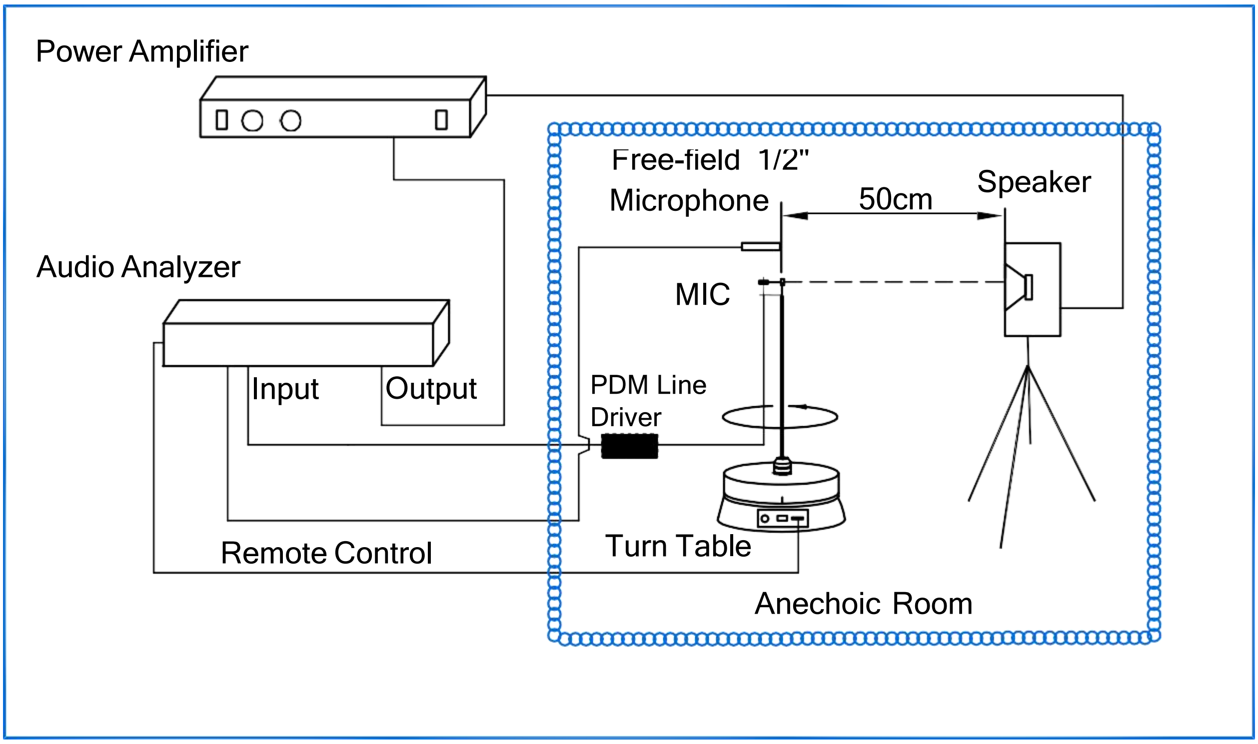
Note 3. Timing



4 Measurement Circuit

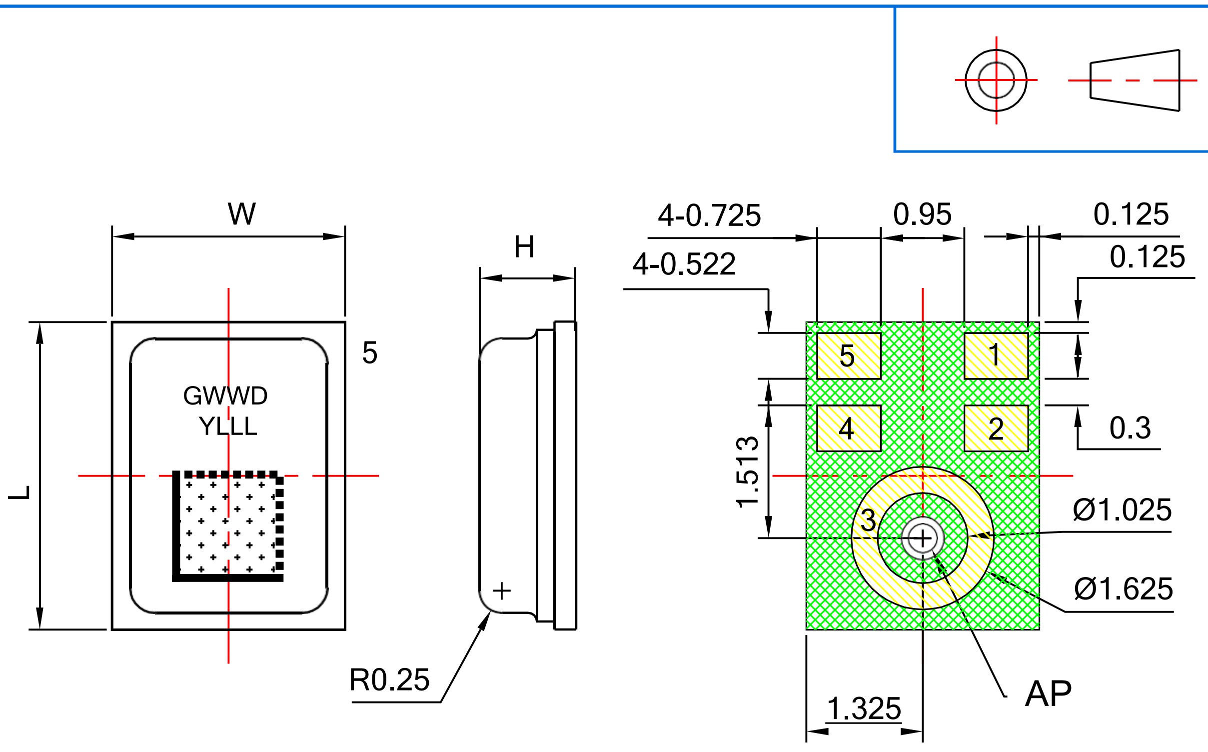


5 Test Setup Drawing



6 Mechanical Characteristics

6.1 Appearance Drawing (Unit: mm)



Top View Side View Bottom View

Pin#	Function
1	Data
2	L/R
3	GND
4	CLK
5	VDD

ITEM	DIMENSION	TOLERANCE	UNITS
Length(L)	3.50	±0.10	mm
Width(W)	2.65	±0.10	mm
Height(H)	0.98	±0.10	mm
ACOUSTIC PORT(AP)	Ø0.325	±0.05	mm

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

2. Identification Number Convention: Job Identification Number.

Identification Number G W W D
Y L L L

G: GoerTek W W :Week D:Day ▨2D Code
Y:Year L L L: Lot Number

6.2 Weight

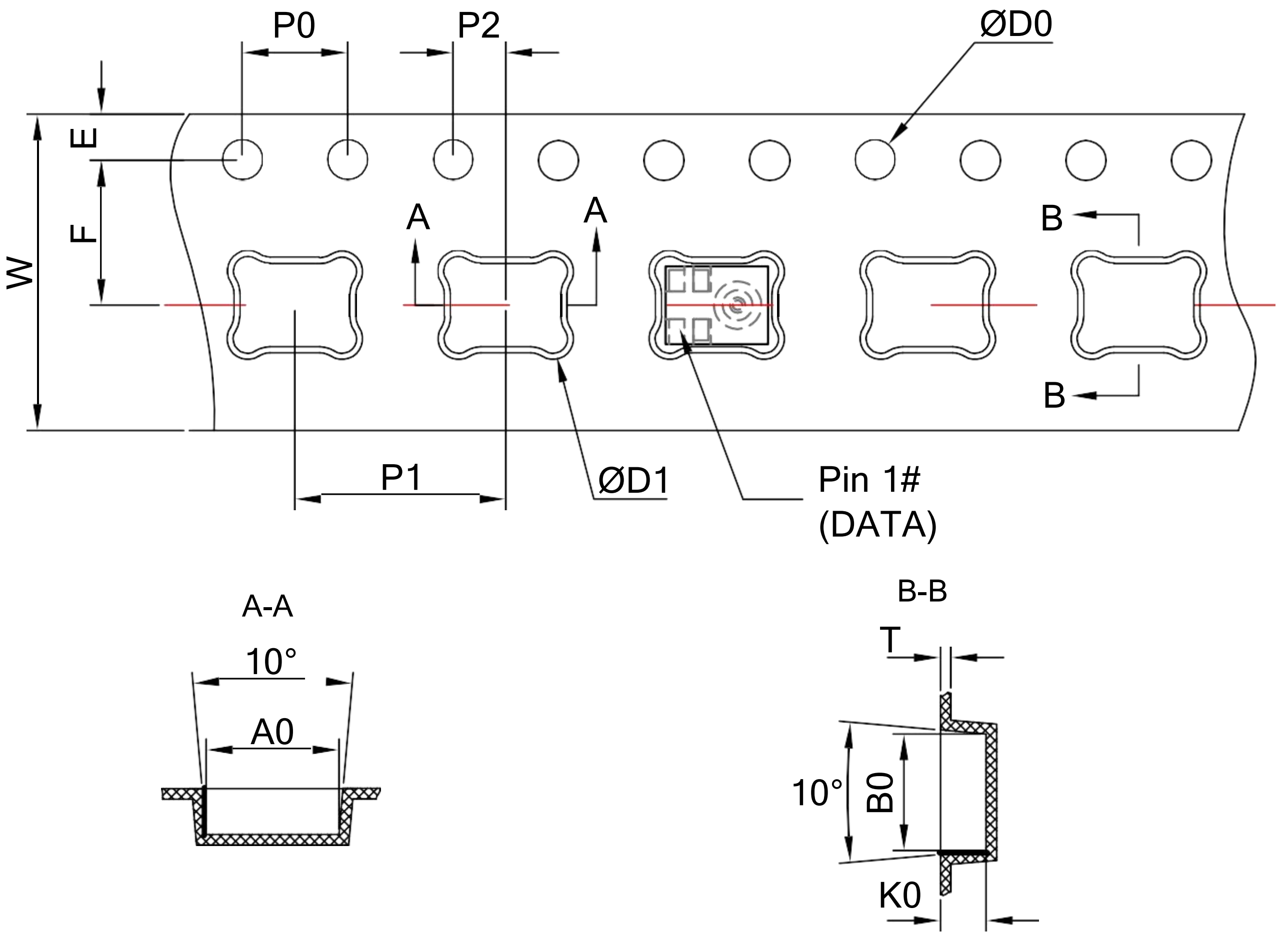
The weight of the MIC is Less than 0.05g.

7 Reliability Test

7.1 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%)
7.2 Drop Test	To be no interference in operation after dropped to 1.0 cm steel plate 12 times from 1.5 meter height in state of JIG,JIG weight of 100 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%)
7.3 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%)
7.4 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%)
7.5 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%)
7.6 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%)
7.7 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%)
7.8 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%)

8 Package

8.1 Tape Specification



The Dimensions as Follows:

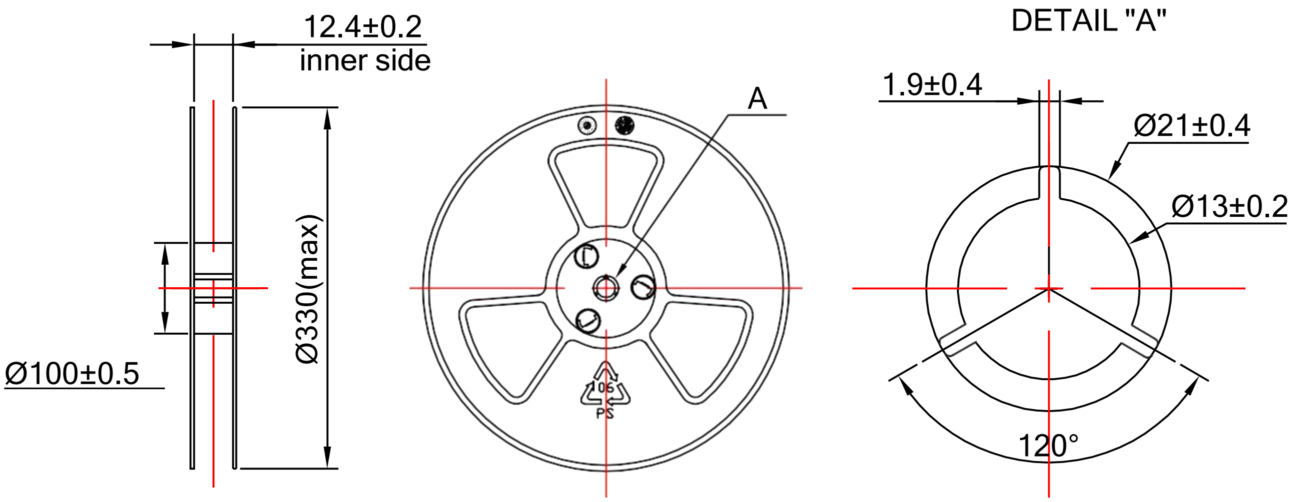
ITEM	W	E	F	ØD0	ØD1
DIM(mm)	12.0±0.30	1.75±0.10	5.5±0.05	$1.50^{+0.10}_{0}$	0.50±0.10
ITEM	P0	10P0	P1	A0	B0
DIM(mm)	4.00±0.10	40.00±0.20	8.00±0.10	3.75±0.05	2.85±0.05
ITEM	K0	P2	T		
DIM(mm)	1.30±0.10	2.00±0.05	0.30±0.05		

8.2 Reel Dimension

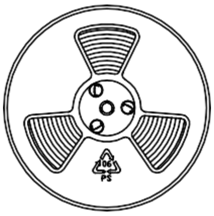
7" reel for sample stage

13" reel will be provided for the mass production stage

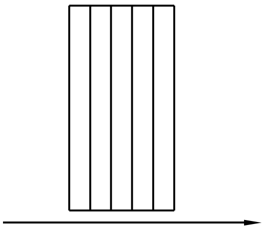
The following is 13" reel dimensions (unit:mm)

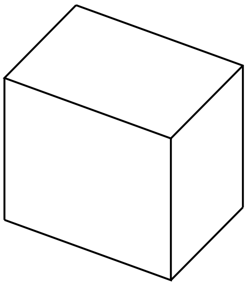


8.3 The Content of Box(13" reel)

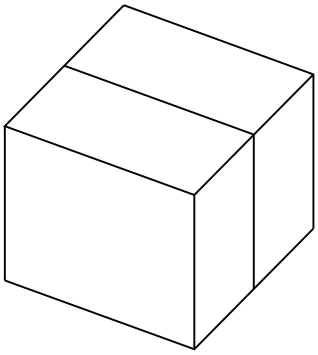


Packing (5,000PCS)

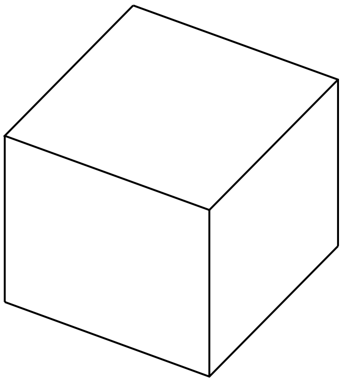




Inner Box(25,000PCS)
(340mm×135mm×355mm)



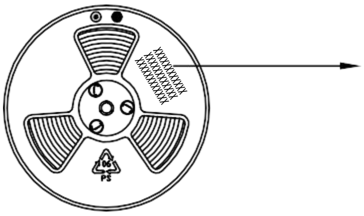
Two Inner Box(50,000PCS)



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

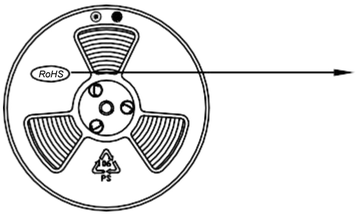
8.4 Packing Explain

8.4.1 The Label Content of the Reel



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

8.4.2 The RoHS Label



RoHS Compliance&
Halogen Free Mark

9 Storage and Transportation

9.1 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.

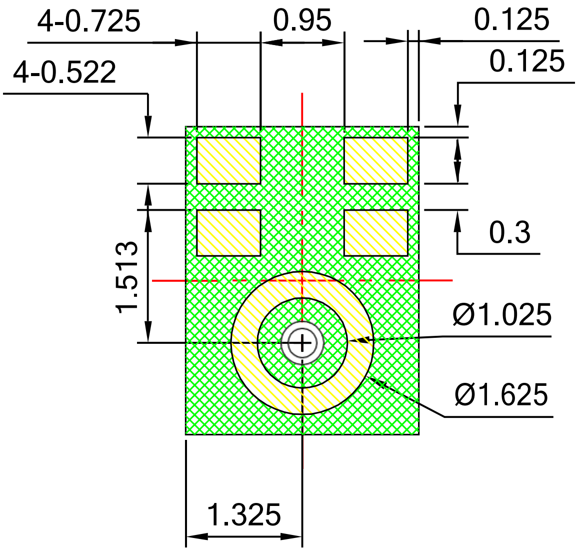
9.2 The MEMS MIC with normal pack can be transported by ordinary conveyances. Please protect products against moist, shock, sunburn and pressure during transportation.

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

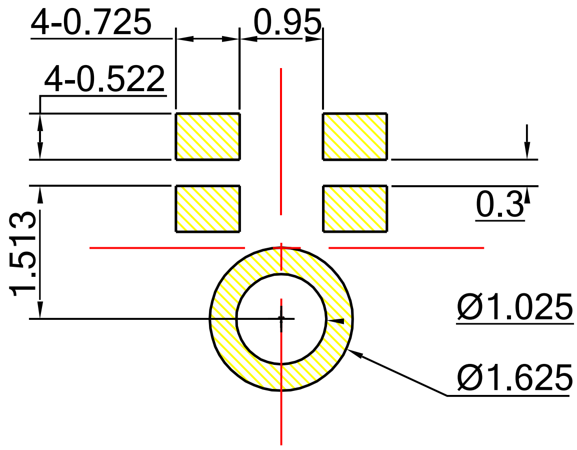
9.4 Operating Temperature Range：-40℃～+100℃

10 Land Pattern Recommendation

10.1 The Pattern of MIC Pad(Unit:mm)



10.2 Recommended Soldering Surface Land Pattern (Unit:mm)

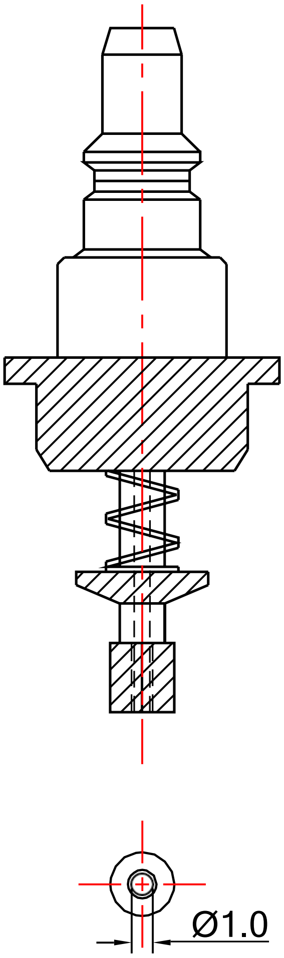


11 Soldering Recommendation

11.1 Soldering Machine Condition

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

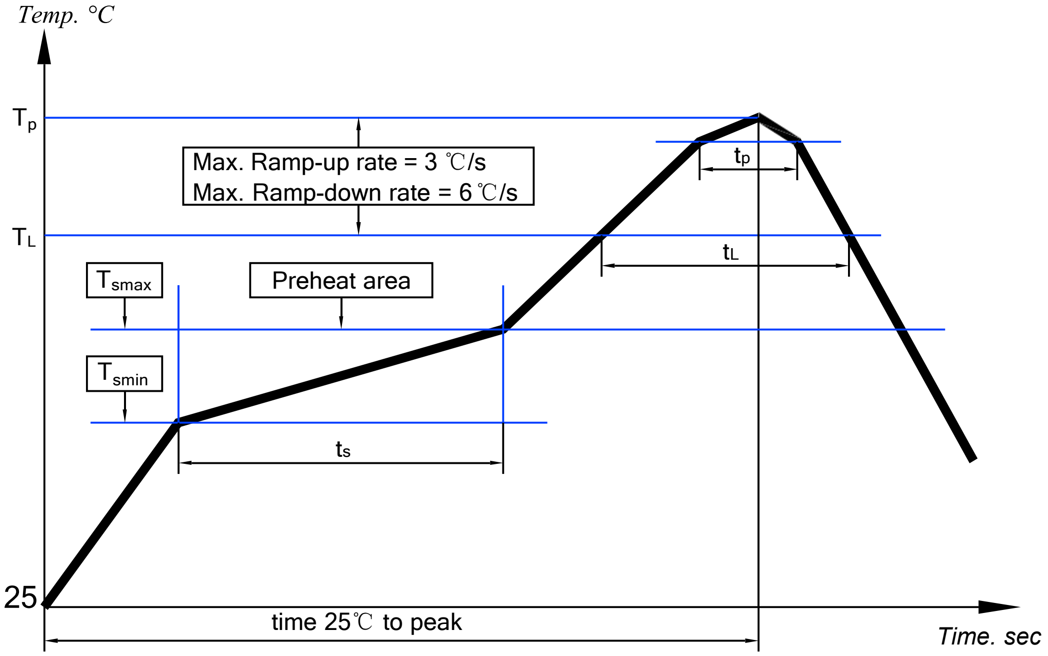
11.2 The Drawing and Dimension of Nozzle



Inside Diameter: 1.0mm;

Please don't vacuum over the acoustic port directly.
Please don't blow the acoustic port directly.

11.3 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.

11.4 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.

12 Cautions When Using MEMS MIC

12.1 Board Wash Restrictions

It is very important not to wash this silicon microphone, otherwise this could damage the microphone.

12.2 Sound Hole Protection

It is very important not to operate vacuum and air blow into sound hole(without any covering over sound holes), otherwise this could damage the microphone.
And it is necessary to be careful about foreign substances into sound hole inside silicon microphone.

12.3 Wire width Adaption

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.

12.4 Ultrasonic Restrictions

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

13 Output Inspection Standard

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