



## APPROVAL SHEET FOR MICROPHONE

CUSTOMER: \_\_\_\_\_

CHECKER: \_\_\_\_\_ Li Tao

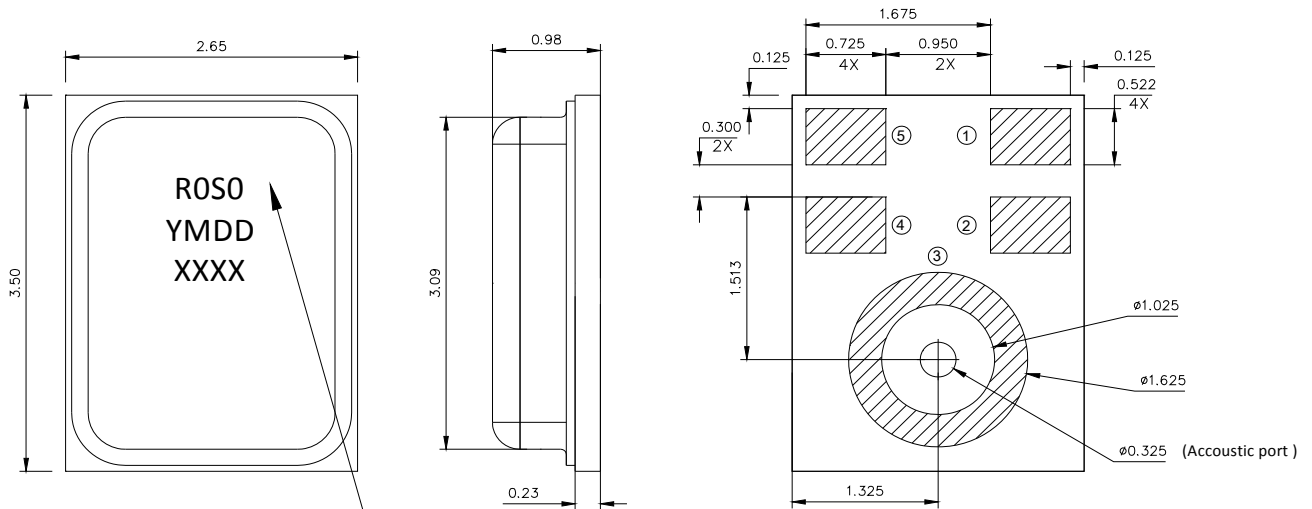
APPROVER: \_\_\_\_\_ Wu Zhijiang



## CONTENTS

1. Mechanical Layout and Dimensions-----	3
2. Product Specifications-----	4
3. Test Setup-----	7
4. Recommended Interface Circuit -----	7
5. Reliability Specifications-----	8
6. Packaging Specifications-----	9
7. Solder Reflow Profile-----	12
8. Recommended Customer Land Pattern-----	13
9. Specification History-----	13

## 1. Mechanical Layout and Dimensions



<b>Y</b>	Year, 1 number, 0~9 stand for 2010~2019
<b>M</b>	Month, 1 number, 1~9,A,B,C
<b>DD</b>	Date, 2 numbers, 01~31

### Pin description

No.	Name	Description
1	Data	PDM data output from the microphone
2	L/R	Left/Right(DATA2/DATA1) channel selection
3	Ground	Ground
4	Clock	Clock input to the microphone
5	Power	Supply and IO voltage for the microphone

### Product size

Item	Dim.	Tol.(+/-)	Unit
Length	3.50	0.10	mm
Width	2.65	0.10	mm
Height	0.98	0.10	mm
Port Hole	0.325	0.05	mm

Note: Tolerance +/-0.15mm unless otherwise specified

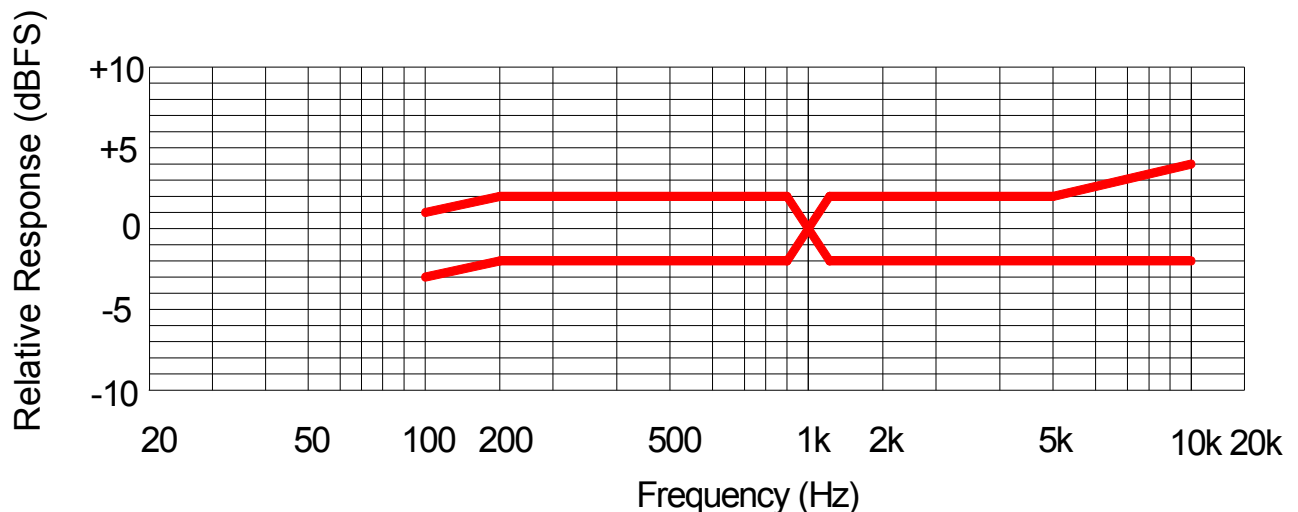
## 2. Product Specifications:

Unless otherwise specified, test conditions are:

- $V_{dd} = 1.8V$
- Clock = 2.40MHz, Duty cycle = 50%
- $F_{IN} = 1 \text{ kHz @ } 94\text{dB SPL}$
- $T_a = 27^\circ\text{C}$ , Room Humidity = 50%

SNR & noise measurement is based on 20 – 20kHz pass band with A-weighting filter applied

Items	Symbol	Condition	Limits			Unit
			Min.	Typ.	Max.	
<b>PERFORMANCE</b>						
2.1 Directivity		Omni-Directional				
2.2 Sensitivity	S	1kHz, 94dB SPL	-29	-26	-23	dBFS
2.3 Signal-to-Noise Ratio	SNR	A-weighting at 1kHz 1Pa		63		dB
2.4 Total Harmonic Distortion	THD	1kHz, 94dB SPL			0.5	%
		1kHz, 115dB SPL			5	
2.5 Power Supply Rejection Ratio	PSR	217Hz, 100mV <sub>pp</sub> square wave superimposed on $V_{dd}=1.8V$		-80		dBFS
2.6 Acoustic Overload Point		THD<10%		122		dB SPL
2.7 Frequency Response Mask						

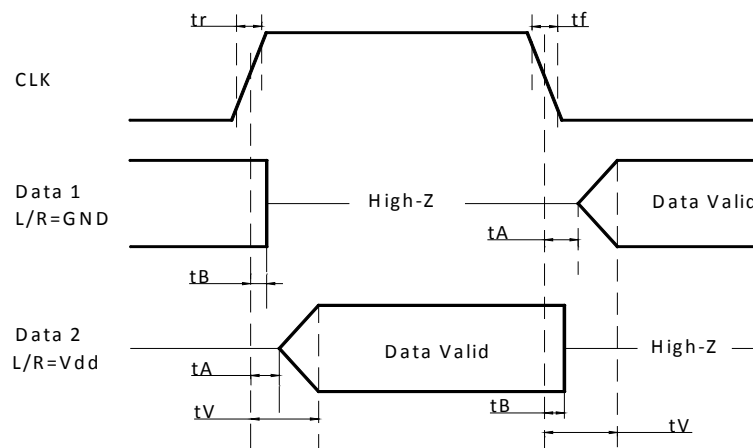




Items	Symbol	Condition	Limits			Unit
			Min.	Typ.	Max.	
<b>INPUT CHARACTERISTICS</b>						
2.8 Supply Voltage	V <sub>dd</sub>		1.64	1.80	3.6	V
2.9 Current Consumption	I <sub>s</sub>	Normal mode			850	uA
		Sleep mode			50	uA
2.10 Clock Frequency	F <sub>clk</sub>		1.00	2.40	3.25	MHz
2.11 Duty Cycle			40	50	60	%
2.12 Input Logic High Level	V <sub>IH</sub>		0.65xV <sub>dd</sub>		V <sub>dd</sub> +0.3	V
2.13 Input Logic Low Level	V <sub>IL</sub>		-0.3		0.35xV <sub>dd</sub>	V
<b>OUTPUT CHARACTERISTICS</b>						
2.14 Output Voltage High	V <sub>oh</sub>		0.70*V <sub>dd</sub>			V
2.15 Output Voltage Low	V <sub>ol</sub>				0.30*V <sub>dd</sub>	V
2.16 Short Circuit Current		Maximum logic output current	1		10	mA
2.17 Load Capacitance					200	pF
<b>SWITCHING CHARATERISTICS</b>						
<b>Audio Interface Timing</b>						
2.18 Delay Time for Data Driven	t <sub>A</sub>		18	30		ns
2.19 Delay Time for Data Valid	t <sub>v</sub>	From clock edge to data valid, C <sub>load,max</sub> =200pF, R <sub>load,min</sub> =500kΩ			114	ns
2.20 Delay Time for High-Z	t <sub>B</sub>			8	16	ns
2.21 Clock Rise Time	t <sub>r</sub>	C <sub>Load</sub> =200pF, 2.4MHz, from 10%V <sub>dd</sub> to 90%V <sub>dd</sub>			13	ns
2.22 Clock Fall Time	t <sub>f</sub>	C <sub>Load</sub> =200pF, 2.4MHz, from 90%V <sub>dd</sub> to 10%V <sub>dd</sub>			13	ns

**Power Up/Down Timing**

2.23 Wake-up Period	$t_{WK}$				10	ms
2.24 Fall-asleep Period	$t_{FSL}$				10	ms
2.25 Stand-by Clock Frequency	$F_{clksb}$				1	kHz

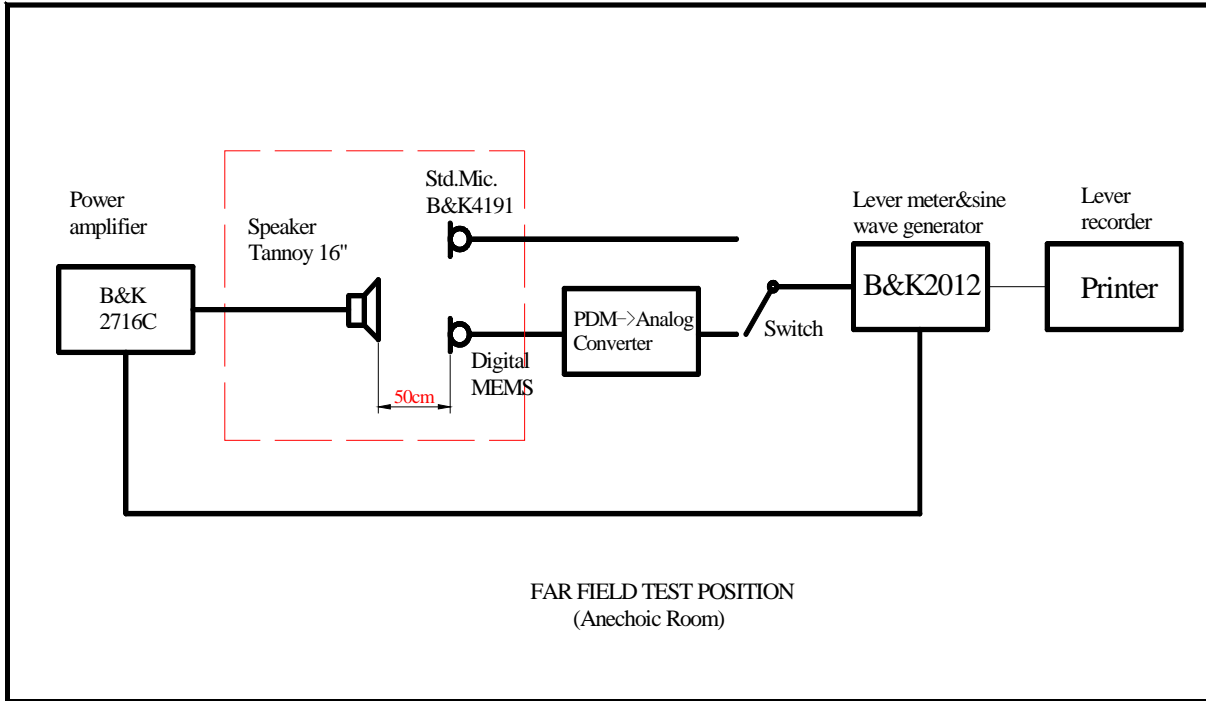
**Timing Diagram**


Label	L/R	Drives Data After	High-Z After
Data 1	Low (L)	Falling Clock Edge	Rising Clock Edge
Data 2	High (H)	Rising Clock Edge	Falling Clock Edge

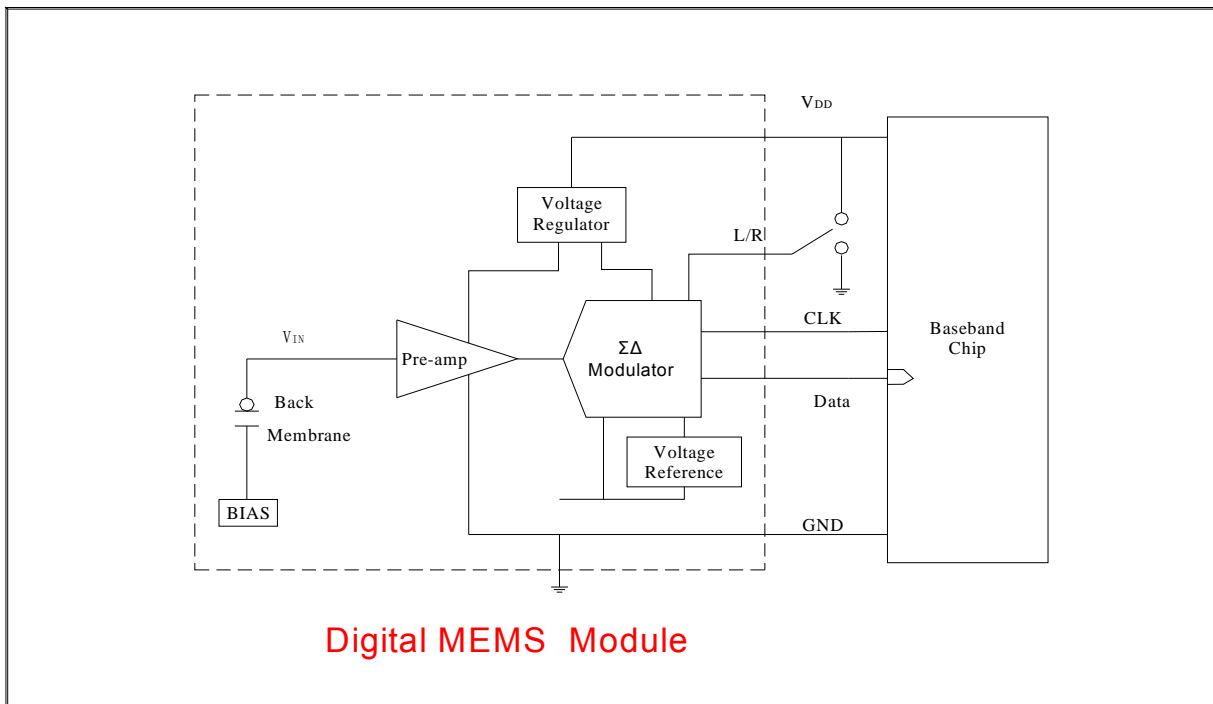
**ENVIROMENTAL CHARACTERISTICS**

2.26 Operating Temperature			-30		+70	°C
2.27 Storage Temperature		Soldered onto PC Board	-40		+85	°C
		In Tape/Reel's	-10		+50	°C
2.28 Relative Humidity			25		85	%
2.29 Air Pressure			860		1060	mBar

### 3. Test Setup



### 4. Recommended Interface Circuit



## 5. Reliability Specifications

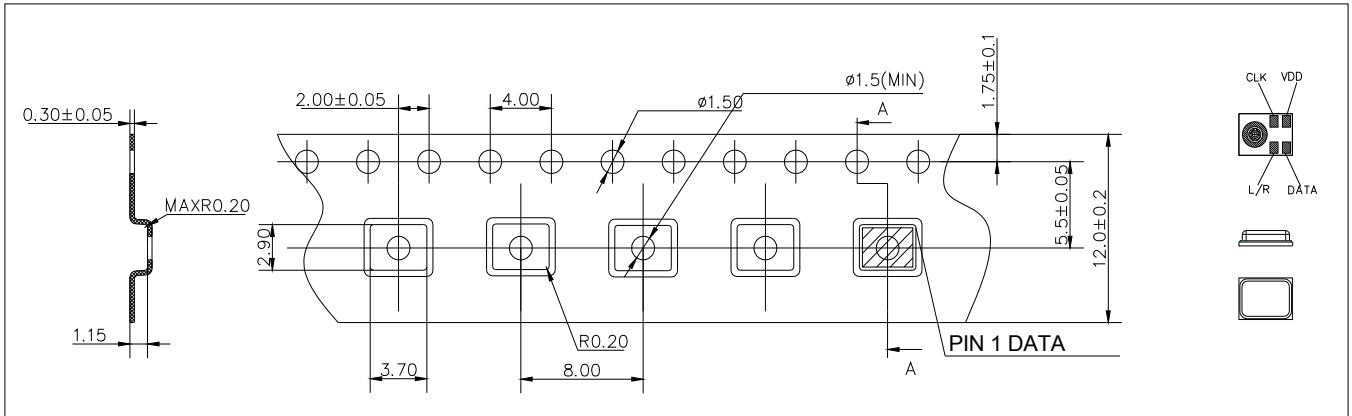
As per customer's requirements. If no customer's requirements available please refer to following tests.

Test item	Detail	Standard
Reflow Simulation	Refer to 7. solder reflow profile, total 3 times	/
Low Temperature	Conditions: $-40\pm 3^{\circ}\text{C}$ Duration: 72 hours	IEC60068-2-1
High Temperature	Conditions: $85\pm 3^{\circ}\text{C}$ Duration: 72 hours	IEC60068-2-2
Temperature Shock	Conditions: 30 minutes at $-40^{\circ}\text{C}$ followed by 30 minutes at $85^{\circ}\text{C}$ , 20 second maximum transition time between temperature extremes. 32 cycles	IEC60068-2-14
Vibration Test	Conditions: 10~60Hz: 0.35mm 60~500Hz: 5g 1 oct/min Duration: 15 minutes per plane.	IEC60068-2-6
Damp heat	Conditions: $55\pm 3^{\circ}\text{C}$ 93%RH Duration: 96 hours	IEC60068-2-56
Drop Test	Conditions: 1.5 Meter height onto a concrete surface each time at three direction in state of packing	IEC60068-2-32
ESD	Conditions: 3 discharges at $\pm 8\text{kV}$ , 150pF, 330 $\Omega$ direct contact to housing and per MIL-883F, method 3015.7, 3 discharges at $\pm 2\text{kV}$ direct contact to all pins.	IEC61000-4-2

The measurement shall to be done after 2 hours of conditioning at room temperature.

The sensitivity change within  $\pm 3\text{dBFS}$  relative to initial value.

## 6. Packaging Specifications

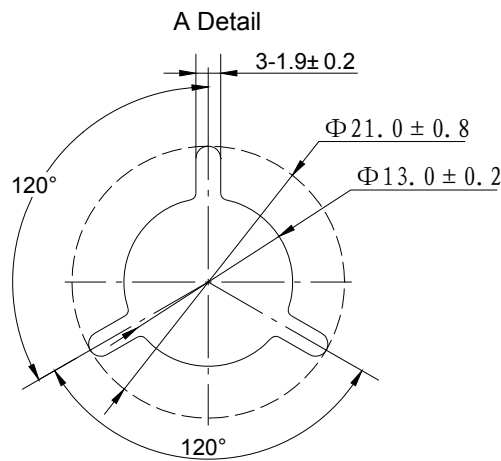
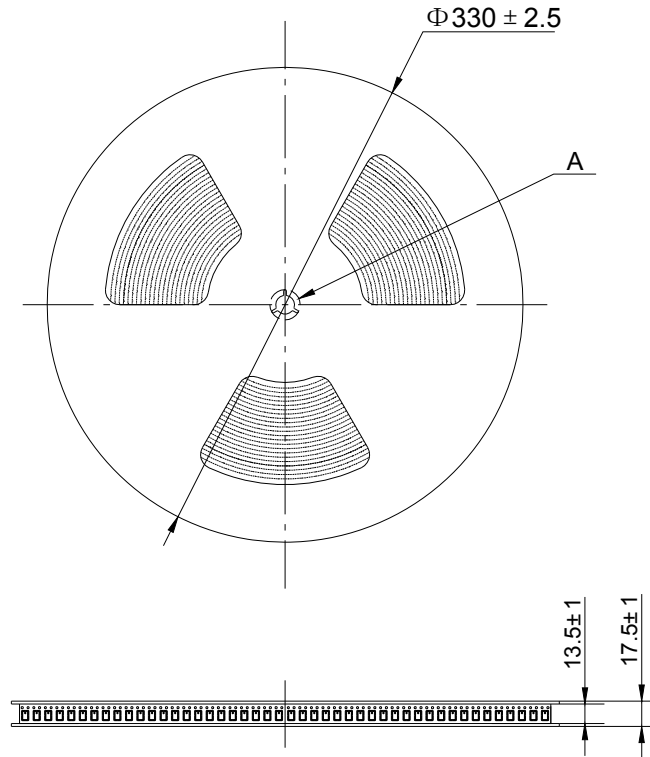


### Notes:

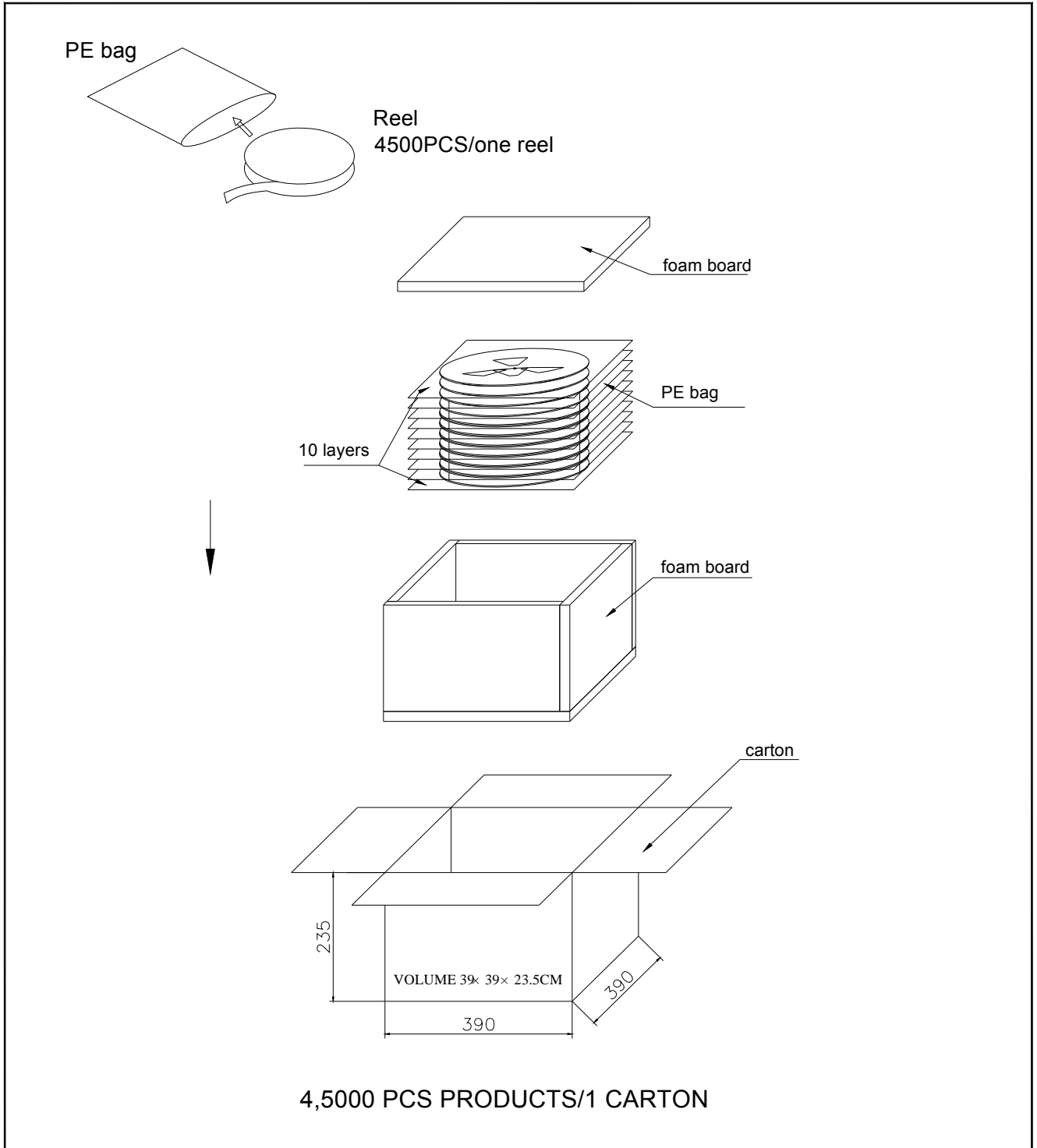
1. 10 sprocket hole pitch cumulative tolerance +/-0.2;
2. Camber in compliance with EIA481;
3. Pocket position relative to sprocket hole measured as true position of pocket. Not pocket hole.

Part Number	Reel Diameter	Qty per Reel
<b>SDM0502B-D263-M03</b>	<b>13"</b>	<b>4500</b>

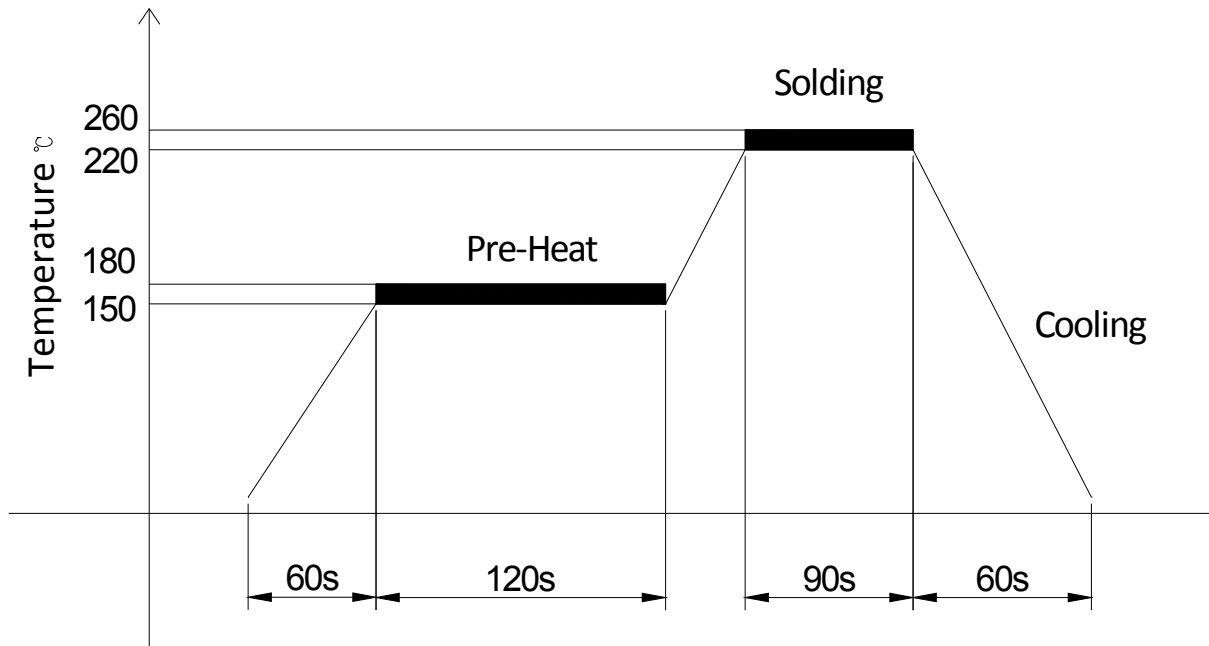
Leader length	Cells at leading end and trailing end of tape should be empty for a length of 350~450mm.
Label	Labels applied to external package and direct to reel. Per JEDEC.
Empty Units	No consecutive empty pockets; No more than 3 empty pockets per reel.(Does not include empty pockets for leader/follower).



4,500 PCS PRODUCTS/1 reel



## 7. Solder Reflow Profile

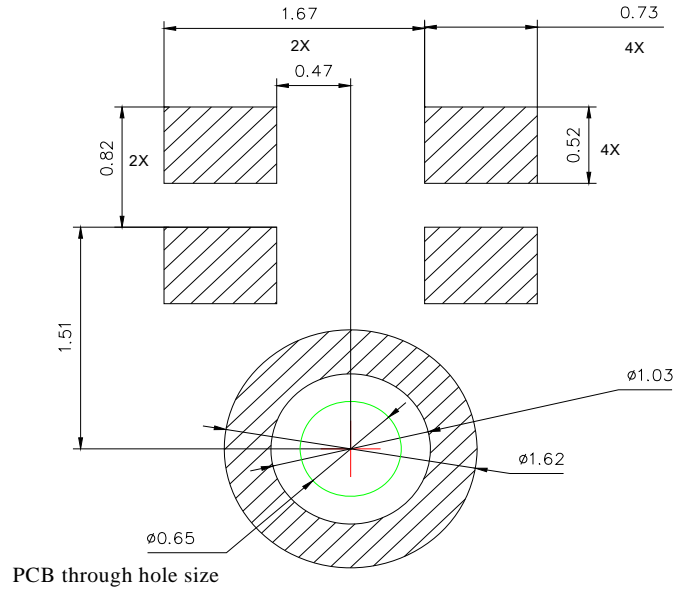


Stage	Temperature Profile	Time(maximum)
Pre-heat	150-180°C	120sec.
Soldering	Above 220°C	90sec.
Peak	260°C (Max)	30sec.

**Notes:**

1. Pulling vacuum over acoustical hole of the microphone is not allowed, because the device can be damaged by vacuum.
2. Wash the board after reflow process is not allowed, because board washing and cleaning agents can damage the device. Device should not be exposed to ultrasonic processing or cleaning.
3. Recommended number of reflow is no more than 3 times.

### 8. Recommended Customer Land Pattern:



### 9. Specification History

ISSUE	PREP	CHKD	DETAIL SPEC CHANGES:	DATE
X1	Li Tao	Wu Zhijiang	Initial Version Release	Mar.20 <sup>th</sup> .2014
X2	Li Tao	Wu Zhijiang	Updated 1	May.25 <sup>th</sup> .2015