

 AAC AAC ACOUSTIC TECHNOLOGIES (SHENZHEN) CO., LTD.		ISSUE: X1
PART No. SDM0502B-RIT371-M04	Remark: GP compliant	DATE: Nov. 1 st . 2023

APPROVAL SHEET FOR MICROPHONE

CUSTOMER: _____

CHECKER: _____ Sean Ma

APPROVER: _____ Zhang Rui

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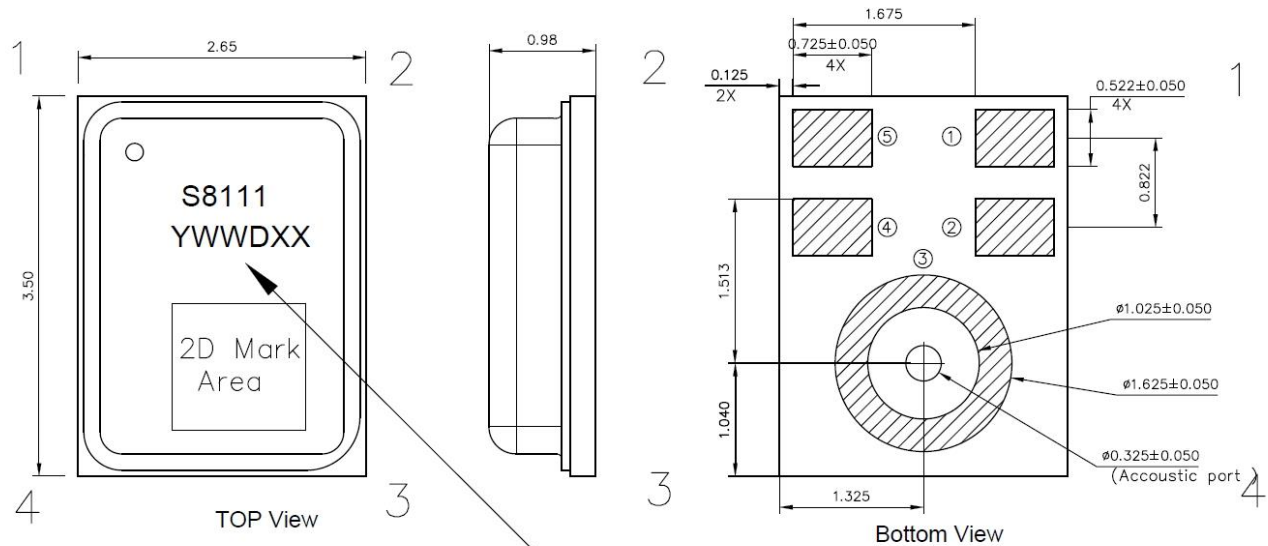
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1. Mechanical Layout and Dimensions



S8111	Identify Mark
YWWD	Indicates year, week, and date seperately
XX	Indicates LOT NO.

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 +/-0.08mm unless otherwise specified

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2. Product Specifications:

Unless otherwise specified, test conditions are:

- V_{dd} = 1.8V
- Duty cycle = 50%
- F_{IN} = 1 kHz @ 94dB SPL
- T_a = 27°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.	
ELECTRICAL CHARACTERISTICS						
2.1 Directivity		Omni-Directional				
2.2 Supply Voltage	V _{dd}		1.64	1.8	3.6	V
2.3 Clock Frequency	F _{clk}	Standard Performance Mode	1.40	2.40	3.30	MHz
		Low Power Mode	500	768	1200	KHz
		Sleep Mode			250	KHz
2.4 Duty Cycle			40	50	60	%
2.5 Logic high IO Voltage	V _{IOH}		0.65*V _{dd}		V _{dd} +0.3	V
2.6 Logic Low IO Voltage	V _{IOL}		-0.3		0.35*V _{dd}	V
2.7 Sleep Current	I _{sleep}	Output Load<5pF			50	uA
2.8 Short Circuit Current		Maximum logic output current	1		20	mA
2.9 Load Capacitance					200	pF
2.10 Delay Time for Data Driven	t _A				70	ns
2.11 Delay Time for Data Valid	t _v				80	ns
2.12 Delay Time for High-Z	t _B		5		25	ns
2.13 Wake-up Time					10	ms
2.14 Fall-asleep Time	t _{FSL}				10	ms
2.15 Clock Rise/Fall Time	tr/f	CLK 35% to 65%			13	ns
2.16 Polarity	Increase Sound Pressure		Increase 1's density			

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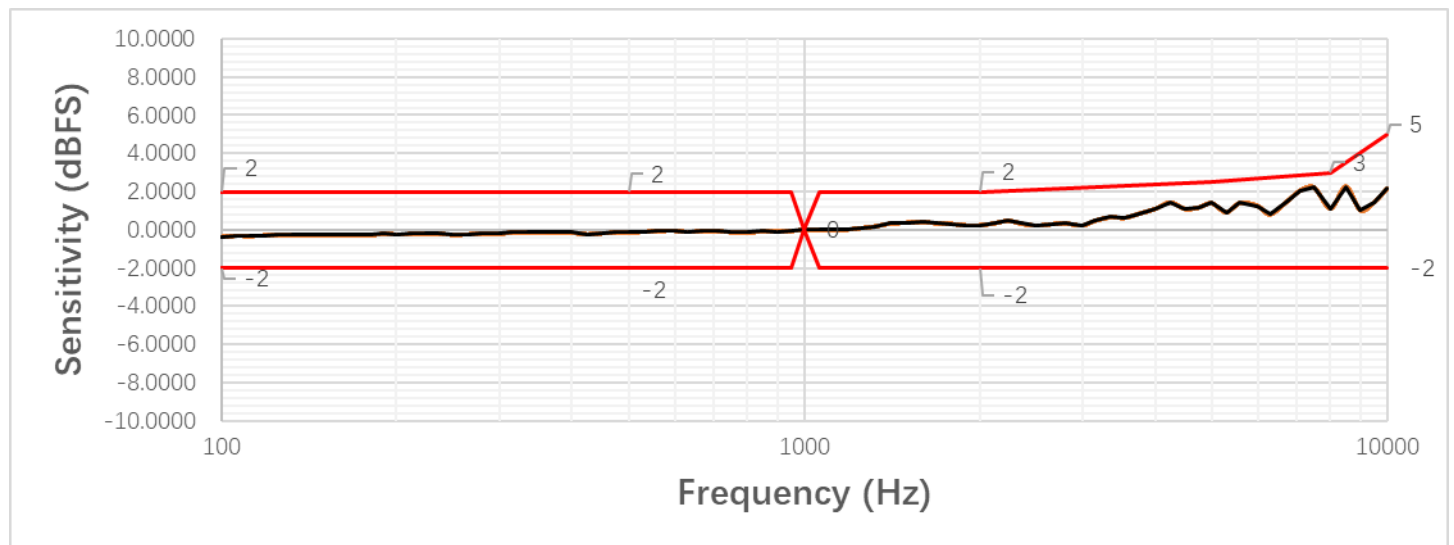
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DATE: Nov. 1st. 2023**Standard Performance Mode($F_{\text{clk}}=2.4\text{MHz}$, $V_{\text{dd}}=1.8\text{V}$)**

2.17 Sensitivity	Sen	1kHz, 94dB SPL	-38.0	-37.0	-36.0	dBFS
2.18 Signal-to-Noise Ratio	SNR	A-weighting at 1kHz 1Pa	-	65	-	dB(A)
2.19 Total Harmonic Distortion	THD	94dB SPL@1kHz	-	0.2	0.5	%
	THD	1% THD@1kHz	-	117	-	dB SPL
2.20 Power Supply Rejection	PSR	100mVpp square wave @217Hz A weight	-	-100	-	dBFS(A)
2.21 Power Supply Rejection Ratio	PSRR	200mVpp sinewave, @1KHz,	-	78	-	dB V/FS
2.22 Acoustic Overload Point	AOP	1kHz THD @ 10%	-	131	-	dB SPL
2.23 Current Consumption	I_s		800	1000	1200	μA

2.24 Frequency Response Limits

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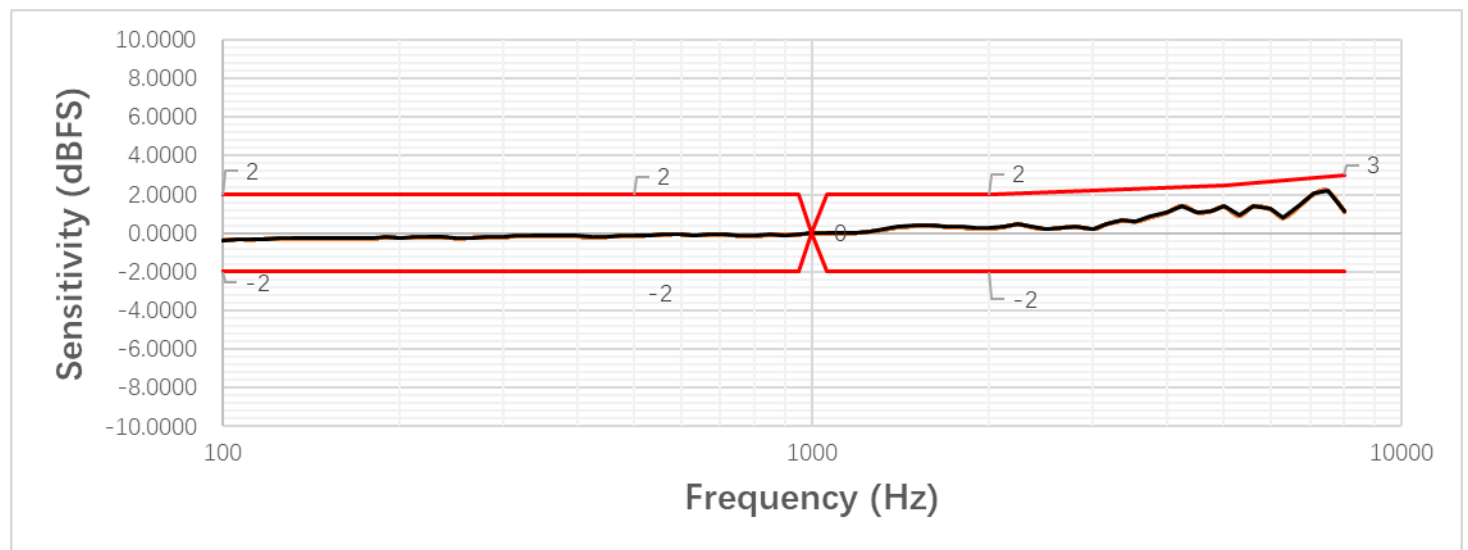
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DATE: Nov. 1st. 2023**Low Power Mode($F_{clk}=768kHz$, $V_{dd}=1.8V$)**

2.25 Sensitivity	Sen	1kHz, 94dB SPL	-22.0	-21.0	-20.0	dBFS
2.26 Signal-to-Noise Ratio	SNR	A-weighting at 1kHz 1Pa	-	65	-	dB(A)
2.27 Total Harmonic Distortion	THD	1KHz, 94dB SPL	-	0.2	0.5	%
		1% THD@1kHz	-	113	-	dB SPL
2.28 Power Supply Rejection	PSR	100mVpp square wave @217Hz, A Weight	-	-92	-	dBFS(A)
2.19 Power Supply Rejection Ratio	PSRR	200mVpp sinewave, @1KHz,	-	65	-	dB V/FS
2.30 Acoustic Overload Point	AOP	1kHz THD @ 10%	-	116.5	-	dB SPL
2.31 Current Consumption	I_s		200	330	400	μA

2.32 Frequency Response Limits

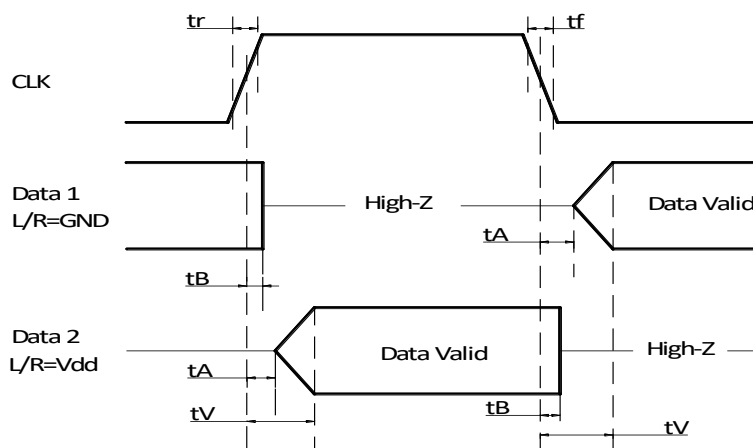
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DATE: Nov. 1st. 2023**2.33 Timing Diagram**

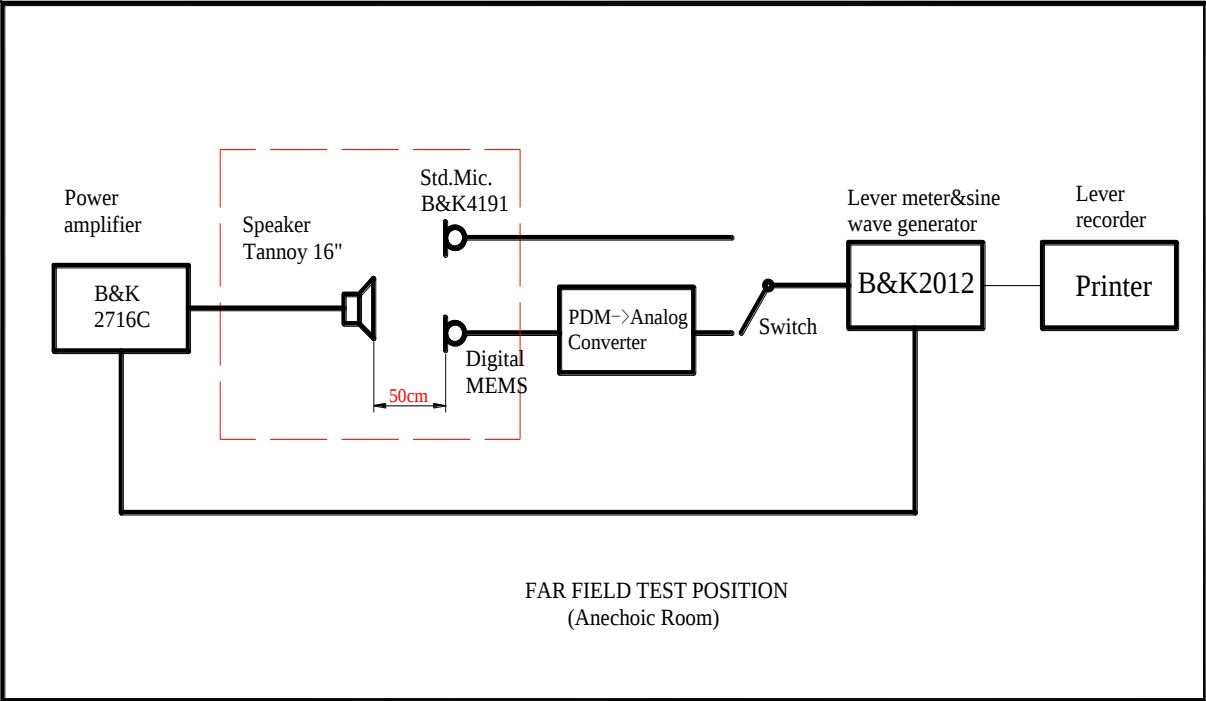
Label	L/R	Drives Data After	High-Z After
Data 1	Low (L)	Falling Clock Edge	Rising Clock Edge
Data 2	High (H)	Rising Clock Edge	Falling Clock Edge

ENVIRONMENTAL CHARACTERISTICS

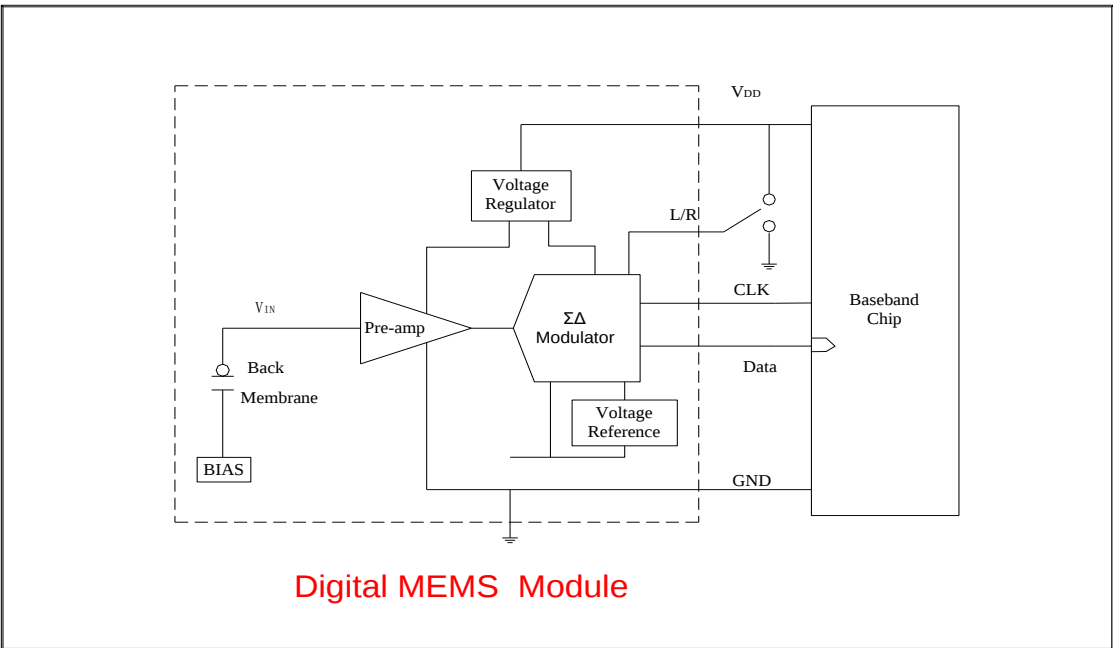
2.34 Operating Temperature			-30		+105	°C
2.35 Storage Temperature		Soldered onto PC Board	-40		+105	°C
		In Tape/Reel's	-10		+50	°C
2.36 Relative Humidity			25		85	%
2.37 Air Pressure			860		1060	mBar

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3. Test Setup



4. Recommended Interface Circuit



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5. Reliability Specifications

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

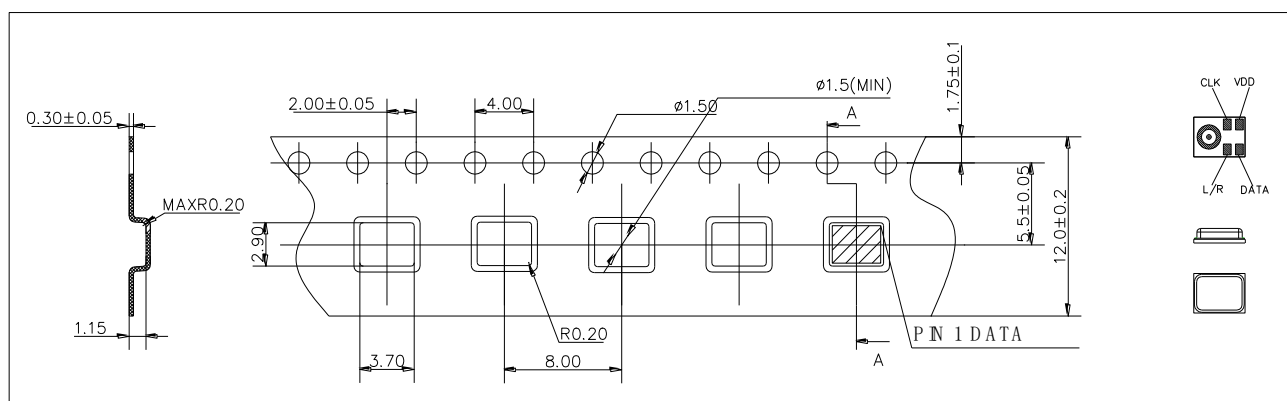
Test item	Detail
Reflow	Microphone is tested to 3 passes through reflow oven, with microphone mounted upside-down under conditions of 260°C for 30 seconds maximum.
High temperature storage	+105°C environment for 120 hours.
Low temperature storage	-40°C environment for 120 hours.
High temperature Bias	+105°C environment while under bias (2.0V) for 120 hours.
Low temperature Bias	-40°C environment while under bias (2.0V) for 120 hours.
Temperature/ Humidity bias	+85°C/85% R.H, environment while under bias (2.0V) for 120hours.
ESD	3 discharges at +/-8KV direct contact to metal cap when unit is grounded (IEC 61000-4-2) and 3 discharges at +/-2KV direct contact to I/O pins. (MIL 883E, Method 3015.7)
Thermal Shock	+85°C, 2h → -40°C, 2h, 20 cycles → Measurements to be taken after 2h recovery time at ambient conditions, 80Hr
Drop Test	To be no interference in operation after drop to steel plate, each time from 1.52 meters' height in 150g jig at three directions in state of packing. Totally for 12 times.

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

The sensitivity change within ±1dBFS relative to initial value.

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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
SDM0502B-RIT371-M04	13"	4500

Leader length	Cells at leading end and trailing end of tape should be empty for a length of 350~450mm.
Label	Label applied to external package and directs 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).

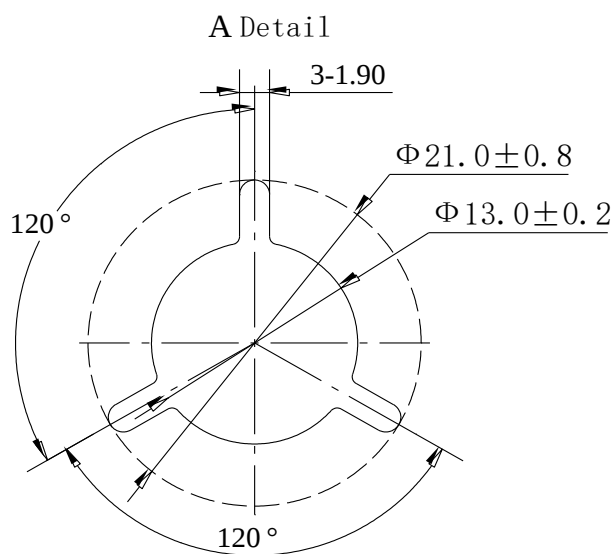
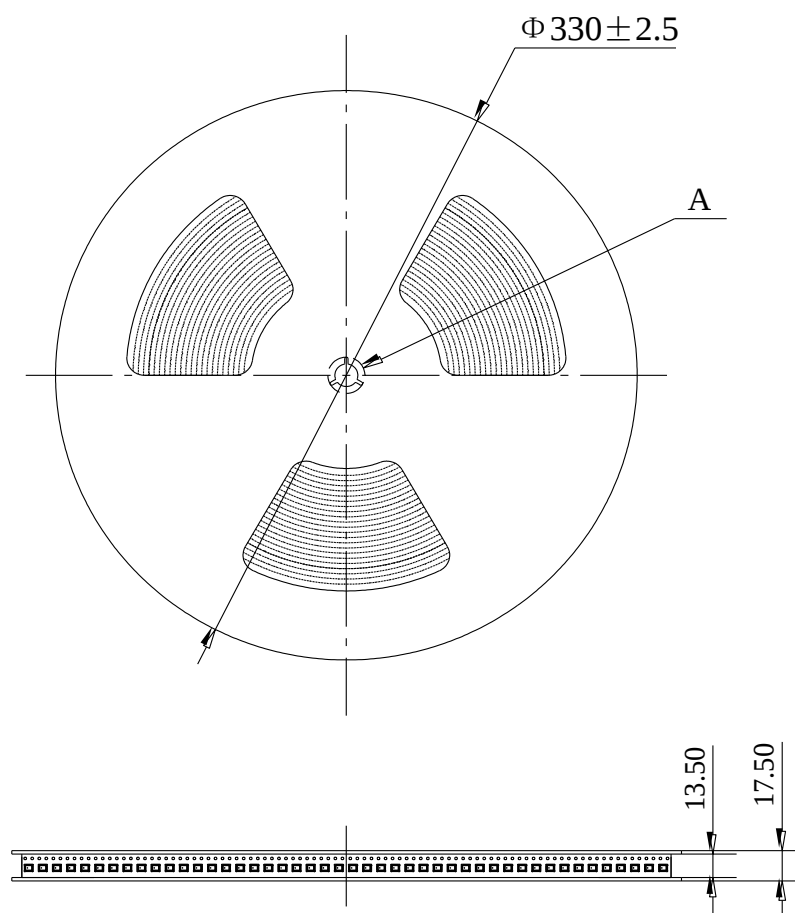
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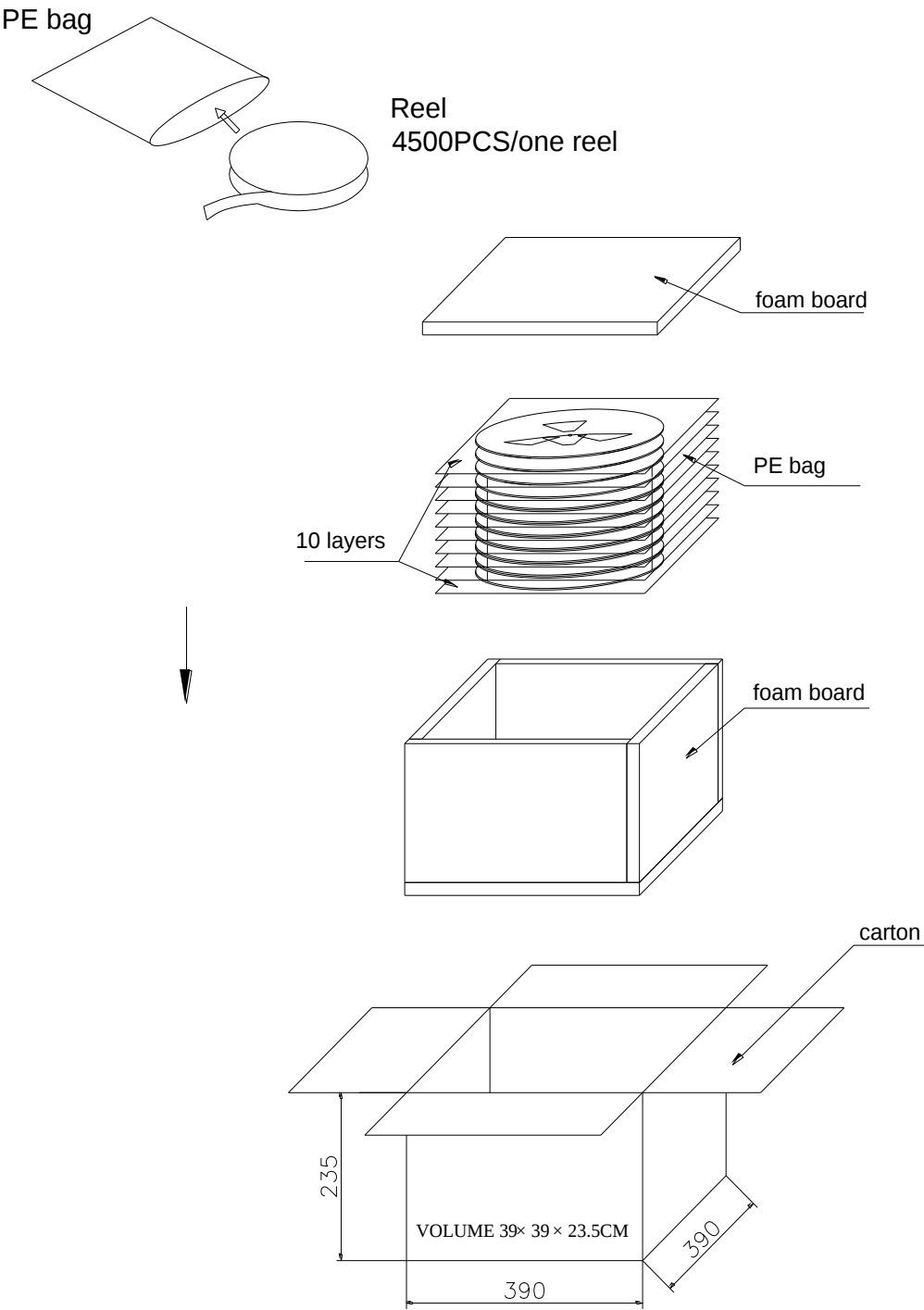
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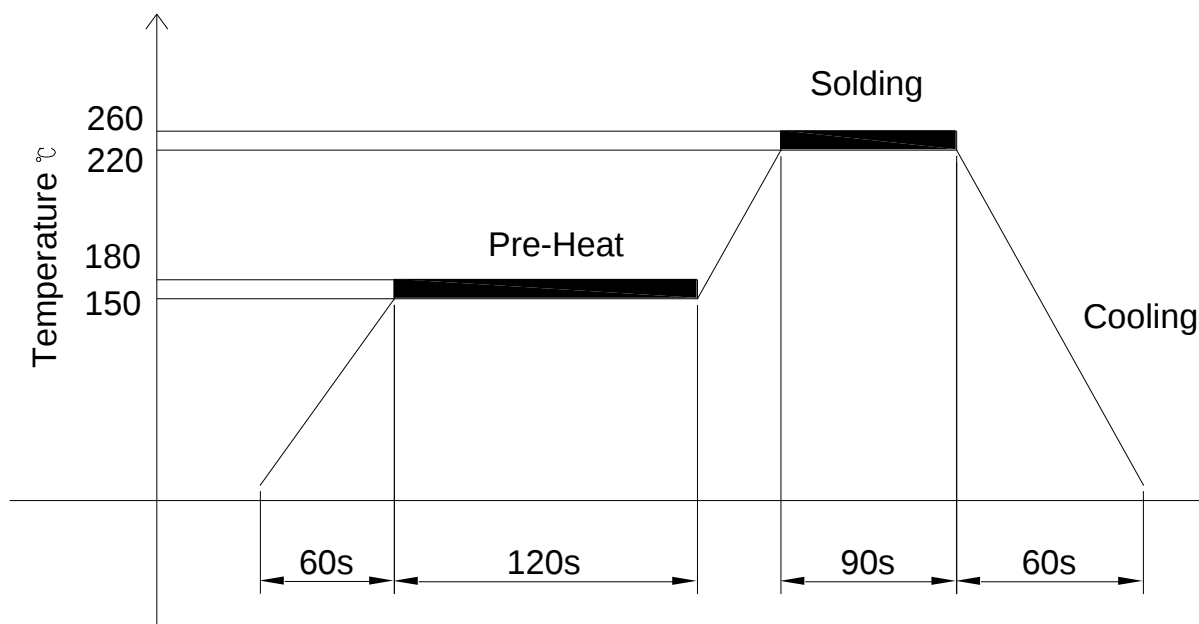
4,500 PCS PRODUCTS/1 reel

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4,5000 PCS PRODUCTS/1 CARTON

7. Reflow Profile



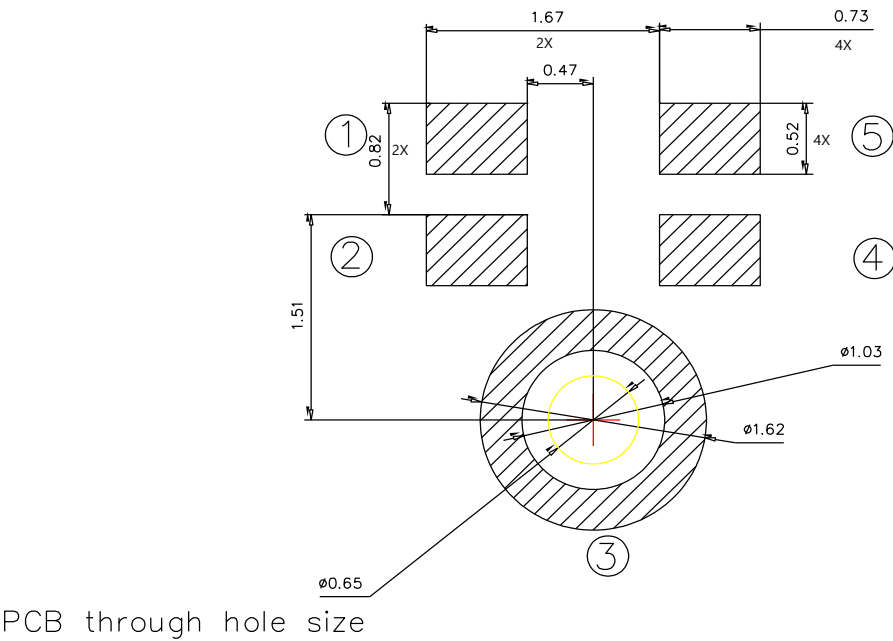
Stage	Temperature Profile	Time(maximum)
Pre-heat	150-180°C	120sec.
Soldering	Above 220°C	90sec.
Peak	260°C (Max)	30sec.

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.

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8. Recommended Customer Land Pattern:



9. Specification History

ISSUE	PREP	CHKD	DETAIL SPEC CHANGES:	DATE
X1	Sean Ma	Zhang Rui	Initial Version Release	Nov. 1 st . 2023