

# SPECIFICATION

## FOR APPRONAL

Customer : \_\_\_\_\_

Product Name : MEMS Microphone \_\_\_\_\_

Model Name : VSM4030DT-S26-A1F \_\_\_\_\_

Drawing No. : VS20250111008 \_\_\_\_\_

### Signature of Voise

Approved by	Checkde by	Issued by	Date

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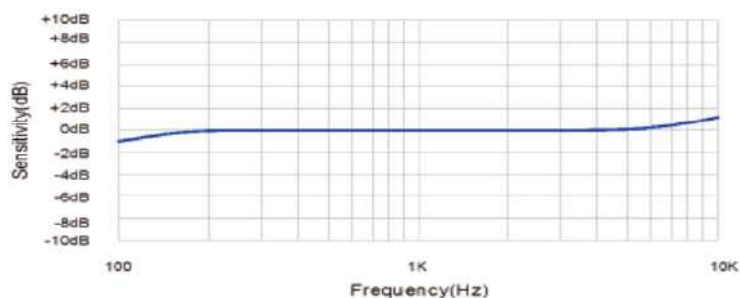
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## 1. Acoustic and Electrical Characteristics

Test conditions: Ta=23± 2°C, RH=55±20%, VDD=1.8V, Clock Frequency = 2.048MHz, Duty Cycle = 50%, No Load Input sound pressure PIN = 94dB SPL@1kHz, Test room temperature Ta = 25°C, Room Humidity = 50±20% SNR & noise floor measurement is with A-Weighting filter applied

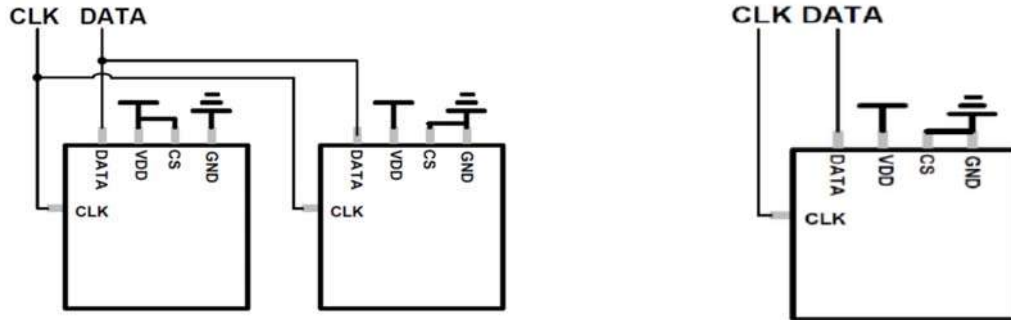
Item	Test Conditions	Min	Typ	Max	Unit
Directivity	—	Omni-Directional			
Sensitivity	@1KHz (0 dB = 1V/Pa)	-27	-26	-25	dBFS
Signal-to-Noise Ratio	@1KHz (0 dB = 1V/Pa)	—	61		dB(A)
Total Harmonic Distortion (THD) @ 100dB SPL	@1KHz	—	0.2	0.5	%
Total Harmonic Distortion (THD) @ 115dB SPL	@1KHz	—	0.5	1	%
Max Input Sound Pressure	@1KHz, THD < 10%	120	125	—	dB SPL
Power Supply Rejection (PSR)	217Hz, 100mVpp square wave	—	-83	—	dB (A)
<b>INPUT CHARACTERISTICS</b>					
Operating Frequency	—	1.024	2.048	4.0	MHz
Clock Duty Cycle	—	40	50	60	%
Power supply Voltage	—	1.6	—	3.6	V
Total Operation Current	1.6V-3.6V power supply voltage No load on DATA	—	850	1000	μA
Standby Current	1.6V-3.6V power supply voltage, Clock off	—	—	2	μA
<b>OUTPUT CHARACTERISTICS</b>					
LOAD Capacitance	—	—	—	100	pF
Short Circuit Output Current	@1KHz (0 dB = 1 V/Pa)	1	—	10	mA
Data Format	—	1/2 Cycle 1-bit PDM			—
Lid to Ground Resistance	—	—	—	100	Ω

## 2. Frequency Response Curve



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### 3. Standard R/L channel Circuit



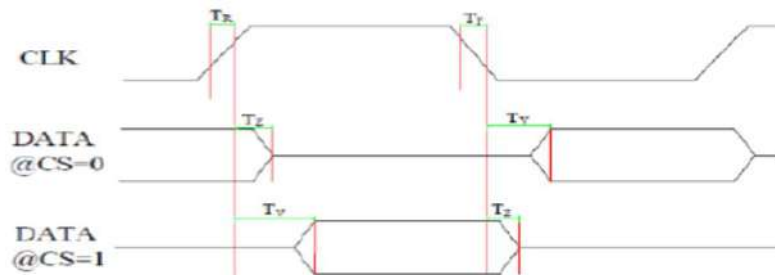
0.1uF ceramic and 10uF ceramic power supply decoupling capacitors should be placed as near as possible to VDD of the microphone and the microphone need clean VDD and AGND with audio codec

### 4 Timing Diagram

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VOH	Output Logic High Level		VDD*0.9			V
VOL	Output Logic Low Level				VDD*0.1	V
VIH	Input Logic High Level		VDD*0.75			V
VIL	Input Logic High Level				VDD*0.25	V

Timing Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Comments
Clock Rising Time	TR			10	ns	RL=1MΩ, CL=12pF
Clock Falling Time	TF			10	ns	RL=1MΩ, CL=12pF
DATA into Hi Z Time	TZ	0		15	ns	RL=1MΩ, CL=12pF
DATA Valid Time	TV	18		40	ns	RL=1MΩ, CL=12pF
Clock Jitter				0.5	ns	Period jitter in RMS
Clock Duty Cycle		40	50	60	%	
Clock Frequency		1.024	2.048	4.0	MHZ	

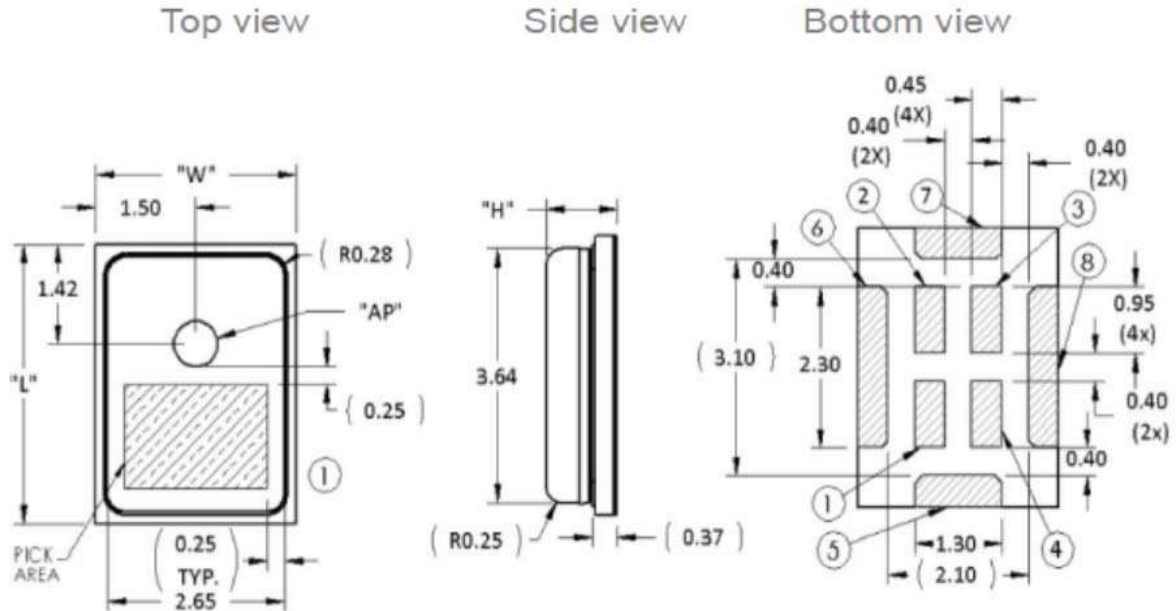


Note:

1. For one-microphone application, the DATA waveform will be @ CS (SELECT) = 0.
2. For two-microphone application, system needs to set CS (SELECT) = 0 & 1 for two microphones respectively.
3. Please refer to reference schematic in Section 7.

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### 5. Mechanical Specifications



Item	Dim.	Tol.	Units
Length	4.00	±0.10	mm
Width	3.00	±0.10	mm
Height	1.00	±0.10	mm
AP	∅0.65	±0.05	mm

Mechanical Dimension

PIN#	1	2	3	4	5	6	7	8
FUNCTION	VDD	SELECT	CLOCK	DATA	GROUND	GROUND	GROUND	GROUND

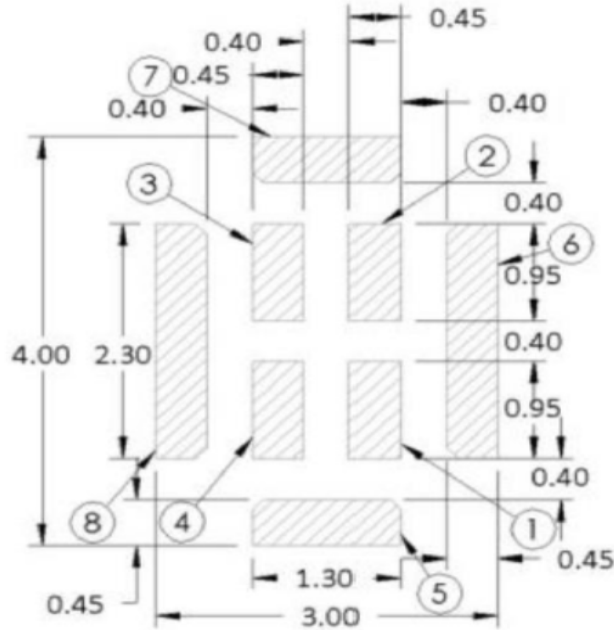
Pin Definition

#### Notes:

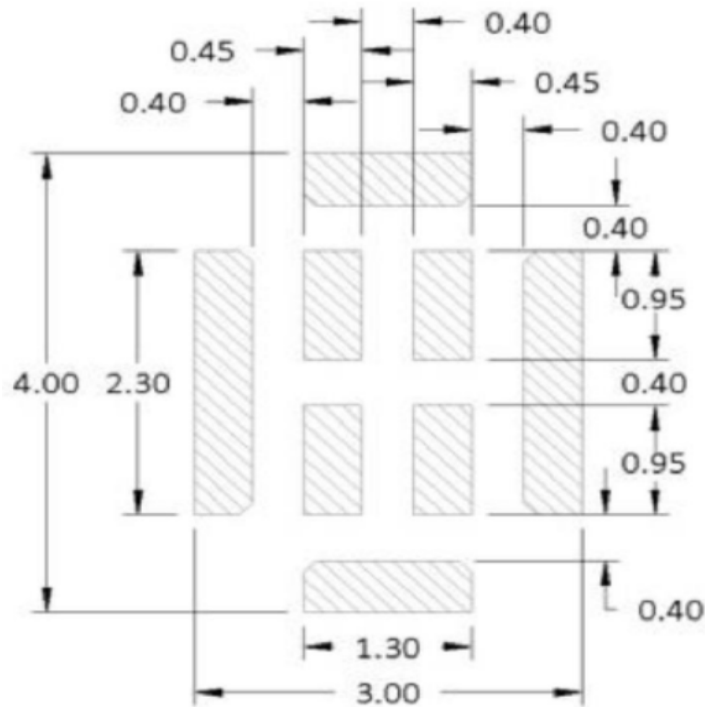
- 1.Pick Area only extends to 0.25 mm of any edge or hole unless otherwise specified and recommended SMT nozzle out circle dimension  $\cong 1.5$  (mm) .
- 2.Suggestion to use the same date code microphone in one array microphone module.
- 3.Dimensions are in millimeters unless otherwise specified.
- 4.Tolerance  $\pm 0.15$ mm unless otherwise specified.

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### 6. Example of Land pattern



### 7. Example solder stencil pattern





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## 8. Reflow Guarantee

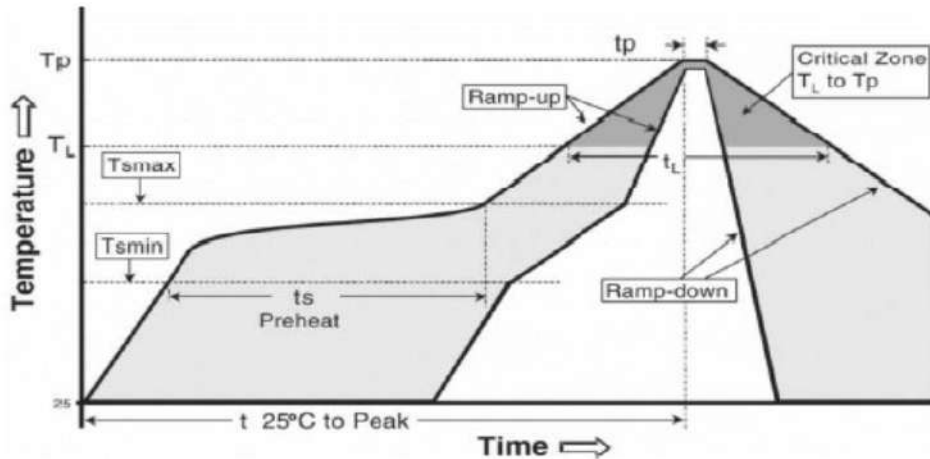


Figure Reflow Profile

Profile Feature	Pb-Free
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.
Preheat:	
- Temperature Min (T <sub>smin</sub> )	150°C
- Temperature Max (T <sub>smax</sub> )	200°C
- Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-180 seconds
Time maintained above	
- Temperature (T <sub>L</sub> )	217°C
- Time (T <sub>L</sub> )	60-150 seconds
Peak Temperature (T <sub>p</sub> )	260°C
Time within 5°C of actual Peak Temperature (t <sub>p</sub> )	20-40 seconds
Ramp-down Rate	6°C/second max.
Temperature 25°C to Peak Temperature	8 minutes max.

Table Reflow Profile

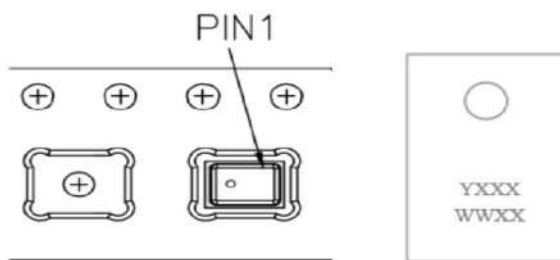
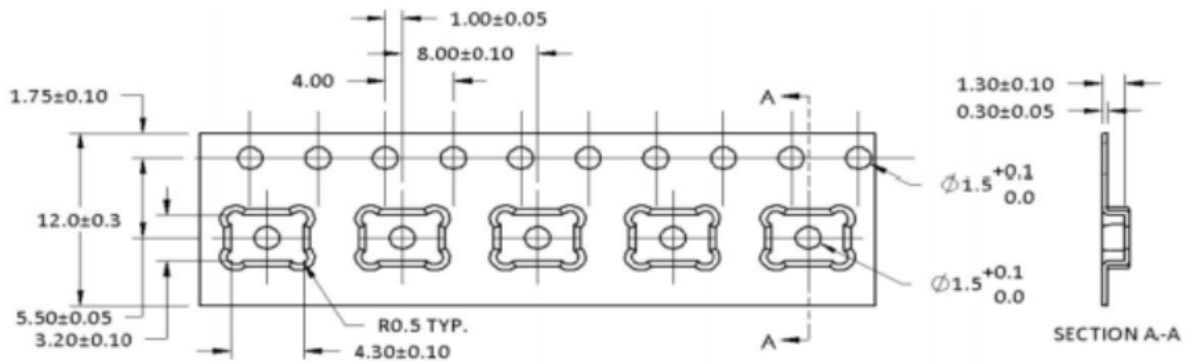
### Notes:

1. Do not board wash or clean after the reflow process.
2. Do not brush board with or without solvents after the reflow process.
3. Do not directly expose to ultrasonic processing, welding, or cleaning.
4. Do not insert any object in acoustic port hole of device at any time.
5. Do not apply air pressure into the acoustic port hole.
6. Do not pull a vacuum over acoustic port hole of the microphone.
7. Do not apply a vacuum when repacking into sealed bags at a rate faster than 0.5 atm/sec.
8. Recommended number of reflow is not more than 5 times.

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## 9.Packaging Spcifications

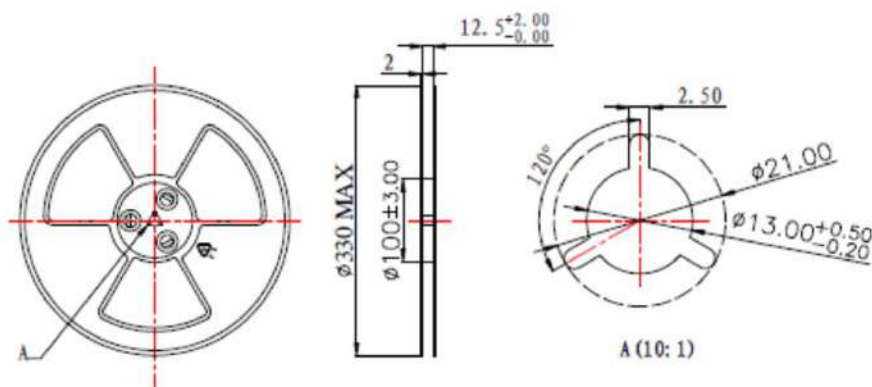
### 9.1 Tape Specification



Line	Character	Description
1	YXXX	Y:Year. XXX: Unique Trace Code
2	WWXX	WW:Week; XX: Trace Code

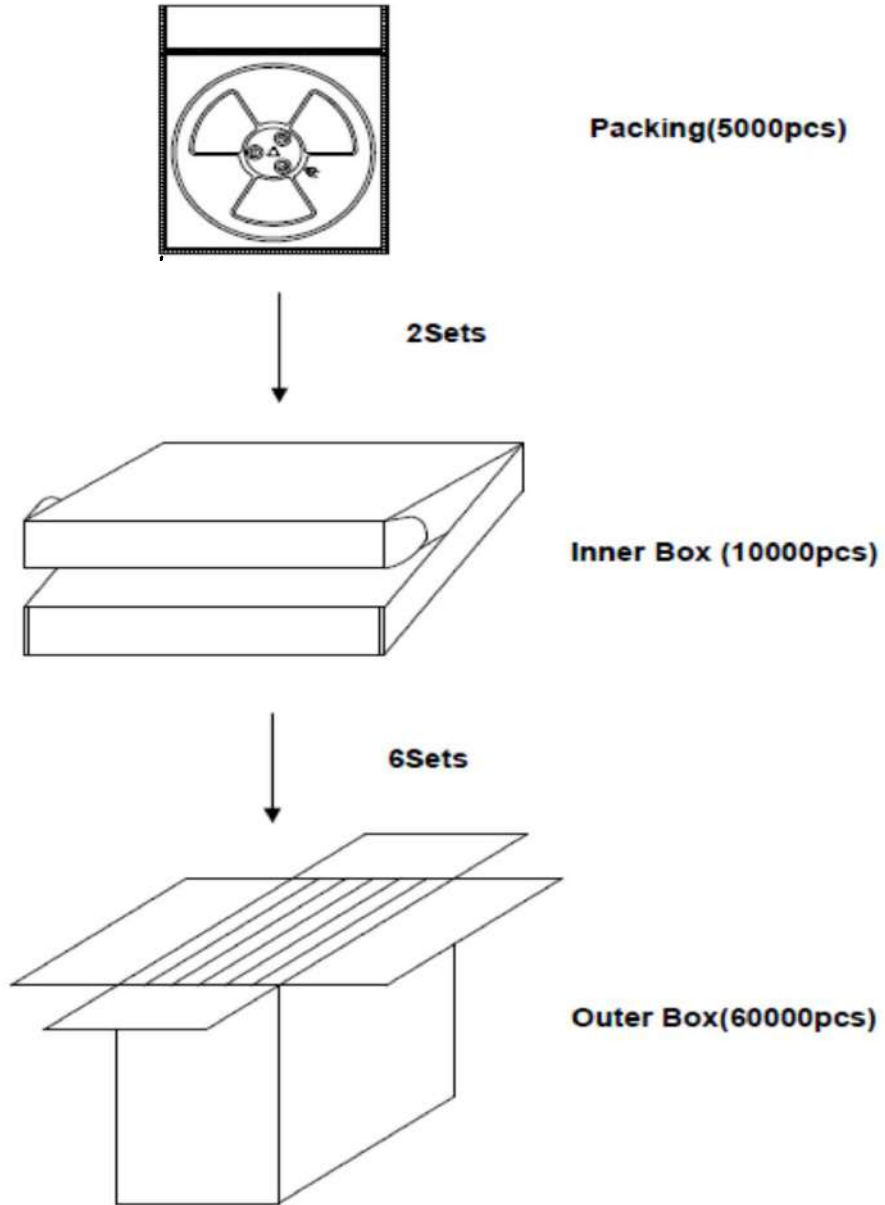
### 9.2 Reel Dimension

#### 13" reel dimensions (unit:mm)



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9.3.The Content of Box(13" reel)



Qty/ Reel	Qty/ One Inner Box	Qty/ Outer Box (Six Inner Box)
5000 pcs	10,000 pcs	60,000 pcs
Φ 330mm	355×340×45mm	365×290×370mm



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## 10. Storage and Transportation

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.
2. Recommend storage period no more than 1 year and floor life(out of bag) atfactory no more than 4 weeks.
3. The MEMS MIC with normal pack can be transported by ordinary conveyances. Please protect products against moist, shock, sunburn and pressure during transportation.
4. Storage Temperature Range: -40℃~+85℃ (Microphone units with package)
5. Operating Temperature Range: -40℃~+105℃

## 11. Reliability Specifications

Note: The microphone sensitivity after stress must deviate by no more than  $\pm 3$ dB from the initial value.

Test Item	Detail
Thermal Shock Test	100 cycles of air-air thermal shock from -40℃ to +105℃ with 15 minute soaks.
High Temperature Test	+105℃ environment while under bias for 240 hours.
Low Temperature Test	-40℃ environment while under bias for 240 hours.
Humidity Test	+85℃/85% R.H. environment while under bias for 240 hours.
Vibration Test	16 minutes in each X, Y, Z axis from 20 to 2,000 Hz with peak acceleration of 20G
Drop Test	1.5-meter height onto a concrete surface each time at three directions in state of packaging.
Reflow Test	5 reflow cycles with peak temperature of +260℃.
ESD Test	Under C=150pF, R=330ohm. Tested to $\pm 8$ KV contact to the case and tested to $\pm 2$ kV contact to I/O terminals. 10 times. Grounding.