

# TECHNICAL SPECIFICATION

*Analog MEMS Microphone*

*Datasheet*

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AOS3729A-T42

SANICO ELECTRONICS

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## Analog MEMS Microphone Datasheet

### AOS3729A-T42



#### 1. General Description

AOS3729A-T42 is a front type MEMS (micro-electromechanical systems) microphone with analog signal output. It provides high sensitivity, low power consumption and high SNR. Output impedance of this microphone is very low, it has much small affection from RF noise.

As MEMS type transducer and optimized ASIC are used inside this microphone, it has no thermal deterioration and superior thermal shock resistance. So, users can make full-automated assembly process with this microphone. This microphone has also very small size in mechanical dimension, it is very suitable for portable devices with audio input function.

#### 2. Features

- ✓ CMOS MEMS microphone with analog output
- ✓ High sensitivity
- ✓ High SNR
- ✓ Low power consumption
- ✓ Low output impedance
- ✓ High thermal shock resistance
- ✓ No quality deterioration from X-ray radiation (please refer to “*Cautions for using MEMS microphone*” of this document)
- ✓ Small sized mechanical dimension
- ✓ High reliability
- ✓ Free from Hazardous Substances

#### 3. Application

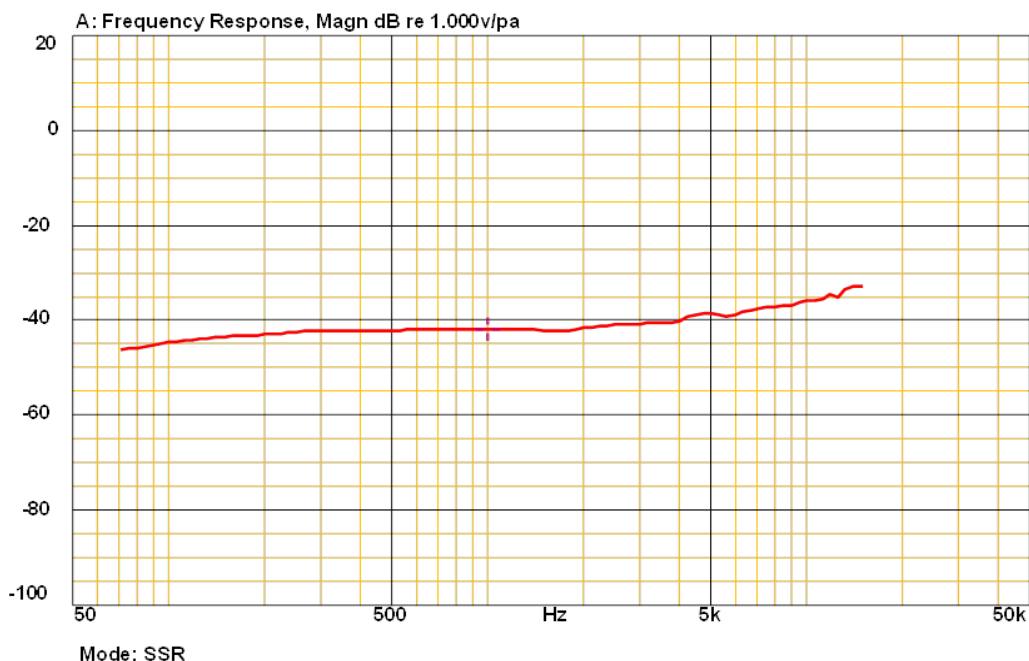
- ✓ Mobile phones and smart phones
- ✓ Notebook and Tablet
- ✓ Ear microphone and Bluetooth head sets
- ✓ Digital still camera and video camera
- ✓ Car navigation and black box
- ✓ Gaming device and other voice input devices

### 4. Electrical Characteristics

Parameter	Symbol	Condition	Limits			Unit
			Min	Typ.	Max	
Sensitivity	S	VDD=2V, F=1KHz, S.P.L.=1Pa, 0dB=1V/Pa	-45	-42	-39	dB
Output Impedance	ZOUT	F=1KHz			300	Ω
Current Consumption	IDSS	VDD=2.0V	50		250	μA
Signal Noise Ratio	S/N	S : f=1KHz, S.P.L.= 1PaN (A-Weighted curve)		58		dB
Operating Voltage	VDD		1.5	2.0	3.6	V
Sensitivity Change Across Voltage	SC/V	VDD=1.5~3.6	0.5		0.5	dB
Total Harmonic Distortion	THD	at 100dB SPL			1.0	%
		at 115dB SPL			10.0	%

- Test Condition: 23±2°C temperature, 65±5% humidity

### 5. Typical Frequency Response Curve

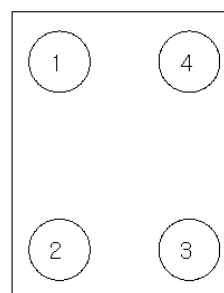
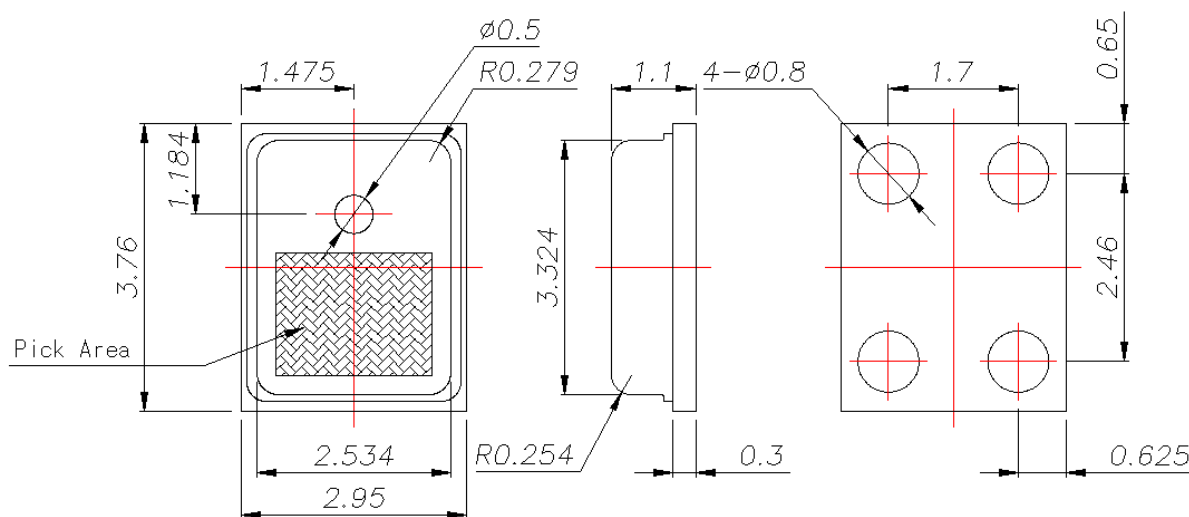


- Test Condition:
  - + Temperature: 23±2°C
  - + Operating Voltage: 2.0V
  - + Speaker: 1Pa (94dB SPL at 1 KHz) at 50cm distance from a loud-speaker

### 6. Temperature Range

- ✓ Storage temperature: -40°C ~ 100°C
- ✓ Operating temperature: -40°C ~ 100°C

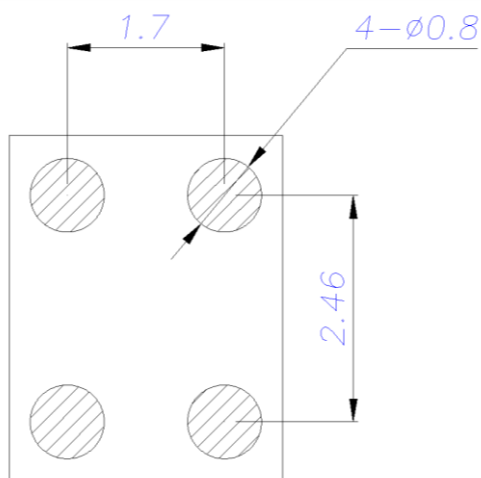
### 7. Mechanical Dimensions & Pin out



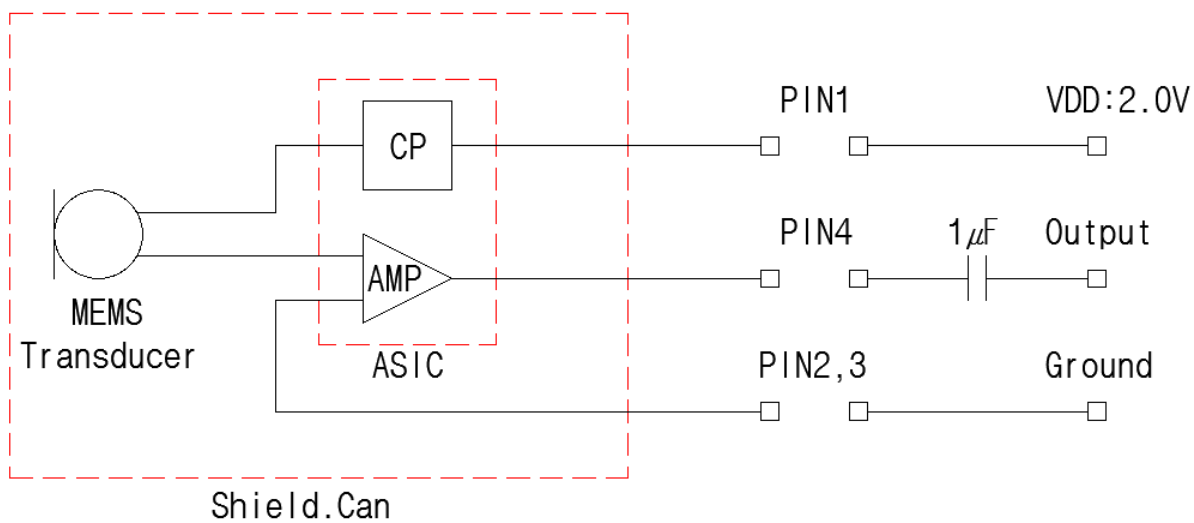
Unit: mm, Tolerance: ±0.1mm

Pin 1	Pin 2	Pin 3	Pin 4
VDD	GND	GND	DAT

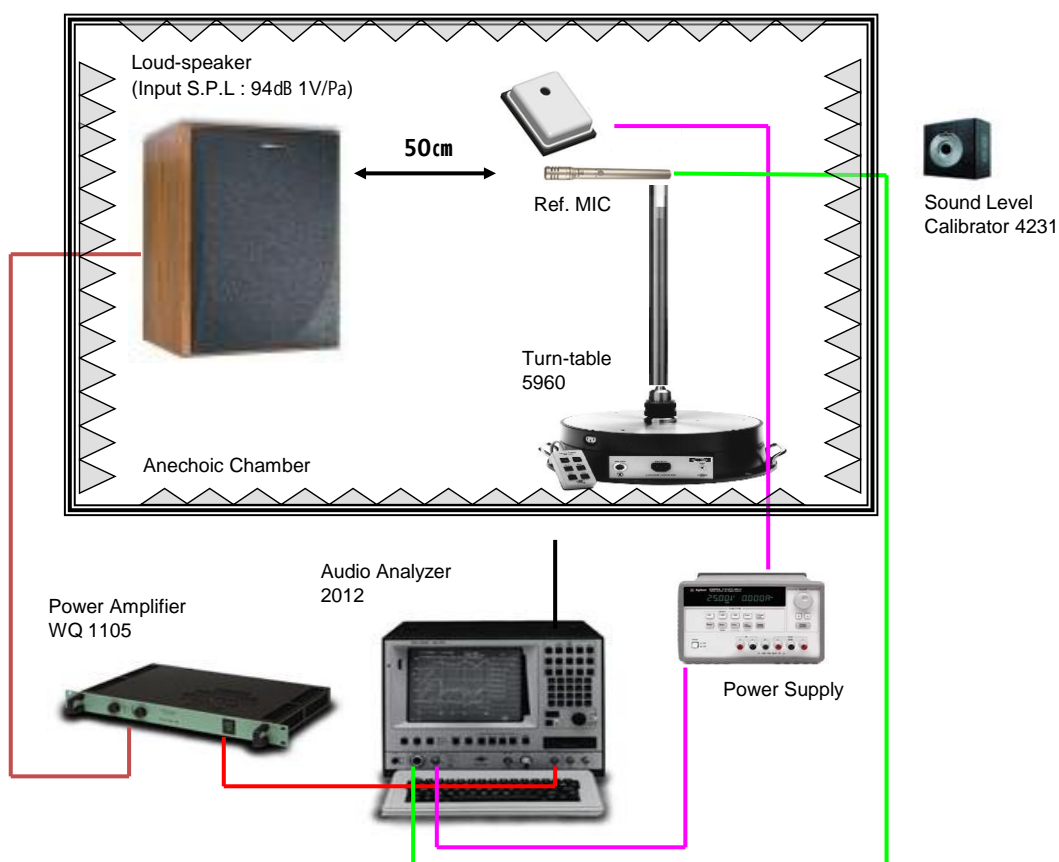
**8. Recommended Customer PCB Pattern**



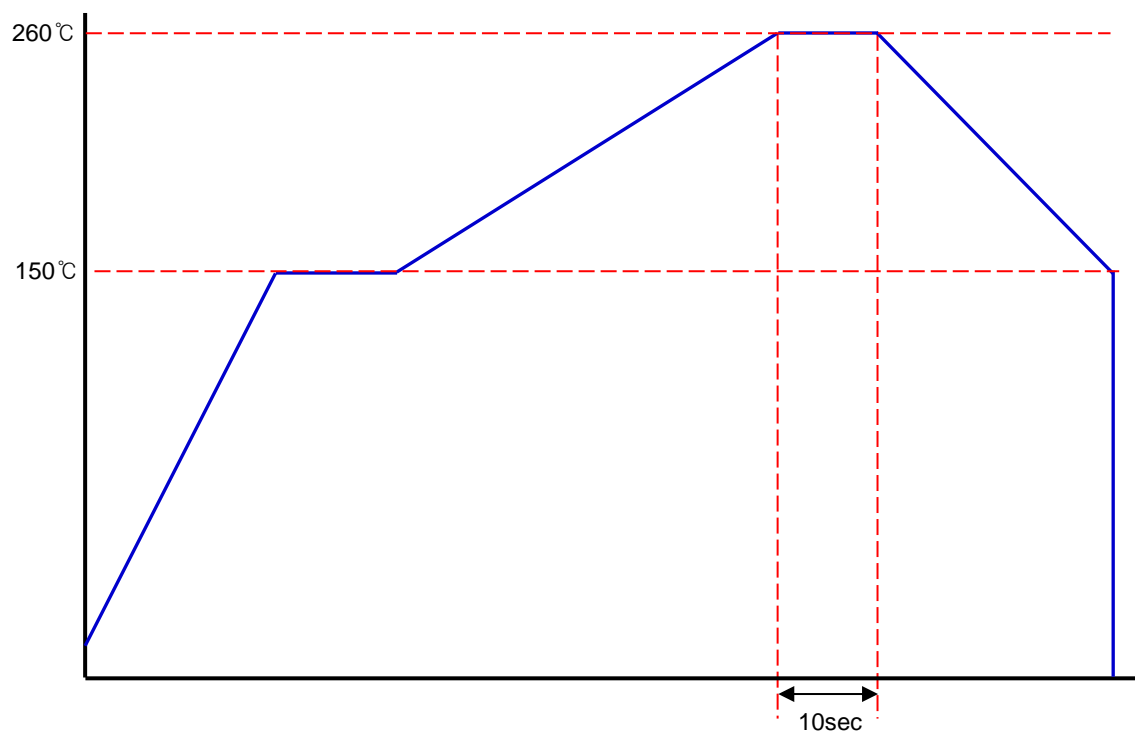
**9. Standard Test Circuit**



### 10. Typical Measurement System



**11. Reflow Profile**



Stage	Temperature Profile	Time (maximum)
Pre-heat	150°C	150 sec
Rising time		210 sec
Peak	260°C maximum	30 sec
Cooling	Max. -5°C/s	150 sec



## 12. Typical Reliability Test Items

NO	Tested Item	Condition	standard
1	Temperature Cycle	-25±2℃, 30min → +20℃±2℃, 10min → +70℃±2℃, 30min → +20℃±2℃, 10min, 5Cycle	SANICO specification
2	Humidity	+85±2℃, 85±2%RH 200Hr	JESD 22-A 101A-B
3	Low Temperature	-40±2℃, 200Hr	IEC 68-2-2 Test Aa
4	High Temperature	+105±2℃, 200Hr	IEC 68-2-2 Test Ba
5	Thermal Shock	(-40±2℃ → +125℃±2℃)×50Cycle 45min	IEC 60068-2-4
6	Drop	Drop 12 times onto thick steel plate from height 1.5m (installed in JIG)	IEC 60068-2-32
7	Vibration	Frequency: 10~55Hz/min → 2Hr Direction: amplitude 1.52mm(X, Y, Z)	MIL 883E, Method 2007.2.A
8	ESD(Contact)	5 discharges at ±8kV direct contact to lid when unit is grounded. 5 discharges at ±2kV direct contact to I/O pins.	IEC 61000-4-2
9	Tumbling	Steel chamber length = 1m, 6.5rpm, 300 times.	SANICO specification
10	Reflow	Pre heat: +170~180℃/120sec, Solder reflow-Above: +230℃/100sec, Peak: +260℃/30sec, Repeat 3 times	SANICO specification
11	Water-resistance	Submerged in water tank (1.5m height, 50cm diameter) for 2HRS, emerged from water tank and put in the air for 4 hours before electrical test. Test condition is based on IPX7.	SANICO specification

Note: After reliability test, the samples shall be stored under climatic conditions such as leaving in the air with room temperature. Unless otherwise noted, the recovery period shall be 2 hours at least before performance testing. After test condition is performed, the sensitivity of the microphone shall not be varied more than 3dBV/Pa from its initial value.

## 13. Cautions for using MEMS microphone

### ✓ X-ray Inspection Equipment

+ X-ray inspection is allowable within the following conditions: 60~80kV, 60~100μA, under 1 min.

### ✓ Cleaning

+ It bans to use volatile cleaner (such as Acetone, TCE and Alcohol) and water-soluble cleaner (such as water and surfactant), and solvent to clean or wash microphone. If user should clean the microphone for manufacturing process, the microphone and sound hole must be covered with protection tape.

+ It is not allowed to wash or clean the board after the reflow process.

+ Cotton (swab, patch and etc.) is recommended to clean dust on PCB side, but it is not

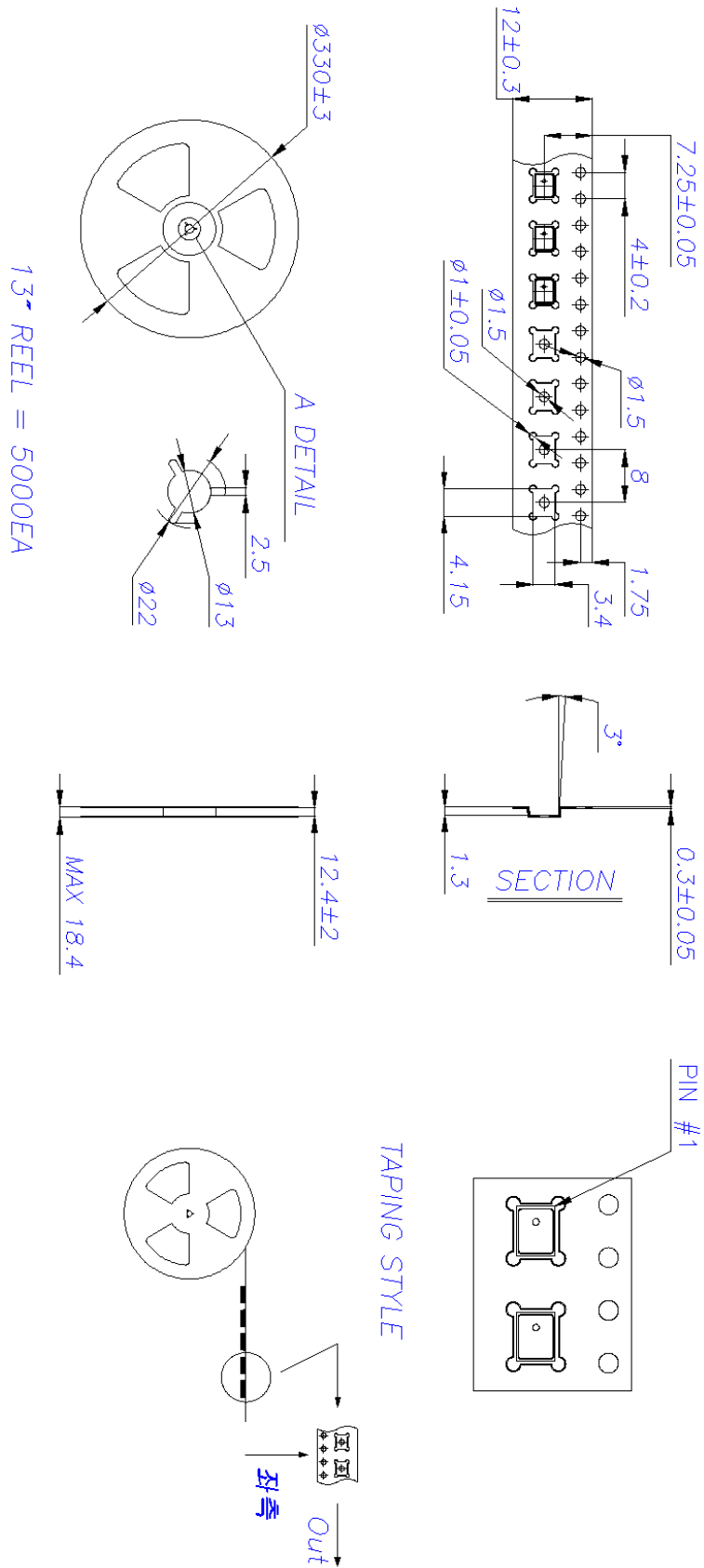
allowed to clean sound port side.

- + Be aware that dust causes degradation of sensitivity (Do not insert any object into the sound port hole).

✓ **Etc.**

- + Locate the microphone on finally reflowed PCB. (If there are two reflow-processes, microphone should be placed in secondly reflowed PCB not on firstly reflowed PCB)
- + Do not directly blow over 30 psi of air pressure in the sound port hole.
- + Do not directly apply a vacuum over sound port hole.

14. Packing Information



**15. Specification Revision History**

Revision	Remarks	Date
Rev 0.1	Specification release	SEP. 04, 2012
Rev 0.11	Add water-resistance level in page 9	SEP. 13, 2012
Rev 0.12	Add water-resist test condition in page 9	SEP. 15, 2012
Rev 0.15	Update reliability test condition on page 9	SEP. 20, 2012
Rev 0.2	Mechanical dimensions & Pin-out drawing in page 5 is updated.	NOV. 21, 2012
Rev 0.21	Electrical characteristics specification is updated in page 4.	NOV. 30, 2012
Rev 0.25	“Mechanical Dimension” in page 5, “Reflow profile” in page 8 and “Cautions for using MEMS microphone” in page 9 are updated	JAN. 15. 2013

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Data subject to be changed without notice

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