

# TECHNICAL SPECIFICATION

*Analog MEMS Microphone*

*Datasheet*

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AOS3729A-T42-NXC

SANICO ELECTRONICS

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## Analog MEMS Microphone Datasheet

### AOS3729A-T42-NXC



#### 1. General Description

AOS3729A-T42-NXC 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
- ✓ Small sized mechanical dimension
- ✓ High reliability
- ✓ Free from Hazardous Substances
- ✓ Top Type Package

#### 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. Absolute Maximum Ratings

Parameter	Absolute Maximum Rating	Units
VDD to Ground	+4	V
Storage temperature in package (tape and Reel)	-10 to 50	°C
Operating Temperature	-40 to 85	°C
Storage Temperature	-40 to 100	°C

Absolute maximum continuous ratings are the values beyond which damage the device may occur. Exposure to those conditions or conditions beyond those indicated may adversely affect device reliability. Functional operation under these conditions is not implied.

#### 5. Electrical Characteristics

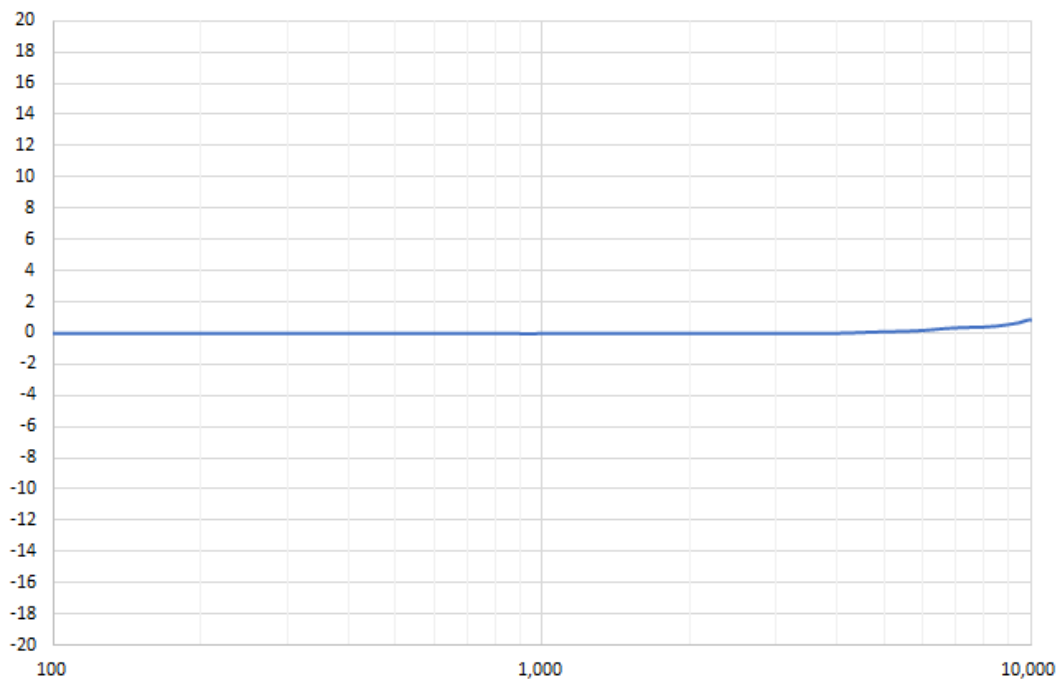
TEST CONDITIONS : 23±2°C, 65±20% R.H., Typical specifications are measured at VDD = 1.8V

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Sensitivity <sup>1</sup>	S	94dB SPL@1kHz	-45	-42	-39	dBV/Pa
Output Impedance	Z <sub>OUT</sub>	F=1kHz			300	Ω
Current Consumption <sup>1</sup>	I <sub>BSS</sub>	VDD =1.8V	40	70	110	μA
Signal Noise Ratio	S/N	94dB SPL@1kHz, A-weighted		59		dB
Operating Voltage	VDD		1.5	1.8	3.6	V
Total Harmonic Distortion	THD	94dB SPL@1kHz, S=Typ, Rload >3kΩ		0.15	0.2	%
Acoustic Overload Point	AOP	10% THD @1kHz,, S = Typ, VDD = 3.6V, Rload > 3 kΩ		125		dB SPL
Power Supply Rejection Ratio	PSRR	200mVpp sinewave @ 1kHz VDD =1.8V		60		dB
Power Supply Rejection	PSR	100mV <sub>pp</sub> squarewave@217Hz VDD =1.8V, A-weighted		-90		dBV(A)
DC Output		VDD =1.5V		0.4		V
Directivity			Omni-directional			

<sup>1</sup>100% tested

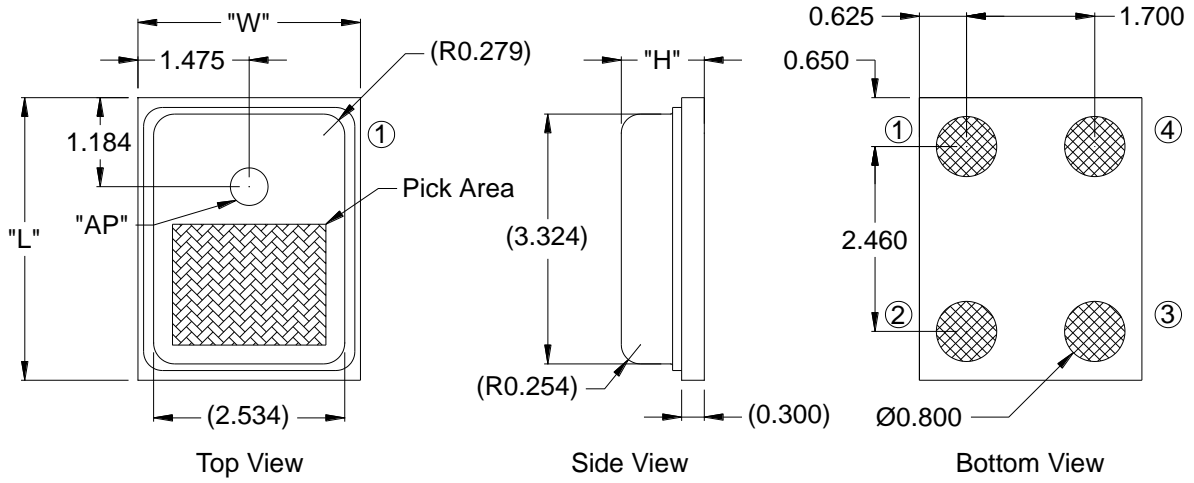
### 6. Typical Frequency Response Curve

**Typical Field Frequency Response  
Normalized to 1kHz**



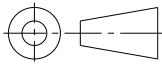
TEST CONDITION : 23±2°C, 65±20% R.H., Typical specifications are measured at VDD = 1.8V  
 Speaker : 1Pa (94dB SPL@1kHz) at 50cm distance from a loud-speaker

**7. Mechanical Dimensions & Pin out**



Item	Dimension	Tolerance
Length(L)	3.76	±0.10mm
Width(W)	2.95	±0.10mm
Height(H)	1.10	±0.10mm
Acoustic Port	Ø0.50	±0.05mm

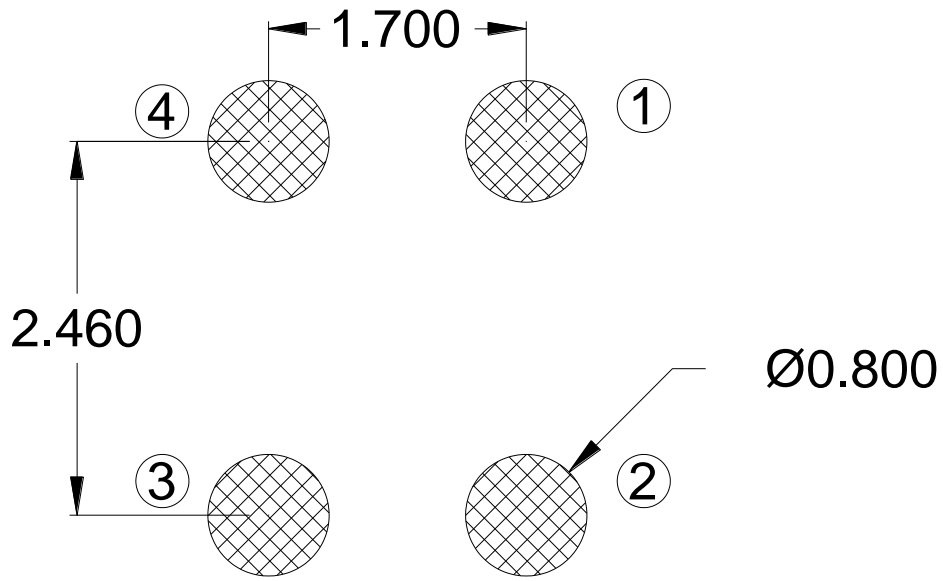
Note : Pick Area only extends to 0.25mm of any edge or hole unless otherwise specified.



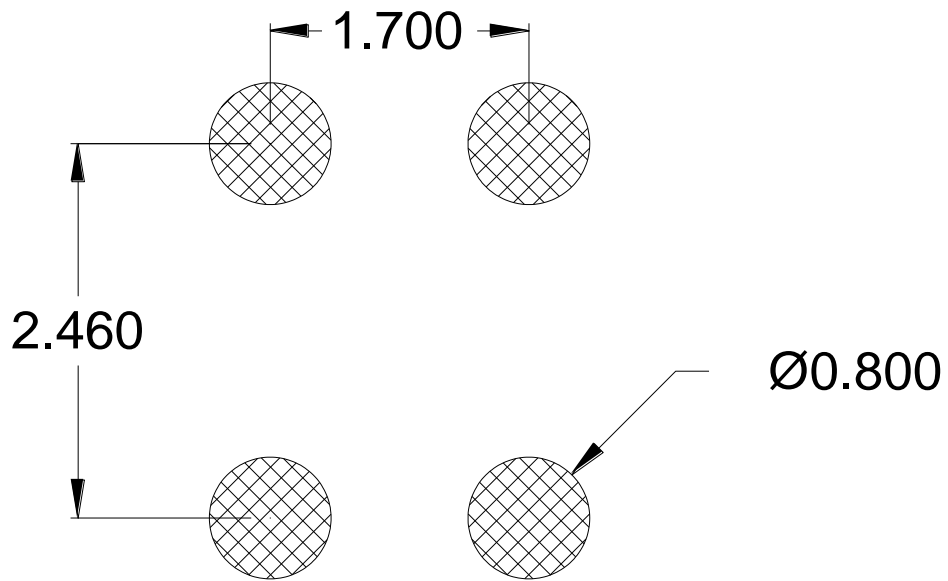
Dimension are in millimeters unless otherwise specified. Tolerance : ±0.15mm,

Pin 1	Pin 2	Pin 3	Pin 4
VDD	Ground	Ground	Output

**8. Recommended Customer PCB Pattern**

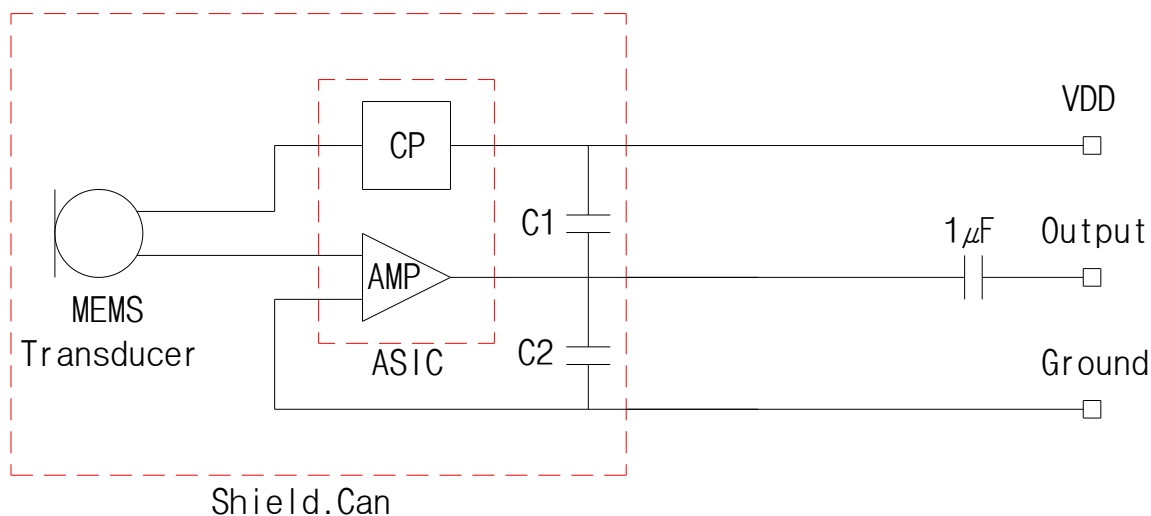


**9. Recommended Customer Stencil Pattern**

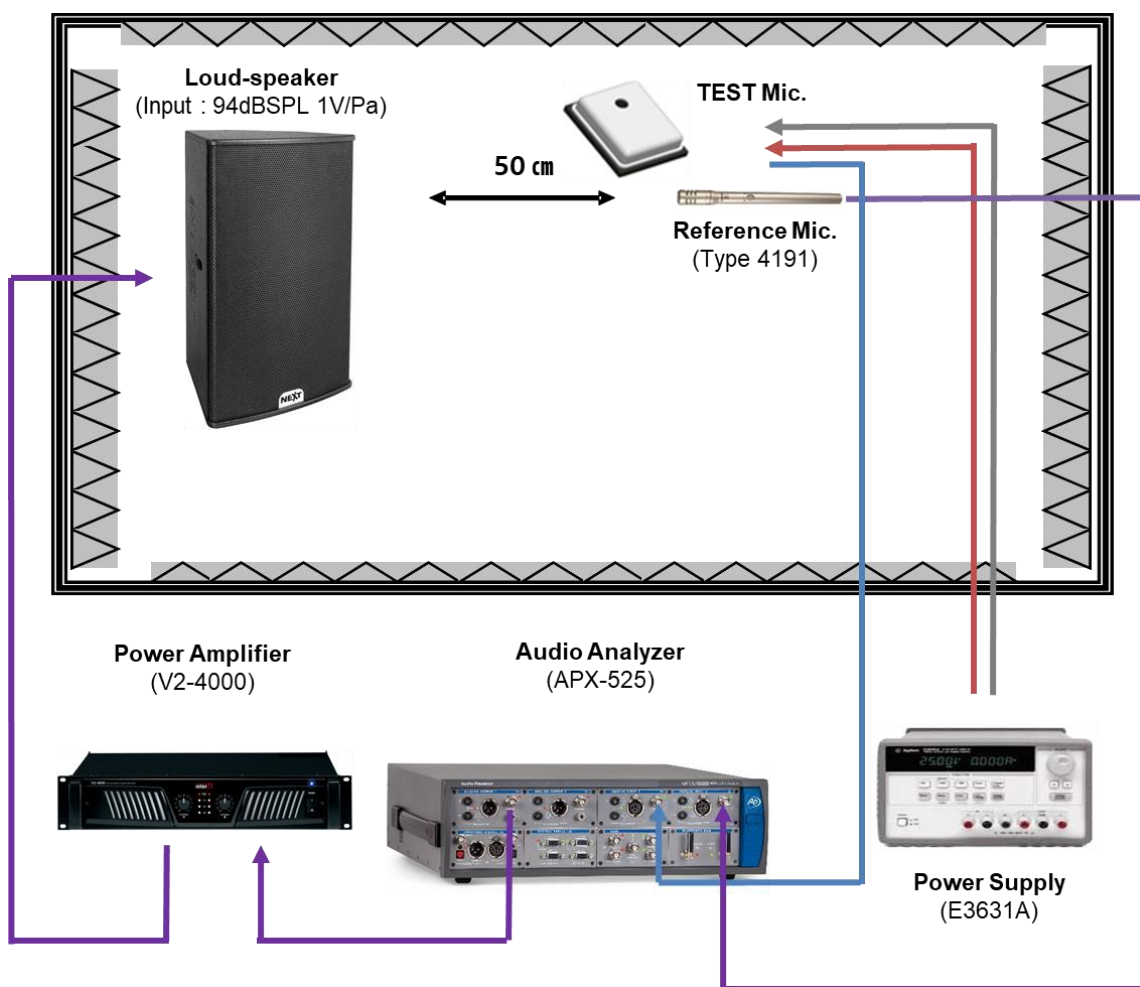


Note : Dimension are in millimeters unless otherwise specified

### 10. Standard Test Circuit

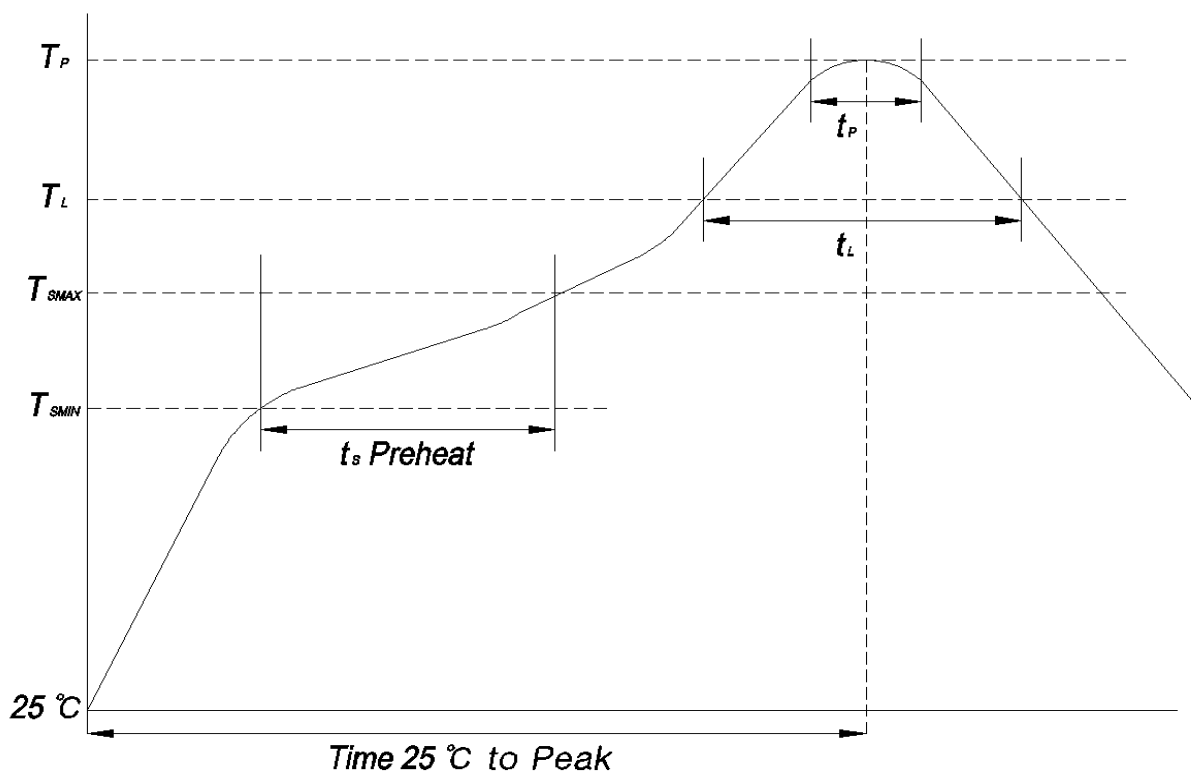


### 11. Typical Measurement System





### 12. Reflow Profile



Profile Feature		Lead(Pb) Free Solder
Preheat	Temperature min.(T <sub>SMIN</sub> )	150 °C
	Temperature max.(T <sub>SMAX</sub> )	200 °C
	Time (ts)	60-120 Seconds
Liquidous	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> )	30 Seconds Max.
Ramp up	Average ramp up rate T <sub>SMAX</sub> to T <sub>P</sub>	3 °C / Second Max.
Ramp down	Average ramp down rate T <sub>P</sub> to T <sub>SMAX</sub>	6 °C / Second Max.
Time 25 °C to Peak temperature		8 Minutes Max.

Notes: Based on JEDC J-STD-020D

**13. Typical Reliability Test Items**

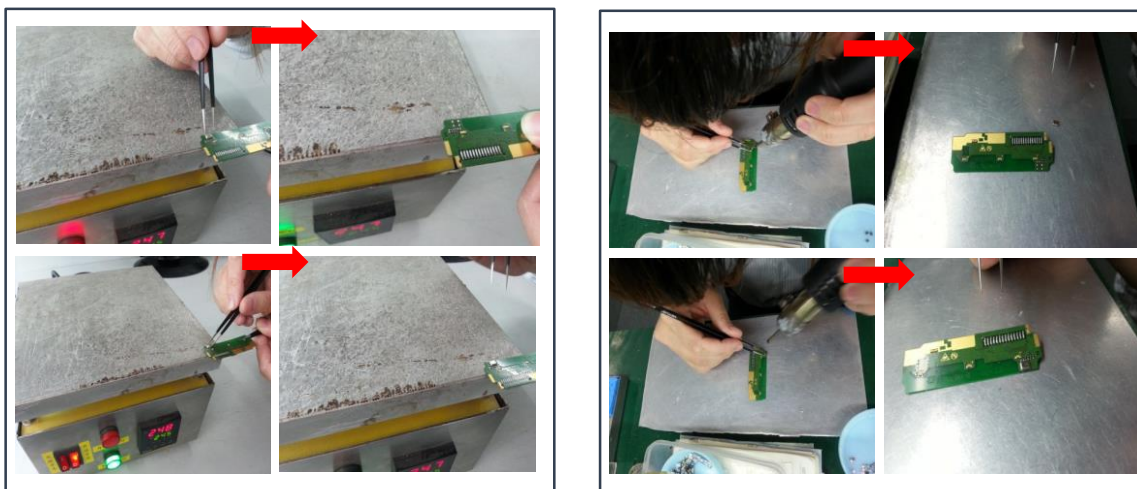
No	Tested Item	Condition	standard
1	Humidity	+85±2°C, 85±2%RH 120h	JESD 22-A 101A-B
2	Low Temperature	-40±2°C, 200h	IEC 68-2-2 Test Aa
3	High Temperature	+105±2°C, 200h	IEC 68-2-2 Test Ba
4	Thermal Shock	(-40±2°C→+85°C±2°C)×96Cycle, 30m	IEC 60068-2-4
5	Drop	Drop 12 times onto thick steel plate from height 1.52m (installed in JIG)	IEC 60068-2-32
6	Vibration	Frequency sweep: 10~55Hz/min → 2h Direction : X, Y, Z (1.52mm distance for each direction)	MIL 883E, Method 2007.2.A
7	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
8	Tumbling	Steel chamber length = 1m, 6.5rpm, 300 times.	SANICO specification
9	Reflow	Peak = 260°C / 30sec, Repeat 3 times	IPC-JEDEC J-STD-020D.1

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.

## 14. Cautions for using MEMS microphone

- ✓ In order to minimize device damage
  - + Do not board wash or clean after the reflow process.
  - + Do not brush board with or without solvents after the reflow process
  - + Do not directly expose to ultrasonic processing, welding, or cleaning.
  - + Do not insert any object in port hole of device at any time.
  - + Do not apply over 30 psi of air pressure into the port hole.
  - + Do not pull a vacuum over port hole of the microphone.
  - + Do not apply a vacuum when repacking into sealed bags at a rate faster than 0.5 atm/sec.
  - + 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)
  - + MSL(moisture sensitivity level) Class 1.

### Re-work Method



+250~270°C, Max 30sec

+Wind Speed: 15L/m

+Do not put a heat-gun over the acoustic hole of MEMS Microphone.

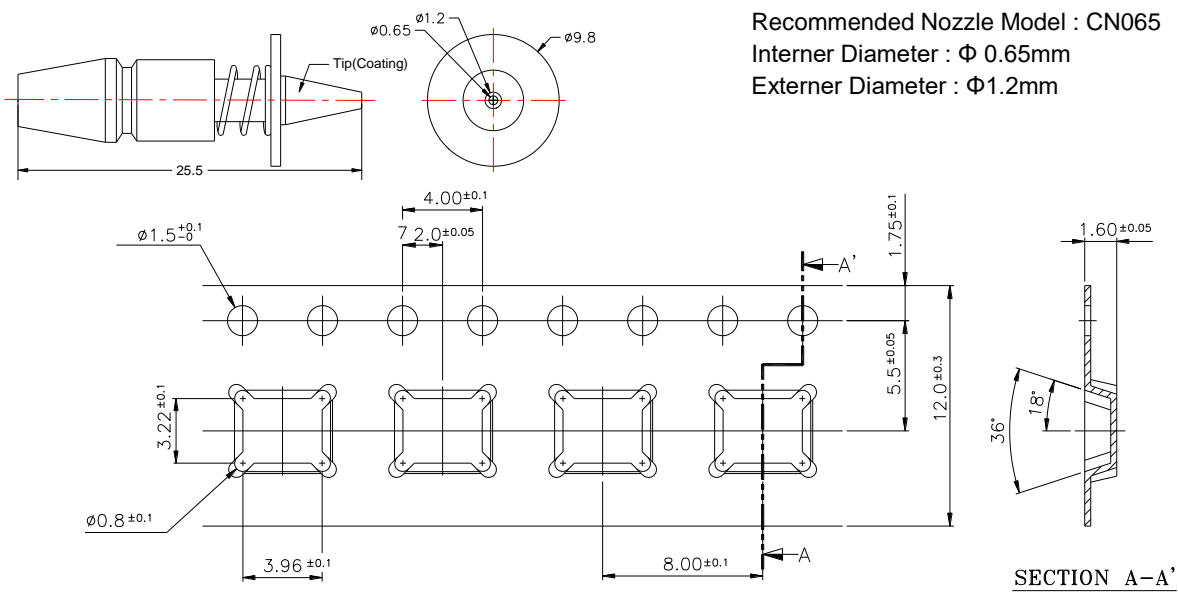
+There must be no other parts on back side

+MEMS Mic. should be detached in 3 seconds. (Peak Temperature 330°C)

+After detach MEMS Mic. from PCB, solder ball and residue must be removed

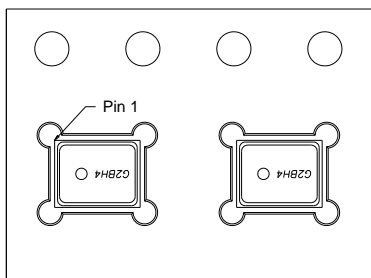
+Don't recommend re-work

**15. Packing Information**



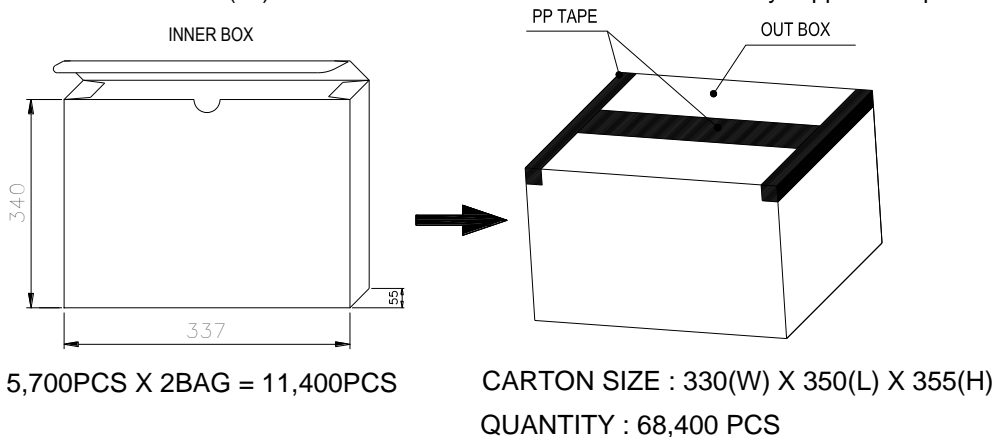
Recommended Nozzle Model : CN065  
 Interner Diameter : Φ 0.65mm  
 Externer Diameter : Φ1.2mm

Model	Reel Diameter	Quantity Per Reel
AOS3729A-T42-NXC	13"	5,700



MARKING : G2BH4				
YEAR	MONTH	DAY	Halogen Free	ASIC VER
2016	2	11	H	4

Note : Dimension are in millimeters unless otherwise specified.  
 Vacuum pickup only in the pick area indicated in Mechanical Specifications.  
 Label applied directly to reel and external package.  
 Shelf life : Twelve(12)months when devices are to be stored in factory supplied unopened.



**16. Specification Revision History**

Revision	Remarks	Date
Rev 0.1	Specification release	Feb 06, 2017
Rev 0.2	Packing Information was updated in page 11. Electrical Characteristics was updated in page 4.	Apr 07, 2017
Rev 0.3	Typical Frequency Response Curve was upgrade page 5.	Apr 07, 2017
Rev 0.4	Mechanical dimension was updated in page 6. Recommended Customer Stencil Pattern was updated in page 7 Standard Circuit was updated in page 8. Packing Information was updated in page 12.	Apr 13, 2018
Rev 0.5	Electrical Characteristics was updated in page 4.	Apr 24, 2018
Rev 0.6	Electrical Characteristics was updated in page 4. Cautions for using MEMS microphone was updated in page 11. Packing Information was updated in page 12.	May 8, 2018

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Data subject to be changed without notice

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