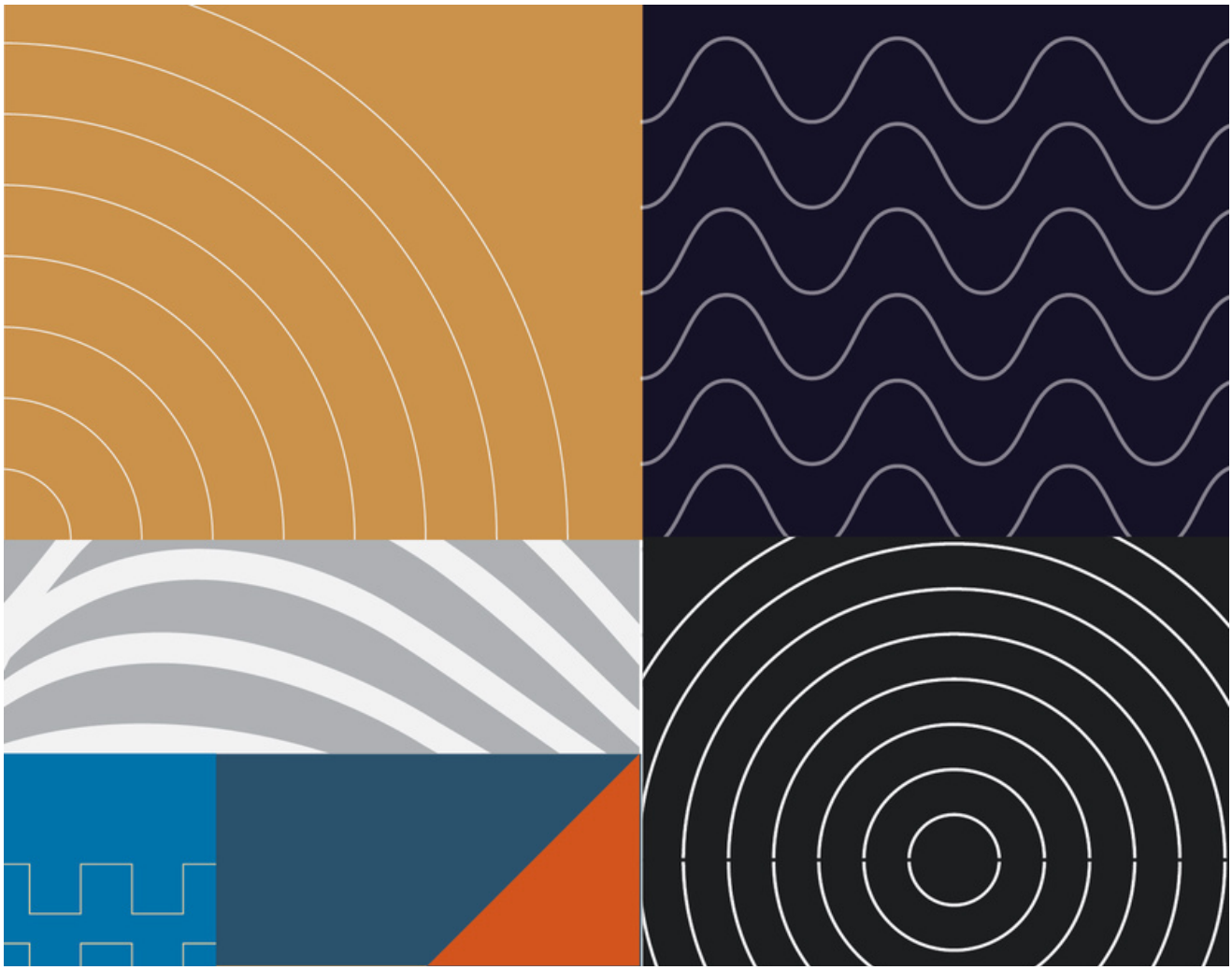
NEW PRODUCT HIGHLIGHT

Bone Conduction MEMS Microphone



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Product Overview

New patented surface mount micro-electromechanical systems (MEMS) microphone enhances hearing experience in most difficult environments over the standard microphones. It works by sensing the vibration signals precisely and reliably transmitted through bone and hence do not pick up the surrounding noise. Its small size allows it to easily fit and provide design flexibility in various types of applications.

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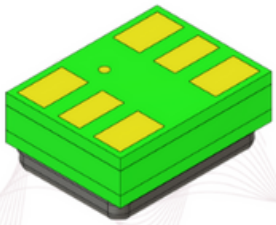
BONE CONDUCTION MEMS MICROPHONE

VMM-1627L-R



Primary Applications: Wearables, Smart voice systems, Medical/Health Monitoring, Industrial, Automotive, Military.

- Footprint: 3.5 X 2.6 X 1.5mm
- Power supply: 1.5V~3.6V
- Current consumption max: 150uA
- Sensitivity: -29±2dBV/g
- S/N ratio: 73dB (A)
- Peak Frequency: 5Khz
- Air conduction noise suppression >40dB @ 1Khz

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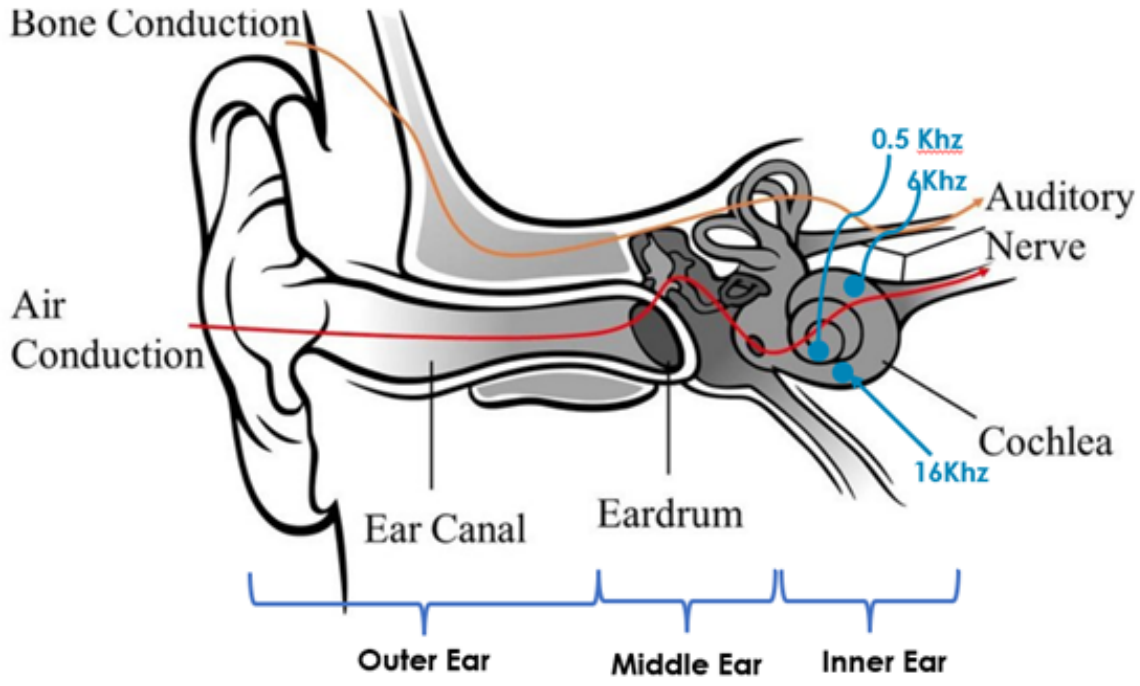
What Is Bone Conduction

Bone Conduction was discovered by the famous 18th century compose, Ludwig van Beethoven who was almost completely deaf in his early twenties. He found a way to hear the piano through his jawbone.

Most sounds are heard by our eardrums, but we can also hear through our bones in which case it bypasses eardrum, and vibrations are transmitted directly to the inner ear, which is connected to our auditory nerve, which then transmits the sound to our brain. We hear our own voice differently as both mediums are involved – air and bone conduction as opposed to someone else hearing us!



Bone conduction microphone can be really advantageous for user with hearing aid needs or is surrounded by noise. Care should be taken to mount the microphone such that noise is not transferred to the device.

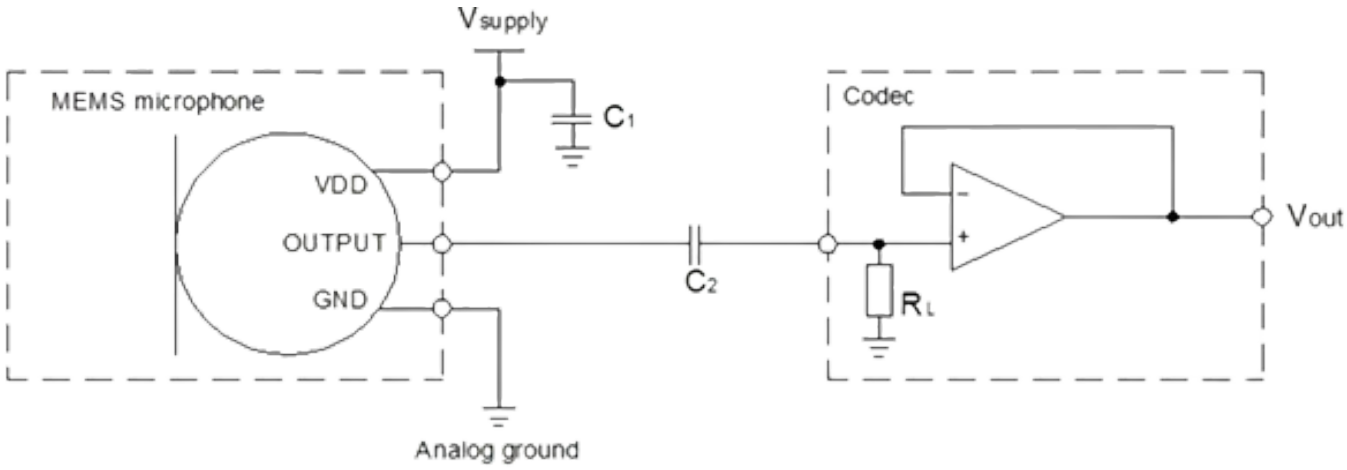
Customer can also combine the best of two microphone types to overcome limitations and develop an array using air conduction microphones with bone conduction microphones to offer best user experience.

Circuit Design

Slight variances in power supply voltage do not affect the sensitivity of PUI Audio's MEMS microphones. As such, a circuit designer only needs to ensure that the voltage output of the power supply is within the voltage range called out in the MEMS microphone specifications.

Unlike traditional ECM microphones, MEMS microphones do not require the use of a bias resistor between the power supply and the microphone. MEMS microphones have an independent output that is separate from the voltage input. It is recommended to decouple the noise of the power supply from the MEMS microphone by using a 0.1µF capacitor at C1 in the diagram below. A DC-blocking/high-pass filter capacitor should be placed between the MEMS output pin and the CODEC/ADC/preamplifier's input pin, C2 in the diagram below. Values between 1µF and 3µF are often used, where the larger the capacitor value, the higher the frequency at which the high-pass filter's corner frequency is placed.

In the event of electromagnetic interference, place a resistor that matches the microphone's impedance between the amplifier's unused differential input and the microphone's ground.



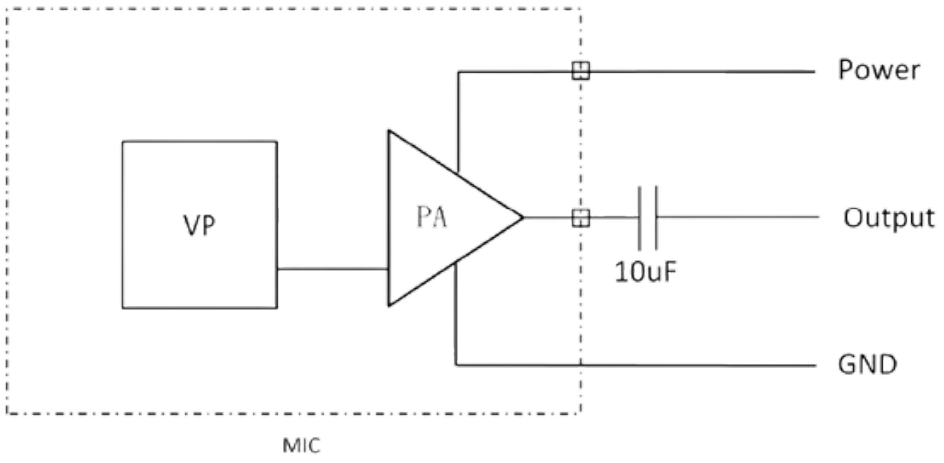
Data Sheet

Bone Conduction Mems Microphone: Patented surface mount vibration sensor that gathers signals transmitted through bone to achieve exceptional noise reduction. Available in 3.5 X 2.6 X 1.5 mm small package. Key applications include wearable products, such as smart wristbands, TWS headphones, Mobile phones, Medicine devices, for example heart rate detection systems.

Specifications

Parameters	Values	Units
Sensitivity Range(1 kHz) 0 dB=1V/Pa Z Direction	-31 (Min) -29 (Typical) -26 (Max)	dB
Operating Voltage Range	1.5 ~ 3.6	VDC
DC output	0.6	V
Max Current consumption	150	μA
Signal to Noise (S/N) Ratio	73	dB (A)
Acceleration	±4	g THD <1% @ 1KHz
Output Impedance	300	Ω
Air Conduction Noise Suppression (@ 1kHz)	>40	dB
Noise Density 250 Hz 1 kHz 2 kHz	-94 -101 -101	dBV/ √Hz
Peak Frequency	5	kHz
Environmental Compliances	RoHS/REACH	-
Operating Temperature	-30 ~ +70	℃
Storage Temperature	-30 ~ +85	℃
MSL (moisture sensitivity Level)	Class 1	

Test Circuit



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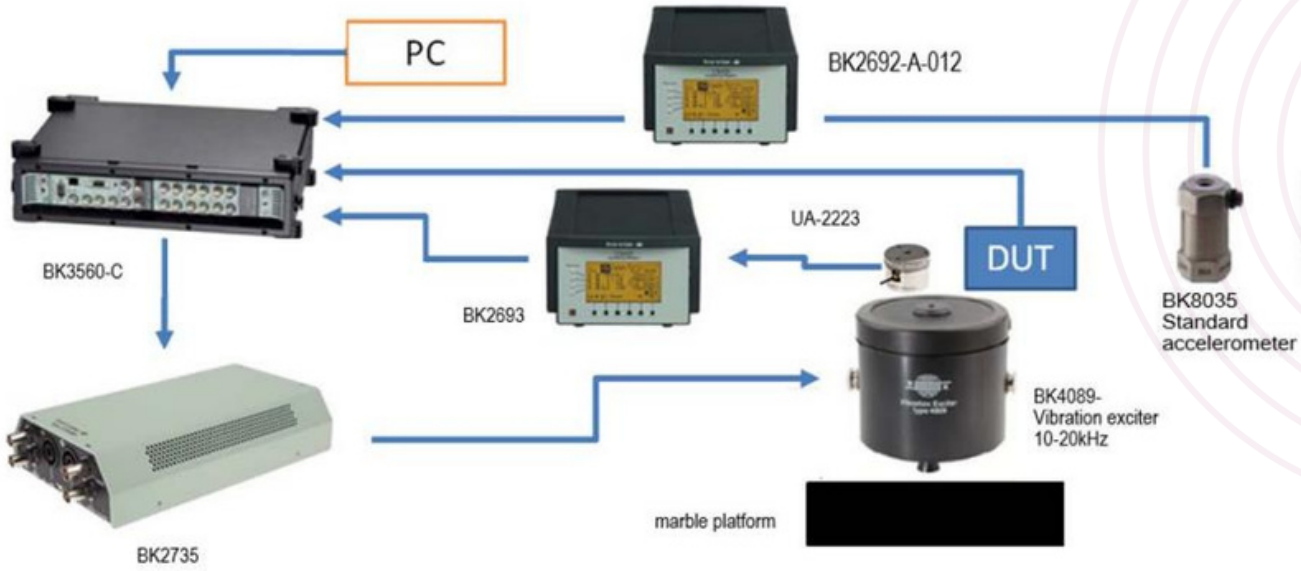
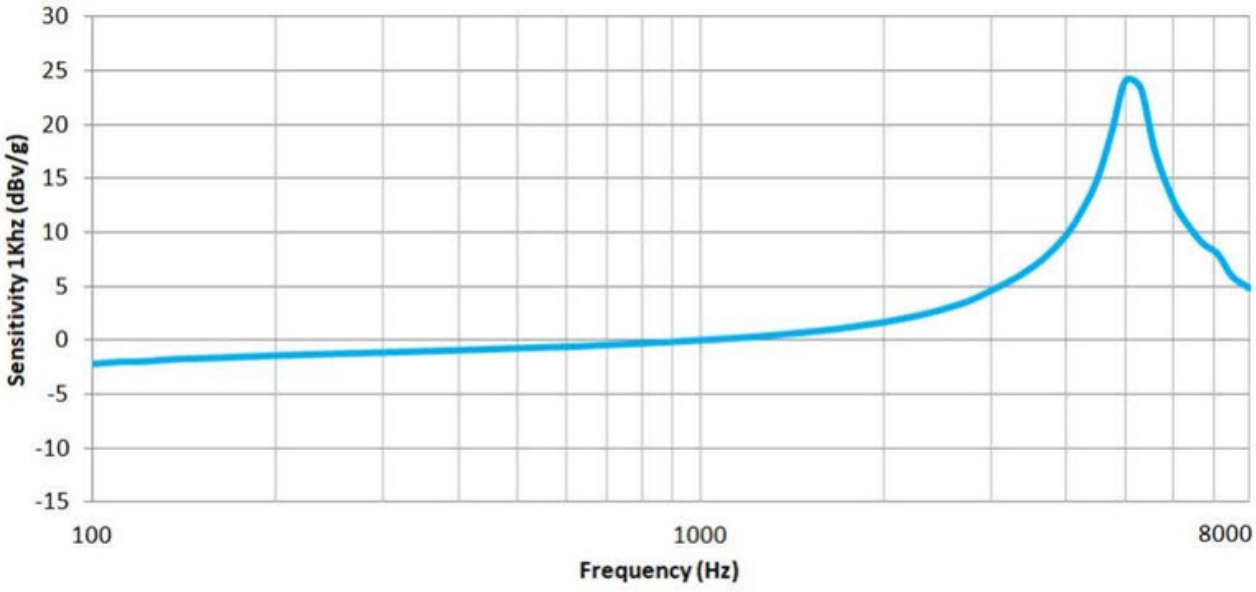
Measurement Method



Typical Frequency Response



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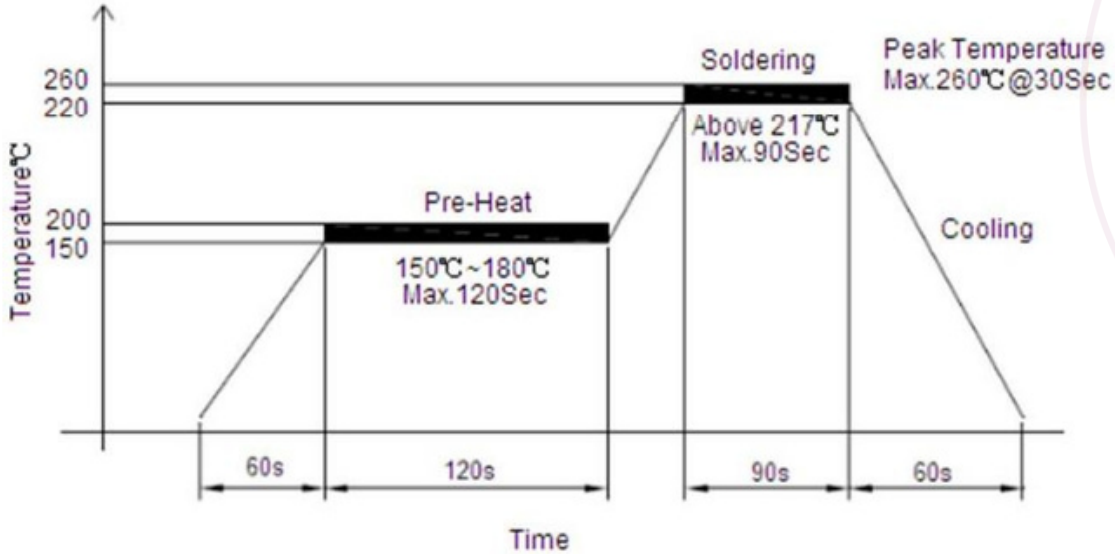
Recommended Soldering Procedure

Recommend reflow profile, solder reflow <=260℃ (for 30s Max of peak temperature)



Important Notes In order to minimize device damage:

1. Times of reflow ⩽3
2. Pressure relief hole can't be covered.
3. Pressure relief hole can't be blown by strong wind.
4. Do not wash or clean the boards after the reflow process.
5. In the process of reflux, there can be no atomizing solvent or liquid

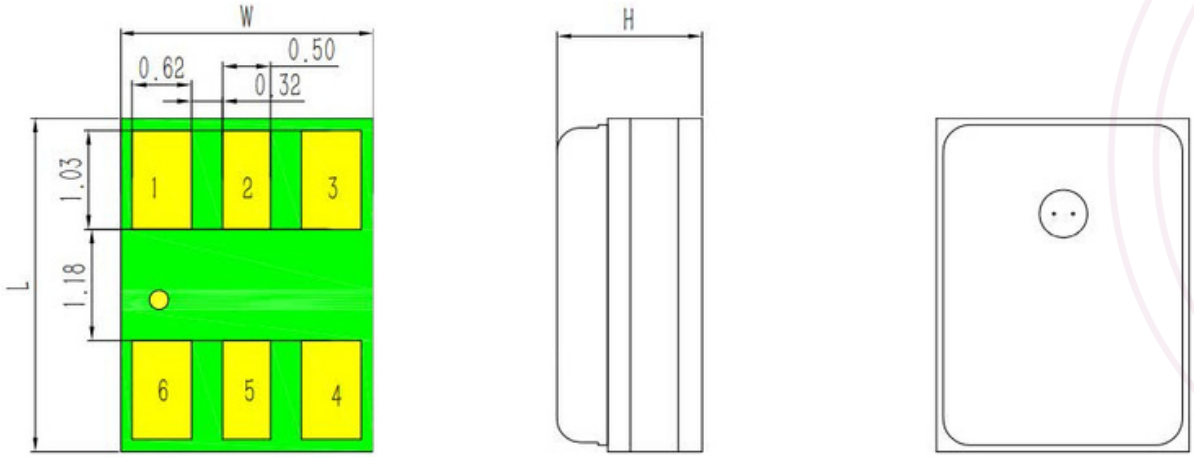
Reliability Testing

Type of Test	Test Specifications
High Temperature Humidity Test	1000 hours at 85 °C with relative humidity at 85%
Thermal Shocking	-30 °C for 30 minutes to 125 °C for 30 minutes with 5 minutes temperature changing time
Vibration Test	30 minutes in each x, y, and z axis from 10 Hz to 55 Hz
Mechanical Shock Test	Subject samples to half sine shock pulses (3000 g ± 15% for 0.3 ms) in each direction, total of 18 shocks
Operation Life	Subject samples to +125 °C for 168 hours with full maximum rated voltage
Drop Test	Drop from a height of 1.5 m on to marble floor 4 times on 6 surfaces.

After each test, the part shall be within ±3 dB of specification after 2 hours of rest at standard room conditions

Data Sheet

Dimensions



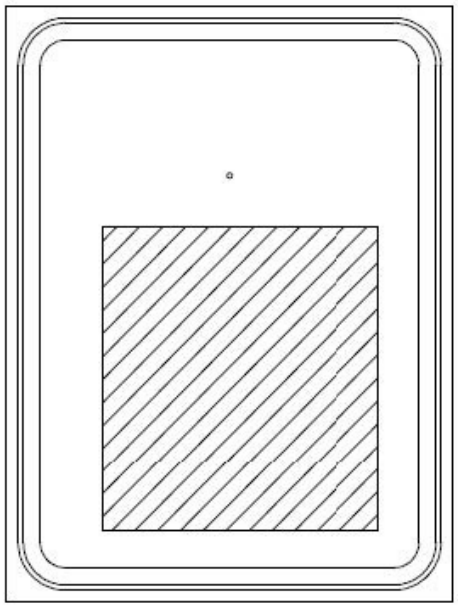
Item	Dimension	Tolerance(+/-)	Units
Length(L)	3.5	0.10	mm
Width(W)	2.65	0.10	mm
Height(H)	1.55	0.10	mm

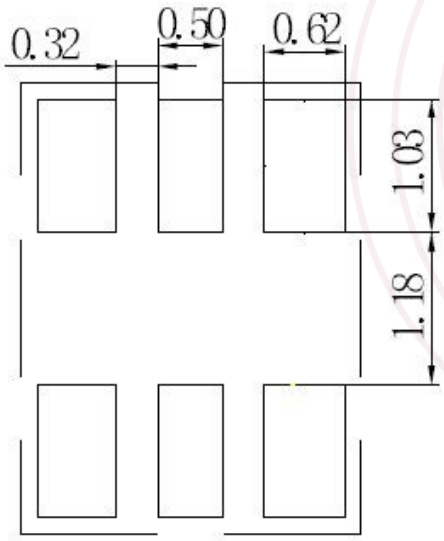
PIN	Signal	Description
1	GND	Ground
2	GND	Ground
3	VDD	Power Suply
4	GND	Ground
5	GND	Ground
6	OUT	Output signal

Notes:
- All dimensions are in millimeter (mm).
- Tolerance±0.15mm unless otherwise specified.

Data Sheet

Suggested Land Pattern*

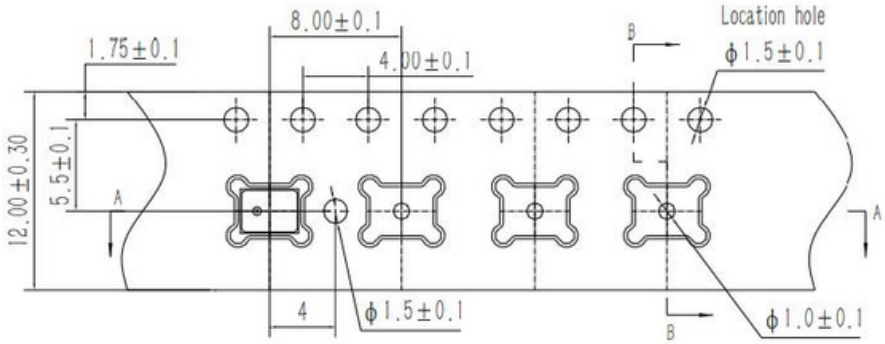


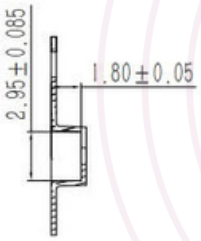


*This land pattern is advisory only and its use or adaptation is entirely voluntary. PUI Audio disclaims all liability of any kind associated with the use, application, or adaptation of this land pattern.

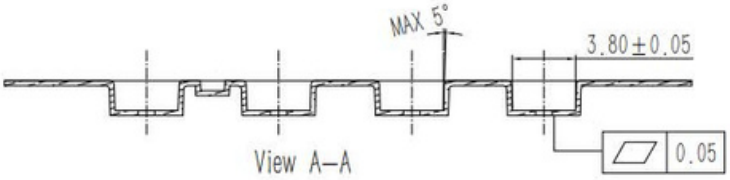
Data Sheet

Packaging

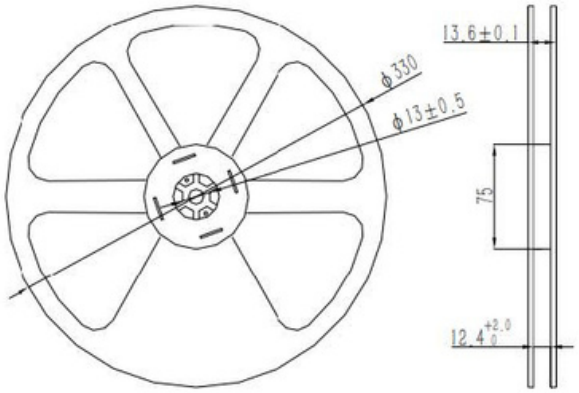




View B–B



View A–A



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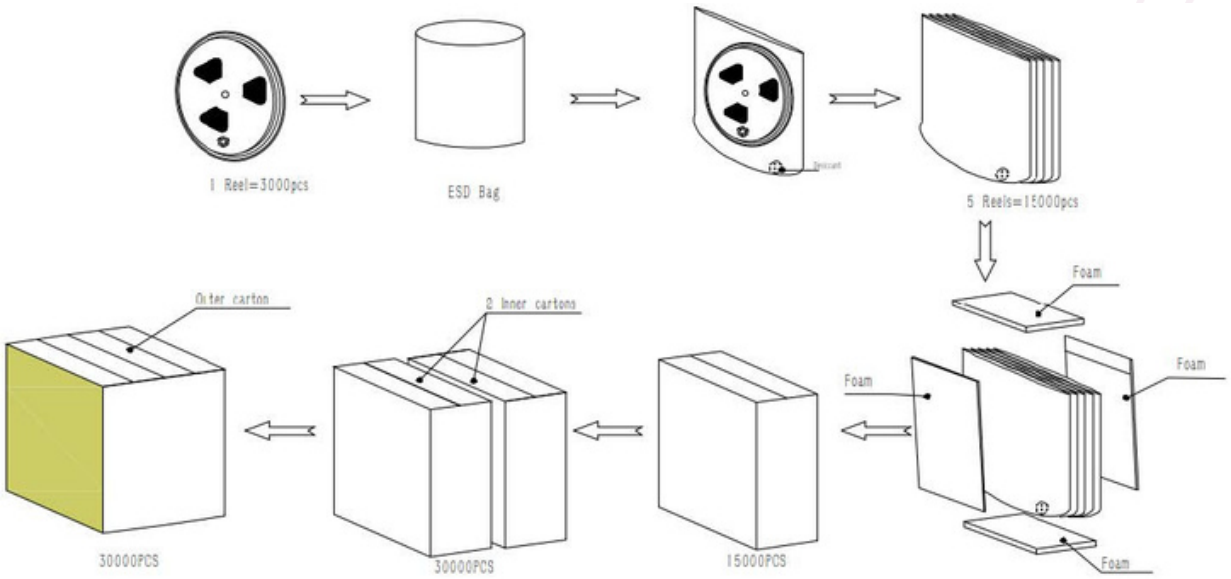

Specifications Revisions

Revision	Description	Date
A	Released from Engineering	10/24/2022

Note:
1. Unless otherwise specified:
A. All dimensions are in millimeters.
B. Default tolerances are ±0.5mm and angles are ±3°.
2. Specifications subject to change or withdrawal without notice.