AKUSTICA

Datasheet

September 2009

AKU1126 Single-Chip Analog Microphone

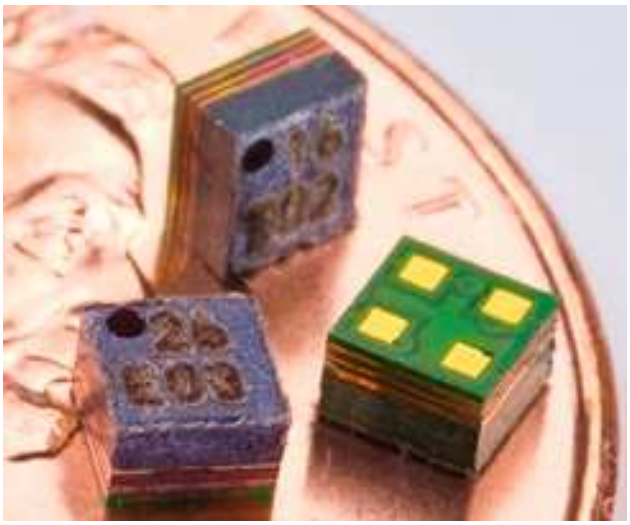
GENERAL DESCRIPTION

The AKU1126 is the world's smallest, analog-output microphone that uses standard semiconductor packaging technology and materials. While other microphones degrade in performance as they shrink in size, the AKU1126 maintains superior performance in an ultra-small form factor.

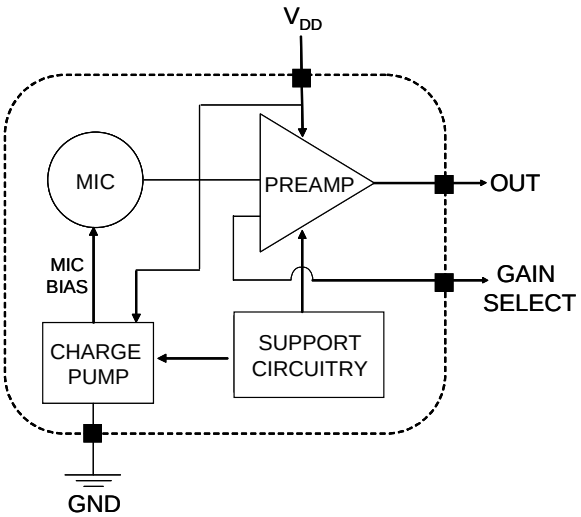
The AKU1126's gain select feature, accessed by use of a single external resistor, allows the microphone to be used in both near-ear applications as well as far-field applications - such as speaker phones or headsets - without the use of additional amplifiers.

The AKU1126 is the first microphone product to leverage Akustica's 1mm x 1mm CMOS MEMS microphone die – a monolithic solution which integrates the acoustic transducer and accompanying electronics in a single chip of silicon. In contrast to other silicon microphones, Akustica's one die approach eliminates the need for inter-die wirebonds, allowing for smaller, higher performance, more reliable products.

AKU1126 microphones are simple to integrate into many consumer electronic devices with little to no design changes. In addition, two or more AKU1126 microphones can be used without increasing the PCB footprint dedicated to a single microphone used today. This makes the AKU1126 ideal for use in very small end-user devices such as mobile phones and headsets where board space is at a premium and a high degree of voice quality can be achieved using microphone arrays and next generation noise suppression technology.



FUNCTIONAL BLOCK DIAGRAM



FEATURES

- Omni-directional microphone
- Less susceptible to wind noise than standard Electret Condenser Microphones
- Microphone sensitivity gain is user-selectable up to 12dB via an external resistor
- Ultra-small footprint for use in portable electronic devices
- Surface-mountable for improved manufacturing reliability and efficiency
- Automated pick and place compatible
- Low power microphone leading to increased battery life for portable devices
- Halogen –free in accordance with IEC61249-2-21
- Lead-free surface mount compatible and RoHS compliant

AKU1126 Datasheet

ABSOLUTE MAXIMUM RATINGS

Supply voltage, V_{DD} to GND	5.5V
ESD Tolerance	
Human Body Model	2000V
Machine Model	200V
Storage temperature range	-40°C to 105°C

STANDARD OPERATING CONDITIONS

Operating temperature range	-40°C to 85°C
Supply Voltage (V_{DD})	1.65 to 3.6V

ELECTRICAL SPECIFICATIONS

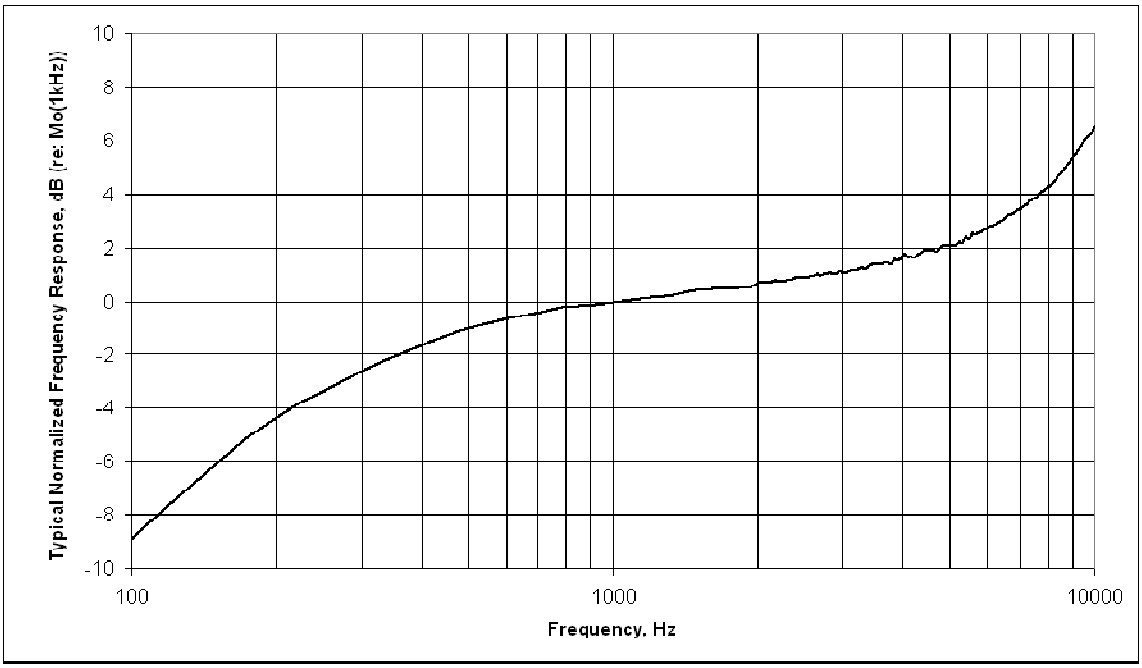
Unless otherwise noted, test conditions are: V_{DD}=2V, T_a=25°C, RH = 50%, R_{ext} = 0Ω

ELECTRO-ACOUSTIC CHARACTERISTICS

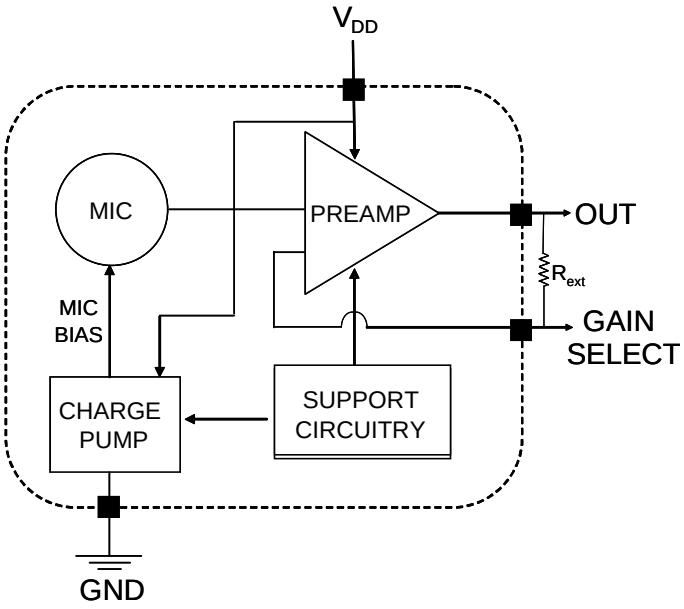
Parameter	Test Conditions	Min	Typical	Max	Unit
Sensitivity	@ 1 kHz (re: 1V/Pa), R_{ext} = 0Ω @ 1 kHz (re: 1V/Pa), R_{ext} = 3.16 kΩ @ 1 kHz (re: 1V/Pa), R_{ext} = 8.45 kΩ @ 1 kHz (re: 1V/Pa), R_{ext} = 16.9 kΩ @ 1 kHz (re: 1V/Pa), R_{ext} = 33.2 kΩ	-48	-45 -42 -39 -36 -33	-42	dBV/Pa
Signal to Noise Ratio (SNR)	@ 1 kHz, A-weighted (20 Hz – 10 kHz), 94 dB SPL input		57		dB
Equivalent Noise Pressure	A-weighted (20 Hz – 10 kHz)		37		dBA SPL
Total Harmonic Distortion	@ 100 dB SPL, f_{in} =1 kHz @ 115 dB SPL, f_{in} =1 kHz			1 5	%
Power Supply Rejection Ratio (PSRR)	Test signal on V_{DD}=217 Hz, 100 mV_{pp}		46		dB
Current Consumption	No Acoustic Input		140	190	µA
Output Impedance				100	Ω
Sensitivity loss over voltage	Change in sensitivity from 3.6 to 1.8V		No change		
Start Up Time	Time to valid acoustic output		500	800	ms

AKU1126 Datasheet

TYPICAL FREQUENCY RESPONSE



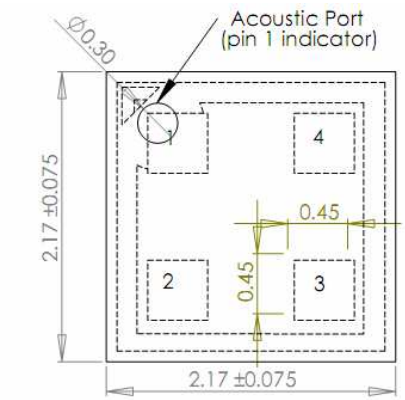
USE OF R_{ext} FOR SELECTABLE GAIN



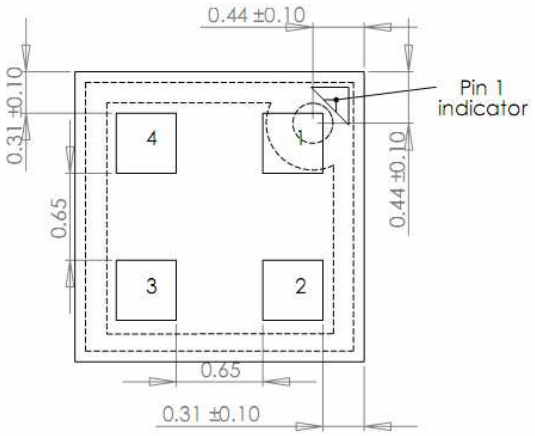
AKU1126 Datasheet

PACKAGE DIMENSIONS

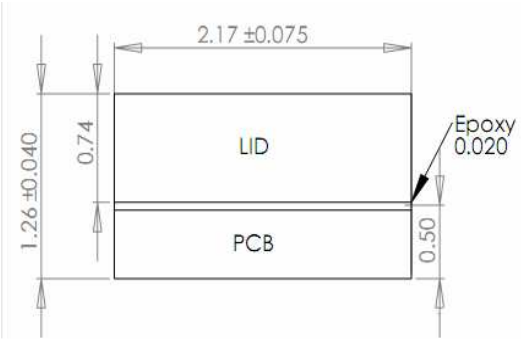
Top View



Bottom View



Side View



PIN DESCRIPTIONS

Pad	Name	Function
1	GAIN SELECT	Gain Select Pad (for 0dB gain, short to Pad 4)
2	V_{DD}	Power Supply
3	GND	Ground
4	OUT	Microphone Output

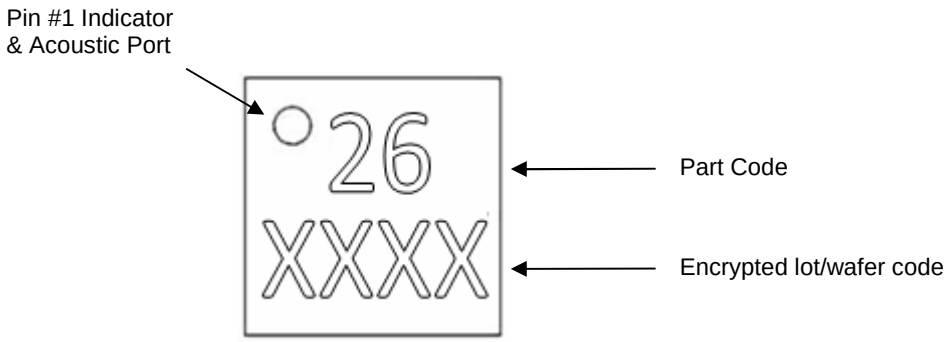
AKU1126 Datasheet

MANUFACTURING NOTES

Solder reflow	210°C to 260°C, 30-90 seconds maximum
Cleaning	Do not wash after reflow. Do not use pressurized air to clean or aid in assembly.
Part Handling	Do not blow air into acoustic port or use vacuum pick-up head over acoustic port in package.

Note: For more detailed information, please refer to application note "AN36 - Recommended Design, Reflow, & Rework Guidelines for the AKU1126"

PART MARKING INFORMATION



ORDERING INFORMATION

Model Number	Part Code	Shipping Method	Standard Quantity
AKU1126AR	26	7" Reel	3,000
AKU1126EVK	EVK	AIB & 5 coupons	1

AKU1126 Datasheet

Akustica, Inc.
2835 East Carson Street
Suite 301
Pittsburgh, PA 15203
Ph: (412) 390-1730
For technical support contact support@akustica.com
www.akustica.com