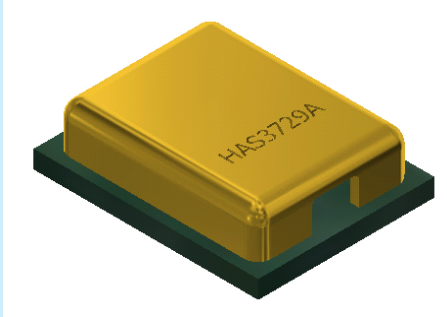


HAS3729A4

SIDE-PORT MEMS MICROPHONE WITH ANALOG OUTPUT



RoHS Compliance

Pb Free

Features

- Surface-mount package :
3.76mmx2.95mmx1.1mm
- Stable sensitivity over power supply range of 1.5V-3.6V.
- SNR of 59dBA.
- Sensitivity of -42dBV.
- Low current consumption of <math><200\mu\text{A}</math>.
- Power Supply Reject Ratio 65dB
- Multi-Chip Module (MCM) Package

Applications

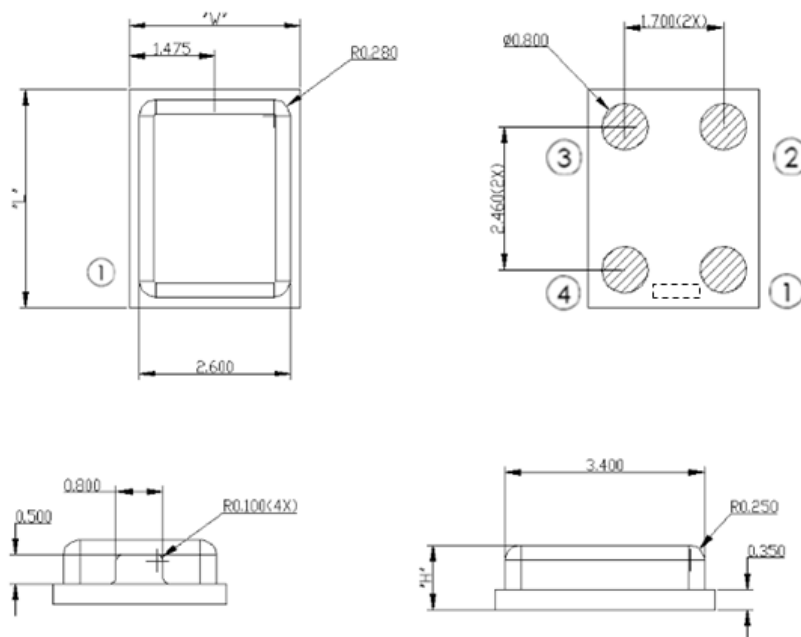
- Mobile telephones
- PDAs
- Digital video cameras
- Portable media devices with audio input
- IP Cameral
- Automotive

Description

The HAS3729A4 is a high quality, low cost, low power analog output top-ported omni-directional MEMS microphone. HAS3729A4 consists of a MEMS microphone element and an preamplifier. HAS3729A4 has a high SNR and flat wideband frequency response, resulting in natural sound with high intelligibility. Due to built-in filter, HAS3729A4 shows high immunity to EMI. The HAS3729A4 is available in a thin 3.76mm × 2.95mm × 1.1mm surface-mount package. It is reflow solder compatible with no sensitivity degradation. The HAS3729A4 is halide free.

MECHANICAL SPECIFICATION

Dimension



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Item	Dimension	Tolerance	Units
Length (L)	3.76	±0.10	mm
Width (W)	2.95	±0.10	mm
Height (H)	1.10	±0.10	mm

Pin #	Pin Name	Type	Description
1	VDD	Power	Power Supply
2	GROUND	Power	Ground
3	GROUND	Power	Ground
4	OUTPUT	Signal	Output Signal

STANDARD SPECIFICATION

Production Specification

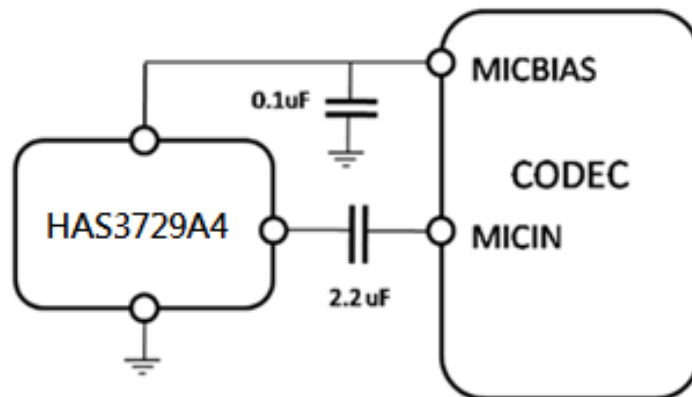
(TA = +25°C, VDD = +1.8V, unless otherwise noted.)

Parameter	Symbol	Test Conditions	Min	Type	Max	Units
Directivity				Omni		
Supply Voltage	VDD		1.5		3.6	V
Current Consumption	IDD				200	µA
Sensitivity (Note)		1kHz, 94dB SPL	-43	-42	-41	dBV
Signal-to-Noise-Ratio	SNR			59		dB
Equivalent Input Noise	EIN			35		dBASPL
Total Harmonic Distortion	THD	1kHz, 94dB SPL		0.1	0.2	%
Power Supply Rejection Ratio	PSRR	217Hz, 100mV Vp-p, square wave on VDD		65		dB
Maximum Acoustic Input				125		dB SPL
Output Impedance	Zout			200		Ω
Output DC Offset				0.7		V
Output Current Limit				90		µA
Polarity				Non-inverting		

Note: Base on BK sound test system.

Typical Applications

The HAS3729A4 output can be connected to a codec microphone input or to a high input impedance gain stage. A dc-blocking capacitor is required at the output of the microphone.



Connect to Audio Codec

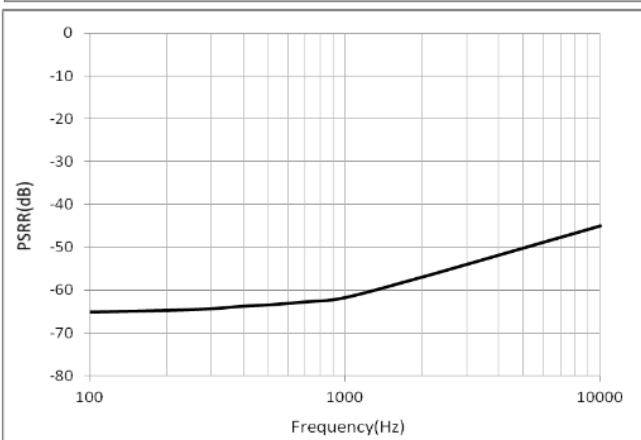
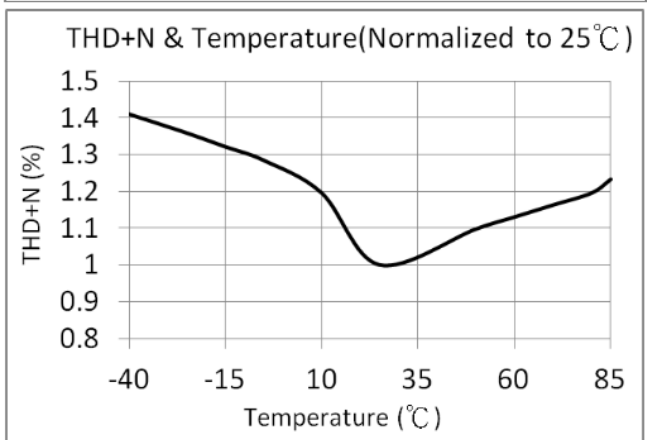
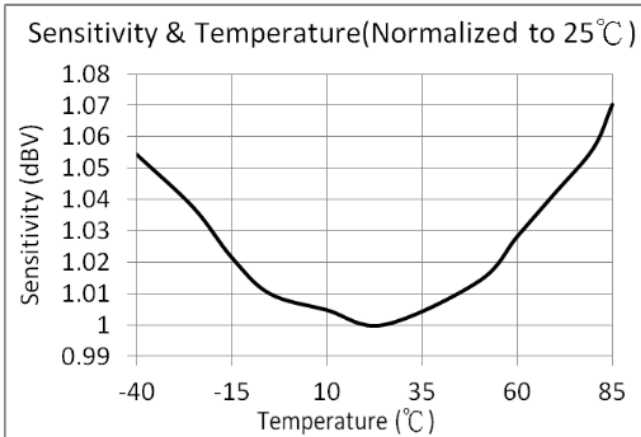
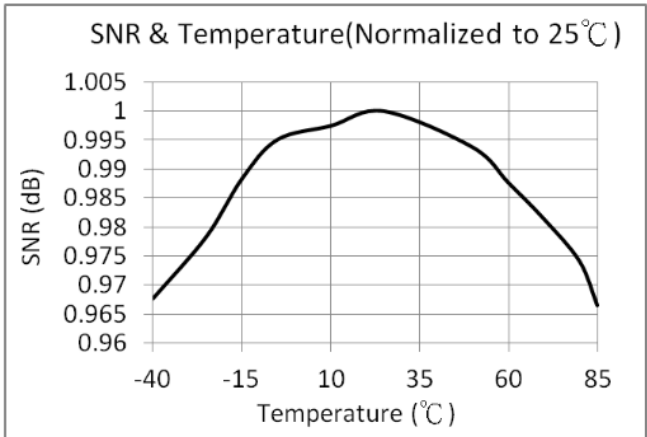
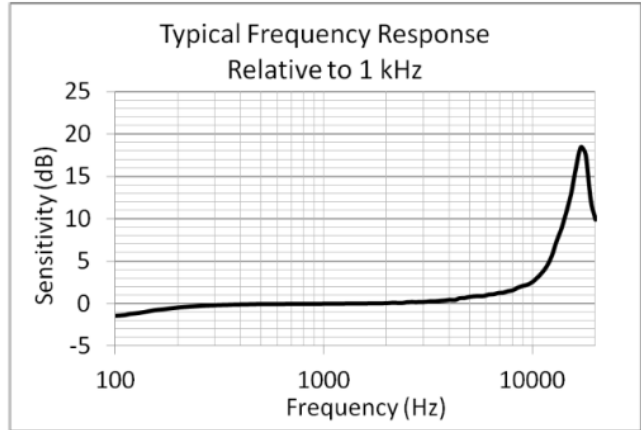
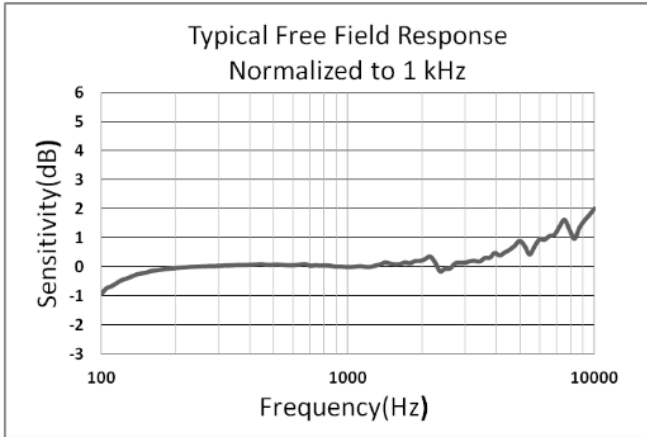


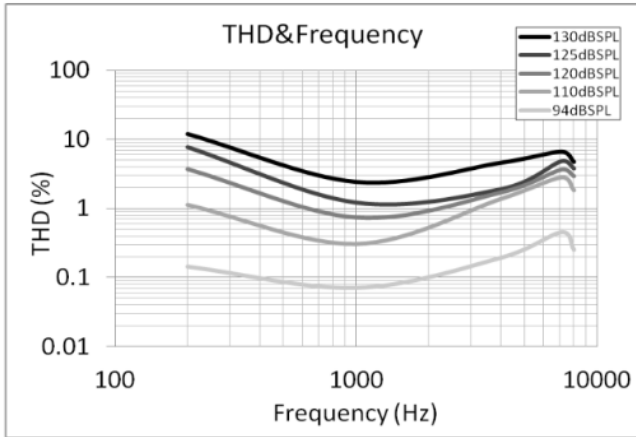
Absolute Maximum Ratings

Parameter	Absolute Maximum Rating	Units
Supply Voltage	1.65~3.6	V
Sound Pressure Level	160	dB
Mechanical Shock	10000	g
Vibration	Per MIL-STD-883 Method 2007, Test Condition B	
Temperature Range	-40~105	°C

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Typical Performance Characteristics





Electro-Static Discharge Sensitivity

This integrated circuit can be damaged by ESD. It is recommended that all integrated circuits be handled with proper precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure.

RELIABILITY SPECIFICATIONS

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

Stress Test	Description
Heat Test, Operational	Temperature: $85\pm 3\text{°C}$ Humidity: $85\pm 5\% \text{RH}$ Duration: 12 hours Voltage: Applied
Cold Test, Operational	Temperature: $-40\pm 3\text{°C}$ Duration: 12 hours Voltage: Applied
Heat Test, Non-Operational	Temperature: $85\pm 3\text{°C}$ Humidity: $50\pm 5\% \text{RH}$ Duration: 96 hours Voltage: Not Applied
Cold Test, Non-Operational	Temperature: $-40\pm 3\text{°C}$ Duration: 96 hours Voltage: Not Applied
Condensation Test, Non-Operational	Temperature: $25\pm 3\text{°C}$ and $55\pm 3\text{°C}$ Humidity: $95\pm 5\% \text{RH}$ Duration: 1 hours each, during 10 minutes ramp, 45 cycles Voltage: Not applied
Temperature Cycling, Non-Operational	Temperature: $-40\pm 3\text{°C}$ and $85\pm 3\text{°C}$ Humidity: $50\pm 5\% \text{RH}$ Duration: 2 hours each, during 6 hours ramp, 5 cycles Voltage: Not applied
Thermal Shock Test, Non-Operational	Temperature: $-40\pm 3\text{°C}$ and $85\pm 3\text{°C}$ Duration: 30 minutes each, during 5 minutes ramp, 256 cycles Voltage: Not applied
Free Fall Test 1.5m	Placed inside test fixture and dropped on concrete from height 1.5m. (1) 3 times by 6 surfaces (2) 1 times by 12 edges (3) 1 times by 8 corners
Random Vibration	Temperature: $23\pm 5\text{°C}$ Humidity: $35\sim 70\% \text{RH}$ Duration: 2 hours each axis (X,Y,Z) Power Spectral Density: $5\text{Hz } 0.10\text{m}^2/\text{s}^3 (=1.0391*10^{-3}\text{g}^2/\text{Hz})$ $12\text{Hz } 2.20\text{m}^2/\text{s}^3 (=22.8602*10^{-3}\text{g}^2/\text{Hz})$ $20\text{Hz } 2.20\text{m}^2/\text{s}^3 (=22.8602*10^{-3}\text{g}^2/\text{Hz})$

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	200Hz 0.04m2/s3(=0.41534*10-3g2/Hz) 200Hz 0.04m2/s3(=0.41564*10-3g2/Hz)
Repeated Low Level Free Fall Test	Placed inside test fixture and dropped on rubber mat from height of 10cm. Each face 2500 times(Total 6 faces, 15000times)
1m Repeated Rotating Free Fall	Placed inside test fixture and dropped on steel sheet from height of 1.0m. 100 times(all faces) Rotation speed of barrel: 10~12 falls/minute
Free Fall Test for master box	Corner drop: Each Corner 1 time Edge drop: Each Edge 1 time Face drop: Each Face 1 time
Random Vibration for master box	Sinusoidal wave vibration Frequency: 5~50Hz Acceleration:7.4m/s2(0.76G) Sweep speed:9Hz/min(5~50Hz, one way 5 min) Test duration: Direction of Face 1-3 20min Direction of Face 2-4 20min Direction of Face 5-6 20min Sample and direction of vibration : 1 direction for 1 sample Package on vibrating table: Free
Substrate bending Test	Deflection: 3mm Rate: 0.5mm/sec
Adhesion	Load: 10 N Duration: 10 seconds
Electrostatic Discharge Test	Capacitance: 150pF Resistance: 330Ω Duration: 10 times Air Discharge: Level 3(+/-8kV) Direct contact discharge: Level 1 (+/-2kV)
Human Body Model	2000 Volts (100pF,1500Ω)
Charged Device Model	500 Volts
Self-alignment effect	Displacement: 0.15mm

SUGGESTIONS

Recommended Customer Land Pattern

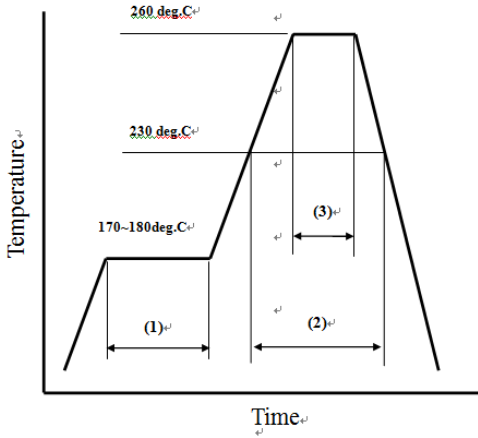
The recommended PCB land pattern for the HAS3729A4 should have a 1:1 ratio to the solder pads on the microphone package. Care should be taken to avoid applying solder paste to the sound hole in PCB. The dimensions of suggested solder paste pattern refer to the land pattern which should be shrunk by 0.025 per side.

	<table border="1"> <thead> <tr> <th>Pin #</th> <th>Pin Name</th> <th>Type</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>VDD</td> <td>Power</td> <td>Power Supply</td> </tr> <tr> <td>2</td> <td>GROUND</td> <td>Power</td> <td>Ground</td> </tr> <tr> <td>3</td> <td>GROUND</td> <td>Power</td> <td>Ground</td> </tr> <tr> <td>4</td> <td>OUTPUT</td> <td>Signal</td> <td>Output Signal</td> </tr> </tbody> </table>	Pin #	Pin Name	Type	Description	1	VDD	Power	Power Supply	2	GROUND	Power	Ground	3	GROUND	Power	Ground	4	OUTPUT	Signal	Output Signal
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	3	GROUND	Power	Ground																	
4	OUTPUT	Signal	Output Signal																		

Solder Flow Profile

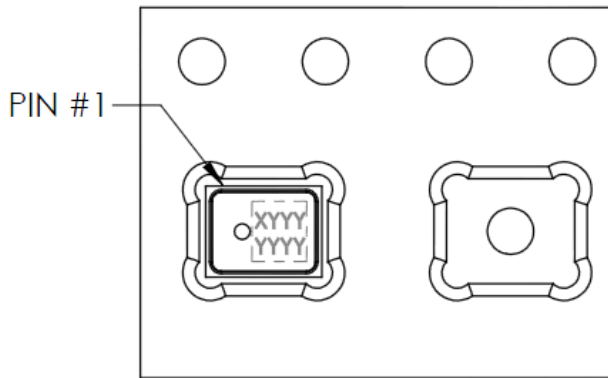
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Stage	Temperature Profile	Time (maximum)
Pre-heat	+170°C ~ +180°C	120sec
Primary heat	> +230°C	100sec
Peak	+260°C maximum	30sec

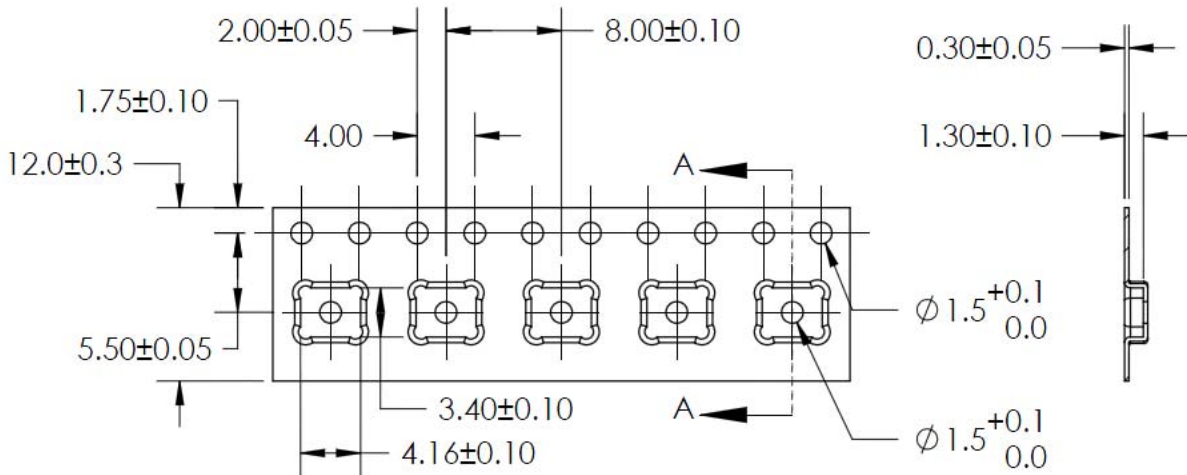
PACKAGING & MARKING DETAIL



MODEL NUMBER	SUFFIX	REEL DIAMETER	QUANTITY PER REEL
	-2	7"	1,200
	-7	13"	5,700

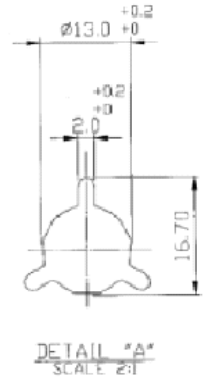
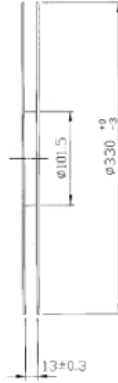
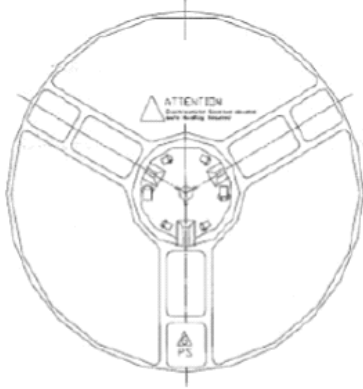
TAPE & REEL	PER EIA-481
LABHL	LABEL APPLIED TO EXTERNAL PACKAGE & DIRECT TO REEL.

COMPONENT ORIENTATION



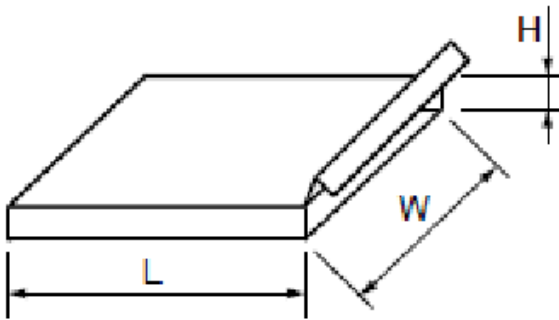
Note: Dimensions are in millimeters unless otherwise specified.

13" REEL



Part NO.	Reel Diameter	Quantity Per Reel	Quantity Per Inner Box	Quantity Per Outer Box
HAS3729A4	13"	5200	5200	46800

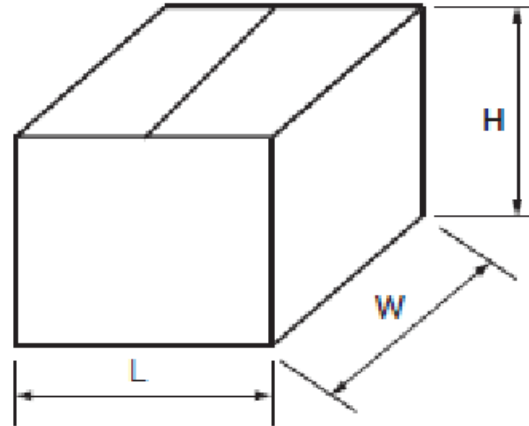
Dimensions for Inner Box



Unit : mm

L	W	H
335	339	45

Dimensions for Outer Box



Unit : mm

L	W	H
445	360	372