Omnidirectional Microphone with Bottom Port and Analog Output

Data Sheet **ADMP404**

FEATURES

- Tiny 3.35 mm × 2.50 mm × 0.88 mm surface-mount package
- High SNR of 62 dBA
- High sensitivity of −38 dBV
- Flat frequency response from 100 Hz to 15 kHz
- Low current consumption: <250 µA
- Single-ended analog output
- High PSRR of 70 dB
- Compatible with Sn/Pb and Pb-free solder processes
- RoHS/WEEE compliant

APPLICATIONS

- Smartphones and feature phones
- Teleconferencing systems
- Digital video cameras
- Bluetooth headsets
- Video phones
- Tablets

GENERAL DESCRIPTION

The ADMP404 is a high quality, high performance, low power, analog output bottom-ported omnidirectional MEMS microphone. The ADMP404 consists of a MEMS microphone element, an impedance converter, and an output amplifier. The ADMP404 sensitivity specification makes it an excellent choice for both near field and far field applications. The ADMP404 has a high signal-to-noise ratio (SNR) and flat, wideband frequency response, resulting in natural sound with high intelligibility. Its low current consumption enables long battery life for portable applications. A built-in particle filter provides high reliability. The ADMP404 complies with the TIA-920 *Telecommunications Telephone Terminal Equipment Transmission Requirements for Wideband Digital Wireline Telephones* standard.

The ADMP404 is available in an ultraminiature 3.35 mm × 2.50 mm × 0.88 mm surface-mount package. It is reflow solder compatible with no sensitivity degradation. The ADMP404 is halide free.

FUNCTIONAL BLOCK DIAGRAM

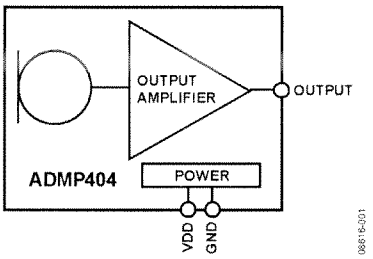

Figure 1.

Rev. B

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REVISION HISTORY

8/11—Rev. A to Rev. B

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12/10—Rev. 0 to Rev. A

Changes to Applications Section and General Description Section 1
Changes to Table 1 3
Changes to Table 2 4

7/10—Revision 0: Initial Version

SPECIFICATIONS

T_A = 25°C, V_{DD} = 1.8 V, unless otherwise noted. All minimum and maximum specifications are guaranteed. Typical specifications are not guaranteed.

Table 1.

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
PERFORMANCE						
Directionality				Omni		
Sensitivity		1 kHz, 94 dB SPL	−41	−38	−35	dBV
Signal-to-Noise Ratio	SNR			62		dBA
Equivalent Input Noise	EIN			32		dBA SPL
Dynamic Range		Derived from EIN and maximum acoustic input		88		dB
Frequency Response[1]		Low frequency −3 dB point		100		Hz
		High frequency −3 dB point		15		kHz
		Deviation limits from flat response within pass band		−3/+2		dB
Total Harmonic Distortion	THD	105 dB SPL			3	%
Power Supply Rejection Ratio	PSRR	217 Hz, 100 mV p-p square wave superimposed on V_{DD} = 1.8 V		70		dB
Maximum Acoustic Input		Peak		120		dB SPL
POWER SUPPLY						
Supply Voltage	V_{DD}		1.5		3.3	V
Supply Current	I_S				250	µA
OUTPUT CHARACTERISTICS						
Output Impedance	Z_{OUT}			200		Ω
Output DC Offset				0.8		V
Output Current Limit				90		µA

[1] See Figure 4 and Figure 6.

ABSOLUTE MAXIMUM RATINGS

Table 2.

Parameter	Rating
Supply Voltage	−0.3 V to +3.6 V
Sound Pressure Level (SPL)	160 dB
Mechanical Shock	10,000 *g*
Vibration	Per MIL-STD-883 Method 2007, Test Condition B
Temperature Range	−40°C to +70°C

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

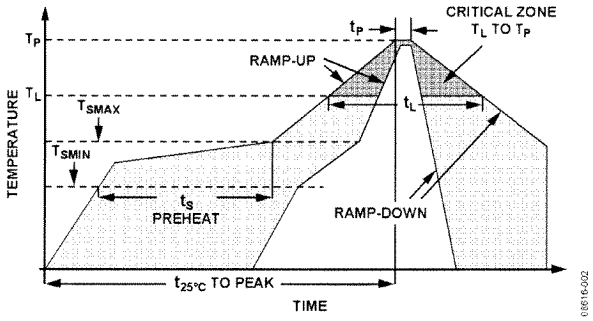

Figure 2. Recommended Soldering Profile Limits

Table 3. Recommended Soldering Profile Limits

Profile Feature	Sn/Pb	Pb-Free
Average Ramp Rate (T_L to T_P)	1.25°C/sec maximum	1.25°C/sec maximum
Preheat		
Minimum Temperature (T_{SMIN})	100°C	150°C
Maximum Temperature (T_{SMAX})	150°C	200°C
Time (T_{SMIN} to T_{SMAX}), t_S	60 sec to 75 sec	60 sec to 75 sec
Ramp-Up Rate (T_{SMAX} to T_L)	1.25°C/sec	1.25°C/sec
Time Maintained Above Liquidous (t_L)	45 sec to 75 sec	~50 sec
Liquidous Temperature (T_L)	183°C	217°C
Peak Temperature (T_P)	215°C + 3°C/−3°C	245°C + 0°C/−5°C
Time Within 5°C of Actual Peak Temperature (t_P)	20 sec to 30 sec	20 sec to 30 sec
Ramp-Down Rate	3°C/sec maximum	3°C/sec maximum
Time 25°C ($t_{25°C}$) to Peak Temperature	5 minute maximum	5 minute maximum

PIN CONFIGURATION AND FUNCTION DESCRIPTIONS

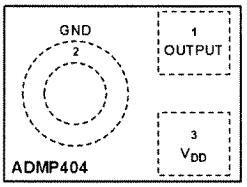

Figure 3. Pin Configuration

Table 4. Pin Function Descriptions

Pin No.	Mnemonic	Description
1	OUTPUT	Analog Output Signal
2	GND	Ground
3	V_{DD}	Power Supply

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