DESCRIPTION

A2112 is a differential input stereo audio power amplifier circuit for mobile phones and other portable audio devices built-in speaker. It provides a stable output power of 150mW 16Ω loads.

The shutdown current of the A2112 is less than 100nA, that can save energy for the system. At the same time the amplifier gain can be set by external resistors, that it is easy to use.

The A2112 is available in MSOP10 package.

FEATURES

- 150mW Stereo Output
- Differential Inputs
- shutdown current is less than 0.1uA
- Built-in " wave " sound canceling circuit
- Wide input voltage range : 2.2V-5.0V
- Available in MSOP10 Package

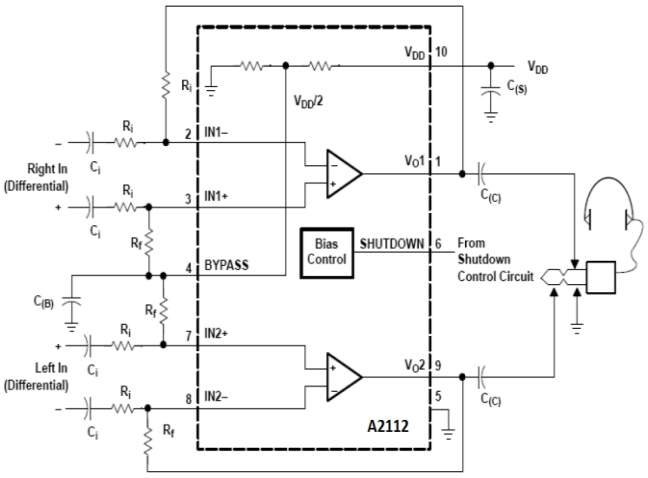
APPLICATION

- Mobile Phones
- PDA
- Bluetooth headset

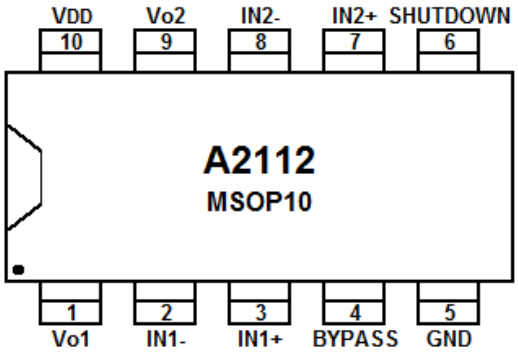
ORDERING INFORMATION

Package Type	Part Number	
MSOP10	MS10	A2112MS10R
		A2112MS10VR
Note	V: Halogen free Package R: Tape & Reel SPQ: 3,000pcs/Reel	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

TYPICAL APPLICATION



PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	VO1	VO1 is the audio output for channel 1.
2	IN1-	IN1- is the negative input for channel 1.
3	IN1+	IN1+is the positive input for channel 1.
4	BYPASS	Bypass Capacitance Input Pin
5	GND	GND is the ground connection.
6	SHUTDOWN	Puts the device in a low quiescent current mode when held high.
7	IN2+	IN2+ is the positive input for channel 2.
8	IN2-	IN2- is the negative input for channel 2.
9	VO2	VO2 is the audio output for channel 2.
10	V_{DD}	V_{DD} is the supply voltage terminal.

ABSOLUTE MAXIMUM RATINGS

V_{DD}, Supply Voltage	-0.3V~5.0V
V_{IN}, Input Voltage	-0.3V~V_{DD}+0.3V
T_{OPR}, Operating Free-air Temperature	-40℃~85℃
T_{STG}, Storage Temperature Range	-65℃~150℃
ESD (HBM)	4000V

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

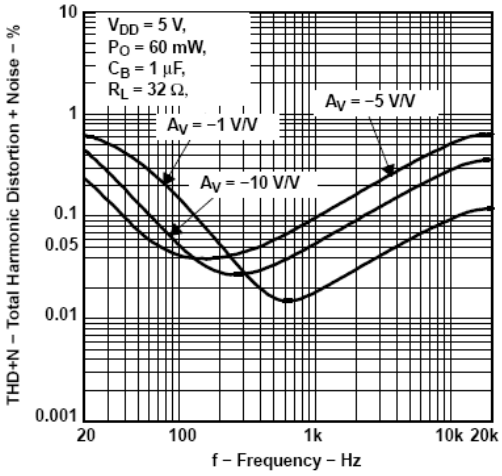
ELECTRICAL CHARACTERISTICS

V_{DD}=5V, unless otherwise specified. Limits apply for T_A = 25°C.

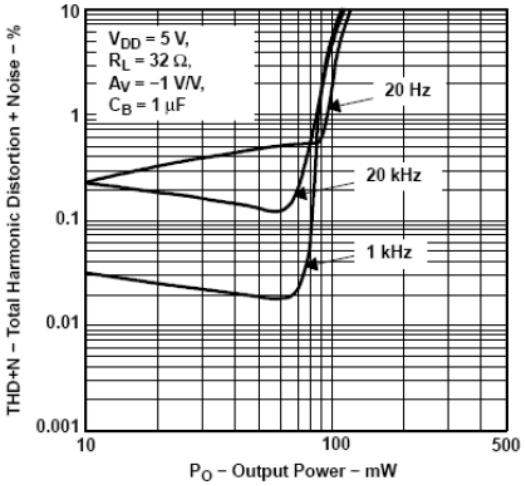
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Current	I_{DD}			1.5	3	mA
Supply Current in SHUTDOWN Mode	I_{SD}	Vshutdown=5V			0.1	μA
Shutdown Voltage Input High	V_{SDIH}		1.2			V
Shutdown Voltage Input Low	V_{SDIL}				0.4	V
Output Offset Voltage	V_{OS}	A_V=2V/V			15	mV
Output Power (each channel)	P_O	THD = 1% (max); f = 1kHz 16Ω Load		150		mW
Wake-up time	T_{WU}			170	220	ms
Thermal Shutdown Temperature	T_{SD}		150	170	190	℃
Total harmonic distortion + noise	THD+N	P_O = 100mWrms; 20-20KHz		0.06		%
Maximum Output Power BW	Bom	G=10 , THD<5%	20			KHz
Supply Current	PSRR	V_{ripple} = 200mV sine p-p f=1kHz	55	60		dB
Channel Isolation	PCS	1KHz		90		dB
Shut Down Time	T_{SDT}	16Ω Load		1.0		ms

TYPICAL PERFORMANCE CHARACTERISTICS

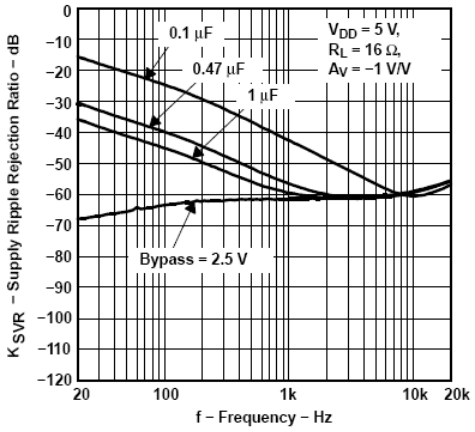
1. Total Harmonic Distortion + Noise vs. Frequency



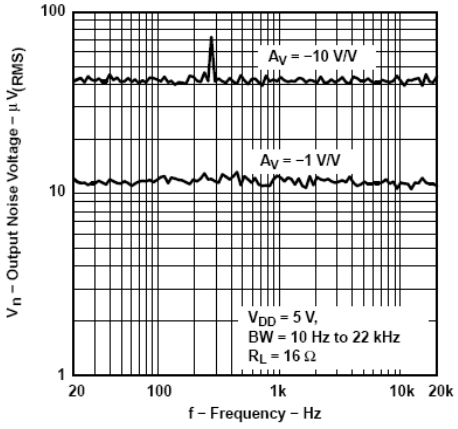
2. Total Harmonic Distortion + Noise vs. Output Power



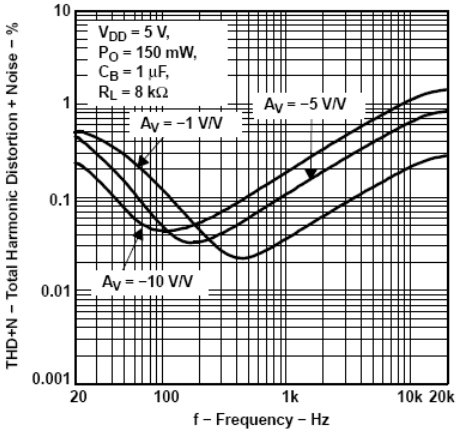
3. Supply Ripple Rejection Ratio vs. Frequency



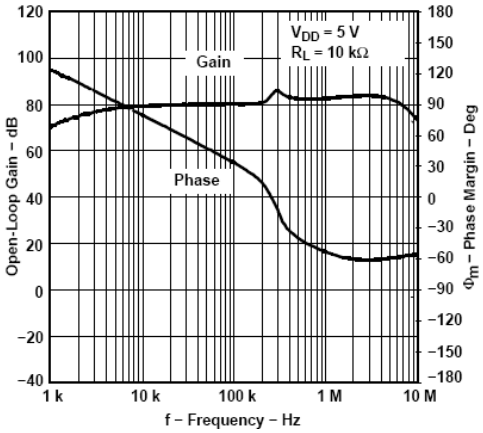
4. Output Noise Voltage vs. Frequency



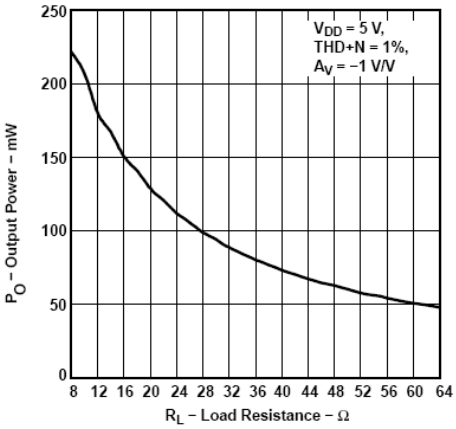
5. Crosstalk vs. Frequency



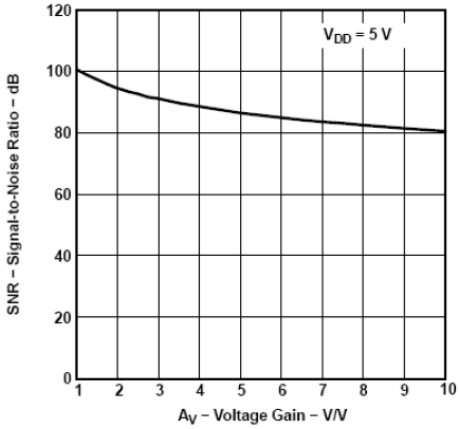
6. Open-loop Gain and Phase Margin vs. Frequency



7. Output Power vs. Load Resistance



8. Signal-TO-Noise Ratio vs. Voltage Gain



DETAILED INFORMATION

Application Information

Gain Setting Resistors

The gain for the A2112 is set by resistors Rf and Ri according to GAIN= - (Rf/Ri), and Ri is usually selected for resistance 5K-20K.

When Rf> 50K, recommended to use metal film resistors, so that we can get better performance. Meanwhile, in order to prevent system instability, it is recommended Rf in parallel with a capacitor Cf, to forming a low -pass filter network together with Rf, and the cutoff frequency of the low pass filter is fc = 1 / (2πRfCf).

For example, if Rf is 100 kΩ and CF is 5 pF then fc(lowpass) is 318kHz, which is well outside the audio range.

Input Capacitor, Ci

Input resistance Ri and the input capacitance Ci form a high -pass filter. Fc(highpass)= fc=1/(2πRiCi). The value of Ci directly affects the bass (low fre-quency) performance of the circuit. Consider the example where Ri is 10kΩ and the specification calls for a flat bass response down to 20Hz, and Ci is 1uF.

ESR additional parasitic capacitance of the resistor will affect the audio signal, so we recommend using a low ESR ceramic capacitor.

Power Coupling Capacitor $C_{(S)}$

For higher frequency transients, spikes, or digital hash on the line, a good low equivalent-series-resistance (ESR) ceramic capacitor, typically 0.1μF, placed as close as possible to the device V_{DD} lead, works best. For filtering lower-frequency noise signals, a larger aluminum

BYPASS Capacitor $C_{(B)}$

BYPASS circuit is a voltage divider network through an internal resistor to achieve, and the internal resistor is designed to in series 100K. To get a good job is usually the characteristics required to meet the CB * 100K> RiCi.

For example, Ri = 10K, Ci = 1uF, the CB value preferably greater than 0.1uF, 1uF select more suggestions

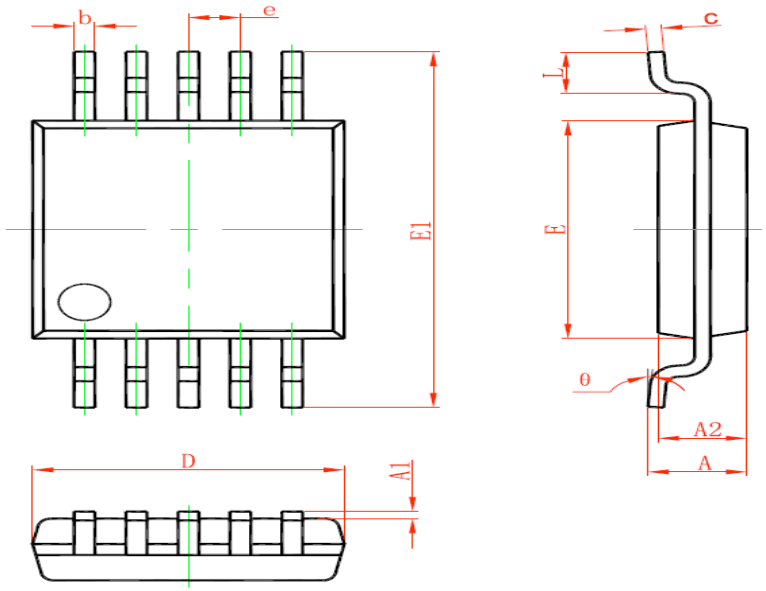
Output Coupling Capacitors $C_{(C)}$

In atypical single-supply, single-ended(SE) configuration, an output coupling capacitor ($C_{(C)}$) is required to block the dc bias at the output of the amplifier, thus preventing dc currents in the load. As with the input coupling capacitor, the output coupling capacitor and impedance of the load form a high-pass filter Fc=1/(2πRLC_C).

The main disadvantage, from a performance stand-point, is that the typically-small load impedance drives the low-frequency corner higher. Large values of $C_{(C)}$ are required to pass low frequencies into the load. The output coupling capacitor required in single-supply SE mode also places additional constraints on the selection of other components in the amplifier circuit. With the rules described earlier still valid, add the following relationship: C_B*100K>RiCi>>RLC_C.

PACKAGE INFORMATION

Dimension in MSOP10 (Unit: mm)



Symbol	Min	Max
A	0.820	1.100
A1	0.020	0.150
A2	0.750	0.950
b	0.180	0.280
c	0.090	0.230
D	2.900	3.100
e	0.500(BSC)	
E	2.900	3.100
E1	4.750	5.050
L	0.400	0.800
θ	0°	6°

IMPORTANT NOTICE

AiT Semiconductor Inc. (AiT) reserves the right to make changes to any its product, specifications, to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

AiT Semiconductor Inc.'s integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life support applications, devices or systems or other critical applications. Use of AiT products in such applications is understood to be fully at the risk of the customer. As used herein may involve potential risks of death, personal injury, or servere property, or environmental damage. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

AiT Semiconductor Inc. assumes to no liability to customer product design or application support. AiT warrants the performance of its products of the specifications applicable at the time of sale.