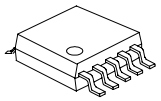
PA6112

CMOS IC

DUAL 150mW AUDIO POWER AMPLIFIER



MSOP-10

*Pb-free plating product number: PA6112L

■ DESCRIPTION

The UTC **PA6112** is a dual audio power amplifier with differential inputs capable of delivering typically 150mW per channel of continuous average power to an 16Ω load with less than 0.1% THD+N using a 5V power supply. The unity-gain stable UTC **PA6112** can be configured by external gain-setting resistors.

The UTC **PA6112** features an externally controlled, low-power consumption shutdown mode. The UTC **PA6112** exhibit a low quiescent current of typically 1.5mA, allowing usage in portable applications.

■ FEATURES

* Operating voltage range V_{DD}=2.5V~5.5V
* Output power:
  -150mW @5V into 16Ω
* Differential inputs
* Shutdown mode available
* Low current consumption:3mA max
* click and pop reduction circuitry
* Unity-gain stable
* Thermal and over-current protection

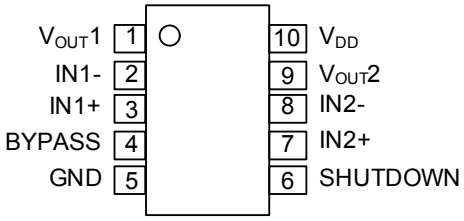
■ ORDERING INFORMATION

Order Number		Package	Packing
Normal	Lead Free Plating		
PA6112-SM2-R	PA6112L-SM2-R	MSOP-10	Tape Reel
PA6112-SM2-T	PA6112L-SM2-T	MSOP-10	Tube

PA6112L-SM2-R
(1)Packing Type
(2)Package Type
(3)Lead Plating

(1) R: Tape Reel, T: Tube
(2) SM2: MSOP-10
(3) L: Lead Free Plating, Blank: Pb/Sn

■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO	PIN NAME	I/O	DESCRIPTION
4	BYPASS	I	Connect to internal voltage divider. For best performance, a 0.1 μF ~ 1 μF low ESR capacitor used.
5	GND	I	Ground
2	IN1-	I	Channel 1 negative input.
3	IN1+	I	Channel 1 positive input.
8	IN2-	I	Channel 2 negative input.
7	IN2+	I	Channel 2 positive input.
6	SHUTDOWN	I	Low quiescent current mode enable. High active.
10	V_{DD}	I	Supply voltage.
1	$V_{OUT}1$	O	Channel 1 audio output.
9	$V_{OUT}2$	O	Channel 2 audio output.

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	6	V
Input Voltage	V_{IN}	-0.3~V_{DD}~+0.3	V
Continuous Total Power Dissipation		internally limited	
Operating Junction Temperature	T_J	-40 ~ +150	℃
Storage Temperature	T_{STG}	-65 ~ +150	℃

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V_{DD}	2.5		5.5	V
High-level Input Voltage	V_{IH}, (SHUTDOWN)	0.6×V_{DD}			V
Low-level Input Voltage	V_{IL}, (SHUTDOWN)			0.25×V_{DD}	V

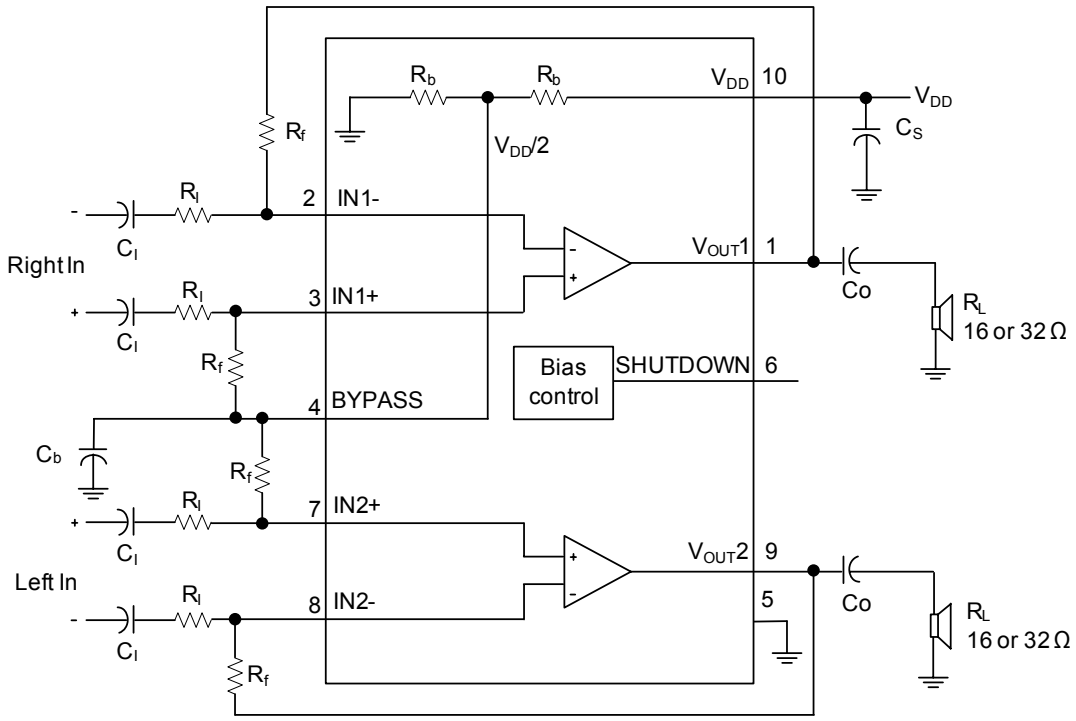
■ ELECTRICAL CHARACTERISTICS (T_A = 25℃)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
DC ELECTRICAL CHARACTERISTICS						
Output Offset Voltage	$V_{O(OFF)}$	A_V = 2 V/V,			15	mV
Power Supply Rejection Ratio	PSRR	V_{DD} = 3.2 V ~ 3.4 V		83		dB
		V_{DD} = 4.9 V ~ 5.1 V		76		
Supply Current	I_{DD}	SHUTDOWN = 0 V, V_{DD} = 2.5 ~ 5.5 V		1.5	3	mA
Supply Current in SHUTDOWN Mode	$I_{DD(SD)}$	SHUTDOWN = V_{DD}		10	50	μA
Input Impedance	Z_{IN}	V_{DD} = 2.5 ~ 5.5 V		>1		MΩ
AC OPERATING CHARACTERISTICS (V_{DD} = 3.3V, R_L = 16Ω)						
Output Power (Each Channel)	P_{OUT}	THD ．0.1%, f = 1 kHz		60		mW
Total Harmonic Distortion + Noise	THD+N	P_{OUT} = 40 mW, 20 - 20 kHz		0.4%		
Maximum Output Power BW	B_{OM}	G = 10, THD < 5%		>20		KHz
Phase Margin		Open loop		96°		
Supply Ripple Rejection Ratio	RR	f = 1 kHz		71		dB
Channel/Channel Output Separation		f = 1 kHz		89		dB
Signal-to-Noise Ratio	SNR	P_{OUT} = 50 mW, A_V = 1		100		dB
Noise Output Voltage	eN	A_V = 1		11		μV(rms)
AC OPERATING CHARACTERISTICS (V_{DD} = 5V, R_L = 16Ω)						
Output Power (each channel)	P_{OUT}	THD≤0.1%, f = 1 kHz		150		mW
Total Harmonic Distortion + Noise	THD+N	P_{OUT} = 100 mW, 20 - 20 kHz		0.6%		
Maximum Output Power BW	B_{OM}	G = 10, THD < 5%		>20		KHz
Phase Margin		Open loop		96°		
Supply Ripple Rejection Ratio	RR	f = 1 kHz		61		dB
Channel/Channel Output Separation		f = 1 kHz		90		dB
Signal-to-Noise Ratio	SNR	P_{OUT} = 100 mW, A_V = 1		100		dB
Noise Output Voltage	eN	A_V = 1		11.7		μV(rms)

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
AC OPERATING CHARACTERISTICS (V_{DD} = 3.3V, R_L = 32Ω)						
Output Power (Each Channel)	P_{OUT}	THD≤ 0.1%, f = 1 kHz		40		mW
Total Harmonic Distortion + Noise	THD+N	P_{OUT} = 30 mW, 20 - 20 kHz		0.4%		
Maximum Output Power BW	B_{OM}	A_V = 10, THD < 2%		>20		KHz
Phase Margin		Open loop		96°		
Supply Ripple Rejection Ratio	RR	f = 1 kHz		71		dB
Channel/Channel Output Separation		f = 1 kHz		95		dB
Signal-to-Noise Ratio	SNR	P_{OUT} = 40 mW, A_V = 1		100		dB
Noise Output Voltage	eN	A_V = 1		11		μV(rms)
AC OPERATING CHARACTERISTICS (V_{DD} = 5V, R_L = 32Ω)						
Output Power (Each Channel)	P_{OUT}	THD≤ 0.1%, f = 1 kHz		90		mW
Total Harmonic Distortion + Noise	THD+N	P_{OUT} = 60 mW, 20 - 20 kHz		0.4%		
Maximum Output Power BW	B_{OM}	A_V = 10, THD < 2%		>20		KHz
Phase Margin		Open loop		97°		
Supply Ripple Rejection Ratio	RR	f = 1 kHz		61		dB
Channel/Channel Output Separation		f = 1 kHz		98		dB
Signal-to-Noise Ratio	SNR	P_{OUT} = 90 mW, A_V = 1		100		dB
Noise Output Voltage	eN	A_V = 1		11.7		μV(rms)

■ TYPICAL APPLICATION CIRCUIT



■ TYPICAL CHARACTERISTICS

Figure 1. Total Harmonic Distortion + Noise vs Frequency

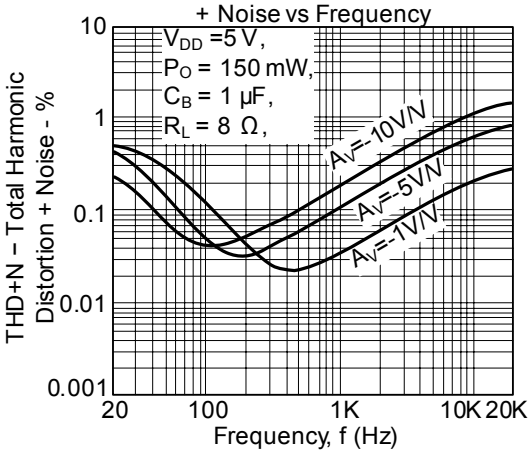


Figure 2. Total Harmonic Distortion + Noise vs Output Power

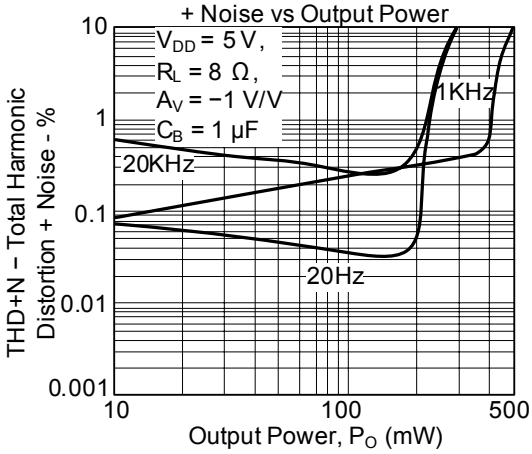


Figure 3. Total Harmonic Distortion + Noise vs Frequency

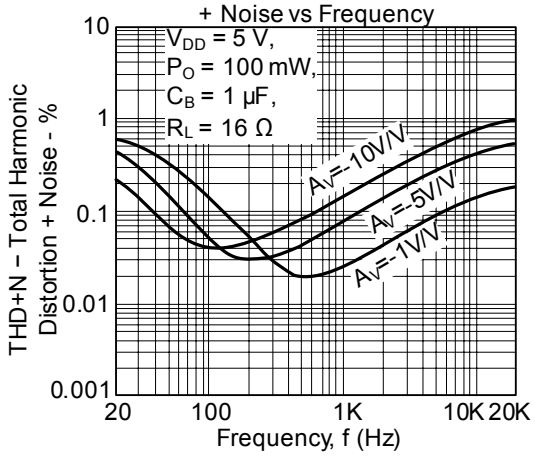


Figure 4. Total Harmonic Distortion + Noise vs Output Power

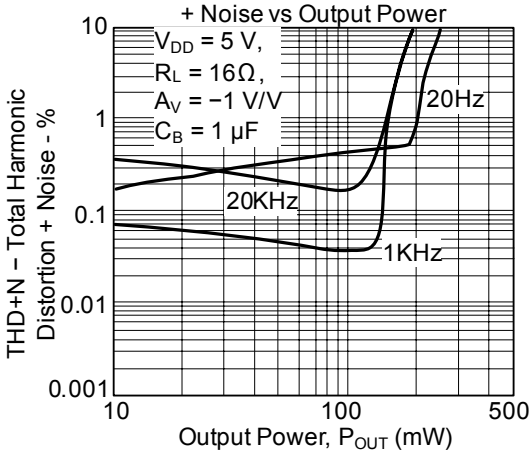


Figure 5. Supply Ripple Rejection Ratio Vs Frequency

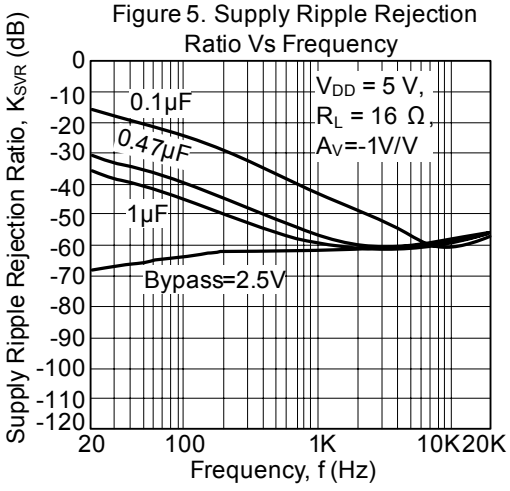
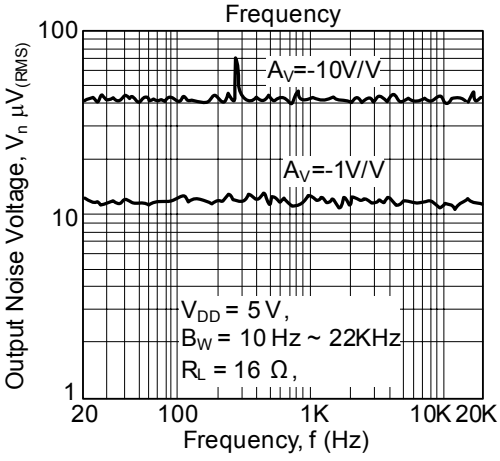


Figure 6. Output Noise Voltage vs Frequency



■ TYPICAL CHARACTERISTICS(Cont.)

Figure 7. Crosstalk vs Frequency

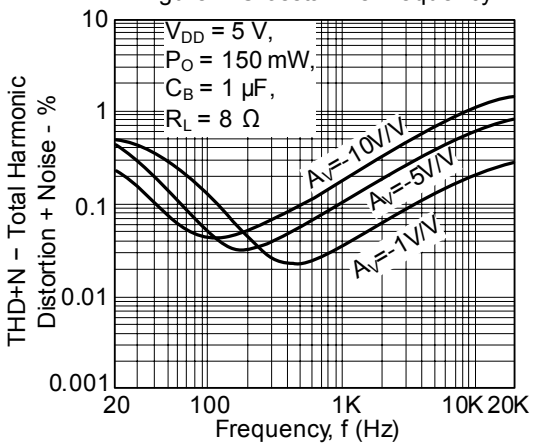


Figure 8. Crosstalk vs Frequency

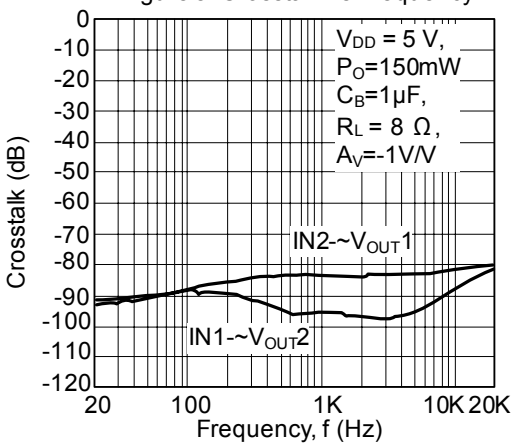


Figure 9. Shutdown Attenuation vs Frequency

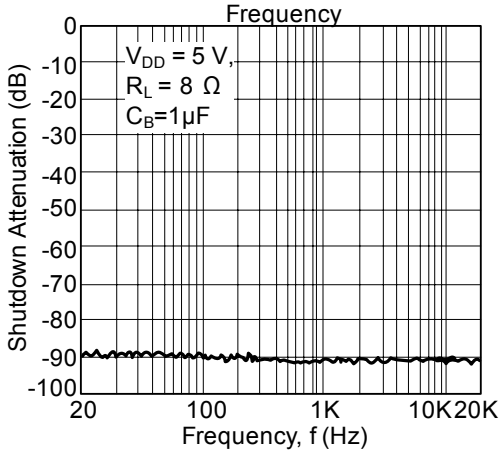


Figure 10. THD + N vs Output Power

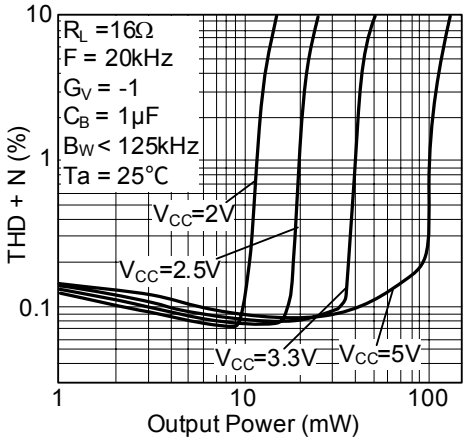


Figure 11. Output Power vs Load Resistance

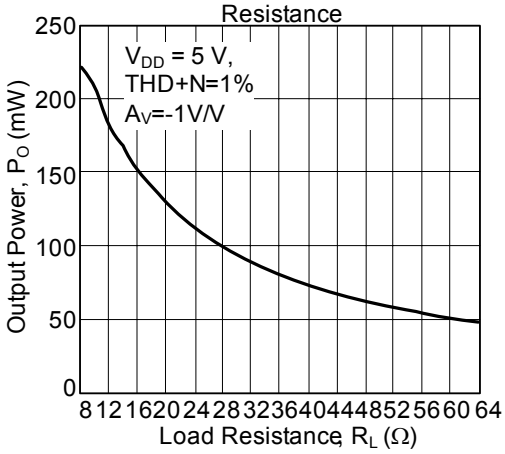
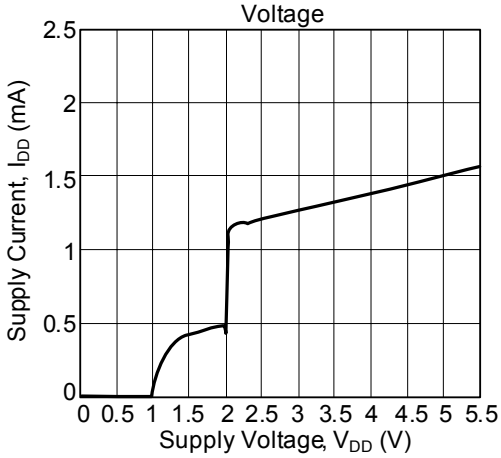


Figure 12. Supply Current vs Supply Voltage



■ TYPICAL CHARACTERISTICS(Cont.)

Figure 13. Signal-to-Noise Ratio vs Voltage Gain

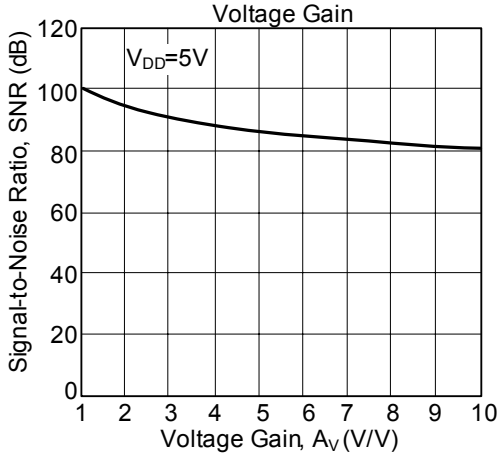


Figure 14. Power Disssipation/Amplifier vs Load Power