



PA3112

CMOS IC

DUAL 150mW AUDIO POWER AMPLIFIER

DESCRIPTION

The UTC **PA3112** 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 **PA3112** can be configured by external gain-setting resistors.

The UTC **PA3112** features an externally controlled, low-power consumption shutdown mode. The UTC **PA3112** exhibit a low quiescent current of typically 1.5mA, allowing usage in portable applications.

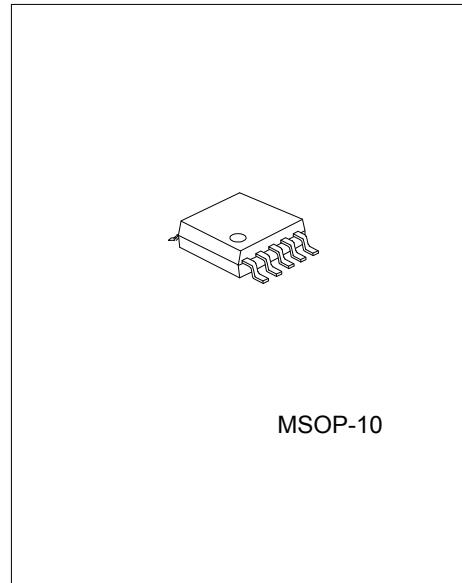
FEATURES

- * Operating voltage range $V_{DD}=2.5V\sim 5.5V$
- * 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

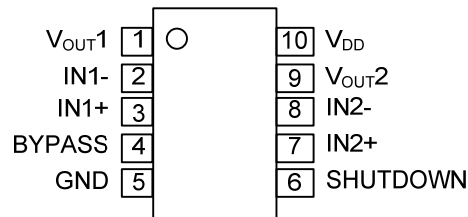
Ordering Number			Package	Packing
Normal	Lead Free	Halogen Free		
PA3112-SM2-R	PA3112L-SM2-R	PA3112G-SM2-R	MSOP-10	Tape Reel
PA3112-SM2-T	PA3112L-SM2-T	PA3112G-SM2-T	MSOP-10	Tube

<p>PA3112L-SM2-R</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube (2) SM2: MSOP-10 (3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn</p>
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Lead-free: PA3112L
Halogen-free: PA3112G

■ 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 μ F ~ 1 μ F 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 _{OUT1}	O	Channel 1 audio output.
9	V _{OUT2}	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	°C
Storage Temperature	T_{STG}	-65 ~ +150	°C

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)	$0.6 \times V_{DD}$			V
Low-level Input Voltage	V_{IL} , (SHUTDOWN)			$0.25 \times V_{DD}$	V

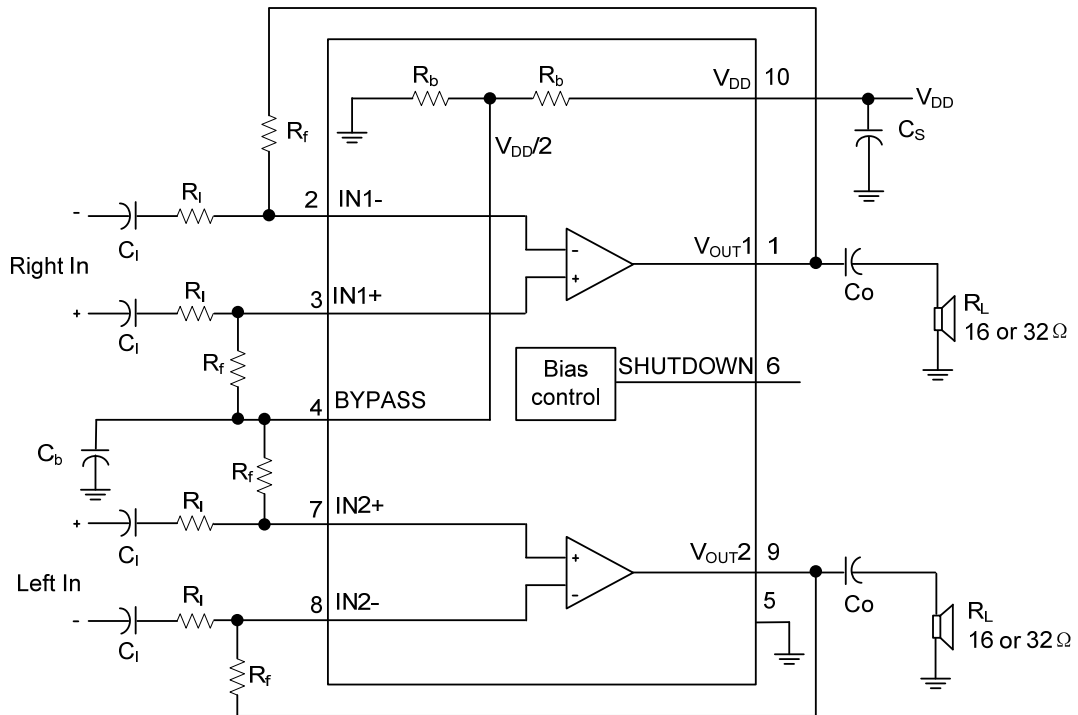
■ ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
DC ELECTRICAL CHARACTERISTICS						
Output Offset Voltage	$V_{O(OFF)}$	$A_V = 2 \text{ V/V}$,			15	mV
Power Supply Rejection Ratio	PSRR	$V_{DD} = 3.2 \text{ V} \sim 3.4 \text{ V}$		83		dB
		$V_{DD} = 4.9 \text{ V} \sim 5.1 \text{ V}$		76		
Supply Current	I_{DD}	SHUTDOWN = 0 V, $V_{DD} = 2.5 \sim 5.5 \text{ V}$		1.5	3	mA
Supply Current in SHUTDOWN Mode	$I_{DD(SD)}$	SHUTDOWN = V_{DD}		10	50	μA
Input Impedance	Z_{IN}	$V_{DD} = 2.5 \sim 5.5 \text{ V}$		>1		M Ω
AC OPERATING CHARACTERISTICS ($V_{DD} = 3.3\text{V}$, $R_L = 16\Omega$)						
Output Power (Each Channel)	P_{OUT}	THD $\leq 0.1\%$, $f = 1 \text{ kHz}$		60		mW
Total Harmonic Distortion + Noise	THD+N	$P_{OUT} = 40 \text{ mW}$, 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	$f = 1 \text{ kHz}$		71		dB
Channel/Channel Output Separation		$f = 1 \text{ kHz}$		89		dB
Signal-to-Noise Ratio	SNR	$P_{OUT} = 50 \text{ mW}$, $A_V = 1$		100		dB
Noise Output Voltage	eN	$A_V = 1$		11		$\mu\text{V(rms)}$
AC OPERATING CHARACTERISTICS ($V_{DD} = 5\text{V}$, $R_L = 16\Omega$)						
Output Power (each channel)	P_{OUT}	THD $\leq 0.1\%$, $f = 1 \text{ kHz}$		150		mW
Total Harmonic Distortion + Noise	THD+N	$P_{OUT} = 100 \text{ mW}$, 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	$f = 1 \text{ kHz}$		61		dB
Channel/Channel Output Separation		$f = 1 \text{ kHz}$		90		dB
Signal-to-Noise Ratio	SNR	$P_{OUT} = 100 \text{ mW}$, $A_V = 1$		100		dB
Noise Output Voltage	eN	$A_V = 1$		11.7		$\mu\text{V(rms)}$

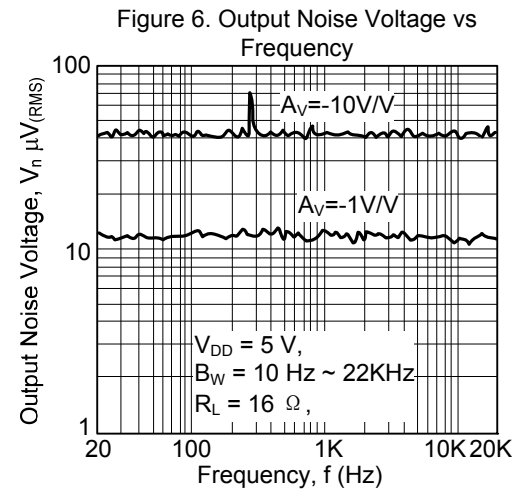
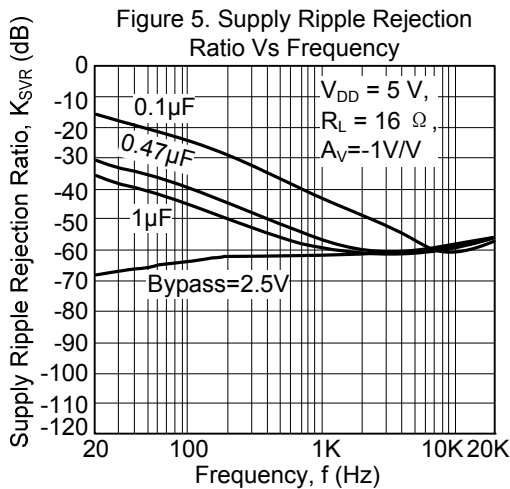
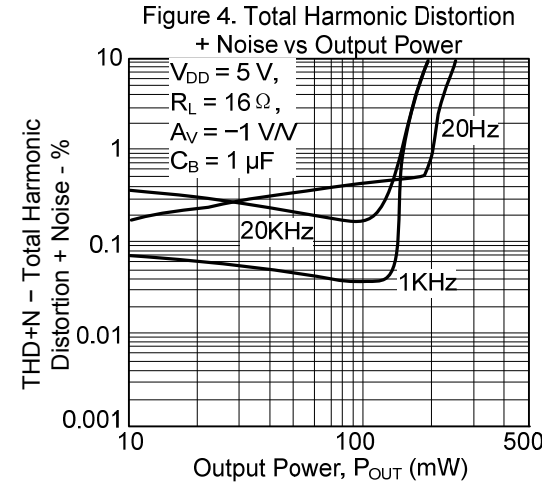
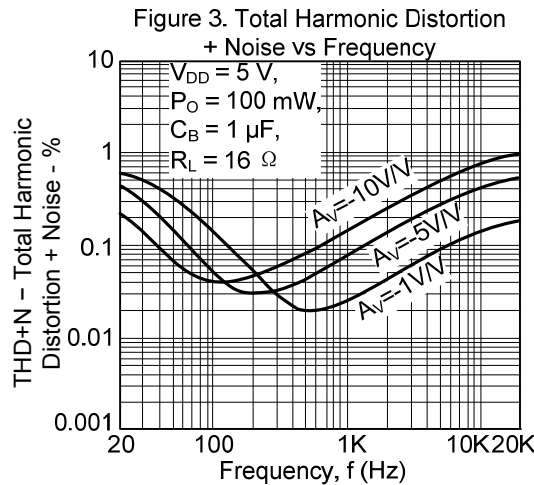
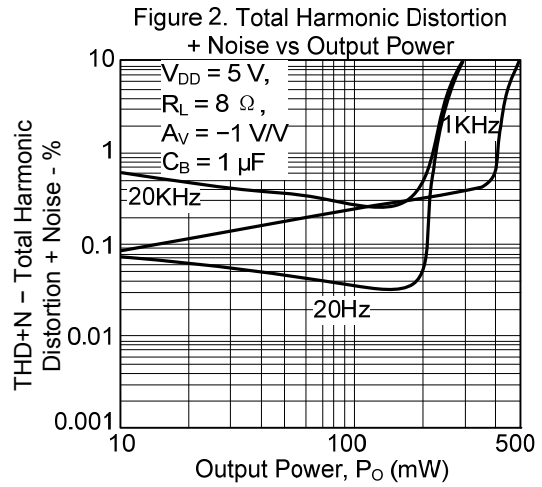
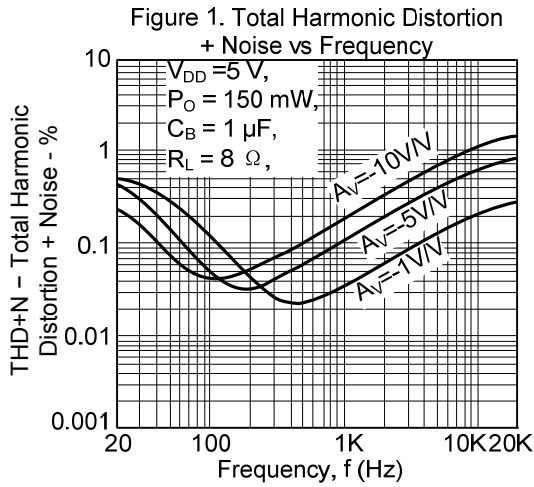
■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
AC OPERATING CHARACTERISTICS ($V_{DD} = 3.3V$, $R_L = 32\Omega$)						
Output Power (Each Channel)	P_{OUT}	THD \leq 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		μ V(rms)
AC OPERATING CHARACTERISTICS ($V_{DD} = 5V$, $R_L = 32\Omega$)						
Output Power (Each Channel)	P_{OUT}	THD \leq 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		μ V(rms)

■ TYPICAL APPLICATION CIRCUIT



■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)

Figure 7. Crosstalk vs Frequency

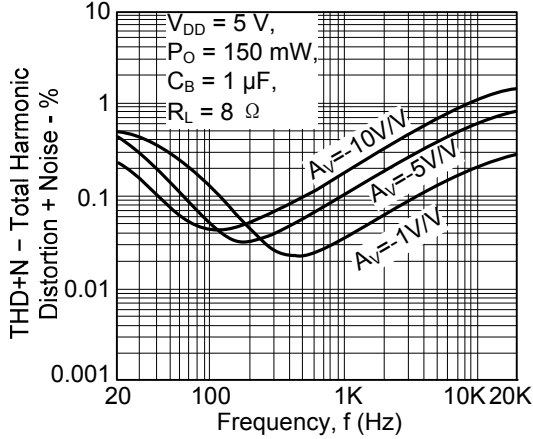


Figure 8. Crosstalk vs Frequency

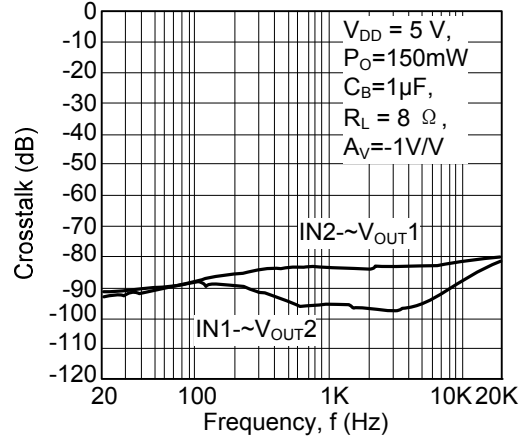


Figure 9. Shutdown Attenuation vs Frequency

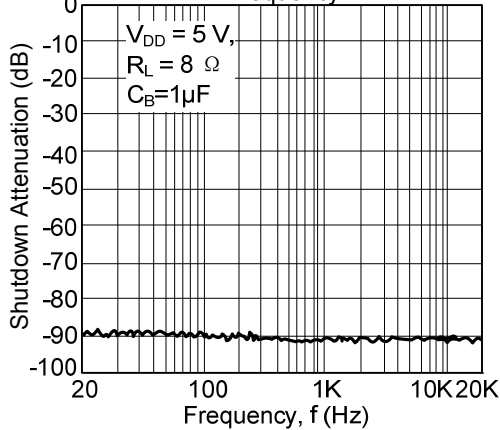


Figure 10. THD + N vs Output Power

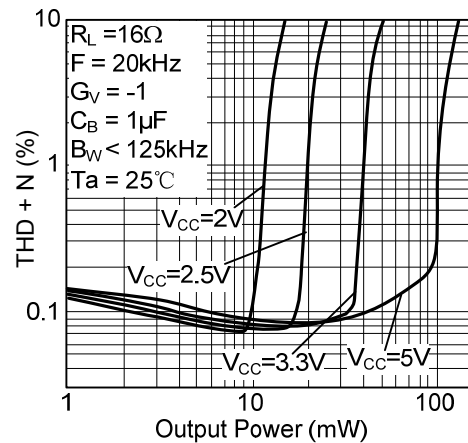


Figure 11. Output Power vs Load Resistance

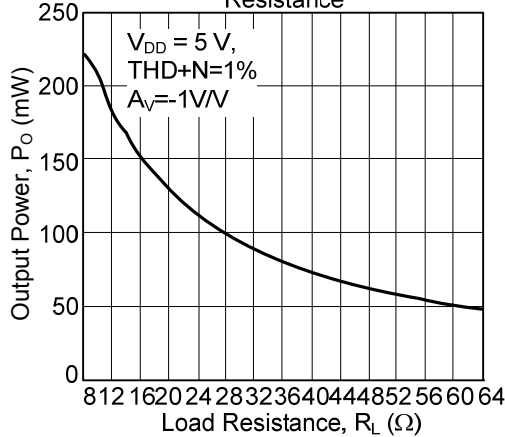
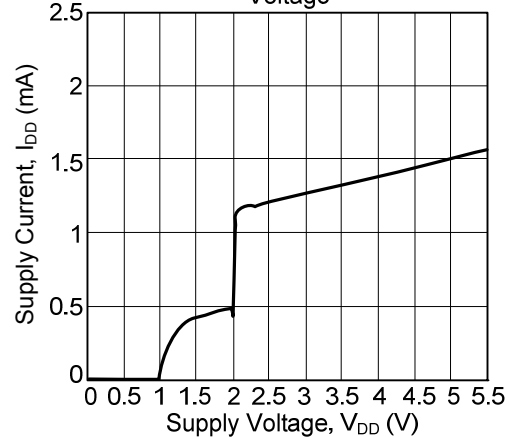
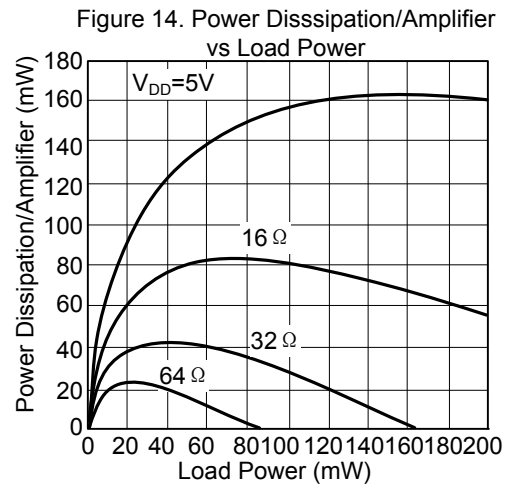
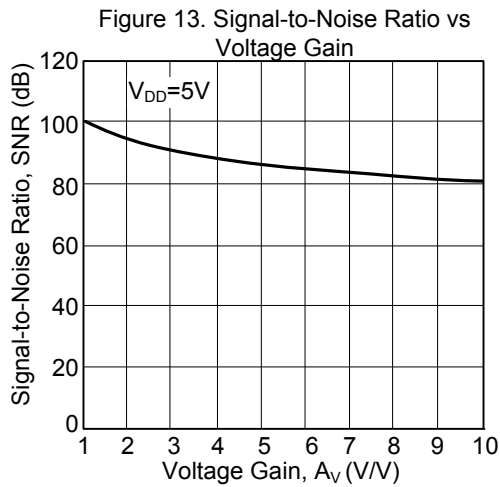


Figure 12. Supply Current vs Supply Voltage



■ TYPICAL CHARACTERISTICS(Cont.)



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