



PA6021

CMOS IC

2-W STEREO AUDIO POWER AMPLIFIER WITH ADVANCED DC VOLUME CONTROL

DESCRIPTION

The **PA6021** is a stereo audio power amplifier that drives 2 W/channel of continuous RMS power into a 4-Ω load when utilizing a heat sink. Advanced dc volume control minimizes external components and allows BTL (speaker) volume control and SE (headphone) volume control.

The 20-pin DIP package allows for the use of a heatsink which provides higher output power.

To ensure a smooth transition between active and shutdown modes, a fade mode ramps the volume up and down.

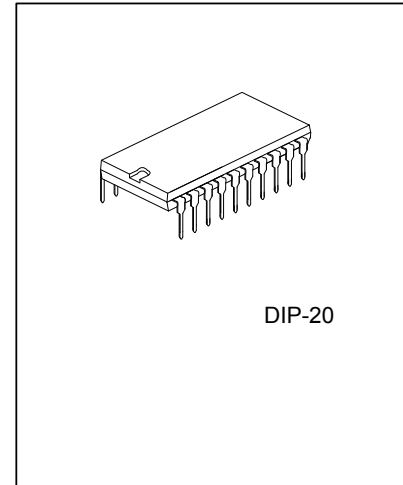
FEATURES

- * 2 W Into 4-W speakers with external heatsink
- * DC volume control with 2-dB Steps from -40 dB ~ 20 dB
 - Fade Mode
 - -85-dB Mute Mode
- * Differential Inputs
- * 1-μA Shutdown Current (Typical)
- * Headphone Mode

ORDERING INFORMATION

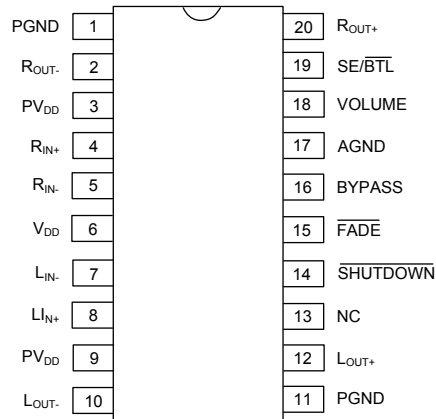
Ordering Number			Package	Packing
Normal	Lead Free Plating	Halogen Free		
PA6021-D20-T	PA6021L-D20-T	PA6021G-D20-T	DIP-20	Tube

<p>PA6021L-D20-T</p>	<p>(1) Packing Type (2) Package Type (3) Lead Plating</p>	<p>(1) T: Tube (2) D20: DIP-20 (3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn</p>
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Lead-free: PA6021L
Halogen-free: PA6021G

■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN #	PIN NAME	I/O	DESCRIPTION
16	BYPASS	I	Tap to voltage divider for internal midsupply bias generator used for analog reference
15	$\overline{\text{FADE}}$	I	Places the amplifier in fade mode if a logic low is placed on this terminal; normal operation if logic high is placed on this terminal.
17	AGND		Analog power supply ground
7	L _{IN-}	I	Left channel negative input for fully differential input.
8	L _{IN+}	I	Left channel positive input for fully differential input.
10	L _{OUT-}	O	Left channel negative audio output
12	L _{OUT+}	O	Left channel positive audio output.
13	NC		No connection
1,11	PGND		Power ground
3,9	PV _{DD}		Supply voltage terminal for power stage
5	R _{IN-}	I	Right channel negative input for fully differential input.
4	R _{IN+}	I	Right channel positive input for fully differential input.
2	R _{OUT-}	O	Right channel negative audio output
20	R _{OUT+}	O	Right channel positive audio output
19	SE/ $\overline{\text{BTL}}$	I	Output control. When this terminal is high, SE outputs are selected. When this terminal is low, BTL outputs are selected.
14	$\overline{\text{SHUTDOWN}}$	I	Places the amplifier in shutdown mode if a TTL logic low is placed on this terminal
6	V _{DD}		Supply voltage terminal
18	VOLUME	I	Terminal for dc volume control. DC voltage range is 0 to V _{DD} .

■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage, V_{DD} , PV_{DD}	V_{SS}	-0.3V ~ 6V	V
Input Voltage, R_{IN+} , R_{IN-} , L_{IN+} , L_{IN-}	V_{IN}	-0.3V ~ $V_{DD}+0.3V$	V
Junction Temperature	T_J	-40°C ~ 150°C	°C
Operating Temperature	T_{OPR}	-40°C ~ 85°C	°C
Storage Temperature Range	T_{STG}	-65°C ~ 85°C	°C

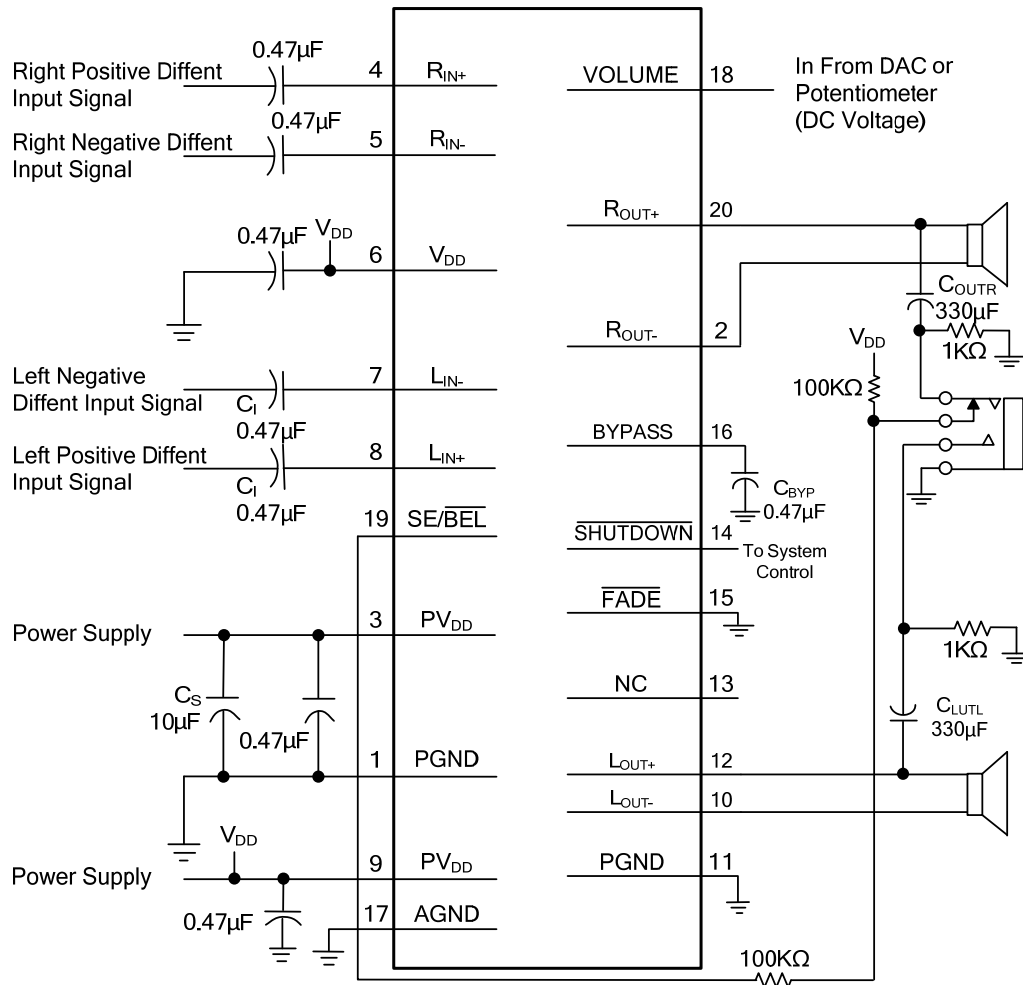
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

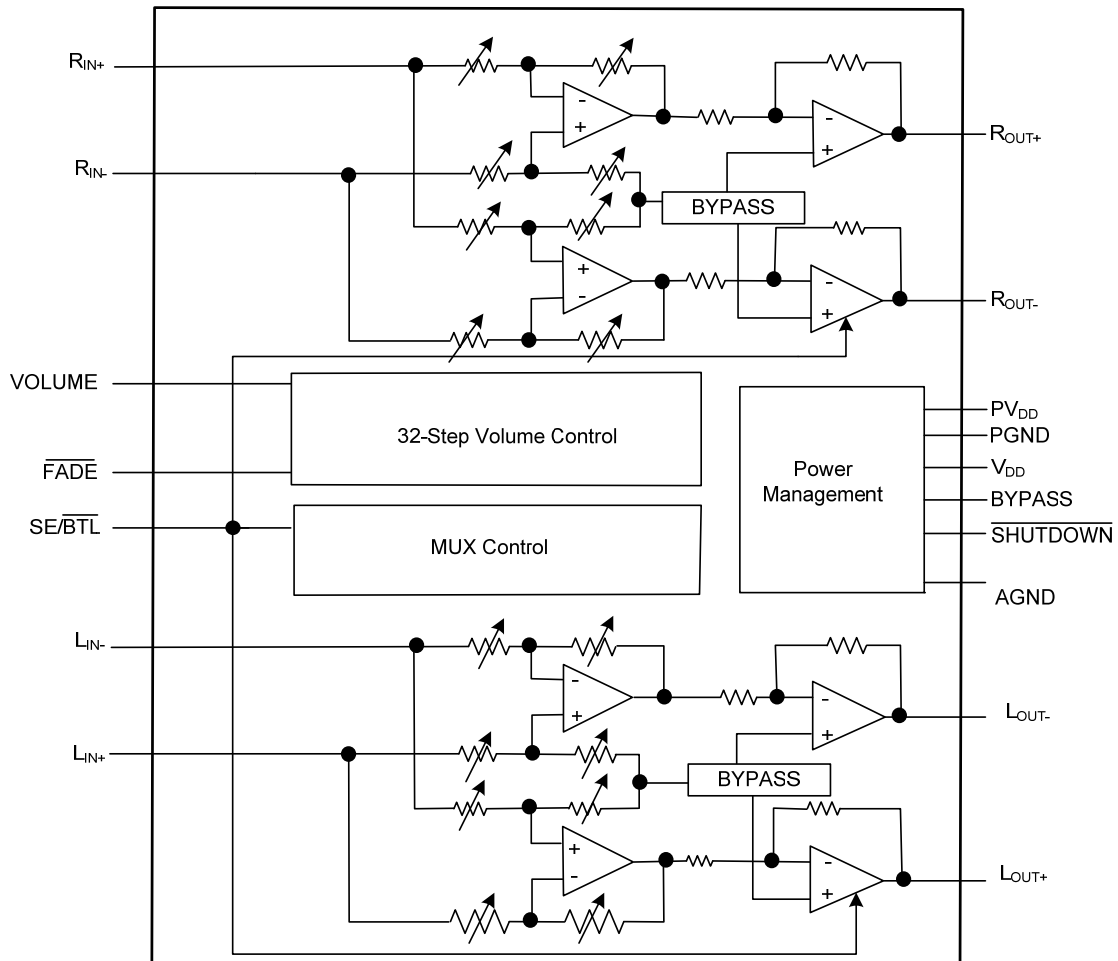
■ ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
DC CHARACTERISTICS ($V_{DD}=PV_{DD}=5.5V$)						
Supply Voltage, V_{DD} , PV_{DD}	V_{DD}		4		5.5	V
DC Differential Output Voltage	$V_{OUT(DIFF)}$	Gain=0dB, SE/ \overline{BTL} =0V			30	mV
		Gain=20dB, SE/ \overline{BTL} =0V			50	
High-level Input Voltage	V_{IH}	SE/ \overline{BTL} , \overline{FADE}	$0.8xV_{DD}$			V
		SHUTDOWN	2			V
Low-level Input Voltage	V_{IL}	SE/ \overline{BTL} , \overline{FADE}			$0.6xV_{DD}$	V
		SHUTDOWN			0.8	V
High-level Input Current (SE/ \overline{BTL} , \overline{FADE} , SHUTDOWN, VOLUME)	$ I_{IH} $	$V_{IN}=V_{DD}=PV_{DD}$			1	μA
Low-level Input Current (SE/ \overline{BTL} , \overline{FADE} , SHUTDOWN, VOLUME)	$ I_{IL} $	$V_{IN}=0V$			1	μA
Supply Current, No Load	I_{DD}	SE/ \overline{BTL} =0V, SHUTDOWN=2V	6.0	7.5	9.0	mA
		SE/ \overline{BTL} =5.5V, SHUTDOWN=2V	3.0	5	6	
Supply Current, Shutdown Mode	$I_{DD(SD)}$	SHUTDOWN=0V		1	20	μA
AC CHARACTERISTICS ($V_{DD}=PV_{DD}=5V$, $R_L=4\Omega$, Gain=20dB)						
Bypass Voltage (Nominally $V_{DD}/2$)	$V_{(Bypass)}$	Measured at pin 16, No load, $V_{DD}=5.5V$	2.65	2.75	2.85	V
High-Level Output Voltage	V_{OH}	$R_L=8\Omega$, Measured between output and $V_{DD}=5.5V$			700	mV
Low-Level Output Voltage	V_{OL}	$R_L=8\Omega$, Measured between output and GND, $V_{DD}=5.5V$			400	mV
Output Power	P_{OUT}	THD=1%, f=1kHz		1.5		W
		THD=10%, f=1kHz		2		
Total Harmonic Distortion + Noise	THD+N	$P_{OUT}=1W$, $R_L=8\Omega$, f=20Hz~20kHz		<0.8%		
Power Supply Rejection Ratio	PSRR	$V_{DD}=PV_{DD}=4V\sim 5.5V$	-42	-70		dB
Input Impedance	Z_I	VOLUME=5V		14		k Ω
Supply Ripple Rejection Ratio	RR	f=1kHz, Gain=0dB, $C_{(BYP)}=0.47\mu\text{F}$	BTL		-82	dB
			SE		-57	dB
Noise Output Voltage	eN	f=20Hz~20kHz, Gain=0dB, $C_{(BYP)}=0.47\mu\text{F}$		36		μV_{RMS}
Supply Current, Max Power Into a 4- Ω Load	I_{DD}	SHUTDOWN=2V, $R_L=4\Omega$, SE/ \overline{BTL} =0V, $P_{OUT}=2W$		1.3		A_{RMS}

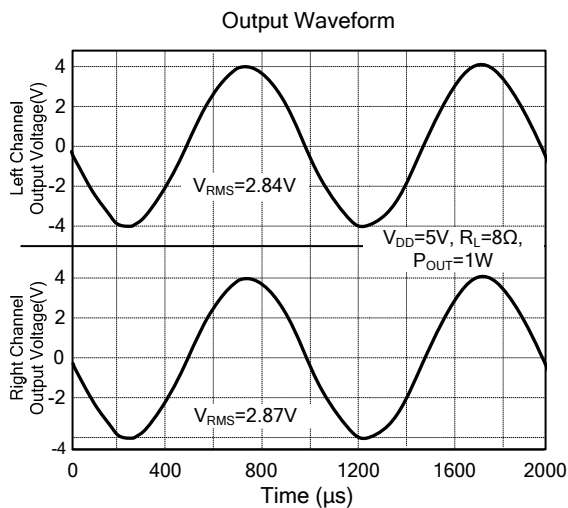
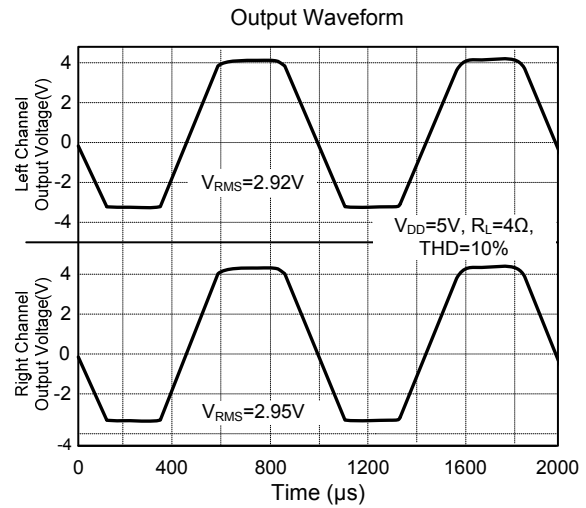
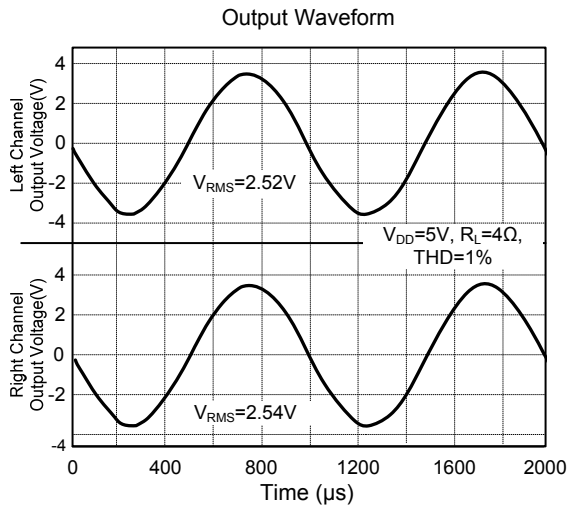
■ TYPICAL APPLICATION CIRCUIT



■ BLOCK DIAGRAM



■ TYPICAL CHARACTERISTICS



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