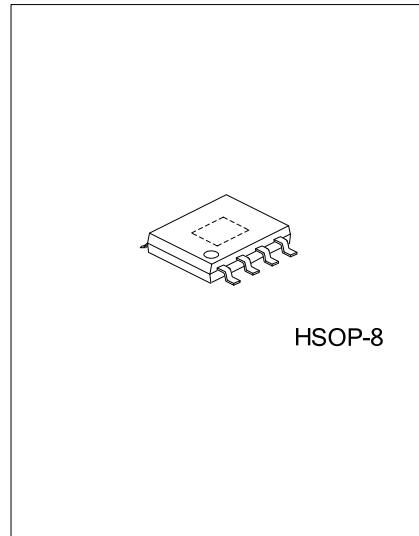




1.25-W MONO FULLY DIFFERENTIAL AUDIO POWER AMPLIFIER



DESCRIPTION

The UTC **PA6203** is a mono fully-differential audio amplifier, capable of delivering 1.25W of continuous average power to an 8-Ω BTL load with less than 1% distortion from a 5V power supply.

The UTC **PA6203** is ideal for PDA/smart phone applications due to features such as -85-dB supply voltage rejection from 90Hz to 5kHz, improved RF rectification immunity and a fast start-up with minimal pop. The device operates from 2.5V to 5.5V, drawing only 1.7mA of quiescent supply current.

FEATURES

- * 1.25W into 8Ω from a 5-V supply at THD=1% (Typ.)
- * 2.5V-5.5V operation
- * Low supply current: 1.7mA typ at 5V
- * Shutdown Control < 10μA
- * Only five external components
 - Improved PSRR (90dB) for direct battery operation
 - Fully differential design reduces RF rectification
 - Improved CMRR eliminates two input coupling capacitors
 - C_(BYPASS) is optional due to fully differential design and high PSRR

APPLICATIONS

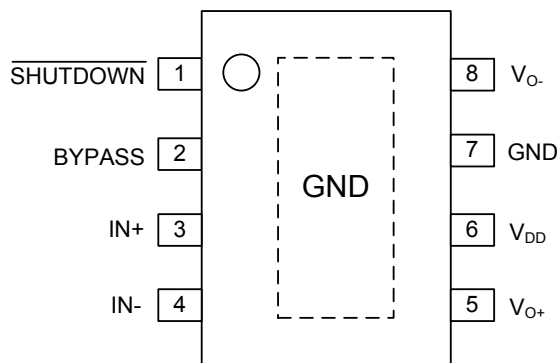
- * Designed for wireless or cellular handsets and PDAs

ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
PA6203L-SH2-T	PA6203G-SH2-T	HSOP-8	Tube
PA6203L-SH2-R	PA6203G-SH2-R	HSOP-8	Tape Reel

<p>PA6203L-SH2-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Halogen Free</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) SH2: HSOP-8</p> <p>(3) L: Lead Free, G: Halogen Free</p>
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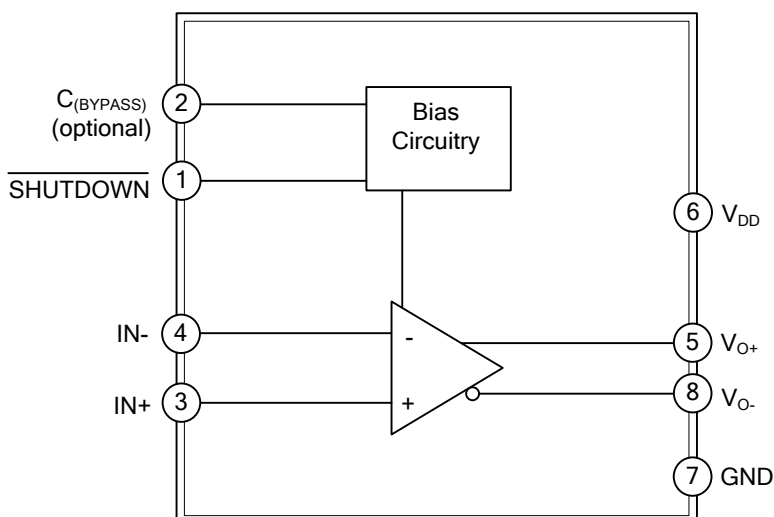
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	SHUTDOWN	Shutdown terminal (active low logic)
2	BYPASS	Mid-supply voltage, adding a bypass capacitor improves PSRR
3	IN+	Positive differential input
4	IN-	Negative differential input
5	V _{O+}	Positive BTL output
6	V _{DD}	Supply voltage terminal
7	GND	High-current ground
8	V _{O-}	Negative BTL output
	Thermal Pad	Connect to ground. Thermal Pad must be soldered down in all applications to properly secure device on the PCB.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Over operating free-air temperature range, unless otherwise noted)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	-0.3~6	V
Input Voltage	INx and SHUTDOWN Pins V_I	-0.3~ $V_{DD}+0.3$	V
Continuous Total Power Dissipation	P_D	Internally Limited	
Operating Free-air Temperature	T_A	-40~85	°C
Junction Temperature	T_J	-40~125	°C
Storage Temperature	T_{STG}	-65~150	°C
Lead Temperature From Case For 10 Seconds		260	°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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	42.3	°C/W
Junction to Case	θ_{JC}	12	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PACKAGE	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V_{DD}	2.5		5.5	V
High-Level Input Voltage	SHUTDOWN V_{IH}	2			V
Low-Level Input Voltage	SHUTDOWN V_{IL}			0.8	V
Common-Mode Input Voltage	V=2.5V, 5.5V, CMRR≤-60dB V_{IC}	0.5		$V_{DD}-0.8$	V
Operating Free-Air Temperature	T_A	-40		85	°C
Load Impedance	Z_L	6.4	8		Ω

■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, Gain=1V/V, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Offset Voltage (Measured Differentially)	$ V_{OO} $	$V_I=0V, V_{DD}=2.5V\sim 5.5V$			9	mV
Power Supply Rejection Ratio	PSRR	$V_{DD}=2.5V\sim 5.5V$		-90	-70	dB
Common Mode Rejection Ratio	CMRR	$V_{DD}=3.6V\sim 5.5V,$ $V_{IC}=0.5V\sim V_{DD}-0.8$		-70	-65	dB
		$V_{DD}=2.5V, V_{IC}=0.5V\sim 1.7V$		-62	-55	
Low-Level Output Voltage	V_{OL}	$R_L=8\Omega, V_{IN+}=V_{DD},$ $V_{IN-}=0V$ or $V_{IN+}=0V,$ $V_{IN-}=V_{DD}$	$V_{DD}=5.5V$	0.30	0.46	V
			$V_{DD}=3.6V$	0.22		
			$V_{DD}=2.5V$	0.19	0.26	
High-Level Output Voltage	V_{OH}	$R_L=8\Omega, V_{IN+}=V_{DD},$ $V_{IN-}=0V$ or $V_{IN+}=0V,$ $V_{IN-}=V_{DD}$	$V_{DD}=5.5V$	4.8	5.12	V
			$V_{DD}=3.6V$	3.28		
			$V_{DD}=2.5V$	2.1	2.24	
High-Level Input Current	$ I_{IH} $	$V_{DD}=5.5V, V_I=5.8V$			1.2	μA
Low-Level Input Current	$ I_{IL} $	$V_{DD}=5.5V, V_I=-0.3V$			1.2	μA
Supply Current	I_{DD}	SHUTDOWN=2V, $V_{DD}=2.5V\sim 5.5V, \text{No Load}$		1.7	2	mA
Supply Current in Shutdown Mode	$I_{DD(SD)}$	SHUTDOWN=0.8V, $V_{DD}=2.5V\sim 5.5V, \text{No Load}$		0.01	0.9	μA

■ OPERATING CHARACTERISTICS ($T_A=25^\circ\text{C}$, Gain=1V/V, $R_L=8\Omega$)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Power	P_O	THD+N=1%, f=1kHz	$V_{DD}=5V$		1.25		W
			$V_{DD}=3.6V$		0.63		W
			$V_{DD}=2.5V$		0.3		W
Total Harmonic Distortion Plus Noise	THD+N	$V_{DD}=5V$, $P_O=1W$, f=1kHz			0.06		%
		$V_{DD}=3.6V$, $P_O=0.5W$, f=1kHz			0.07		
		$V_{DD}=2.5V$, $P_O=200mW$, f=1kHz			0.08		
Supply Ripple Rejection Ratio	K_{SVR}	$C_{(BYPASS)}=0.47\mu F$, $V_{DD}=3.6V\sim 5.5V$, Inputs Ac-Grounded with $C_I=2\mu F$	f=217Hz~2kHz, $V_{RIPPLE}=200mV_{PP}$		-87		dB
		$C_{(BYPASS)}=0.47\mu F$, $V_{DD}=2.5V\sim 3.6V$, Inputs Ac-Grounded with $C_I=2\mu F$	f=217Hz~2kHz, $V_{RIPPLE}=200mV_{PP}$		-82		dB
		$C_{(BYPASS)}=0.47\mu F$, $V_{DD}=2.5V\sim 5.5V$, Inputs Ac-Grounded with $C_I=2\mu F$	f=40Hz~20kHz, $V_{RIPPLE}=200mV_{PP}$		≤ -74		dB
Signal-To-Noise Ratio	SNR	$V_{DD}=5V$, $P_O=1W$			104		dB
Output Voltage Noise	V_N	f=20Hz~20kHz	No Weighting		17		μV_{RMS}
			A Weighting		13		
Common Mode Rejection Ratio	CMRR	$V_{DD}=2.5V\sim 5.5V$, Resistor Tolerance=0.1%, Gain=4V/V, $V_{ICM}=200mV_{PP}$	f=20Hz~1kHz		≤ -85		dB
			f=20Hz~20kHz		≤ -74		dB
Input Impedance	Z_I				2		M Ω
Output Impedance	Z_O	Shutdown Mode		>10k			
Shutdown Attenuation		f=20Hz~20kHz, $R_F=R_I=20k\Omega$			-80		dB

■ TYPICAL APPLICATION CIRCUIT

Table 1. Typical Component Values

COMPONENT	VALUE	UNIT
R_I	10	k Ω
R_F	10	k Ω
$C_{(BYPASS)}$ (Note 1)	0.22	μ F
C_S	1	μ F
C_I	0.22	μ F

Note: 1. $C_{(BYPASS)}$ is optional

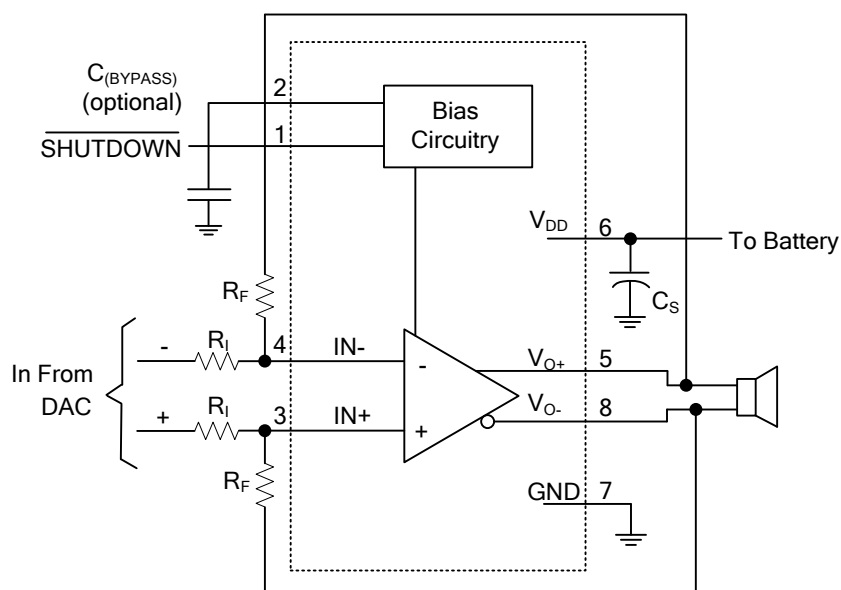


Figure 1. Typical Differential Input Application Schematic

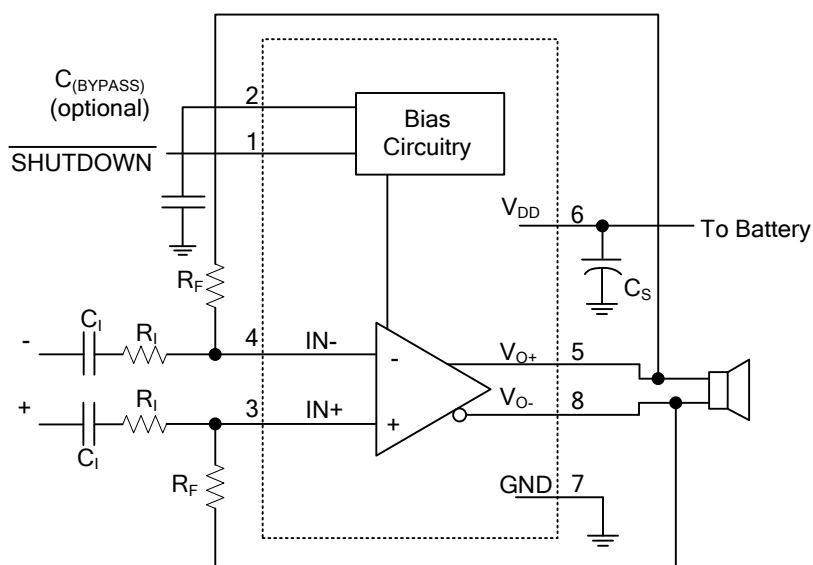


Figure 2. Differential Input Application Schematic Optimized With Input Capacitors

■ TYPICAL APPLICATION CIRCUIT(Cont.)

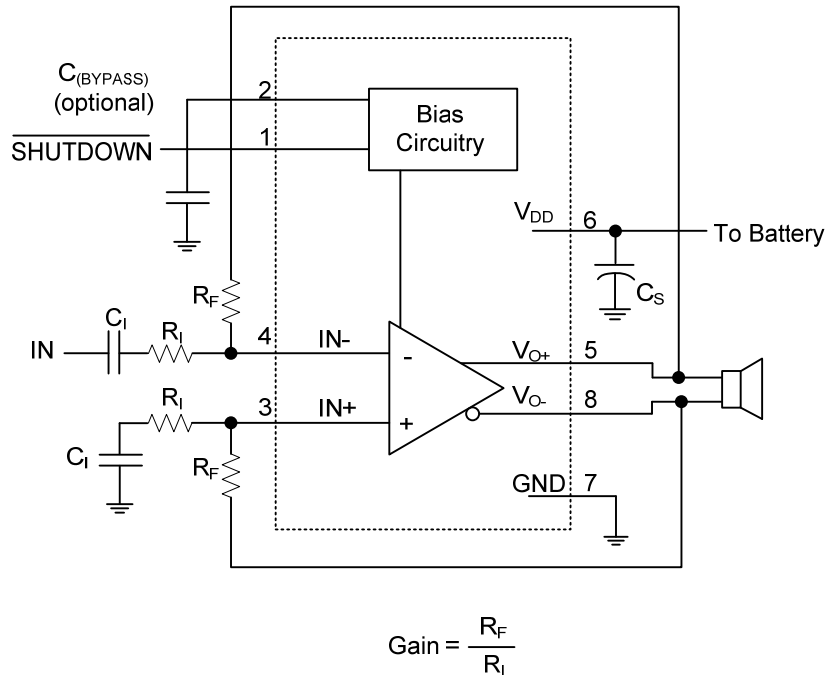


Figure 3. Single-Ended Input Application Schematic

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