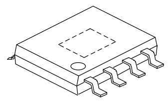
1.25-W MONO FULLY DIFFERENTIAL AUDIO POWER AMPLIFIER



HSOP-8

■ 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

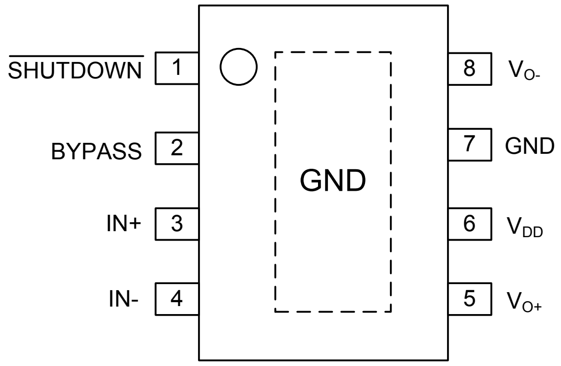
* Designed for wireless or cellular handsets and PDAs

■ 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

PA6203L-SH2-T	
(1)Packing Type	(1) T: Tube, R: Tape Reel
(2)Package Type	(2) SH2: HSOP-8
(3)Halogen Free	(3) L: Lead Free, G: Halogen Free

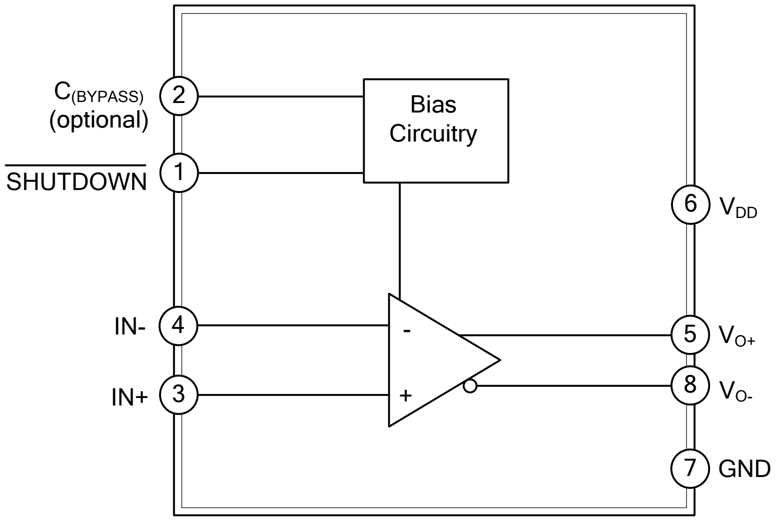
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	$\overline{\text{SHUTDOWN}}$	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 $\overline{\text{SHUTDOWN}}$ 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	$\overline{\text{SHUTDOWN}}$	V_{IH}	2			V
Low-Level Input Voltage	$\overline{\text{SHUTDOWN}}$	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°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~5.5V				9	mV
Power Supply Rejection Radio	PSRR	V_{DD}=2.5V~5.5V			-90	-70	dB
Common Mode Rejection Ratio	CMRR	V_{DD}=3.6V~5.5V, V_{IC}=0.5V~V_{DD}-0.8			-70	-65	dB
		V_{DD}=2.5V, V_{IC}=0.5V~1.7V			-62	-55	
Low-Level Output Voltage	V_{OL}	R_L=8Ω, 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=8Ω, 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}	$\overline{\text{SHUTDOWN}}$=2V, V_{DD}=2.5V~5.5V, No Load			1.7	2	mA
Supply Current in Shutdown Mode	$I_{DD(SD)}$	$\overline{\text{SHUTDOWN}}$=0.8V, V_{DD}=2.5V~5.5V, No Load			0.01	0.9	μA

■ OPERATING CHARACTERISTICS (T_A=25°C, Gain=1V/V, R_L=8Ω)

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}	$C_{(BYPASS)}$=0.47µF, V_{DD}=3.6V~5.5V, Inputs Ac-Grounded with C_I=2µF	f=217Hz~2kHz, V_{RIPPLE}=200mV_{PP}		-87		dB
		$C_{(BYPASS)}$=0.47µF, V_{DD}=2.5V~3.6V, Inputs Ac-Grounded with C_I=2µF	f=217Hz~2kHz, V_{RIPPLE}=200mV_{PP}		-82		dB
		$C_{(BYPASS)}$=0.47µF, V_{DD}=2.5V~5.5V, Inputs Ac-Grounded with C_I=2µF	f=40Hz~20kHz, V_{RIPPLE}=200mV_{PP}		≤-74		dB
Signal-To-Noise Radio	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 Radio	CMRR	V_{DD}=2.5V~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		MΩ
Output Impedance	Z_O	Shutdown Mode		>10k			
Shutdown Attenuation		f=20Hz~20kHz, R_F=R_I=20kΩ			-80		dB

■ TYPICAL APPLICATION CIRCUIT

Table 1. Typical Component Values

COMPONENT	VALUE	UNIT
R_I	10	kΩ
R_F	10	kΩ
$C_{(BYPASS)}$ (Note 1)	0.22	μF
C_S	1	μF
C_I	0.22	μF

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

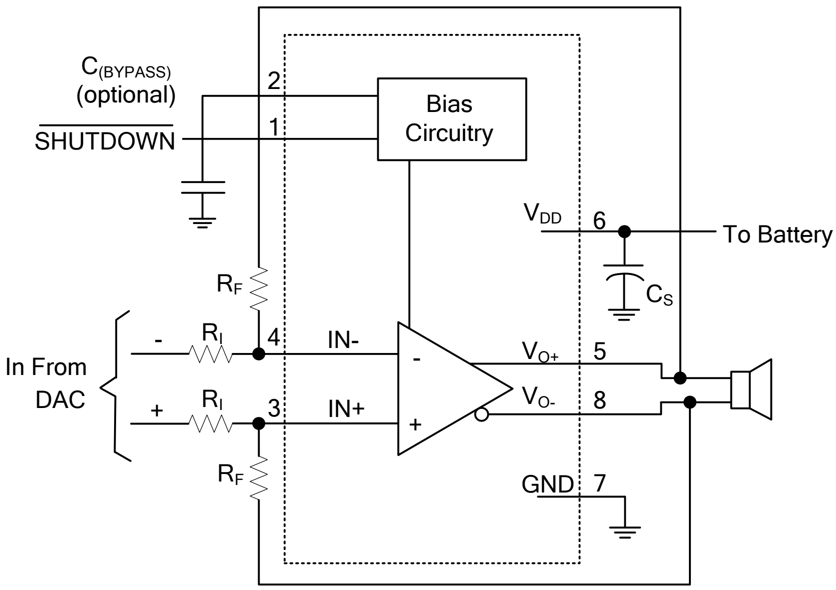


Figure 1. Typical Differential Input Application Schematic

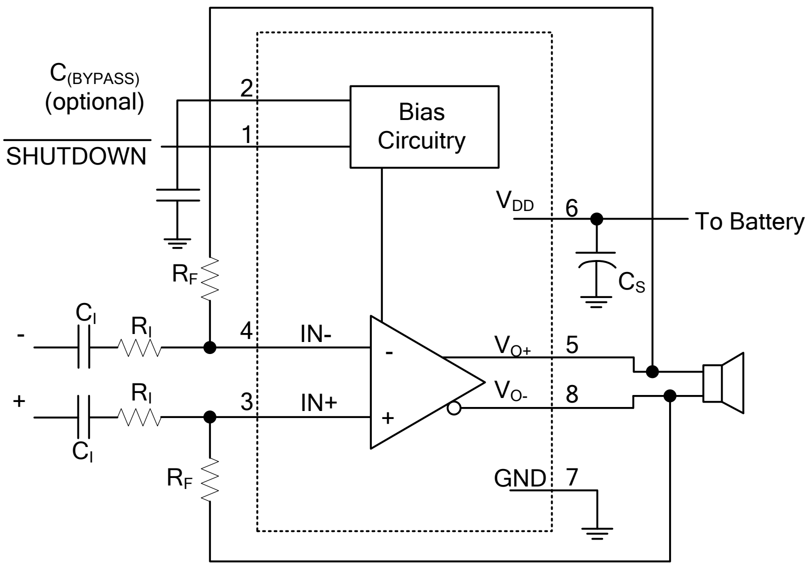
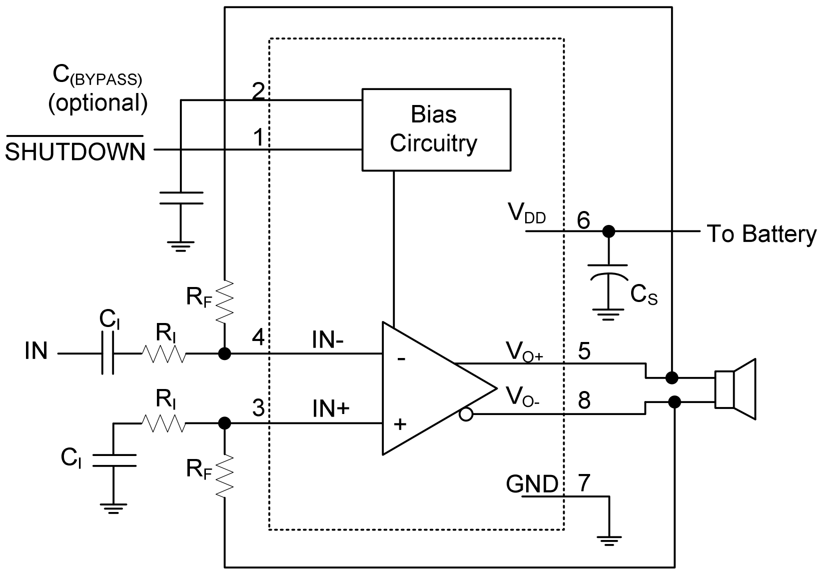


Figure 2. Differential Input Application Schematic Optimized With Input Capacitors

■ TYPICAL APPLICATION CIRCUIT(Cont.)



$$\text{Gain} = \frac{R_F}{R_I}$$

Figure 3. Single-Ended Input Application Schematic