



DESCRIPTION

The A2210 is a Class-AB audio power amplifier designed for mobile phones and other portable communication devices. It is capable of delivering 1.2W of continuous average power to an 8Ω BTL load with less than 1% distortion (THD+N) from a 5V DC power supply.

The A2210 was designed specifically to provide high quality output power with a minimal amount of external components. It does not require output coupling capacitors or bootstrap capacitors. And with ultra low shutdown current, the A2210 is ideally suited for mobile phone and other low voltage applications where minimal power consumption is a primary requirement. With special pop-click eliminating circuit, the A2210 provides perfect pop-click characteristic during turn-on and turn-off transitions.

The A2210 is unity-gain stable and can be configured by external gain-setting resistors.

The A2210 is available in MSOP8 package.

ORDERING INFORMATION

| Package Type | Part Number | |
|---|------------------------------------|------------|
| MSOP8 | MS8 | A2210MS8R |
| | | A2210MS8VR |
| Note | R: Tape & Reel V: Green Package | |
| AiT provides all Pb free products Suffix " V " means Green Package | | |

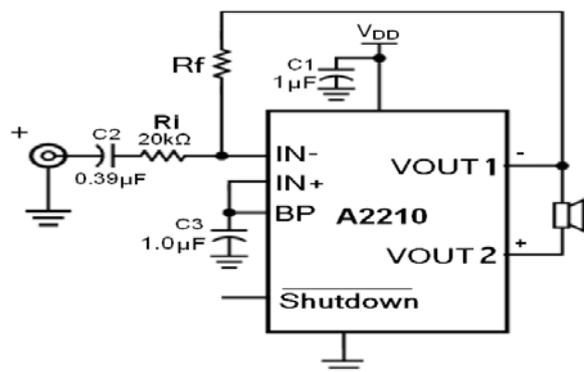
FEATURES

- PSRR @ $f_{IN} = 217\text{Hz}$, $V_{DD} = 5\text{V}$ 62dB(typ.)
- Power Output @ $V_{DD} = 5\text{V}$ & 1% THD $R_L = 8\Omega$ 1.27W(typ.)
- Power Output @ $V_{DD} = 3\text{V}$ & 1% THD $R_L = 8\Omega$ 400mW(typ.)
- Power Output @ $V_{DD} = 5\text{V}$ & 1% THD $R_L = 4\Omega$ 2W(typ.)
- Shutdown Current: 0.1μA(typ.)
- 2.2V ~ 5.5V operation
- Improved circuitry eliminates pop-click noise during turn-on and turn-off transitions
- No output coupling capacitors, snubber networks or bootstrap capacitors required
- Unity-gain stable
- External gain configuration capability
- Available in MSOP8 packages

APPLICATION

- Wireless handsets
- Portable electronic devices
- PDAs, Handheld computers

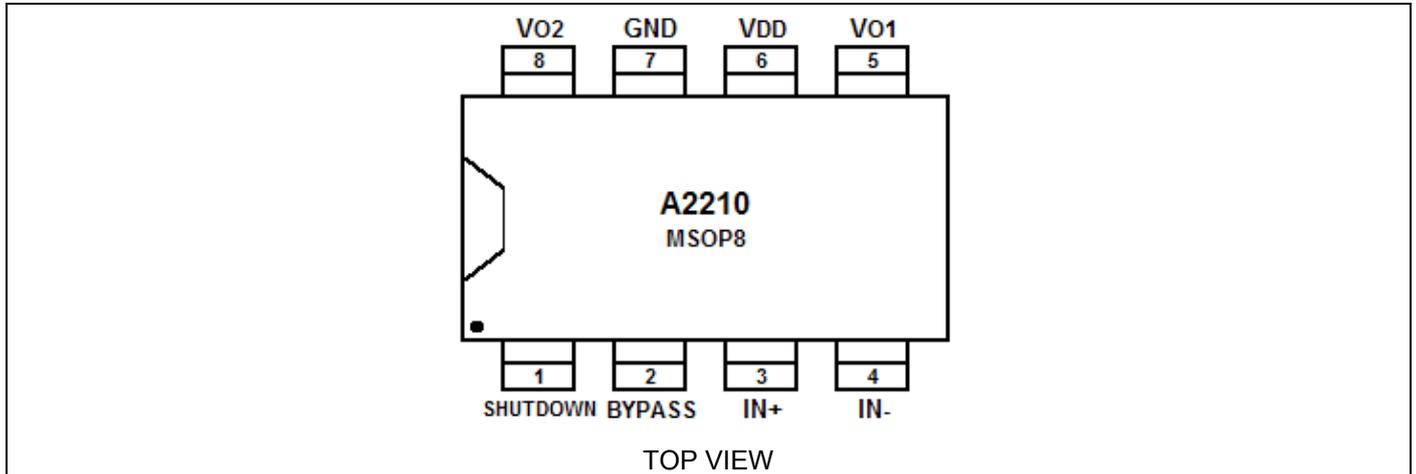
TYPICAL APPLICATION



Single-Ended Input Configuration



PIN DESCRIPTION



| Pin # | Symbol | Functions |
|-------|-----------------|-----------------------------|
| 1 | SHUTDOWN | Shutdown |
| 2 | BYPASS | Bypass |
| 3 | IN+ | Positive Differential Input |
| 4 | IN- | Negative Differential Input |
| 5 | VO1 | Positive BTL output |
| 6 | V _{DD} | Power Supply |
| 7 | GND | Power Ground |
| 8 | VO2 | Negative BTL output |



ABSOLUTE MAXIMUM RATINGS

| | |
|--|-------------------------------|
| V _{DD} , Supply Voltage | -0.3V ~ 6.0V |
| V _{IN} , Input Voltage | -0.3V ~ V _{DD} +0.3V |
| T _{OPR} , Operation Temperature | -40°C ~ 85°C |
| T _{STG} , Storage Temperature | -65°C ~ 150°C |
| HBM, ESD Susceptibility | 4000V |

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

OPERATING RATINGS

| | |
|---------------------------------|--|
| Temperature Range | |
| $T_{MIN} \leq T_A \leq T_{MAX}$ | $-40^{\circ}\text{C} \leq T_A \leq 85^{\circ}\text{C}$ |
| Supply Voltage | $2.2\text{V} \leq V_{DD} \leq 5.5\text{V}$ |



ELECTRICAL CHARACTERISTICS

$V_{DD} = 5V$. Unless otherwise specified. Limits apply for $T_A = 25^\circ C$.

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|---------------|---|------|------|------|------------|
| Quiescent Power Supply Current | I_{DD} | $V_{IN} = 0V, I_o = 0A, \text{No Load}$ | - | 4 | 8 | mA |
| | | $V_{IN} = 0V, I_o = 0A, 8\Omega \text{ Load}$ | - | 5 | 10 | mA |
| Shutdown Current | I_{SD} | $V_{SHUTDOWN} = 0V$ | - | 0.1 | 2 | μA |
| Shutdown Voltage Input High | V_{SDIH} | | 1.2 | - | - | V |
| Shutdown Voltage Input Low | V_{SDIL} | | - | - | 0.4 | V |
| Output Offset Voltage | V_{OS} | | - | 7 | 50 | mV |
| Resistor Output to GND | $R_{OUT-GND}$ | | 7.0 | 8.5 | 9.7 | k Ω |
| Output Power (8 Ω) | P_O | THD = 1% (max); f = 1 kHz, 8 Ω Load | 0.8 | 1.2 | - | W |
| Wake-up time | T_{WU} | | - | 170 | 220 | ms |
| Thermal Shutdown Temperature | T_{SD} | | 150 | 170 | 190 | $^\circ C$ |
| Total Harmonic Distortion + Noise | THD+N | $P_O = 0.4W_{rms}; f = 1kHz$ | - | 0.1 | - | % |
| Power Supply Rejection Ratio | PSRR | $V_{ripple} = 200mV_{sine\ p-p}; f=217Hz$ | 55 | 62 | - | dB |
| | | $V_{ripple} = 200mV_{sine\ p-p}; f=1kHz$ | | 66 | | |
| Shut Down Time | T_{SDT} | 8 Ω Load | - | 1.0 | - | ms |



V_{DD} = 3V. Unless otherwise specified. Limits apply for T_A = 25°C.

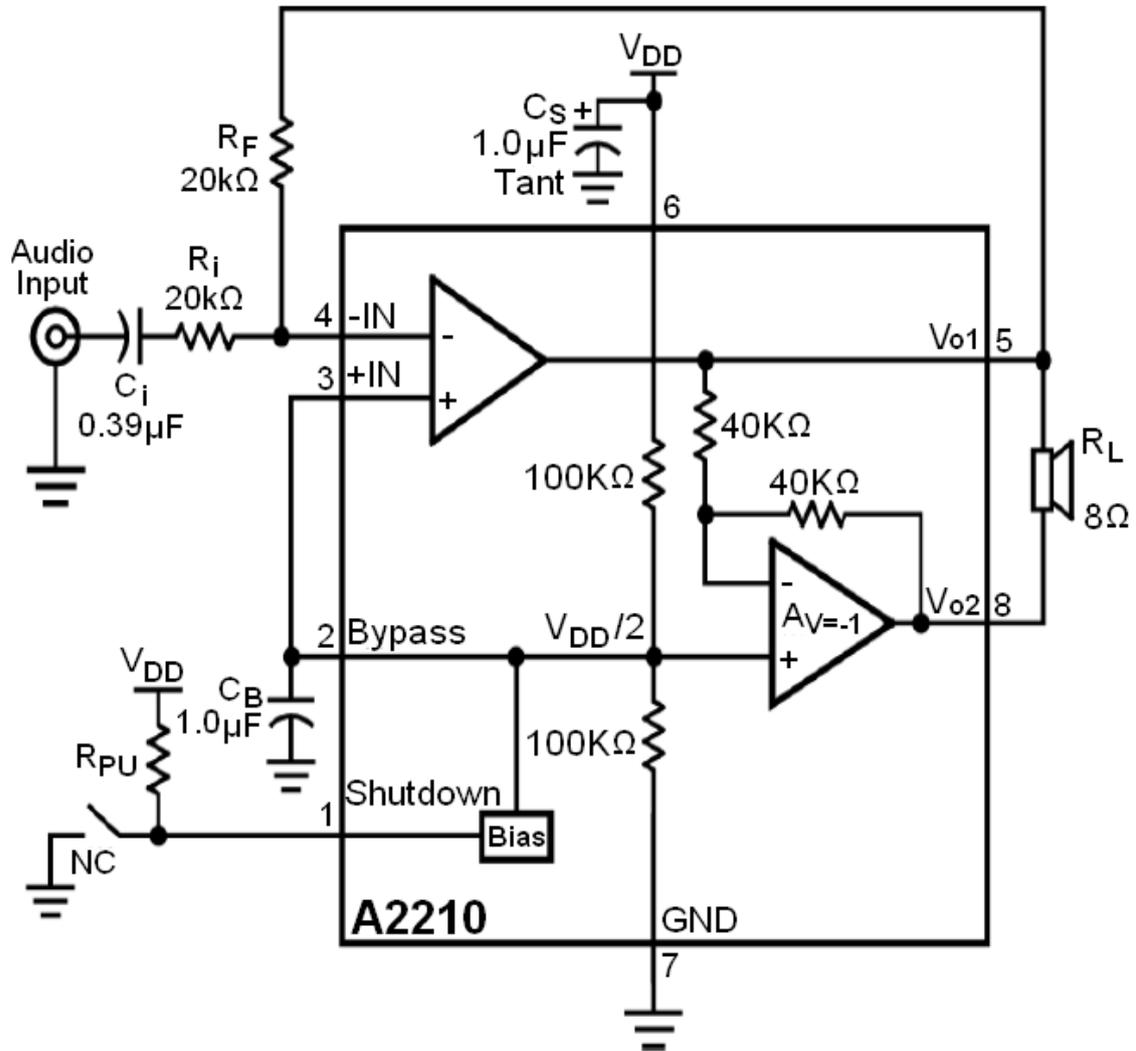
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|----------------------|---|------|------|------|------|
| Quiescent Power Supply Current | I _{DD} | V _{IN} = 0V, I _o = 0A, No Load | - | 3.5 | 7 | mA |
| | | V _{IN} = 0V, I _o = 0A, 8Ω Load | - | 4.5 | 9 | mA |
| Shutdown Current | I _{SD} | V _{SHUTDOWN} = 0V | - | 0.1 | 2 | μA |
| Shutdown Voltage Input High | V _{SDIH} | | 1.2 | - | - | V |
| Shutdown Voltage Input Low | V _{SDIL} | | - | - | 0.4 | V |
| Output Offset Voltage | V _{OS} | | - | 7 | 50 | mV |
| Resistor Output to GND | R _{OUT-GND} | | 7.0 | 8.5 | 9.7 | kΩ |
| Output Power (8Ω) | P _O | THD = 1% (max); f = 1 kHz 8Ω Load | 0.28 | 0.41 | - | W |
| Wake-up time | T _{WU} | | - | 170 | 220 | ms |
| Thermal Shutdown Temperature | T _{SD} | | 150 | 170 | 190 | °C |
| Total Harmonic Distortion + Noise | THD+N | P _O = 0.4W _{rms} ; f = 1kHz | - | 0.1 | - | % |
| Power Supply Rejection Ratio | PSRR | V _{ripple} = 200mV _{sine p-p} ; f = 217Hz | 45 | 56 | - | dB |
| | | V _{ripple} = 200mV _{sine p-p} ; f = 1kHz | | 62 | | |

V_{DD} = 2.6V. Unless otherwise specified. Limits apply for T_A = 25°C.

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|-----------------|---|------|------|------|------|
| Quiescent Power Supply Current | I _{DD} | V _{IN} = 0V, I _o = 0A, No Load | - | 2.6 | 5.5 | mA |
| Shutdown Current | I _{SD} | V _{SHUTDOWN} = 0V | - | 0.1 | 2 | μA |
| Output Power | P _O | THD = 1% (max); f = 1 kHz | - | 0.3 | - | W |
| | | 8Ω Load | | 0.5 | | |
| | 4Ω Load | | | | | |
| Total Harmonic Distortion + Noise | THD+N | P _O = 0.1W _{rms} ; f = 1kHz | - | 0.08 | - | % |
| Power Supply Rejection Ratio | PSRR | V _{ripple} = 200mV _{sine p-p} ; f = 217Hz | - | 44 | - | dB |
| | | V _{ripple} = 200mV _{sine p-p} ; f = 1kHz | | 44 | | |



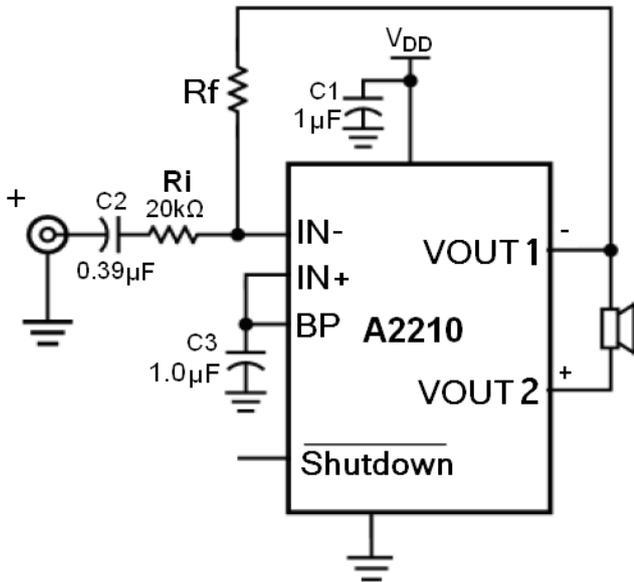
BLOCK DIAGRAM



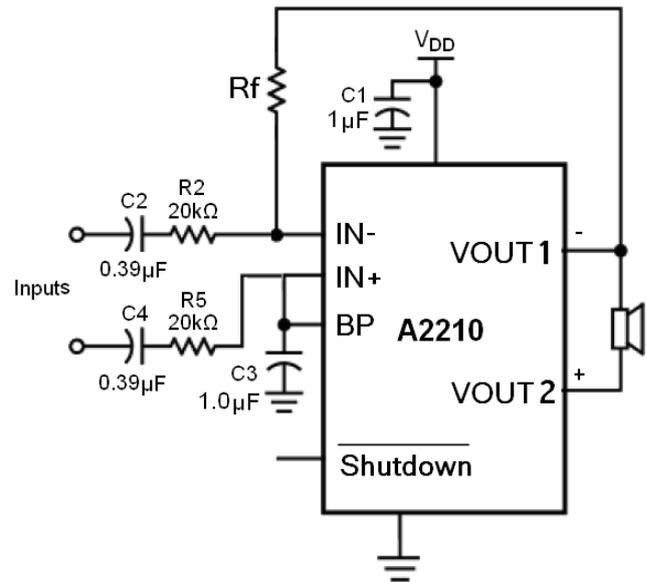


TYPICAL APPLICATION

1. Single-Ended Input Configuration



2. Differential Input Configuration

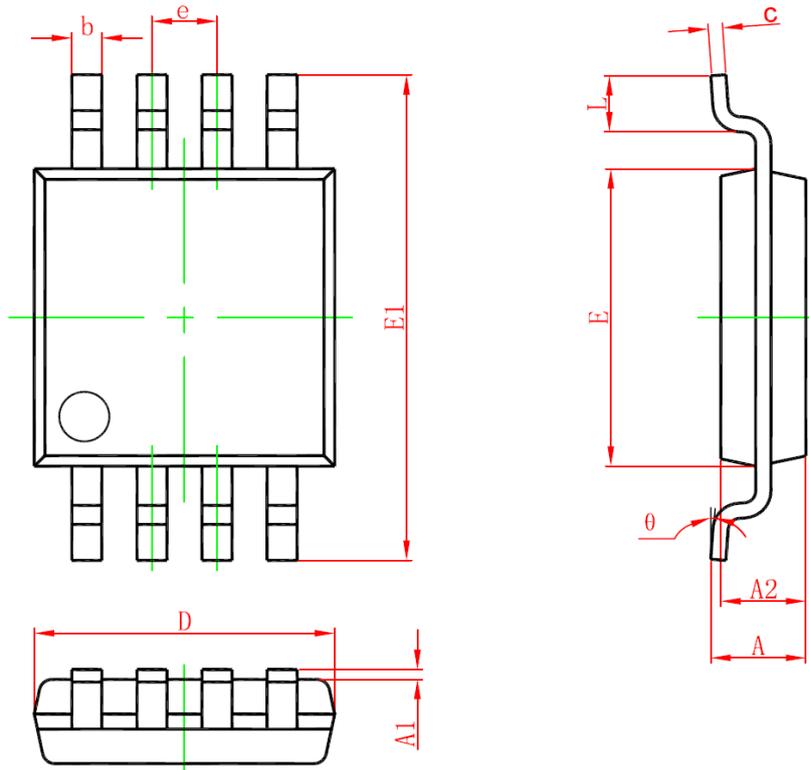


The resistors (Rf) set the gain of the amplifier according to equation (1). $Gain = 2 \times Rf / Ri$. Typical $Ri = 20K$, $Rf = 20K$, $GAIN = 2$



PACKAGE INFORMATION

Dimension in MSOP8 (Unit: mm)



| Symbol | Min | Max |
|----------|------------|-------|
| A | 0.820 | 1.100 |
| A1 | 0.020 | 0.150 |
| A2 | 0.750 | 0.950 |
| b | 0.250 | 0.380 |
| c | 0.090 | 0.230 |
| D | 2.900 | 3.100 |
| e | 0.650(BSC) | |
| E | 2.900 | 3.100 |
| E1 | 4.750 | 5.050 |
| L | 0.400 | 0.800 |
| θ | 0° | 6° |



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