DESCRIPTION

The A2203 is a Class-AB audio power amplifier designed for mobile phone, MID and other portable communication devices. It is capable of delivering 1.1 watts of continuous average power to an 8Ω BTL load with less than 1% distortion (THD+N) from a $5V_{DC}$ power supply.

The A2203 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 A2203 is ideally suited for mobile phone, MID and other low voltage applications where minimal power consumption is a primary requirement.

With special pop-click eliminating circuit, the A2203 provides perfect pop-click characteristic during turn-on and turn-off transitions.

The A2203 is unity-gain stable and can be configured by external gain-setting resistors.

The A2203 is available in MSOP8 and SOP8 packages

ORDERING INFORMATION

Package Type	Part Number	
MSOP8	MS8	A2203MS8R
		A2203MS8VR
SOP8	M8	A2203M8R
		A2203M8VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

FEATURES

- Improved PSRR at 217 Hz & 1 KHz: 60dB
- Power output at 5.0V, 1% THD+N, 8Ω: 1.1W (typ.)
- Ultra low shutdown current: 0.1uA (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 and SOP8 Packages

APPLICATION

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

TYPICAL APPLICATION

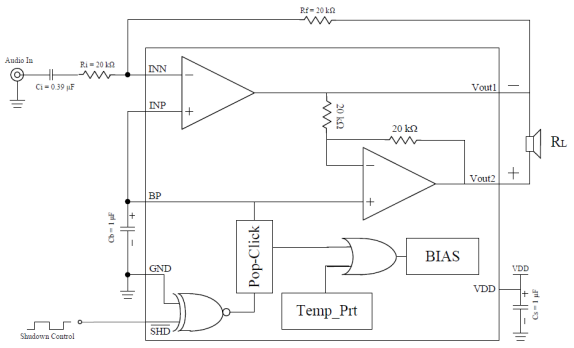
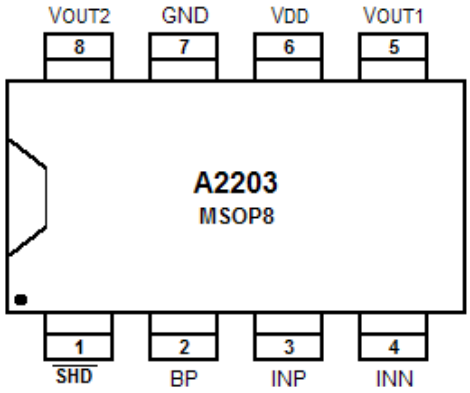
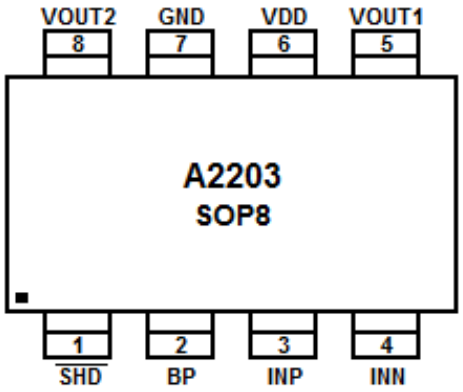


Fig1.

PIN DESCRIPTION



Top View



Top View

Pin #	Symbol	I/O	Functions
1	$\overline{SHD}$	I	Shut-down Logical Control, '0' is active.
2	BP	I/O	Analog ground for inner OPAs. It's about a half of V_{DD}.
3	INP	I	Positive Input
4	INN	I	Negative Input
5	V_{OUT1}	O	Negative BTL Output
6	V_{DD}	I/O	Power Supply (2.2 ~ 5.5 V)
7	GND	I/O	Ground
8	V_{OUT2}	O	Positive BTL Output

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	-0.3V~6V
Input Voltage	-0.3V~V_{DD}+0.3V
Power Dissipation	See Dissipation Rating Table
Junction Temperature	-40°C~+150°C
Storage Temperature	-65°C~+150°C
Thermal Resistance	
θ_{JC}, MSOP8	56°C/W
θ_{JA} , MSOP8	190°C/W
θ_{JA} , SOP8	184°C/W
Operating Ratings	
Temperature Range	-40°C≦T_A≦85°C
Supply Voltage	2.2V≦V_{DD}≦5.5V

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.

ELECTRICAL CHARACTERISTICS

The following specifications apply for the circuit shown in Figure 1, unless otherwise specified.
Limits apply for T_A = 25℃.

V_{DD} = 5V

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Quiescent Power Supply Current	I_{DD}	V_{IN} = 0V, 8Ω Load		3.0	8	mA
		V_{IN} = 0V, No Load		2.5	7	mA
Shutdown Current	I_{SD}	V_{IN}=0V, V_{SHD}=GND, No Load		0.1	2	uA
Shutdown Voltage Input High	V_{SDIH}		1.2			V
Shutdown Voltage Input Low	V_{SDIL}				0.9	V
Output Offset Voltage	V_{OS}		-50	6	50	mV
Total Harmonic Distortion+Noise	THD+N	P_{OUT} =0.5Wrms, f=1KHz,		0.07		%
Output Power	P_O	THD+N<=1%, f=1KHz, 8Ω Load	0.9	1.1		W
Power Supply Rejection Ratio	PSRR	Input terminated with 10Ω, $V_{DDRIPPLE}$=0.2V_{P-P}, f=217Hz		60		dB
		Input terminated with 10Ω, $V_{DDRIPPLE}$=0.2V_{P-P}, f=1KHz		61		dB
Wake-up time	T_{WU}			100		ms

V_{DD} = 3V

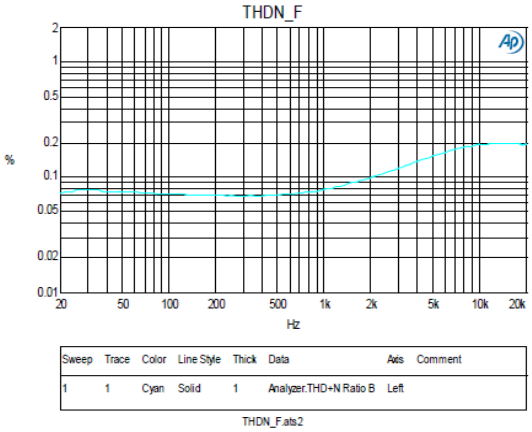
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Quiescent Power Supply Current	I_{DD}	V_{IN} = 0V, 8Ω Load		2	7	mA
		V_{IN} = 0V, No Load		1.5	6	mA
Shutdown Current	I_{SD}	V_{IN}=0V, V_{SHD}=GND, No Load		0.1	2	uA
Shutdown Voltage Input High	V_{SDIH}		1.0			V
Shutdown Voltage Input Low	V_{SDIL}				0.7	V
Output Offset Voltage	V_{OS}		-50	6	50	mV
Total Harmonic Distortion+Noise	THD+N	P_{OUT} =0.25Wrms, f=1KHz,		0.08		%
Output Power	P_O	THD+N<=1%, f=1KHz, 8Ω Load		310		mW
Power Supply Rejection Ratio	PSRR	Input terminated with 10Ω, $V_{DDRIPPLE}$=0.2V_{P-P}, f=217Hz		57		dB
		Input terminated with 10Ω, $V_{DDRIPPLE}$=0.2V_{P-P}, f=1KHz		58		dB
Wake-up time	T_{WU}			75		ms

V_{DD} = 2.6V

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Quiescent Power Supply Current	I_{DD}	V_{IN} = 0V, 8Ω Load		1.7		mA
		V_{IN} = 0V, No Load		1.2		mA
Shutdown Current	I_{SD}	V_{IN}=0V, V_{SHD}=GND, No Load		0.1		uA
Shutdown Voltage Input High	V_{SDIH}		1.0			V
Shutdown Voltage Input Low	V_{SDIL}				0.7	V
Output Offset Voltage	V_{OS}		-50	4	50	mV
Total Harmonic Distortion+Noise	THD+N	P_{OUT} =0.15Wrms, f=1KHz,		0.08		%
Output Power	P_O	THD+N<=1%, f=1KHz, 8Ω Load		230		mW
Power Supply Rejection Ratio	PSRR	Input terminated with 10Ω, $V_{DDRIPPLE}$=0.2V_{P-P}, f=217Hz		56		dB
		Input terminated with 10Ω, $V_{DDRIPPLE}$=0.2V_{P-P}, f=1KHz		57		dB
Wake-up time	T_{WU}			70		ms

TYPICAL PERFORMANCE CHARACTERISTICS

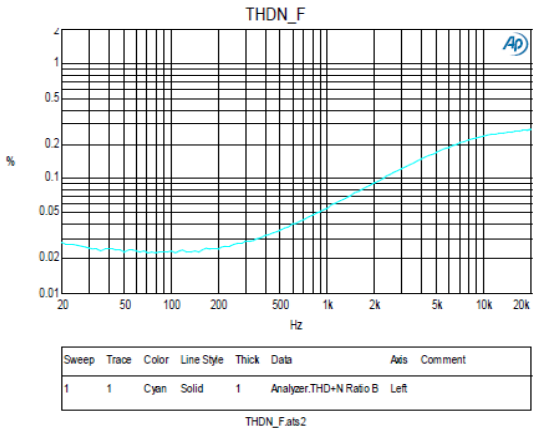
1. THDN vs. Frequency
V_{DD}=5V R_L=8Ω P_O=500mW



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.THD+N Ratio B	Left	

THDN_F.ats2

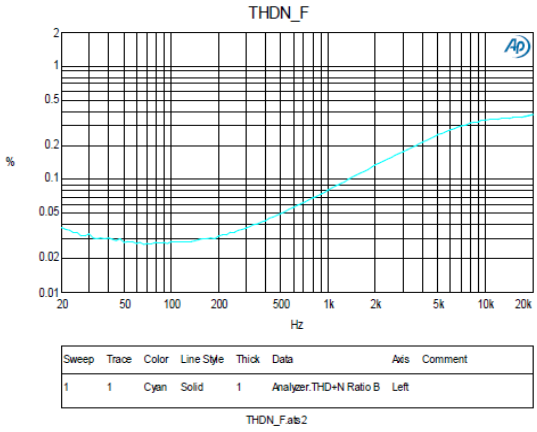
2. THDN vs. Frequency
V_{DD}=3V R_L=8Ω P_O=250mW



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.THD+N Ratio B	Left	

THDN_F.ats2

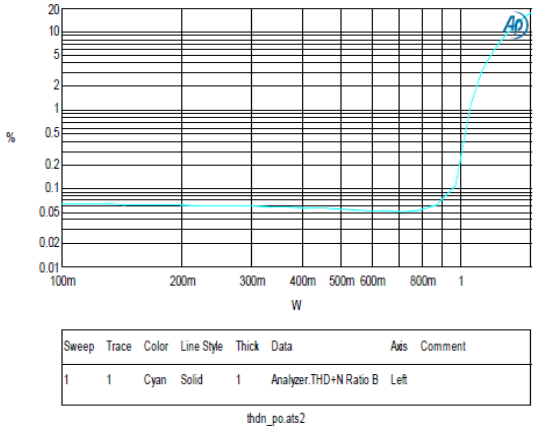
3. THDN vs. Frequency
V_{DD}=2.6V R_L=8Ω P_O=150mW



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.THD+N Ratio B	Left	

THDN_F.ats2

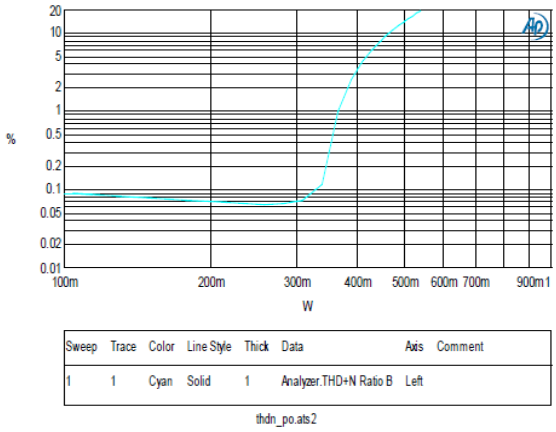
4. THDN vs. Frequency
V_{DD}=5V R_L=8Ω F=1KHz



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.THD+N Ratio B	Left	

thdn_po.ats2

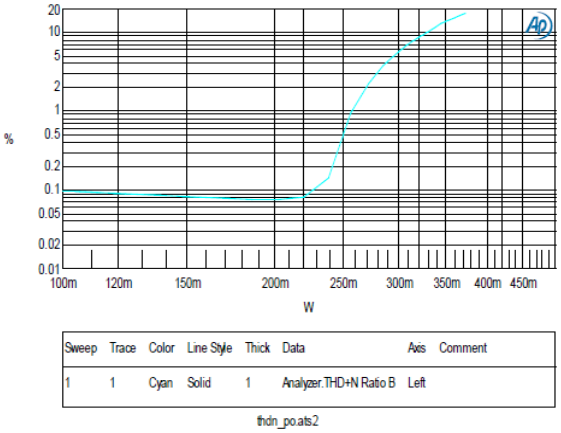
5. THDN vs. Output Power
V_{DD}=3V R_L=8Ω F=1KHz



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.THD+N Ratio B	Left	

thdn_po.ats2

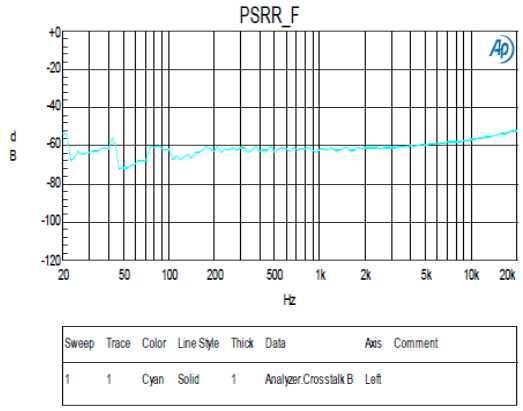
6. THDN vs. Output Power
V_{DD}=2.6V R_L=8Ω F=1KHz



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.THD+N Ratio B	Left	

thdn_po.ats2

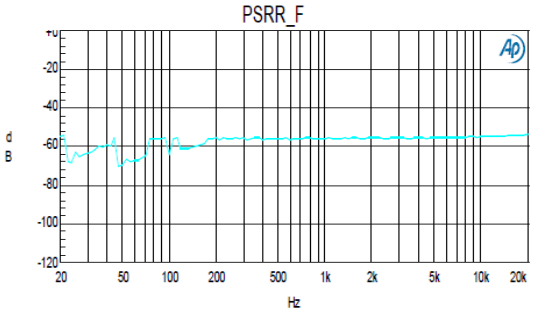
7. PSRR vs. Frequency
V_{DD}=5V R_L=8Ω



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.Crosstalk B	Left	

psrr_f.ats2

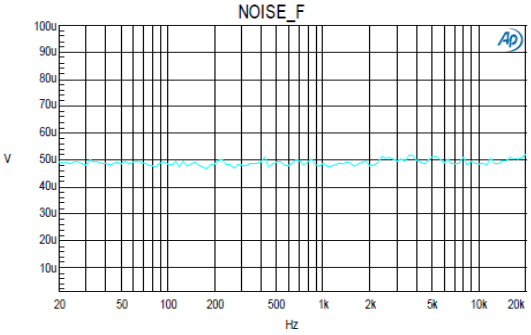
8. PSRR vs. Frequency
V_{DD}=3V R_L=8Ω



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.Crosstalk B	Left	

psrr_f.ats2

9. Noise Floor 20KBW
V_{DD}=5V R_L=8Ω



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.Amplitude B	Left	

NOISE_F.ats2

DETAILED INFORMATION

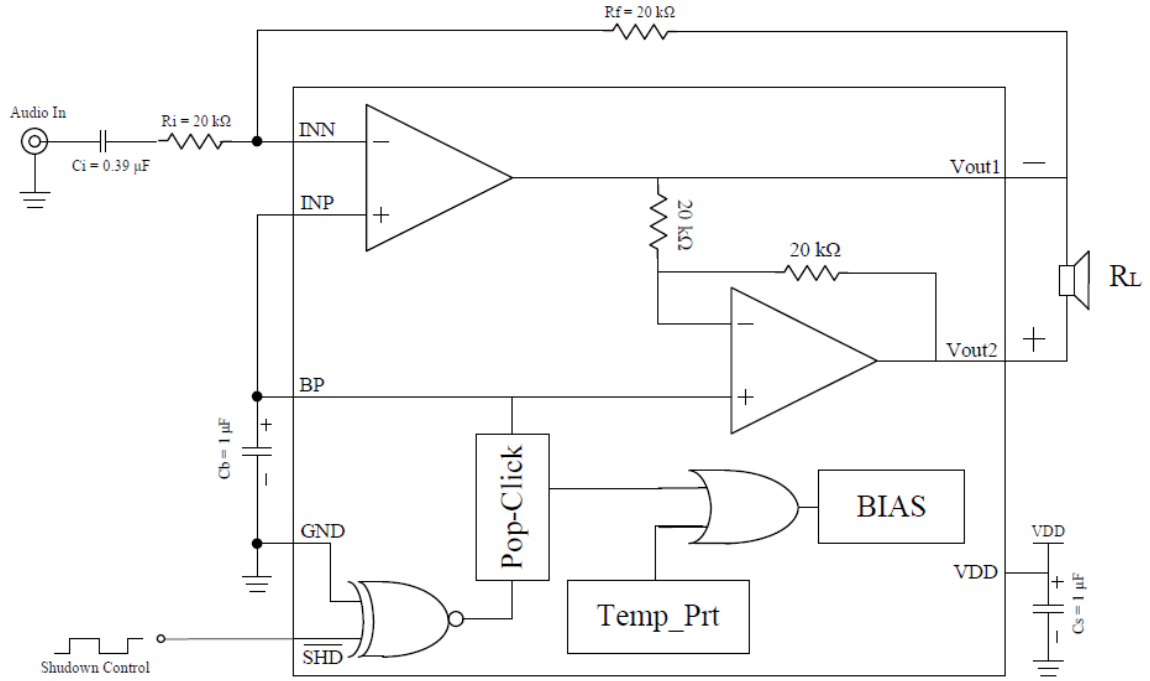


Figure. 1 A2203 Typical Application Circuit

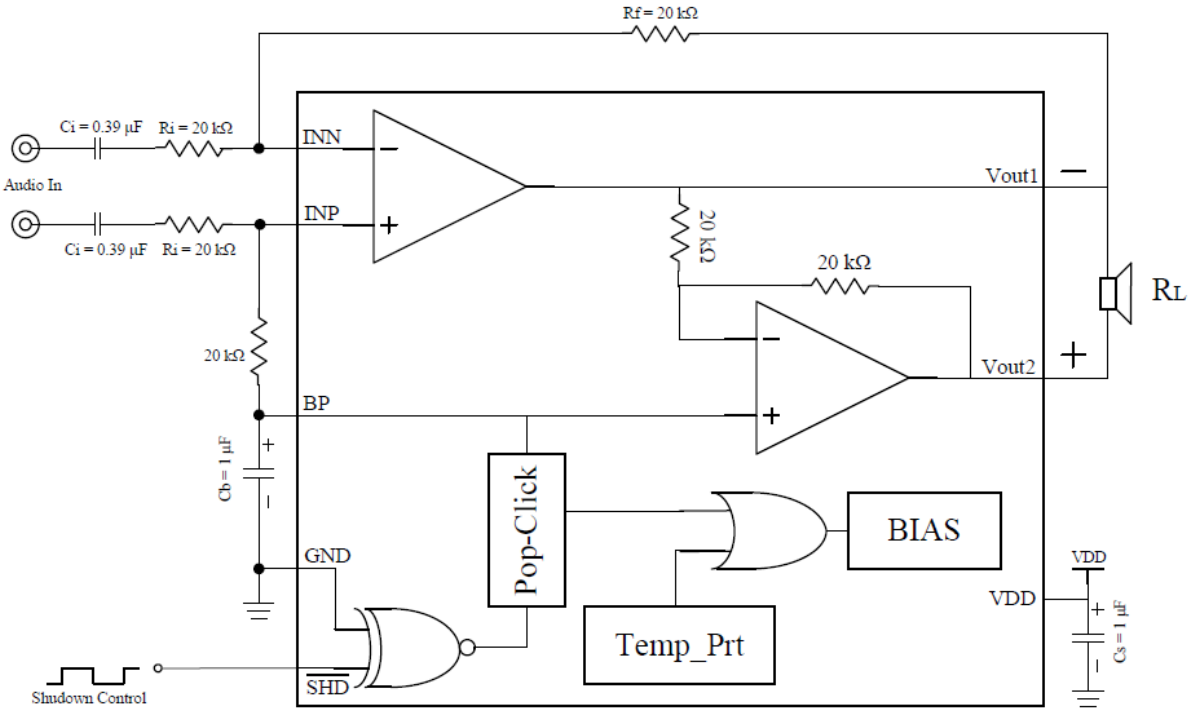


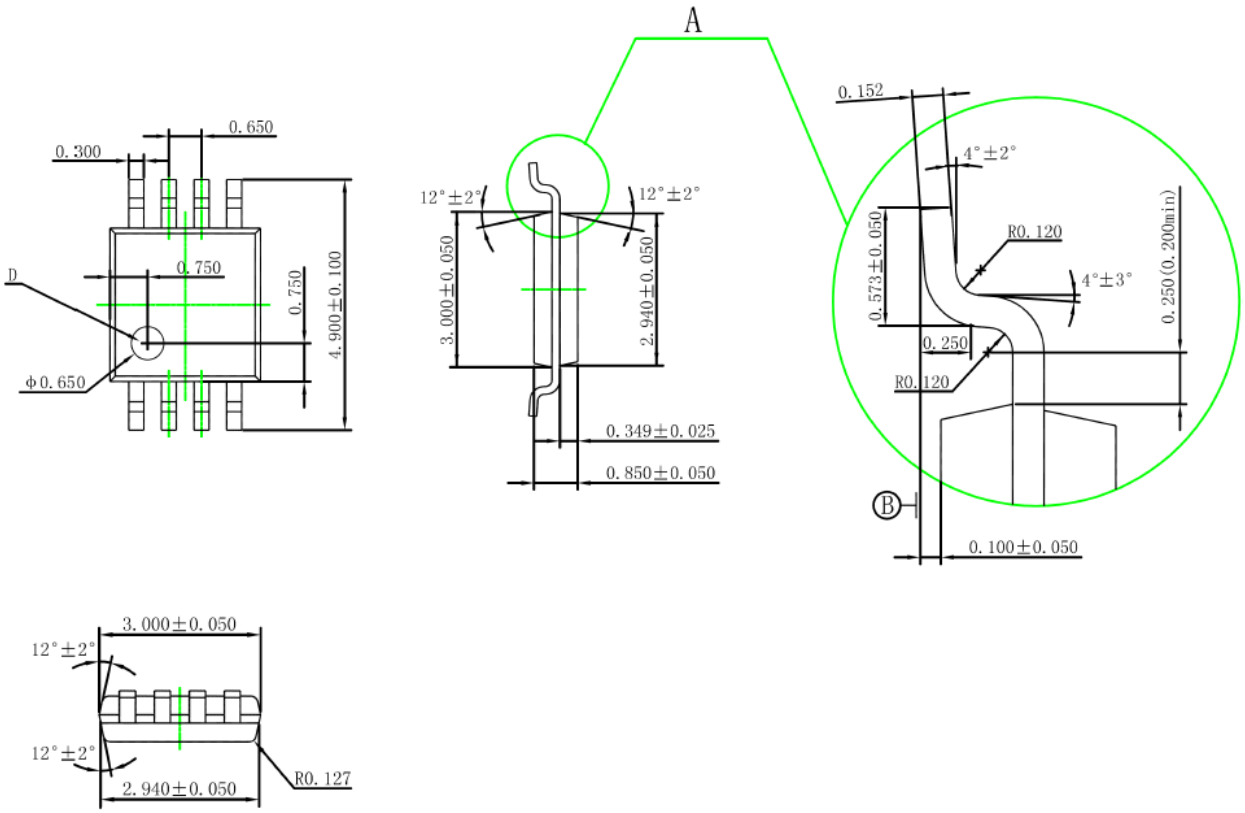
Figure. 2 A2203 Differential Amplifier Configuration

External Components Description

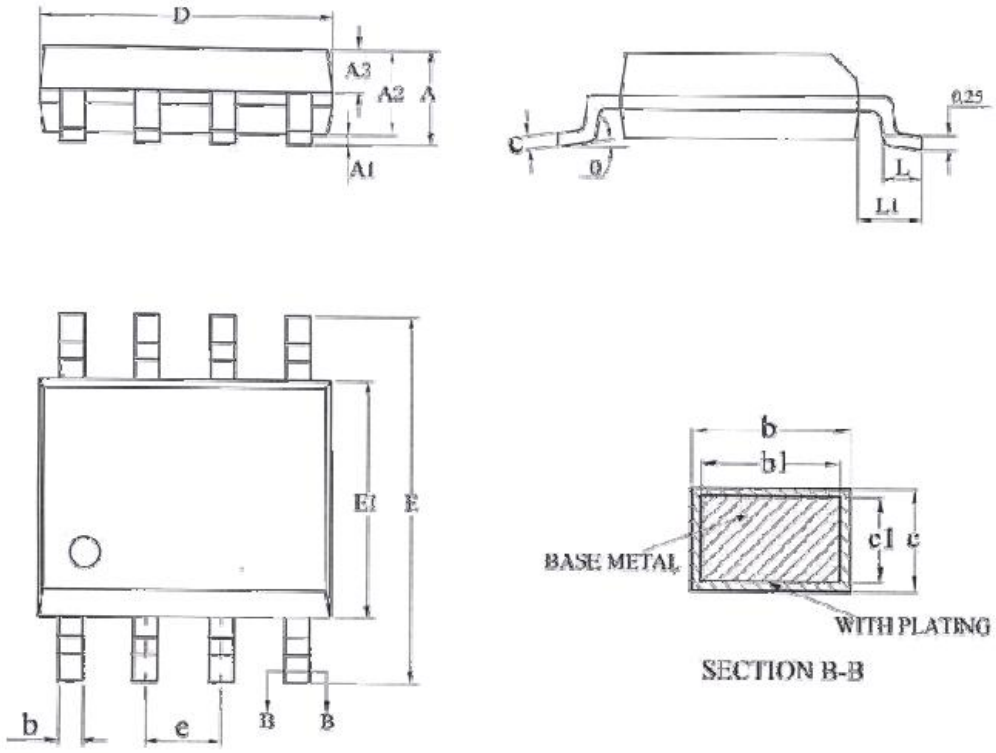
Components	Functional Description
Ri	Inverting input resistance which sets the closed-loop gain in conjunction with Rf. This resistor also forms a high pass filter with Ci at fc = 1/(2πRi*Ci).
Ci	Input coupling capacitor which blocks the DC voltage at the amplifiers input terminates. Also creates a high-pass filter with Ri at fc = 1/(2πRi*Ci)..
Rf	Feedback resistance which sets the closed-loop gain in conjunction with Ri. The gain is A_{VD}=2*(Rf/Ri).
Cs	Supply bypass capacitor which provides power supply filtering.
Cb	Bypass pin capacitor which provides half-supply filtering. Refer to the section.

PACKAGE INFORMATION

Dimension in MSOP8 (Unit: mm)



Dimension in MSOP8 (Unit: mm)



Symbol	Min	Max
A	-	1.770
A1	0.080	0.280
A2	1.200	1.600
A3	0.550	0.750
b	0.390	0.480
b1	0.380	0.430
c	0.210	0.260
c1	0.190	0.210
D	4.700	5.100
E	5.800	6.200
E1	3.700	4.100
e	1.270(BSC)	
L	0.500	0.800
L1	1.050(BSC)	
θ	0°	8°

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