



## DESCRIPTION

The A2230 is a Class-AB audio power amplifier. It is capable of delivering 1.7 watts of continuous average power to an 4Ω BTL load with less than 10% distortion (THD+N) from a 5V<sub>DC</sub> power supply, or 1.1 watts continuous average power to an 8Ω BTL load with less than 1% distortion.

The A2230 is 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. The A2230 is ideally suited for audio speakers and other low voltage applications.

With special pop-click eliminating circuit, the A2230 provides perfect pop-click characteristic during turn-on and turn-off transitions.

The A2230 is unity-gain stable and can be configured by external gain-setting resistors.

The A2230 is available in SOP8 package.

## ORDERING INFORMATION

Package Type	Part Number	
SOP8 SPQ: 2,500pcs/Reel, 100pcs/Tube	M8	A2230M8R
		A2230M8VR
		A2230M8U
		A2230M8VU
Note	V: Halogen free Package R: Tape & Reel U: Tube	
AiT provides all RoHS products		

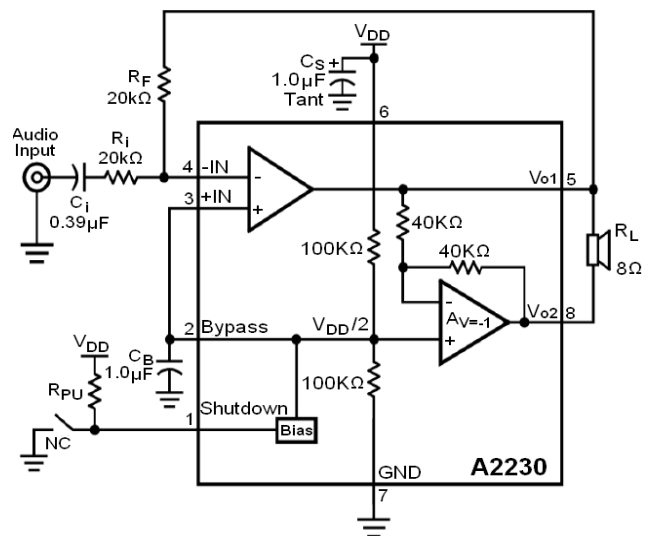
## FEATURES

- Improved PSRR at 217 Hz & 1 kHz 60dB
- Power output at 5.0V, 10% THD+N, 4Ω 1.7 W (typ.)
- Power output at 5.0V, 1% THD+N, 8Ω 1.1 W (typ.)
- 2.2V ~ 5.5V operation voltage.
- 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 SOP8 package.

## APPLICATION

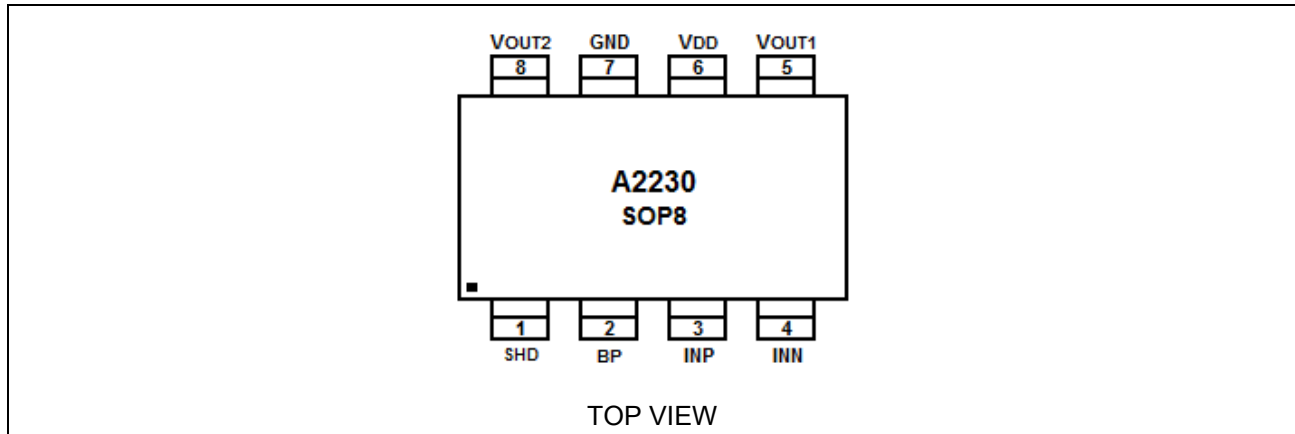
- Audio speakers
- Desktop computers
- Low voltage audio systems

## TYPICAL APPLICATION





## PIN DESCRIPTION



Pin #	Symbol	I/O	Functions
1	SHD	I	Shut-down Logical Control, '1' 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

## EXTERNAL COMPONENTS DESCRIPTION

Components	Functional Description
$R_i$	Inverting input resistance which sets the closed-loop gain in conjunction with $R_f$ . This resistor also forms a high pass filter with $C_i$ at $f_c = 1/(2\pi R_i C_i)$ .
$C_i$	Input coupling capacitor which blocks the DC voltage at the amplifiers input terminates. Also creates a high-pass filter with $R_i$ at $f_c = 1/(2\pi R_i C_i)$ .
$R_f$	Feedback resistance which sets the closed-loop gain in conjunction with $R_i$ . The gain is $A_{VD}=2*(R_f/R_i)$ .
$C_s$	Supply bypass capacitor which provides power supply filtering.
$C_b$	Bypass pin capacitor which provides half-supply filtering. Refer to the section.



## ABSOLUTE MAXIMUM RATINGS

Supply Voltage	-0.3V~6.0V
Input Voltage	-0.3V~V <sub>DD</sub> +0.3V
Power dissipation	See Dissipation Rating Table
Junction Temperature	-40°C~+150°C
Storage Temperature	-65°C~+150°C
<b>Thermal Resistance</b>	
$\theta_{JA}$ (SOP8)	184°C/W

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

Parameter	Value
Temperature Range	-40°C ≤ T <sub>A</sub> ≤ 85°C
Supply Voltage	2.2V ≤ V <sub>DD</sub> ≤ 5.5V



## ELECTRICAL CHARACTERISTICS

The following specifications apply for the circuit shown in Figure 1, unless otherwise specified.  
Limits apply for  $T_A = 25^\circ\text{C}$ .

$V_{DD} = 5V$

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Quiescent Power Supply Current	$I_{DD}$	$V_{IN} = 0V, 8\Omega$ Load	-	3.0	8.0	mA
		$V_{IN} = 0V$ , No Load	-	2.5	7.0	
Shutdown Current	$I_{SD}$	$V_{IN}=0V, V_{SHD}=GND$ , No Load	-	0.5	-	$\mu\text{A}$
Shutdown Voltage Input High	$V_{SDIH}$		1.2	-	-	V
Shutdown Voltage Input Low	$V_{SDIL}$		-	-	0.9	V
Output Offset Voltage	$V_{OS}$		-50	6.0	50	mV
Total Harmonic Distortion + Noise	THD+N	$P_o=0.5W_{rms}, f=1\text{kHz}$	-	0.07	-	%
Output Power	$P_o$	THD+N $\leq$ 1%, $f=1\text{kHz}, 8\Omega$ Load	-	1.1	-	W
		THD+N $\leq$ 10%, $f=1\text{kHz}, 4\Omega$ Load	-	1.7	-	
Power Supply Rejection Ratio	PSRR	Input terminated with $10\Omega$ , $V_{DDRIPPLE}=0.2V_{P-P}, f=217\text{Hz}$	-	60	-	dB
		Input terminated with $10\Omega$ , $V_{DDRIPPLE}=0.2V_{P-P}, f=1\text{kHz}$	-	61	-	dB
Wake-up Time	$T_{WU}$		-	100	-	ms

$V_{DD} = 3V$

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Quiescent Power Supply Current	$I_{DD}$	$V_{IN} = 0V, 8\Omega$ Load	-	2	7	mA
		$V_{IN} = 0V$ , No Load	-	1.5	6	
Shutdown Current	$I_{SD}$	$V_{IN}=0V, V_{SHD}=GND$ , No Load	-	0.5	-	$\mu\text{A}$
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	$P_o=0.25W_{rms}, f=1\text{kHz}$	-	0.08	-	%
Output Power	$P_o$	THD+N $\leq$ 1%, $f=1\text{kHz}, 8\Omega$ Load	-	310	-	mW
Power Supply Rejection Ratio	PSRR	Input terminated with $10\Omega$ , $V_{DDRIPPLE}=0.2V_{P-P}, f=217\text{Hz}$	-	57	-	dB
		Input terminated with $10\Omega$ , $V_{DDRIPPLE}=0.2V_{P-P}, f=1\text{kHz}$	-	58	-	dB
Wake-up Time	$T_{WU}$		-	75	-	ms



## TYPICAL APPLICATION CIRCUIT

20kΩ

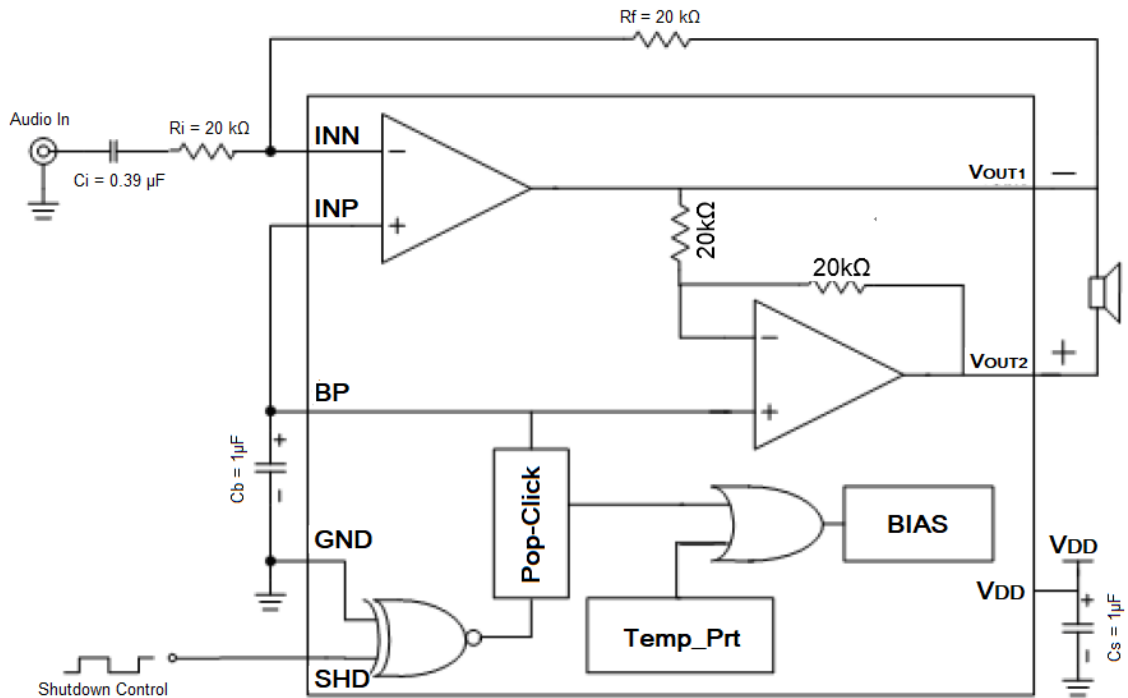


Figure 1. A2230 Typical Application Circuit

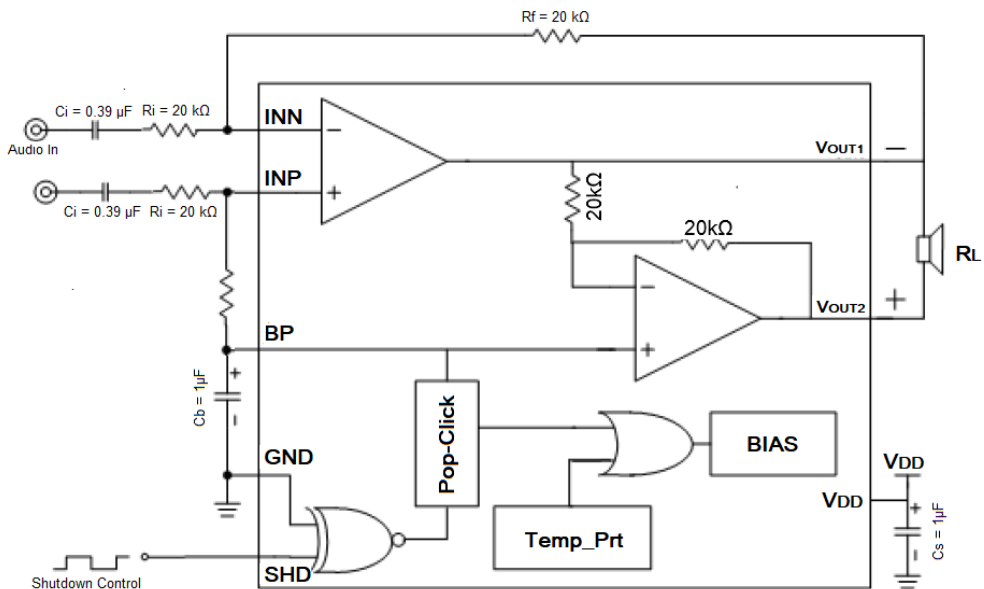


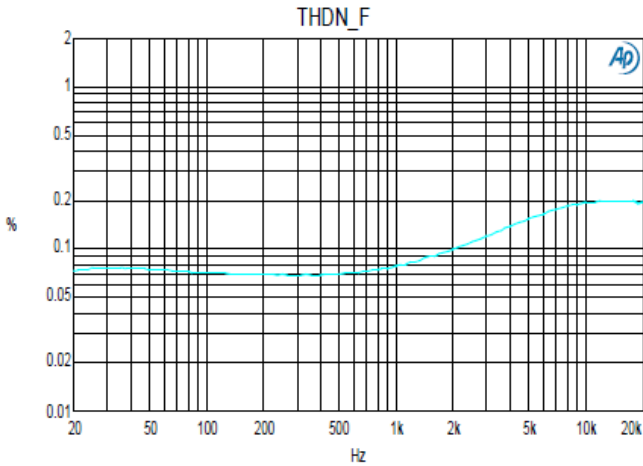
Figure 2. A2230 Differential Amplifier Configuration



**TYPICAL PERFORMANCE CHARACTERISTICS**

1. THDN vs. Frequency

$V_{DD}=5V$   $R_L=8\Omega$   $P_O=500mW$

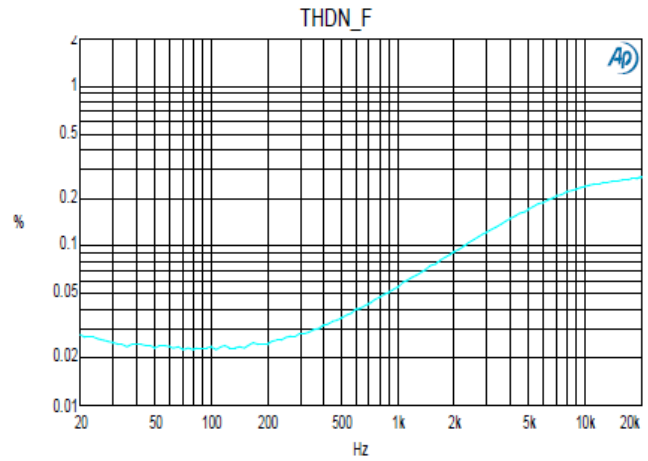


Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.THD+N Ratio B	Left	

THDN\_F.ats2

2. THDN vs. Frequency

$V_{DD}=3V$   $R_L=8\Omega$   $P_O=250mW$

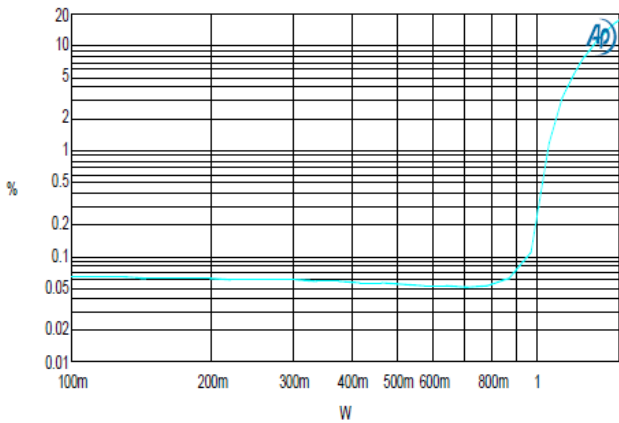


Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.THD+N Ratio B	Left	

THDN\_F.ats2

3. THDN vs. Output Power

$V_{DD}=5V$   $R_L=8\Omega$   $F=1kHz$

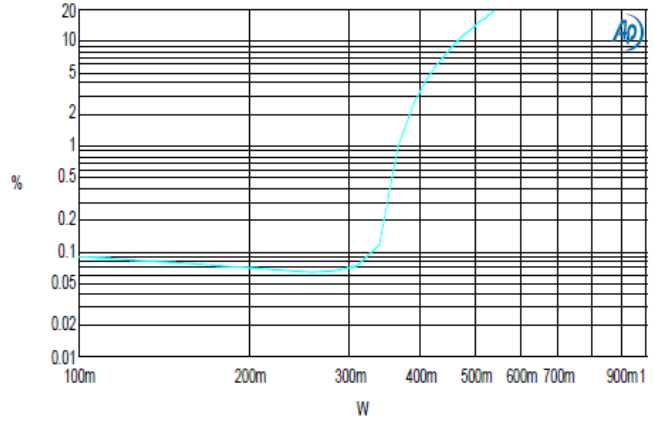


Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.THD+N Ratio B	Left	

THDN\_F.ats2

4. THDN vs. Output Power

$V_{DD}=3V$   $R_L=8\Omega$   $F=1kHz$



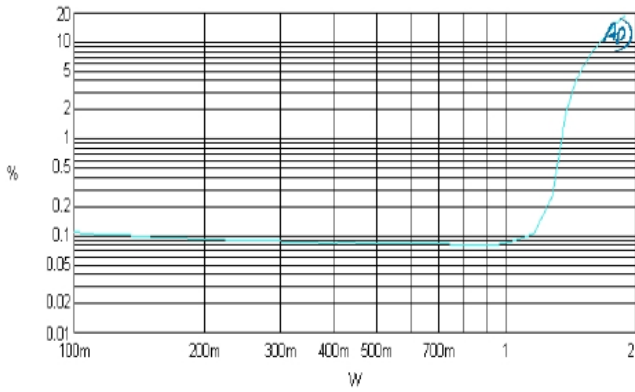
Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer.THD+N Ratio B	Left	

THDN\_F.ats2



5. THDN vs. Output Power

$V_{DD}=5V$   $R_L=4\Omega$   $F=1kHz$

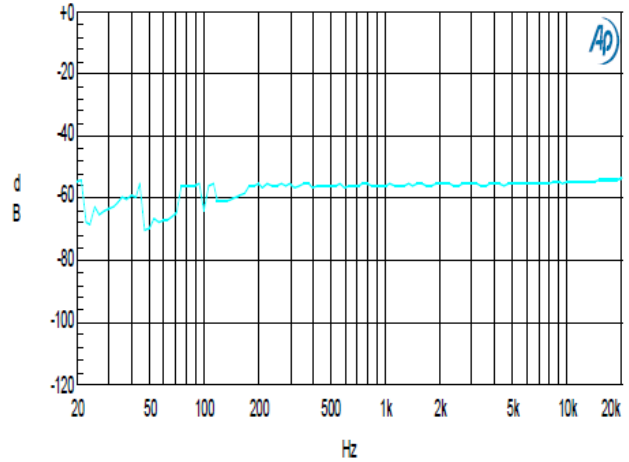


Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer:THD+N Ratio B	Left	

THDN\_F.ats2

6. PSRR vs. Frequency

$V_{DD}=5V$   $R_L=8\Omega$

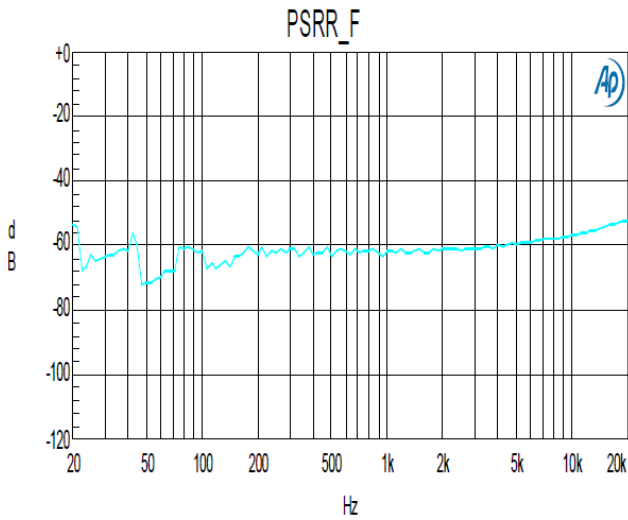


Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer:Crosstalk B	Left	

PSRR\_fats2

7. PSRR vs. Frequency

$V_{DD}=3V$   $R_L=8\Omega$

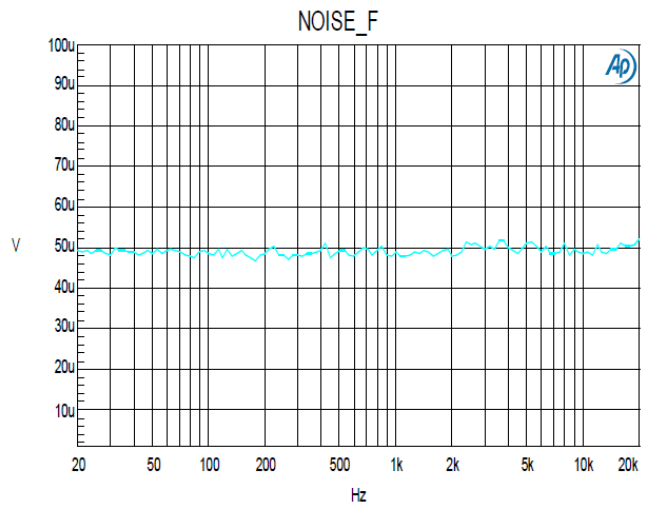


Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer:Crosstalk B	Left	

PSRR\_fats2

8. Noise Floor 20kBW

$V_{DD}=5V$   $R_L=8\Omega$



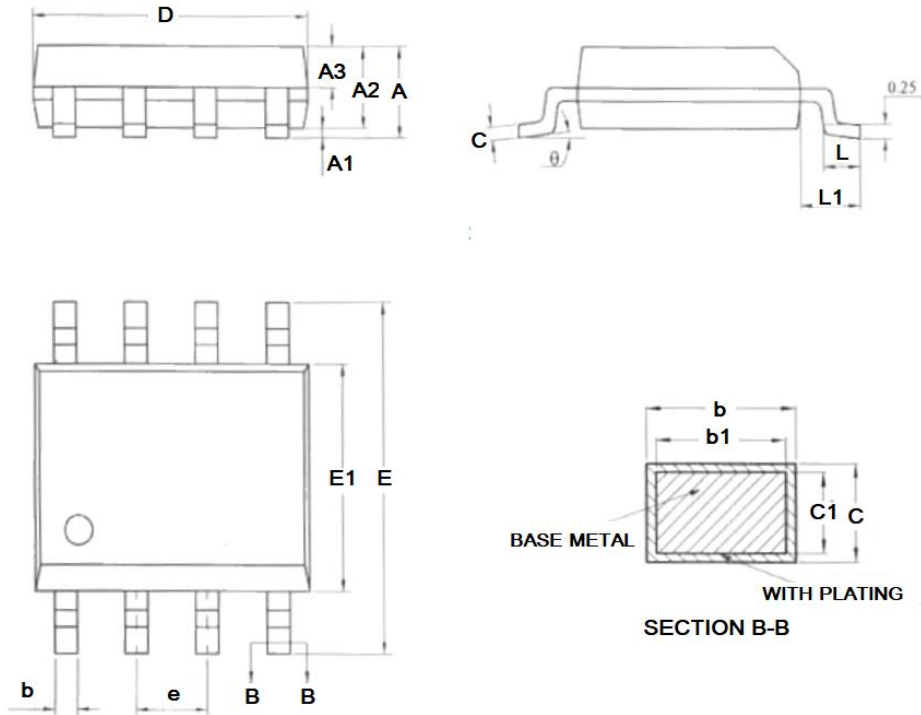
Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Analyzer:Amplitude B	Left	

NOISE\_F.ats2



**PACKAGE INFORMATION**

Dimension in SOP8 (Unit: mm)



Symbol	Min	Max
A	-	1.77
A1	0.08	0.28
A2	1.20	1.60
A3	0.55	0.75
b	0.39	0.48
b1	0.38	0.43
c	0.21	0.26
c1	0.19	0.21
D	4.70	5.10
E	5.80	6.20
E1	3.70	4.10
e	1.27 BSC	
L	0.50	0.80
L1	1.05 BSC	
θ	0°	8°





## IMPORTANT NOTICE

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