

**LOW VOLTAGE AUDIO POWER AMPLIFIER****AZ386****General Description**

The AZ386 is a power amplifier designed for use in low voltage consumer applications. The gain is internally set to 20dB to keep external part count low, but the addition of an external resistor and capacitor between pins 1 and 8 will increase the gain to any value from 20 to 200dB.

The inputs are ground referenced while the output automatically biases to one-half the supply voltage. The quiescent power drain is only 24mW when operating from a 6V supply, making the AZ386 ideal for battery operation.

**Features**

- Wide supply voltage range: 5V to 18V
- Low quiescent current drain: 4.5mA
- Voltage gains from 20 to 200dB
- Battery operation
- Minimum external parts
- Low power dissipation
- Low distortion

**Applications**

- AM - FM radio amplifier
- Cordless phone
- TV sound systems
- Portable tape player amplifier
- Intercoms
- Line drivers
- Ultrasonic drivers
- Small servo drivers
- Power converters

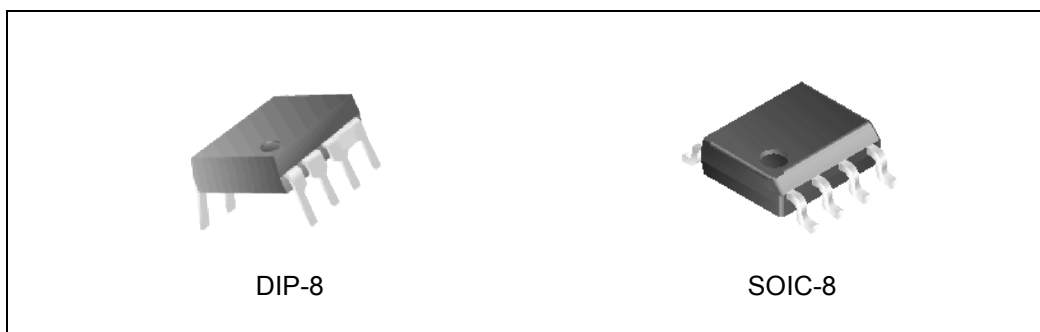


Figure 1. Package Types of AZ386



**LOW VOLTAGE AUDIO POWER AMPLIFIER**

**AZ386**

**Pin Configuration**

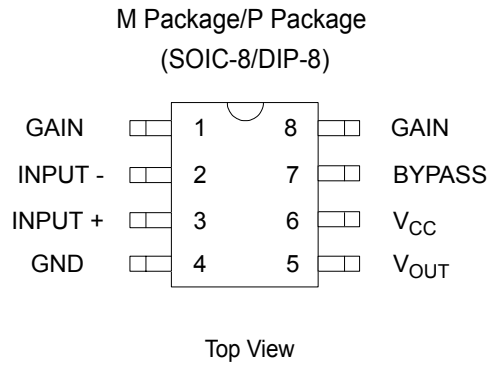


Figure 2. Pin Configuration of AZ386

**Functional Block Diagram**

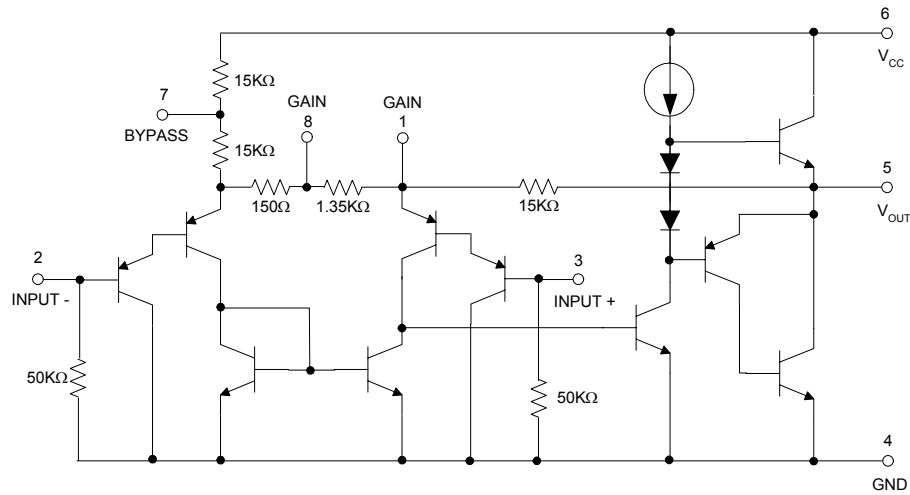


Figure 3. Functional Block Diagram of AZ386

**LOW VOLTAGE AUDIO POWER AMPLIFIER****AZ386****Ordering Information**

Package	Temperature Range	Part Number	Marking ID	Packing Type
SOIC-8	-40°C~85°C	AZ386M	386M	Tube/Tape/Reel
DIP-8		AZ386P	AZ386P	Tube

**Absolute Maximum Ratings (Note 1)**

Parameter	Symbol	Value		Unit
Power Supply Voltage	$V_{CC}$	20		V
Package Dissipation (Note 2)	$P_D$	AZ386P	1.25	W
		AZ386M	0.73	W
Input Voltage	$V_{IN}$	-0.4		V
Operating Temperature Range	$T_{OP}$	-40 to 85		°C
Junction Temperature	$T_J$	150		°C
Storage Temperature Range	$T_{STG}$	-65 to 150		°C
Soldering Information		DIP-8 Soldering (10 sec.)	260	°C
		SOIC-8 (15 sec.)	215	
Thermal Resistance	$\theta_{JA}$	DIP	107	°C/W
		SOIC	172	

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Note 2: For operation in ambient temperatures ( $T_A$ ) above 25°C, the device must be derated based on a 150°C maximum junction temperature and 1) a thermal resistance of 107°C/W junction to ambient for the dual-in-line package and 2) a thermal resistance of 170°C/W for the small outline package.

**LOW VOLTAGE AUDIO POWER AMPLIFIER****AZ386****Electrical Characteristics (Note 3)**Operating Conditions:  $T_A=25^{\circ}\text{C}$  unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	$V_{CC}$		5		18	V
Quiescent Current	$I_Q$	$V_{CC} = 6\text{V}, V_{IN} = 0$		4.5	8	mA
Output Power	$P_{OUT}$	$V_{CC} = 6\text{V}, R_L = 8\Omega, \text{THD} = 10\%$	250	325		mW
		$V_{CC} = 9\text{V}, R_L = 8\Omega, \text{THD} = 10\%$	500	700		mW
		$V_{CC} = 16\text{V}, R_L = 32\Omega, \text{THD} = 10\%$	700	1000		mW
Voltage Gain	$G_V$	$V_{CC} = 6\text{V}, f = 1\text{KHz}$ $10\mu\text{F}$ from Pin 1 to 8		26		dB
					46	
Bandwidth	BW	$V_{CC} = 6\text{V}, \text{Pins 1 and 8 open}$		300		KHz
Total Harmonic Distortion	THD	$V_{CC} = 6\text{V}, R_L = 8\Omega, P_{OUT} = 125\text{mW}$ $f=1\text{KHz}, \text{Pins 1 and 8 open}$		0.2		%
Power Supply Rejection Ratio	PSRR	$V_{CC} = 6\text{V}, f=1\text{KHz}, C_{BYPASS} = 10\mu\text{F},$ Pins 1 and 8 open, Referred to Output		50		dB
Input Resistance	$R_{IN}$			50		$\text{K}\Omega$
Input Bias Current	$I_{BIAS}$	$V_{CC} = 6\text{V}, \text{Pin 2 and 3 open}$		250		nA

Note 3: All voltages are measured with respect to the ground pin, unless otherwise specified.



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**AZ386**

**Typical Performance Characteristics**

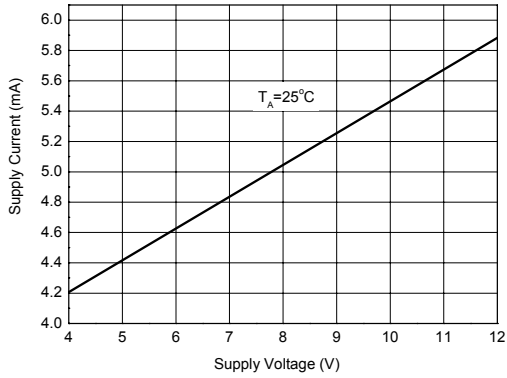


Figure 4. Quiescent Supply Current vs. Supply voltage

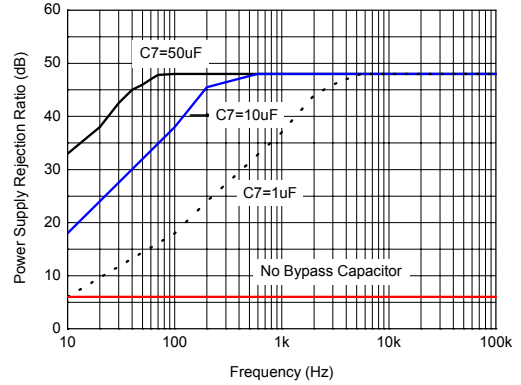


Figure 5. Power Supply Rejection Ratio (Referred to the Output) vs. Frequency

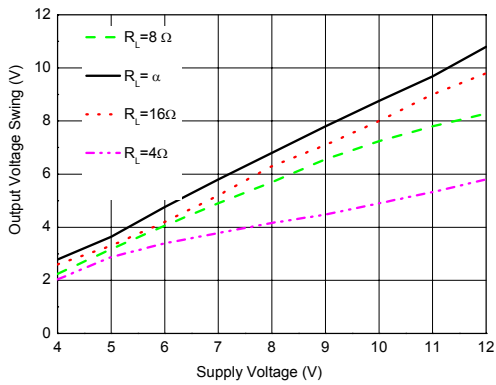


Figure 6. Peak-to-Peak Output Voltage Swing vs. Supply Voltage

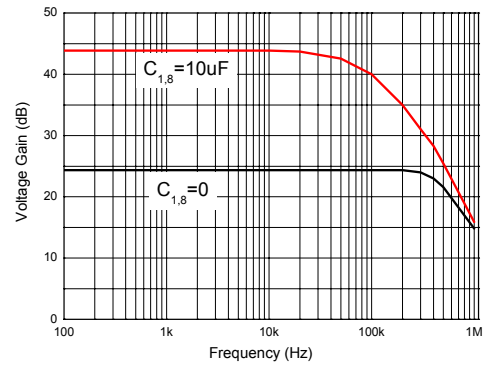


Figure 7. Voltage Gain vs. Frequency

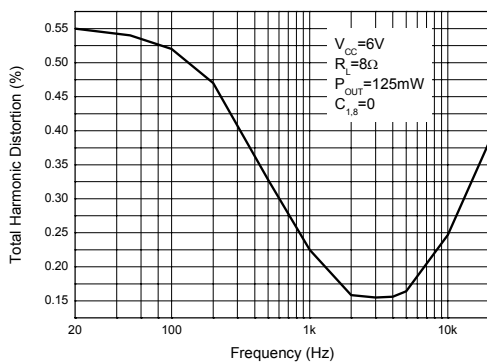


Figure 8. Distortion vs. Frequency

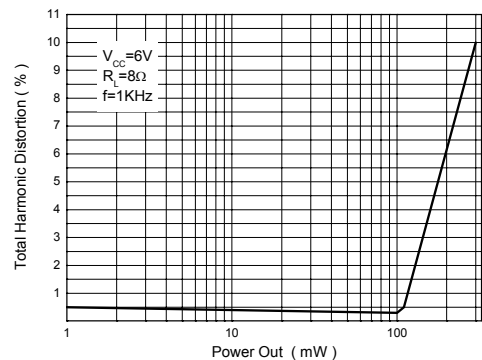


Figure 9. Distortion vs. Output Power



**LOW VOLTAGE AUDIO POWER AMPLIFIER**

**AZ386**

**Typical Performance Characteristics (Continued)**

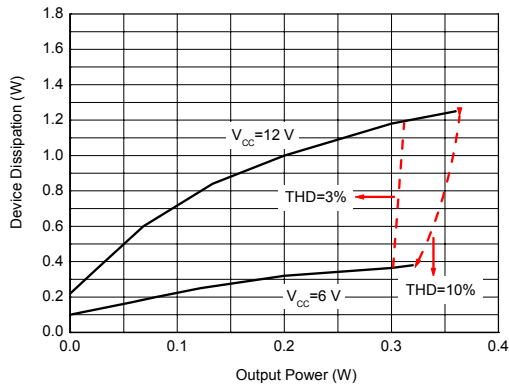


Figure 10. Device Dissipation vs. Output Power (4Ω Load)

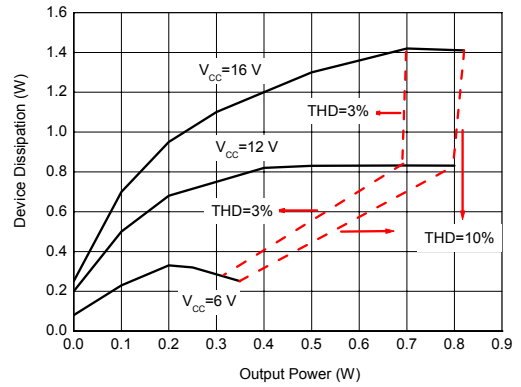


Figure 11. Device Dissipation vs. Output Power (8Ω Load)

**Typical Applications**

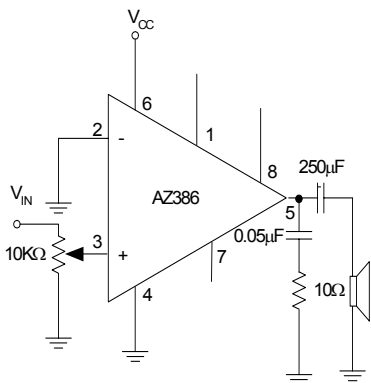


Figure 13. Amplifier With Gain = 20dB

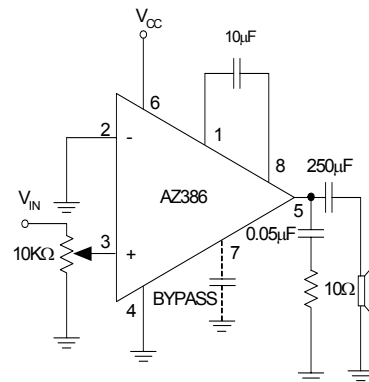


Figure 14. Amplifier With Gain = 200dB



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Typical Applications (Continued)

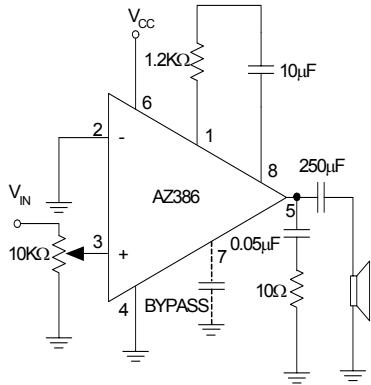


Figure 15. Amplifier With Gain = 50dB

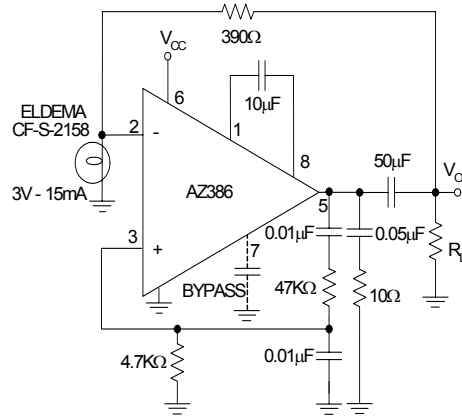


Figure 16. Low Distortion Power Wienbridge Oscillator

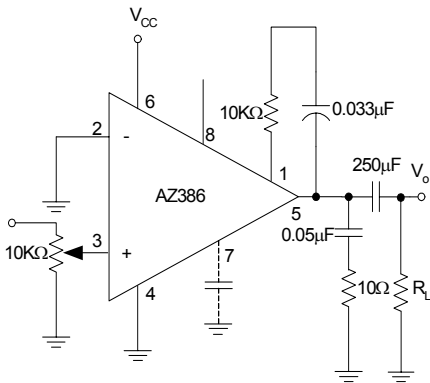


Figure 17. Amplifier With Bass Boost

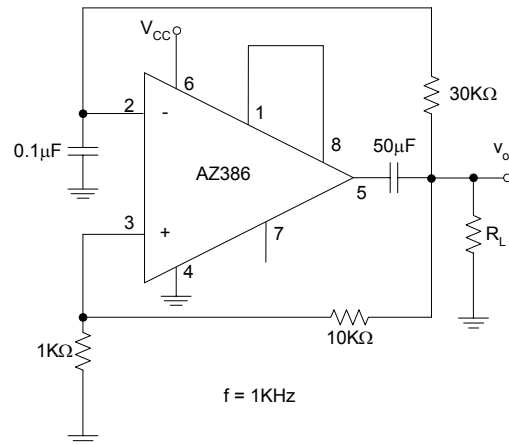


Figure 18. Square Wave Oscillator



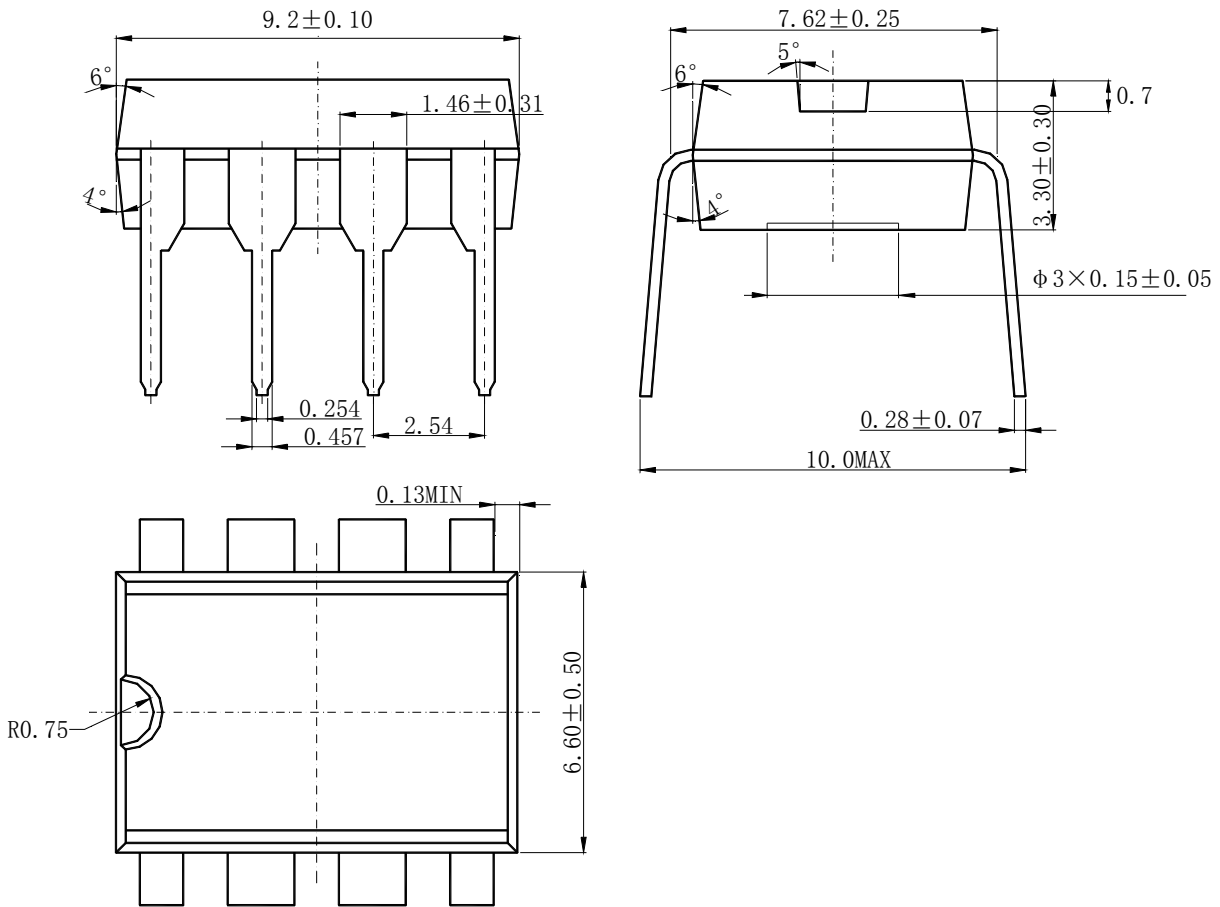
**LOW VOLTAGE AUDIO POWER AMPLIFIER**

**AZ386**

**Mechanical Dimensions**

**DIP-8**

Unit: mm







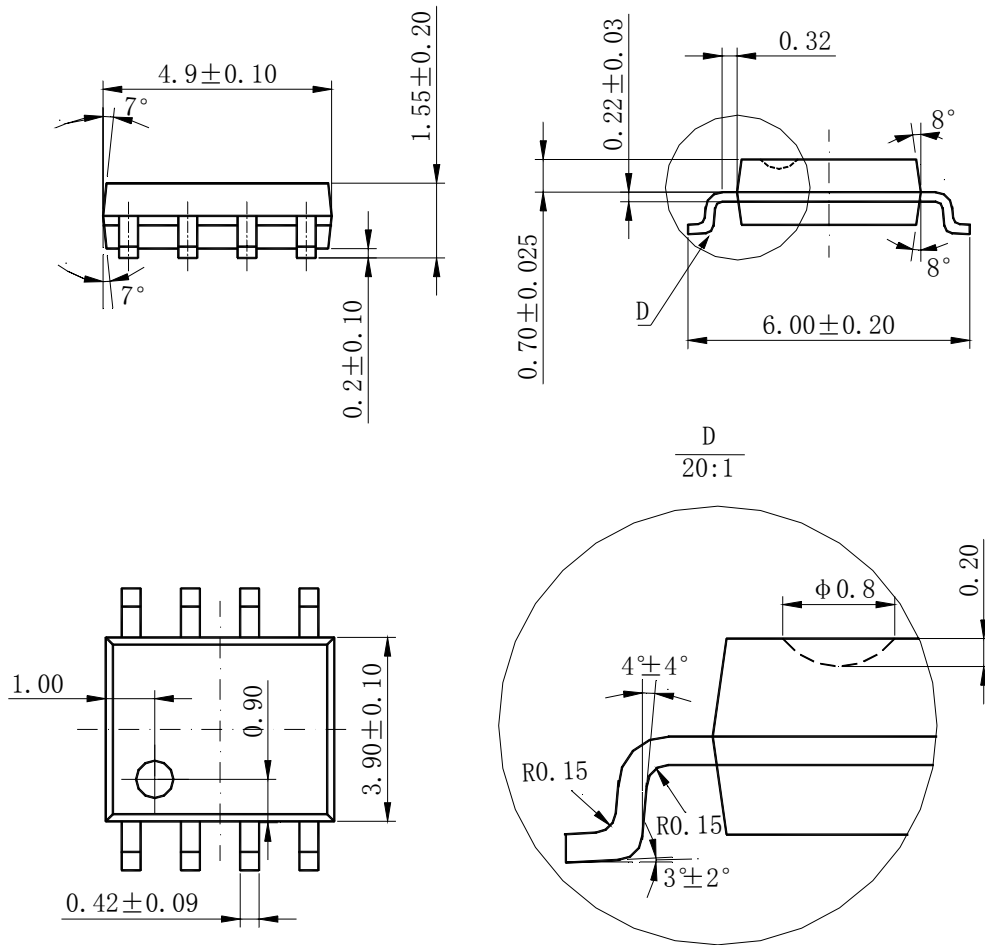
**LOW VOLTAGE AUDIO POWER AMPLIFIER**

**AZ386**

**Mechanical Dimensions (Continued)**

**SOIC-8**

Unit: mm





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