

# Audio Power Amplifier Monolithic IC MM3111

April 16, 2004

## Outline

This IC is an audio power amp that can operate at low voltage. Operating supply voltage supports 3V and 5V power amp, making it ideal for applications such as mobile phones and other portable communication devices. It is equipped with the capability to provide continuous supply of 1W (Ave) output against 8Ω load from a 5V single power supply with 2% high harmonic distortion (THD+N). MM3111 does not require an output coupling capacitor, so that applications can be configured with the minimum number of external parts. It also includes a shutdown function and can operate with low power consumption when a mute signal is inputted into the SHUTDOWN pin. It also includes a thermal runaway protection function (thermal shutdown) to allow a gain to be set with an external resistor.

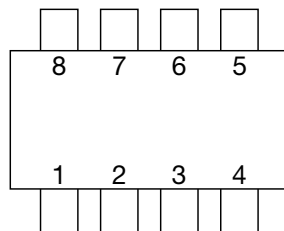
## Features

- |  |   |
|--|---|
| 1. Operating supply voltage                  | 1.8~5.5V (supports 3V and 5V)                                 |
| 2. Operating ambient temperature             | -40~85°C  |
| 3. Current consumption (no-load)             | 3.5mA ( $V_{DD}=3V$ ) typ.                                    |
| 4. Current consumption during Power Save     | 2.0μA max.  |
| 5. Maximum output power                      | 1.0W ( $V_{DD}=5V$ , THD=2%)<br>0.31W ( $V_{DD}=3V$ , THD=1%) |
| 6. PSRR                                      | 66dB (f=1kHz, $V_{DD}=5V$ )                                   |
| 7. No output coupling capacitor required     |   |
| 8. SHUTDOWN pin for both Power Save and mute |   |
| 9. Thermal shutdown function                 |   |
| 10. Mounted in a small package               | VSOP-8B (0.65 mm pitch)                                       |

## Package

VSOP-8B

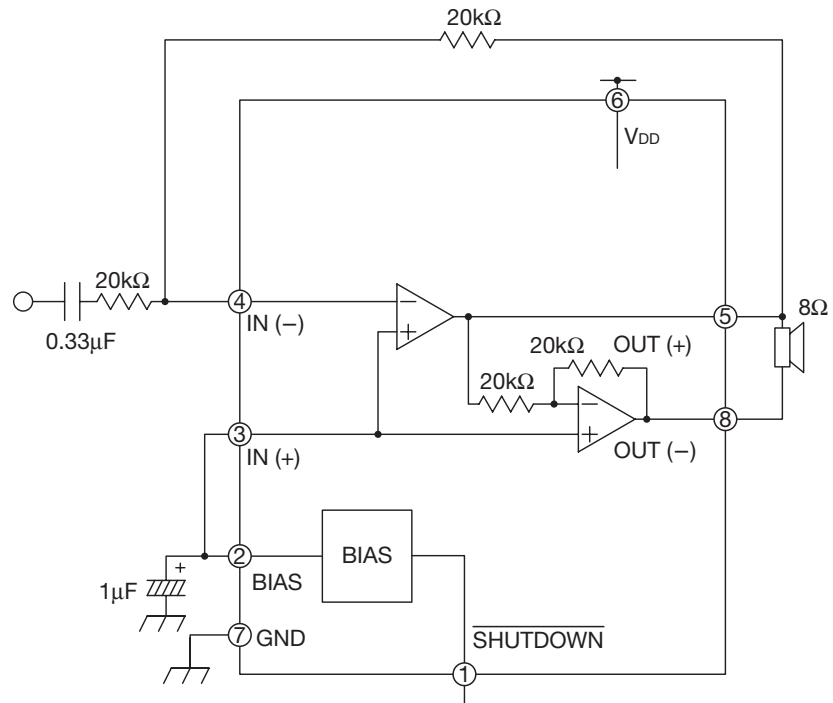
## Pin Assignment



VSOP-8B  
(TOP VIEW)

1	SHUTDOWN
2	BIAS
3	IN (+)
4	IN (-)
5	OUT (+)
6	$V_{DD}$
7	GND
8	OUT (-)

Block Diagram



**Absolute Maximum Ratings** (Ta=25°C)

Item	Symbol	Ratings	Units
Storage temperature	T <sub>STG</sub>	-65~+150	°C
Input voltage	V <sub>IN max.</sub>	-0.3~V <sub>DD</sub> +0.3	V
Supply voltage	V <sub>DD</sub>	6	V
Allowable loss	P <sub>d</sub>	0.34 (alone)	W

**Recommended Operating Conditions**

Item	Symbol	Ratings	Units
Supply voltage	V <sub>DD</sub>	2.0~5.5 1.8=Movement guarantee	V
Operating temperature	T <sub>OPR</sub>	-40~+85	°C

**Electrical Characteristics** (Except where noted otherwise, R<sub>L</sub>=8Ω, f=1kHz)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
<b>When V<sub>DD</sub>=5V</b>						
Current consumption 1	I <sub>DD1</sub>	V <sub>IN</sub> =0V, No load		4	8	mA
Current consumption 2	I <sub>DD2</sub>	V <sub>IN</sub> =0V, R <sub>L</sub> =8Ω		5	10	mA
When power save	IPS	SHUTDOWN=0V			2	μA
Maximum output electric power	P <sub>O</sub>	THD+N=2%	0.8	1.0		W
Ripple rejection	PSRR	R <sub>S</sub> =0Ω, V <sub>RIPPLE</sub> =200mV <sub>P-P</sub> , C <sub>BIAS</sub> =1μF		66		dB
Output offset voltage	V <sub>OFF</sub>		-50	0	50	mV
THD+N	THD	HPF=400Hz, LPF=30kHz, P <sub>O</sub> =0.4W		0.1		%
<b>When V<sub>DD</sub>=3V</b>						
Current consumption 1	I <sub>DD1</sub>	V <sub>IN</sub> =0V, No load		3.5	7	mA
Current consumption 2	I <sub>DD2</sub>	V <sub>IN</sub> =0V, R <sub>L</sub> =8Ω		4.5	9	mA
When power save	IPS	SHUTDOWN=0V			2	μA
Maximum output electric power	P <sub>O</sub>	THD+N=1%	0.28	0.31		W
Ripple rejection	PSRR	R <sub>S</sub> =0Ω, V <sub>RIPPLE</sub> =200mV <sub>P-P</sub> , C <sub>BIAS</sub> =1μF		62		dB
Output offset voltage	V <sub>OFF</sub>		-50	0	50	mV
THD+N	THD	HPF=400Hz, LPF=30kHz, P <sub>O</sub> =0.15W		0.1		%
<b>When V<sub>DD</sub>=2.6V</b>						
Current consumption 1	I <sub>DD1</sub>	V <sub>IN</sub> =0V, No load		2.6		mA
When power save	IPS	SHUTDOWN=0V			2	μA
Maximum output electric power	P <sub>O</sub>	THD+N=1%		0.2		W
THD+N	THD	HPF=400Hz, LPF=30kHz, P <sub>O</sub> =0.1W		0.08		%
Ripple rejection	PSRR	R <sub>S</sub> =0Ω, V <sub>RIPPLE</sub> =200mV <sub>P-P</sub> , C <sub>BIAS</sub> =1μF		44		dB