SGM4896
1.15W Fully Differential Audio Power Amplifier

GENERAL DESCRIPTION

The SGM4896 is a fully differential audio power amplifier that is designed for portable communication device applications and demanding applications in mobile phones. It is capable of delivering 1.15W of continuous average power to an 8Ω BTL load with less than 1% distortion (THD+N) from a 5V battery voltage. It operates from 2.5V to 5.5V power supply.

The SGM4896 features a low-power consumption shutdown mode. To facilitate this, Shutdown may be enabled by logic low. Additionally, the SGM4896 features an internal thermal shutdown protection mechanism.

The SGM4896 contains advanced pop & click circuitry, a minimal count of external components and low-power shutdown mode. All these features make SGM4896 ideal for wireless handsets and other low voltage applications where minimal power consumption is a primary requirement.

The SGM4896 is available in Pb-free CSP-8 package. It operates over an ambient temperature range of -40℃ to +85℃.

FEATURES

- **Fully Differential Amplifier**
- **Excellent PSRR: Direct Connection to the Battery**
- **1.15W to 8Ω BTL Load from 5V Supply at THD+N < 1% (TYP)**
- **2.5V to 5.5V Operation**
- **Low Shutdown Current**
- **Shutdown Pin is Compatible with 1.8V Logic**
- **Improved Pop & Click Circuitry**
- **Thermal Overload Protection Circuitry**
- **No Output Coupling Capacitors, Bootstrap Capacitors Required**
- **External Gain Configuration Capability**
- **-40℃ to +85℃ Operating Temperature Range**
- **Pb-Free CSP-8 Package**

APPLICATIONS

Portable Systems
Wireless Handsets
Mobile Phone
Handheld Computers
PDAs
GPS

PACKAGE/ORDERING INFORMATION

MODEL	ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION	MARKING INFORMATION
SGM4896	SGM4896YG/TR	CSP-8	Tape and Reel, 3000	4896YG

ABSOLUTE MAXIMUM RATINGS

Supply Voltage 6V
Input Voltage . . . . . –0.3V to (V_+) + 0.3V
Storage Temperature Range . . . . . –65℃ to +150℃
Junction Temperature . . . . . 150℃
Operating Temperature Range . . . . . –40℃ to +85℃
Lead Temperature Range (Soldering 10 sec)
. . . . . 260℃

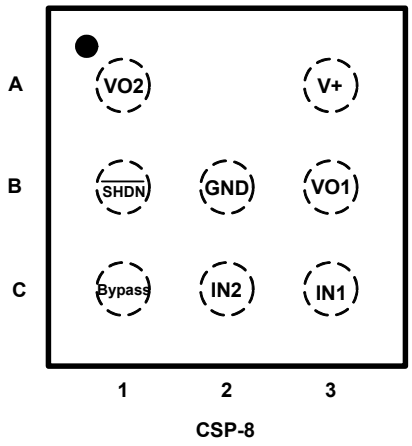
NOTES
1. Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.
ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

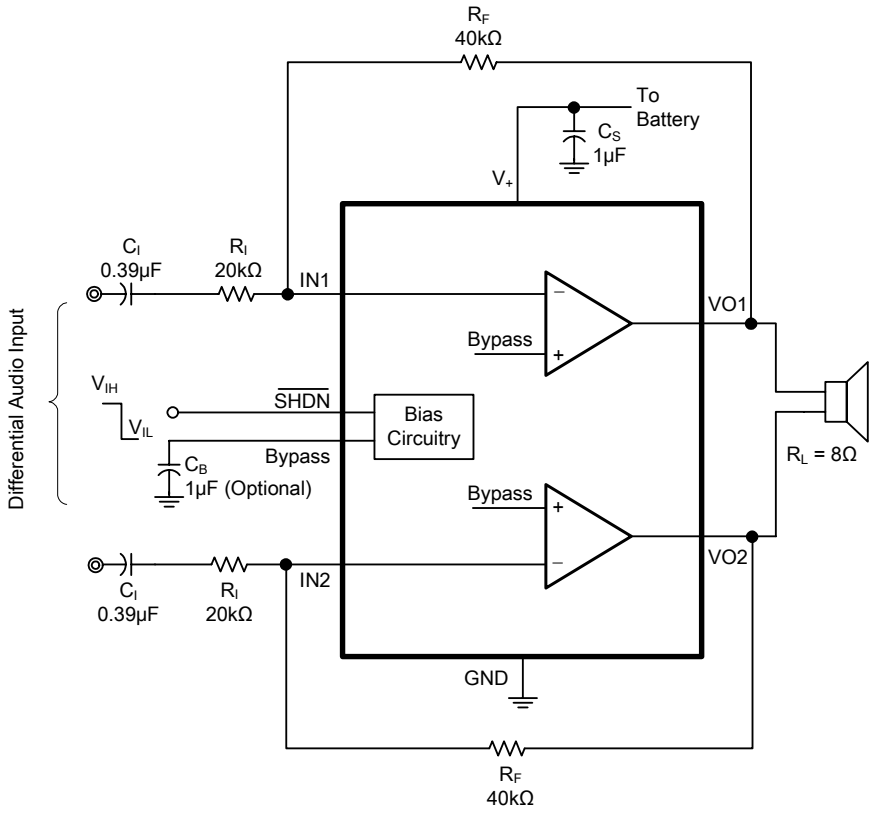
PIN CONFIGURATION (Top View)

SGM4896YG



CSP-8

TYPICAL APPLICATION



ELECTRICAL CHARACTERISTICS

Gain = 1 V/V, T_A = 25℃, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Supply Voltage	V_+			2.5		5.5	V
Shutdown Current	I_{SD}	V_{SHDN} = 0V, I_{OUT} = 0mA	V_+ = 5.0V		0.01	1	μA
			V_+ = 3.6V		0.01	1	
			V_+ = 2.5V		0.01	1	
Output Offset Voltage	V_{OS}	V_{SHDN} = 0V, I_{OUT} = 0mA	V_+ = 5.0V	-15	0.86	15	mV
			V_+ = 3.6V		0.75		
			V_+ = 2.5V	-15	0.70	15	
Quiescent Power Supply Current	I_Q	V_{SHDN} = V_+	V_+ = 5.0V, No Load		4.88	6	mA
			V_+ = 5.0V, 8Ω Load		4.92	6.2	
			V_+ = 3.6V, No Load		4.58		
			V_+ = 3.6V, 8Ω Load		4.62		
			V_+ = 2.5V, No Load		4.36	5.5	
			V_+ = 2.5V, 8Ω Load		4.38	5.6	
Shutdown Voltage Input High	V_{SDIH}			1.2			V
Shutdown Voltage Input Low	V_{SDIL}					0.4	
Low-Level Output Voltage	V_{OL}	V_{IN1} = V_+, R_L = 8Ω, V_{IN2} = GND, or V_{IN2} = V_+, V_{IN1} = GND	V_+ = 5.0V		0.46	0.9	V
			V_+ = 3.6V		0.40		
			V_+ = 2.5V		0.24	0.7	
High-Level Output Voltage	V_{OH}		V_+ = 5.0V	4.1	4.56		V
			V_+ = 3.6V		3.22		
			V_+ = 2.5V	1.8	2.25		
Common Mode Rejection Ratio	CMRR	V_{IC} = 0.5V to V_+ - 0.8V	V_+ = 5.0V		-77		dB
			V_+ = 3.6V		-71		
			V_+ = 2.5V		-65		

Specifications subject to changes without notice.

ELECTRICAL CHARACTERISTICS

Gain = 1 V/V, T_A = 25℃, unless otherwise noted.

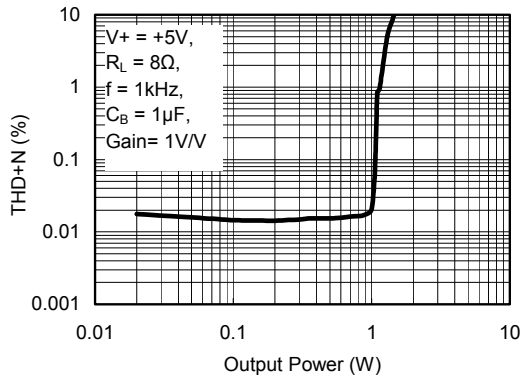
PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Output Power	P_O	f = 1kHz, R_L = 8Ω, THD+N < 1%	V_+ = 5.0V		1.15		W
			V_+ = 3.6V		0.6		
			V_+ = 3.0V		0.4		
			V_+ = 2.5V		0.28		
Total Harmonic Distortion + Noise	THD+N	P_O = 0.6Wrms, f = 1kHz, V_+ = 5.0V			0.02		%
Power Supply Rejection Ratio	PSRR	V_{RIPPLE} = 200mV_{PP}, C_I = 0.39μF, C_B = 1μF, f = 217Hz, R_L = 8Ω, 10Ω Terminated Input	V_+ = 5.0V		-73		dB
			V_+ = 3.6V		-71		
			V_+ = 3.0V		-73		
			V_+ = 2.5V		-72		
		V_{RIPPLE} = 200mV_{PP}, C_I = 0.39μF, C_B = 1μF, f = 1kHz, R_L = 8Ω, 10Ω Terminated Input	V_+ = 5.0V		-73		
			V_+ = 3.6V		-72		
			V_+ = 3.0V		-74		
			V_+ = 2.5V		-73		
Common Mode Rejection Ratio (1)	CMRR	V_+ = 5V, f = 217Hz, V_{CM} = 200mV_{PP}, R_L = 8Ω			-70		dB
Wake–up Time	T_{WU}	C_B = 1μF	V_+ = 5.0V		172		ms
			V_+ = 3.6V		134		
			V_+ = 3.0V		115		
			V_+ = 2.5V		102		
Shutdown Time	T_{SDT}		V_+ = 5.0V		92		μs
			V_+ = 3.6V		52		
			V_+ = 3.0V		44		
			V_+ = 2.5V		56		

Note1: CMRR is affected by the matching between external gain-setting resistor ratios.

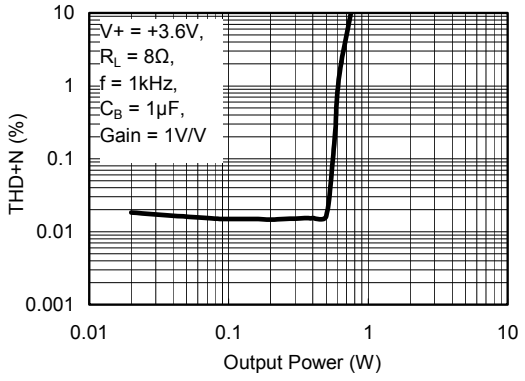
Specifications subject to changes without notice.

TYPICAL PERFORMANCE CHARACTERISTICS

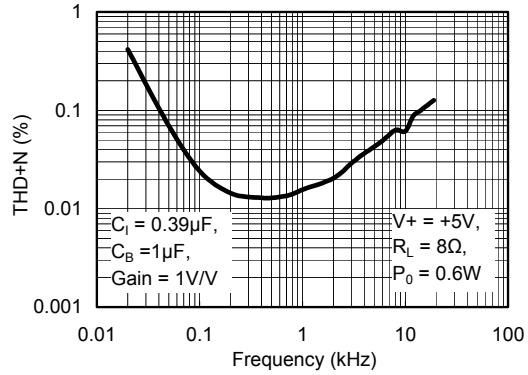
THD+N vs. Output Power



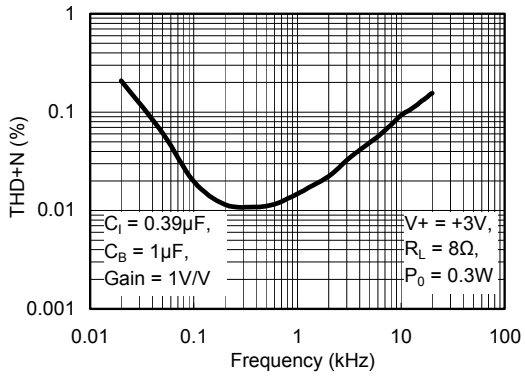
THD+N vs. Output Power



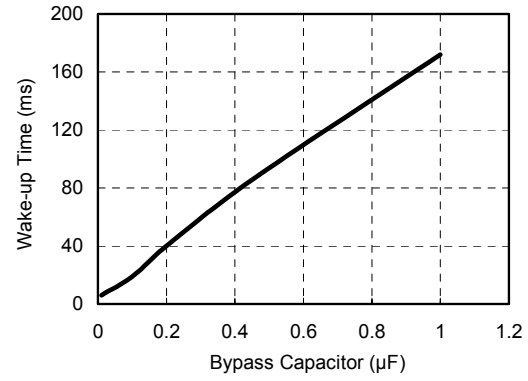
THD+N vs. Frequency



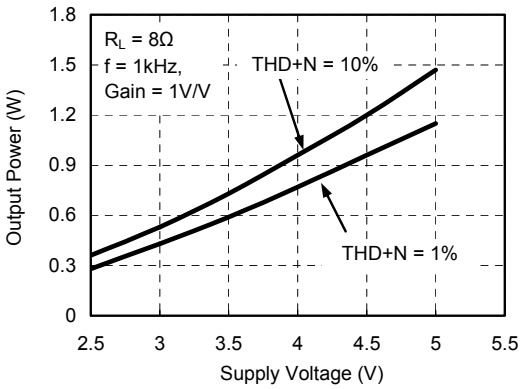
THD+N vs. Frequency



Wake-up Time vs. Bypass Capacitor

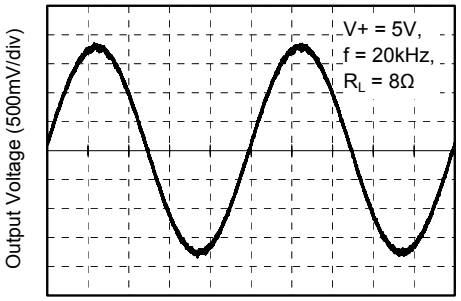


Output Power vs. Supply Voltage

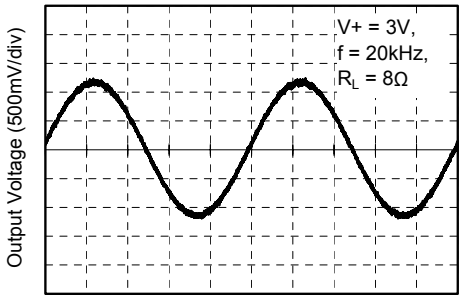


TYPICAL PERFORMANCE CHARACTERISTICS

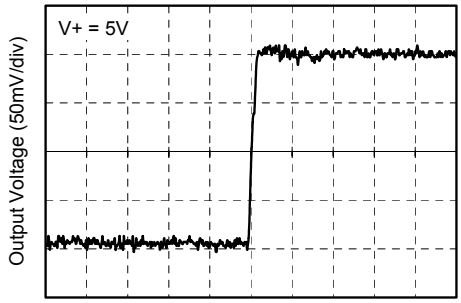
V_{OUT+} or V_{OUT-} Large Sine Signal Response



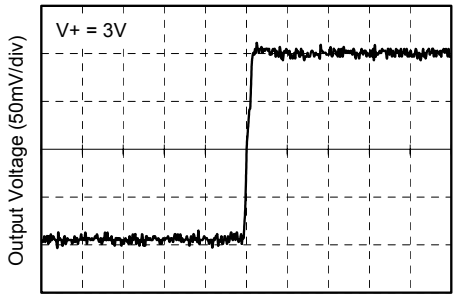
V_{OUT+} or V_{OUT-} Large Sine Signal Response



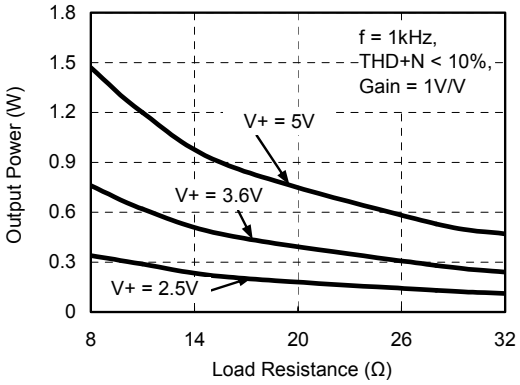
Small Signal Step Response



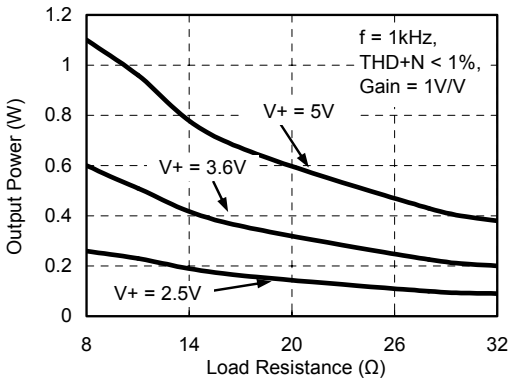
Small Signal Step Response



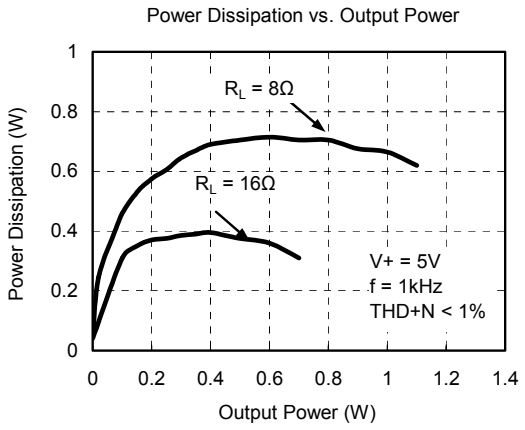
Output Power vs. Load Resistance

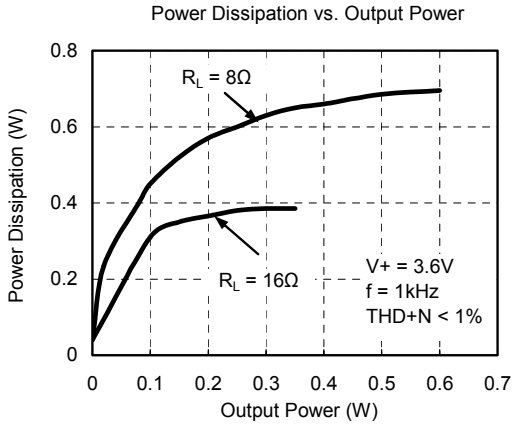


Output Power vs. Load Resistance



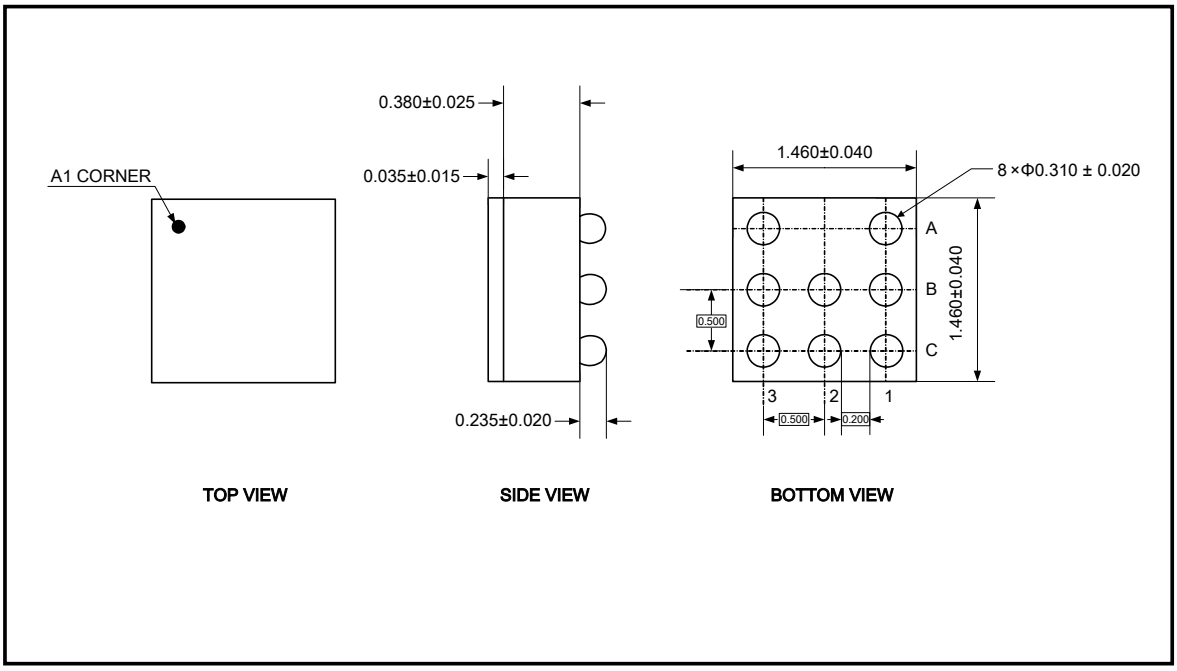
TYPICAL PERFORMANCE CHARACTERISTICS





PACKAGE OUTLINE DIMENSIONS

CSP-8



Note: All linear dimensions are in millimeters.