SGM4996
1.3 Watt Fully Differential Audio Power Amplifier with Selectable Shutdown

GENERAL DESCRIPTION

The SGM4996 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 1.3W of continuous average power to an 8Ω load with 1% distortion (THD+N) from a 5V battery voltage. It operates from 2.5V to 5.5V power supply.

The SGM4996 features a low-power consumption shutdown mode. To be flexible, shutdown may be enabled by either a logic high or low depending on the voltage applied on the SD MODE pin. Additionally, the SGM4996 features an internal thermal shutdown protection mechanism.

The SGM4996 contains advanced pop & click circuitry, a minimal count of external components and low-power shutdown mode. All these features make SGM4996 ideal for wireless handsets and other low voltage applications where minimal power consumption is a primary requirement.

The SGM4996 is available in Green MSOP10, DFN3×3-10L and MSOP8 packages. It operates over an ambient temperature range of -40℃ to +85℃.

FEATURES

- **Fully Differential Amplifier**
- **Excellent PSRR: Direct Connection to the Battery**
- **1.3W to 8Ω Load from 5V Supply at THD+N = 1% (TYP)**
- **2.5V to 5.5V Operation**
- **Low Shutdown Current**
- **Improved Pop & Click Circuitry**
- **Support Single- Ended or Differential input**
- **Thermal Overload Protection Circuitry**
- **No Output Coupling Capacitors, Bootstrap Capacitors Required**
- **External Gain Configuration Capability**
- **-40℃ to +85℃ Operating Temperature Range**
- **Green MSOP10, DFN3×3-10L and MSOP8 Packages**

APPLICATIONS

Portable Systems
Wireless Handsets
Mobile Phone
Handheld Computers
PDAs
GPS

PACKAGE/ORDERING INFORMATION

MODEL	ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION	MARKING INFORMATION
SGM4996	SGM4996YMS10G/TR	MSOP10	Tape and Reel, 3000	SGM4996YMS10
	SGM4996YD10G/TR	DFN3×3-10L	Tape and Reel, 3000	SGM4996D
	SGM4996YMS8G/TR	MSOP8	Tape and Reel, 3000	SGM4996YMS8

ABSOLUTE MAXIMUM RATINGS

Supply Voltage……6V
Input Voltage ..…… –0.3V to (V_{CC}) + 0.3V
Storage Temperature Range ……..…… –65℃ to +150℃
Junction Temperature……..150℃
Operating Temperature Range……..–40℃ to +85℃
Lead Temperature Range (Soldering 10 sec)
……260℃
ESD Susceptibility
HBM……..……4000V
MM……400V

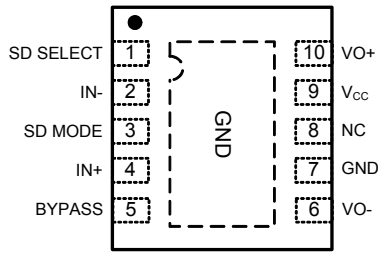
Note: Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure 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.

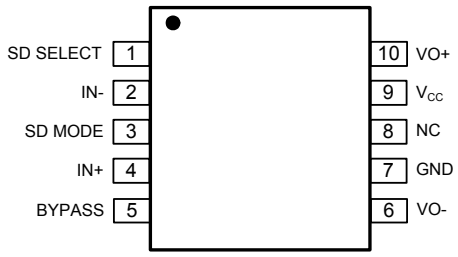
PIN CONFIGURATIONS (Top View)

SGM4996YD10G



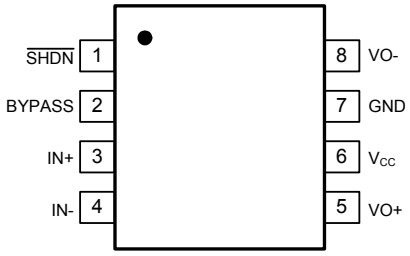
DFN3×3-10L

SGM4996YMS10G



MSOP10

SGM4996YMS8G



MSOP8

APPLICATION CIRCUIT

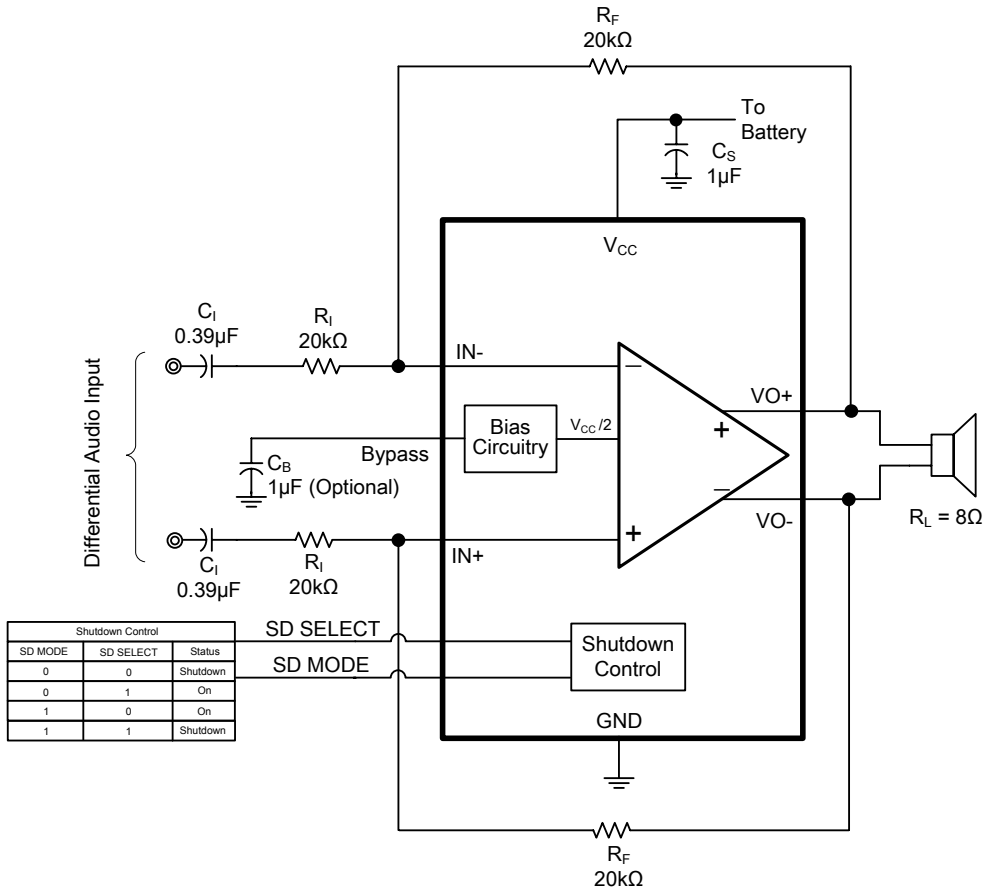


Figure1. Typical Differential Input Application Schematic

APPLICATION CIRCUIT(Cont.)

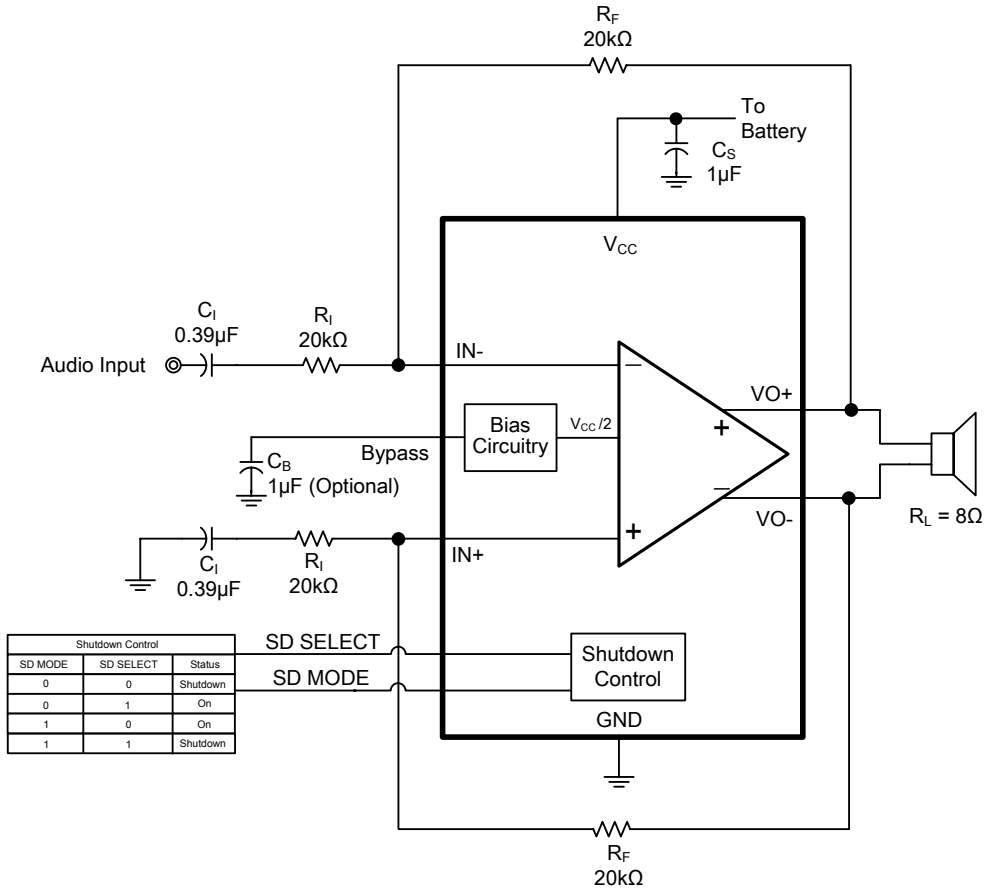


Figure2. Single- Ended Input Application Schematic

APPLICATION CIRCUIT(Cont.)

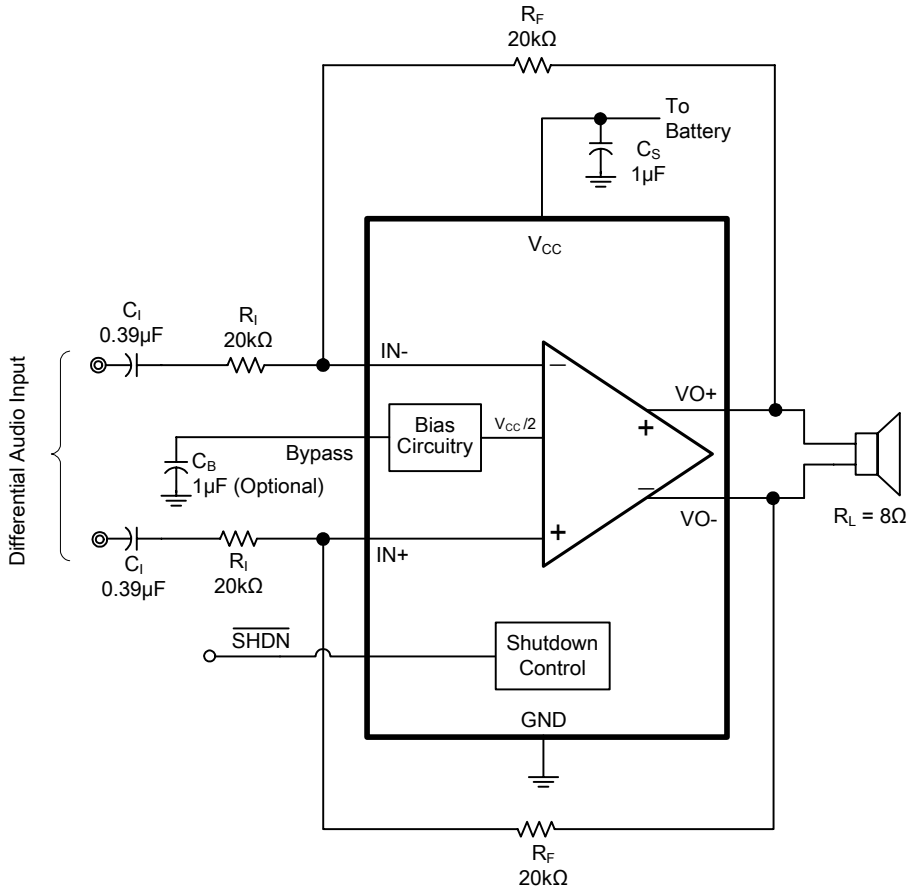


Figure3. Typical Differential Input Application Schematic for SGM4996YMS8G

APPLICATION CIRCUIT(Cont.)

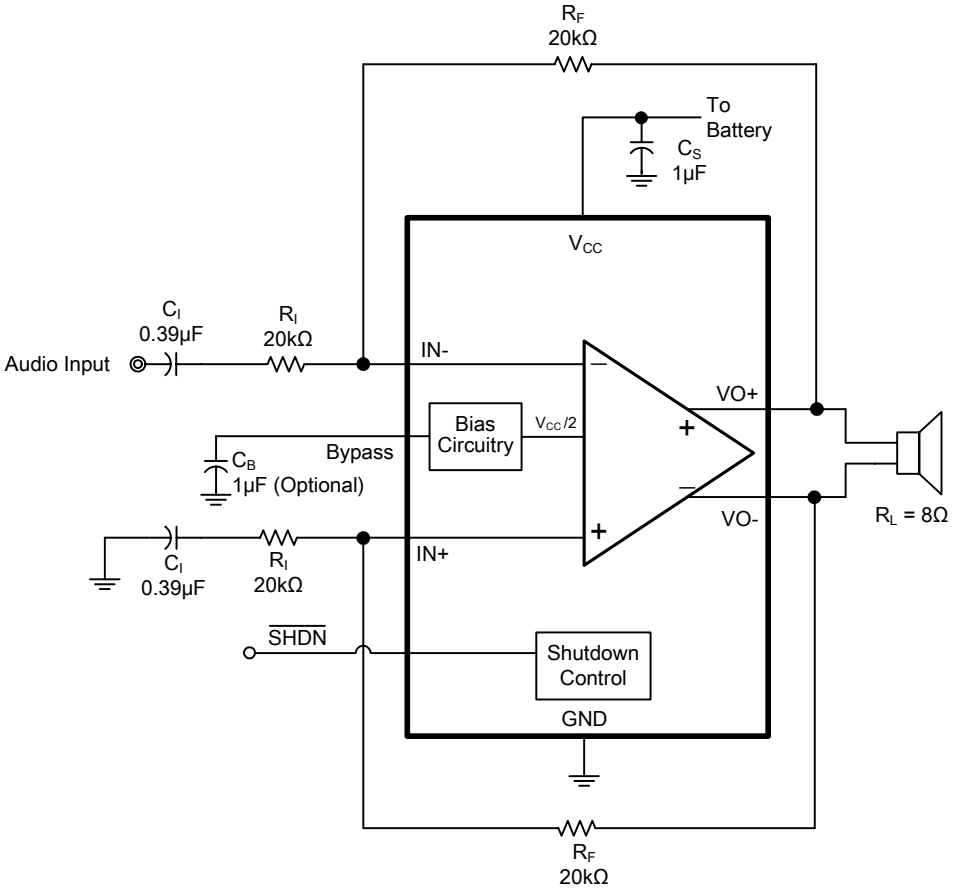


Figure4. Single- Ended Input Application Schematic for SGM4996YMS8G

ELECTRICAL CHARACTERISTICS

(The following AC specifications apply for 8Ω load, A_V = 1V/V, T_A = 25℃, unless otherwise specified.)

PARAMETER	SYMBOL	CONDITIONS		SGM4996 MIN	SGM4996 TYP	SGM4996 MAX	UNITS
Supply Voltage	V_{CC}			2.5		5.5	V
Shutdown Current	I_{SD}	SDM = SDS = GND or SDM = SDS = V_{CC}	V_{CC} = 5.0V		0.01	2	μA
			V_{CC} = 3.6V		0.01		
			V_{CC} = 2.6V		0.01		
Output Offset Voltage	V_{OS}	V_{IN} = 0V, I_O = 0A		-10	2	10	mV
Quiescent Power Supply Current	I_Q	V_{IN} = 0V	V_{CC} = 5.0V, No Load		4.70	7.5	mA
			V_{CC} = 5.0V, 8 Ω Load		4.73	8	
			V_{CC} = 3.6V, No Load		3.85	6	
			V_{CC} = 3.6V, 8 Ω Load		3.87		
			V_{CC} = 2.6V, No Load		3.20		
			V_{CC} = 2.6V, 8 Ω Load		3.21		
SD SELECT Threshold High	V_{SDSIH}			1.2			V
SD SELECT Threshold Low	V_{SDSIL}					0.4	
SD MODE Threshold High	V_{SDMIH}			1.2			
SD MODE Threshold Low	V_{SDMIL}					0.4	
Output Power (8Ω)	P_O	f = 1kHz, THD+N = 1%	V_{CC} = 5.0V		1.30		W
			V_{CC} = 3.6V		0.66		
			V_{CC} = 3.0V		0.46		
			V_{CC} = 2.6V		0.33		
		f = 1kHz, THD+N = 10%	V_{CC} = 5.0V		1.60		
			V_{CC} = 3.6V		0.82		
			V_{CC} = 3.0V		0.57		
			V_{CC} = 2.6V		0.41		
Total Harmonic Distortion + Noise	THD+N	P_O = 0.6Wrms, f = 1kHz, V_{CC} = 5.0V			0.013		%
Power Supply Rejection Ratio	PSRR	V_{ripple} = 200mV_{p-p} C_B = 1μF f = 217Hz (Note 1, 2)	V_{CC} = 5.0V		-85		dB
			V_{CC} = 3.6V		-81		
			V_{CC} = 3.0V		-64		
			V_{CC} = 2.6V		-54		
		V_{ripple} = 200mV_{p-p} C_B = 1μF f = 1kHz (Note 1, 2)	V_{CC} = 5.0V		-83		
			V_{CC} = 3.6V		-80		
			V_{CC} = 3.0V		-64		
			V_{CC} = 2.6V		-54		
Common Mode Rejection Ratio	CMRR	f = 217Hz, V_{CM} = 200mV_{PP}, V_{CC} = 5.0V (Note 2)			-81		dB
Wake–Up Time	T_{WU}	C_B = 1μF	V_{CC} = 5.0V		68		ms
			V_{CC} = 3.6V		53		
			V_{CC} = 3.0V		45		
			V_{CC} = 2.6V		40		

Specifications subject to changes without notice.

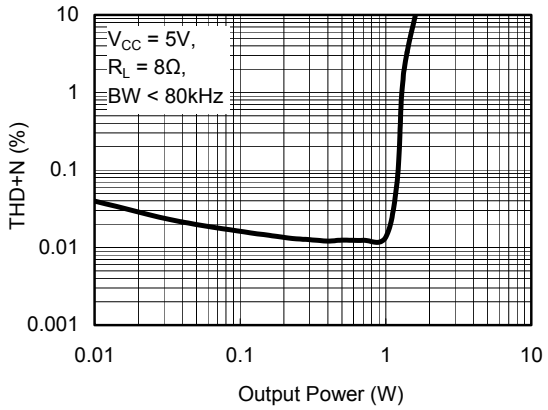
Note 1: 10Ω terminated input.

Note 2: PSRR and CMRR are affected by the matching between external gain-setting resistor ratios.

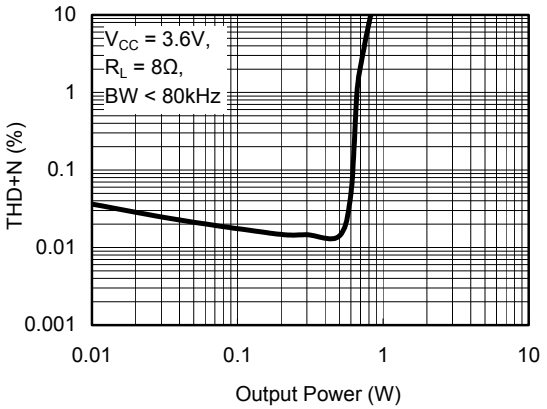
TYPICAL PERFORMANCE CHARACTERISTICS

At T_A= +25℃, A_V = 1, f = 1kHz, C_B = 1μF, unless otherwise noted.

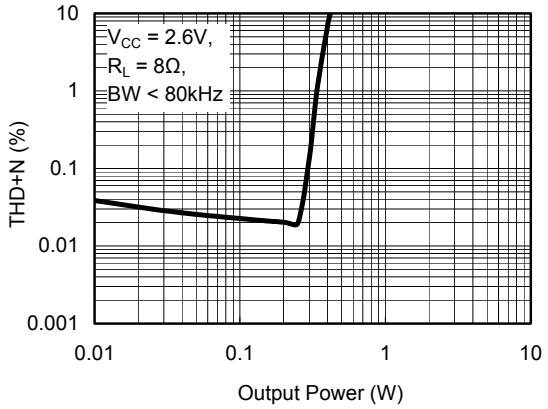
THD+N vs. Output Power



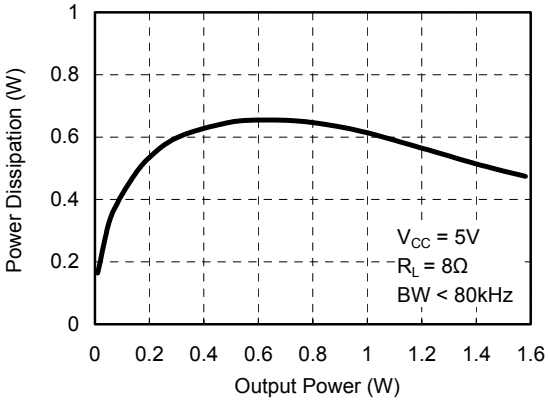
THD+N vs. Output Power



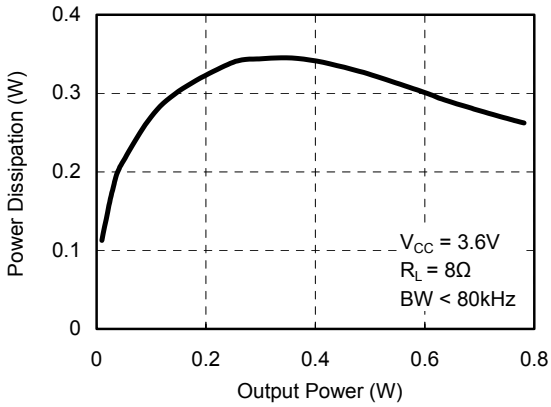
THD+N vs. Output Power



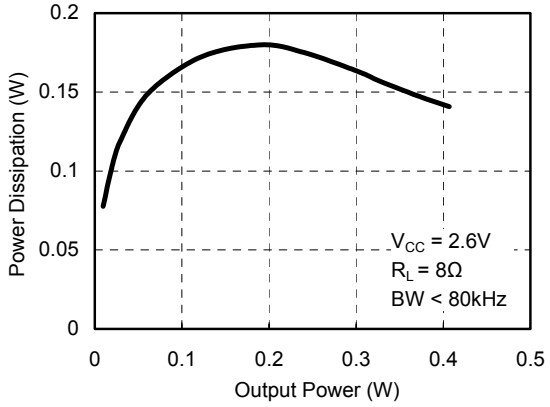
Power Dissipation vs. Output Power



Power Dissipation vs. Output Power



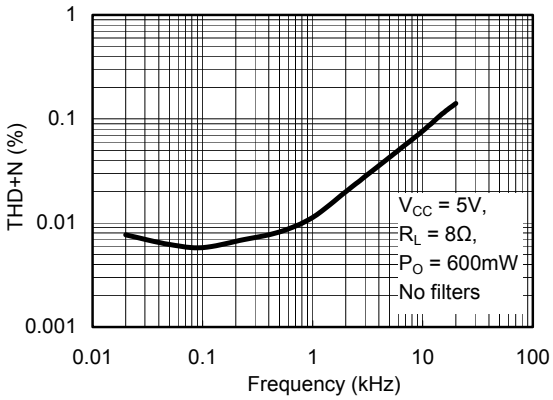
Power Dissipation vs. Output Power



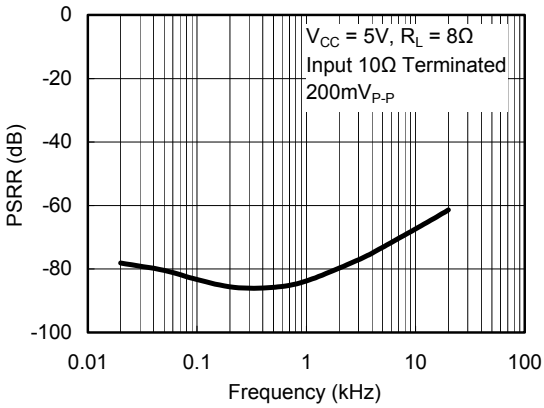
TYPICAL PERFORMANCE CHARACTERISTICS

At T_A= +25℃, A_V = 1, f = 1kHz, C_B = 1μF, unless otherwise noted.

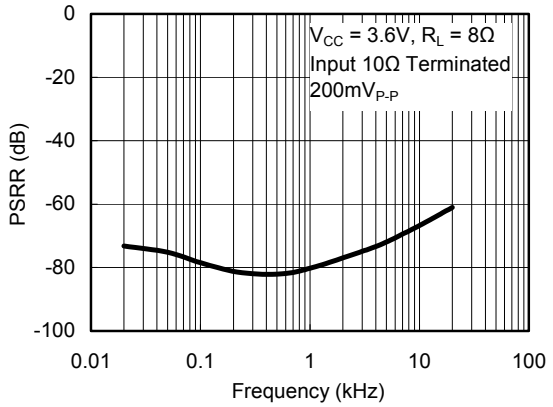
THD+N vs. Frequency



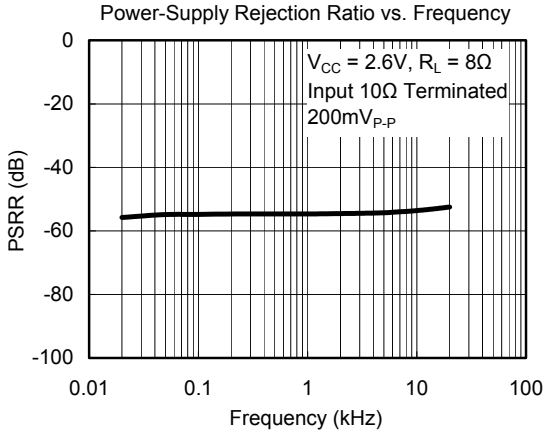
Power-Supply Rejection Ratio vs. Frequency



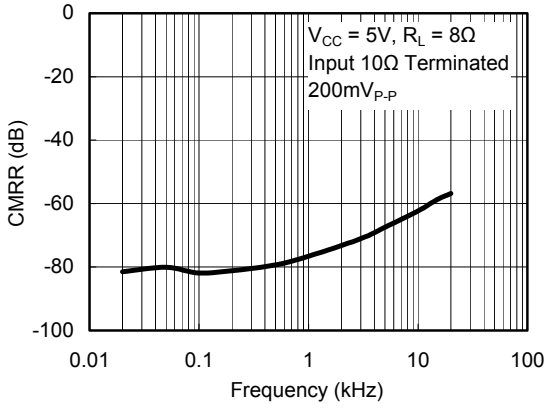
Power-Supply Rejection Ratio vs. Frequency



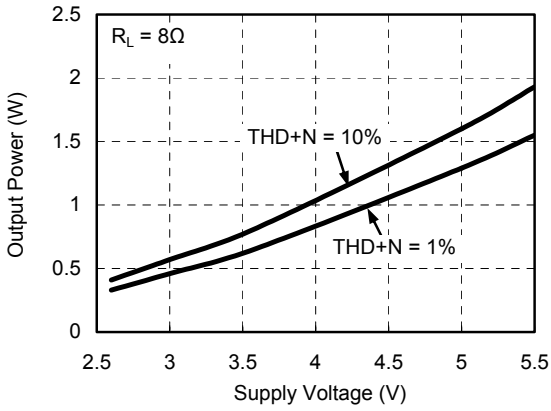
Power-Supply Rejection Ratio vs. Frequency



Common Mode Rejection Ratio vs. Frequency

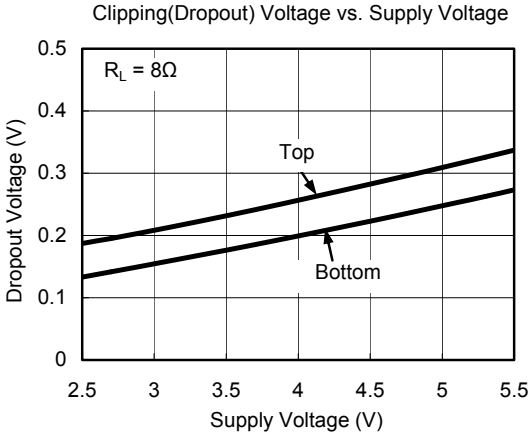


Output Power vs. Supply Voltage



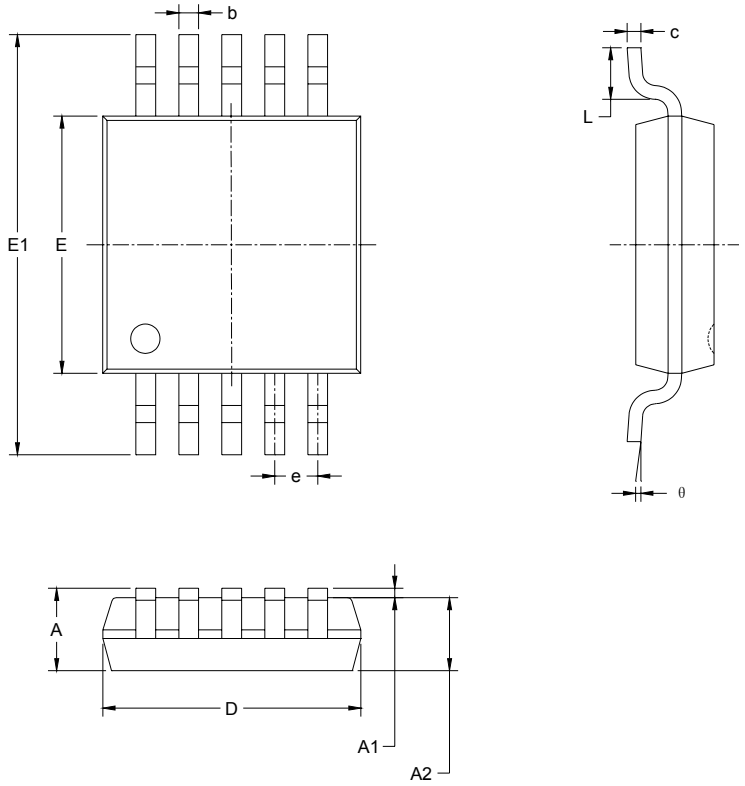
TYPICAL PERFORMANCE CHARACTERISTICS

At T_A= +25℃, A_V = 1, f = 1kHz, C_B = 1μF, unless otherwise noted.



PACKAGE OUTLINE DIMENSIONS

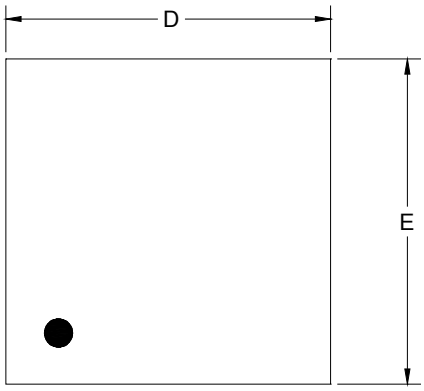
MSOP10



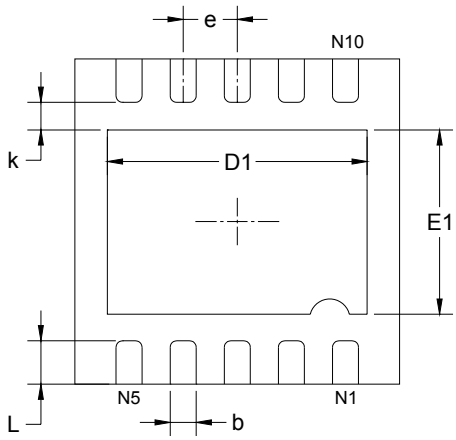
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.180	0.280	0.007	0.011
C	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.500 BSC		0.020 BSC	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

PACKAGE OUTLINE DIMENSIONS

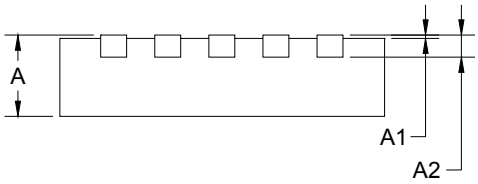
DFN3×3-10L



TOP VIEW



BOTTOM VIEW

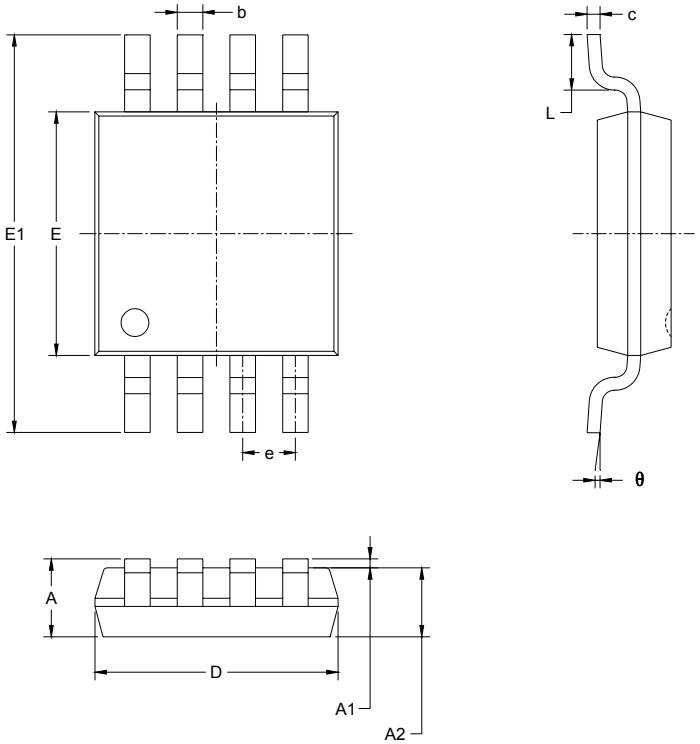


SIDE VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	2.900	3.100	0.114	0.122
D1	2.300	2.500	0.091	0.098
E	2.900	3.100	0.114	0.122
E1	1.600	1.800	0.063	0.071
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.500 TYP		0.020 TYP	
L	0.300	0.500	0.012	0.020

PACKAGE OUTLINE DIMENSIONS

MSOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650 BSC		0.026 BSC	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

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