SGM4863
Dual 2.1W Audio Power Amplifier Plus Stereo Headphone Function

GENERAL DESCRIPTION

The SGM4863 is a dual bridge-connected audio power amplifier which, when connected to a 5V supply, will deliver 2.1W to a 4Ω load or 2.5W to a 3Ω load with 1% THD+N. In addition, the headphone input pin allows the amplifiers to operate in single-ended mode when driving stereo headphones.

To simplify audio system design, the SGM4863 combines dual bridge speaker amplifiers and stereo headphone amplifiers on one chip.

The SGM4863 features a low-power consumption shutdown mode and thermal shutdown protection. It also utilizes circuitry to reduce “clicks and pops” during device turn-on.

The SGM4863 is available in Green TSSOP20/PP package. It operates over an ambient temperature range of -40℃ to +85℃.

FEATURES

- **P_O at 1% THD+N, V_{CC} = 5V**
  - **R_L = 3 Ω** **2.5W (typ)**
  - **R_L = 4 Ω** **2.1W (typ)**
  - **R_L = 8 Ω** **1.3W (typ)**
- **Low Shutdown Current** **0.03μA**
- **Operation Supply Voltage** **2.5V to 5.5V**
- **Stereo Headphone Amplifier Mode**
- **“Click and pop” Suppression Circuitry**
- **Unity-Gain Stable**
- **Thermal Shutdown Protection Circuitry**
- **-40℃ to +85℃ Operating Temperature Range**
- **Green TSSOP20/PP Package**

APPLICATIONS

Multimedia Monitors
Portable and Desktop Computers
Portable Televisions

PACKAGE/ORDERING INFORMATION

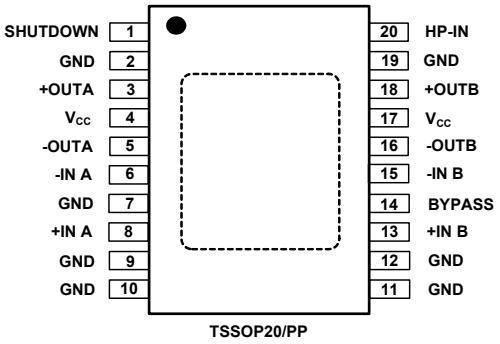
MODEL	ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION	MARKING INFORMATION
SGM4863	SGM4863YPTS20G/TR	TSSOP20/PP	Tape and Reel, 3000	SGM4863YPTS20

ORDER NUMBER

SGM4863 X X G / TR

- Tape and Reel
- Green Product
- Package Type
  - PTS20 TSSOP20/PP
- Operating Temperature Range
  - Y -40℃ to +85℃

PIN CONFIGURATION (Top View)



TSSOP20/PP

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.

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

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.

ELECTRICAL CHARACTERISTICS

(The following specifications apply for V_{CC} = 5V unless otherwise noted. Limits apply for T_A = 25℃.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Voltage	V_{CC}		2.5		5.5	V
Quiescent Power Supply Current	I_Q	V_{IN} = 0V, I_O = 0A (Note 1), BTL mode		6.7	10	mA
		V_{IN} = 0V, I_O = 0A (Note 1), SE mode		3.5	5	
Shutdown Current	I_{SD}	V_{CC} applied to the SHUTDOWN pin		0.03	2	μA
Headphone Sense High Input Voltage	V_{IH}	Hold High for SE mode	4			V
Headphone Sense Low Input Voltage	V_{IL}	Hold Low for BTL mode			3.2	V
Turn On Time	T_{ON}	C_{BYPASS} = 1μF		480		ms

EIECTRICAL CHARACTERISTICS FOR BRIDGED-MODE OPERATION

(The following specifications apply for V_{CC} = 5V unless otherwise noted. Limits apply for T_A = 25℃.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Output Offset Voltage	V_{OS}	V_{IN} = 0V			9	30	mV
Output Power(Note 2)	P_O	THD+N = 1%, f = 1kHz	R_L = 3Ω		2.5		W
			R_L = 4Ω		2.1		
			R_L = 8Ω		1.3		
		THD+N = 10%, f = 1kHz	R_L = 3Ω		3.2		
			R_L = 4Ω		2.6		
			R_L = 8Ω		1.6		
Total Harmonic Distortion + Noise	THD+N	f = 1kHz, A_{VD} = 2	R_L = 4Ω, P_O = 2W		0.04		%
			R_L = 8 Ω, P_O = 1W		0.03		
Power Supply Rejection Ratio	PSRR	V_{RIPPLE} = 200mV_{RMS}, R_L = 8Ω, C_B = 1.0μF	f = 1kHz		-71		dB
			f = 217Hz		-73		
Channel Separation	X_{TALK}	f = 1kHz, C_B = 1.0μF			-86		dB
Signal to Noise Ratio	SNR	V_{CC} = 5V, P_O = 1.1W, R_L = 8Ω, BW < 80kHz			-99		dB

EIECTRICAL CHARACTERISTICS FOR SINGLE-MODE OPERATION

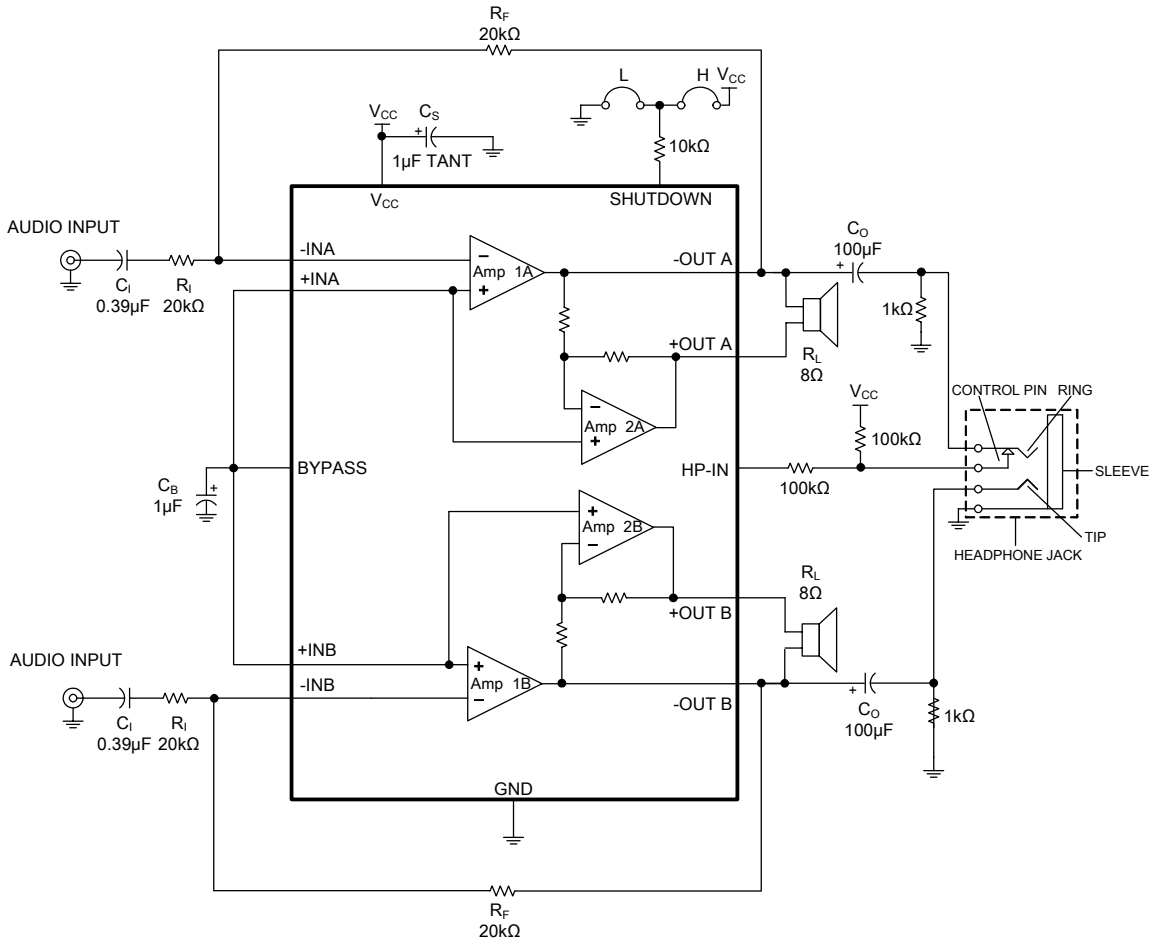
(The following specifications apply for V_{CC} = 5V unless otherwise noted. Limits apply for T_A = 25℃.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Output Offset Voltage	V_{OS}	V_{IN} = 0V			9	30	mV
Output Power	P_O	THD+N = 1%, f = 1kHz, R_L = 8Ω			340		mW
		THD+N = 10%, f = 1kHz, R_L = 8Ω			440		
		THD+N = 1%, f = 1kHz, R_L = 16Ω			190		
		THD+N = 10%, f = 1kHz, R_L = 16Ω			230		
		THD+N = 1%, f = 1kHz, R_L = 32Ω			90		
		THD+N = 10%, f = 1kHz, R_L = 32Ω			120		
Total Harmonic Distortion + Noise	THD+N	A_V = -1, P_O = 75mW, 20Hz≤f≤20kHz, R_L = 32Ω			0.1		%
Power Supply Rejection Ratio	PSRR	V_{RIPPLE} = 200mV_{RMS}, C_B = 1.0μF	f = 1kHz		-78		dB
			f = 217Hz		-74		
Channel Separation	X_{TALK}	f = 1kHz, C_B = 1.0μF			-81		dB
Signal to Noise Ratio	SNR	P_O = 340mW, R_L = 8Ω, BW < 80kHz			-100		dB

Specifications subject to changes without notice.

Note 1:The quiescent power supply current depends on the offset voltage when a practical load is connected to the amplifier.
Note 2: When driving 3Ω or 4Ω loads, the SGM4863 must be mounted to a circuit board that has a minimum of 2.5in^2 of exposed, uninterrupted copper area connected to the TSSOP20/PP package's exposed DAP.

TYPICAL APPLICATION



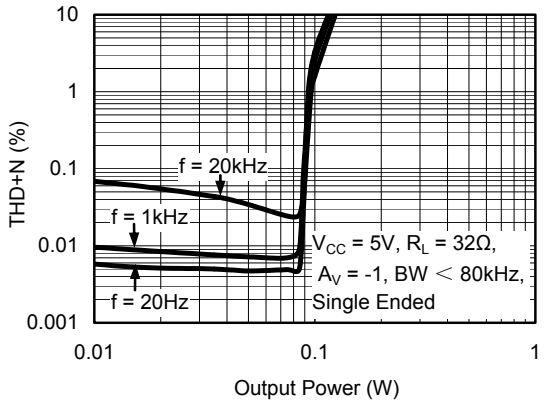
Note: It is necessary to connect the schottky barrier diode with the power supply to prevent IC destruction when the power supply occur Surge voltage.

EXTERNAL COMPONENTS DESCRIPTION

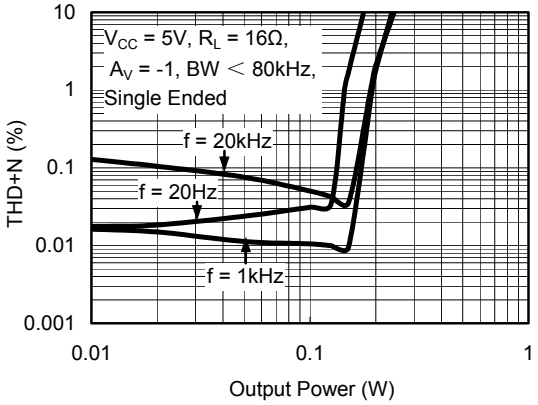
Components	Functional Description
R_I	The Inverting input resistance, along with R_F, set the closed-loop gain. R_I, along with C_I, form a high pass filter with fc = $1/(2\pi R_I C_I)$.
C_I	The input coupling capacitor blocks DC voltage at the amplifier's input terminals. C_I, along with R_I, create a highpass filter with fc = $1/(2\pi R_I C_I)$.
R_F	The feedback resistance, along with R_I, set the closed-loop gain.
C_S	The supply bypass capacitor.
C_B	The capacitor, C_B, filters the half-supply voltage present on the BYPASS pin.

TYPICAL PERFORMANCE CHARACTERISTICS

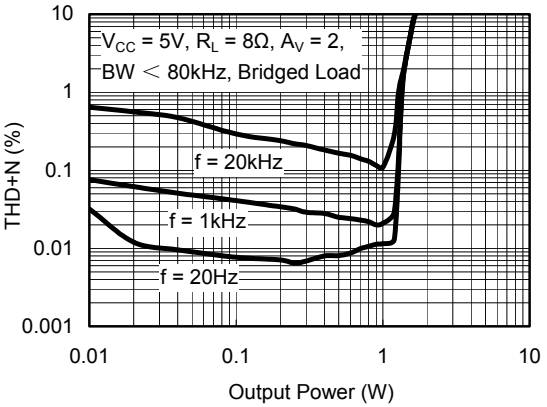
THD+N vs. Output Power



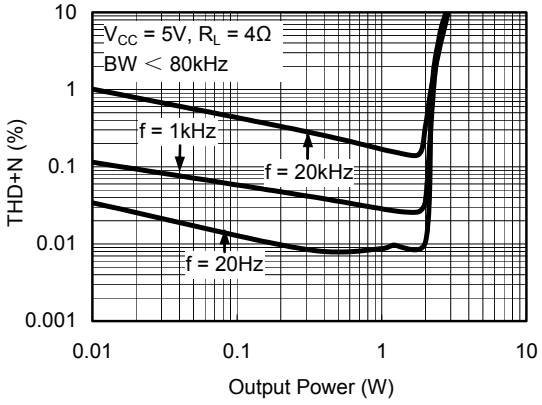
THD+N vs. Output Power



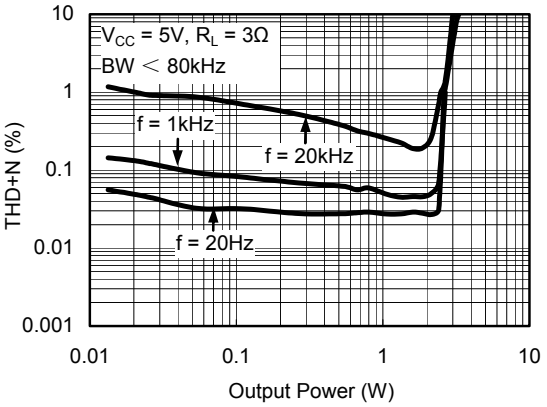
THD+N vs. Output Power



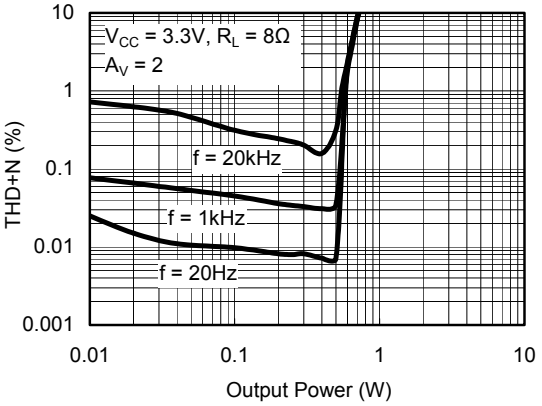
THD+N vs. Output Power



THD+N vs. Output Power



THD+N vs. Output Power



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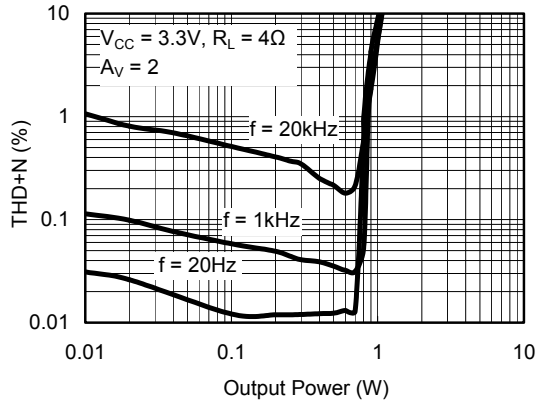
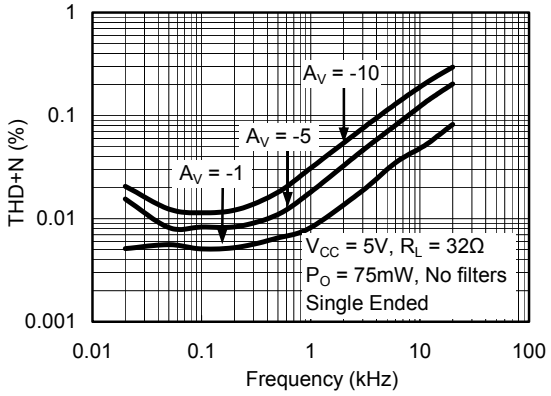
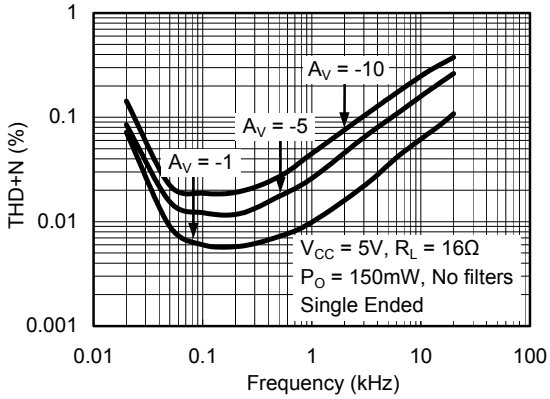
THD+N vs. Output Power



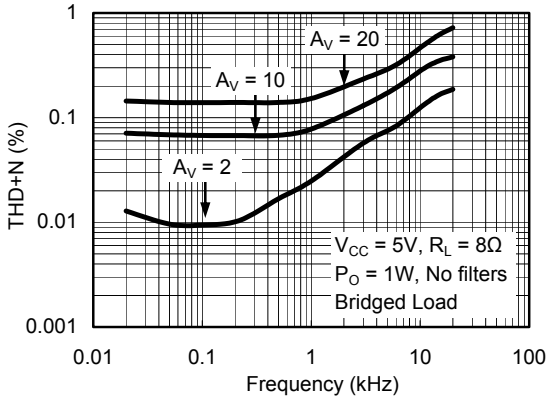
THD+N vs. Frequency



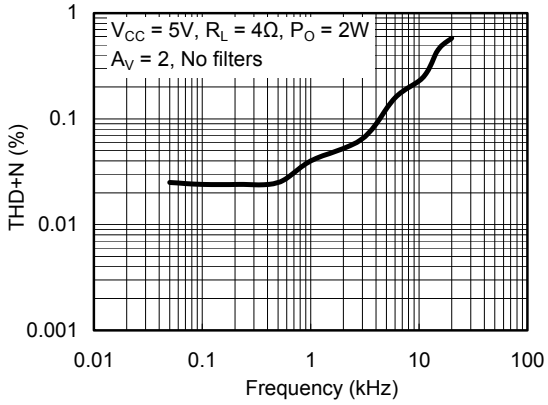
THD+N vs. Frequency



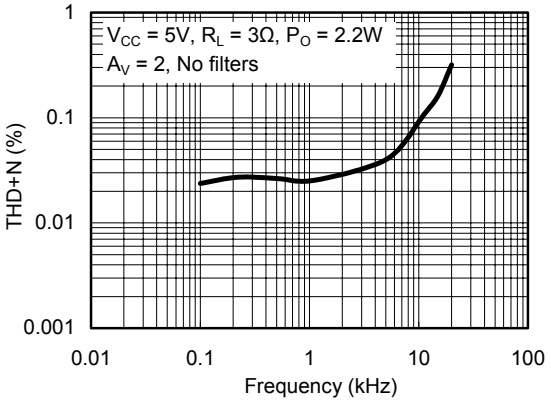
THD+N vs. Frequency



THD+N vs. Frequency

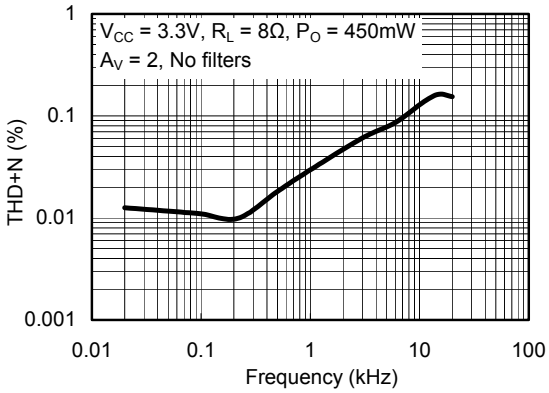


THD+N vs. Frequency

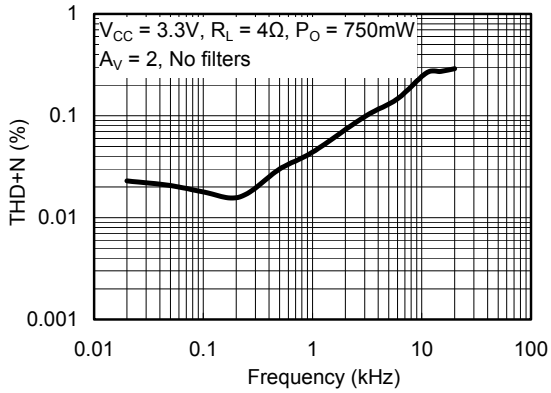


TYPICAL PERFORMANCE CHARACTERISTICS

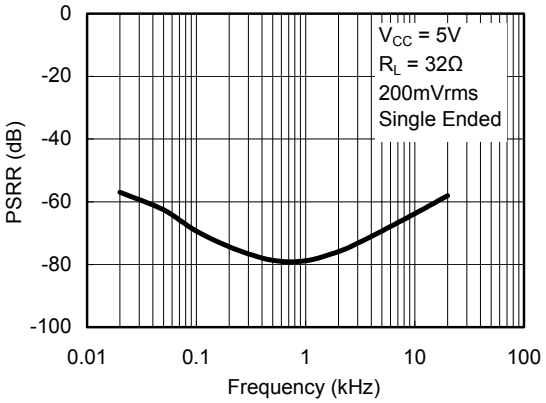
THD+N vs. Frequency



THD+N vs. Frequency



Power-Supply Rejection Ratio vs. Frequency



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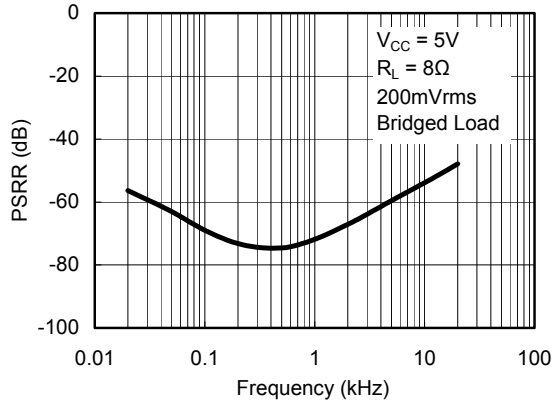
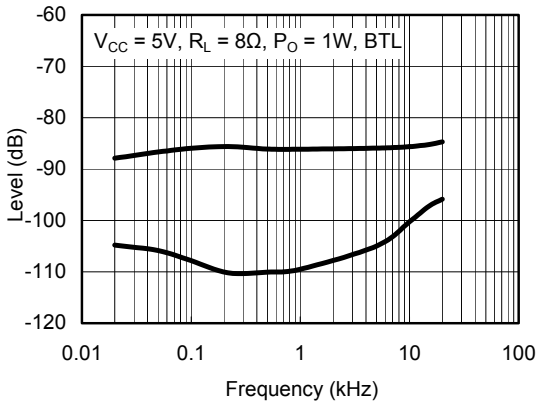
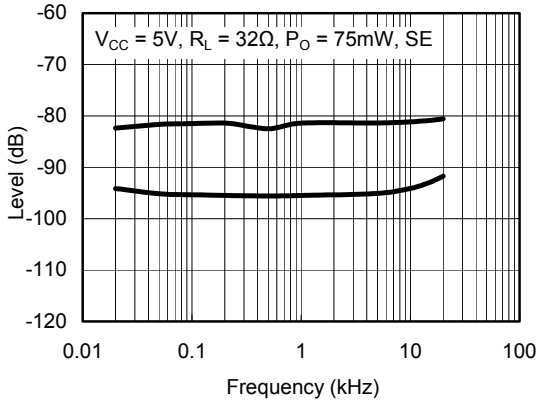


Crosstalk vs. Frequency

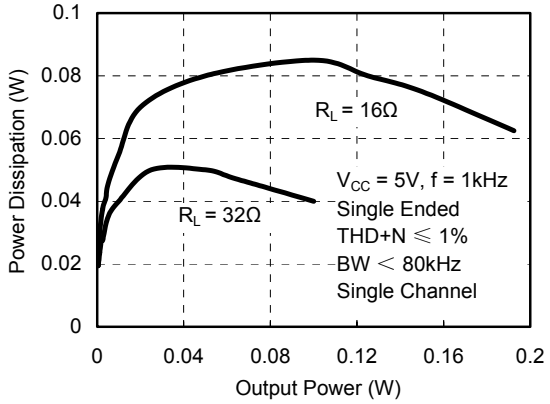


Crosstalk vs. Frequency



TYPICAL PERFORMANCE CHARACTERISTICS

Power Dissipation vs. Output Power



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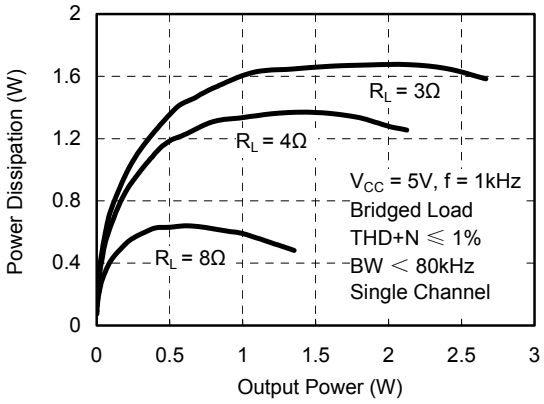
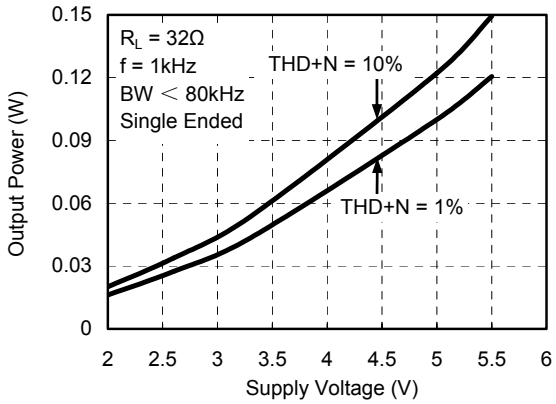
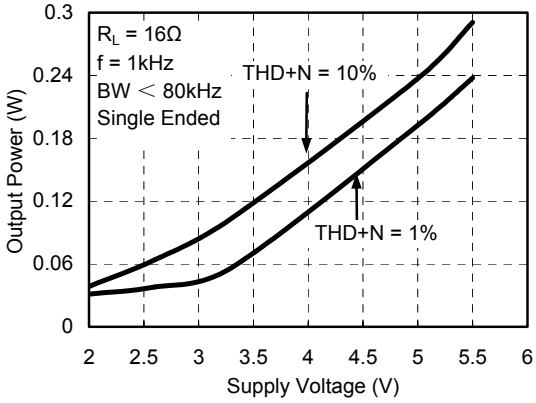


Output Power vs. Supply Voltage



Output Power vs. Supply Voltage



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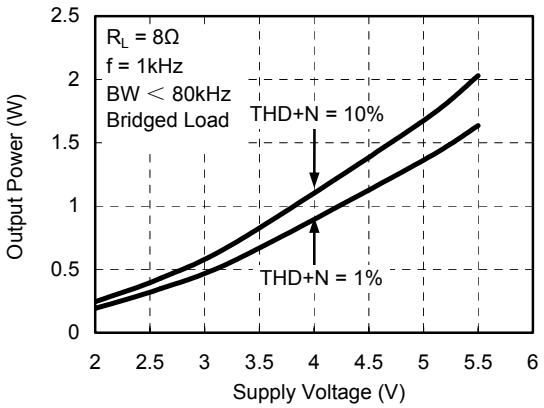

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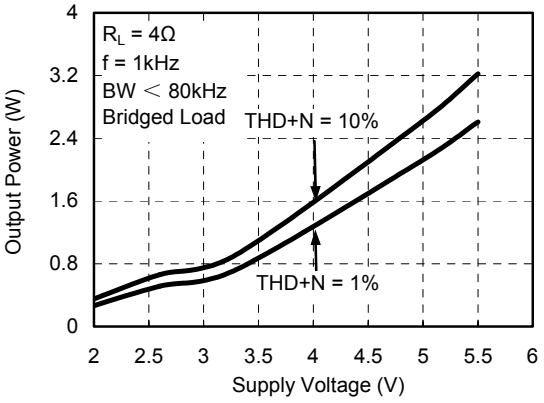

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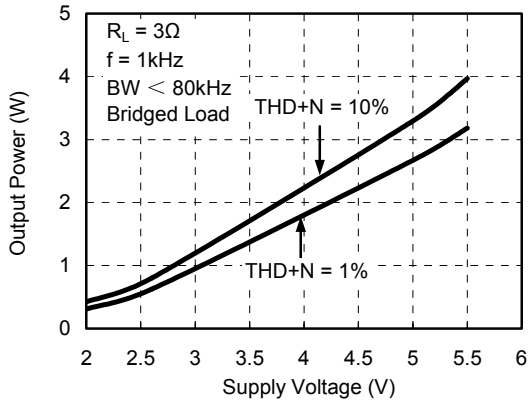
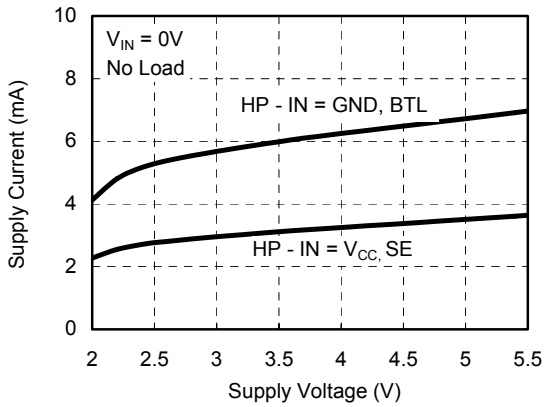
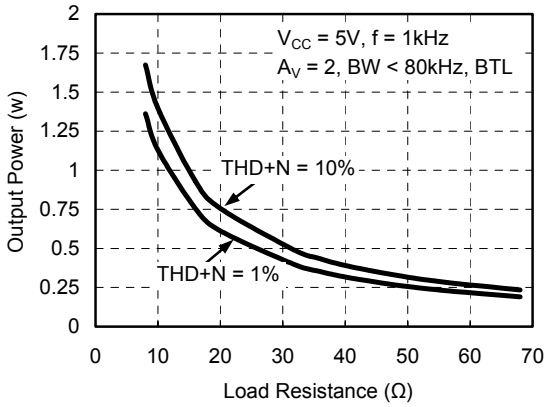
Output Power vs. Supply Voltage



Supply Current vs. Supply Voltage



Output Power vs. Load Resistance



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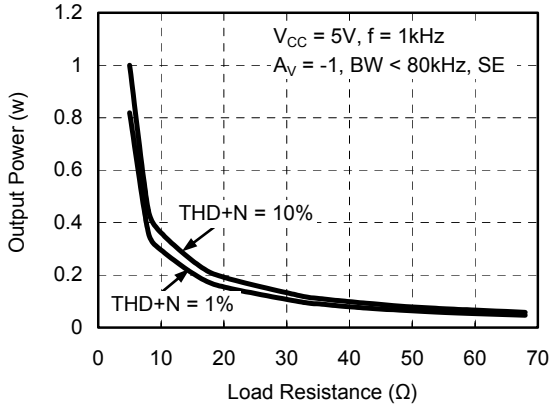
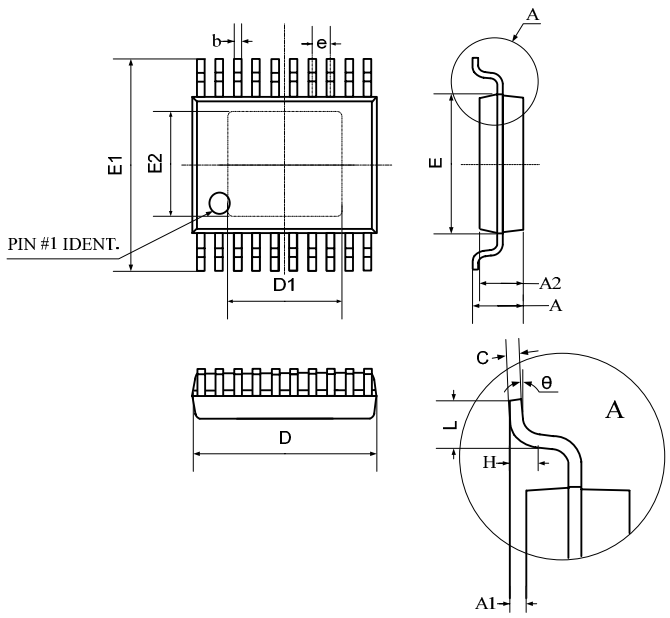


PACKAGE OUTLINE DIMENSION

TSSOP20/PP



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
D	6.400	6.600	0.252	0.259
D1	4.100	4.300	0.165	0.169
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
E2	2.900	3.100	0.114	0.122
A		1.100		0.043
A2	0.800	1.000	0.031	0.039
A1	0.020	0.150	0.001	0.006
e	0.65 (BSC)		0.026 (BSC)	
L	0.500	0.700	0.020	0.028
H	0.25(TYP)		0.01(TYP)	
θ	1°	7°	1°	7°

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