



SGM4888

Dual 2.1W Audio Power Amplifier Plus Stereo Headphone & 3D Enhancement

GENERAL DESCRIPTION

The SGM4888 is a dual bridge-connected audio power amplifier which operates from 2.8V to 5.5V supply voltage. It can deliver 2.5W into a 3Ω load or 2.1W into a 4Ω load from 5V supply at THD+N = 1%.

The SGM4888 integrates dual bridge speaker amplifier and stereo headphone amplifier on one chip to simplify design.

The SGM4888 has pop/click suppression circuitry, low power consumption shutdown mode and thermal shutdown protection.

The SGM4888 is available in a Green TQFN-4×4-24L package. It operates over an ambient temperature range of -40°C to +85°C.

FEATURES

- **Supply Voltage Range: 2.8V to 5.5V**
- **2.5W into 3Ω Load from 5V Power Supply at THD+N = 1% (Typical, per Channel)**
- **2.1W into 4Ω Load from 5V Power Supply at THD+N = 1% (Typical, per Channel)**
- **1.3W into 8Ω Load from 5V Power Supply at THD+N = 1% (Typical, per Channel)**
- **Shutdown Current: 0.02μA (TYP)**
- **PSRR: 80dB (TYP) at 217Hz**
- **3D Enhancement**
- **Stereo Headphone Amplifier Mode**
- **Pop/Click Suppression Circuitry**
- **Thermal Shutdown Protection**
- **-40°C to +85°C Operating Temperature Range**
- **Available in a Green TQFN-4×4-24L Package**

APPLICATIONS

Cell Phones, PDAs
Multimedia Monitors
Portable and Desktop Computers
Desktops Audio System

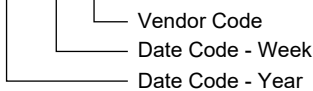
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM4888	TQFN-4x4-24L	-40°C to +85°C	SGM4888YTQF24G/TR	SGM4888 YTQF24 XXXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXXX = Date Code and Vendor Code.

XXXXX



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

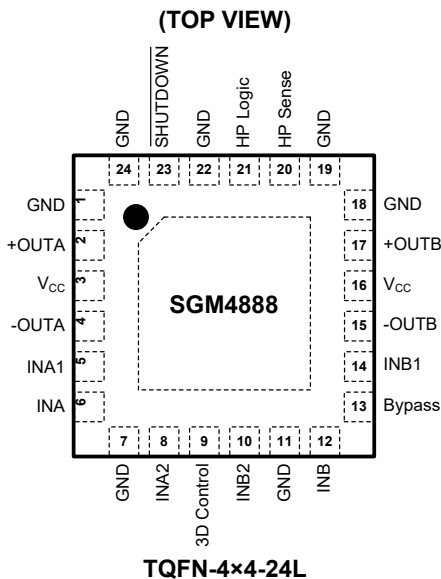
ABSOLUTE MAXIMUM RATINGS

- Supply Voltage.....6V
- Input Voltage.....-0.3V to (V_{CC}) + 0.3V
- Storage Temperature Range-65°C to +150°C
- Junction Temperature.....+150°C
- Lead Temperature Range (Soldering, 10s).....+260°C
- ESD Susceptibility
- HBM.....4000V
- MM.....400V

RECOMMENDED OPERATING CONDITIONS

- Supply Voltage Range2.8V to 5.5V
- Operating Temperature Range-40°C to +85°C

PIN CONFIGURATION



OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

ESD SENSITIVITY CAUTION

This integrated circuit can be damaged if ESD protections are not considered carefully. 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 even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN DESCRIPTION

PIN	NAME	FUNCTION
1, 7, 11, 18, 19, 22, 24	GND	Ground.
2	+OUTA	Non Inverting Output in BTL Mode for Left Channel.
3,16	V _{CC}	Supply voltage.
4	-OUTA	Inverting Output in BTL Mode for Left Channel.
5	INA1	Non 3D-mode Feedback Input for Left Channel.
6	INA	Left Channel Input.
8	INA2	3D-mode Feedback Input for Left Channel.
9	3D Control	3D-mode Control. Active high for 3D-mode, active low for general stereo mode.
10	INB2	3D-mode Feedback Input for Right Channel.
12	INB	Right Channel Input.
13	Bypass	Bypass Capacitor. Provides the common mode voltage.
14	INB1	Non 3D-mode Feedback Input for Right Channel.
15	-OUTB	Inverting Output in BTL Mode for Right Channel.
17	+OUTB	Non Inverting Output in BTL Mode for Right Channel.
20	HP Sense	Headphone Sense Control.
21	HP Logic	Headphone Logic Control.
23	SHUTDOWN	Shutdown Control. Active low for shutdown mode.
Exposed Pad	GND	Exposed Pad. Connect to GND.

LOGIC LEVEL TRUTH TABLE

Shutdown Pin	Headphone Logic Pin	Headphone Jack Sense Pin	Operational Output Mode
Logic High	High	Don't Care	Single-Ended (SE)
Logic High	Low	Low (HP not plugged in)	Bridged (BTL)
Logic High	Don't Care	High (HP plugged in)	Single-Ended (SE)
Logic Low	Don't Care	Don't Care	Micro-Power Shutdown

ELECTRICAL CHARACTERISTICS

(V_{CC} = 5V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Voltage	V _{CC}		2.8		5.5	V
Quiescent Power Supply Current ⁽¹⁾	I _Q	V _{IN} = 0V, I _O = 0A, BTL mode		6.7	10	mA
		V _{IN} = 0V, I _O = 0A, SE mode		3.5	5	
Shutdown Current	I _{SD}	GND applied to the SHUTDOWN pin		0.02	2	μA
Headphone Sense High Input Voltage	V _{IH}		4			V
Headphone Sense Low Input Voltage	V _{IL}				3.2	V
Shutdown, Headphone Logic, 3D Control High Input Voltage	V _{SDIH}		1			V
Shutdown, Headphone Logic, 3D control Low Input Voltage	V _{SDIL}				0.8	V
Turn-On Time	t _{ON}	1μF Bypass Cap (C ₆)		210		ms
Bridged-Mode Operation						
Output Offset Voltage	V _{OS}	V _{IN} = 0V		5	30	mV
Output Power ⁽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 = 1W		0.07	%
			R _L = 8Ω, P _O = 0.4W		0.04	
Power Supply Rejection Ratio	PSRR	Input unterminated, 217Hz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 8Ω		-80	dB	
		Input unterminated, 1kHz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 8Ω		-69		
		Input grounded with 10Ω, 217Hz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 8Ω		-68		
		Input grounded with 10Ω, 1kHz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 8Ω		-70		
Crosstalk	X _{TALK}	f = 1kHz, C ₆ = 1.0μF, 3D Control = Low		-90		dB
Single-Mode Operation						
Output Power	P _O	THD+N = 0.5%, f = 1kHz, R _L = 32Ω		95		mW
Total Harmonic Distortion + Noise	THD+N	P _O = 20mW, 1kHz, R _L = 32Ω		0.01		%
Power Supply Rejection Ratio	PSRR	Input unterminated, 217Hz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 32Ω		-74	dB	
		Input unterminated, 1kHz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 32Ω		-75		
		Input grounded with 10Ω, 217Hz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 32Ω		-69		
		Input grounded with 10Ω, 1kHz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 32Ω		-74		
Crosstalk	X _{TALK}	f = 1kHz, C ₆ = 1.0μF, 3D Control = Low		-84		dB

ELECTRICAL CHARACTERISTICS (continued)(V_{CC} = 3V, T_A = +25°C, unless otherwise noted.)

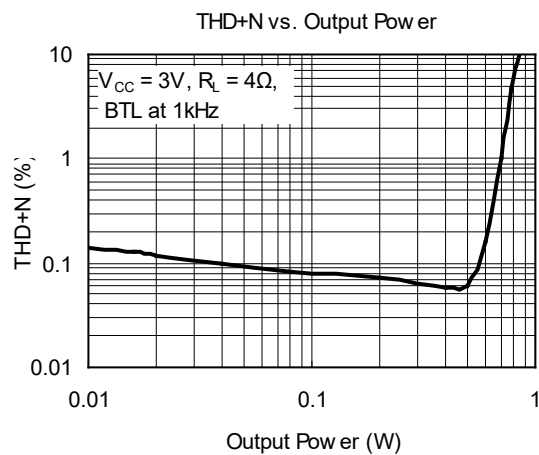
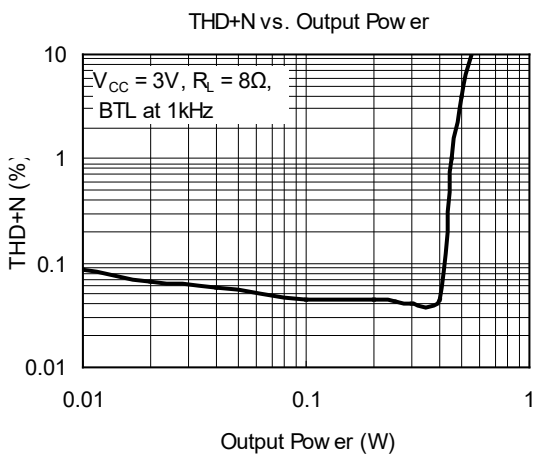
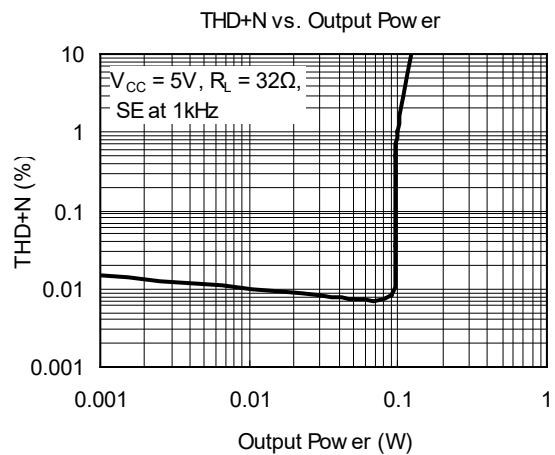
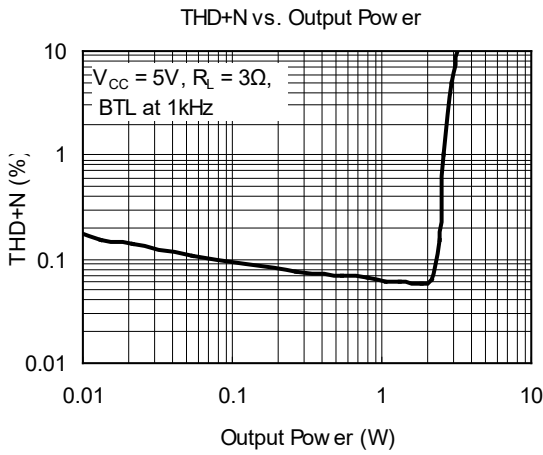
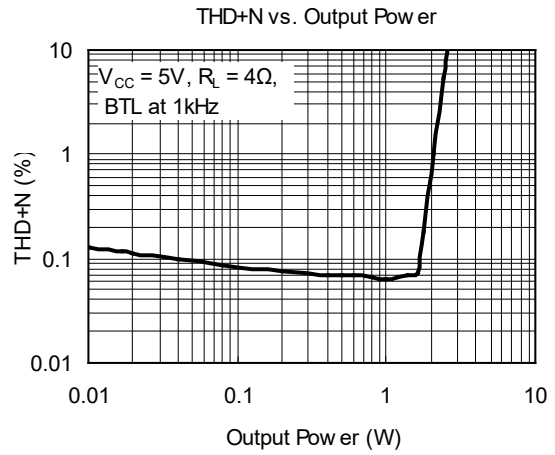
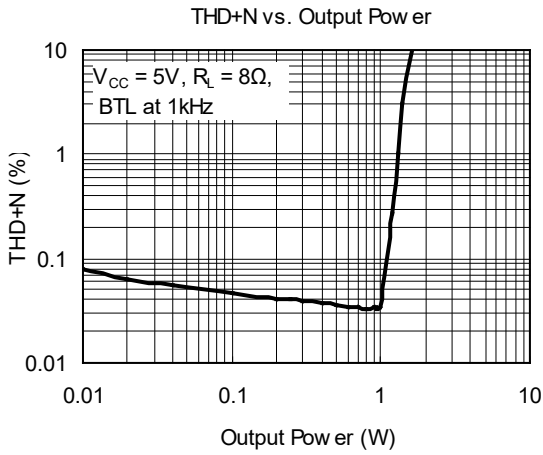
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Quiescent Power Supply Current ⁽¹⁾	I _Q	V _{IN} = 0V, I _O = 0A, BTL mode		5.7		mA
		V _{IN} = 0V, I _O = 0A, SE mode		3		
Shutdown Current	I _{SD}	GND applied to the $\overline{\text{SHUTDOWN}}$ pin		0.02		μA
Headphone Sense High Input Voltage	V _{IH}		2.4			V
Headphone Sense Low Input Voltage	V _{IL}				1.9	V
Shutdown, Headphone Logic, 3D Control High Input Voltage	V _{SDIH}		1			V
Shutdown, Headphone Logic, 3D Control Low Input Voltage	V _{SDIL}				0.6	V
Turn-On Time	T _{ON}	1μF Bypass Cap (C ₆)		150		ms
Bridged-Mode Operation						
Output Offset Voltage	V _{OS}	V _{IN} = 0V		5		mV
Output Power ⁽²⁾	P _O	THD+N = 1%, f = 1kHz	R _L = 3Ω		0.85	W
			R _L = 4Ω		0.7	
			R _L = 8Ω		0.45	
		THD+N = 10%, f = 1kHz	R _L = 3Ω		1	
			R _L = 4Ω		0.85	
			R _L = 8Ω		0.55	
Total Harmonic Distortion + Noise	THD+N	f = 1kHz	R _L = 4Ω, P _O = 280mW		0.06	%
			R _L = 8Ω, P _O = 200mW		0.04	
Power Supply Rejection Ratio	PSRR	Input unterminated, 217Hz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 8Ω		-73	dB	
		Input unterminated, 1kHz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 8Ω		-67		
		Input grounded with 10Ω, 217Hz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 8Ω		-66		
		Input grounded with 10Ω, 1kHz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 8Ω		-67		
Crosstalk	X _{TALK}	f = 1kHz, C ₆ = 1.0μF, 3D Control = Low		-92		dB
Single-Mode Operation						
Output Power	P _O	THD+N = 0.5%, f = 1 kHz, R _L = 32Ω		33		mW
Total Harmonic Distortion + Noise	THD+N	P _O = 25mW, 1kHz, R _L = 32Ω		0.01		%
Power Supply Rejection Ratio	PSRR	Input unterminated, 217Hz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 32Ω		-74	dB	
		Input unterminated, 1kHz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 32Ω		-75		
		Input grounded with 10Ω, 217Hz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 32Ω		-69		
		Input grounded with 10Ω, 1kHz V _{RIPPLE} = 200mV _{P-P} , C ₆ = 1μF, R _L = 32Ω		-74		
Crosstalk	X _{TALK}	f = 1kHz, C ₆ = 1.0μF, 3D Control = Low		-84		dB

NOTES:

- The quiescent power supply current depends on the offset voltage when a practical load is connected to the amplifier.
- When driving 3Ω or 4Ω loads, the SGM4888 must be mounted to a circuit board that has a minimum of 2.5in² of exposed, uninterrupted copper area connected to the TQFN-4×4-24L package's exposed DAP.

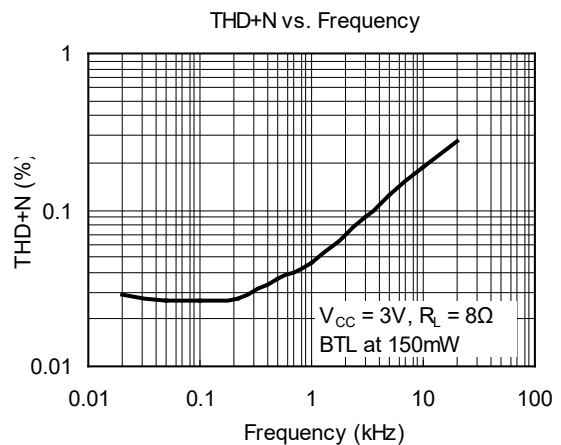
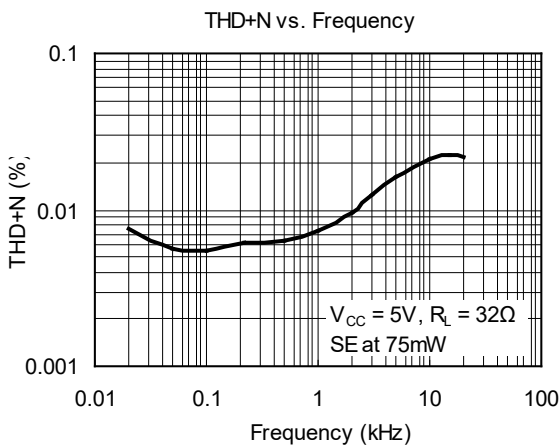
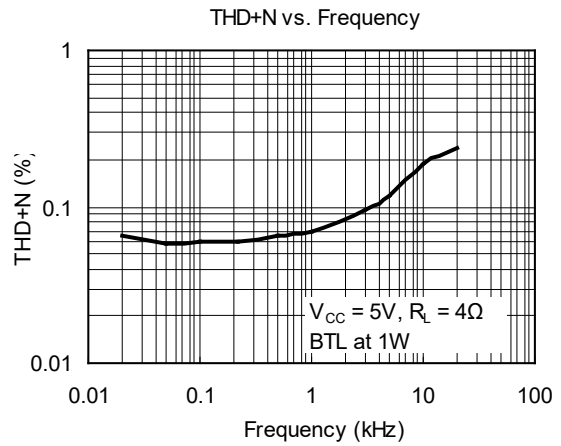
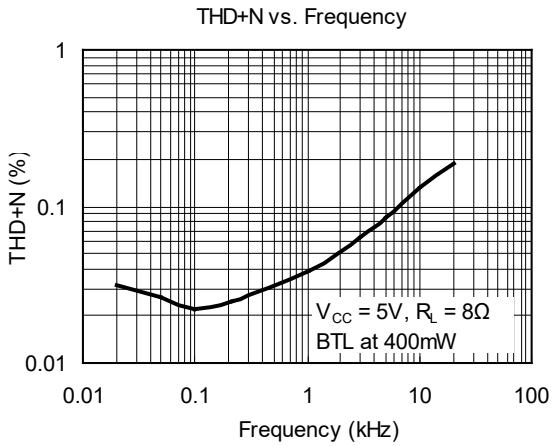
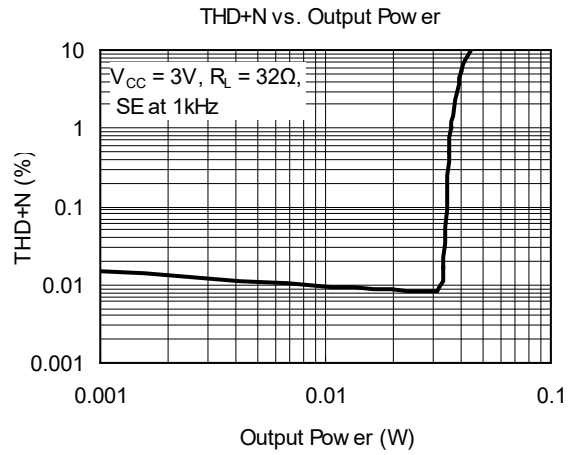
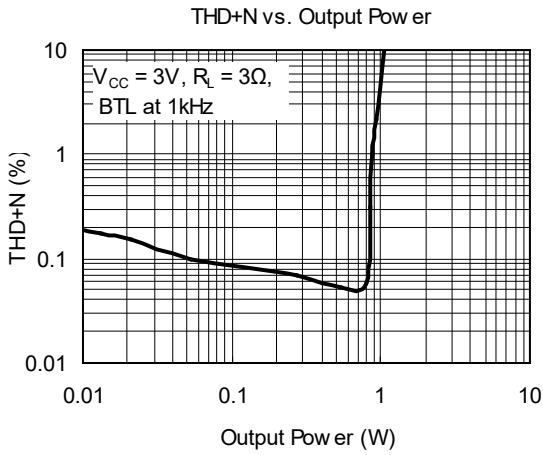
TYPICAL PERFORMANCE CHARACTERISTICS

At $T_A = +25^\circ\text{C}$, $C_6 = 1\mu\text{F}$, $\text{BW} < 80\text{kHz}$, unless otherwise noted.



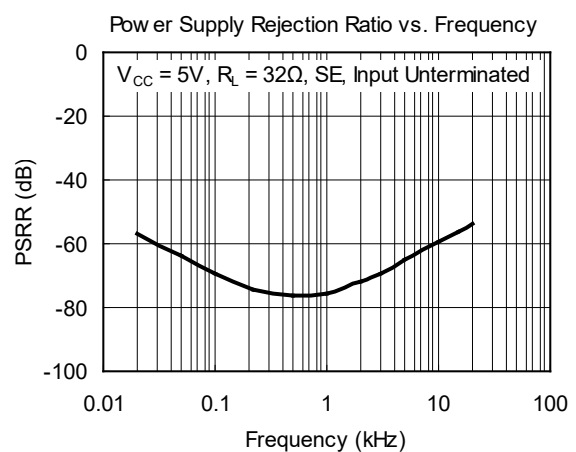
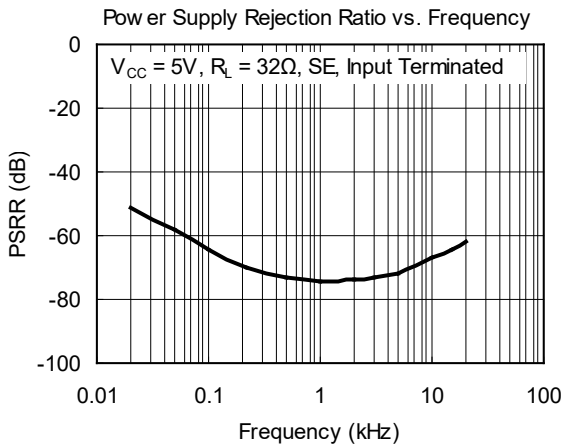
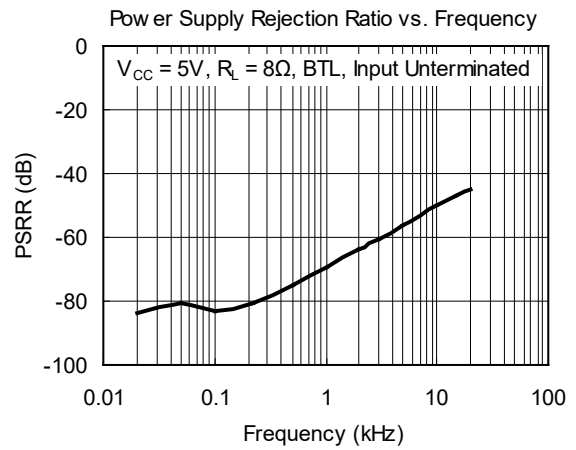
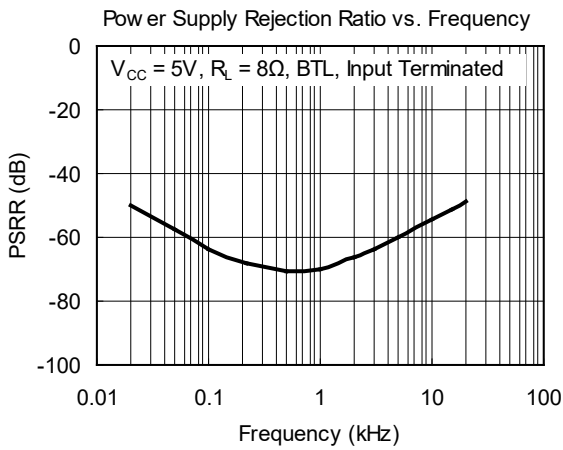
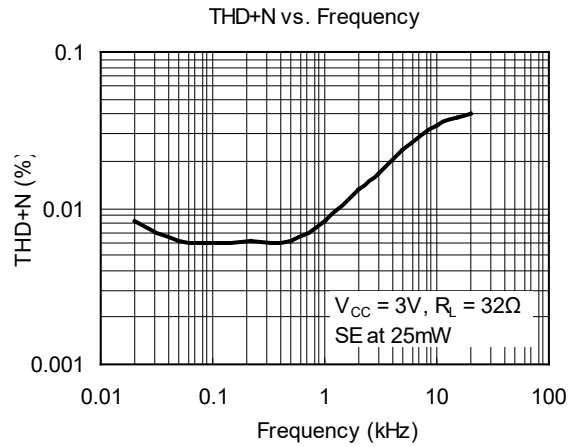
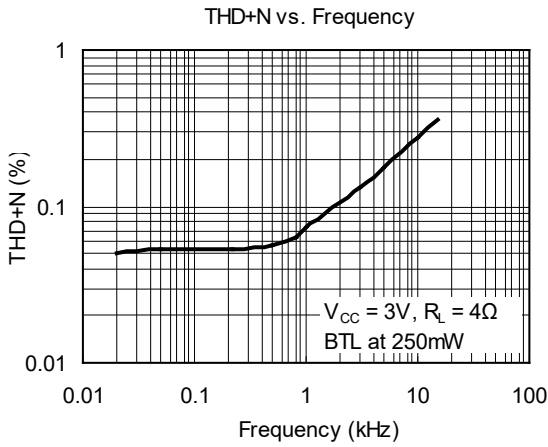
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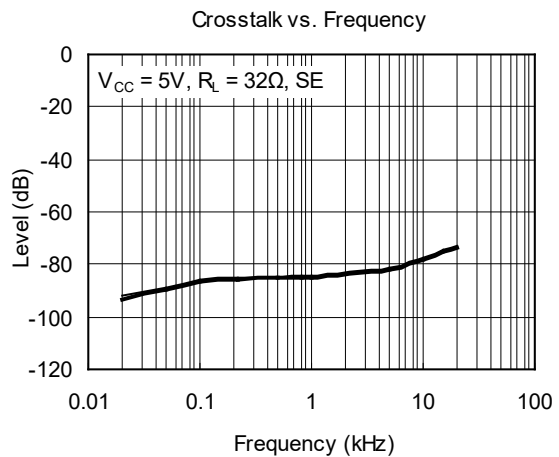
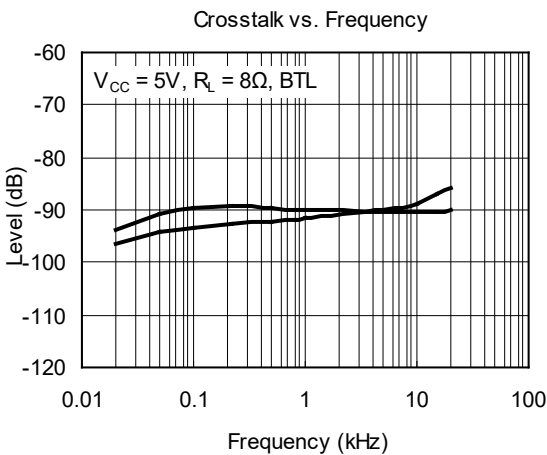
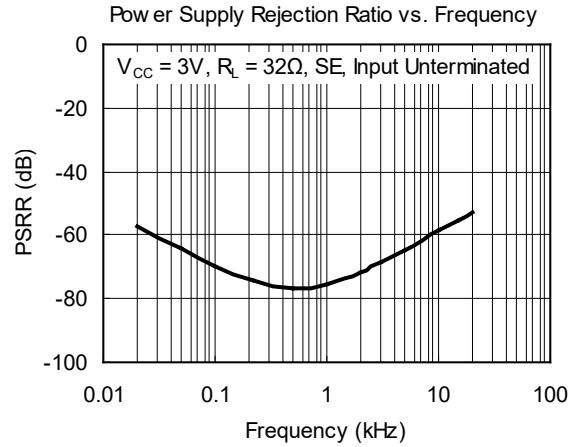
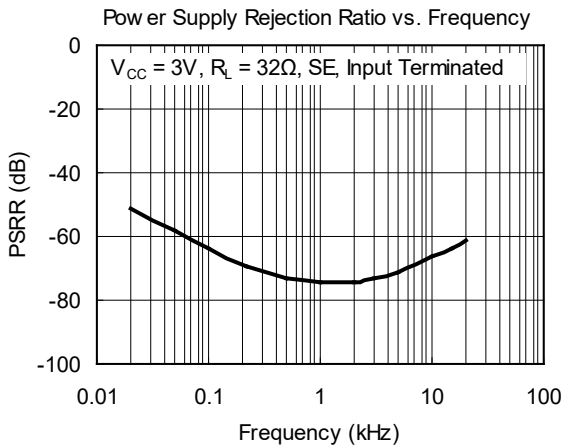
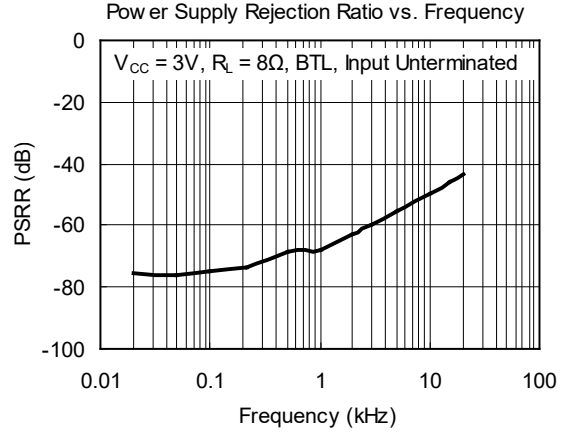
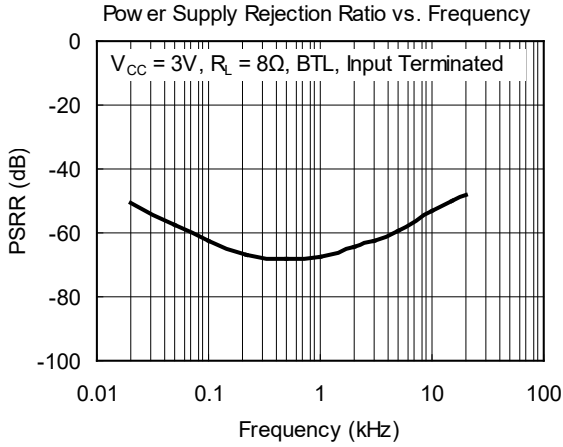
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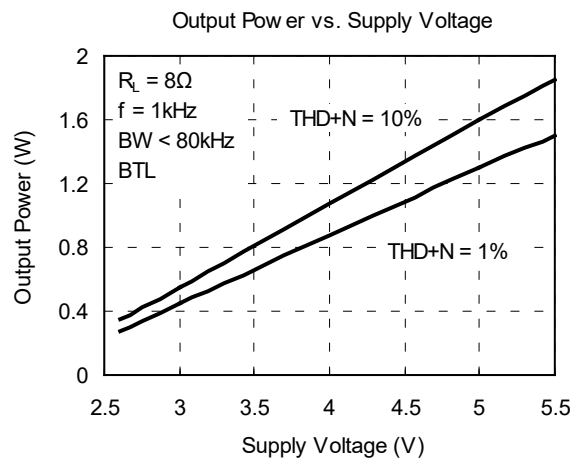
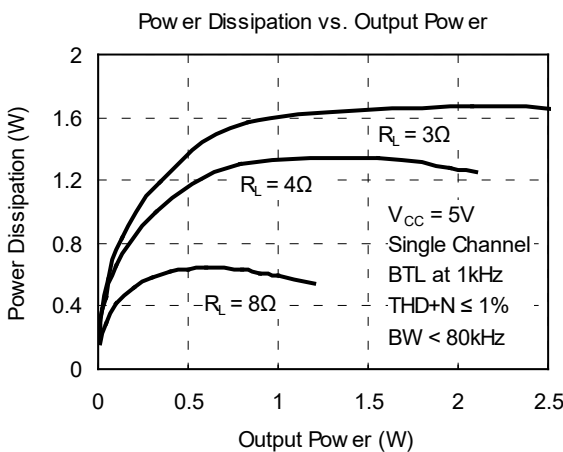
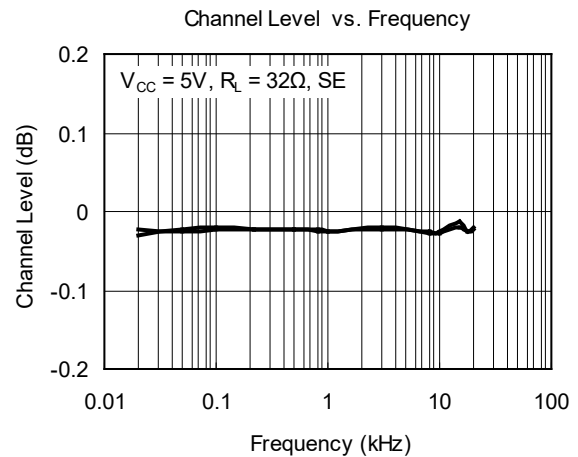
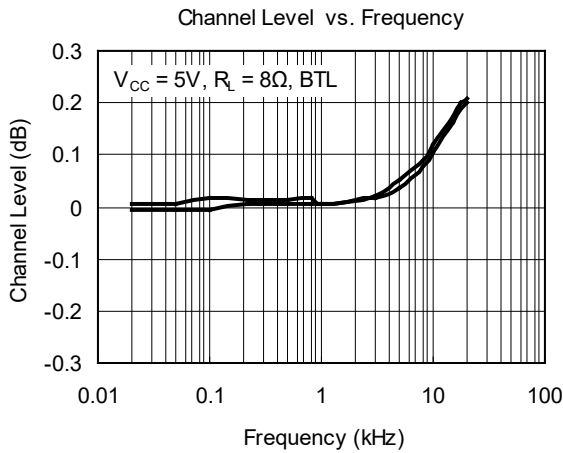
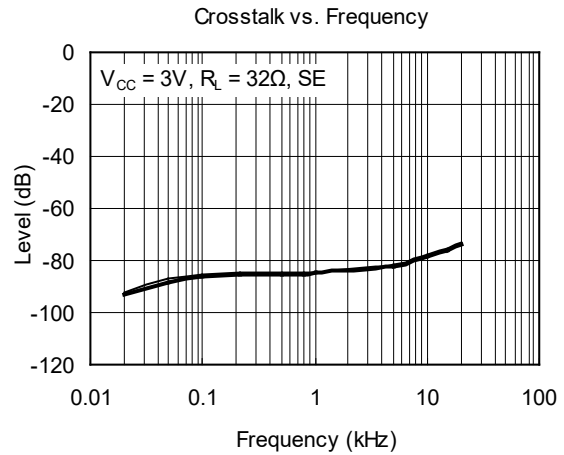
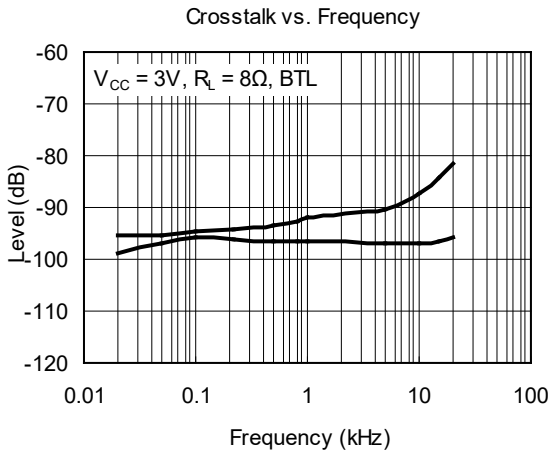
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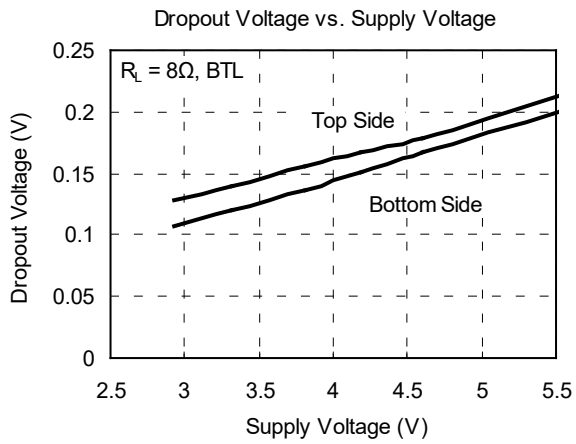
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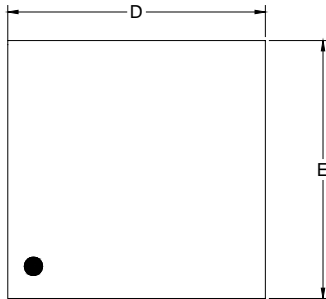
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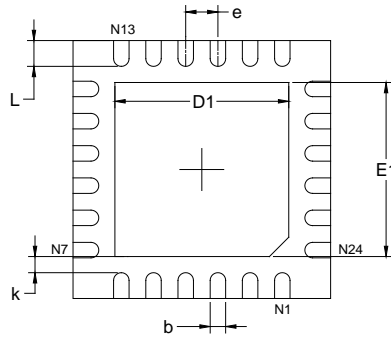


PACKAGE OUTLINE DIMENSIONS

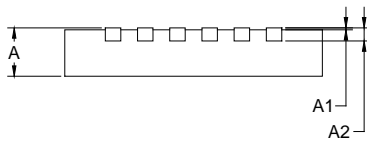
TQFN-4x4-24L



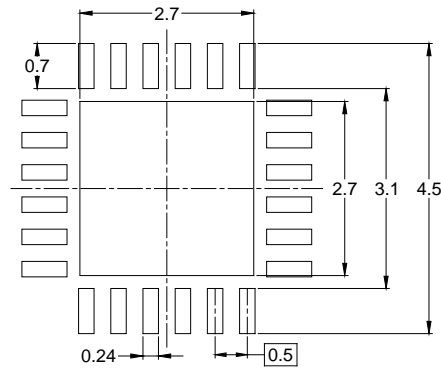
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

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	3.900	4.100	0.154	0.161
D1	2.600	2.800	0.102	0.110
E	3.900	4.100	0.154	0.161
E1	2.600	2.800	0.102	0.110
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

NOTE: This drawing is subject to change without notice.

PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TQFN-4×4-24L	13"	12.4	4.30	4.30	1.10	4.0	8.0	2.0	12.0	Q1

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PACKAGE INFORMATION

CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
13"	386	280	370	5

DD0002