Dual 2.2W Audio Amplifier Plus Stereo Headphone Function

■ General Description

The LN4818 is a dual bridge-connected audio power amplifier which, when connected to a 5V supply, will deliver 2.2W to a 4Ω load with less than 1.0% THD+N. In addition, the headphone input pin allows the amplifiers to operate in single-ended mode when driving stereo headphones.

Boomer audio power amplifiers were designed specifically to provide high quality output power from a surface mount package while requiring few external components. To simplify audio system design, the LN4818 combines dual bridge speaker amplifiers and stereo headphone amplifiers on one chip.

The LN4818 features an externally controlled, low-power consumption shutdown mode, a stereo headphone amplifier mode, and thermal shutdown protection. It also utilizes circuitry to reduce “clicks and pops” during device turn-on.

■ Applications

- Cell phones
- Multimedia monitors
- Portable and desktop computers
- Portable audio systems

■ Key Specifications

- Power Output @1% THD+N & VDD=5V
- LN4818SQ R_L=4Ω 2.2W (TYP)
  R_L=8Ω 1.1W (TYP)
- Single-ended mode THD+N at 75mW into 32Ω 0.5%(MAX)
- Shutdown current 0.04μA(TYP.)
- Supply voltage 2.0V~5.5V

■ Features

- Stereo headphone amplifier mode
- “Click and pop” suppression circuitry
- Unity-gain stable
- Thermal shutdown protection circuitry
- Exposed-DAP: QFN4×4-24 packaging available

■ Package

- QFN4×4-24

■ Ordering Information

Ordering Number	Package Type
LN4818SQ	QFN-24

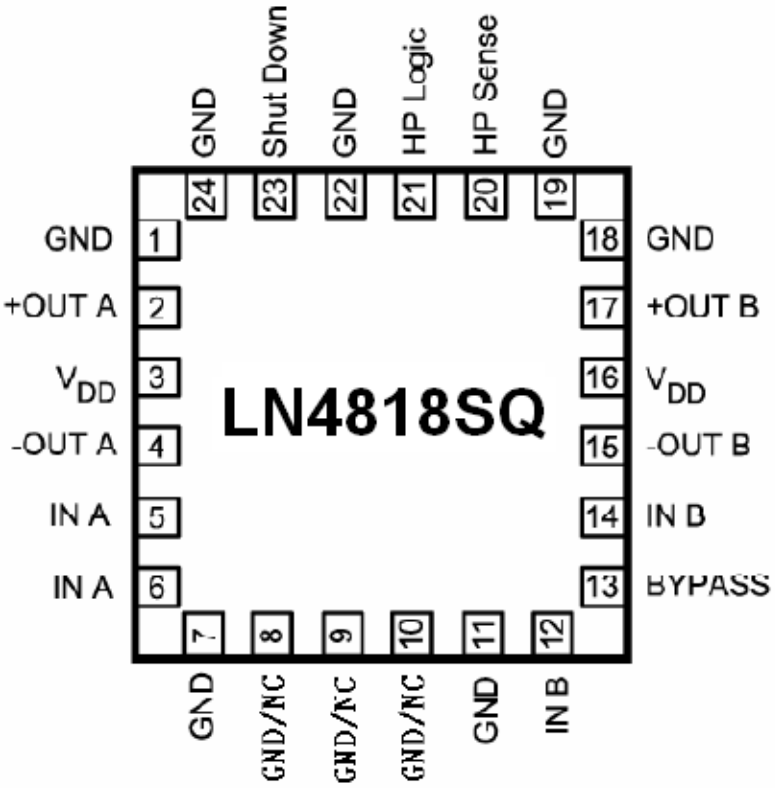
■ Operating Ratings

Temperature Range

TMIN ≤ TA ≤ TMAX---------- −40°C ≤ TA ≤ 85°C

Supply Voltage ---------- 2.7V ≤ VDD ≤ 5.5V

■ Pin Configuration

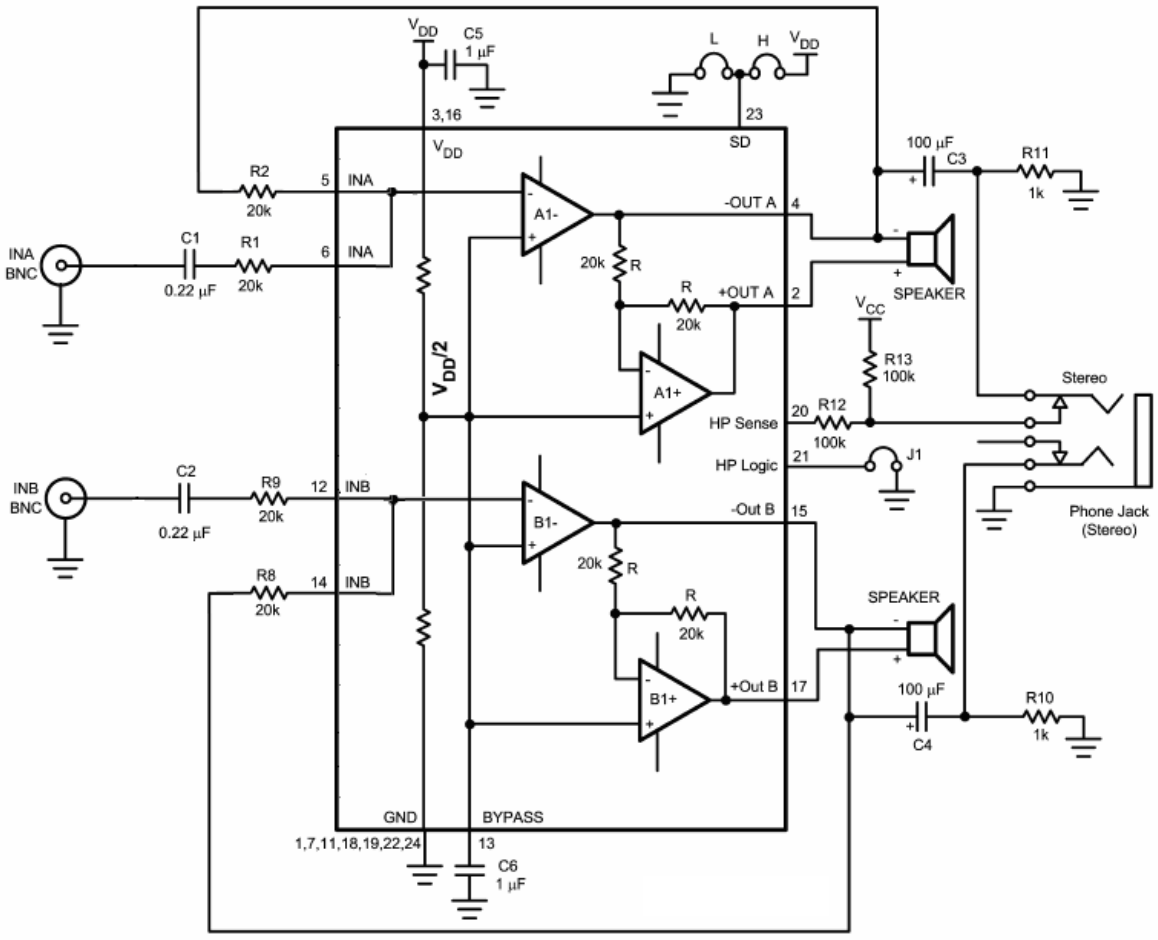


Ordering Number: LN4818SQ

■ Pin Function Description

Pin Name	DRB	I/O	Function Description
INA	5、6	I	Left channel input
INB	12、14	I	Right channel input
-OUTA	4	O	Left channel negative output
+OUTA	2	O	Left channel positive output
-OUTB	15	O	Right channel negative output
+OUTB	17	O	Right channel positive output
VDD	3、16		Power supply
Hp Sense	20	I	Headphone control terminal
HP Logic	21		Headphone logic control terminal
$\overline{\text{Shutdown}}$	23	I	Shutdown terminal (active low logic)
Bypass	13		Adding a bypass capacitor
GND	1、7、11、18、19、22、24		High-current ground
GND/NC	8、9、10		Ground（No Connect）

■ Function Block Diagram



■ Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	V_{DD}	-0.3—6.0	V
Input Voltage	V_{IN}	-0.3—V_{DD}+0.3	V
Power Output	—	Internal limit	
Junction Temperature	—	-150	℃
Storage Temperature	Tstg	-65—150	℃
ESD Susceptibility	-	2000	V

■ Electrical Characteristics

(VDD = 5V Unless otherwise specified. Limits apply for TA = 25°C.)

Symbol	Parameters	Test Conditions	Min.	Typ.	Max.	Unit
VDD	Supply voltage	—	2.7	—	5.5	V
I_{DD}	Quiescent Power Supply Current	VIN = 0V, I_O = 0A, BTL	1	4	7.5	mA
		VIN = 0V, I_O = 0A, SE	—	2	—	mA
I_{SD}	Shutdown Current	$V_{SHUTDOWN}$ = 0V	—	0.04	1	μA
V_{IH}	HP, $\overline{Shutdown}$ Voltage Input High	—	1.4	—	—	V
V_{IL}	HP, $\overline{Shutdown}$ Voltage Input Low	—	—	—	0.4	V
T_{WU}	Wake up time	1uF Bypass capacitor		100		ms

■ Electrical Characteristics For Bridged-Mode Operation

(VDD = 5V Unless otherwise specified. Limits apply for TA = 25°C.)

Symbol	Parameters	Test Conditions	Min.	Typ.	Max.	Unit
V_{OS}	Output Offset Voltage	VIN = 0V	—	5	50	mV
P_O	Output Power	THD+N = 1%; f = 1 kHz RL=8Ω RL=4Ω	 1.0 —	 1.3 2.2	—	W
		THD+N = 10%; f = 1 kHz RL=8Ω RL=4Ω	 — —	 1.7 2.5	—	W
THD+N	Total Harmonic Distortion+Noise	AVD=2; f=1kHz RL=8Ω,P_O=0.4W	—	0.06	—	%
PSRR	Power Supply Rejection Ratio	VDD=5V ,V_{ripple} = 200mV_{p-p}， 0C_{BP}=1μF, RL=8Ω	—	80	—	dB
XTALK	Channel Separation	f=1kHz,C_{BP}=1μF	—	100	—	dB
SNR	Signal To Noise Ratio	VDD=5V， RL=8Ω,PO=1.1mW	—	98	—	dB

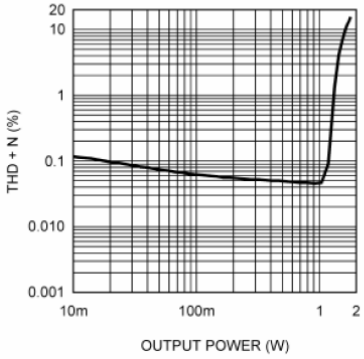
■ Electrical Characteristics For Single-Ended Operation

(VDD = 5V Unless otherwise specified. Limits apply for TA = 25°C.)

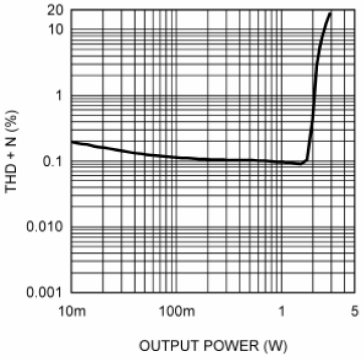
Symbol	Parameters	Test Conditions	Min.	Typ.	Max.	Unit
P_O	Output Power	THD+N= 0.5%; f =1 kHz，RL=32Ω	80	93	—	mW
Vos	Output Offset Voltage	Vin=0V	5	50		mV
THD+N	Total Harmonic Distortion+Noise	Av=-1, f=1kHz, RL=32Ω,PO=20mW	—	0.015	—	%
PSRR	Power Supply Rejection Ratio	f =1kHz ,V_{ripple} = 200Mv_{RMS}，C_B=1μF	—	80	—	dB
XTALK	Channel Separation	f=1kHz,CBP=1μF	—	90	—	dB
SNR	Signal To Noise Ratio	VDD=5V，RL=8Ω,PO=340mW	—	95	—	dB

■ Typical Performance Characteristics

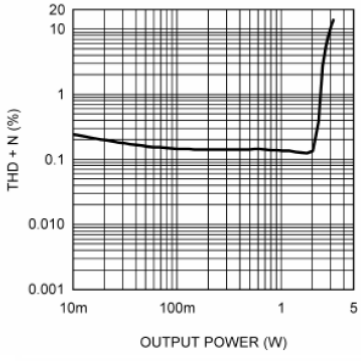
THD+N vs Output Power
5V, 8Ω, BTL at 1kHz



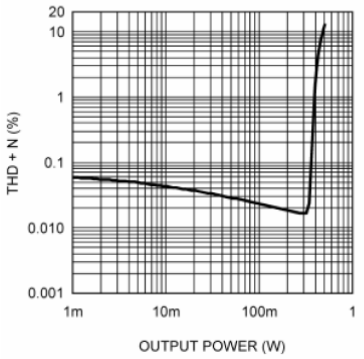
THD+N vs Output Power
5V, 4Ω, BTL at 1kHz



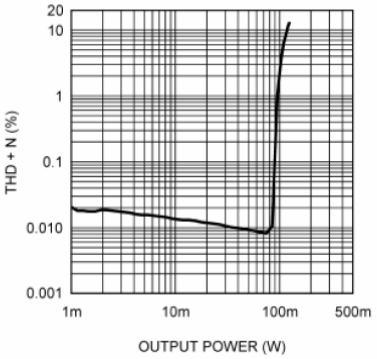
THD+N vs Output Power
5V, 3Ω, BTL at 1kHz



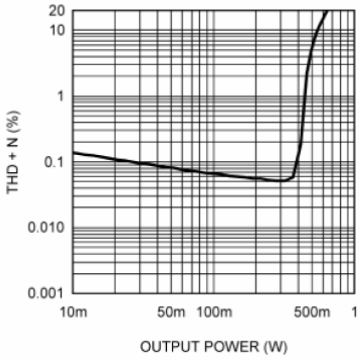
THD+N vs Output Power
5V, 32Ω, BTL at 1kHz



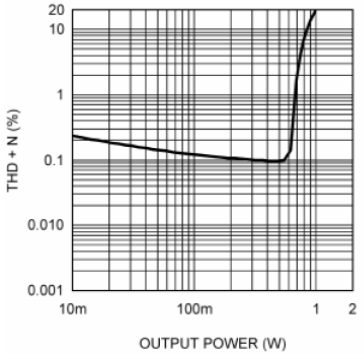
THD+N vs Output Power
5V, 32Ω, SE at 1kHz



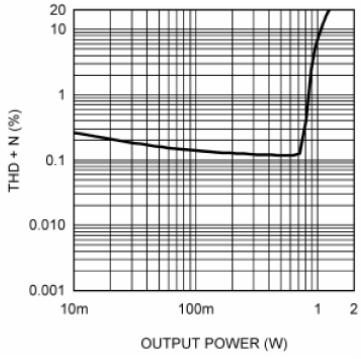
THD+N vs Output Power
3V, 8Ω, BTL at 1kHz



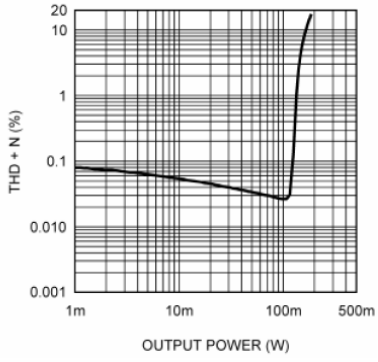
THD+N vs Output Power
3V, 4Ω, BTL at 1kHz



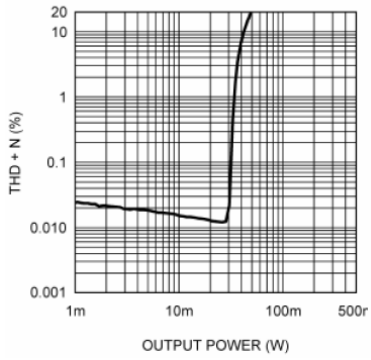
THD+N vs Output Power
3V, 3Ω, BTL at 1kHz



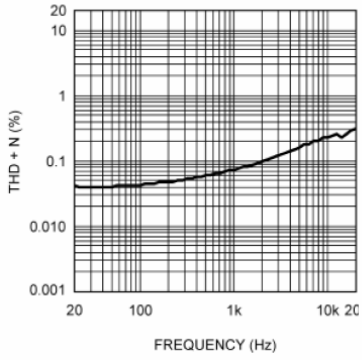
THD+N vs Output Power
3V, 32Ω, BTL at 1kHz



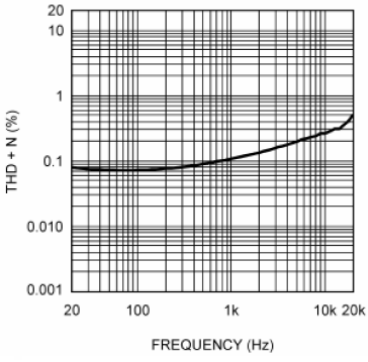
THD+N vs Output Power
3V, 32Ω, SE at 1kHz



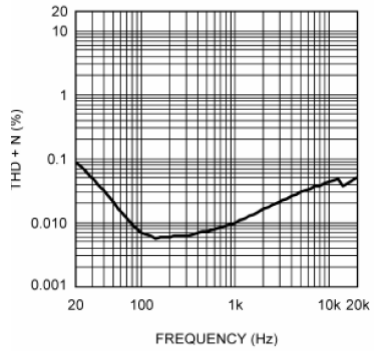
THD+N vs Frequency
5V, 8Ω, BTL at 400mW



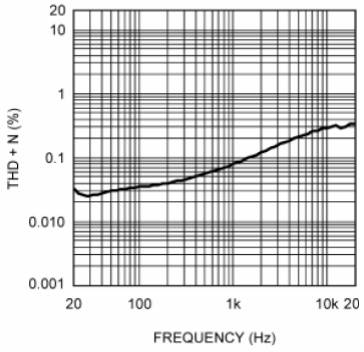
THD+N vs Frequency
5V, 4Ω, BTL at 1W



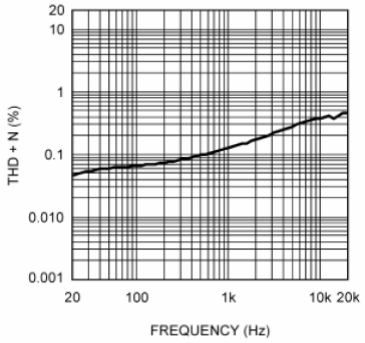
THD+N vs Frequency
5V, 32Ω, SE at 75mW



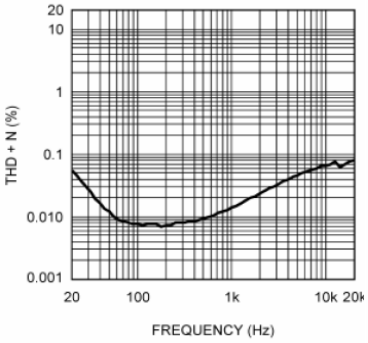
THD+N vs Frequency
3V, 8Ω, BTL at 150mW



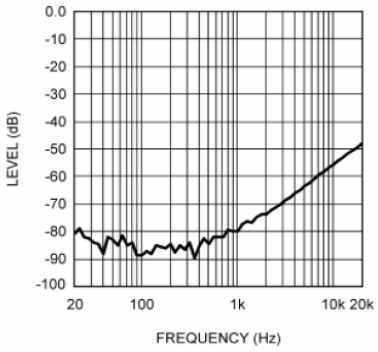
THD+N vs Frequency
3V, 4Ω, BTL at 250mW



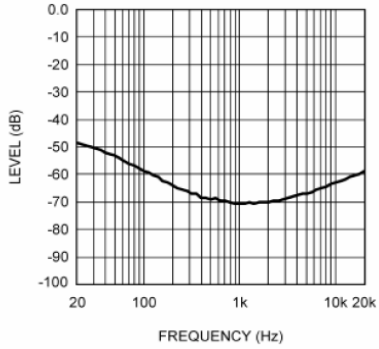
THD+N vs Frequency
3V, 32Ω, SE at 25mW



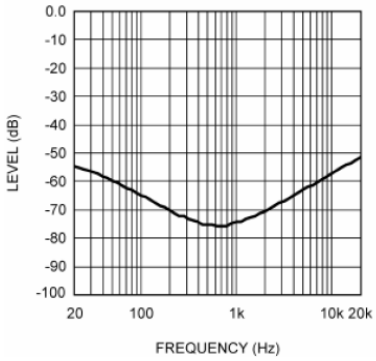
PSRR
5V, 8Ω, BTL, Input Unterminated



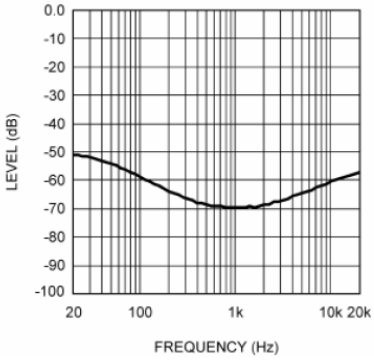
PSRR
5V, 8Ω, BTL, Input Terminated



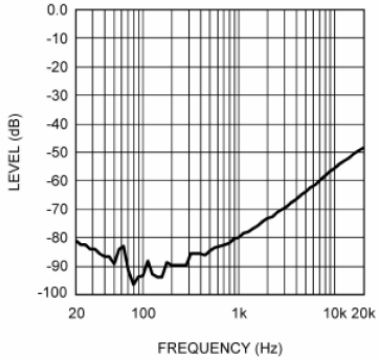
PSRR
5V, 32Ω, SE, Input Unterminated



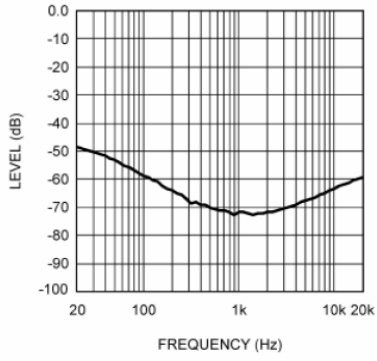
PSRR
5V, 32Ω, SE, Input Terminated



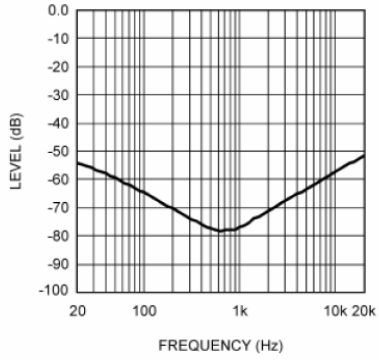
PSRR
3V, 8Ω, BTL, Input Unterminated



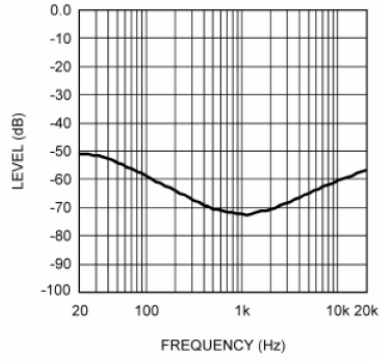
PSRR
3V, 8Ω, BTL, Input Terminated



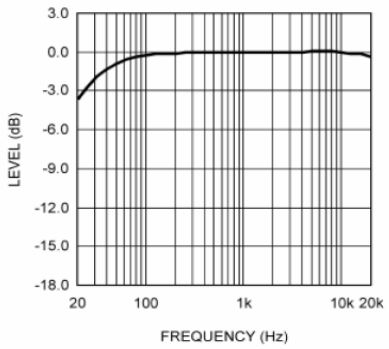
PSRR
3V, 32Ω, SE, Input Unterminated



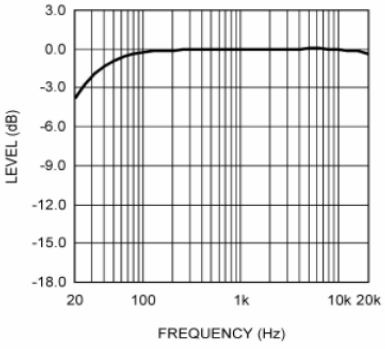
PSRR
3V, 32Ω, SE, Input Terminated



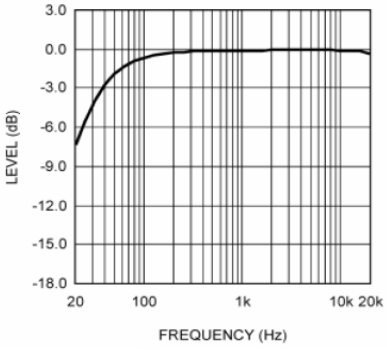
Frequency Response
5V, 8Ω, BTL



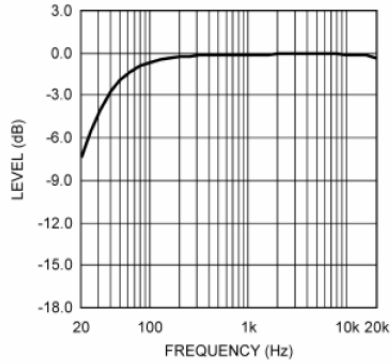
Frequency Response
3V, 8Ω, BTL



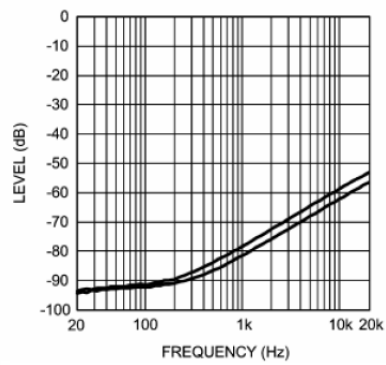
Frequency Response
5V, 32Ω, SE



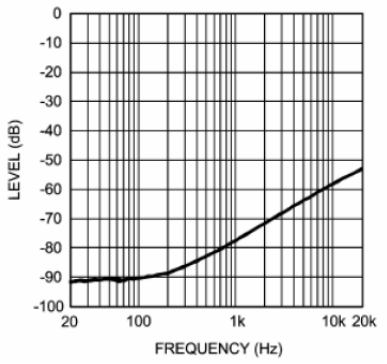
Frequency Response
3V, 32Ω, SE



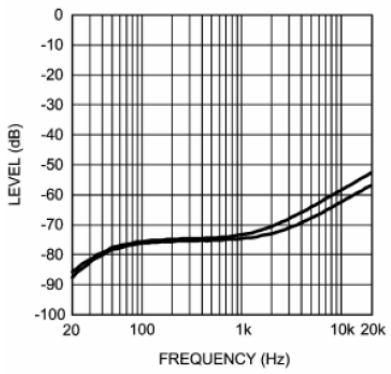
Crosstalk
5V, 8Ω, BTL



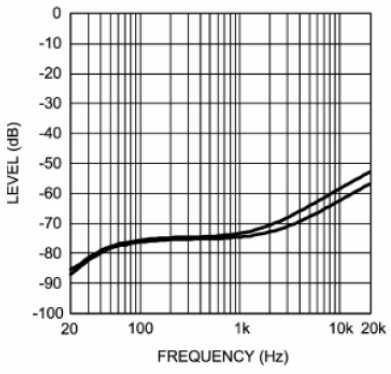
Crosstalk
3V, 8Ω, BTL



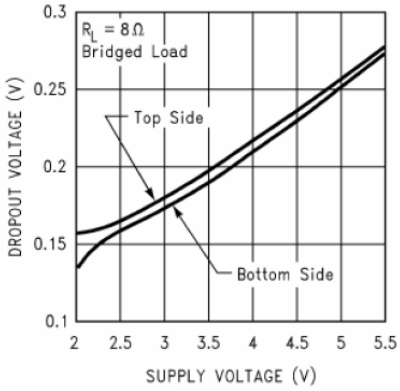
Crosstalk
3V, 32Ω, SE



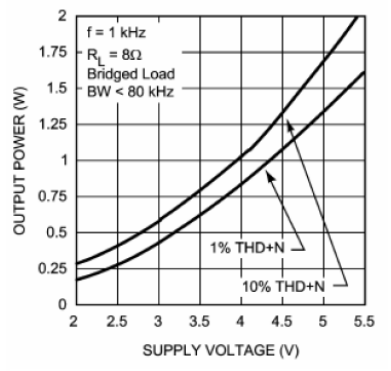
Crosstalk
5V, 32Ω, SE



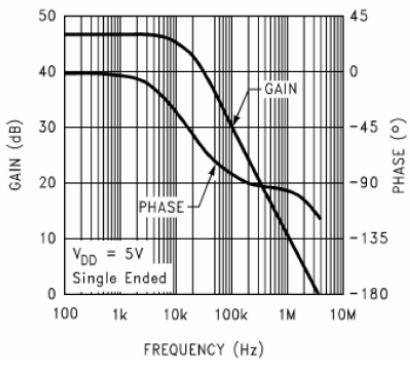
Dropout Voltage vs
Supply Voltage



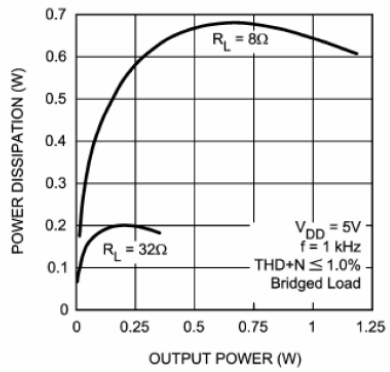
Output Power vs
Supply Voltage



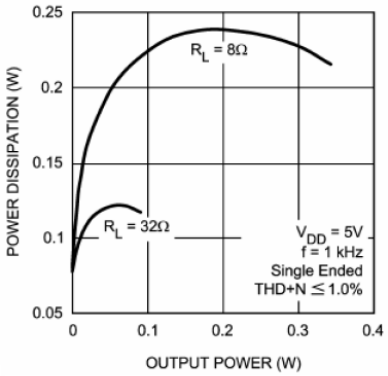
Open Loop
Frequency Response



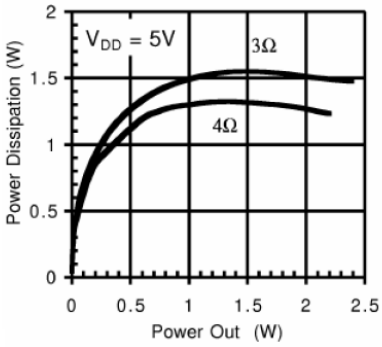
Power Dissipation vs
Output Power



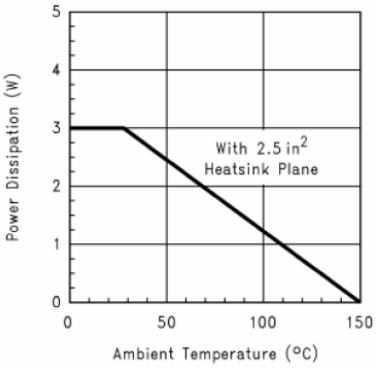
Power Dissipation vs Output Power



Power Dissipation vs Output Power
Single Channel, f = 1kHz, THD+N ≤ 1.0%, BW < 80kHz

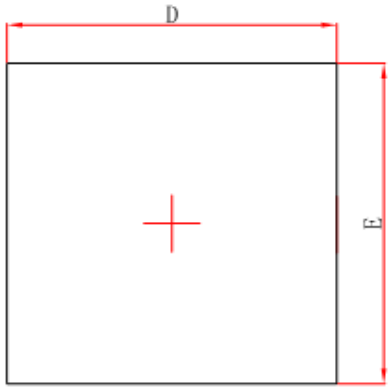


Power Derating Curve

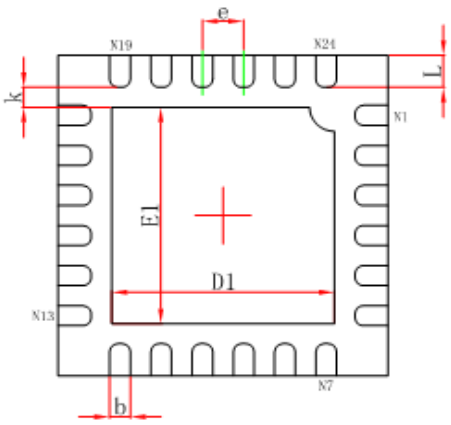


■ Package Information

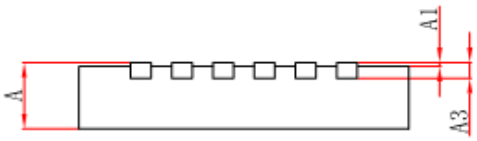
- **QFN4×4-24**



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	3.900	4.100	0.154	0.161
E	3.900	4.100	0.154	0.161
D1	2.600	2.800	0.102	0.110
E1	2.600	2.800	0.102	0.110
k	0.200MIN.		0.008MIN.	
b	0.180	0.300	0.007	0.012
e	0.500TYP.		0.020TYP.	
L	0.300	0.500	0.012	0.020