2W Stereo Audio Power Amplifier with Shutdown Mode

General Description

The EMA1201 is a stereo bridged audio power amplifier capable of delivering 1.2W of continuous average power into a 8Ω load or 1.7W into 4Ω with less than 1% THD when powered by a 5V power supply. It does not require output coupling capacitors or bootstrap capacitors, and is ideal for mobile phone and other low voltage applications where minimal power consumption is a primary requirement.

The EMA1201 features a low-power consumption shutdown mode, and an internal thermal shutdown protection mechanism. Advanced pop & click circuitry is built in to eliminate noises that would otherwise occur during turn-on and turn-off transitions. The EMA1201 is unity-gain stable and can be configured by external gain-setting resistors.

EMP products are Pb-free and RoHS compliant.

Key Specifications

- BTL mode P_O at THD+N=1%, f=1kHz, V_{DD} =5V
  1.7 W (typ) into 4Ω
  1.2 W (typ) into 8Ω
- BTL mode P_O at THD+N=10%, f=1kHz, V_{DD} =5V
  2 W (typ) into 4Ω
  1.5 W (typ) into 8Ω
- Shutdown current 0.1μA (typ)

Features

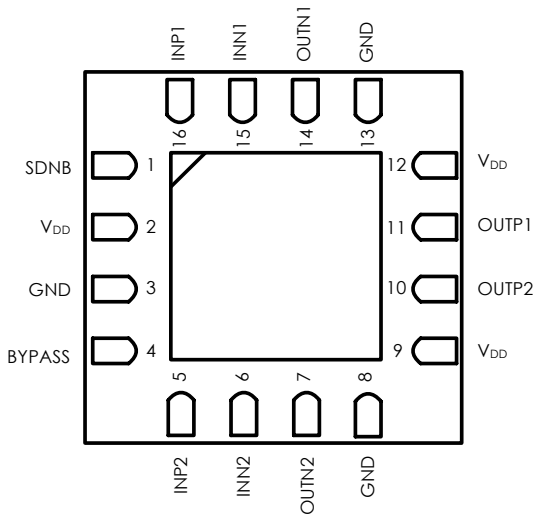
- No output coupling capacitors, bootstrap capacitors, or snubber circuits required
- Unity-gain stable
- TQFN
- External gain configuration capability

Applications

- Portable Computers
- Desktop computers

Connection Diagram

TQFN Package

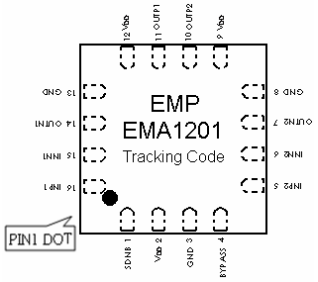


Order information

EMA1201-50HB16GRR/NRR

50	5.0V Operation
HB16 (EB16)	TQFN-16 Package
GRR	RoHS (Pb Free) Rating: -40 to 85°C Package in Tape & Reel
NRR	RoHS & Halogen free (By Request) Rating: -40 to 85°C Package in Tape & Reel

Order, Mark & Packing Information

Package	Product ID	Marking	Packing
TQFN-16	EMA1201-50HB16GRR		5K units Tape & Reel

Typical Application

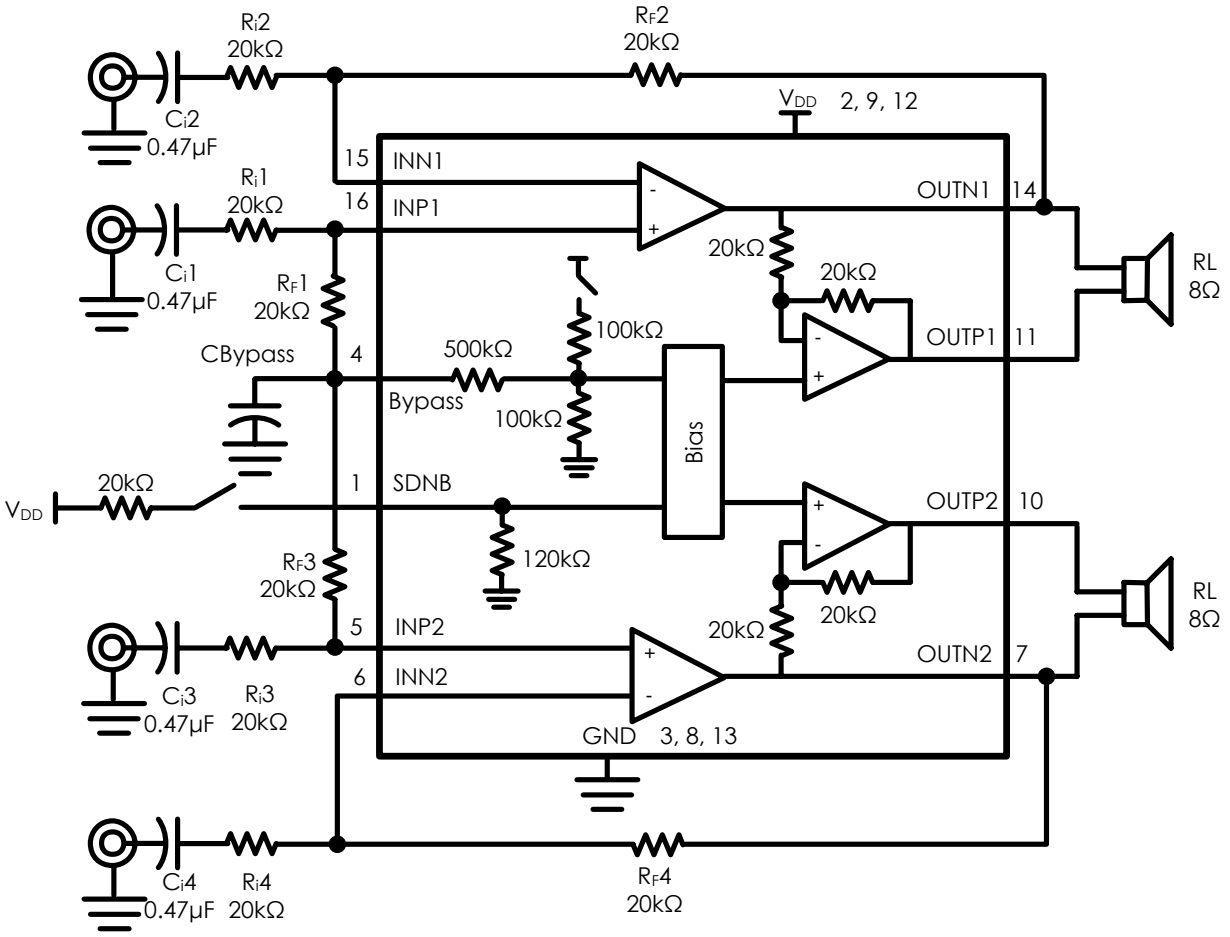


FIGURE 2. Typical Audio Amplifier Application Circuit with differential input

Absolute Maximum Ratings

Supply Voltage	6.0V	Thermal Resistance	
Storage Temperature	-65°C to +150°C	θ_{JA} (TQFN)	190°C/W
Input Voltage	-0.3V to VDD +0.3V		
Power Dissipation	Internally Limited	Operating Ratings	
ESD Susceptibility	HBM 2kV	Temperature Range	-40°C ≦ TA ≦ 85°C
	MM 200V	Supply Voltage	2.5V ≦ VDD ≦ 5.5V
Junction Temperature	150°C		

Electrical Characteristics

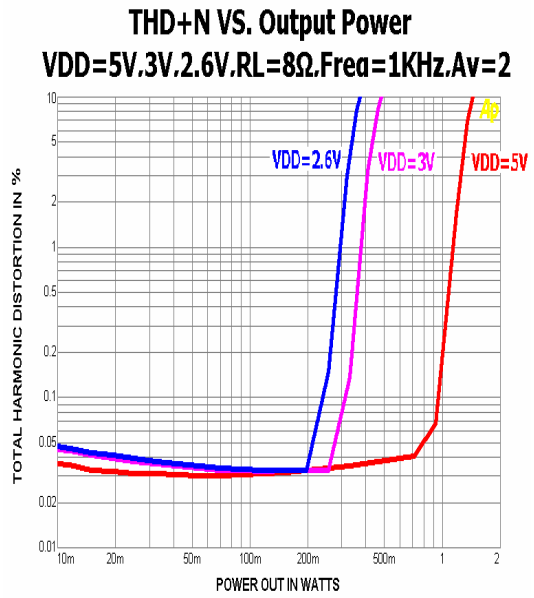
The following specifications apply for V_{DD} = 5V and R_L = 8Ω unless otherwise specified. Limits apply for T_A = 25°C.

Symbol	Parameter	Conditions	Conditions			Units (Limits)
			Min	Typical	Limit	
I_{DD}	Quiescent Power Supply Current	V_{IN} = 0V, Io = 0A		3.5	8.0	mA
I_{SD}	Shutdown Current	V_{SDNB} = GND		0.1	1.0	μA
V_{OS}	Output Offset Voltage	V_{IN} = 0V		5.0	50	mV
P_O	Output Power	THD + N = 1 %, f = 1kHz R_L = 4Ω R_L = 8Ω		1.7 1.2		W
		THD + N = 10 %, f = 1kHz R_L = 4Ω R_L = 8Ω		2.0 1.5		W
THD+N	Total Harmonic Distortion + Noise	f = 1kHz, AV=2, P_O=0.25W R_L = 8Ω		0.03		%
PSRR	Power Supply Rejection Ratio	V_{RIPPLE}=200mV, sine p-p at 217Hz, input 10Ω to GND		60	55	dB

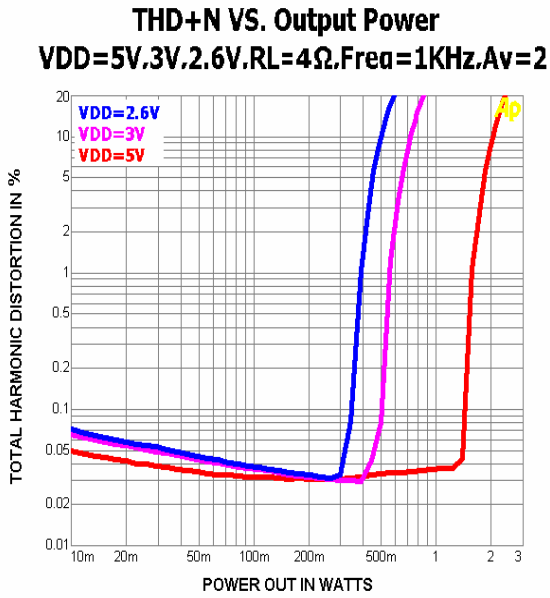
The following specifications apply for V_{DD} = 2.6V and R_L = 8Ω unless otherwise specified. Limits apply for T_A = 25°C.

Symbol	Parameter	Conditions	Conditions			Units (Limits)
			Min	Typical	Limit	
I_{DD}	Quiescent Power Supply Current	V_{IN} = 0V, Io = 0A		2.5	5.0	mA
I_{SD}	Shutdown Current	V_{SDNB} = GND		0.1	1.0	μA
V_{OS}	Output Offset Voltage	V_{IN} = 0V		5.0	50	mV
P_O	Output Power	THD + N = 1 %, f = 1kHz R_L = 4Ω R_L = 8Ω		0.4 0.3		W
		THD + N = 10 %, f = 1kHz R_L = 4Ω R_L = 8Ω		0.5 0.38		W
THD+N	Total Harmonic Distortion + Noise	f = 1kHz, AV=2, P_O=0.1W R_L = 8Ω		0.03		%
PSRR	Power Supply Rejection Ratio	V_{RIPPLE}=200mV, sine p-p at 217Hz, input 10Ω to GND		60	55	dB

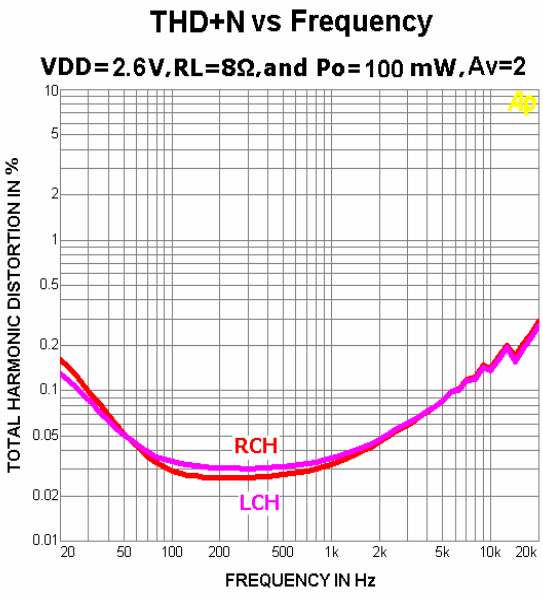
Typical Performance Characteristics



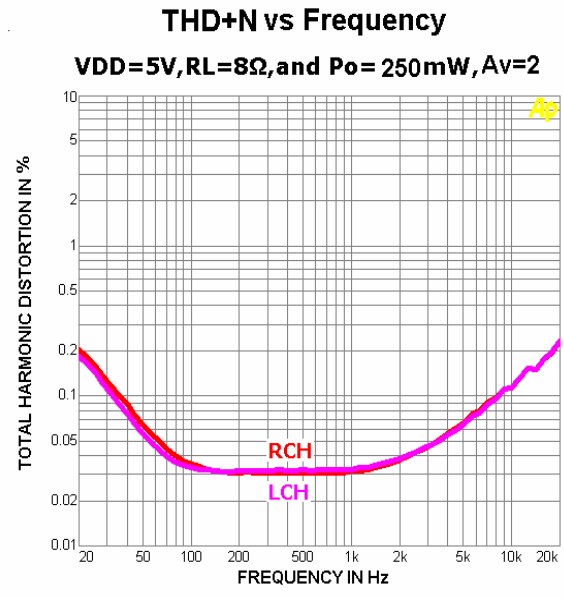
THD + Noise vs Output Power



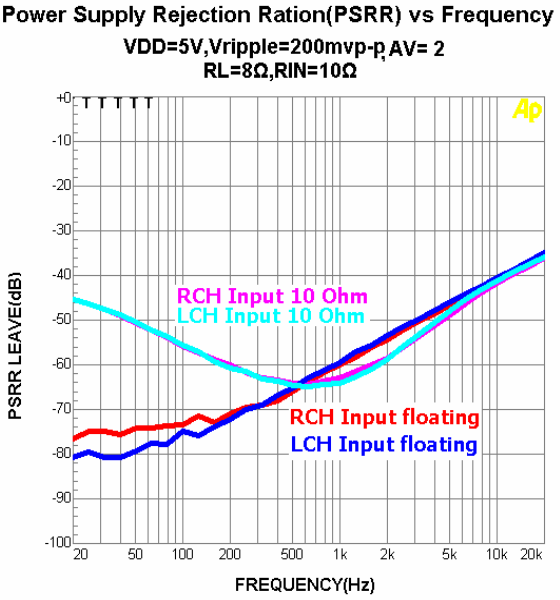
THD + Noise vs Output Power



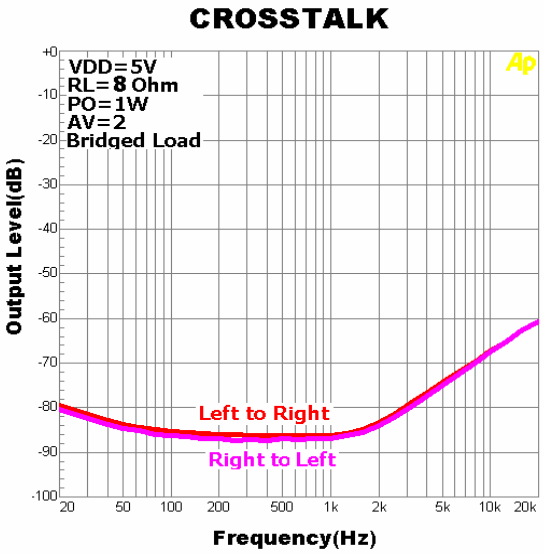
THD + Noise vs Frequency



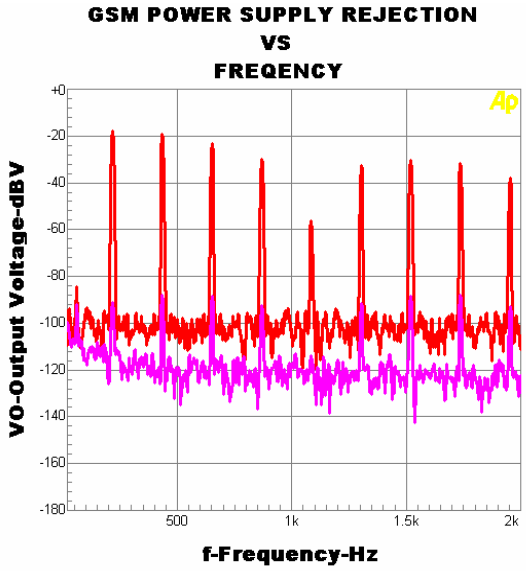
THD + Noise vs Frequency



PSRR

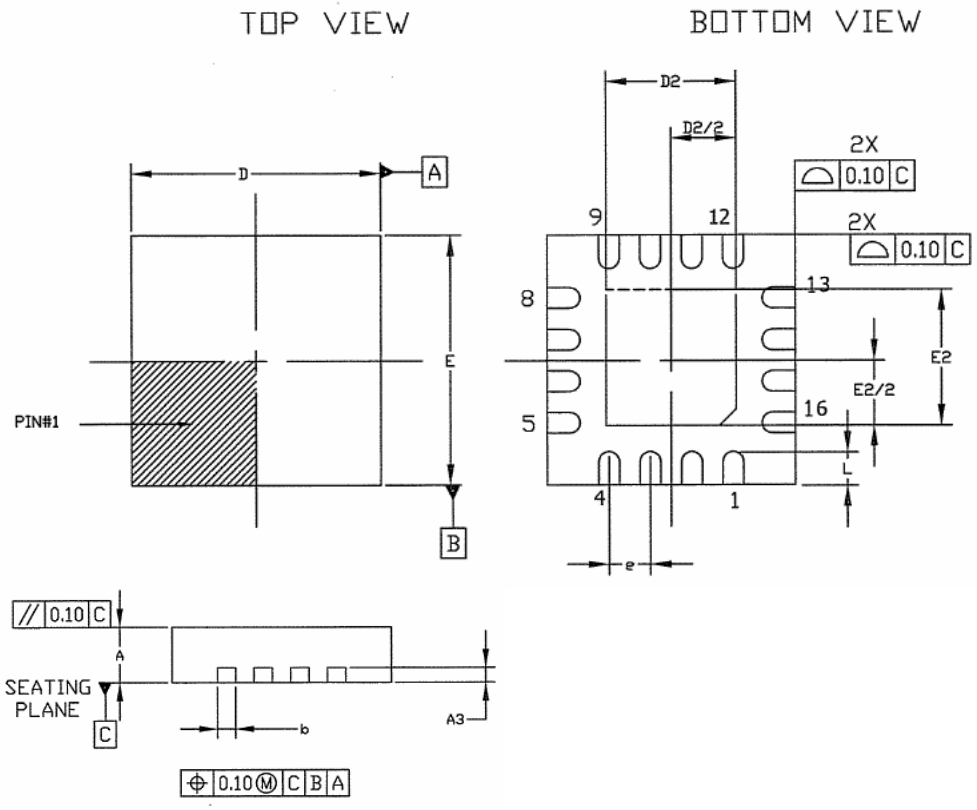


Crosstalk



3.6V power supply with
square wave 500mVp-p, f=217Hz, duty=20%

TQFN-16 Outline Dimension



SIDE VIEW

SYMBOL	COMMON					
	DIMENSIONS MILLIMETER			DIMENSIONS INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.027	0.029	0.031
A3	0.195	0.203	0.211	0.0077	0.008	0.0083
b	0.18	0.23	0.30	0.007	0.009	0.012
D	2.95	3.0	3.05	0.116	0.118	0.120
E	2.95	3.0	3.05	0.116	0.118	0.120
e	0.50 BSC			0.020 BSC		
L	0.35	0.40	0.45	0.014	0.016	0.018

SYMBOL	D2/E2			D2/E2		
	DIMENSIONS MILLIMETER			DIMENSIONS INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
OPTION 1	1.50/1.50	1.625/1.625	1.75/1.75	0.059/0.059	0.064/0.064	0.069/0.069

Revision History

Revision	Date	Description
4.0	2009.06.05	EMP transferred from version 3.0

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