

RC5502

Dual High Power Audio Amplifier

Features

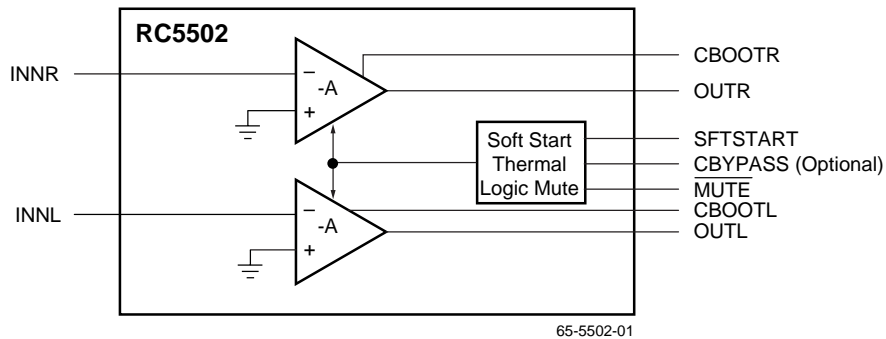
- 3W/channel into an 8 ohm speaker with $V_{CC}=12V$
- No pop during power-up and power-down
- Speaker mute control pin
- Internal thermal limiting circuitry
- User definable gain
- Self-centering output bias voltage
- Total Harmonic Distortion < 0.1%

Description:

The RC5502 is a stereo audio amplifier for use in directly driving non-powered speakers. The RC5502 amplifier can provide up to 3 watts of peak power into an 8 ohm speaker load from a 12 volt supply. The gain of the RC5502 is user

defined by the selection of the appropriate feedback resistors. The RC5502 has internal circuitry for the prevention of “popping” with power-up/power-down and internal thermal limiting circuitry.

Block Diagram



Preliminary Information

Functional Description:

The RC5502 stereo sound amplifier is an audio device that can be used on PC motherboards and add-in sound cards. It consists of stereo output amplifiers which can drive 4 and 8 ohm speakers without popping during power-up/power-down, a mute control pin for disabling the power amplifiers and internal thermal limiting circuitry.

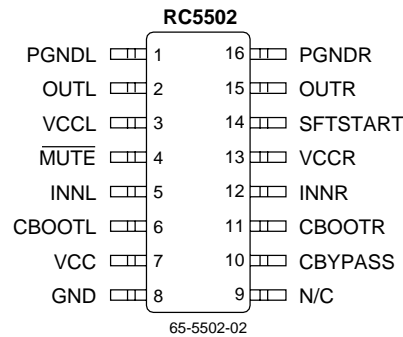
The power amplifiers can deliver 3 watts per channel of peak power to an 8 ohm speaker with a 12 volt power supply. This is accomplished by using an external boot strap capacitor to raise the internal base voltage of the output transistor. In this application, the output voltage can swing ± 5 volts into an 8 ohm speaker load with only a 12 volt supply. The user defines the amplifier gain so the output power level can be optimized based on the input signal level.

To prevent turn-on speaker pop, a time delay is provided to the power amplifiers during power-up to allow the output voltage to settle before the amplifiers are activated. This time constant is user defined through an external capacitor on the SFTSTART pin.

The positive (+) input signals for both amplifiers are internally biased at approximately 6.2 volts and this sets the “AC ground” reference level for the amplifiers. This reference signal is connected to pin 10. This signal is internally generated, however, an external bypass capacitor can be connected to this pin to improve the L/R channel cross talk.

The internal thermal limiting circuitry activates if the chip temperature typically exceeds 150°C.

Pin Assignments



Pin Definitions

Pin Name	Pin Number	Pin Function Description
PGNDL	1	Left Amplifier ground.
OUTL	2	Left Amplifier output.
VCCL	3	Left Amplifier 12V power supply.
MUTE	4	Amplifier mute. (L=Disable, H=Enable)
INNL	5	Left Amplifier IN.
CBOOTL	6	Left Amplifier VBoot Capacitor.
VCC	7	12V power supply.
GND	8	Ground.
NC	9	No Connection.
CBYPASS	10	Bypass Capacitor. (optional)
CBOOTR	11	Right Amplifier VBoot Capacitor.
INNR	12	Right Amplifier IN.
VCCR	13	Right Amplifier 12V Power Supply
SFTSTART	14	Soft Start Timing Capacitor
OUTR	15	Right Amplifier Output.
PGNDR	16	Right speaker ground.

Absolute Maximum Ratings

(beyond which the device may be damaged)¹

Parameter		Min	Typ	Max	Units
VCC VCCR VCCL	Power supply voltage			13.2	V

Note:

1. Functional operation under any of these conditions is NOT implied. Performance is guaranteed only if Operating Conditions are not exceeded.

Operating Conditions

Parameter		Conditions	Min	Typ	Max	Units
VCC VCCL VCCR	Power Supply		11.2	12	12.8	V
V _{IH}	Input Voltage Logic High		2			V
V _{IL}	Input Voltage Logic Low				0.8	V
	Ambient Temperature		0		70	°C
T _c	Maximum Operation Die Temperature	Overthermal Protection		150		°C
I _{total}	Power Supply Current	No load		19	25	mA
ESD	ESD Threshold	Human Body Model	2000			V

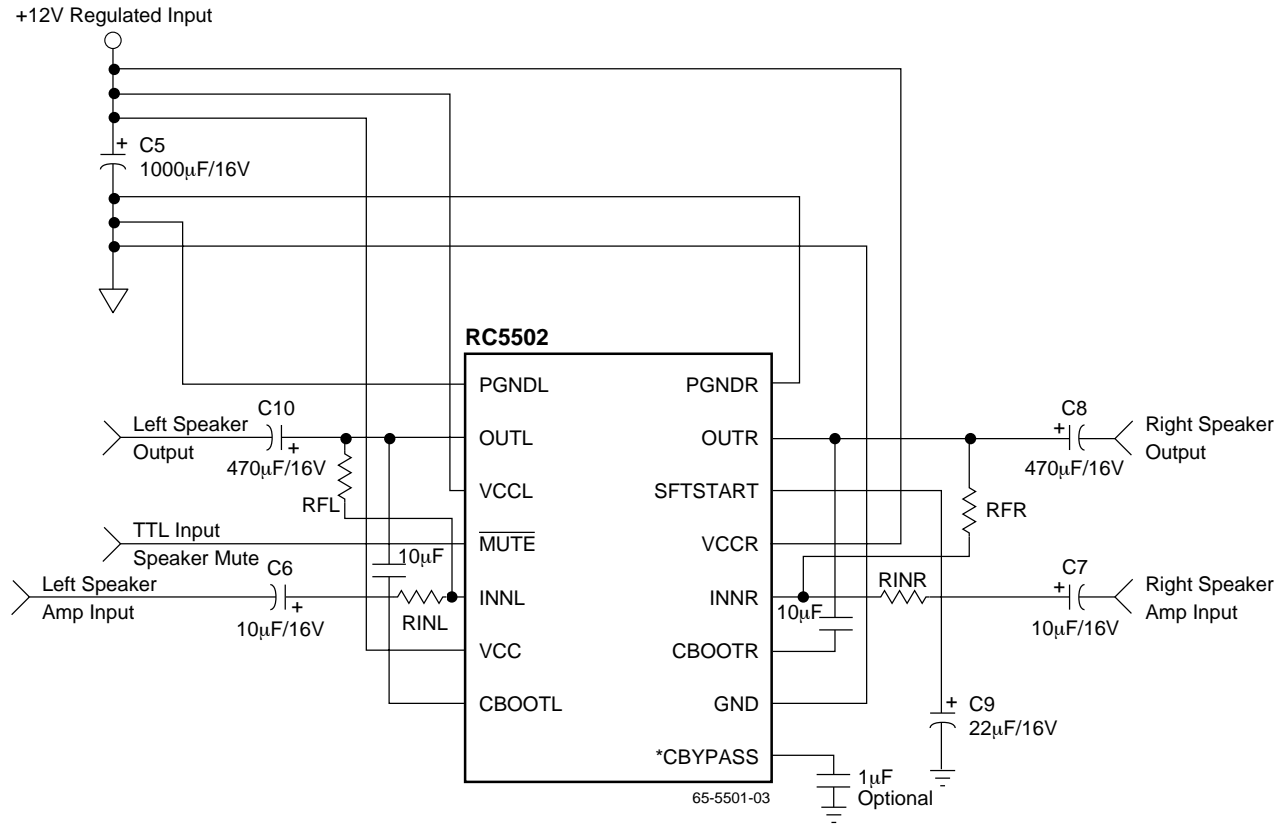
Electrical Characteristics

VCC = VCCL = VCCR = 12V ± 6%, unless otherwise specified.

Parameter		Conditions	Min	Typ	Max	Units
		f = 1KHz, RL = 8Ω unless otherwise specified				
Z _{in}	Input Impedance		100			KΩ
V _o	Output Voltage	RL = 8Ω, VCC = 12V		±5		V
SNR	Signal to Noise Ratio	Input Referenced		85		dB
P _o	Power Output Per Channel Peak	RL = 8Ω, VCC = 12V (See Figure 1)		3		W
CS	Channel Separation L/R Input Referenced	V _{in} = 0.5 V _{rms}	66			dB
THD	Total Harmonic Distortion	f _o = 1KHz, P _o = 50mW		0.1		%
Noise		20Hz to 20kHz, A-Weighted		4		μV _{rms}
PSRR	Power Supply Rejection Ratio Input Referenced	f = 100Hz, ΔV _{cc} = 1.6Vp-p	70	80		dB
Soft Start						
Delay	Anti-Pop Ramp-Up and Ramp-Down time	No Pop condition C _{DELAY} = 22μF on SFTSTART		2		sec

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Applications Discussion



Notes:
 The gain for each amplifier is user defined and is calculated as follows: $A = -R_f/R_{in}$ with typical values for $R_f = 100K$.
 *Cbypass is optional. An external 1µF bypass capacitor will typically improve the L/R channel cross talk by 20dB.

Figure 1

Preliminary Information

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Preliminary Information

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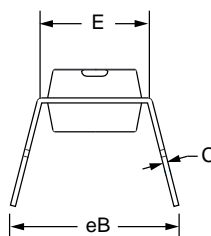
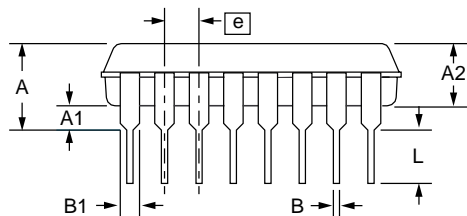
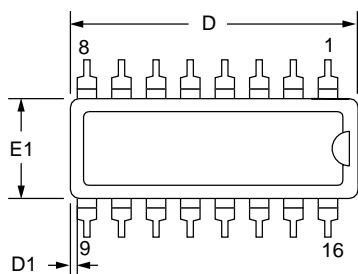
Mechanical Dimensions

16 Lead Plastic DIP Package

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	—	.210	—	5.33	
A1	.015	—	.38	—	
A2	.115	.195	2.93	4.95	
B	.014	.022	.36	.56	
B1	.045	.070	1.14	1.78	
C	.008	.015	.20	.38	4
D	.745	.840	18.92	21.33	2
D1	.005	—	.13	—	
E	.300	.325	7.62	8.26	
E1	.240	.280	6.10	7.11	2
e	.100 BSC		2.54 BSC		
eB	—	.430	—	10.92	
L	.115	.160	2.92	4.06	
N	16		16		5

Notes:

1. Dimensioning and tolerancing per ANSI Y14.5M-1982.
2. "D" and "E1" do not include mold flashing. Mold flash or protrusions shall not exceed .010 inch (0.25mm).
3. Terminal numbers are shown for reference only.
4. "C" dimension does not include solder finish thickness.
5. Symbol "N" is the maximum number of terminals.



Preliminary Information

Ordering Information

Product Number	Package
RC5502N	16 PDIP

Preliminary Information

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