



SANYO Semiconductors

DATA SHEET

LA42201 — Monolithic Linear IC Audio Output for TV application BTL 20W Monaural Power Amplifier

Overview

The LA42201 is a 20W monaural power amplifier IC and optimal for use as the audio output power amplifier in TV application.

Functions

- 20W Monaural ($V_{CC} = 13V$, $R_L = 4\Omega$, THD = 10%)
- Built-in mute function.
- Built-in various protection circuit (short to power/short to ground/load shorting/thermal/overvoltage protection).

Specifications

Maximum Ratings at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$	No signal	21	V
Allowable power dissipation	$Pd\ max$	Infinitely large heat sink	25	W
Maximum junction temperature	$T_j\ max$		150	$^\circ C$
Thermal resistance	θ_{jc}		3	$^\circ C/W$
Operating temperature	T_{opr}		-25 to +75	$^\circ C$
Storage temperature	T_{stg}		-40 to +150	$^\circ C$

Operating Conditions at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		13	V
Recommended load resistance	R_L		4	Ω
Allowable operating supply voltage range	$V_{CC\ op}$		8 to 16	V

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LA42201

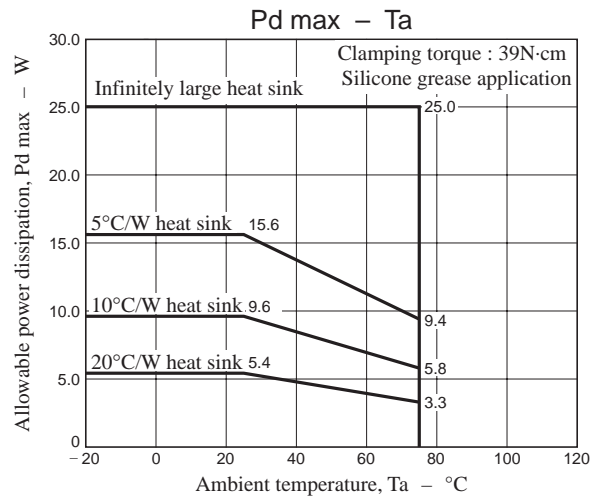
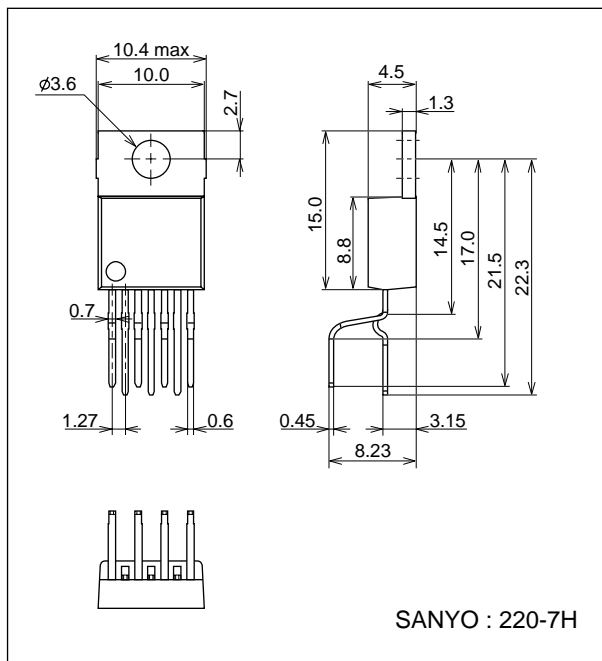
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 13\text{V}$, $R_L = 4\Omega$, $f = 1\text{kHz}$, $R_g = 600\Omega$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	I_{CCO}	$R_g = 0$	30	50	100	mA
Output power	P_O	THD = 10%	17	20		W
Total harmonic distortion	THD	$P_O = 1\text{W}$		0.06	0.3	%
Voltage gain	VG	$V_O = 0\text{dBm}$	28	30	32	dB
Output noise voltage	V_{NO}	$R_g = 0$, BPF = 20Hz to 20kHz		0.2	0.4	mVrms
Ripple rejection ratio	SVRR	$R_g = 0$, $f_R = 100\text{Hz}$, $V_{CCR} = 0\text{dBm}$	30	40		dB
Mute attenuation value	ATT	$V_O = 1\text{Vrms}$, BPF = 20Hz to 20kHz	70	80		dB
Mute control voltage (pin 6)	V_{MUTE-H}	Mute OFF	2.5		5.0	V
	V_{MUTE-L}	Mute ON	0		1.0	V
Input resistance	R_i		35	50	65	k Ω

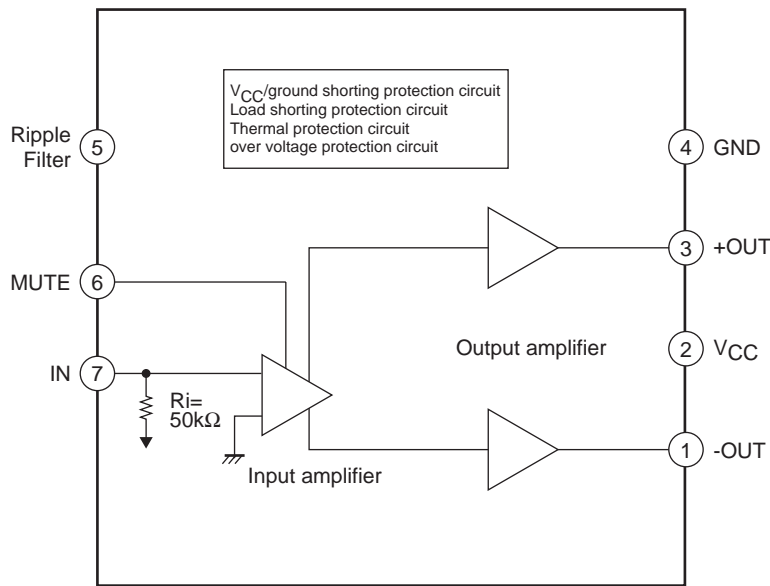
Package Dimensions

unit : mm (typ)

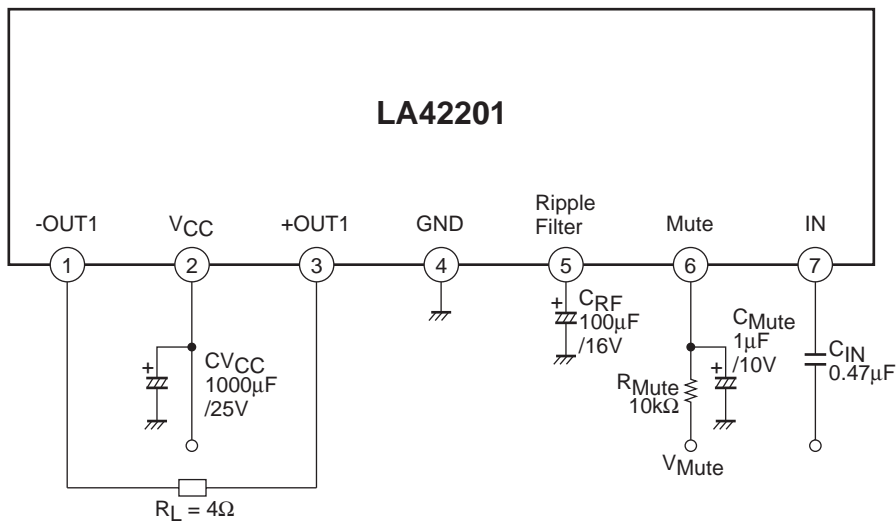
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Block Diagram



Test Circuit



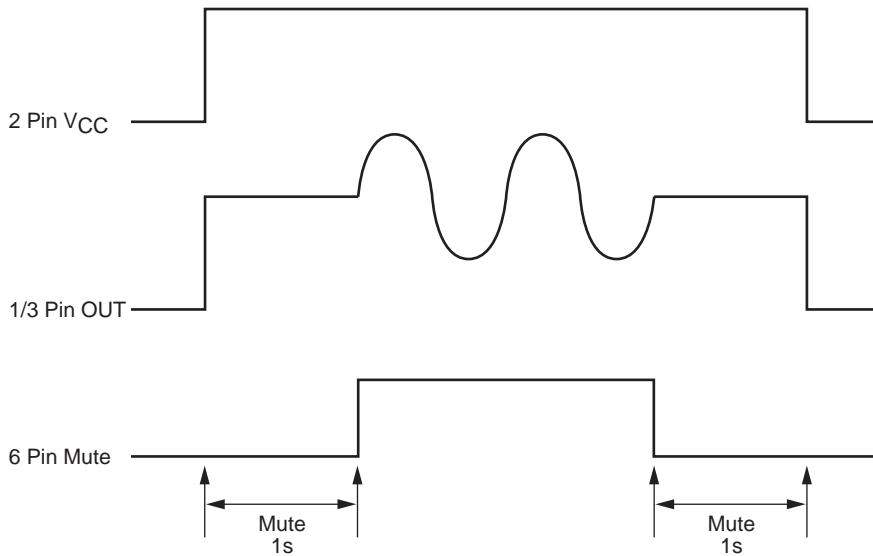
Description of external parts

- C_{IN} : Input coupling capacitor, for which $0.47\mu F$ is recommended. Since the input pin potential is about $1/2 V_{CC}$, the ceramic capacitor with small leak current is recommended.
- C_{RF} : Ripple filter capacitor, for which $100\mu F$ is recommended. Note that the capacitance below $100\mu F$ will cause decrease in the ripple removal ratio.
- C_{Mute} : Capacitor for mute.
- C_{VCC} : Power capacitor.

Cautions

Oscillation of the capacitor between the output pin and GND may cause oscillation. In such an event, insert $0.1\mu\text{F} + 2.2\Omega$ between pins 1 and 3.

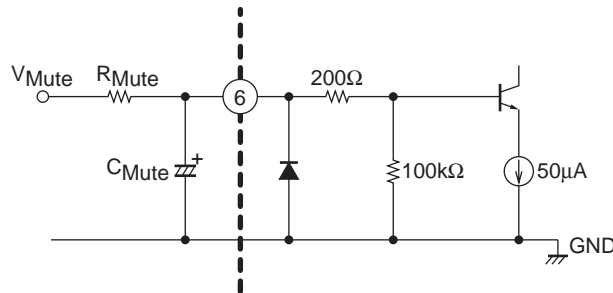
1. Rise and fall of AMP V_{CC} (2Pin), Mute (6Pin)



- When raising AMP, always raise the Mute pin 6 in 1sec after the V_{CC} pin 2.
 - When falling AMP, always fall the V_{CC} pin 2 in 1sec after the Mute pin 6.
- Above procedure will alleviate the shock sound at rise and fall.

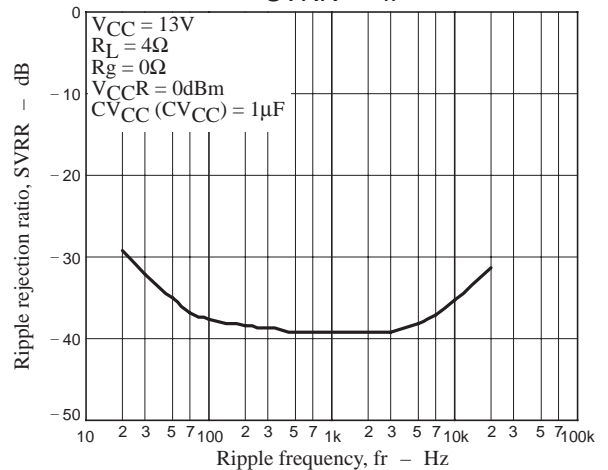
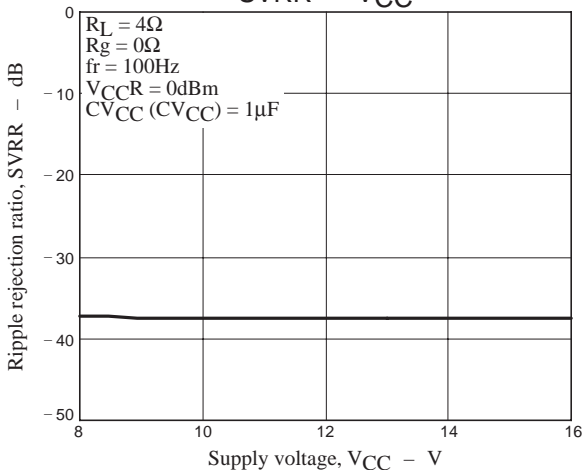
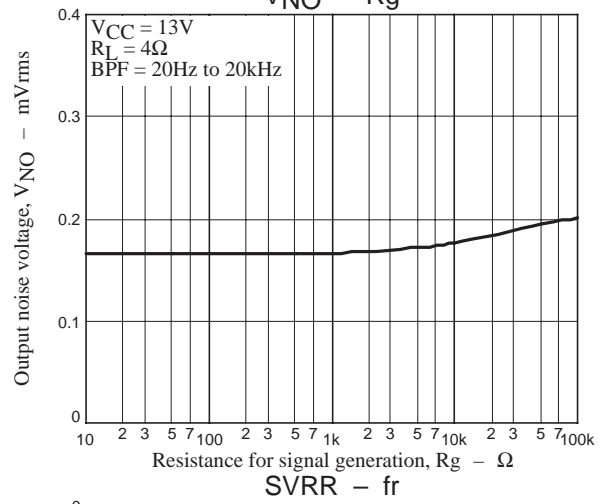
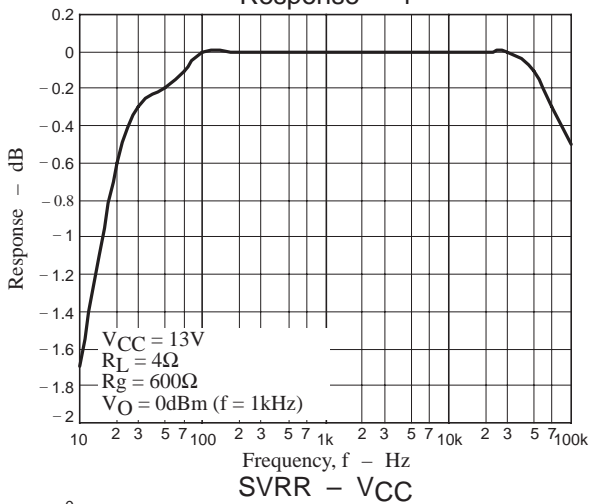
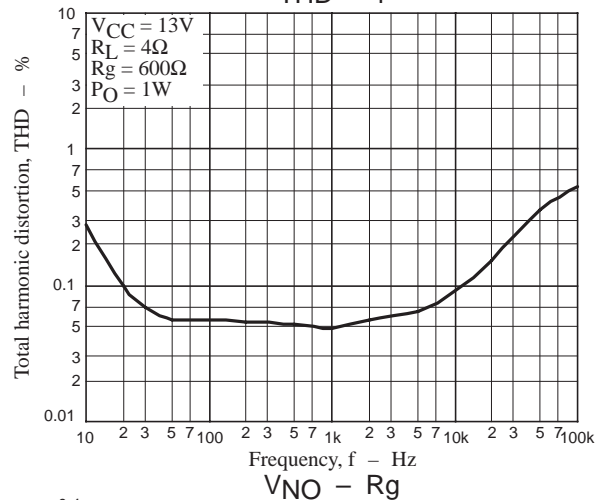
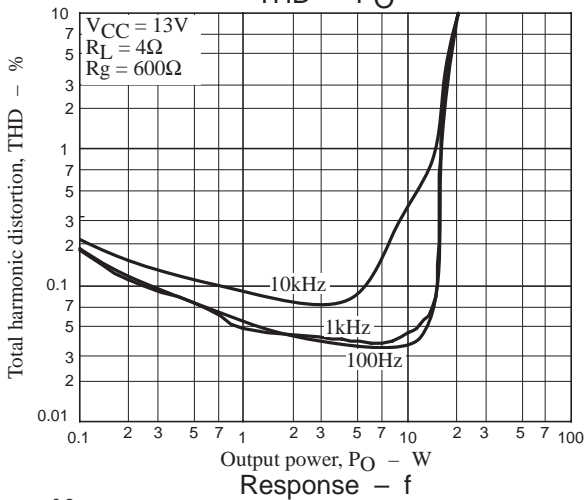
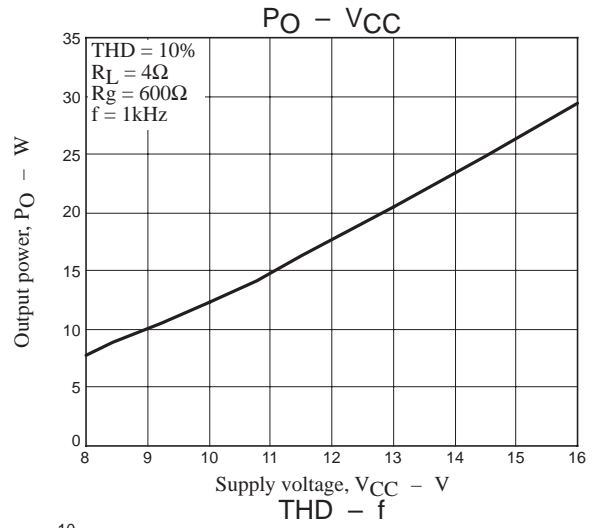
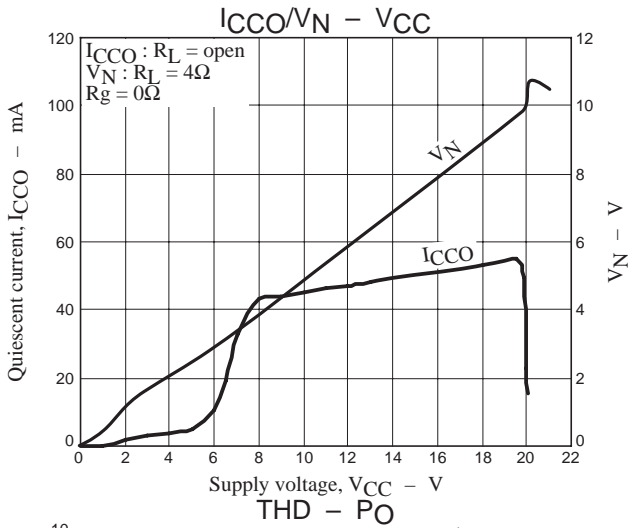
2. Mute function (pin 6)

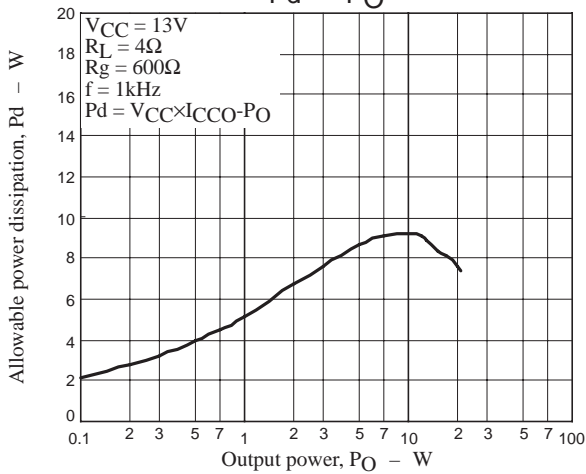
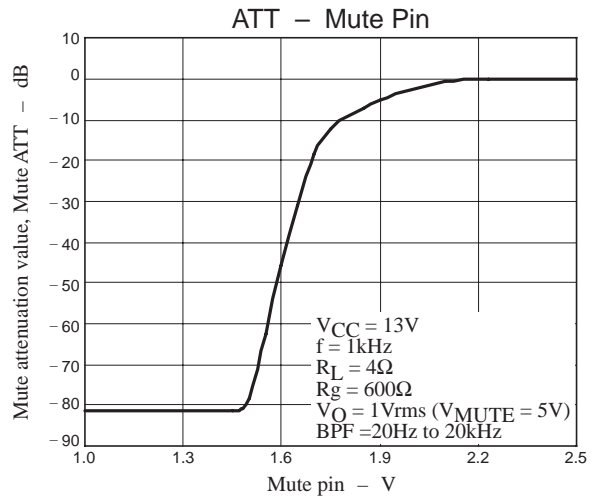
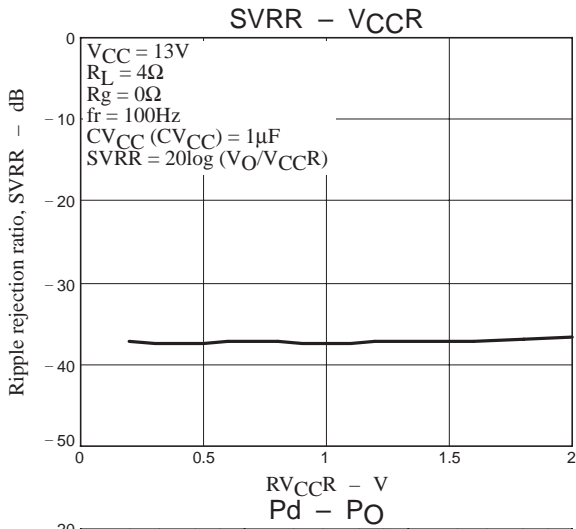
The mute function is turned ON with the pin 6 voltage of 1.0V or less and OFF with the voltage of 2.5V or more. The inrush current to pin 6 is about $50\mu\text{A}$ when V_{Mute} is 5V and R_{Mute} is $10\text{k}\Omega$.



Cautions for use

1. Short-circuit (power – output short-circuit), ground fault (GND – output short-circuit), and load short-circuit protective circuits are incorporated. They are activated in case of abnormal connection. These circuits remain active while such abnormal connection continues and is reset automatically when the abnormality is removed.
2. The thermal protection circuit is incorporated and is activated when the junction temperature (T_j) rises to about 170°C or more. The output is controlled to return gradually to the attenuated state.
3. When the product is used near the maximum rating, even the slightest change in the condition may cause exceeding of the maximum rating, resulting possibly in breakdown. Take the sufficient margin for the supply voltage, etc. and always use the product within a range never exceeding the maximum rating.





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