

SANYO Semiconductors DATA SHEET

Monolithic Linear IC

LA42352—5W 2-Channel AF Power Amplifier With DC Volume Control

Overview

LA42352 is 5W 2-channel AF power amplifier with DC volume control intended for televisions.

LA42000 series is power IC which made Pin compatible possible altogether in 3 to 15W. They consist of four kinds of power ICs. (mono, stereo, mono with volume function, stereo with volume function.). They realized PCB layout communalization of an audio power block of TV.

	DO	Channel		Valore -
	PO	Mono	Stereo	Volume
LA42051	5W	0		
LA42052	5W		0	
LA42351	5W	0		0
LA42352	5W		0	0
LA42071	7W	0		
LA42072	7W		0	
LA42152	15W		0	

Feature

- PO 5W×2ch (V_{CC} = 18V, R_L = 8 Ω , THD = 10%)
- Built-in DC Volume Control.
- Built-in Standby function.
- Built-in overheat protection.

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Specitications

Maximum Ratings at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max	No signal	24	V
Allowable power dissipation	Pd max	Infinite heat sink	15	W
Maximum junction temperature	Tj max		150	°C
Thermal resistance	θјс		3	°C/W
Operating temperature	Topr		-25 to +75	°C
Storage temperature	Tstg		-40 to +150	°C

Operating Conditions at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V _{CC}		18	V
Recommended load resistance	RL		8	Ω
Allowable operating voltage range	V _{CC} op		10 to 22	V

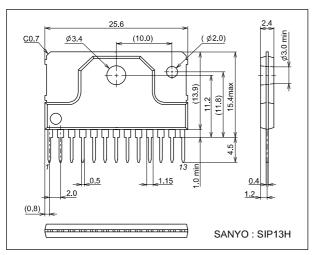
Operating Characteristics at $Ta=25^{\circ}C,\ V_{CC}=18V,\ R_{L}=8\Omega,\ Volume=5V,\ f=1kHz,\ Rg=600\Omega$

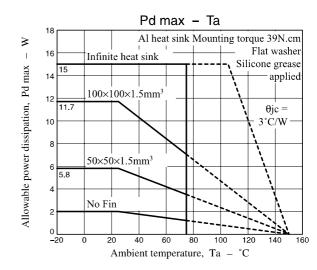
Parameter	Cumbal	Conditions	Ratings			11.2
Parameter	Symbol		min	typ	max	Unit
Standby current	I _{STB}	Amplifier off		1	10	μΑ
Quiescent current	Icco	Rg = 0, Volume = 0V	35	65	130	mA
Output power	PO	THD = 10%	4	5		W
Total harmonic distortion	THD	P _O = 1W		0.1	0.8	%
Voltage gain	VG	V _O = 0dBm	32.5	34.5	36.5	dB
Output noise voltage	V _{NO}	Rg = 0, Volume = 0V, BPF = 20Hz to 20kHz		0.13	0.4	mVrms
Volume Attenuation	Att	V _{IN} = 100mV, Vcont = 0V, with 1k-BPF	70	80		dB
Channel separation	Sep.	Rg = $10k\Omega$, $V_O = 0dBm$	48	55		dB
Standby control voltage	V _{STB} -H	Amplifier on	2.5		10	V
(The Pin 5 voltage)	V _{STB} -L	Amplifier off	0		0.5	V
Input resistance	Ri		14	20	26	kΩ

* $0dBm = 1mW (600\Omega) = 774.6mVrms$

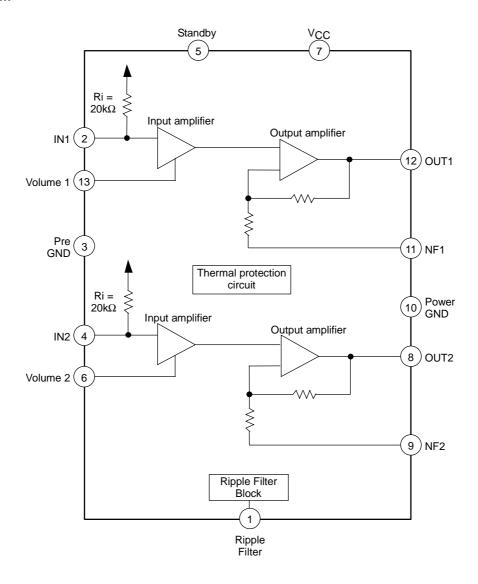
Package Dimensions

unit : mm 3107B

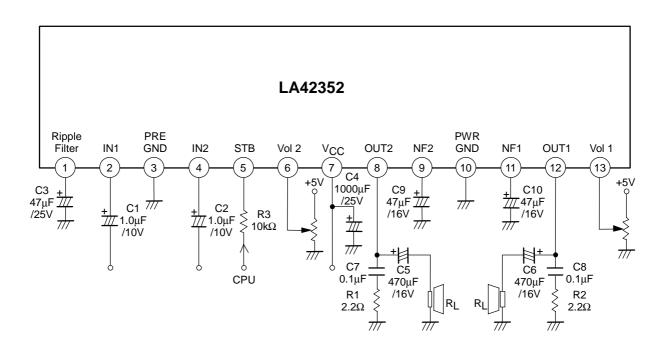




Block Diagram



Sample Application Circuit



Pin Descriptions

Pin No	Symbol	Pin Voltage	Equivalent Circuit	Description
		V _{CC} = 18V	Equivalent Official	
1	RF	17.6	$\begin{array}{c c} & & & & \\ & & & & \\ & & & & \\ & & & & $	Ripple filter reference
2 4	IN1 IN2	4.4	200Ω 200Ω 4.4V	• Input pin
3	PRE_GND	0		Pre GND pin
5	STB	0 to 5V (Input voltage)	$ \begin{array}{c c} & & & & & & \\ \hline & & & & \\ \hline & & & & & $	Standby pin The standby function is on when this pin at ground level
6 13	Vol 2 Vol 1	0 to 5V (Input voltage)	6 200Ω W W W W W W W W W W W W W W W W W W	Control Volume
7	Vcc	18		Power supply

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Continued from preceding		Pin Voltage			
Pin No	Symbol	V _{CC} = 18V	Equivalent Circuit	Description	
8 12	OUT2 OUT1	8.9	VCC 10kΩ W 12 \$5.1kΩ GND	Output pin	
9 10	NF2 NF1	8.8	9 10 10 10 10 10 10 10 10 10	Negative feedback pin at Power amplifier Connect NF capacitor	
10	PWR_GND	0		Power GND pin	

Description of External parts

C1, C2 : Input capacitors. A value of 1.0μF is recommended for capacitors. Note that the low-frequency area characteristics can be adjusted by changing f₁.

c3 : Ripple filter capacitor. A value of 47µF is recommended for capacitors. Decreasing the capacitance value excessively or removing this capacitor causes ripple to occur. However, increasing the capacitance value does not always cause ripple to reduced. Decreasing the capacitance value makes the starting time earlier.

C4 : Power capacitor.

C5, C6 : Output capacitors. A value of 470µF is recommended for capacitors.

C7, C8 : Oscillation blocking capacitor. Use a polyester film capacitor that is good in high frequency response and temperature characteristic.

C9, C10 : Feedback capacitor. A value of 47μF is recommended for capacitors. Decreasing the capacitance value lowers the low frequency response. Increasing the capacitance value makes the starting time later.

R1, R2 : Resistor connected in series with oscillation blocking capacitor. Prevents phase shift attributable to the oscillation blocking capacitor so that oscillation is hard to occur.

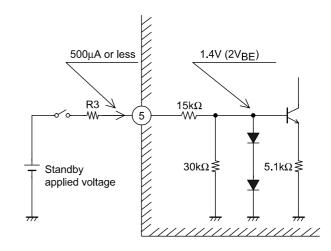
R3 : Standby switch current limiting resistor. A value of $10k\Omega$ is recommended for resistance (when the applied voltage for the standby switch is 3V to 10V). This resistor cannot be removed.

Features of IC Inside and Usage Note

Standby function

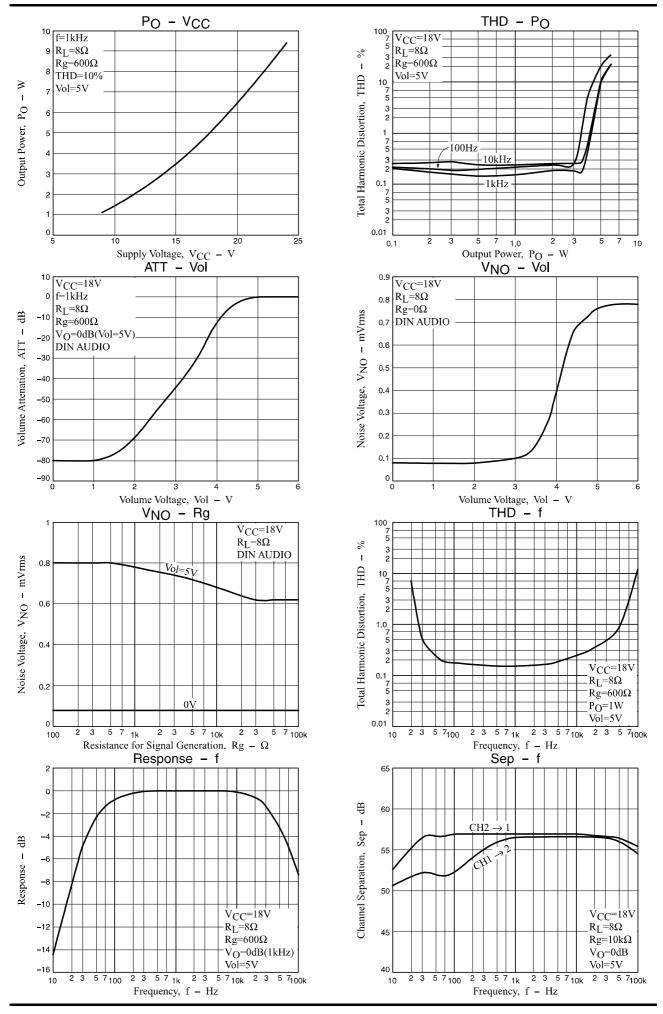
- Pin 5 is the standby switch pin. The amplifier is turned on by applying approximately 3V or more to this pin through an external resistor (R3).
- If voltage in excess of 10V is to be applied to the standby switch, calculate the value of R3 using the following formula so that the current flowing into pin 5 is $500\mu A$ or less:

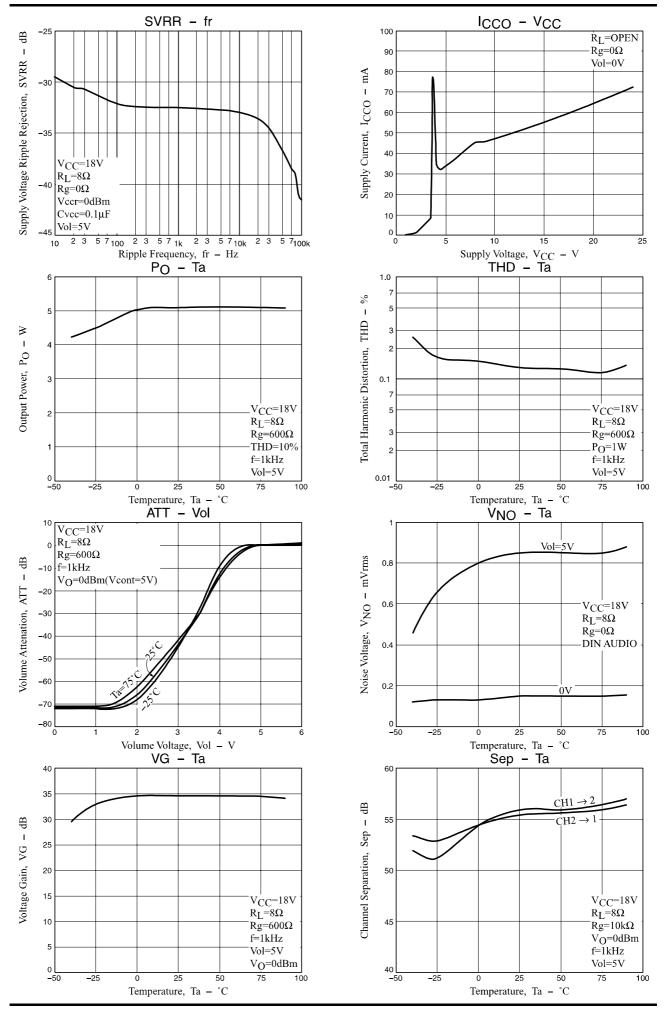
$$R3 = \frac{(Applied\ voltage - 2V_{BE}\ (\approx 1.4V))}{500\mu A} - 15k\Omega$$

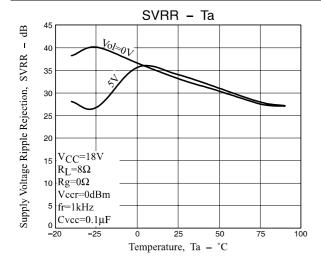


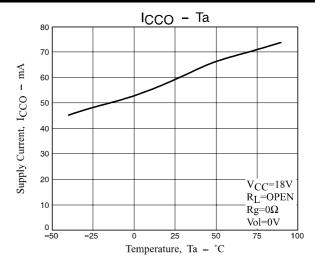
Protector

• In order to prevent damage or degradation which may be caused by abnormally heated IC, the LA42352 has a thermal shutdown protector. Accordingly, if the IC junction temperature (Tj) climbs to around 160°C due to inadequate heat dissipation, the thermal shutdown protector will operate to control the output gradually into attenuation.









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