



SANYO Semiconductors

DATA SHEET

LA42052

Monolithic Linear IC
Audio Output for TV application
5W × 2ch Power Amplifier

Overview

LA42052 is 5W 2-channel AF power amplifier intended for televisions.

Functions

- 5W × 2 channels ($V_{CC} = 18V$, $R_L = 8\Omega$)
- Standby function
- Pop noise reduction function
- Ripple filter
- Thermal protection circuit

LA42000 series is power IC which made Pin compatible altogether in 5 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).

Model name	P _O	Channel		Volume
		Monaural	Stereo	
LA42051	5W	○		
LA42052	5W		○	
LA42351	5W	○		○
LA42352	5W		○	○
LA42071	7W	○		
LA42072	7W		○	
LA42152	15W		○	

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max	No signal	24	V
Allowable power dissipation	P _d max	Infinite heat sink	15	W
Maximum junction temperature	T _j max		150	°C
Thermal resistance	θ _{jc}		3	°C/W
Operating temperature	T _{opr}		-25 to +75	°C
Storage temperature	T _{stg}		-40 to +150	°C

■ Any and all SANYO Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO Semiconductor representative nearest you before using any SANYO Semiconductor products described or contained herein in such applications.

■ SANYO Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO Semiconductor products described or contained herein.

SANYO Semiconductor Co., Ltd.

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

LA42052

Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	unit
Recommended supply voltage	V_{CC}		18	V
Recommended load resistance	R_L		8	Ω
Allowable operating voltage range	$V_{CC\text{ op}}$		5.5 to 22	V

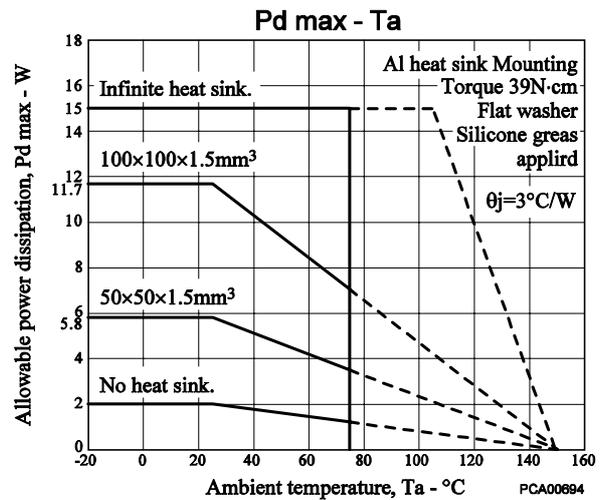
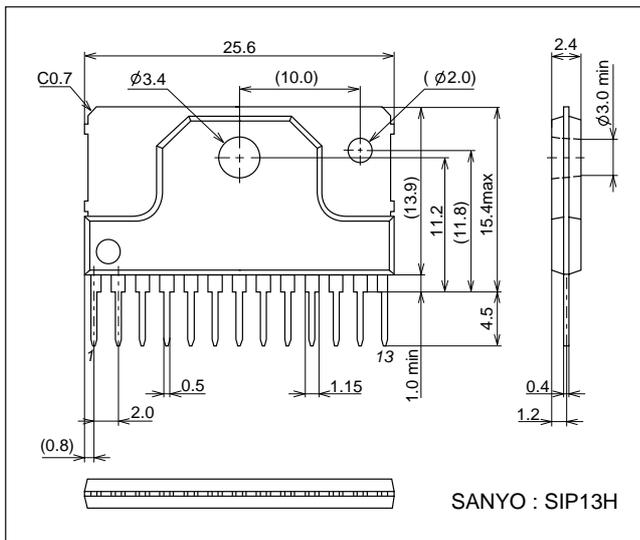
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 18\text{V}$, $R_L = 8\Omega$, $f = 1\text{kHz}$, $R_g = 600\Omega$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Standby current	I_{STB}	Amplifier off		1	10	μA
Quiescent current	I_{CCO}	$R_g = 0$	18	50	100	mA
Output power	P_O	THD = 10%	4	5		W
Total harmonic distortion	THD	$P_O = 1\text{W}$		0.15	0.4	%
Voltage gain	VG	$V_O = 0\text{dBm}$	33	35	37	dB
Output noise voltage	V_{NO}	$R_g = 0$, BPF = 20Hz to 20kHz		0.05	0.25	mVrms
Ripple rejection	SVRR	$R_g = 0$, $f_R = 100\text{Hz}$, $V_{CCR} = 0\text{dBm}$	50	60		dB
Channel separation	Sep.	$R_g = 10\text{k}\Omega$, $V_O = 0\text{dBm}$	50	60		dB
Standby control voltage (The Pin 5 voltage)	V_{ST}	Amplifier on	1.0		5	V
		Amplifier off	0		0.5	V
Input resistance	R_i		21	30	39	$\text{k}\Omega$

Package Dimensions

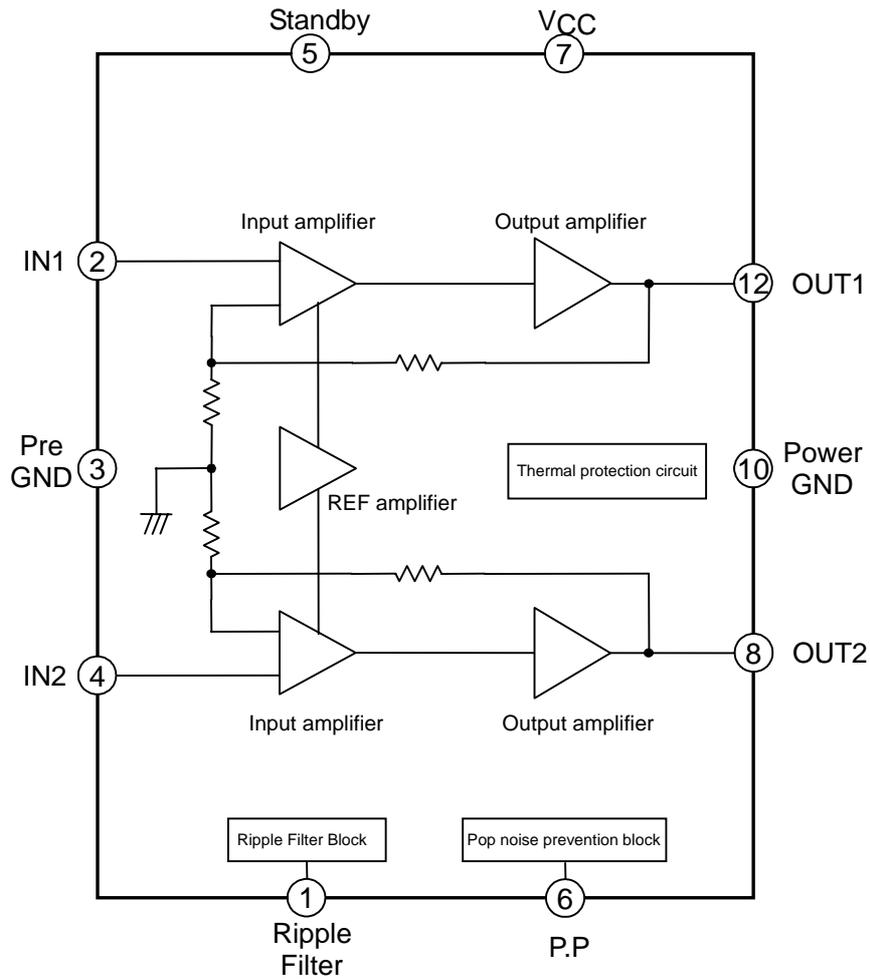
unit : mm

3107B

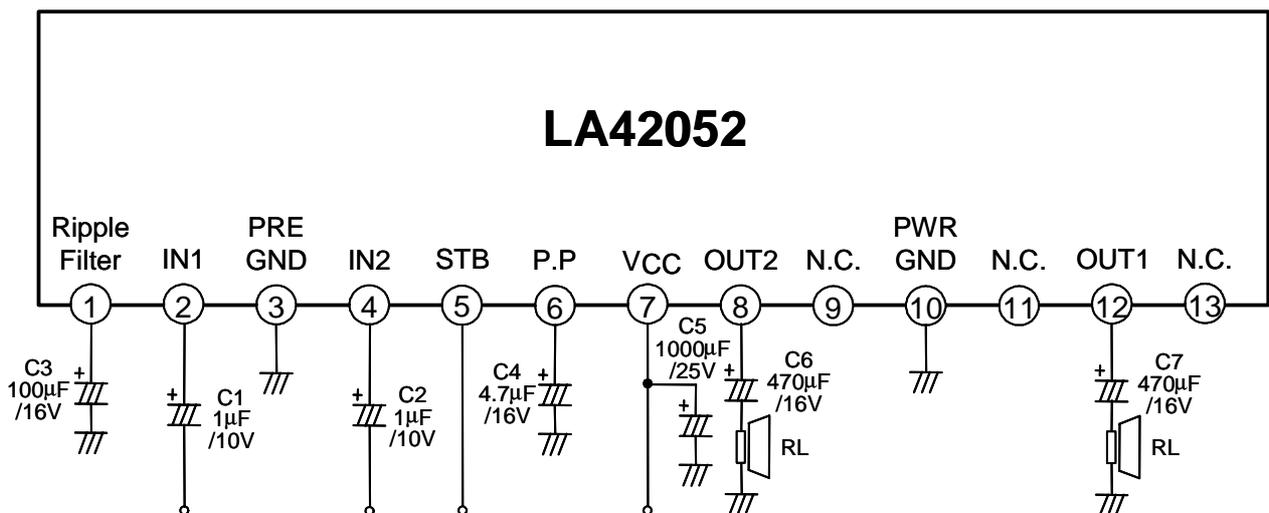


LA42052

Block Diagram



Application Circuit Example



External Components

- C1,C2 : Input coupling capacitors, which are recommended to be 1.0μF or less.
The input pin voltage $2V_{BE}$ (about 1.4V).
Determine the polarity orientation of these capacitors based on the DC current from the circuit connected to the LA42052 front end.
- C3 : The recommended value for the Ripple filter capacitor is 100μF.
- C4 : The recommended value for the P.P capacitor 4.7μF. It is a capacitor for there being small Pop sound.
- C5 : Power supply capacitor.
- C6, C7 : The recommended value for the output capacitor is 470μF.

1. Standby Function (Pin 5)

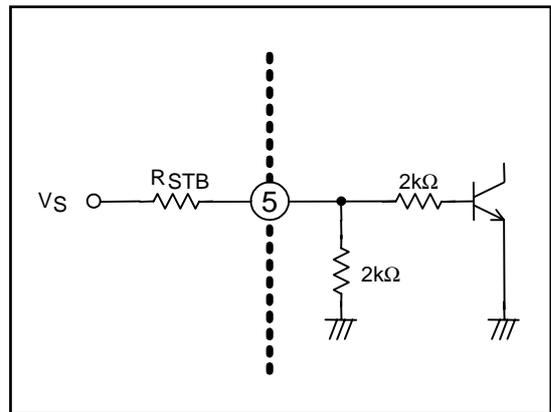
By means of controlling pin 5 to high and low, the power Supply can be set to ON and OFF.

Control Voltage of pin 5

Pin 5	Amplifier	Standby
0 to 0.5	OFF	ON
1.0 to 5.0	ON	OFF

When the impression voltage of V_S is high, I want to stop 5 pin inflow current. Restriction resistance (R_{STB}) is inserted in a case.

$V_S = 5V$, $R_{STB} = 5.1k\Omega$
5 pin inflow current = about 750μA
5 pin voltage = about 1.2V



2. Ripple filter and Mute function (Pin 1)

Pin voltage is approx. $1/2 V_{CC}$
The recommended value for the Ripple filter capacitor is 100μF.
Muting :
The output signal can be controlled by connecting pin 1(Ripple filter) to ground via a resistance of 300 to 500Ω. If resistance is higher than 750Ω, the suppression ratio will decrease.

3. Input Pin (Pin 2,4)

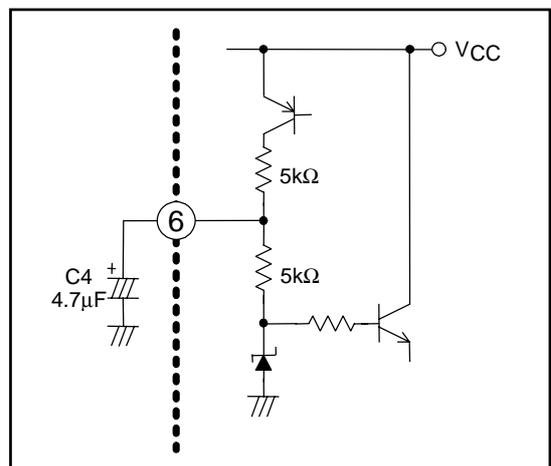
Voltage at the input pins is approx. $2V_{BE}$ (about 1.4V)
Determine the polarity orientation of these capacitors based on the DC current from the circuit Connected to the LA42052 front end.
Input resistance is approx. 30kΩ (typ)

The recommended value for the input capacitor is 1.0μF.

4. P.P (Pin 6)

The Pin 6 is Terminal for there being small pop sound at the time of power supply ON/OFF.
C4 recommends 4.7μF.
When capacitance is higher 10μF, the sound will not be cut off when setting the power supply OFF.

$$\text{Pin 6 voltage} = \frac{V_{CC} - V_{CE}(\text{about } 0.3V) - 5.6V}{2} + 5.6V$$



Usage Notes

1. Lightning (power supply - output short-circuit) and ground fault (GND - output short-circuit) protective circuits are not incorporated. Due care must be taken during handling of the product.
2. The thermal protective circuit is incorporated and activated when the junction temperature (T_j) rises above about 160°C.
This circuit controls the output gradually to the attenuated condition.
3. Always ensure the sufficient margin for the supply voltage, etc. to operate the product within the area where the maximum rating will never be exceeded. Namely, the maximum rating may be exceeded due to the slight change in conditions, resulting in damage, if the product is used around the maximum rating.

- Specifications of any and all SANYO Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Semiconductor Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO Semiconductor products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of SANYO Semiconductor Co., Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO Semiconductor product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of April, 2006. Specifications and information herein are subject to change without notice.