



# SANYO Semiconductors DATA SHEET

## LA42152 — Monolithic Linear IC Audio Output for TV application 15W × 2ch Power Amplifier

### Overview

LA42152 is 15W 2-channel AF power amplifier intended for televisions.

### Functions

- 15W × 2 channels ( $V_{CC} = 16.5V$ ,  $R_L = 8\Omega$ )
- Standby function
- Mute function
- 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 <sub>O</sub> | 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 <sub>CC</sub> max | No signal          | 24          | V    |
| Allowable power dissipation  | P <sub>d</sub> max  | Infinite heat sink | 15          | W    |
| Maximum junction temperature | T <sub>j</sub> max  |                    | 150         | °C   |
| Thermal resistance           | θ <sub>jc</sub>     |                    | 2           | °C/W |
| Operating temperature        | T <sub>opr</sub>    |                    | -25 to +75  | °C   |
| Storage temperature          | T <sub>stg</sub>    |                    | -40 to +150 | °C   |

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# LA42152

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

| Parameter                         | Symbol       | Conditions | Ratings   | unit     |
|-----------------------------------|--------------|------------|-----------|----------|
| Recommended supply voltage        | $V_{CC}$     |            | 16.5      | V        |
| Recommended load resistance       | $R_L$        |            | 8         | $\Omega$ |
| Allowable operating voltage range | $V_{CC\ op}$ |            | 5.5 to 22 | V        |

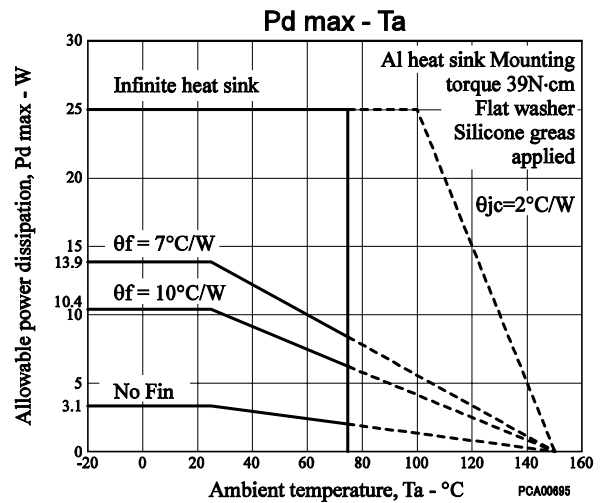
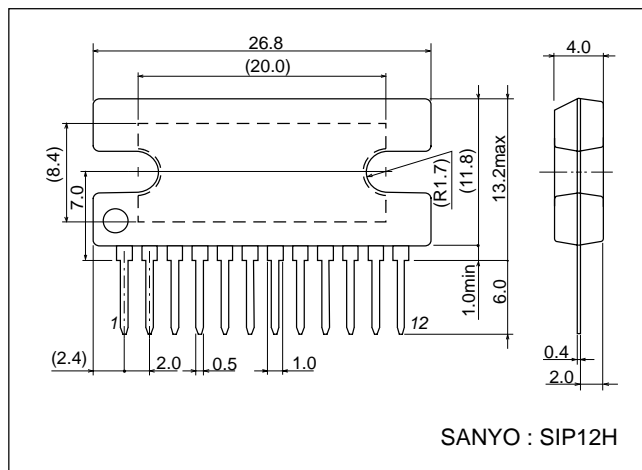
## Electrical Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC} = 16.5\text{V}$ , $R_L = 8\Omega$ , $f = 1\text{kHz}$ , $R_g = 600\Omega$

| Parameter                                      | Symbol     | Conditions   | Ratings |      |     | Unit             |
|--|------------|--|---------|------|-----|------------------|
|  |            |  | min     | typ  | max |                  |
| Standby current                                | $I_{STB}$  | Amplifier off  |         | 0    | 10  | $\mu\text{A}$    |
| Quiescent current                              | $I_{CCO}$  | $R_g = 0$ , $R_L = \text{open}$                            | 40      | 70   | 150 | mA               |
| Output power                                   | $P_O$      | THD = 10%  | 13      | 15   |     | W                |
| Total harmonic distortion                      | THD        | $P_O = 1\text{W}$  |         | 0.06 | 0.2 | %                |
| Voltage gain                                   | VG         | $V_O = 0\text{dBm}$  | 33      | 35   | 37  | dB               |
| Output noise voltage                           | $V_{NO}$   | $R_g = 0$ , BPF = 20Hz to 20kHz                            |         | 0.2  | 0.4 | mVrms            |
| Ripple rejection                               | SVRR       | $R_g = 0$ , $f_R = 100\text{Hz}$ , $V_{CCR} = 0\text{dBm}$ | 50      | 60   |     | dB               |
| Channel separation                             | CH.Sep     | $R_g = 10\text{k}\Omega$ , $V_O = 0\text{dBm}$             | 50      | 60   |     | dB               |
| Muting attenuation                             | ATT        | $V_O = 1\text{Vrms}$ , BPF = 20Hz to 20kHz                 | 80      | 90   |     | dB               |
| Muting control voltage<br>(The Pin 6 voltage)  | $V_{mute}$ | Muting on  | 1.7     |      | 3.0 | V                |
|  |            | Muting off   | 0       |      | 0.5 | V                |
| Standby control voltage<br>(The Pin 5 voltage) | $V_{ST}$   | Amplifier on   | 2.5     |      | 20  | V                |
|  |            | Amplifier off  | 0       |      | 0.5 | V                |
| Input resistance                               | $R_i$      |  | 21      | 30   | 39  | $\text{k}\Omega$ |

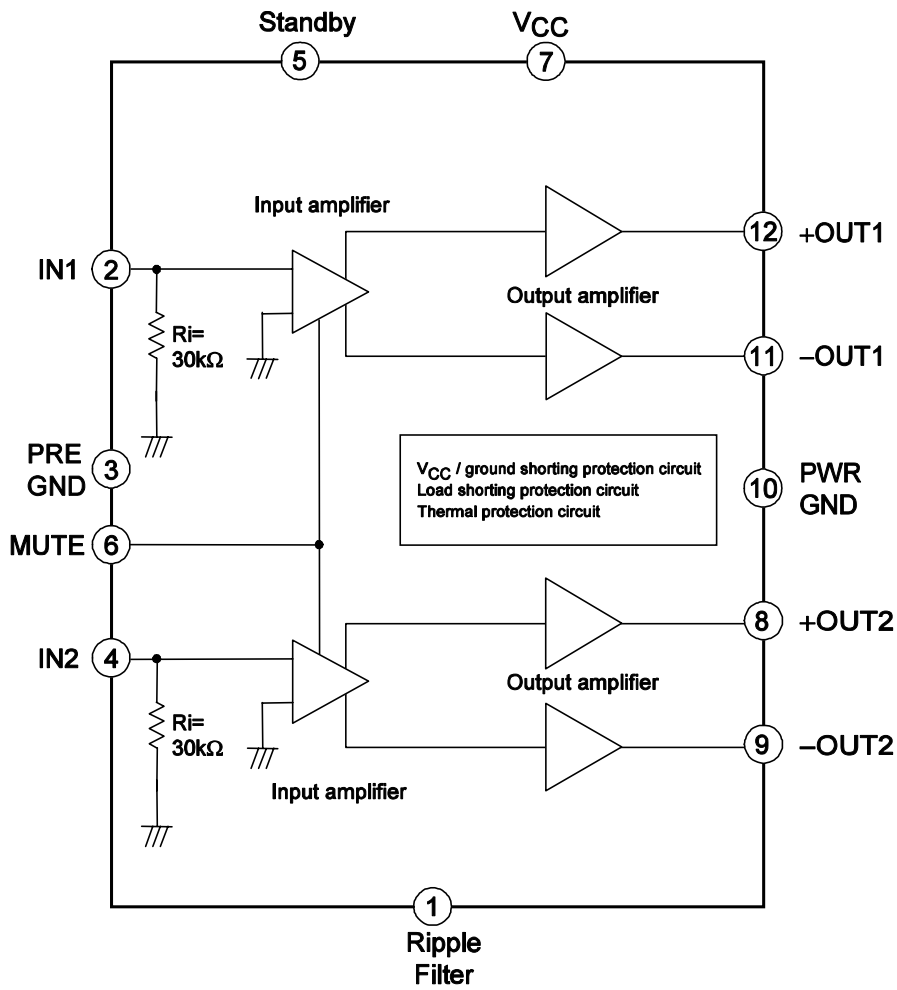
## Package Dimensions

unit : mm

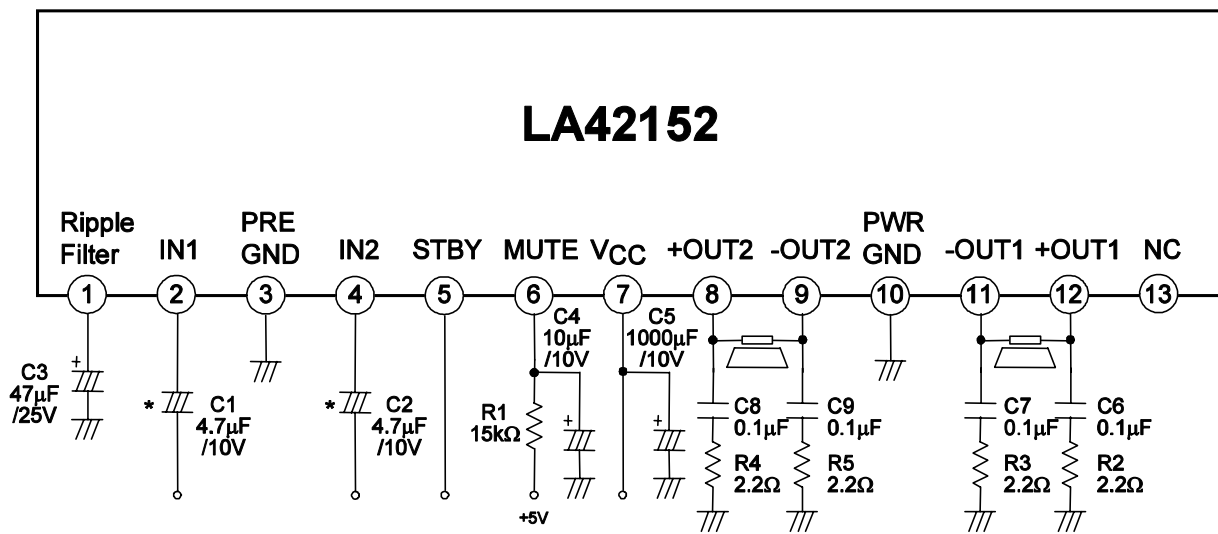
3049B



Block Diagram



Application Circuit Example



**External Components**

- C1,C2 : Input coupling capacitors, which are recommended to be 4.7μF or less. The input circuit is of a zero bias type, so that the input pin potential is close to zero volts. Therefore, the polarity must be determined depending on the DC potential of a circuit connected in the previous stage of LA42152.
- C3 : Capacitor for the starting time of ripple filter and amplifier, which is recommended to be 47μF.
- C4,R1 : Capacitor and resistor for muting. C4 is necessary even when no muting function is provided.
- C5 : Power supply capacitor.
- C6 to C9 : Capacitors and resistors for prevention of oscillation. For C6 to C9, polyester film capacitors, and having R2 to R5 satisfactory temperature characteristics are recommended. Uses 2.2Ω resistor together.

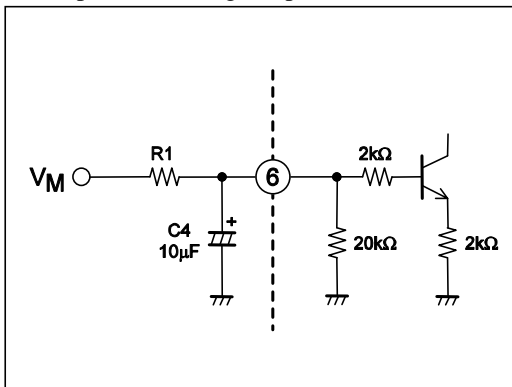
**1. Muting function (Pin 6)**

Mute ON when the voltage of pin 6 is 1.7V (min) or more.

Set the  $V_M$  application voltage so that the voltage of pin 6 becomes 1.7V or more.

The time constant of mute is determined with R1 and C4. The constant must be determined after review because it is concerned with the pop sound at mute ON/OFF. C4 is concerned with the pop sound also when the amplifier is turned ON, so that this is necessary even when the mute function is not used.

Example: The voltage of pin 6 becomes about 1.8V under conditions of  $V_M = 5V$  and  $R1 = 15k\Omega$ .



**2. Standby function (Pin 5)**

The amplifier is turned ON when the voltage of 2.5V (min) or more is applied to pin 5.

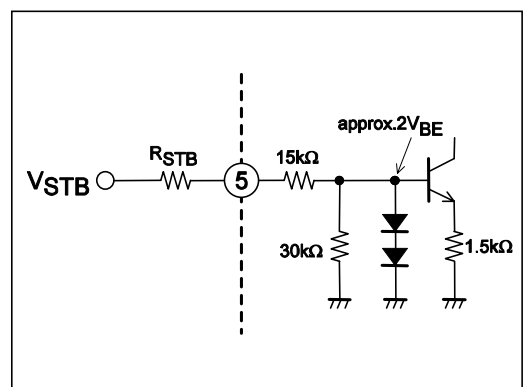
Control Voltage of pin 5

| Pin 5 voltage | Amplifier | Standby |
|---------------|-----------|---------|
| 0 to 0.5V     | OFF       | ON      |
| 2.5 to 20V    | ON        | OFF     |

To suppress 5 pin inflow current when the impressed voltage of  $V_{STB}$  is high, limitation resistance ( $R_{STB}$ ) is inserted.

Example: Limiting the inrush current to pin 5 to 500μA or less

$$R_{STB} = \frac{\text{Application voltage } (V_{STB}) - 2V_{BE}(\text{about } 1.4V)}{500\mu A} - 15k\Omega$$



## Usage Note

1. Lightning (power supply - output short-circuit), ground fault (GND - output short-circuit), and load short-circuit protection circuits are incorporated. These protection circuits are activated in case of abnormal connection. These circuits are active while above abnormal connection continues and reset automatically when such abnormality is removed. Depending on operation conditions, the protective circuits remain locked and continue to be active even when abnormal condition is removed. In this case, turn OFF standby or power supply temporarily and the protective circuits can be reset.
2. The thermal protective circuit is incorporated, which is activated when the junction temperature ( $T_j$ ) rises to about 160°C or more, controlling the output gradually to the attenuated condition.
3. During use near the maximum rating, the product may suffer damage if even the slightest fluctuation of condition exceeds the maximum rating. Be sure to use the product within a range which never exceeds the maximum rating while allowing sufficient margin for the supply voltage, etc.

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