Ordering number : ENA0316

SANYO Semiconductors
DATA SHEET

Monolithic Linear IC

LA42152 — 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 = 8Ω)
- 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_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	Pd max	Infinite heat sink	15	W
Maximum junction temperature	Tj max		150	°C
Thermal resistance	θjc		2	°C/W
Operating temperature	Topr		-25 to +75	°C
Storage temperature	Tstg		-40 to +150	°C

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Operating Conditions at Ta=25°C

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

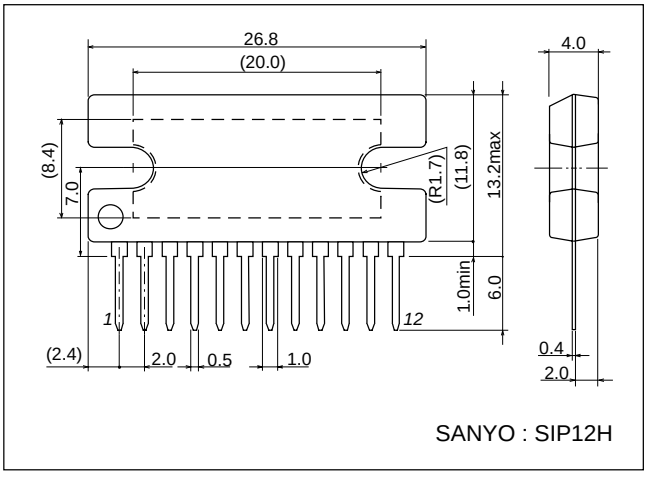
Electrical Characteristics at Ta = 25°C, V_{CC} = 16.5V, R_L = 8Ω, f = 1kHz, Rg = 600Ω

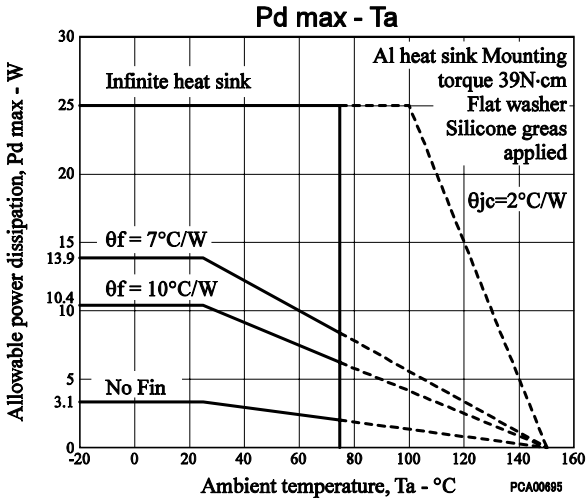
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Standby current	I_{STB}	Amplifier off		0	10	μA
Quiescent current	I_{CCO}	Rg = 0, R_L = open	40	70	150	mA
Output power	P_O	THD = 10%	13	15		W
Total harmonic distortion	THD	P_O = 1W		0.06	0.2	%
Voltage gain	VG	V_O = 0dBm	33	35	37	dB
Output noise voltage	V_{NO}	Rg = 0, BPF = 20Hz to 20kHz		0.2	0.4	mVrms
Ripple rejection	SVRR	Rg = 0, f_R = 100Hz, V_{CC}R = 0dBm	50	60		dB
Channel separation	CH.Sep	Rg = 10kΩ, V_O = 0dBm	50	60		dB
Muting attenuation	ATT	V_O = 1Vrms, BPF = 20Hz to 20kHz	80	90		dB
Muting control voltage (The Pin 6 voltage)	V_{mute}	Muting on	1.7		3.0	V
		Muting off	0		0.5	V
Standby control voltage (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	kΩ

Package Dimensions

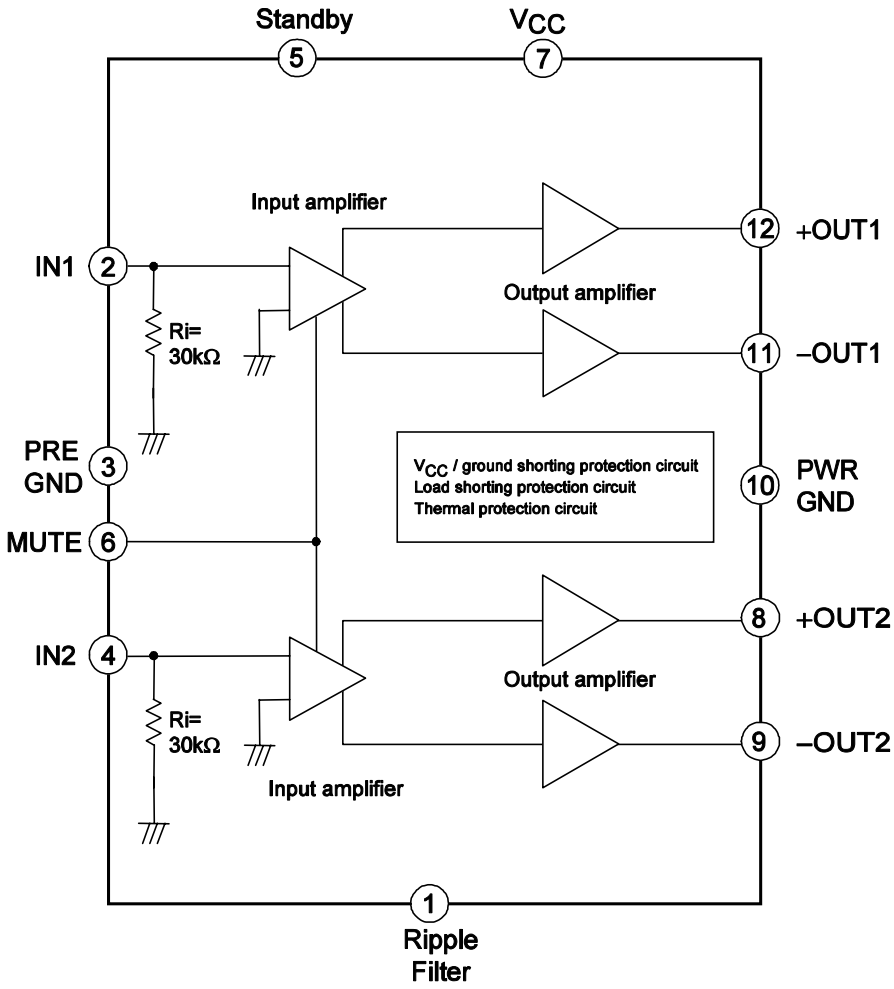
unit : mm

3049B

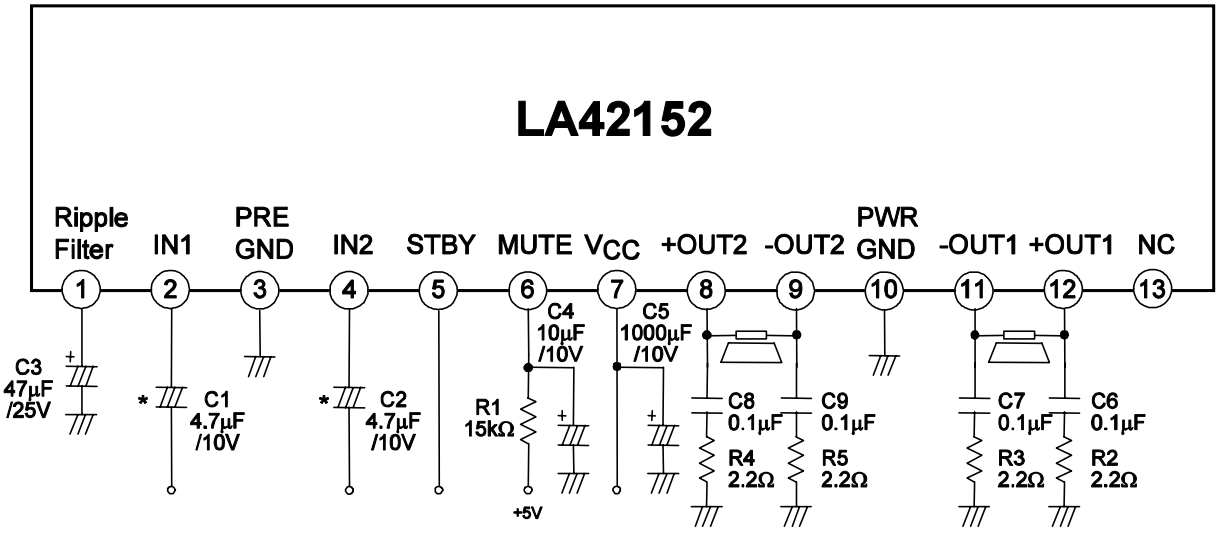




Block Diagram



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.

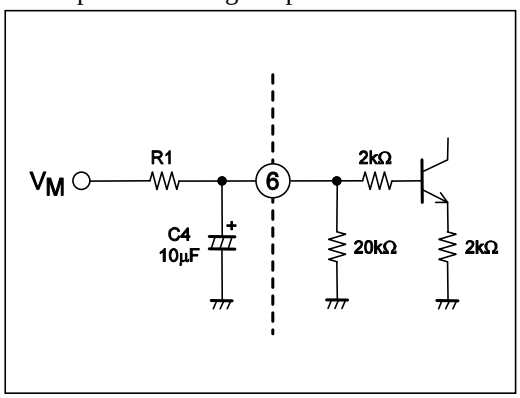
1. Muting function (Pin 6)

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 = 15kΩ.



2. Standby function (Pin 5)

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

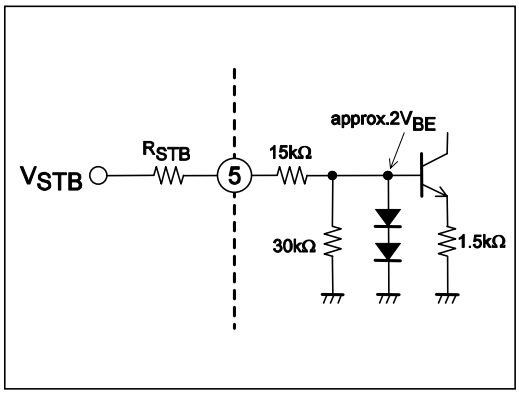
Control Voltage of pin 5

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. Lightening (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 (Tj) 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.