

SANYO Semiconductors DATA SHEET

LA42205 — Monolithic Linear IC Audio Output for TV application 5W × 2ch Power Amplifier

Overview

The LA42205 is a 5W 2-channel power amplifier IC and optimal for use as the audio output power amplifier in TV application

Functions

- 5W \times 2 channels (V_{CC} = 9.5V, R_L = 8 Ω)
- Built-in standby function.
- Built-in mute function.
- Built-in various protection circuit (short to VCC/short to ground/load shorting/overheating).

Specifications

Maximum Ratings at $Ta = 25^{\circ}C$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max	No signal	16	V
Allowable power dissipation	Pd max	Infinitely large heat sink	30	W
Maximum output current	I _O peak	Per channel	1.0	А
Maximum junction temperature	Tj max		150	°C
Thermal resistance	θјс		2.5	°C/W
Operating temperature	Topr		-20 to +75	°C
Storage temperature	Tstg		-40 to +150	°C

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

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V _{CC}		9.5	٧
Recommended load resistance	RL		8	Ω
Allowable operating supply	V _{CC} op	Under conditions such that	7 to 14	V
voltage range		maximum ratings are not exceeded		

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$\textbf{Electrical Characteristics} \ at \ Ta = 25^{\circ}C, \ V_{CC} = 9.5V, \ R_L = 8\Omega, \ f = 1 kHz, \ Rg = 600\Omega$

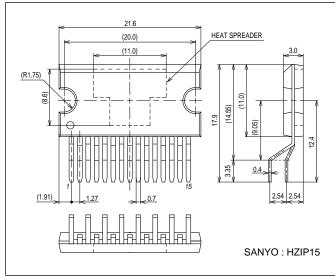
Dorometer	Cumbal	Conditions		1.114			
Parameter	Symbol	Conditions	min	typ	max	Unit	
Standby current	Ist	Amplifier OFF		0	10	μΑ	
Quiescent current	Icco	Rg = 0, R _L = OPEN	35	70	140	mA	
Output power	P _O 1	THD = 10%	4	5		W	
Total harmonic distortion	THD	P _O = 1W		0.06	0.2	%	
Voltage gain	VG	V _O = 0dBm	30	32	34	dB	
Output noise voltage	V _{NO}	Rg = 0, BPF = 20Hz to 20kHz		0.2	0.4	mVrms	
Ripple rejection ratio	SVRR	Rg = 0, fR = 100Hz, V _{CC} R = 0dBm	40	50		dB	
Channel separation	CH.Sep	$Rg = 10k\Omega$, $V_O = 0dBm$	50	60		dB	
Mute attenuation value	ATT	V _O = 1Vrms, BPF = 20Hz to 20kHz	80	90		dB	
Mute control voltage (pin 7)	Vmute	Mute ON *1	1.5		3.0	V	
		Mute OFF	0		0.5	V	
Standby control voltage (pin 6)	Vst	Amplifier ON *1	2.5		Vcc	V	
		Amplifier OFF	0		0.5	V	
Input resistance	Ri		21	30	39	kΩ	

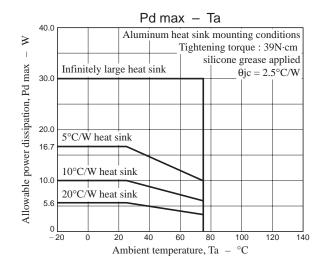
^{*1 :} Note that the standby pin (pin 6) and MUTE pin (pin 7) incorporate the anti-electrostatic diode allowing the current to flow through the diode when the potential of V_{CC} (pin 9) decreases below that of pin 6 or 7.

Package Dimensions

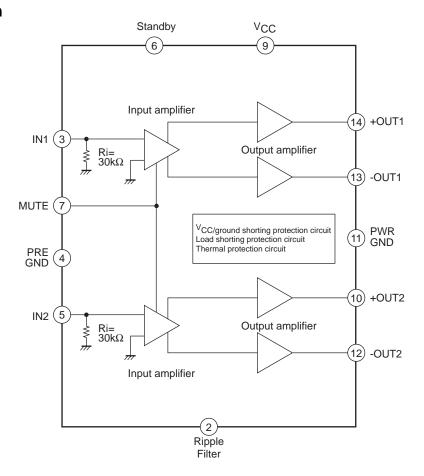
unit: mm (typ)

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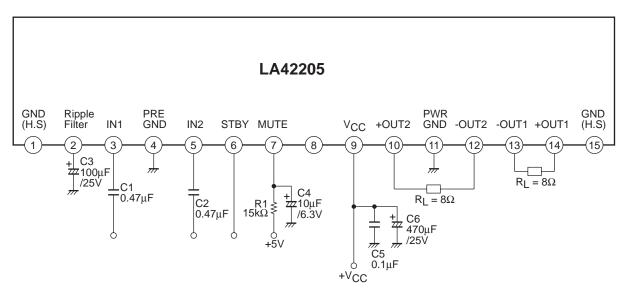




Block Diagram



Test Circuit



- * Pin 8 : NC. This pin must be left open.
- * Pins 1 and 15 are connected to the heat sink. They must be connected to power and ground.

Pin Voltage

Conditions : $V_{CC} = 9.5V$, STBY = 5V

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pin	GND	Ripple	IN1	Pre	IN2	STBY	Mute	N.C.	Vcc	+OUT2	Power	-OUT2	-OUT1	+OUT1	GND
	(H.S)	Filter		GND							GND				(H.S)
Pin voltage	0	9.2	0.7	0	0.7	5	0	-	9.5	4.8	0	4.8	4.8	4.8	0
(V)															

External Components

C1, C2 : Input coupling capacitors. A value of 47µF is recommended.

The input pin potential is 0.7V.

: Capacitor which sets the starting time of the ripple filter and amplifier. A value of 100µF is recommended.

C4, R1 : Capacitor and resistor for muting function. C4 is necessary even when the mute function is not used.

c5 : This capacitor increases the oscillator margin. We recommend a value of $0.1\mu F$.

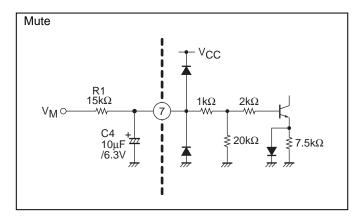
C6 : Power supply capacitor.

1. Muting function (pin 7)

The muting function is turned on when the pin 7 voltage is 1.5V (minimum) or higher.

The V_M applied voltage is set so that the pin 7 voltage will be 1.5V or higher.

The muting time constant is determined by an C4, R1 circuit, and the component values must be determined by a careful analysis, since they are related to impulse noise that occurs when the muting function is turned on or off. Also note that since C4 affects the occurrence of impulse noise when the amplifier is turned on or off, it will be required if the muting function is not used.



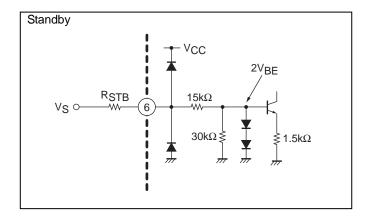
2. Standby function (pin 6)

The amplifier is turned on by applying a level of 2.5V (minimum) or higher to pin 6.

Pin 6 control voltage

Pin 6 voltage	Amplifier	Standby		
0 to 0.5	Off	On		
2.5 to V _{CC}	On	Off		

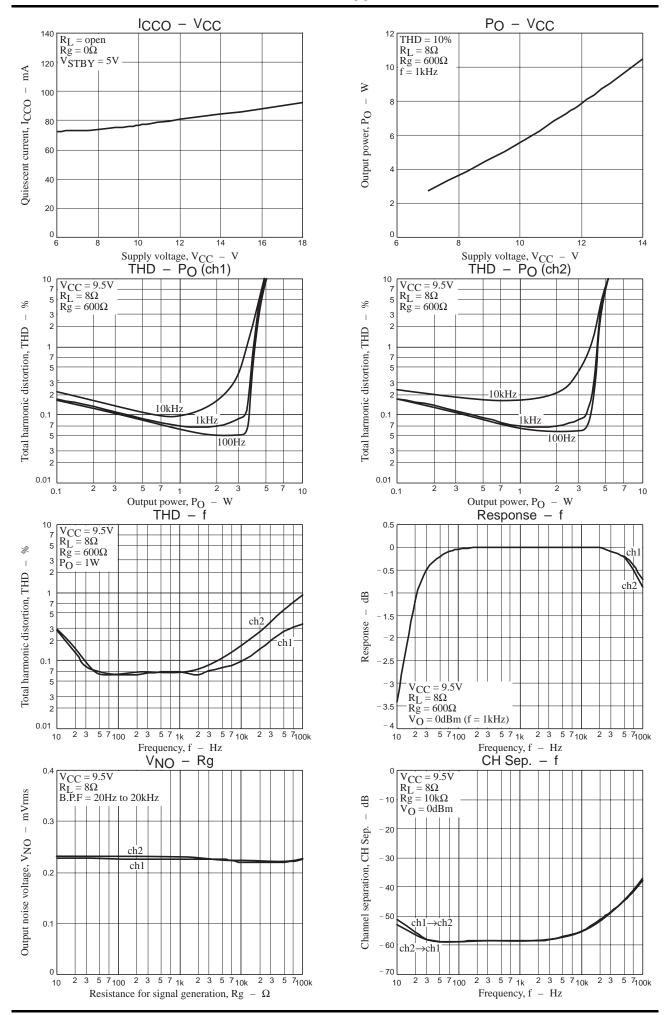
The limit resistor RSTB may be inserted if the VSTB applied voltage is comparatively high and there is a need to suppress the pin 6 sink current.

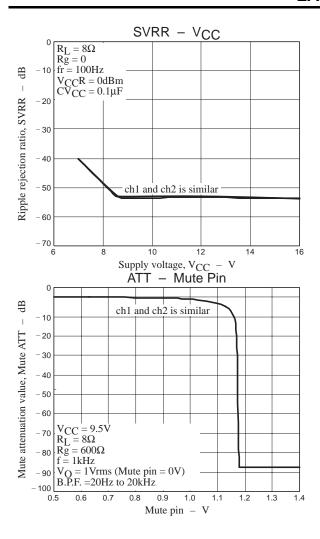


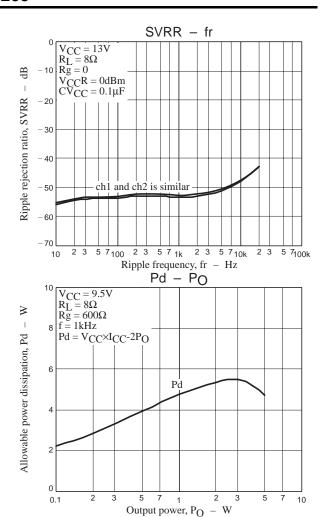
LA42205

Usage Notes

- 1. This IC includes three short circuit protection circuits: shorting to power (shorts between an output and the power supply), shorting to ground (shorts between an output and ground), and load shorting protection circuits.
 - These protection circuits operate while the corresponding abnormal condition continues, and recover automatically when the abnormal condition is resolved.
 - There are, however, cases where, due to IC usage conditions, one of these protection circuits may lock and continue operating after the problem has been resolved. If this occurs, the protection circuit state can be reset by either switching the IC to standby mode or by temporarily cutting power from the IC.
- 2. This IC includes a thermal protection circuit that operates if the junction temperature (Tj) rises to 160°C or higher. This circuit gradually reduces the output level.
- 3. If this IC is operated in the vicinity of any of its maximum ratings, even slight changes in operating conditions could result in a maximum rating being exceeded. Since this could lead to the destruction of the IC, end product designs must include adequate margins in the supply voltage and other parameters so that the IC is always used within ranges such that the maximum ratings are never exceeded.







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