

Ordering number : ENN6502

Monolithic Linear IC



LA4629

Two-Channel Audio Frequency Power Amplifier

Overview

The LA4629 is a 2-channel power amplifier developed for use in radio/cassette player products. The LA4629 reduces the number of required external components by 50% over earlier products (BS/NF capacitors and oscillation prevention RC components) and thus can contribute significantly to space saving in end products.

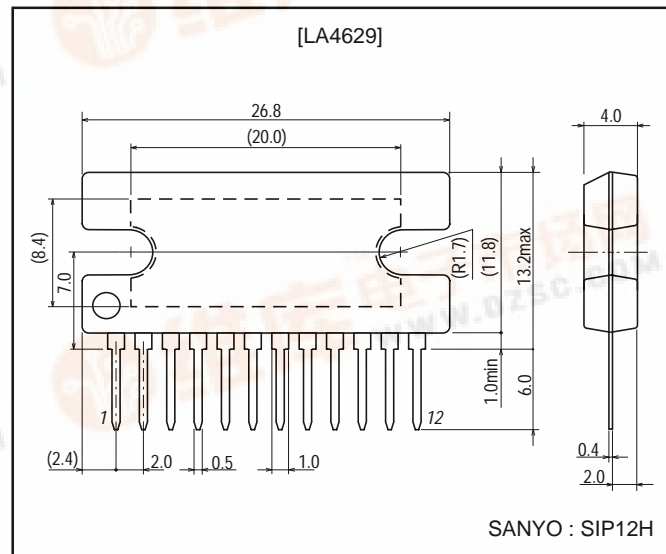
Features

- Provided in the SIP12H package.
- $P_O : 2.5\text{ W} \times 2$ ($V_{CC} = 9\text{ V}$, $R_L = 3\ \Omega$)
 $4.5\text{ W} \times 2$ ($V_{CC} = 12\text{ V}$, $R_L = 3\ \Omega$)
 $2.0\text{ W} \times 2$ ($V_{CC} = 9\text{ V}$, $R_L = 4\ \Omega$)
 $4.0\text{ W} \times 2$ ($V_{CC} = 12\text{ V}$, $R_L = 4\ \Omega$)
- Standby function built in (supports direct microcontroller control).
- Built-in thermal protection circuit.

Package Dimensions

unit : mm

3049B-SIP12H



Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\text{ max}}$	No input	24	V
Allowable power dissipation	$P_d\text{ max}$	With an arbitrarily large heat sink	25	W
Operating temperature	T_{op}		-25 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		12	V
Operating voltage range	$V_{CC\text{ op}}$	The range over which the package P_d is not exceeded.	5 to 22	V
Recommended operating load resistance	$R_L\text{ op}$		2.7 to 8	Ω

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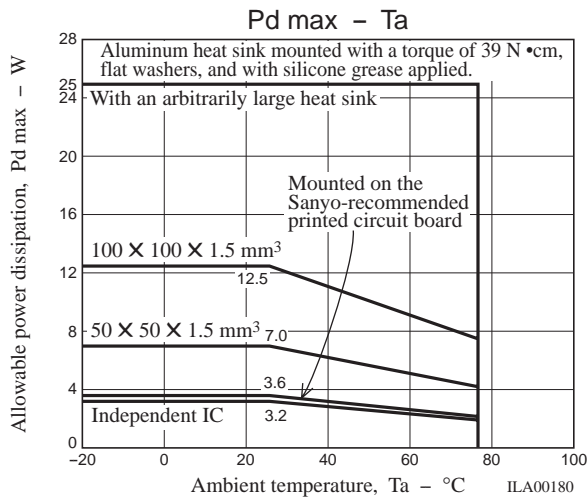
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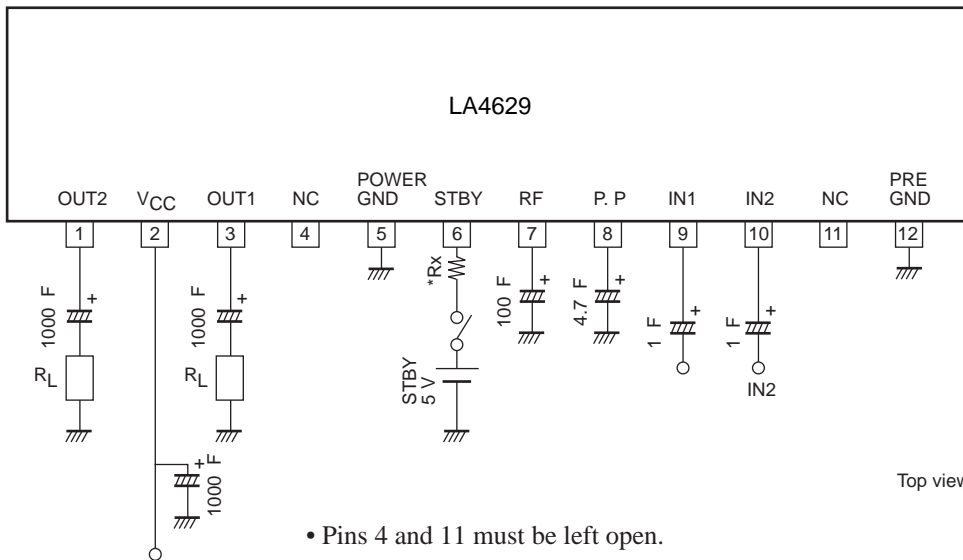
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Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 12\text{V}$, $R_L = 3\ \Omega$, $f = 1\ \text{kHz}$, $R_g = 600\ \Omega$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	I_{CCO}	$R_g = 0$	18	35	80	mA
Standby current	I_{ST}			1.0	10	μA
Voltage gain	V_G	$V_O = 0\ \text{dBm}$	43	45	47	dB
Output power	PO(1)	THD = 10 %	3.0	4.5		W
	PO(2)	$V_{CC} = 12\ \text{V}$, $R_L = 4\ \Omega$, THD = 10 %		4.0		W
	PO(3)	$V_{CC} = 9\ \text{V}$, $R_L = 3\ \Omega$, THD = 10 %	2.0	2.5		W
	PO(4)	$V_{CC} = 9\ \text{V}$, $R_L = 4\ \Omega$, THD = 10 %		2.0		W
Total harmonic distortion	THD	$P_O = 1\ \text{W}$		0.2	0.8	%
Output noise voltage	V_{NO}	$R_g = 0$, DIN AUDIO		0.15	0.5	mV
Ripple rejection ratio	SVRR	$R_g = 0$, $f_R = 100\ \text{Hz}$, $V_r = 0\ \text{dBm}$, DIN AUDIO	45	55		dB
Channel separation	CHsep	$R_g = 0$, $V_O = 0\ \text{dBm}$, DIN AUDIO	43	50		dB
Input resistance	R_i		20	30	40	$\text{k}\Omega$
Standby pin voltage	V_{ST}	The pin 6 voltage such that the amplifier is on	1.5	5.0		V



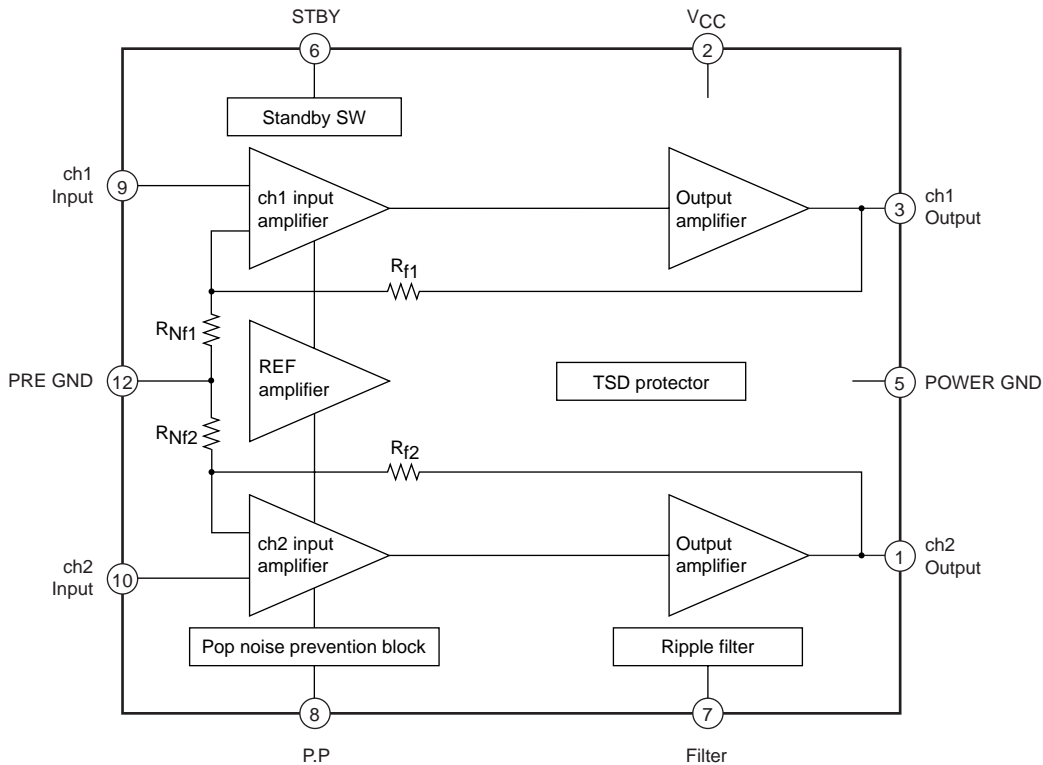
Application Circuit



- Pins 4 and 11 must be left open.
- *• Rx: If the STBY pin (pin 6) is used, observe the following:
Insert the resistor Rx in series to limit the inflowing current.
(The amplifier will be on when a voltage is applied to pin 6.)

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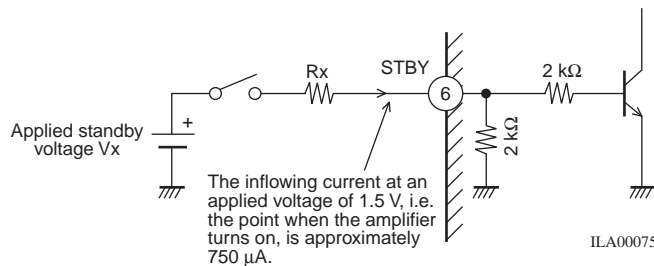
Block Diagram



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Pin Functions

1. Standby switch function (pin 6)



STBY pin applied voltage: 5 V

To hold the pin 6 inflow current to about 750 μ A insert a resistor (R_x) of 4.7 k Ω

STBY pin applied voltage: 12 V

To hold the pin 6 inflow current to about 750 μ A insert a resistor (R_x) of 14 k Ω (12 k Ω).

STBY pin applied voltage: Other value (V_x)

To hold the pin 6 inflow current to about 750 μ A insert a resistor (R_x) of $(V_x - 1.5 \text{ V})/750 \mu\text{A}$.

- If a microcontroller output signal is applied directly, insert a resistor in series and adjust the current to a level optimal for the drive capability of the microcontroller.

2. Input pins (pins 9 and 10)

The input pin voltage is about $2 V_{BE}$ (1.4 V).

The input pin impedance is about 30 k Ω .

- Although the recommended value for the input capacitor is 0.22 μ F, the starting time can be modified by changing the value of this capacitor. (The time from the point a voltage is applied to the standby pin to the point sound is emitted.)

Input capacitor	1.0 μ F	2.2 μ F	3.3 μ F	4.7 μ F	10 μ F
Starting time (ts)	0.2 s	0.3 s	0.5 s	0.65 s	1.5 s

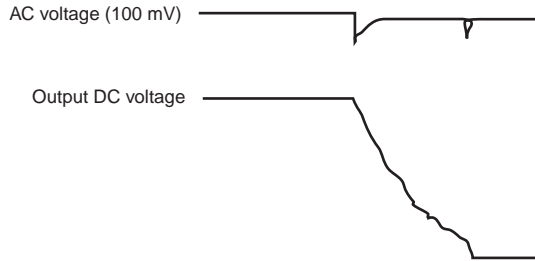
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3. FILTER (decoupling) pin (pin 7)

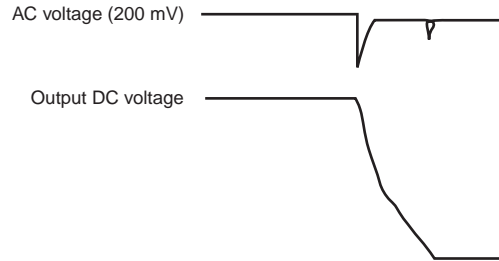
The pin voltage is about $1/2 V_{CC}$.

The recommended value for the filter capacitor is $100 \mu\text{F}$.

The pulse noise that occurs when the standby pin is set low (power off) will be degraded if a value under $100 \mu\text{F}$ is used.



Filter capacitor = $100 \mu\text{F}$ ILA00078



Filter capacitor = $47 \mu\text{F}$ ILA00079

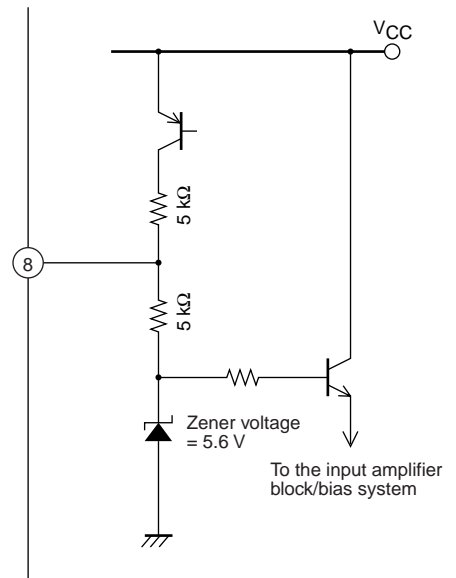
4. P.P (pulse noise) pin (pin 8)

$$\text{Pin 8 pin voltage} \approx \frac{V_{CC} - V_{CE} (\text{about } 0.3 \text{ V}) - 5.6 \text{ V}}{2 \text{ k}\Omega} + 5.6 \text{ V}$$

- The recommended value for the P.P capacitor is $4.7 \mu\text{F}$.

The pulse noise that occurs when the standby pin is set low (power off) will be degraded if a value under $2.2 \mu\text{F}$ is used.

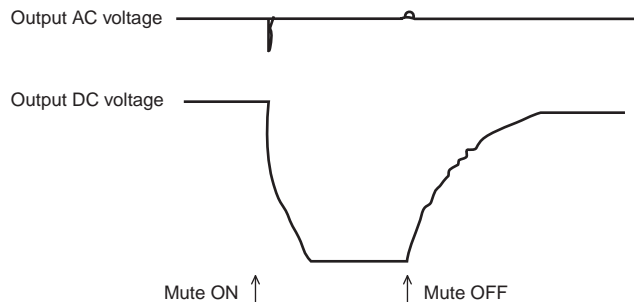
Furthermore, if a value over $10 \mu\text{F}$ is used, the signal may not be cut off and sound may remain audible when the standby pin is set low (power off).



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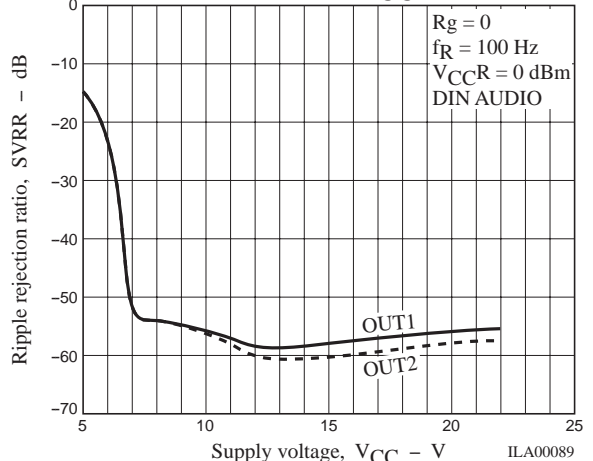
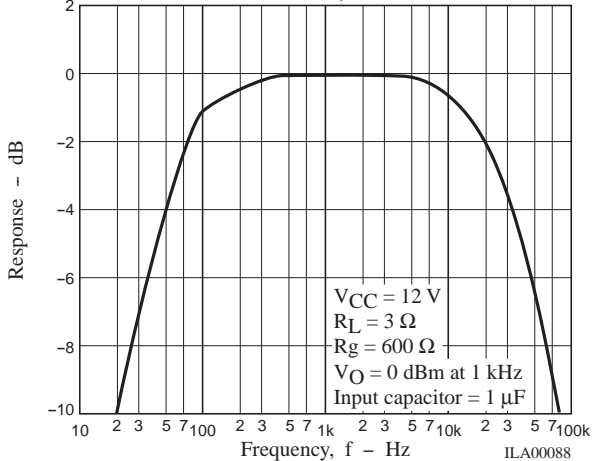
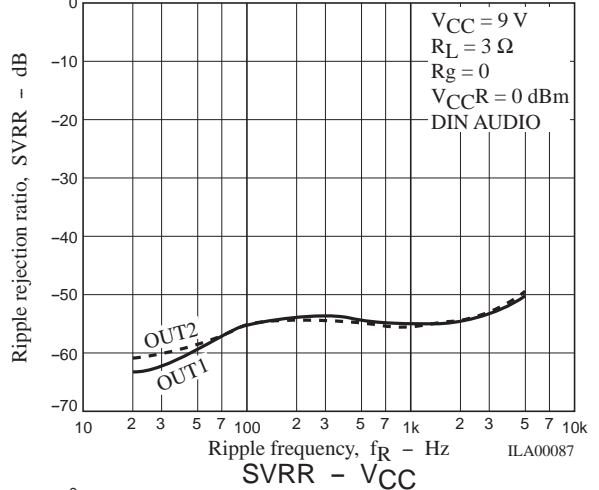
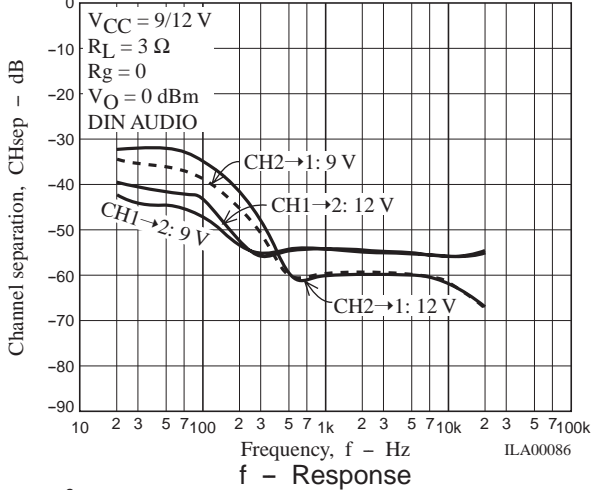
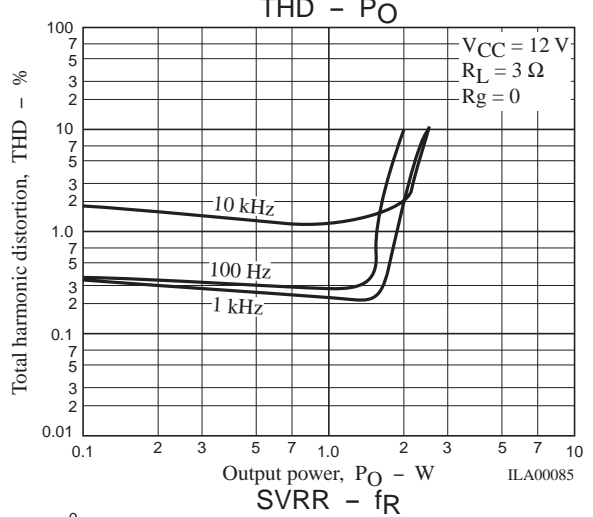
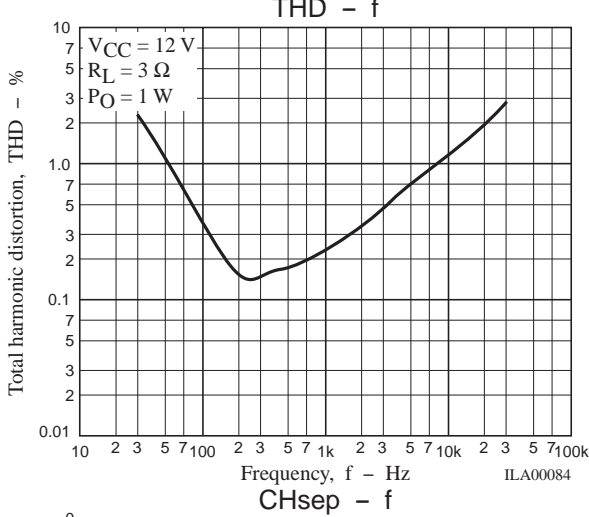
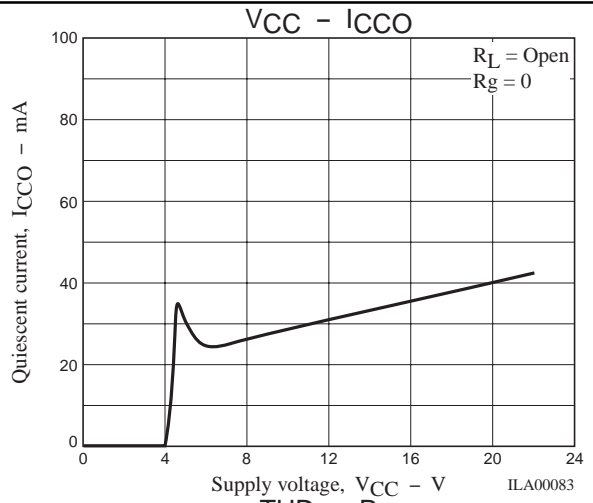
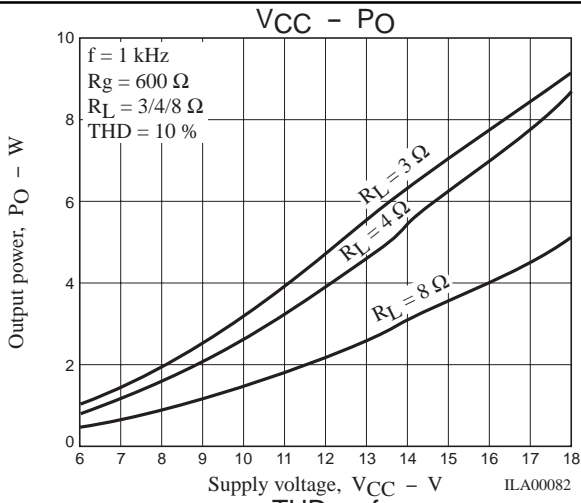
5. MUTE (Muting)

The output signal can be controlled by shifting the pin 7 (FILTER) level towards ground with a 300 to 500Ω resistor. However, note that the degree of suppression is reduced if a value of 750Ω or more is used.



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