Ordering number : EN6012

Monolithic Linear IC

LA4600

Audio Power Amplifier for Radio Cassette Recorders

Overview

The LA4600 is an audio power amplifier which requires minimum count of external parts by incorporating BS capacitor, NF capacitor; and oscillation prevention CR components into the IC circuitry.

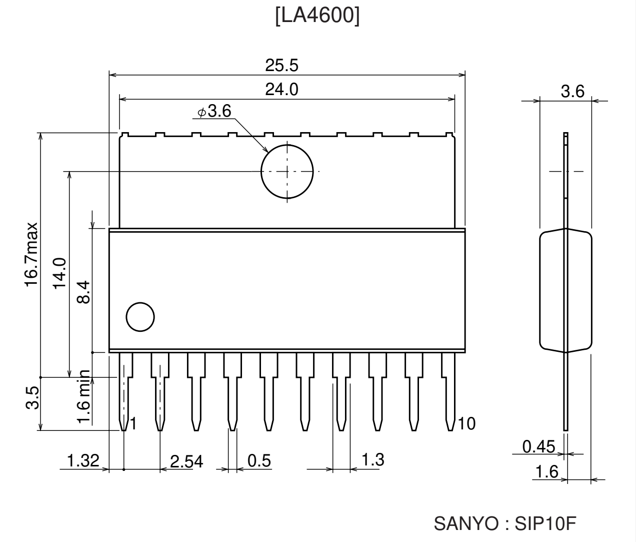
Functions

- Output power : V_{CC}= 12V/4Ω........... 4.0W X 2
  V_{CC}= 9V/4Ω .... 2.0W X 2
- Built-in stanby switch
- Built-in overheat protection (TSD)

Package Dimensions

unit: mm

3046B-SIP10F



Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	Vcc max	Rg=0 (No signal)	24	V
Allowable power dissipation	Pd max	With an arbitrary large	12.5	W
Thermal resistance	θj-c		10.0	°C/W
Operating temperature	Topr		– 20 to +75	°C
Storage temperature	Tstg		– 40 to +150	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	Vcc		12	V
Recommended load resistance	R_L		4	Ω
Operating supply voltage range	Vcc Op	Within maximum ratings	5.0 to 22	V
Operating load resistance range			2.7 to 8	Ω

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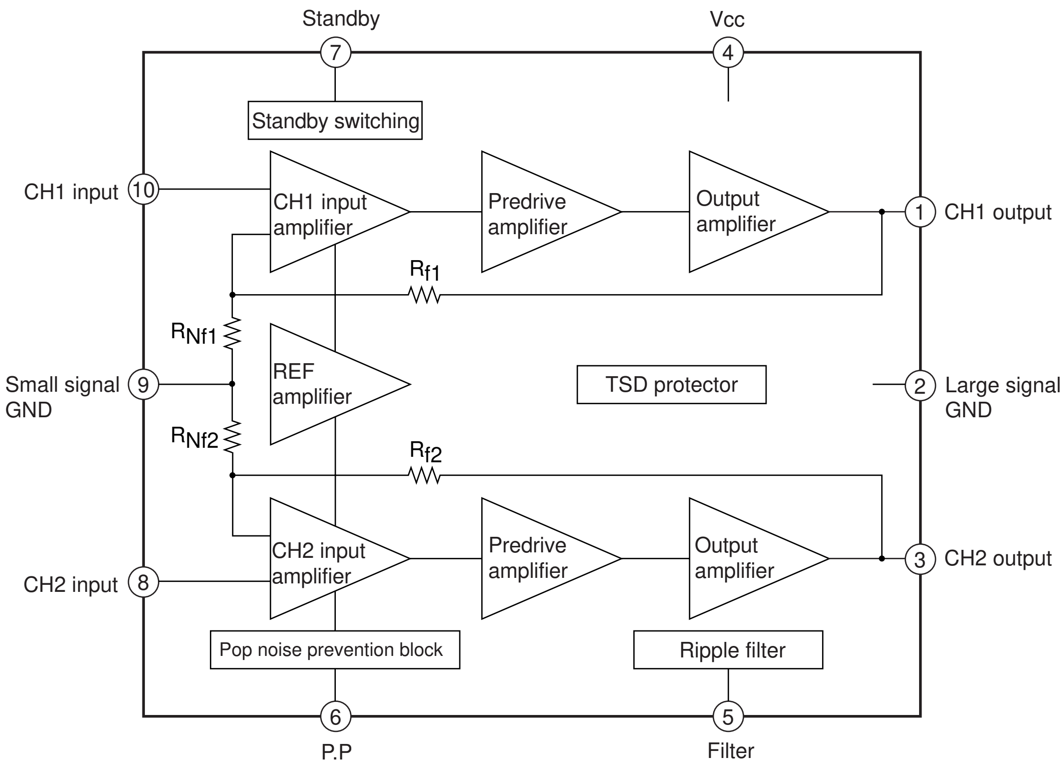
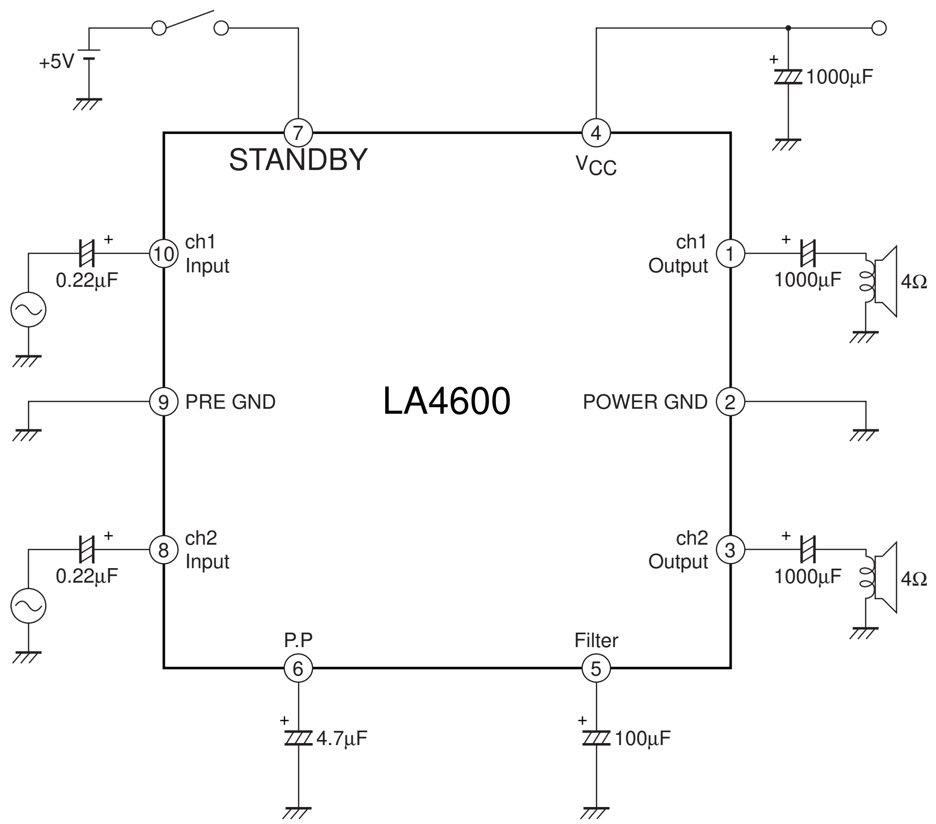
Electrical Characteristics at Ta = 25°C, V_{CC}=12V, RL=4Ω, f=1 kHz

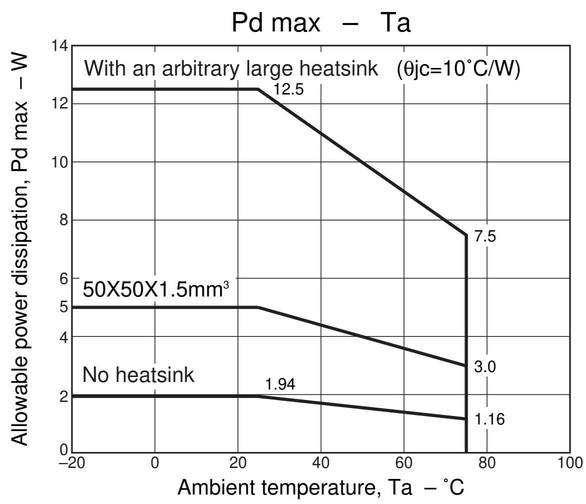
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Standby current	Ist	Standby pin —> GND	—	1.0	10	µA
Quiescent current	Icco	Rg=0	18	32	64	mA
Voltage gain	VG	Vo=0dBm	43.0	45.0	47.0	dB
Total harmonic distortion	THD	Po=1w	—	0.2	0.8	%
Output noise voltage	Vno	Rg=0, DIN AUDIO	—	0.15	0.5	mV
Output voltage	Po1	THD=10%	3.0	4.0	—	W
	Po2	Vcc=9V, THD=10%	1.5	2.0	—	W
Channel separation	Chsep	Vo=0dBm, Rg=0, DIN AUDIO	50	60	—	dB
Ripple rejection ratio	SVRR	Vr=0dBm, Rg=0, fr=100 Hz DIN AUDIO	45	55	—	dB
Stanby ON voltage	Vst		1.5	5.0	—	V
Input resistance	Ri		20	30	40	KΩ

Block Diagram



Sample Application





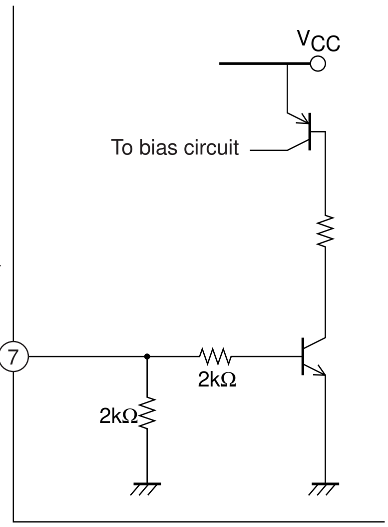
Pin Descriptions

1. Standby switching function (7)

Power is switched ON and OFF by controlling the High and Low states at pin 7, respectively (standby). To switch power ON, apply 1.5V or more, or 800 µA to pin 7.

$$\text{Current supplied to pin 7} \doteqdot \frac{\text{Applied voltage}}{2\ \text{k}\Omega} + \frac{\text{Applied voltage} - V_{BE}\ (\text{approx. } 0.7\text{V})}{2\ \text{k}\Omega}$$

- When directly connecting a microcontroller with this pin, add a resistor in series to optimize the current for the microcontroller.



2. Input pins (8,10)

Voltage at the input pins is approx. 2 V_{BE} (1.4V).
Input impedance is approx. 30 kΩ.

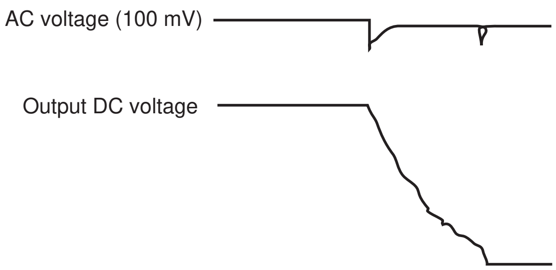
- The recommended value for the input capacitor is 0.22 µF, but this can be varied in order to adjust the starting time (t_S). (The starting time is the time required from applying voltage to the standby pin until sound output is obtained.)

Input capacitator	1.0 µF	2.0 µF	3.3 µF	4.7 µF	10 µF
Starting time (t_s)	0.2s	0.3s	0.5s	0.65s	1.5s

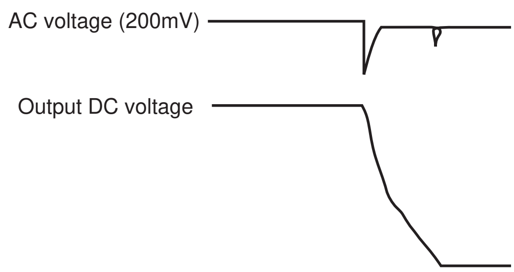
3. Filter (decoupling) pin (5)

Pin voltage is approx. 1/2 V_{CC}.
The recommended value for the filter capacitor is 100 µF.
When capacitance is lower, pop noise when setting the standby pin to Low (power OFF) will increase.

Filter capacitor= 100 µ



Filter capacitor= 47 µF

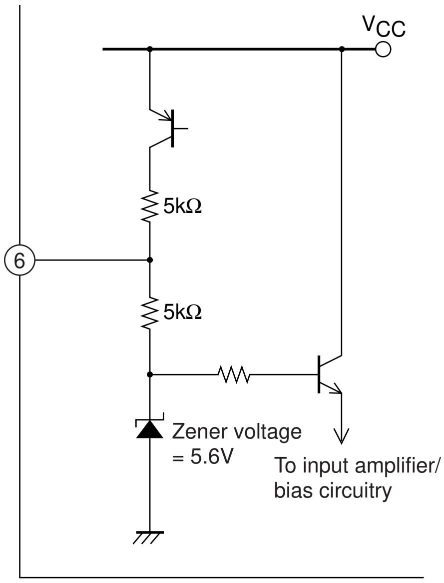


4. P.P (pop noise) pin (6)

$$\text{Voltage at pin 6} \fallingdotseq \frac{V_{CC} - V_{CE}\ (\text{approx. } 0.3\text{V}) - 5.6\text{V}}{2} + 5.6\text{V}$$

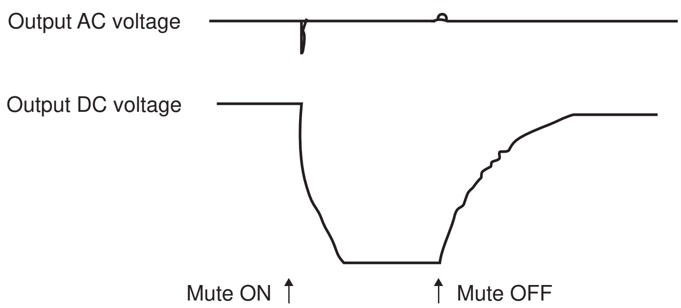
- The recommended value for the P.P capacitor is 4.7 µF.
  When capacitance is lower than 2.2 µF, pop noise when setting the standby pin to Low (power OFF) will increase.

  When capacitance is higher than 10 µF, the sound will not be cut off when setting the standby pin to Low (power OFF).

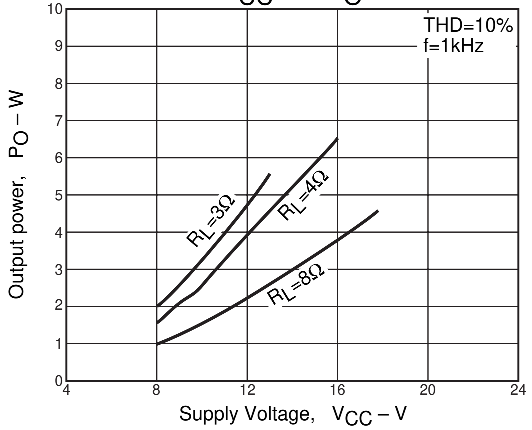


5. Muting

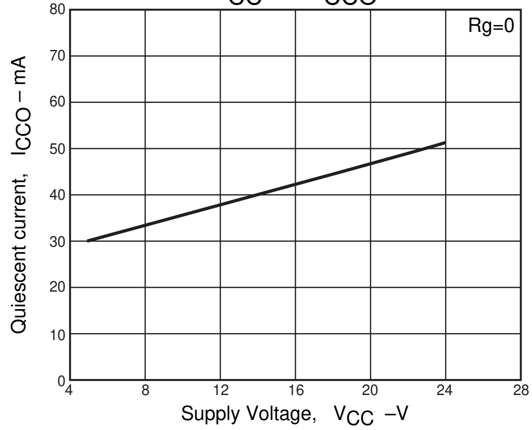
The output signal can be controlled by connecting pin 5 (Filter) to ground via a resistance of 300 to 500 Ω. If resistance is higher than 750 Ω, the suppression ratio will decrease.



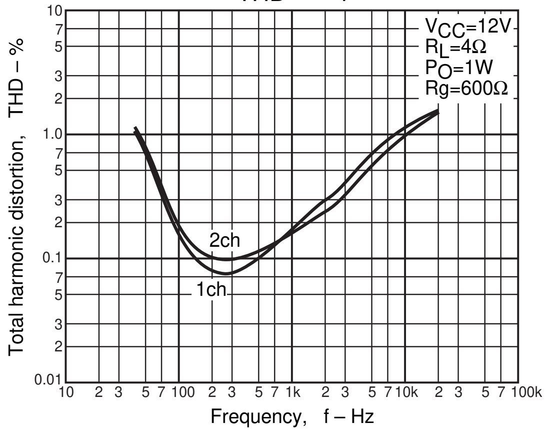
V_{CC} – P_O



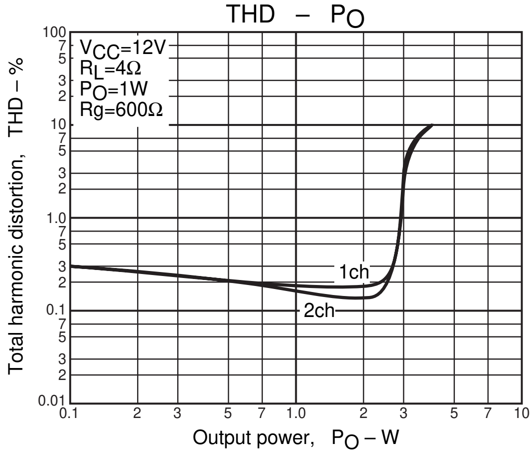
V_{CC} – I_{CCO}



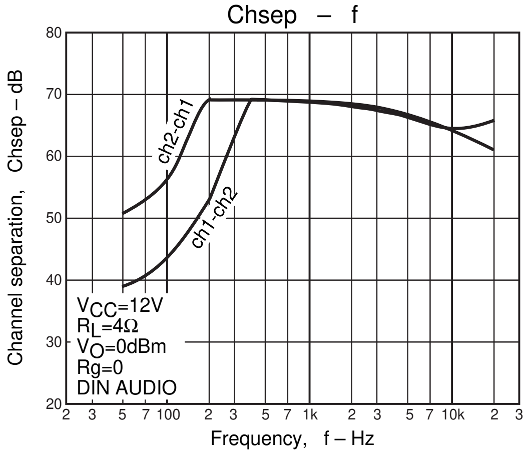
THD – f



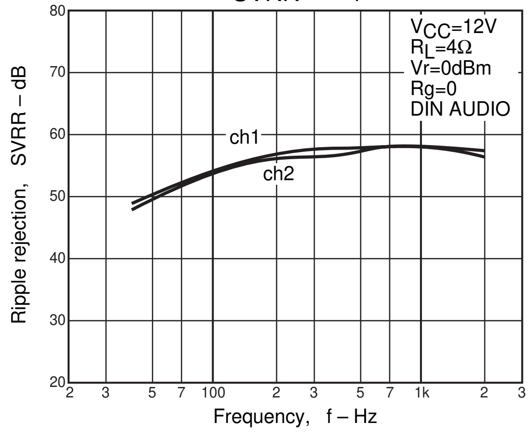
THD – P_O



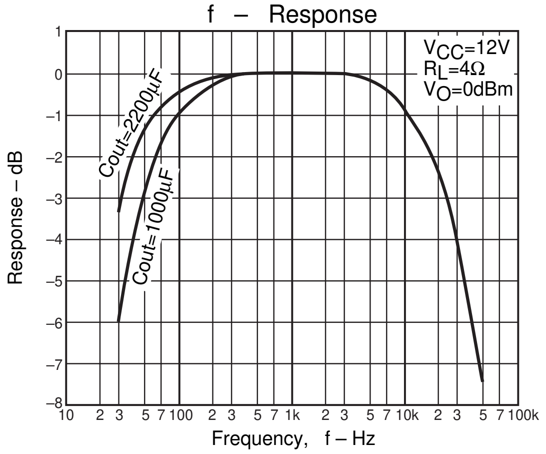
Chsep – f



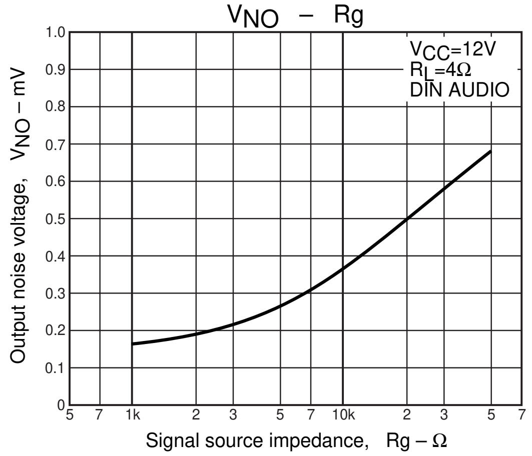
SVRR – f

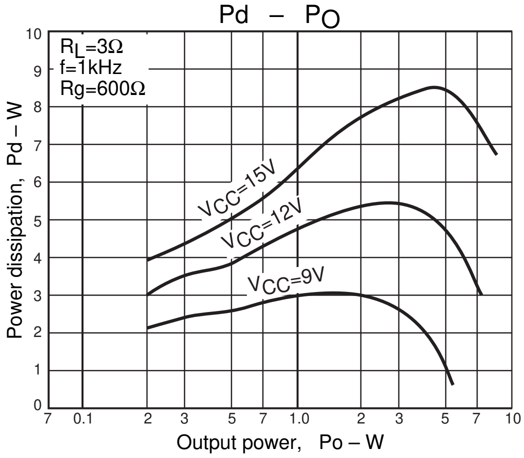


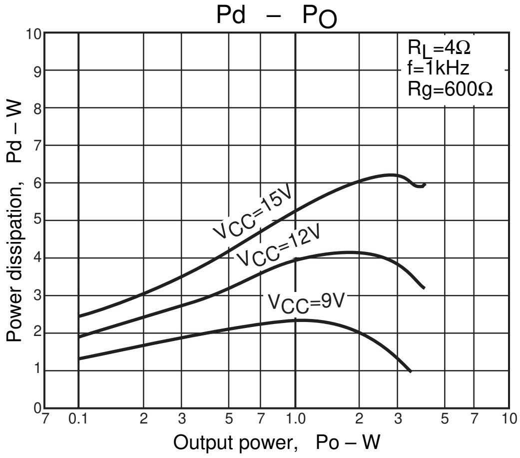
f – Response

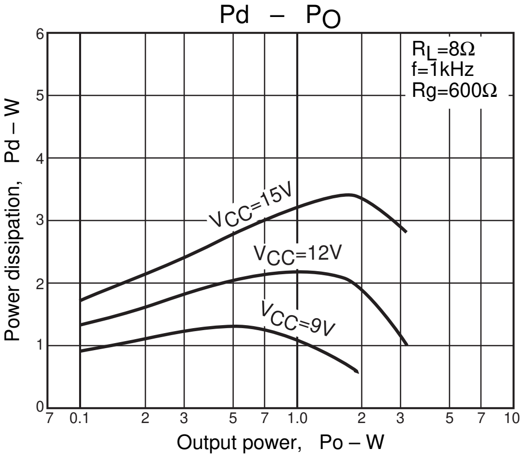


V_{NO} – Rg









This catalog provides information as of November, 1998. Specifications and information herein are subject to change without notice.