

## 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 : $\mathrm{V}_{\mathrm{CC}}=12 \mathrm{~V} / 4 \Omega$............
4.0W X 2
$\mathrm{V}_{\mathrm{CC}}=9 \mathrm{~V} / 4 \Omega$.............. 2.0 W X 2
- Built-in stanby switch
- Built-in overheat protection (TSD)


## Package Dimensions

unit: mm
3046B-SIP10F


## Specifications

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

| Parameter | Symbol | Conditions | Ratings | Unit |
| :--- | :---: | :---: | :---: | :---: |
| Maximum supply voltage | Vcc max | $\mathrm{Rg}=0$ (No signal) | 24 | V |
| Allowable power dissipation | Pd max | With an arbitrary large | 12.5 | W |
| Thermal resistance | $\theta \mathrm{j}-\mathrm{c}$ |  | 10.0 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |
| Operating temperature | Topr |  | -20 to +75 | ${ }^{\circ} \mathrm{C}$ |
| Storage temperature | Tstg |  | -40 to +150 | ${ }^{\circ} \mathrm{C}$ |

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

| Parameter | Symbol | Conditions | Ratings | Unit |
| :--- | :---: | :---: | :---: | :---: |
| Recommended supply voltage | Vcc |  | 12 | V |
| Recommended load resistance | $\mathrm{R}_{\mathrm{L}}$ |  | 4 | $\Omega$ |
| Operating supply voltage range | Vcc Op | Within maximum ratings | 5.0 to 22 | V |
| Operating load resistance range |  |  | 2.7 to 8 | $\Omega$ |

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Electrical Characteristics at $\mathrm{Ta}=25^{\circ} \mathrm{C}, \mathrm{V}_{\mathrm{Cc}}=\mathbf{1 2 V}, \mathrm{RL}=4 \Omega, \mathrm{f}=1 \mathrm{kHz}$

| Parameter | Symbol | Conditions | Ratings |  |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | min | typ | max |  |
| Standby current | Ist | Standby pin $\longrightarrow$ GND | - | 1.0 | 10 | $\mu \mathrm{A}$ |
| Quiescent current | Icco | $\mathrm{Rg}=0$ | 18 | 32 | 64 | mA |
| Voltage gain | VG | $\mathrm{Vo}=0 \mathrm{dBm}$ | 43.0 | 45.0 | 47.0 | dB |
| Total harmonic distortion | THD | $\mathrm{Po}=1 \mathrm{w}$ | - | 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 | $\mathrm{Vr}=0 \mathrm{dBm}, \mathrm{Rg}=0, \mathrm{fr}=100 \mathrm{~Hz}$ DIN AUDIO | 45 | 55 | - | dB |
| Stanby ON voltage | Vst |  | 1.5 | 5.0 | - | V |
| Input resistance | Ri |  | 20 | 30 | 40 | $\mathrm{K} \Omega$ |

## 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 1.5 V or more, or 800 $\mu \mathrm{A}$ to pin 7 .


- 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. $2 \mathrm{~V}_{\mathrm{BE}}(1.4 \mathrm{~V})$.
Input impedance is approx. $30 \mathrm{k} \Omega$.

- The recommended value for the input capacitor is $0.22 \mu \mathrm{~F}$, but this can be varied in order to adjust the starting time $\left(\mathrm{t}_{\mathrm{s}}\right)$. (The starting time is the time required from applying voltage to the standby pin until sound output is obtained. )

| Input capacitator | $1.0 \mu \mathrm{~F}$ | $2.0 \mu \mathrm{~F}$ | $3.3 \mu \mathrm{~F}$ | $4.7 \mu \mathrm{~F}$ | $10 \mu \mathrm{~F}$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Starting time $\left(\mathrm{t}_{\mathrm{s}}\right)$ | 0.2 s | 0.3 s | 0.5 s | 0.65 s | 1.5 s |

## 3. Filter (decoupling) pin (5)

Pin voltage is approx. $1 / 2 \mathrm{~V}_{\mathrm{CC}}$.
The recommended value for the filter capacitor is $100 \mu \mathrm{~F}$.
When capacitance is lower, pop noise when setting the standby pin to Low (power OFF) will increase.

Filter capacitor= $100 \mu$


Filter capacitor= $47 \mu \mathrm{~F}$


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

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

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

When capacitance is lower than $2.2 \mu \mathrm{~F}$, pop noise when setting the standby pin to Low (power OFF) will increase.

When capacitance is higher than $10 \mu \mathrm{~F}$, 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 $500 \Omega$. If resistance is higher than $750 \Omega$, the suppression ratio will decrease.




Chsep - f










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