# DATA SHEET

# TDA2611A
## 5 W audio power amplifier

Product specification

November 1982

# 5 W audio power amplifier TDA2611A

The TDA2611A is a monolithic integrated circuit in a 9-lead single in-line (SIL) plastic package with a high supply voltage audio amplifier. Special features are:

- **possibility for increasing the input impedance**
- single in-line (SIL) construction for easy mounting
- very suitable for application in mains-fed apparatus
- extremely low number of external components
- thermal protection
- well defined open loop gain circuitry with simple quiescent current setting and fixed integrated closed loop gain.

## QUICK REFERENCE DATA

| | | | | |
|---|---|---|---|---|
| Supply voltage range | $V_P$ | | 6 to 35 | V |
| Repetitive peak output current | $I_{ORM}$ | < | 1,5 | A |
| Output power at $d_{tot}$ = 10% | | | | |
| $V_P$ = 18 V; $R_L$ = 8 Ω | $P_o$ | typ. | 4,5 | W |
| $V_P$ = 25 V; $R_L$ = 15 Ω | $P_o$ | typ. | 5 | W |
| Total harmonic distortion at $P_o$ < 2 W; $R_L$ = 8 Ω | $d_{tot}$ | typ. | 0,3 | % |
| Input impedance | $\|Z_i\|$ | typ. | 45 | kΩ |
| Total quiescent current at $V_P$ = 18 V | $I_{tot}$ | typ. | 25 | mA |
| Sensitivity for $P_o$ = 2,5 W; $R_L$ = 8 Ω | $V_i$ | typ. | 55 | mV |
| Operating ambient temperature | $T_{amb}$ | | −25 to + 150 | °C |
| Storage temperature | $T_{stg}$ | | −55 to + 150 | °C |

## PACKAGE OUTLINE

9-lead SIL; plastic (SOT110B); SOT110-1.

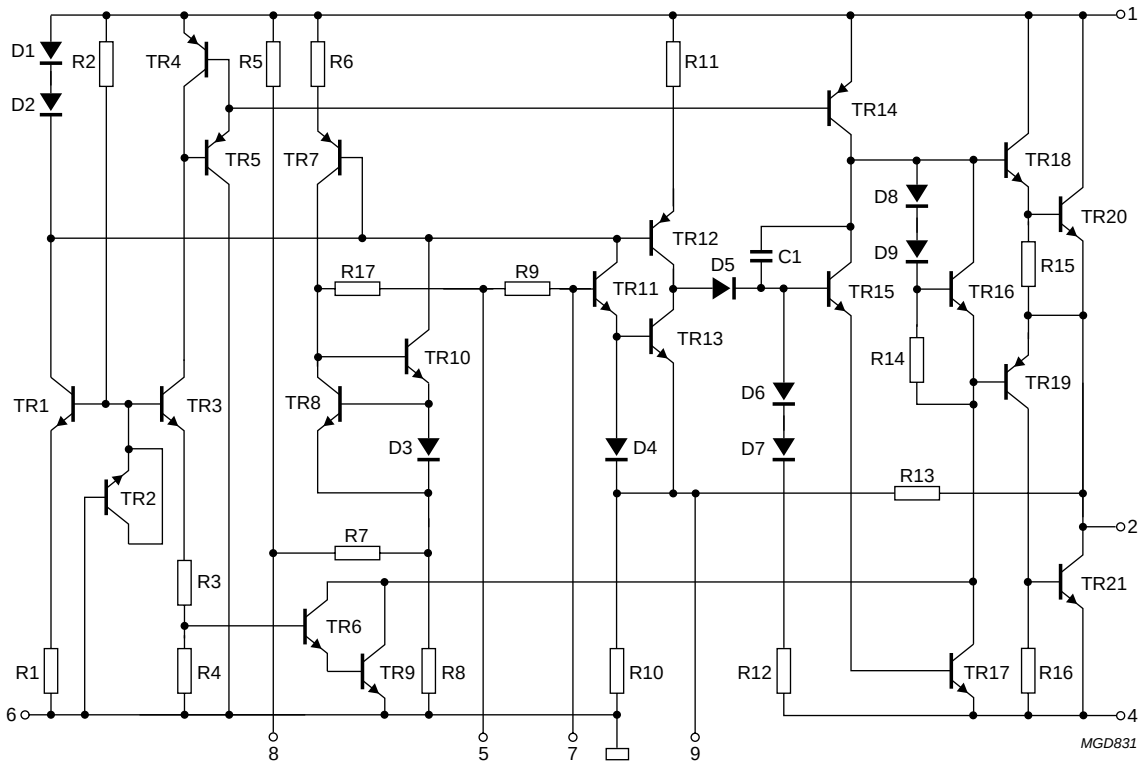



Fig.1 Circuit diagram; pin 3 not connected.

**RATINGS**

Limiting values in accordance with the Absolute Maximum System (IEC 134)

| | | | |
|---|---|---|---|
| Supply voltage | $V_P$ | max. | 35 V |
| Non-repetitive peak output current | $I_{OSM}$ | max. | 3 A |
| Repetitive peak output current | $I_{ORM}$ | max. | 1,5 A |
| Total power dissipation | see derating curves Fig. 2 | | |
| Storage temperature | $T_{stg}$ | −55 to + 150 | °C |
| Operating ambient temperature | $T_{amb}$ | −25 to + 150 | °C |

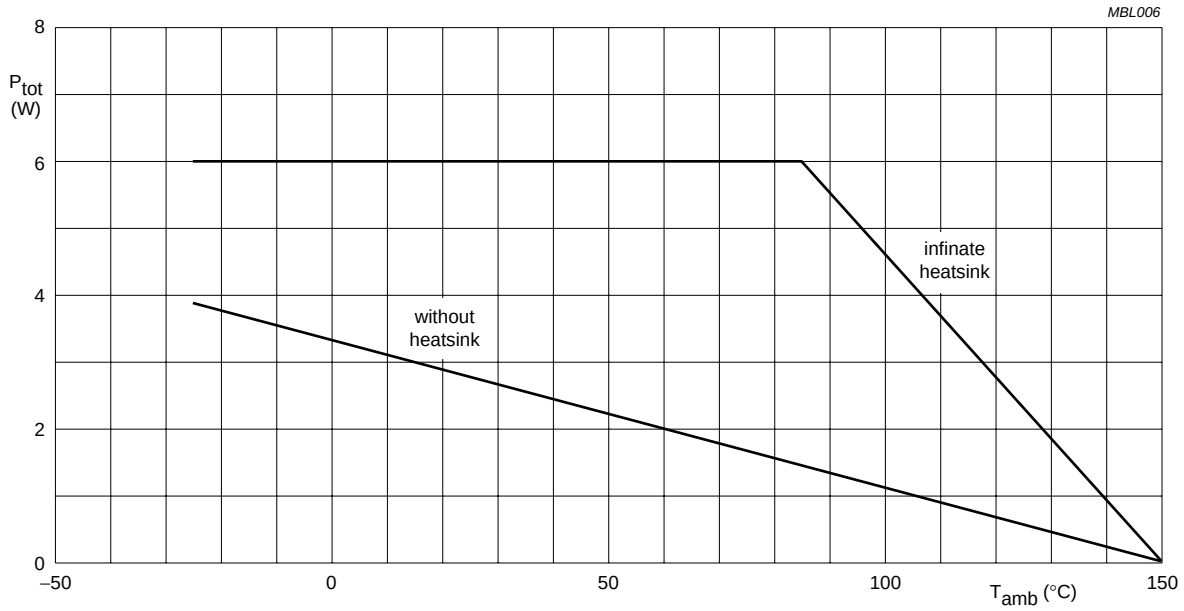



Fig.2 Power derating curves.

**HEATSINK EXAMPLE**

Assume $V_P = 18$ V; $R_L = 8\ \Omega$; $T_{amb} = 60$ °C maximum; $T_j = 150$ °C (max. for a 4 W application into an 8 Ω load, the maximum dissipation is about 2,2 W).

The thermal resistance from junction to ambient can be expressed as:

$$R_{th\ j\text{-}a} = R_{th\ j\text{-}tab} + R_{th\ tab\text{-}h} + R_{th\ h\text{-}a} = \frac{150 - 60}{2,2} = 41\ \text{K/W}.$$

Since $R_{th\ j\text{-}tab} = 11$ K/W and $R_{th\ tab\text{-}h} = 1$ K/W, $R_{th\ h\text{-}a} = 41 - (11 + 1) = 29$ K/W.

## D.C. CHARACTERISTICS

| | | | | |
|---|---|---|---|---|
| Supply voltage range | $V_P$ | | 6 to 35 | V |
| Repetitive peak output current | $I_{ORM}$ | < | 1,5 | A |
| Total quiescent current at $V_P = 18$ V | $I_{tot}$ | typ. | 25 | mA |

## A.C. CHARACTERISTICS

$T_{amb} = 25$ °C; $V_P = 18$ V; $R_L = 8\ \Omega$; $f = 1$ kHz unless otherwise specified; see also Fig. 3

A.F. output power at $d_{tot} = 10\%$

| | | | | |
|---|---|---|---|---|
| $V_P = 18$ V; $R_L = 8\ \Omega$ | $P_o$ | > | 4 | W |
| | | typ. | 4,5 | W |
| $V_P = 12$ V; $R_L = 8\ \Omega$ | $P_o$ | typ. | 1,7 | W |
| $V_P = 8{,}3$ V; $R_L = 8\ \Omega$ | $P_o$ | typ. | 0,65 | W |
| $V_P = 20$ V; $R_L = 8\ \Omega$ | $P_o$ | typ. | 6 | W |
| $V_P = 25$ V; $R_L = 15\ \Omega$ | $P_o$ | typ. | 5 | W |
| Total harmonic distortion at $P_o = 2$ W | $d_{tot}$ | typ. | 0,3 | % |
| | | < | 1 | % |
| Frequency response | | > | 15 | kHz |
| Input impedance | $\lvert Z_i \rvert$ | typ. | 45 | k$\Omega$[1] |
| Noise output voltage at $R_S = 5$ k$\Omega$; B = 60 Hz to 15 kHz | $V_n$ | typ. | 0,2 | mV |
| | | < | 0,5 | mV |
| Sensitivity for $P_o = 2{,}5$ W | $V_i$ | typ. | 55 | mV |
| | | | 44 to 66 | mV |

**Note**

1. Input impedance can be increased by applying C and R between pins 5 and 9 (see also Figures 6 and 7).

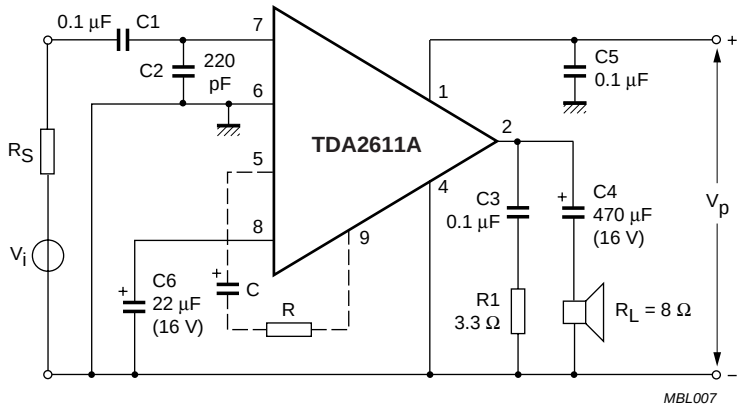
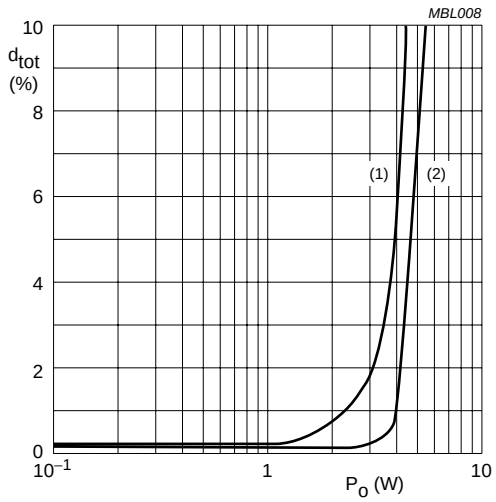



Fig.3 Test circuit; pin 3 not connected.

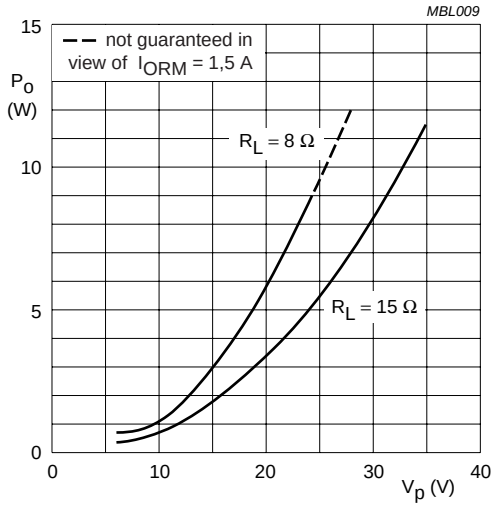



Typical values

(1) $R_L$ = 8 Ω; $V_P$ = 18 V.

(2) $R_L$ = 15 Ω; $V_P$ = 25 V.

Fig.4 Total harmonic distortion as a function of output power.




Typical values:
f = 1 kHz.
$d_{tot}$ = 10%.

Fig.5 Output power as a function of supply voltage.

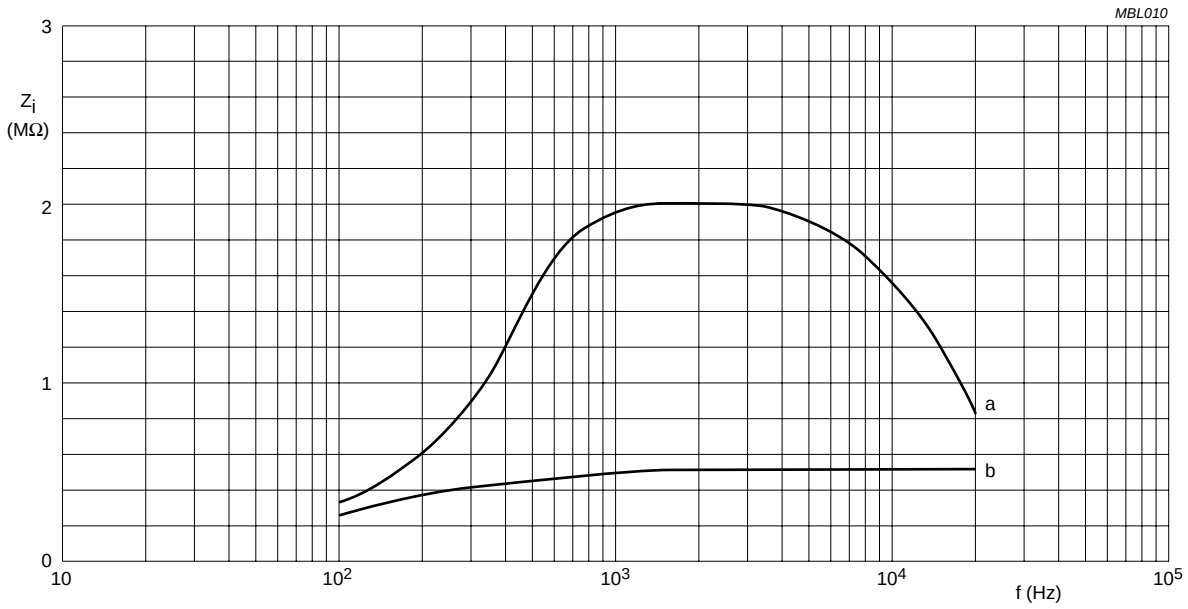



Fig.6 Input impedance as a function of frequency; curve a for C = 1 μF, R = 0 Ω; curve b for C = 1 μF, R = 1 kΩ; circuit of Fig. 3; C2 = 10 pF; typical values.

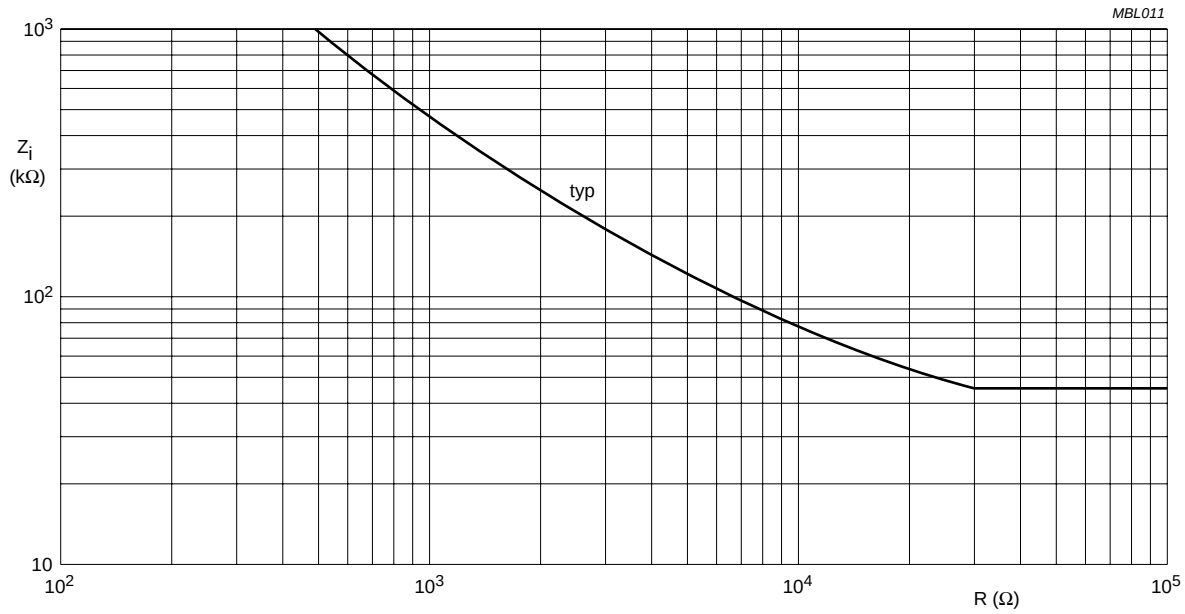



Fig.7 Input impedance as a function of R in circuit of Fig. 3; C = 1 μF; f = 1 kHz.

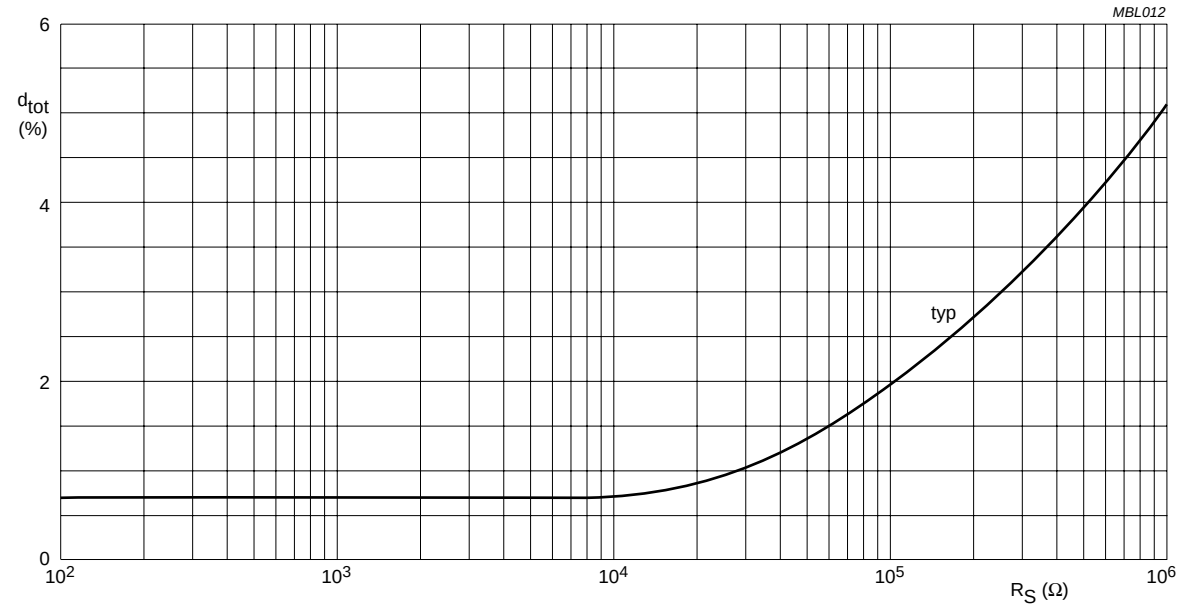
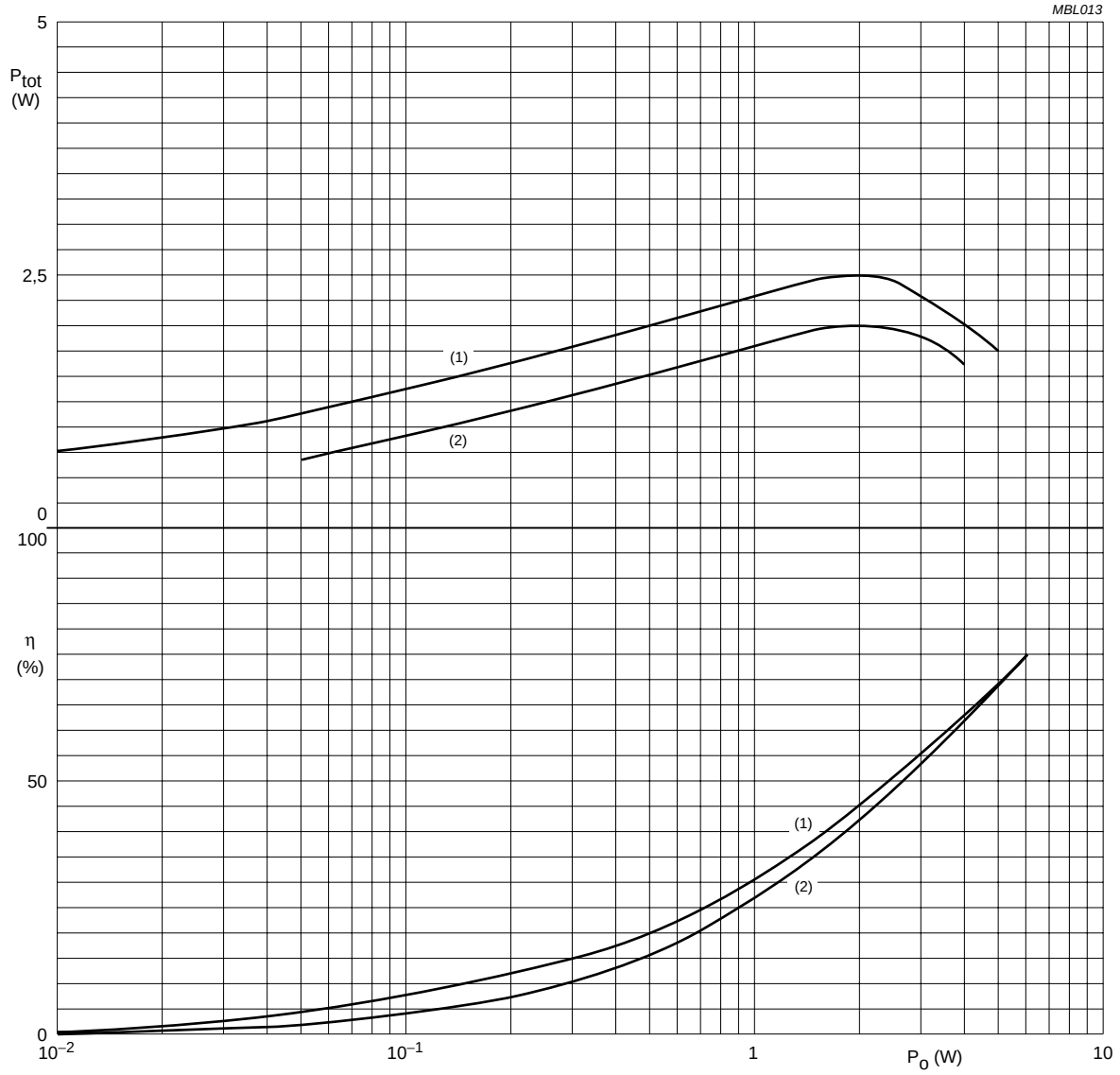



Fig.8 Total harmonic distortion as a function of $R_S$ in the circuit of Fig. 3; $P_o$ = 3,5 W; f = 1 kHz.




(1) $V_P$ = 25 V; $R_L$ = 15 Ω; f = 1 khz.
(2) $V_P$ = 18 V; $R_L$ = 8 Ω; f = 1 khz.

Fig.9 Total power dissipation and efficiency as a function of output power.

## APPLICATION INFORMATION

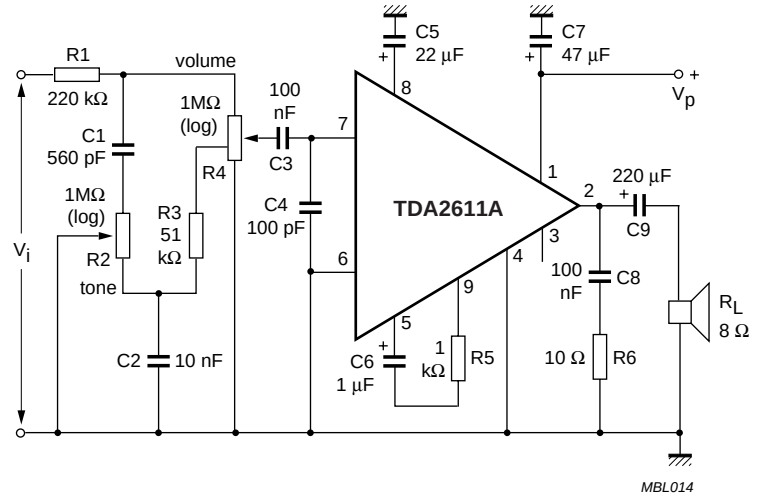
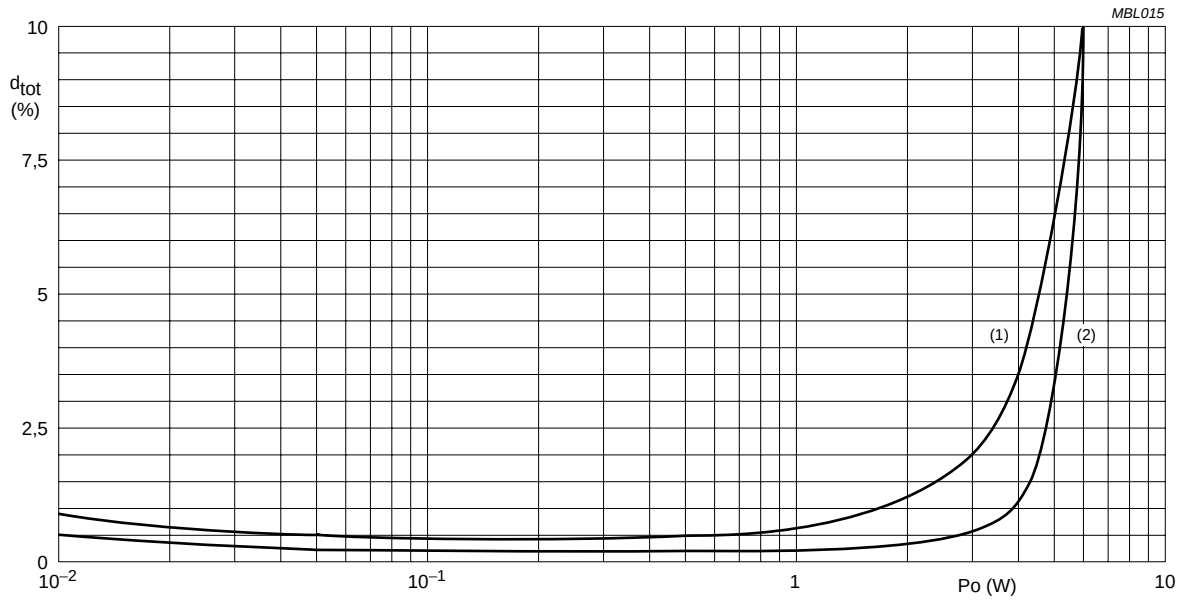
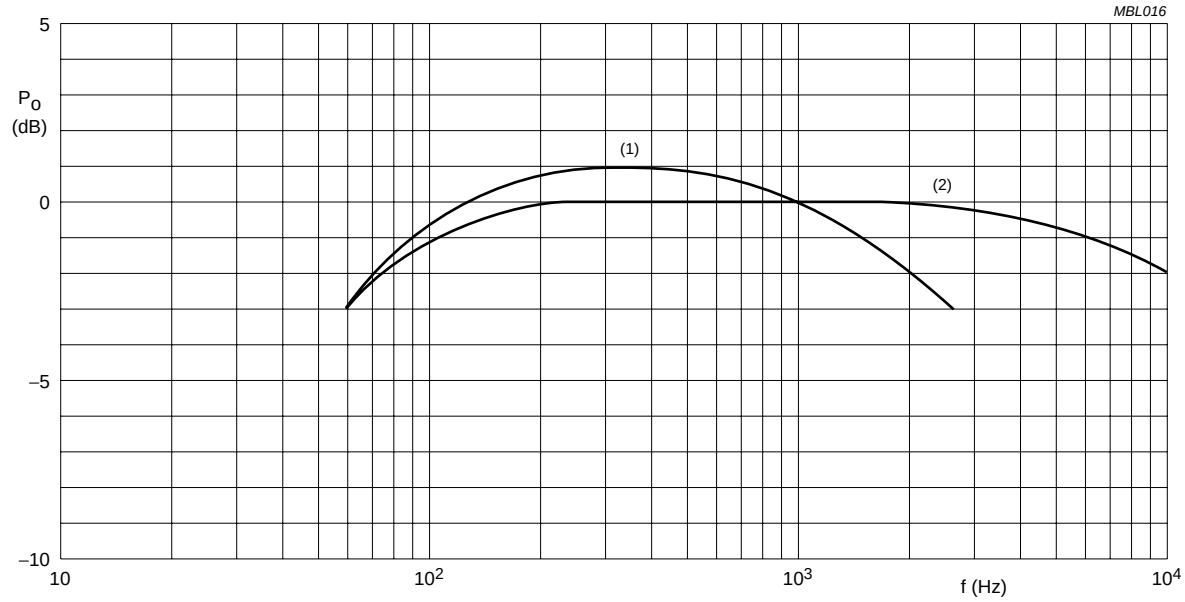



Fig.10 Ceramic pickup amplifier circuit.




(1) With tone control.
(2) Without tone control.

Fig.11 Total harmonic distortion as a function of output power; in circuit of Fig. 10; typical values.




(1) Tone control min. high.
(2) Tone control max. high.

Fig.12 Frequency characteristics of the circuit of Fig. 10; $P_o$ relative to 0 dB = 3 W; typical values.

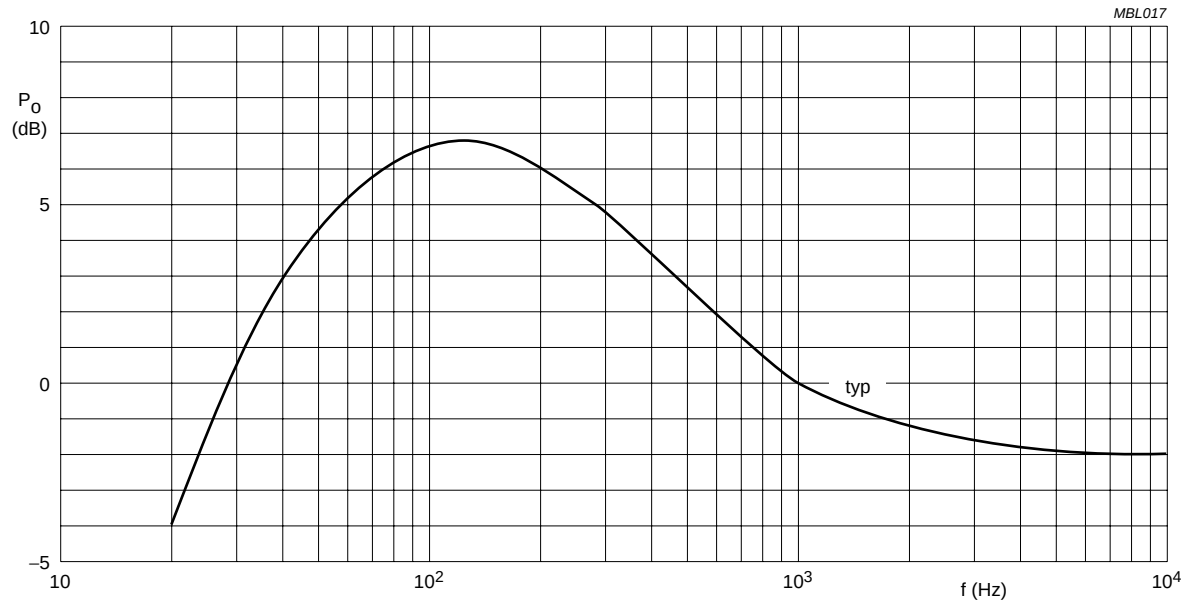
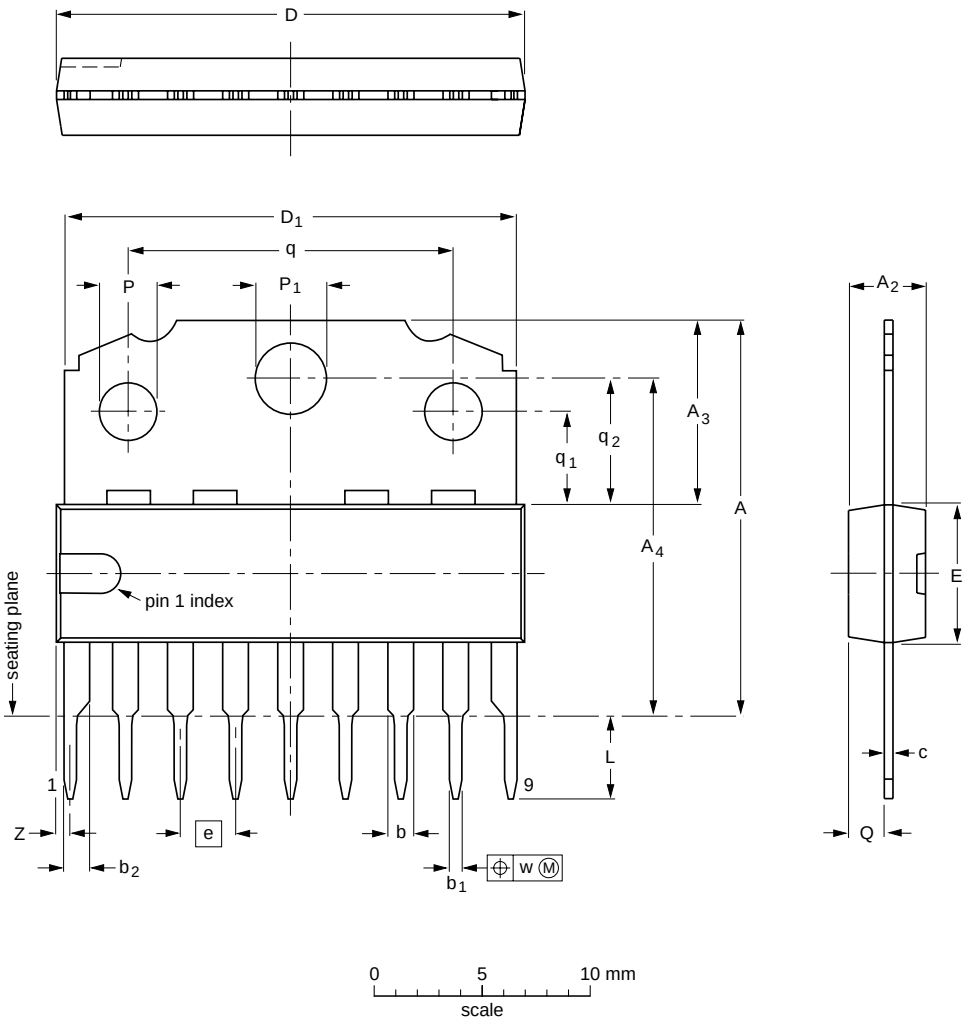



Fig.13 Frequency characteristic of the circuit of Fig. 10; volume control at the top; tone control max. high.

## PACKAGE OUTLINE

**SIL9MPF: plastic single in-line medium power package with fin; 9 leads** **SOT110-1**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_2$ max. | $A_3$ | $A_4$ | b | $b_1$ | $b_2$ | c | $D^{(1)}$ | $D_1$ | $E^{(1)}$ | e | L | P | $P_1$ | Q | q | $q_1$ | $q_2$ | w | $Z^{(1)}$ max. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 18.5<br>17.8 | 3.7 | 8.7<br>8.0 | 15.8<br>15.4 | 1.40<br>1.14 | 0.67<br>0.50 | 1.40<br>1.14 | 0.48<br>0.38 | 21.8<br>21.4 | 21.4<br>20.7 | 6.48<br>6.20 | 2.54 | 3.9<br>3.4 | 2.75<br>2.50 | 3.4<br>3.2 | 1.75<br>1.55 | 15.1<br>14.9 | 4.4<br>4.2 | 5.9<br>5.7 | 0.25 | 1 |

**Note**

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT110-1 | | | | | | ~~95-02-25~~<br>03-03-12 |

## SOLDERING

### Introduction

There is no soldering method that is ideal for all IC packages. Wave soldering is often preferred when through-hole and surface mounted components are mixed on one printed-circuit board. However, wave soldering is not always suitable for surface mounted ICs, or for printed-circuits with high population densities. In these situations reflow soldering is often used.

This text gives a very brief insight to a complex technology. A more in-depth account of soldering ICs can be found in our *"IC Package Databook"* (order code 9398 652 90011).

### Soldering by dipping or by wave

The maximum permissible temperature of the solder is 260 °C; solder at this temperature must not be in contact with the joint for more than 5 seconds. The total contact time of successive solder waves must not exceed 5 seconds.

The device may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified maximum storage temperature ($T_{stg\ max}$). If the printed-circuit board has been pre-heated, forced cooling may be necessary immediately after soldering to keep the temperature within the permissible limit.

### Repairing soldered joints

Apply a low voltage soldering iron (less than 24 V) to the lead(s) of the package, below the seating plane or not more than 2 mm above it. If the temperature of the soldering iron bit is less than 300 °C it may remain in contact for up to 10 seconds. If the bit temperature is between 300 and 400 °C, contact may be up to 5 seconds.

## DATA SHEET STATUS

| DOCUMENT STATUS[1] | PRODUCT STATUS[2] | DEFINITION |
|---|---|---|
| Objective data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary data sheet | Qualification | This document contains data from the preliminary specification. |
| Product data sheet | Production | This document contains the product specification. |

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Printed in The Netherlands RM5/02/pp15 Date of release: November 1982

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