

DATA SHEET

TDA7056

**3 W mono BTL audio output
amplifier**

Product specification
File under Integrated Circuits, IC01

May 1992

3 W mono BTL audio output amplifier**TDA7056****FEATURES**

- No external components
- No switch-on/off clicks
- Good overall stability
- Low power consumption
- Short circuit proof
- ESD protected on all pins.

GENERAL DESCRIPTION

The TDA7056 is a mono output amplifier contained in a 9 pin medium power package. The device is designed for battery-fed portable mono recorders, radios and television.

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--------|-----------------------------|---------------------------------|------|------|------|------|
| V_P | supply voltage | | 3 | 11 | 18 | V |
| P_O | output power in 16 Ω | $V_P = 11$ V | 2.5 | 3 | – | W |
| G_V | internal voltage gain | | 39 | 40.5 | 42 | dB |
| I_P | total quiescent current | $V_P = 11$ V; $R_L = \infty$ | – | 5 | 7 | mA |
| THD | total harmonic distortion | $P_O = 0.5$ W | – | 0.25 | 1 | % |

ORDERING INFORMATION

| EXTENDED TYPE NUMBER | PACKAGE | | | |
|-------------------------|---------|--------------|----------|-----------------------|
| | PINS | PIN POSITION | MATERIAL | CODE |
| TDA7056 | 9 | SIL | plastic | SOT110 ⁽¹⁾ |

Note

1. SOT110-1; 1996 August 21.

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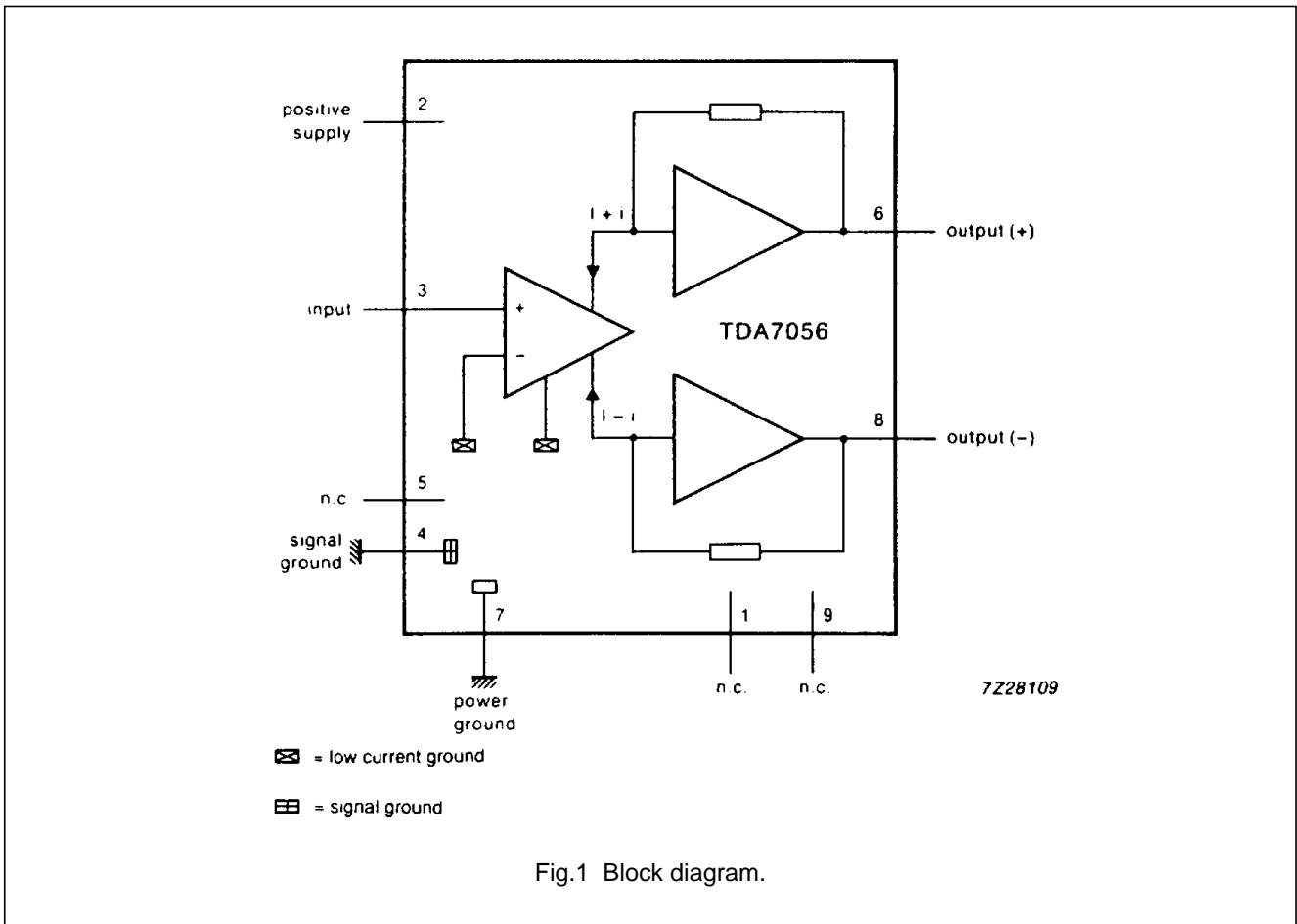


Fig.1 Block diagram.

PINNING

| PIN | DESCRIPTION |
|-----|---------------|
| 1 | n.c. |
| 2 | V_P |
| 3 | input (+) |
| 4 | signal ground |
| 5 | n.c. |
| 6 | output (+) |
| 7 | power ground |
| 8 | output (-) |
| 9 | n.c. |

FUNCTIONAL DESCRIPTION

The TDA7056 is a mono output amplifier, designed for battery-fed portable radios and mains-fed equipment such as television. For space reasons there is a trend to decrease the number of external components. For portable applications there is also a trend to decrease the number of battery cells, but still a reasonable output power is required.

The TDA7056 fulfills both of these requirements. It needs no peripheral components, because it makes use of the Bridge-Tied-Load (BTL) principle. Consequently it has, at the same supply voltage, a higher output power compared to a conventional Single Ended output stage. It delivers an output power of 1 W into a loudspeaker load of 8 Ω with 6 V supply or 3 W into 16 Ω loudspeaker at 11 V without need of an external heatsink. The gain is internally fixed at 40 dB. Special attention is given to switch-on/off click suppression, and it has a good overall stability. The load can be short circuited at all input conditions.

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LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|------------------------------------|---------------------------|------|------|------|
| V_P | supply voltage | | – | 18 | V |
| I_{ORM} | Peak output current repetitive | | – | 1 | A |
| I_{OSM} | Peak output current non-repetitive | | – | 1.5 | A |
| T_{stg} | storage temperature range | | –55 | 150 | °C |
| T_j | junction temperature | | – | 150 | °C |
| P_{tot} | total power dissipation | $T_{case} < 60\text{ °C}$ | – | 9 | W |
| T_{sc} | short circuiting time | see note 1 | – | 1 | hr |

Note

- The load can be short-circuited at all input conditions.

THERMAL RESISTANCE

| SYMBOL | PARAMETER | NOM. | UNIT |
|---------------|--------------------------------------|------|------|
| $R_{th\ j-c}$ | from junction to case | 10 | K/W |
| $R_{th\ j-a}$ | from junction to ambient in free air | 55 | K/W |

POWER DISSIPATIONAssume: $V_P = 11\text{ V}$; $R_L = 16\ \Omega$.

The maximum sine-wave dissipation is 1.52 W.

The $R_{th\ j-a}$ of the package is 55 K/W. $T_{amb\ max} = 150 - 55 \times 1.52 = 66.4\text{ °C}$.

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CHARACTERISTICSAt $T_{amb} = 25\text{ }^{\circ}\text{C}$; $f = 1\text{ kHz}$; $V_P = 11\text{ V}$; $R_L = 16\text{ }\Omega$ (see Fig.2).

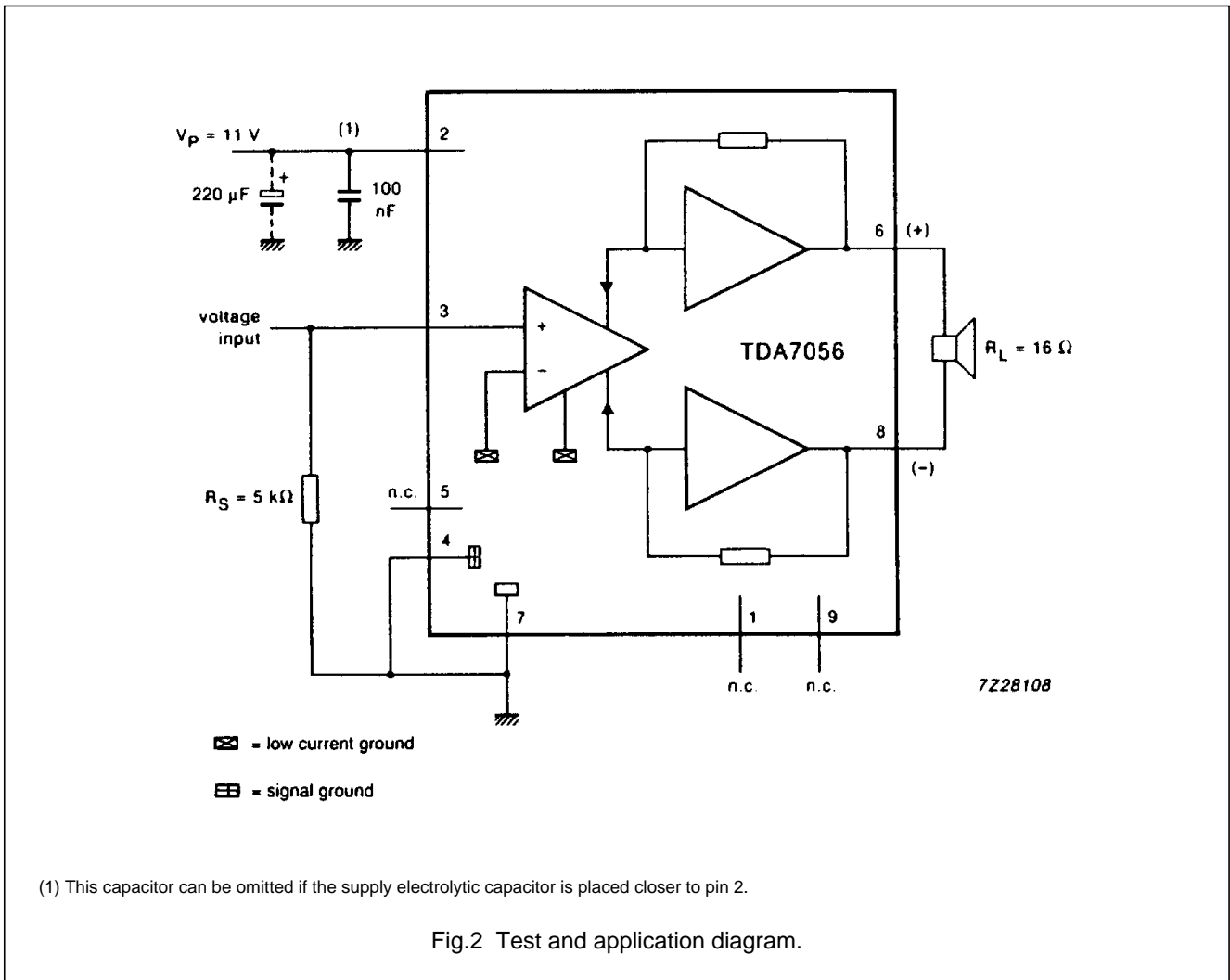
| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------|--------------------------------|--------------------------|------|--------------|------|------------------|
| V_P | operating supply voltage | | 3 | 11 | 18 | V |
| I_{ORM} | repetitive peak output current | | – | – | 0.6 | A |
| I_P | total quiescent current | note 1 $R_L = \infty$ | – | 5 | 7 | mA |
| P_O | output power | THD = 10% | 2.5 | 3 | – | W |
| THD | total harmonic distortion | $P_O = 0.5\text{ W}$ | – | 0.25 | 1 | % |
| G_V | voltage gain | | 39 | 40.5 | 42 | dB |
| V_{no} | noise output voltage | note 2 | – | 180 | 300 | μV |
| V_{no} | noise output voltage | note 3 | – | 60 | – | μV |
| | frequency response | | – | 20 to 20.000 | – | Hz |
| RR | ripple rejection | note 4 | 36 | 50 | – | dB |
| ΔV | DC-output offset voltage | note 5 | – | – | 200 | mV |
| $ Z_i $ | input impedance | | – | 100 | – | $\text{k}\Omega$ |
| I_i | input bias current | | – | 100 | 300 | nA |

Notes to the characteristics

1. With a load connected to the outputs the quiescent current will increase, the maximum value of this increase being equal to the DC output offset voltage divided by R_L .
2. The noise output voltage (RMS value) is measured with $R_S = 5\text{ k}\Omega$ unweighted (20 Hz to 20 kHz).
3. The noise output voltage (RMS value) at $f = 500\text{ kHz}$ is measured with $R_S = 0\text{ }\Omega$ and bandwidth = 5 kHz.
With a practical load ($R_L = 16\text{ }\Omega$, $L_L = 200\text{ }\mu\text{H}$) the noise output current is only 50 nA.
4. The ripple rejection is measured with $R_S = 0\text{ }\Omega$ and $f = 100\text{ Hz}$ to 10 kHz.
The ripple voltage (200 mV) is applied to the positive supply rail.
5. $R_S = 5\text{ k}\Omega$.

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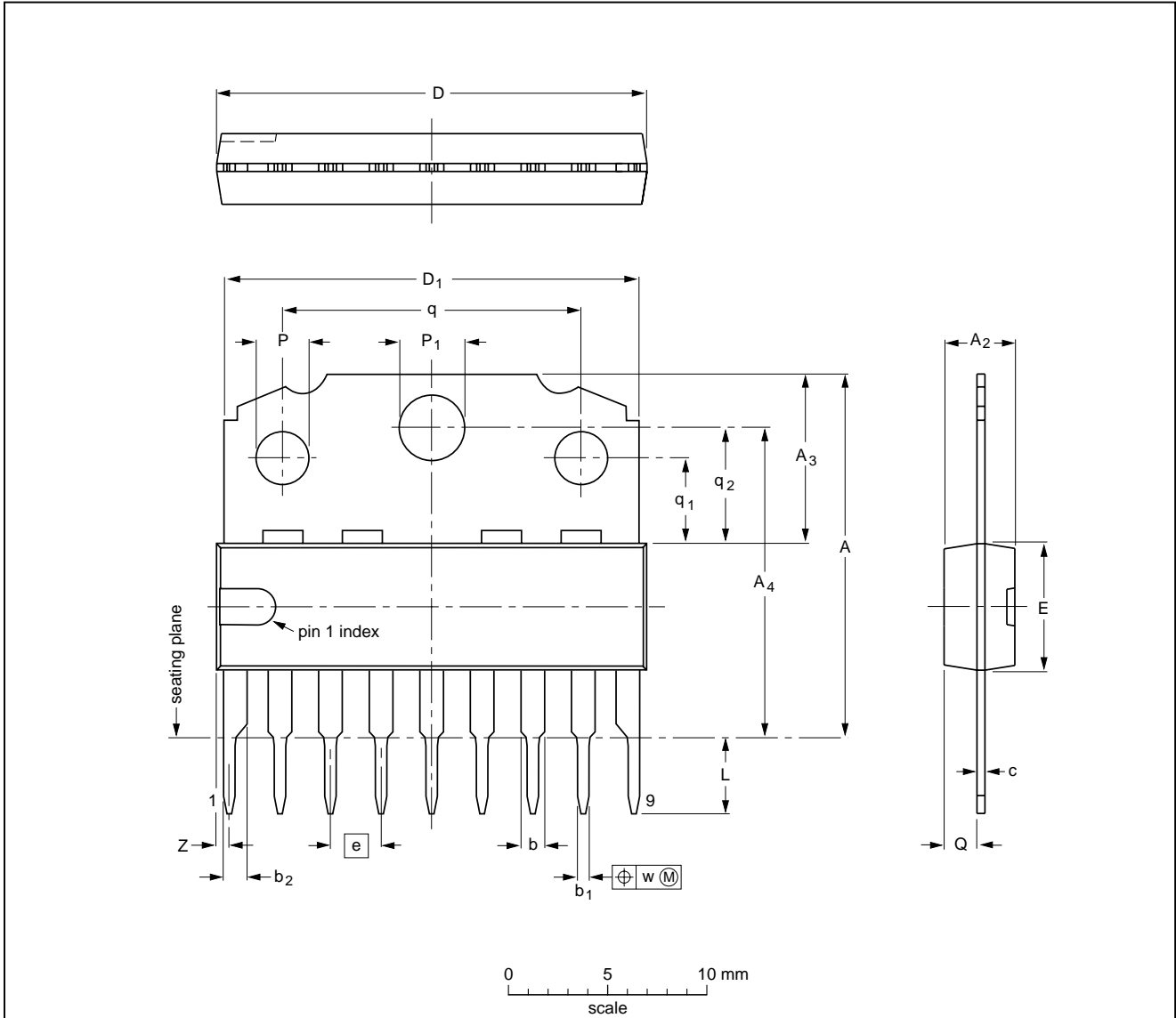
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PACKAGE OUTLINE

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 17.8 | 3.7 | 8.7 8.0 | 15.8 15.4 | 1.40 1.14 | 0.67 0.50 | 1.40 1.14 | 0.48 0.38 | 21.8 21.4 | 21.4 20.7 | 6.48 6.20 | 2.54 | 3.9 3.4 | 2.75 2.50 | 3.4 3.2 | 1.75 1.55 | 15.1 14.9 | 4.4 4.2 | 5.9 5.7 | 0.25 | 1.0 |

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 | EIAJ | | | |
| SOT110-1 | | | | | | 92-11-17 95-02-25 |

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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.

DEFINITIONS

| Data sheet status | |
|---|---|
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| Limiting values | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

LIFE SUPPORT APPLICATIONS

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