

# DATA SHEET

## **TDA1517; TDA1517P** **2 × 6 W stereo power amplifier**

Product specification  
Supersedes data of 1998 Apr 28  
File under Integrated Circuits, IC01

2002 Jan 17

**2 × 6 W stereo power amplifier****TDA1517; TDA1517P****FEATURES**

- Requires very few external components
- High output power
- Fixed gain
- Good ripple rejection
- Mute/standby switch
- AC and DC short-circuit safe to ground and  $V_P$
- Thermally protected
- Reverse polarity safe
- Capability to handle high energy on outputs ( $V_P = 0\text{ V}$ )
- No switch-on/switch-off plop
- Electrostatic discharge protection.

**GENERAL DESCRIPTION**

The TDA1517 is an integrated class-B dual output amplifier in a plastic single in-line medium power package with fin (SIL9MPF) and a plastic heat-dissipating dual in-line package (HDIP18). The device is primarily developed for multi-media applications.

**QUICK REFERENCE DATA**

| SYMBOL        | PARAMETER                        | CONDITIONS                             | MIN. | TYP. | MAX. | UNIT               |
|---------------|----------------------------------|----------------------------------------|------|------|------|--------------------|
| $V_P$         | supply voltage                   |                                        | 6.0  | 14.4 | 18.0 | V                  |
| $I_{ORM}$     | repetitive peak output current   |                                        | –    | –    | 2.5  | A                  |
| $I_{q(tot)}$  | total quiescent current          |                                        | –    | 40   | 80   | mA                 |
| $I_{sb}$      | standby current                  |                                        | –    | 0.1  | 100  | $\mu\text{A}$      |
| $I_{sw}$      | switch-on current                |                                        | –    | –    | 40   | $\mu\text{A}$      |
| $ Z_i $       | input impedance                  |                                        | 50   | –    | –    | $\text{k}\Omega$   |
| $P_o$         | output power                     | $R_L = 4\ \Omega$ ; THD = 0.5%         | –    | 5    | –    | W                  |
|               |                                  | $R_L = 4\ \Omega$ ; THD = 10%          | –    | 6    | –    | W                  |
| SVRR          | supply voltage ripple rejection  | $f_i = 100\text{ Hz to }10\text{ kHz}$ | 48   | –    | –    | dB                 |
| $\alpha_{cs}$ | channel separation               |                                        | 40   | –    | –    | dB                 |
| $G_v$         | closed loop voltage gain         |                                        | 19   | 20   | 21   | dB                 |
| $V_{no(rms)}$ | noise output voltage (RMS value) |                                        | –    | 50   | –    | $\mu\text{V}$      |
| $T_c$         | crystal temperature              |                                        | –    | –    | 150  | $^{\circ}\text{C}$ |

**ORDERING INFORMATION**

| TYPE<br>NUMBER | PACKAGE |                                                               |          |
|----------------|---------|---------------------------------------------------------------|----------|
|                | NAME    | DESCRIPTION                                                   | VERSION  |
| TDA1517        | SIL9MPF | plastic single in-line medium power package with fin; 9 leads | SOT110-1 |
| TDA1517P       | HDIP18  | plastic heat-dissipating dual in-line package; 18 leads       | SOT398-1 |

$2 \times 6\text{ W}$  stereo power amplifier

## TDA1517; TDA1517P

## BLOCK DIAGRAM

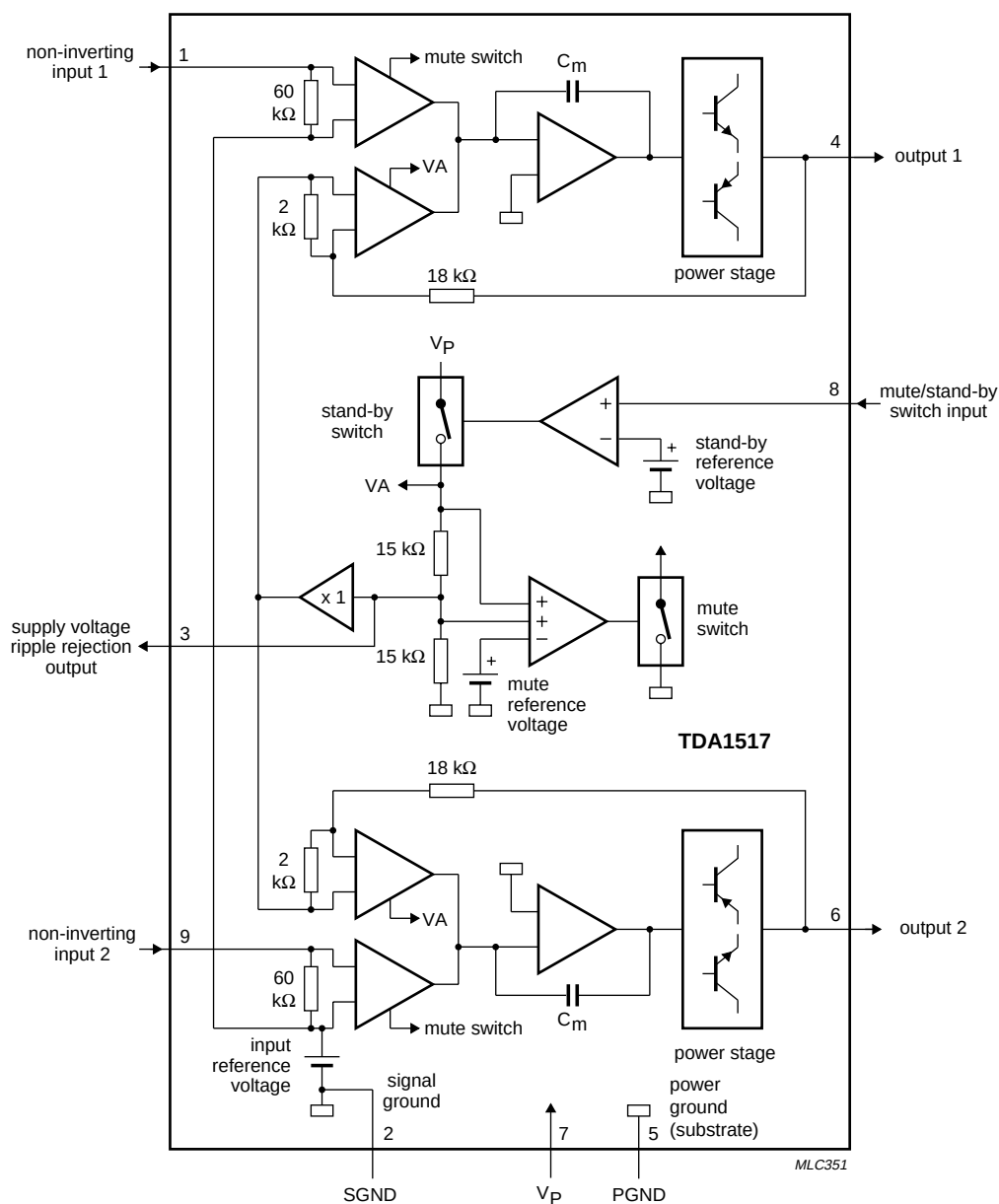


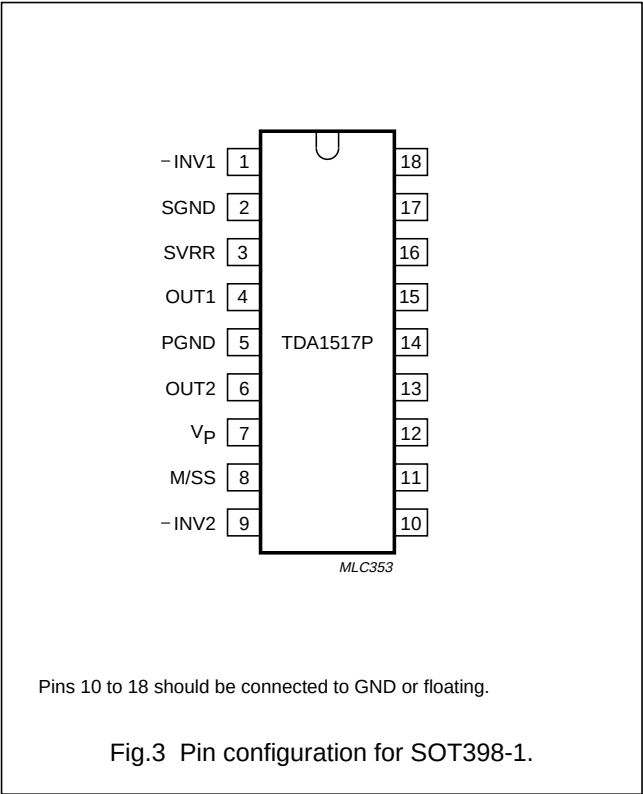
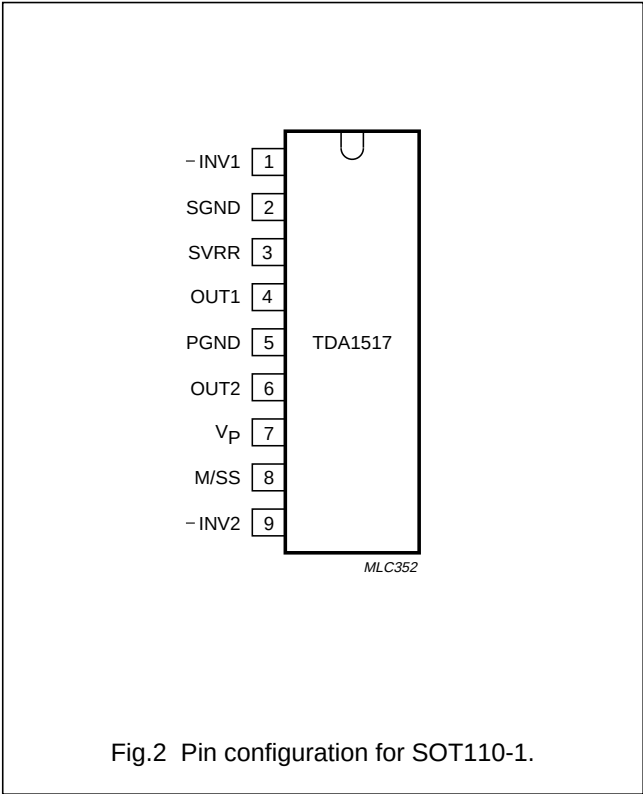
Fig.1 Block diagram.

2 × 6 W stereo power amplifier

TDA1517; TDA1517P

PINNING

| SYMBOL         | PIN | DESCRIPTION                            |
|----------------|-----|----------------------------------------|
| –INV1          | 1   | non-inverting input 1                  |
| SGND           | 2   | signal ground                          |
| SVRR           | 3   | supply voltage ripple rejection output |
| OUT1           | 4   | output 1                               |
| PGND           | 5   | power ground                           |
| OUT2           | 6   | output 2                               |
| V <sub>P</sub> | 7   | supply voltage                         |
| M/SS           | 8   | mute/standby switch input              |
| –INV2          | 9   | non-inverting input 2                  |



FUNCTIONAL DESCRIPTION

The TDA1517 contains two identical amplifiers with differential input stages. The gain of each amplifier is fixed at 20 dB. A special feature of the device is the mute/standby switch which has the following features:

- Low standby current (<100 μA)
- Low mute/standby switching current (low cost supply switch)
- Mute condition.

2 × 6 W stereo power amplifier

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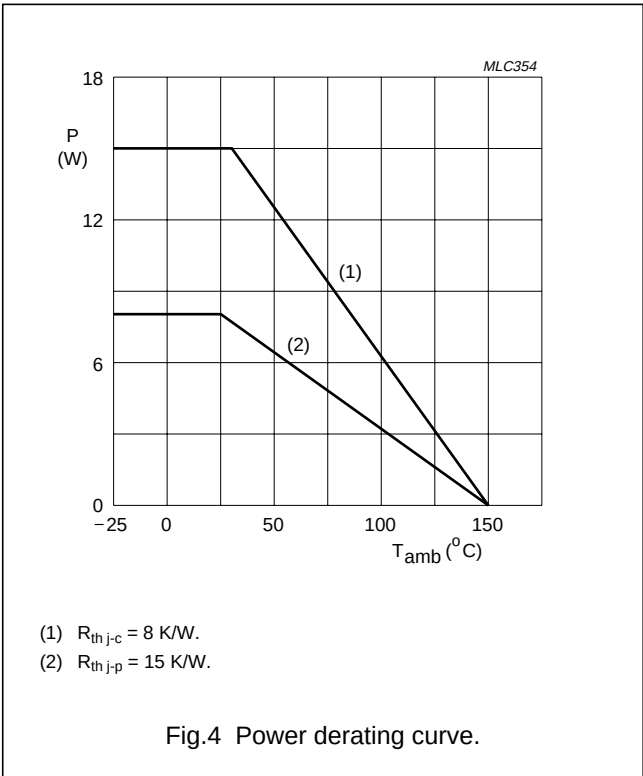
LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL             | PARAMETER                             | CONDITIONS           | MIN. | MAX. | UNIT |
|--------------------|---------------------------------------|----------------------|------|------|------|
| V <sub>P</sub>     | supply voltage                        | operating            | –    | 18   | V    |
|                    |                                       | no signal            | –    | 20   | V    |
| V <sub>P(sc)</sub> | AC and DC short-circuit safe voltage  |                      | –    | 18   | V    |
| V <sub>P(r)</sub>  | reverse polarity                      |                      | –    | 6    | V    |
| ERG <sub>O</sub>   | energy handling capability at outputs | V <sub>P</sub> = 0 V | –    | 200  | mJ   |
| I <sub>OSM</sub>   | non-repetitive peak output current    |                      | –    | 4    | A    |
| I <sub>ORM</sub>   | repetitive peak output current        |                      | –    | 2.5  | A    |
| P <sub>tot</sub>   | total power dissipation               | see Fig.4            | –    | 15   | W    |
| T <sub>stg</sub>   | storage temperature                   |                      | –55  | +150 | °C   |
| T <sub>amb</sub>   | operating ambient temperature         |                      | –40  | +85  | °C   |
| T <sub>c</sub>     | crystal temperature                   |                      | –    | 150  | °C   |

THERMAL RESISTANCE

| SYMBOL              | TYPE NUMBER       | PARAMETER                                   | VALUE | UNIT |
|---------------------|-------------------|---------------------------------------------|-------|------|
| R <sub>th j-c</sub> | TDA1517           | thermal resistance from junction to case    | 8     | K/W  |
| R <sub>th j-p</sub> | TDA1517P          | thermal resistance from junction to pins    | 15    | K/W  |
| R <sub>th j-a</sub> | TDA1517; TDA1517P | thermal resistance from junction to ambient | 50    | K/W  |



**2 × 6 W stereo power amplifier****TDA1517; TDA1517P****DC CHARACTERISTICS**

$V_P = 14.4\text{ V}$ ;  $T_{\text{amb}} = 25\text{ °C}$ ; measured in Fig.6; unless otherwise specified.

| SYMBOL                     | PARAMETER                       | CONDITIONS                                                               | MIN. | TYP. | MAX. | UNIT |
|----------------------------|---------------------------------|--------------------------------------------------------------------------|------|------|------|------|
| <b>Supply</b>              |                                 |                                                                          |      |      |      |      |
| $V_P$                      | supply voltage                  | note 1                                                                   | 6.0  | 14.4 | 18.0 | V    |
| $I_{q(\text{tot})}$        | total quiescent current         |                                                                          | –    | 40   | 80   | mA   |
| $V_O$                      | DC output voltage               |                                                                          | –    | 6.95 | –    | V    |
| <b>Mute/standby switch</b> |                                 |                                                                          |      |      |      |      |
| $V_8$                      | switch-on voltage level         | see Fig.5                                                                | 8.5  | –    | –    | V    |
| <b>Mute condition</b>      |                                 |                                                                          |      |      |      |      |
| $V_O$                      | output signal in mute position  | $V_{l(\text{max})} = 1\text{ V}$ ; $f_i = 20\text{ Hz to }15\text{ kHz}$ | –    | –    | 2    | mV   |
| <b>Standby condition</b>   |                                 |                                                                          |      |      |      |      |
| $I_{\text{sb}}$            | DC current in standby condition |                                                                          | –    | –    | 100  | μA   |
| $V_{\text{sw}}$            | switch-on current               |                                                                          | –    | 12   | 40   | μA   |

**Note**

1. The circuit is DC adjusted at  $V_P = 6\text{ to }18\text{ V}$  and AC operating at  $V_P = 8.5\text{ to }18\text{ V}$ .

**2 × 6 W stereo power amplifier****TDA1517; TDA1517P****AC CHARACTERISTICS**

$V_P = 14.4\text{ V}$ ;  $R_L = 4\ \Omega$ ;  $f = 1\text{ kHz}$ ;  $T_{\text{amb}} = 25\text{ }^\circ\text{C}$ ; measured in Fig.6; unless otherwise specified.

| SYMBOL         | PARAMETER                       | CONDITIONS                  | MIN. | TYP. | MAX. | UNIT          |
|----------------|---------------------------------|-----------------------------|------|------|------|---------------|
| $P_o$          | output power                    | THD = 0.5%; note 1          | 4    | 5    | –    | W             |
|                |                                 | THD = 10%; note 1           | 5.5  | 6.0  | –    | W             |
| THD            | total harmonic distortion       | $P_o = 1\text{ W}$          | –    | 0.1  | –    | %             |
| $f_{lr}$       | low frequency roll-off          | at –3 dB; note 2            | –    | 45   | –    | Hz            |
| $f_{hr}$       | high frequency roll-off         | at –1 dB                    | 20   | –    | –    | kHz           |
| $G_v$          | closed loop voltage gain        |                             | 19   | 20   | 21   | dB            |
| SVRR           | supply voltage ripple rejection | note 3                      |      |      |      |               |
|                | on                              |                             | 48   | –    | –    | dB            |
|                | mute                            |                             | 48   | –    | –    | dB            |
|                | standby                         |                             | 80   | –    | –    | dB            |
| $ Z_i $        | input impedance                 |                             | 50   | 60   | 75   | k $\Omega$    |
| $V_{no}$       | noise output voltage            |                             |      |      |      |               |
|                | on                              | $R_s = 0\ \Omega$ ; note 4  | –    | 50   | –    | $\mu\text{V}$ |
|                | on                              | $R_s = 10\ \Omega$ ; note 4 | –    | 70   | 100  | $\mu\text{V}$ |
|                | mute                            | note 5                      | –    | 50   | –    | $\mu\text{V}$ |
| $\alpha_{cs}$  | channel separation              | $R_s = 10\ \Omega$          | 40   | –    | –    | dB            |
| $ \Delta G_v $ | channel unbalance               |                             | –    | 0.1  | 1    | dB            |

**Notes**

- Output power is measured directly at the output pins of the IC.
- Frequency response externally fixed.
- Ripple rejection measured at the output with a source impedance of  $0\ \Omega$ , maximum ripple amplitude of 2 V (p-p) and a frequency between 100 Hz and 10 kHz.
- Noise voltage measured in a bandwidth of 20 Hz to 20 kHz.
- Noise output voltage independent of  $R_s$  ( $V_i = 0\text{ V}$ ).

2 × 6 W stereo power amplifier

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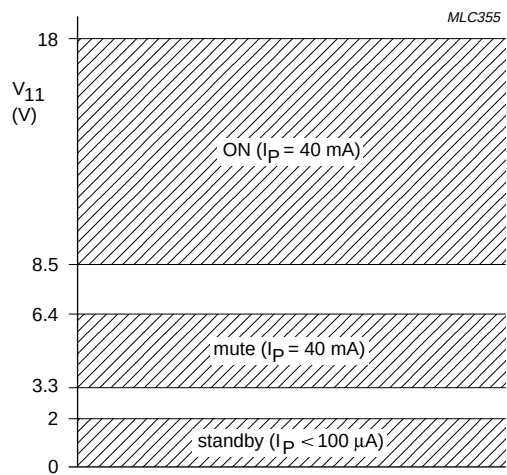


Fig.5 Standby, mute and on conditions.

APPLICATION INFORMATION

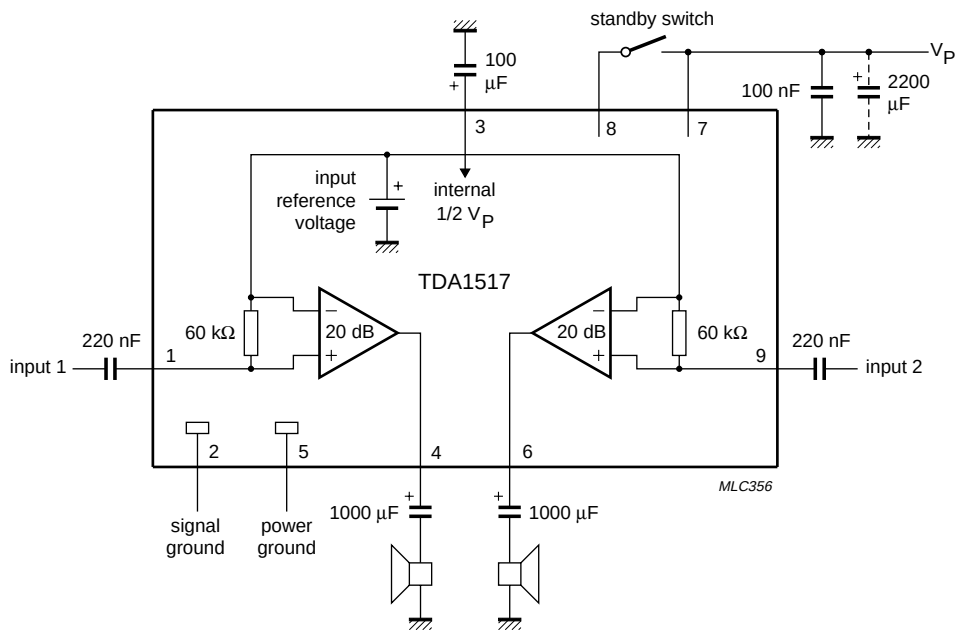


Fig.6 Application circuit diagram.



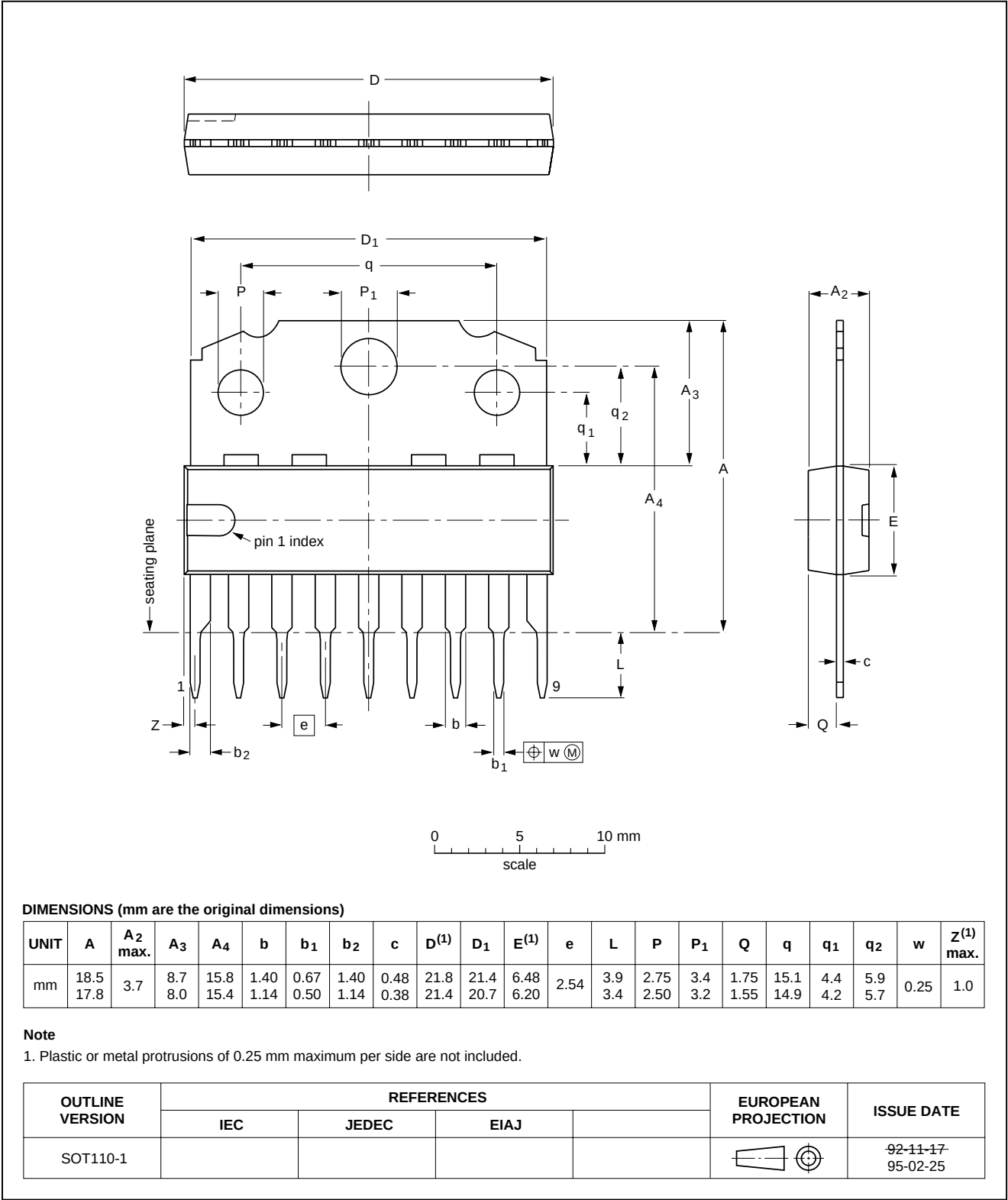
2 × 6 W stereo power amplifier

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PACKAGE OUTLINES

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

SOT110-1

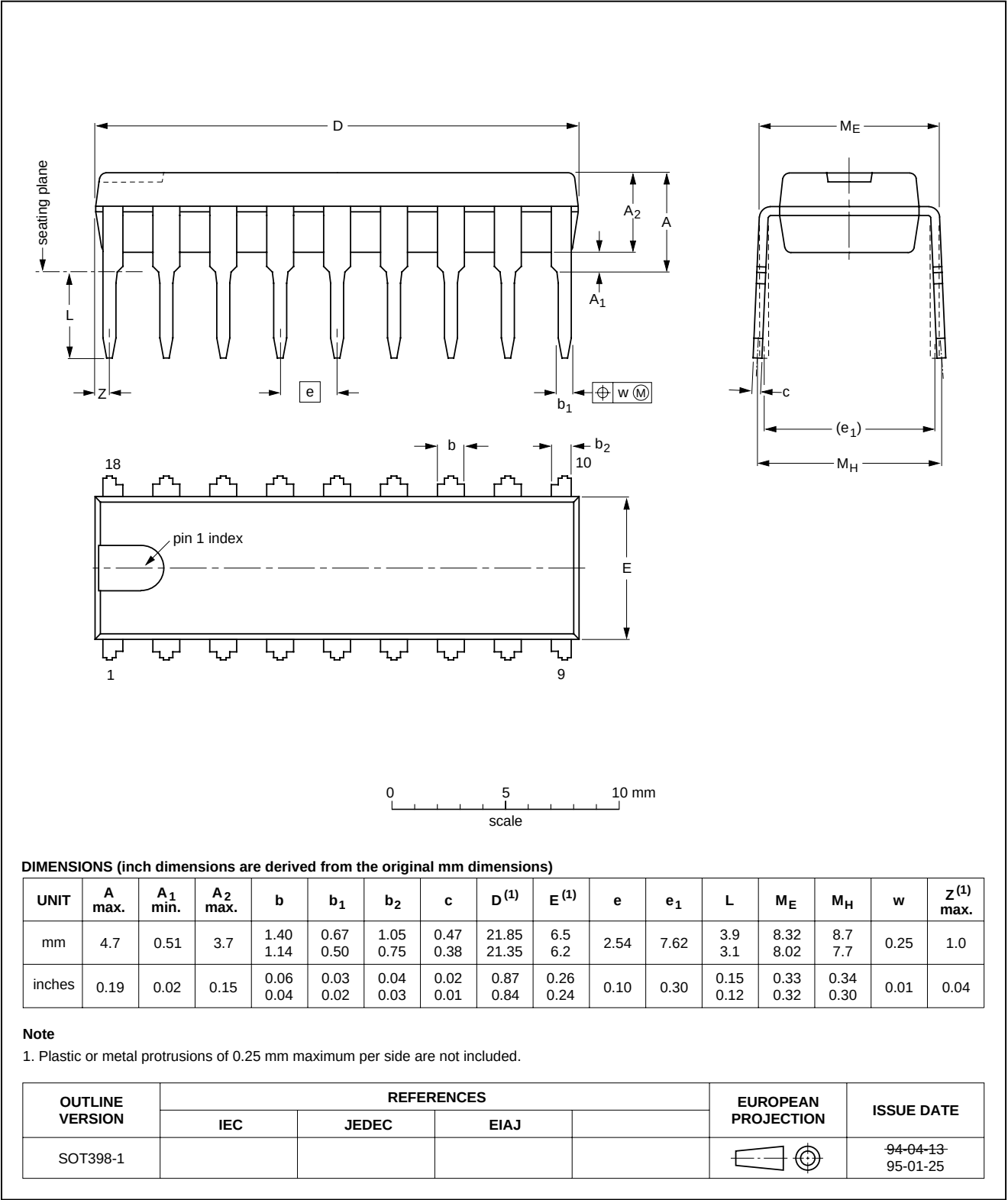


2 × 6 W stereo power amplifier

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HDIP18: plastic heat-dissipating dual in-line package; 18 leads

SOT398-1



2 × 6 W stereo power amplifier

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SOLDERING

Introduction to soldering through-hole mount packages

This text gives a brief insight to wave, dip and manual soldering. A more in-depth account of soldering ICs can be found in our *“Data Handbook IC26; Integrated Circuit Packages”* (document order number 9398 652 90011).

Wave soldering is the preferred method for mounting of through-hole mount IC packages on a printed-circuit board.

Soldering by dipping or by solder wave

The maximum permissible temperature of the solder is 260 °C; solder at this temperature must not be in contact with the joints 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<sub>stg(max)</sub>). 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.

Manual soldering

Apply the soldering iron (24 V or less) to the lead(s) of the package, either 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.

Suitability of through-hole mount IC packages for dipping and wave soldering methods

| PACKAGE                   | SOLDERING METHOD |                         |
|---------------------------|------------------|-------------------------|
|                           | DIPPING          | WAVE                    |
| DBS, DIP, HDIP, SDIP, SIL | suitable         | suitable <sup>(1)</sup> |

Note

1. For SDIP packages, the longitudinal axis must be parallel to the transport direction of the printed-circuit board.

$2 \times 6$  W stereo power amplifier

## TDA1517; TDA1517P

## DATA SHEET STATUS

| DATA SHEET STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITIONS                                                                                                                                                                                                                                                                                                            |
|----------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective data                   | Development                   | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.                                                                                                                            |
| Preliminary data                 | Qualification                 | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.                                     |
| Product data                     | Production                    | This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A. |

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**NOTES**

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