

# DATA SHEET

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

Product specification  
Supersedes data of 2002 Jan 17

2004 Feb 18



**2 x 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), a plastic rectangular-bent single in-line medium power package with fin (RBS9MPF) or 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 NUMBER   | PACKAGE |                                                                                |          |
|---------------|---------|--------------------------------------------------------------------------------|----------|
|               | NAME    | DESCRIPTION                                                                    | VERSION  |
| TDA1517/N3    | SIL9MPF | plastic single in-line medium power package with fin; 9 leads                  | SOT110-1 |
| TDA1517/N3/S5 | RBS9MPF | plastic rectangular-bent single in-line medium power package with fin; 9 leads | SOT352-1 |
| TDA1517P      | HDIP18  | plastic heat-dissipating dual in-line package; 18 leads                        | SOT398-1 |

## 2 x 6 W stereo power amplifier

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## BLOCK DIAGRAM

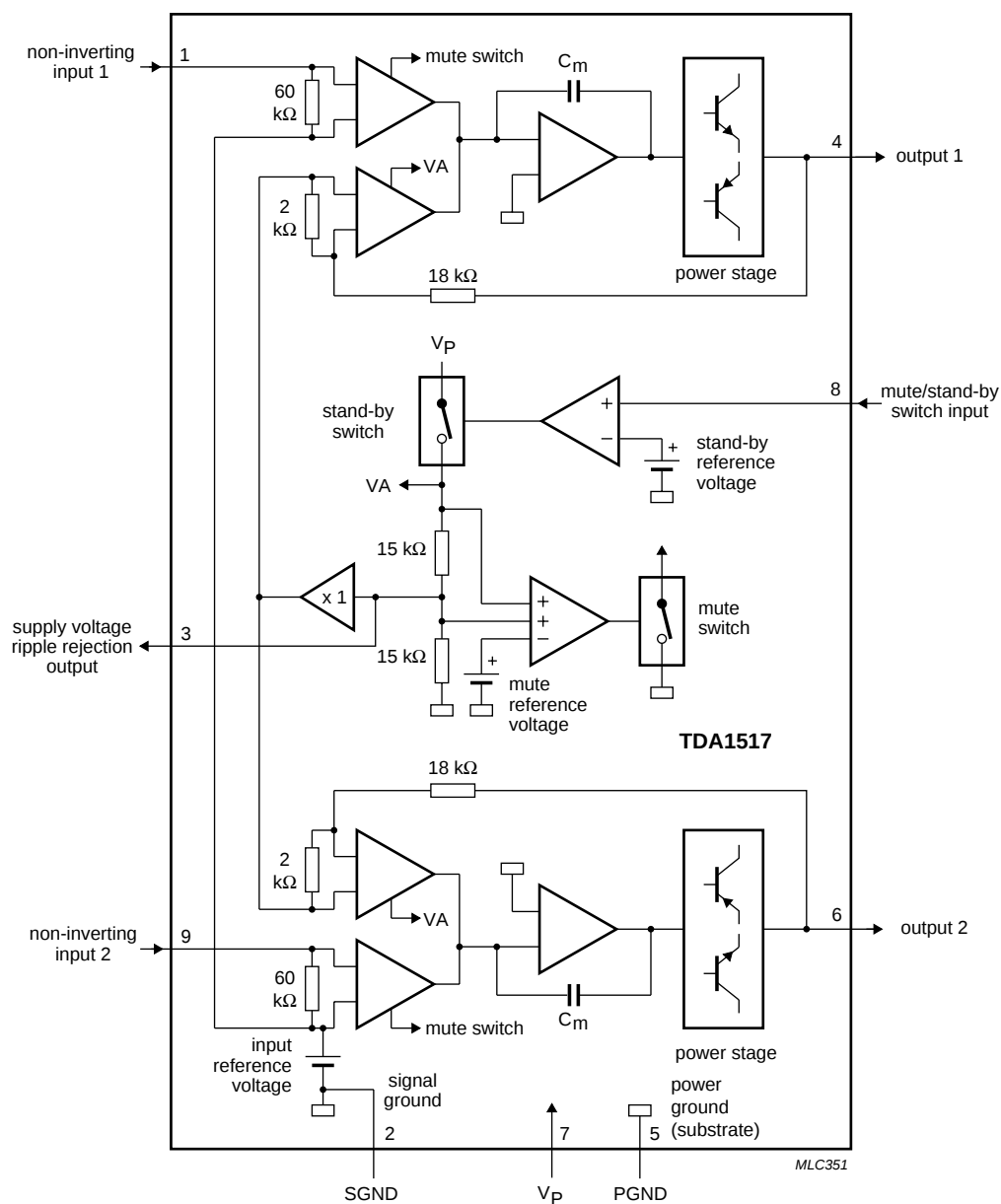


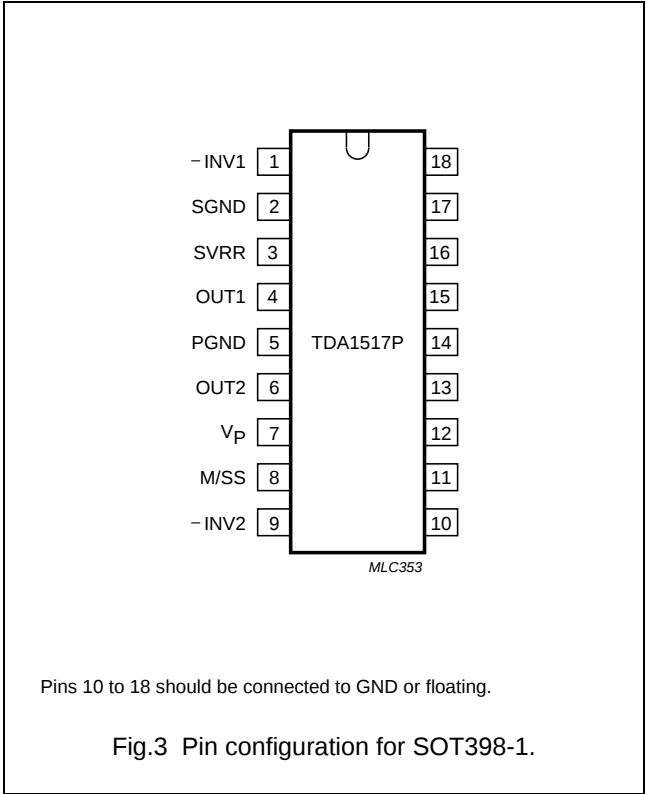
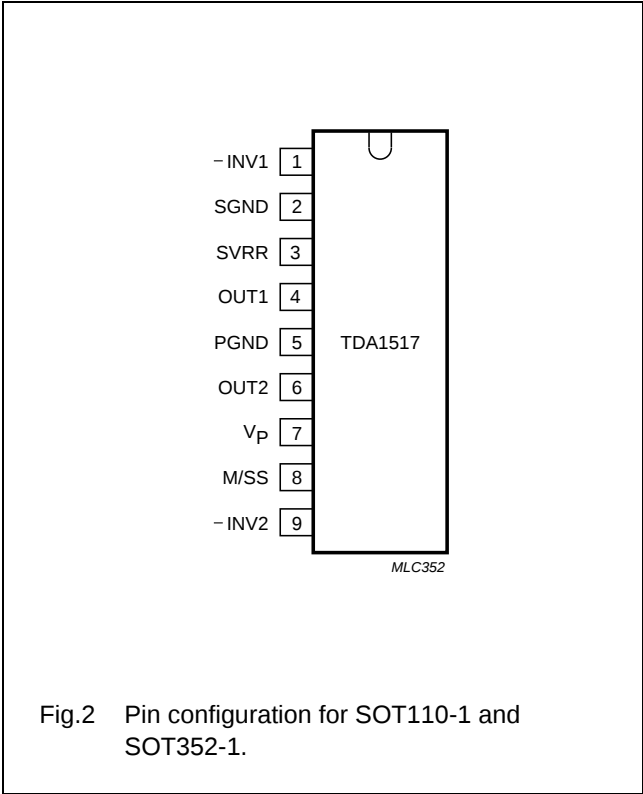
Fig.1 Block diagram.

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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.

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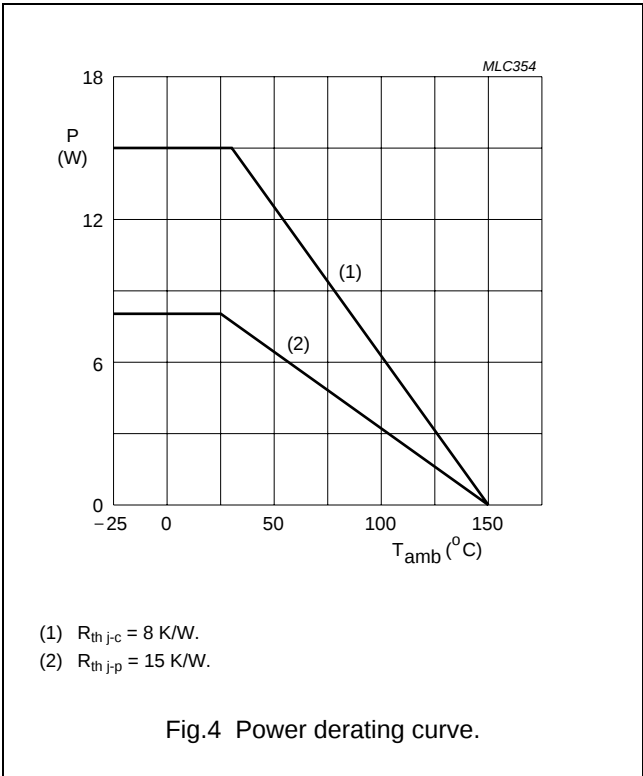
LIMITING VALUES

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/N3; TDA1517/N3/S5              | 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/N3; TDA1517/N3/S5;<br>TDA1517P | thermal resistance from junction to ambient | 50    | K/W  |



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**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  | $\mu\text{A}$ |
| $V_{\text{sw}}$            | switch-on current               |                                                                          | –    | 12   | 40   | $\mu\text{A}$ |

**Note**

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

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**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  $R_s$  ( $V_i = 0\text{ V}$ ).

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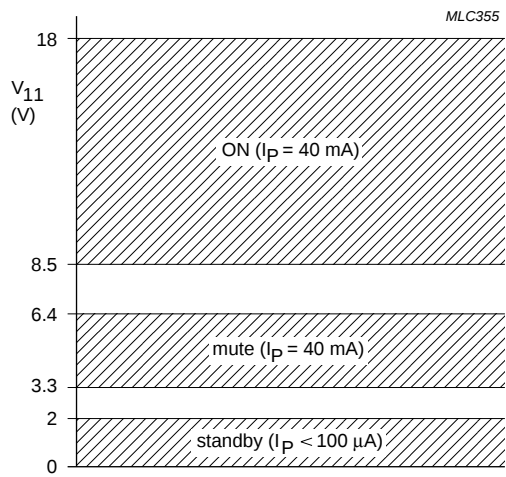


Fig.5 Standby, mute and on conditions.

APPLICATION INFORMATION

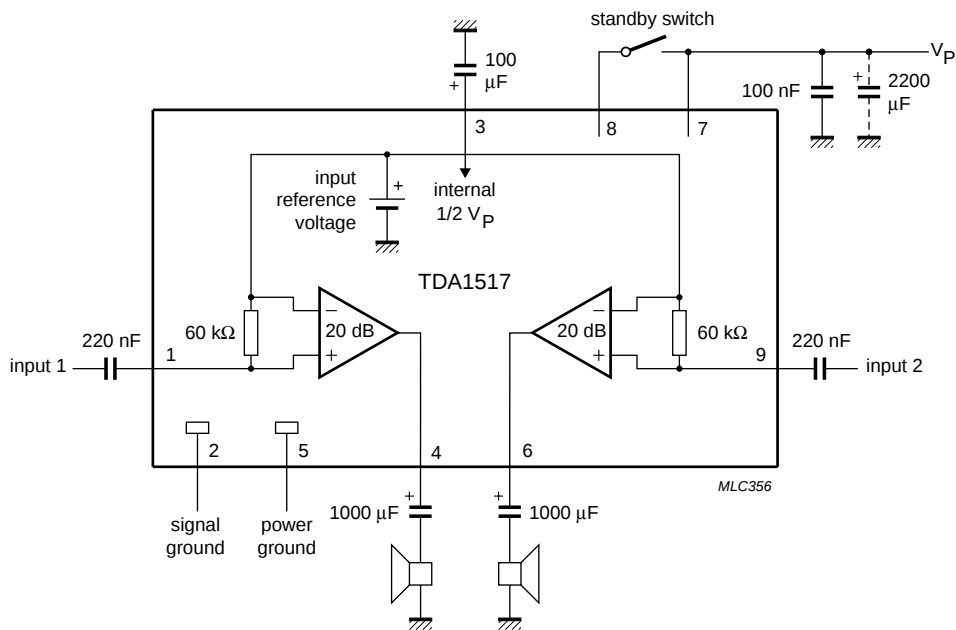


Fig.6 Application circuit diagram.

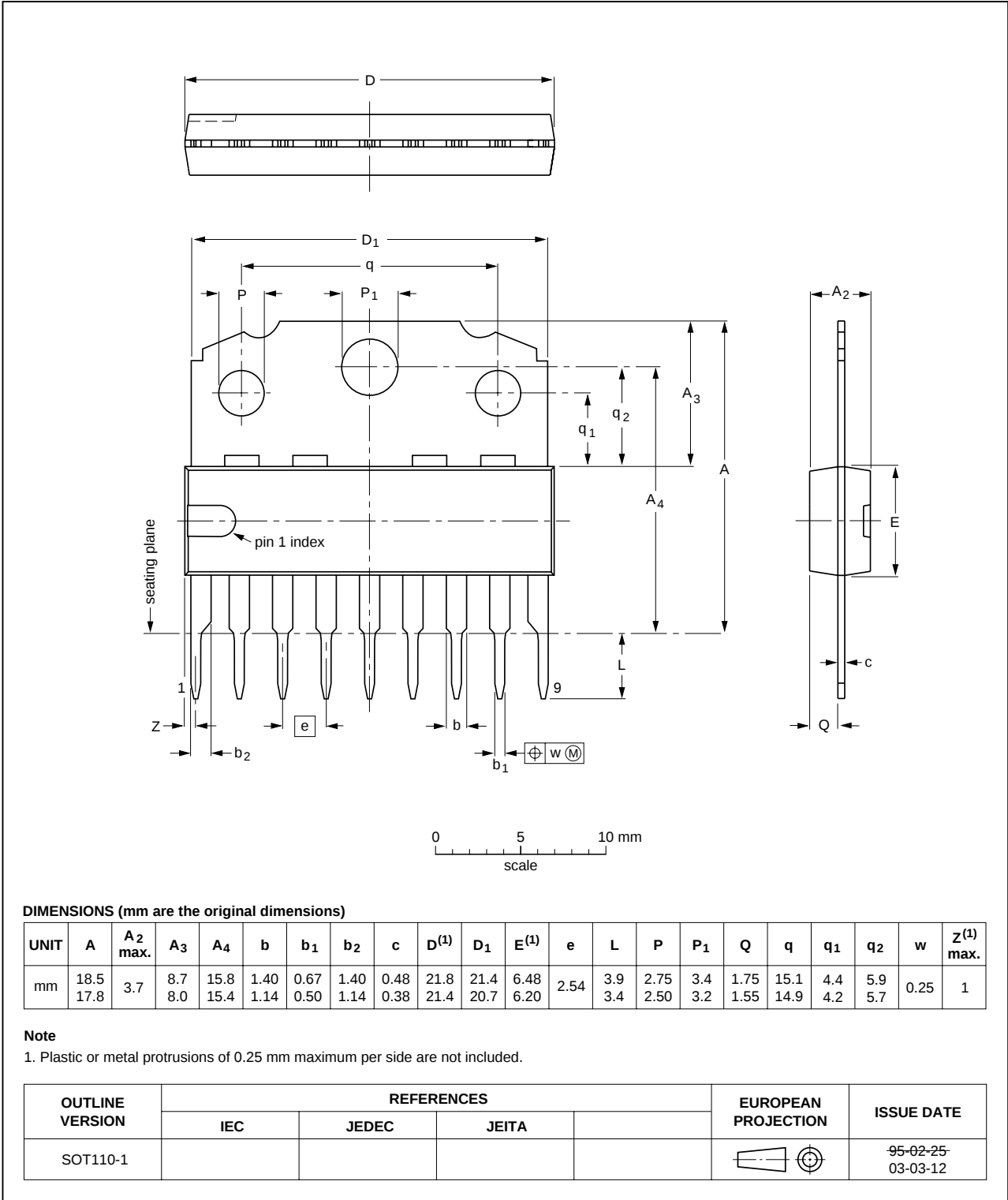
2 x 6 W stereo power amplifier

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PACKAGE OUTLINES

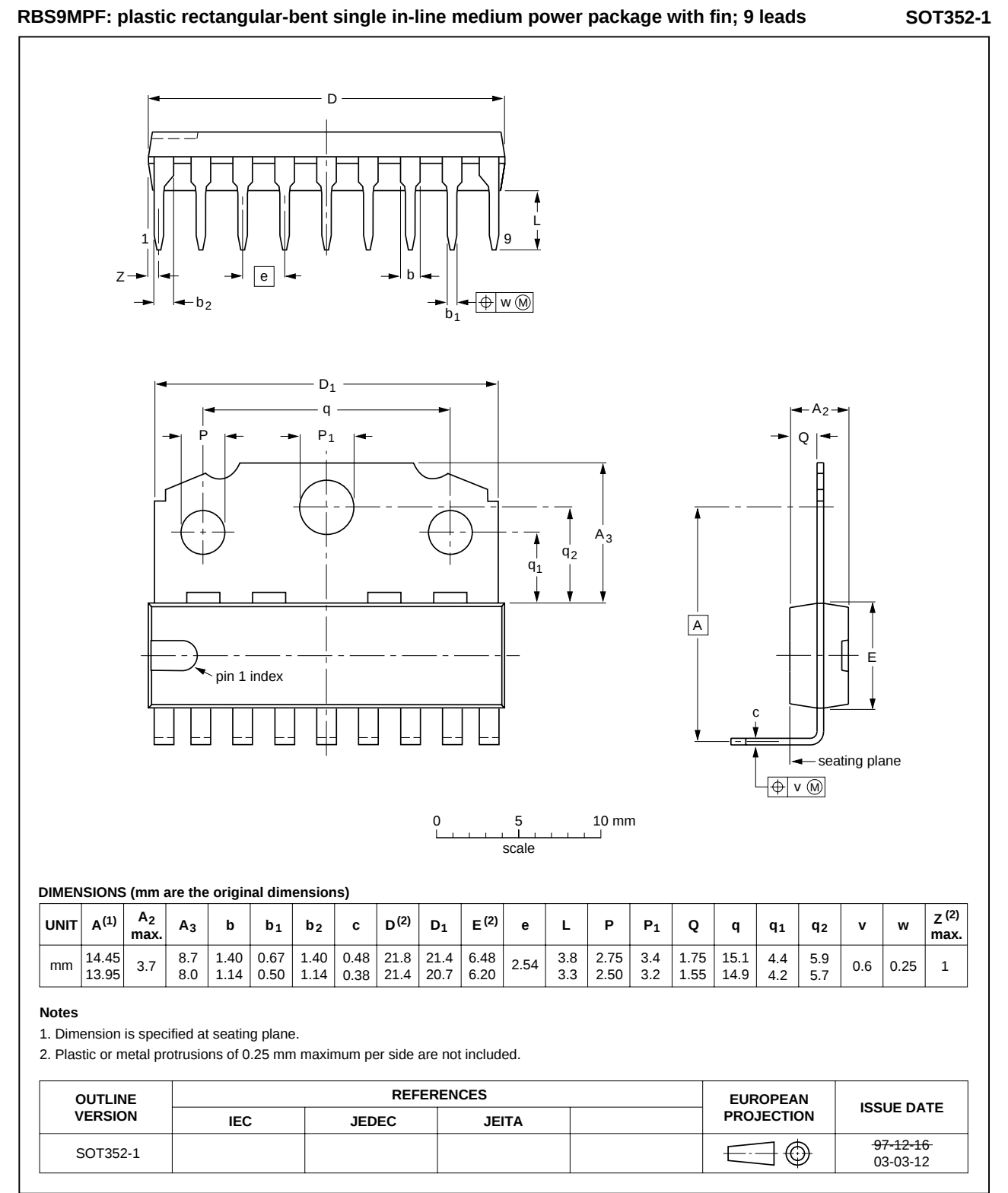
SIL9MPF: plastic single in-line medium power package with fin; 9 leads

SOT110-1



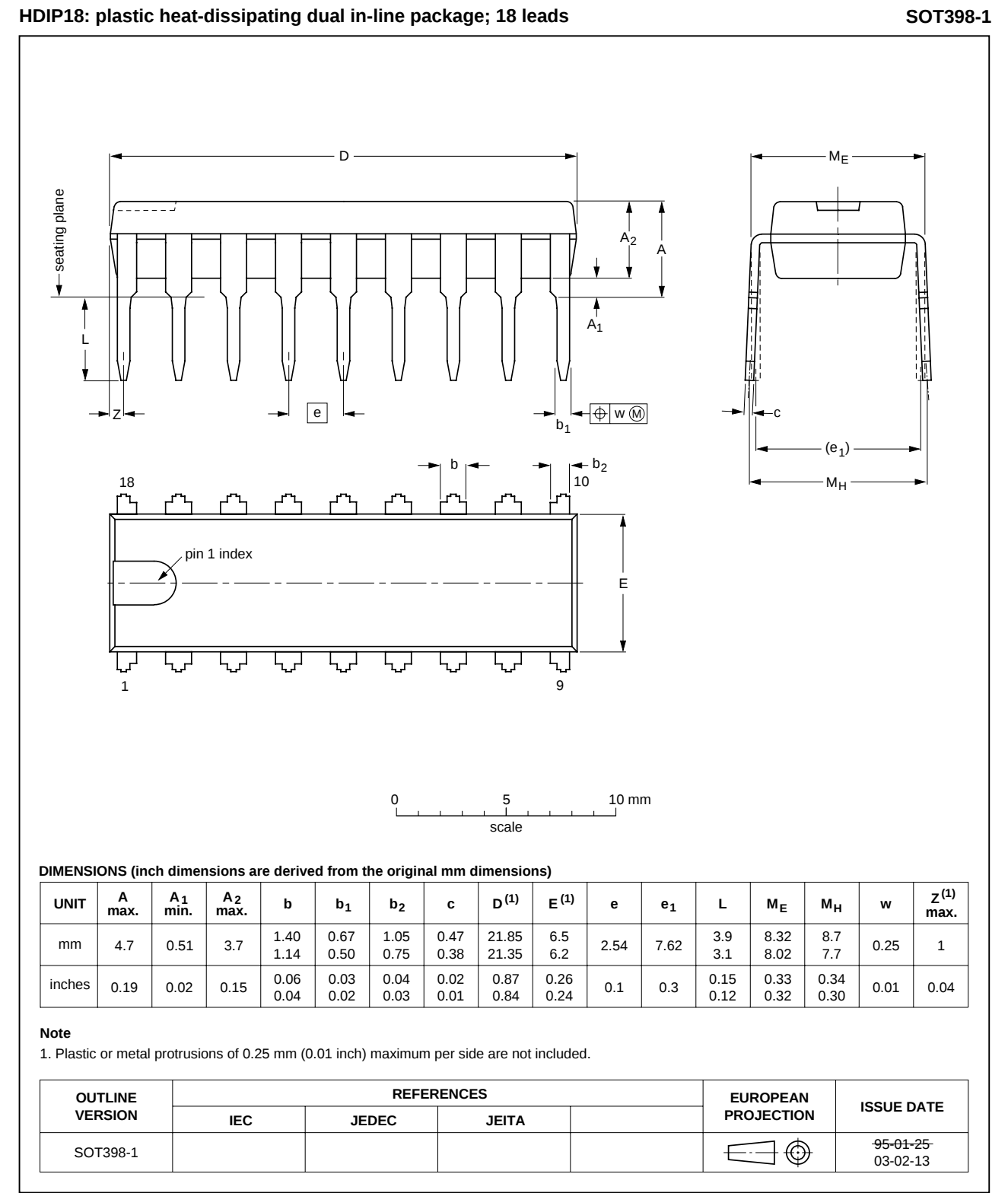
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## 2 x 6 W stereo power amplifier

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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**

Driven by legislation and environmental forces the worldwide use of lead-free solder pastes is increasing. Typical dwell time of the leads in the wave ranges from 3 to 4 seconds at 250 °C or 265 °C, depending on solder material applied, SnPb or Pb-free respectively.

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 ( $T_{\text{stg(max)}}$ ). 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.

**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                    |
| CPGA, HCPGA                     | –                | suitable                |
| DBS, DIP, HDIP, RDBS, SDIP, SIL | suitable         | suitable <sup>(1)</sup> |
| PMFP <sup>(2)</sup>             | –                | not suitable            |

**Notes**

1. For SDIP packages, the longitudinal axis must be parallel to the transport direction of the printed-circuit board.
2. For PMFP packages hot bar soldering or manual soldering is suitable.

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## DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | 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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