



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



DATA SHEET

TDA8571J

4 × 40 W BTL quad car radio power amplifier

Product specification
Supersedes data of 1998 Mar 13

2002 Mar 05

4 × 40 W BTL quad car radio power amplifier

TDA8571J

FEATURES

- Requires very few external components
- High output power
- Low output offset voltage
- Fixed gain
- Diagnostic facility (distortion, short-circuit and temperature pre-warning)
- Good ripple rejection
- Mode select switch (operating, mute and standby)
- Load dump protection
- Short-circuit safe to ground and to V_P and across the load
- Low power dissipation in any short-circuit condition
- Thermally protected
- Reverse polarity safe
- Electrostatic discharge protection
- No switch-on/switch-off plop
- Flexible leads
- Low thermal resistance
- Pin compatible with the TDA8568Q, except for the gain.

GENERAL DESCRIPTION

The TDA8571J is a integrated class-B output amplifier contained in a 23-lead Single-In-Line (SIL) plastic power package. It contains four amplifiers in a BTL configuration, each with a gain of 34 dB. The output power is 4 × 40 W (EIAJ) into a 4 Ω load.

APPLICATIONS

- Primarily developed for car radio applications.

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------------|---------------------------------|--------------------|------|------|------|------|
| V_P | operating supply voltage | | 6 | 14.4 | 18 | V |
| I_{ORM} | repetitive peak output current | | – | – | 7.5 | A |
| $I_{q(tot)}$ | total quiescent current | | – | 200 | – | mA |
| I_{stb} | standby current | | – | 0.2 | 100 | μA |
| I_{sw} | switch-on current | | – | – | 80 | μA |
| $ Z_i $ | input impedance | | 25 | 30 | – | kΩ |
| $P_{o(EIAJ)}$ | EIAJ output power | THD = maximum | – | 40 | – | W |
| SVRR | supply voltage ripple rejection | $R_s = 0 \Omega$ | – | 50 | – | dB |
| α_{cs} | channel separation | $R_s = 10 k\Omega$ | – | 50 | – | dB |
| $G_{V(cl)}$ | closed-loop voltage gain | | 33 | 34 | 35 | dB |
| $V_{n(o)}$ | noise output voltage | $R_s = 0 \Omega$ | – | – | 170 | μV |
| $ V_{OS} $ | DC output offset voltage | MUTE | – | – | 80 | mV |
| $ \Delta V_{OS} $ | delta DC output offset voltage | ON ↔ MUTE | – | – | 80 | mV |

ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|-------------|---------|--|----------|
| | NAME | DESCRIPTION | VERSION |
| TDA8571J | DBS23P | plastic DIL-bent-SIL power package; 23 leads (straight lead length 3.2 mm) | SOT411-1 |

4 × 40 W BTL quad car radio power amplifier

TDA8571J

BLOCK DIAGRAM

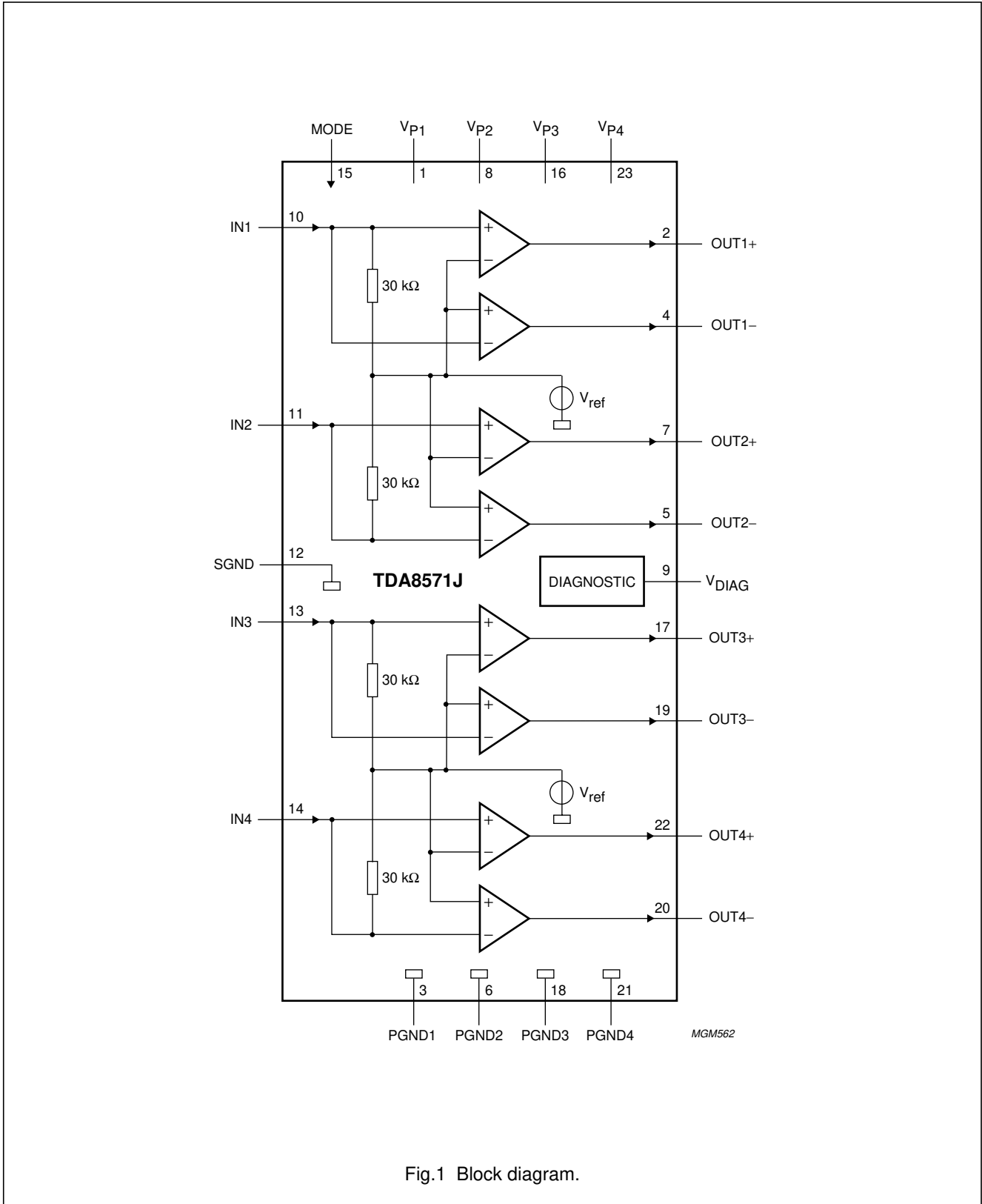


Fig.1 Block diagram.

4 × 40 W BTL quad car radio power amplifier

TDA8571J

PINNING

| SYMBOL | PIN | DESCRIPTION |
|-------------------|-----|--------------------------|
| V _{P1} | 1 | supply voltage 1 |
| OUT1+ | 2 | output 1+ |
| PGND1 | 3 | power ground 1 |
| OUT1- | 4 | output 1- |
| OUT2- | 5 | output 2- |
| PGND2 | 6 | power ground 2 |
| OUT2+ | 7 | output 2+ |
| V _{P2} | 8 | supply voltage 2 |
| V _{DIAG} | 9 | diagnostic output |
| IN1 | 10 | input 1 |
| IN2 | 11 | input 2 |
| SGND | 12 | signal ground |
| IN3 | 13 | input 3 |
| IN4 | 14 | input 4 |
| MODE | 15 | mode select switch input |
| V _{P3} | 16 | supply voltage 3 |
| OUT3+ | 17 | output 3+ |
| PGND3 | 18 | power ground 3 |
| OUT3- | 19 | output 3- |
| PGND4 | 21 | power ground 4 |
| OUT4+ | 22 | output 4+ |
| V _{P4} | 23 | supply voltage 4 |

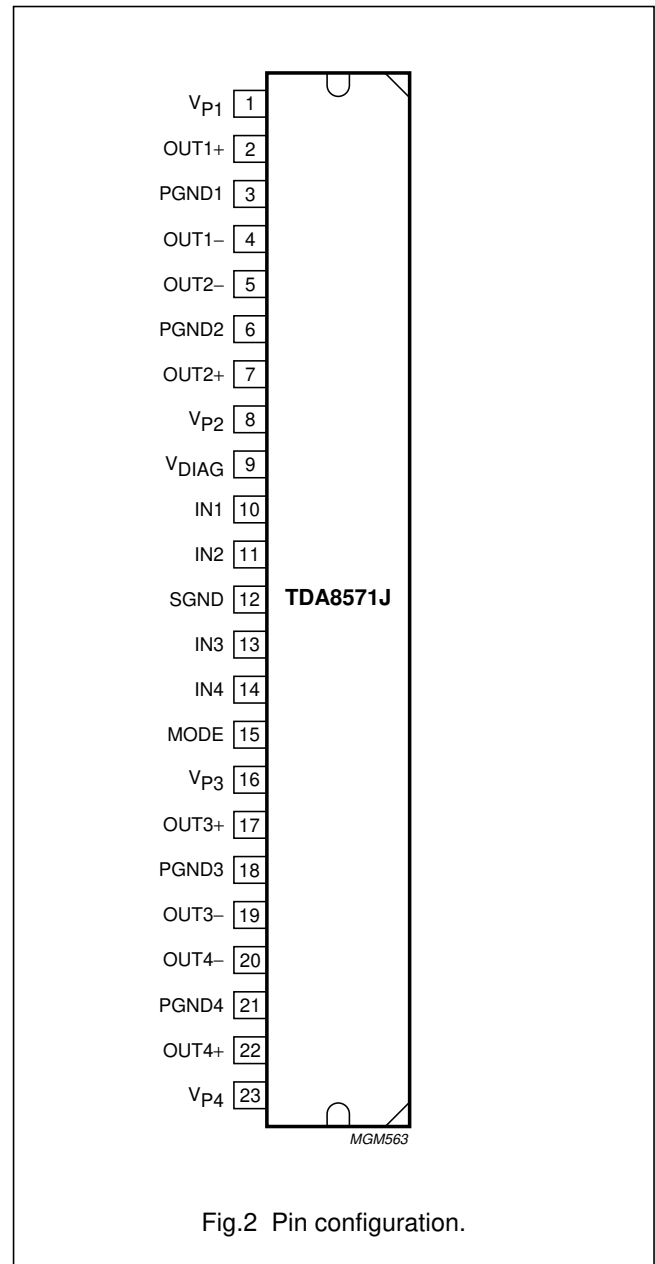


Fig.2 Pin configuration.

4 × 40 W BTL quad car radio power amplifier

TDA8571J

FUNCTIONAL DESCRIPTION

The TDA8571J contains four identical amplifiers which can be used for bridge applications. The gain of each amplifier is fixed at 34 dB.

Mode select switch (pin MODE)

- Standby: low supply current (<100 µA)
- Mute: input signal suppressed
- Operating: normal on condition.

Since this pin has a low input current (<80 µA), a low cost supply switch can be applied.

To avoid switch-on plops, it is advised to keep the amplifier in the mute mode during ≥150 ms (charging of the input capacitors at pins IN1, IN2, IN3 and IN4). When switching from standby to mute, the slope should be at least 18 V/s. This can be realized by:

- Microprocessor control
- External timing circuit (see Fig.3).

Diagnostic output (pin V_{DIAG})

DYNAMIC DISTORTION DETECTOR (DDD)

At the onset of clipping of one or more output stages, the dynamic distortion detector becomes active and pin V_{DIAG} goes LOW. This information can be used to drive a sound processor or DC volume control to attenuate the input signal and so limit the distortion. The output level of pin V_{DIAG} is independent of the number of channels that are clipping (see Fig.4).

SHORT-CIRCUIT DIAGNOSTIC

When a short-circuit occurs at one or more outputs to ground or to the supply voltage, the output stages are switched off until the short-circuit is removed and the device is switched on again, with a delay of approximately 10 ms after removal of the short-circuit. During this short-circuit condition, pin V_{DIAG} is continuously LOW.

When a short-circuit occurs across the load of one or more channels, the output stages are switched off during approximately 10 ms. After that time it is checked during approximately 50 µs to determine whether the short-circuit is still present. Due to this duty cycle of 50 µs/10 ms the average current consumption during this short-circuit condition is very low.

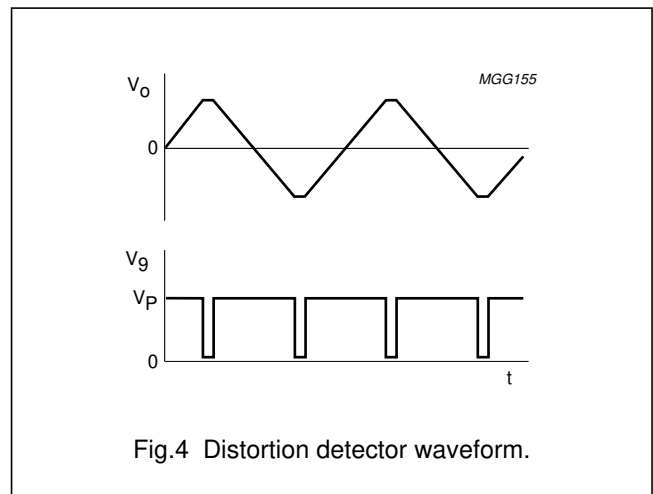
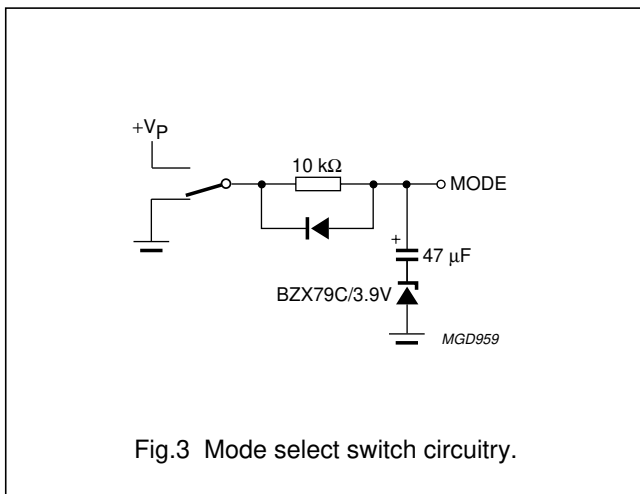
During this short-circuit condition, pin V_{DIAG} is LOW for 10 ms and HIGH for 50 µs (see Fig.5). The protection circuits of all channels are coupled. This means that if a short-circuit condition occurs in **one** of the channels, **all** channels are switched off. Consequently, the power dissipation in any short-circuit condition is very low.

TEMPERATURE PRE-WARNING

When the virtual junction temperature T_{vj} reaches 145 °C, pin V_{DIAG} goes LOW.

OPEN-COLLECTOR OUTPUTS

The diagnostic pin has an open-collector output, so more devices can be tied together. An external pull-up resistor is needed.



4 × 40 W BTL quad car radio power amplifier

TDA8571J

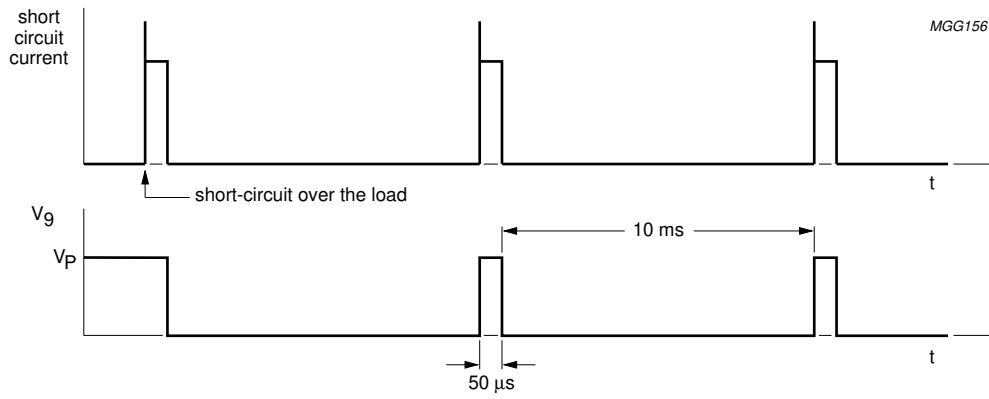


Fig.5 Short-circuit waveform.

4 × 40 W BTL quad car radio power amplifier

TDA8571J

QUALITY SPECIFICATION

In accordance with "General Quality Specification For Integrated Circuits (SNW-FQ-611D)".

DC CHARACTERISTICS

$V_P = 14.4\text{ V}$; $T_{\text{amb}} = 25\text{ °C}$; measured in Fig.7; unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|----------------------------|--------------------------------|-----------------------------------|------|------|-------|--------------------|
| Supply | | | | | | |
| V_P | supply voltage | note 1 | 6 | 14.4 | 18 | V |
| $I_{q(\text{tot})}$ | quiescent current | $R_L = \infty$ | – | 200 | 360 | mA |
| Operating condition | | | | | | |
| V_{MODE} | mode select switch level | | 8.5 | – | V_p | V |
| I_{MODE} | mode select switch current | $V_{\text{MODE}} = 14.4\text{ V}$ | – | 30 | 80 | μA |
| V_O | output voltage | note 2 | – | 7.0 | – | V |
| Mute condition | | | | | | |
| V_{MODE} | mode select switch level | | 3.3 | – | 6.4 | V |
| V_O | output voltage | note 2 | – | 7.0 | – | V |
| $ V_{\text{OS}} $ | DC output offset voltage | MUTE | – | – | 80 | mV |
| $ \Delta V_{\text{OS}} $ | delta DC output offset voltage | ON \leftrightarrow MUTE | – | – | 80 | mV |
| Standby condition | | | | | | |
| V_{MODE} | mode select switch level | | 0 | – | 2 | V |
| I_{stb} | standby current | | – | 0.2 | 100 | μA |
| Diagnostic | | | | | | |
| V_{DIAG} | diagnostic output voltage | during any fault condition | – | – | 0.6 | V |
| T_{vj} | temperature pre-warning | $V_{\text{DIAG}} = 0.6\text{ V}$ | – | 145 | – | $^{\circ}\text{C}$ |

Notes

1. The circuit is DC adjusted at $V_P = 6$ to 18 V and AC operating at $V_P = 8.5$ to 18 V .
2. At $18\text{ V} < V_P < 30\text{ V}$ the DC output voltage $\leq \frac{1}{2}V_P$.

4 × 40 W BTL quad car radio power amplifier

TDA8571J

AC CHARACTERISTICS

$V_P = 14.4$ V; $R_L = 4$ Ω ; $f = 1$ kHz; $T_{amb} = 25$ °C; measured in Fig.7; unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|----------------|---------------------------------|--|------|-------------|---------|------------|
| P_o | output power | THD = 0.5% | 16 | 19 | – | W |
| | | THD = 10% | 21 | 26 | – | W |
| | | $V_P = 13.7$ V; THD = 0.5% | – | 17.5 | – | W |
| | | $V_P = 13.7$ V; THD = 10% | – | 23 | – | W |
| $P_{o(EIAJ)}$ | EIAJ output power | THD = maximum; $V_i = 2$ V (p-p) square wave | 35 | 40 | – | W |
| $P_{o(max)}$ | maximum output power | THD = maximum; $V_P = 15.2$ V; $V_i = 2$ V (p-p) square wave | 40 | 45 | – | W |
| THD | total harmonic distortion | $P_o = 1$ W | – | 0.1 | – | % |
| | | $V_{MODE} = 0.6$ V; note 1 | – | 10 | – | % |
| B_p | power bandwidth | THD = 0.5%; $P_o = -1$ dB with respect to 16 W | – | 20 to 20000 | – | Hz |
| $f_{ro(l)}$ | low frequency roll-off | at -1 dB; note 2 | – | 25 | – | Hz |
| $f_{ro(h)}$ | high frequency roll-off | at -1 dB | 20 | – | – | kHz |
| $G_{V(cl)}$ | closed-loop voltage gain | | 33 | 34 | 35 | dB |
| SVRR | supply voltage ripple rejection | $R_s = 0$ Ω ; maximum ripple $V_{ripple} = 2$ V (p-p) | | | | |
| | | on | 40 | – | – | dB |
| | | mute | 50 | – | – | dB |
| | standby | 80 | – | – | dB | |
| $ Z_i $ | input impedance | | 25 | 30 | 38 | k Ω |
| $V_{n(o)}$ | noise output voltage | B = 20 Hz to 20 kHz | | | | |
| | | on; $R_s = 0$ Ω | – | 125 | 170 | μ V |
| | | on; $R_s = 10$ k Ω | – | 150 | – | μ V |
| | mute; independent of R_s | – | 100 | – | μ V | |
| α_{cs} | channel separation | $P_o = 16$ W; $R_s = 10$ k Ω | 45 | – | – | dB |
| $ \Delta G_V $ | channel unbalance | | – | – | 1 | dB |
| V_o | output signal in mute | maximum input voltage $V_i = 1$ V (RMS) | – | – | 2 | mV |

Notes

- Dynamic Distortion Detector (DDD) active, pin V_{DIAG} is set to LOW level.
- Frequency response externally fixed.

4 × 40 W BTL quad car radio power amplifier

TDA8571J

TEST AND APPLICATION INFORMATION

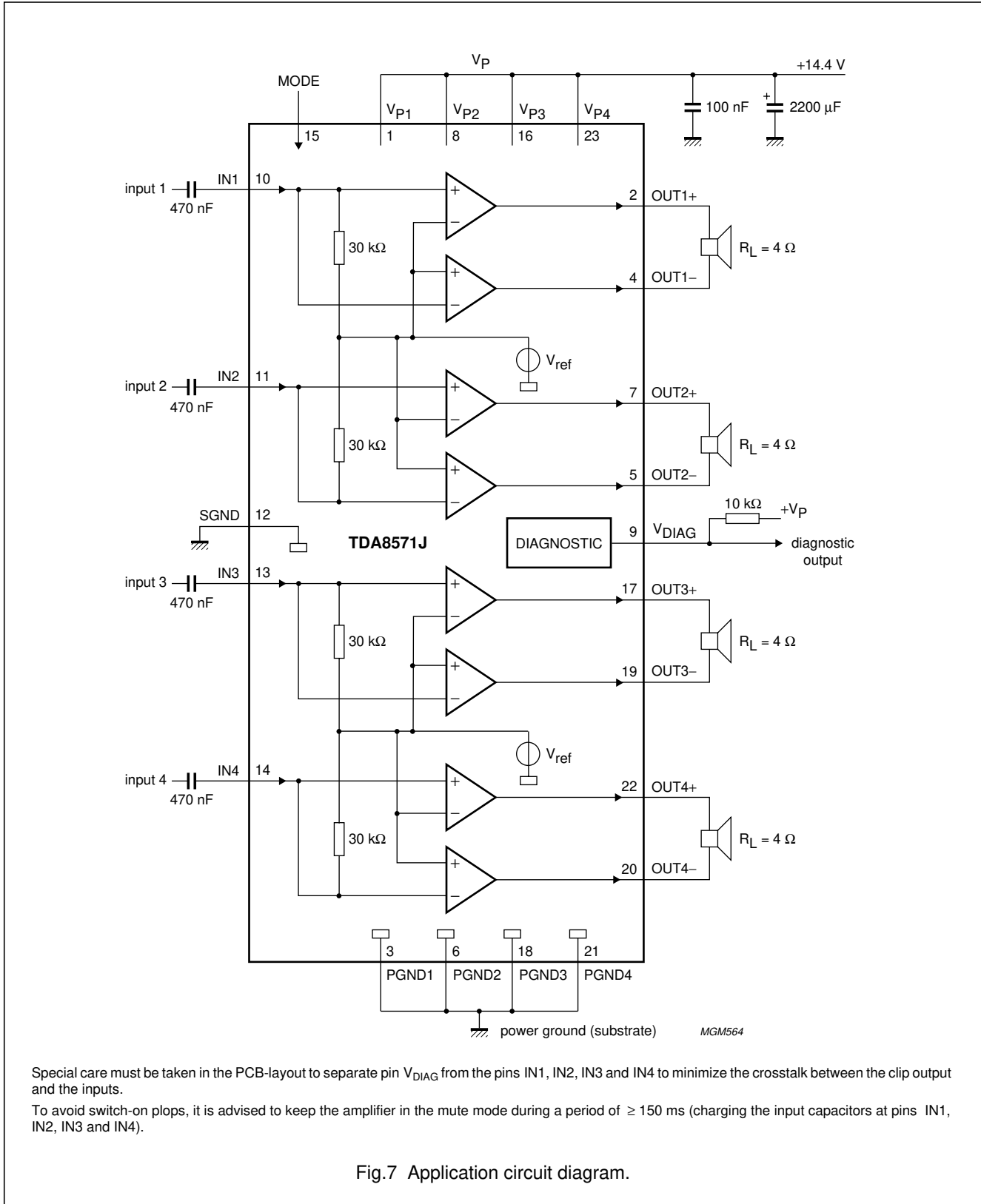


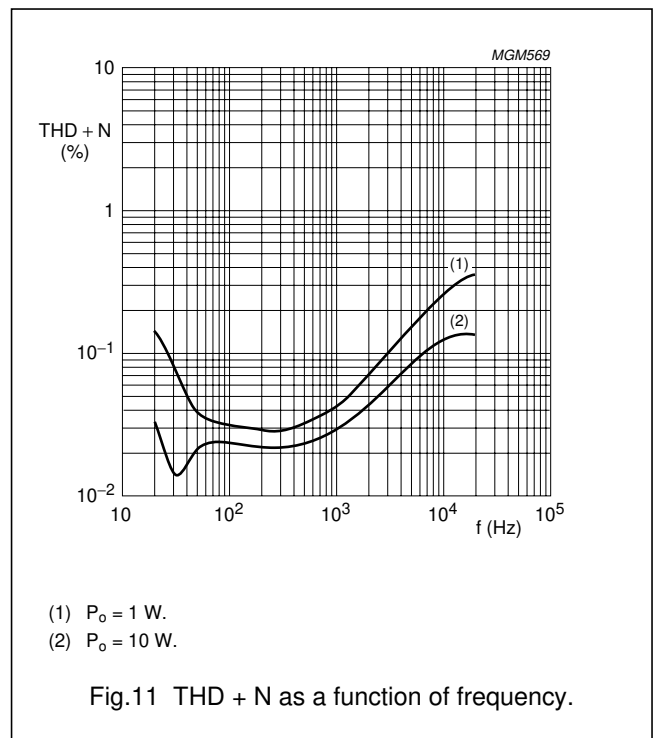
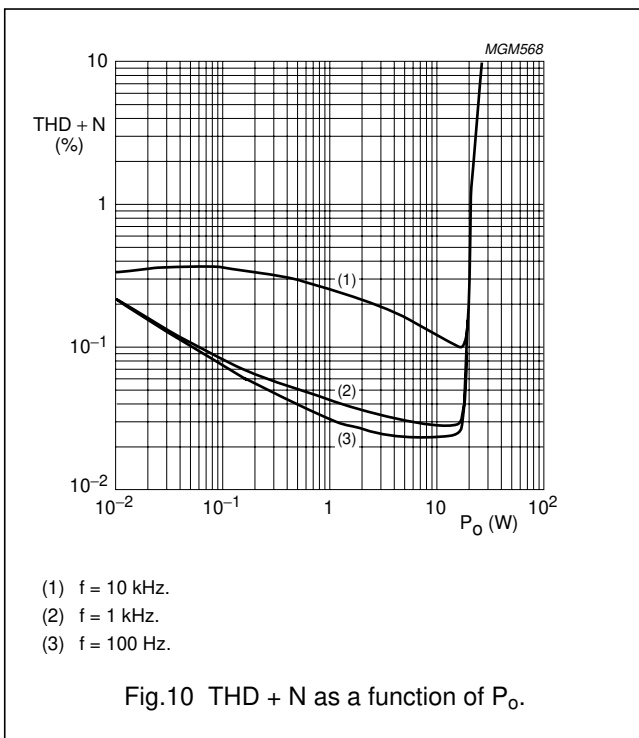
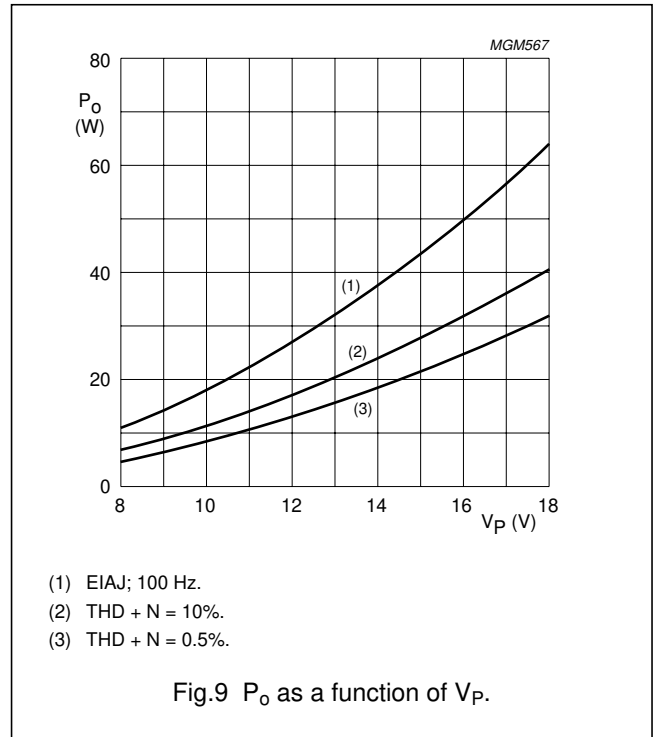
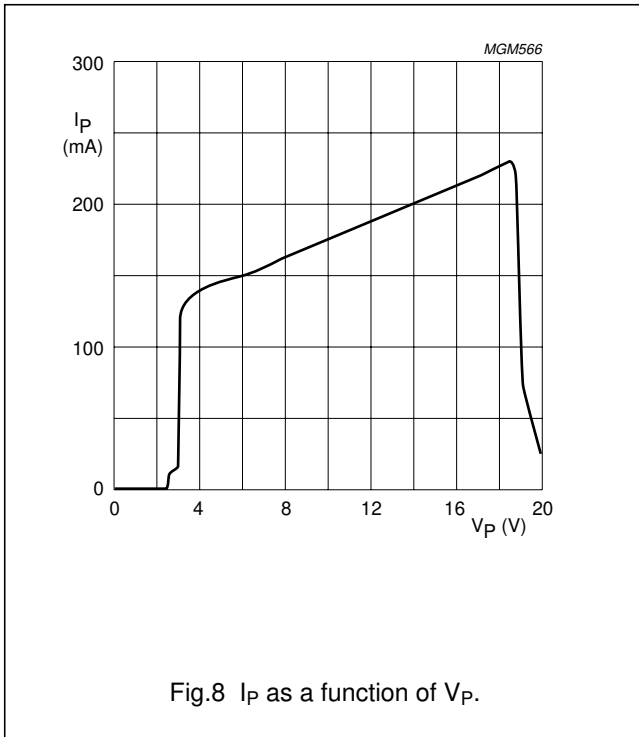
Fig.7 Application circuit diagram.

4 × 40 W BTL quad car radio power amplifier

TDA8571J

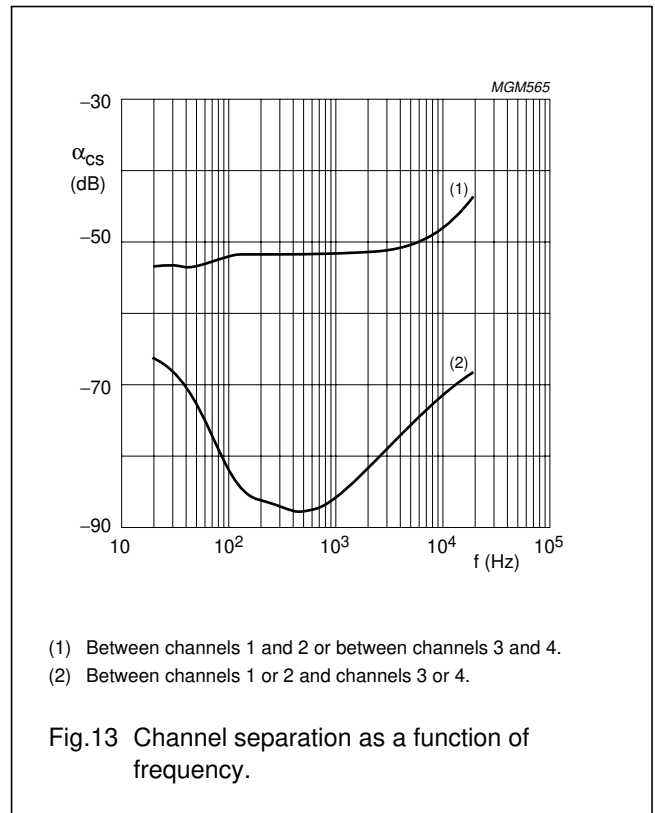
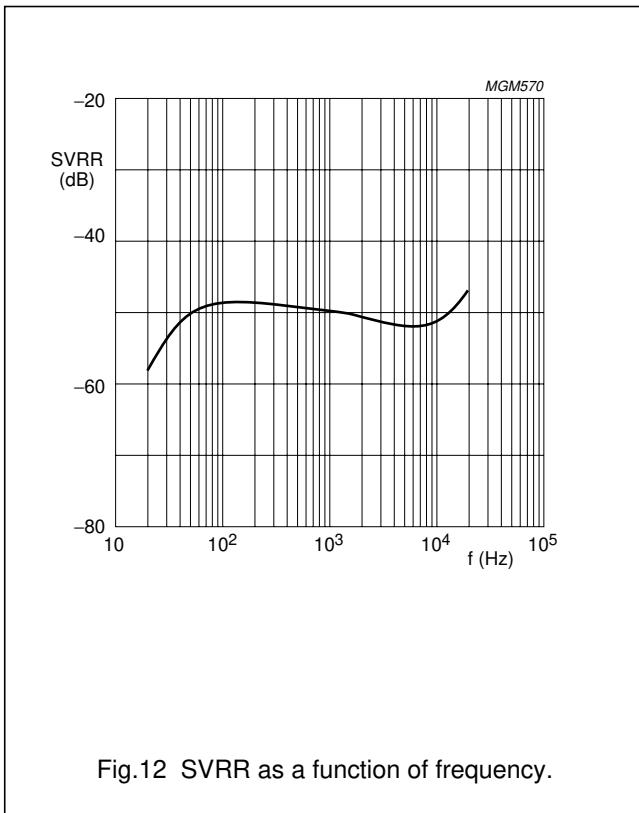
Test information

Figures 8 to 13 have the following conditions: $V_P = 14.4\text{ V}$; $R_L = 4\ \Omega$; $f = 1\text{ kHz}$; 80 kHz filter used; unless otherwise specified.



4 × 40 W BTL quad car radio power amplifier

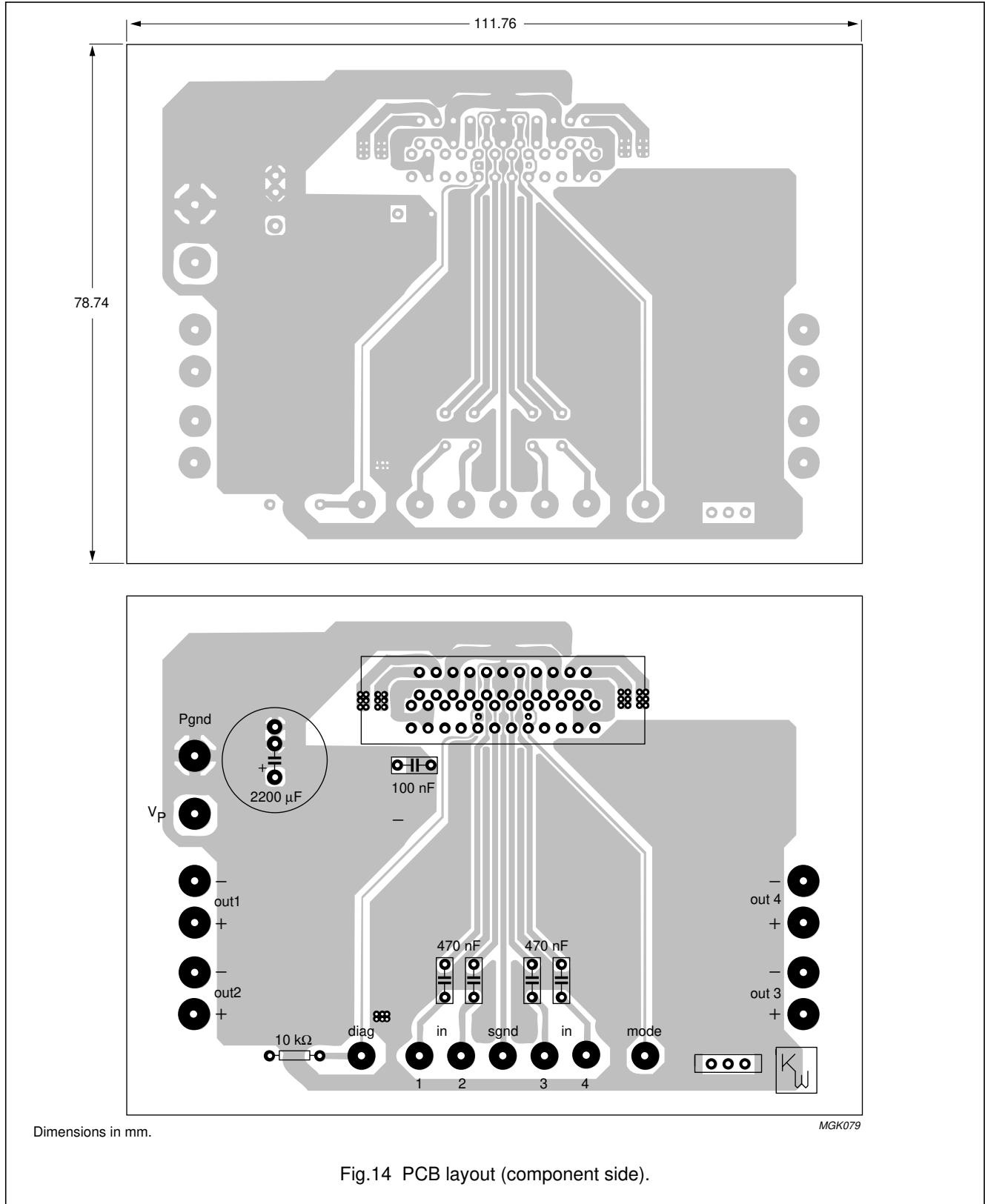
TDA8571J



4 × 40 W BTL quad car radio power amplifier

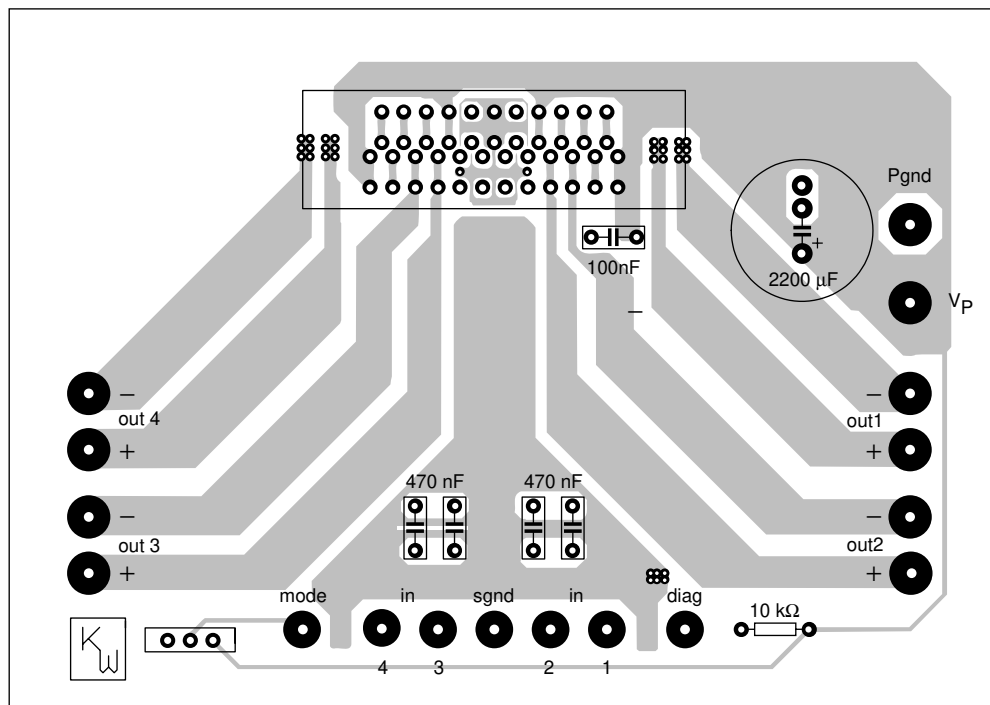
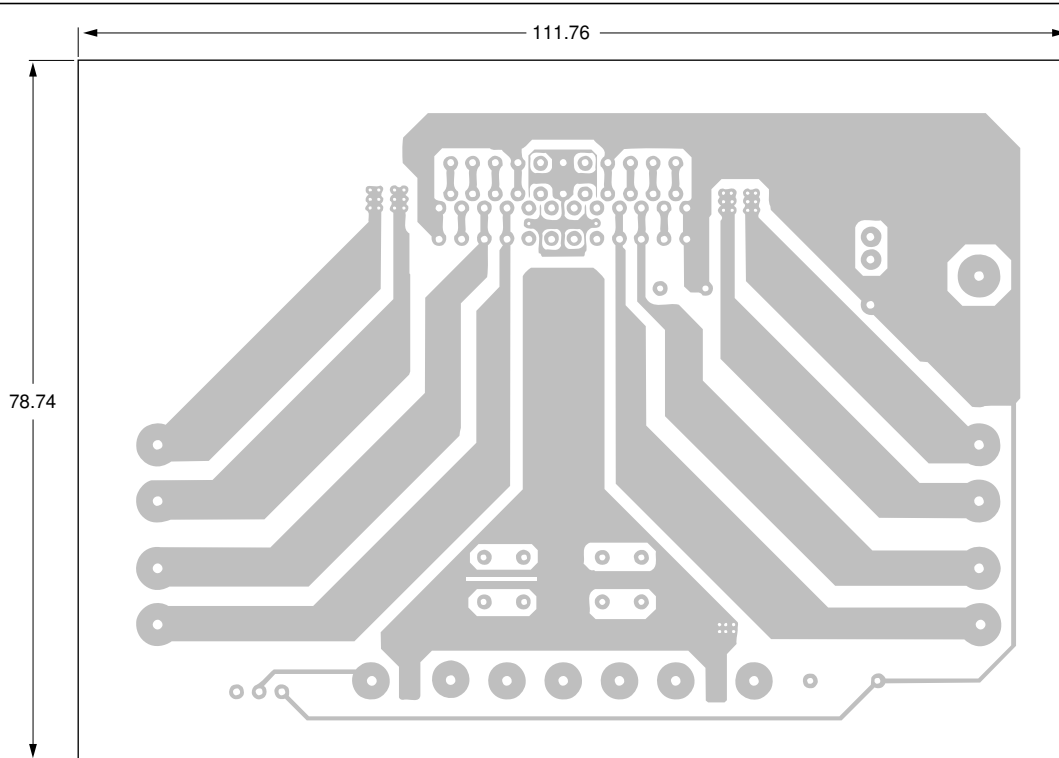
TDA8571J

PCB layout



4 × 40 W BTL quad car radio power amplifier

TDA8571J



MGK080

Dimensions in mm.

Fig.15 PCB layout (soldering side).

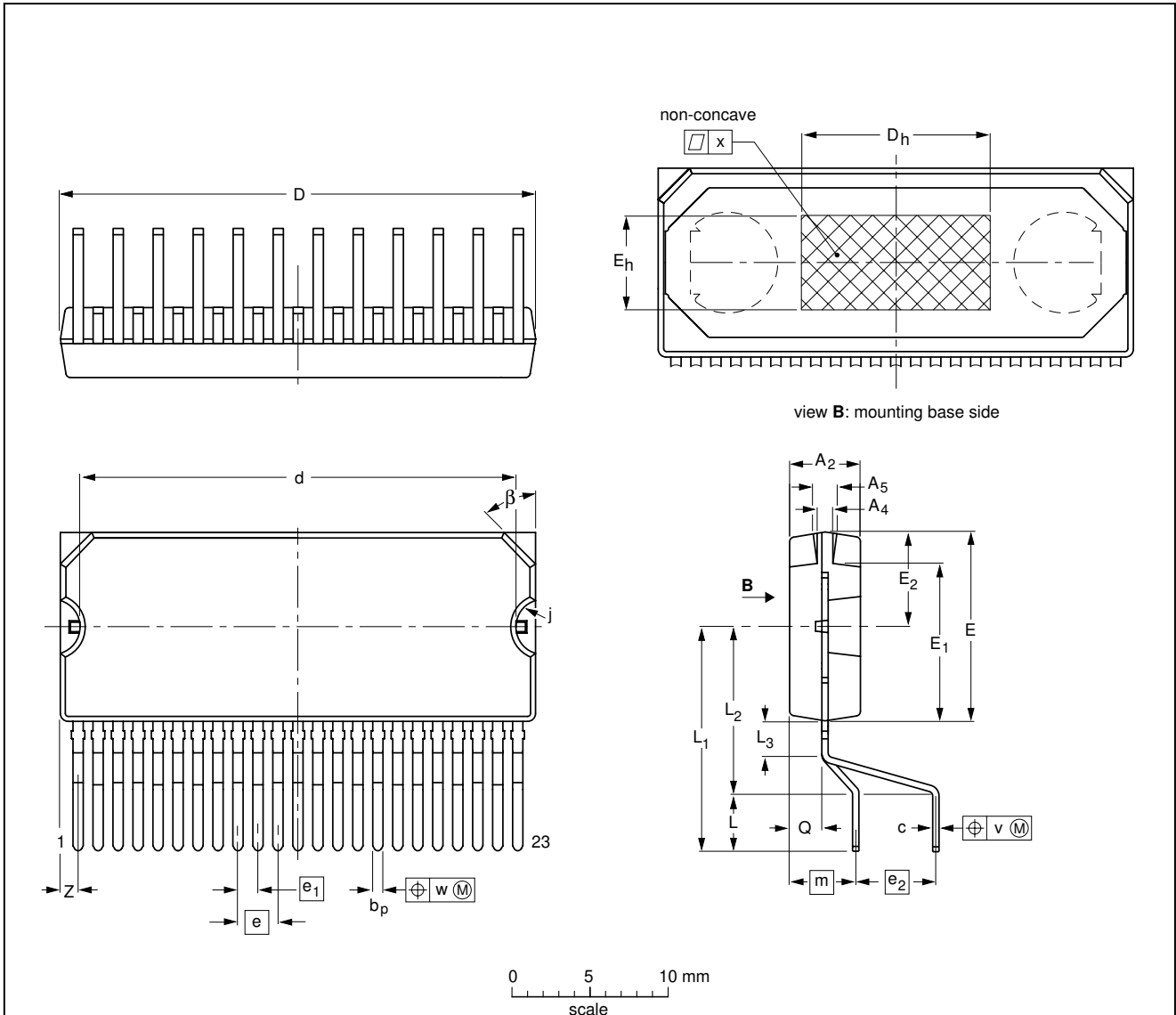
4 × 40 W BTL quad car radio power amplifier

TDA8571J

PACKAGE OUTLINE

DBS23P: plastic DIL-bent-SIL power package; 23 leads (straight lead length 3.2 mm)

SOT411-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A ₂ | A ₄ | A ₅ | b _p | c | D ⁽¹⁾ | d | D _h | E ⁽¹⁾ | e | e ₁ | e ₂ | E _h | E ₁ | E ₂ | j | L | L ₁ | L ₂ | L ₃ | m | Q | v | w | x | β | Z ⁽¹⁾ |
|------|----------------|----------------|----------------|----------------|--------------|------------------|--------------|----------------|------------------|------|----------------|----------------|----------------|----------------|----------------|--------------|------------|----------------|----------------|----------------|-----|------------|-----|------|------|-----|------------------|
| mm | 4.6 4.3 | 1.15 0.85 | 1.65 1.35 | 0.75 0.60 | 0.55 0.35 | 30.4 29.9 | 28.0 27.5 | 12 | 12.2 11.8 | 2.54 | 1.27 | 5.08 | 6 | 10.15 9.85 | 6.2 5.8 | 1.85 1.65 | 3.6 2.8 | 14.0 13.0 | 10.7 9.9 | 2.4 1.6 | 4.3 | 2.1 1.8 | 0.6 | 0.25 | 0.03 | 45° | 1.43 0.78 |

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 | | | |
| SOT411-1 | | | | | | 96-10-11 98-02-20 |

4 × 40 W BTL quad car radio power amplifier

TDA8571J

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 ($T_{stg(max)}$). 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 |
| DBS, DIP, HDIP, SDIP, SIL | suitable | suitable ⁽¹⁾ |

Note

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

4 × 40 W BTL quad car radio power amplifier

TDA8571J

DATA SHEET STATUS

| DATA SHEET STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾ | 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. |

Notes

1. Please consult the most recently issued data sheet before initiating or completing a design.
2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

DEFINITIONS

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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 — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

DISCLAIMERS

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance. Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no licence or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

4 × 40 W BTL quad car radio power
amplifier

TDA8571J

NOTES

4 × 40 W BTL quad car radio power
amplifier

TDA8571J

NOTES

Philips Semiconductors – a worldwide company

Contact information

For additional information please visit <http://www.semiconductors.philips.com>. Fax: +31 40 27 24825

For sales offices addresses send e-mail to: sales.addresses@www.semiconductors.philips.com.

© Koninklijke Philips Electronics N.V. 2002

SCA74

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.

The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Printed in The Netherlands

753503/02/pp20

Date of release: 2002 Mar 05

Document order number: 9397 750 09411

Let's make things better.

**Philips
Semiconductors**



PHILIPS