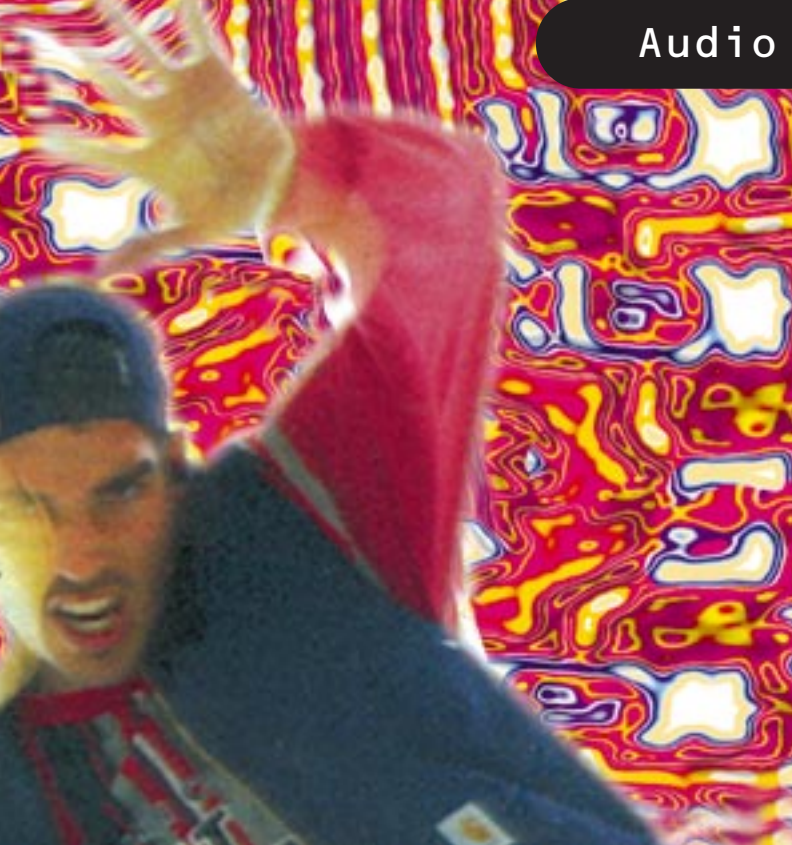
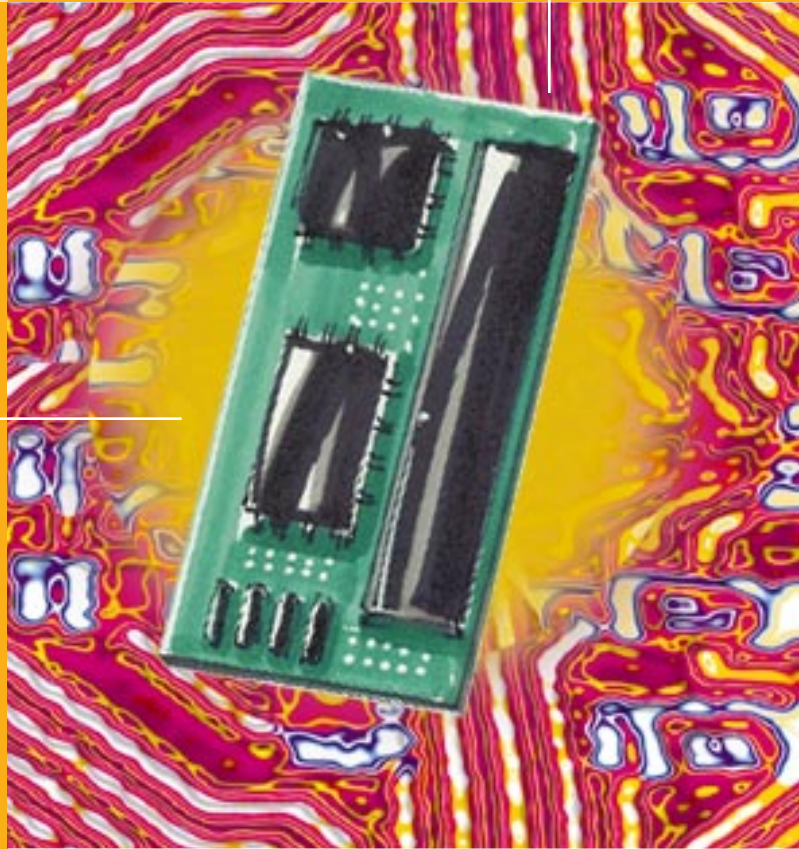


Audio Power

Audio power amplifiers



Designer's guide - October 1996



Let's make things better.



PHILIPS

Contents

| Section | Page |
|--|------|
| 1 Introduction | 1-2 |
| 2 Product survey and page reference | 2-1 |
| In application sequence | 2-2 |
| In power output sequence | 2-5 |
| 3 Audio amplifier ICs for portable radio/audio equipment | 3-1 |
| 4 Audio amplifier ICs for car radios/power boosters | 4-1 |
| 5 Audio amplifier ICs for mains-powered systems including hi-fi and TV sound | 5-1 |
| Appendices | |
| 1 Further information | A-2 |
| Data | A-2 |
| Application notes and leaflet | A-2 |
| 2 Index of audio amplifier ICs | A-3 |



NOTE

Purchase of Philips I²C components conveys a license under the Philips I²C patent to use the components in the I²C system, provided the system conforms to the I²C specifications defined by Philips.

INTEGRATED POWER WITH PHILIPS AUDIO AMPLIFIER ICs

Few people realize that one of the world's first ICs was an audio power amplifier from Philips. This delivered a mere 25 mW into a hearing-aid earpiece and incorporated just three transistors and 2 resistors.

Not surprisingly, we've made many advances since that initial introduction. Advances that have led to ICs such as the TDA8551 incorporating digital volume control with a control range of more than 80 dB. Or the hi-fi TDA1514A, which can deliver 50 W – more than two thousand times the power of that first integrated amplifier.

These are just two of the extensive range of audio ICs we now supply for a whole host of applications – including portable radio and recorders, car radios, multimedia systems, hi-fi TV, radio and music centres, and digital audio systems.

Integrated power

A major feature of our latest range is the high degree of functional power integrated within each package. A functional power that dramatically reduces the peripheral component count of finished equipment, leading to:

- lower system development costs
- smaller, more compact circuitry
- far fewer production problems
- significantly lower production costs.

What's more, advanced internal protection circuitry completely eliminates danger of damage from thermal runaway, short-circuits and electrostatic discharge. Providing a level of circuit reliability formerly the exclusive preserve of professional systems, and, moreover, providing you with a solid guarantee of quality and reliability in your own systems.

A valuable aid to designers

In the following pages you'll find our complete range of audio amplifiers. Intended principally as a designer's first selection guide, the pages give the most important parameters, or at least, those that feature prominently when design criteria are initially being considered. Used in conjunction with our Data Handbook IC01 (which gives more detailed information), this guide provides audio system designers with a ready means of selecting the most appropriate components for their designs.

The publication is divided into three application areas: portable radio/audio, car radio and mains-powered systems. Many products, however, may be suitable for several application areas: car audio systems and mains-powered multimedia PCs for example. What's more, many of today's applications for audio amplifier ICs, e.g. musical greeting cards, were unheard of just a few years ago. This means that any subdivision such as that given in this guide can be only a preliminary indication of a product's suitability for a particular application. In using this guide, therefore, designers should cast their net as wide as possible and should consider all likely candidates when looking for a suitable audio IC for their application.



PRODUCT SURVEY

PRODUCT SURVEY IN APPLICATION SEQUENCE

For portable radio/audio equipment

| Type No. | RMS power (W) | Supply (V) | Package | Remarks | Page |
|-------------------------------|----------------------------|------------|------------------|---|------|
| TDA1011 | 6.5 | 3.6 to 24 | SIL9MP | Separate pre/power amplifiers | 3-2 |
| TDA1015 | 4 | 3.6 to 18 | SIL9MP | Separate pre/power amplifiers | 3-2 |
| TDA1015T | 0.5 | 3.6 to 12 | SO8 | Separate pre/power amplifiers | 3-2 |
| TDA1016 | 2 | 3.6 to 15 | DIP16 | Record/playback + ALC | 3-3 |
| TDA1308T | 2×0.06 (d = 0.1%) | 3 to 7 | SO8 | Stereo headphone driver | 3-4 |
| TDA7050(T) | $[0.15]/2 \times 0.075$ | 1.6 to 6 | DIP8, SO8 | No peripheral components | 3-5 |
| TDA7052/ TDA7053 | 1 2×1 | 3 to 18 | DIP8 | No peripheral components | 3-6 |
| TDA7052A(AT)/ TDA7052B(BT) | 1(0.5) | 4.5 to 18 | DIP8, SO8 | DC volume control; 36 dB gain TDA7052A(AT) with 40 dB gain | 3-7 |
| TDA7053A(AT) | $2 \times 1(2 \times 0.5)$ | 4.5 to 18 | DIP16, SO16 | DC volume control; 40 dB gain | 3-8 |
| TDA7056/ TDA7057Q | 3 2×3 | 3 to 18 | SIL9MP SIL13P | No peripheral components | 3-9 |
| TDA7056A/ TDA7056B | 5 | 4.5 to 18 | SIL9MP | DC volume control; 36 dB gain TDA7056A with 40 dB gain | 3-10 |
| TDA7057AQ | 2×5 | 4.5 to 18 | SIL13P | DC volume control; 40 dB gain | 3-11 |
| TDA8541(T) | 1 | 2.2 to 18 | DIP8, SO8 | Few peripheral components | 3-12 |
| TDA8542(T) | 2×1 | 2.2 to 18 | DIP16, SO16L | Few peripheral components | 3-13 |
| TDA8543(T) | 2 | 2.2 to 18 | DIP16, SO16 | Few peripheral components | 3-14 |
| TDA8547(T) | 2×1 | 2.2 to 18 | DIP16, SO16L | Standby per channel | 3-15 |
| TDA8551(T) | 1 | 2.7 to 6 | DIP8, SO8 | Digital volume control | 3-16 |
| TDA8558(T) | 0.125 | 1.8 to 18 | DIP8, SO8 | Power saving muting facility | 3-17 |
| TDA8559(T) | 0.035 | 1.8 to 30 | DIP16, SO16 | Stereo headphone amplifier | 3-18 |

Note to tables: Output powers are quoted at $d_{tot} = 10\%$ unless stated otherwise and depend on supply voltage and loudspeaker impedance. Figures in square brackets refer to performance in BTL configuration.

PRODUCT SURVEY IN APPLICATION SEQUENCE

For car radios/power boosters

| Type No. | RMS power (W) | Supply (V) | Package | Remarks | Page |
|--|---------------------------------|--------------------------|------------------------------------|--|------|
| TDA1010A/ TDA1020 | 3.4 to 12 | 6 to 24 | SIL9MP | Separate pre/power amplifiers + load dump prot., standby, HF limit | 4-2 |
| TDA1510AQ/ TDA1515BQ | 2 × 12[1 × 24] | 6 to 18 | SIL13P | 1-end/BTL, 26 - 50[32 - 56] dB gain TDA1510AQ with LS protection | 4-3 |
| TDA1516BQ/ TDA1516CQ/ TDA1518BQ | 2 × 12[1 × 24] | 8.5 to 18 | SIL13P | 2 × 1-end/1 × BTL, 20[26] dB gain TDA1516BQ but BTL only TDA1516BQ with 40[46] dB gain | 4-4 |
| TDA1517(P)/ TDA1519 | 2 × 6 | 8.5 to 18 | SIL9MP, DIP18 | 20 dB gain TDA1517 with 40 dB gain | 4-5 |
| TDA1519A/ TDA1519B | 2 × 11[1 × 22] 2 × 6[1 × 12] | 8.5 to 17.5 8.5 to 18 | SIL9P SIL9MP | 2 × 1-end/1 × BTL, 40[46] dB gain | 4-6 |
| TDA1552Q/ TDA1553Q/ TDA1553CQ/ TDA1557Q | [2 × 22] | 8.5 to 18 | SIL13P | Dual BTL amplifiers, [26] dB gain TDA1552Q with LS protection TDA1553Q with CMOS mode switch TDA1553Q with [46] dB gain | 4-7 |
| TDA1554Q/ TDA1555Q/ TDA1558Q | 4 × 11[2 × 22] | 8.5 to 18 | SIL17P | 1-end/BTL, 20[26] dB gain TDA1554Q with distortion detector TDA1554Q with 40[46] dB gain | 4-8 |
| TDA1556Q | [2 × 22] | 8.5 to 18 | SIL17P | Dual BTL, diff. inputs, [26] dB gain | 4-9 |
| TDA1560Q | [40] | 8 to 18 | SIL17P | BTL class-H amplifier, [30] dB gain | 4-10 |
| TDA1561Q | 2 × 23 | 6 to 18 | DBS13P | Automatic switching to high-power mode when needed | 4-11 |
| TDA8560Q/ TDA8563Q/ TDA8563AQ | [2 × 40] | 8.5 to 18 | SIL13P | Dual BTL amplifiers. [40] dB gain TDA8560Q with [26] dB gain TDA8563Q with 2.2% THD (10% with TDA8563Q) | 4-12 |
| TDA8561Q/ TDA8564Q | 4 × 12[2 × 24] | 8.5 to 18 | SIL17P | 4 × 1-end/dual BTL, 20[26] dB gain TDA8561Q with 40[46] dB gain | 4-13 |
| TDA8562Q/ TDA8565Q | 4 × 12 | 8.5 to 18 | SIL17P | 4 × 1-end amplifier, 20 dB gain TDA8562Q with 40 dB gain | 4-14 |
| TDA8566Q | 2 × 25 | 8.5 to 18 | DBS17P | Differential inputs | 4-15 |
| TDA8567Q/ TDA8568Q/ TDA8569Q | 4 × 25 | 8.5 to 18 | DBS23P | Quad BTL amplifier, 4 Ω load, [26] dB gain TDA8567Q with [40] dB gain TDA8567Q driving 2 Ω load | 4-16 |
| TDA8574(T) | dual line driver | 6 to 12 | DIP16, SO16 | Class H high output level | 4-17 |
| TDA8576T | dual line driver | 6 to 12 | SO16 | Class H high output level | 4-18 |
| TDA8577/ TDA8578(T)/ TDA8579(T) | dual line driver | 5 to 18 | SIL9MP DIP16, SO16 DIP8, SO8 | Completely separated inputs Completely separated inputs Inverting inputs linked | 4-19 |

Note to tables: Output powers are quoted at $d_{tot} = 10\%$ unless stated otherwise and depend on supply voltage and loudspeaker impedance. Figures in square brackets refer to performance in BTL configuration.

PRODUCT SURVEY IN APPLICATION SEQUENCE

For mains-powered systems including hi-fi and TV sound

| Type No. | RMS power (W) | Supply (V) | Package | Remarks | Page |
|---------------------------|-------------------|------------|---------|---|-------|
| TDA1013B | 4 to 10 | 10 to 40 | SIL9MP | DC volume control | 5-2 |
| TDA1514A | 50 (d = 0.1%) | 15 to 60 | SIL9P | Super hi-fi, 20 - 46 dB gain | 5-3/4 |
| TDA1521A/ TDA2615 | 2 × 6 (d = 0.5%) | 15 to 42 | SIL9MP | Automatic mute; hi-fi TDA1521A with extra mute pin | 5-5 |
| TDA1521(Q)/ TDA2616(Q) | 2 × 12 (d = 0.5%) | 15 to 42 | SIL9P | Automatic mute; hi-fi TDA1521(Q) with extra mute pin | 5-5 |
| TDA2611A | 4 to 10 | 6 to 35 | SIL9MP | Adjustable input impedance | 5-6 |
| TDA2613/ TDA2614 | 6 (d = 0.5%) | 15 to 42 | SIL9MP | Automatic mute; hi-fi TDA2613 with extra mute pin | 5-6 |

Note to tables: Output powers are quoted at $d_{tot} = 10\%$ unless stated otherwise and depend on supply voltage and loudspeaker impedance. Figures in square brackets refer to performance in BTL configuration.

PRODUCT SURVEY IN POWER OUTPUT SEQUENCE

Very low power (less than 1 W)

| Type No. | RMS power (W) | Supply (V) | Package | Remarks | Application | Page |
|------------|----------------------------|------------|-------------|-------------------------------|-------------|------|
| TDA8574(T) | dual line driver | 6 to 12 | DIP16, SO16 | Class H high output level | c, m | 4-17 |
| TDA8576T | dual line driver | 6 to 12 | SO16 | Class H high output level | c, m | 4-18 |
| TDA8577 | dual line driver | 5 to 18 | SIL9MP | Completely separated inputs | c, m | 4-19 |
| TDA8578(T) | dual line driver | 5 to 18 | DIP16, SO16 | Completely separated inputs | c, m | 4-19 |
| TDA8579(T) | dual line driver | 5 to 18 | DIP8, SO8 | Inverting inputs linked | c, m | 4-19 |
| TDA8559(T) | 0.035 | 1.8 to 30 | DIP16, SO16 | Stereo headphone amplifier | p | 3-18 |
| TDA1308T | 2×0.06 (d = 0.1%) | 3 to 7 | SO8 | Stereo headphone driver | p, c, m | 3-4 |
| TDA7050(T) | $[0.15]/2 \times 0.075$ | 1.6 to 6 | DIP8, SO8 | No peripheral components | p | 3-5 |
| TDA1015T | 0.5 | 3.6 to 12 | SO8 | Separate pre/power amplifiers | p | 3-2 |

2

Low power (1 W to 5 W)

| Type No. | RMS power (W) | Supply (V) | Package | Remarks | Application | Page |
|-------------------------------|----------------------------|------------|------------------|---|-------------|------|
| TDA8558(T) | 0.125 | 1.8 to 18 | DIP8, SO8 | Power saving muting facility | p, m | 3-17 |
| TDA7052A(AT)/ TDA7052B(BT) | 1(0.5) | 4.5 to 18 | DIP8, SO8 | DC volume control; 36 dB gain TDA7052A(AT) with 40 dB gain | p, m | 3-7 |
| TDA7052/ TDA7053 | 1 2×1 | 3 to 18 | DIP8 DIP16 | No peripheral components No peripheral components | p, m | 3-6 |
| TDA8541(T) | 1 | 2.2 to 18 | DIP8, SO8 | Few peripheral components | p, m | 3-12 |
| TDA8551(T) | 1 | 2.7 to 6 | DIP8, SO8 | Digital volume control | p, m | 3-16 |
| TDA8542(T) | 2×1 | 2.2 to 18 | DIP16, SO16L | Few peripheral components | p, m | 3-13 |
| TDA7053A(AT) | $2 \times 1(2 \times 0.5)$ | 4.5 to 18 | DIP16, SO16 | DC volume control; 40 dB gain | p, m | 3-8 |
| TDA8543(T) | 2 | 2.2 to 18 | DIP16, SO16 | Few peripheral components | p, m | 3-14 |
| TDA8547(T) | 2×1 | 2.2 to 18 | DIP16, SO16L | Standby per channel | p, m | 3-15 |
| TDA1016 | 2 | 3.6 to 15 | DIP16 | Record/playback + ALC | p, m | 3-3 |
| TDA7056/ TDA7057Q | 3 2×3 | 3 to 18 | SIL9MP SIL13P | No peripheral components No peripheral components | p, m | 3-9 |
| TDA1015 | 4 | 3.6 to 18 | SIL9MP | Separate pre/power amplifiers | p, m | 3-2 |
| TDA7057AQ | 2×5 | 4.5 to 18 | SIL13P | DC volume control; 40 dB gain | p, m | 3-11 |
| TDA7056A/ TDA7056B | 5 | 4.5 to 18 | SIL9MP | DC volume control; 36 dB gain TDA7056A with 40 dB gain | p, m | 3-10 |

Note to tables: Output powers are quoted at $d_{\text{tot}} = 10\%$ unless stated otherwise and depend on supply voltage and loudspeaker impedance. Figures in square brackets refer to performance in BTL configuration. Application areas: c = car radios/power boosters, m = mains-powered equipment, p = portable radio/audio equipment.

PRODUCT SURVEY IN POWER OUTPUT SEQUENCE

Medium power (6 W to 12 W)

| Type No. | RMS power (W) | Supply (V) | Package | Remarks | Application | Page |
|---------------------------|-------------------|------------|---------------|---|-------------|------|
| TDA1010A/ TDA1020 | 3.4 to 12 | 6 to 24 | SIL9MP | Separate pre/power amplifiers + load dump prot., standby, HF limit | c, m | 4-2 |
| TDA1013B | 4 to 10 | 10 to 40 | SIL9MP | DC volume control | m | 5-2 |
| TDA2611A | 4 to 10 | 6 to 35 | SIL9MP | Adjustable input impedance | m | 5-6 |
| TDA2613/ TDA2614 | 6 (d = 0.5%) | 15 to 42 | SIL9MP | Automatic mute; hi-fi TDA2613 with extra mute pin | m | 5-6 |
| TDA1011 | 6.5 | 3.6 to 24 | SIL9MP | Separate pre/power amplifiers | p, m | 3-2 |
| TDA1517(P)/ TDA1519 | 2 × 6 | 6 to 18 | SIL9MP, DIP18 | 20 dB gain TDA1517 with 40 dB gain | c, m | 4-5 |
| TDA1521A/ TDA2615 | 2 × 6 (d = 0.5%) | 15 to 42 | SIL9MP | Automatic mute; hi-fi TDA1521A with extra mute pin | m | 5-5 |
| TDA1521(Q)/ TDA2616(Q) | 2 × 12 (d = 0.5%) | 15 to 42 | SIL9P | Automatic mute; hi-fi TDA1521(Q) with extra mute pin | m | 5-5 |

High power (more than 12 W)

| Type No. | RMS power (W) | Supply (V) | Package | Remarks | Application | Page |
|--|---------------------------------|--------------------------|-----------------|--|-------------|----------------------|
| TDA1519A/ TDA1519B | 2 × 11[1 × 22] 2 × 6[1 × 12] | 8.5 to 17.5 8.5 to 18 | SIL9P SIL9MP | 2 × 1-end/1 × BTL, 40[46] dB gain | c, m | 4-6 |
| TDA1554Q/ TDA1555Q/ TDA1558Q | 4 × 11[2 × 22] | 8.5 to 18 | SIL17P | 1-end/BTL, 20[26] dB gain TDA1554Q with distortion detector TDA1554Q with 40[46] dB gain | c | 4-8 |
| TDA1510AQ/ TDA1515BQ | 2 × 12[1 × 24] | 8.5 to 18 | SIL13P | 1-end/BTL, 26 - 50[32 - 56] dB gain TDA1510AQ with LS protection | c | 4-3 |
| TDA1516BQ/ TDA1516CQ/ TDA1518BQ | 2 × 12[1 × 24] | 8.5 to 18 | SIL13P | 2 × 1-end/1 × BTL, 20[26] dB gain TDA1516BQ but BTL only TDA1516BQ with 40[46] dB gain | c | 4-4 |
| TDA8562Q/ TDA8565Q | 4 × 12 | 8.5 to 18 | SIL17P | 4 × 1-end amplifier, 20 dB gain TDA8562Q with 40 dB gain | c | 4-14 |
| TDA8561Q/ TDA8564Q | 4 × 12[2 × 24] | 8.5 to 18 | SIL17P | 4 × 1-end/dual BTL, 20[26] dB gain TDA8561Q with 40[46] dB gain | c | 4-13 |
| TDA1552Q/ TDA1553Q/ TDA1553CQ/ TDA1557Q | [2 × 22] | 8.5 to 18 | SIL13P | Dual BTL amplifiers, [26] dB gain TDA1552Q with LS protection TDA1553Q with CMOS mode switch TDA1553Q with [46] dB gain | c | 4-7 |
| TDA1556Q | [2 × 22] | 8.5 to 18 | SIL17P | Dual BTL, diff. inputs, [26] dB gain | c | 4-9 |
| TDA1561Q | 2 × 23 | 6 to 18 | DBS13P | Automatic switching to high- power mode | c, m | 4-11 |
| TDA8566Q | 2 × 25 | 8.5 to 18 | DBS17P | Diagnostic outputs | c | 4-15 |
| TDA8567Q/ TDA8568Q/ TDA8569Q | 4 × 25 | 8.5 to 18 | DBS23P | Quad BTL amplifier, 4 Ω load, [26] dB gain TDA8567Q with [40] dB gain TDA8567Q driving 2 Ω loads | c c c | 4-16 4-16 4-16 |
| TDA1560Q | [40] | 8 to 18 | SIL17P | BTL class-H amplifier, [30] dB gain | c, m | 4-10 |
| TDA8560Q/ TDA8563Q/ TDA8563AQ | [2 × 40] | 8.5 to 18 | SIL13P | Dual BTL amplifiers. [40] dB gain TDA8560Q with [26] dB gain TDA8563Q with 2.2% THD | c | 4-12 |
| TDA1514A | 50 (d = 0.1%) | 15 to 60 | SIL9P | Super hi-fi, 20 - 46 dB gain | m | 5-3/4 |

Note to tables: Output powers are quoted at $d_{tot} = 10\%$ unless stated otherwise and depend on supply voltage and loudspeaker impedance. Figures in square brackets refer to performance in BTL configuration. Application areas: c = car radios/power boosters, m = mains-powered equipment, p = portable radio/audio equipment.



PORTABLE RADIO/
AUDIO EQUIPMENT

3

TDA1011/TDA1015

Preamplifier plus 6.5 W/4 W power amplifier

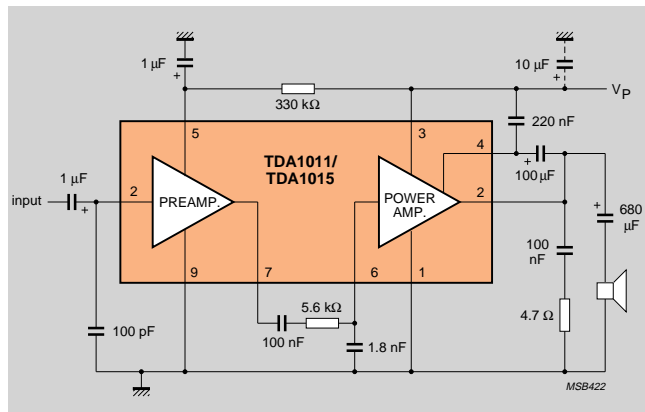
- Separate preamplifier and power amplifier
- Thermal protection
- High input impedance (greater than 100 kΩ)
- Low current drain (typically 14 mA with a 12 V supply)
- Limits RF noise.
- Minimum number of external components
- Simple and low cost heatsinking
- No switch-on/switch-off clicks
- Output noise diminishes with reducing volume

These ICs are primarily for battery-powered portable recorders and radios, the TDA1011 offering an output power of 6.5 W and the TDA1015 and output power of 4 W. However, their wide supply voltage ranges (TDA1011: 3.6 to 24 V, TDA1015: 3.6 to 18 V) mean they are also suitable for mains powered equipment. The ICs come in a 9-pin medium-power plastic SIL package and are pin compatible with each other.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|-----------------------|--------------------|--------------------|
| with bootstrapping | | |
| 1 | 6 | 4 |
| 2.3 | 9 | 4 |
| 4.2 | 12 | 4 |
| *6.5 | 16 | 4 |
| without bootstrapping | | |
| 3 | 12 | 4 |

* TDA1011



TDA1015T

500 mW amplifier

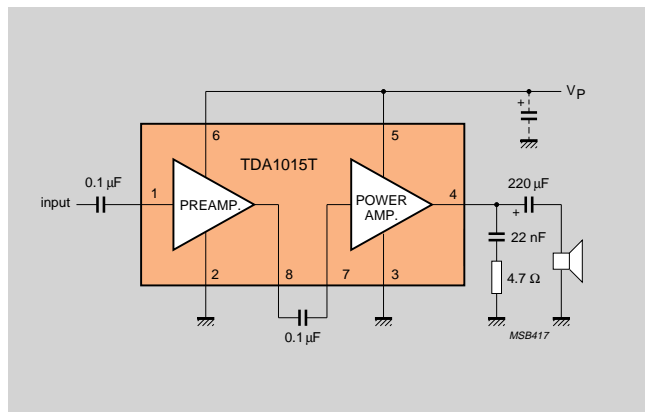
- Separate preamplifier and power amplifier
- Thermal protection
- High input impedance (greater than 100 kΩ)
- Low current drain (typically 14 mA with a 12 V supply)
- Limits RF noise
- Few peripheral components

This amplifier is for portable and mains-powered equipment. It delivers up to 500 mW into 32 Ω and has a supply voltage range from 3.6 V up to 12 V.

It comes in an 8-pin SO package for surface mounting in compact circuitry such as mobile radios and telecom equipment.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (mW) | supply voltage (V) | load impedance (Ω) |
|-------------------|--------------------|--------------------|
| 300 | 6 | 8 |
| 500 | 9 | 16 |
| 500 | 12 | 32 |



TDA1016

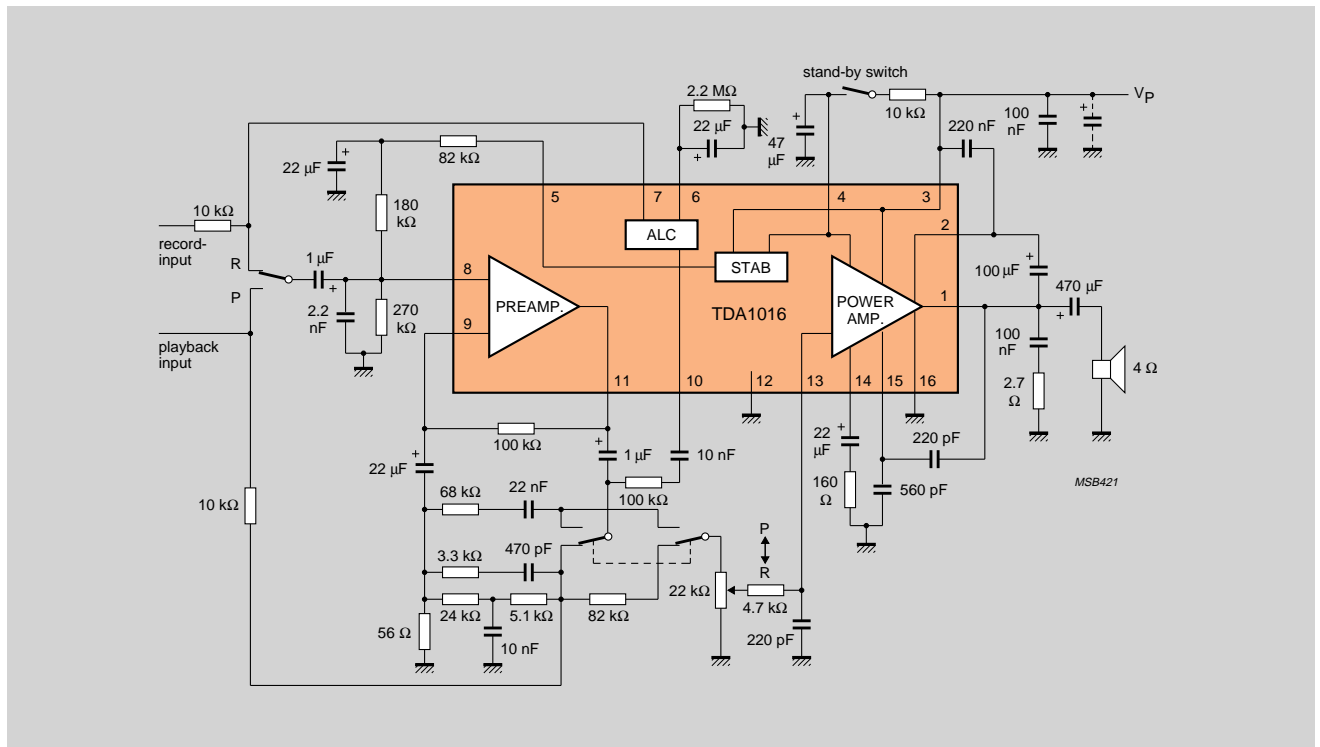
2 W power and record/playback preamplifier

- Separate record/playback preamplifier and power amplifier
- Incorporates ALC (automatic level control) for recording
- Voltage stabilization (2.6 V)
- Short-circuit protection
- Thermal protection
- Standby switching facility to minimize current drain

This amplifier includes an ALC (automatic level control) circuit and is designed specifically for recorders and radio recorders. With an operating voltage range from 3.6 V to 15 V, it's ideal for a wide range of both portable and mains-powered equipment. Two of these ICs can be used for stereo. The IC comes in a 16-pin plastic DIP with internal heat spreader.

POWER OUTPUT AT $d_{tot} = 10\%$ (with bootstrapping)

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 2 | 9 | 4 |



TDA1308T

60 mW stereo headphone amplifier

3

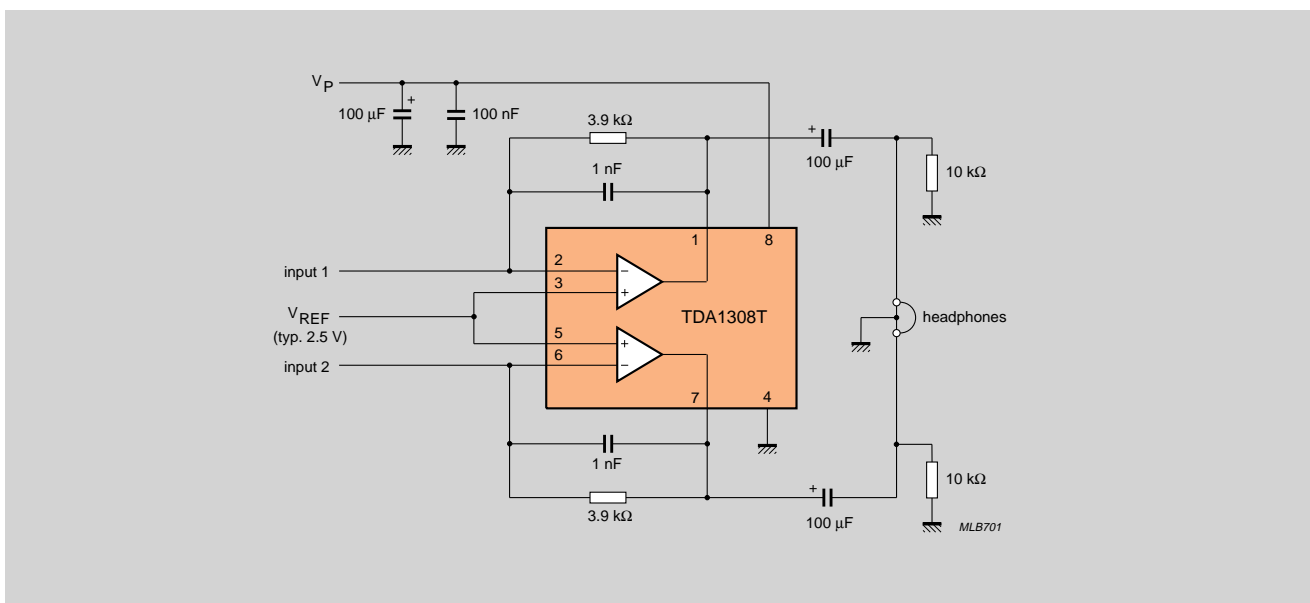
- Wide temperature range
- No switch-on/off clicks
- Excellent power supply ripple rejection
- Low current drain (typically 3 mA with a 5 V supply)
- Short-circuit resistant
- 110 dB signal-to-noise ratio
- 5 V/ μ s slew rate at unity gain
- Large output voltage swing

This is a class-AB stereo driver for delivering up to 60 mW into 32 Ω headphones. It is fabricated in a 1 μ m CMOS process and is intended primarily for portable digital audio applications. It has a supply voltage range from 3 V to 7 V.

It comes an 8-pin SO package for surface mounting.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (mW) | supply voltage (V) | load impedance (Ω) |
|-------------------|--------------------|-----------------------------|
| 60 | 5 | 32 |



TDA7050(T)

150 mW BTL or 2 × 75 mW low-voltage amplifier

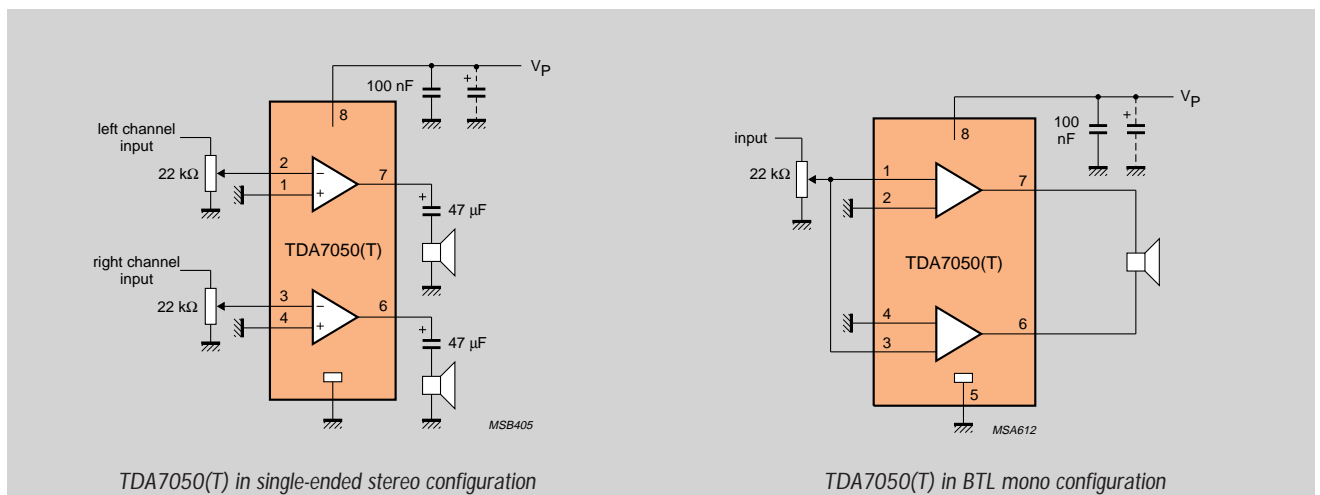
- Requires no external components in BTL configuration
- Operates with battery supplies from 6 V down to 1.6 V
- Very low quiescent current (typically 3.2 mA with 3 V supply)
- Closed-loop voltage gain fixed at 26 dB in the stereo configuration or 32 dB in the BTL configuration (floating differential input, 3 V supply and 32 Ω load)

This low-voltage amplifier is for portable mono (BTL) or stereo apparatus with headphones.

It comes in an 8-pin plastic DIP (TDA7050), or in an 8-pin small outline (SO) plastic package for surface mounting (TDA7050T).

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (mW) | supply voltage (V) | load impedance (Ω) |
|-------------------|--------------------|--------------------|
| mono BTL | | |
| 150 | 4.5 | 64 |
| 140 | 3 | 32 |
| stereo | | |
| 2 × 75 | 4.5 | 32 |
| 2 × 35 | 3 | 32 |



TDA7052/TDA7053

1 W/2 × 1 W BTL amplifiers

- No external components required
- Excellent overall stability
- Output protected against short-circuit
- No external heatsink required
- Low power consumption
- No switch-on or switch-off clicks
- Supply voltage range of 3 V to 18 V
- Fixed closed-loop voltage gain of 39 dB (6 V supply, 8 Ω load)

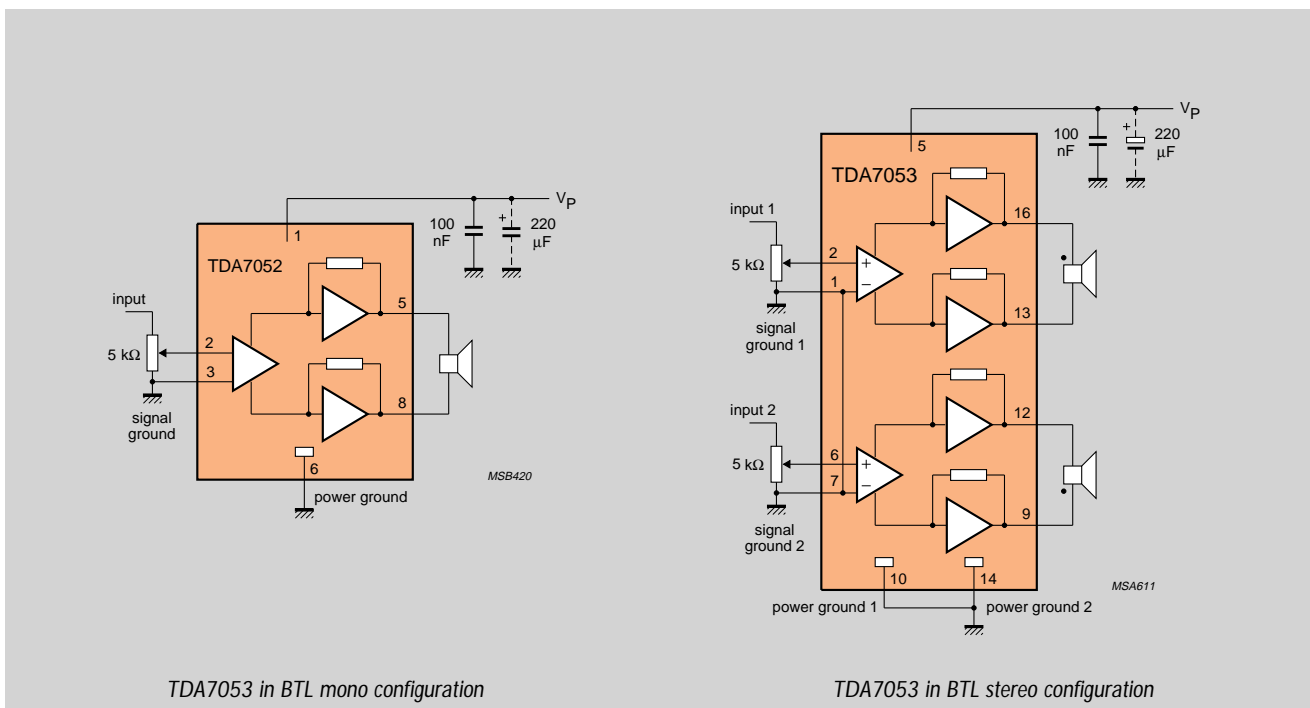
3

The proprietary circuit design of these amplifiers makes use of the bridge-tied load (BTL) principle to achieve low-voltage operation without sacrifice of output power. They are therefore primarily intended for battery-powered portable recorders and radios. However, their wide supply voltage range (3 V to 18 V) also makes them suitable for TV.

The TDA7052 comes in an 8-pin plastic DIP and is pin-compatible with half of the TDA7053 which is in a 16-pin plastic DIP.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|--------------------|
| TDA7052 | | |
| 1 | 6 | 8 |
| 2 | 11 | 25 |
| TDA7053 | | |
| 2 × 1 | 6 | 8 |
| 2 × 2 | 11 | 25 |



TDA7052A(AT)/TDA7052B(BT)

1 W/0.5 W BTL amplifiers with DC volume control

- No external components required
- Excellent overall stability
- Output protected against short-circuit to V_p , ground or across load
- No external heatsink required
- Low power consumption
- Thermal protection
- Low HF radiation
- All pins ESD protected
- No switch-on/switch-off clicks
- Supply voltage range of 4.5 V to 18 V
- DC volume control
- Mute facility

The proprietary circuit design of these amplifiers makes use of the bridge-tied load (BTL) principle to provide low-voltage operation without sacrifice of output power. They have fixed voltage gain of 36 dB for the A versions, and 40 dB for the B versions. Although they are primarily for battery-powered

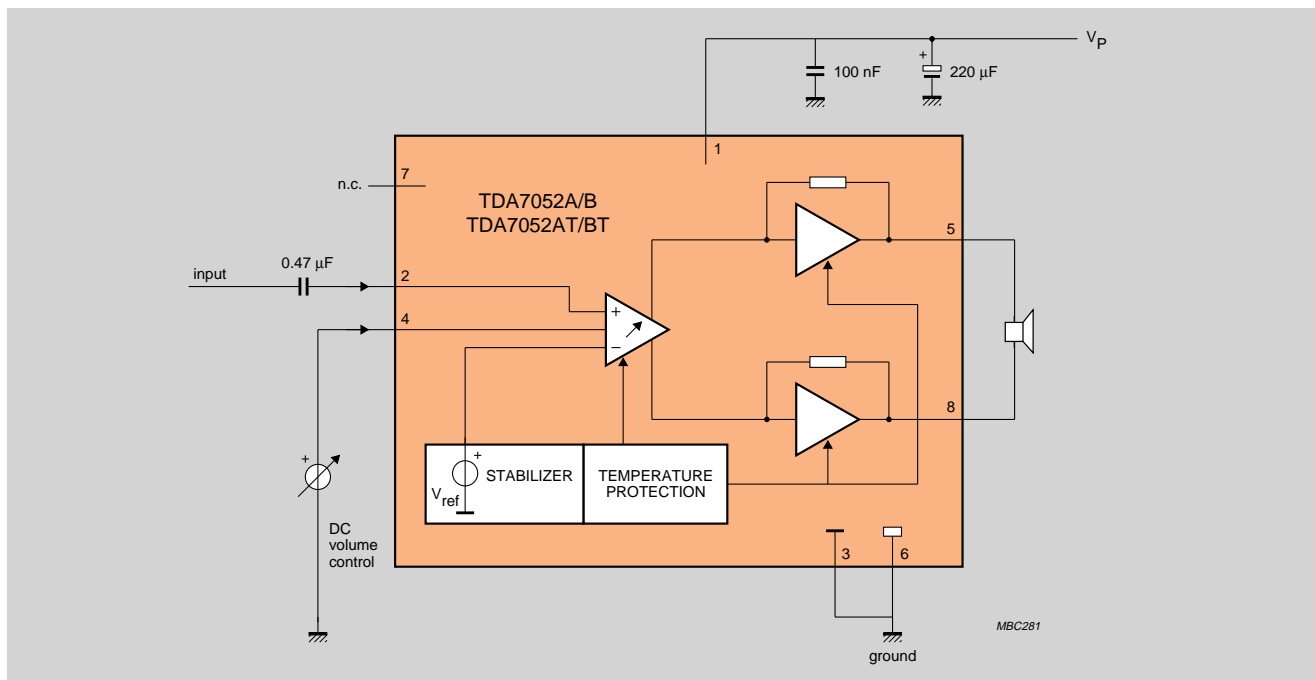
portable recorders, radios and telephones, their wide supply voltage range (4.5 V to 18 V) also makes them suitable for multi-media and TV applications.

The amplifiers have built-in DC volume control with a logarithmic characteristic providing control over a typical range of 80 dB (73 dB B versions). When the DC control voltage drops below 0.3 V (0.4 V B versions), the amplifier is muted. Except for pin 4 (DC volume control), the amplifiers are pin-compatible with the TDA7052.

They come in an 8-pin plastic DIP (TDA7052A/7052B) or in an 8-pin small outline (SO) plastic package for surface mounting (TDA7052AT/TDA7052BT).

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|---------------------|--------------------|-----------------------------|
| TDA7052A/TDA7052B | | |
| 1 | 6 | 8 |
| 2 | 12 | 32 |
| TDA7052AT/TDA7052BT | | |
| 0.5 | 6 | 16 |



TDA7053A/TDA7053AT

2 × 1 W/2 × 0.5 W BTL amplifiers with DC volume control

3

- No external components required
- Excellent overall stability
- Output protected against short-circuit to V_P , ground or across load
- No external heatsink required
- Low power consumption.
- Thermal protection
- Low HF radiation
- All pins ESD protected
- No switch-on/switch-off clicks
- Supply voltage range of 4.5 V to 18 V
- DC volume control
- Mute facility

These amplifiers are stereo versions of the TDA7052B/TDA7052BT. They use the same proprietary circuit design which makes use of the bridge-tied load (BTL) principle to provide low-voltage operation without sacrifice of output power. They have fixed voltage gain of 40 dB. Although they are pri-

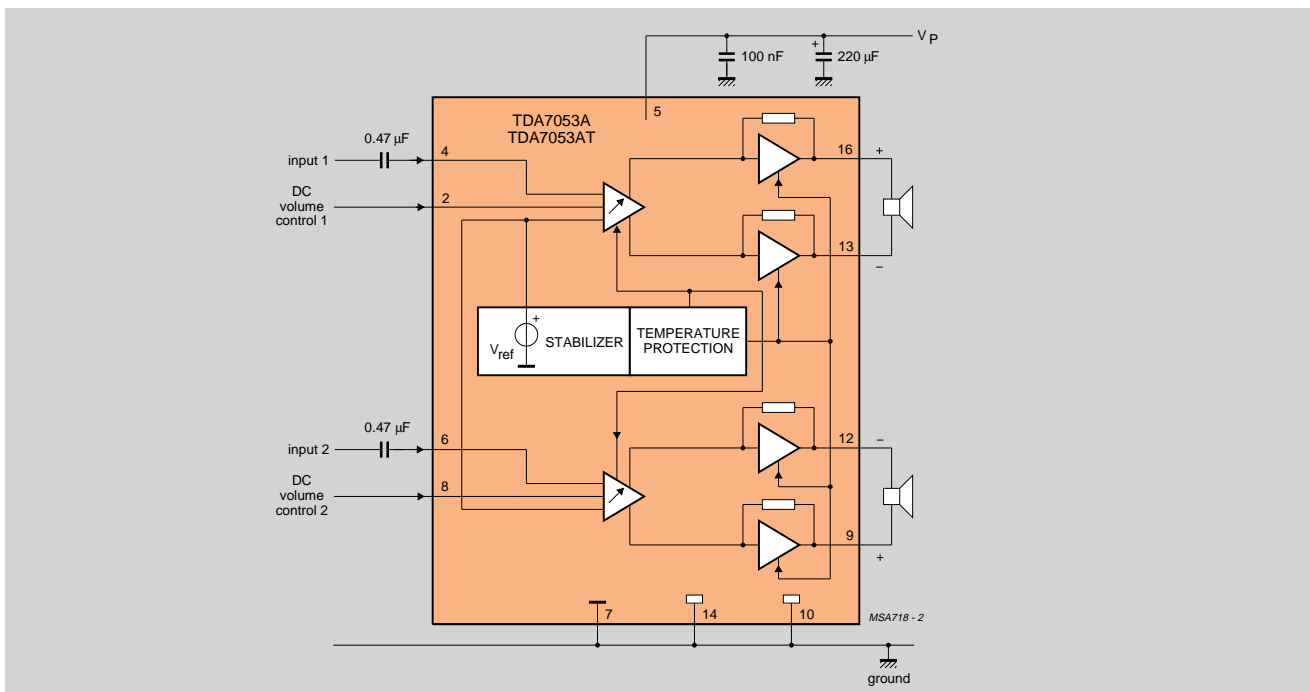
marily for battery-powered portable recorders, radios and telephones, their wide supply voltage range (4.5 V to 18 V) also makes them suitable for multimedia and TV applications.

The amplifiers have built-in DC volume control with a logarithmic characteristic providing control over a typical range of 73 dB. When the DC control voltage drops below 0.4 V, the amplifier is muted.

They come in a 16-pin plastic DIP (TDA7053A) or in a 16-pin small outline (SO) plastic package for surface mounting (TDA7053AT).

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| TDA7053A | | |
| 2 × 1 | 6 | 8 |
| 2 × 2 | 12 | 32 |
| TDA7053AT | | |
| 2 × 0.5 | 6 | 16 |



TDA7056/TDA7057Q

3 W/2 × 3 W BTL amplifiers

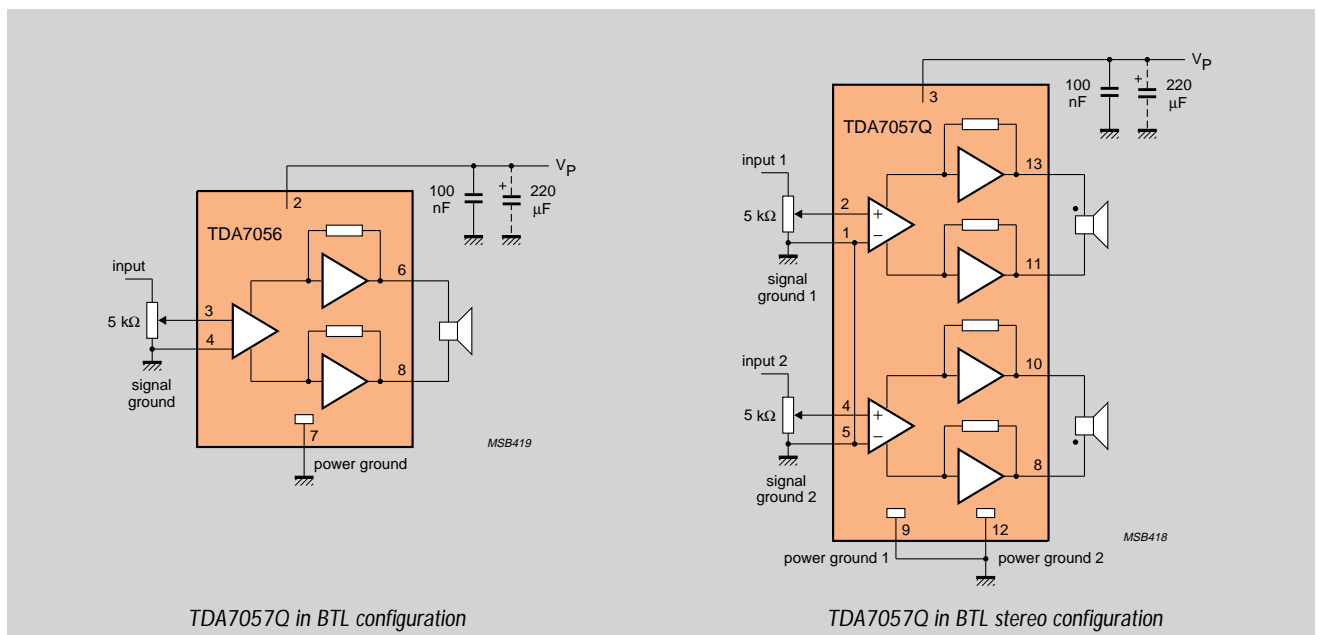
- No external components required
- Excellent overall stability
- Output protected against short-circuit
- Low power consumption
- No switch-on or switch-off clicks
- Supply voltage range of 3 V to 18 V
- Fixed closed-loop voltage gain of 39 dB
(11 V supply, 16 Ω load)

These BTL amplifiers are primarily for battery-powered portables. However, their wide supply voltage range (3 V to 18 V) also makes them suitable for mains-powered applications such as TV.

The TDA7056 comes in a 9-pin plastic SIL medium-power package. The TDA7057Q comes in a 13-pin plastic SIL power package with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|-------------------|--------------------|--------------------|
| TDA7056 3 | 11 | 16 |
| TDA7057Q 2 × 3 | 11 | 16 |



TDA7056A/TDA7056B

5 W BTL amplifiers with DC volume control

3

- No external components required
- Excellent overall stability
- Output protected against short-circuit to V_P , ground or across load
- Low power consumption
- No switch-on/switch-off clicks
- DC volume control
- Mute mode
- Thermal protection
- Low HF radiation
- All pins ESD protected

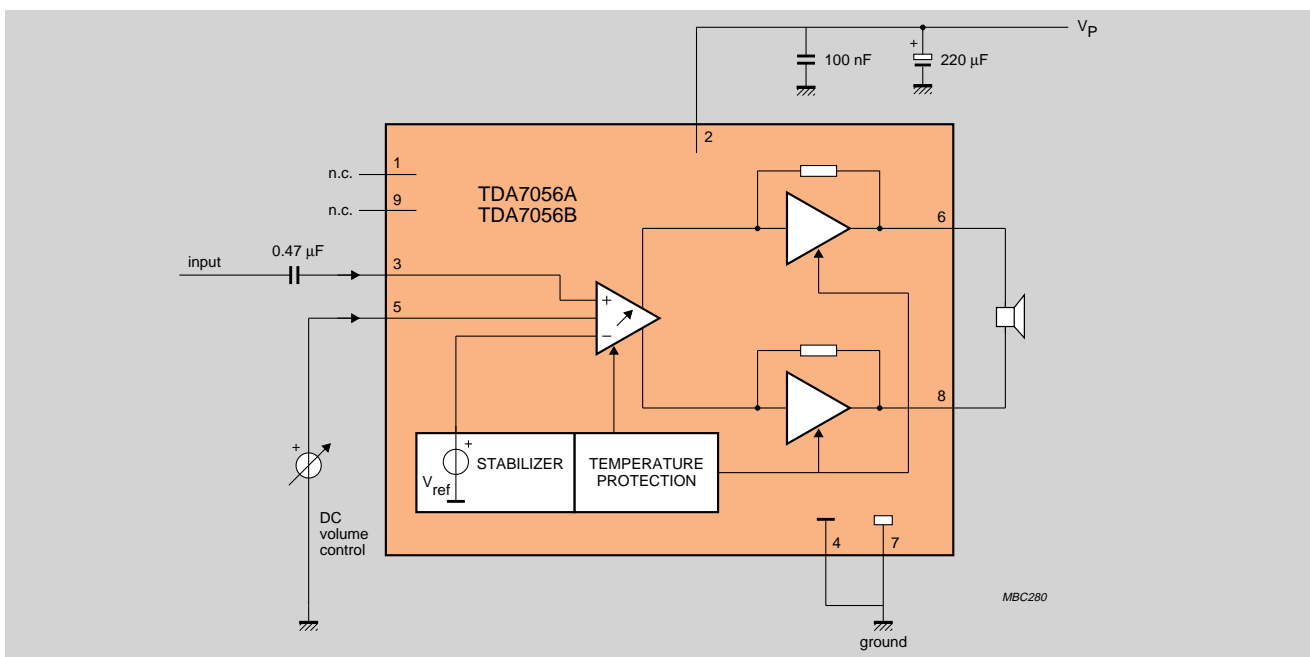
These BTL amplifiers are primarily for battery-powered portables. However, their wide supply voltage range (4.5 V to 18 V) also makes them suitable for mains-powered applications such as multimedia and TV. They have fixed voltage gain of 36 dB for the A version, and 40 dB for the B version.

The amplifiers have built-in DC volume control with a logarithmic characteristic providing control over a typical range of 80 dB (73 dB B version). When the DC control voltage drops below 0.3 V (0.4 V B version), the amplifier is muted.

Both ICs come in a 9-pin plastic SIL package.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| Both ICs | 12 | 16 |
| TDA7056A | 12 | 8 |
| TDA7056B | 12 | 8 |



TDA7057AQ

2 × 5 W BTL amplifier with DC volume control

- No external components required
- Excellent overall stability
- Output protected against short-circuit to V_P , ground or across load
- Low power consumption
- No switch-on/switch-off clicks
- DC volume control
- Mute mode
- Thermal protection
- Low HF radiation
- All pins ESD protected

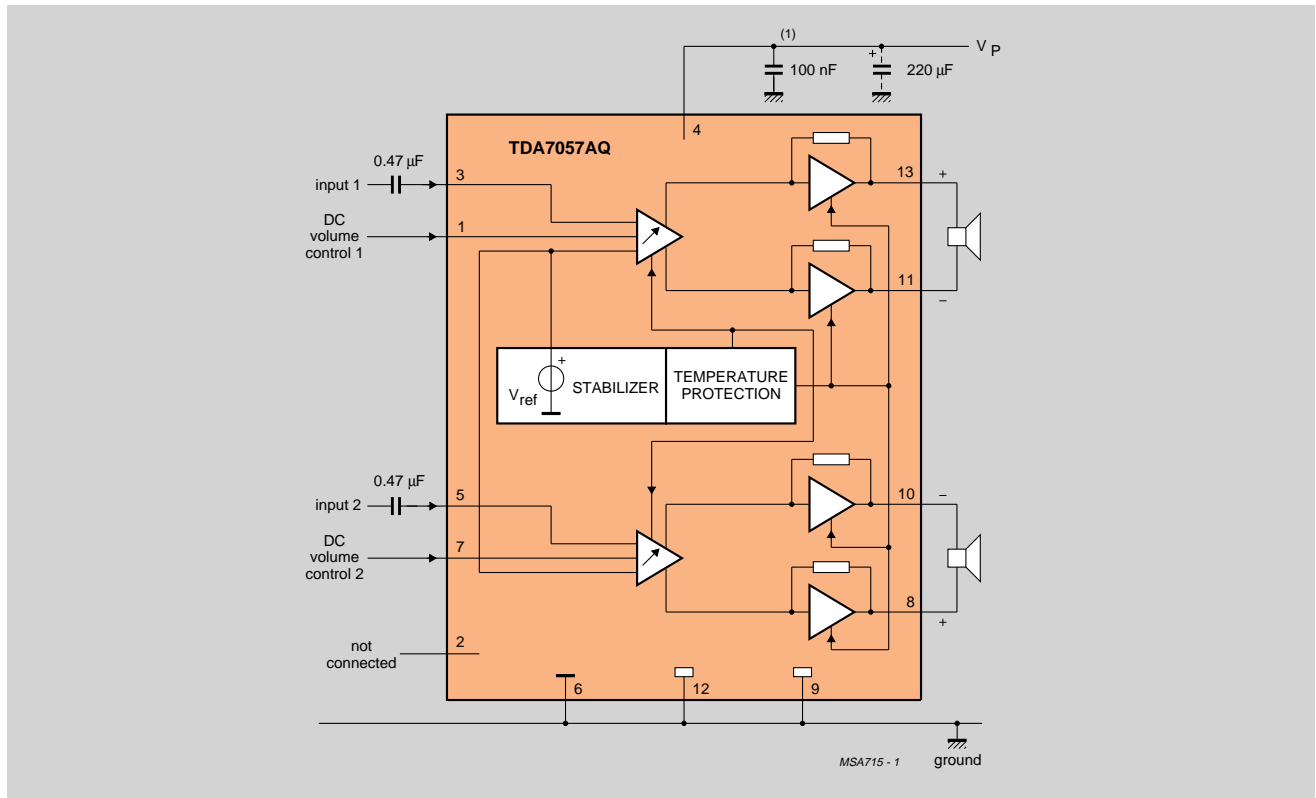
The amplifier has built-in DC volume control with a logarithmic characteristic providing control over a typical range of 73 dB. When the DC control voltage drops below 0.4 V, the amplifier is muted.

The IC comes in a 13-pin plastic SIL package with the leads bent to DIL format.

This BTL amplifier is a stereo version of the TDA7056B. Although primarily for battery-powered portables, its wide supply voltage range (4.5 V to 18 V) also makes them suitable for mains-powered applications such as multimedia and TV. It has a fixed voltage gain of 40 dB.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 2 × 3.5 | 12 | 16 |
| 2 × 5.0 | 12 | 8 |



TDA8541/TDA8541T

1 W BTL amplifiers

- Few external components required
- Low saturation voltage of output stage
- Gain settable with external resistors
- Standby mode controllable by CMOS-compatible levels
- Low standby current
- No switch-on/switch-off clicks
- High supply-voltage ripple rejection
- Thermal protection
- Outputs short-circuit safe to ground, V_{CC} and across load
- All pins ESD protected

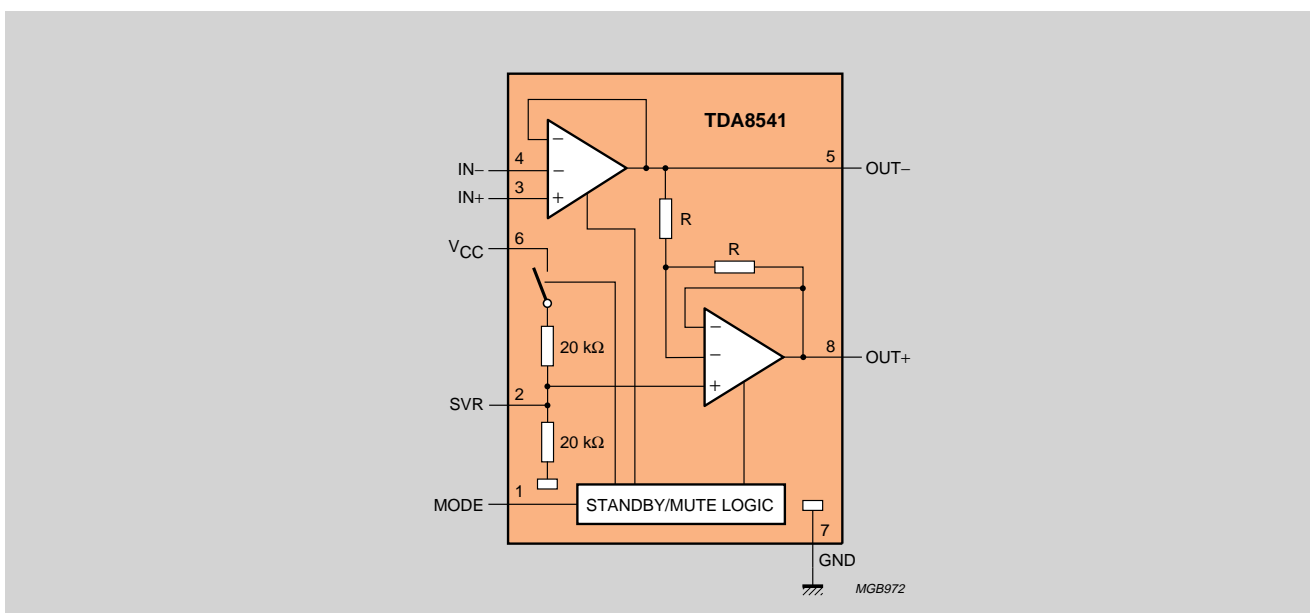
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These amplifiers make use of the bridge-tied load (BTL) principle to achieve low-voltage operation without sacrifice of output power. They are therefore primarily for battery-powered applications such as portable recorders and radios and cellular telephones. However, their wide supply voltage range (2.2 V to 18 V) also makes them suitable for mains powered applications such as multimedia PCs. The amplifiers also feature a standby/mute facility to avoid switch-on/switch-off clicks.

They come in an 8-pin plastic DIP (TDA8541) or in an 8-pin small outline (SO) plastic package for surface mounting (TDA8541T).

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 1 | 5 | 8 |



TDA8542/TDA8542T

2 × 1 W BTL amplifiers

- Few external components required
- Low saturation voltage of output stage
- Gain settable with external resistors
- Standby mode controllable by CMOS-compatible levels
- Low standby current
- No switch-on/switch-off clicks
- High supply-voltage ripple rejection
- Thermal protection
- Outputs short-circuit safe to ground, V_{CC} and across load
- All pins ESD protected

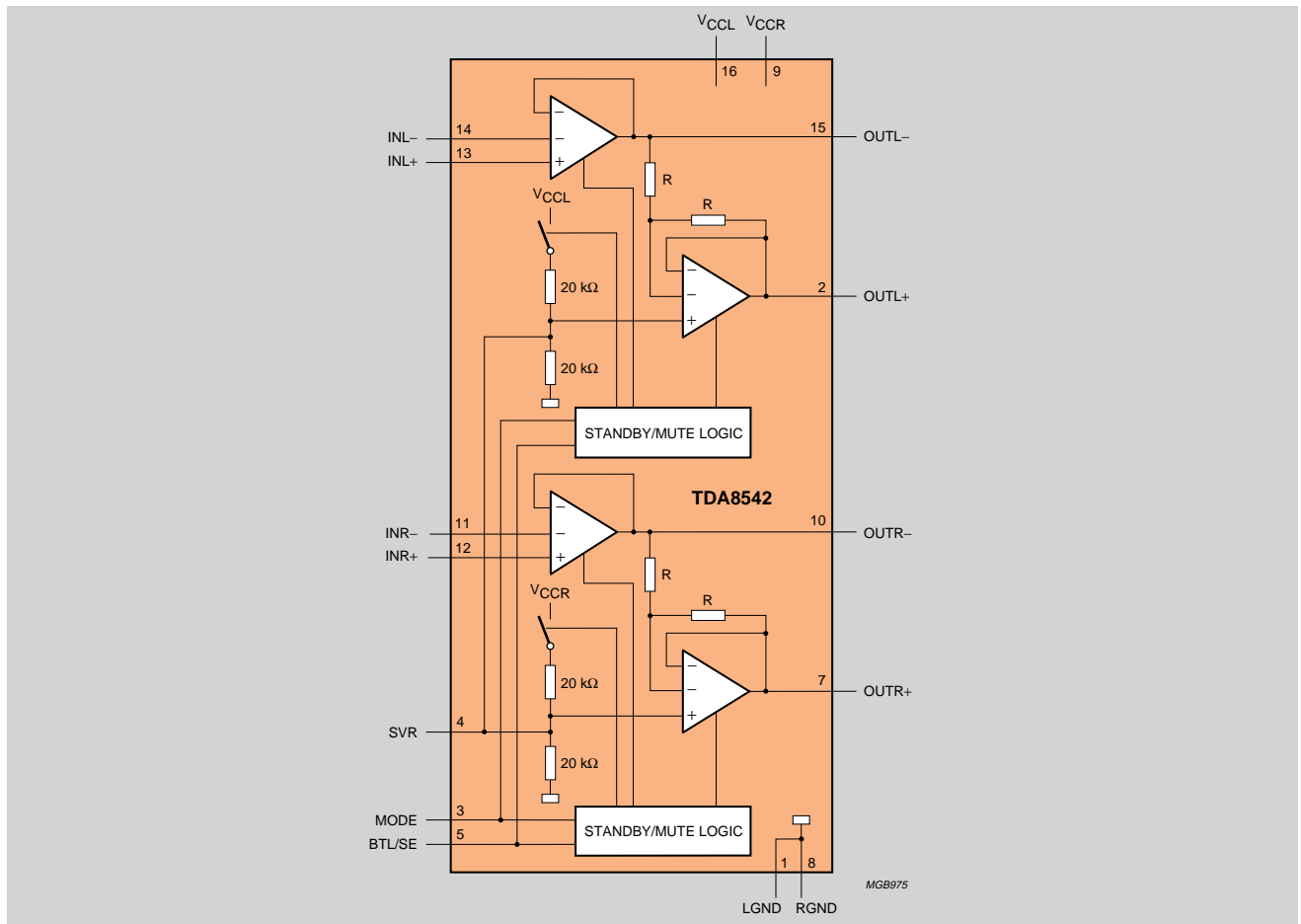
These amplifiers are stereo versions of the TDA8541/TDA8541T. They are primarily for battery-powered applications such as portable recorders and radios and cellular telephones. However, their wide supply voltage range (2.2 V to 18 V) also makes them suitable for mains powered applications such as multimedia PCs. The amplifiers also feature a standby/mute facility to avoid switch-on/switch-off clicks.

Besides audio applications, they are also suitable for use as electric motor drivers in, for example, CD servo systems.

The amplifiers come in a 16-pin plastic DIP (TDA8542) or in a 16-pin small outline (SO) plastic package for surface mounting (TDA8542T).

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 2 × 1 | 5 | 8 |



TDA8543/TDA8543T

2 W BTL amplifiers

3

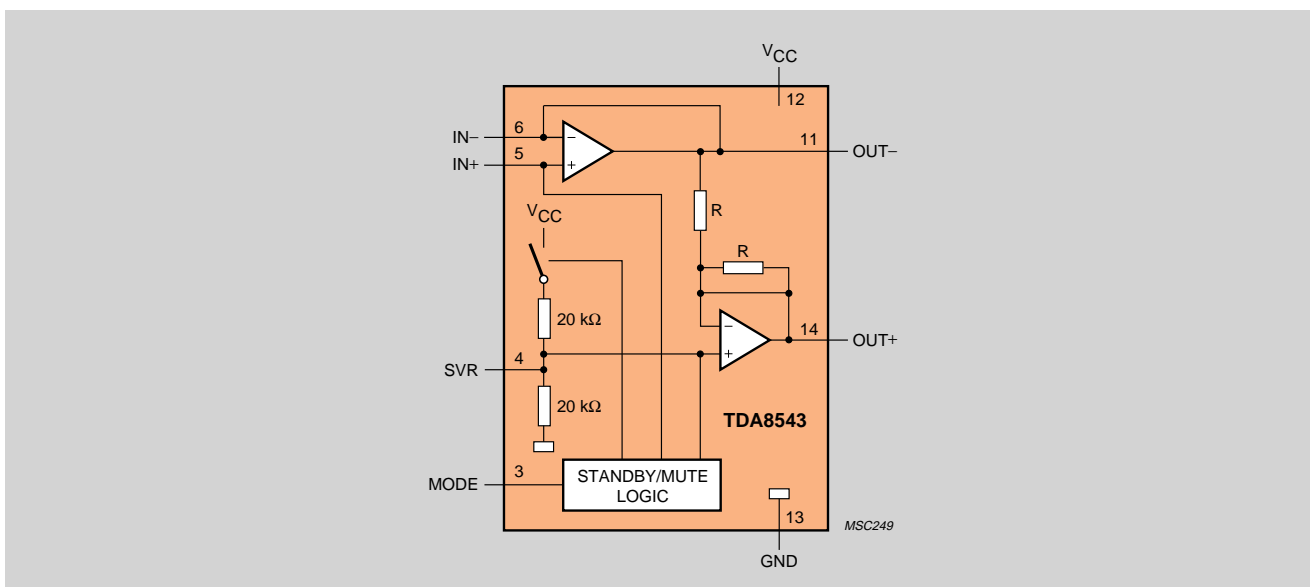
- Few external components required
- Low saturation voltage of output stage
- Gain settable with external resistors
- Standby mode controllable by CMOS-compatible levels
- Low standby current
- No switch-on/switch-off clicks
- High supply-voltage ripple rejection
- Thermal protection
- Outputs short-circuit safe to ground, V_{CC} and across load
- All pins ESD protected

These BTL amplifiers are primarily for battery-powered applications such as portable recorders and radios and cellular telephones. However, their wide supply voltage range (2.2 V to 18 V) also makes them suitable for mains powered applications such as multimedia PCs. The amplifiers also feature a standby/mute facility to avoid switch-on/switch-off clicks.

They come in a 16-pin plastic DIP (TDA8543) or in an 16-pin small outline (SO) plastic package for surface mounting (TDA8543T).

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 1 | 5 | 8 |
| 2 | 7.5 | 8 |
| 1.4 | 7.5 | 16 |
| 2 | 9 | 16 |
| 1.3 | 9 | 25 |



TDA8547/TDA8547T

2 × 1 W BTL amplifiers with independent channel standby selection

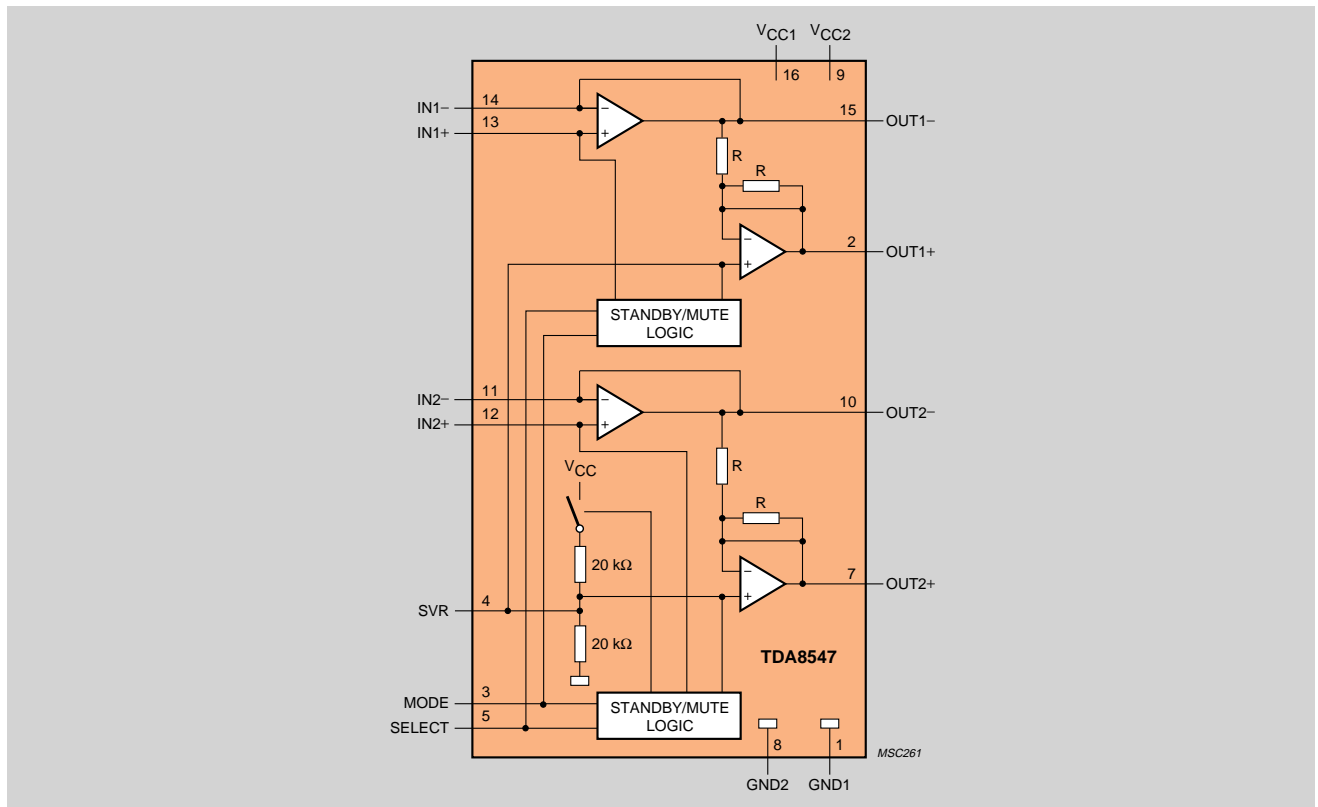
- Independent standby selection of output channels
- Few external components required
- Low saturation voltage of output stage
- Gain settable with external resistors
- Standby mode controllable by CMOS-compatible levels
- Low standby current
- No switch-on/switch-off clicks
- High supply-voltage ripple rejection
- Thermal protection
- Outputs short-circuit safe to ground, V_{CC} and across load
- All pins ESD protected

These BTL stereo amplifiers incorporate standby/mute logic that allows either one of the output channels to be switched into a standby condition. This feature can be used, for example, for loudspeaker selection. The amplifiers are primarily for battery-powered applications such as portable recorders and radios and cellular telephones. However, their wide supply voltage range (2.2 V to 18 V) also makes them suitable for mains powered applications such as multimedia PCs.

The amplifiers come in a 16-pin plastic DIP (TDA8547) or in a 16-pin small outline (SO) plastic package for surface mounting (TDA8547T).

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 2 × 1 | 5 | 8 |



TDA8551/TDA8551T

1 W BTL amplifiers with digital volume control

3

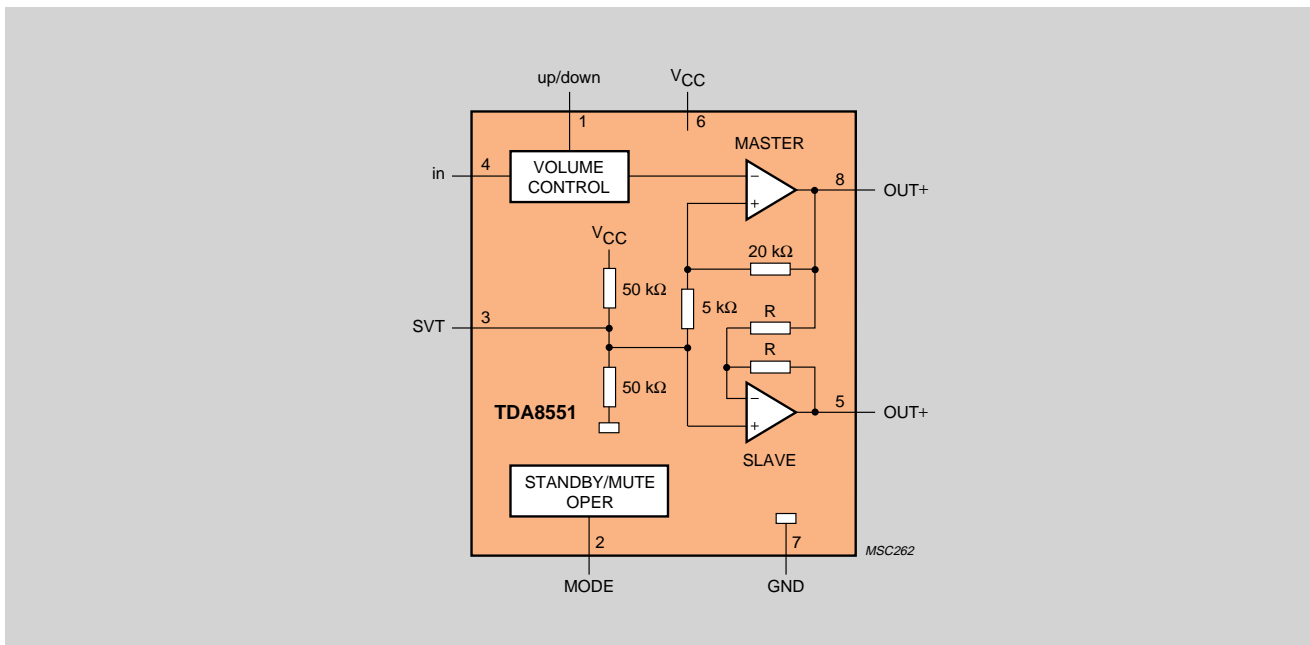
- One-pin digital volume control (volume setting with up/down pulses)
- Few external components required
- Low saturation voltage of output stage
- Standby mode controllable by CMOS-compatible levels
- Low standby current
- No switch-on/switch-off clicks
- High supply-voltage ripple rejection
- Thermal protection
- Outputs short-circuit safe to ground, V_{CC} and across load
- All pins ESD protected

These BTL mono amplifiers feature digital volume control and standby/mute logic. They are primarily for battery-powered applications such as portable recorders/radios and cellular telephones but they are also ideally suited for use in, for example, personal computers.

The amplifiers come in an 8-pin plastic DIP (TDA8551) or in an 8-pin small outline (SO) plastic package for surface mounting (TDA8551T).

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 1 | 5 | 8 |



TDA8558/TDA8558T

Low-voltage BTL mono amplifiers

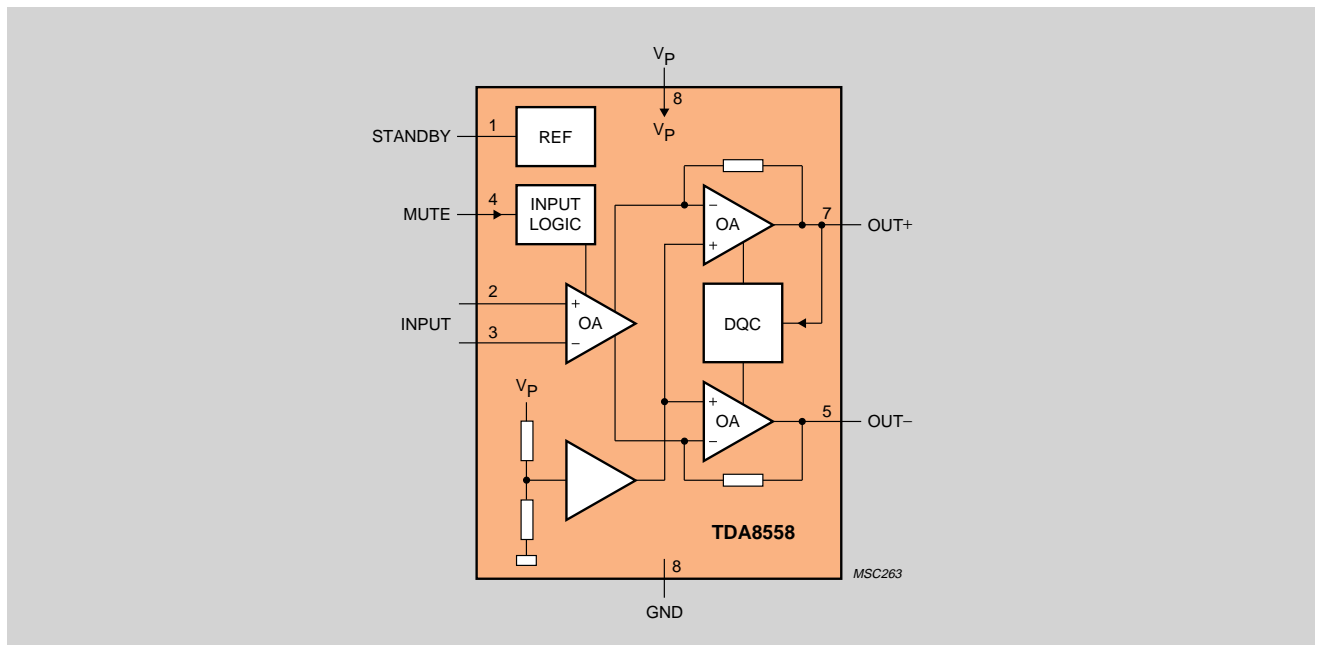
- Operating voltages down to 1.8 V
- Very low quiescent current
- Low distortion
- No external components required
- Differential inputs
- Standby mode
- No switch-on/switch-off clicks
- Outputs short-circuit safe to ground, V_{CC} and across load
- All pins ESD protected

These BTL mono amplifiers operate at voltages from as low as 1.8 V up to a maximum of 18 V. They also consume very little quiescent current. The amplifiers are therefore ideally suited to battery-powered applications (2×1.5 V cells) in, for example, cellular telephones and personal audio equipment. Moreover, a dynamic quiescent controller (DQC) feature automatically increases quiescent current at higher frequencies to minimize HF cross-over distortion. The amplifiers also feature a standby/mute facility to avoid switch-on/switch-off clicks.

They come in an 8-pin plastic DIP (TDA8558) or in an 8-pin small outline (SO) plastic package for surface mounting (TDA8558T).

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 0.125 | 3 | 25 |



TDA8559/TDA8559T

Low-voltage BTL stereo amplifiers

- Operating voltages down to 1.9 V
- Very low quiescent current
- Low distortion
- Few external components required
- Differential inputs
- Can be used as a mono amplifier in BTL or stereo single-ended (SE) mode
- SE mode without need of capacitor in series with the loudspeaker
- Mute and standby mode
- No switch-on/switch-off clicks
- Outputs short-circuit safe to ground, V_{CC} and across load
- All pins ESD protected

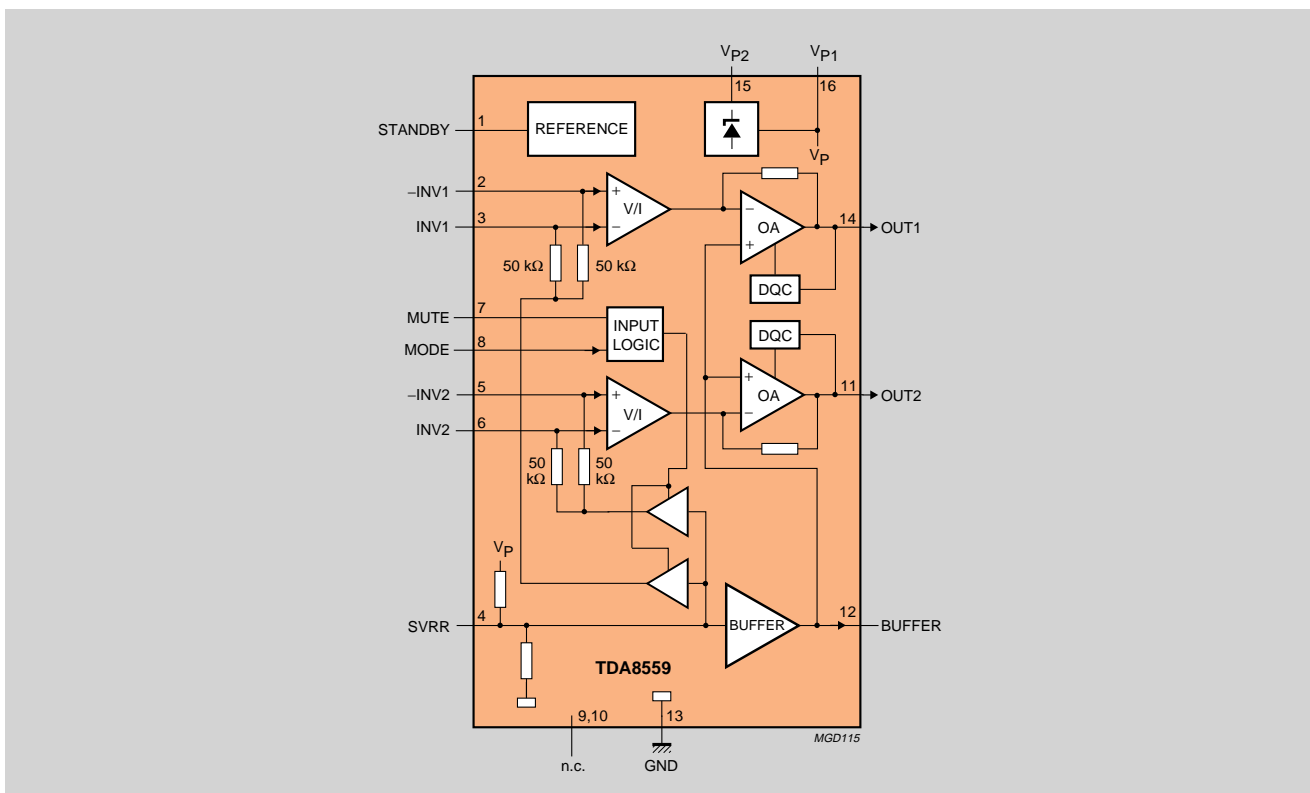
These BTL stereo amplifiers operate at voltages from as low as 1.9 V up to a maximum of 30 V and they consume very little quiescent current. The amplifiers are therefore ideally suited to

battery-powered applications (2×1.5 V cells) in, for example, personal audio equipment. They can also be used as a mono amplifier (e.g. in cellular phones) and as a line driver in mains-powered applications without need of any external components. A dynamic quiescent controller (DQC) feature automatically increases quiescent current at higher frequencies to minimize HF cross-over distortion. The amplifiers also feature a standby/mute facility to avoid switch-on/switch-off clicks.

They come in a 16-pin plastic DIP (TDA8559) or in a 16-pin small outline (SO) plastic package for surface mounting (TDA8559T).

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 0.035 | 3 | 32 |
| BTL mode | | |
| 0.140 | 3 | 25 |





CAR RADIOS/
POWER BOOSTERS

TDA1010A/TDA1020

Pre-amplifier plus 3.4 to 12 W power amplifier

- Separate pre-amplifier and power amplifier allows standby switching
- Low-cost of external components
- Good ripple rejection
- Thermal protection
- Output protected against AC short-circuit to ground
- Load dump protection allows the circuit to tolerate supply voltages as high as 45 V without damage
- High frequency limiting beyond the audible range in the pre-amplifier and power amplifier suppresses supply interference and ignition noise
- Standby switching feature with low current consumption (<1 mA)

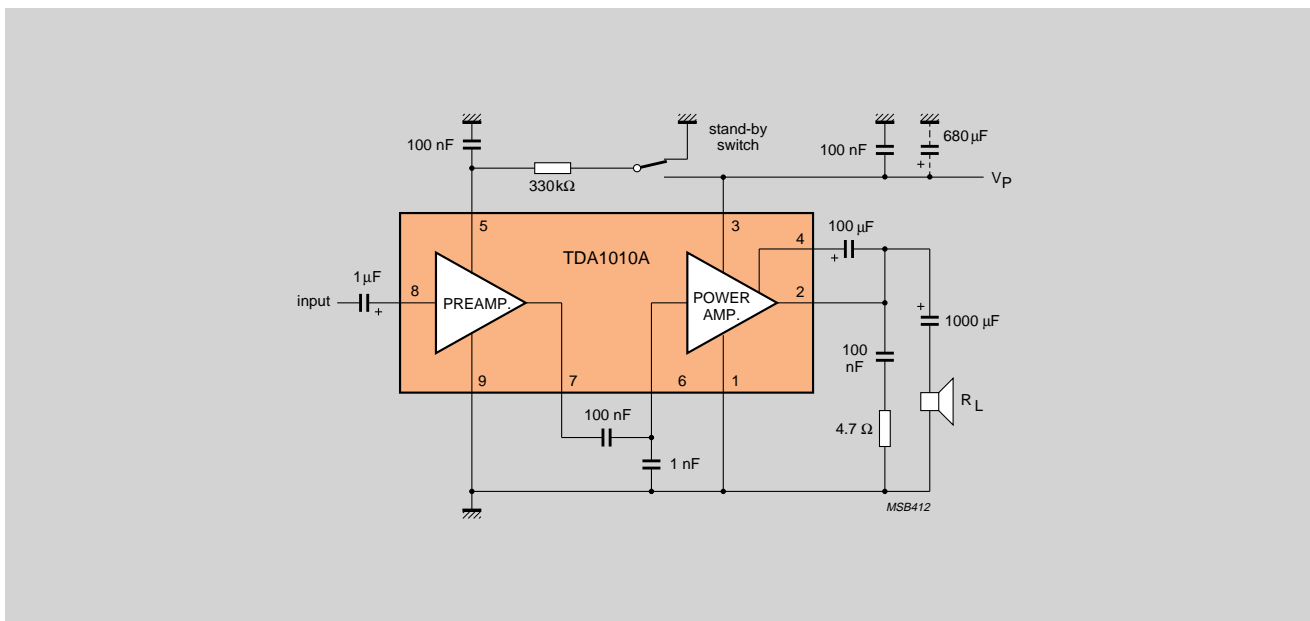
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Although these mono amplifiers are primarily for use in car radios, their wide supply voltage range (6 V to 24 V) also makes them attractive for mains-powered radios and tape recorders requiring output powers up to 12 W.

They come in a 9-pin plastic SIL medium-power packages for easy mounting.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|--|--------------------|-----------------------------|
| without bootstrap | | |
| 5.5 | 14.4 | 4 |
| with bootstrap capacitor (TDA1010A/1020) | | |
| 3.4 | 14.4 | 8 |
| 6.2 | 14.4 | 4 |
| 6.4/12 | 14.4 | 2 |
| with additional 220 Ω bootstrap resistor between pins 3 and 4 (TDA1010A only) | | |
| 9 | 14.4 | 2 |
| 10 | 18 | 2 |



TDA1510AQ/TDA1515BQ

24 W BTL or 2 × 12 W amplifiers

- Low offset voltage at output (<50 mV) – important for BTL
- Externally adjustable voltage gain range of 32 dB to 56 dB in BTL configuration and 26 dB to 50 dB in stereo configuration (14.4 V supply, 4 Ω load)
- High ripple rejection (50 dB at 1 kHz, $R_s = 0 \Omega$)
- Load dump and SOAR protection
- Protection against AC short-circuit from output to ground
- Thermal protection
- Internally limited bandwidth for rejection of HF interference
- Low standby current (<2 mA) to simplify switching
- Few external components needed

These class-B output amplifiers can be used in car audio systems to drive loads down to 1.6 Ω. They have externally adjustable voltage gain.

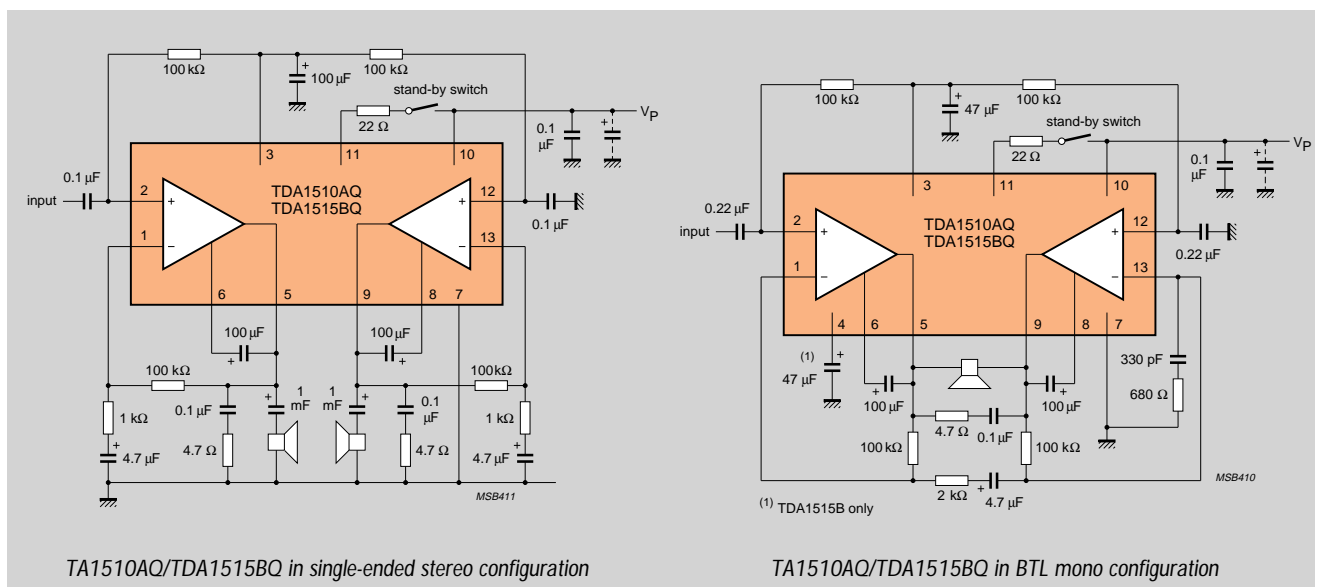
They come in 13-pin plastic SIL power packages with the pins bent to DIL format.

Additional features of the TDA1515BQ

- Low standby current (<100 μA) which allows switching via TTL circuitry
- Outputs protected against AC and DC short-circuit to ground
- Loudspeaker protection in BTL configuration
- Outputs protected against short-circuit to ground in BTL configuration
- Protected against reverse polarity supply voltage

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|-------------------------------------|--------------------|--------------------|
| mono BTL with bootstrap capacitors | 14.4 | 4 |
| stereo with bootstrap capacitors | 14.4 | 4 |
| 2 × 7 | 14.4 | 4 |
| 2 × 12 | 14.4 | 2 |
| stereo without bootstrap capacitors | 14.4 | 4 |
| 2 × 6 | 14.4 | 4 |



TA1510AQ/TDA1515BQ in single-ended stereo configuration

TA1510AQ/TDA1515BQ in BTL mono configuration

TDA1516BQ/TDA1516CQ/TDA1518BQ

24 W BTL or 2 × 12 W amplifiers

- No external components in BTL configuration
- Low offset voltage (100 mV) at output (250 mV for TDA1518BQ) – important for BTL
- Fixed closed-loop voltage gain (14.4 V supply, 4 Ω load) of 26 dB for BTL (TDA1516BQ and TDA1516CQ) and 20 dB for stereo (TDA1516BQ). The figures for the TDA1518BQ are 46 dB (BTL) and 40 dB (stereo)
- High supply voltage ripple rejection (48 dB between 100 Hz and 10 kHz, $R_s = 0 \Omega$)
- Load dump protection
- Output protected against AC and DC short-circuit to ground or supply rail
- Thermal protection
- Reverse polarity safe
- Standby feature with switch-on voltage of 0 V to 2 V at pin 11 and a switch-on current of only 12 μA to allow use of an inexpensive switch. The standby supply current is <100 μA. The voltage at pin 11 for normal operation is >8.5 V
- Mute facility with switch-on voltage of 3 V to 6.4 V at pin 11 to eliminate switch-on/switch-off clicks. The supply current in the muted condition is 40 mA

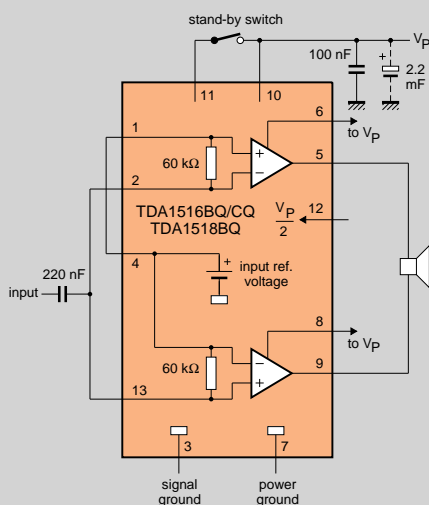
- Identical inputs (inverting and non-inverting)
- Few external components needed in stereo configuration

Like the TDA1510AQ/1515BQ these are car audio class-B power amplifiers but with internally fixed gain for excellent channel balance (within 1 dB). The three types are virtually identical except for their gain. The TDA1516CQ is identical to the TDA1516BQ except that it consumes very little current in short-circuit to ground condition (typically 5.5 mA) and is only suitable for operation in BTL mode.

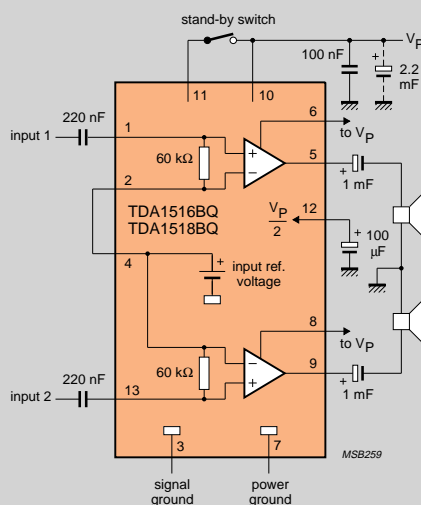
The ICs come in 13-pin plastic SIL power packages with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|--------------------------------|--------------------|--------------------|
| mono BTL with bootstrapping | 14.4 | 4 |
| mono BTL without bootstrapping | 14.4 | 4 |
| stereo with bootstrapping | 14.4 | 4 |
| 2 × 7 | 14.4 | 2 |
| stereo without bootstrapping | 14.4 | 4 |
| 2 × 6 | 14.4 | 4 |
| 2 × 11 | 14.4 | 2 |



TDA1516BQ/TDA1516CQ/TDA1518BQ in BTL mono configuration



TDA1516BQ/TDA1518BQ in single-ended stereo configuration

TDA1517(P)/TDA1519

2 × 6 W amplifiers

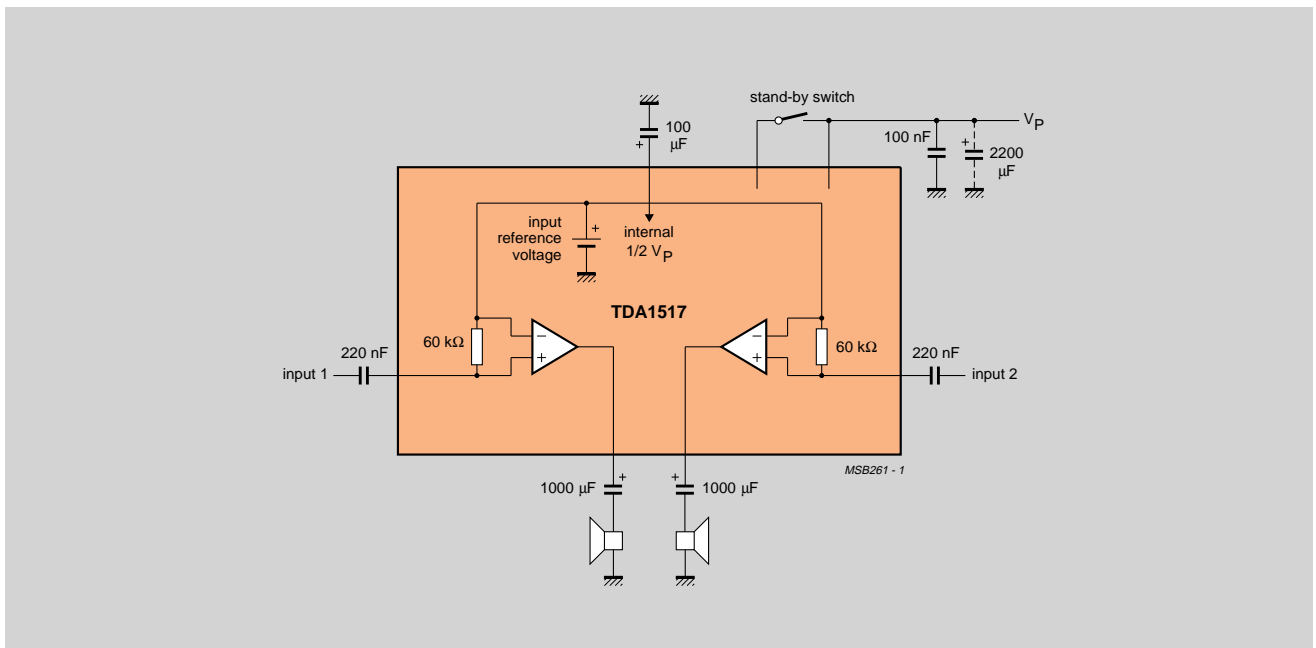
- Fixed closed-loop voltage gain of typically 20 dB for the TDA1517(P), 40 dB for the TDA1519 (14.4 V supply, 4 Ω load)
- Excellent channel balance (within 1 dB)
- High supply voltage ripple rejection (48 dB between 100 Hz and 10 kHz, $R_s = 0 \Omega$)
- Load dump protection
- Output protected against AC and DC short-circuit to ground or supply
- Thermal and SOAR protection
- Reverse polarity safe
- Protected against electrostatic discharge
- Few external components needed
- Standby feature with switch-on voltage of 0 V to 2 V at pin 8 and a switch-on current of only 12 μA to allow use of an inexpensive switch. The standby supply current is <100 μA. The voltage at pin 8 for normal operation is >8.5 V
- Mute facility with switch-on voltage of 3 V to 6.4 V at pin 8 to eliminate switch-on/switch-off clicks. The supply current in the muted condition is 40 mA

The TDA1517 and TDA1519 are stereo power amplifiers developed for use in car audio systems. They are virtually identical except for their gain.

The TDA1517 and TDA1519 come in 9-pin plastic SIL medium-power packages and the TDA1517P comes in an 18-pin DIP.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|--------------------|
| 2 × 6 | 14.4 | 4 |



TDA1519A/TDA1519B

22 W BTL or 2 × 11 W/12 W BTL or 2 × 6 W amplifiers

- No external components in BTL configuration
- Very few external components in stereo configuration
- Low offset voltage at output (250 mV) – important for BTL
- Fixed closed-loop voltage gain (14.4 V supply, 4 Ω load) of 46 dB for BTL and 40 dB for stereo
- High supply voltage ripple rejection (48 dB between 100 Hz and 10 kHz, $R_s = 0 \Omega$)
- Load dump protection
- Output protected against AC and DC short-circuit to ground or supply rail
- Thermal protection
- Reverse polarity safe
- Standby feature with switch-on voltage of 0 V to 2 V at pin 8 and a switch-on current of only 12 μA to allow use of an inexpensive switch. The standby supply current is <100 μA. The voltage at pin 8 for normal operation is >8.5 V

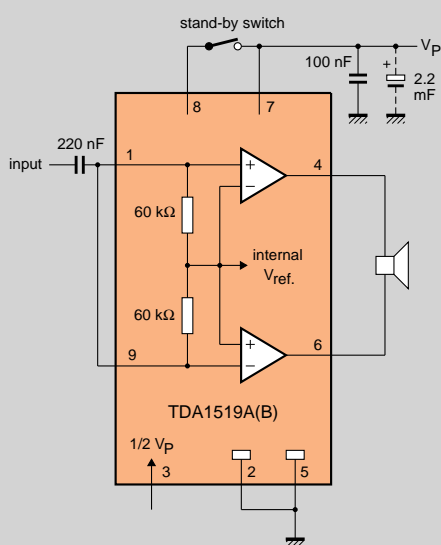
- Mute facility with switch-on voltage of 3.3 V to 6.4 V at pin 8 to eliminate switch-on/switch-off clicks. The supply current in the muted condition is 40 mA
- Identical inputs (inverting and non-inverting)

These are car audio class-B power amplifiers with internally fixed gain for excellent channel balance (within 1 dB). The two types are virtually identical except for their output power.

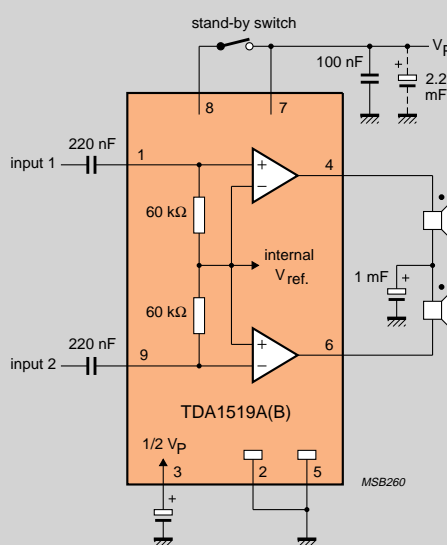
The TDA1519A comes in a 9-pin power plastic SIL package with or without the pins bent to DIL format. The TDA1519B comes in a 9-pin plastic medium-power SIL package.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|---------------------------|--------------------|--------------------|
| mono BTL (TDA1519A/1519B) | | |
| 22/12 | 14.4 | 4 |
| stereo (TDA1519A/1519B) | | |
| 2 × 11/6 | 14.4 | 4 |



TDA1519A(B) in BTL mono configuration



TDA1519A(B) in single-ended stereo configuration

TDA1552Q/TDA1553Q/CQ/TDA1557Q

2 × 22 W BTL amplifiers

- Very few external components
- Low offset voltage at output (150 mV; 250 mV for the TDA1557Q) – important for BTL
- Fixed closed-loop voltage gain (14.4 V supply, 4 Ω load) of 26 dB (46 dB for the TDA1557Q)
- High supply voltage ripple rejection (48 dB between 100 Hz and 10 kHz, $R_s = 0 \Omega$)
- Load dump protection
- Output protected against AC and DC short-circuit to ground or supply rail
- Low current consumption in short-circuit to ground condition (typ. 5.5 mA)
- Thermal protection
- Reverse polarity safe
- Standby feature with switch-on voltage of 0 V to 2 V at pin 11 and a switch-on current of only 25 μA to allow use of an inexpensive switch. The standby supply current is <100 μA. The voltage at pin 11 for normal operation is >8.5 V
- Mute facility with switch-on voltage of 3.3 V to 6.4 V at pin 11 to eliminate switch-on/switch-off clicks

- TDA1553CQ incorporates mute/standby/normal operation selection with CMOS-compatible switching levels
- Loudspeaker protection limits voltage across the associated loudspeaker to 1 V or less in the event any of the outputs being short-circuited to ground (TDA1553Q, TDA1553CQ and TDA1557Q)

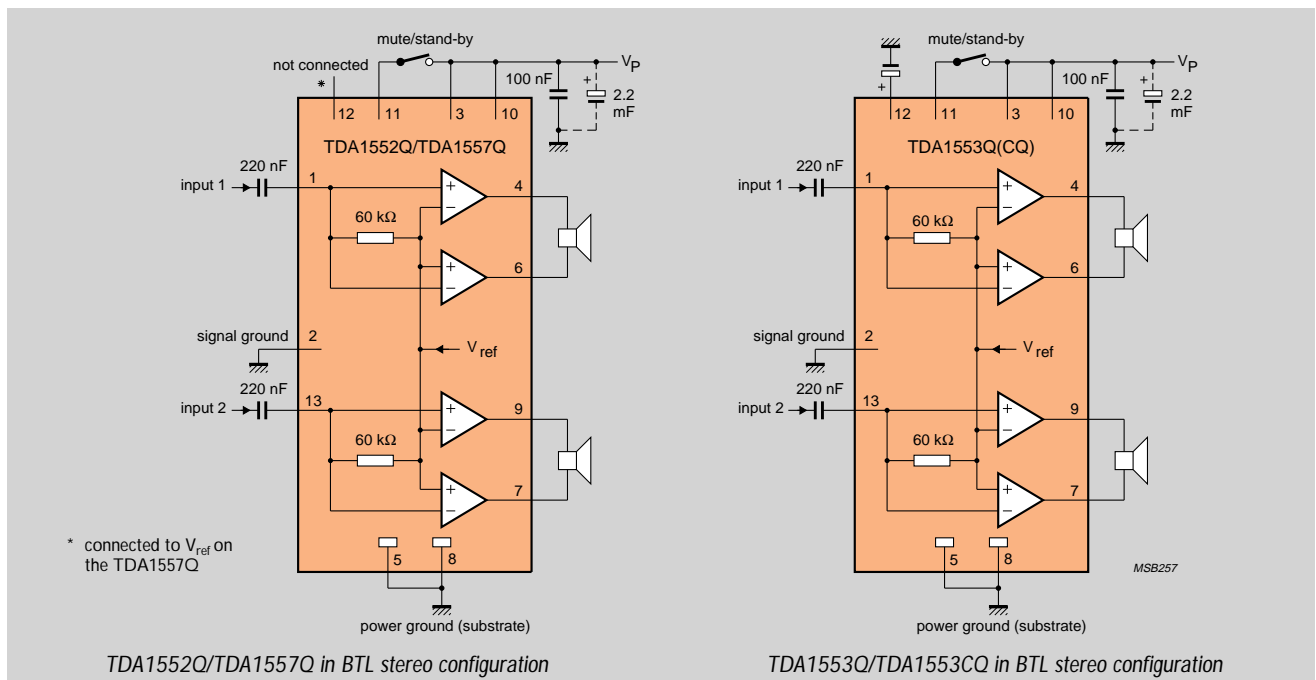
These are car audio class-B power amplifiers with internally fixed gain for excellent channel balance (within 1 dB). The four types are virtually identical except that the TDA1553Q, TDA1553CQ and TDA1557Q incorporate loudspeaker protection and that the TDA1557Q has a 20 dB higher gain.

They come in 13-pin plastic SIL power packages with the pins bent to DIL format.

4

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|--------------------|
| 2 × 22 | 14.4 | 4 |



TDA1554Q/TDA1555Q/TDA1558Q

2 × 22 W BTL or 4 × 11 W amplifiers

- Very few external components
- Low offset voltage at output (100 mV, 250 mV for the TDA1558Q) – important for BTL
- Fixed closed-loop voltage gain (14.4 V supply, 4 Ω load) of 20 dB (26 dB in BTL), 40 dB (46 dB in BTL) for the TDA1558Q
- High supply voltage ripple rejection (48 dB between 100 Hz and 10 kHz, $R_s = 0 \Omega$)
- Load dump protection
- Output protected against AC and DC short-circuit to ground or supply rail
- Thermal protection
- Reverse polarity safe
- Standby feature with switch-on voltage of 0 V to 2 V at pin 14 and a switch-on current of only 12 μA to allow use of an inexpensive-pensive switch. The standby supply current is >100 μA. The voltage at pin 14 for normal operation is >8.5 V
- Mute facility with switch-on voltage of 3.3 V to 6.4 V at pin 14 to eliminate switch-on/switch-off clicks

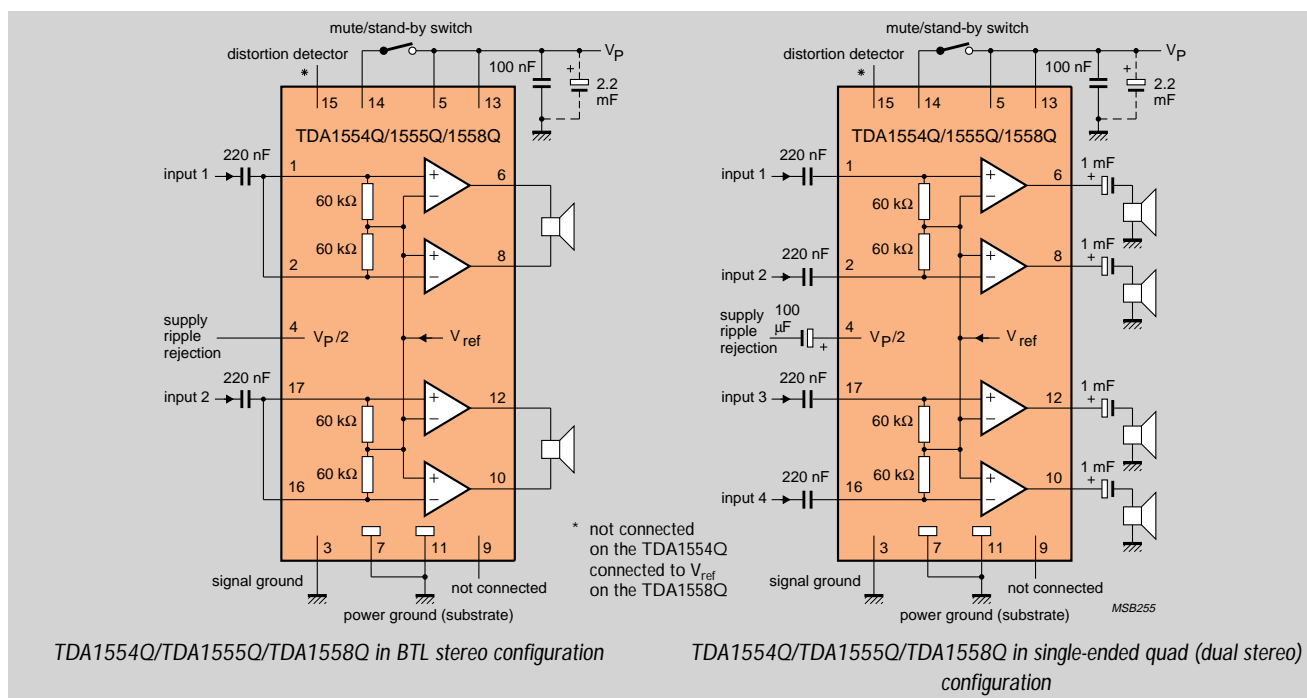
- Identical inputs (inverting and non-inverting)
- Distortion detector senses output clipping and for clip distortion of 3.5% it supplies a current of 50 μA typical for reducing the drive via a sound processor or DC volume control (TDA1555Q only)

These are class-B power amplifiers with internally fixed gain for excellent channel balance (within 1 dB). They are for BTL stereo or quad (front and rear stereo) car audio applications. The three types are virtually identical except that the TDA1555Q incorporates distortion detection, and the TDA1558Q has 20 dB higher gain.

They come in 17-pin plastic SIL power packages with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|--------------------|
| BTL stereo | | |
| 2 × 22 | 14.4 | 4 |
| quad | | |
| 4 × 11 | 14.4 | 2 |
| 4 × 6 | 14.4 | 4 |



TDA1556Q

2 × 22 W BTL amplifier with differential inputs

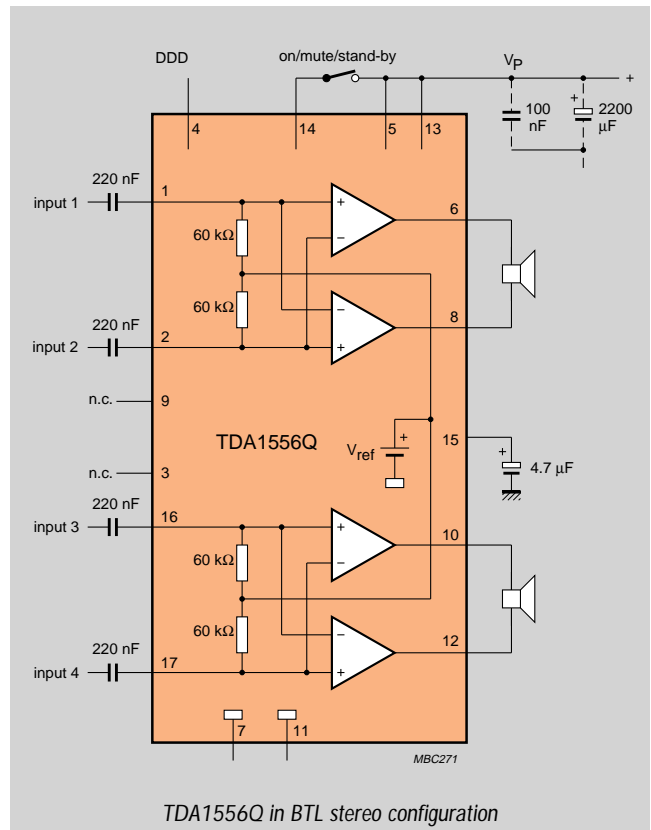
- Very few external components
- Differential inputs
- High CMRR (>64 dB)
- High supply voltage ripple rejection (48 dB between 100 Hz and 10 kHz, $R_s = 0 \Omega$)
- Low offset voltage at output (150 mV) – important for BTL
- Fixed closed-loop voltage gain (14.4 V supply, 4 Ω load) of 26 dB
- Load dump protection
- Thermal protection
- Outputs protected against AC and DC short-circuit to ground, supply rail or across load
- Low current consumption in short-circuit to ground condition (5.5 mA)
- Reverse polarity safe
- Loudspeaker protection limits voltage across the associated loudspeaker to 1 V or less in the event any of the outputs being short-circuited to ground
- Standby feature with switch-on voltage of 0 V to 2 V at pin 14 and a switch-on current of only 25 μA to allow use of an inexpensive switch. The standby supply current is <100 μA . The voltage at pin 14 for normal operation is >8.5 V
- Mute facility with switch-on voltage of 3.3 V to 6.4 V at pin 14 to eliminate switch-on/switch-off clicks
- Distortion detector senses output clipping. It provides 50 μA typical for a clip distortion of 3.5% to reduce input drive via a sound processor or DC volume control

This is a class-B power amplifier with internally fixed gain for excellent channel balance (within 1 dB). The amplifier has two differential input stages with high Common Mode Ripple Rejection (CMRR) which makes it very attractive for car radio booster applications. The TDA1556Q also incorporates a Dynamic Distortion Detector (DDD) and loudspeaker protection.

It comes in a 17-pin plastic SIL power package with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 2 × 22 | 14.4 | 4 |



TDA1560Q

40 W BTL class-H amplifier

- Few external components
- Very high output power
- Low power dissipation when reproducing music
- Fixed closed-loop voltage gain (14.4 V supply, 8 Ω load) of 30 dB
- High supply voltage ripple rejection of 55 dB over the frequency range 100 Hz to 10 kHz, $R_s = 0 \Omega$
- Switches to low output power if the heatsink overheats
- Low crossover distortion
- No switch-on/off clicks
- Thermal protection
- Mode switch for standby (0 to 1.2 V)/mute (2.6 to 3.5 V)/class-B (4.5 to 7 V)/class-H (8.5 V to V_p) operation. Maximum switch current is only 20 μA to allow use of an inexpensive-pensive switch
- Low offset voltage at the output – important for BTL
- Load dump protection
- Load short-circuit safe to ground or V_p

- Pins protected against ESD
- Thermal protection

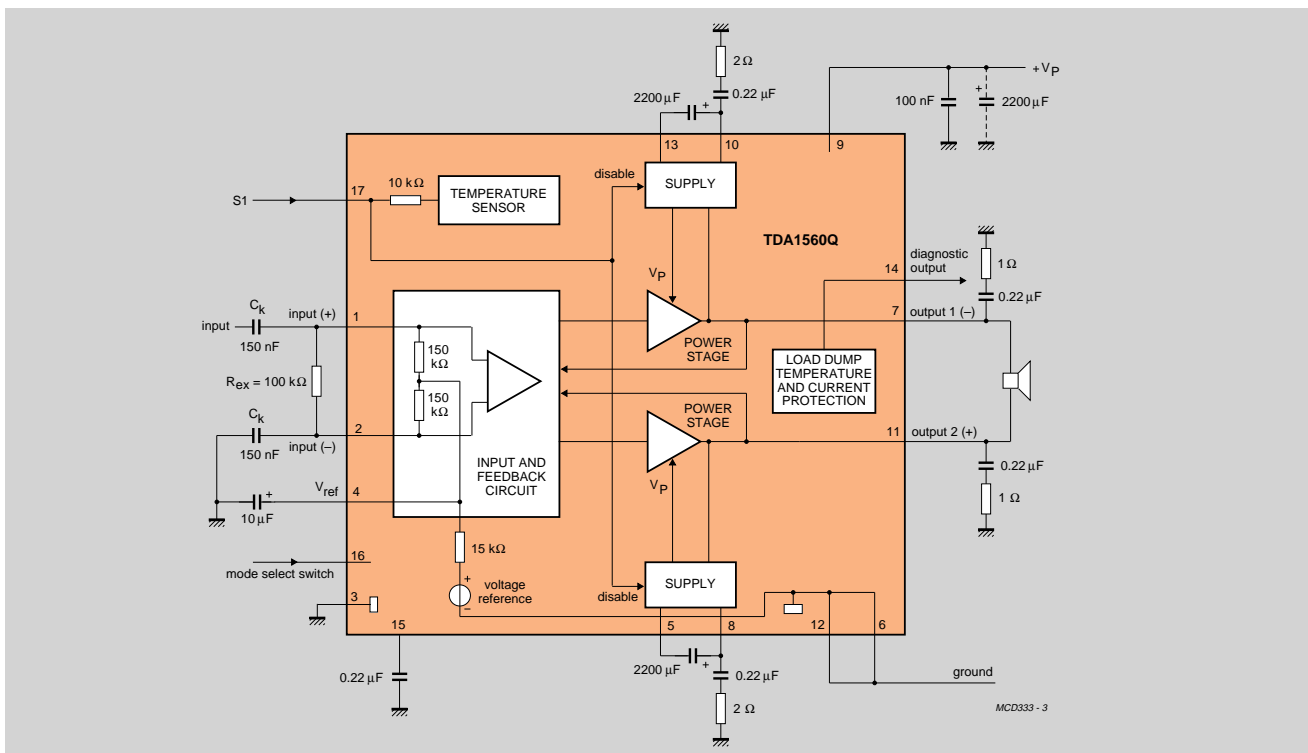
Primarily for car audio applications, this IC uses class-H amplifier techniques so that, with a 14.4 V supply and minimal heatsinking, it can deliver 40 W into an 8 Ω load. For the first time, this allows a 4 × 40 W car radio to be assembled in a standard DIN-sized car radio case.

Below 10 W the IC acts as a normal BTL amplifier. At higher outputs, the internal supply voltage is doubled by adding the charge stored on external capacitors. This allows the power output to increase to 40 W.

The amplifier comes in a 17-pin plastic SIL power package with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|--------------------|
| 17 | 14.4 | 4 |
| 40 | 14.4 | 8 |



TDA1561Q

2 × 23 W high efficiency power amplifier

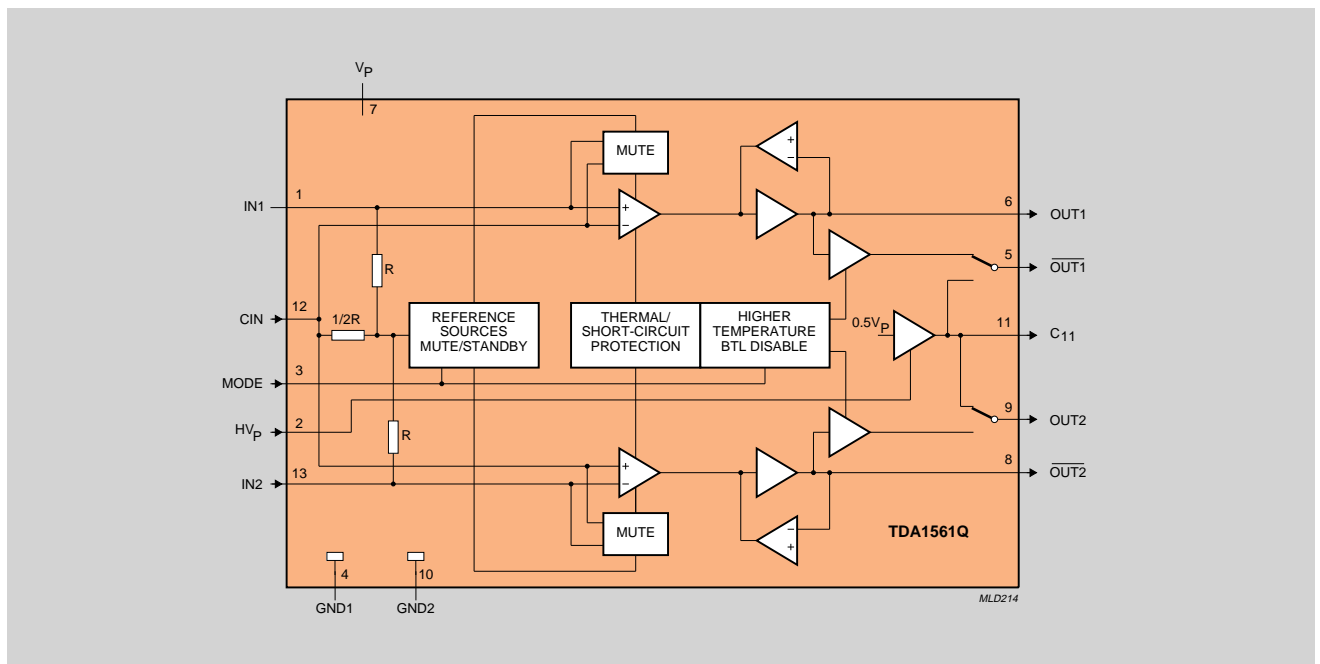
- Low power dissipation since the amplifier switches from SE mode into BTL mode only when receiving high-amplitude signals
- High common-mode rejection ratio
- Mute/standby/BTL-disable switch (mode select pin)
- Zero-crossing mute
- Load dump protection
- Short-circuit safe to ground, V_p and across load
- Loudspeaker protection
- Automatically switches to SE mode at excessive crystal temperature
- Thermal protection

This power amplifier normally operates in low-power single-ended mode and switches to high-power BTL mode only when large amplitude signals are received from the preamplifier. The TDA1561Q therefore dissipates only about 55% of the power dissipated by a conventional power amplifier (measured at average maximum music power) which means heatsinks can be smaller. Primarily for car audio applications, the amplifier is also ideal for multimedia systems and active loudspeakers.

The TDA1561Q comes in a 13-pin plastic SIL power package with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 2 × 23 | 14.4 | 4 |



TDA8560Q/TDA8563Q/TDA8563AQ

2 × 40 W BTL amplifiers

- Very few external components
- High supply voltage ripple rejection (>50 dB between 100 Hz and 10 kHz, $R_s = 0 \Omega$)
- Low offset voltage (150 mV) at output (200 mV for TDA8560Q) – important for BTL
- Fixed closed-loop voltage gain (14.4 V supply, 4 Ω load) of 26 dB (TDA8563Q/TDA8563AQ) or 40 dB (TDA8560Q)
- Load dump protection
- Thermal protection
- Outputs protected against AC and DC short-circuit to ground, supply rail or across load
- Low current consumption in short-circuit to ground condition
- Reverse polarity safe
- Standby feature with switch-on voltage of 0 V to 2 V at pin 11 and a switch-on current of only 15 μA to allow use of an inexpensive switch. The standby supply current is <100 μA . The voltage at pin 11 for normal operation is >8.5 V
- Mute facility with switch-on voltage of 3.3 V to 6.4 V at pin 11 to eliminate switch-on/switch-off clicks
- Diagnostic facility senses distortion, load short-circuit and temperature
- Pins protected against ESD
- Low thermal resistance

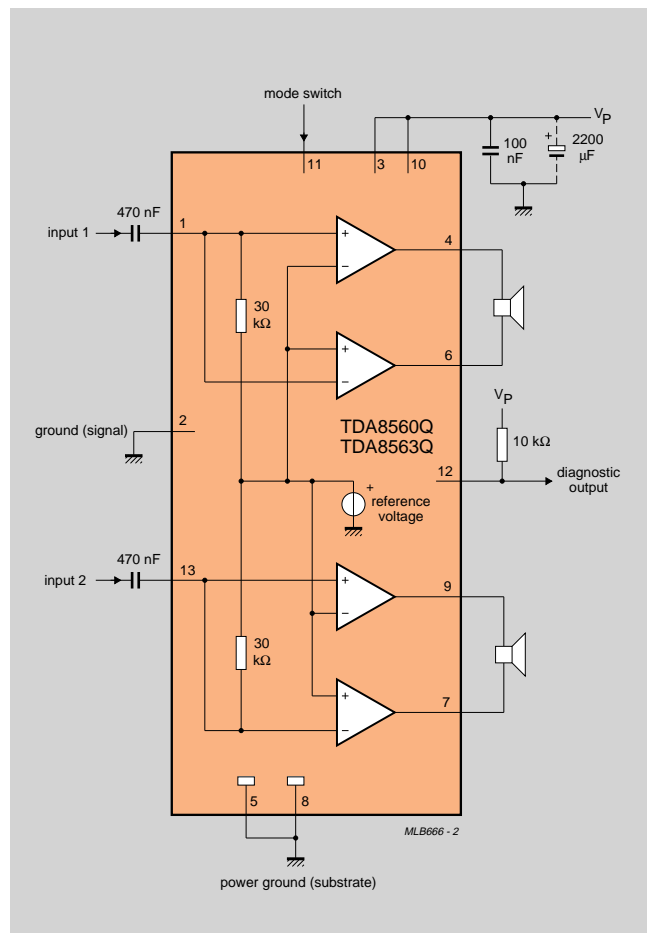
These are class-B power amplifiers with internally-fixed voltage gain for excellent channel balance (within 1 dB). They are primarily for car audio applications. The amplifiers are distinguishable by their closed-loop voltage gain. The gain of the TDA8560Q is 40 dB, and that of the TDA8563Q and TDA8563AQ is 26 dB.

A diagnostic facility senses distortion, load short-circuit and temperature. At onset of distortion (10% THD in the TDA8560Q/TDA8563Q, 2.5% THD in the TDA8563AQ) or temperature >150 °C, the diagnostic output signal can be used to reduce the input drive via a sound processor or DC volume control. For load short-circuit or output short-circuit to ground or supply, the outputs are switched-off until the short-circuit is removed.

The amplifiers come in 13-pin plastic SIL power packages with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 2 × 21 | 13.2 | 4 |
| 2 × 25 | 14.4 | 4 |
| 2 × 35 | 13.2 | 2 |
| 2 × 40 | 14.4 | 2 |



TDA8561Q/TDA8564Q

2 × 24 W BTL or 4 × 12 W amplifiers

- Very few external components
- Low offset voltage (150 mV) at output (250 mV for TDA8564Q) – important for BTL
- High supply voltage ripple rejection (>48 dB between 100 Hz and 10 kHz, $R_s = 0 \Omega$)
- Load dump protection
- Output protected against AC and DC short-circuit to ground or supply rail
- Low current consumption (40 mA) during any short-circuit condition
- Thermal protection
- Reverse polarity safe
- Standby feature with switch-on voltage of 0 V to 2 V at pin 14 and a switch-on current of only 12 μ A to allow use of an inexpensive-pensive switch. The standby supply current is >100 μ A. The voltage at pin 14 for normal operation is >8.5 V
- Mute facility with switch-on voltage of 3.3 V to 6.4 V at pin 14 to eliminate switch-on/switch-off clicks
- Identical inputs (inverting and non-inverting)
- Diagnostic facility senses distortion, load short-circuit and temperature
- Pins protected against ESD
- Low thermal resistance

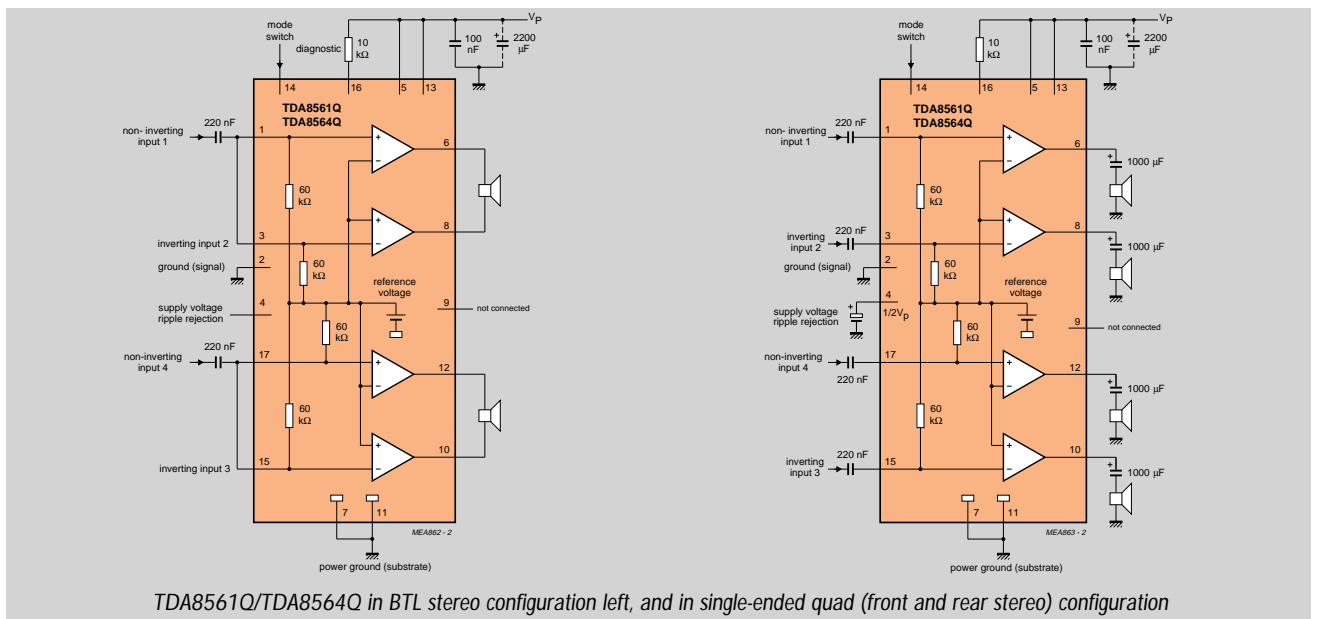
These are class-B power amplifiers with internally-fixed gain for excellent channel balance (within 1 dB). They are for BTL stereo or quad (front and rear stereo) car audio applications. The two types are identical except that the TDA8561Q has a fixed closed-loop voltage gain of 26 dB (BTL)/20 dB (single-ended) whereas that of the TDA8564Q 46 dB (BTL) and 40 dB (single-ended).

A diagnostic facility senses distortion, load short-circuit and temperature. At onset of distortion or temperature >150 °C, the diagnostic output signal can be used to reduce the input drive via a sound processor or DC volume control. For load short-circuit or output short-circuit to ground or supply, the outputs are switched-off until the short-circuit is removed.

The amplifiers come in 17-pin plastic SIL power packages with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| BTL stereo | | |
| 2 × 24 | 14.4 | 4 |
| quad | | |
| 4 × 7 | 14.4 | 4 |
| 4 × 12 | 14.4 | 2 |



TDA8562Q/TDA8565Q

4 × 12 W single-ended amplifier

- Very few external components
- High supply voltage ripple rejection (>48 dB between 100 Hz and 10 kHz, $R_s = 0 \Omega$)
- Load dump protection
- Output protected against AC and DC short-circuit to ground or supply rail
- Low current consumption (40 mA) during any short-circuit condition
- Identical inputs
- Thermal protection
- Reverse polarity safe
- Standby feature with switch-on voltage of 0 V to 2 V at pin 8 and a switch-on current of only 12 μ A to allow use of an inexpensive switch. The standby supply current is <100 μ A. The voltage at pin 8 for normal operation is >8.5 V
- Mute facility to eliminate switch-on/switch-off clicks
- Diagnostic facility for sensing distortion, short-circuit and temperature
- Pins protected against ESD
- Low thermal resistance

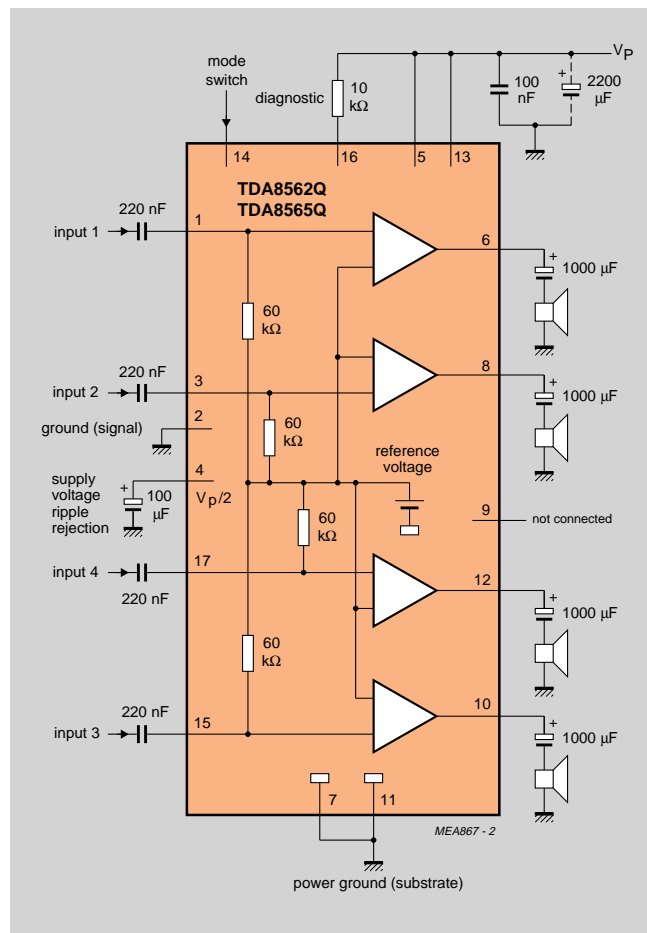
These are car audio class-B power amplifiers with internally fixed gain for excellent channel balance (within 1 dB). They are for quad (front and rear stereo) car audio applications. The two types are identical except that the TDA8562Q has a fixed closed-loop voltage gain of 20 dB, whilst that of the TDA8565Q is 20 dB higher.

A diagnostic facility senses distortion, load short-circuit and temperature. At onset of distortion or temperature >150 °C, the diagnostic output signal can be used to reduce the input drive via a sound processor or DC volume control. For load short-circuit or output short-circuit to ground or supply, the outputs are switched-off until the short-circuit is removed

The amplifiers come in 17-pin plastic SIL power packages with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 4 × 7 | 14.4 | 4 |
| 4 × 12 | 14.4 | 2 |



TDA8566Q

2 × 25 W BTL power amplifier with differential inputs

- Differential inputs
- Very high Common Mode Rejection Ratio
- High common mode input signal handling capacity
- Very few external components
- High output power
- Low offset voltage at output (<100 mV) – important for BTL
- Fixed gain
- Diagnostic facility for sensing distortion, short-circuit and temperature
- Good ripple rejection
- Mode-select switch (operating, mute and standby)
- Load dump protection
- Short-circuit proof to ground, to V_p and across the load
- Low power dissipation in any short circuit condition
- Thermally protected
- Reverse-polarity safe
- Pins protected against ESD
- No switch-on/switch-off clicks
- Low thermal resistance

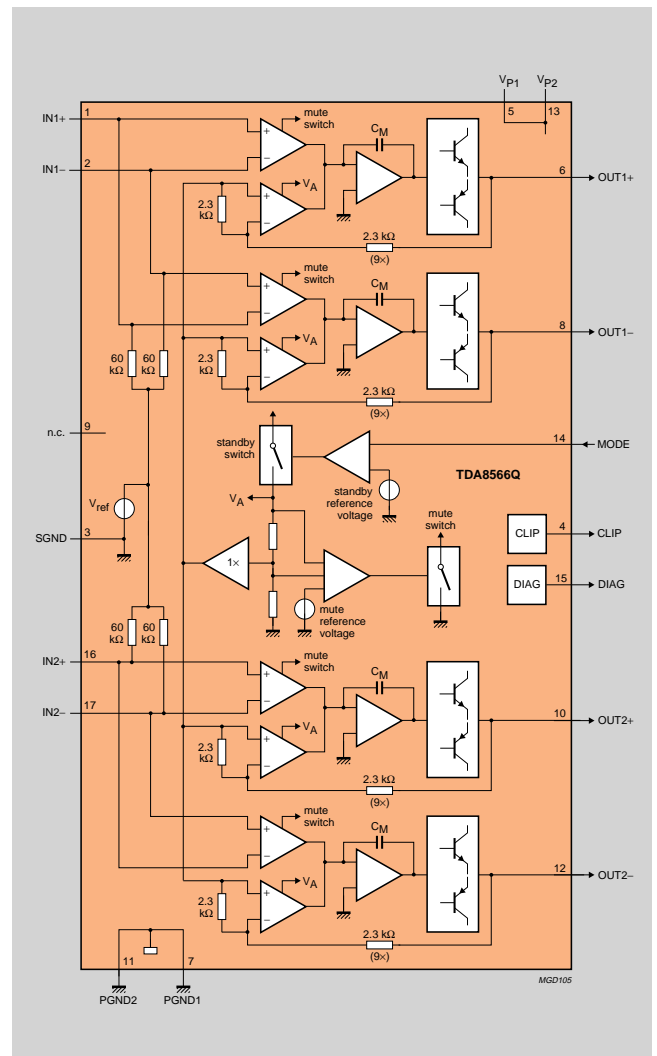
This is a class-B BTL stereo power amplifier. It features a high-impedance fully-differential balanced input stage that's also capable of operating in single-ended mode (with one input capacitively coupled to an audio ground).

A diagnostic facility senses distortion, load short-circuit and temperature. At onset of distortion or temperature >145 °C, the diagnostic output signal can be used to reduce the input drive via a sound processor or DC volume control. For load short-circuit or output short-circuit to ground or supply, the outputs are switched-off until the short-circuit is removed.

The amplifier comes in 17-pin plastic SIL power package with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 2 × 25 | 14.4 | 4 |
| 2 × 40 | 14.4 | 2 |



TDA8567Q/TDA8568Q/TDA8569Q

4 × 25 W BTL amplifiers

- Very few external components
- High output power
- Low offset voltage at output (TDA8567Q & TDA8569Q < 150 mV, TDA8568Q < 200 mV) – important for BTL
- Diagnostic facility for sensing distortion, short-circuit and temperature
- Good ripple rejection
- Mode-select switch (operating, mute and standby)
- Load dump protection
- Short-circuit proof to ground, to V_p and across the load
- Low power dissipation in any short circuit condition
- Thermally protected
- Reverse-polarity safe
- Pins protected against ESD
- No switch-on/switch-off clicks
- Low thermal resistance

These are class-B power amplifiers with internally fixed gain for excellent channel balance. They are for quad (front and rear stereo) car audio applications. The TDA8567Q and TDA8569Q have a fixed closed-loop voltage gain of 26 dB, whilst that of the TDA8568Q is 40 dB. The TDA8569, moreover, can drive loads down to 2 Ω.

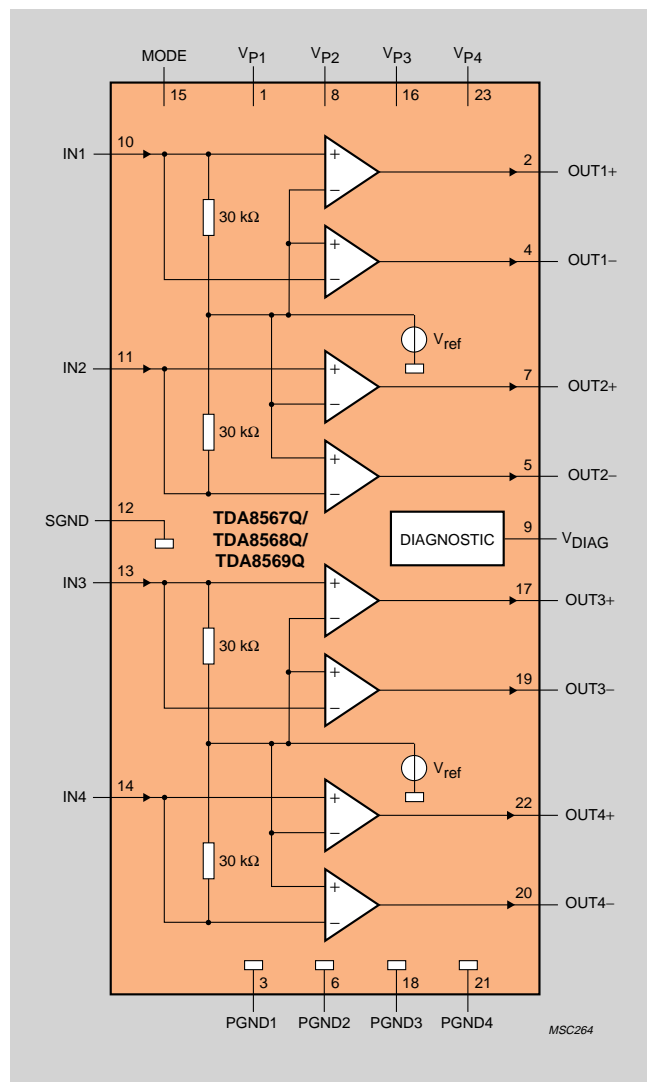
A diagnostic facility senses distortion, load short-circuit and temperature. At onset of distortion or temperature >145 °C, the diagnostic output signal can be used to reduce the input drive via a sound processor or DC volume control. For load short-circuit or output short-circuit to ground or supply, the outputs are switched-off until the short-circuit is removed

The amplifiers come in 23-pin plastic SIL power packages with the pins bent to DIL format.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|----------------------------|--------------------|--------------------|
| TDA8567Q/TDA8568Q/TDA8569Q | | |
| 4 × 25 | 14.4 | 4 |

4



TDA8574(T)

Dual common-mode rejection differential line drivers

- Class-H operation means that output voltage swings are greater than the supply voltage
- High supply voltage ripple rejection
- Low distortion (0.003% THD at 1 kHz with $V_{O(rms)} = 3\text{ V}$)
- Low noise (noise output of typ. 5 μV)
- Supply voltage range of 6 V to 12 V
- All pins ESD protected

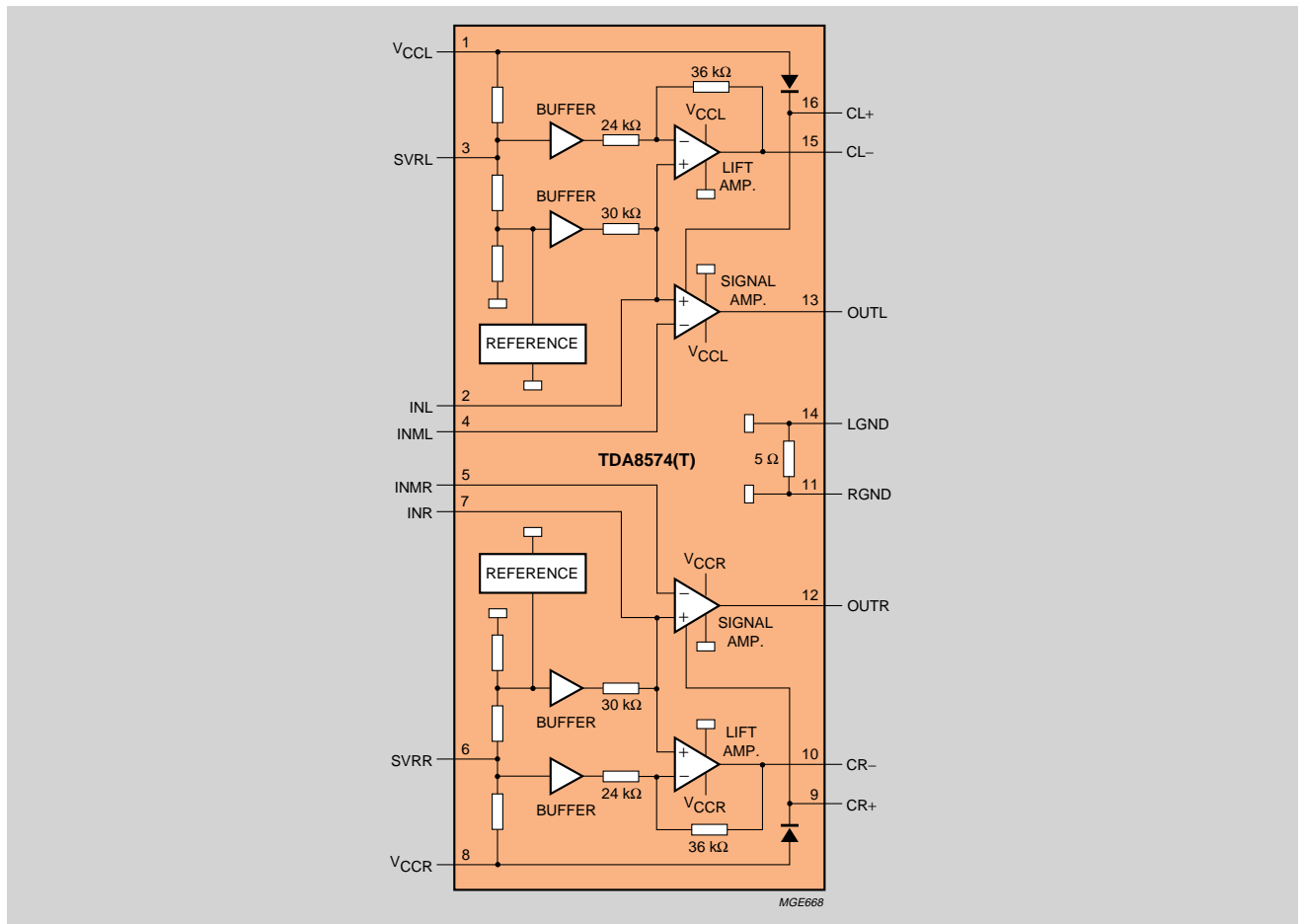
is 14 V (peak-to-peak). This high output level significantly improves signal-to-noise ratio of the power amplifier stage by allowing it to operate at lower gain.

The TDA8574 comes in a 16-pin plastic DIP and the TDA8574T comes in a 16-pin SO package for surface mounting.

These two-channel class-H amplifiers with single-ended outputs offer 8 dB voltage gain and low distortion. They're principally for eliminating ground noise in car and mains-powered applications with long connections between the signal sources and output amplifiers (or boosters). Class-H operation ensures that voltage swings over the load are greater than the supply voltage: with a supply voltage of 9 V, the output voltage swing across the load

POWER OUTPUT AT $d_{tot} = 0.1\%$

| AC output (V_{rms}) | supply voltage (V) | load impedance (Ω) |
|-------------------------|--------------------|-----------------------------|
| 5 | 9 | 10 k |



TDA8576T

Dual common-mode rejection differential line driver

- Class-H operation means that output voltage swings are greater than the supply voltage
- High supply voltage ripple rejection
- Low distortion (0.005% THD at 1 kHz with $V_{o(rms)} = 3\text{ V}$)
- Low noise (noise output of typ. 5 μV)
- Supply voltage range of 6 V to 12 V
- All pins ESD protected

swings over the load are greater than the supply voltage: with a supply voltage of 9 V, the output voltage swing across the load is 14 V (peak-to-peak). This high output level significantly improves signal-to-noise ratio of the power amplifier stage by allowing it to operate at lower gain.

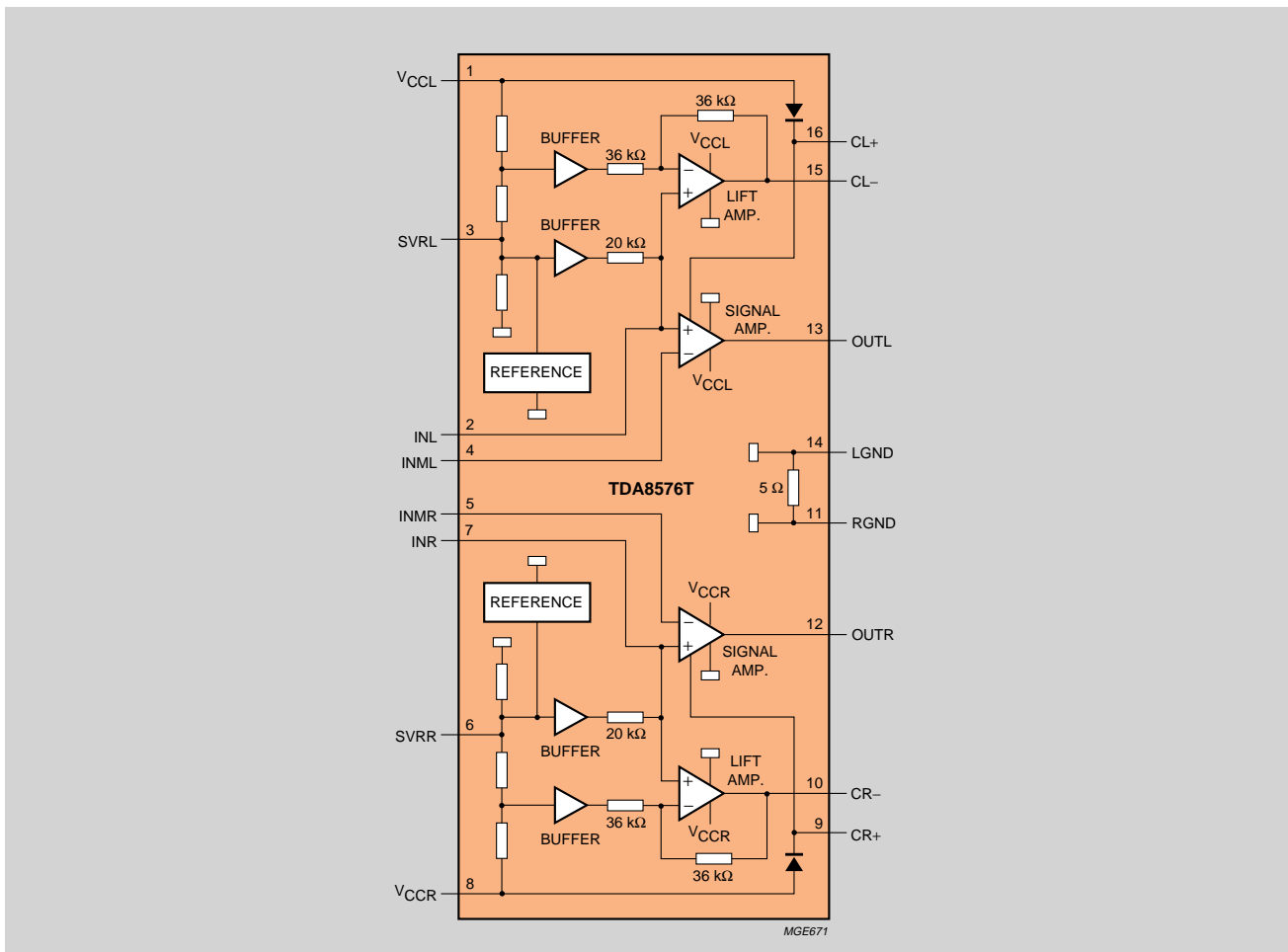
The TDA8576T comes in a 16-pin SO package for surface mounting.

4

This two-channel class-H amplifier with single-ended outputs offers 6 dB voltage gain and low distortion. It's principally for eliminating ground noise in car and mains-powered applications with long connections between the signal sources and output amplifiers (or boosters). Class-H operation ensures that voltage

POWER OUTPUT AT $d_{tot} = 0.1\%$

| AC output (V_{rms}) | supply voltage (V) | load impedance (Ω) |
|-------------------------|--------------------|-----------------------------|
| 5 | 9 | 10 k |



TDA8577/TDA8578(T)/TDA8579(T)

Dual common-mode rejection differential line drivers

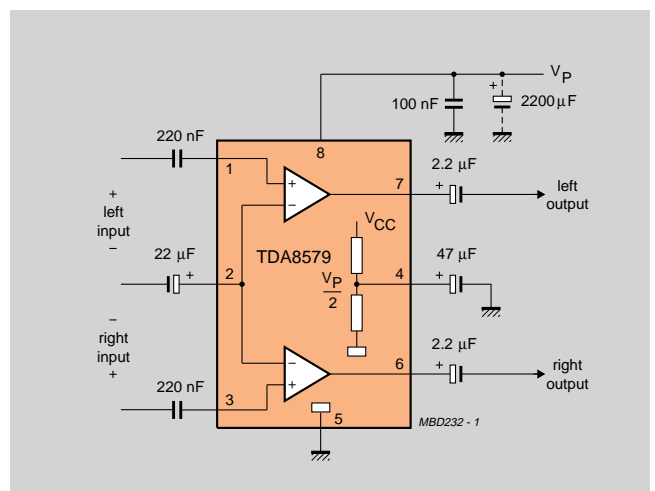
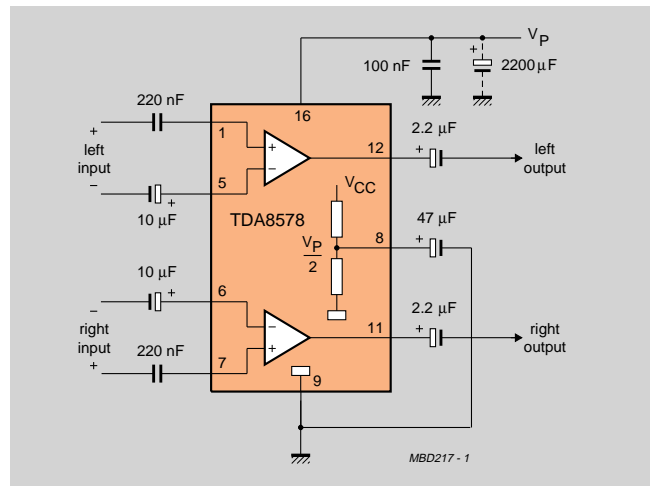
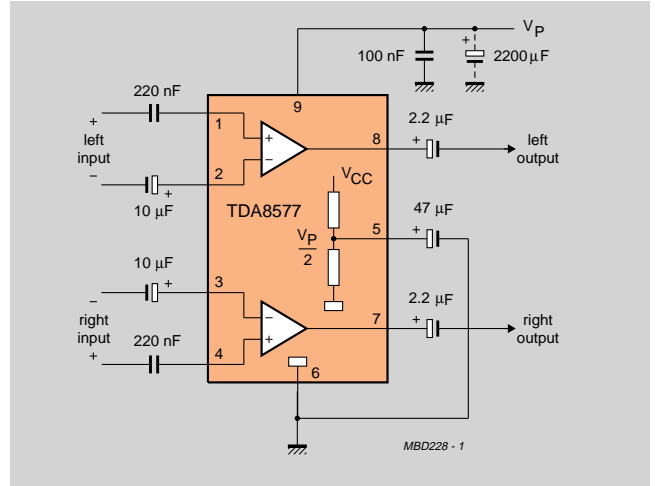
- 70 dB common-mode rejection from 100 Hz to 100 kHz with a 5 kΩ load
- Common-mode rejection is independent of source resistance
- Few peripheral components
- 65 dB supply voltage ripple rejection with $R_S = 2\text{ k}\Omega$
- Low power consumption
- Noise output of $3.7\text{ }\mu\text{V}$ at $R_S = 0\text{ }\Omega$
- Supply voltage range of 5 V to 18 V
- 0.02% THD at 1 kHz with $V_i = 1\text{ V}$
- All pins ESD protected
- AC and DC short-circuit proof to ground and supply
- 0.2 sec DC input voltage settling time

These two-channel amplifiers with differential inputs and single-ended outputs have 0 dB voltage gain and low distortion. They are for eliminating ground noise in car and mains-powered applications with long connections between the signal sources and output amplifiers (or boosters).

The TDA8577 comes in an 9-pin plastic SIL package and the TDA8578(T) comes in a 16-pin plastic DIL or SO package. These two types have completely separated inputs. The TDA8579(T) has linked inverting inputs and comes in an 8-pin plastic DIL or SO package.

POWER OUTPUT AT $d_{tot} = 1\%$

| AC output (V) | supply voltage (V) | load impedance (Ω) |
|---------------|--------------------|-----------------------------|
| 2 | 8.5 | 10 k |





MAINS-POWERED
SYSTEMS INCLUDING
HI-FI AND TV SOUND

TDA1013B

4 W to 10 W amplifier with DC volume control

- Separate preamplifier and power amplifier
- Incorporates DC volume control with a control range >80 dB (control voltage between 2 V and 7 V)
- Well defined open-loop gain and fixed closed-loop gain (power stage) of 38 dB (18 V supply, 8 Ω load)
- Minimum number of external components
- Simple and low cost heatsinking
- No switch-on/switch-off clicks
- Output noise diminishes with reducing volume

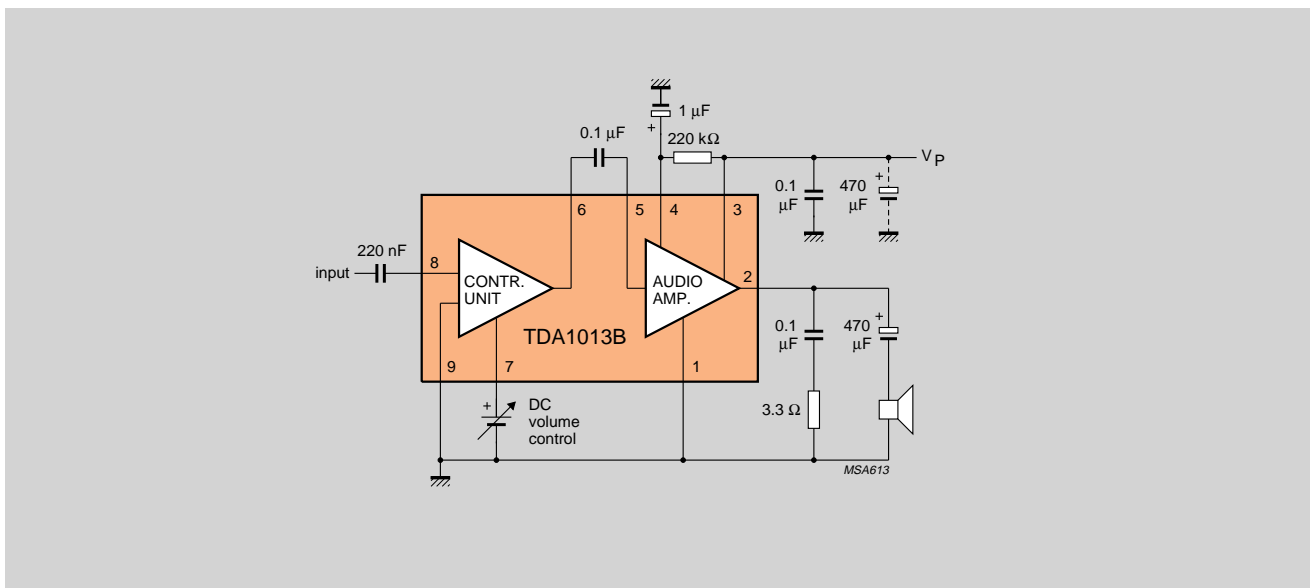
5

This amplifier has a built-in DC volume control with a logarithmic characteristic providing control over a range of more than 80 dB. Its wide supply voltage range (10 V to 40 V) makes it ideal for mains-powered equipment such as TV sets.

It comes in a 9-pin plastic SIL medium-power package offering simple and low-cost heatsinking.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|--------------------|
| 4.2 | 18 | 8 |
| 10 | 35 | 16 |



TDA1514A

50 W high-performance hi-fi amplifier

- High ripple rejection of 72 dB
- Standby feature with an activation level of <math><1\text{ V}</math> at pin 3. The supply voltage to obtain the standby state is $\pm 4.5\text{ V}$ to $\pm 7\text{ V}$. The standby supply current is 20 mA.
- Mute facility with an activation level of 2 V to 4.5 V at pin 3
- Thermal protection
- Good supply voltage ripple rejection
- Signal to noise ratio is 82 dB at $P_o = 50\text{ mW}$, $R_s = 2\text{ k}\Omega$
- High slew rate (10 V/ μs)
- Output protected against AC short-circuit (asymmetrical power supply) and DC short-circuit (symmetrical power supply) via SOAR protection
- Externally adjustable closed-loop voltage gain of 20 dB to 46 dB
- Low output offset voltage (2 mV) also allows 2 \times TDA1514A to be used in BTL configuration to obtain output powers up to 100 W (see next page)

With its high power output and high performance, this amplifier is ideal for top quality mains-powered hi-fi systems, radios, TV sets and digital audio systems.

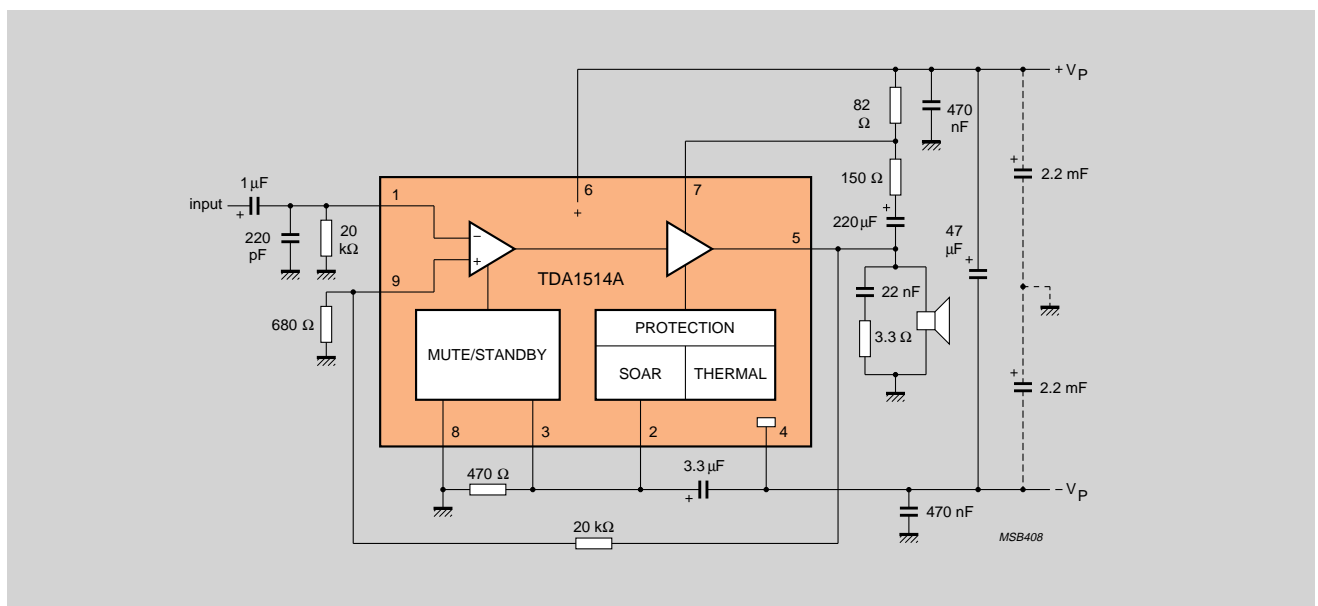
The output transistors have total thermal and SOAR protection, and the circuit embodies a special mute facility that operates for a short period after switch-on to eliminate switch-on/switch-off clicks. This period is preset by external components.

The IC can operate from either asymmetrical or symmetrical power supplies ($\pm 7.5\text{ V}$ to $\pm 30\text{ V}$) and comes in a 9-pin plastic SIL power package.

POWER OUTPUT WITH $V_p = \pm 27.5\text{ V}$, $R_L = 8\ \Omega$

| power output* (W) | d_{tot} (%) | d_{tot} (dB) |
|-------------------|---------------|----------------|
| 32 (40) | 0.003 | -90 |
| 40 (50) | 0.1 | -60 |
| 51 (65) | 10 | -20 |

* values between brackets are for $V_p = \pm 24\text{ V}$, $R_L = 4\ \Omega$



2 × TDA1514A

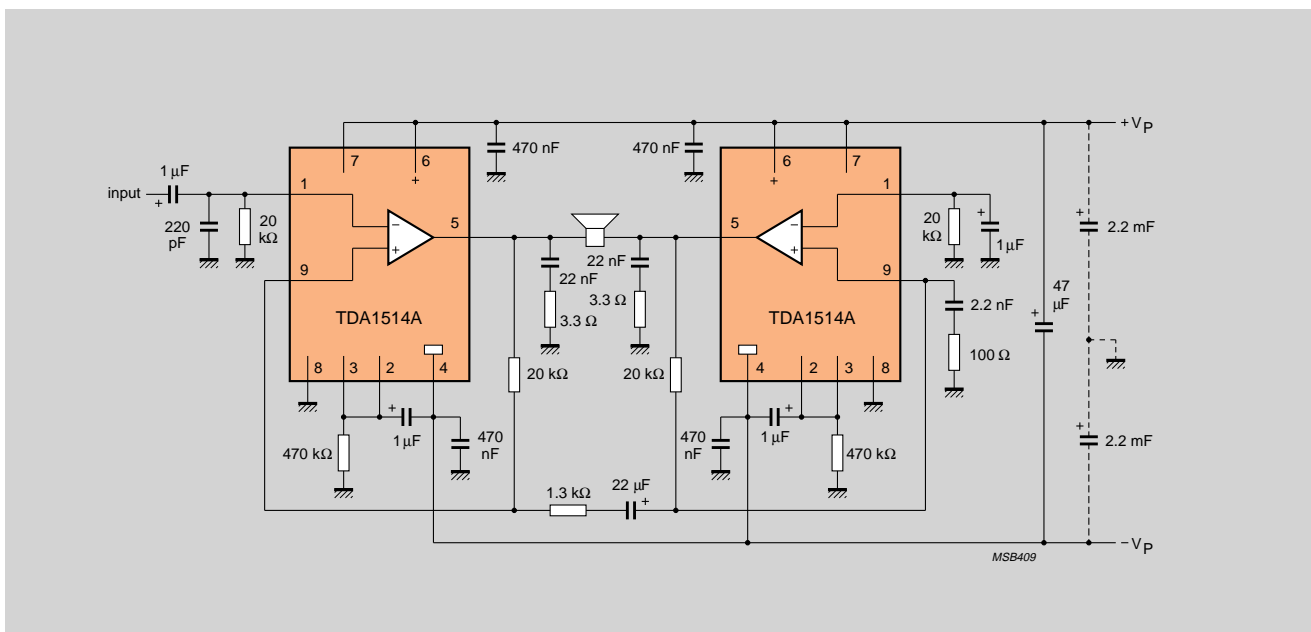
100 W BTL high-performance hi-fi amplifier

The low output offset voltage (2 mV) of the TDA1514A (see previous page) allows two of these ICs to be connected in BTL configuration to obtain output powers of up to 100 W.

5

POWER OUTPUT AT $d_{tot} = -60$ dB (0.1%)

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|-----------------------------|
| 100 | ± 24 | 8 |
| 70 | ± 27.5 | 16 |
| 65 | ± 20 | 8 |
| 55 | ± 15 | 4 |



TDA1521(Q)/TDA2616(Q) AND TDA1521A/TDA2615

2 × 6 W and 2 × 12 W hi-fi amplifiers

- Very few external components required
- Input muted during power-on and off (no switch-on or switch-off clicks). This facility allows operation via remote control
- Fixed voltage gain of 30 dB (± 16 V supply 8 Ω load) for excellent gain balance between channels (within 0.2 dB)
- High supply voltage ripple rejection (50 dB at 100 Hz)
- Channel separation 70 dB (symmetrical supply)
- Meets IEC 268 and DIN 45500 hi-fi specifications
- Output protected against short-circuit
- Thermal protection

The TDA1521(Q) and TDA1521A, and the TDA2615 and TDA2616(Q) are pin-compatible amplifiers for mains-powered applications such as stereo TV sound channels and stereo radio. They can operate from a symmetrical power supply of ± 7.5 to ± 21 V or from an asymmetrical power supply of 15 V to 42 V. The low offset voltage (40 mV) between output and ground also makes these amplifiers suitable for BTL applications.

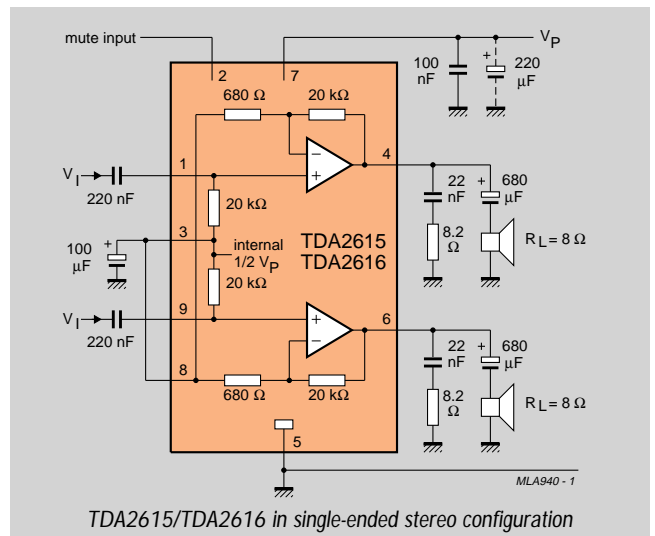
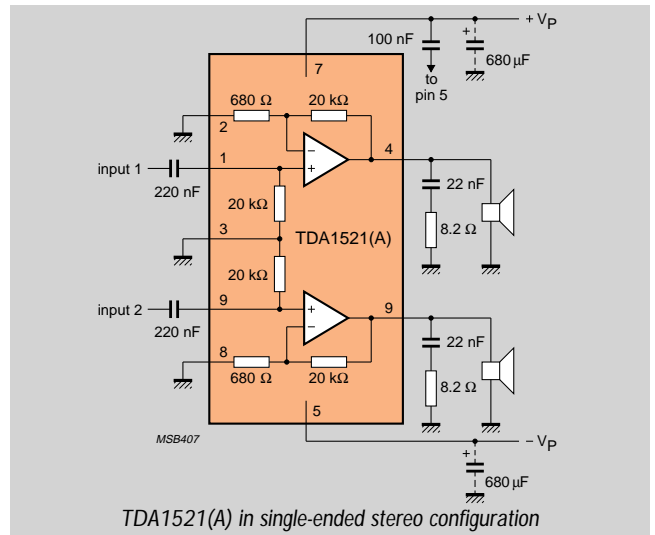
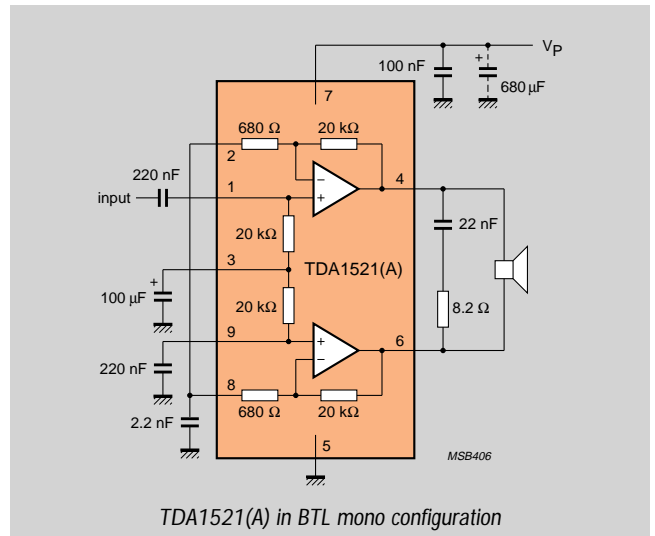
The TDA1521A/TDA1521(Q) are identical to the TDA2615/TDA2616(Q) except for a mute facility at pin 2 and internal feedback interconnected for both channels to pin 8 on the TDA2615/TDA2616(Q). This implies that the TDA2615 and TDA2616(Q) have a fixed gain (30 dB).

The TDA1521A/TDA2615 come in 9-pin plastic SIL medium-power packages. The TDA1521(Q)/TDA2616(Q) come in 9-pin plastic SIL power packages. The pins are bent to DIL format for the versions with a Q suffix.

POWER OUTPUT AT $d_{tot} = 0.5\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|---------------------------------|--------------------|-----------------------------|
| TDA1521(Q)/TDA2616(Q): mono BTL | | |
| 20 * | 24 | 8 |
| TDA1521(Q)/TDA2616(Q): stereo | | |
| 2 × 12 ** | ± 16 | 8 |
| 2 × 6 | ± 12 | 8 |
| 2 × 10 | ± 12 | 4 |
| TDA1521A/TDA2615: stereo | | |
| 2 × 6 | ± 12 | 8 |

* 26 W at $d_{tot} = 10\%$ ** 2 × 15 W at $d_{tot} = 10\%$



TDA2611A

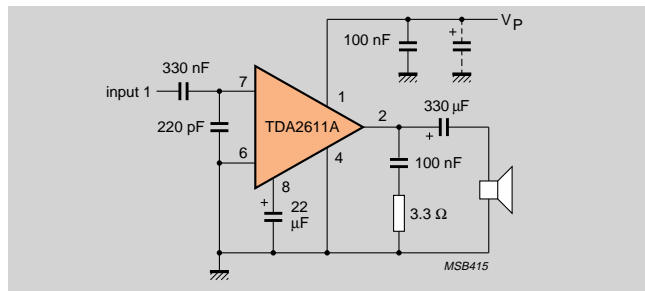
4 W to 10 W amplifier

- Few external components
- Thermal protection
- Well defined open-loop gain with simple quiescent current setting and fixed closed-loop voltage gain of 38 dB (18 V supply, 8 Ω load)

This amplifier is ideal for the sound output stage of TV sets. It can operate from supply voltages between 6 V and 35 V and comes in a 9-pin plastic SIL medium-power package.

POWER OUTPUT AT $d_{tot} = 10\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|--------------------|
| 4.5 | 18 | 8 |
| 10 | 35 | 16 |



5

TDA2613/TDA2614

6 W hi-fi amplifiers

- Very few external components required
- Input muted during power-on and off (no switch-on or switch-off clicks)
- Low offset voltage between output and ground
- Meets IEC 268 and DIN 45500 hi-fi specifications
- Output protected against short-circuit
- Thermal protection
- Fixed closed-loop voltage gain of 30 dB (24 V supply, 8 Ω load)

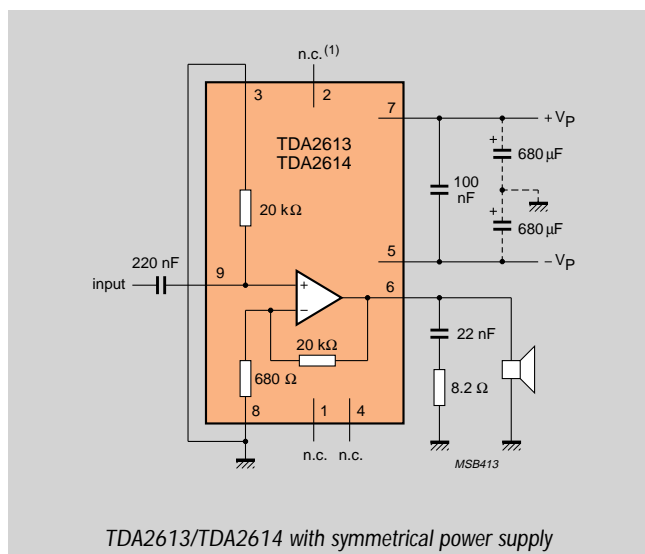
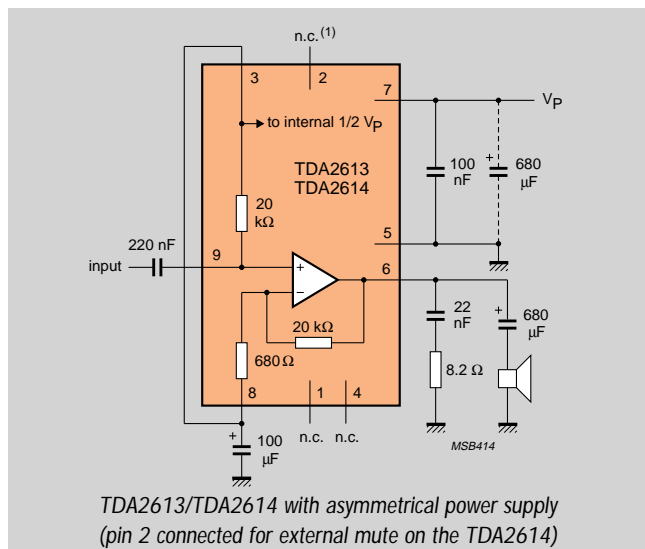
These are mono versions of the TDA1521A/TDA2615 and are pin compatible with one channel of those ICs. They deliver 6 W for mains-powered equipment such as TV sets and radios. They can operate from an asymmetrical power supply of between 15 and 42 V or from a symmetrical power supply of between ±7.5 V and ±21 V.

The TDA2613 and TDA2614 are identical except for the mute facility at pin 2 on the TDA2614.

They come in a 9-pin plastic SIL medium-power package.

POWER OUTPUT AT $d_{tot} = 0.5\%$

| power output (W) | supply voltage (V) | load impedance (Ω) |
|------------------|--------------------|--------------------|
| 6 | 24 | 8 |
| 6 | ±12 | 8 |
| 10 | 24 | 4 |
| 10 | ±12 | 4 |





APPENDICES

A

FURTHER INFORMATION

Data

Data on our semiconductors for radio/audio systems are available in loose data sheets or are given in Philips Semiconductors data handbook IC01a (ordering code 9398 183 00011) and IC01b (ordering code 9398 183 10011).

Data for our semiconductors for TV and video systems are available in loose data sheets or are given in Philips Semiconductors data handbooks IC02a (ordering code 9398 652 23011), IC02b (ordering code 9398 652 24011) and IC02c (ordering code 9398 652 24011).

Application Notes and Leaflets

The following Philips Semiconductors Application Notes relating to audio amplifiers are available:

1. "TDA1013B Audio amplifier with DC volume control" Philips Semiconductors Application Note NBA/AN9005.
2. "Recorder IC TDA1016 for portable applications" Philips Semiconductors Application Note NBA8301.
3. "TDA1514A Hi-fi power amplifiers" Philips Semiconductors Application Note NBA/AN8911.
4. "Audio power ICs for car radios" Philips Semiconductors Application Note NBA9001 (ordering code: 9398 078 30011).
5. "TDA1551Q, TDA1554Q, TDA1555Q and TDA1558Q audio power amplifiers for car radio" Philips Semiconductors Application Note NBA/AN9202.
6. "TDA1552Q/53(A)Q, TDA1556Q and TDA1557Q double BTL amplifiers" Philips Semiconductors Application Note NBA/AN9013.
7. "TDA1556Q 2 × 22 W BTL amplifier with differential inputs" Philips Semiconductors Leaflet.
8. "Economic 6 W hi-fi audio amplifier for mains-fed applications" Philips Semiconductors Application Note NBA/AN8902.
9. "TDA2614: economic 6.5 W hi-fi audio amplifier for mains-fed applications" Philips Semiconductors Application Note NBA/AN9109.
10. "6.5 W stereo hi-fi audio amplifier for mains-fed applications" Philips Semiconductors Application Note NBA/AN9110.
11. "12 W stereo hi-fi audio amplifier (20 W BTL)" Philips Semiconductors Application Note NBA/AN9205.
12. "TDA7052A; 1 W BTL mono audio amplifier with DC volume control" Philips Semiconductors Application Note NBA/AN9207.
13. "TDA7052/7053: 1 W componentless BTL mono/stereo audio amplifiers" Philips Semiconductors Application Note NBA8907 (ordering code: 9398 068 10011).
14. "TDA7056A; 3 W BTL mono audio amplifier with DC volume control" Philips Semiconductors Application Note NBA/AN9208.
15. "3 W mono BTL audio amplifier" Philips Semiconductors Application Note NBA/AN9009.
16. "TDA7057 3 W componentless BTL stereo audio amplifier" Philips Semiconductors Application Note NBA/AN9009.
17. "TDA1560Q power lifting amplifier (class-H)" Philips Semiconductors Application Note NBA/AN9206.

For data sheets/handbooks and Application Notes, please contact your local Philips Semiconductors sales organization at the address listed on the back cover.

INDEX OF AUDIO AMPLIFIER ICs

| Type number | Description | Application* | Page |
|-----------------------------|---|--------------|-------|
| TDA1010A/1020 | Preamplifier plus 3.4 to 12 W power amplifier | c, m | 4-2 |
| TDA1011 | 6.5 W amplifier | p, m | 3-2 |
| TDA1013B | 4 W to 10 W amplifier with DC volume control | m | 5-2 |
| TDA1015 | 4 W amplifier | p, m | 3-2 |
| TDA1015T | 500 mW amplifier | p | 3-2 |
| TDA1016 | 2 W power and record/playback preamplifier | p, m | 3-3 |
| TDA1308T | 2 × 60 mW headphone/line output driver | p, c, m | 3-4 |
| TDA1510AQ/1515BQ | 24 W BTL or 2 × 12 W amplifiers | c | 4-3 |
| TDA1514A | 50 W high-performance hi-fi amplifier | m | 5-3/4 |
| TDA1516BQ/1516CQ/1518BQ | 24 W BTL or 2 × 12 W amplifiers | c | 4-4 |
| TDA1517(P)/1519 | 2 × 6 W amplifiers | c, m | 4-5 |
| TDA1519A/1519B | 22 W BTL or 2 × 11 W/12 W BTL or 2 × 6 W amplifiers | c, m | 4-6 |
| TDA1521(Q)/2616(Q) | 2 × 12 W hi-fi amplifiers | m | 5-5 |
| TDA1521A/2615 | 2 × 6 W hi-fi amplifiers | m | 5-5 |
| TDA1552Q/1553Q/1553CQ/1557Q | 2 × 22 W BTL amplifiers | c | 4-7 |
| TDA1554Q/1555Q/1558Q | 2 × 22 W BTL or 4 × 11 W amplifiers | c | 4-8 |
| TDA1556Q | 2 × 22 W BTL amplifier with differential inputs | c | 4-9 |
| TDA1560Q | 40 W class-H amplifier | c, m | 4-10 |
| TDA1561Q | 2 × 23 W high-efficiency power amplifier | c, m | 4-11 |
| TDA2611A | 4 W to 10 W amplifier | m | 5-6 |
| TDA2613/2614 | 6 W hi-fi amplifiers | m | 5-6 |
| TDA7050(T) | 150 mW BTL or 2 × 75 mW low-voltage amplifier | p | 3-5 |
| TDA7052/7053 | 1 W/2 × 1 W BTL amplifiers | p, m | 3-6 |
| TDA7052A(AT)/7052B(BT) | 1 W/0.5 W BTL amplifier with DC volume control | p, m | 3-7 |
| TDA7053A(AT) | 2 × 1 W/0.5 W BTL amplifier with DC volume control | p, m | 3-8 |
| TDA7056/7057Q | 3 W/2 × 3 W BTL amplifiers | p, m | 3-9 |
| TDA7056A/7056B | 5 W BTL amplifier with DC volume control | p, m | 3-10 |
| TDA7057AQ | 2 × 5 W BTL amplifier with DC volume control | p, m | 3-11 |
| TDA8541(T) | 1 W BTL amplifiers | p, m | 3-12 |
| TDA8542(T) | 2 × 1 W BTL amplifiers | p, m | 3-13 |
| TDA8543(T) | 2 W BTL amplifiers | p, m | 3-14 |
| TDA8547(T) | 2 × 1 W BTL amplifiers with standby selection | p, m | 3-15 |
| TDA8551(T) | 1 W BTL amplifiers with digital volume control | p, m | 3-16 |
| TDA8558(T) | Low-voltage BTL mono amplifiers | p, m | 3-17 |
| TDA8559(T) | Low-voltage BTL stereo amplifiers | p | 3-18 |
| TDA8560Q/8563Q/8563AQ | 2 × 40 W BTL amplifier with diagnostics | c | 4-12 |
| TDA8561Q/8564Q | 2 × 24 W/4 × 7 W amplifier with diagnostics | c | 4-13 |
| TDA8562Q/8565Q | 4 × 12 W amplifier with diagnostics | c | 4-14 |
| TDA8566Q | 2 × 25 W BTL power amplifier with differential inputs | c | 4-15 |
| TDA8567Q/8568Q/8569Q | 4 × 25 W BTL amplifiers | c | 4-16 |
| TDA8574(T) | Dual common-mode rejection differential line drivers | c, m | 4-17 |
| TDA8577 | Dual common-mode rejection differential line driver | c, m | 4-19 |
| TDA8576T | Dual common-mode rejection differential line driver | c, m | 4-18 |
| TDA8578(T) | Dual common-mode rejection differential line driver | c, m | 4-19 |
| TDA8579(T) | Dual common-mode rejection differential line receiver | c, m | 4-19 |

* c = car radios/power boosters, m = mains-powered equipment, p = portable radio/audio equipment