DATA SHEET

TDA7052
1 W BTL mono audio amplifier

Product specification
File under Integrated Circuits, IC01

July 1994

Philips
Semiconductors

PHILIPS

1 W BTL mono audio amplifier TDA7052

GENERAL DESCRIPTION

The TDA7052 is a mono output amplifier in a 8-lead dual-in-line (DIL) plastic package. The device is designed for battery-fed portable audio applications.

Features:

- No external components
- No switch-on or switch-off clicks
- Good overall stability
- Low power consumption
- No external heatsink required
- Short-circuit proof

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_P	Supply voltage range		3	6	18	V
I_{tot}	Total quiescent current	$R_L = \infty$	–	4	8	mA
G_v	Voltage gain		38	39	40	dB
P_o	Output power	THD = 10%; 8 Ω	–	1,2	–	W
THD	Total harmonic distortion	P_o = 0,1 W	–	0,2	1,0	%

PACKAGE OUTLINE

8-lead DIL; plastic (SOT97); SOT97-1; 1996 August 21.

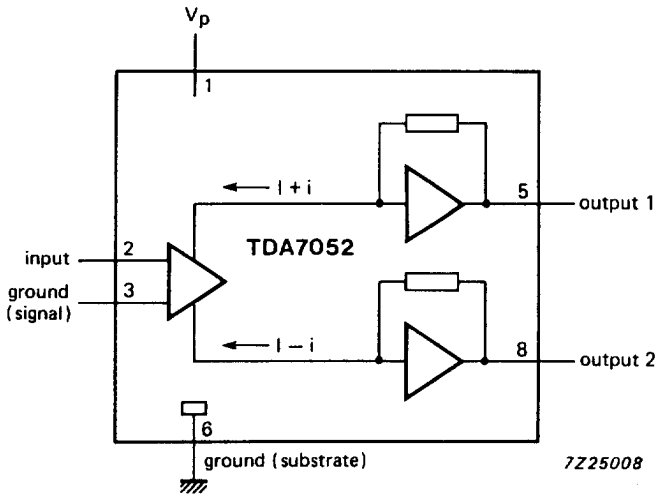


Fig.1 Block diagram.

PINNING

1	V_P	supply voltage	5	OUT1	output1
2	IN	input	6	GND2	ground (substrate)
3	GND1	ground (signal)	7	n.c.	not connected
4	n.c.	not connected	8	OUT2	output2

FUNCTIONAL DESCRIPTION

The TDA7052 is a mono output amplifier designed for battery-fed portable audio applications, such as tape recorders and radios.

The gain is fixed internally at 40 dB. A large number of tape recorders and radios are still designed for mono sound, plus a space-saving trend by reduction of the number of battery cells. This means a decrease in supply voltage which results in an reduction of output power. To compensate for this reduction, the TDA7052 uses the Bridge-Tied-Load principle (BTL) which can deliver an output power of 1,2 W (THD = 10%) into an 8 Ω load with a power supply of 6 V. The load can be short-circuited at each signal excursion.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_P	Supply voltage	–	18	V
I_{OSM}	Non-repetitive peak output current	–	1,5	A
P_{tot}	Total power dissipation	see Fig. 2		
T_c	Crystal temperature	–	150	°C
T_{stg}	Storage temperature range	–55	+150	°C

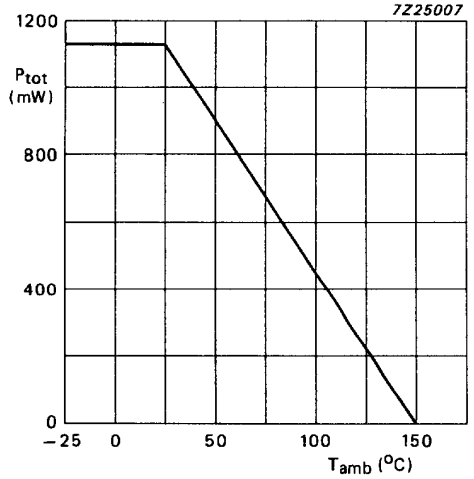


Fig.2 Power derating curve.

POWER DISSIPATION

Assume V_P = 6 V; R_L = 8 Ω; T_{amb} = 50 °C maximum.

The maximum sinewave dissipation is 0,9 W.

$$R_{th\ j\text{-}a} = \frac{150 - 50}{0,9} \approx 110 \text{ K/W}.$$

Where $R_{th\ j\text{-}a}$ of the package is 110 K/W, so no external heatsink is required.

CHARACTERISTICS

V_P = 6 V; R_L = 8 Ω; f = 1 kHz; T_{amb} = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply						
V_P	Supply voltage range		3	6	18	V
I_{tot}	Total quiscent current	$R_L = \infty$	–	4	8	mA
G_v	Voltage gain		38	39	40	dB
P_o	Output power	THD = 10%	–	1,2	–	W
	Noise output voltage (RMS value)					
$V_{no(rms)}$		note 1	–	150	300	μV
$V_{no(rms)}$		note 2	–	60	–	μV
f_r	Frequency response		–	20 Hz to 20 kHz	–	Hz
SVRR	Supply voltage ripple rejection	note 3	40	50	–	dB
ΔV_{5-8}	DC output offset voltage pin 5 to 8	R_S = 5 k Ω	–	–	100	mV
THD	Total harmonic distortion	P_O = 0,1 W	–	0,2	1,0	%
$\lvert Z_I \rvert$	Input impedance		–	100	–	kΩ
I_{bias}	Input bias current		–	100	300	nA

Notes to the characteristics

1. The unweighted RMS noise output voltage is measured at a bandwidth of 60 Hz to 15 kHz with a source impedance (R_S) of 5 kΩ.
2. The RMS noise output voltage is measured at a bandwidth of 5 kHz with a source impedance of 0 Ω and a frequency of 500 kHz. With a practical load (R = 8 Ω; L = 200 μH) the noise output current is only 100 nA.
3. Ripple rejection is measured at the output with a source impedance of 0 Ω and a frequency between 100 Hz and 10 kHz. The ripple voltage = 200 mV (RMS value) is applied to the positive supply rail.

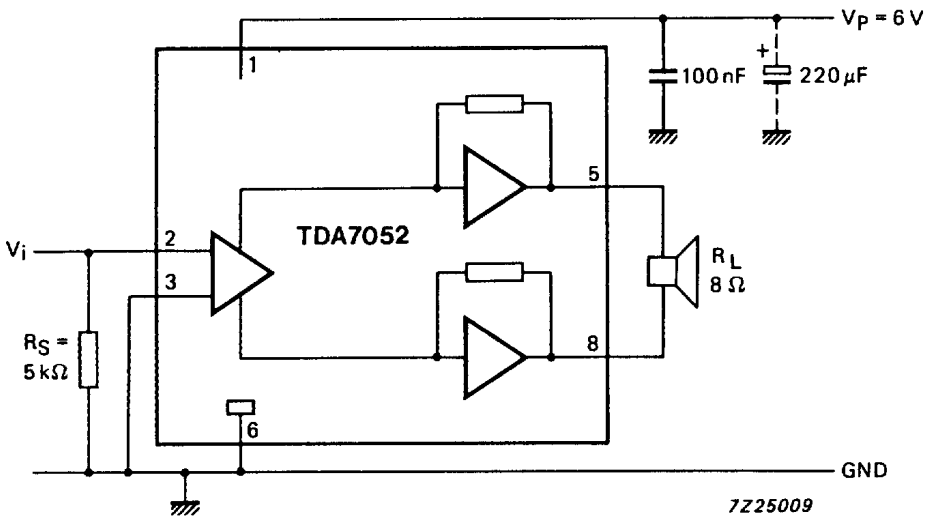
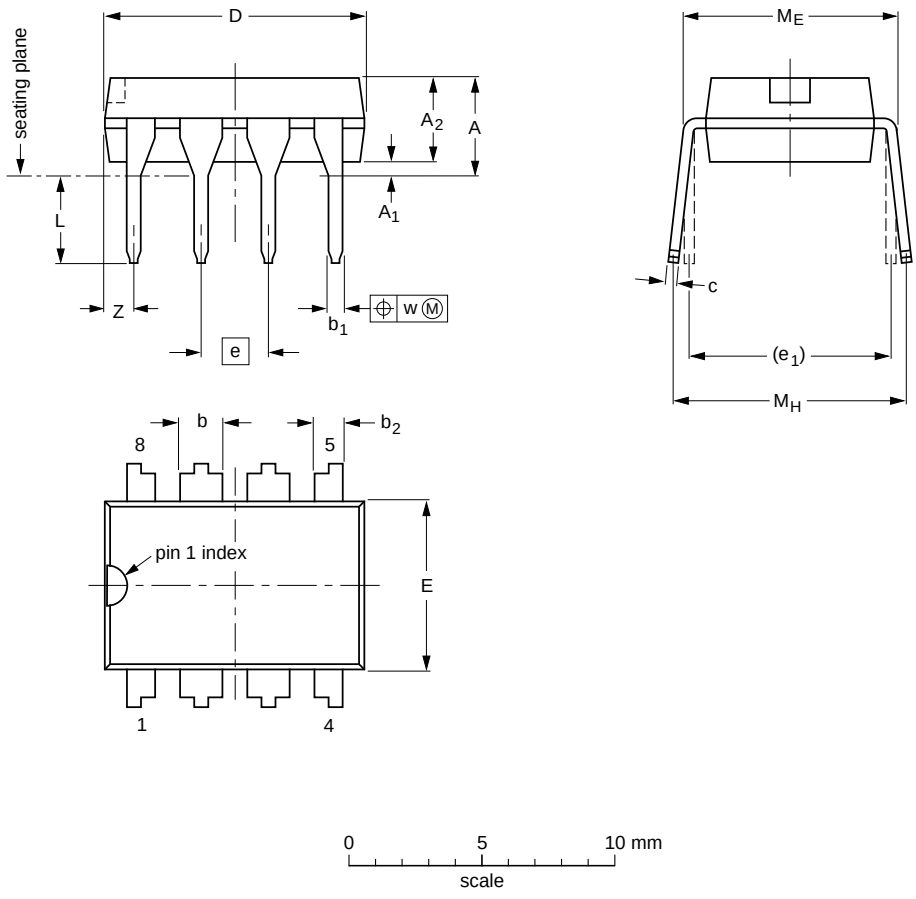


Fig.3 Application diagram.

PACKAGE OUTLINE

DIP8: plastic dual in-line package; 8 leads (300 mil) **SOT97-1**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A_1 min.	A_2 max.	b	b_1	b_2	c	D (1)	E (1)	e	e_1	L	M_E	M_H	w	Z (1) max.
mm	4.2	0.51	3.2	1.73 1.14	0.53 0.38	1.07 0.89	0.36 0.23	9.8 9.2	6.48 6.20	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	1.15
inches	0.17	0.020	0.13	0.068 0.045	0.021 0.015	0.042 0.035	0.014 0.009	0.39 0.36	0.26 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.045

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT97-1	050G01	MO-001AN				~~92-11-17~~ 95-02-04

SOLDERING

Introduction

There is no soldering method that is ideal for all IC packages. Wave soldering is often preferred when through-hole and surface mounted components are mixed on one printed-circuit board. However, wave soldering is not always suitable for surface mounted ICs, or for printed-circuits with high population densities. In these situations reflow soldering is often used.

This text gives a very brief insight to a complex technology. A more in-depth account of soldering ICs can be found in our *"IC Package Databook"* (order code 9398 652 90011).

Soldering by dipping or by wave

The maximum permissible temperature of the solder is 260 °C; solder at this temperature must not be in contact with the joint for more than 5 seconds. The total contact time of successive solder waves must not exceed 5 seconds.

The device may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified maximum storage temperature ($T_{stg\ max}$). If the printed-circuit board has been pre-heated, forced cooling may be necessary immediately after soldering to keep the temperature within the permissible limit.

Repairing soldered joints

Apply a low voltage soldering iron (less than 24 V) to the lead(s) of the package, below the seating plane or not more than 2 mm above it. If the temperature of the soldering iron bit is less than 300 °C it may remain in contact for up to 10 seconds. If the bit temperature is between 300 and 400 °C, contact may be up to 5 seconds.

DEFINITIONS

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

LIFE SUPPORT APPLICATIONS

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