

1 Watt low voltage audio power 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

parameter	conditions	symbol	min.	typ.	max.	unit
Supply voltage range		V_p	3	6	15	V
Total quiescent current	$R_L \rightarrow \infty$	I_{tot}	—	4	8	mA
Voltage gain		G_v	39	40	41	dB
Output power	THD = 10%, 8 Ω	P_o	—	1,2	—	W
Total harmonic distortion	$P_o = 0,1$ W	THD	—	0,2	1,0	%

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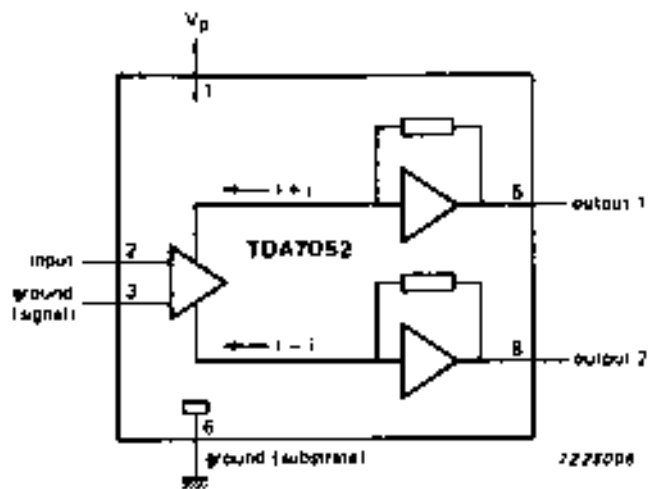


Fig. 1 Block diagram.

PINNING

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

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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)

parameter	symbol	min.	max.	unit
Supply voltage	V _p	-	18	V
Non-repetitive peak output current	I _{OSM}	-	1,5	A
Total power dissipation	P _{tot}	see Fig. 2		
Crystal temperature	T _c	-	150	°C
Storage temperature range	T _{stg}	-65	+150	°C

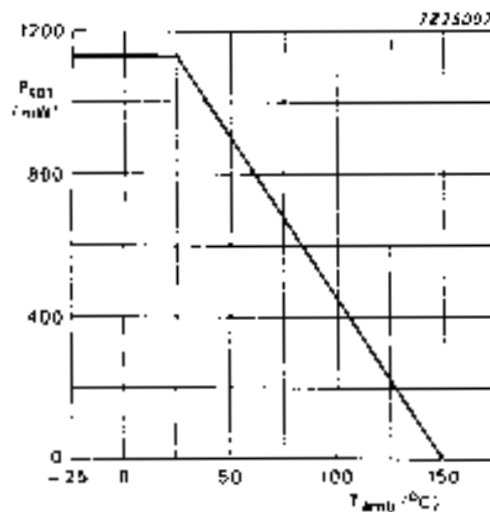


Fig. 2 Power derating curve.

POWER DISSIPATION

Assume V_p = 6 V, R_L = 8 Ω, T_{amb} = 50 °C maximum

The maximum sinewave dissipation is 0,9 W.

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

Where R_{thj-a} of the package is 110 K/W, so no external heatsink is required

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CHARACTERISTICS

$V_p = 6\text{ V}$; $R_L = 8\ \Omega$; $f = 1\text{ kHz}$; $T_{\text{amb}} = 25\text{ }^\circ\text{C}$; unless otherwise specified.

parameter	conditions	symbol	min.	typ.	max.	unit
Supply						
Supply voltage range		V_p	3	6	15	V
Total quiescent current	$R_L = \infty$	I_{tot}	—	4	8	mA
Voltage gain		G_v	39	40	41	dB
Output power	THD = 10%	P_o	*	1,2	—	W
Noise output voltage (RMS value)	note 1	$V_{\text{no(rms)}}$	—	150	300	μV
	note 2	$V_{\text{no(rms)}}$	—	60	—	μV
Frequency response		f_r	—	20 Hz to 20 kHz	—	Hz
Supply voltage ripple rejection	note 3	SVRR	40	50	—	dB
DC output offset voltage pin 5 to 8	$R_S = 5\text{ k}\Omega$	ΔV_{5-8}	—	—	100	mV
Total harmonic distortion	$P_o = 0,1\text{ W}$	THD	—	0,2	1,0	%
Input impedance		$ Z_i $	—	100	—	$\text{k}\Omega$
Input bias current		I_{bias}	—	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 k Ω .
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 ($R = 8\ \Omega$; $L = 200\ \mu\text{H}$) 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.

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APPLICATION INFORMATION

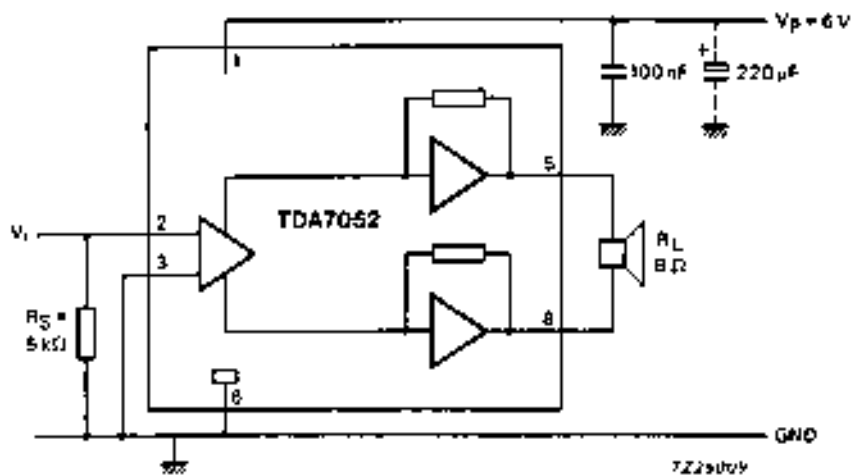


Fig. 3 Application diagram.