

Low voltage mono/stereo power amplifier

TDA7050

GENERAL DESCRIPTION

The TDA7050 is a low voltage audio amplifier for small radios with headphones (such as watch, pen and pocket radios) in mono (bridge-tied load) or stereo applications.

Features

- Limited to battery supply application only (typ. 3 and 4 V)
- Operates with supply voltage down to 1,6 V
- No external components required
- Very low quiescent current
- Fixed integrated gain of 26 dB, floating differential input
- Flexibility in use – mono BTL as well as stereo
- Small dimension of encapsulation (see package design example)

QUICK REFERENCE DATA

Supply voltage range	V_P		1,6 to 6,0 V
Total quiescent current (at $V_P = 3$ V)	I_{tot}	typ.	3,2 mA
Bridge tied load application (BTL)			
Output power at $R_L = 32 \Omega$ $V_P = 3$ V; $d_{tot} = 10\%$	P_o	typ.	140 mW
D.C. output offset voltage between the outputs	$ \Delta V $	max.	70 mV
Noise output voltage (r.m.s. value) at $f = 1$ kHz; $R_S = 5$ k Ω	$V_{no(rms)}$	typ.	140 μ V
Stereo application			
Output power at $R_L = 32 \Omega$ $d_{tot} = 10\%$; $V_P = 3$ V	P_o	typ.	35 mW
$d_{tot} = 10\%$; $V_P = 4,5$ V	P_o	typ.	75 mW
Channel separation at $R_S = 0 \Omega$; $f = 1$ kHz	α	typ.	40 dB
Noise output voltage (r.m.s. value) at $f = 1$ kHz; $R_S = 5$ k Ω	$V_{no(rms)}$	typ.	100 μ V

PACKAGE OUTLINE

8-lead DIL; plastic (SOT97); SOT97-1; 1996 July 23.

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RATINGS

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

Supply voltage	V_P	max.	6 V
Peak output current	I_{OM}	max.	150 mA
Total power dissipation			see derating curve Fig.1
Storage temperature range	T_{stg}		-55 to + 150 °C
Crystal temperature	T_C	max.	100 °C
A.C. and d.c. short-circuit duration at $V_P = 3,0$ V (during mishandling)	t_{sc}	max.	5 s

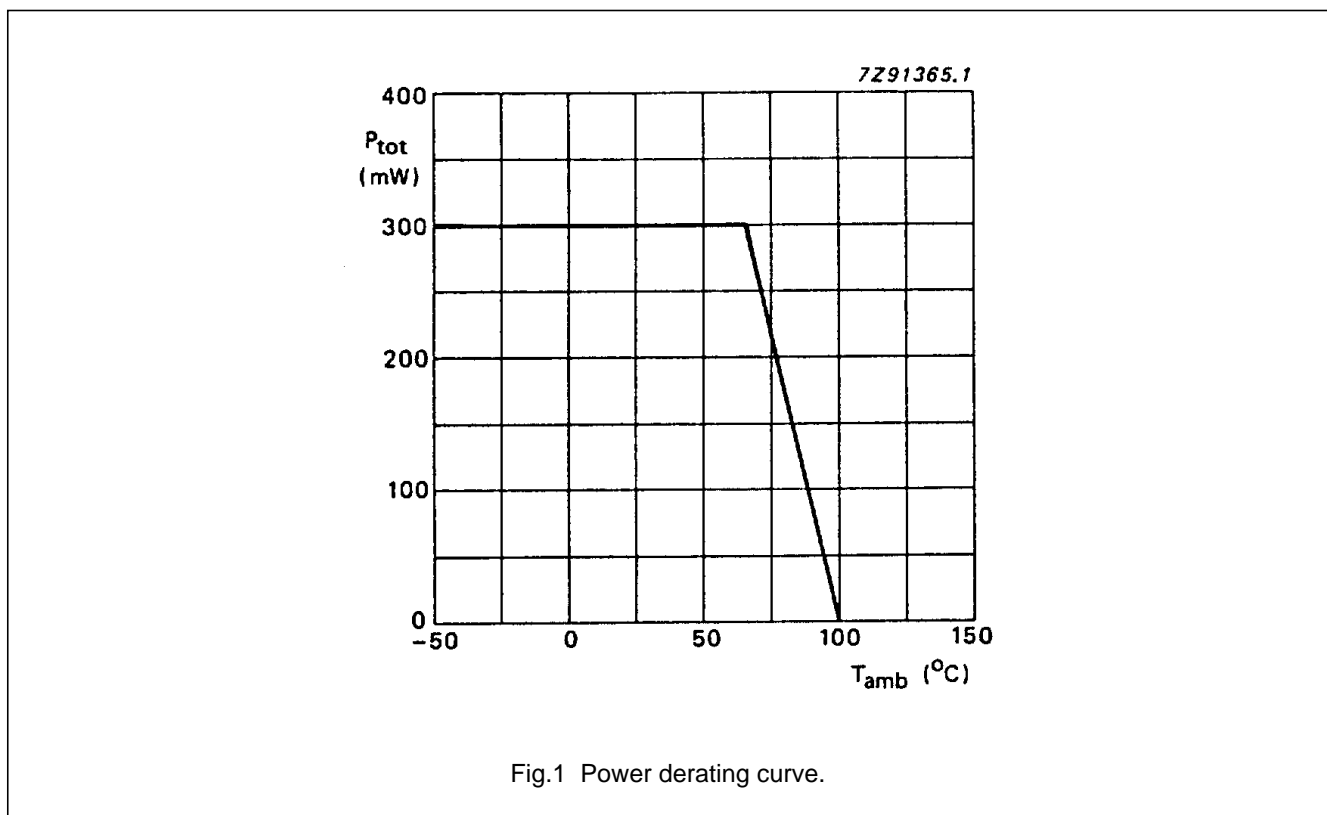


Fig.1 Power derating curve.

THERMAL RESISTANCE

From junction to ambient

$R_{thj-a} = 110$ K/W

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CHARACTERISTICS

$V_P = 3\text{ V}$; $f = 1\text{ kHz}$; $R_L = 32\ \Omega$; $T_{\text{amb}} = 25\text{ }^\circ\text{C}$; unless otherwise specified

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply					
Supply voltage	V_P	1,6	–	6,0	V
Total quiescent current	I_{tot}	–	3,2	4	mA
Bridge-tied load application (BTL); see Fig.4					
Output power; note 1					
$V_P = 3,0\text{ V}$; $d_{\text{tot}} = 10\%$	P_o	–	140	–	mW
$V_P = 4,5\text{ V}$; $d_{\text{tot}} = 10\%$ ($R_L = 64\ \Omega$)	P_o	–	150	–	mW
Voltage gain	G_v	–	32	–	dB
Noise output voltage (r.m.s. value)					
$R_S = 5\text{ k}\Omega$; $f = 1\text{ kHz}$	$V_{\text{no(rms)}}$	–	140	–	μV
$R_S = 0\ \Omega$; $f = 500\text{ kHz}$; $B = 5\text{ kHz}$	$V_{\text{no(rms)}}$	–	tbf	–	μV
D.C. output offset voltage (at $R_S = 5\text{ k}\Omega$)	$ \Delta V $	–	–	70	mV
Input impedance (at $R_S = \infty$)	$ Z_i $	1	–	–	$\text{M}\Omega$
Input bias current	I_i	–	40	–	nA
Stereo application; see Fig.5					
Output power; note 1					
$V_P = 3,0\text{ V}$; $d_{\text{tot}} = 10\%$	P_o	–	35	–	mW
$V_P = 4,5\text{ V}$; $d_{\text{tot}} = 10\%$	P_o	–	75	–	mW
Voltage gain	G_v	24.5	26	27.5	dB
Noise output voltage (r.m.s. value)					
$R_S = 5\text{ k}\Omega$; $f = 1\text{ kHz}$	$V_{\text{no(rms)}}$	–	100	–	μV
$R_S = 0\ \Omega$; $f = 500\text{ kHz}$; $B = 5\text{ kHz}$	$V_{\text{no(rms)}}$	–	tbf	–	μV
Channel separation					
$R_S = 0\ \Omega$; $f = 1\text{ kHz}$	α	30	40	–	dB
Input impedance (at $R_S = \infty$)	$ Z_i $	2	–	–	$\text{M}\Omega$
Input bias current	I_i	–	20	–	nA

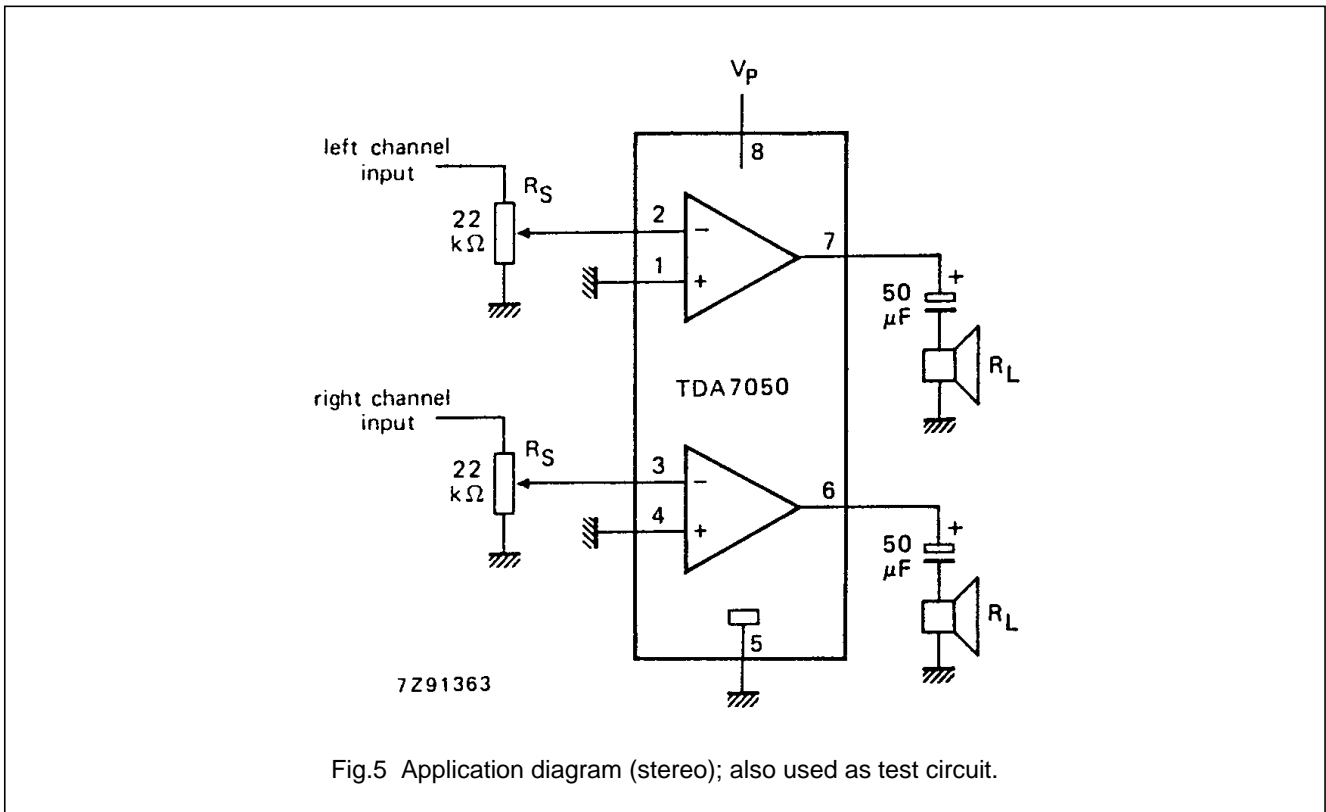
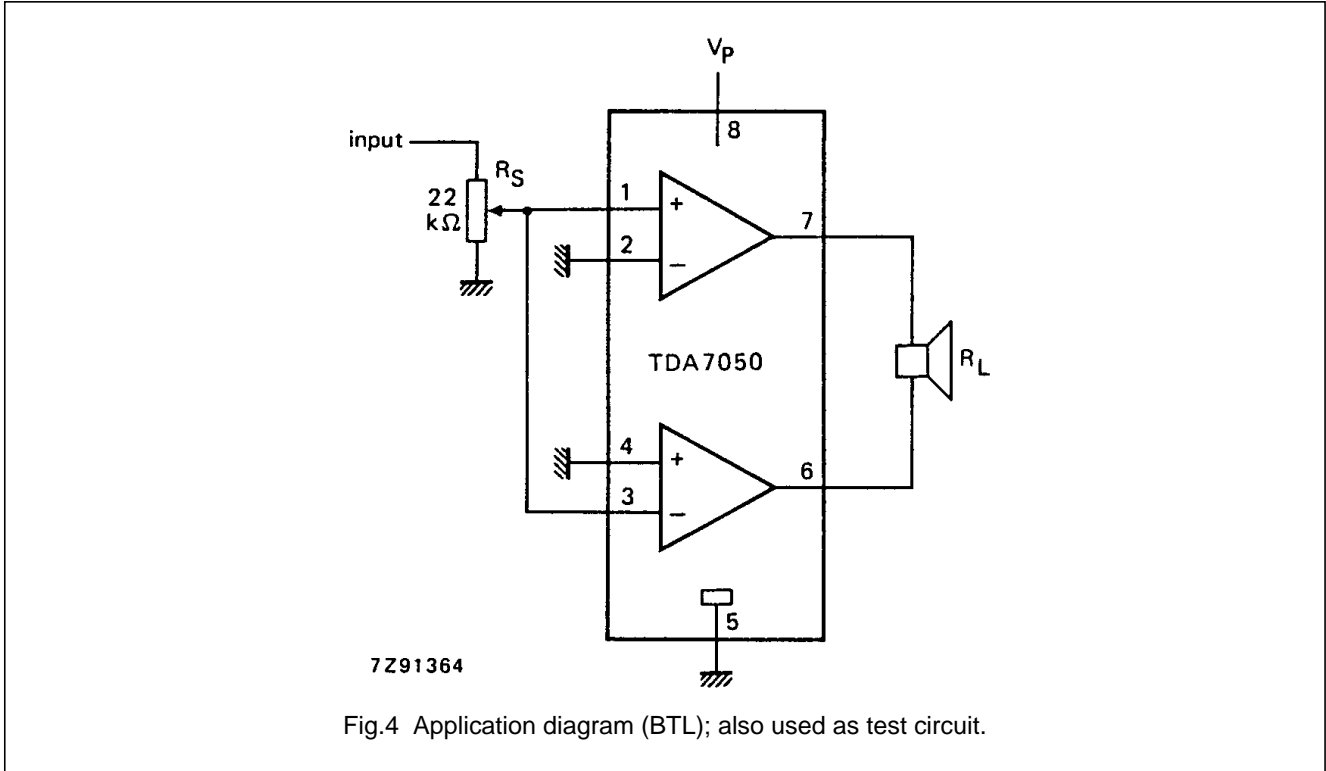
Note

- Output power is measured directly at the output pins of the IC. It is shown as a function of the supply voltage in Fig.2 (BTL application) and Fig.3 (stereo application).

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APPLICATION INFORMATION



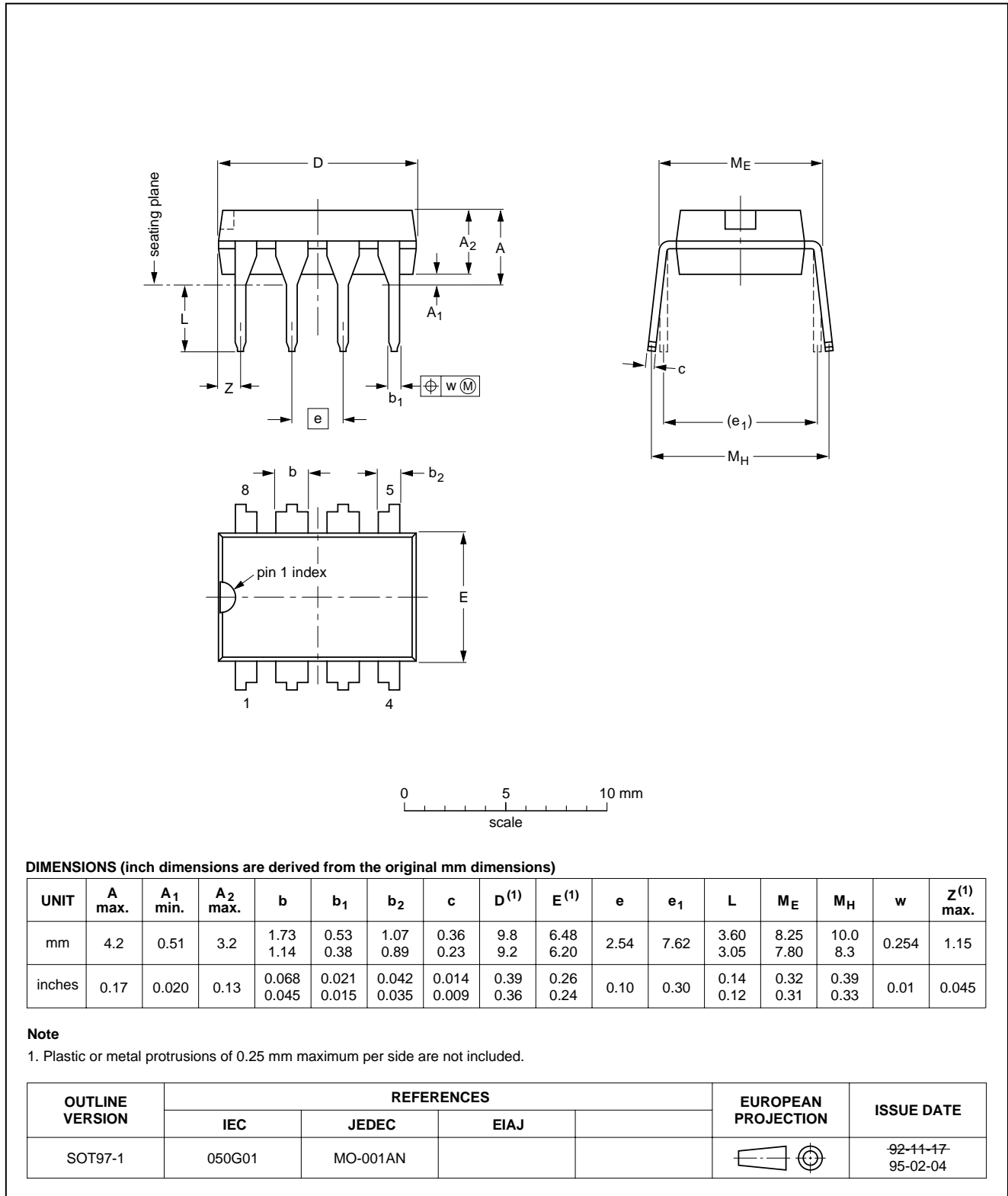
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PACKAGE OUTLINE

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