20W HI-FI AUDIO AMPLIFIER — TDA1520A

GENERAL DESCRIPTION

The TDA1520A is a monolithic integrated hi-fi audio power amplifier designed for asymmetrical or symmetrical power supplies for mains-fed apparatus.

Features

- Low input offset voltage
- Output stage with low cross-over distortion
- Single in-line (SIL) power package
- A.C. short-circuit protected
- Very low internal thermal resistance
- Thermal protection
- Very low intermodulation distortion
- Very low transient intermodulation distortion
- Complete SOAR protection

QUICK REFERENCE DATA

Supply voltage range	V_P		15 to 50	V
Total quiescent current at V_P = 33 V	I_{tot}	typ.	70	mA
Output power at d_{tot} = 0.5%				
sine-wave power				
V_P = 33 V; R_L = 4 Ω	P_o	typ.	22	W
V_P = 33 V; R_L = 4 Ω	P_o	>	20	W
V_P = 42 V; R_L = 8 Ω	P_o	typ.	20	W
Closed-loop voltage gain (externally determined)	G_c	typ.	30	dB
Input resistance (externally determined by R_{8-1})	R_i	typ.	20	kΩ
Signal-to-noise ratio at P_o = 50 mW	S/N	typ.	76	dB
Supply voltage ripple rejection at f = 100 Hz	RR	typ.	60	dB

PACKAGE OUTLINE

TDA1520A : 9-lead SIL; plastic power (SOT-131A).
TDA1520AQ: 9-lead SIL-bent-to-DIL; plastic power (SOT-157A).

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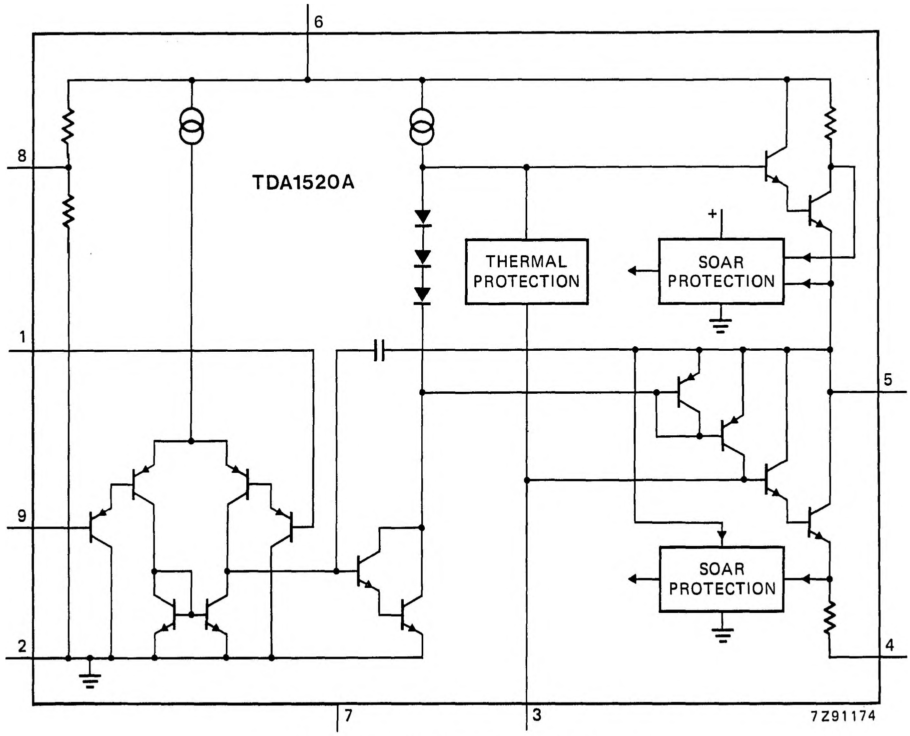

Fig. 1 Simplified internal circuit diagram.

PINNING

1. Non-inverting input
2. Input ground (substrate)
3. Compensation
4. Negative supply (ground)
5. Output
6. Positive supply (V_P)
7. Not connected
8. Ripple rejection
9. Inverting input (feedback)

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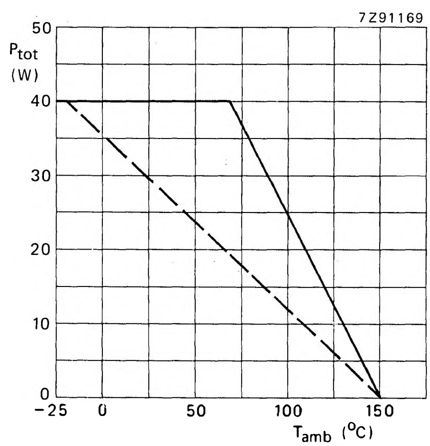
RATINGS

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

Supply voltage	V_P	max.	50 V
Repetitive peak output current	I_{ORM}	max.	4 A
Non-repetitive peak output current	I_{OSM}	max.	5 A
Total power dissipation	see derating curve Fig. 2		
Storage temperature	T_{stg}	−55 to + 150	°C
Operating ambient temperature	T_{amb}	−25 to + 150	°C
Duration of a.c. short-circuit of load ($R_L = 0\ \Omega$) during full-load sine-wave drive at: $V_S = \pm 20$ V (symmetrical) and $R_{supply} = 0\ \Omega$; or $V_S = 35$ V (asymmetrical) and $R_{supply} \geqslant 4\ \Omega$	t_{sc}	max.	100 hours



——— mounted on infinite heatsink.
— — —mounted on heatsink of 2.3 K/W.

Fig. 2 Power derating curves.

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	$\leqslant$	2 K/W

D.C. CHARACTERISTICS

Supply voltage range	V_P		15 to 50	V
Total quiescent current at V_P = 33 V	I_{tot}	typ.	70	mA
		⩽	105	mA
Minimum guaranteed output current (peak value)	I_{ORM}	⩾	3.2	A

A.C. CHARACTERISTICS

V_P = 33 V; R_L = 4 Ω; f = 1 kHz; T_{amb} = 25 °C; measured in test circuit of Fig. 3; unless otherwise specified

Output power				
sine-wave power at d_{tot} = 0.5%				
R_L = 4 Ω (Fig. 4)	P_o	typ.	22	W
R_L = 4 Ω (Fig. 4)	P_o	>	20	W
R_L = 8 Ω; V_P = 42 V (Fig. 4)	P_o	typ.	20	W
Power bandwidth at d_{tot} = 0.5% from P_o = 50 mW to 10 W	B	20 Hz to	20	kHz
Voltage gain				
open-loop	G_o	typ.	74	dB
closed-loop	G_c	typ.	30	dB
Internal resistance of pin 1 (at $R_{1\text{-}8} = \infty$)	R_i	>	1	MΩ
Input resistance of test circuit at pin 1 (Fig. 3)	R_i	typ.	20	kΩ
Input sensitivity				
for P_o = 16 W	V_i	typ.	260	mV
Signal-to-noise ratio				
at P_o = 50 mW; R_{source} = 2 kΩ				
f = 20 Hz to 20 kHz; unweighted	S/N	typ.	76	dB
weighted; measured according to IEC 179 (A-curve)	S/N	typ.	80	dB
Ripple rejection at f = 100 Hz; R_S = 0 Ω	RR	typ.	60	dB
Total harmonic distortion at P_o = 16 W	d_{tot}	typ.	0.01	%
Output resistance (pin 5)	R_o	typ.	0.01	Ω
Input offset voltage	$V_{5\text{-}8}$	typ.	1	mV
		<	100	mV
Transient intermodulation distortion				
at P_o = 10 W	d_{TIM}	typ.	0.01	%
Intermodulation distortion at P_o = 10 W	d_{IM}	typ.	0.01	%
Slew rate	SR	typ.	9	V/μs

APPLICATION INFORMATION

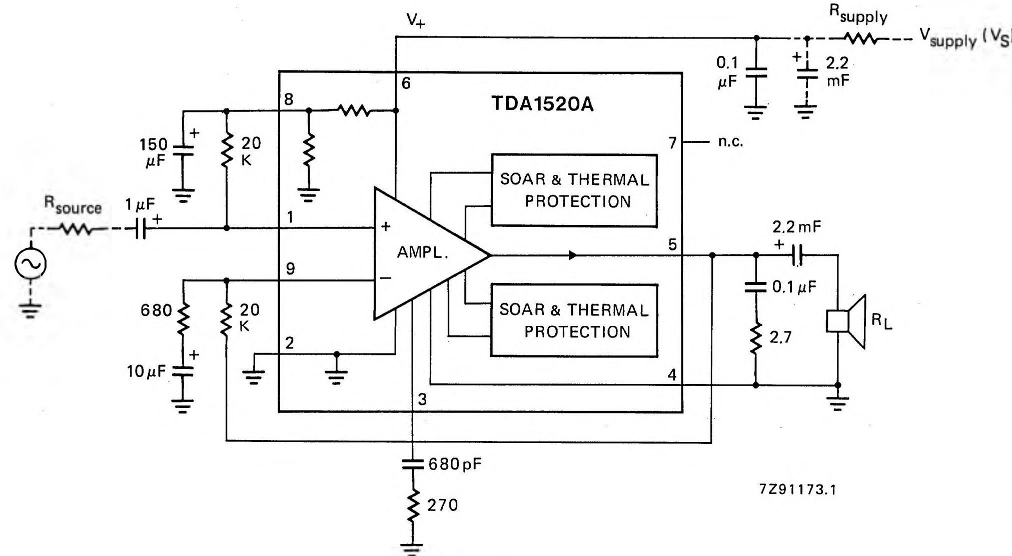


Fig. 3 Test and application circuit.

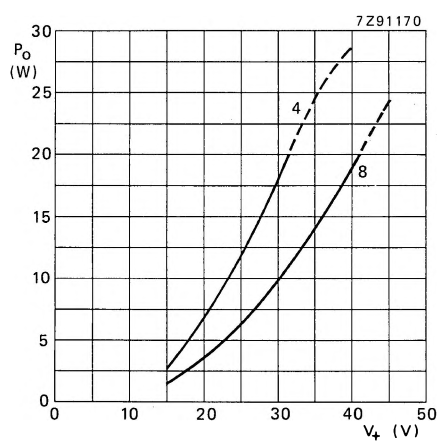


Fig. 4 Output power (P_o) versus supply voltage (V_p) at f = 1 kHz, d_{tot} = 0.5%, G_v = 30 dB.

APPLICATION INFORMATION (continued)

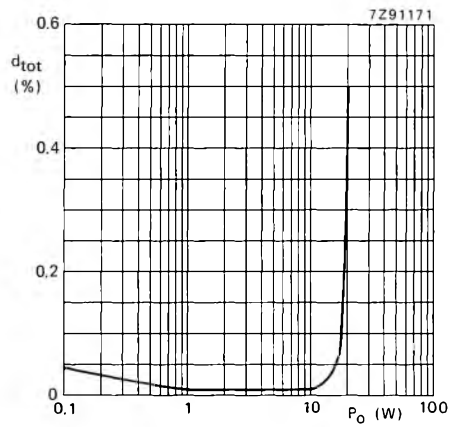


Fig. 5 Total harmonic distortion (d_{tot}) versus output power (P_o) at V_p = 33 V, R_L = 4 Ω, f = 1 kHz.

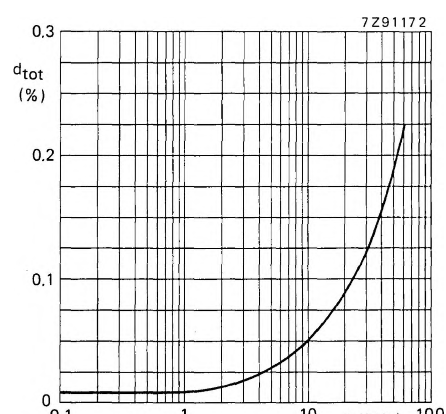


Fig. 6 Total harmonic distortion (d_{tot}) versus operating frequency (f) at V_p = 33 V, R_L = 4 Ω, P_o = 10 W (constant).