

DEVELOPMENT DATA

This data sheet contains advance information and specifications are subject to change without notice.

TDA1520B
TDA1520BQ

20 W HI-FI AUDIO POWER AMPLIFIER

GENERAL DESCRIPTION

The TDA1520B is an integrated hi-fi audio power amplifier designed for use with non-stabilized symmetrical or stabilized asymmetrical power supplies in mains-fed applications (e.g. stereo radio, stereo TV sound and cassette recorder).

Features

- Low offset voltage at output (suitable for BTL application)
- Low cross-over and secondary cross-over distortion
- Low intermodulation and transient intermodulation distortion
- Low harmonic distortion
- Good hum suppression
- High slew rate
- No switch-on/switch-off plop
- Thermal protection

QUICK REFERENCE DATA (note 1)

parameter	conditions	symbol	min.	typ.	max.	unit
Supply voltage range		V_p	15	—	50	V
Total quiescent current		I_{tot}	22	60	105	mA
Output power at THD = 0,5%		P_o	20	22	—	W
Input impedance		Z_i	1000	—	—	k Ω
Signal plus noise to noise ratio at $P_O = 50$ mW	note 2	(S+N)/N	70	75	—	dB
Supply voltage ripple rejection at $R_S = 0 \Omega$	$f = 100$ Hz	SVRR	45	60	—	dB
	$f = 10$ kHz	SVRR	45	80	—	dB

Notes to the Quick Reference Data

1. All values measured from test circuit Fig.6; $V_p = 33$ V; $R_L = 4 \Omega$; $f = 1$ kHz; $T_{amb} = 25$ °C; unless otherwise specified.
2. Bandwidth is 20 Hz to 20 kHz; $R_S = 2$ k Ω (RMS value).

PACKAGE OUTLINES

TDA1520B: 9-lead SIL; plastic power (SOT131).

TDA1520BQ: 9-lead SIL-bent-to-DIL; plastic power (SOT157).

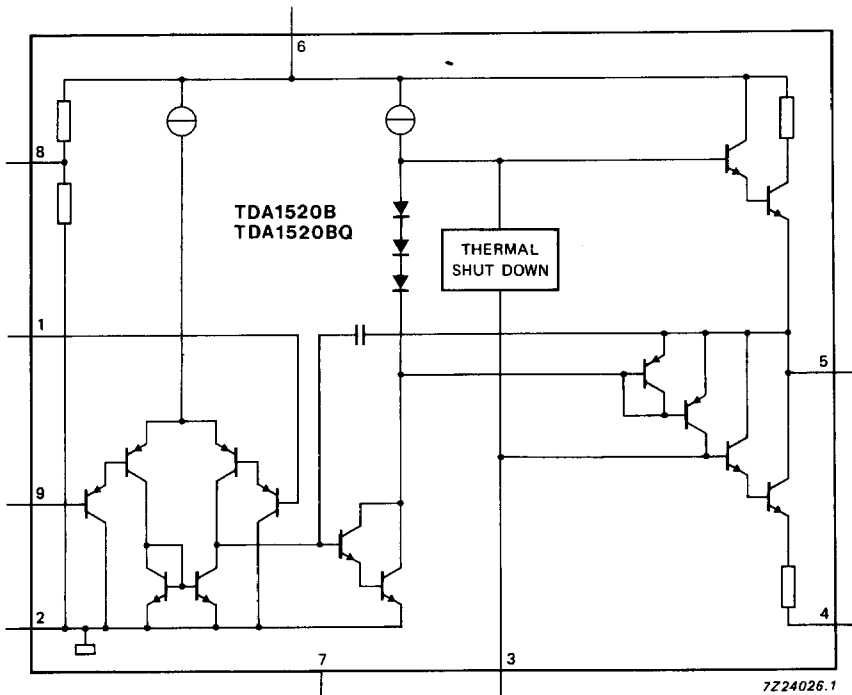


Fig. 1 Block diagram.

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 Supply voltage ripple rejection
- 9 Inverting input (feedback)

RATINGS

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

parameter	conditions	symbol	min.	max.	unit
Supply voltage	note 1	V_p	—	50	V
Input voltage pins 1 to 2		V_I	—	25	V
pins 9 to 2		V_{I1}	—	25	V
Repetitive peak output current		I_{ORM}	—	4	A
Non-repetitive peak output current	note 2	I_{OSM}	—	5	A
Total power dissipation		P_{tot}	see Fig.2		
AC short-circuit time of the load impedance during signal drive at $V_p = \pm 20$ V	symmetrical supply; $R_S = 2 \Omega$; $f = \geq 20$ Hz	T_{sc}	—	1	hour
$V_p = 30$ V		asymmetrical supply; $R_S = 4 \Omega$	T_s	—	1
Operating ambient temperature range		T_{amb}	see Fig.2		
Storage temperature range		T_{stg}	-55	+150	$^{\circ}\text{C}$

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Notes to the Ratings

1. Minimum rise time of the supply must be ≥ 20 ms.
2. Maximum peak current is defined by the internal protection circuits.

POWER DISSIPATION AND HEATSINK INFORMATION

The maximum theoretical power dissipation with a stabilized power supply is ($V_p = 33$ V and $R_L = 4 \Omega$):

$$\frac{V_p^2}{2 \pi^2 R_L} = 13.8 \text{ W.}$$

Worst case power dissipation with a non-stabilized power supply is (regulation factor of 15%; over voltage of 10% and $R_L \text{ min.} = 0.8 \times R_L \text{ typ.}$; V_{pL} is the loaded supply voltage):

$$\frac{(1.1 \times V_{pL})^2}{2 \pi^2 R_{L \text{ min.}}} = 23.4 \text{ W.}$$

With a maximum ambient temperature of 50°C and a maximum crystal temperature of 150°C , the required thermal resistance is:

$$R_{thj-a} = \frac{150 - 50}{23.4} = 4.3 \text{ K/W.}$$

The thermal resistance of the encapsulation is ≤ 2.5 K/W, therefore the thermal resistance of the heatsink must be < 1.8 K/W.

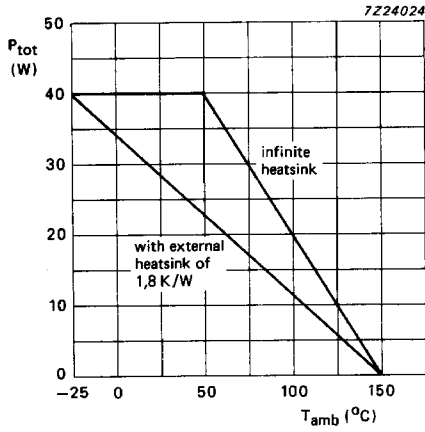


Fig. 2 Power derating curve.

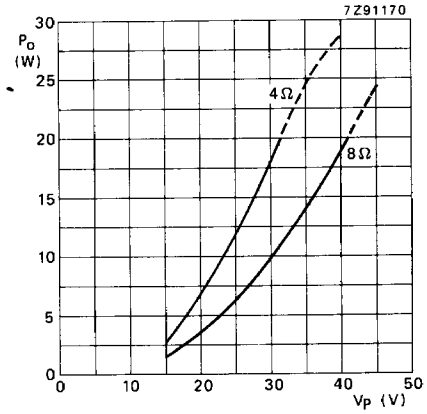


Fig. 3 Output power (P_O) as a function of supply voltage (V_p);
 $f = 1 \text{ kHz}$; $d_{\text{tot}} = 0.5\%$; $G_V = 30 \text{ dB}$.

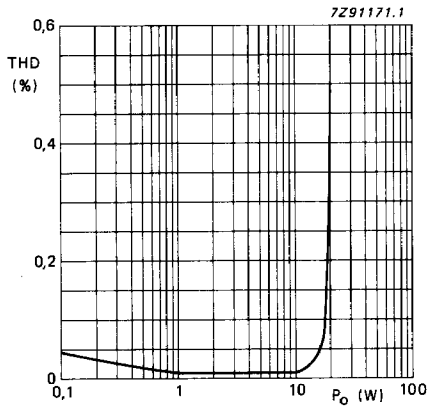


Fig. 4 Total harmonic distortion (THD) as a function of output power (P_O);
 $V_p = 33 \text{ V}$; $R_L = 4 \Omega$; $f = 1 \text{ kHz}$.

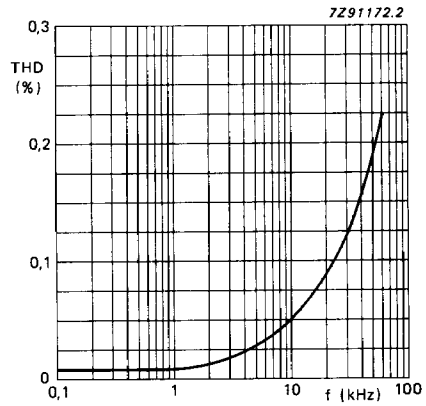


Fig. 5 Total harmonic distortion (THD) as a function of operating frequency (f);
 $V_p = 33 \text{ V}$; $R_L = 4 \Omega$;
 $P_O = 10 \text{ W}$ (constant).

CHARACTERISTICS

$V_p = 33 \text{ V}$; $R_L = 4 \text{ } \Omega$; $f = 1 \text{ kHz}$; $T_{amb} = 25 \text{ }^\circ\text{C}$; unless otherwise specified; measured from test circuit, Fig. 6.

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parameter	conditions	symbol	min.	typ.	max.	unit
Supply voltage range		V_p	15	—	50	V
Total quiescent current		I_p	22	60	105	mA
Peak output current		I_{OM}	—	—	3,2	A
Power output at THD = 0.5%	note 1	P_O	20	22	—	W
Total harmonic distortion at $P_O = 12 \text{ W}$	note 1	THD	—	0.01	0.1	%
Power bandwidth at THD = 0.5%	$P_O = 50 \text{ mW}$ to 10 W	B	—	20 to 20000	—	Hz
Input voltage at $P_O = 20 \text{ W}$	note 2	V_I	225	290	325	mV
Input impedance	note 3	Z_I	1000	—	—	k Ω
Signal plus noise to noise ratio at P_O at 50 mW	note 4	(S+N)/N	70	75	—	dB
Offset voltage		$ V_{5-8} $	0	± 10	± 100	mV
Input offset current		I_{os}	—	0	1	μA
Output impedance		Z_O	—	—	0.1	Ω
Supply voltage ripple rejection at $R_S = 0 \text{ } \Omega$	$f = 100 \text{ Hz}$	SVRR	45	60	—	dB
	$f = 10 \text{ kHz}$	SVRR	45	80	—	dB
Intermodulation distortion at $P_O = 10 \text{ W}$		d_{IM}	—	0.02	—	%
Transient intermodulation distortion	note 5	d_{TIM}	—	0.01	—	%
Slew rate		SR	—	6	—	V/ μs

Notes to the Characteristics

- Output power is measured directly at the output pin.
- The closed-loop gain is determined by external resistors and is variable between 20 to 40 dB.
- Input impedance in the test circuit is determined by the bias resistor R.
- Unweighted noise measured in a bandwidth of 20 Hz to 20 kHz at $R_S = 2 \text{ k}\Omega$.
- The transient intermodulation distortion is measured at $P_O = 10 \text{ W}$. The input signal is a 3.18 kHz square-wave signal mixed with a 15 kHz sine-wave signal and a peak-to-peak voltage ratio of 4:1.

APPLICATION INFORMATION

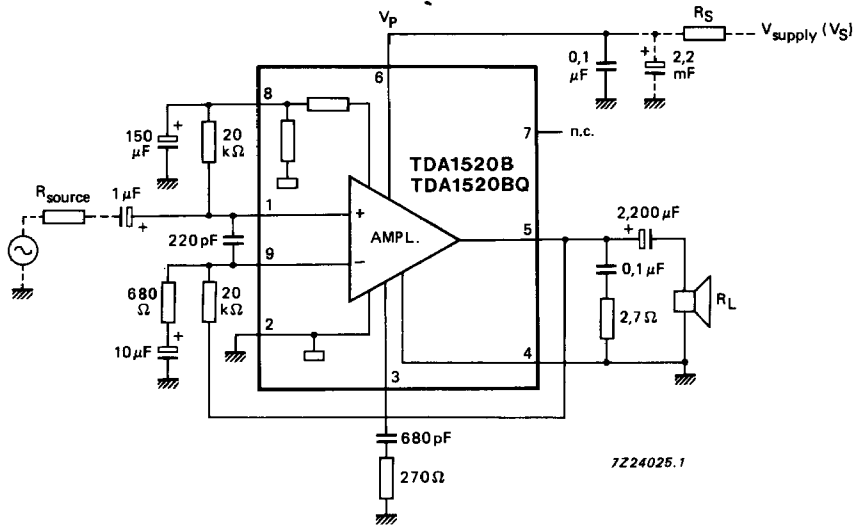


Fig. 6 Test and application diagram.