



LM2002/LM2002A 8 Watt Audio Power Amplifier

General Description

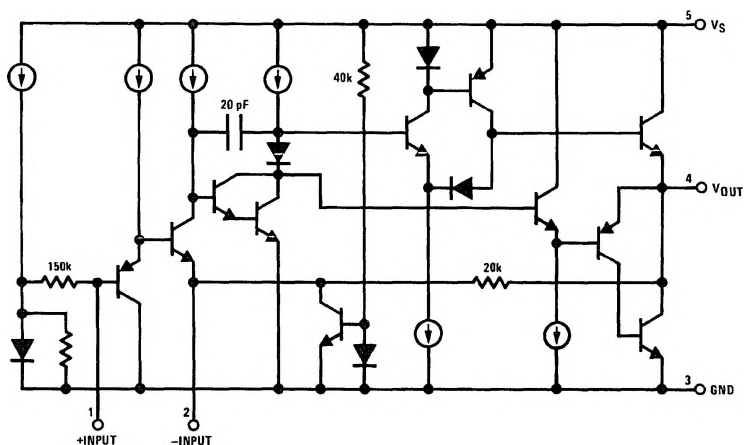
The LM2002 is a cost effective, high power amplifier suited for automotive applications. High current capability (3.5A) enables the device to drive low impedance loads with low distortion. The LM2002 is current limited and thermally protected. High voltage protection is available (LM2002A) which enables the amplifier to withstand 40V transients on its supply. The LM2002 comes in a 5-pin TO-220 package.

Features

- High peak current capability (3.5A)
- Large output voltage swing

- Externally programmable gain
- Wide supply voltage range (5V–20V)
- Few external parts required
- Low distortion
- High input impedance
- No turn-on transients
- High voltage protection available (LM2002A)
- Low noise
- AC short circuit protected
- Pin for pin compatible with TDA2002

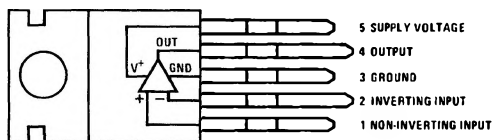
Equivalent Schematic



TL/H/7929-1

Connection Diagram

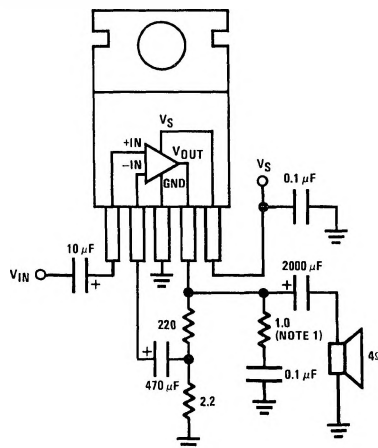
Plastic Package



TL/H/7929-2

Order Number LM2002T or LM2002AT
See NS Package Number T05A

Typical Application



TL/H/7929-3

Absolute Maximum Ratings

If Military/Aerospace specified devices are required, contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Peak Supply Voltage (50 ms)

LM2002A (Note 2)

LM2002

Operating Supply Voltage

40V

25V

20V

Output Current

Repetitive

Non-repetitive

3.5A

4.5A

Input Voltage

±0.5V

Power Dissipation (Note 3)

15W

Operating Temperature

0°C to +70°C

Storage Temperature

−60°C to +150°C

Lead Temperature (Soldering, 10 sec.)

260°C

Electrical Characteristics

$V_S = 14.4V$, $T_{TAB} = 25^\circ C$, $A_v = 100$ (40 dB), $R_L = 4\Omega$, unless otherwise specified

Parameter	Conditions	Min	Typ	Max	Units
DC Output Level		6.4	7.2	8	V
Quiescent Supply Current	Excludes Current in Feedback Resistors		45	80	mA
Supply Voltage Range		5		20	V
Input Resistance			150		kΩ
Bandwidth	Gain = 40 dB		100		kHz
Output Power	$V_S = 13.2V$, $f = 1\text{ kHz}$				
	$R_L = 4\Omega$, THD = 10%		4.3		W
	$R_L = 2\Omega$, THD = 10%		6.5		W
	$V_S = 13.8V$, $f = 1\text{ kHz}$				
	$R_L = 4\Omega$, THD = 10%		4.8		W
	$R_L = 2\Omega$, THD = 10%		7.4		W
	$V_S = 14.4V$, $f = 1\text{ kHz}$				
	$R_L = 4\Omega$, THD = 10%	4.8	5.2		W
	$R_L = 2\Omega$, THD = 10%	7	8		W
	$R_L = 1.6\Omega$, THD = 10%		9		W
	$V_S = 16V$, $f = 1\text{ kHz}$				
	$R_L = 4\Omega$, THD = 10%		6.5		W
	$R_L = 2\Omega$, THD = 10%		10		W
	$R_L = 1.6\Omega$, THD = 10%		10.5		W
THD	$P_O = 2W$, $R_L = 4\Omega$, $f = 1\text{ kHz}$		0.1		%
	$P_O = 4W$, $R_L = 2\Omega$, $f = 1\text{ kHz}$		0.1		%
Ripple Rejection	$R_S = 50\Omega$, $f = 100\text{ Hz}$	30	40		dB
	$R_S = 50\Omega$, $f = 1\text{ kHz}$		44		dB
Input Noise Voltage	$R_S = 0$, 15 kHz Bandwidth		2		μV
Input Noise Current	$R_S = 100\text{ k}\Omega$, 15 kHz Bandwidth		40		pA

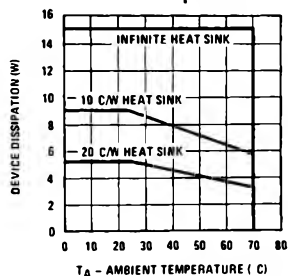
Note 1: A 1.0 resistor and 0.1 μF capacitor should be placed as close as possible to pins 3 and 4 for stability.

Note 2: The LM2002 shuts down above 25V.

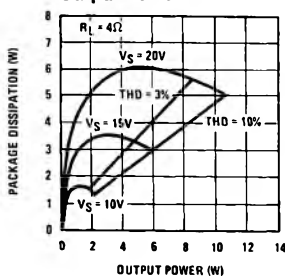
Note 3: For operating at elevated temperatures, the device must be derated based on a 150°C maximum junction temperature and a thermal resistance of 4°C/W junction to case.

Typical Performance Characteristics

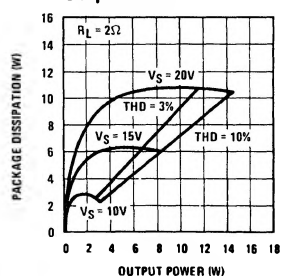
Device Dissipation vs Ambient Temperature



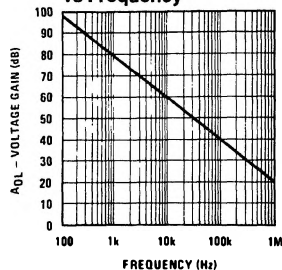
Power Dissipation vs Output Power



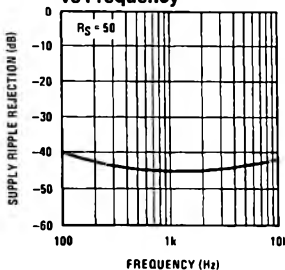
Power Dissipation vs Output Power



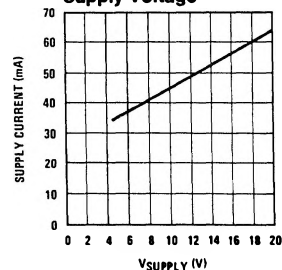
Open Loop Gain vs Frequency



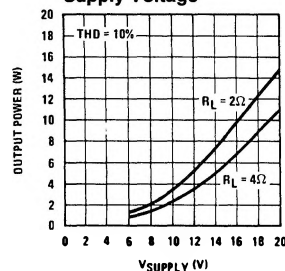
Supply Ripple Rejection vs Frequency



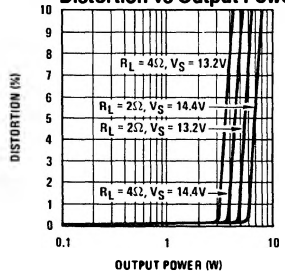
Supply Current vs Supply Voltage



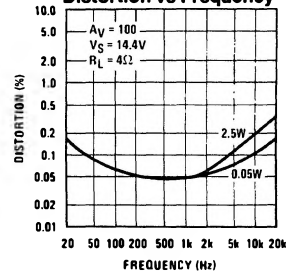
Output Power vs Supply Voltage



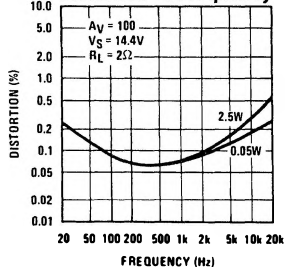
Distortion vs Output Power



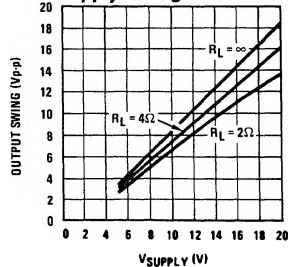
Distortion vs Frequency



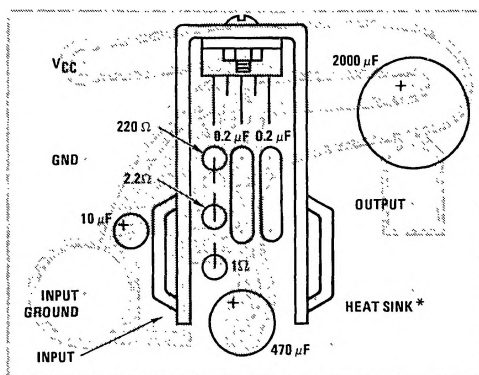
Distortion vs Frequency



Output Swing vs Supply Voltage



Component Layout

$$R_L = 4\Omega$$


*Staver V-5 Heatsink
Staver Company
41 Saxon Ave
P.O. Drawer H
Bayshore, NY 11706
TEL: (516) 666-8000