



## LM2002/LM2002A 8 Watt Audio Power Amplifier

### General Description

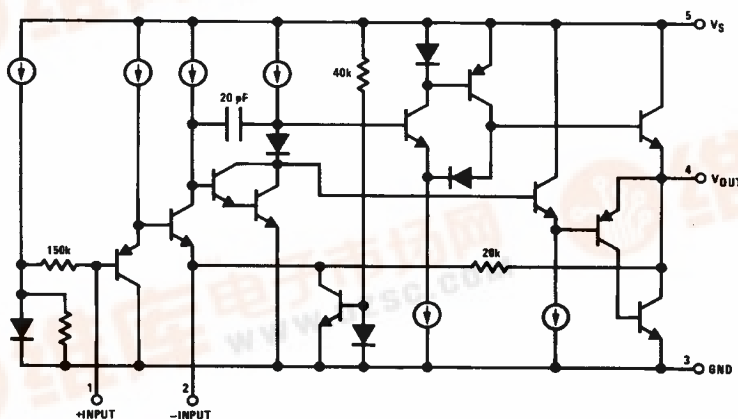
The LM2002 is a cost effective, high power amplifier suited for automotive applications. High current capability (3.5A) enables the device to drive low impedance loads with low distortion. The LM2002 is current limited and thermally protected. High voltage protection is available (LM2002A) which enables 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

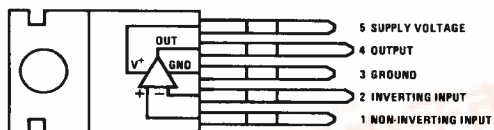
### Equivalent Schematic



TL/H/7929-1

### Connection Diagram

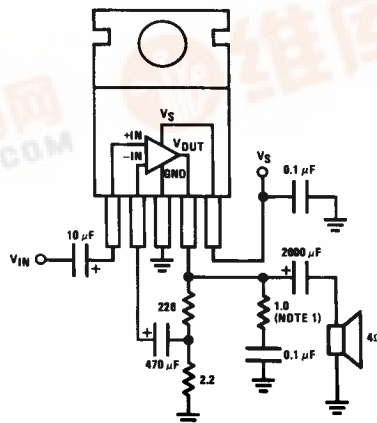
#### Plastic Package



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, please 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		k $\Omega$
Bandwidth	Gain = 40 dB		100		kHz
Output Power	$V_S = 13.2V$ , $f = 1$ kHz				
	$R_L = 4\Omega$ , THD = 10%		4.3		W
	$R_L = 2\Omega$ , THD = 10%		6.5		W
	$V_S = 13.8V$ , $f = 1$ kHz				
	$R_L = 4\Omega$ , THD = 10%		4.8		W
	$R_L = 2\Omega$ , THD = 10%		7.4		W
	$V_S = 14.4V$ , $f = 1$ 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
	$V_S = 16V$ , $f = 1$ kHz				
	$R_L = 4\Omega$ , THD = 10%		6.5		W
THD	$P_O = 2W$ , $R_L = 4\Omega$ , $f = 1$ kHz		0.1		%
	$P_O = 4W$ , $R_L = 2\Omega$ , $f = 1$ kHz		0.1		%
Ripple Rejection	$R_S = 50\Omega$ , $f = 100$ Hz	30	40		dB
	$R_S = 50\Omega$ , $f = 1$ kHz		44		dB
Input Noise Voltage	$R_S = 0$ , 15 kHz Bandwidth		2		$\mu V$
Input Noise Current	$R_S = 100$ k $\Omega$ , 15 kHz Bandwidth		40		pA

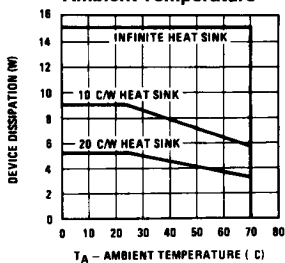
**Note 1:** A 1.0 resistor and 0.1  $\mu F$  capacitor should be placed as close as possible to pins 3 and 4 for stability.

**Note 2:** The LM2002 shuts down above 25V.

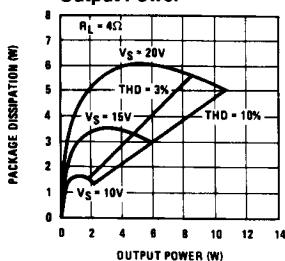
**Note 3:** For operating at elevated temperatures, the device must be derated based on a 150°C maximum junction temperature and a thermal resistance of 4°C/W junction to case.

# Typical Performance Characteristics

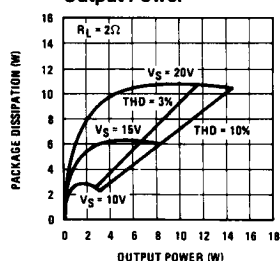
## Device Dissipation vs Ambient Temperature



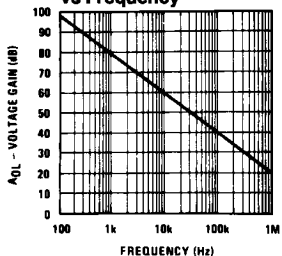
## Power Dissipation vs Output Power



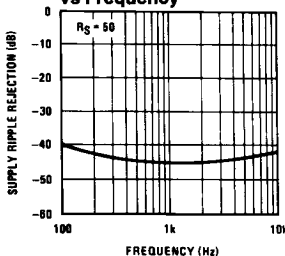
## Power Dissipation vs Output Power



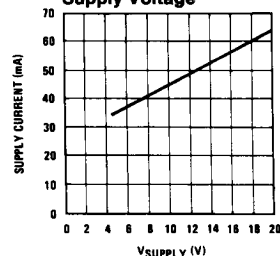
## Open Loop Gain vs Frequency



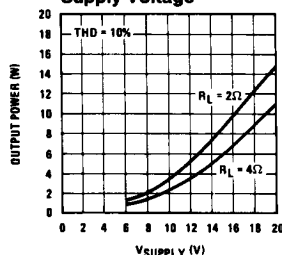
## Supply Ripple Rejection vs Frequency



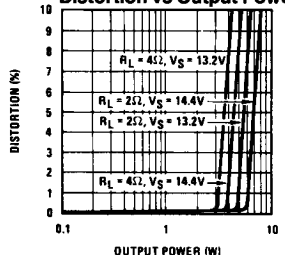
## Supply Current vs Supply Voltage



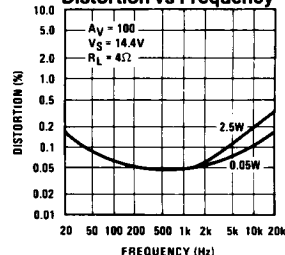
## Output Power vs Supply Voltage



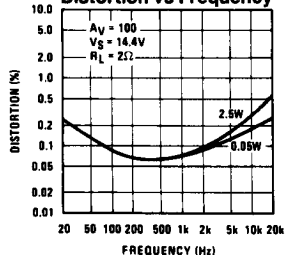
## Distortion vs Output Power



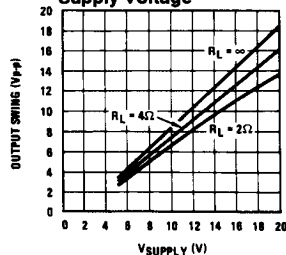
## Distortion vs Frequency



## Distortion vs Frequency

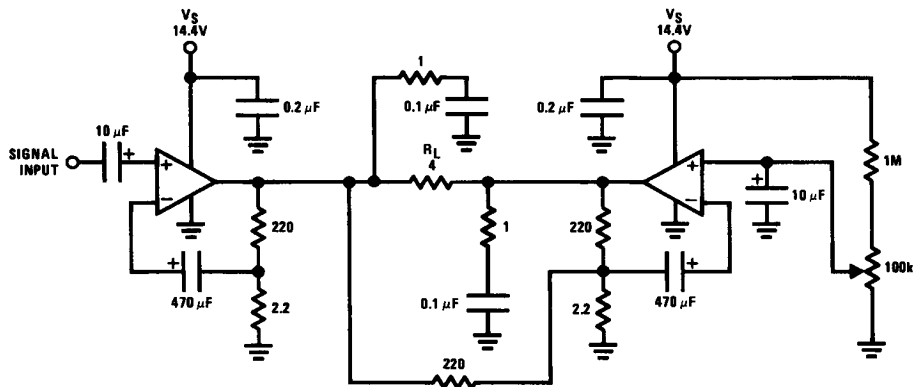


## Output Swing vs Supply Voltage



## Typical Applications (Continued)

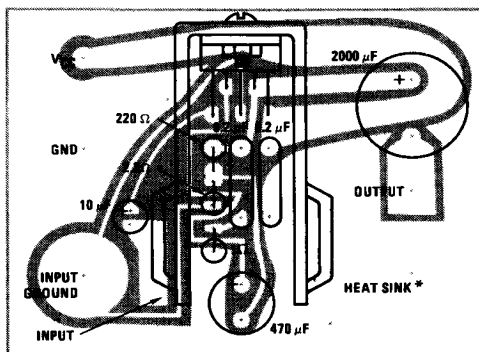
### 16W Bridge Amplifier



TL/H/7929-5

## Component Layout

Single Amplifier

 $V_S = 20V$  $R_L = 4\Omega$ 

TL/H/7929-6

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