

## LM384 5W Audio Power Amplifier

### General Description

The LM384 is a power audio amplifier for consumer application. In order to hold system cost to a minimum, gain is internally fixed at 34 dB. A unique input stage allows inputs to be ground referenced. The output is automatically self-centering to one half the supply voltage.

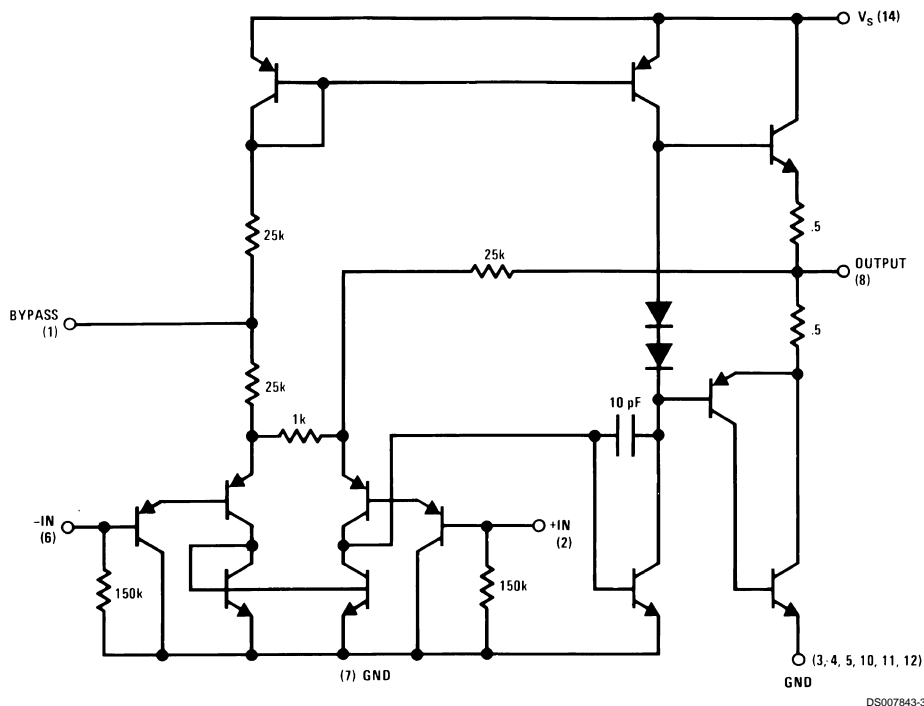
The output is short-circuit proof with internal thermal limiting. The package outline is standard dual-in-line. A copper lead frame is used with the center three pins on either side comprising a heat sink. This makes the device easy to use in standard p-c layout.

Uses include simple phonograph amplifiers, intercoms, line drivers, teaching machine outputs, alarms, ultrasonic drivers, TV sound systems, AM-FM radio, sound projector systems, etc. See AN-69 for circuit details.

### Features

- Wide supply voltage range
- Low quiescent power drain
- Voltage gain fixed at 50
- High peak current capability
- Input referenced to GND
- High input impedance
- Low distortion
- Quiescent output voltage is at one half of the supply voltage
- Standard dual-in-line package

### Schematic Diagram



## Absolute Maximum Ratings (Note 1)

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

Supply Voltage	28V
Peak Current	1.3A
Power Dissipation (See (Notes 4, 5))	1.67W
Input Voltage	±0.5V
Storage Temperature	-65°C to +150°C

Operating Temperature 0°C to +70°C

Lead Temperature (Soldering, 10 sec.) 260°C

Thermal Resistance  
 $\theta_{JC}$  30°C/W  
 $\theta_{JA}$  79°C/W

**Note 1:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits.

## Electrical Characteristics (Note 2)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$Z_{IN}$	Input Resistance			150		k $\Omega$
$I_{BIAS}$	Bias Current	Inputs Floating		100		nA
$A_V$	Gain		40	50	60	V/V
$P_{OUT}$	Output Power	THD = 10%, $R_L = 8\Omega$	5	5.5		W
$I_Q$	Quiescent Supply Current			8.5	25	mA
$V_{OUT Q}$	Quiescent Output Voltage			11		V
BW	Bandwidth	$P_{OUT} = 2W, R_L = 8\Omega$		450		kHz
$V^+$	Supply Voltage		12		26	V
$I_{SC}$	Short Circuit Current (Note 6)			1.3		A
$PSRR_{RTO}$	Power Supply Rejection Ratio (Note 3)			31		dB
THD	Total Harmonic Distortion	$P_{OUT} = 4W, R_L = 8\Omega$		0.25	1.0	%

**Note 2:**  $V^+ = 22V$  and  $T_A = 25^\circ C$  operating with a Staver V7 heat sink for 30 seconds.

**Note 3:** Rejection ratio referred to the output with  $C_{BYPASS} = 5 \mu F$ , freq = 120 Hz.

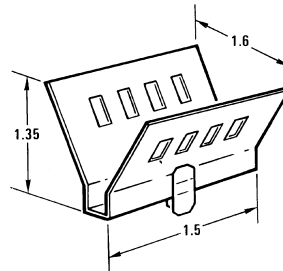
**Note 4:** The maximum junction temperature of the LM384 is 150°C.

**Note 5:** The package is to be derated at 15°C/W junction to heat sink pins.

**Note 6:** Output is fully protected against a shorted speaker condition at all voltages up to 22V.

## Heat Sink Dimensions

Staver "V7" Heat Sink

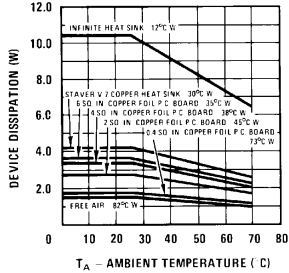


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Staver Company  
 41 Saxon Ave.  
 P.O. Drawer H  
 Bay Shore, N.Y.  
 Tel: (516) 666-8000

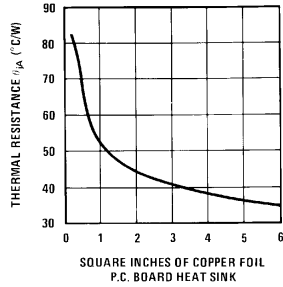
# Typical Performance Characteristics

**Device Dissipation vs Ambient Temperature**



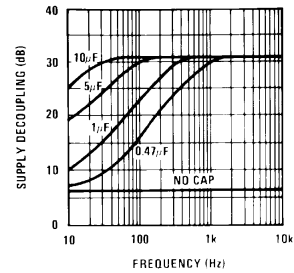
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**Thermal Resistance vs Square Inches**



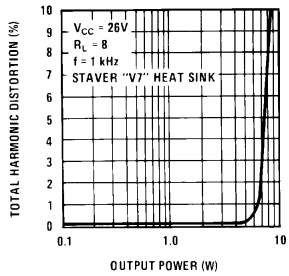
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**Supply Decoupling vs Frequency**



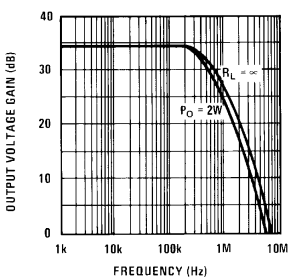
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**Total Harmonic Distortion vs Output Power**



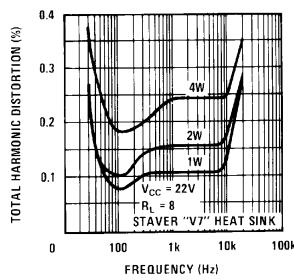
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**Output Voltage Gain vs Frequency**



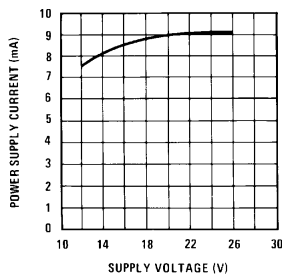
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**Total Harmonic Distortion vs Frequency**



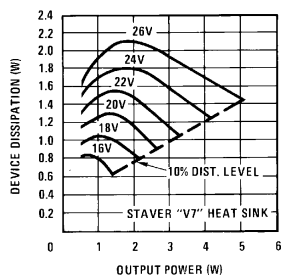
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**Power Supply Current vs Supply Voltage**



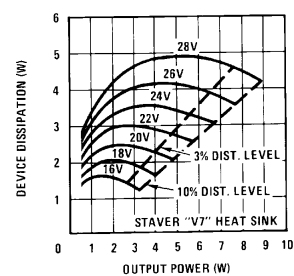
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**Device Dissipation vs Output Power — 16Ω Load**



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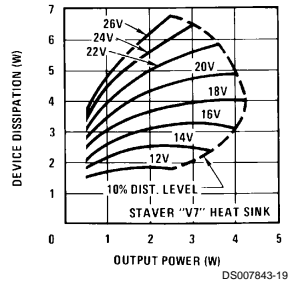
**Device Dissipation vs Output Power — 8Ω Load**



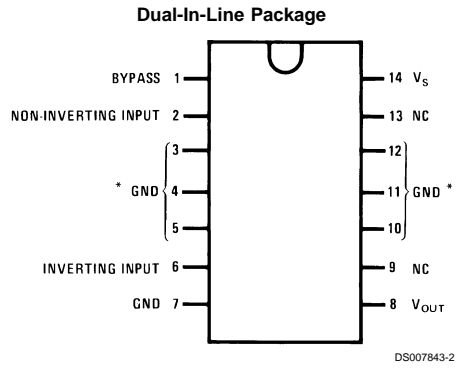
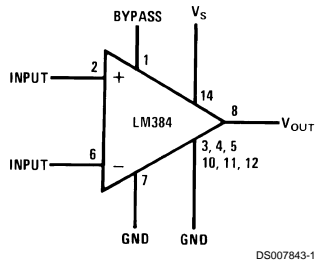
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## Typical Performance Characteristics (Continued)

Device Dissipation vs  
Output Power —  $4\Omega$  Load



## Block and Connection Diagrams

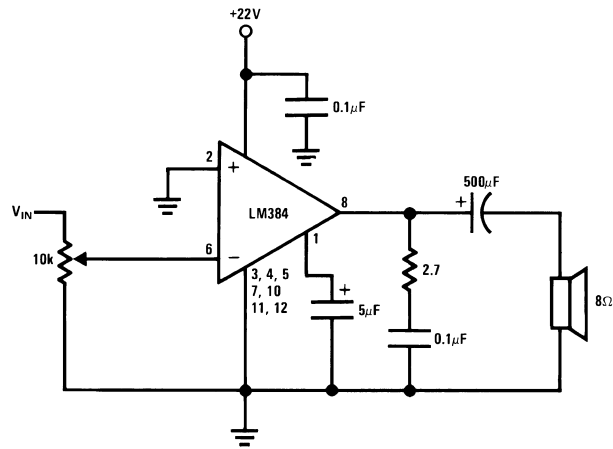


Note 7: Heatsink Pins

Top View  
Order Number LM384N  
See NS Package Number N14A

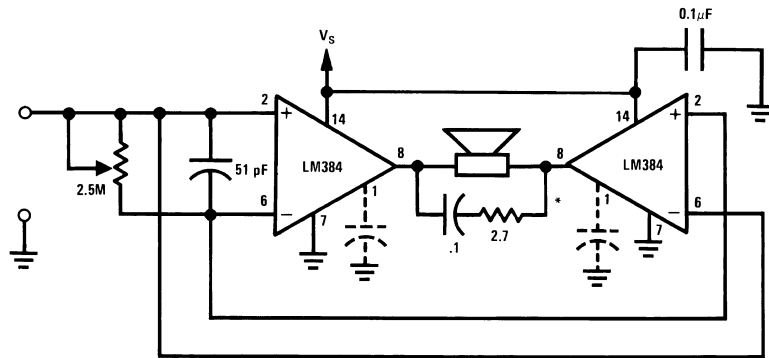
## Typical Applications

Typical 5W Amplifier



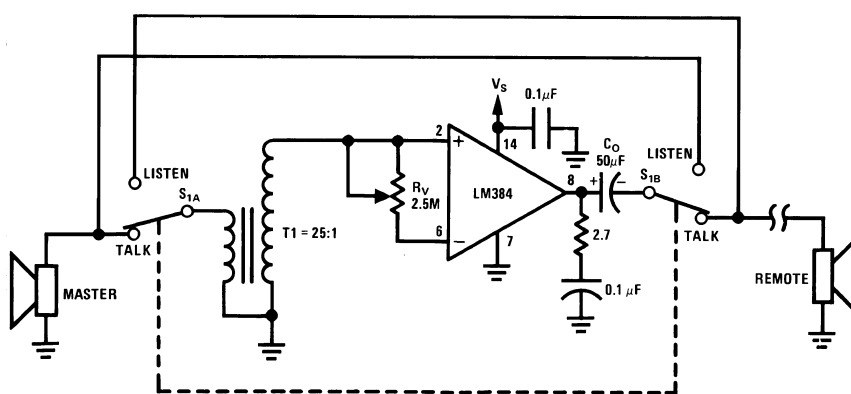
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Bridge Amplifier



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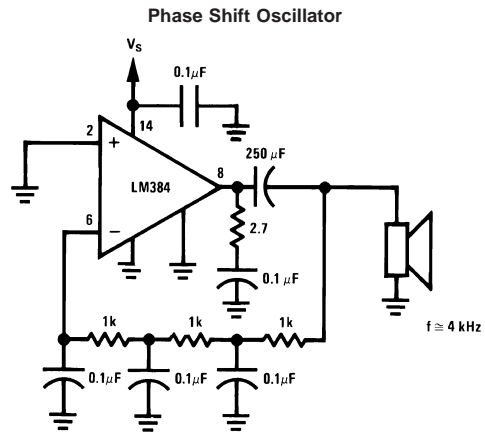
Intercom



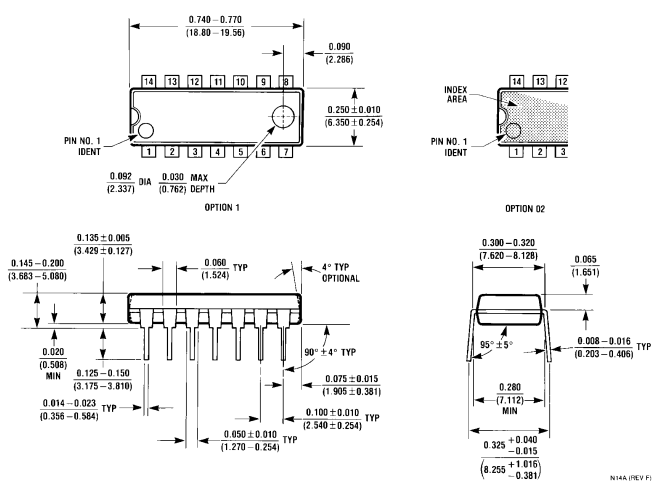
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\*For stability with high current loads

## Typical Applications (Continued)



**Physical Dimensions** inches (millimeters) unless otherwise noted




**Molded Dual-In-Line Package (N)**  
**Order Number LM384N**  
**NS Package Number N14A**

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