SNAS547C – FEBRUARY 1995 – REVISED APRIL 2013

LM384 5W Audio Power Amplifier

Check for Samples: LM384

FEATURES

- **Wide Supply Voltage Range: 12V to 26V**
- **Low Quiescent Power Drain**
- **Voltage Gain Fixed at 50**
- **High Peak Current Capability: 1.3A**
- **Input Referenced to GND**
- **High Input Impedance: 150kΩ**
- **Low Distortion: 0.25% (P_O=4W, R_L=8Ω)**
- **Quiescent Output Voltage is at One Half of the Supply Voltage**
- **14-Pin PDIP Package**

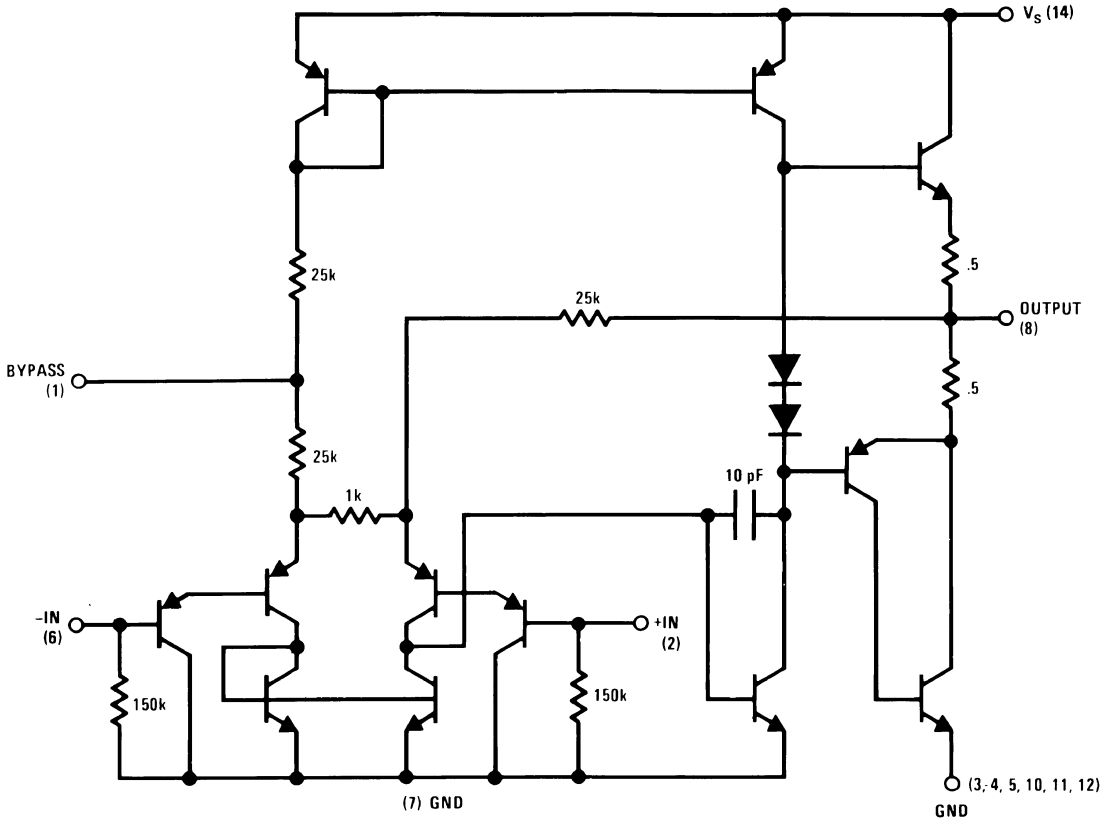
DESCRIPTION

The LM384 is a power audio amplifier for consumer applications. In order to hold system cost to a minimum, gain is internally fixed at 34 dB. A unique input stage allows ground referenced input signals. The output automatically self-centers 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 and sound projector systems. See SNAA086 for circuit details.

Schematic Diagram



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Absolute Maximum Ratings(1)(2)

Supply Voltage		28V
Peak Current		1.3A
Power Dissipation(3)(4)		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	θ_{JC}	30°C/W
	θ_{JA}	79°C/W

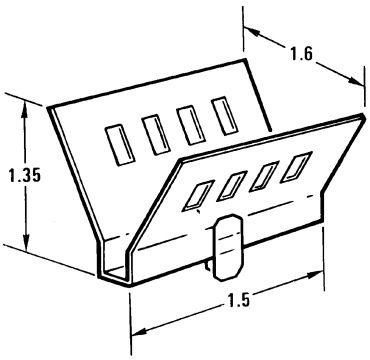
(1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not ensure specific performance limits.
(2) If Military/Aerospace specified devices are required, please contact the Texas Instruments Sales Office/Distributors for availability and specifications.
(3) The maximum junction temperature of the LM384 is 150°C.
(4) The package is to be derated at 15°C/W junction to heat sink pins.

Electrical Characteristics(1)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Z_{IN}	Input Resistance			150		kΩ
I_{BIAS}	Bias Current	Inputs Floating		100		nA
A_V	Gain		40	50	60	V/V
P_{OUT}	Output Power	THD = 10%, R_L = 8Ω	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 = 8Ω		450		kHz
V^+	Supply Voltage		12		26	V
I_{SC}	Short Circuit Current(2)			1.3		A
$PSRR_{RTO}$	Power Supply Rejection Ratio(3)			31		dB
THD	Total Harmonic Distortion	P_{OUT} = 4W, R_L = 8Ω		0.25	1.0	%

(1) V^+ = 22V and T_A = 25°C operating with a Staver V7 heat sink for 30 seconds.
(2) Output is fully protected against a shorted speaker condition at all voltages up to 22V.
(3) Rejection ratio referred to the output with C_{BYPASS} = 5 µF, freq = 120 Hz.

Heat Sink Dimensions



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

Figure 1. Staver “V7” Heat Sink

Typical Performance Characteristics

Device Dissipation vs Ambient Temperature

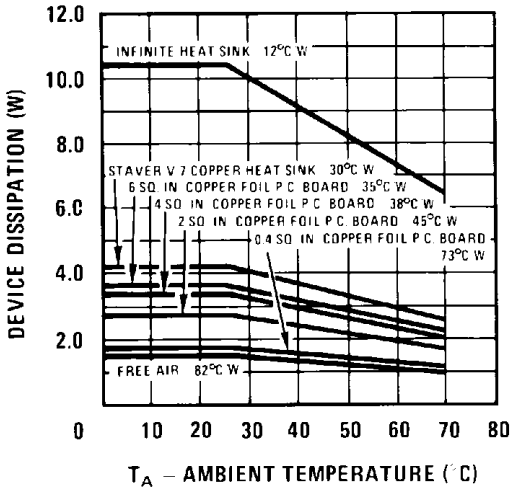


Figure 2.

Thermal Resistance vs Square Inches

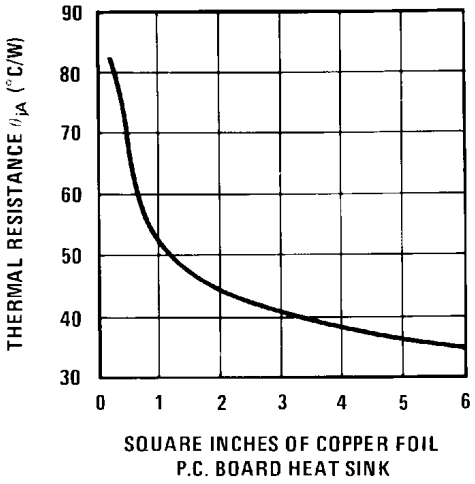


Figure 3.

Supply Decoupling vs Frequency

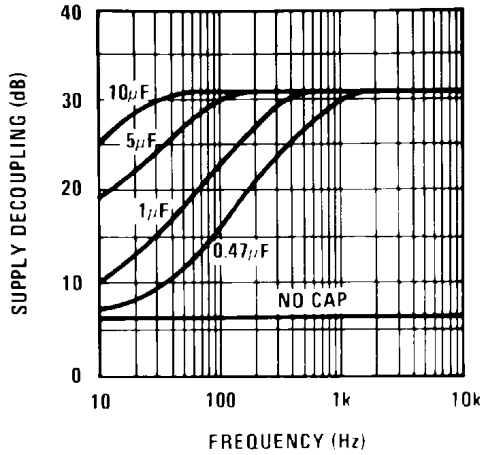


Figure 4.

Total Harmonic Distortion vs Output Power

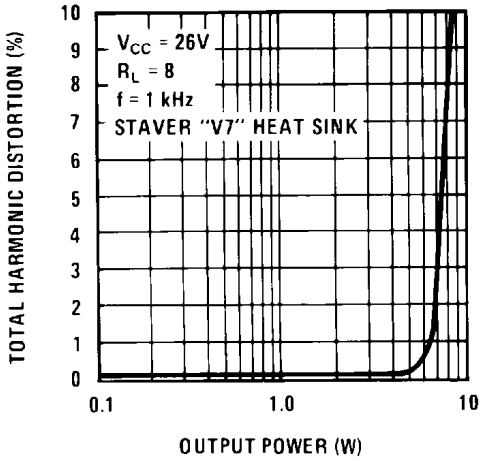


Figure 5.

Output Voltage Gain vs Frequency

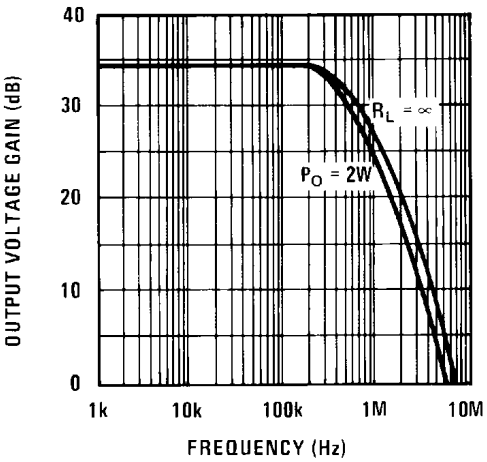


Figure 6.

Total Harmonic Distortion vs Frequency

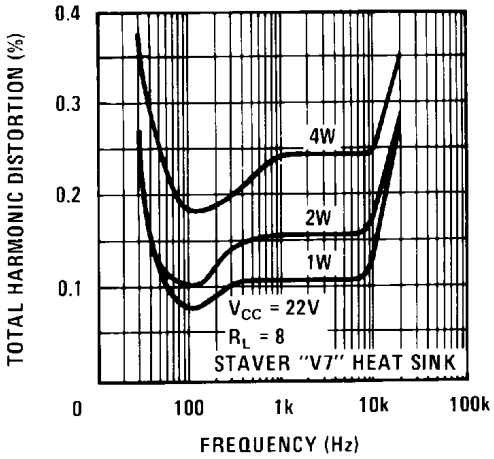


Figure 7.

Typical Performance Characteristics (continued)

Power Supply Current vs Supply Voltage

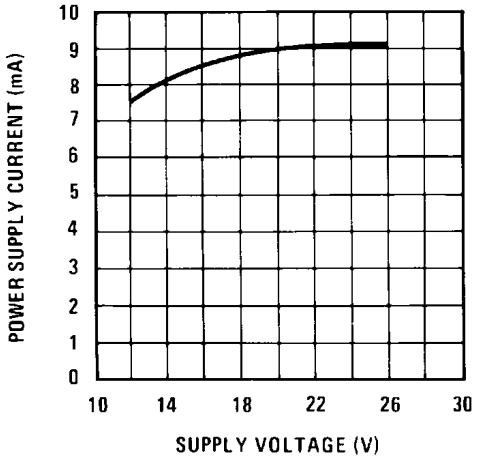


Figure 8.

Device Dissipation vs Output Power—16Ω Load

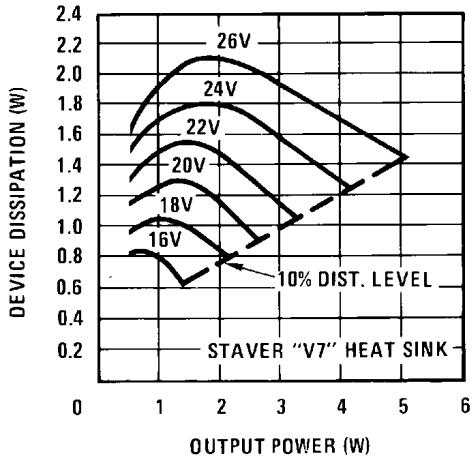


Figure 9.

Device Dissipation vs Output Power—8Ω Load

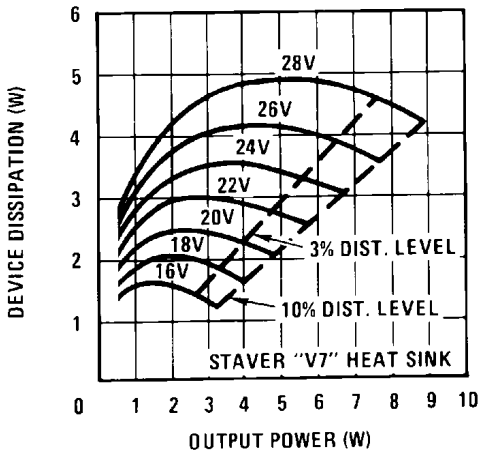


Figure 10.

Device Dissipation vs Output Power—4Ω Load

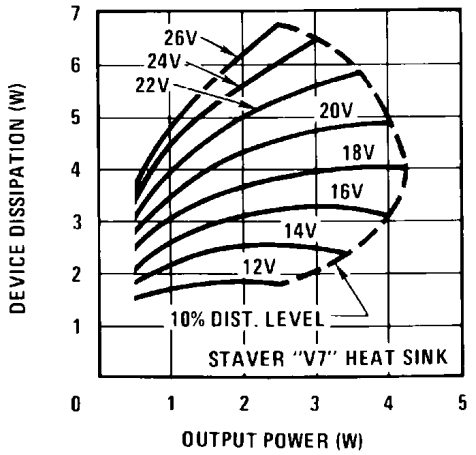
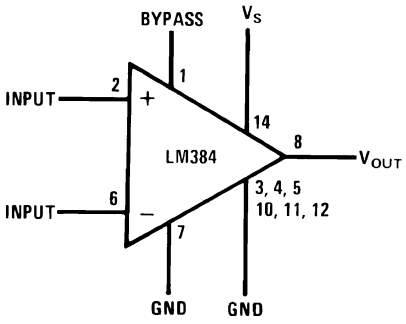
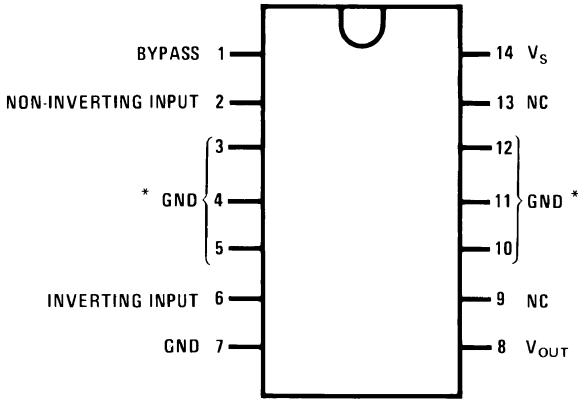


Figure 11.

Block and Connection Diagrams





Note: Heatsink Pins

Figure 12. 14-Pin PDIP (Top View)
See NFF0014A Package

Typical Applications

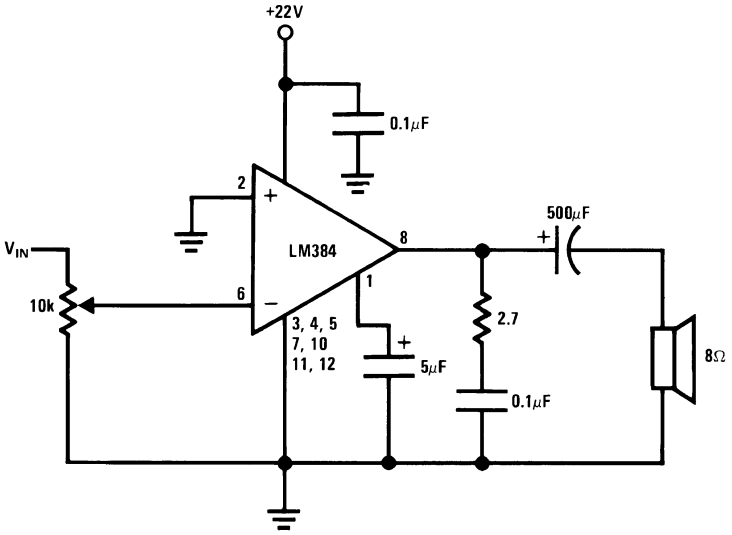


Figure 13. Typical 5W Amplifier

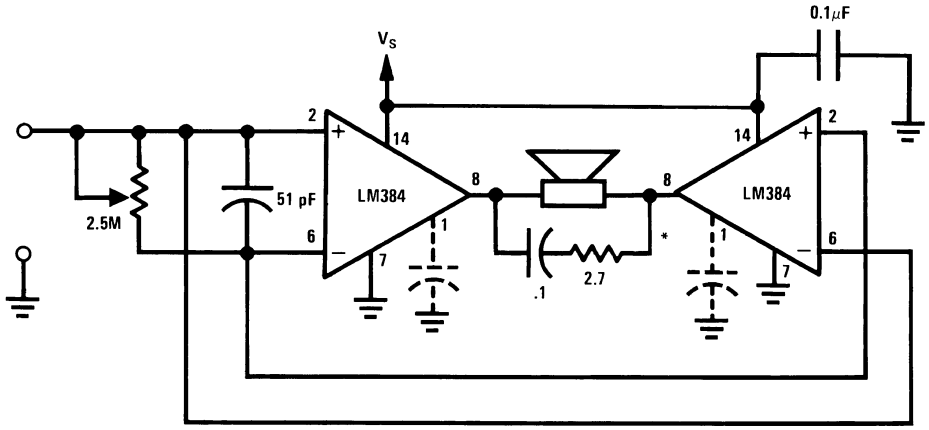
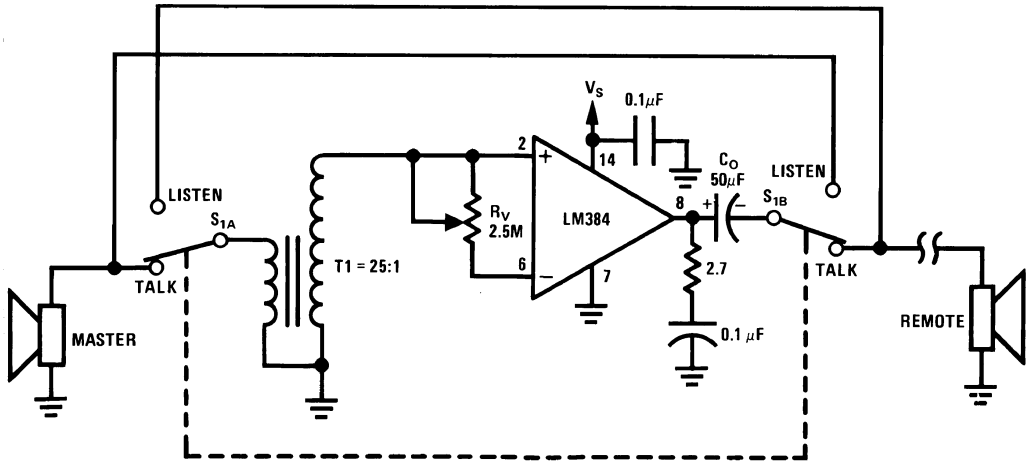


Figure 14. Bridge Amplifier



*For stability with high current loads

Figure 15. Intercom

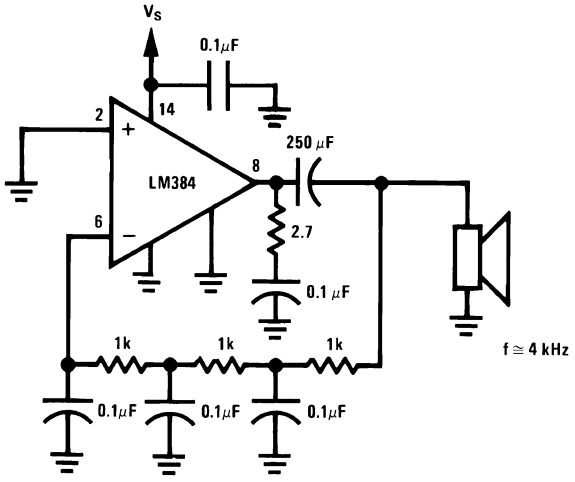
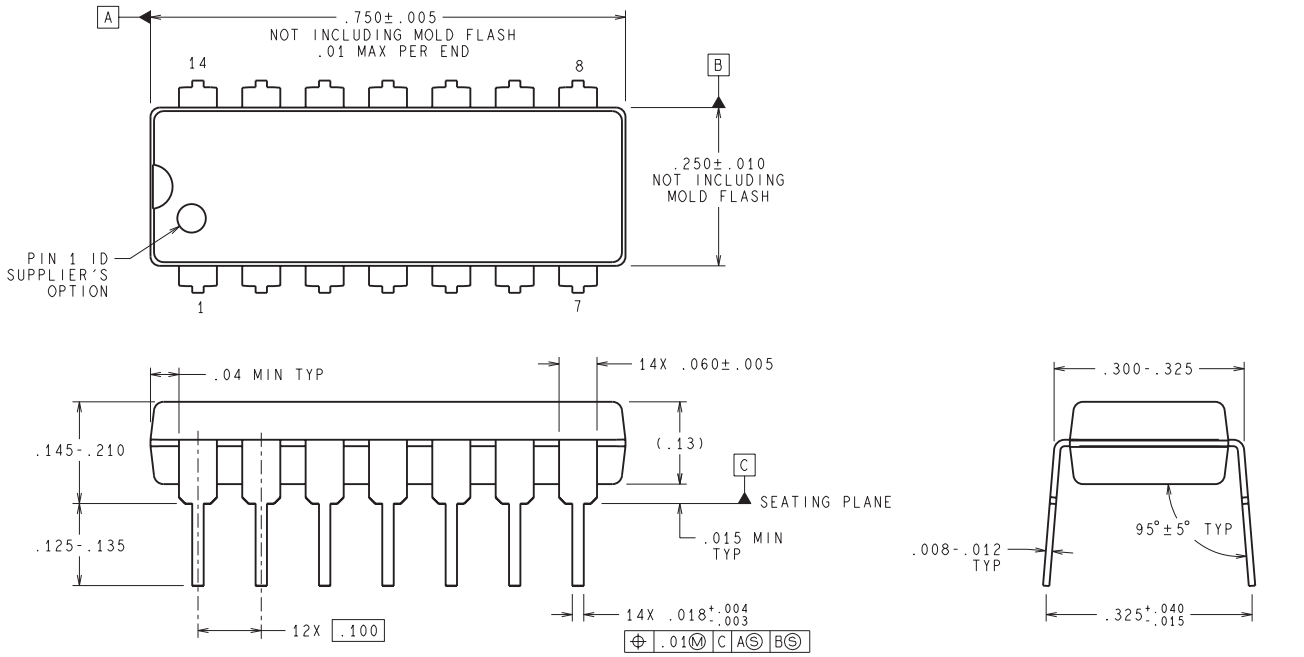


Figure 16. Phase Shift Oscillator

NFF0014A



DIMENSIONS ARE IN INCHES
DIMENSIONS IN ( ) FOR REFERENCE ONLY

N14A (Rev G)