February 1995

# National Semiconductor

## 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.

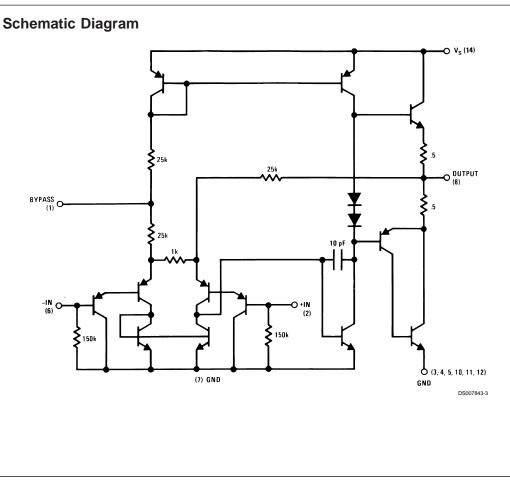
The output is short-circuit proof with internal thermal limiting. The package outline is standard dual-in-line. A copper lead frame is used with the center three pins on either side comprising a heat sink. This makes the device easy to use in standard p-c layout.

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

LM384 5W Audio Power Amplifier





www.national.com

#### 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<br>(Soldering, 10 sec.)         | 260°C                  |
| Thermal Resistance                               |                        |
| θ <sub>JC</sub>                                  | 30°C/W                 |
| ALθ  | 79°C/W                 |
| Note 1: Absolute Maximum Ratings indicate limits | beyond which damage to |

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 | Тур  | Max | Units |
|---------------------|--------------------------------|-------------------------------|-----|------|-----|-------|
| Z <sub>IN</sub>     | Input Resistance               |                               |     | 150  |     | kΩ    |
| IBIAS               | Bias Current                   | Inputs Floating               |     | 100  |     | nA    |
| A <sub>V</sub>      | Gain                           |                               | 40  | 50   | 60  | V/V   |
| Pout                | Output Power                   | THD = 10%, $R_L = 8\Omega$    | 5   | 5.5  |     | W     |
| l <sub>q</sub>      | Quiescent Supply Current       |                               |     | 8.5  | 25  | mA    |
| V <sub>OUT Q</sub>  | Quiescent Output Voltage       |                               |     | 11   |     | V     |
| BW                  | Bandwidth                      | $P_{OUT} = 2W, R_L = 8\Omega$ |     | 450  |     | kHz   |
| V+                  | Supply Voltage                 |                               | 12  |      | 26  | V     |
| I <sub>sc</sub>     | Short Circuit Current (Note 6) |                               |     | 1.3  |     | A     |
| PSRR <sub>RTO</sub> | Power Supply Rejection Ratio   |                               |     | 31   |     | dB    |
|                     | (Note 3))                      |                               |     |      |     |       |
| 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  $C_{BYPASS} = 5 \ \mu\text{F}$ , freq = 120 Hz.

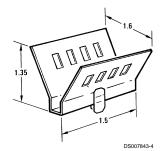
Note 4: The maximum junction temperature of the LM384 is 150°C.

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.

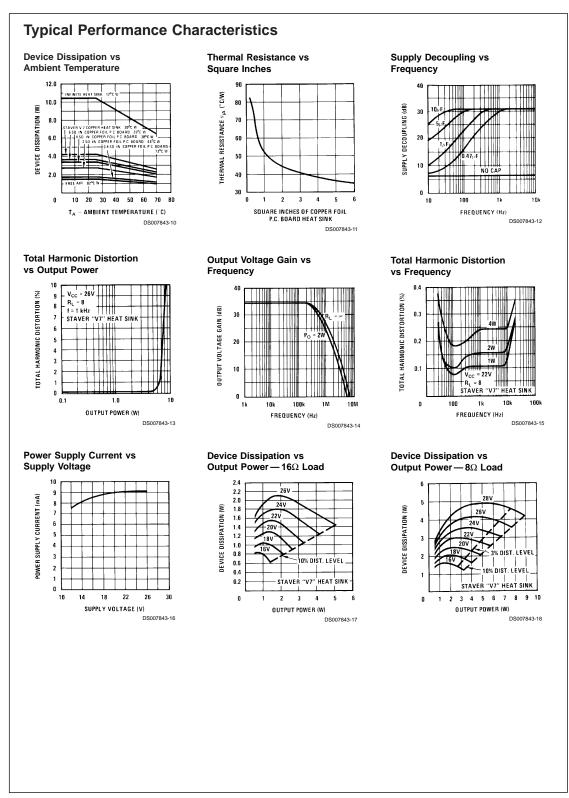
### Heat Sink Dimensions

#### Staver "V7" Heat Sink

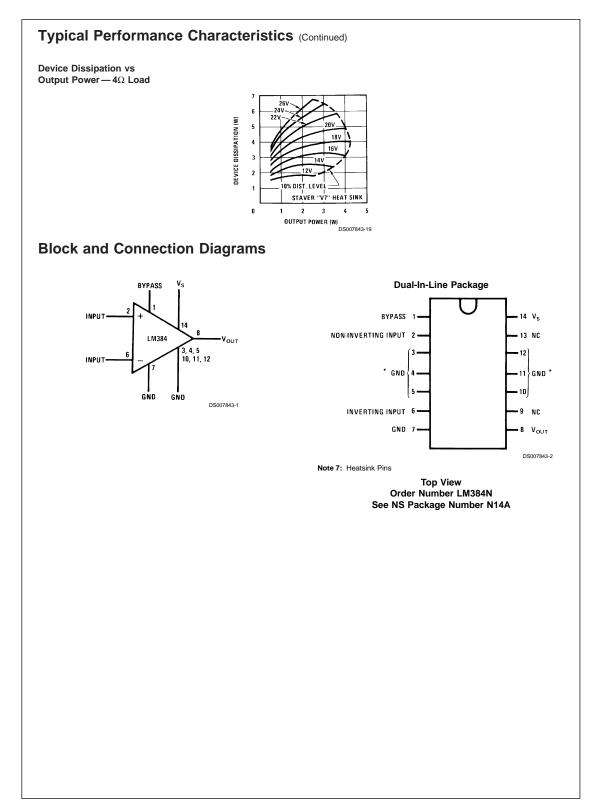


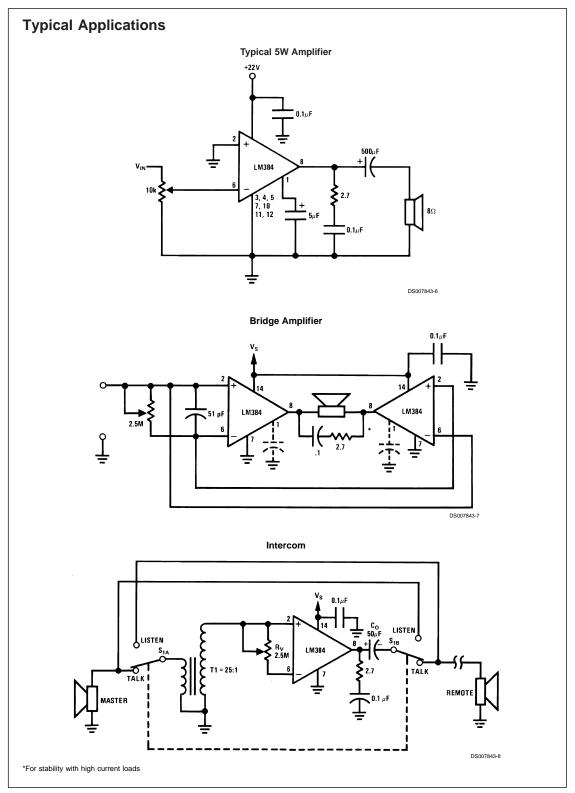
Staver Company 41 Saxon Ave. P.O. Drawer H Bay Shore, N.Y. Tel: (516) 666-8000

www.national.com



www.national.com





www.national.com

