

## 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:** 150k $\Omega$
- **Low Distortion:** 0.25% ( $P_O=4W$ ,  $R_L=8\Omega$ )
- **Quiescent Output Voltage is at One Half of the Supply Voltage**
- **14-Pin PDIP Package**

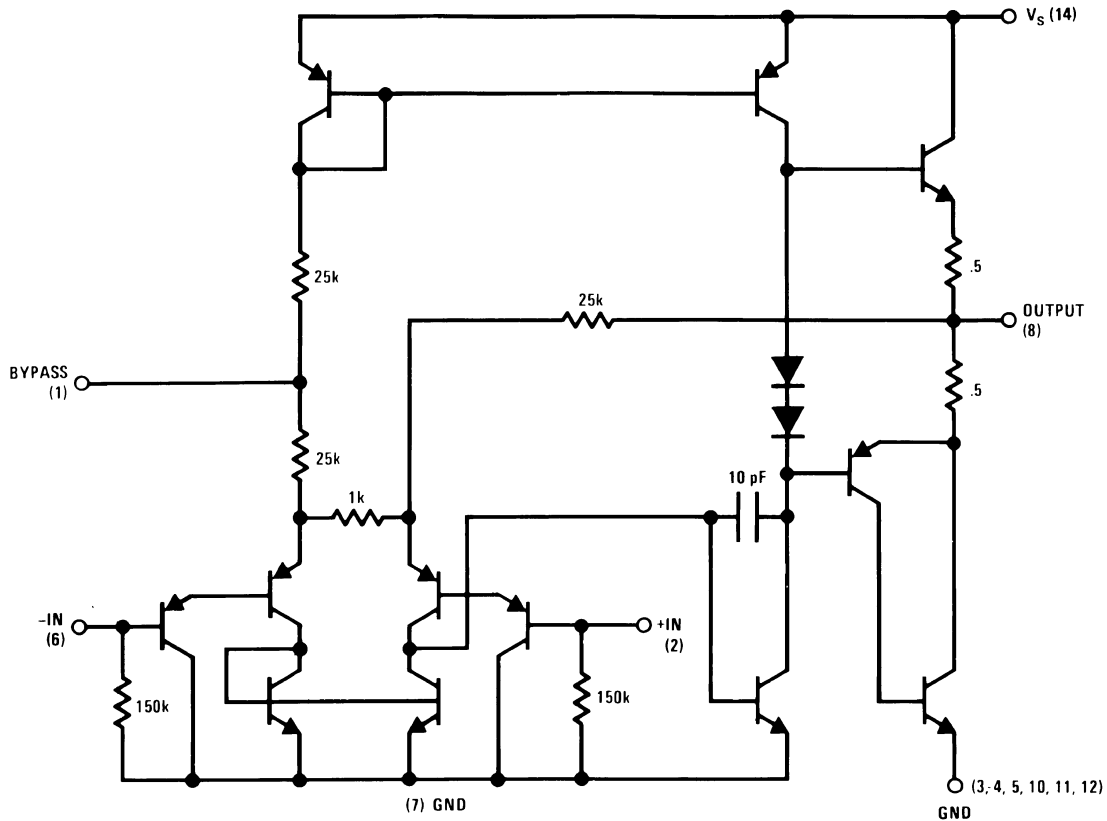
### DESCRIPTION

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



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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<sup>(1)(2)</sup>

Supply Voltage		28V
Peak Current		1.3A
Power Dissipation <sup>(3)(4)</sup>		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

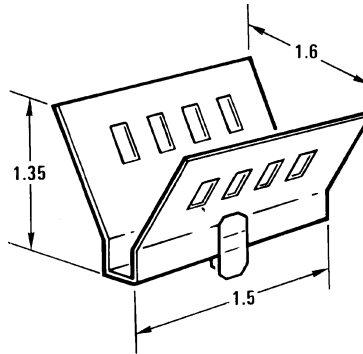
- (1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not ensure specific performance limits.
- (2) If Military/Aerospace specified devices are required, please contact the Texas Instruments 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<sup>(1)</sup>

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 <sup>(2)</sup>			1.3		A
$PSRR_{RTO}$	Power Supply Rejection Ratio <sup>(3)</sup>			31		dB
THD	Total Harmonic Distortion	$P_{OUT} = 4W$ , $R_L = 8\Omega$		0.25	1.0	%

- (1)  $V^+ = 22V$  and  $T_A = 25^\circ C$  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  $C_{BYPASS} = 5 \mu F$ , 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

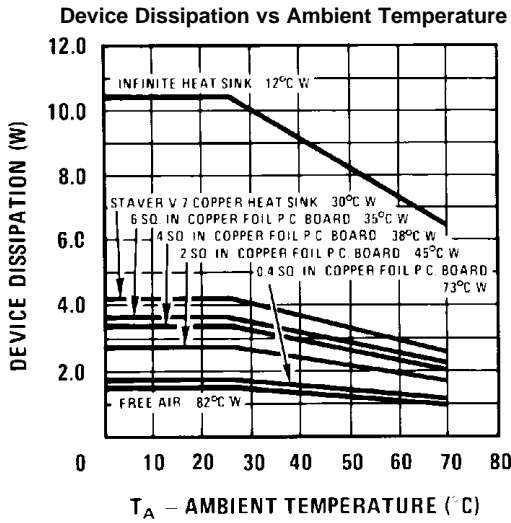


Figure 2.

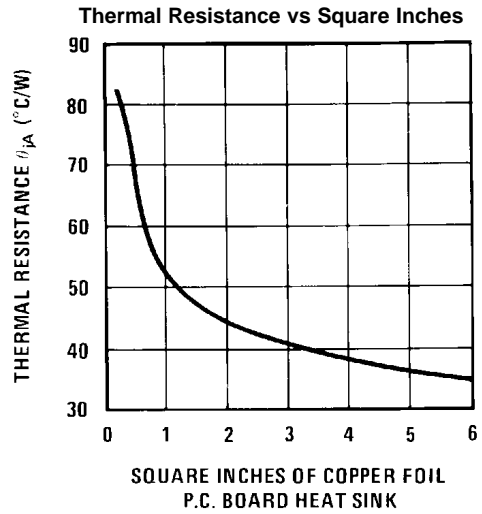


Figure 3.

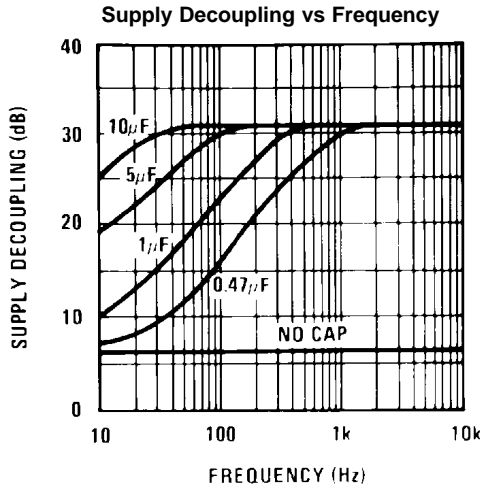


Figure 4.

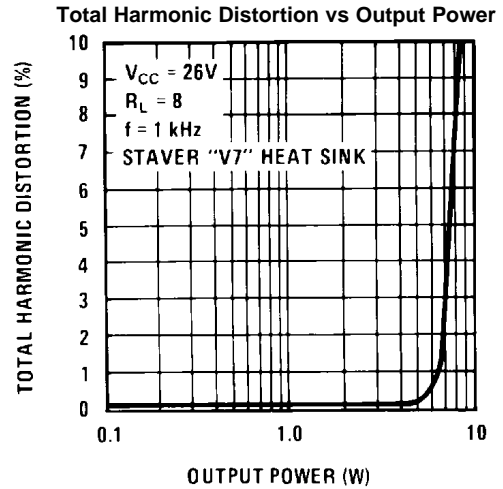


Figure 5.

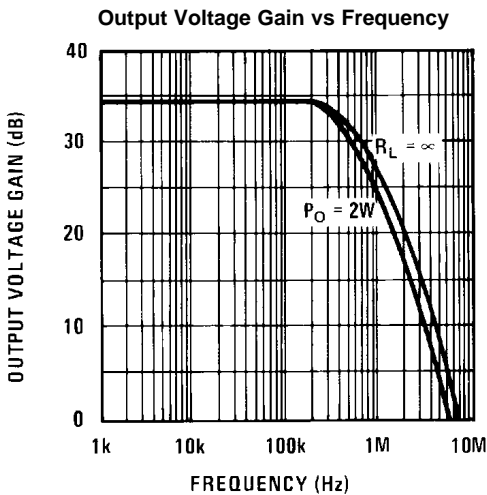


Figure 6.

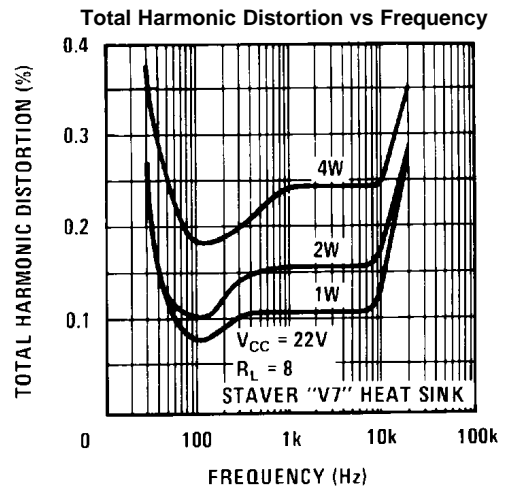


Figure 7.

Typical Performance Characteristics (continued)

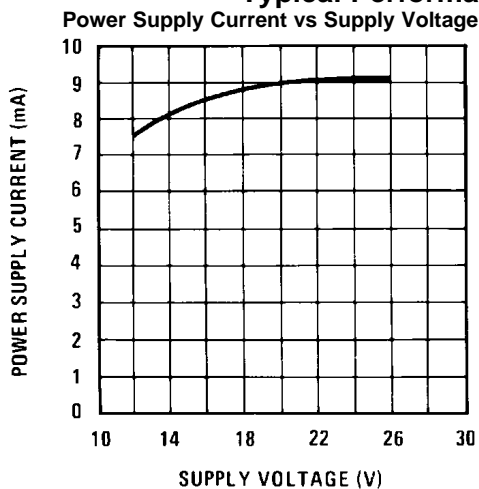


Figure 8.

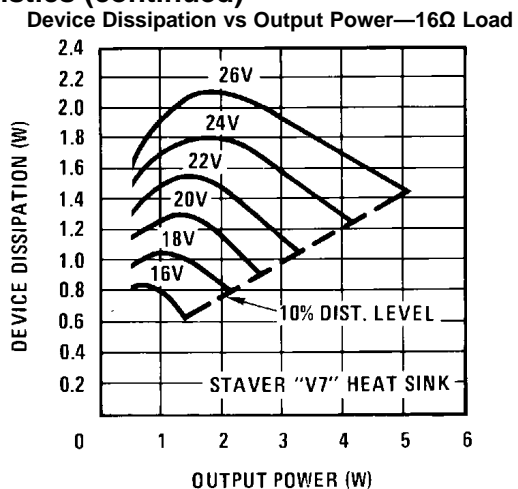


Figure 9.

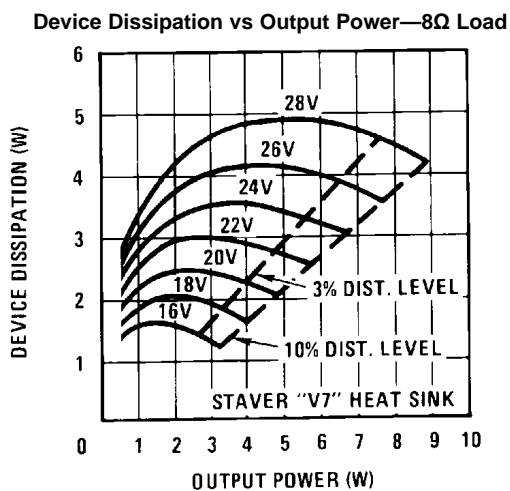


Figure 10.

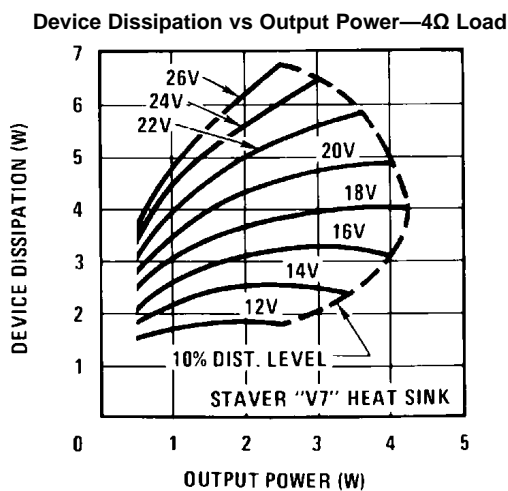
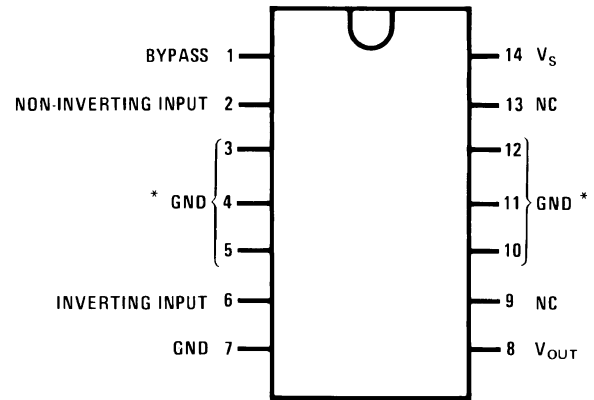
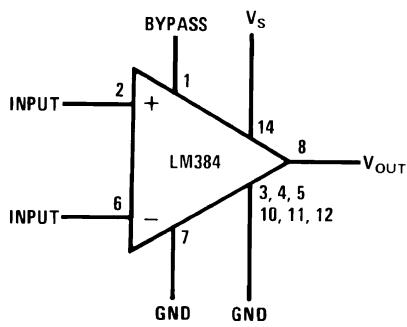


Figure 11.

Block and Connection Diagrams



Note: Heatsink Pins

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

Typical Applications

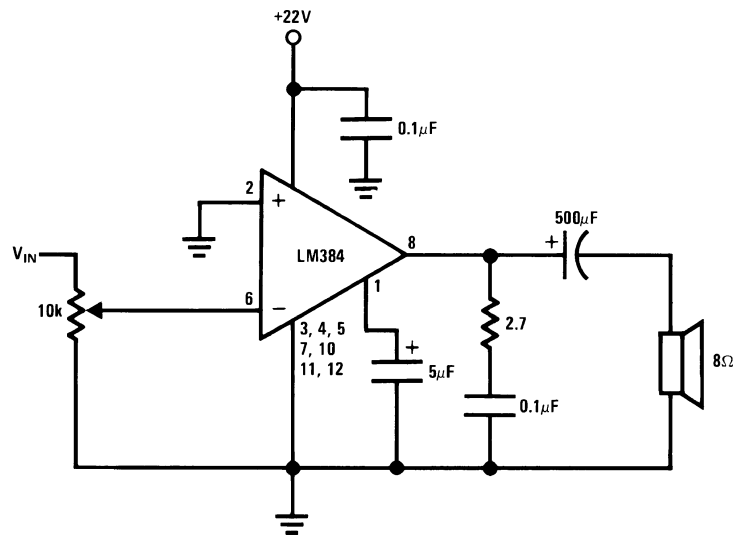


Figure 13. Typical 5W Amplifier

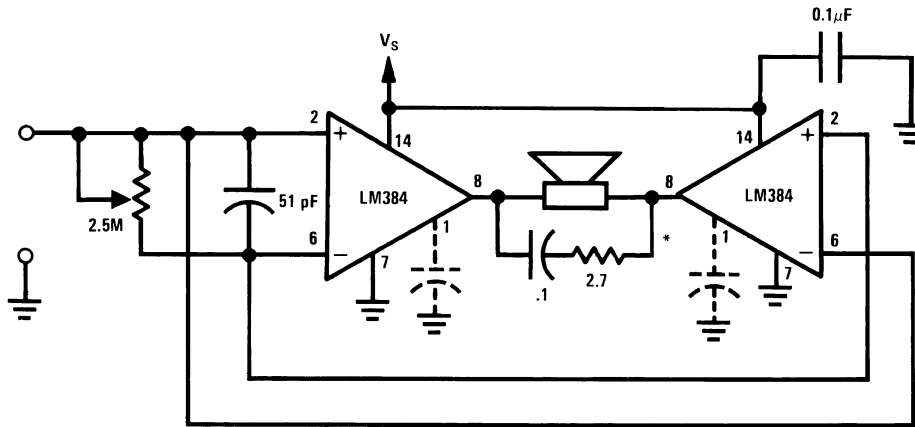
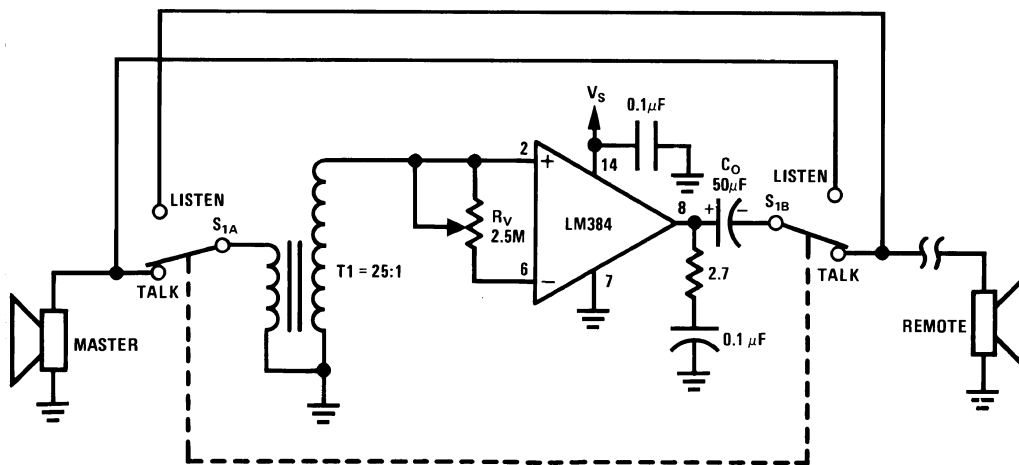


Figure 14. Bridge Amplifier



\*For stability with high current loads

Figure 15. Intercom

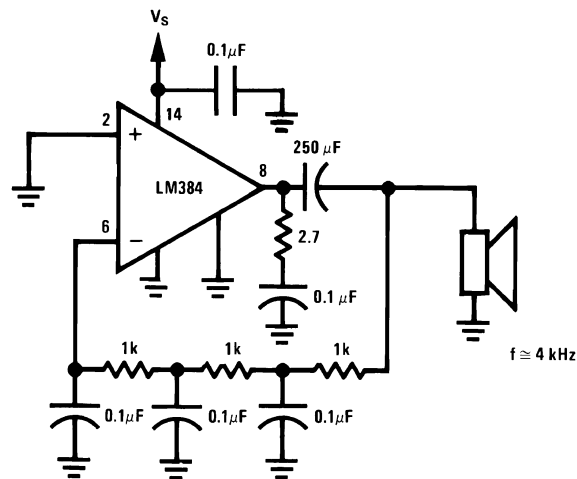


Figure 16. Phase Shift Oscillator

### REVISION HISTORY

Changes from Revision B (April 2013) to Revision C	Page
• Changed layout of National Data Sheet to TI format .....	<a href="#">7</a>



**PACKAGING INFORMATION**

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
<a href="#">LM384N/NOPB</a>	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	Level-1-NA-UNLIM	0 to 70	LM384N
LM384N/NOPB.B	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	Level-1-NA-UNLIM	0 to 70	LM384N
LM384N/NOPBG4	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	Level-1-NA-UNLIM	0 to 70	LM384N
LM384N/NOPBG4.B	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	Level-1-NA-UNLIM	0 to 70	LM384N

(1) **Status:** For more details on status, see our [product life cycle](#).

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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**TUBE**


\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
LM384N/NOPB	N	PDIP	14	25	502	14	11938	4.32
LM384N/NOPB.B	N	PDIP	14	25	502	14	11938	4.32
LM384N/NOPBG4	N	PDIP	14	25	502	14	11938	4.32
LM384N/NOPBG4.B	N	PDIP	14	25	502	14	11938	4.32

N (R-PDIP-T\*\*)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - $\triangle C$  Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
  - $\triangle D$  The 20 pin end lead shoulder width is a vendor option, either half or full width.

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Last updated 10/2025