

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 Ω
- **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**

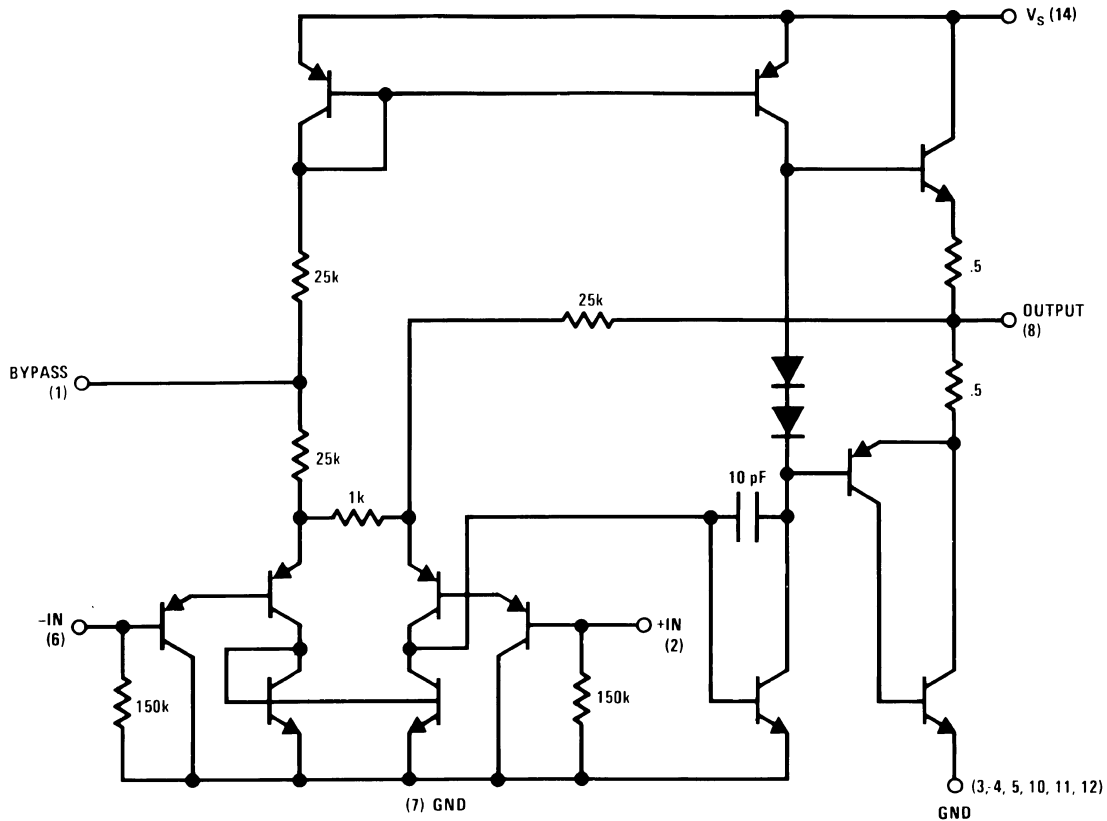
DESCRIPTION

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⁽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

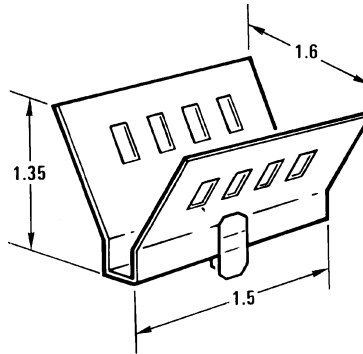
- (1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not ensure specific performance limits.
- (2) If Military/Aerospace specified devices are required, please contact the Texas Instruments 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		k Ω
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 ⁽²⁾			1.3		A
$PSRR_{RTO}$	Power Supply Rejection Ratio ⁽³⁾			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

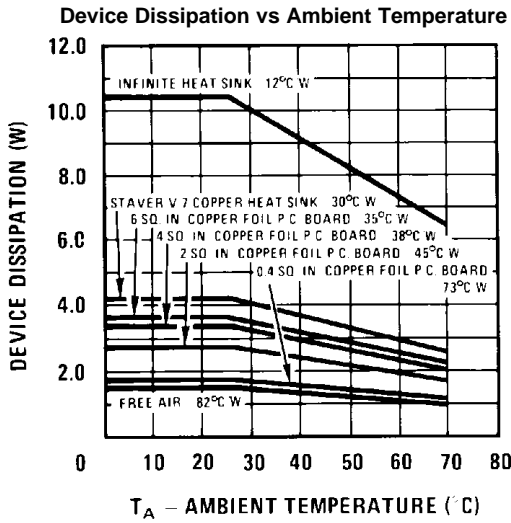


Figure 2.

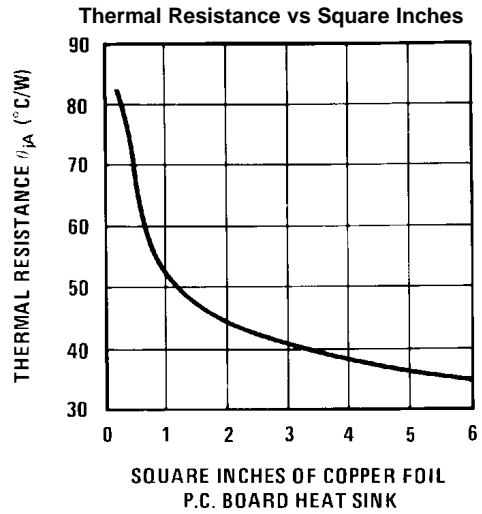


Figure 3.

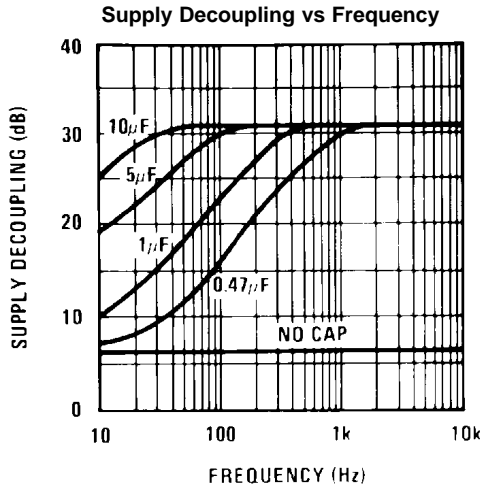


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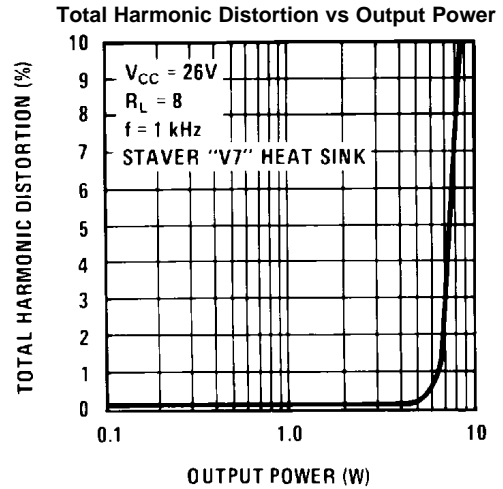


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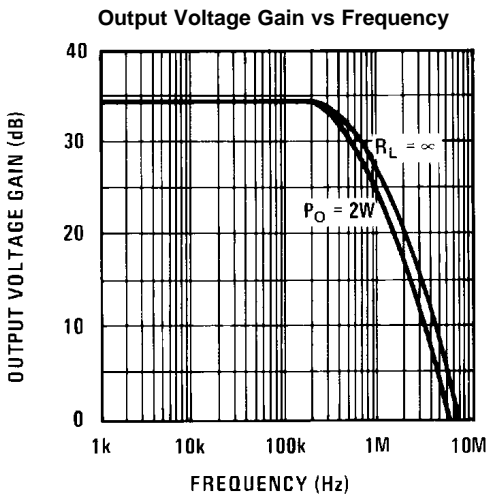


Figure 6.

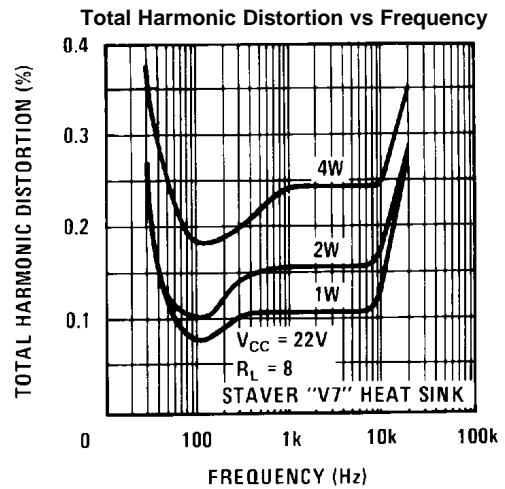


Figure 7.

Typical Performance Characteristics (continued)

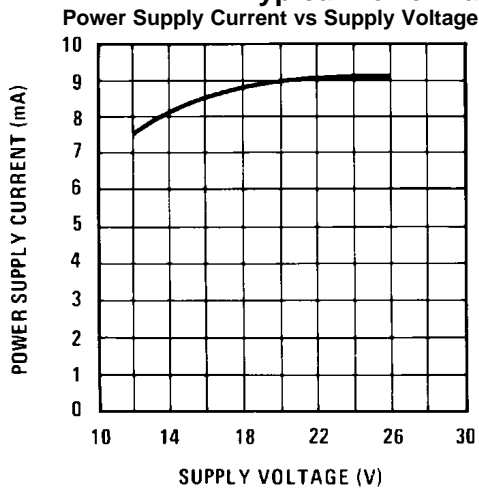


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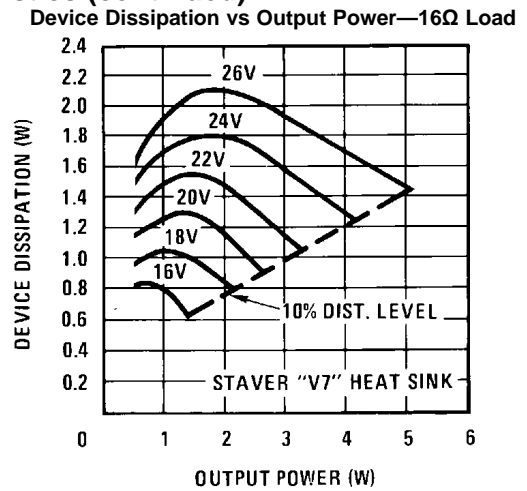


Figure 9.

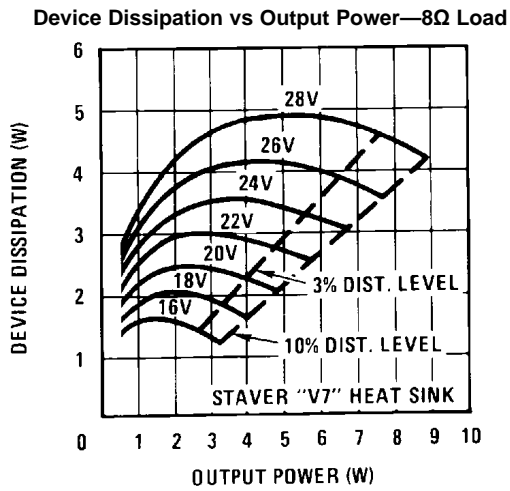


Figure 10.

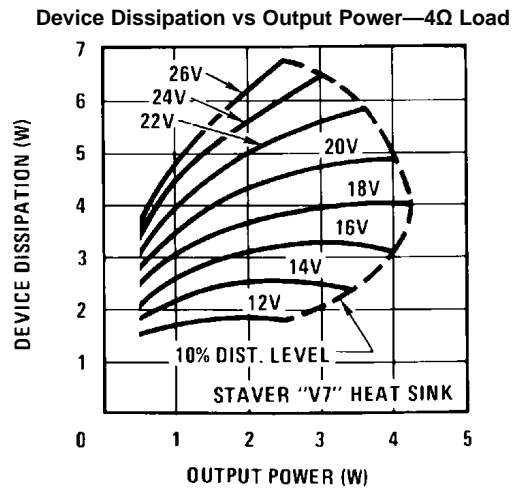
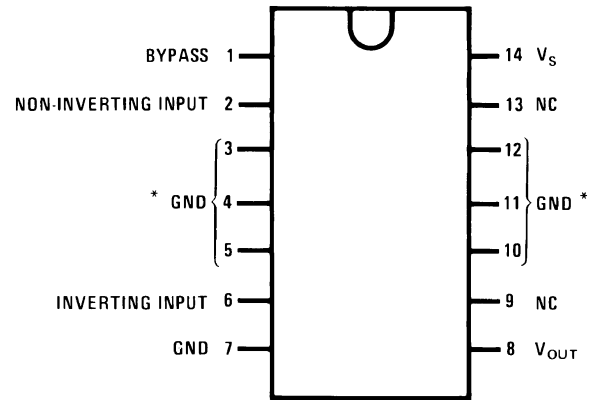
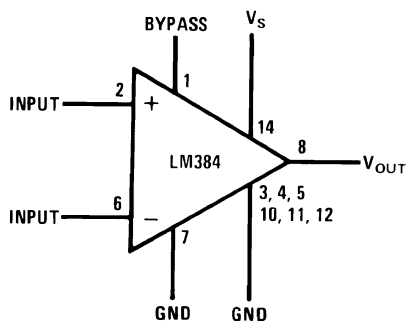


Figure 11.

Block and Connection Diagrams



Note: Heatsink Pins

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

Typical Applications

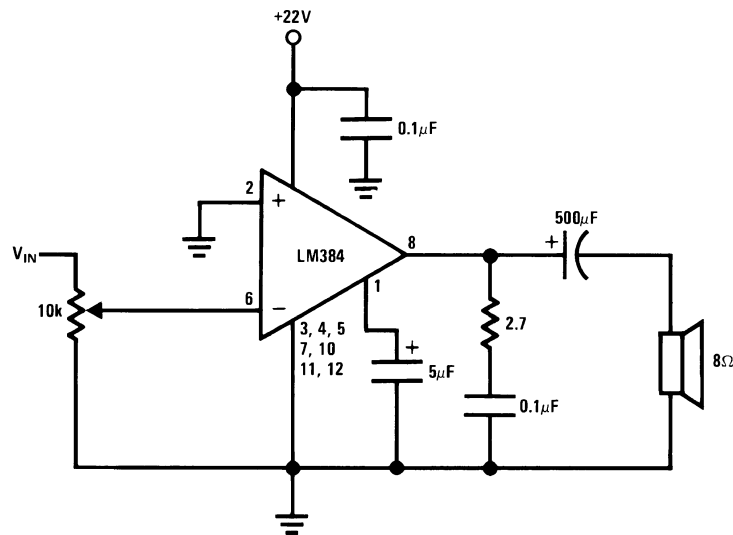


Figure 13. Typical 5W Amplifier

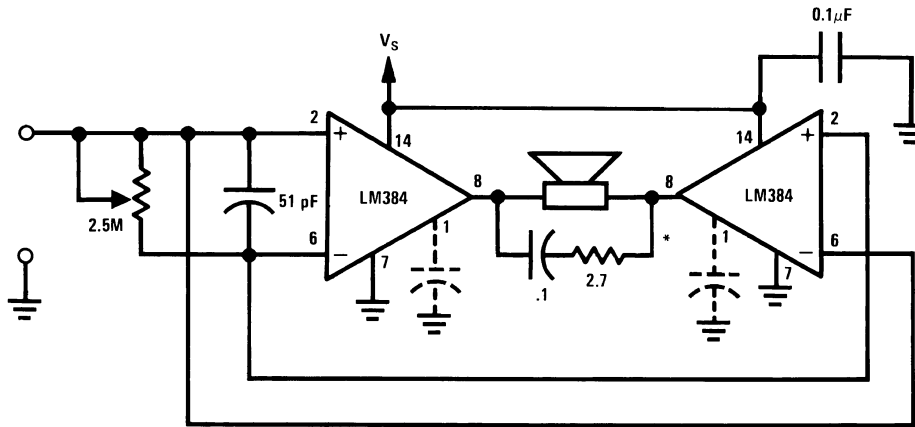
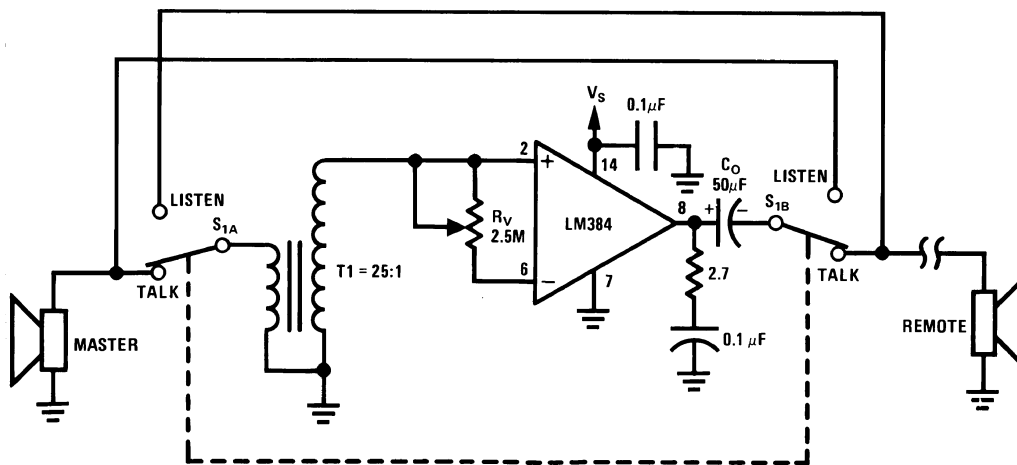


Figure 14. Bridge Amplifier



*For stability with high current loads

Figure 15. Intercom

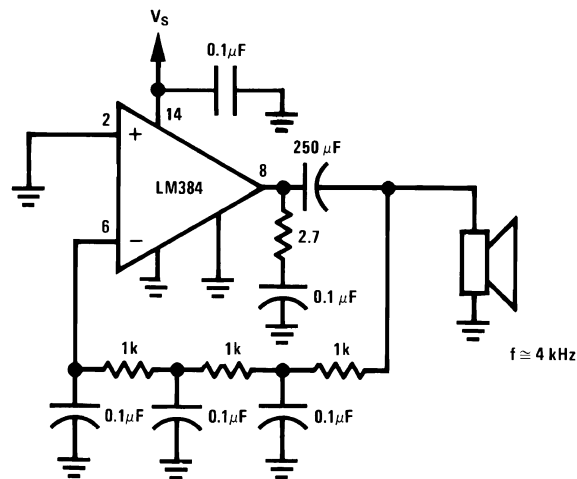


Figure 16. Phase Shift Oscillator

REVISION HISTORY

Changes from Revision B (April 2013) to Revision C	Page
• Changed layout of National Data Sheet to TI format	7

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
LM384N	ACTIVE	PDIP	NFF	14	25	TBD	Call TI	Call TI	0 to 70	LM384N	Samples
LM384N/NOPB	ACTIVE	PDIP	NFF	14	25	Pb-Free (RoHS Exempt)	SN	Level-1-NA-UNLIM	0 to 70	LM384N	Samples

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSELETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

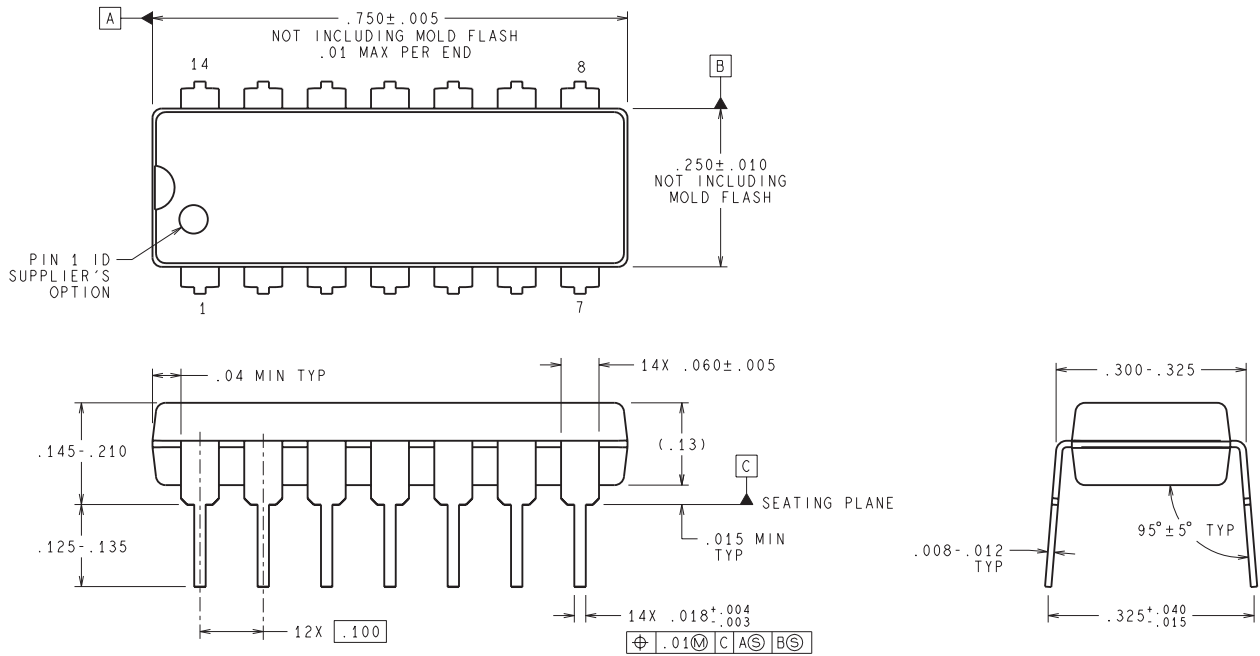
(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) Multiple Top-Side Markings will be inside parentheses. Only one Top-Side Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Top-Side Marking for that device.

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