

# LM1877

## Dual Audio Power Amplifier

### General Description

The LM1877 is a monolithic dual power amplifier designed to deliver 2W/channel continuous into 8Ω loads. The LM1877 is designed to operate with a low number of external components, and still provide flexibility for use in stereo phonographs, tape recorders and AM-FM stereo receivers, etc. Each power amplifier is biased from a common internal regulator to provide high power supply rejection, and output Q point centering. The LM1877 is internally compensated for all gains greater than 10.

### Features

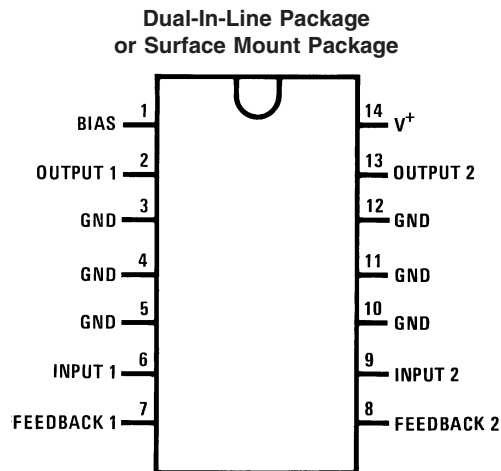
- 2W/channel
- -65 dB ripple rejection, output referred
- -65 dB channel separation, output referred

- Wide supply range, 6V-24V
- Very low cross-over distortion
- Low audio band noise
- AC short circuit protected
- Internal thermal shutdown

### Applications

- Multi-channel audio systems
- Stereo phonographs
- Tape recorders and players
- AM-FM radio receivers
- Servo amplifiers
- Intercom systems
- Automotive products

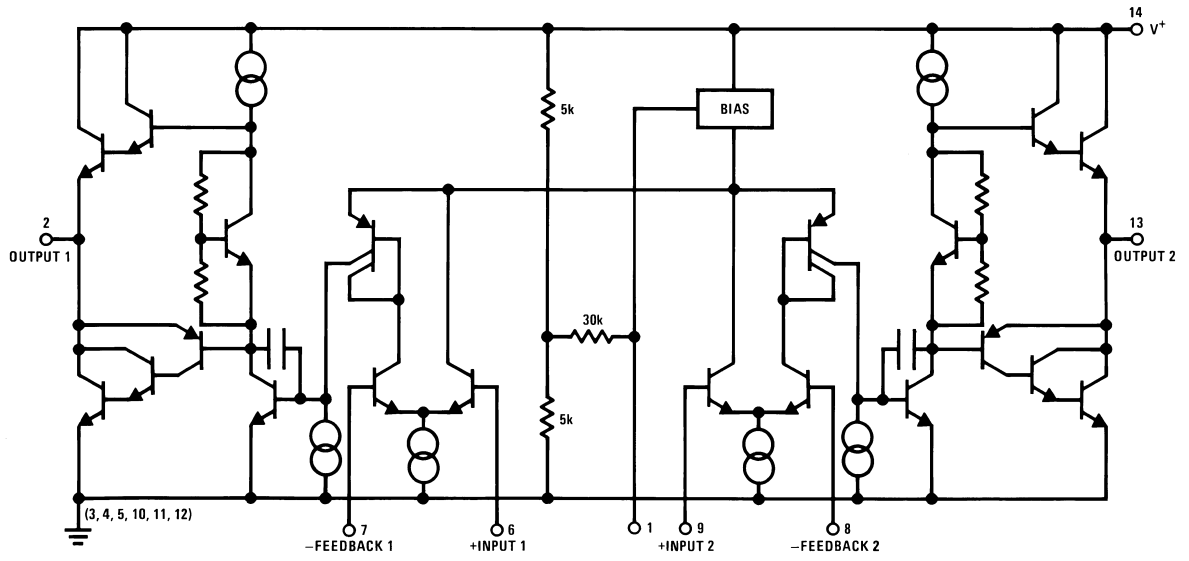
### Connection Diagram



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**Top View**  
Order Number LM1877M-9 or LM1877N-9  
See NS Package Number M14B or N14A

## Equivalent Schematic Diagram



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**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	26V
Input Voltage	±0.7V
Operating Temperature	0°C to +70°C
Storage Temperature	-65°C to +150°C
Junction Temperature	150°C
Lead Temperature	
N-Package Soldering (10 sec.)	260°C

M-Package Infared (15 sec.)	220°C
M-Package Vapor Phase (60 sec.)	215°C
Thermal Resistance	
θ <sub>JC</sub> (N-Package)	30°C/W
θ <sub>JA</sub> (N-Package)	79°C/W
θ <sub>JC</sub> (M-Package)	27°C/W
θ <sub>JA</sub> (M-Package)	114°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**

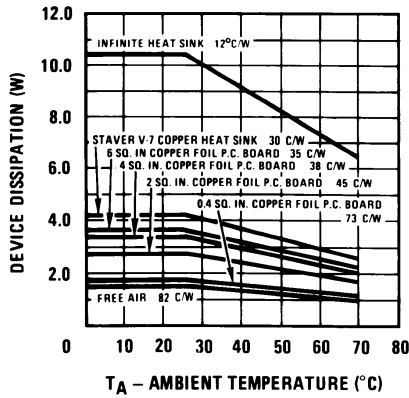
V<sub>S</sub> = 20V, T<sub>A</sub> = 25°C, (Note 2) R<sub>L</sub> = 8Ω, A<sub>V</sub> = 50 (34 dB) unless otherwise specified

Parameter	Conditions	Min	Typ	Max	Units
Total Supply Current	P <sub>O</sub> = 0W		25	50	mA
Output Power LM1877	THD = 10% V <sub>S</sub> = 20V, R <sub>L</sub> = 8Ω V <sub>S</sub> = 12V, R <sub>L</sub> = 8Ω	2.0	1.3		W/Ch W/Ch
Total Harmonic Distortion LM1877	f = 1 kHz, V <sub>S</sub> = 14V				
	P <sub>O</sub> = 50 mW/Channel		0.075		%
	P <sub>O</sub> = 500 mW/Channel		0.045		%
	P <sub>O</sub> = 1 W/Channel		0.055		%
Output Swing	R <sub>L</sub> = 8Ω		V <sub>S</sub> -6		Vp-p
Channel Separation	C <sub>F</sub> = 50 μF, C <sub>IN</sub> = 0.1 μF, f = 1 kHz, Output Referred				
	V <sub>S</sub> = 20V, V <sub>O</sub> = 4 Vrms	-50	-70		dB
	V <sub>S</sub> = 7V, V <sub>O</sub> = 0.5 Vrms		-60		dB
PSRR Power Supply Rejection Ratio	C <sub>F</sub> = 50 μF, C <sub>IN</sub> = 0.1 μF, f = 120 Hz, Output Referred				
	V <sub>S</sub> = 20V, V <sub>RIPPLE</sub> = 1 Vrms	-50	-65		dB
	V <sub>S</sub> = 7V, V <sub>RIPPLE</sub> = 0.5 Vrms		-40		dB
Noise	Equivalent Input Noise				
	R <sub>S</sub> = 0, C <sub>IN</sub> = 0.1 μF, BW = 20 Hz-20 kHz, Output Noise Wideband		2.5		μV
	R <sub>S</sub> = 0, C <sub>N</sub> = 0.1 μF, A <sub>V</sub> 200		0.80		mV
Open Loop Gain	R <sub>S</sub> = 0, f = 100 kHz, R <sub>L</sub> = 8Ω		70		dB
Input Offset Voltage			15		mV
Input Bias Current			50		nA
Input Impedance	Open Loop		4		MΩ
DC Output Level	V <sub>S</sub> = 20V	9	10	11	V
Slew Rate			2.0		V/μs
Power Bandwidth			65		kHz
Current Limit			1.0		A

**Note 2:** For operation at ambient temperature greater than 25°C, the LM1877 must be derated based on a maximum 150°C junction temperature.

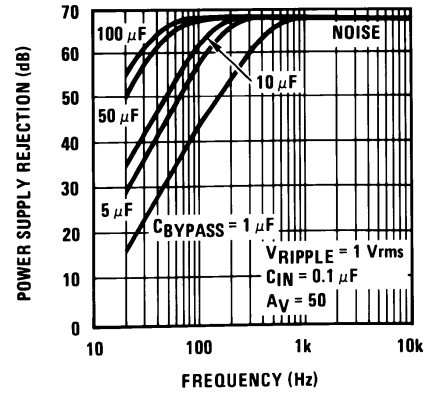
# Typical Performance Characteristics

Device Dissipation vs Ambient Temperature



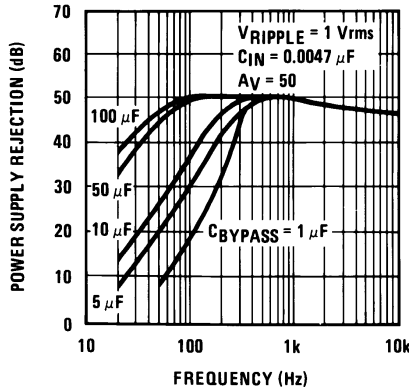
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Power Supply Rejection Ratio (Referred to the Output) vs Frequency



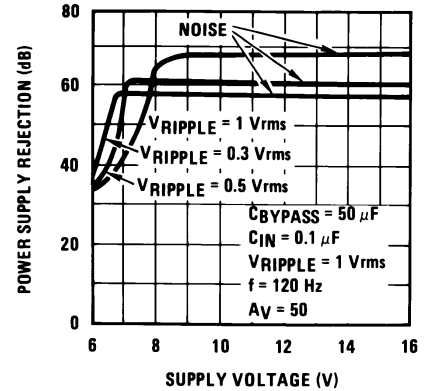
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Power Supply Rejection Ratio (Referred to the Output) vs Frequency



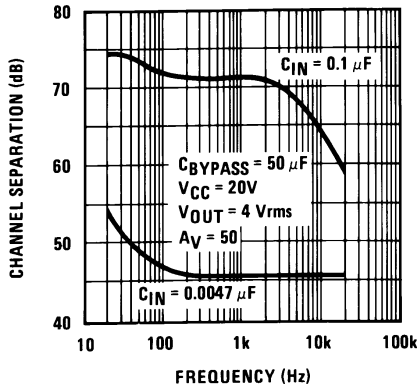
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Power Supply Rejection Ratio (Referred to the Output) vs Supply Voltage



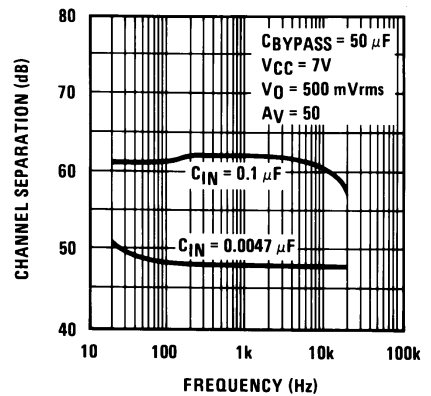
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Channel Separation (Referred to the Output) vs Frequency



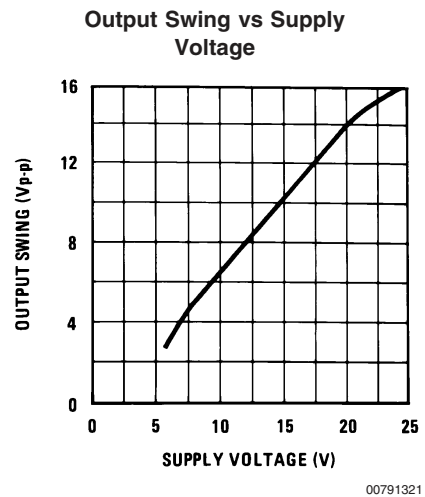
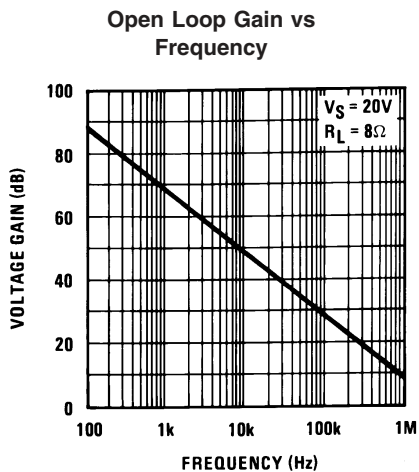
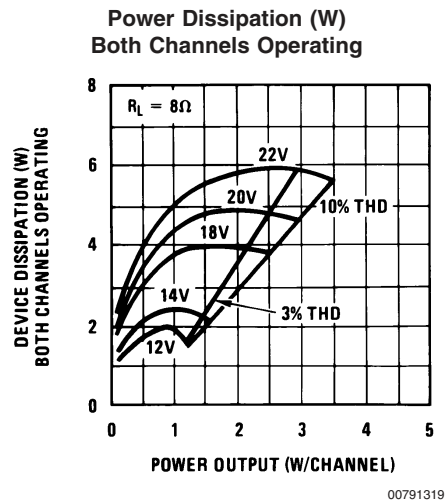
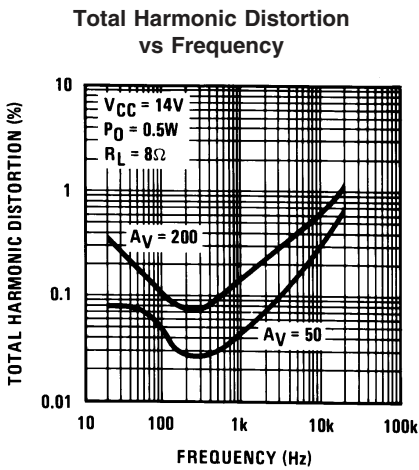
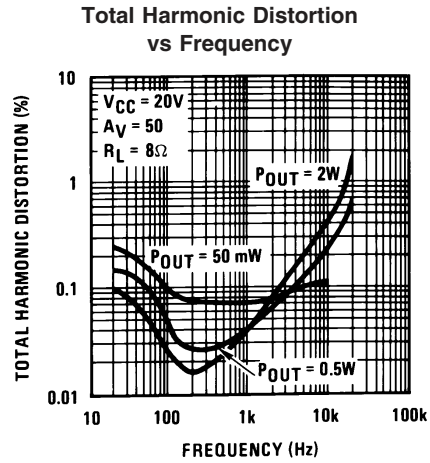
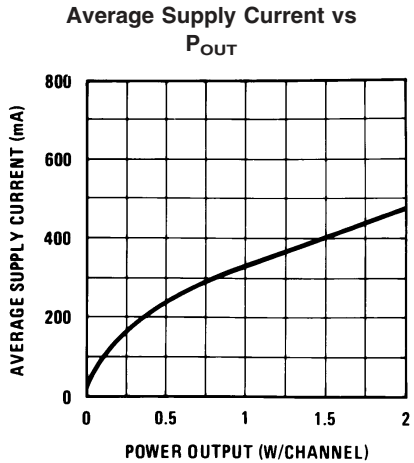
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Channel Separation (Referred to the Output) vs Frequency



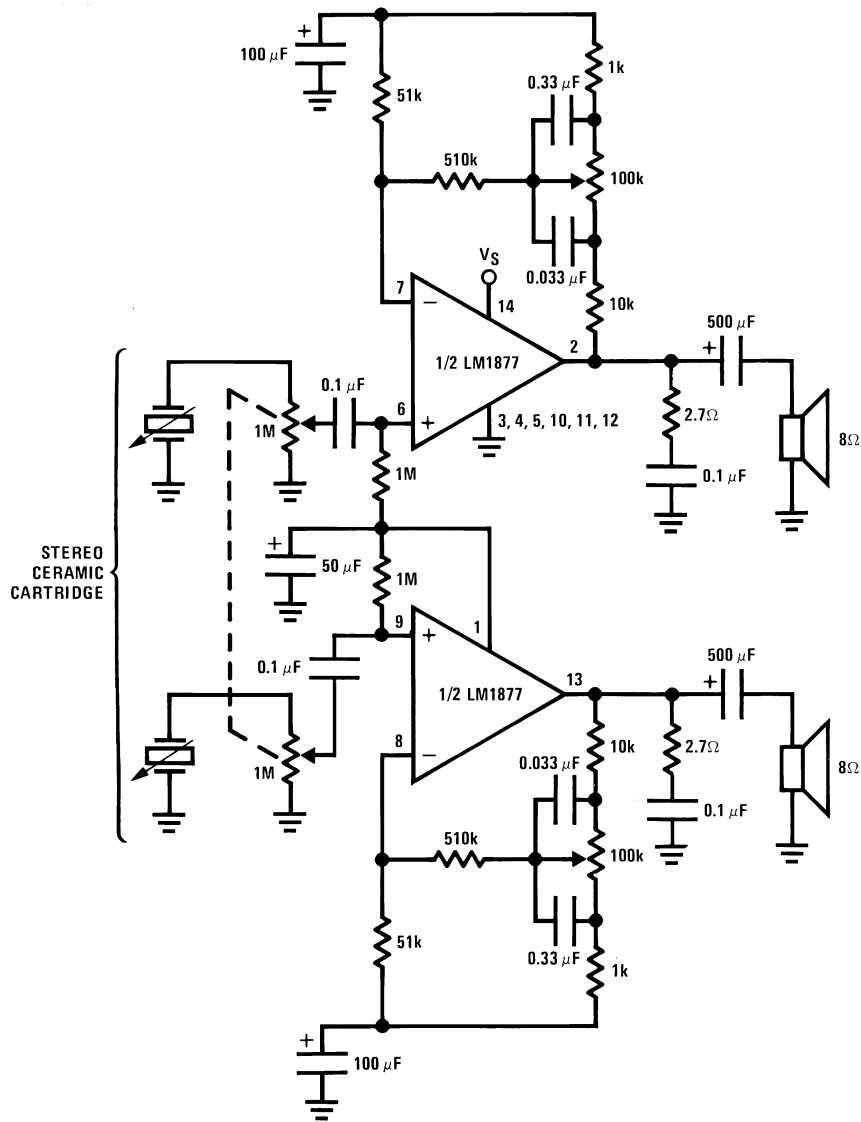
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# Typical Performance Characteristics (Continued)



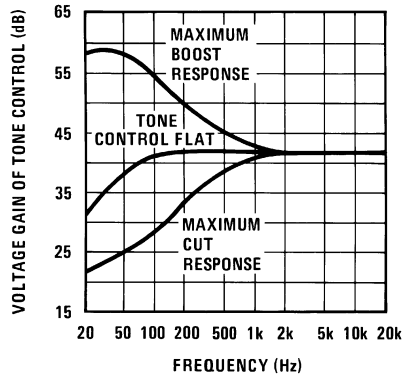
# Typical Applications

## Stereo Phonograph Amplifier with Bass Tone Control



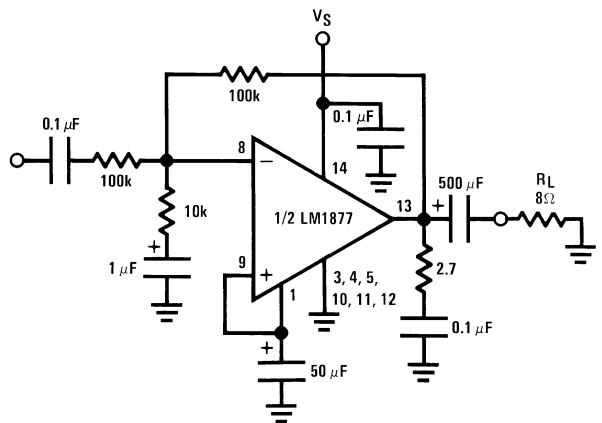
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## Frequency Response of Bass Tone Control



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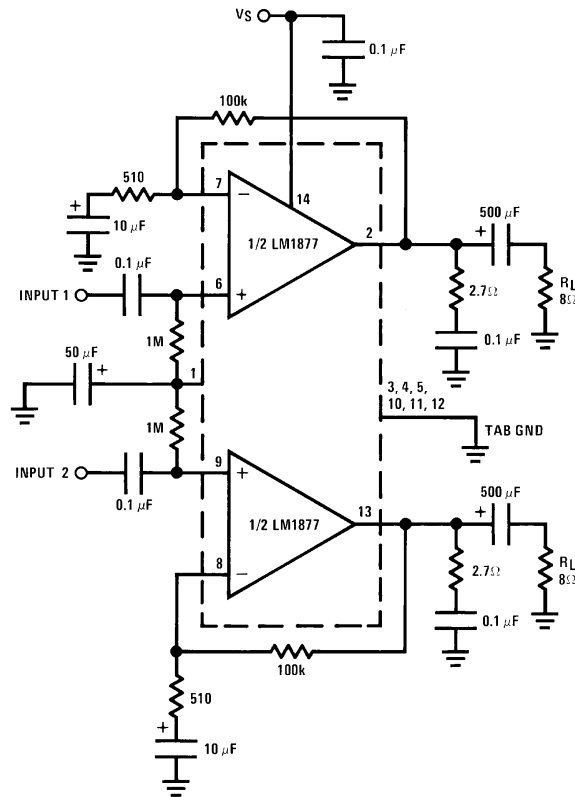
## Inverting Unity Gain Amplifier



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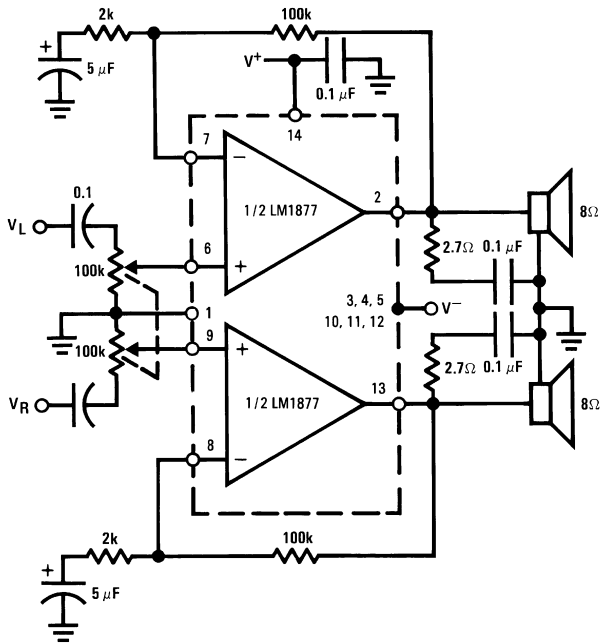
Typical Applications (Continued)

Stereo Amplifier with  $A_V = 200$



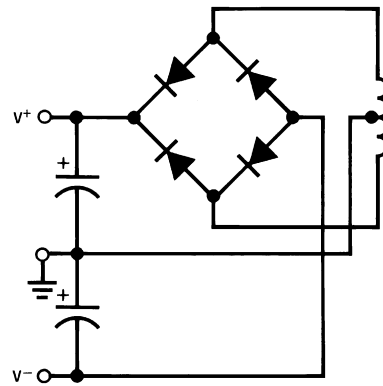
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Non-Inverting Amplifier Using Split Supply



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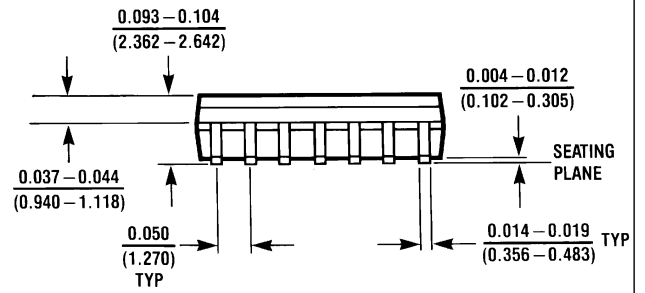
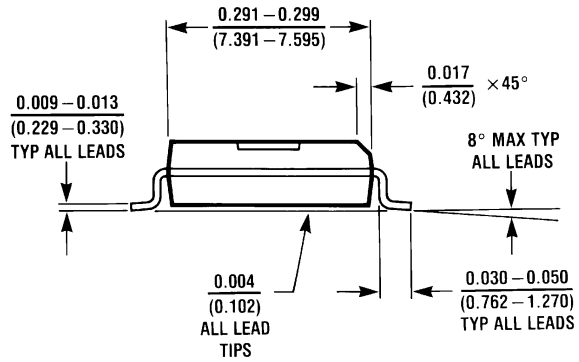
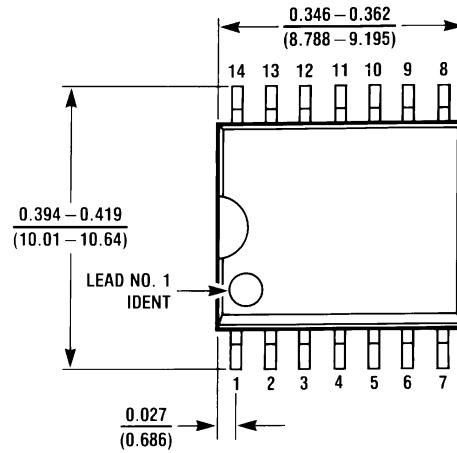
Typical Split Supply



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# Physical Dimensions

inches (millimeters) unless otherwise noted

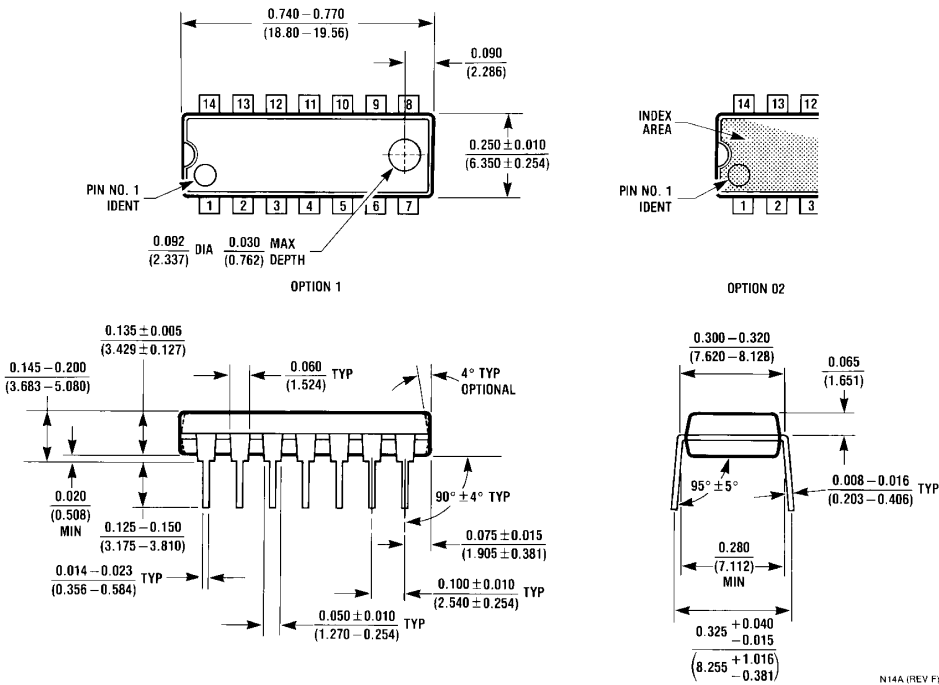


M14B (REV D)

Molded SOIC Package (M)  
 Order Number LM1877M-9  
 NS Package Number M14B



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



**Molded Dual-In-Line Package (N)  
Order Number LM1877N-9  
NS Package Number N14A**

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