

LM1877 Dual Audio Power Amplifier

General Description

The LM1877 is a monolithic dual power amplifier designed to deliver 2W/channel continuous into 8 Ω 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

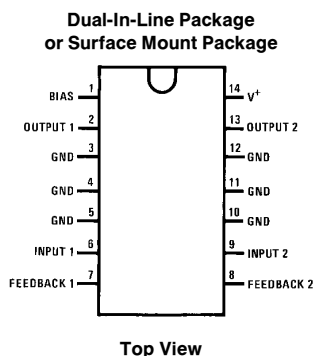
- 2W/channel
- -65 dB ripple rejection, output referred
- -65 dB channel separation, output referred

- 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

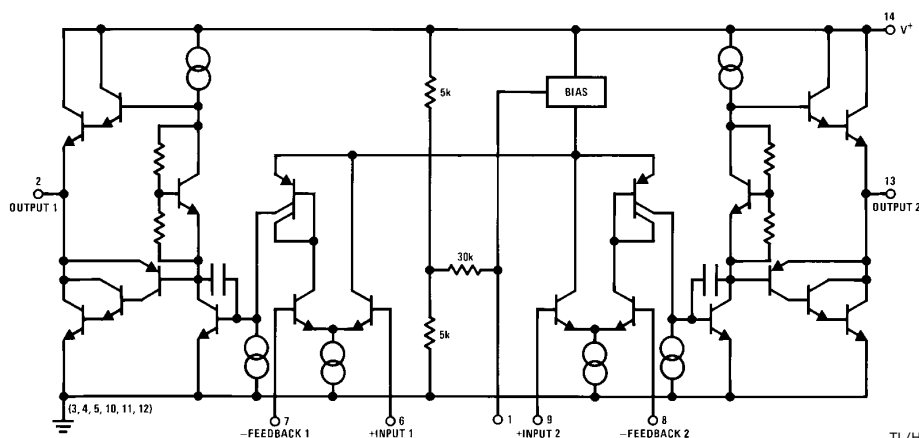
Connection Diagram



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

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Equivalent Schematic Diagram



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Absolute Maximum Ratings

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	26V
Input Voltage	$\pm 0.7V$
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 Infused (15 sec.)	220°C
M-Package Vapor Phase (60 sec.)	215°C
Thermal Resistance	
θ_{JC} (N-Package)	30°C/W
θ_{JA} (N-Package)	79°C/W
θ_{JC} (M-Package)	27°C/W
θ_{JA} (M-Package)	114°C/W

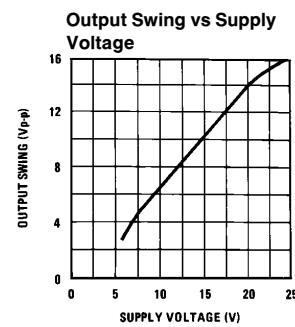
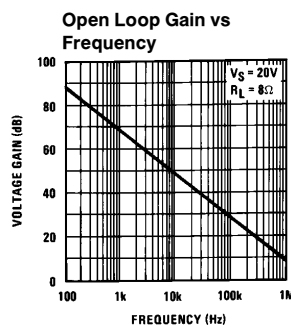
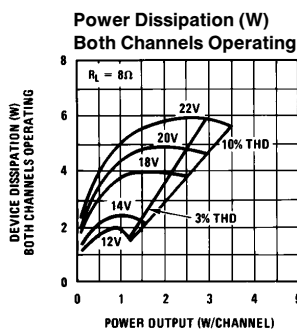
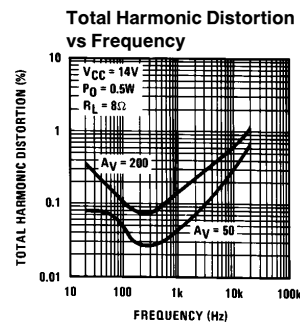
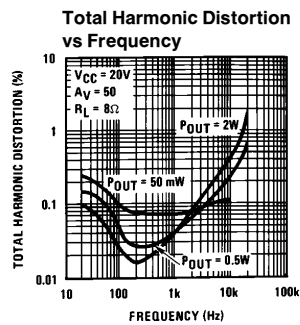
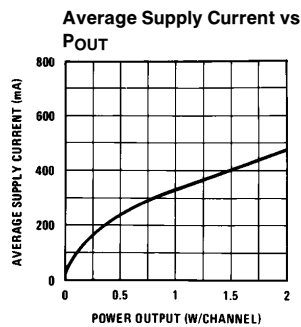
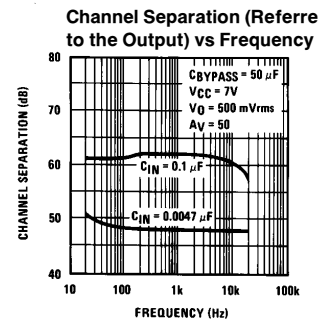
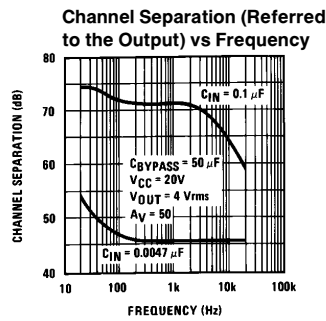
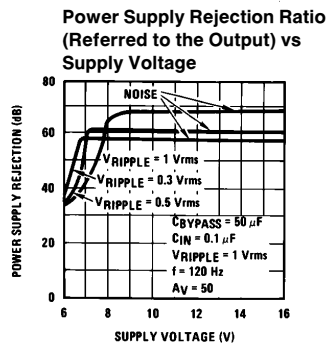
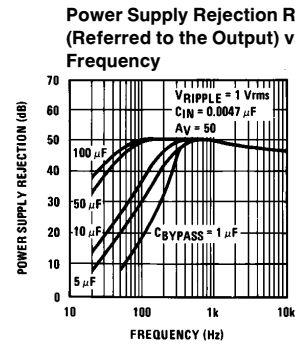
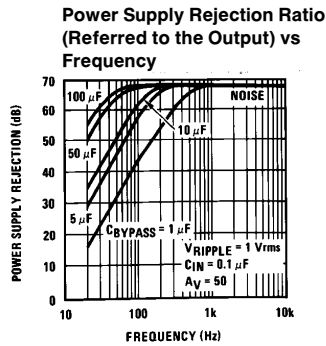
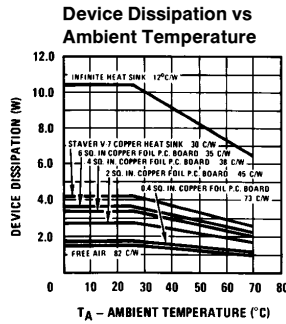
Electrical Characteristics

$V_S = 20V$, $T_A = 25^\circ C$, (See Note 1) $R_L = 8\Omega$, $A_V = 50$ (34 dB) unless otherwise specified

Parameter	Conditions	Min	Typ	Max	Units
Total Supply Current	$P_O = 0W$		25	50	mA
Output Power LM1877	THD = 10% $V_S = 20V$, $R_L = 8\Omega$ $V_S = 12V$, $R_L = 8\Omega$	2.0	1.3		W/Ch W/Ch
Total Harmonic Distortion LM1877	$f = 1\text{ kHz}$, $V_S = 14V$				
	$P_O = 50\text{ mW/Channel}$		0.075		%
	$P_O = 500\text{ mW/Channel}$		0.045		%
	$P_O = 1\text{ W/Channel}$		0.055		%
Output Swing	$R_L = 8\Omega$		$V_S - 6$		Vp-p
Channel Separation	$C_F = 50\text{ }\mu F$, $C_{IN} = 0.1\text{ }\mu F$, $f = 1\text{ kHz}$, Output Referred				
	$V_S = 20V$, $V_O = 4\text{ Vrms}$	–50	–70		dB
	$V_S = 7V$, $V_O = 0.5\text{ Vrms}$		–60		dB
PSRR Power Supply Rejection Ratio	$C_F = 50\text{ }\mu F$, $C_{IN} = 0.1\text{ }\mu F$, $f = 120\text{ Hz}$, Output Referred				
	$V_S = 20V$, $V_{RIPPLE} = 1\text{ Vrms}$	–50	–65		dB
	$V_S = 7V$, $V_{RIPPLE} = 0.5\text{ Vrms}$		–40		dB
Noise	Equivalent Input Noise				
	$R_S = 0$, $C_{IN} = 0.1\text{ }\mu F$, $BW = 20\text{ Hz} - 20\text{ kHz}$, Output Noise Wideband		2.5		μV
	$R_S = 0$, $C_N = 0.1\text{ }\mu F$, $A_V 200$		0.80		mV
Open Loop Gain	$R_S = 0$, $f = 100\text{ kHz}$, $R_L = 8\Omega$		70		dB
Input Offset Voltage			15		mV
Input Bias Current			50		nA
Input Impedance	Open Loop		4		M Ω
DC Output Level	$V_S = 20V$	9	10	11	V
Slew Rate			2.0		V/ μs
Power Bandwidth			65		kHz
Current Limit			1.0		A

Note 1: For operation at ambient temperature greater than 25°C, the LM1877 must be derated based on a maximum 150°C junction temperature.

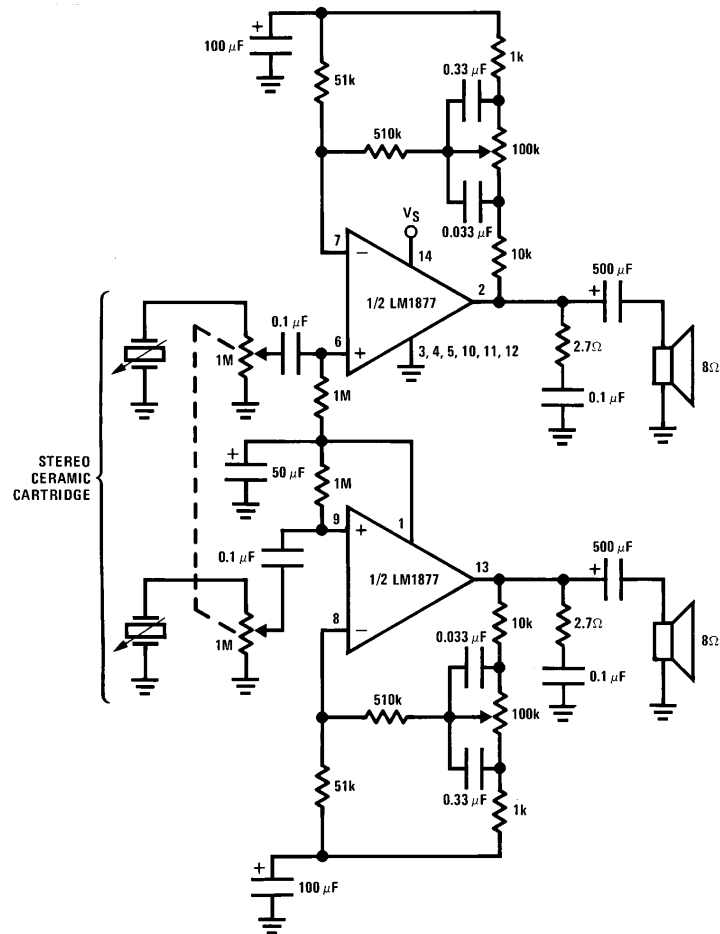
Typical Performance Characteristics



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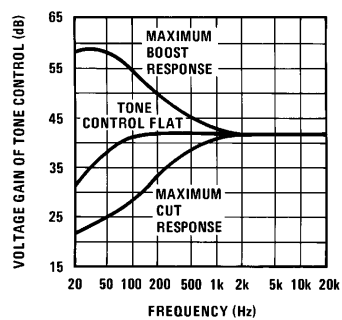
Typical Applications

Stereo Phonograph Amplifier with Bass Tone Control



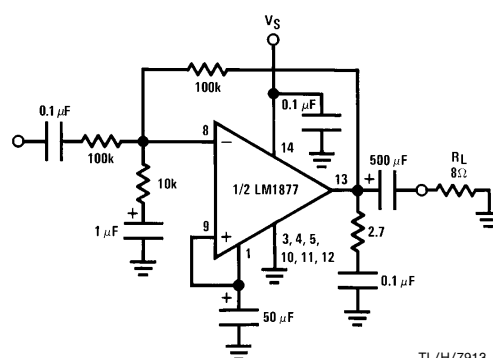
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Frequency Response of Bass Tone Control



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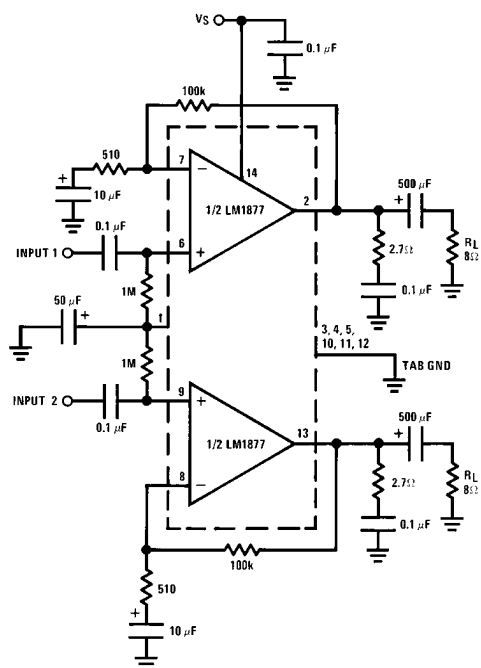
Inverting Unity Gain Amplifier



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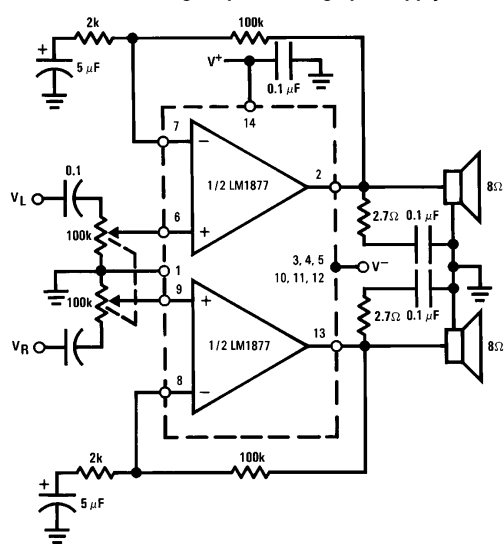
Typical Applications (Continued)

Stereo Amplifier with $A_V = 200$



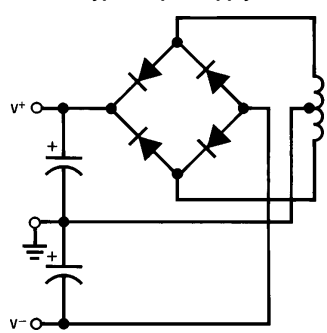
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Non-Inverting Amplifier Using Split Supply



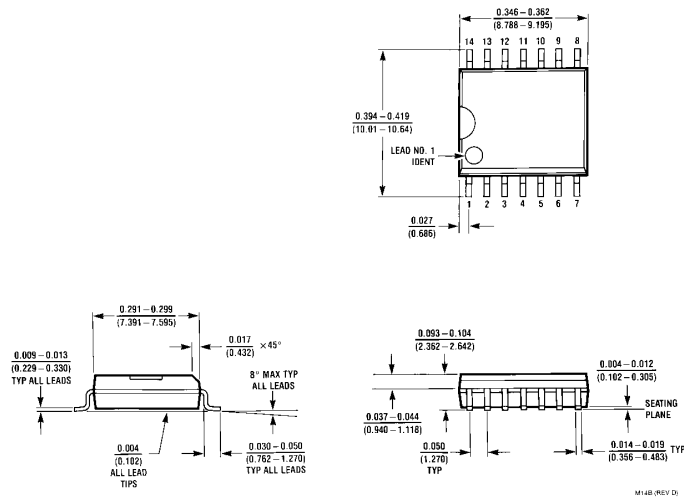
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Typical Split Supply

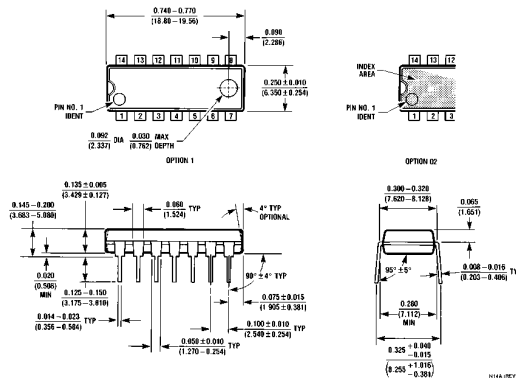


TL/H/7913-9

Physical Dimensions inches (millimeters)



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



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

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