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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

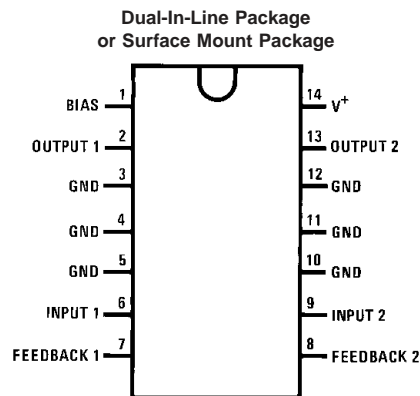
- 2W/channel
- -65 dB ripple rejection, output referred
- -65 dB channel separation, output referred

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

Applications

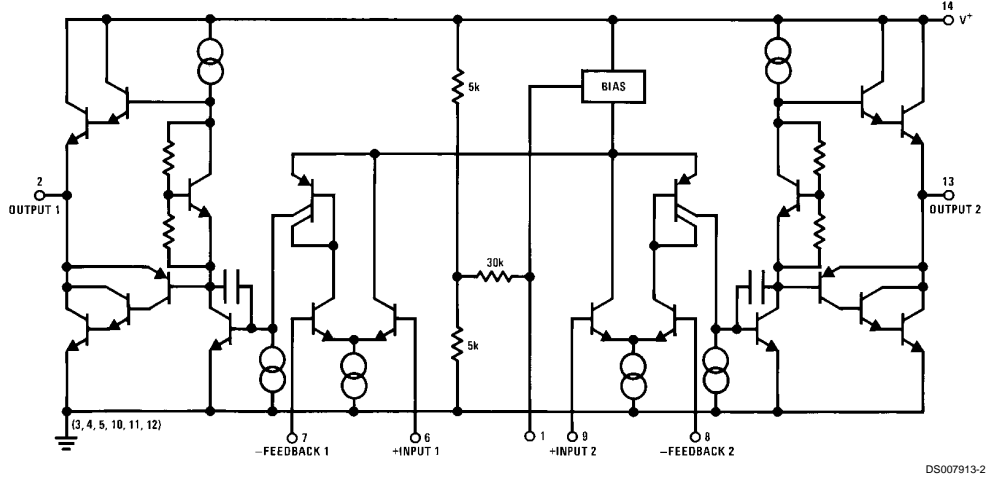
- Multi-channel audio systems
- Stereo phonographs
- Tape recorders and players
- AM-FM radio receivers
- Servo amplifiers
- Intercom systems
- Automotive products

Connection Diagram



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

Equivalent Schematic Diagram



DS007913-2

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 Infrared (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

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

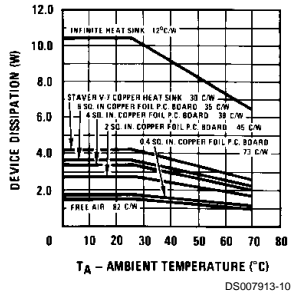
$V_S = 20V$, $T_A = 25^\circ C$, (Note 2) $R_L = 8\Omega$, $A_V = 50$ (34 dB) unless otherwise specified

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	$f = 1$ kHz, $V_S = 14V$				
	$P_O = 50$ mW/Channel		0.075		%
	$P_O = 500$ mW/Channel		0.045		%
	$P_O = 1$ W/Channel		0.055		%
Output Swing	$R_L = 8\Omega$		$V_S - 6$		Vp-p
Channel Separation	$C_F = 50$ μF , $C_{IN} = 0.1$ μF , $f = 1$ kHz, Output Referred				
	$V_S = 20V$, $V_O = 4$ Vrms	-50	-70		dB
	$V_S = 7V$, $V_O = 0.5$ Vrms		-60		dB
PSRR Power Supply Rejection Ratio	$C_F = 50$ μF , $C_{IN} = 0.1$ μF , $f = 120$ Hz, Output Referred				
	$V_S = 20V$, $V_{RIPPLE} = 1$ Vrms	-50	-65		dB
	$V_S = 7V$, $V_{RIPPLE} = 0.5$ Vrms		-40		dB
Noise	Equivalent Input Noise				
	$R_S = 0$, $C_{IN} = 0.1$ μF , BW = 20 Hz–20 kHz, Output Noise Wideband		2.5		μV
	$R_S = 0$, $C_N = 0.1$ μF , $A_V = 200$		0.80		mV
Open Loop Gain	$R_S = 0$, $f = 100$ 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

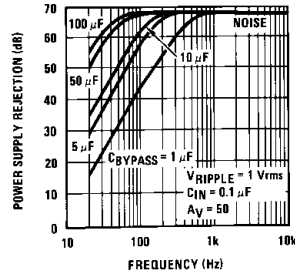
Note 2: For operation at ambient temperature greater than 25°C, the LM1877 must be derated based on a maximum 150°C junction temperature.

Typical Performance Characteristics

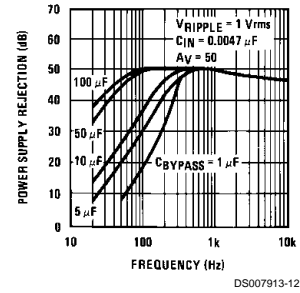
Device Dissipation vs Ambient Temperature



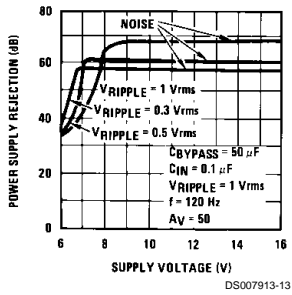
Power Supply Rejection Ratio (Referred to the Output) vs Frequency



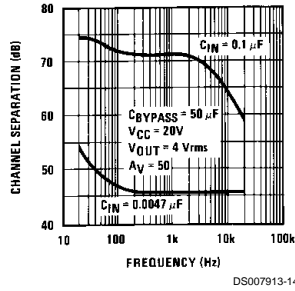
Power Supply Rejection Ratio (Referred to the Output) vs Frequency



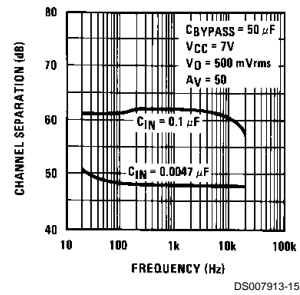
Power Supply Rejection Ratio (Referred to the Output) vs Supply Voltage



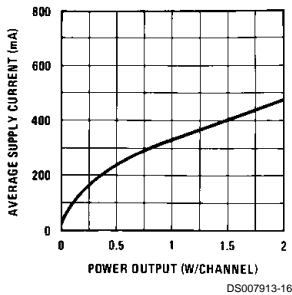
Channel Separation (Referred to the Output) vs Frequency



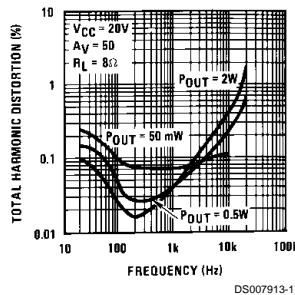
Channel Separation (Referred to the Output) vs Frequency



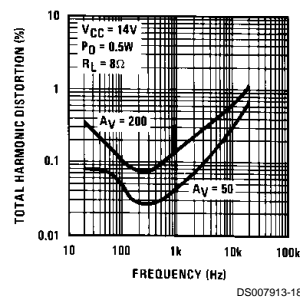
Average Supply Current vs P_{OUT}



Total Harmonic Distortion vs Frequency

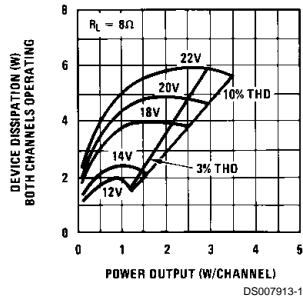


Total Harmonic Distortion vs Frequency

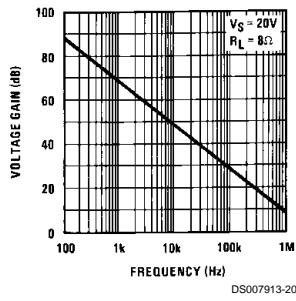


Typical Performance Characteristics (Continued)

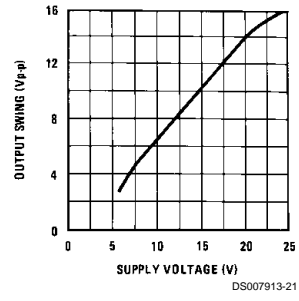
**Power Dissipation (W)
Both Channels Operating**



**Open Loop Gain vs
Frequency**

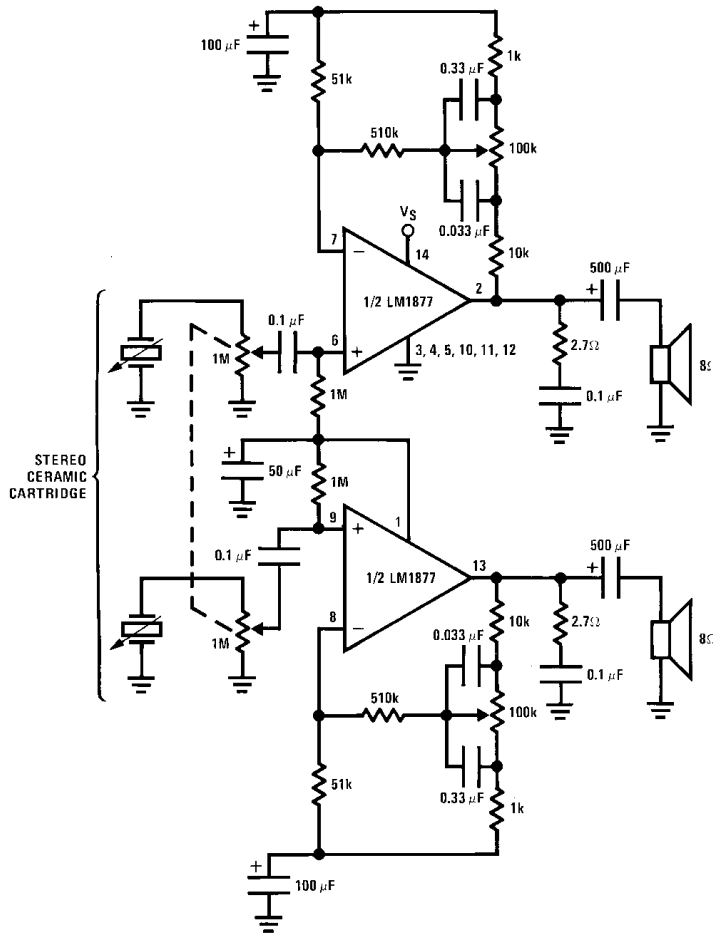


**Output Swing vs Supply
Voltage**



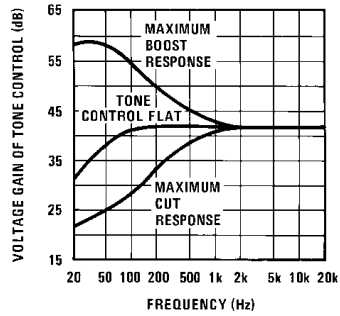
Typical Applications

Stereo Phonograph Amplifier with Bass Tone Control



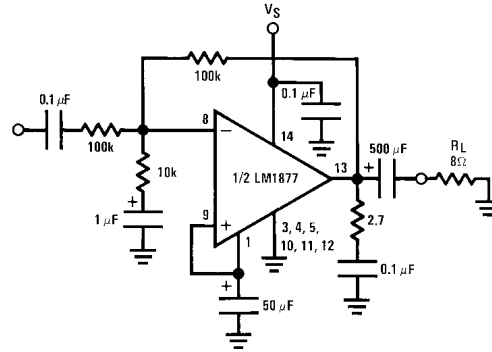
Typical Applications (Continued)

Frequency Response of Bass Tone Control



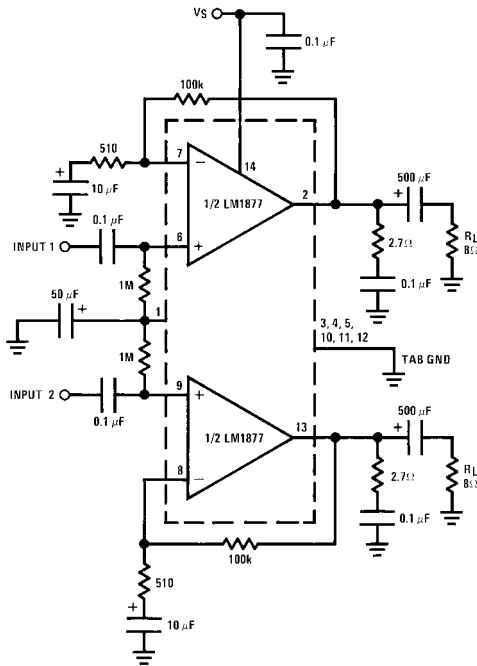
DS007913-5

Inverting Unity Gain Amplifier



DS007913-6

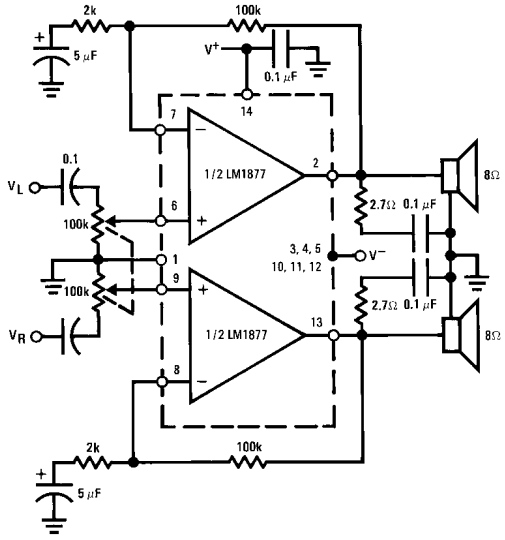
Stereo Amplifier with A_v = 200



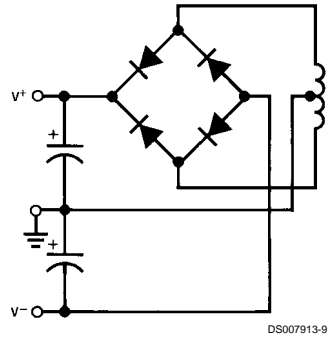
DS007913-7

Typical Applications (Continued)

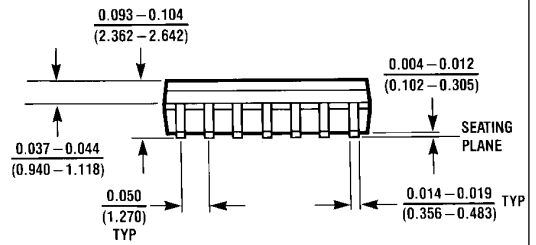
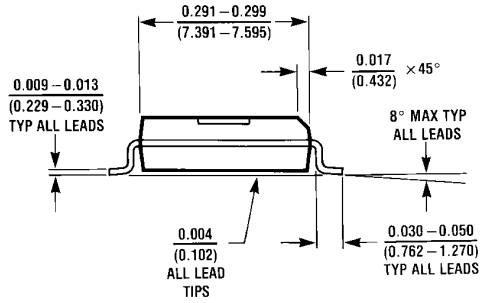
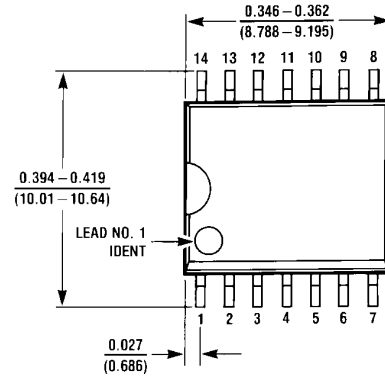
Non-Inverting Amplifier Using Split Supply



Typical Split Supply



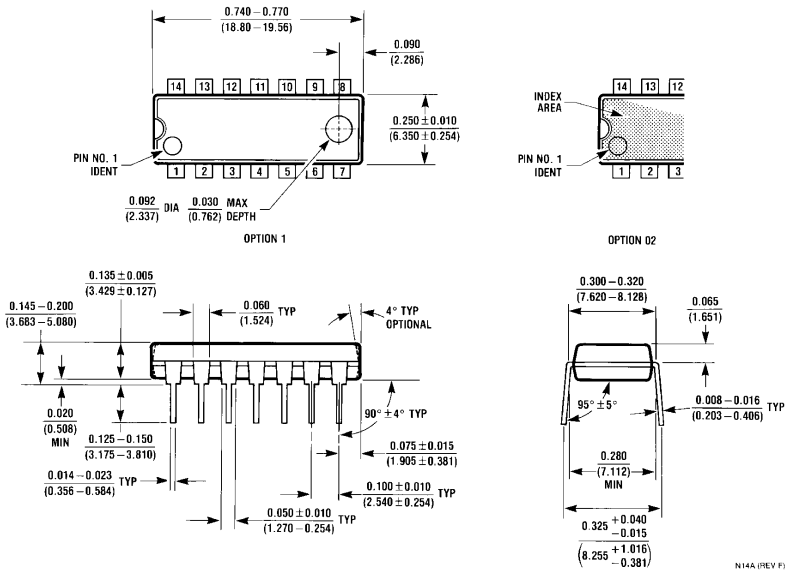
Physical Dimensions inches (millimeters) unless otherwise noted



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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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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LM1877 Product Folder

Dual Audio Power Amplifier

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Parametric Table

Channels (Channels)	2
Input Output Type	Not Rail to Rail
Bandwidth, typ (MHz)	5
Slew Rate, typ (Volts/usec)	2
Supply Current per Channel, typ (mA)	12.50
Minimum Supply Voltage (Volt)	6

Parametric Table

Maximum Supply Voltage (Volt)	26
Offset Voltage, Max (mV)	15
Input Bias Current, Temp Max (nA)	50
Output Current, typ (mA)	1000
Voltage Noise, typ (nV/Hz)	-
Shut down	No
Special Features	AvCl> 10



Datasheet

Title	Size in Kbytes	Date	View Online	Download	Receive via Email
LM1877 Dual Audio Power Amplifier	257 Kbytes	24-Jun-99	View Online	Download	Receive via Email
LM1877 Dual Audio Power Amplifier (JAPANESE)	328 Kbytes		View Online	Download	Receive via Email

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Package Availability, Models, Samples & Pricing

Part Number	Package			Status	Models		Samples & Electronic Orders	Budgetary Pricing		Std Pack Size	Package Marking
	Type	Pins	MSL		SPICE	IBIS		Qty	\$US each		
LM1877M-9	SOIC WIDE	14	MSL	Full production	N/A	N/A	24 Hour Buy Now	1K+	\$0.6000	rail of 50	[logo]UçZç2çT LM1877M -9
LM1877MX-9	SOIC WIDE	14	MSL	Full production	N/A	N/A	Buy Now	1K+	\$0.6000	reel of 1000	[logo]UçZç2çT LM1877M -9

LM1877N-9A	MDIP	14	MSL	Lifetime buy	N/A	N/A	Buy Now	1K+	\$0.5500	rail of 25	 UçZç3çTçP LM1877N-9A
LM1877N-9	MDIP	14	MSL	Full production	N/A	N/A	24 Hour Buy Now	1K+	\$0.6600	rail of 25	 UçZç3çT LM1877N-9
LM1877-9 MDC	Die			Full production	N/A	N/A	Samples			N/A	-
LM1877-9 MWC	Wafer			Full production	N/A	N/A				wafer jar of N/A	-

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- Intercom systems
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Design Tools

Title	Size in Kbytes	Date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			View Online	Download	Receive via Email
Amplifiers Selection Guide software for Windows	7 Kbytes	12-Jun-2002	View		

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Application Notes

Title	Size in Kbytes	Date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			View Online	Download	Receive via Email
SB-111: Mass Storage - Hard Disk	82 Kbytes	28-Jun-96	View Online	Download	Receive via Email

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