National Semiconductor Corporation

LM382 Low Noise Dual Preamplifier

General Description

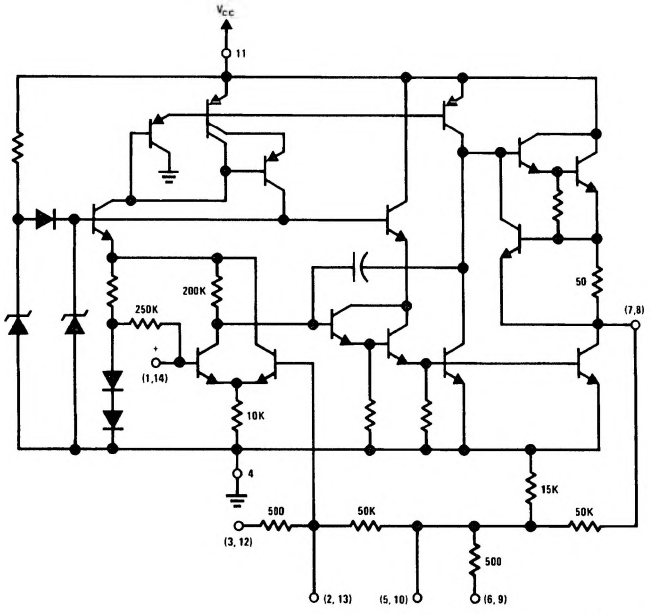
The LM382 is a dual preamplifier for the amplification of low level signals in applications requiring optimum noise performance. Each of the two amplifiers is completely independent, with individual internal power supply decoupler-regulator, providing 120 dB supply rejection and 60 dB channel separation. Other outstanding features include high gain (100 dB), and wide power bandwidth (75 kHz, 20 Vp-p). The LM382 operates from a single supply across the wide range of 9V to 40V.

A resistor matrix is provided on the chip to allow the user to select a variety of closed loop gain options and frequency response characteristics such as flat-band, NAB or RIAA equalization. The circuit is supplied in the 14 lead dual-in-line package.

Features

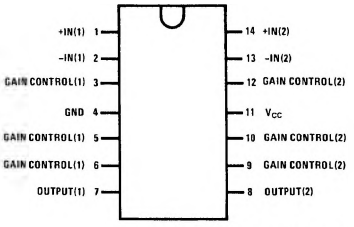
- Low noise — 0.8 μV total equivalent input noise
- High gain — 100 dB open loop
- Single supply operation
- Wide supply range 9V to 40V
- Power supply rejection — 120 dB
- Large output voltage swing
- Wide bandwidth — 15 MHz unity gain
- Power bandwidth — 75 kHz, 20 Vp-p
- Internally compensated
- Short circuit protected

Schematic and Connection Diagrams



TL/H/7842–1

Dual-In-Line Package



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Top View

Order Number LM382N
See NS Package Number N14A

Absolute Maximum Ratings

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

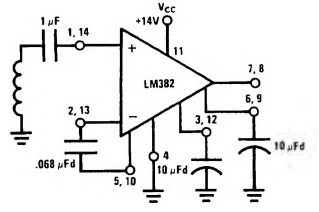
Supply Voltage	+40V
Power Dissipation (Note 1)	1.56 W
Operating Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 10 sec.)	+260°C

Electrical Characteristics $T_A = 25°C$, $V_{CC} = 14V$, unless otherwise stated.

Parameter	Conditions	Min	Typ	Max	Units
Voltage Gain	Open Loop, f = 100 Hz		100,000		V/V
Supply Current	V_{CC} 9V to 40V, $R_L = \infty$		10	20	mA
Output DC Voltage			6		V
Input Resistance (Positive Input)			100		kΩ
(Negative Input)			200		kΩ
Input Current (Negative Input)			0.5		μA
Output Resistance	Open Loop		150		Ω
Output Current	Source		8		mA
	Sink		2		mA
Output Voltage Swing	Peak-to-Peak, R_L = 10k		12		V
Unity Gain Bandwidth			15		MHz
Power Bandwidth	20 Vp-p (V_{CC} = 24V)		75		kHz
Maximum Input Voltage	Linear Operation			300	mVrms
Supply Rejection Ratio	f = 1 kHz		120		dB
Channel Separation	f = 1 kHz	40	60		dB
Total Harmonic Distortion	60 dB Gain, f = 1 kHz		0.1	0.3	%
Total Equivalent Input Noise	R_S = 600Ω, 100–10,000 Hz (Flat Response Circuit)		0.8	1.2	μVrms

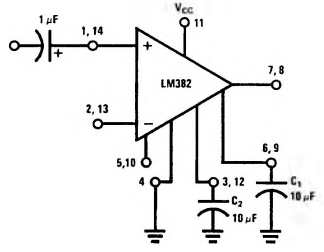
Note 1: For operation in ambient temperatures above 25°C, the device must be derated based on a 150°C maximum junction temperature and a thermal resistance of 80°C/W junction to ambient.

Typical Applications



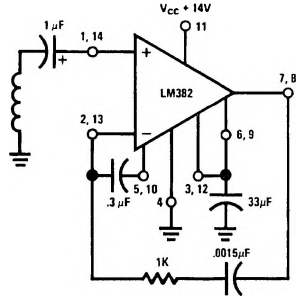
TL/H/7842-3

Tape Preamp (NAB Equalization)



TL/H/7842-5

Flat Response — Fixed Gain Configuration



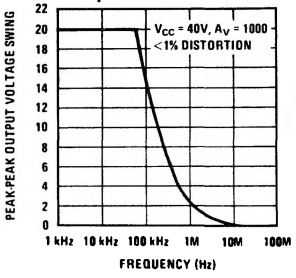
TL/H/7842-4

Phono Preamp (RIAA Equalization)

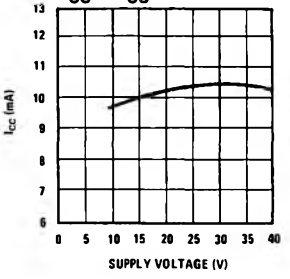
Capacitor	Gain
C1 Only	40 dB
C2 Only	55 dB
C1 & C2	80 dB

Typical Performance Characteristics

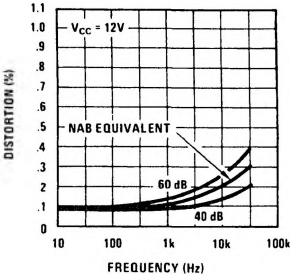
Large Signal Frequency Response



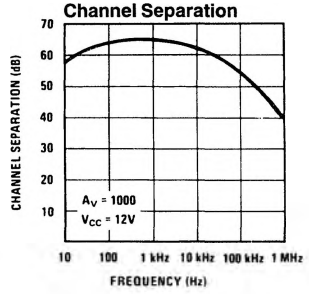
V_{CC} vs I_{CC}



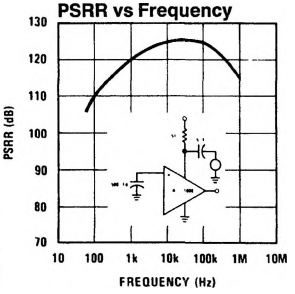
% Distortion



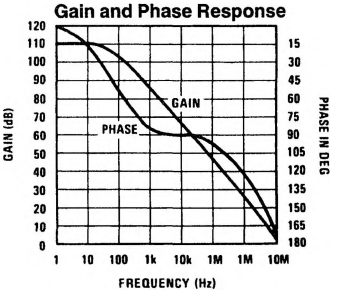
Channel Separation



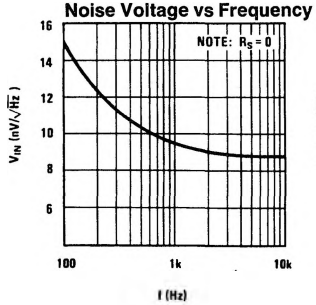
PSRR vs Frequency



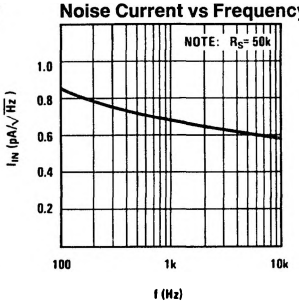
Gain and Phase Response



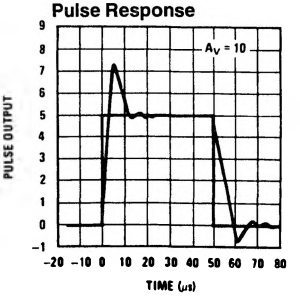
Noise Voltage vs Frequency



Noise Current vs Frequency



Pulse Response



TL/H/7842–6