DUAL LOW-NOISE PREAMP

LM387

DESCRIPTION

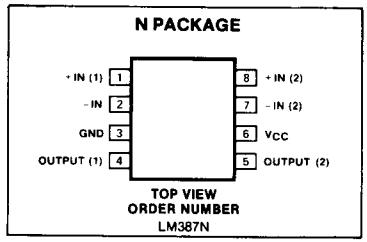
The LM387 is a dual preamplifier for the amplification of low level signals in applications requiring optimum noise performance. Each of the two amplifiers is completely independent, with an internal power supply decoupler-regulator, providing 110dB supply rejection and 60dB channel separation. Other outstanding features include high gain (104dB), large output voltage swing (V_{CC} - 2V p-p), and wide power bandwidth (75kHz, 20V p-p). The LM387 operates from a single supply across the wide range of 9 to 40V.

The amplifiers are internally compensated for all gains greater than 10. The LM387 is available in an 8 lead dual-in-line package.

FEATURES

- **Low noise—0.8μV total input noise**
- **High gain—104dB open loop**
- **Single supply operation**
- **Wide supply range 9 to 40V**
- **Power supply rejection—110dB**
- **Large output voltage swing (VCC - 2V p-p)**
- **Wide bandwidth 15MHz unity gain**
- **Power bandwidth 75kHz, 20V p-p**
- **Internally compensated**
- **Short circuit protected**

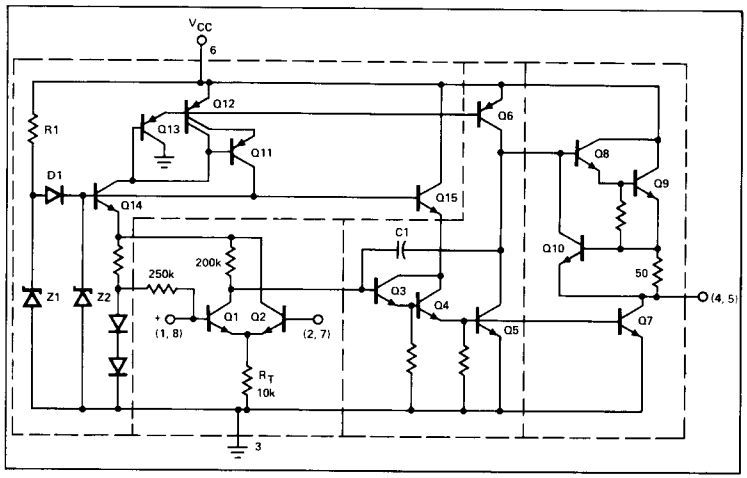
PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Supply voltage	+40	V
Power dissipation	500	mW
Operating temperature range	0 to +70	°C
Storage temperature range	-65 to +150	°C
Lead temperature (soldering, 60sec)	+300	°C

EQUIVALENT CIRCUIT



15

DUAL LOW-NOISE PREAMP LM387

DC ELECTRICAL CHARACTERISTICS

$T_A = 25\,°C$, $V_{CC} = 14V$ unless otherwise specified.

PARAMETER	TEST CONDITIONS	LM387			UNIT
		Min	Typ	Max	
Voltage gain	Open loop		160,000		V/V
Supply current	V_{CC} 9 to 40V, $R_L = \infty$		10		mA
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		V_{CC}-2		V

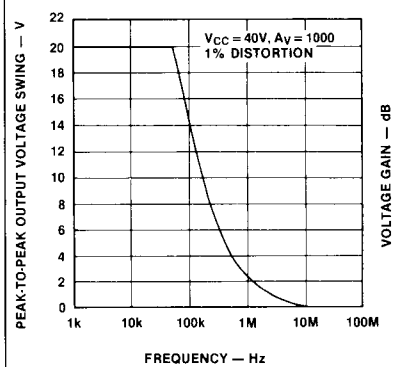
AC ELECTRICAL CHARACTERISTICS

$T_A = 25\,°C$, $V_{CC} = 14V$ unless otherwise specified.

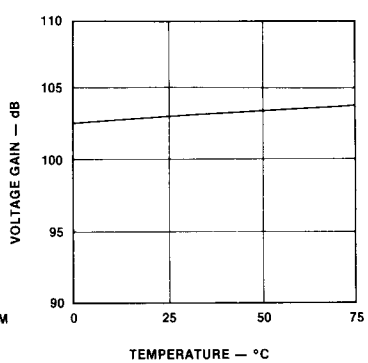
PARAMETER	TEST CONDITIONS	LM387			UNIT
		Min	Typ	Max	
Small signal bandwidth			15		MHz
Power bandwidth	20V p-p ($V_{CC} = 24V$)		75		kHz
Maximum input voltage	Linear operation			300	μVrms
Supply rejection ratio	f = 1kHz		110		dB
Channel separation	f = 1kHz		60		dB
Total harmonic distortion	75dB gain, f = 1kHz		0.1		%
Total equivalent input noise	$R_S = 600\Omega$, 100-10,000Hz		0.8	1.4	μVrms
Noise figure	50kΩ, 100-10,000Hz		1.0		dB
	10kΩ, 100-10,000Hz		1.6		dB
	5kΩ, 100-10,000Hz		2.8		dB

TYPICAL PERFORMANCE CHARACTERISTICS

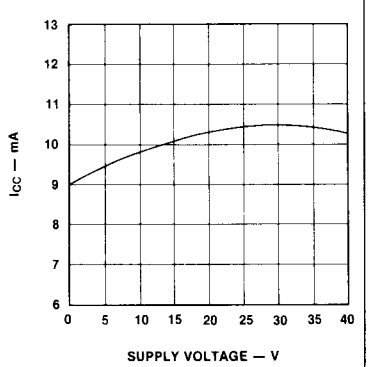
LARGE SIGNAL FREQUENCY RESPONSE



GAIN vs TEMPERATURE

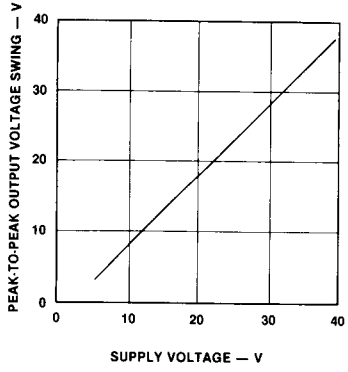


VCC vs ICC

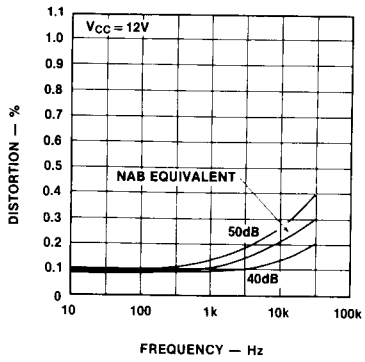


TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

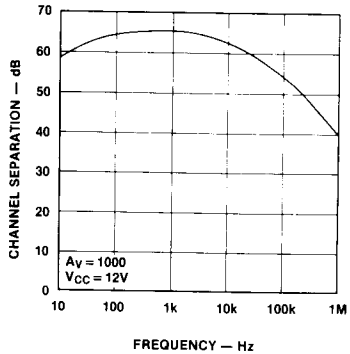
P-P OUTPUT VOLTAGE SWING vs VCC



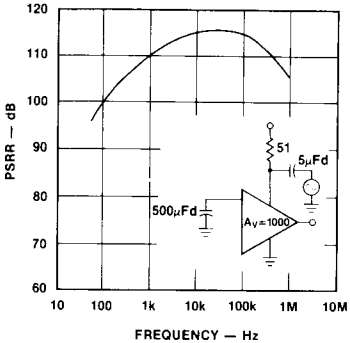
% DISTORTION



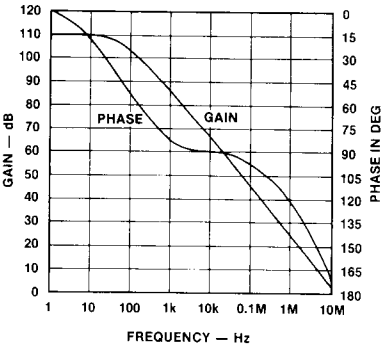
CHANNEL SEPARATION



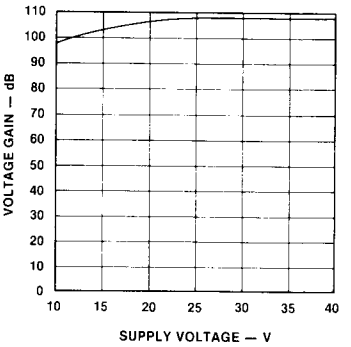
PSRR vs FREQUENCY



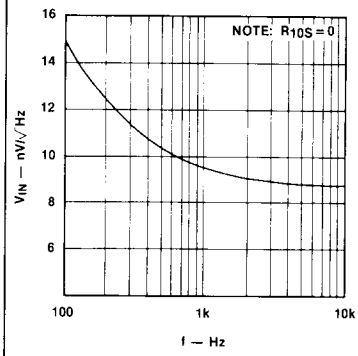
GAIN AND PHASE RESPONSE



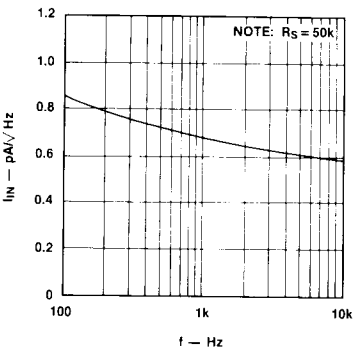
VOLTAGE GAIN vs SUPPLY VOLTAGE



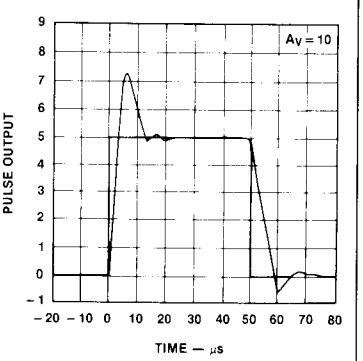
NOISE VOLTAGE vs FREQUENCY



NOISE CURRENT vs FREQUENCY



PULSE RESPONSE



15

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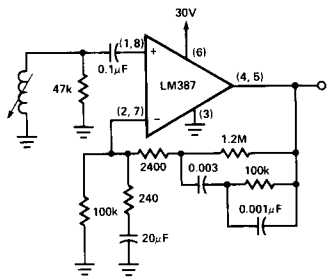
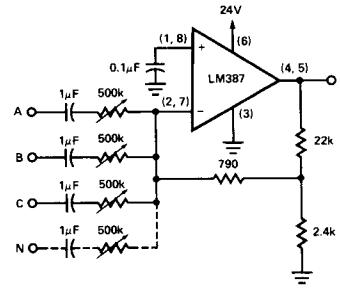
TYPICAL APPLICATIONS

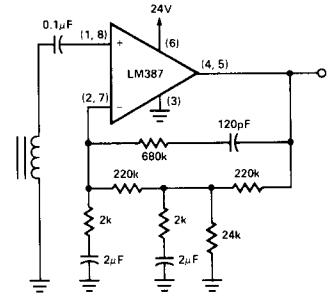
TYPICAL MAGNETIC PHONO PREAMPLIFIER



AUDIO MIXER



TWO-POLE FAST TURN-ON NAB TAPE PREAMPLIFIER



TYPICAL TAPE PLAYBACK AMPLIFIER