

March 1987

LM387/LM387A Low Noise Dual Preamplifier

General Description

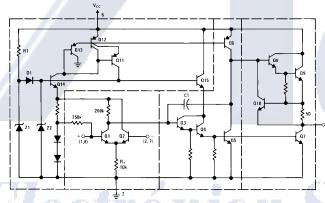
The LM387 is a dual preamplifier for the amplification of low level signals in applications requiring optimum noise performance. Each of the two amplifiers is completely independent, with an internal power supply decoupler-regulator, providing 110 dB supply rejection and 60 dB channel separation. Other outstanding features include high gain (104 dB), large output voltage swing (V $_{\rm CC}$ - 2V)p-p, and wide power bandwidth (75 kHz, 20 Vp-p). The LM387A is a selected version of the LM387 that has lower noise in a NAB tape circuit, and can operate on a larger supply voltage. The LM387 operates from a single supply across the wide range of 9V to 30V, the LM387A operates on a supply of 9V to

The amplifiers are internally compensated for gains greater than 10. The LN387, LM387A is available in an 8-lead dualin-line package. The LM387, LM387A is biased like the LM381. See AN-64 and AN-104.

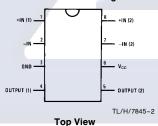
Features

- 1.0 μV total input noise ■ Low noise ■ High gain 104 dB open loop
- Single supply operation
- 9 to 30V Wide supply range LM387 9 to 40V LM387A 110 dB
- Power supply rejection
- Large output voltage swing (V_{CC} 2V)p-p
- Wide bandwidth 15 MHz unity gain
- Power bandwidth 75 kHz, 20 Vp-p
- Internally compensated
- Short circuit protected
- Performance similar to LM381

Schematic and Connection Diagrams



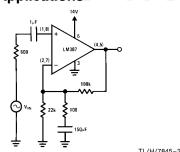
Dual-In-Line Package



Order Number LM387N or LM387AN See NS Package Number N08E

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Typical Applications



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FIGURE 1. Flat Gain Circuit (A_V = 1000)

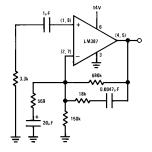


FIGURE 2. NAB Tape Circuit

RRD-B30M115/Printed in U. S. A.

TL/H/7845-4

Absolute Maximum Ratings

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

Supply Voltage LM387

+30V LM387A +40V Power Dissipation (Note 1) 1.5W 0°C to $+70^{\circ}\text{C}$ Operating Temperature Range -65°C to $+150^{\circ}\text{C}$ Storage Temperature Range Lead Temperature (Soldering, 10 sec.) 260°C

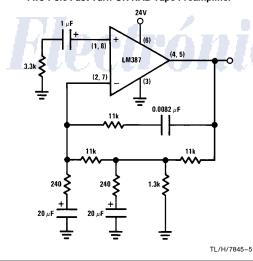
Electrical Characteristics $T_A = 25^{\circ}C$, $V_{CC} = 14V$, unless otherwise stated

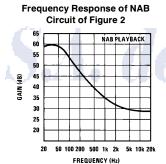
Parameter	Conditions	Min	Тур	Max	Units
Voltage Gain	Open Loop, f = 100 Hz		160,000		V/V
Supply Current	LM387, V _{CC} 9V-30V, R _L LM387A, V _{CC} 9V-40V, R		10 10		mA mA
Input Resistance Positive Input Negative Input		50	100 200		kΩ kΩ
Input Current Negative Input			0.5	3.1	μΑ
Output Resistance	Open Loop		150	7/	Ω
Output Current	Source Sink		8 2	/	mA mA
Output Voltage Swing	Peak-to-Peak		V _{CC} -2		V
Unity Gain Bandwidth			15		MHz
Large Signal Frequency Response	20 Vp-p (V $_{\rm CC}$ $>$ 24V), THD \leq 1%		75		kHz
Maximum Input Voltage	Linear Operation			300	mVrms
Supply Rejection Ratio Input Referred	f = 1 kHz		110		dB
Channel Separation	f = 1 kHz	40	60		dB
Total Harmonic Distortion	60 dB Gain, f = 1 kHz		0.1	0.5	%
Total Equivalent Input Noise (Flat Gain Cricuit)	10 Hz-10,000 Hz LM387 <i>Figure 1</i>		1.0	1.2	μVrms
Output Noise NAB Tape Playback Circuit Gain of 37 dB	Unweighted LM387A Figure 2		400	700	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.

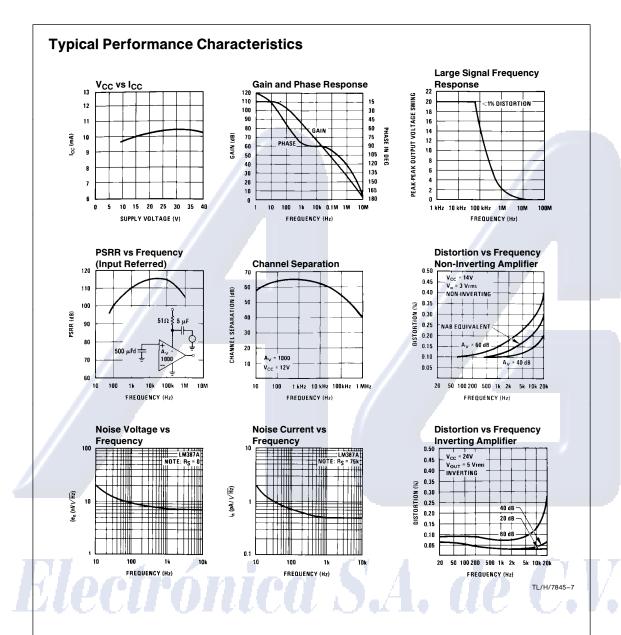
Typical Applications (Continued)

Two-Pole Fast Turn-ON NAB Tape Preamplifier

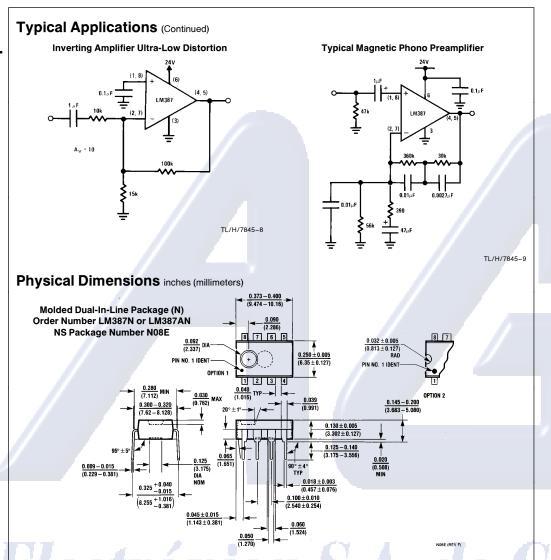




TL/H/7845-6



3



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