National Semiconductor

LM1310 Phase-Locked Loop FM Stereo Demodulator

General Description

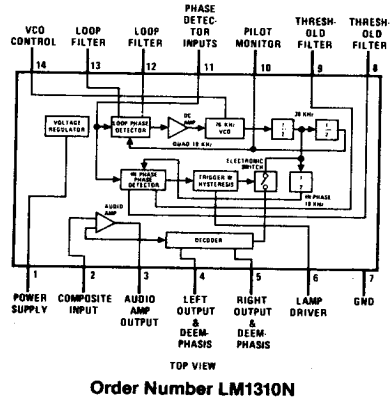
The LM1310 is an integrated FM stereo demodulator using phase locked loop techniques to regenerate the 38 kHz subcarrier. A second version also available is the LM1800 (see separate data sheet) which adds superb power supply rejection and buffered (emitter follower) outputs to the basic phase locked decoder circuit. The features available in these integrated circuits make possible a system delivering high fidelity sound within the cost restraints of inexpensive stereo receivers.

Features

- Automatic stereo/monaural switching
- No coils, all tuning performed with single potentiometer
- Wide supply operating voltage range
- Excellent channel separation

Connection Diagram

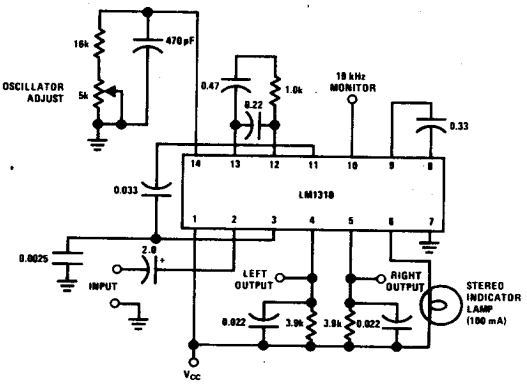
Dual-In-Line Package



TOP VIEW

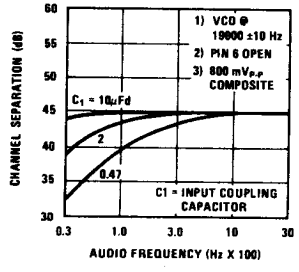
Order Number LM1310N
See NS Package N14A

Typical Application

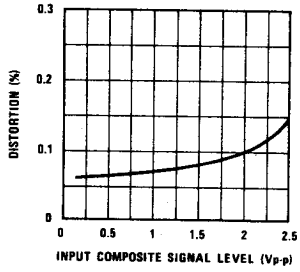


Typical Performance Characteristics

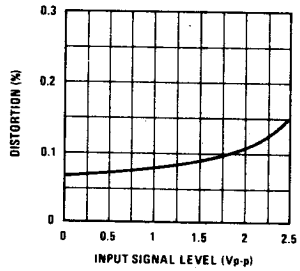
Channel Separation



Stereo Distortion vs Input Amplitude



Monaural Distortion vs Input Amplitude



Absolute Maximum Ratings

Supply Voltage	18V	Operating Supply Voltage Range	10V to 18V
Power Dissipation (Note 2)	715 mW	Storage Temperature Range	−65°C to +150°C
Operating Temperature Range	0°C to +70°C	Lead Temperature (Soldering, 10 seconds)	300°C

Electrical Characteristics (Note 1)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Current	Lamp "OFF"		18		mA
Lamp Driver Saturation	100 mA Lamp Current		1.3		V
Lamp Driver Leakage			1.0		nA
Pilot Level for Lamp "ON"	Pin 11 Adjusted to 19.00 kHz		15	20	mVrms
Pilot Level for Lamp "OFF"	Pin 11 Adjusted to 19.00 kHz	3.0	7.0		mVrms
Composite Input	Maximum for THD < 0.5%	2.8			Vp-p
Monaural Input	Maximum for THD < 1.0%	2.8			Vp-p
Stereo Channel Separation		30	40		dB
	2.0Vp-p Composite with 10% Pilot		45		dB
Monaural Channel Unbalance	Pilot "OFF"		0.3	1.5	dB
Recovered Audio			485		mVrms
Total Harmonic Distortion			0.3		%
Total Harmonic Distortion	2.0 Vp-p Composite with 10% Pilot		0.15		%
Capture Range	50 mVrms of Pilot		±3.5		% of f_o
Ultrasonic Frequency Rejection	19 kHz		35		dB
	38 kHz		45		dB
Dynamic Input Resistance		20	50		kΩ
SCA Rejection	f = 67 kHz; Measure 9 kHz Beat Note with 1 kHz Modulation "OFF"		75		dB

Note 1: Unless otherwise noted: V_{CC} = +12 V_{DC} and T_A = +25°C. The input signal is a 2.8 Vp-p standard multiplex composite signal using 10% Pilot and with L or R-channel only modulated at 1.0 kHz.

Note 2: 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 175°C/W junction to ambient.

Note 3: The VCO can be defeated (sometimes desirable when using an AM-FM receiver in the AM mode) by returning pin 14 to ground through a 2.2 kΩ resistor.

Typical Performance Characteristics (Continued)

Pilot Amplitude vs Capture Frequency