Dual, Continuous, Analog Highpass Filter

LF580 DATA SHEET

FEATURES

- **only 2 small capacitors required**
- **200 to 10 kHz adjustable corner frequency**
- **dual 12 dB/Oct Butterworth filter (24 dB/Oct cascaded)**
- **1.1 to 3.0 VDC operating range**
- **adjustable by a single potentiometer**

STANDARD PACKAGING

- 8 pin MICROpac
- 8 pin MINIpac
- 8 pin PLID ®
- Chip (66 x 61mils)

DESCRIPTION

The LF580 continuous analog filter consists of two second order (12 dB/oct), tunable (0.2 to 10 kHz) highpass Butterworth filter blocks.

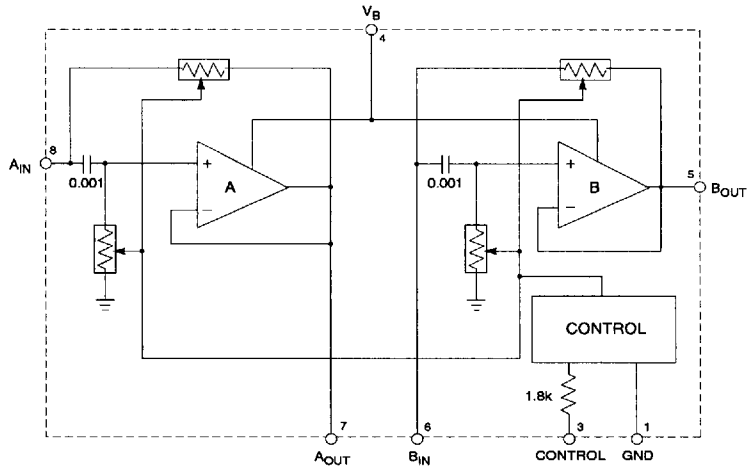
Tracking and corner frequency of each block are controlled by a single potentiometer. Cascading the two blocks together results in a single 24dB/oct high pass filter requiring only two external 0.001 µF capacitors for the filter response.

The output noise of each filter stage is typically 5.6µV. Cascading the two filter blocks together will produce a noise level which is

$$V_N = \sqrt{(V_{N1})^2 + (V_{N2})^2}$$

Where V_N is the total output noise of both filters, V_{N1} and V_{N2} is the noise of each filter.

To improve the signal-to-noise ratio of the filter the LF580 should be placed after a preamplifier, provided that the signal level does not exceed the maximum signal capability of 50mVRMS



All resistors in ohms, all capacitors in microfarads unless otherwise stated

BLOCK DIAGRAM

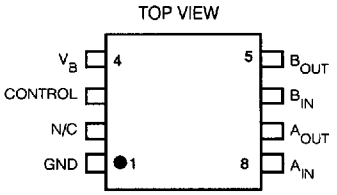
Revision Date: June 1994

ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE/UNITS
Supply Voltage	5 V DC
Operating Temperature Range	-10°C to 50° C
Storage Temperature Range	-40°C to 100° C

CAUTION
CLASS 1 ESD SENSITIVITY

PIN CONNECTION



ELECTRICAL CHARACTERISTICS

Conditions: Frequency = 1 kHz, Temperature = 25°C, Supply Voltage V_B = 1.3 V

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Insertion Loss		V_{IN} =1 V_{RMS} Note 1	-	2	3	dB
Current Drain	I_T	R_{CNT} = 100 kΩ	200	280	370	µA
Corner Frequency	f_C	V_{IN} =1 V_{RMS} Note 2	1300	1650	1900	Hz
Distortion	THD	V_{IN} =1.25 V_{RMS}	-	2	5	%
Ouput Noise		Note 3	-	8	10	µV
Supply Rejection	SR	V_B = 3.0V_{DC} Note 4	-	45	56	dB

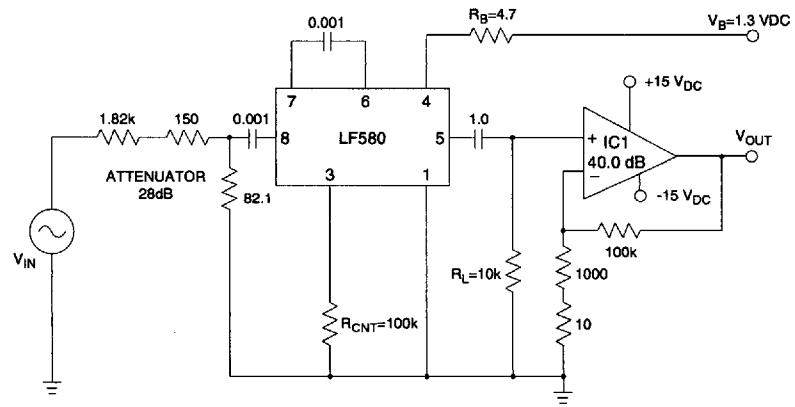
All parameters and switches remain as shown in Test Circuit unless otherwise stated in "Conditions" column

Notes 1: Insertion Loss = 20 Log(V_{OUT}/V_{IN})-12

2: a) measure output voltage V_{OUT1} (R_{CNT} =100kΩ)
b) measure output voltage V_{OUT2} (R_{CNT} =10.274kΩ)
f_C = 1000 x 2 $^{(V_{OUT1} / V_{OUT2})}$

3: Output Noise = V_{OUT} /100, filter bandwidth 200Hz to 10kHz at 12dB/Oct

4: V_B modulated with 1V_{RMS} at 1 kHz
Supply Rejection = 20 Log (V_{OUT})-40



All resistors in ohms, all capacitors in microfarads unless otherwise stated in conditions column

Fig. 1 Test Circuit

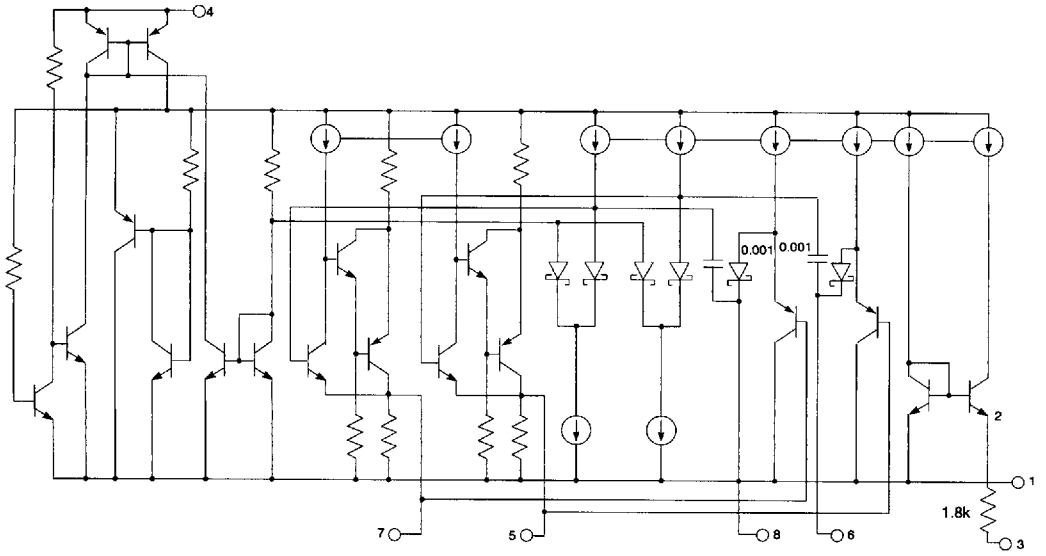


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Fig. 2 Functional Schematic

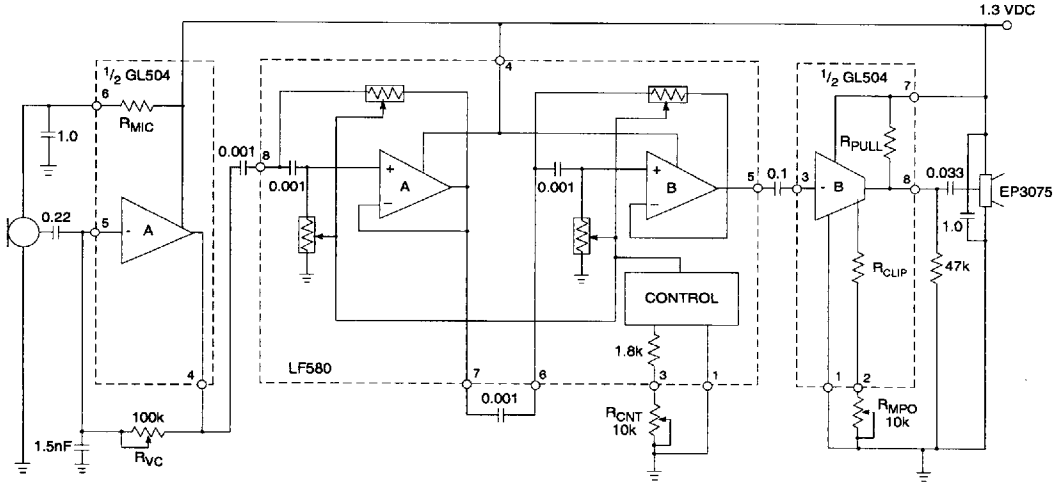

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Fig. 3 GL504-LF580 Application Circuit

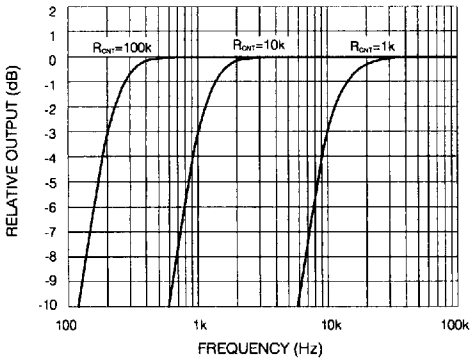

Fig. 4 Frequency Response at Various R_{CNT} Values

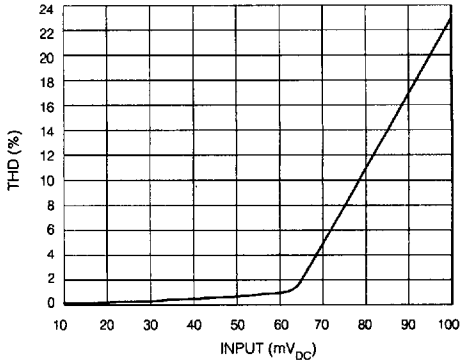

Fig. 5 Total Harmonic Distortion vs Input Level (measured at Pin 7)

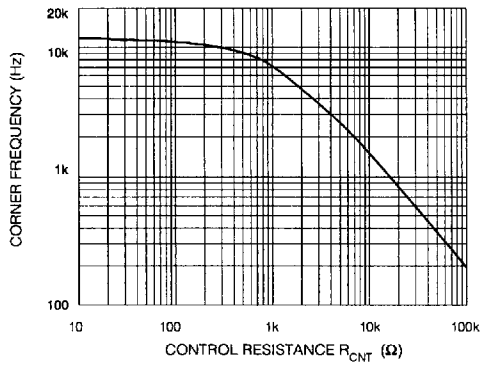

Fig. 6 Corner Frequency vs Control Resistance

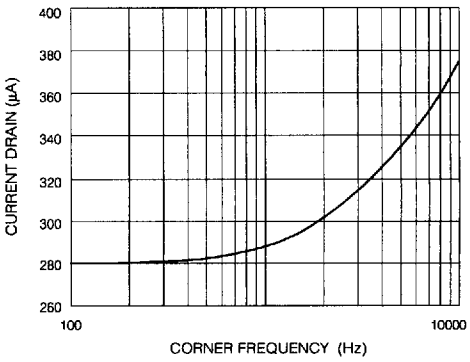

Fig. 7 Current Drain vs Corner Frequency

REVISION NOTES

Corrections to Figure 2 and Figure 3.