



FEATURES

- **40dB of electrical gain**
- **1.0 to 1.6 VDC supply operating range**
- **current trim capability (R_T)**
- **high efficiency class B output stage**
- **may be used with a linear or compression preamplifier**

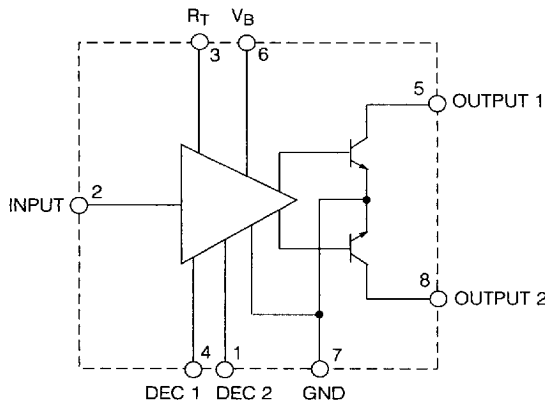
STANDARD PACKAGING

- 8 pin MICROpac (unavailable for LD549)
- 8 pin MINIpac
- 8 pin PLID®
- Chip (47 x 40 mils)

DESCRIPTION

The LC/LV/LD549 is an 8 pin, low voltage, push-pull audio frequency output stage amplifier with a single unbalanced input. The circuit utilizes two internal negative feedback loops to stabilize the DC operating point for temperature stability and to linearize the transfer function over a wide dynamic range. The circuit operates near ideal class B conditions resulting in low distortion and very low quiescent current, required for extended battery life.

The LC549, LV549 and LD549 differ in only one respect; the LV549 and LD549 are selected devices which are capable of delivering from 10 mA to 41 mA and from 36 mA to 75 mA of output current respectively. These values are the maximum current drawn with both output stage transistors in saturation. Thus the LD549 is capable of producing a high output in a low impedance load, the LV549 is selected to have lower peak currents, extending the life of the battery.



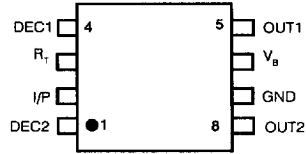
U.S. Patent No. 4,085,382
Patented in other countries

BLOCK DIAGRAM

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | VALUE & UNITS |
|-----------------------|----------------|
| Supply Voltage | 3 VDC |
| Power dissipation | 60 mW |
| Operating Temperature | -10 to + 40 °C |
| Storage Temperature | -20 to + 70 °C |

PIN CONNECTION



CAUTION
CLASS 1 ESD SENSITIVITY



ELECTRICAL CHARACTERISTICS

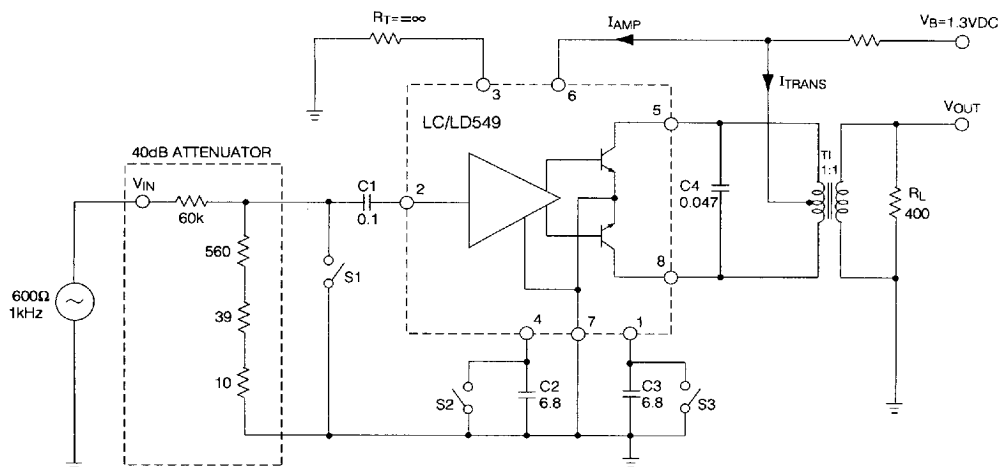
Conditions: Temperature 25 °C, Supply Voltage $V_B = 1.3$ VDC

| PARAMETER | SYMBOL | CONDITION | MIN | TYP | MAX | UNITS |
|-------------------------|-----------------------------------|--|---------------------------|---------------|----------------|----------------|
| Gain | A_{CL} | $V_{OUT} = 0.707 V_{RMS}$ | 38 | 40 | 42 | dB |
| Quiescent Current | I_{AMP} | | 100 | - | 400 | μA |
| | I_{TRANS} | | 170 | - | 370 | μA |
| | I_{TOT} | | - | 500 | 770 | μA |
| Maximum Drive Current | | $V1 = 0V$ (S2, S3 closed) $V4 = 0V$ LC549 LV549 LD549 | 10 10 36 | 35 - 50 | 75 41 75 | mA mA mA |
| | Input Impedance | | 18 | 27 | 36 | k Ω |
| | Total Harmonic Distortion & Noise | THD | $V_{OUT} = 0.707 V_{RMS}$ | - | 0.5 | - |
| $V_{OUT} = 1.3 V_{RMS}$ | | | - | 2.5 | 5.2 | % |
| Input Referred Noise | IRN | NFB 0.2 to 10 kHz at 12 dB/oct (S1 closed) | - | 1.2 | 2.5 | μV |
| Start Up Time | | | - | - | 3 | sec |

All switches and parameters remain as shown in test circuit unless stated in condition column

START-UP TIME TEST (Refer to Test Circuit)

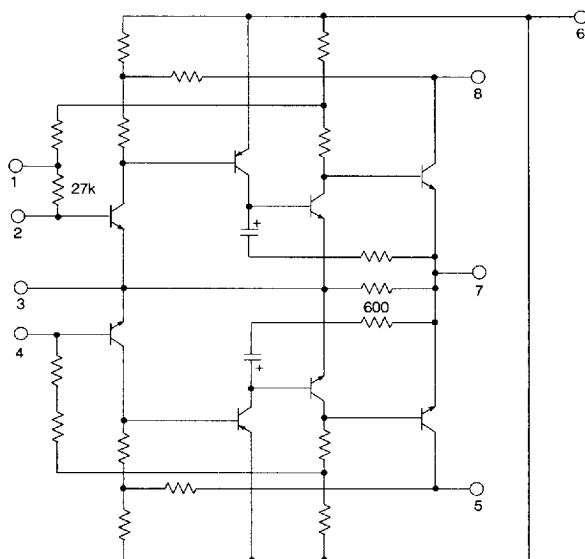
| | SEQUENCE | CONDITIONS | COMMENTS |
|---|---|------------|---|
| 1 | Power Supply | Off | |
| 2 | S1 | Closed | Removes V_{IN} |
| 3 | S2 / S3 | Closed | Discharges C2 and C3 |
| 4 | S1 | Open | Applies V_{IN} (V_{IN} level is determined from Gain Test) |
| 5 | S2 / S3 | Open | Removes short from C2 and C3 |
| 6 | Power Supply | On | |
| 7 | Gain must be within specification, within 3 seconds after power supply is turned on | | |



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

$$\text{Gain} = 20 \text{ Log}_{10} \left(\frac{\text{VOUT}}{\text{VIN}} \right) + 40 \text{ dB}$$

Fig. 1 Test Circuit



All resistors in ohms, all capacitors in farads unless otherwise stated
 U.S. Patent No. 4,085,382 - Patented in other countries

Fig. 2 Equivalent Circuit

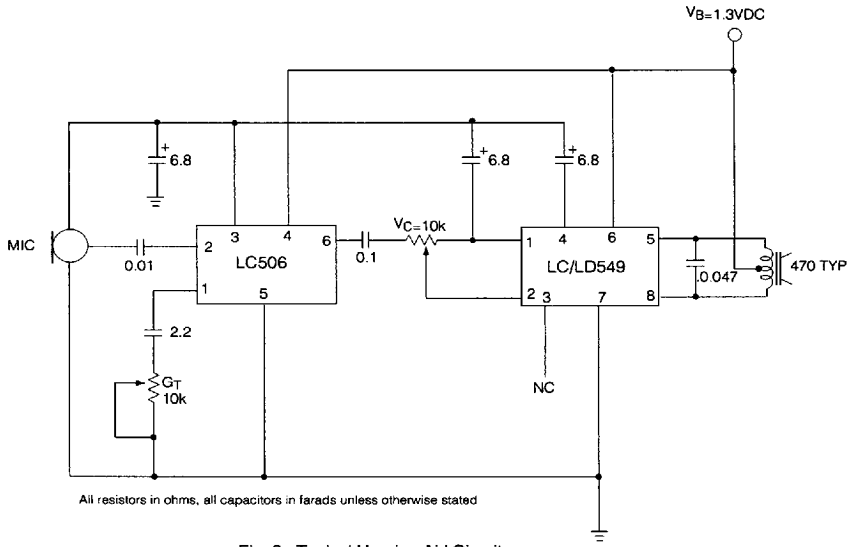


Fig. 3 Typical Hearing Aid Circuit

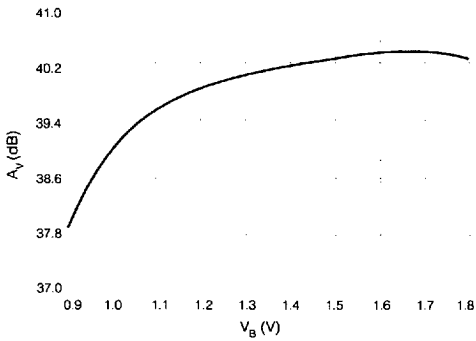


Fig. 4 Volume Gain vs Battery Voltage

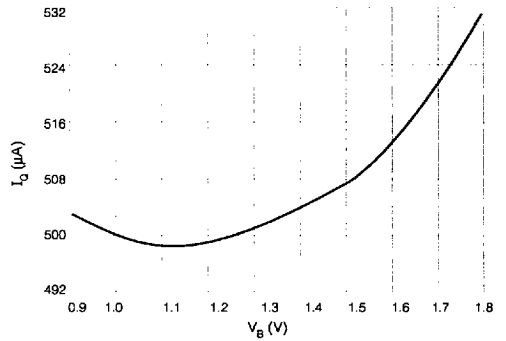


Fig. 5 Quiescent Current vs Battery Voltage

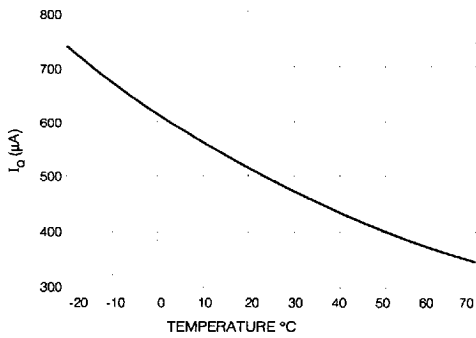


Fig. 6 Quiescent Current vs Temperature

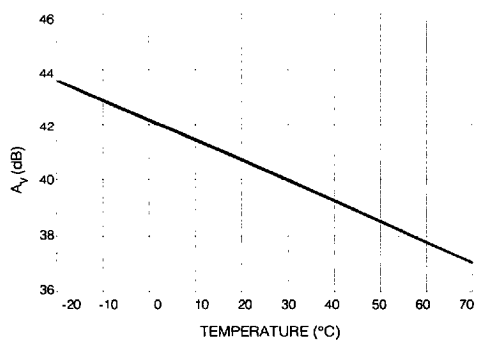


Fig. 7 Gain vs Temperature

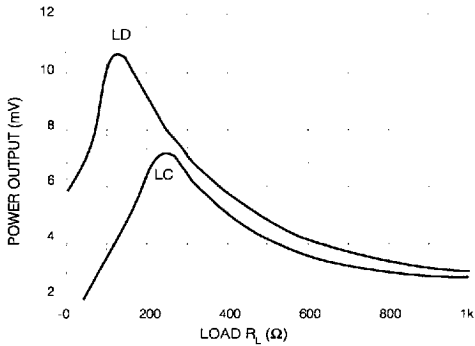


Fig. 8 Power Output vs Load Resistance at 7% Distortion $R_B = 0\Omega$

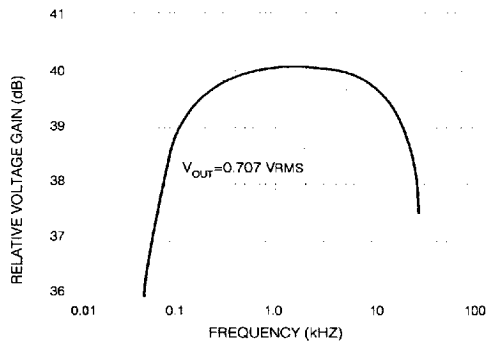


Fig. 9 Voltage Gain vs Frequency

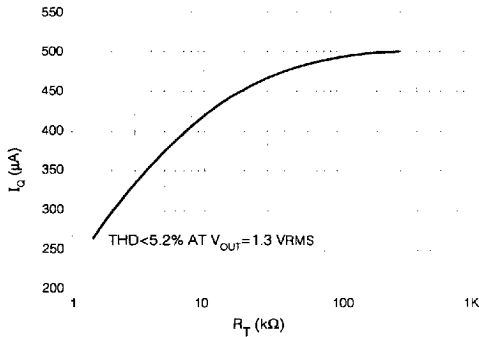


Fig. 10 Quiescent Current vs Current Trim Resistor

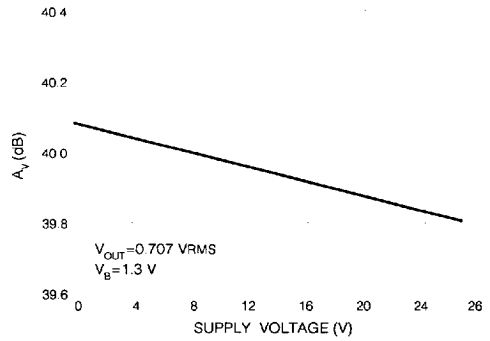


Fig. 11 Voltage Gain vs Battery Resistance

REVISION NOTES
8 pin MICROpac unavailable for LD549

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