Low Distortion AGC Compression Amplifier

LD502 DATA SHEET

FEATURES

- **adjustable gain from 0 to 60 dB**
- **0.94 V DC voltage regulator on-chip**
- **attack time fixed at less than 1 ms**
- **release time adjustable from 40 to 500 ms**
- **low input referred noise 1.2 μV**
- **<1 % distortion at 10 mVRMS output**
- **operates from 1.05 to 3 VDC**

STANDARD PACKAGING

- 8 pin MICROpac
- 8 pin MINIpac
- 8 pin PLID ®
- 8 pin SLT
- Chip (64 x 62 mils)

  Au Bump

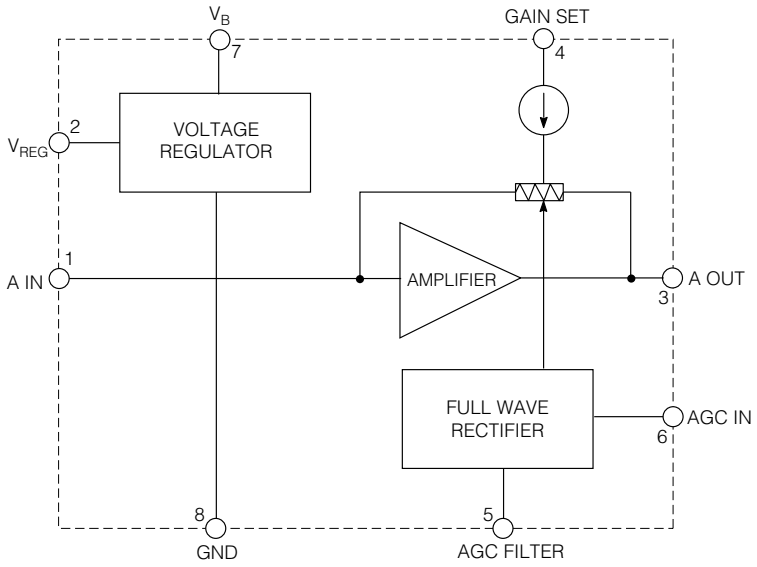
DESCRIPTION

The LD502 is a compression (AGC) preamplifier that consists of a single ended input inverting amplifier, with an internal current controlled resistance connected between input and output.

By using R_{GT} (see test circuit) to vary the value of this current controlled resistance, the amplifier gain and compression threshold can be controlled over a range of 60 dB.

The AGC current is derived from a full wave rectifier driven by a differential amplifier. The attack time of the AGC circuit is fixed at less than 1 ms. The release time is adjustable from 40 to 500 ms by selecting the value of an external capacitor (C3).

Internally, a series shunt voltage regulator produces a 0.94 V DC regulated output voltage. This provides a bias for electret microphones and permits circuit operations over a wide range of supply voltages, 1.05 to 3 VDC for LD502 without any degradation of electrical performances.



BLOCK DIAGRAM

Patented 1985 Patent Pending Europe 83.300836.0
Canada 1183580 USA 4506169 Japan 58-06886

Revision Date: March 1994

Document No. 500 - 43 - 18

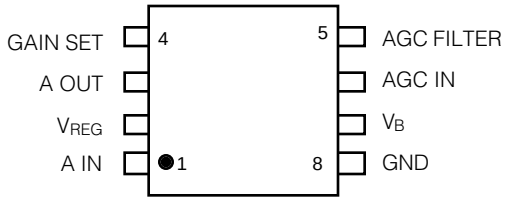
GENNUM CORPORATION P.O. Box 489, Stn A, Burlington, Ontario, Canada L7R 3Y3 tel. (905) 632-2996 fax: (905) 632-5946
Japan Branch: A-302, Miyamae Village, 2–10–42 Miyamae, Suginami–ku, Tokyo 168, Japan tel. (03) 3334-7700 fax (03) 3247-8839

ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE/UNITS
Supply Voltage	3 V DC
Power Dissipation	25 mW
Operating Temperature Range	-10°C to 50° C
Storage Temperature Range	-20°C to 70° C

CAUTION
CLASS 1 ESD SENSITIVITY

PIN CONNECTION

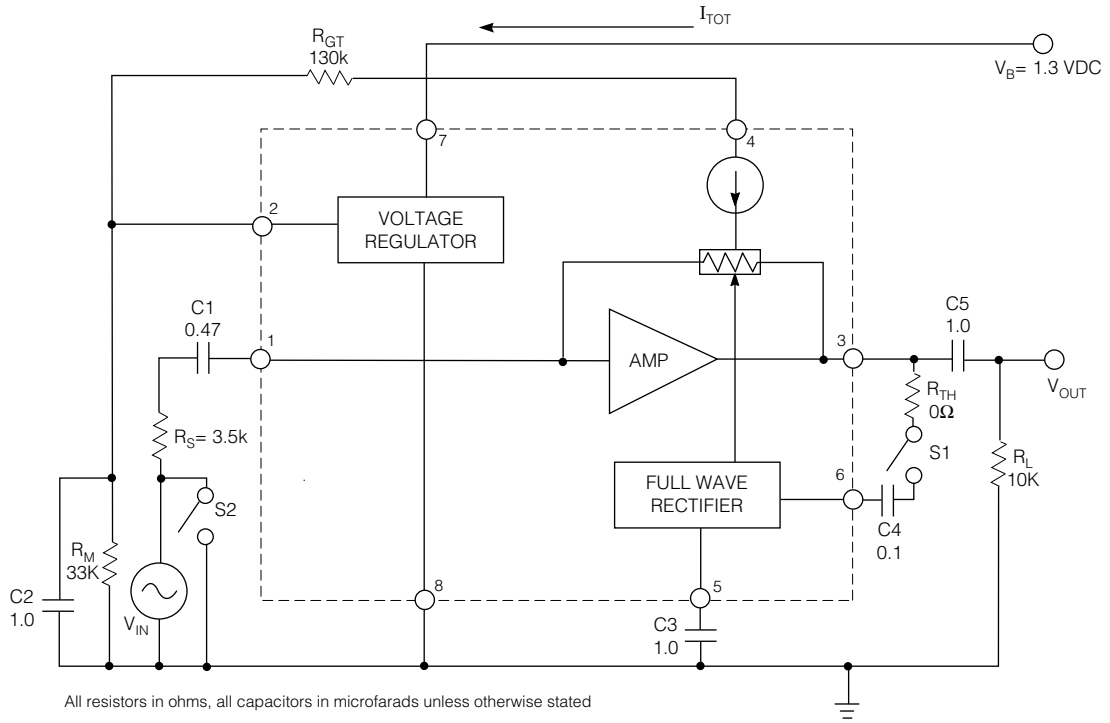


ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Gain	A_V	V_{OUT} = 11.0 mV, 20 Log ($\frac{V_{OUT}}{V_{IN}}$)	38	41	46	dB
Output Level	V_{OHIGH}	V_{IN} = 6.32 mV, S1 closed	7.5	12	15.5	mV
Distortion -Linear	THD	V_{OUT} = 11.0 mV	-	1	2.9	%
- AGC		V_{IN} = 6.32mV, S1 closed	-	1	2.2	%
Input Referred Noise	IRN	S2 closed,NFB 0.2 to 10 kHz at 12 dB/Oct	-	1.2	2.2	µV
Compression Function Ratio		V_{IN} = 0.1 to 6.32 mV, S1 closed	2	5	8	dB
Total Amplifier Current	I_{AMP}		160	310	380	µA
Regulated Voltage	V_{REG}		0.890	0.940	0.990	VDC
Supply Rejection	PSRR		51	60	-	dB

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



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

Fig. 1 Test Circuit

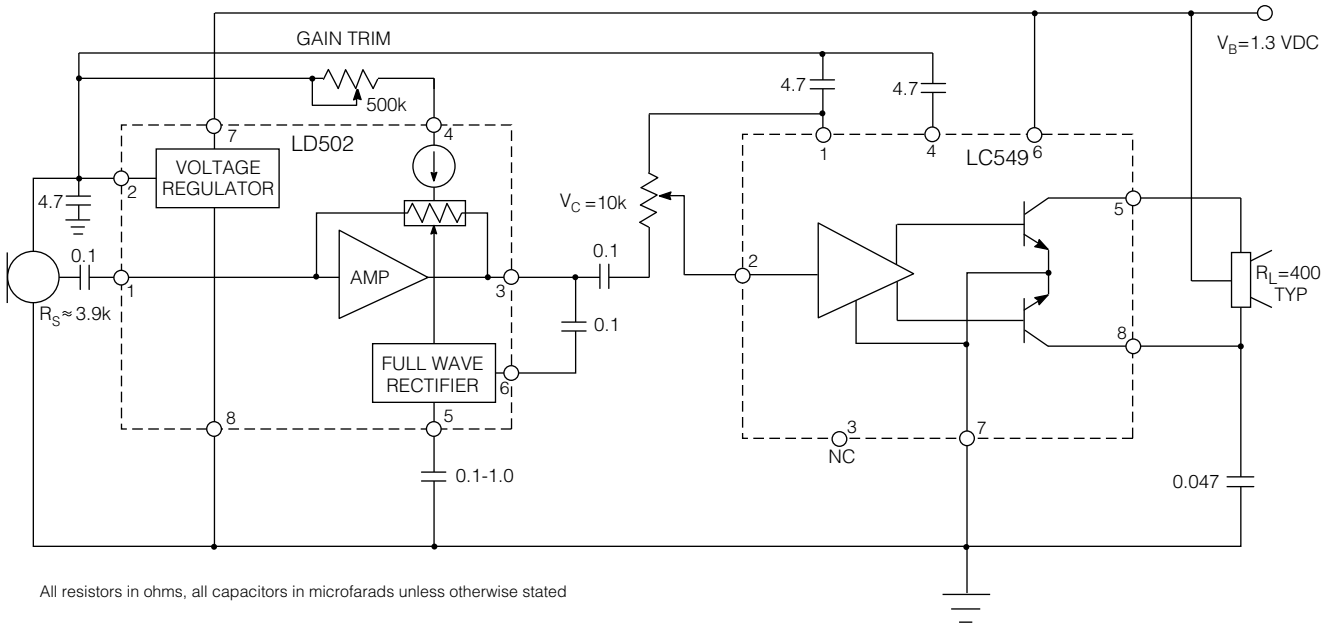


Fig. 2 LD502/LC549Hearing Instrument Application

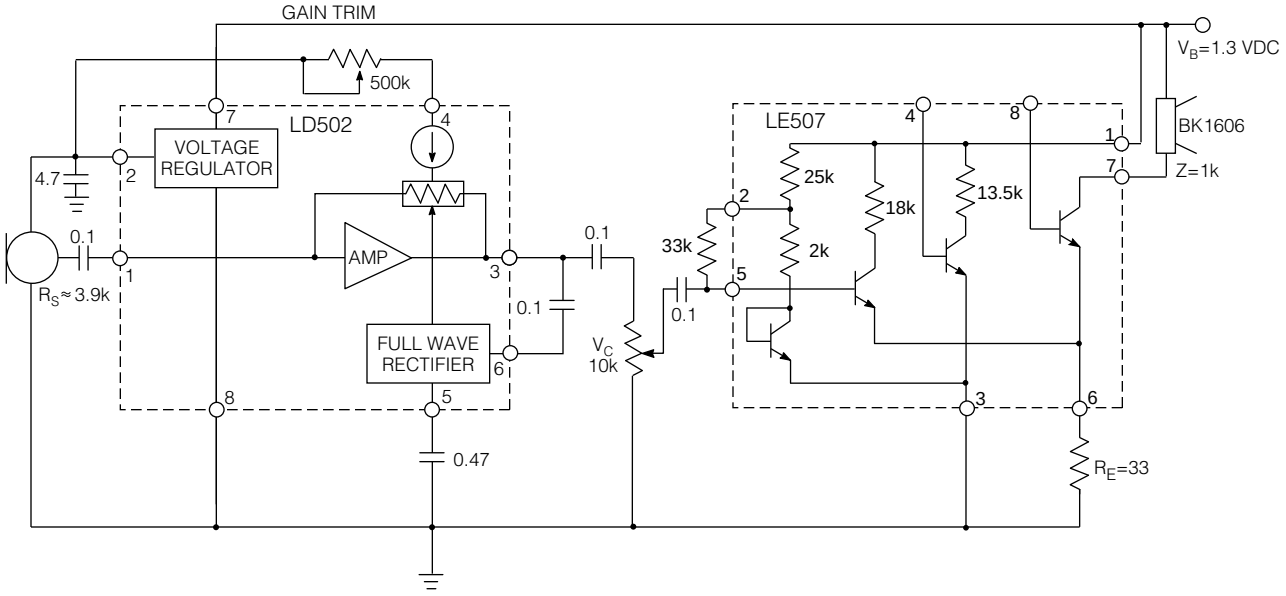


Fig. 3 LD502/LE507 Hearing Instrument Application

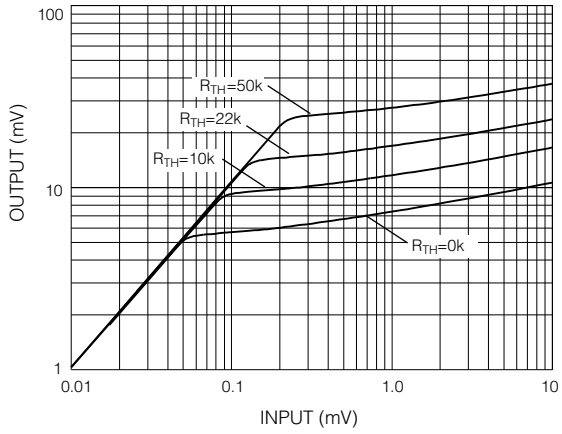


Fig. 4 I/O Characteristics at Various R_{TH} Values

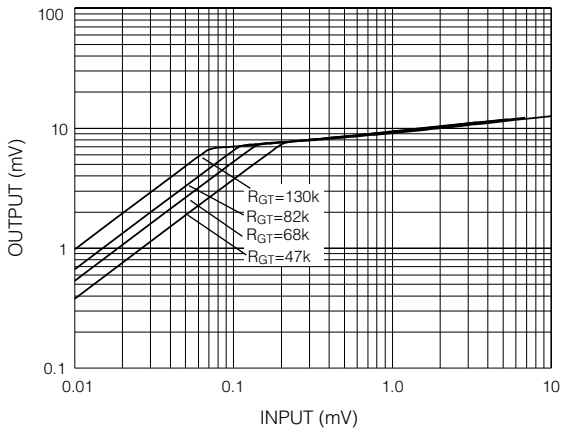


Fig. 5 I/O Characteristics at Various R_{GT} Values

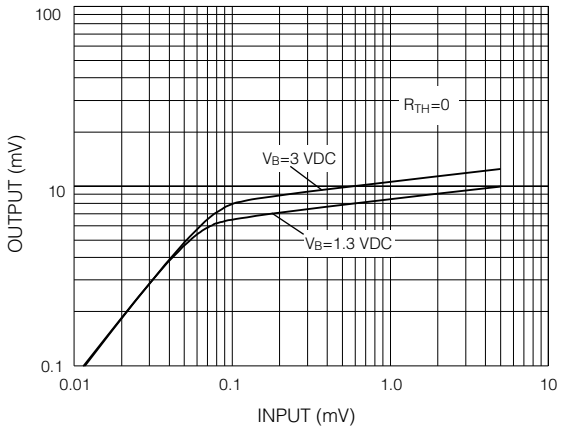


Fig. 6 Effects of Supply Voltage Variation

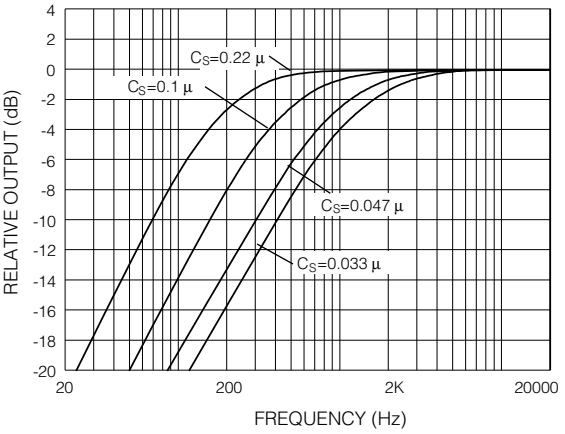


Fig. 7 Frequency Response at Various C_S Values

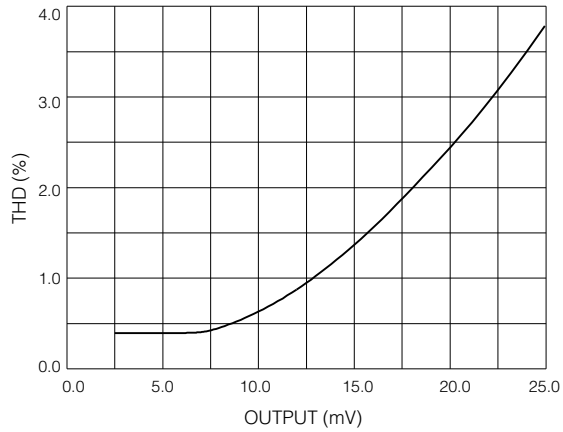


Fig. 8 Total Harmonic Distortion vs Output Level

REVISION NOTES

Changes to Fig.1, test conditions, Pb/Sn bump removed.

DOCUMENT IDENTIFICATION

PRODUCT PROPOSAL
This data has been compiled for market investigation purposes only, and does not constitute an offer for sale.

ADVANCE INFORMATION NOTE
This product is in development phase and specifications are subject to change without notice. Gennum reserves the right to remove the product at any time. Listing the product does not constitute an offer for sale.

PRELIMINARY DATA SHEET
The product is in a preproduction phase and specifications are subject to change without notice.

DATA SHEET
The product is in production. Gennum reserves the right to make changes at any time to improve reliability, function or design, in order to provide the best product possible.