

**FEATURES**

- 72 dB typical gain
- 0.2 to 2.0 mA of transducer current adjustment
- 43 dB range of feedback volume control
- 1.0 to 1.6 V supply operating range
- Schottky diodes provide symmetrical peak clipping
- requires only 4 external parts for operation

**STANDARD PACKAGING**

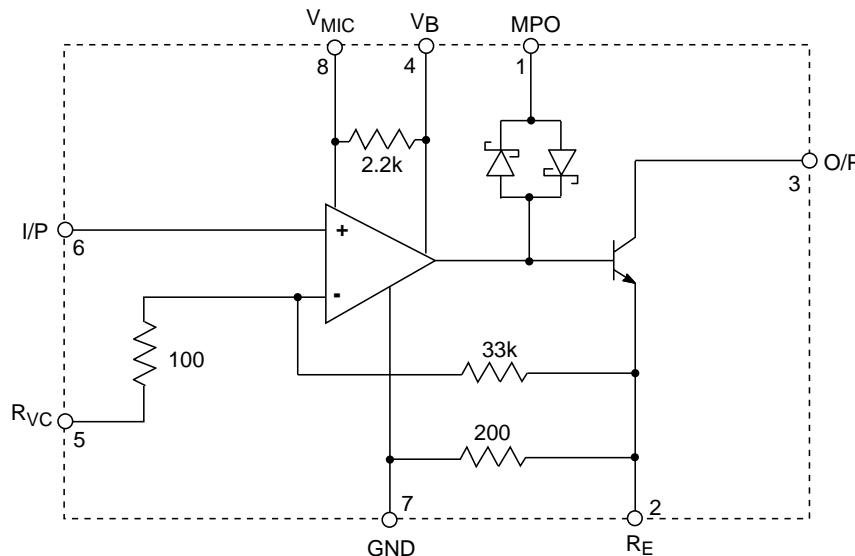
- 8 pin MINIpac
- 8 pin MICROpac
- 8 pin PLID®
- 8 pin SLT
- Chip (56 x 55 mils)

**DESCRIPTION**

The LS505 is a low voltage, monolithic integrated circuit amplifier comprised of an operational amplifier driving a single transistor Class A output stage with open collector. Also included are a pair of complementary Schottky diodes which provide the capability for symmetrical peak clipping in a feedback configuration.

An internal negative feedback loop ensures a stable operating point for the output stage over the designed operating voltage. This also permits trimming of the output current with the use of a single external resistor.

The input stage and microphone are biased by an internal 2.2 kΩ decoupling resistor to increase battery line signal rejection.



**BLOCK DIAGRAM**

All resistors in ohms, all capacitors in farads unless otherwise stated.

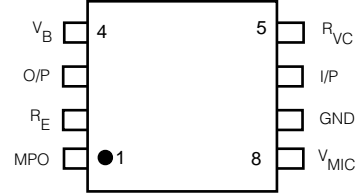
## ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE & UNITS
Supply Voltage	3 V
Power dissipation	25 mW
Operating Temperature	-10 to +40 °C
Storage Temperature	-20 to +70 °C

**CAUTION**  
CLASS 1 ESD SENSITIVITY



## PIN CONNECTION

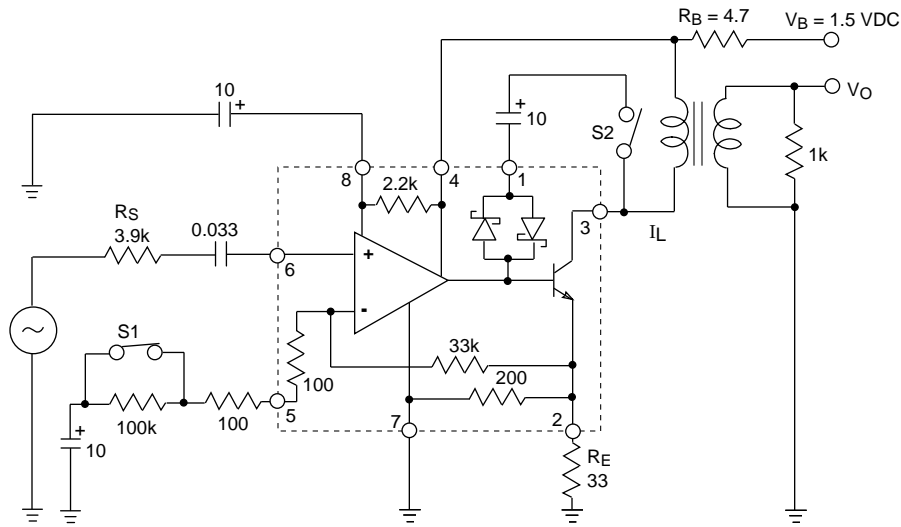


## ELECTRICAL CHARACTERISTICS

Conditions: Temperature 25 °C, Supply Voltage  $V_B = 1.55$  VDC

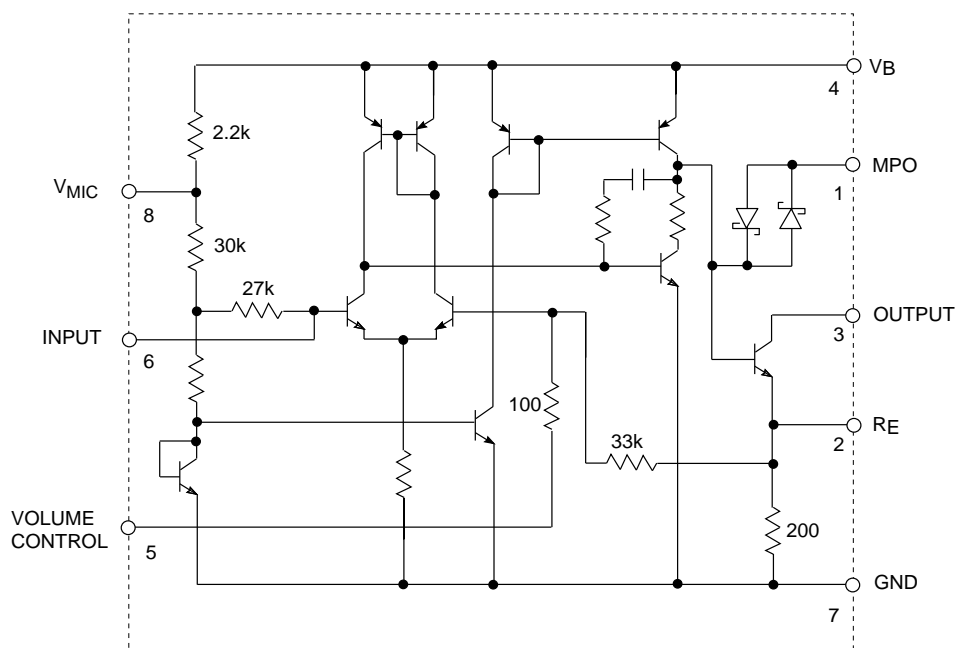
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNITS
Gain	$A_{CL}$	$V_O = 0.707$ VRMS	68	72	76	dB
Temperature Coefficient of Gain	$\eta_A$		-	0.07	-	dB/°C
Amplifier Current	$I_{AMP}$		180	210	280	$\mu$ A
Temperature Coefficient of Current	$\eta_I$		-	-0.002	-	mA/°C
Transducer Current	$I_{TRANS}$		1.3	1.5	1.9	mA
Total Harmonic Distortion	THD	$V_O = 0.707$ VRMS	-	2	5	%
Input Referred Noise	IRN	NFB 0.2 to 10 kHz at 12 dB/oct	-	1.2	2.0	$\mu$ VRMS
Battery Resistance Stability		$R_B = 22\Omega$	-	-	22	$\Omega$
Volume Control Range		$R_{VC} = 100$ to $100.1$ k $\Omega$ S1 open	36	43	-	dB
Input Impedance (Pin 6)	$R_{IN}$		-	27	-	k $\Omega$
Frequency Response (-3 dB)		Low	-	100	-	Hz
		High	-	5K	-	Hz
Maximum Output		S2 closed	0.125	0.19	0.275	VRMS
Gain Dependence of RB			-	0.16	-	dB/ $\Omega$
Emitter Bias Voltage (Pin 2)	$V_{RE}$		-	42.5	-	mV

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



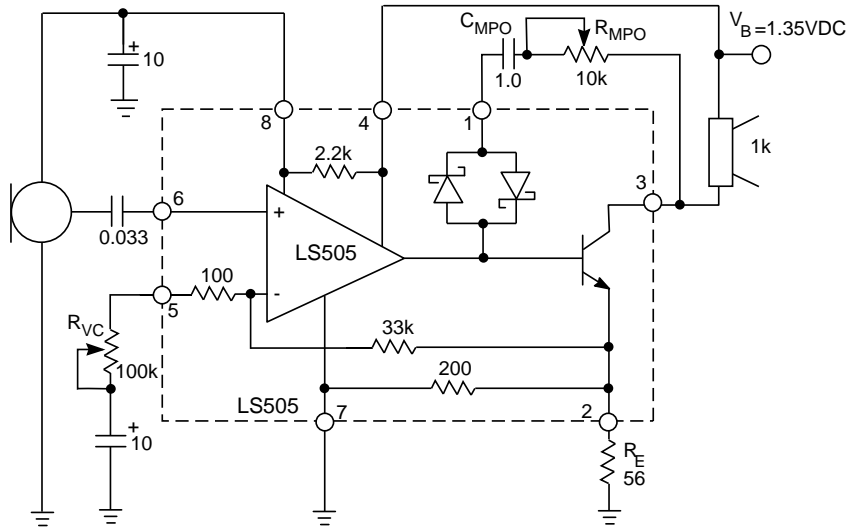
All resistors in ohms, all capacitors in  $\mu\text{F}$  unless otherwise stated

Fig. 1 Test Circuit



All resistors in ohms, all capacitors in farads unless otherwise stated  
 U.S. Patent No. 4,034,306 - Patented in other countries

Fig. 2 Functional Schematic



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

Fig. 3 Typical Hearing Aid Applications

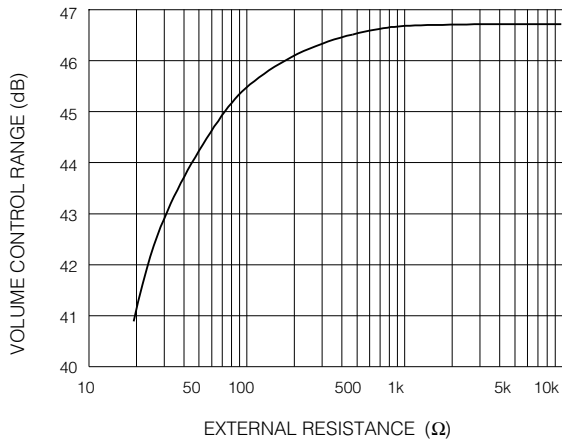


Fig. 4 Volume Control Range vs  $R_E$

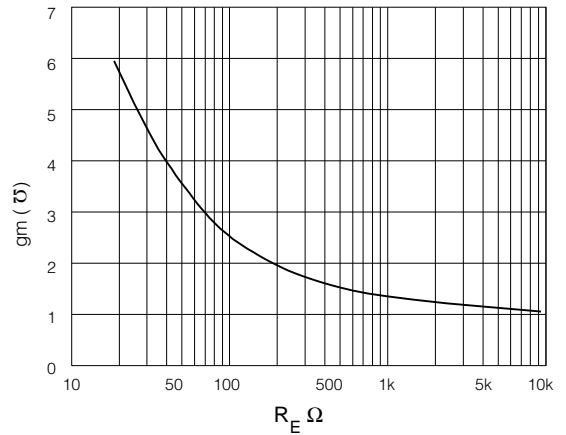


Fig. 5  $GM\bar{\sigma}$  vs  $R_E$

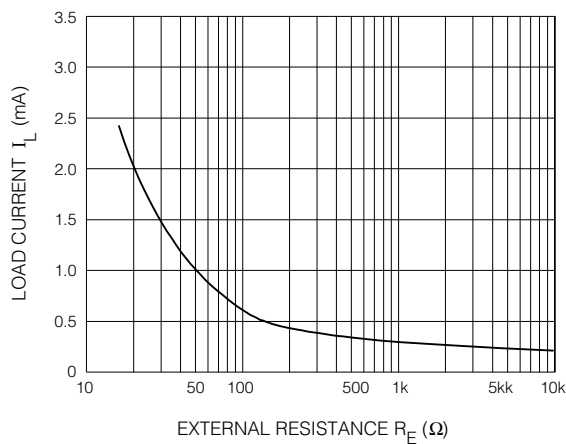


Fig. 6 Load Current vs External Resistance

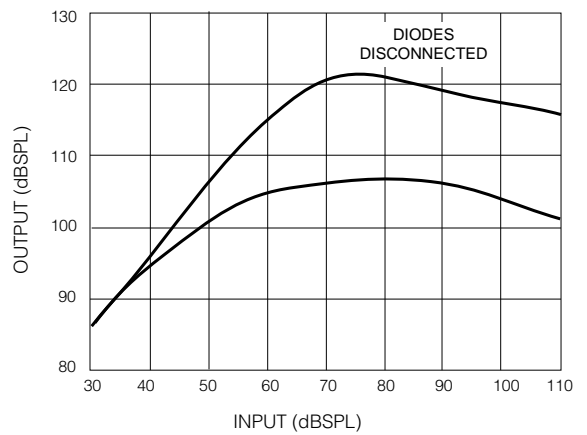


Fig. 7 I/O Characteristics

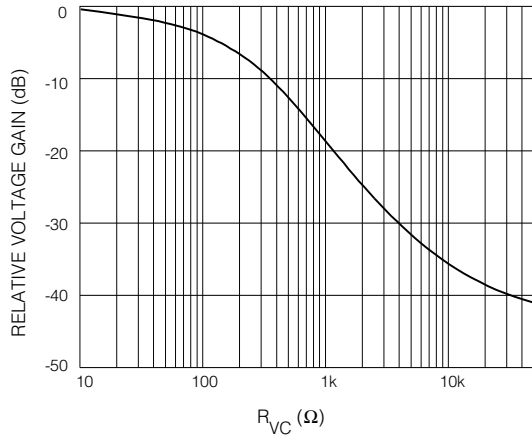


Fig. 8 Relative Voltage Gain vs Volume Control Resistance

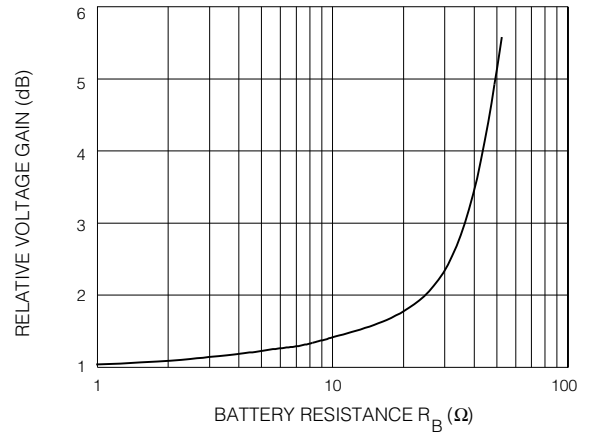


Fig. 9 Relative Voltage Gain vs Battery Resistance

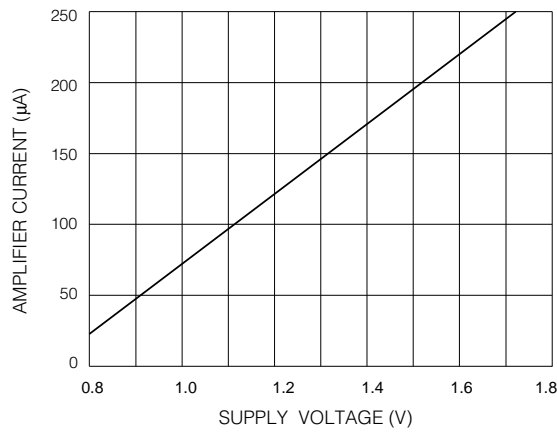


Fig. 10 Amplifier Current vs Supply Voltage

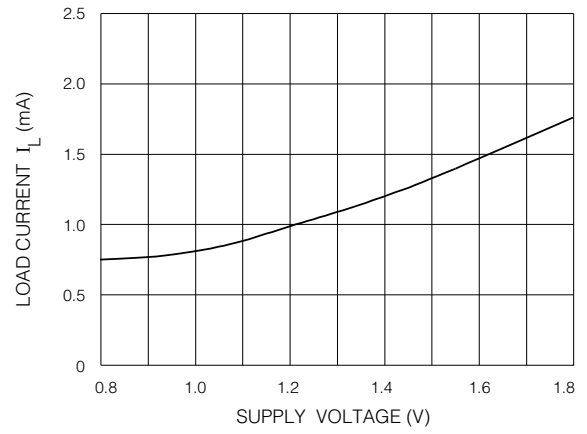


Fig. 11 Load Current vs Supply Voltage

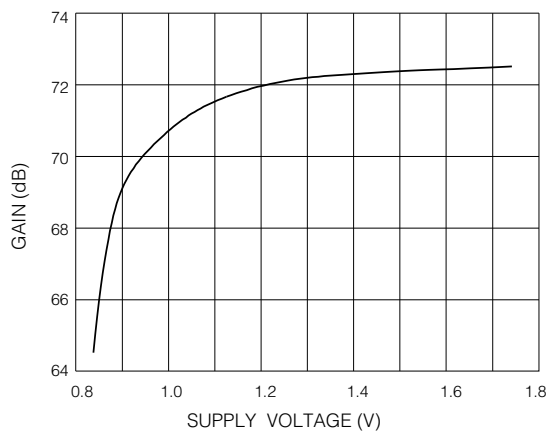


Fig. 12 Gain vs Supply Voltage

**REVISION NOTES**

Au bump removed

