

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

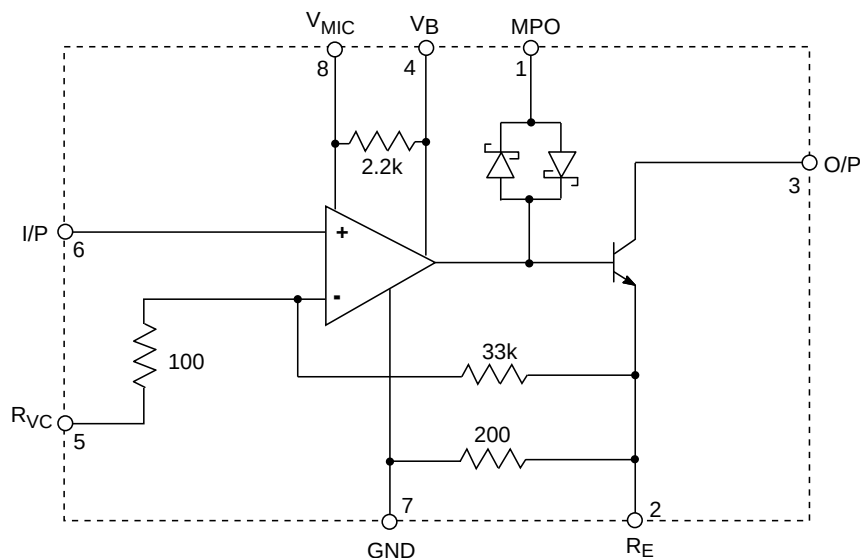
- 8 pin MINIpac
- 8 pin MICROpac
- 8 pin PLID®
- 8 pin SLT
- Chip (56 x 55 mils)

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 k Ω decoupling resistor to increase battery line signal rejection.



BLOCK DIAGRAM

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

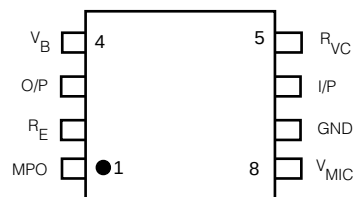
ABSOLUTE MAXIMUM RATINGS

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

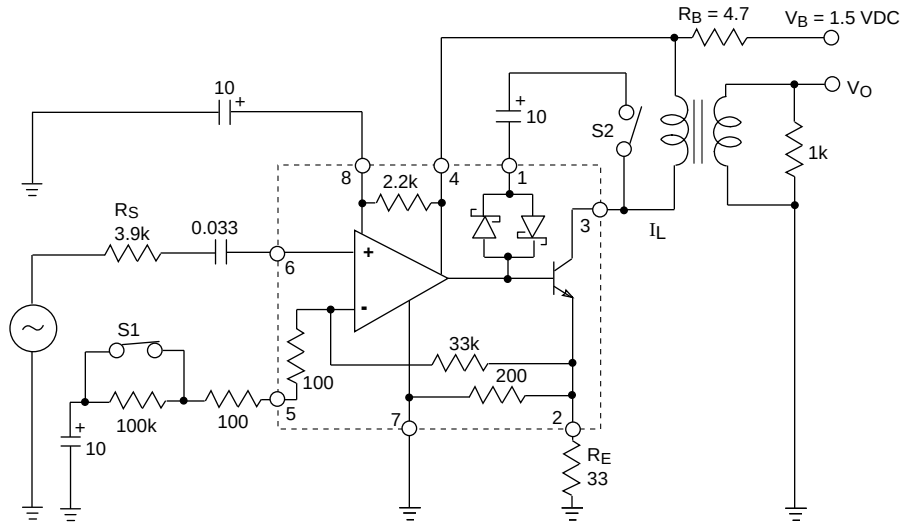


ELECTRICAL CHARACTERISTICS

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

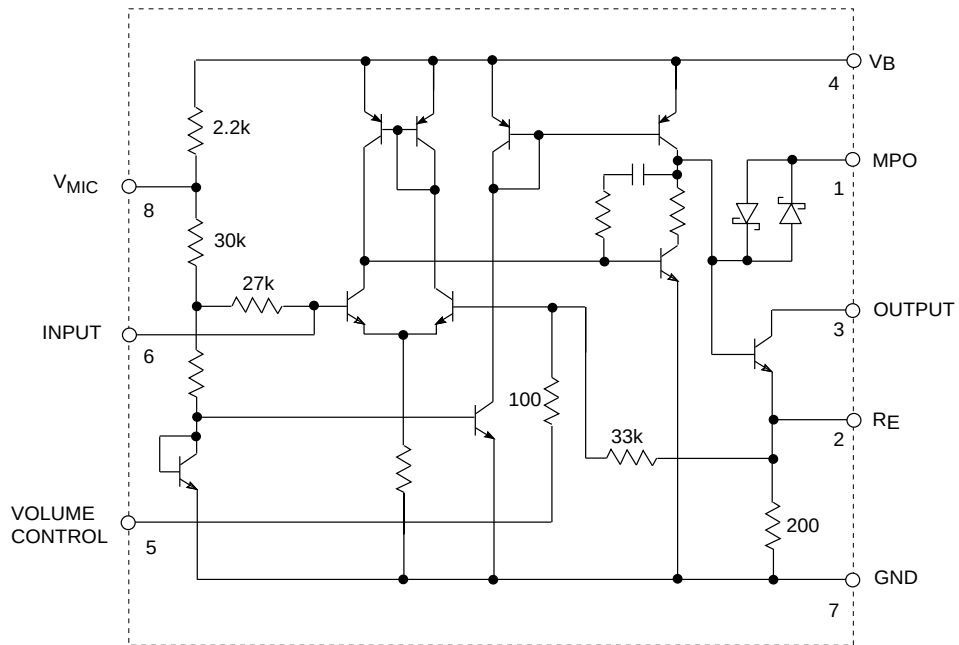
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNITS
Gain	A_{CL}	$V_O = 0.707$ VRMS	68	72	76	dB
Temperature Coefficient of Gain	η_A		-	0.07	-	dB/°C
Amplifier Current	I_{AMP}		180	210	280	μA
Temperature Coefficient of Current	η_I		-	-0.002	-	mA/°C
Transducer Current	I_{TRANS}		1.3	1.5	1.9	mA
Total Harmonic Distortion	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	μVRMS
Battery Resistance Stability		$R_B = 22\Omega$	-	-	22	Ω
Volume Control Range		$R_{VC} = 100$ to 100.1 kΩ S1 open	36	43	-	dB
Input Impedance (Pin 6)	R_{IN}		-	27	-	kΩ
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/Ω
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



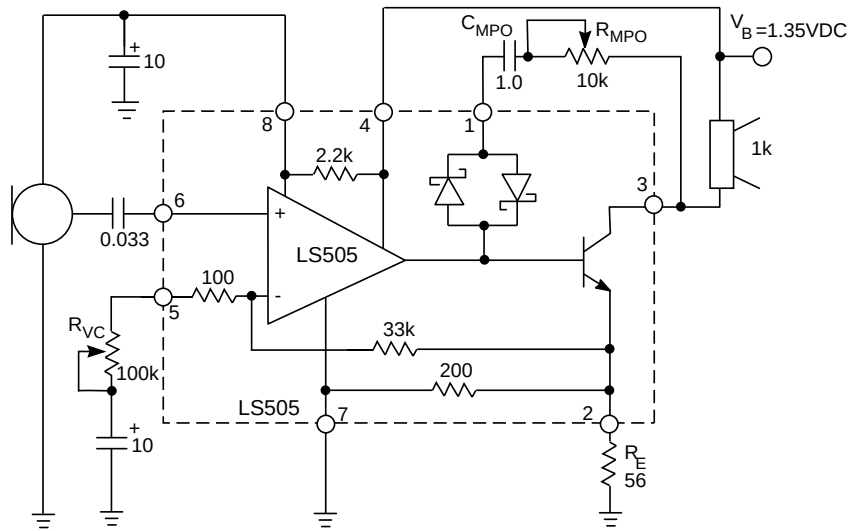
All resistors in ohms, all capacitors in μF unless otherwise stated

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

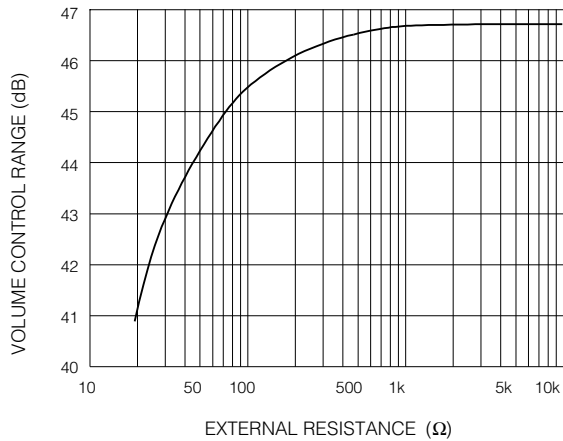


Fig. 4 Volume Control Range vs R_E

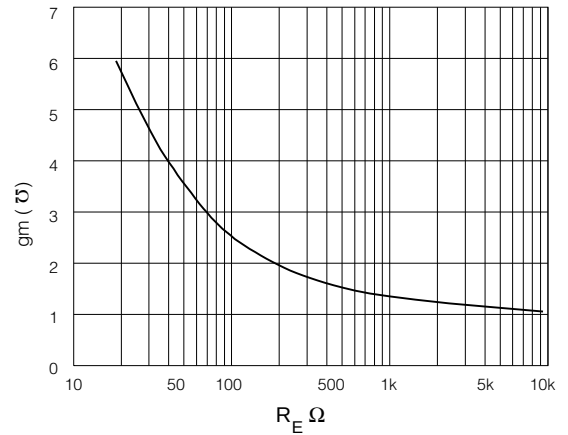


Fig. 5 $GM\bar{\sigma}$ vs R_E

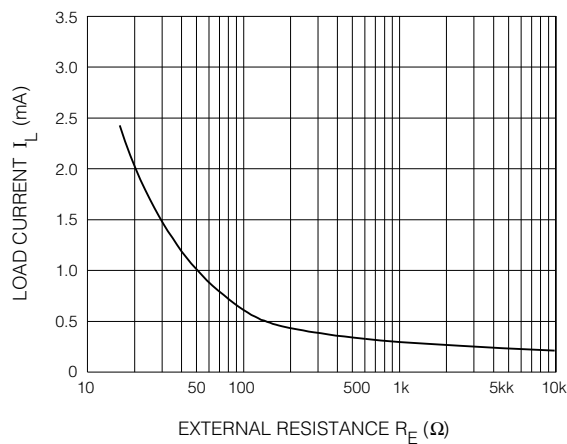


Fig. 6 Load Current vs External Resistance

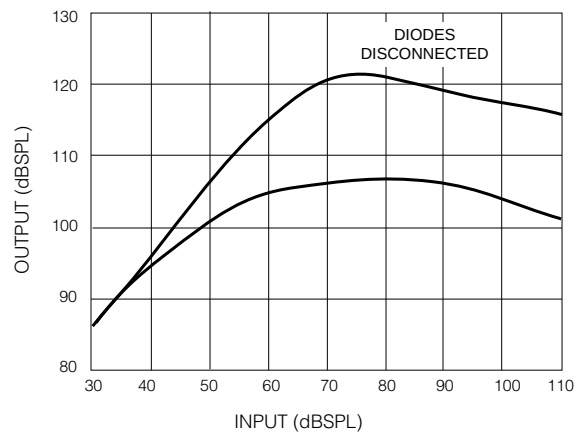


Fig. 7 I/O Characteristics

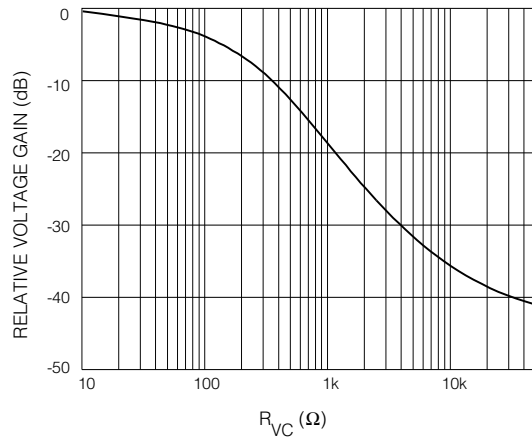


Fig. 8 Relative Voltage Gain vs Volume Control Resistance

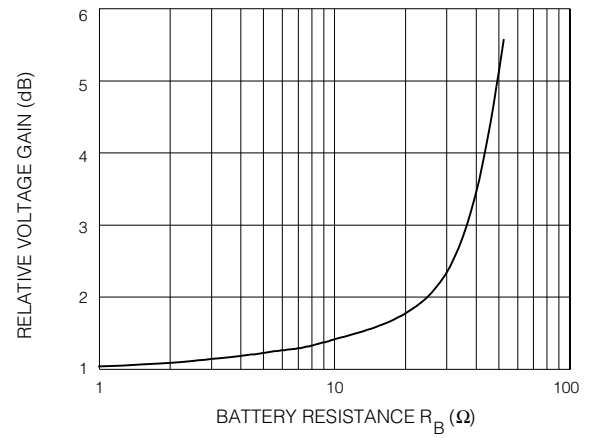


Fig. 9 Relative Voltage Gain vs Battery Resistance

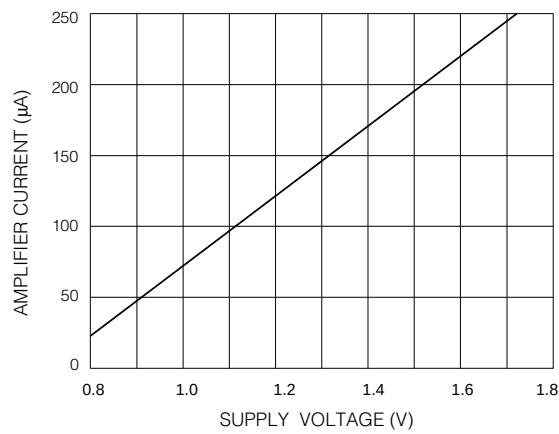


Fig. 10 Amplifier Current vs Supply Voltage

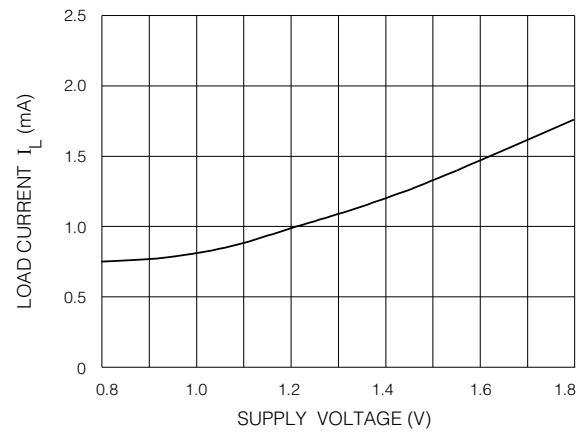


Fig. 11 Load Current vs Supply Voltage

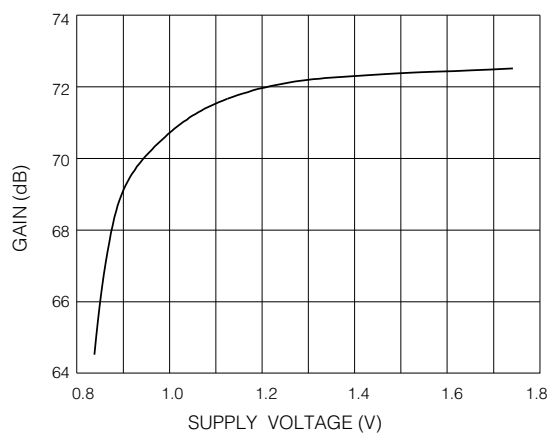


Fig. 12 Gain vs Supply Voltage

REVISION NOTES

Au bump removed

