

Class A Amplifier with 2 Independent Gain Blocks

LP508 DATA SHEET

FEATURES

- 1 μ V input referred noise
- 1.0 to 5 VDC operating range
- 61 dB typical gain (adjustable)
- 0.28 to 2.0 mA range of transducer current
- 1 % electrical distortion
- the first and second blocks can be DC coupled
- 4.0 k Ω microphone decoupling resistor, on-chip
- 100 Hz to 50 kHz frequency response
- volume control range >40 dB

STANDARD PACKAGING

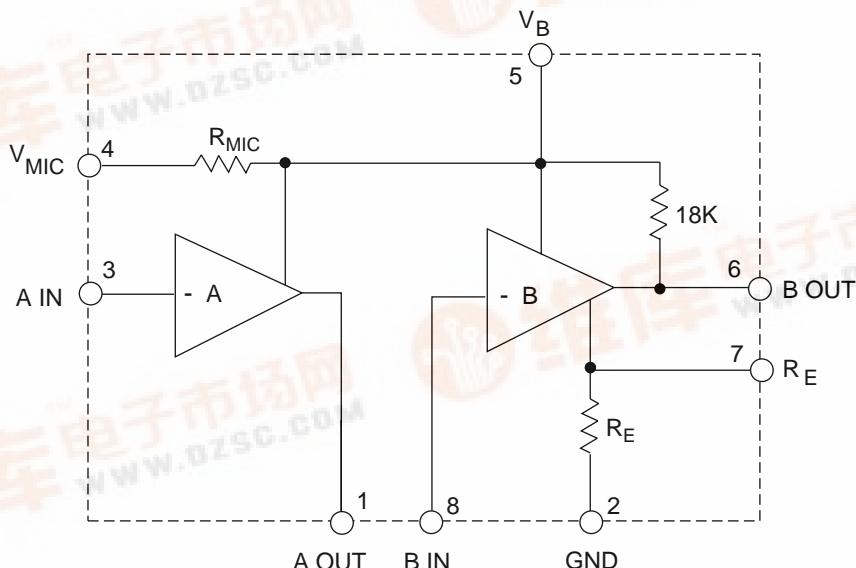
- 8 pin MICROpac
- 8 pin PLID ®
- 8 pin SLT
- Chip (59 x 53 mils)

Au Bump

DESCRIPTION

The LP508 is an 8 pin Class A amplifier utilizing Gennum's proprietary low voltage bipolar JFET technology. It consists of 2 single ended, low noise inverting gain blocks. The first block has a typical open loop gain of 50 dB, with the closed loop gain set by the ratio of the feedback resistor to the source impedance. The second block has the output transistor bias set by R_E and V_{RE} at pin 7 which is 27 mV.

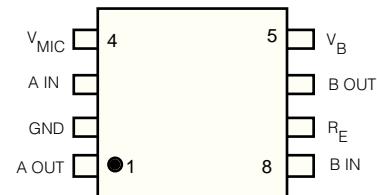
Typically, the gain of the first block is set to 29 dB, with the second block at 32 dB, giving a total gain of 61 dB.

**BLOCK DIAGRAM**

ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE/UNITS
Supply Voltage	5 V DC
Power Dissipation	25 mW
Operating Temperature Range	-10°C to 40° C
Storage Temperature Range	-20°C to 70° C

PIN CONNECTION



CAUTION
CLASS 1 ESD SENSITIVITY

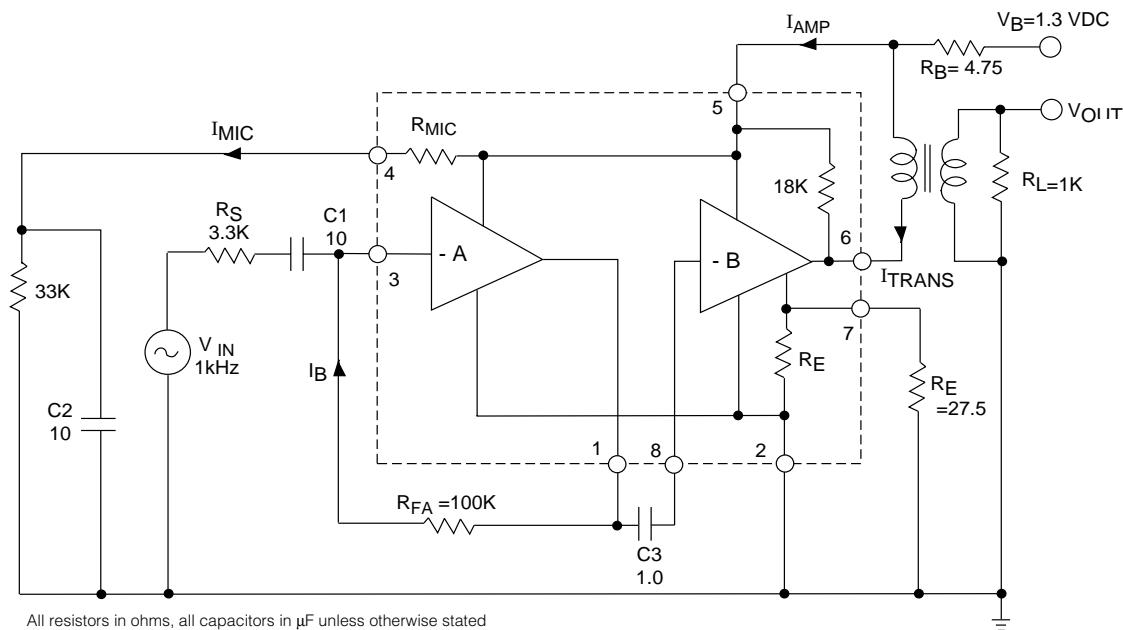


ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Gain (Closed Loop)	A_{CL}	$V_{OUT} = 500\text{mVRMS}$	57	61	65	dB
Distortion	THD	$V_{OUT} = 500\text{mVRMS}$	-	1	4	%
Amplifier Current	I_{AMP}	$I_{AMP} = I_A + I_{MIC}$	125	195	255	μA
Transducer Current	$I_{TRANS\ H}$	$R_E = 27.5$	1.1	1.3	1.7	mA
Transducer Current	$I_{TRANS\ L}$	$R_E = \infty$	200	275	350	μA
Input Referred Noise	IRN	NFB 0.2 to 10 kHz at 12 dB/oct.	-	1	2	μV
Stable with Battery Resistance to			-	-	22	Ω
Input Bias Current (pin 3)	I_B		-50	0	50	nA
On Chip Emitter Resistor	R_E		-	100	-	Ω
Emitter Bias Voltage (Pin 7)	V_{RE}		-	27	-	mV
Microphone Decoupling Resistor	R_{MIC}		-	4	-	k Ω

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



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

Fig. 1 Test Circuit

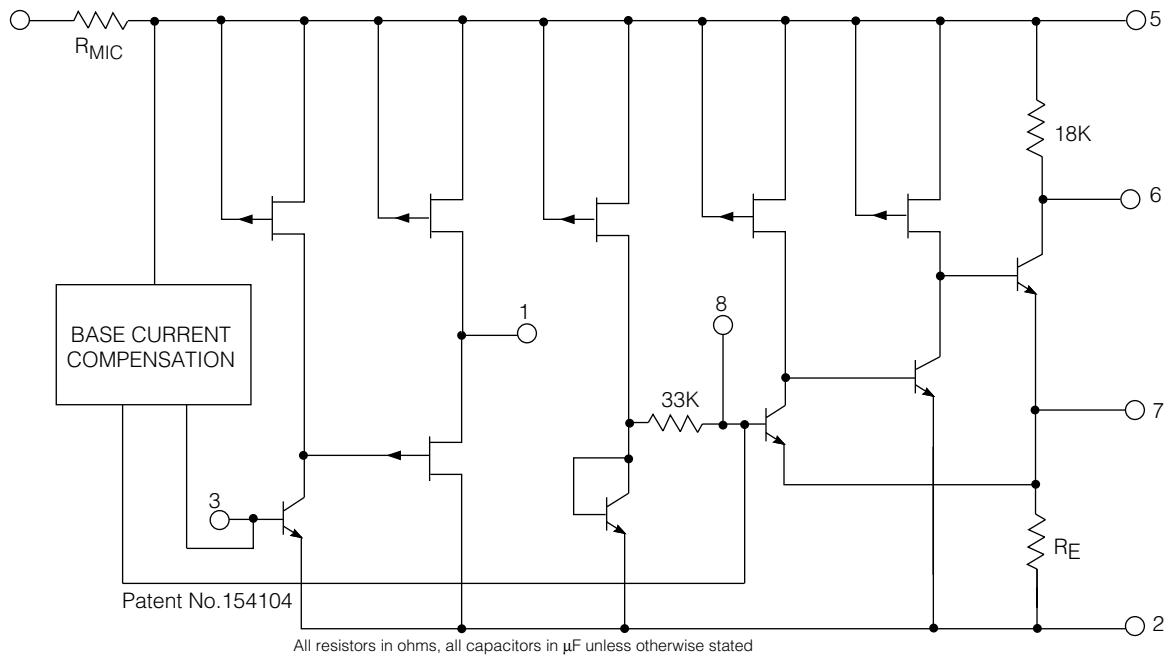
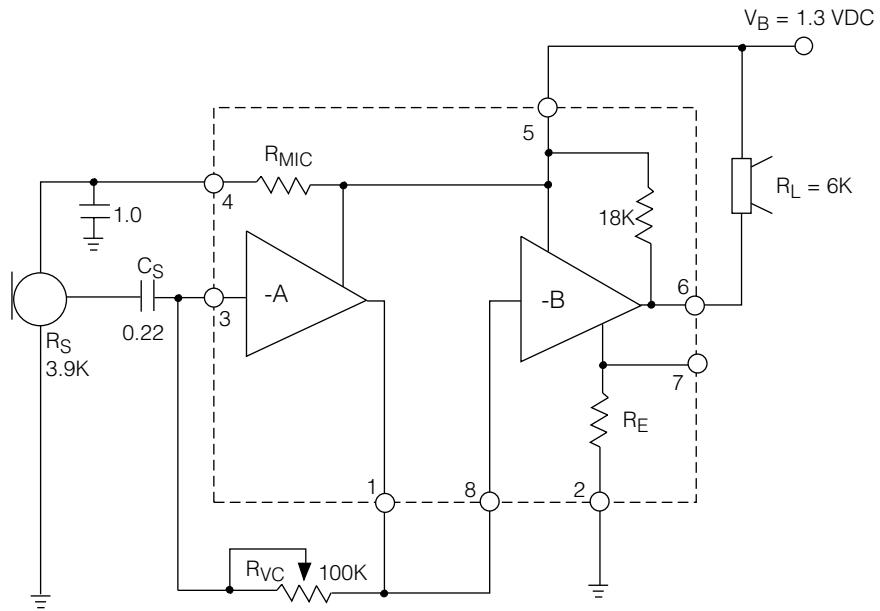


Fig. 2 Functional Schematic



$$\text{Gain of stage A} = 20 \log_{10} \left(\frac{R_VC}{R_S} \right) \quad \text{Gain of stage B} = 20 \log_{10} \left(\frac{R_L // 18K}{R_E} \right)$$

For low impedance receivers, a capacitor from pin 6 to pin 2 may be required for stability.

All resistors in ohms, all capacitors in μ F unless otherwise stated

Fig. 3 Typical Hearing Aid Circuit

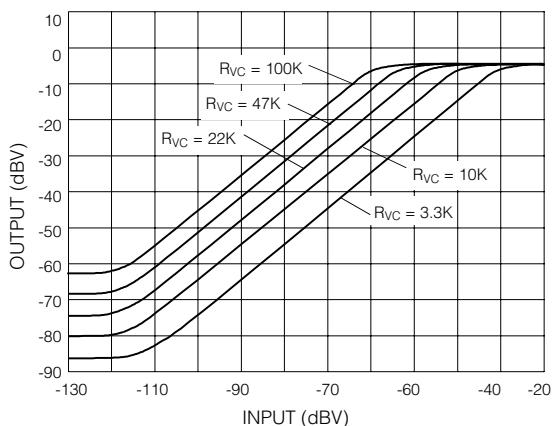


Fig. 4 I/O Characteristics at Various RVC Values

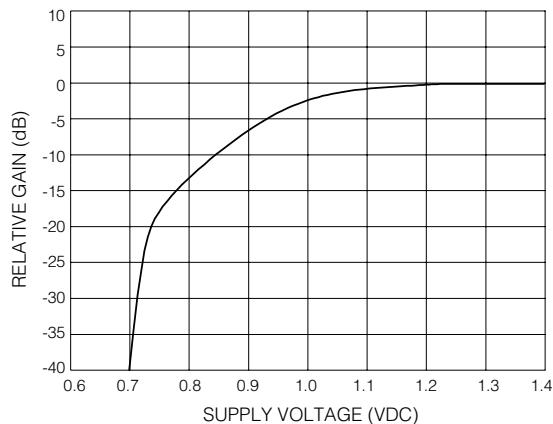


Fig. 6 Gain vs Supply Voltage

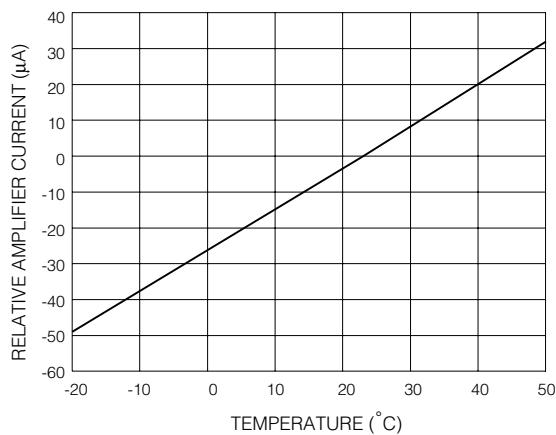


Fig. 8 Amplifier Current vs Temperature

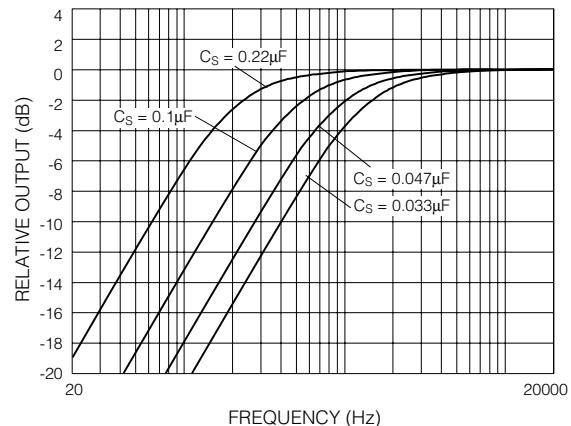


Fig. 5 Frequency Response at Various CS Values

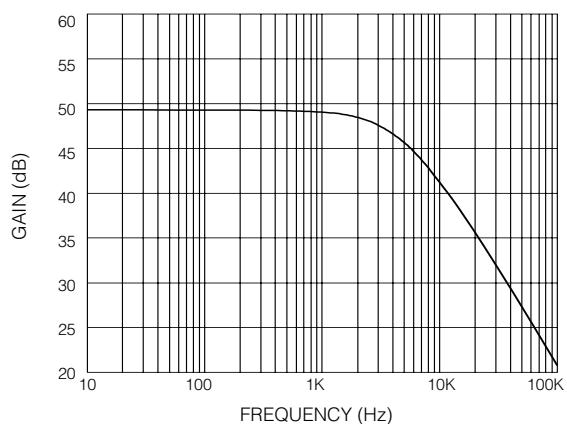


Fig. 7 Preamplifier A Open Loop Frequency Response

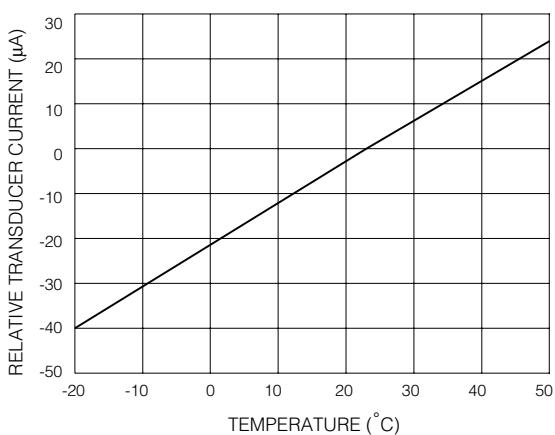


Fig. 9 Transducer Current vs Temperature

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DOCUMENT IDENTIFICATION: 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.

REVISION NOTES:

Changes to standard packaging information