

Class A Amplifier with 3 Independent Gain Blocks

GC509 DATA SHEET

FEATURES

- 145 µA typical current drain
- · low noise and distortion
- 1.0 to 5 VDC operating range
- 2 independent preamplifiers
- · Class A output stage
- variable transducer current
- 4 k Ω microphone decoupling resistor

STANDARD PACKAGING

- 10 pin MICROpac
- 10 pin PLID $^{\ensuremath{\mathbb{R}}}$
- 10 pin SLT
- Chip (61 x 55 mils) Au Bump

DESCRIPTION

The GC509 is a Class A amplifier utilizing Gennum's proprietary low voltage JFET technology. It consists of two singleended, low noise inverting gain blocks, a Class A output stage, and an on-chip microphone decoupling resistor.

Blocks A and B typically have an open loop voltage gain of 56 dB, with the closed loop gain set by the ratio of the feedbackresistor to the source impedance. It is recommended that the maximum closed loop gain be 20 dB lower than the open loop gain. All blocks of the device are internally bias compensated, preventing any DC current flow via external feedback resistors. Without this compensation, audible scratchiness would be present during changes in volume control settings.

The output stage of the GC509 is a Class A current drive. It has a fixed reference voltage of typically 55 mV at pin 8 of the device. The current that flows in the transducer is the ratio of the 55 mV reference voltage and the on-chip emitter resistor (R_E). To increase the bias current in the transducer, simply place an external R_E resistor from pin 8 to ground, thereby decreasing the equivalent emitter resistance and increasing the current.



BLOCK DIAGRAM

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ABSOLUTE MAXIMUM RATINGS

CAUTION CLASS 1 ESD SENSITIVITY	
Operating Temperature	-10° to + 40°C
Power Dissipation	25 mW
Supply Voltage	5V DC
PARAMETER	VALUE / UNITS

PIN CONNECTION



ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Amplifier Current	I _{AMP}		80	145	210	μA
Transducer Current	I _{TRANS}	R _E = ∞	200	275	350	μA
Maximum Transducer Current	I _{TRANS(MAX)}	R _E = 0 Ω	2	-	-	mA
Input Bias Current	IBIAS	$R_{FA} = 1M, R_{FB} = 1M$	-50	0	50	nA
Input Referred Noise	IRN	NFB 0.2 to 10kHz at 12dB/Oct	-	1	2	μVRMS
Harmonic Distortion	THD	S1 = b, V_{OUT} = 500 mVRMS	-	1	4	%
Voltage Gain	A _V	S1 = b, V_{OUT} = 500 mVRMS	70	73	76	dB
Stable with Battery Resistance Resistance (R _B) to:	Stability	$R_{B} = 22 \Omega$	-	-	22	Ω
Emitter Bias Voltage (Pin 8)	V _{RE}		-	55	-	mV
Microphone Resistance	R _{MIC}		3	4	5	kΩ
On Chip Emitter Resistor	R _E		-	200	-	Ω
Preamp Current Drive Capability	I _{OUT}		-	30	-	μΑ

All switches remain as shown in Test Circuit unless otherwise stated in CONDITIONScolumn.









Fig. 3 Typical Hearing Aid Circuit



REVISION NOTES	
Changes to standard packaging.	

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DOCUMENT IDENTIFICATION

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