FEATURES

- **highly configurable, versatile DSP platform**
- **high quality two-channel AGC signal processing**
- **fully programmable via serial data interface**
- **high performance data converters - dual, over-sampled A/Ds; over-sampled D/A with efficient switched-mode output power amp**
- **drives zero-bias 2-terminal receivers**
- **multiple communication rates up to 85.3kb/s**
- **thinSTAX™ packaging - CIC size**
- **multi-memory**
- **internal/external volume control**
- **volume control taper determined by external VC**

thinSTAX™ PACKAGING

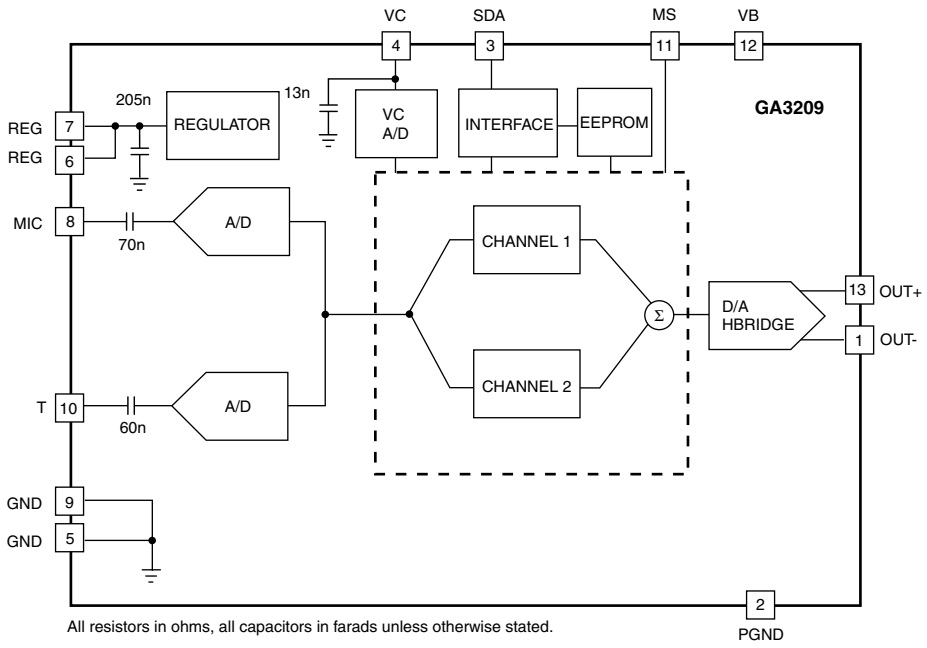
Hybrid typical dimensions:

0.227 x 0.125 x 0.060 in
(5.76 x 3.18 x 1.52 mm)

DESCRIPTION

The GA3209 hybrid is a programmable DSP system based on a two-channel compression circuit. It can be used as a platform for a wide range of hearing aid applications. It's extensive programmability and compact size make it ideal for sophisticated CIC applications. The reflowable thinSTAX™ packaging enables easy use in BTE applications. This very versatile DSP hybrid is capable of multiple configurations and has a wide range of functions.

The GA3209 hybrid code programmed into the GC5050 controller chip is "4".

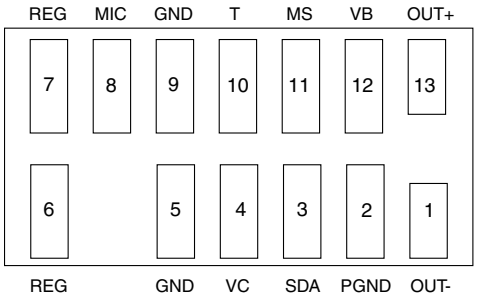


BLOCK DIAGRAM

ABSOLUTE MAXIMUM RATING

Operating Temperature Range	-10°C to 40°C
Storage Temperature Range	-20°C to 70°C
Absolute Maximum Power Dissipation	25mW
Maximum Operating Supply Voltage	1.5VDC
Absolute Maximum Supply Voltage	2VDC

PAD CONNECTION



ELECTRICAL CHARACTERISTICS

Conditions: Supply Voltage V_B = 1.3V; Temperature = 25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Hybrid Current	I_{AMP}	See current consumption section	-	700	-	µA
Minimum Operating Supply Voltage	V_{BOFF}	Ramp down	0.94	1.0	1.05	V
Supply Voltage turn on threshold	V_{BON}	Ramp up	1.06	1.10	1.16	V
Supply Voltage Hysteresis			90	100	110	mV
Supply Voltage during Communication	V_{BC}	During Communication	1.19	1.35	1.5	V
Hybrid Current during Communication	I_P	Programming (<5 ms)	-	3.7	-	mA
EEPROM Burn Cycles		Note 2	100k	-	-	cycles
Low Frequency System Bandwidth			-	125	-	Hz
High Frequency System Bandwidth			-	16	-	kHz
Total Maximum System Gain	A_V	V_{IN} = -95 dBV @ 3kHz; squelch disabled See Note 1.	-	83	-	dB
Converter Gain	A_{CONV}	A/D + D/A gain.	-	29	-	dB
Total Harmonic Distortion	THD	V_{IN} = -40 dBV	-	-	1	%
THD at Maximum Input	THD_M	V_{IN} = -15 dBV, HRX - ON	-	-	3	%
Clock Frequency	f_{clk}		1.945	2.048	2.151	MHz
REGULATOR						
Regulator Voltage	V_{REG}		0.90	0.95	1.00	V
Regulator Supply Rejection	$PSRR_{REG}$		-	50	-	dB
INPUT						
Input Referred Noise	IRN	Bandwidth 100Hz - 8kHz	-	-	-106	dBV
Input Impedance	Z_{IN}		-	16	-	kΩ
Anti-alias Filter Rejection (input referred)		$f=f_{clk}$-8kHz, V_{IN} = -40dBV	-	80	-	dB
Maximum Input Level			-	-15	-	dBV
Input Dynamic Range		HRX - ON, Bandwidth 100Hz - 8kHz	-	95	-	dB
Audio Sample Rate			-	32	-	kHz
A/D Dynamic Range		Bandwidth 100Hz - 8kHz	-	86	-	dB
Mic - Telecoil Isolation		Identical Front and Rear channel configuration	-	30	-	dB

ELECTRICAL CHARACTERISTICS (Continued)

Conditions: Supply Voltage V_B = 1.3V; Temperature = 25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
OUTPUT						
Maximum RMS Output Voltage		0dBFS f = 1kHZ	-	-1	-	dBV
D/A Dynamic Range		Bandwidth 100Hz - 8kHz	-	80	-	dB
Output Impedance	Z_{OUT}	Note 2	-	-	20	Ω
VOLUME CONTROL						
Volume Control Resistance	R_{VC}		-	200	-	kΩ
Volume Control Range	ΔA		47.5	48.13	48.5	dB
MS INPUT						
Pull Down Resistance			-	1	-	MΩ
Logic 1 Voltage			V_{REG}	-	V_B	V
SDA INPUT						
Logic 0 Voltage		Note 2	0	-	0.3	V
Logic 1 Voltage		Note 2	1	-	1.3	V
SDA OUTPUT						
Standby Pull Up Current			1.4	2	2.6	µA
Sync Pull Up Current			450	500	550	µA
Logic 0 Current (Pull Down)			225	250	275	µA
Logic 1 Current (Pull Up)			225	250	275	µA
Synchronization Time (Synchronization Pulse Width)	T_{SYNC}	Baud = 0 Baud = 1 Baud = 2	237 118 59	250 125 62.5	263 132 66	µs µs µs

NOTE 1: Total System Gain consists of: *Wideband System Gain + High and Low Independent Channel Gains + Converter Gain*
Total System Gain is calibrated during Cal/Config process.
NOTE 2: Sample tested.

SUPPORT SOFTWARE

All support software for the GA3209 is available from Gennum Web Site www.gennum.com/hip/software/paragon_sw.html

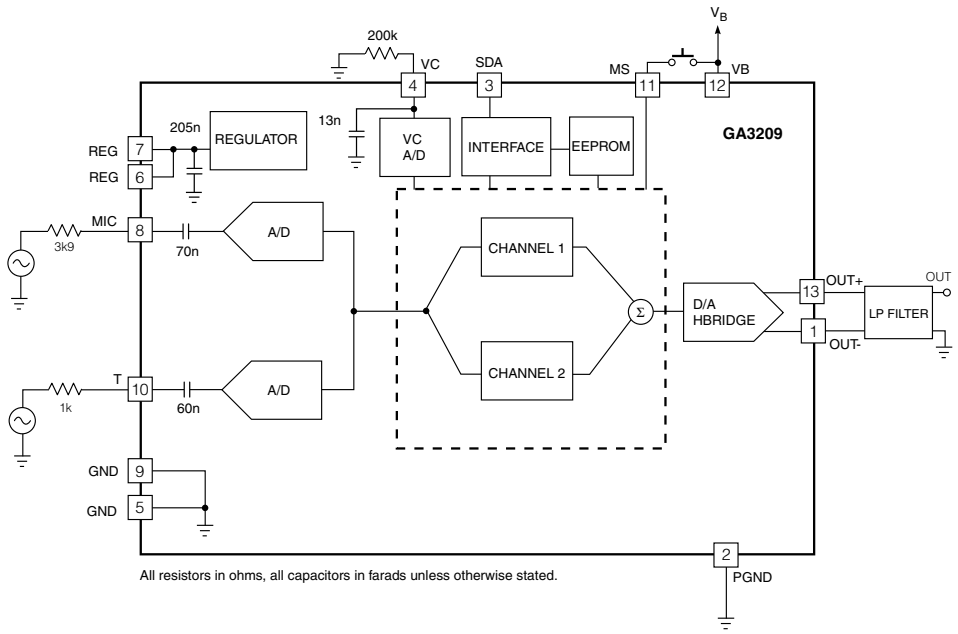


Fig. 1 Test Circuit

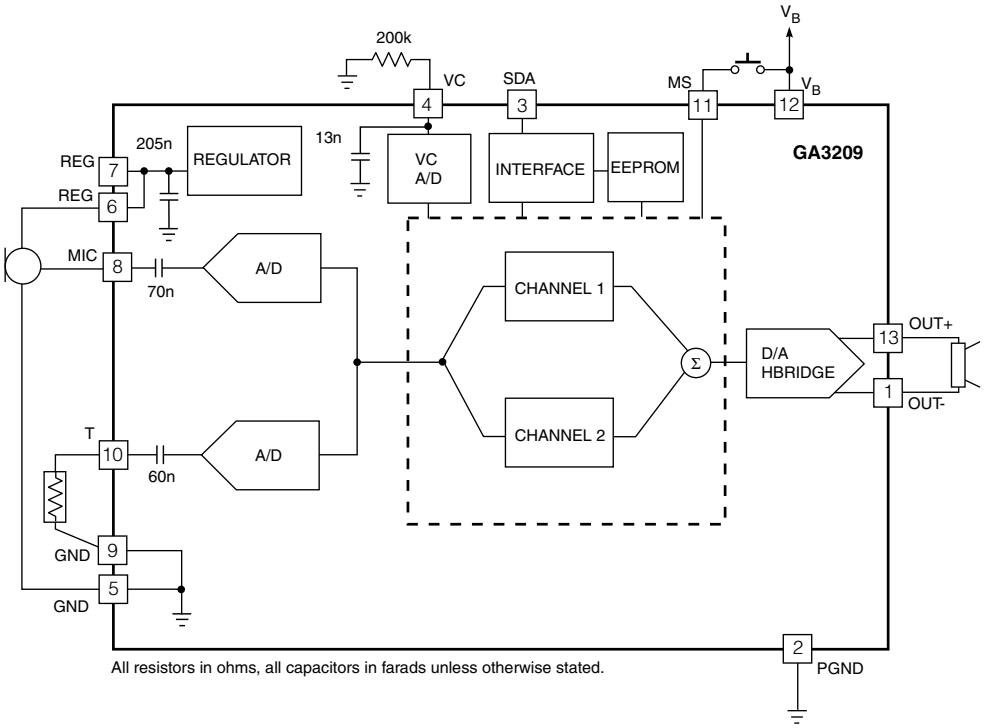


Fig. 2 Typical Application Circuit

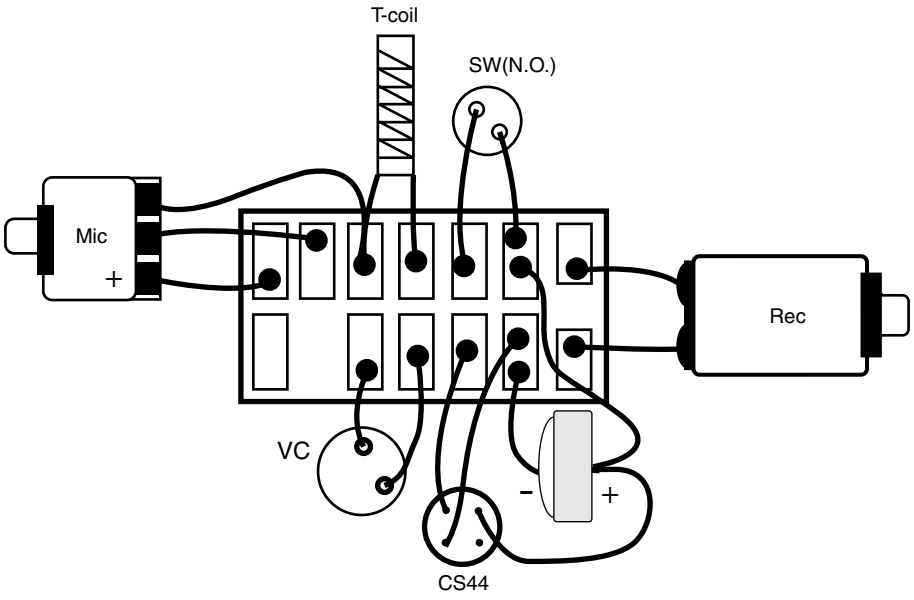
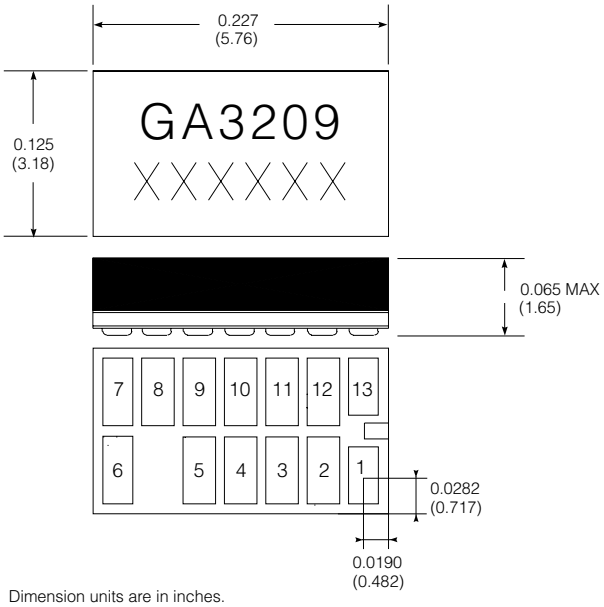


Fig. 3 Assembly Diagram

PACKAGE DIMENSIONS



Dimension units are in inches.
Dimensions in parentheses are in millimetres, converted from inches and include minor rounding errors.
1.0000 inches = 25.400mm
Dimension tolerances: ±0.003 (±0.08) unless otherwise stated.
Work order number: XXXXXX
Minimum Pad Size: 0.022 x 0.042 (0.56 x 1.05)
This Hybrid is designed for either point-to-point manual soldering or for reflow according to Gennum's reflow process (Information Note 521-45).

PAD LOCATION

PAD NO.	PAD POSITION		PAD DIMENSION	
	X	Y	Xdim	Ydim
1	0	0	22.2	41.5
2	-31.1	3	23.6	47.5
3	-62.9	3	23.6	47.5
4	-94.7	3	23.6	47.5
5	-126.5	3	23.6	47.5
6	-189.45	3	22.3	47.5
7	-189.45	65.5	22.3	47.5
8	-158.35	65.5	23.5	47.5
9	-126.5	65.5	23.6	47.5
10	-94.7	65.5	23.6	47.5
11	-62.9	65.5	23.6	47.5
12	-31.1	65.5	23.6	47.5
13	0	68.5	22.2	41.5
1	0	0	0.564	1.054
2	-0.790	0.076	0.599	1.207
3	-1.598	0.076	0.599	1.207
4	-2.405	0.076	0.599	1.207
5	-3.213	0.076	0.599	1.207
6	-4.812	0.076	0.566	1.207
7	-4.812	1.664	0.566	1.207
8	-4.022	1.664	0.597	1.207
9	-3.213	1.664	0.599	1.207
10	-2.405	1.664	0.599	1.207
11	-1.598	1.664	0.599	1.207
12	-0.790	1.664	0.599	1.207
13	0	1.740	0.564	1.054

CAUTION
ELECTROSTATIC
SENSITIVE DEVICES
DO NOT OPEN PACKAGES OR HANDLE
EXCEPT AT A STATIC-FREE WORKSTATION

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

REVISION NOTES:
Correction to Package Dimensions diagram.

For latest product information, visit www.gennum.com

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