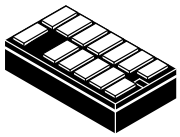
PARAGON GA3224

Pre-configured DSP System for Hearing Aids

ON Semiconductor®

http://onsemi.com



13 PAD
PARAGON
CASE TBD

Description

The Paragon® GA3224 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. Its 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 Paragon GA3224 hybrid contains the GC5057 controller chip featuring Power On Reset (POR).

The Paragon GA3224 hybrid code programmed into the GC5057 controller chip is “8”.

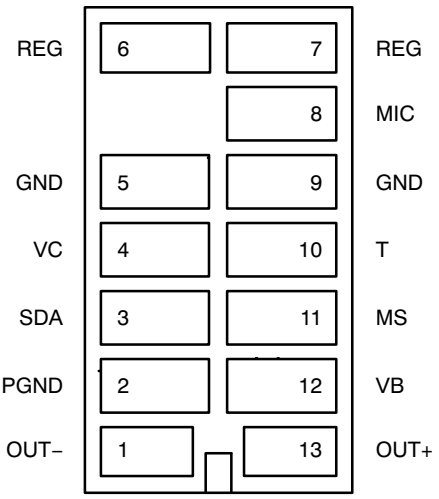
Features

- Highly Configurable, Versatile DSP Platform
- High Quality, Two−channel AGC Signal Processing
- High Performance Data Converters – Dual, Over−sampled A/Ds; Over−sampled D/A with Efficient Switched−mode Output Power Amp
- High−fidelity Audio Quality
- Drives Zero−bias 2−terminal Receivers
- Multiple Communication Rates up to 85.3 kb/s
- thinSTAX Packaging − CIC Size
- Multi−memory
- Internal/External Volume Control
- Volume Control Taper determined by External VC
- Tri−state Memory Select Operation
- Audible Memory Change Indicator
- Also Available as E1 RoHS Compliant Hybrid

thinSTAX Packaging

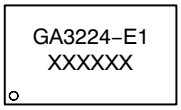
- Hybrid Typical Dimensions:
  0.227 x 0.125 x 0.060 in
  (5.76 x 3.18 x 1.52 mm)

PAD CONNECTION



(Bottom View)

MARKING DIAGRAM



GA3224	= Specific Device Code
E1	= RoHS Compliant Hybrid
XXXXXX	= Work Order Number

ORDERING INFORMATION

Device	Shipping†
GA3224−E1	25 Units / Bubble Pack
GA3224−E1−T	500 Units / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

BLOCK DIAGRAM

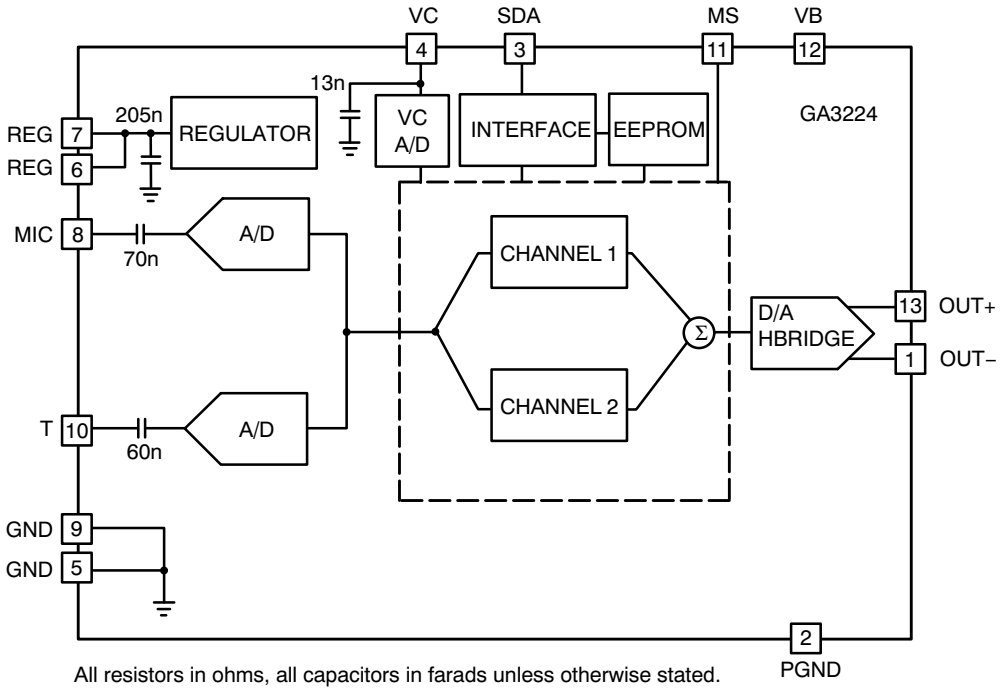


Figure 1. Paragon GA3224 Block Diagram

Table 1. ABSOLUTE MAXIMUM RATINGS

Parameter	Value	Units
Operating Temperature Range	−10 to +40	°C
Storage Temperature Range	−20 to +70	°C
Absolute Maximum Power Dissipation	25	mW
Maximum Operating Supply Voltage	1.5	VDC
Absolute Maximum Supply Voltage	2	VDC

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

WARNING: Electrostatic Sensitive Device − Do not open packages or handle except at a static−free workstation.

WARNING: Moisture Sensitive Device − Non−RoHS Compliant − Level 3 MSL; RoHS Compliant − Level 4 MSL. Do not open packages except under controlled conditions.

Table 2. ELECTRICAL CHARACTERISTICS (Conditions: V_B = 1.3 V; 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)	100 k	–	–	cycles
Low Frequency System Bandwidth	–	–	100	140	225	Hz
High Frequency System Bandwidth	–	–	15.2	16	16.8	kHz
Total Maximum System Gain	A_V	V_{IN} = −95 dBV at 3 kHz; squelch disabled (Note 1)	81	83	85	dB
Converter Gain	A_{CONV}	A/D + D/A gain	27	29	31	dB
Total Harmonic Distortion	THD	V_{IN} = −40 dBV	–	0.05	1	%
THD at Maximum Input	THD_M	V_{IN} = −15 dBV, HRX − ON	–	1.5	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 100 Hz − 8 kHz	–	−108	−106	dBV
Input Impedance	Z_{IN}	–	11.2	16	22	kΩ
Anti−alias Filter Rejection (input referred)	–	$f = f_{clk}$ − 8 kHz, V_{IN} = −40 dBV	–	80	–	dB
Maximum Input Level	–	–	–	−15	–	dBV
Input Dynamic Range	–	HRX − ON, Bandwidth 100 Hz − 8 kHz	–	93	–	dB
Audio Sample Rate	–	–	30.4	32	33.6	kHz
A/D Dynamic Range	–	Bandwidth 100 Hz − 8 kHz	–	86	–	dB
OUTPUT						
Maximum RMS Output Voltage	–	0 dBFS f = 1 kHz	−3	−1	1	dBV
D/A Dynamic Range	–	Bandwidth 100 Hz − 8 kHz	80	–	–	dB
Output Impedance	Z_{OUT}	(Note 2)	–	–	20	Ω
VOLUME CONTROL						
Volume Control Resistance	R_{VC}	–	160	200	240	kΩ
Volume Control Range	ΔA	–	47.5	48	48.5	dB
MS INPUT						
Low State	Lo	–	0	–	$V_{REG}/3$	V
Open State	Z	–	$V_{REG}/3$	–	$2V_{REG}/3$	V
High State	Hi	–	$2V_{REG}/3$	–	V_B	V

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.
2. Sample tested.

Table 2. ELECTRICAL CHARACTERISTICS (Conditions: V_B = 1.3 V; Temperature = 25°C)

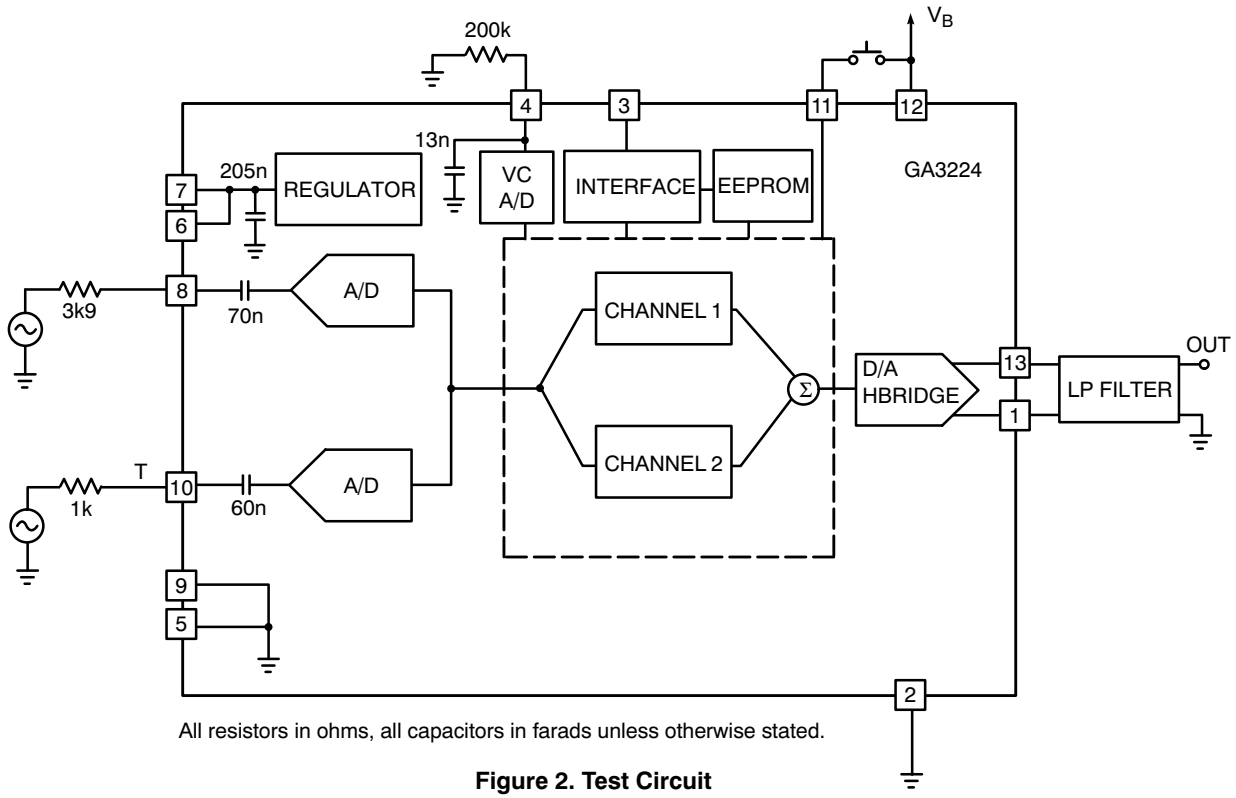
Parameter	Symbol	Conditions	Min	Typ	Max	Units
SDA INPUT						
Logic 0 Voltage	–	(Note 2)	0	–	0.3	V
Logic 1 Voltage	–	(Note 2)	1	–	1.3	V
SDA OUTPUT						
Standby Pull Up Current	–	–	1.4	2	2.6	μA
Sync Pull Up Current	–	–	450	500	550	μA
Logic 0 Current (Pull Down)	–	–	225	250	275	μA
Logic 1 Current (Pull Up)	–	–	225	250	275	μA
Synchronization Time (Synchronization Pulse Width)	T_{SYNC}	Baud = 0	237	250	263	μs
		Baud = 1	118	125	132	
		Baud = 2	59	62.5	66	
		Baud = 3	29.76	31.25	32.81	
		Baud = 4	14.88	15.63	16.41	
		Baud = 5	7.44	7.81	8.20	
		Baud = 6	3.72	3.91	4.10	
		Baud = 7	1.86	1.95	2.05	

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.
2. Sample tested.

Support Software

Paragon GA3224 is fully supported ON Semiconductor's software tools available from ARKonline® website http://ark.onsemi.com/.

TYPICAL APPLICATIONS



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

Figure 2. Test Circuit

TYPICAL APPLICATIONS (Continued)

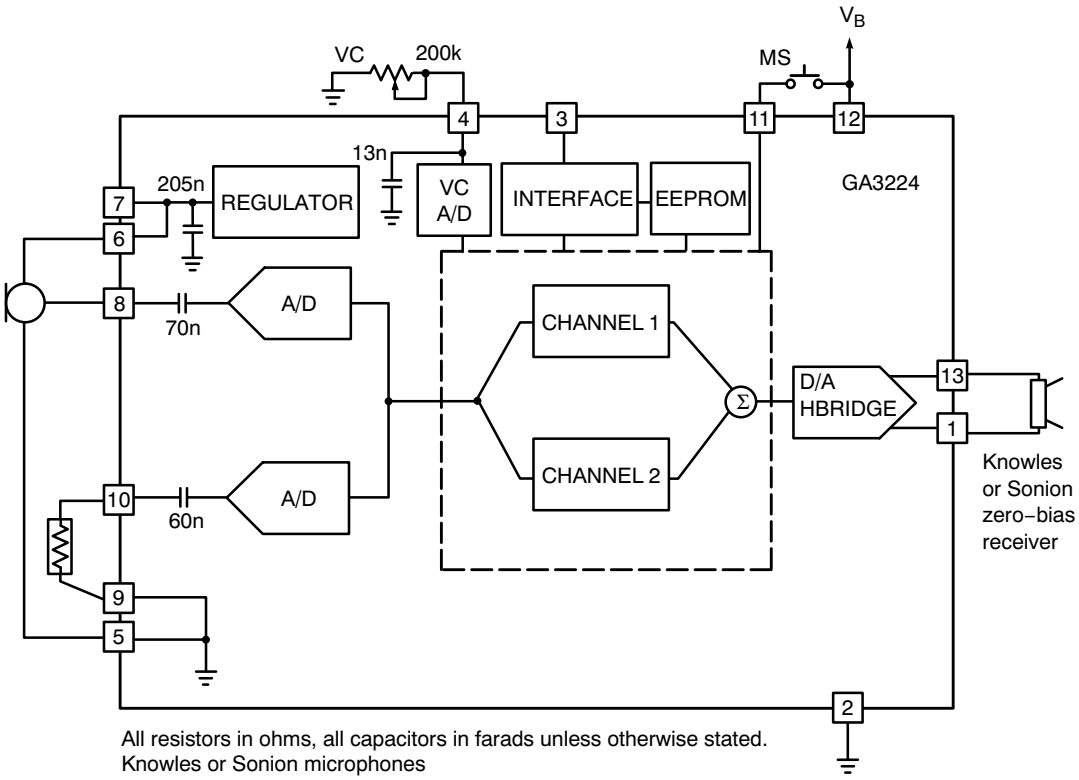


Figure 3. Sample Application Circuit

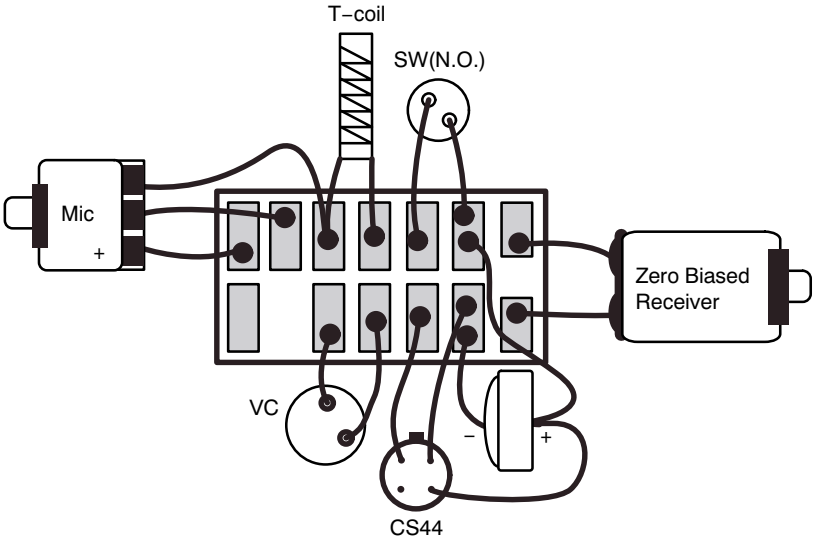


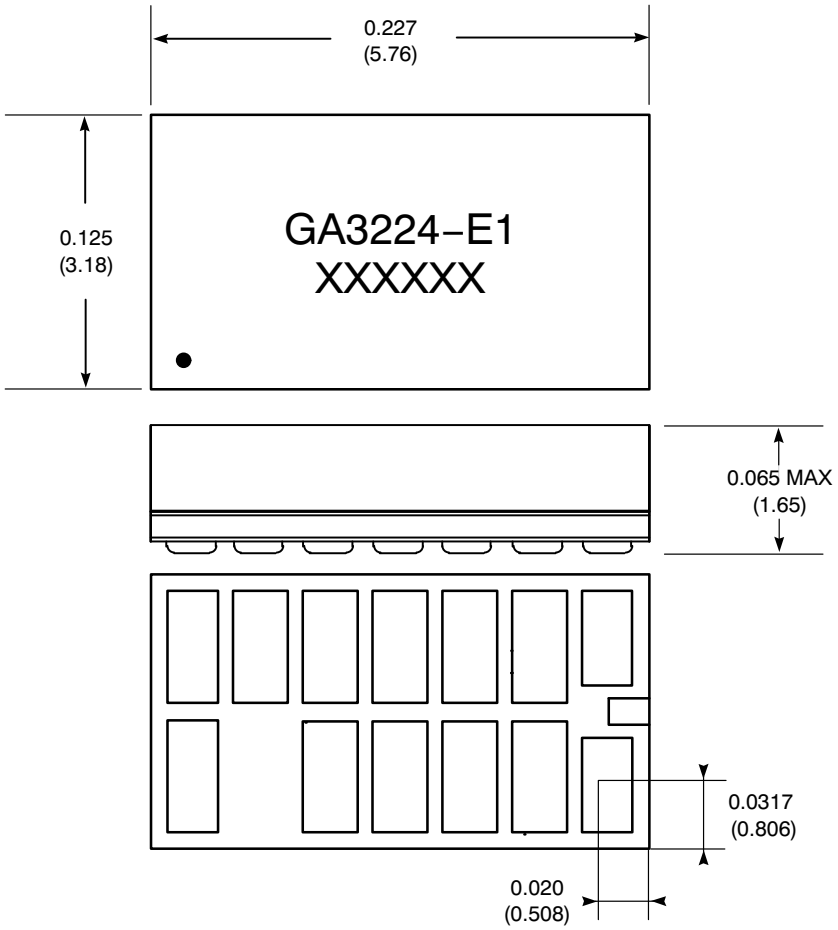
Figure 4. Assembly Diagram

Table 3. PAD POSITION AND DIMENSIONS

Pad No.	Pad Position		Pad Dimensions	
	X	Y	Xdim (mil)	Ydim (mil)
1	0	0	23.0	40.5
2	−31.5	3	24.0	46.5
3	−63.0	3	23.0	46.5
4	−94.0	3	23.0	46.5
5	−125.0	3	23.0	46.5
6	−187.0	3	23.0	46.5
7	−187.0	64.5	23.0	46.5
8	−156.0	64.5	23.0	46.5
9	−125.0	64.5	23.0	46.5
10	−94.0	64.5	23.0	46.5
11	−63.0	64.5	23.0	46.5
12	−31.5	64.5	24.0	46.5
13	0	67.5	23.0	40.5
Pad No.	**X**	**Y**	**Xdim (mm)**	**Ydim (mm)**
1	0	0	0.584	1.029
2	−0.800	0.076	0.610	1.181
3	−1.600	0.076	0.584	1.181
4	−2.388	0.076	0.584	1.181
5	−3.175	0.076	0.584	1.181
6	−4.750	0.076	0.584	1.181
7	−4.750	1.638	0.584	1.181
8	−3.962	1.638	0.584	1.181
9	−3.175	1.638	0.584	1.181
10	−2.388	1.638	0.584	1.181
11	−1.600	1.638	0.584	1.181
12	−0.800	1.638	0.610	1.181
13	0	1.715	0.584	1.029

PARAGON GA3224

PACKAGE DIMENSIONS



Dimension units are in inches.
Dimensions in parentheses are in millimeters, converted from inches and include minor rounding errors.
1.000 inches = 25.4 mm
Dimension tolerances: ±0.003 (±0.08) unless otherwise stated.
• = location of Pin 1
RoHS compliant hybrid, MSL#4
This Hybrid is designed for either point−to−point manual soldering or for reflow according to ON Semiconductor's reflow process.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

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