

FEATURES

- **DynamEQ®II flexibility**
- **six programmable parameters**
- **four memories**
- **24dB/oct state variable filter**
- **twin average detectors**
- **handles high input levels**
- **drives class D integrated receivers**

thinSTAX™ PACKAGING

Hybrid typical dimensions:
0.200 x 0.115 x 0.060in.
(5.08 x 2.92 x 1.52mm)

DESCRIPTION

The GA3204 programmable hybrid is composed of a DynamEQ®II Wide Dynamic Range Compression signal processor and the GP523 controller memory chip. The hybrid incorporates 24dB/oct filtering.

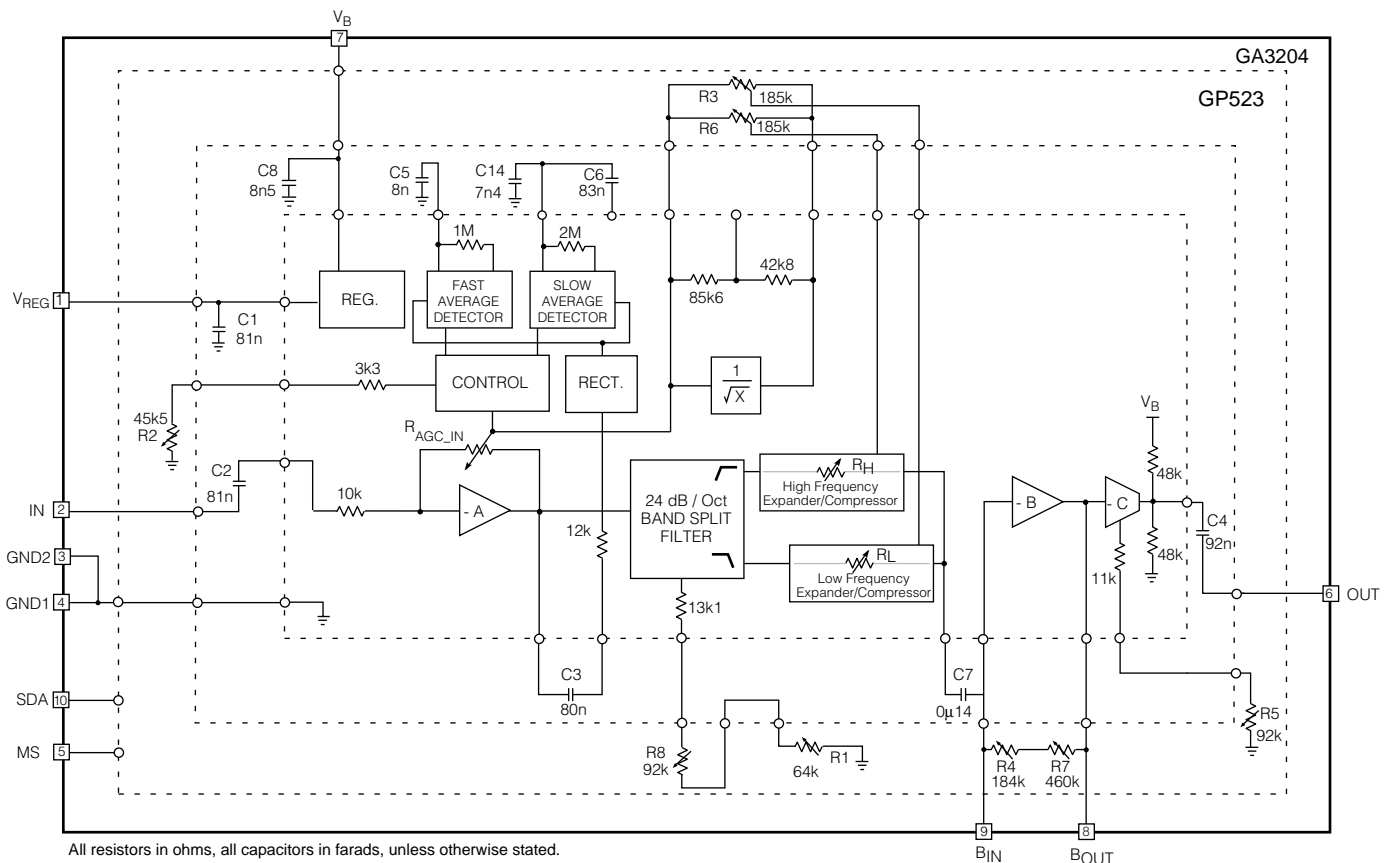
The gain and frequency response are dependent on the user's environment. The Twin Average Detector circuit is optimized for sound quality during normal listening without sacrificing comfort during sudden loud sounds.

The GA3204 features six programmable parameters: independent compression ratio adjustment in the high and low frequency channels, VC adjustment, threshold adjustment, crossover frequency adjustment and MPO adjustment.

Four independent memories add to hybrid flexibility.

The output stage is designed as a preamplifier for the class D integrated receiver.

The GA3204 hybrid code programmed into GP523 is "1".



BLOCK DIAGRAM

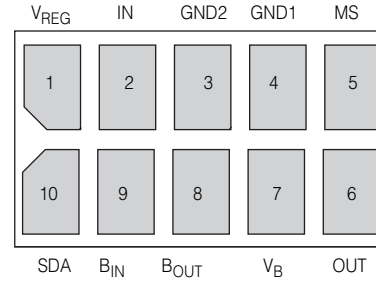
ABSOLUTE MAXIMUM RATINGS

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

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



PAD CONNECTIONS



GA3204

ELECTRICAL CHARACTERISTICS

Conditions: Supply Voltage $V_B = 1.3$ V, Frequency = 1 kHz, Temperature = 25°C.

The programmable parameters are adjusted to the following set values unless otherwise specified.

(MPO) R5 - Tap 0; (TH) R2 - Tap 15; (FC) R1 - Tap 7; (HP) R6 - Tap 0; (LP) R3 - Tap 0; (VC) R4 - Tap 15, R7 - Tap 23; R8 - Tap 0.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Hybrid Current	I_{AMP}		-	395	580	μ A
Minimum Voltage	V_b		1.1	-	-	V
Total Harmonic Distortion	THD	$V_{IN} = -40$ dBV at 1kHz	-	0.6	1	%
THD with Maximum Allowable Input	THD_M	$V_{IN} = -23$ dBV, $R_{VC} = 47$ k Ω	-	2	10	%
Input Referred Noise	IRN	Aweighted filter	-	3	-	μ V _{RMS}
Total System Gain	A_V	$V_{IN} = -90$ dBV	44	47	50	dB
Regulator Voltage	V_{REG}	$I_{LOAD} = 30$ μ A	890	930	1000	mV
AGC						
Lower Threshold	TH_{LO}		-88.5	-84.5	-80.5	dBV
Upper Threshold	TH_{HI}		-36	-32	-28	dBV
Compression Gain Range	ΔA	Gain (-90dBV _{IN}) -Gain(-30dBV _{IN})	36.5	39.5	42.5	dB
System Gain in Compression	A_{60}	$V_{IN} = -60$ dBV	26	29	32	dB
Minimum Compression Ratio	$CMP_{1:1}$	$V_{IN} = 3$ kHz, -60dBV to -40dBV; R3 - Tap 15; R6 - Tap 15	0.9	1.0	1.1	Ratio
Maximum Compression Ratio	$CMP_{4:1}$	$V_{IN} = 3$ kHz, -60dBV to -40dBV; R3 - Tap 0; R6 - Tap 0	3.6	4.0	4.3	Ratio
Fast Average Detector Time Constant	τ_{FAST}		-	8	-	ms
Slow Average Detector Time Constant	τ_{SLOW}		-	180	-	ms
FILTER						
Maximum Crossover Frequency	f_{C_MAX}	R1 - Tap 0	3	3.9	-	kHz
Nominal Crossover Frequency	f_{C_NOM}	R1 - Tap 7	1.5	1.9	2.3	kHz
Minimum Crossover Frequency	f_{C_MIN}	R1 - Tap 15	-	0.9	1.4	kHz
Filter Rolloff Rate			-	24	-	dB/oct
STAGE A and B						
Open Loop Gain (B)	A_{OL_B}		-	52	-	dB
Input Impedance (A)	R_{IN}		8	10.6	12	k Ω
OUTPUT STAGE						
Stage Gain	A_C	$V_{IN} = -90$ dBV	7	9	11	dB
Maximum Output Level	MPO	$V_{IN} = -25$ dBV, $R_{VCEXT} = 221$ k	-20	-18	-16	dBV
MPO Range	Δ MPO	R5 - Tap 15 to Tap 0, $R_{VCEXT} = 221$ k	11.6	13.6	15.6	dB
Output Resistance	R_{OUT}		-	24	-	k Ω

All conditions and parameters remain as shown in the Test Circuit unless otherwise specified in the CONDITIONS column.

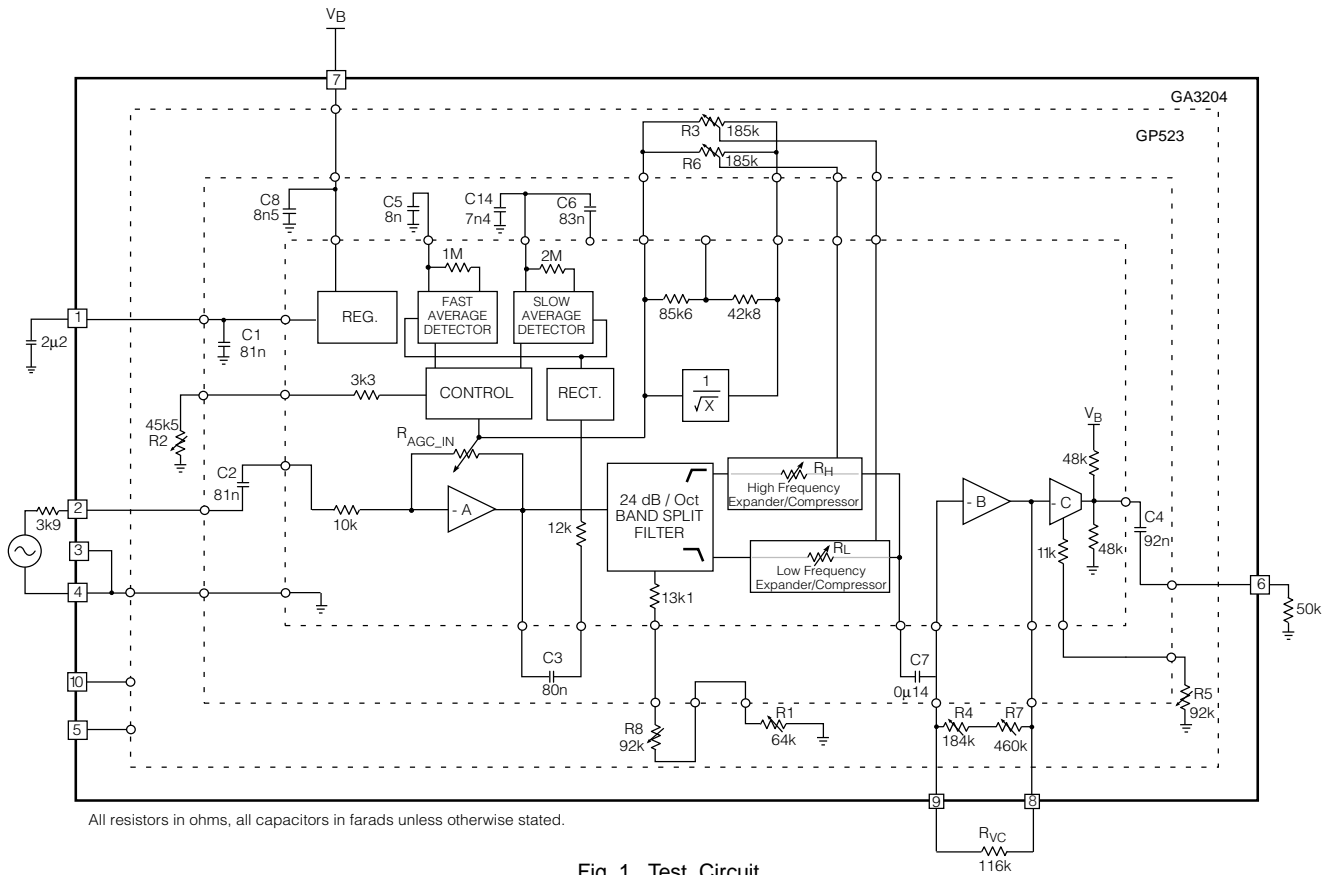


Fig. 1 Test Circuit

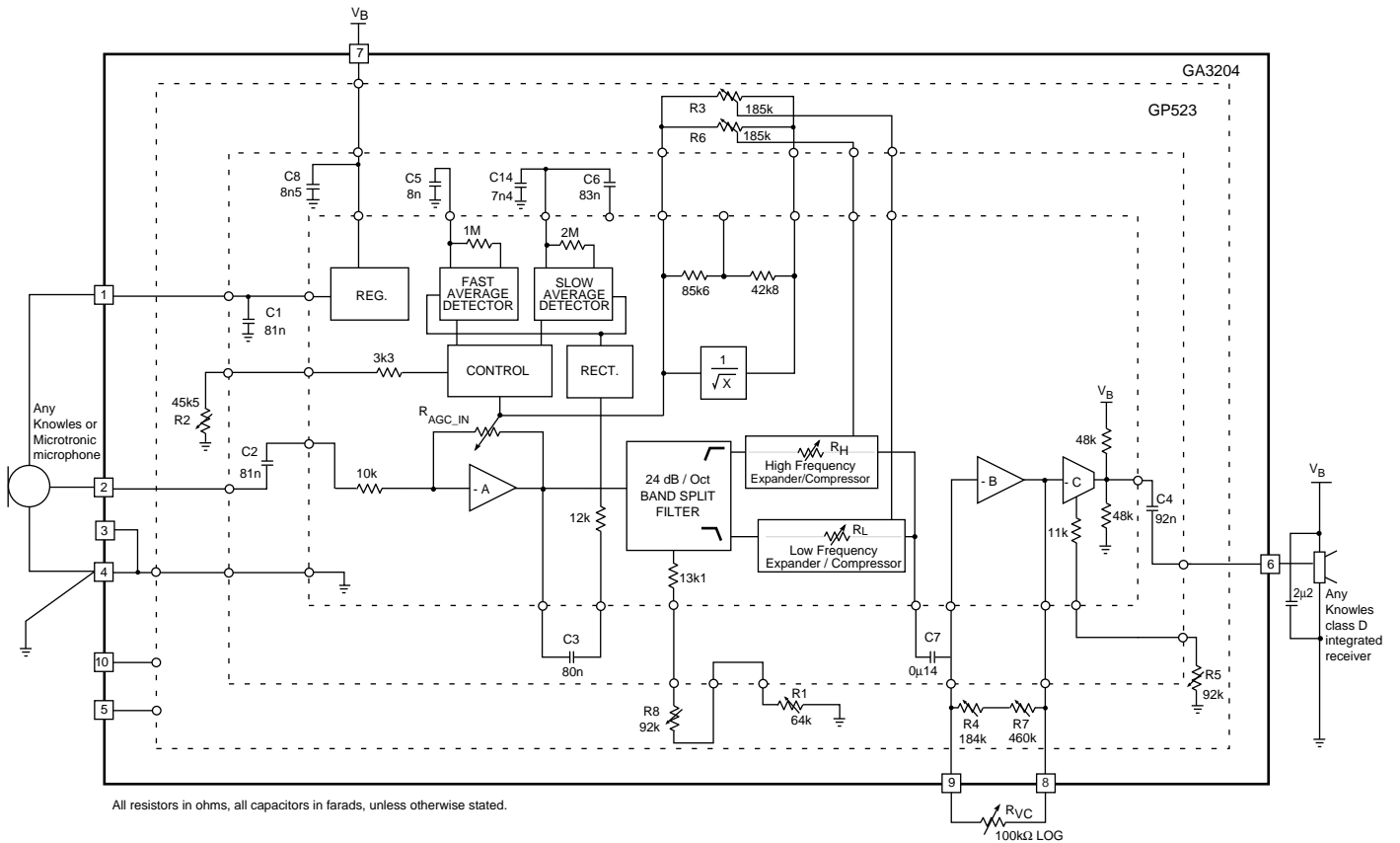


Fig. 2 Typical Application Circuit

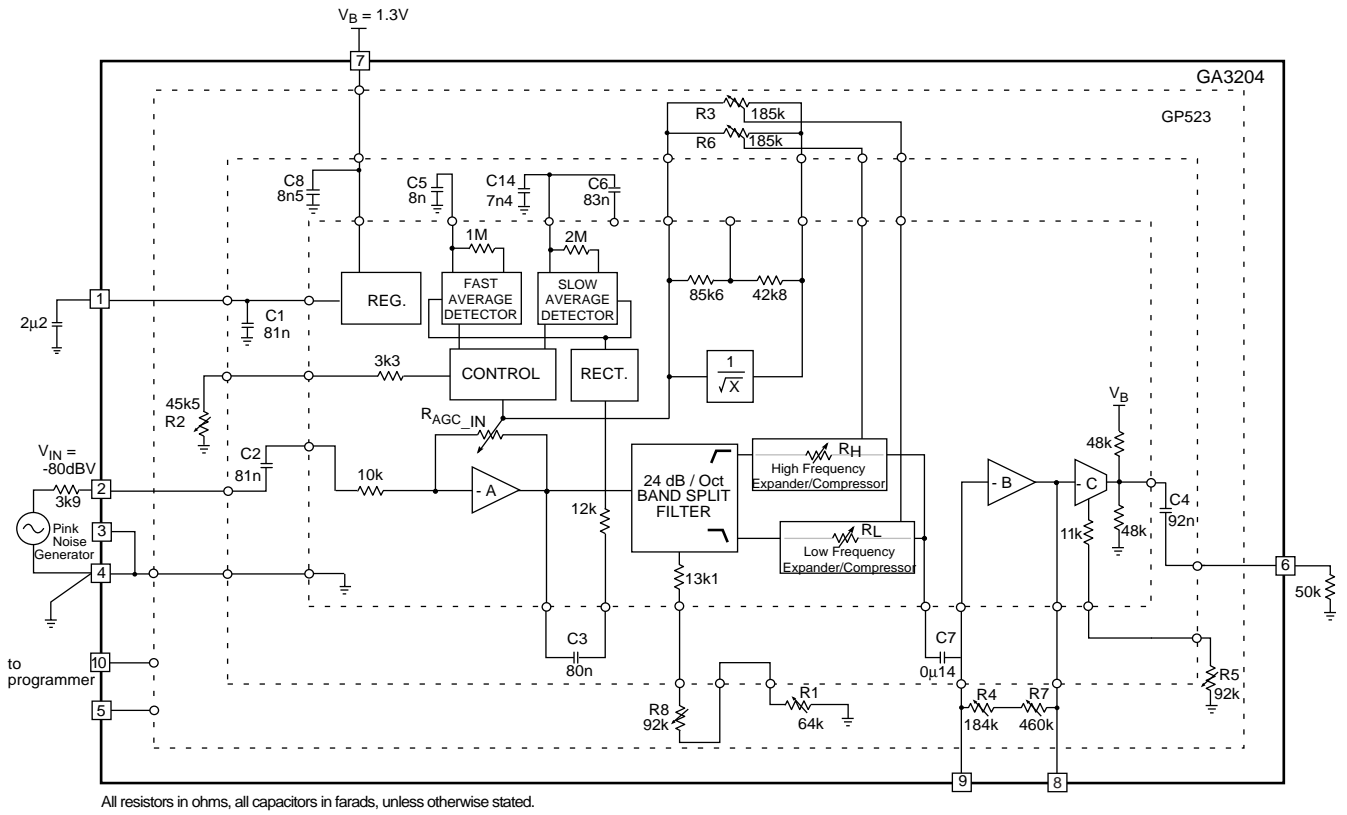


Fig. 3 Characterization Circuit (Used to generate typical curves)

Table of Defaults

R1 - Tap 7	R5 - Tap 0
R2 - Tap 15	R6 - Tap 0
R3 - Tap 0	R7 - Tap 7
R4 - Tap 13	R8 - Tap 0

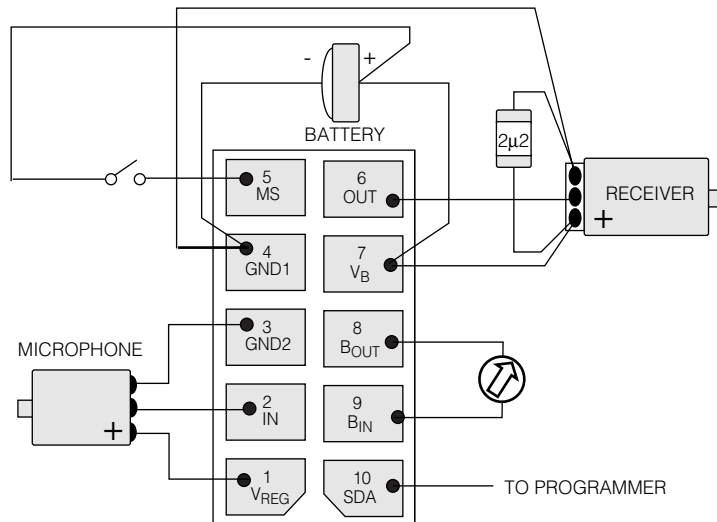


Fig. 4 Typical Assembly Diagram

TYPICAL PERFORMANCE CURVES

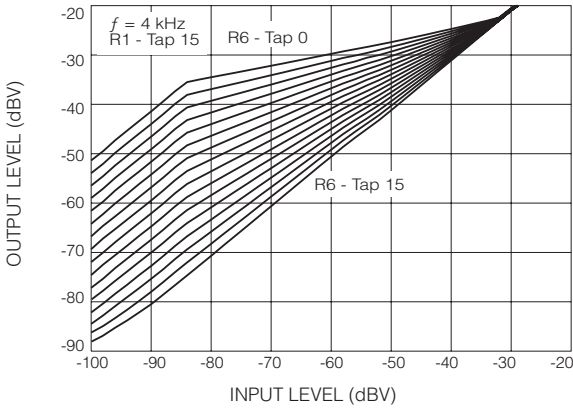


Fig. 5 I/O Transfer Function for Different Compression Ratios (High Frequency Channel)

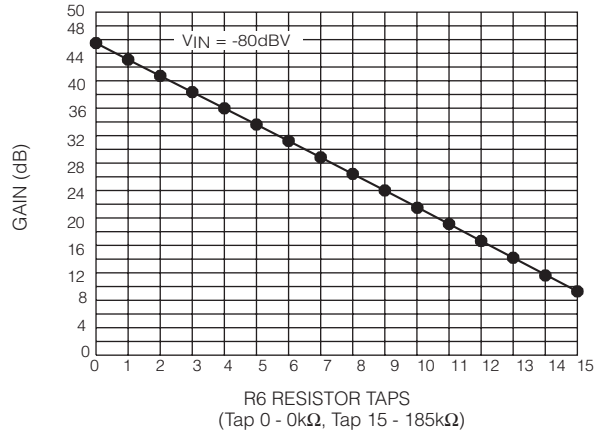


Fig. 6 High Frequency Gain (Compression Ratio Adjustment)

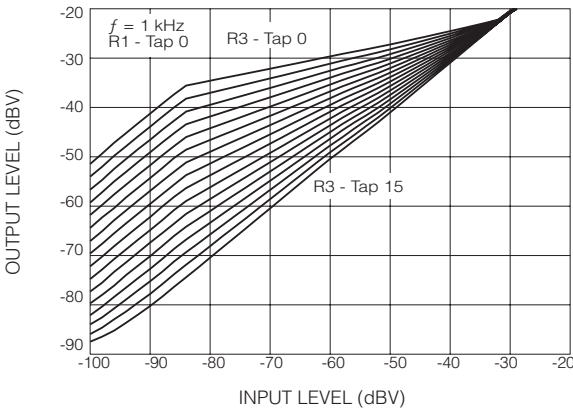


Fig. 7 I/O Transfer Function for Different Compression Ratios (Low Frequency Channel)

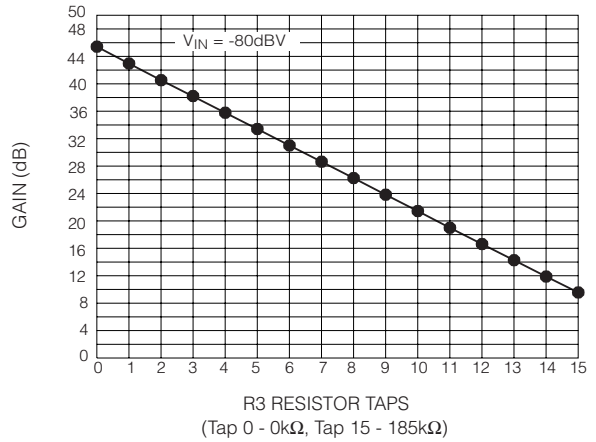


Fig. 8 Low Frequency Gain (Compression Ratio Adjustment)

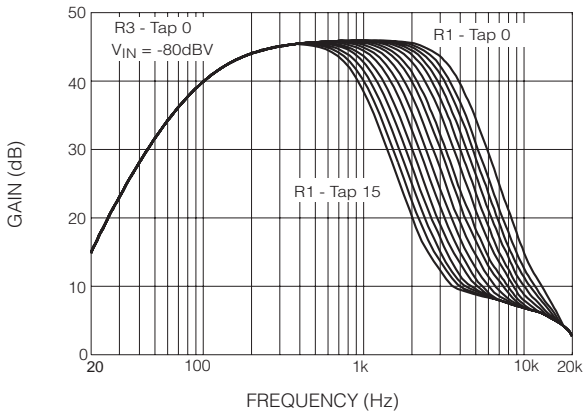


Fig. 9 Frequency Response for Different Crossover Frequency Steps

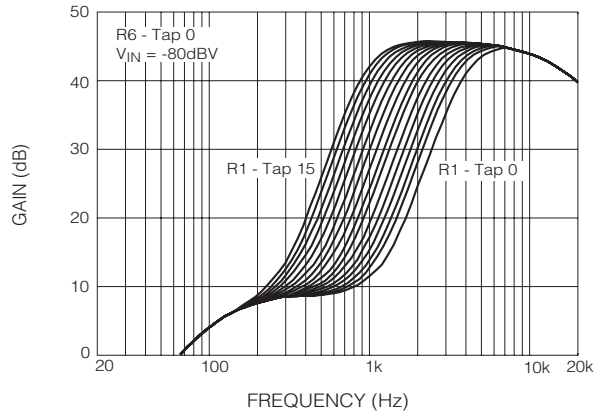


Fig. 10 Frequency Response for Different Crossover Frequency Steps

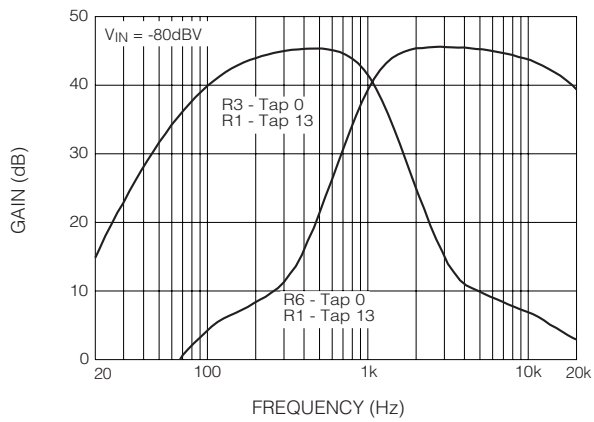


Fig. 11 Crossover Frequency Representation

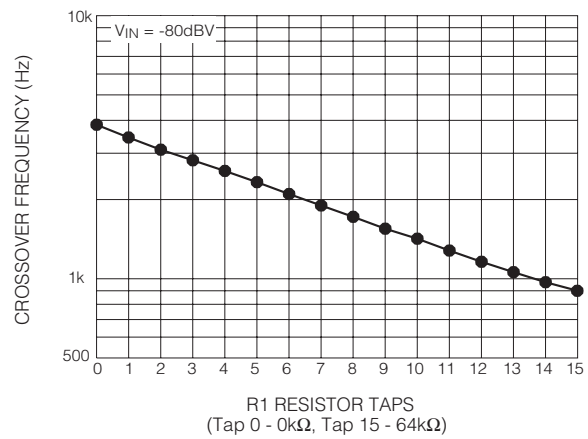


Fig. 12 Crossover Frequency Adjustment

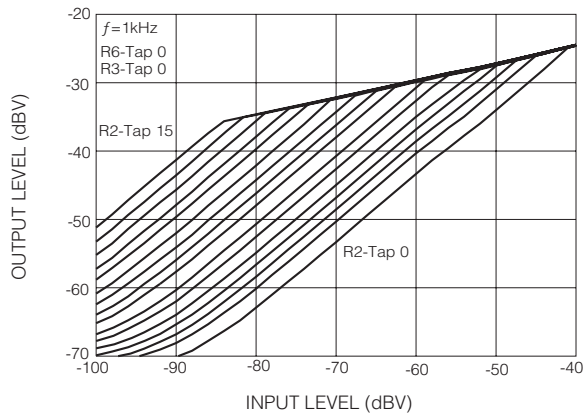


Fig. 13 I/O Transfer Function for Different Thresholds

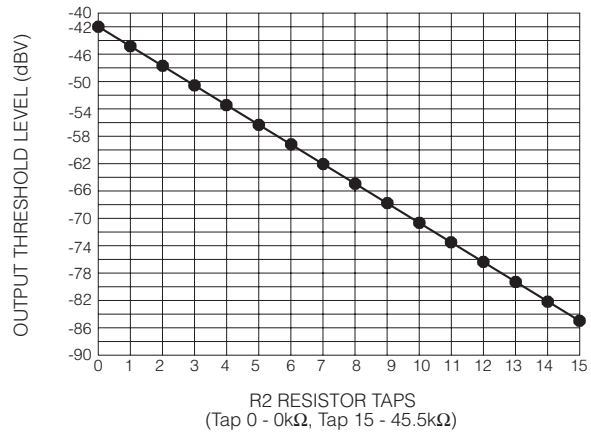


Fig. 14 Threshold Adjustment

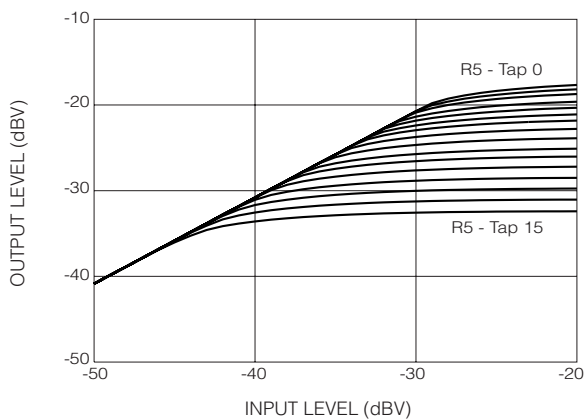


Fig. 15 I/O Transfer Function for Different MPO Steps

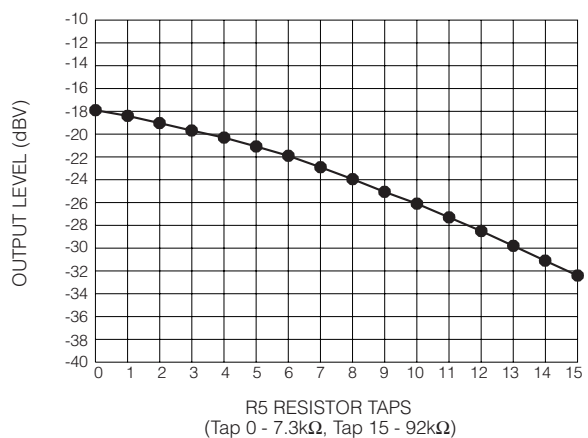


Fig. 16 MPO Adjustment

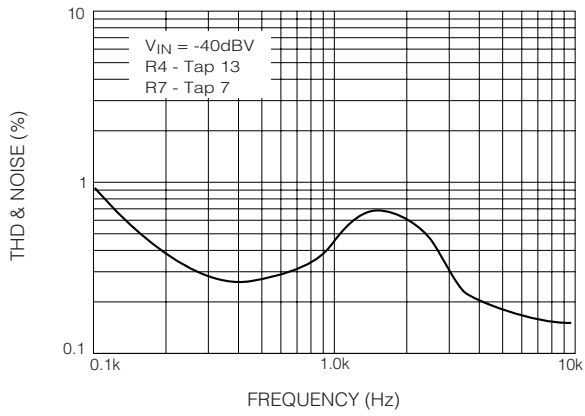


Fig. 17 THD and Noise vs Frequency

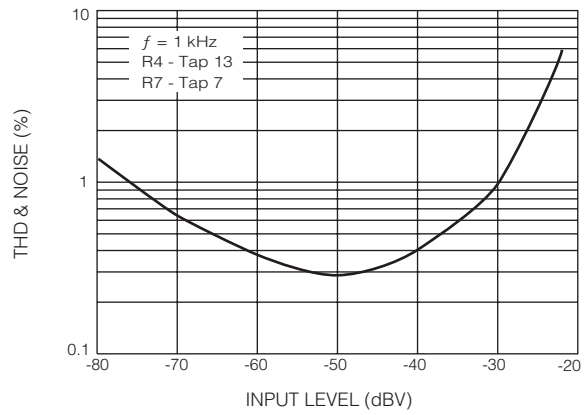


Fig. 18 THD and Noise vs Input Level

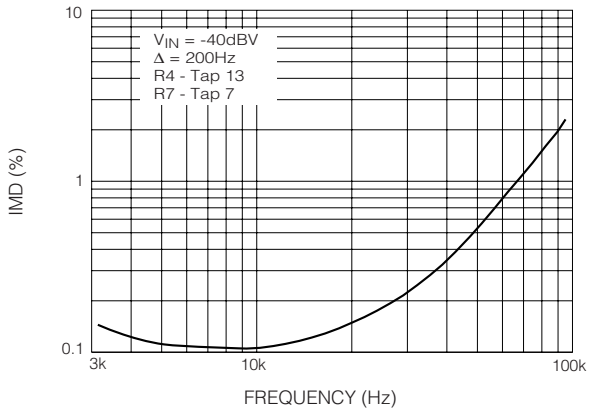


Fig. 19 Intermodulation Distortion (CCIF) vs Frequency

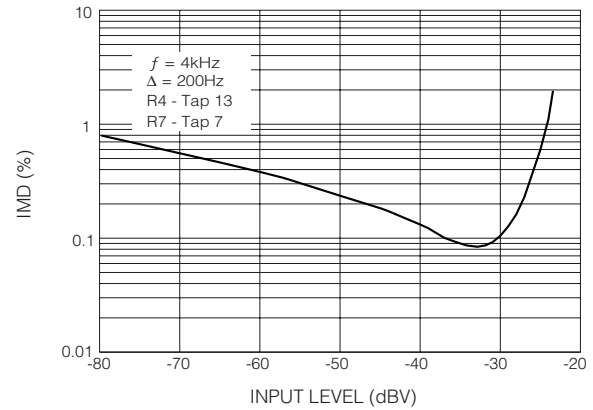


Fig. 20 Intermodulation Distortion (CCIF) vs Input Level

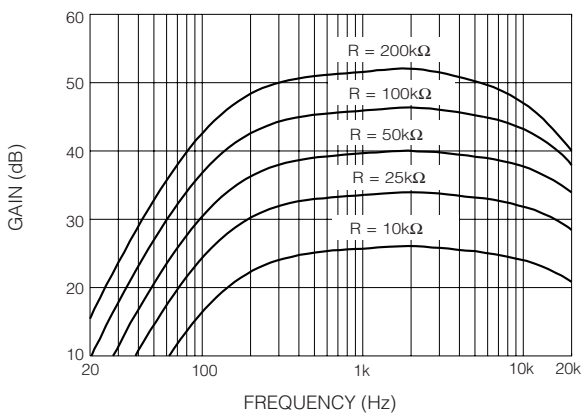
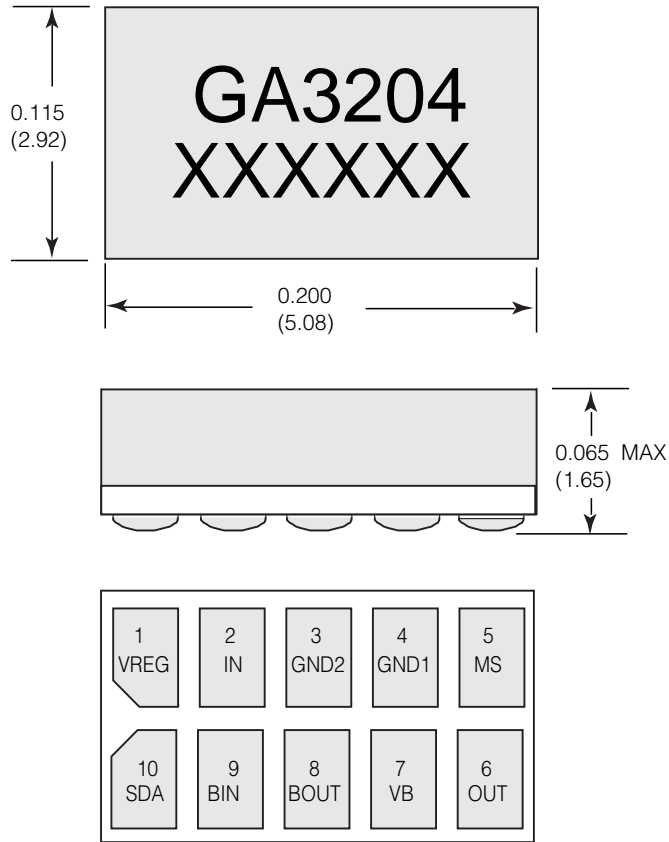


Fig. 21 Frequency Response for Different Feedback Resistor Values

PACKAGE DIMENSIONS

GA3204



Dimensions are in inches.
 Dimensions in parenthesis are in millimetres converted from inches and include minor rounding errors.
 1.0000 inches = 25.400 mm.
 Dimension tolerances ± 0.003 (± 0.08) unless otherwise stated.
 Minimum Pad sizes 0.0285 x 0.0400 (0.724 x 1.016).
 XXXXXX - work order number.

This hybrid is designed for either point-to-point manual soldering or it can be reflowed according to Gennum's recommended reflow process (Information Note 521-45).

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REVISION NOTES:
 Changes to conditions and Tap values in the Electrical Characteristics Table.
 For latest product information, visit www.gennum.com

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