

FEATURES

- dual channel signal processing
- reflowable hybrid
- 4th order state variable filter
- adjustable crossover frequency
- adjustable compression ratio from 1:1 to 4:1
- independent compression ratio adjustment for low and high frequency band
- adjustable AGC threshold levels
- unique twin average detectors
- > 95dB dynamic range
- low THD and IMD distortion
- drives class D integrated receivers
- MPO range externally adjustable

thinSTAX™ PACKAGING

Hybrid Typical Dimensions:

0.190 x 0.105 x 0.050in.
(4.83 x 2.67 x 1.27mm)

DEVICE DESCRIPTION

The DynamEQ®II hybrid family is a second generation Wide Dynamic Range Compression (WDRC) system.

The small hybrid design makes it particularly suitable for CIC applications. GA3202 hybrid incorporates 24dB/oct filtering. The gain and frequency response is dependant on the user's environment.

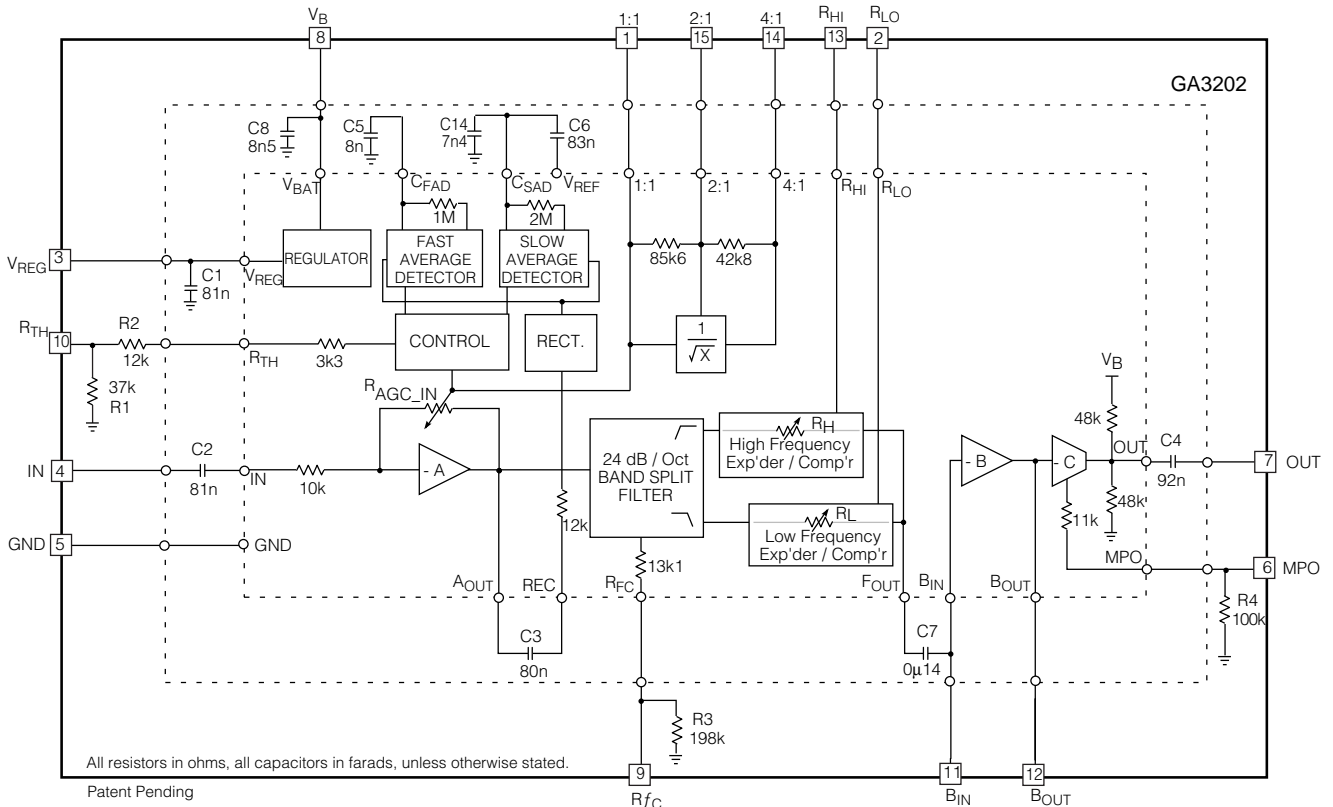
Twin averaging detector circuits are optimized for sound quality during normal listening, without sacrificing comfort during sudden loud inputs.

All input signals to DynamEQ®II are processed by 2:1 compression before subsequent band splitting.

The 24 dB/oct band split filter ahead of the expander/compressor circuits allows for independent compression ratio adjustments (1:1 to 4:1) in high and low frequency channels.

The gain setting stage is followed by a class D integrated receiver preamplifier stage. Symmetrical peak clipping is used to achieve MPO adjustment.

The GA3202 is designed as a CIC alternative to GS3032, GR3032 and GS3028 with MPO adjustment range modifications.



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

Patent Pending

BLOCK DIAGRAM

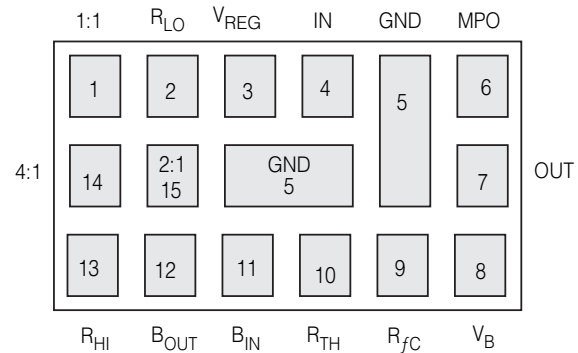
ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE
Supply Voltage	3 VDC
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 CONNECTION



ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Hybrid Current	I_{AMP}		-	380	530	μ A
Minimum Voltage	V_b		-	-	-	V
Total Harmonic Distortion	THD	$V_{IN} = -40$ dBV at 1kHz	-	0.2	1.0	%
THD with Maximum Allowable Input	THD _M	$V_{IN} = -23$ dBV, $R_{vc} = 47$ k Ω	-	2	-	%
Input Referred Noise	IRN	Aweight	-	3.0	-	μ V _{RMS}
Total System Gain	A_V	$V_{IN} = -90$ dBV	45	48	51	dB
Regulator Voltage	V_{REG}	$I_{LOAD} = 30$ μ A	890	930	1000	mV
AGC						
Lower Threshold	TH _{LO}		-91	-87	-83	dBV
Upper Threshold	TH _{HI}		-36	-32	-28	dBV
Compression Gain Range	ΔA	Gain(-90dBV _{IN}) - Gain(-30dBV _{IN})	37.5	40.5	43.5	dB
System Gain in Compression	A_{60}	$V_{IN} = -60$ dBV	26	29	32	dB
Min. Compression Ratio	CMP _{1:1}	$V_{IN} = 3$ kHz, -60dBV to -40dBV, Rhp=1:1 Rlp=1:1	0.9	1.0	1.1	Ratio
Max. Comp. Ratio	CMP _{4:1}	$V_{IN} = 3$ kHz, -60dBV to -40dBV, Rhp=4:1, Rlp=4:1	3.6	4.0	4.3	Ratio
Fast Detector Time Constant	τ_{FAST}		-	8	-	ms
Slow Detector Time Constant	τ_{SLOW}		-	180	-	ms
FILTER						
Maximum Cross-over Frequency	f_{c_0}	$R_{fc} = 0\Omega$	3.0	3.9	-	kHz
Nominal Cross-over Frequency	$f_{c_{22}}$	$R_{fc} = 22$ k Ω	1.5	1.9	2.3	kHz
Minimum Cross-over Frequency	$f_{c_{220}}$	$R_{fc} = 220$ k Ω	-	0.9	1.4	kHz
Filter Roll-off Rate			-	24	-	dB/oct
STAGE A and B						
Open Loop Gain (B)	A_{OL_B}		-	52	-	dB
Input Impedance (A)	R_{IN}		-	11	-	k Ω
OUTPUT STAGE						
Stage Gain	A_C	$V_{IN} = -30$ dBV	7.0	9	11.0	dB
Max Output Level	MPO	$R_{vc} = 220$ k Ω , $V_{IN} = -25$ dBV	-16	-14	-12	dBV
MPO Range	Δ MPO	$R_{MPO} = 0\Omega$ to 100k Ω	17	19	21	dB
Output Resistance	R_{OUT}		-	24	-	k Ω

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

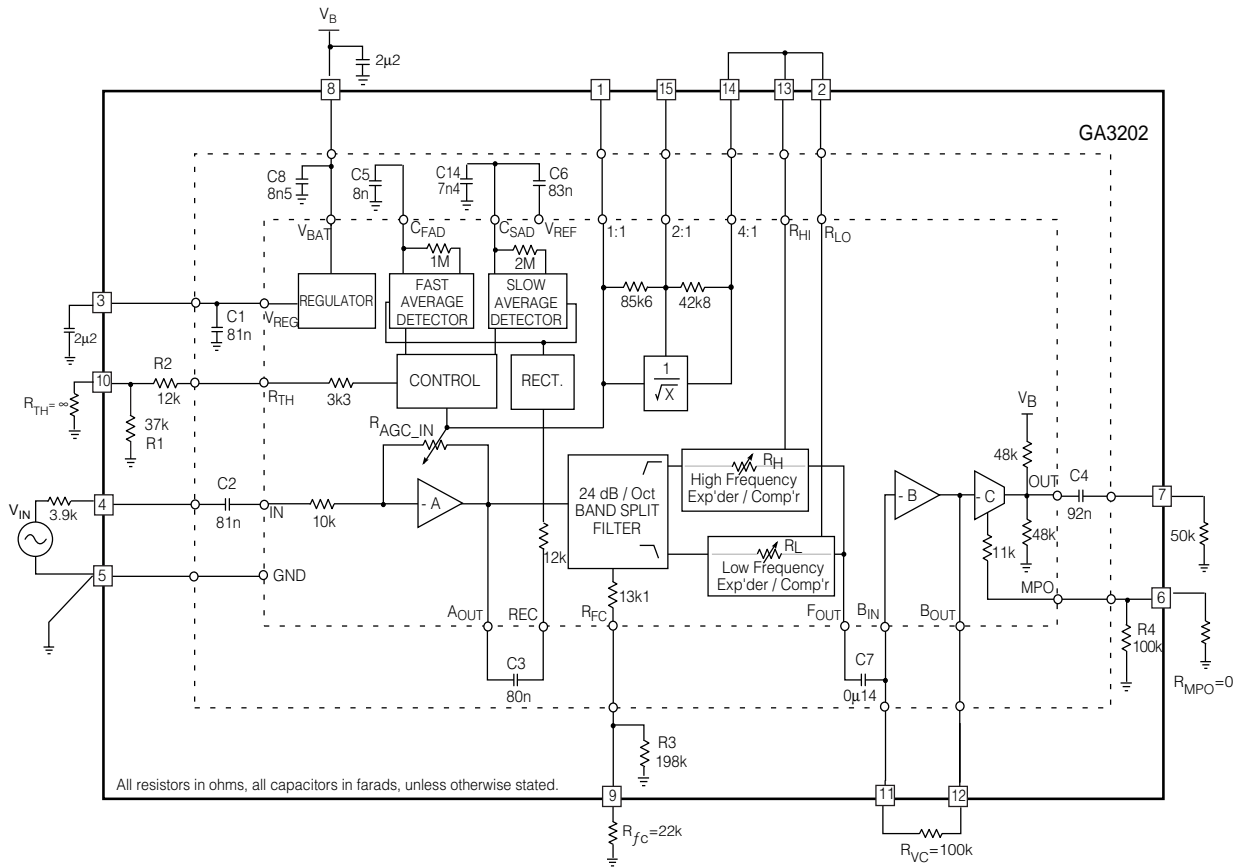


Fig. 1 Production Test Circuit

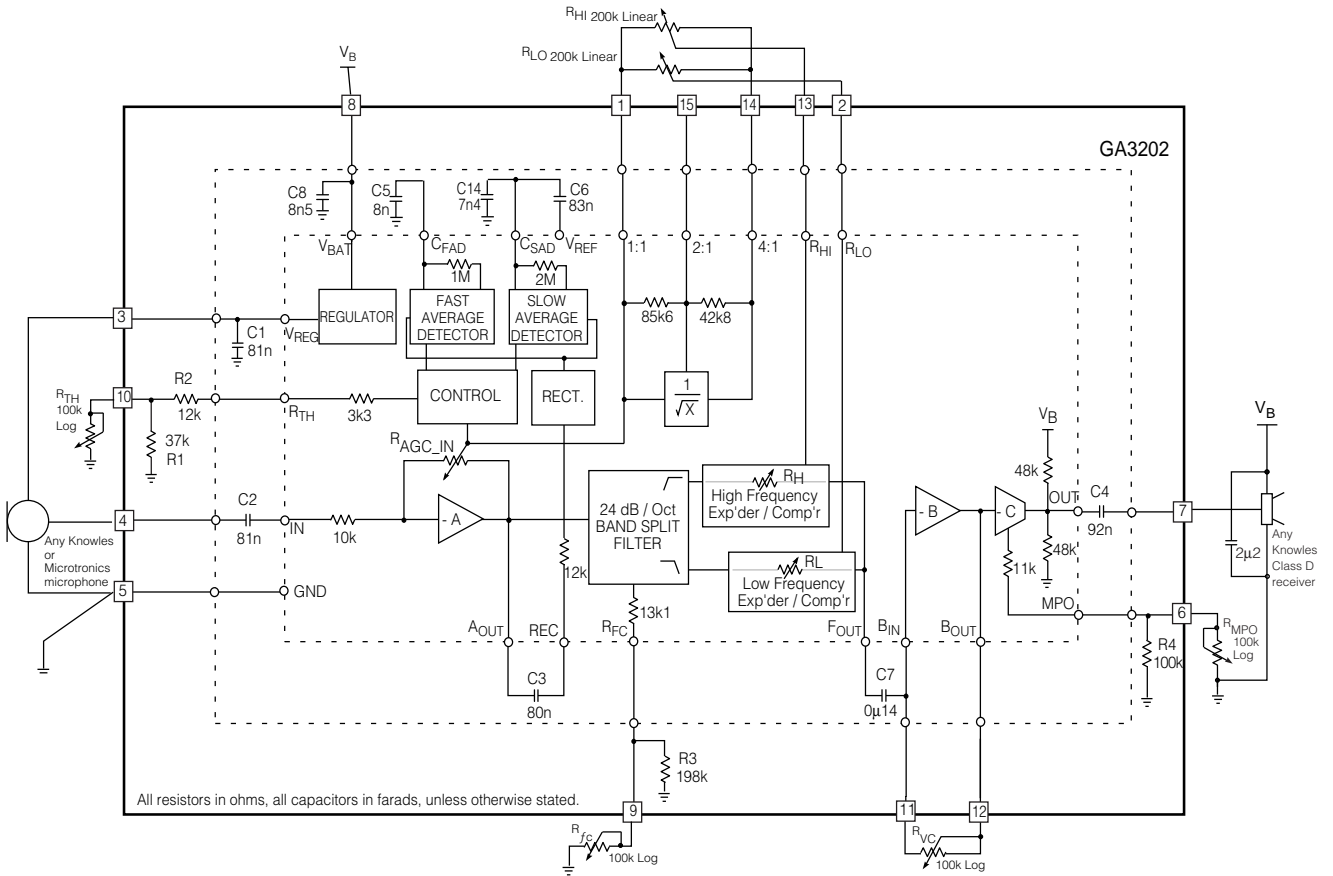


Fig. 2 Typical Application Circuit

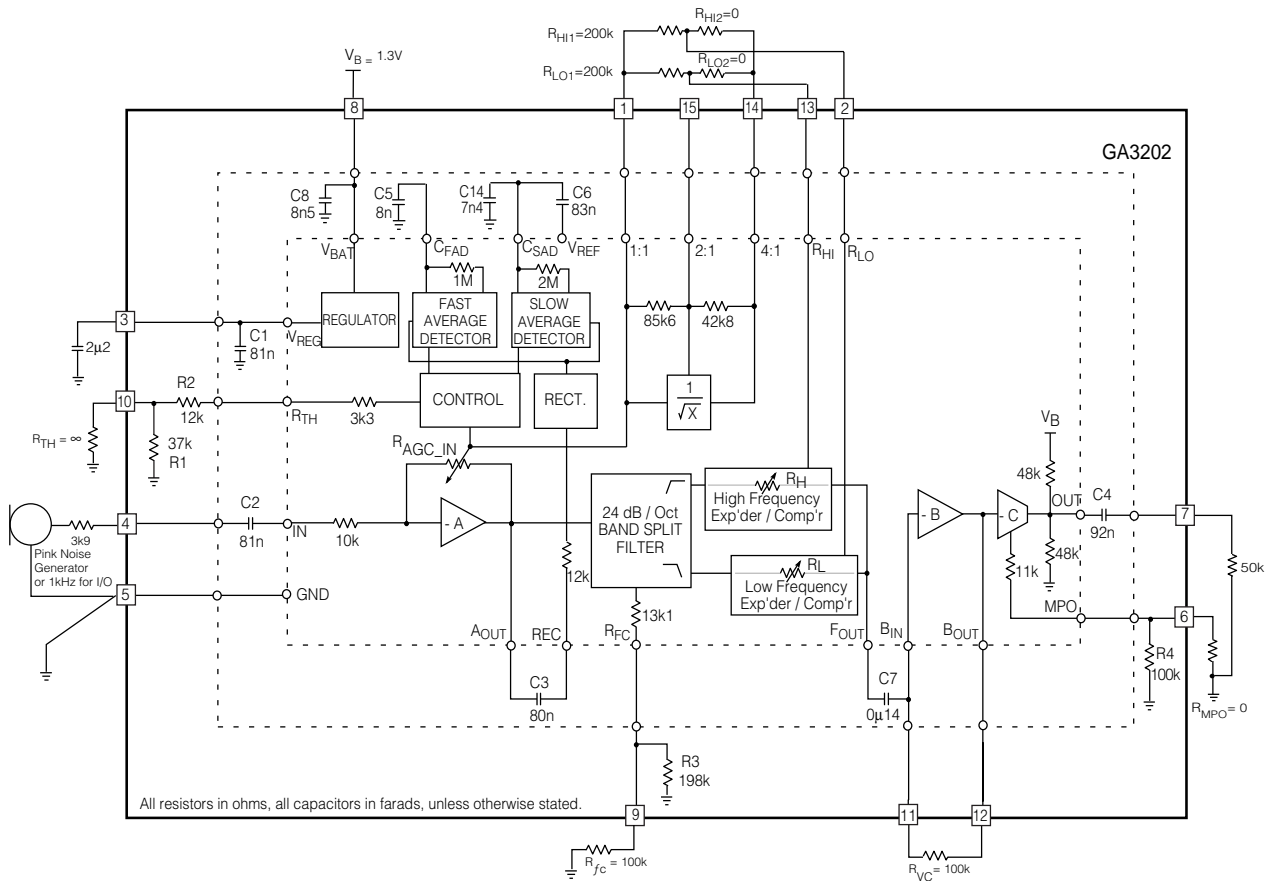


Fig. 3 Characterization Circuit (Used to generate typical curves)

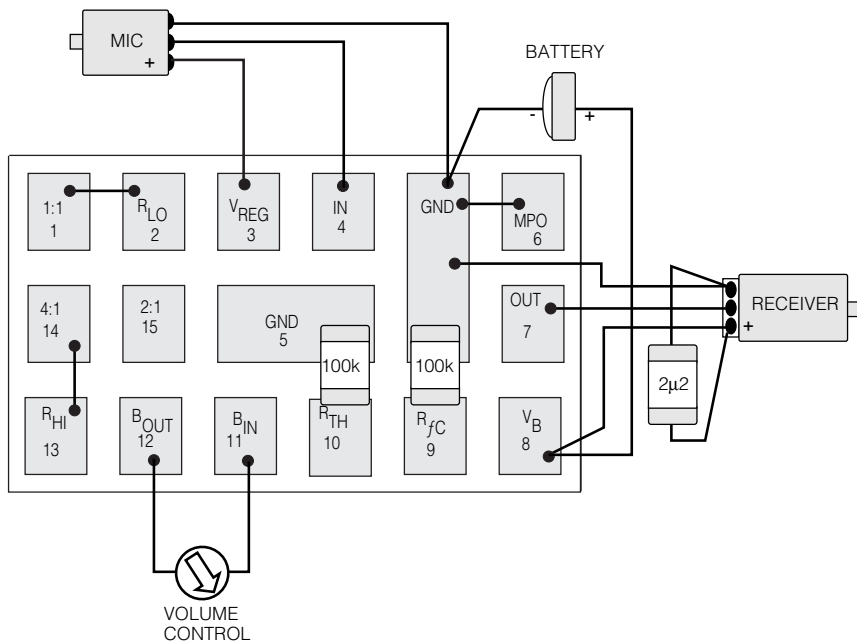


Fig. 4 Typical Assembly Diagram

TYPICAL PERFORMANCE CURVES

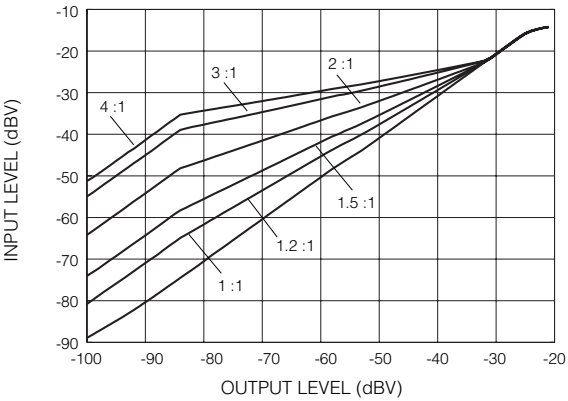


Fig. 5 I/O Transfer function for Different Compression Ratios

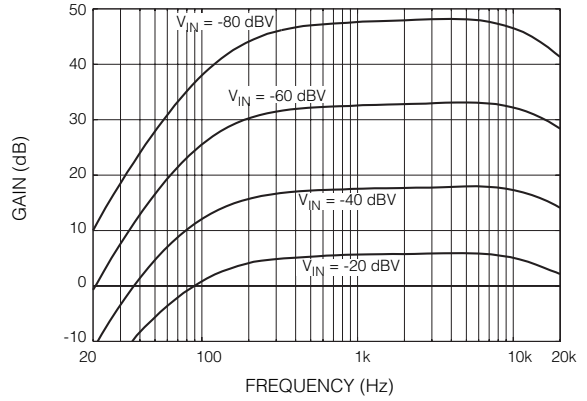


Fig. 6 Frequency Response for Different Input Levels

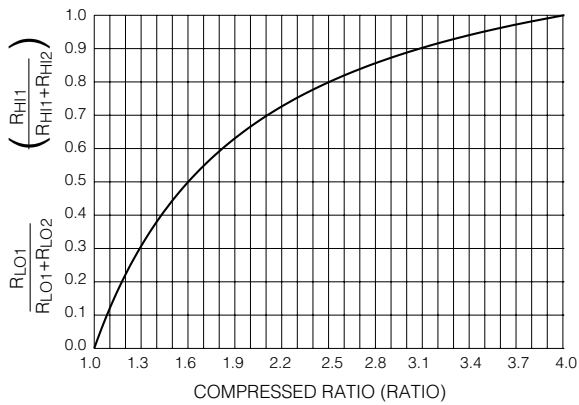


Fig. 7 Compression Settings Resistor Ratio for High Pass Channel (R_{H11} & R_{H12}) and Low Pass Channel (R_{LO1} & R_{LO2})

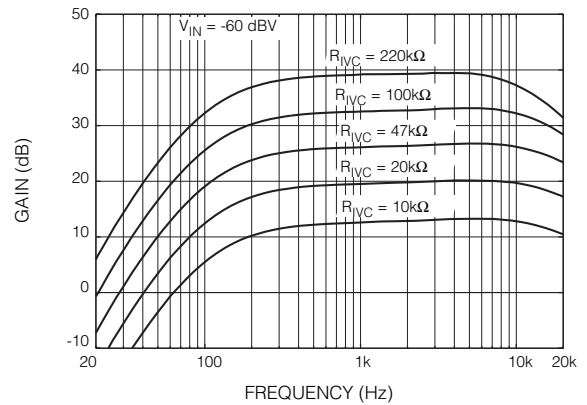


Fig. 8 Frequency Response for Different R_{VC} Values

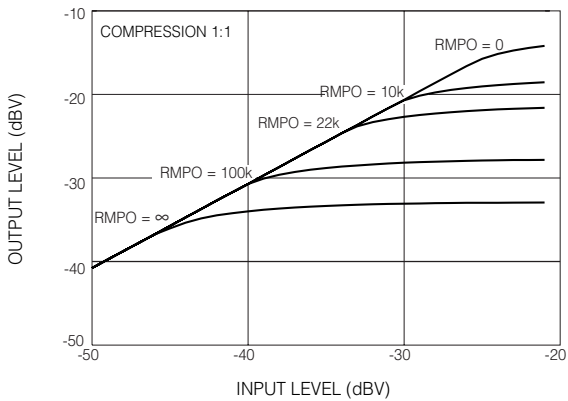


Fig. 9 I/O Transfer Function for Different R_{MPO} Resistors

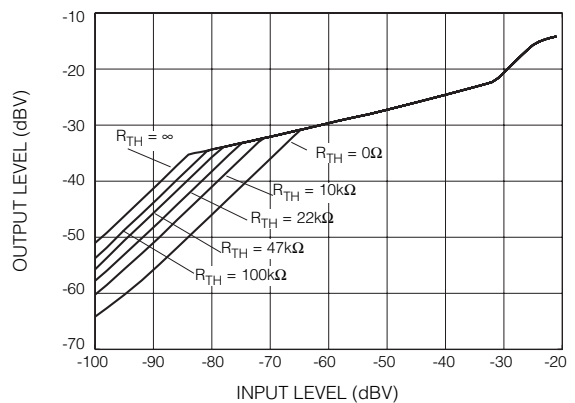


Fig. 10 I/O Transfer Function for Different R_{TH} Resistors

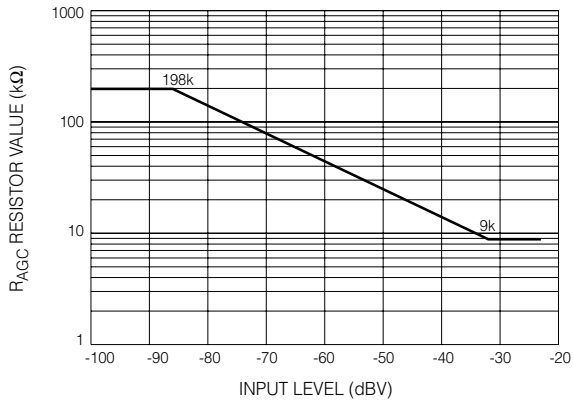


Fig. 11 Stage A Compressor Feedback Resistor Value

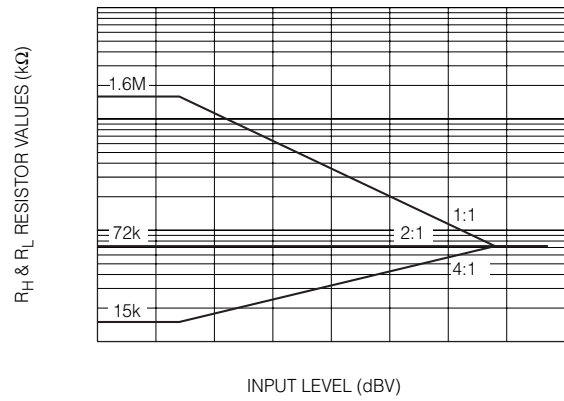


Fig. 12 Expander / Compressor Resistors Values

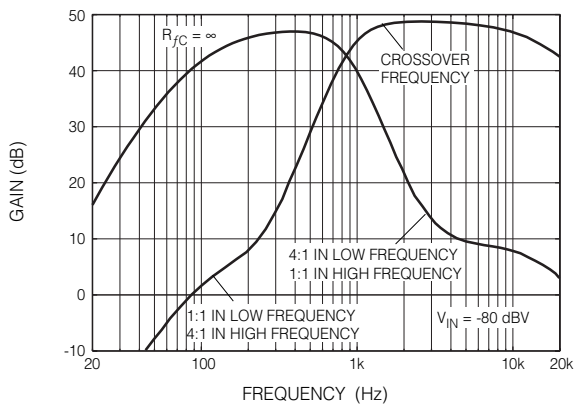


Fig. 13 Crossover Frequency Representation

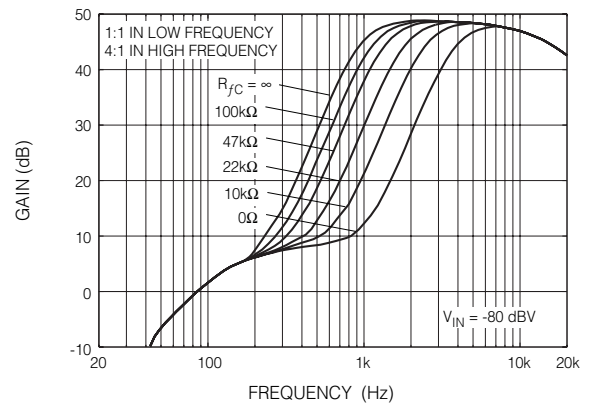


Fig. 14 Frequency Response for Different R_{fc} Resistor Values

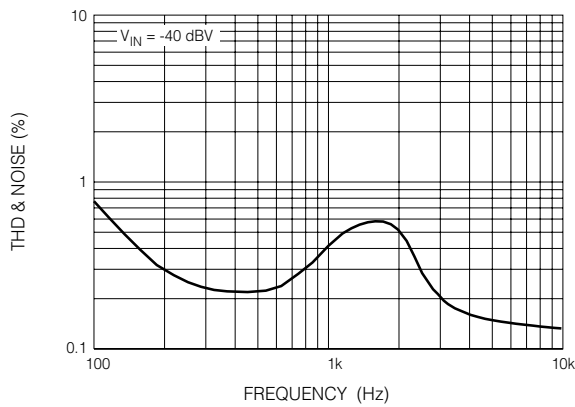


Fig. 15 THD and Noise vs Frequency

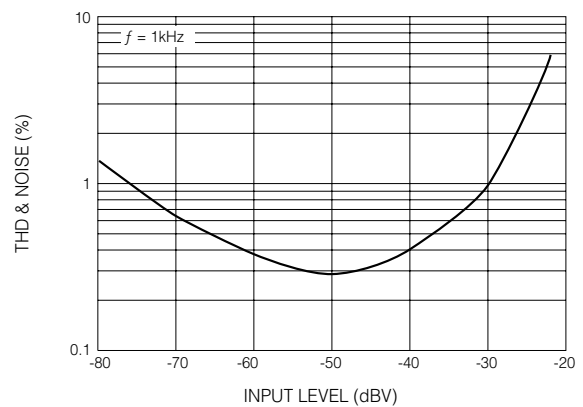


Fig. 16 THD and Noise vs Input Level

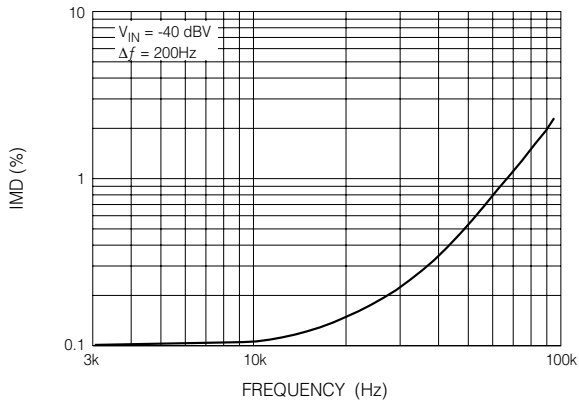


Fig. 17 Intermodulation Distortion (CCIF) vs Frequency

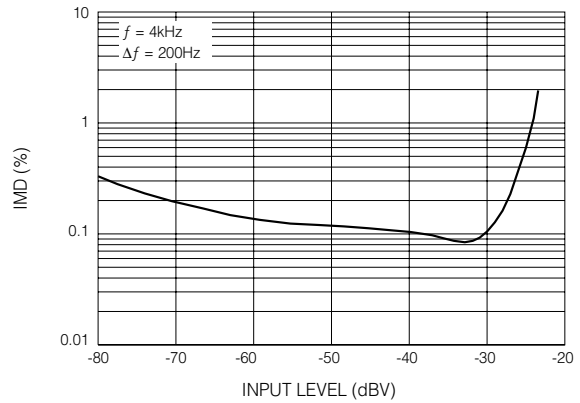
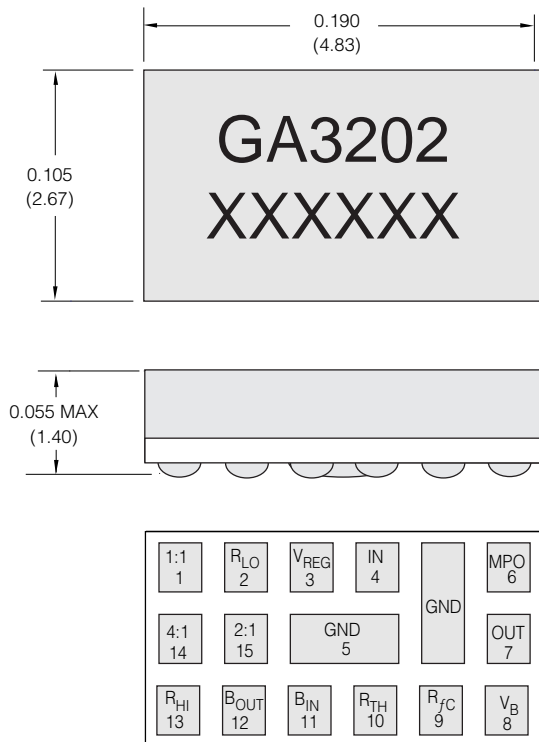


Fig. 18 Intermodulation Distortion (CCIF) vs Input Level

PACKAGE DIMENSIONS



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 size: 0.022 x 0.025 (0.56 x 0.64)
 XXXXXX - work order number.
 This hybrid is designed to be reflowed according to Gennum's recommended reflow process (Information Note 521-45).

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REVISION NOTES:
 thinSTAX™ added. Changes to note in Packaging Dimensions.

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

