AGC-O with Active Low Cut Filter in a CIC Size Hybrid - GS3044

DATA SHEET

GS3044

FEATURES

- **CIC suitable package size**
- **low distortion compression limiting**
- **38dB maximum system gain, adjustable over a 38dB range**
- **output compression threshold, adjustable over 16dB range**
- **2nd order active low cut filter adjustable from 530Hz to 2.0kHz**
- **designed to drive a class D integrated receiver**
- **averaging detector**
- **flexibility to add high cut filter**

STANDARD PACKAGING

Hybrid typical dimensions:

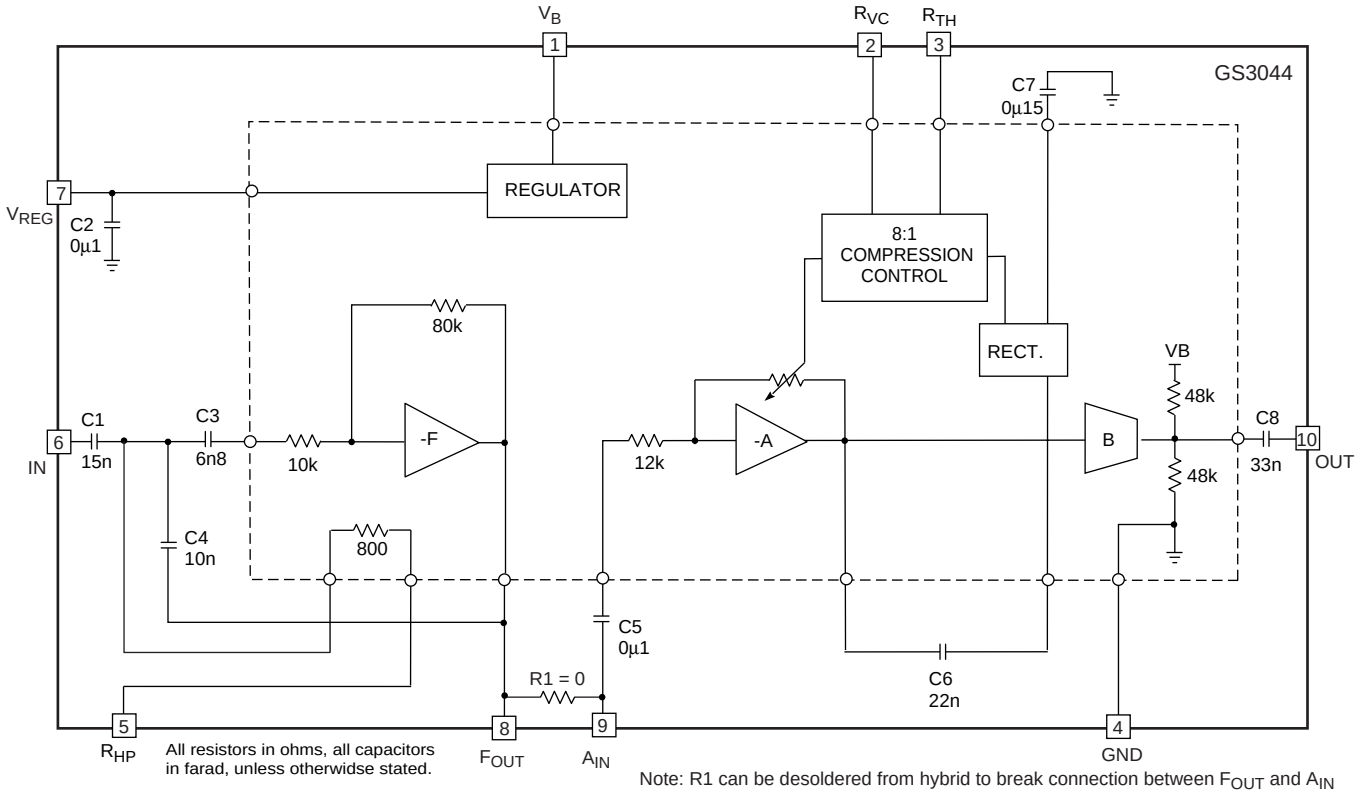
0.180 x 0.110 x 0.070 in.

(4.57 x 2.79 x 1.78 mm)

DESCRIPTION

The GS3044 CIC hybrid features AGC-O capability for low distortion output limiting with an active low cut filter in a package size suitable for CIC instruments. The circuit consists of an AGC preamplifier and output stage, capable of driving a class D integrated receiver. The compression control circuit, connected between the input and output of the AGC preamplifier, varies the current controlled resistance. It operates with an 8:1 compression ratio and uses an averaging detector with a time constant of 270ms, selected to provide optimal sound quality over a full range of sound and listening environments. The actual attack and release times are typically 40ms and 150ms respectively when the circuit is fully in the compression region of operation (measured times vary depending on gain and threshold settings).

The system gain, compression control and filter corner frequency can be adjusted by choosing three independent resistors or 100k trimmers. Maximum system gain is 38dB. It can be adjusted within a 38dB range. The output compression threshold can be adjusted within a 16dB range. The filter's corner frequency can be adjusted from 530Hz to 2kHz.



BLOCK DIAGRAM

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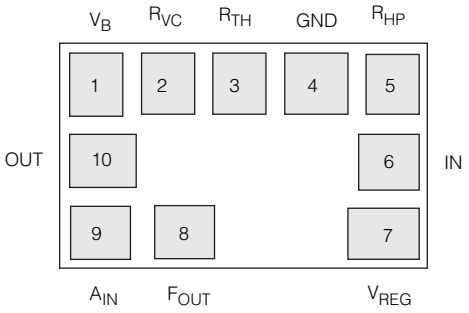
ABSOLUTE MAXIMUM RATINGS

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

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Hybrid Current	I_{AMP}		-	235	340	µA
Minimum Voltage	V_B		-	-	1.1	V
Total Harmonic Distortion	THD	V_{IN} = -60dBV	-	0.5	1.0	%
Input Referred Noise	IRN	A weighted, R_{HP} = 100kΩ	-	4.4	-	μV_{RMS}
System Gain at Peak	A_V	Frequency = 2.8kHz, R_{HP} = 100kΩ	35	38	41	dB
Relative Gain at Peak with Low Cut, Note 3	ΔA_V	Frequency = 2.8kHz, R_{HP} = 0	-	-1.0	-	dB
Relative Gain at 500Hz, Note 3	ΔA_{LF}	Frequency = 500Hz, R_{HP} = 100kΩ	-	-3.0	-	dB
Relative Gain at 500Hz with Low Cut, Note 3	ΔA_{LC}	Frequency = 500Hz, R_{HP} = 0	-27	-23	-19	dB
Relative Gain at 5kHz, Note 3	ΔA_{HF}	Frequency = 5kHz, R_{HP} = 100kΩ	-	-3.0	-	dB
Regulator Voltage	V_{REG}		890	935	1000	mV
Power Supply Rejection Ratio	PSRR		49	56	-	dB
AGC						
Maximum Threshold (O/P Referred)	TH_{MAX}	V_{IN} = -60dBV, Note 2	-43	-41	-39	dBV
Minimum Threshold (O/P Referred)	TH_{MIN}	V_{IN} = -70dBV, R_{TH} = 100k, Note 2	-59	-57	-55	dBV
VC Gain Range	ΔA_{VC}	R_{VC} = 100kΩ to 0Ω	35	38	41	dB
Compression Ratio High Threshold	CMP-H	V_{IN} = -60dBV to -30dBV, R_{TH} = 0	8.0	9.0	10.0	ratio
Compression Ratio Low Threshold	CMP-L	V_{IN} = -70dBV to -40dBV, R_{TH} = 100kΩ	6.5	7.3	9.0	ratio
Stage A Gain	A_A	V_{IN} = -70dBV	24	27	30	dB
Compression Gain Range	A_{RANGE}	Note 1	47	53	55	dB
AGC Time Consrtant	τ_{AGC}		-	270	-	ms
OUTPUT STAGE						
Gain	A_B		-	11	-	dB
Output Resistance	R_{OP}		-	24	-	kΩ
FILTER						
Minimum Corner Frequency	f_{C_MIN}		-	530	-	Hz
Maximum Corner Frequency	f_{C_MAX}		-	2	-	kHz

All parameters and switches remain as shown in the Test Circuit unless otherwise stated in the CONDITIONS column.

NOTE: 1. $A_{RANGE} = A_A - A_A[V_{IN}$ = -20dBV, R_{TH} = 100k]
2. Measured at output of Stage A
3. Relative to System Gain at Peak

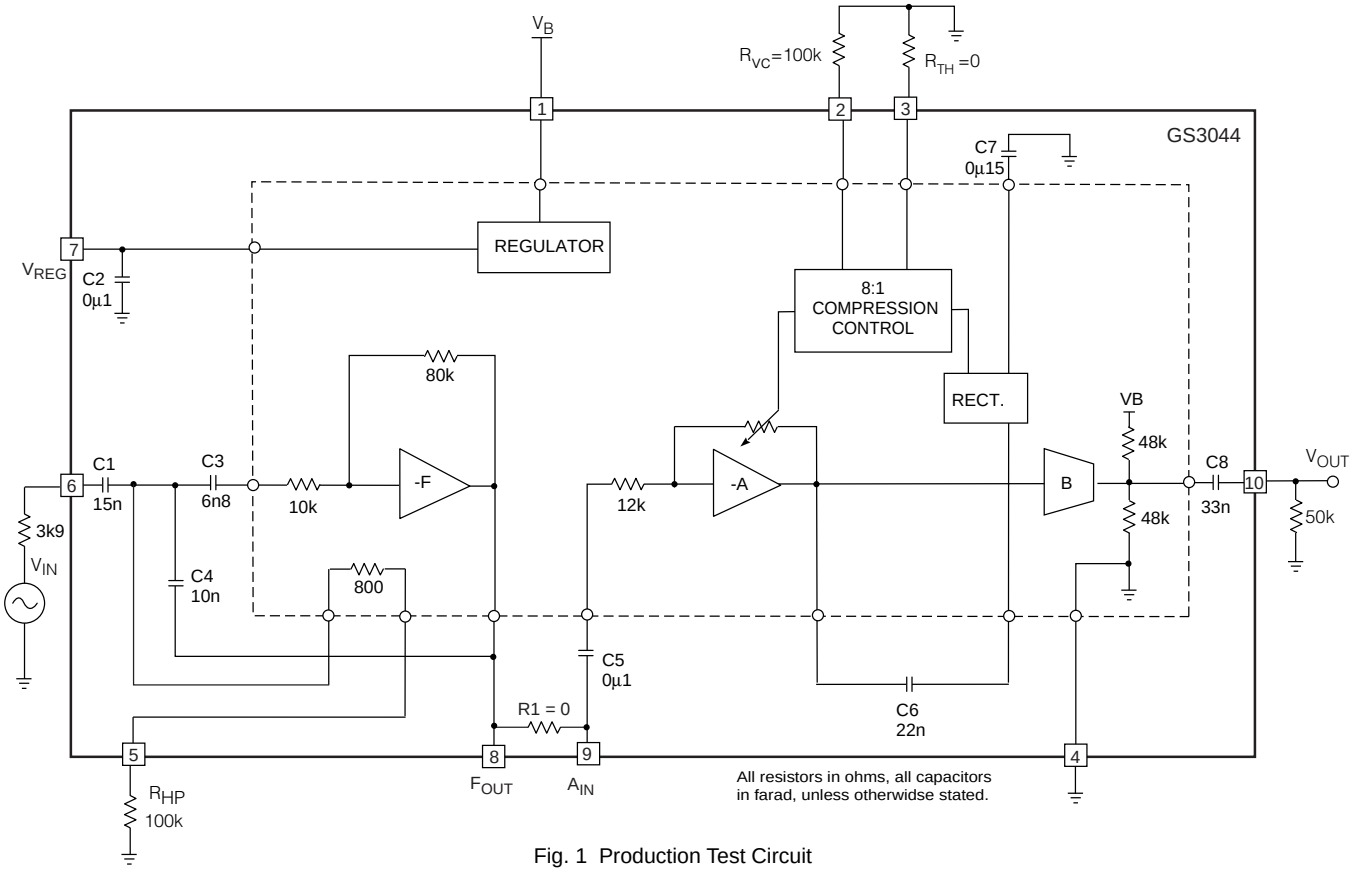


Fig. 1 Production Test Circuit

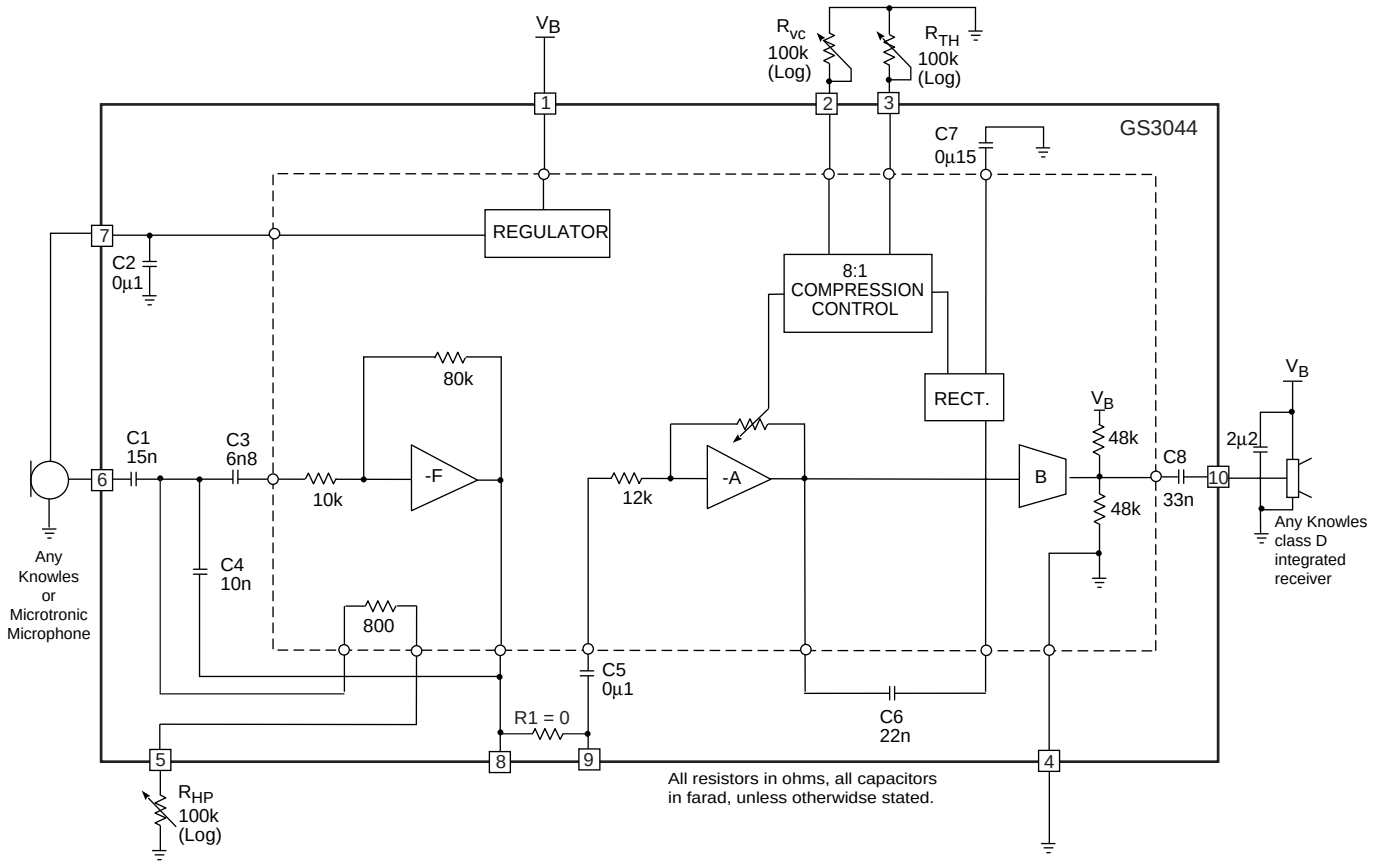


Fig. 2 Typical Application Circuit

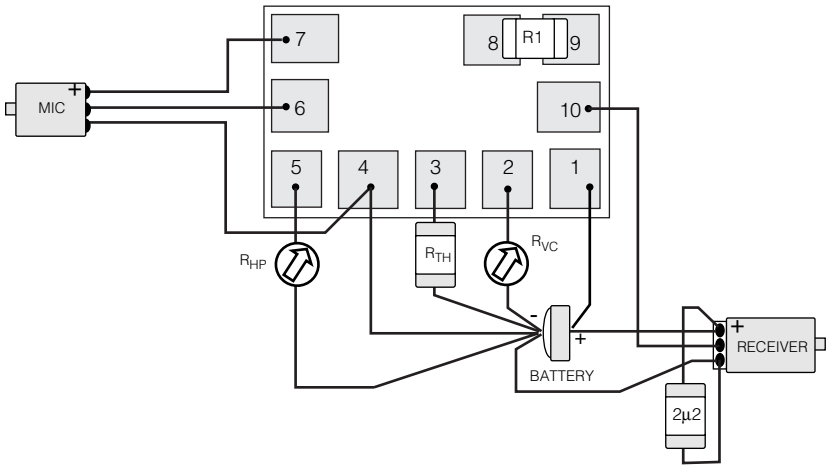


Fig. 3 Typical Hearing Instrument Assembly Diagram

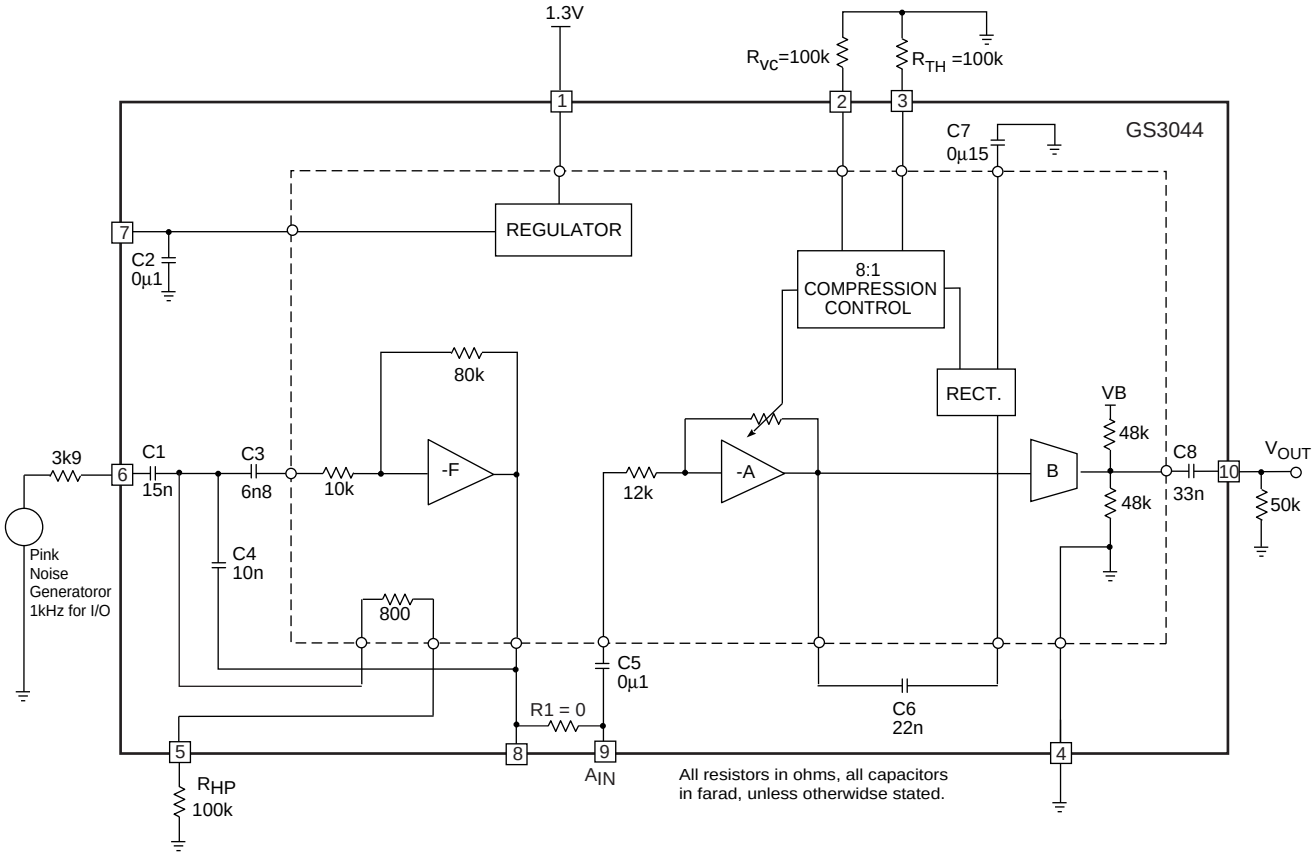


Fig. 4 Characterization Circuit (used to generate typical curves)

TYPICAL PERFORMANCE CURVES

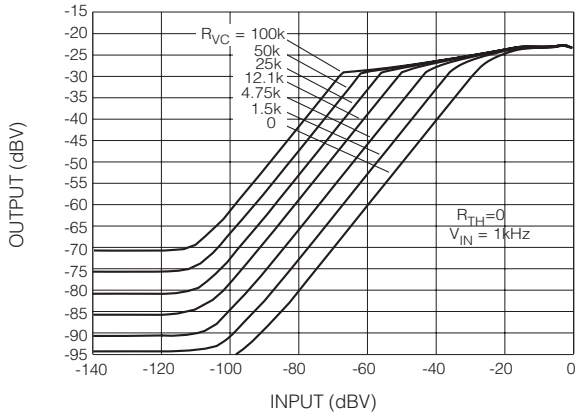


Fig. 5 Input vs Output Volume Control Settings

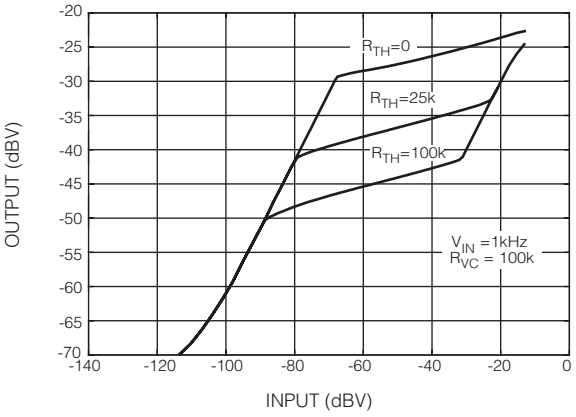


Fig. 6 Input vs Output Threshold Settings

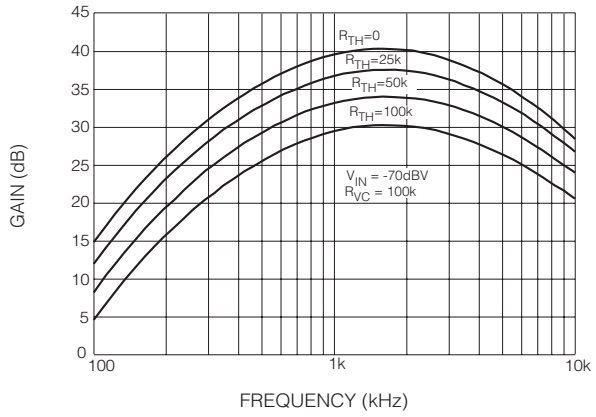


Fig. 7 Frequency Response vs R_{TH}

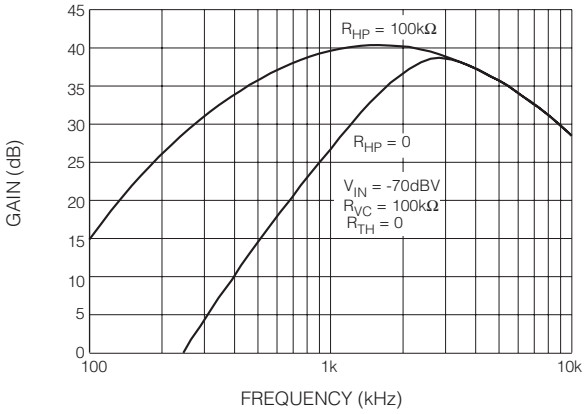


Fig. 8 Frequency Response vs R_{HF}

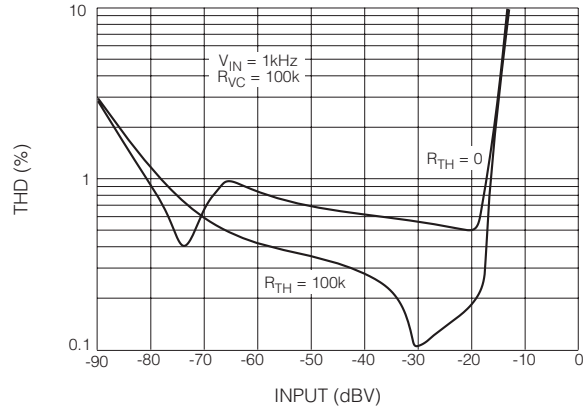


Fig. 9 THD vs Input

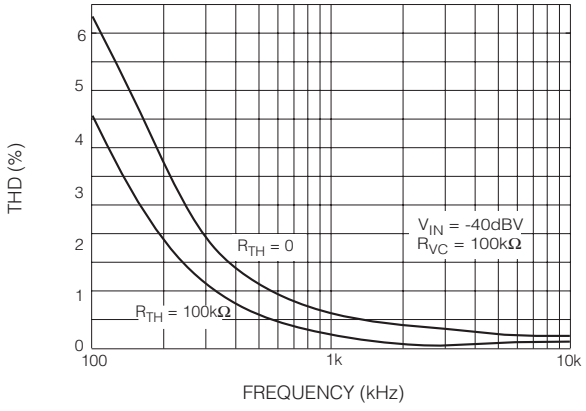


Fig. 10 THD vs Frequency

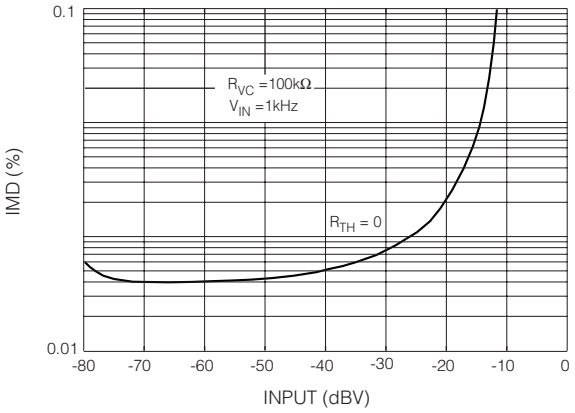


Fig. 11 Intermodulation distortion vs Input

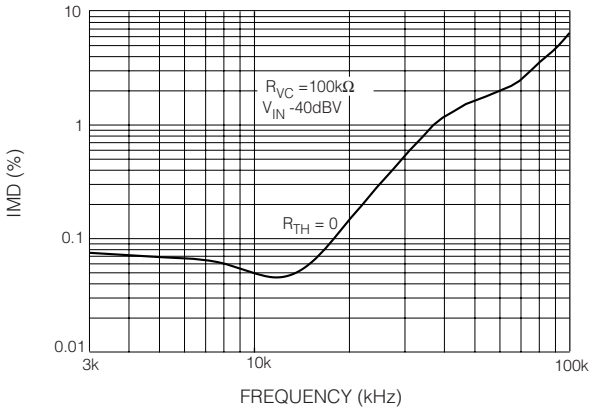
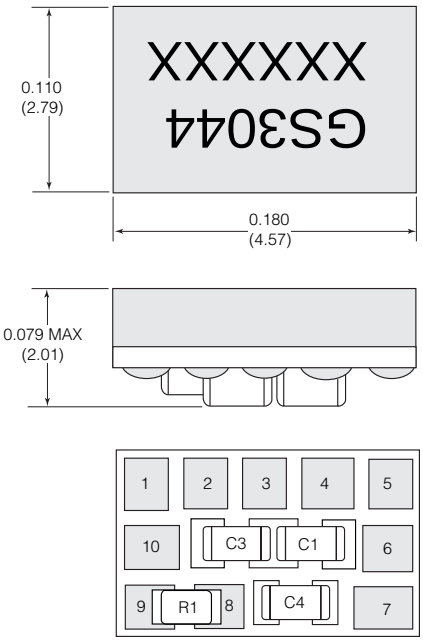


Fig. 12 Intermodulation Distortion vs Frequency

PACKAGE DIMENSIONS



Dimensions are in inches.
Dimensions shown in parenthesis are in millimeters, converted from inches and include minor rounding errors.
1.0000 inches = 25.400mm.
Dimension tolerances ±0.003 (+0.08) unless otherwise stated.
Minimum Pad size: 0.027 x 0.026in (0.68 x 0.71mm)
XXXXXX - work order number.
This hybrid is designed for point-to-point manual soldering.

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DOCUMENT IDENTIFICATION:
DATA SHEET
The product is in production. Gennum reserves the right to make changes at any time to improve reliability, function or design, in order to provide the best product possible.

REVISION NOTES:
Updated to Data Sheet; Correction to Figure 7.