

FEATURES

- **small outline for CIC applications**
- **designed to drive class D integrated receivers**
- **on chip voltage regulator for stable operation through to end of battery life**
- **adjustable symmetrical peak clipper for MPO control**
- **low current drain (150 μ A typical)**

STANDARD PACKAGING

- Hybrid Typical Dimensions

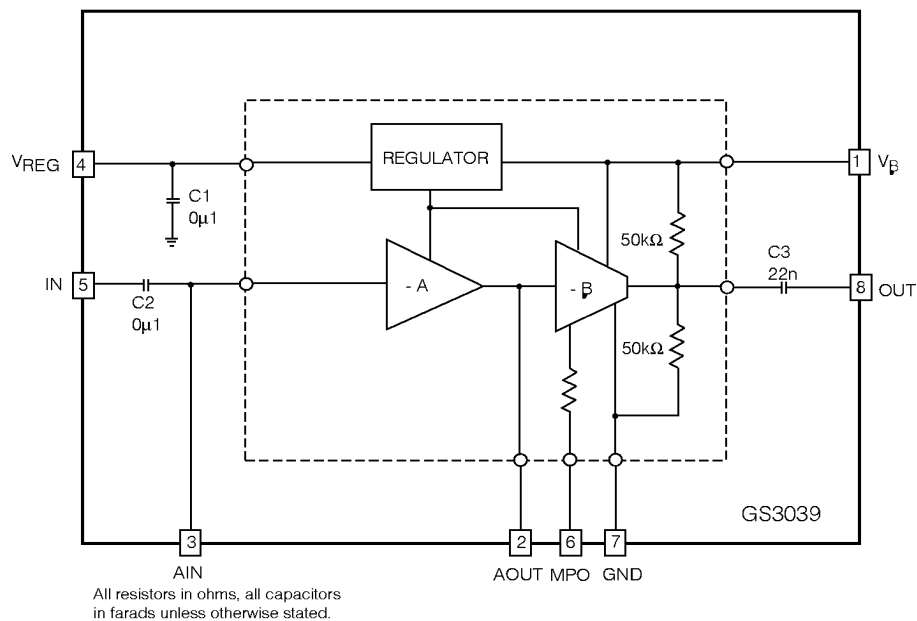
0.145 in x 0.085 in x 0.060 in
(3.68 mm x 2.16 mm x 1.52 mm)

DESCRIPTION

The GS3039 is a Gennum proprietary hybrid for CIC applications. It incorporates a newly designed integrated circuit which offers optimum performance in class D receiver applications.

The system consists of a voltage regulator, a single low noise inverting preamplifier and a mid supply referenced output stage. The voltage regulator provides a clean DC voltage for the microphone and preamplifier, so that at end of battery life conditions when the output impedance of the battery is high, the system maintains stable operation. The preamplifier and output stage have been optimally compensated to minimize aliasing effects normally associated with class D operation. The two stages have been DC coupled to reduce the external components required, thereby minimizing the hybrid footprint.

The hybrid incorporates a decoupling capacitor for the regulator as well as input and output coupling capacitors for the microphone and receiver. In a minimum parts configuration, a microphone, receiver and gain set resistor, need to be added to the hybrid for a fully functional hearing instrument. Should the application require the Maximum Power Output (MPO) to be adjusted, a potentiometer can be added from pad 6 of the hybrid to ground.

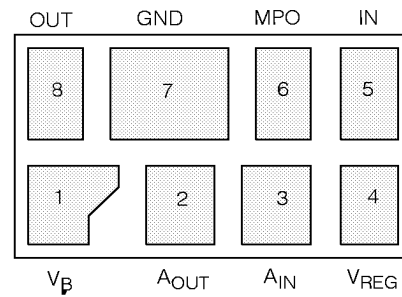


BLOCK DIAGRAM

ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE & UNITS
Supply Voltage	3 V DC
Power Dissipation	25 mW
Operating Temperature	-10 to + 40 °C
Storage Temperature	-20 to +70 °C
CAUTION CLASS 1 ESD SENSIVITY 	

PIN CONNECTION



ELECTRICAL CHARACTERISTICS

Conditions: Supply Voltage $V_B = 1.3\text{VDC}$, Temperature 25 °C, Frequency = 1 kHz.

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNITS
Amplifier Current	I_{AMP}		80	150	220	μA
Regulator Voltage	V_{REG}		0.87	0.92	0.97	V
Regulator Power Supply Rejection	P_{SRR}		-	63	-	dB
Input Referred Noise	IRN	NFB at 200 Hz to 10 kHz	-	2	-	μVRMS
STAGE A						
Input Bias Voltage	V_{BIAS}		500	570	630	mV
Input Bias Current	I_{BIAS}		-25	0	25	nA
Output Voltage Swing Low	V_{OL}		200	250	-	mV
Open Loop Voltage Gain	A_{OL}	At DC	46	53	-	dB
STAGE B						
Maximum Output Level	MPO	$V_{IN} = -50 \text{ dBV}$	-14.5	-12.5	-10.5	dBV
MPO Range	ΔMPO	$V_{IN} = -50 \text{ dBV}$, $R_{MPO} = 50 \text{ k}\Omega$	14	16	18	dB
Output Impedance	R_{OUT}		20	25	30	$\text{k}\Omega$
SYSTEM						
AC Voltage Gain	GAIN	$V_{IN} = -66 \text{ dBV}$	40	42	44	dB
Change in Gain	ΔGAIN	$R_{MPO} = 100 \text{ k}\Omega$, $V_{IN} = -78 \text{ dBV}$	-	0	2.5	dB

All conditions and parameters remain as shown in test circuit unless stated in "conditions " column.

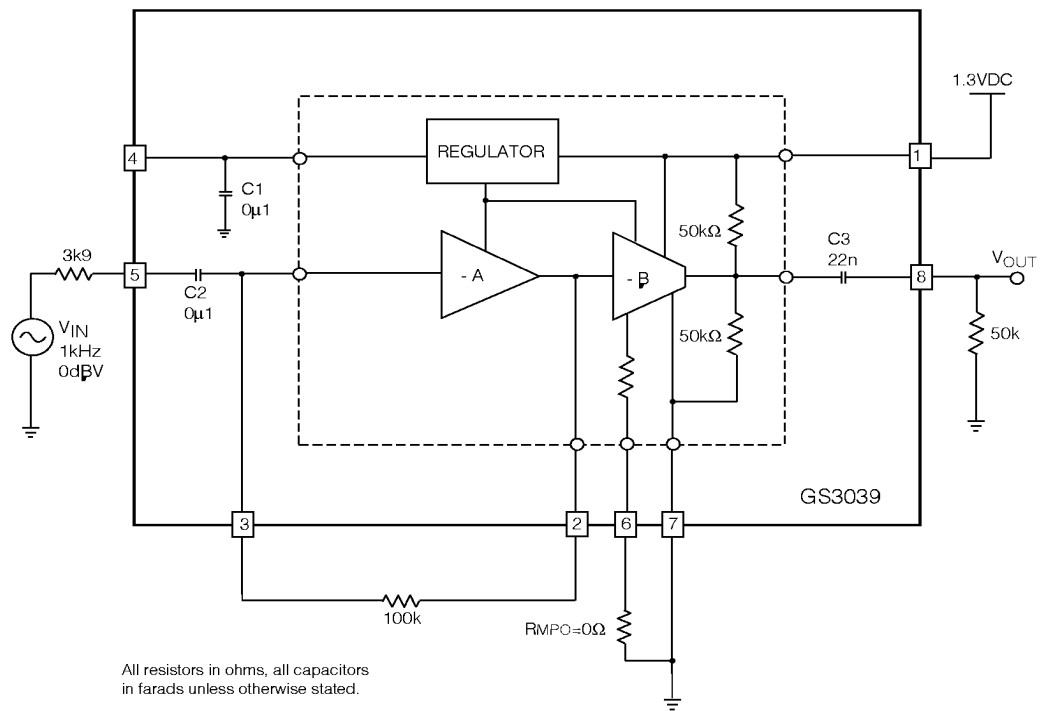


Fig. 1 Production Test Circuit

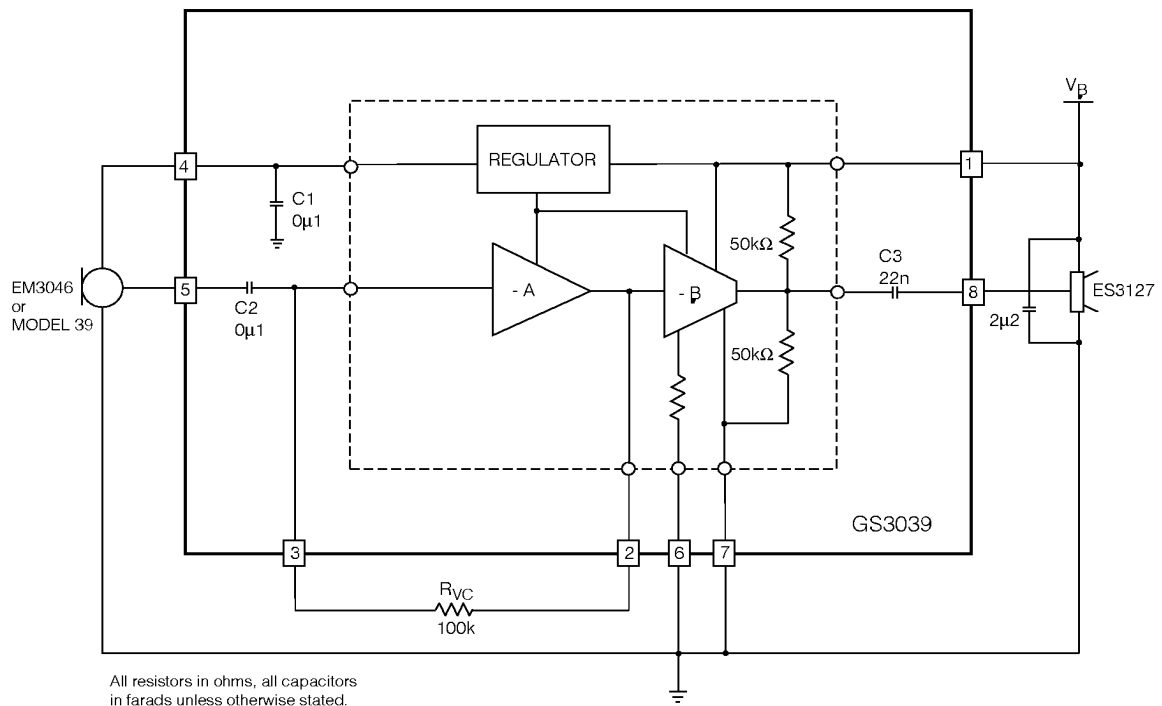


Fig. 2 Typical Hearing Instrument Application
(Minimum Parts Configuration)

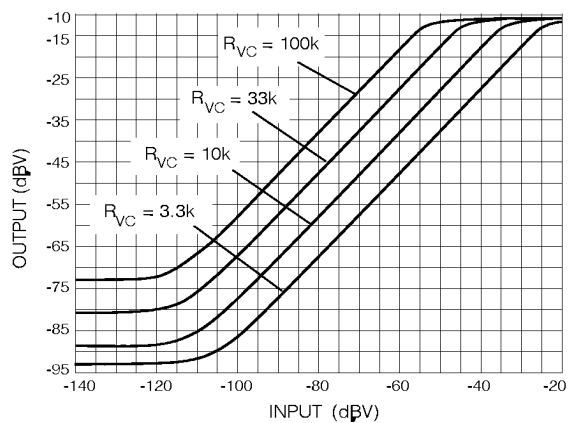


Fig. 5 I/O for Various R_{VC} Settings

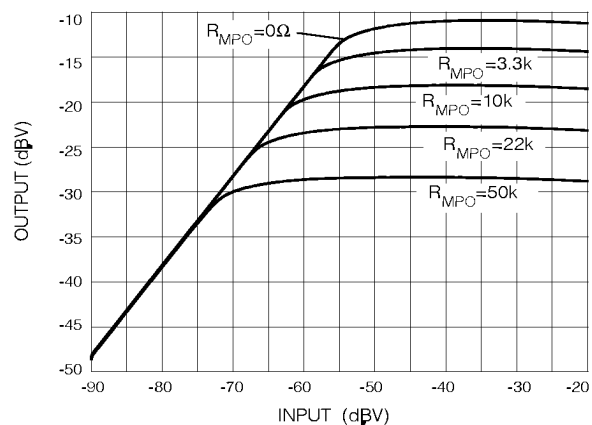


Fig. 6 I/O for Various R_{MPO} Settings

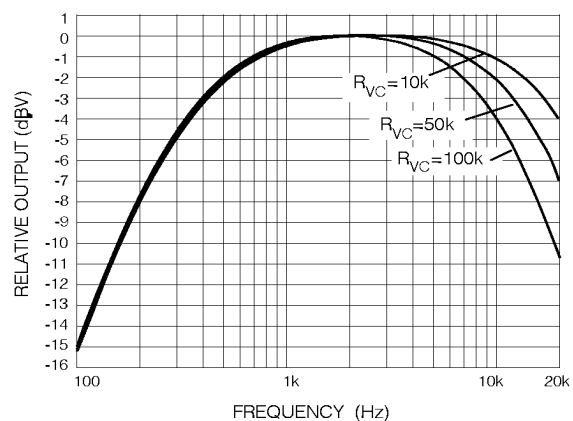


Fig. 7 Frequency Response for Various R_{VC} Values

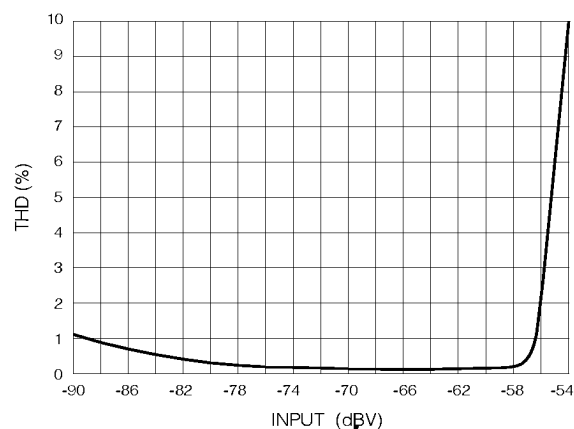


Fig. 8 Distortion vs Input Level ($R_{VC} = 100k\Omega$)

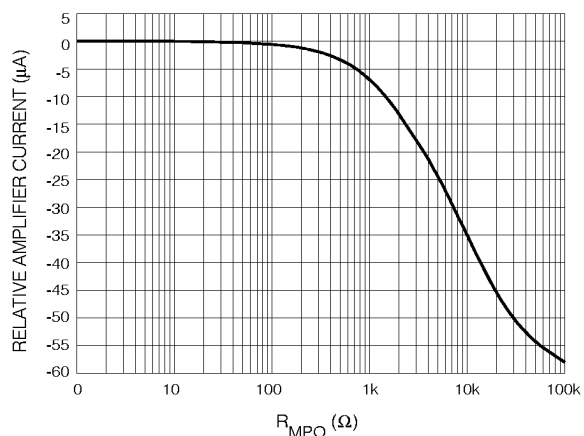


Fig. 9 Quiescent Current vs MPO Resistance

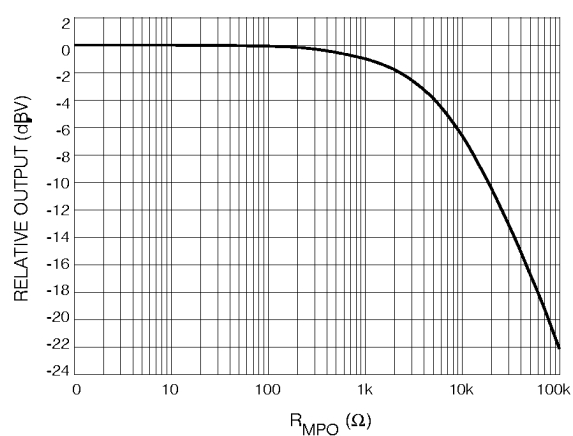


Fig. 10 Output vs MPO Resistance

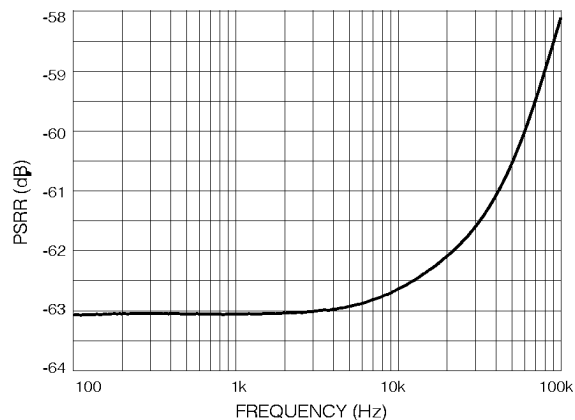


Fig. 11 Regulator Power Supply Rejection Ratio

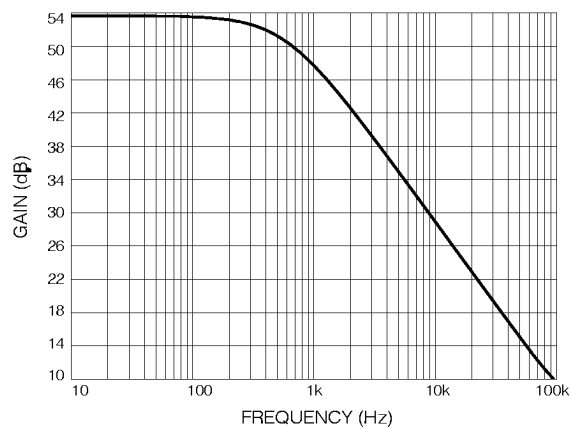
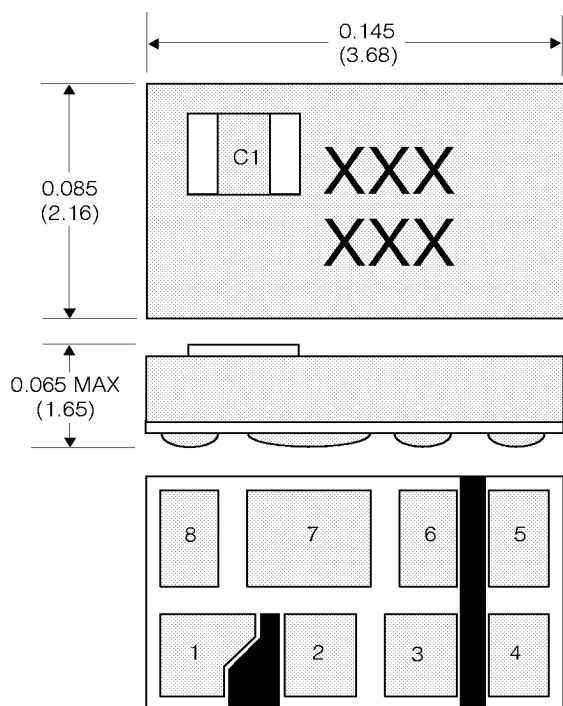


Fig. 12 Preamplifier A Open Loop Frequency Response



The GS3039 is a partially-flooded version of the GS3024A hybrid. Caution has to be exercised during assembly since there are exposed contacts of the C1 capacitor on the top side of the hybrid.

Dimensioning units are inches.
Dimensions shown in parenthesis are in millimetres, converted from inches and include minor round off errors.
1.0000 inches = 25.400mm
Minimum Pad size 0.021 x 0.030 (0.53 x 0.76)
Dimension tolerances ± 0.003 (± 0.08) unless otherwise stated.
Pad numbers and capacitor numbers for illustration only.
This hybrid is designed for point to point manual soldering.

Fig. 13 Hybrid Layout and Dimensions

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

Gennum Corporation assumes no responsibility for the use of any circuits described herein and makes no representations that they are free from patent infringement.

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Printed in Canada.