
**FEATURES**

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

**STANDARD PACKAGING**

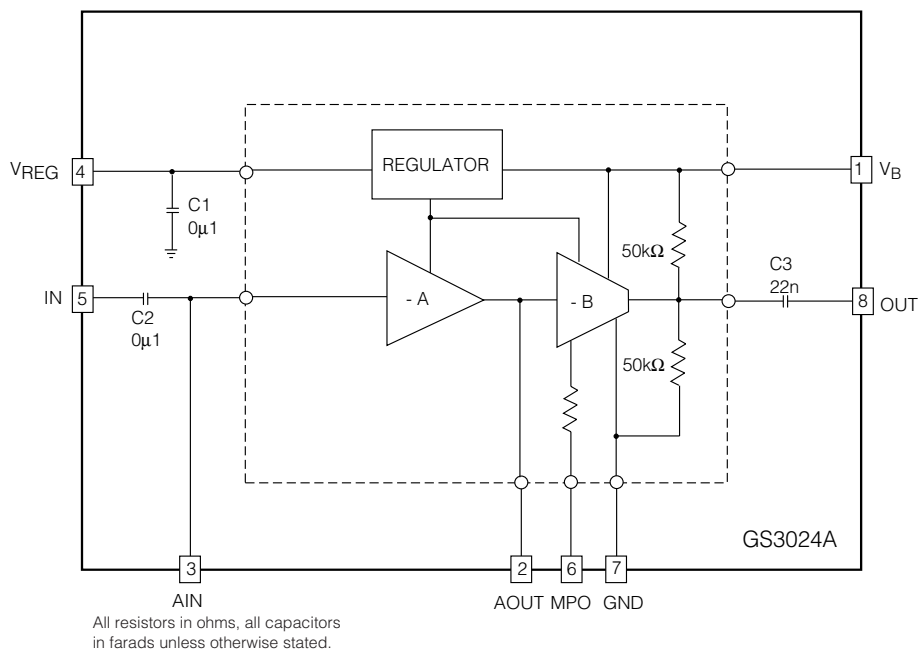
- Hybrid Typical Dimensions  
0.145 in. x 0.085 in. x 0.065 in.  
(3.68 mm x 2.16 mm x 1.65 mm)

**DESCRIPTION**

The GS3024A is a Genum 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.

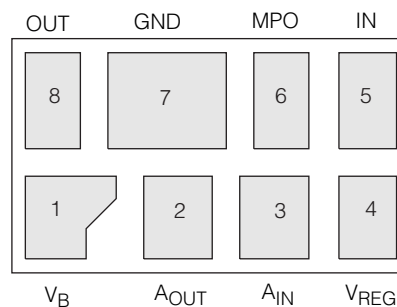
The hybrid incorporates a decoupling capacitor for the regulator as well as input and output coupling capacitors for the microphone and receiver. In a minimum parts configuration, a microphone, receiver and gain set resistor, need to be added to the hybrid for a fully functional hearing instrument. Should 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 SENSITIVITY

**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	$\mu\text{A}$
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	-	$\mu\text{VRMS}$
<b>STAGE A</b>						
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
<b>STAGE B</b>						
Maximum Output Level	MPO	$V_{IN} = -50\text{ dBV}$	-14.5	-12.5	-10.5	dBV
MPO Range	$\Delta\text{MPO}$	$V_{IN} = -50\text{ dBV}$ , $R_{MPO} = 50\text{ k}\Omega$	14	16	18	dB
Output Impedance	$R_{OUT}$		20	25	30	$\text{k}\Omega$
<b>SYSTEM</b>						
AC Voltage Gain	GAIN	$V_{IN} = -66\text{ dBV}$	40	42	44	dB
Change in Gain	$\Delta\text{GAIN}$	$R_{MPO} = 100\text{ k}\Omega$ , $V_{IN} = -78\text{ dBV}$	-	0	2.5	dB

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

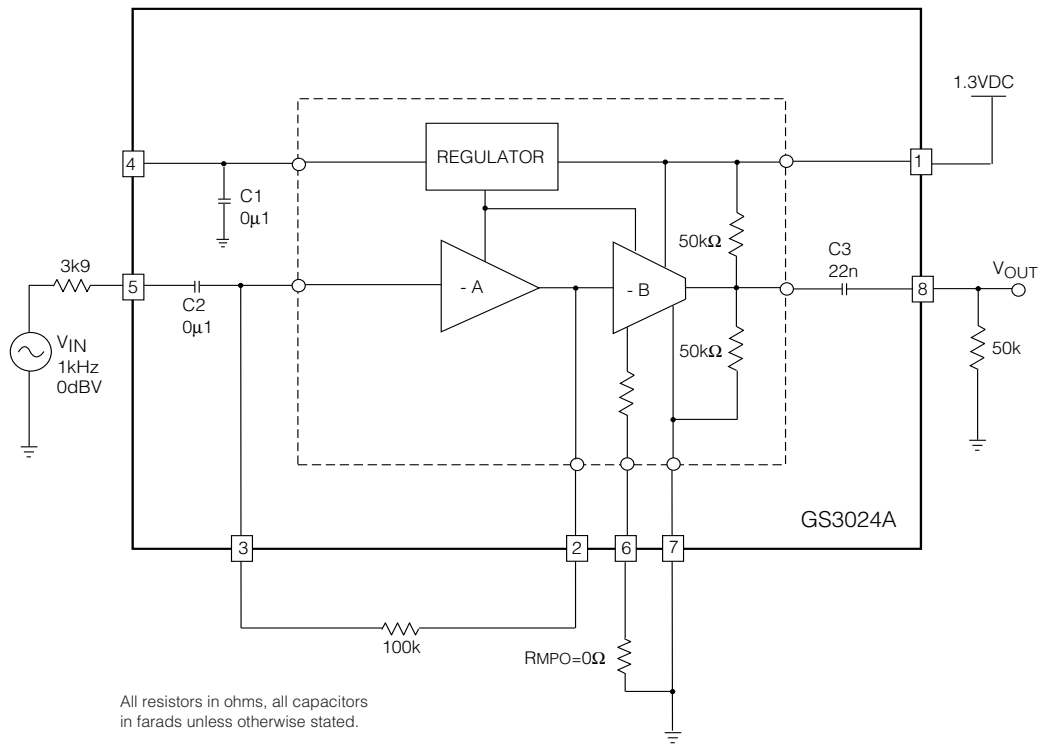


Fig. 1 Production Test Circuit

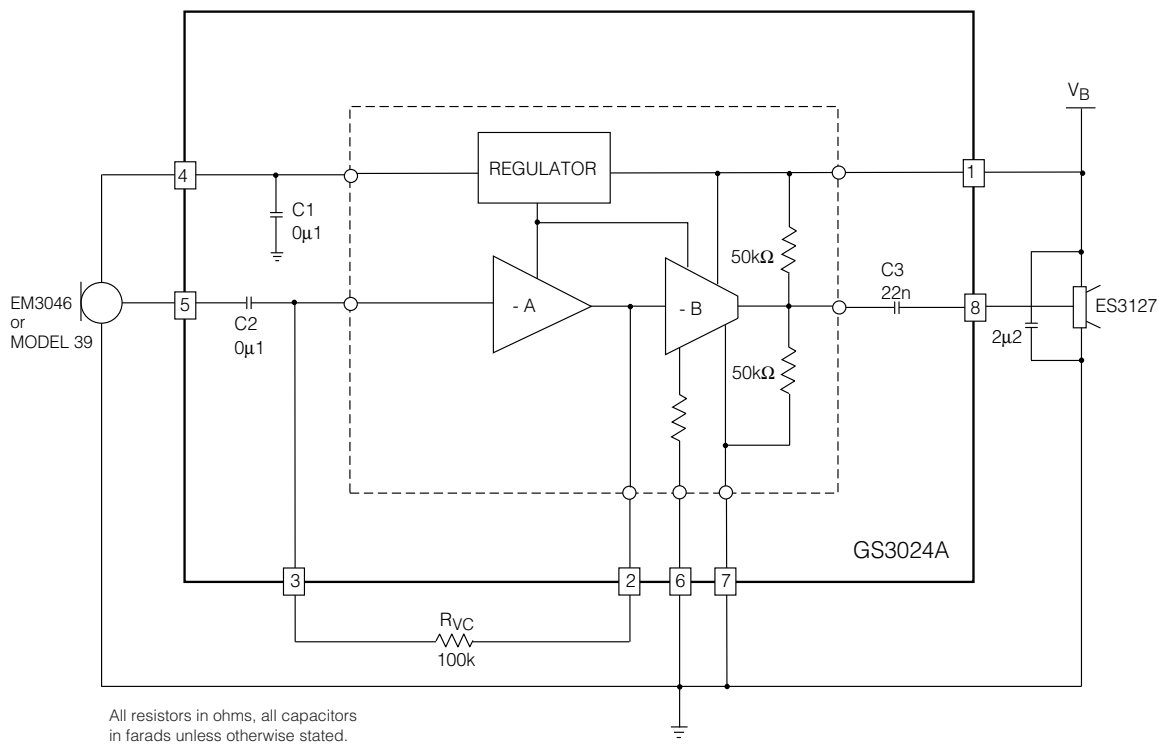


Fig. 2 Typical Hearing Instrument Application  
(Minimum Parts Configuration)

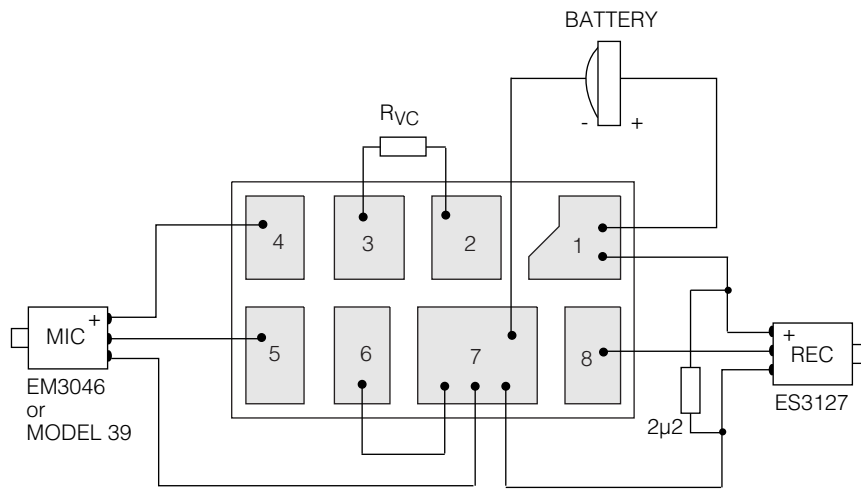


Fig. 3 Typical Instrument Assembly Diagram  
(Minimum Parts Configuration)

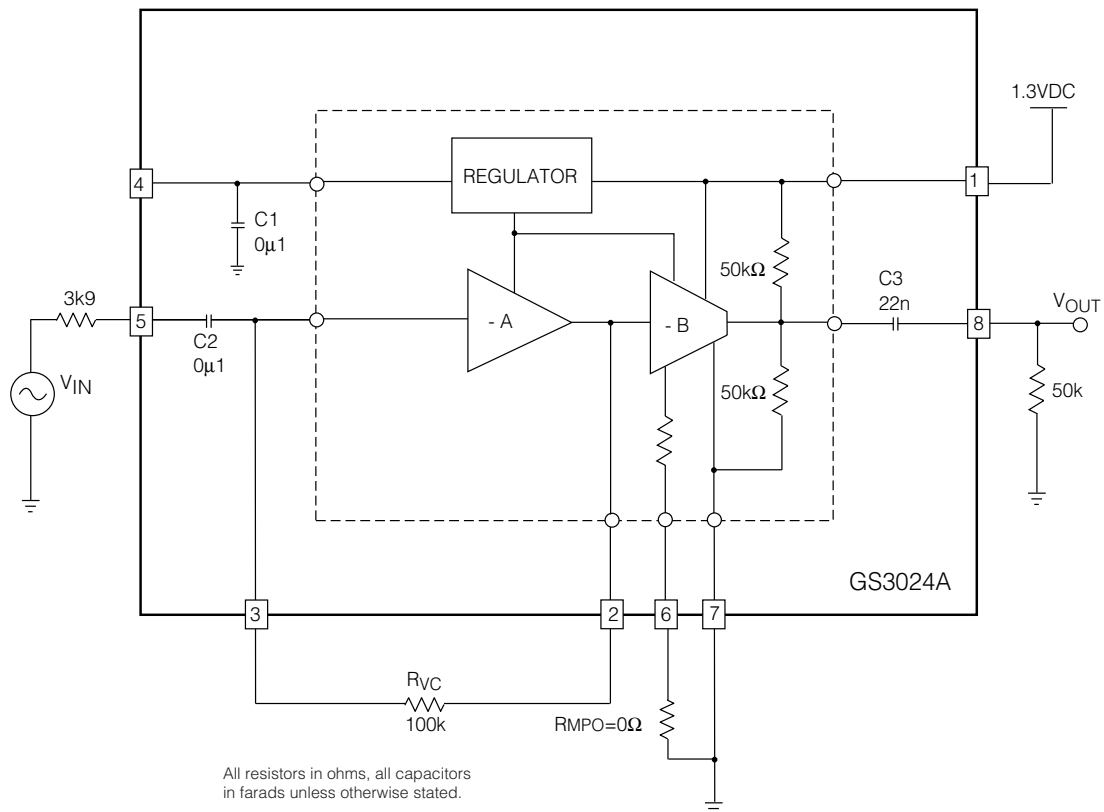


Fig. 4 Characterization Circuit  
(Used to generate typical curves)

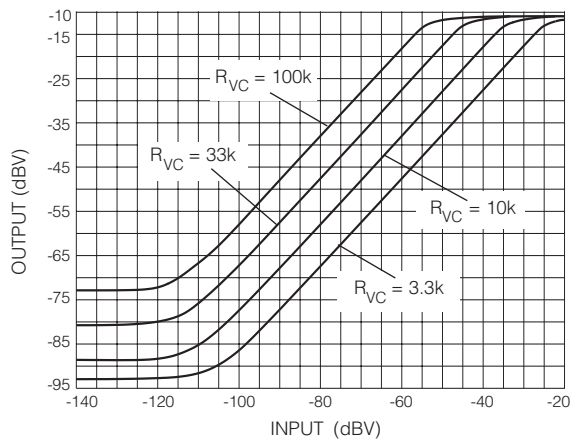


Fig. 5 I/O for Various  $R_{VC}$  Settings

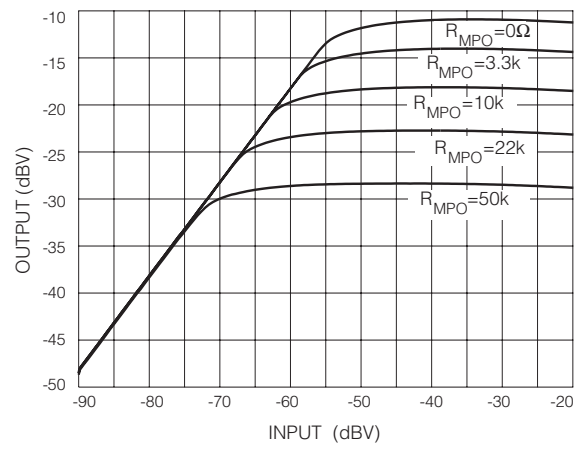


Fig. 6 I/O for Various  $R_{MPO}$  Settings

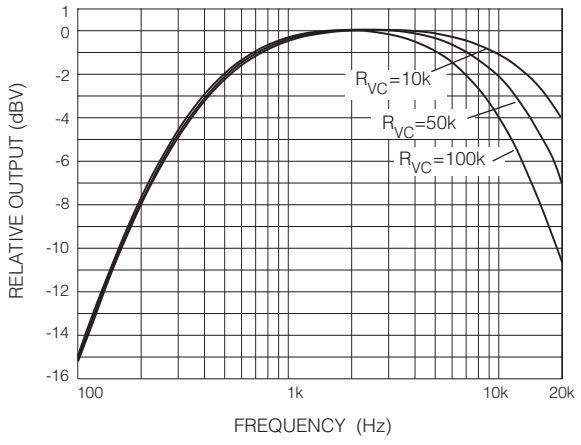


Fig. 7 Frequency Response for Various  $R_{VC}$  Values

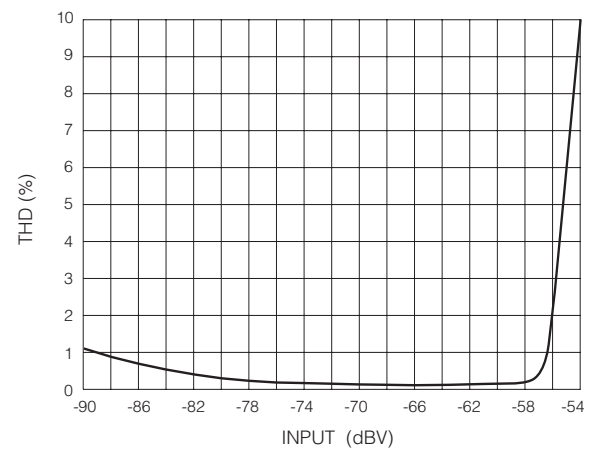


Fig. 8 Distortion vs Input Level ( $R_{VC} = 100k\Omega$ )

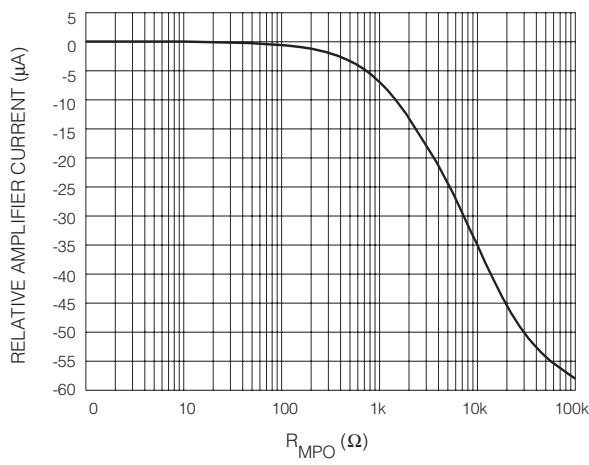


Fig. 9 Quiescent Current vs MPO Resistance

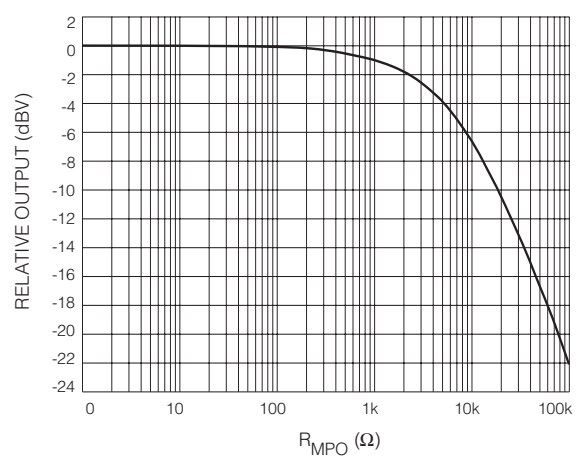


Fig. 10 Output vs MPO Resistance

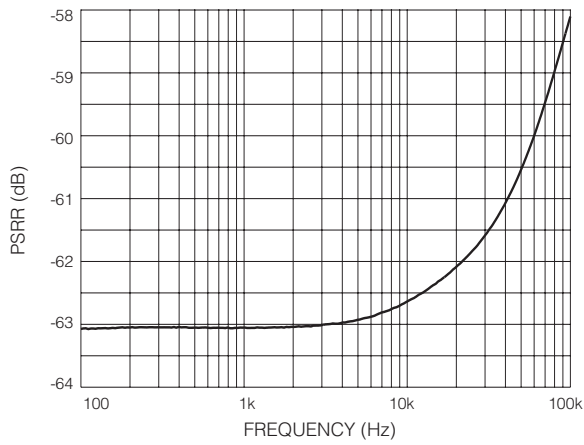


Fig. 11 Regulator Power Supply Rejection Ratio

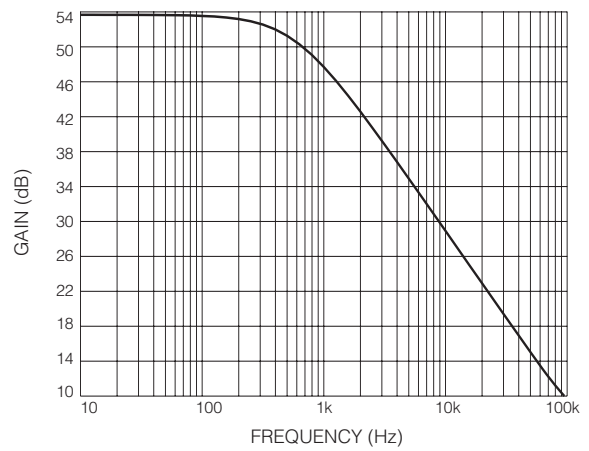
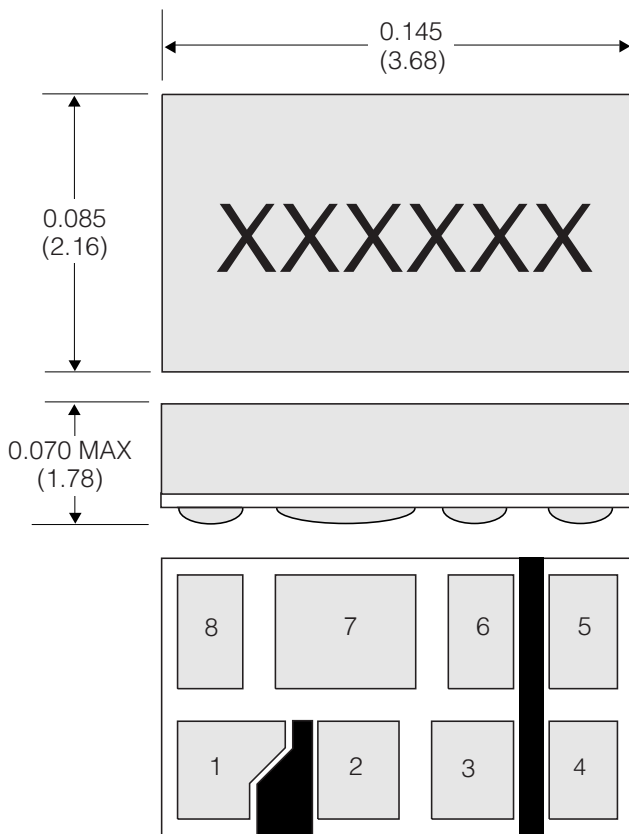


Fig. 12 Preamplifier A Open Loop Frequency Response



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  $\pm 0.003$  ( $\pm 0.08$ ) 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