

## FEATURES

- handles high input levels (up to 100 mVRMS) cleanly
- low THD and IMD distortion
- unique twin average detectors
- dual channel signal processing
- adjustable AGC threshold levels
- highpass filter with adjustable corner frequency
- 2:1 compression of high frequencies
- no external capacitors or resistors required
- 30% smaller by volume than DynamEQ® I GS3011

## STANDARD PACKAGING

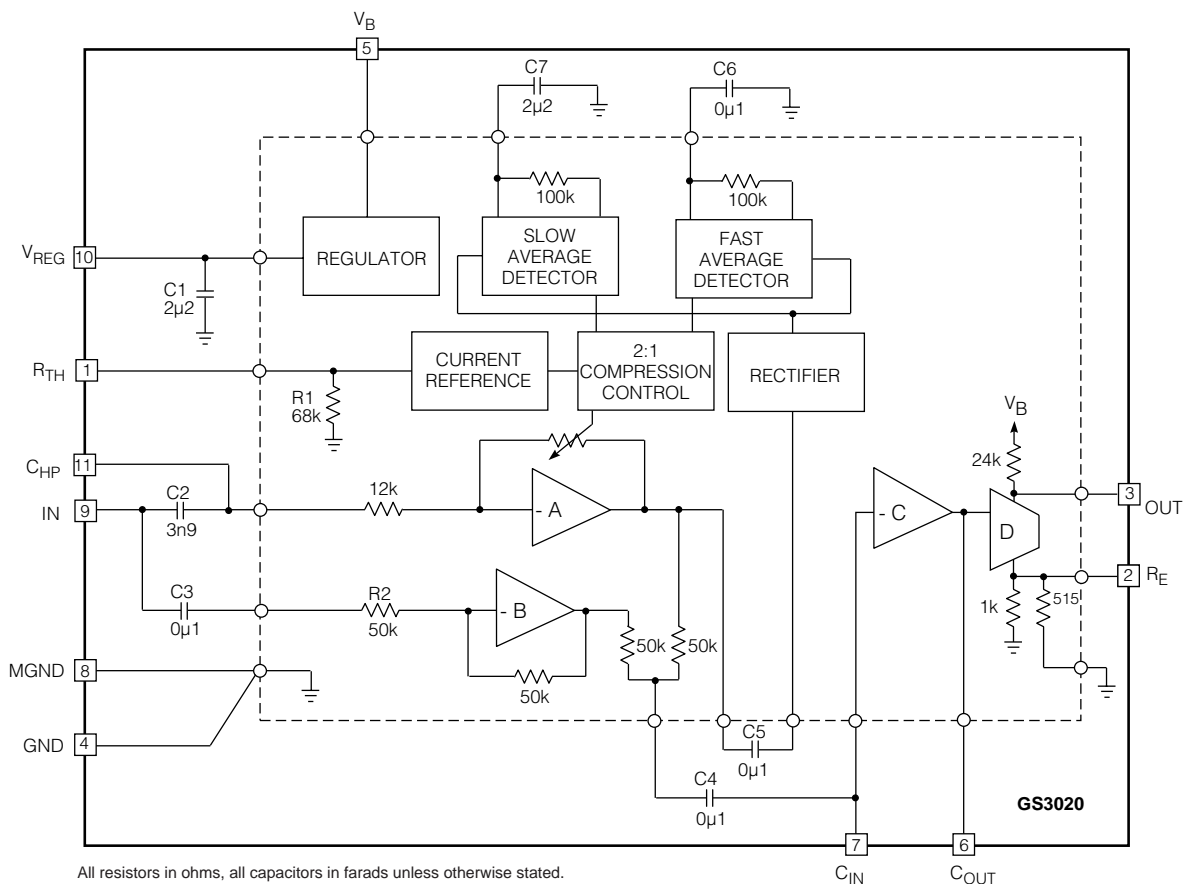
- Hybrid Typical Dimensions  
0.250 in x 0.115 in x 0.115 in  
(6.35 mm x 2.92 mm x 2.92 mm)

## DESCRIPTION

The DynamEQ® I hybrid is a dynamically adaptive loudness growth equalizer. Its gain and frequency response is dependent on the user's environment, and is designed for level dependant frequency response providing treble increase at low levels (TILL). The unique twin averaging detector circuit dramatically reduces pumping effects and is optimized for mild to moderate hearing loss.

DynamEQ® I has two signal paths for dual channel processing incorporating 4 amplifying stages (A, B, C, D) and the AGC processing circuit.

Stage A is a highpass channel with 2:1 compression, Stage B is a wideband unity gain buffer. The sum of the two paths gives a high frequency boost to low level signals, which gradually compresses to a flat response at high input levels. Stage C is used for volume control adjustment, while stage D is a class A power amplifier with receiver bias current adjustment.

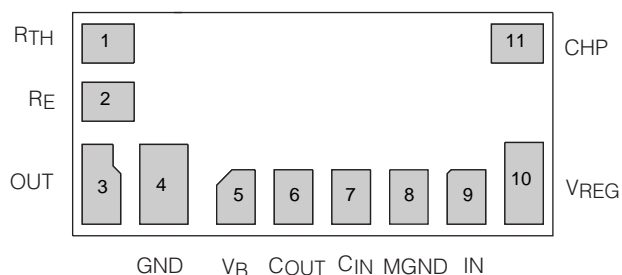


## FUNCTIONAL BLOCK DIAGRAM

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	VALUE / UNITS
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**  
CLASS 1 ESD SENSITIVITY

**PAD CONNECTION****ELECTRICAL CHARACTERISTICS**

Conditions: Input Level  $V_{IN} = -97$  dBV, Frequency = 5 kHz, Temperature = 25°C, Supply Voltage  $V_B = 1.3$  V

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Hybrid Current	$I_{AMP}$	$V_{IN} = 0V_{RMS}$	90	190	300	$\mu A$
Minimum Voltage	$V_B$		1.1	-	-	V
Total Harmonic Distortion	THD	$R_{VC} = 15k\Omega$ ; $V_{IN} = -40dBV$ at 1kHz	-	0.1	1	%
Input Referred Noise	IRN	NFB 0.2 to 10kHz at 12dB/oct	-	2.5	-	$\mu VRMS$
Total System Gain	$A_V$		52.5	55.5	58.5	dB
<b>AGC</b>						
Compression Ratio	COMP	$V_{IN} = -60dBV$ & $-80dBV$ , $R_{VC} = 15k$	1.74:1	1.95:1	2.11:1	Ratio
Threshold			-	-94	-	dBV
Compression Gain Range	$A_{RANGE}$	$R_{VC} = 15k\Omega$ ; Note 1	26	28	-	dB
High Pass Corner Frequency	$f_{HPC}$	$C_{HP}$ - Not Connected	-	3.4	-	kHz
System Gain in Compression	$A_{80}$	$V_{IN} = -80dBV$	45	47	49	dB
<b>OUTPUT STAGE</b>						
Minimum Transducer Current	$I_{TR}$	$R_E$ - Not Connected	130	160	190	$\mu A$
Maximum Current Sink	$I_{SINK}$		3	6	-	mA
Output Impedance	$Z_{OUT}$		20	24	28	$k\Omega$
$R_E$ Voltage	$V_{RE}$		52	56	60	mV
<b>REGULATOR</b>						
Regulator Voltage	$V_{REG}$		0.89	0.95	0.99	V

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

$V_{PX}$  actual voltage measured on the pin at given condition (X is pin number)

**Notes:** 1.  $A_{RANGE} = V_{P3} [V_{IN} = -97dBV] - V_{P3} [V_{IN} = -20 dBV] + 77dBV$

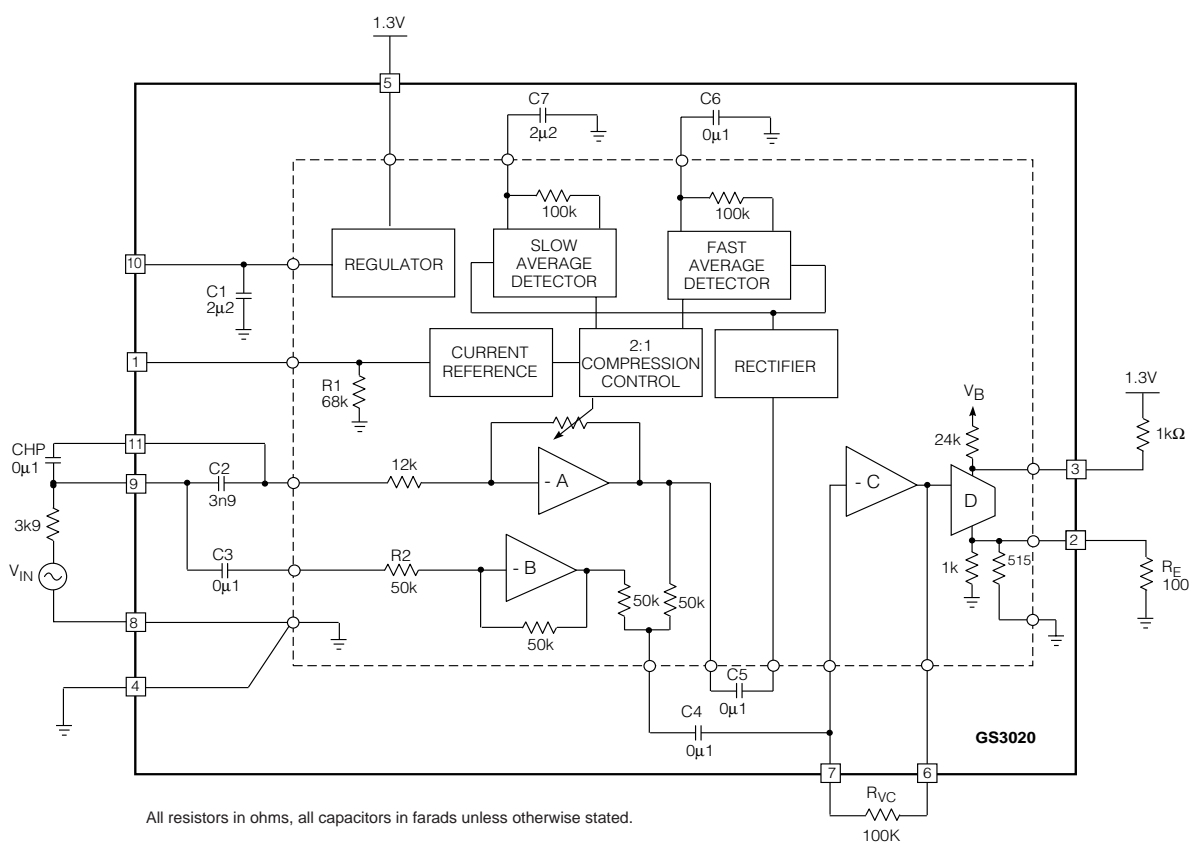


Fig.1 Production Test Circuit

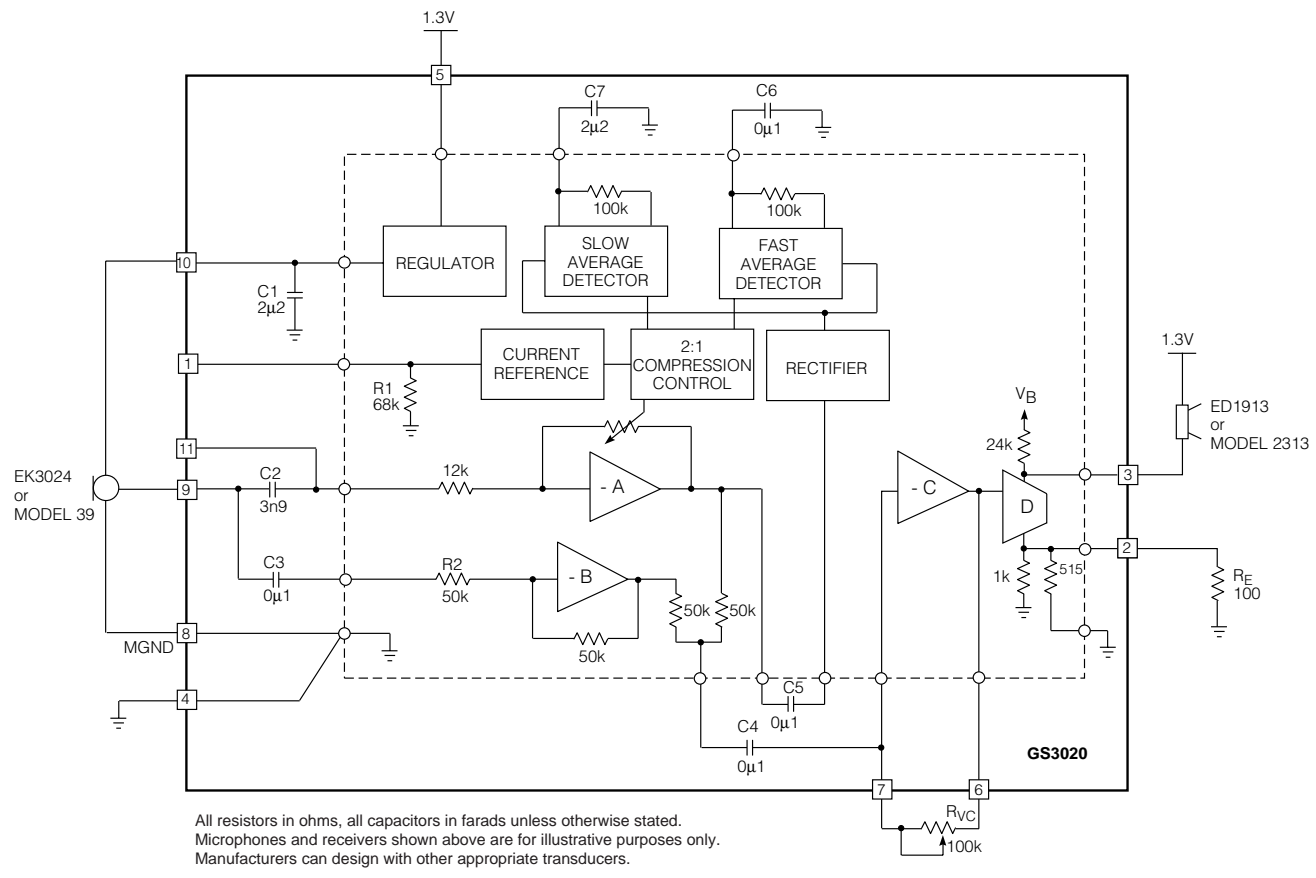


Fig. 2 Example of Hearing Instrument Application

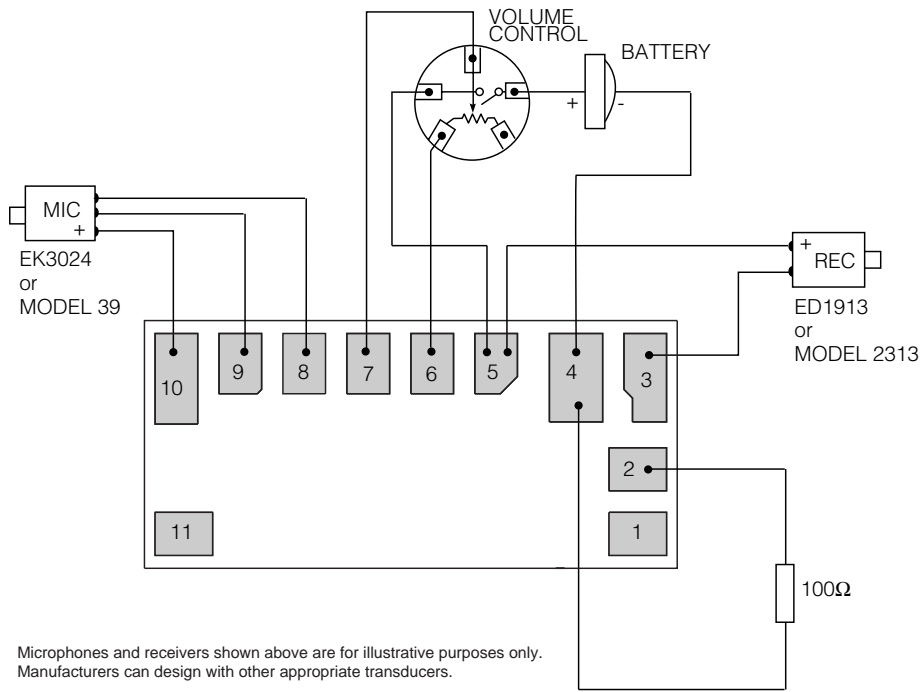


Fig. 3 Example of Assembly Diagram

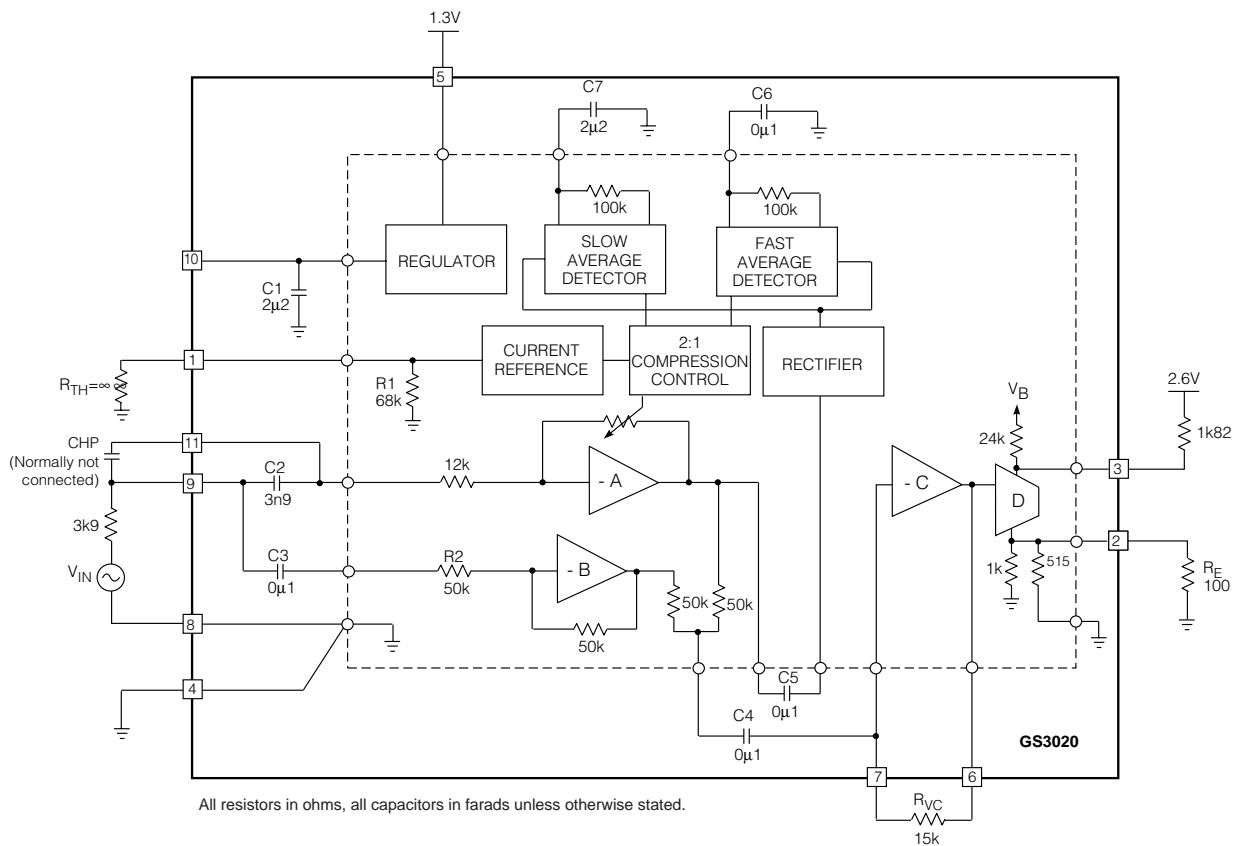


Fig. 4 Characterization Circuit (used to generate typical curves)

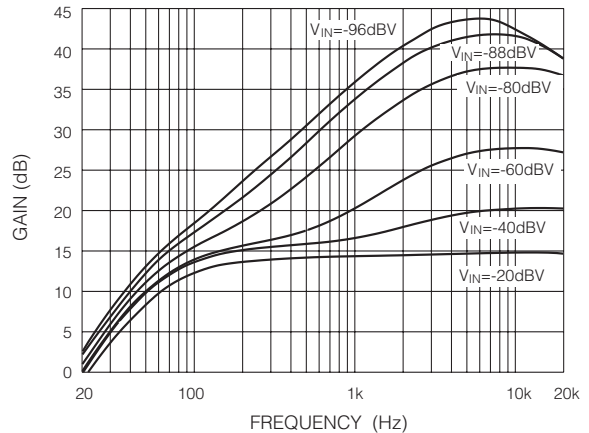


Fig. 5 Frequency Response for Different Input Levels

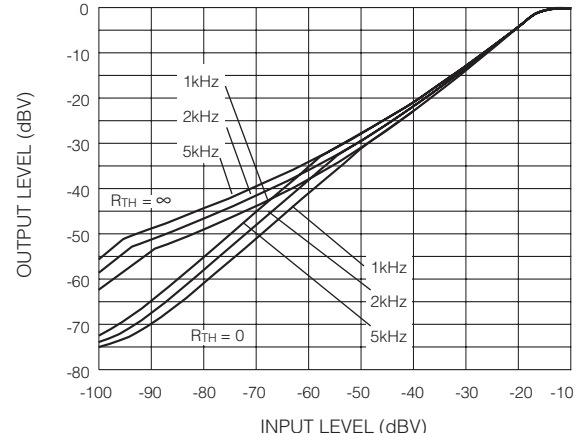


Fig. 6 I/O Transfer Function for Different Test Frequencies. Shown for Min/Max  $R_{TH}$  Resistors Values

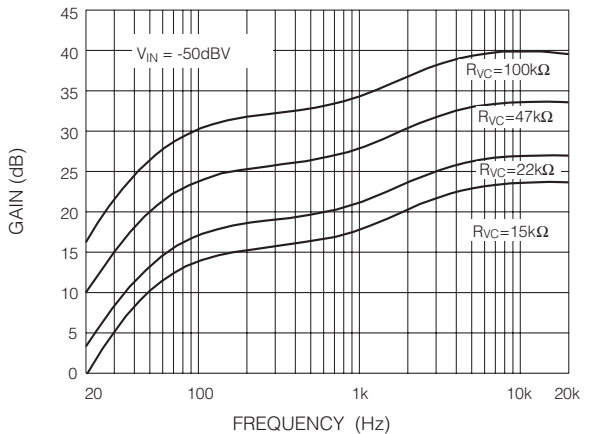


Fig. 7 Frequency Response for Different  $R_{VC}$  Values

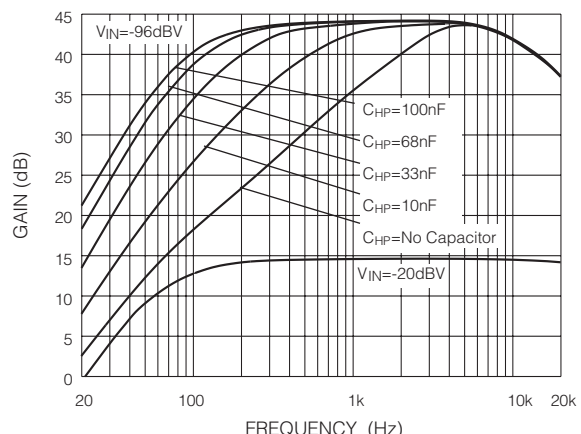


Fig. 8 Corner Frequency vs  $C_{HP}$  Capacitor Value

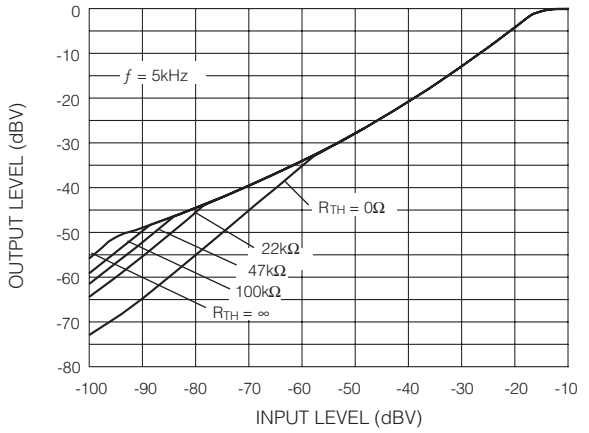


Fig. 9 I/O Transfer Function for Different  $R_{TH}$  Resistors

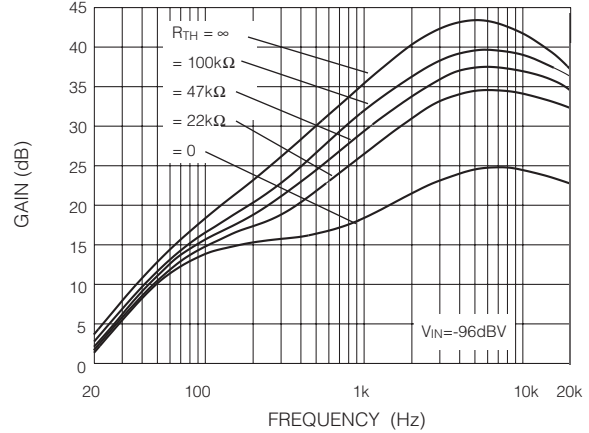


Fig. 10 Frequency Characteristics for Different  $R_{TH}$  Values

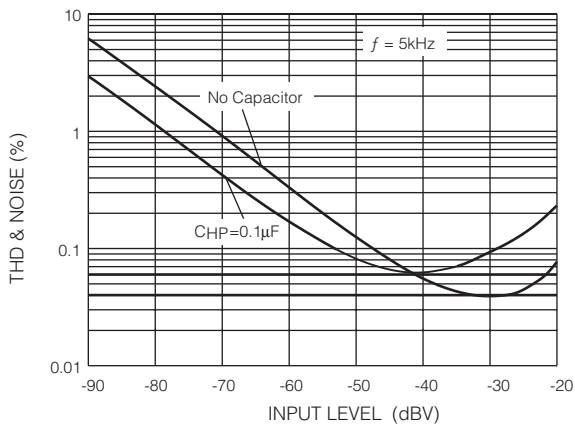


Fig. 11 THD & Noise vs Input Level

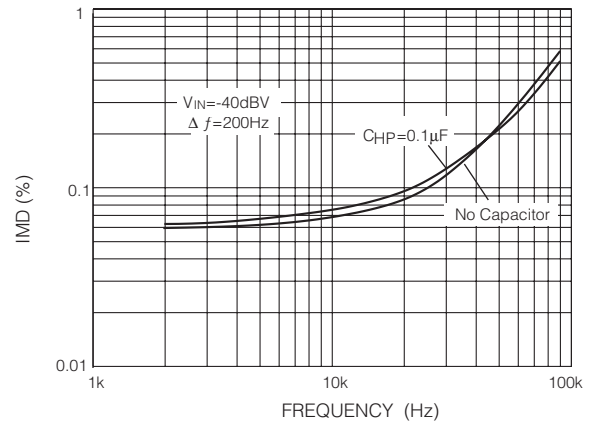
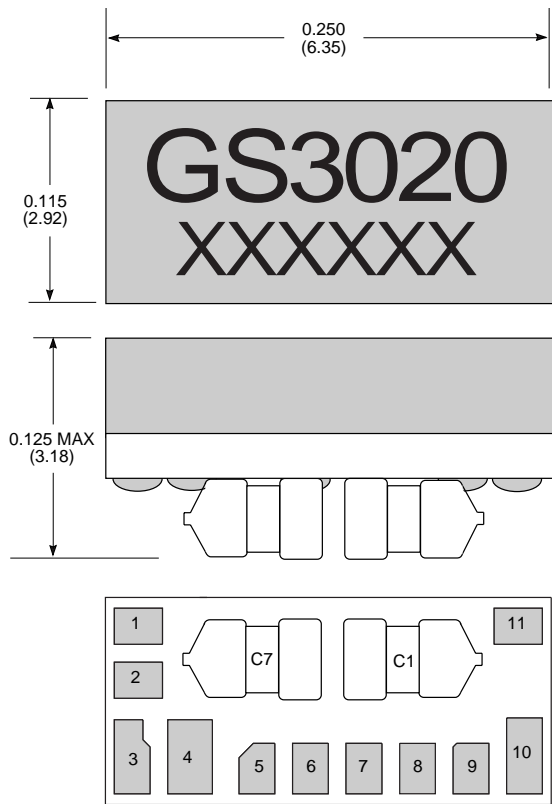


Fig. 12 Intermodulation Distortion (CCIF) vs Frequency



Dimension units are in inches.  
 Dimensions in parenthesis are in millimetres converted from inches and include minor rounding errors.  
 1.0000 inches = 25.400 mm.  
 Dimension  $\pm 0.005 (+0.13)$  unless otherwise stated.  
 Pad numbers for illustration purposes only.  
 Smallest pad 0.020 x 0.027 (0.51 x 0.69)  
 Largest pad 0.025 x 0.041 (0.64 x 1.04)  
 XXXXXX - work order number.  
 This hybrid is designed for point to point manual soldering.

Fig. 13 Hybrid Layout & 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